Treatability Study Draft Final Report
Hempstead Intersection Street Former MGP Site

Prepared by Remedius, LLC for URS Corporation

This report describes the findings of a treatability study. The study's purpose was to develop a treatment regimen for solidifying soil contaminated with manufactured gas plant (MGP) residuals at the Hempstead Intersection Street Former MGP Site in Hempstead, New York.

Introduction

Site Description

Site Name and Location

The Hempstead Intersection Street former Manufactured Gas Plant (MGP) Site is located in the Villages of Hempstead and Garden City, New York. The site property is presently owned by National Grid, and the only operations at the site are conducted by National Grid for its gas operations (gas regulator station).

History of Operations

A manufactured gas plant began operation at the Hempstead - Intersection Street site in the early 1900s under the ownership of the Nassau and Suffolk Lighting Company. The plant was also owned and operated by the Hempstead Gas Light Company prior to merging with LILCO. LILCO operated the plant through the early-1950s. Following the arrival of interstate natural gas through pipelines in the northeast, the Hempstead plant served only as a peaking/emergency facility to ensure gas supplies and was subsequently shut down in the mid-1950s. The plant was demolished in the mid-1950s by LILCO. In 1998, KeySpan Corporation acquired most of the former plant property from its predecessor company, LILCO. KeySpan was acquired by National Grid in 2007. An adjoining 0.8-acre property to the south, which was a part of the former plant facility, was repurchased by National Grid in 2008. This 0.8 acre property was previously sold by LILCO (a National Grid predecessor company) in the early 1980's, and used for the storage of new cars.

Records indicate that the plant manufactured carbureted water gas for much of its operating life. Gas was produced at the Hempstead plant to supply areas of central Nassau County from Garden City to Freeport and East Rockaway. The plant operations began in the southern portion of the original plant property and expanded to the north as the demand for gas increased.

Waste Stream Description

Remedial Investigation (RI) Summary

While MGP operations ended at the site more than 40 years ago, the Hempstead site still bears the residues associated with such operations. The Remedial Investigation, conducted under the oversight of the New York State Department of Environmental Conservation, determined the presence of potentially hazardous materials on the site associated with former MGP operations; and some of these materials are found off site in a dissolved phase groundwater plume that moves in a south-southwesterly direction from the site. The chemicals include volatile aromatic hydrocarbons such as benzene, toluene, ethylbenzene and xylenes (BTEX) and polycyclic aromatic hydrocarbons (PAHs). Extensive testing performed to date does not show Site related impacts to drinking water supplies, or any site related indoor air concerns.

KeySpan began a Remedial Investigation of the Hempstead MGP site in 2000 under an Order on Consent with the New York State Department of Environmental Conservation (NYSDEC). Supplemental Remedial work was undertaken in 2003 and 2004 to further define the extent of contamination on the site, on adjacent properties and the off-site groundwater plume. The supplemental work included a private groundwater well survey distributed to over 400 property owners. Based upon subsequent discussion with the NYSDEC and NYSDOH, a groundwater Capture Zone Analysis (CZA) was also performed to verify that there were no anticipated effects from the Site on local water supply wells. This CZA was completed in the 2005-2006 time frame during which time there were also other NYSDEC/NYSDOH comment/review cycles conducted in order to complete the Remedial Investigation Report.

The Key Findings of the Final Remedial Investigation Report as summarized in the NYSDEC Fact Sheet announcing the acceptance of that Report, are:

- The investigation found the presence of materials typically associated with MGPs, including BTEX, PAH's, and total cyanide. These wastes were found in soil and groundwater. Most were found in shallow soils in the upper 8 feet of the site near where MGP operations were located, and/or in a zone approximately 24-34 feet below grade both on and off-site.
- There is a plume of groundwater containing BTEX and PAHs, flowing generally south from the site. It is about 600 feet wide and extends for about 3,800 feet. It is at a depth of between approximately 24 and 30 feet beneath the ground surface. The concentrations of BTEX and the PAHs diminish as the plume migrates away from the site, primarily because of natural attenuation. The investigation also found other local non-MGP, non-KeySpan related source contributors for BTEX and PAH's which are outside of KeySpan's control. The area of the groundwater plume is bounded approximately by Second Street to the North, Sealy and Terrace Avenue to the East, Hilton Avenue, Kensington Court and Cathedral Avenue to the West, and Front Street to the South.
- The Remedial Investigation determined that chemical constituents from the site have not adversely impacted the drinking water supply wells serving the communities, and are not expected to adversely affect those wells based on anticipated pumping rates.
- There are no current complete pathways through which people on or near the site are exposed to hazardous materials, but there are potential exposure pathways that will be mitigated as part of the Site remediation.

A Remedial Action Plan and Interim Remedial Measures approved for the site will eliminate potential pathways.

Remedial Technology Description

Interim Remedial Measures (IRM) and Remedial Action Plan (RAP)
Interim Remedial Measures (IRMs), which were approved by the NYSDEC in November 2007, have been completed at the site. The IRMs included installation of wells to recover liquid tars from the deep sub-surface (completed in early 2008), and IRM related excavations which removed approximately 4,000 cubic yards of coal tar-contaminated soil from several locations in the northern and eastern areas of the site where the tar has not penetrated to great depths. IRM work was completed in December 2008.

Remedial Action Plan (RAP)
The Remedial Action Plan (RAP) builds on the IRMs with additional source removal excavation and In Situ Solidification (ISS) of contaminated soils that are located deeper below the ground surface. The ISS process uses large augers to inject and mix cement-based materials into the soil to solidify and immobilize contaminants in place. The RAP also calls for enhanced bioremediation of the dissolved-phase groundwater plume that flows generally south from the site.

Conclusions

The study described in this report progressed through six phases (tiers). A total of 51 mixes were prepared and tested. For every one of these mixes, the primary stabilization reagents used to treat the soil was a 3-to-1 blend of ground granulated blast furnace slag (GGBFS) and Portland cement. This combination was used because its effectiveness for treating MGP contaminated soil has been well established.

As the study progressed, the results from one tier were used to refine the mixes for each subsequent tier. The first tier evaluated a broad range of doses for material from four areas at the site. The results from these mixes greatly exceeded the project's performance criteria, so the study's second tier focused on lesser doses. The third tier investigated the effect of admixtures: bentonite, organoclay, and plasticizer. The fourth tier evaluated the sensitivity of a mix design to varying water-to-reagent ratios. The fifth tier investigated mix designs that approximate the upper and lower limits of what a contractor might use for deep soil mixing and for jet grouting. And the sixth and final tier investigated low doses of reagents with the addition of bentonite.

Conclusions

The study's results can be summarized as follows:

- Tier I data show that a dose of 10% GGBFS-cement is more than sufficient to produce a treated material that complies with the project's performance criteria.

- Tier II data shows that mixes prepared using doses of GGBFS-cement less than 7.5% gain sufficient strength, but do not sufficiently reduce the soil's permeability. Mixes prepared using doses less than 7.5% were more permeable than the project's criterion of 1 x 10^{-6} cm/sec. The Tier II results demonstrated that the addition of bentonite or organoclay to mixes prepared using a 10% dose of GGBFS-cement decreased permeability. The improvement was more significant using bentonite compared to organoclay.
- Tier III mixes all used a baseline GGBFS-cement dose of 9% with and without admixtures. All of the mixes, with the exception of the mix created using a plasticizer, complied with the project's strength and permeability criteria. These mixes, with the exception of the mix created using a plasticizer, were submitted to Vanderbilt University for leachability testing.
- Tier IV mixes were prepared using a baseline GGBFS-cement dose of 9%. The data shows the sensitivity of mixes to grouts created using water-to-reagents ratios varying in 0.5 increments from 0.5 to 2.0. Only the mixes created using grout with a water-to-reagents ratio of 0.5 complied with both strength and permeability criteria. None of these mixes, however utilized bentonite.
- Tier V data shows that a 6% dose of GGBFS-cement, with and without bentonite, does produce a treated material that complies with the project's performance criteria. However, the mix created without bentonite only marginally exceeded the project's permeability criterion, whereas, the mix created using bentonite safely exceeded the criterion.
- Tier VI data shows that a GGBFS-cement dose as low as 4.5% does produce a treated soil that complies with the project's performance criteria, provided that the mix includes bentonite.

Treatability Study Approach

This study investigates the effectiveness of stabilization/solidification for immobilizing the hazardous constituents found in impacted soil at the Hempstead Intersection Street former MGP Site. Since 1992, cement-based solidification of former MGP sites has been successfully implemented at numerous sites.

Test Objectives and Rationale

The primary objectives of the treatment process are to:

- Create a solidified material with sufficient strength to accommodate future site uses; and
- Reduce the rate at which water flows through the solidified material.

Secondary objectives of the treatability study are to:

- Evaluate the buffer capacity of the aquifer to mitigate the effect from the addition of alkaline reagents on bioremediation of the downgradient plume;
- Evaluate the relative shear strength of potential mix designs and additives which will aid with the selection of solidification equipment and equipment operating conditions; and
- Develop quality control parameters that can be used during full-scale operations.

This study's specific performance criteria are:

TABLE 1. Project Performance Criteria

Parameter	Methodology	Criterion
Unconfined Compressive Strength	ASTM D2166	$\geq$ 50 psi
Hydraulic Conductivity	ASTM D5084	$\leq 1 \times 10^{-6}$ cm/sec

Experimental Design and Procedures

A treatability study is an iterative process whereby small samples of contaminated material are treated by mixing the material with different combinations and quantities of reagents. Treated specimens are cured for the time necessary for reactions to occur. Most chemical reactions occur fairly rapidly (i.e., within 24 to 72 hours), whereas physical changes such as strength and impermeability develop more slowly, often taking 28 days or more to fully develop. After curing, pertinent characteristics of treated specimens are determined. Post treatment parameters are compared to the corresponding pre treatment parameters and to the project's performance criteria. Combinations of reagents and dosages that produce desirable changes to the contaminated material are refined and retested. This process continues until an optimal treatment regimen is developed.

Equipment and Materials

Portland cement

Portland cement is the most common type of cement in general use around the world. It is a fine powder produced by grinding Portland cement clinker, a limited amount of calcium sulfate which controls the set time, and other minor constituents (as allowed by various standards).

Type I Portland cement is known as common or general purpose cement. It is commonly used for general construction especially when making precast and precast-prestressed concrete that is not to be in contact with soils or ground water.

Type II Portland cement is intended to have moderate sulfate resistance with or without moderate heat of hydration. This type of cement costs about the same as Type I. Because of similar price to that of Type I, Type II is often used

as a general purpose cement, and the majority of Portland cement sold in North America meets this specification. Portland cement meeting both Type I and Type II specifications (i.e., Type I/II) is in common use.

Type I/II Portland cement provided by LaFarge North America was used for this study. Portland cement is often a primary ingredient in solidification/stabilization mix designs to initiate cementitious hydration reactions.

Ground Granulated Blast Furnace Slag

Ground granulated blast furnace slag (GGBFS) is obtained by quenching molten iron slag (a by-product of iron and steel making) from a blast furnace in water or steam, to produce a glassy, granular product that is then dried and ground into a fine powder.

GGBFS is used to make durable concrete structures in combination with ordinary portland cement and/or other pozzolanic materials. ASTM C 989-82 and AASHTO M 302 were developed to cover ground granulated blast furnace slag for use in concrete and mortar.

Two major uses of GGBFS are in the production of quality-improved slag cement, namely Portland Blast furnace cement (PBFC) and High Slag Blast furnace cement (HSBFC), with GGBFS content ranging typically from 30 to 70% by weight; and in the production of ready-mixed or site-batched durable concrete.

Experience with solidification/stabilization of soils containing residual hydrocarbon product has shown that the addition of GGBFS achieves a lower permeability than use of Portland cement alone, and the leaching of hydrocarbons to groundwater is also further reduced as compared to Portland cement alone. Additionally, the use of GGBFS reduces the heat of hydration for more controlled strength-gain in a large treated mass, provides better resistance to adverse alkali-silica reactions (ASR) and provides resistance to sulfate and other chemicals which can interfere with cement hydration reactions.

Grade 120 GGBFS provided by LaFarge North America was used for this study.

Bentonite

Bentonite is a clay generated frequently from the alteration of volcanic ash, consisting predominantly of smectite minerals, usually montmorillonite. Smectites are clay minerals, consisting of individual crystallites smaller than 2µm in largest dimension. Bentonite presents strong colloidal properties and its volume increases several times when coming into contact with water, creating a gelatinous and viscous fluid. The property of swelling makes sodium bentonite useful as a sealant.

Bentonite was used as an additive in this study to evaluate its effect in reducing the permeability of solidified materials. The bentonite used for this study was obtained from Bentonite Performance Minerals. Its product name is National Standard Bentonite obtained from the company's Colony, Wyoming plant.

Organoclay

Organoclays are manufactured by modifying bentonite with quaternary amines, a type of surfactant that contains a nitrogen ion. The nitrogen end of the quaternary amine, the hydrophilic end, is positively charged, and ion exchanges onto the clay platelet for sodium or calcium. The amines used are of the long chain type with 12-18 carbon atoms. After some 30 per cent of the clay surface is coated with these amines it becomes hydrophobic and, with certain amines, organophilic.

The main component of organoclay is bentonite, a chemically altered volcanic ash that consists primarily of the clay mineral montmorillonite. The bentonite in its natural state can absorb up to seven times its weight in water, after treatment can absorb only 5 to 10 per cent of its weight in water, but 40 to 70 per cent in oil, grease, and other sparingly-soluble, hydrophobic chlorinated hydrocarbons.

As the organoclay is introduced into water, the quaternary amine is activated and extends perpendicularly off the clay platelets into the water. A chlorine or bromine ion is loosely attached to the carbon chain. Since the sodium ions that were replaced by the nitrogen are positively charged, they bond with the chlorine ion, resulting in sodium salt that is washed away. The result is a neutral surfactant with a solid base, which is the organoclay. The hydrophilic end of the amine dissolves into the oil droplet because "like dissolves like," thus removing that droplet from water. Because the partition reaction takes place "outside" of the clay particle (in contrast to adsorption of oil by carbon, which takes place inside its pores), the organoclay does not foul quickly.

Organoclay was used as an additive in this study to evaluate its effect on absorbing organic contaminants and reducing their leachability. The organoclay used for this study was a product obtained from Colloid Environmental Technologies Company (CETCO). Its product name is PM-199.

Rheobuild 1000

Rheobuild 1000 is a high-range, water-reducing admixture formulated to produce rheoplastic concrete. Rheoplastic concrete flows easily and maintains high plasticity for time periods longer than conventional concrete.

Rheobuild was used as an additive in this study to evaluate its effect for reducing the viscosity of treated soil. Rheobuild is a product of the Admixture Systems business of BASF Construction Chemicals.

Sampling and Analysis

Soil samples for a treatability study were collected by personnel from URS between the 15th of September and the 4th of October 2008 from four sample locations at the site (ISS-01, -02, -03, and -04). These sample locations were selected based upon data from previous field investigations. The locations were selected to represent expected or average conditions and worst case conditions for both physical and chemical characteristics.

As the study progressed, its scope increased. Due to the increased scope, all of the soil originally collected from the area representing worst case conditions (ISS-04) was consumed and additional soil was needed to complete the study. So, URS personnel returned to the field in March of 2010 and collected additional material from the ISS-04 area which was used to complete the study.

Soil was collected from the flights of a hollow-stem auger from targeted depth intervals and combined to create a composite sample representative of the vertical soil profile to be treated at each sample location. Soil was placed into Department of Transportation (DOT) approved 5-gallon buckets with screw top lids. Buckets were lined with polyethylene liners. A total of four 5-gallon buckets were collected at each sample location. Two buckets from each location were sent to Remedius and two were retained at the site for future use.

While sampling the soil, continuous split-spoon samples were collected and blow counts recorded. Soil samples were visually examined for soil type and NAPL saturation and the findings recorded on boring logs. Two soil samples from each sample location, one from above the water table and the other from below, were collected to determine the soil's moisture content. Copies of the boring logs and soil moistures were provided to Remedius for reference.

Sample locations were selected to encompass the range of soil characteristics and non-aqueous phase liquid (NAPL) saturations at the site.

Sample ISS-01 (IPR-2, HISB-59 Area)
This area represents shallow and deep NAPL impacts in an area where deep mixing (> 40' bgs) is proposed.

Sample ISS-02 (HIMW-06 Area Downgradient of Storage Holder
This area represents shallow NAPL impacts through approximately 20 feet of soil downgradient from the former gas holder.

Sample ISS-03 (IPR-6 Area)
This area represents intermittent NAPL impacts between 30' to 45' bgs towards the eastern limit of treatment.

ISS-04 (IPR-21, IPR-21 Area)
This area represents typical DNAPL impacts below the Medical Office Building parking lot.

Results and Discussion

Soil Characterization

Remedius received eight 5-gallon containers of soil from the Hempstead Intersection Street Former MGP Site for the treatability study. These materials were used for Tiers I, II, and III of the study. When samples were received at Remedius' geotechnical laboratory, each container was labeled with a unique laboratory ID. Both containers from the same sample location were combined and homogenized to form a single composite sample. Each composite sample was labeled with a unique laboratory ID created by concatenating the IDs of the original containers. Four composite samples were created, one each from ISS-01, -02, -03, and -04 areas. These four samples were used during the initial three phases (Tiers I, II, and III) of this treatability study.

TABLE 2. Sample IDs

Container	Location	Sample ID	Composite ID
1	ISS-01 (25'-70' bgs)	5524	5524+5524A
2	ISS-01 (25'-70' bgs)	5524A	
3	ISS-02 (10'-35' bgs)	5521	5521+5521A
4	ISS-02 (10'-35' bgs)	5521A	
5	ISS-03 (10'-50' bgs)	5522	5522+5523
6	ISS-03 (10'-50' bgs)	5523	
7	ISS-04 (20'-40' bgs)	5525	5525+5525A
8	ISS-04 (20'-40' bgs)	5525A	

Physical Properties
A portion of soil from each composite sample was used for determination of these physical properties:

- Moisture Content

- Density
- Particle Size Distribution
- Atterberg Limits
- Soil Classification

The purpose for determining these properties is to gain some insight into characteristics that could affect solidification effectiveness.

Moisture Content—ASTM D2216. This methodology is used to determine the water (moisture) content by mass of soil, rock, and similar materials where the reduction in mass by drying is due to loss of water. A test specimen is dried in an oven at a temperature of 110° ± 5° C to a constant mass. The loss of mass due to drying is considered to be water. The water content is calculated using the mass of water and the mass of the dry specimen.

$$w = \frac{M_w}{M_s} \times 100 \qquad \textbf{(EQ 1)}$$

where:

w = water content (%)

M_w = mass of water $M_w = M_{ms} - M_s$

M_s = mass of oven dry specimen

M_{ms} = mass of moist specimen

TABLE 3. Moisture Content

Sample	Sample ID	Moisture Content (%)
ISS-01	5524+5524A	15.2
ISS-02	5521+5521A	5.7
ISS-03	5522+5523	9.8
ISS-04	5525+5525A	10.4
	Average	10.3

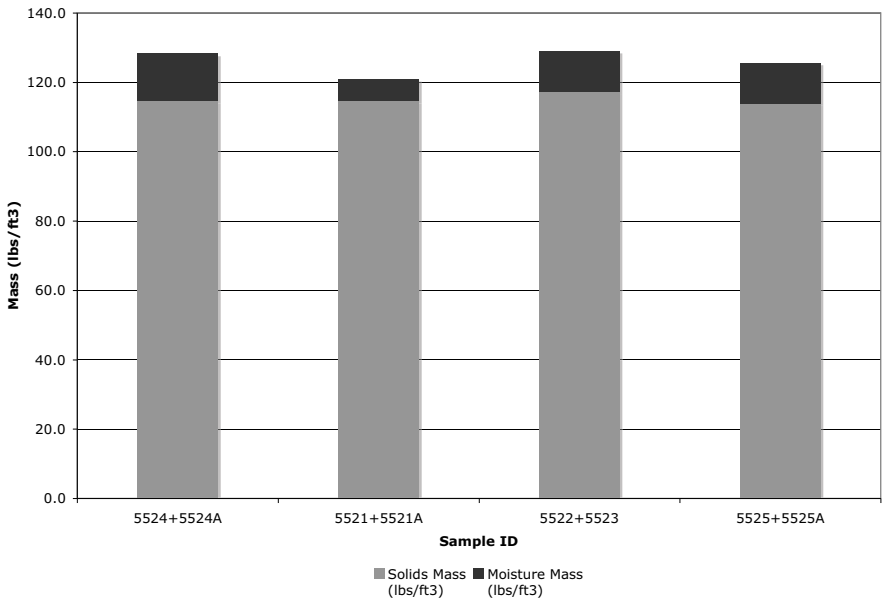
Density (Unit Weight)—ASTM D698. This methodology is used to determine the relationship between water content and dry unit weight of soils (compaction curve) compacted in a 4 or 6-in. (101.6 or 152.4-mm) diameter mold with a 5.5-lbf (24.4-N) rammer dropped from a height of 12 in. (305 mm) producing a compactive effort of 12,400 ft-lbf/ft^3 (600 kN-m/m^3).

A single point compaction test using a sample of soil "as received" was used to determine the approximate in-place density of soil. Soil with no moisture content adjustment was placed in three layers into a 4-inch diameter mold with a volume of 1/30th of a cubic foot. Each layer was compacted by 25 blows of a 5.5-lbf (24.4-N) rammer dropped from a distance of 12-in. (305-mm), subjecting the soil to a total compactive effort of about 12,400 ft-lbf/ft^3 (600 kN-m/m^3).

TABLE 4. Soil Density and Moisture

Location	Sample ID	Total Mass (lbs/ft^3)	Moisture (%)	Solids Mass (lbs/ft^3)	Moisture Mass (lbs/ft^3)
ISS-01	5524+5524A	128.3	11.8	114.8	13.5
ISS-02	5521+5521A	121.0	5.5	114.7	6.3
ISS-03	5522+5523	129.1	10.0	117.4	11.7
ISS-04	5525+5525A	125.7	10.3	114.0	11.7
	Average	126.0	9.4	115.2	10.8

FIGURE 1. Soil Density



Particle Size Distribution—ASTM D422. This methodology is used for the quantitative determination of the distribution of particle sizes in soils. The distribution of particle sizes larger than 75 m (retained on the No. 200 sieve) is determined by sieving, while the distribution of particle sizes smaller than 75 m is determined by a sedimentation process, using a hydrometer.

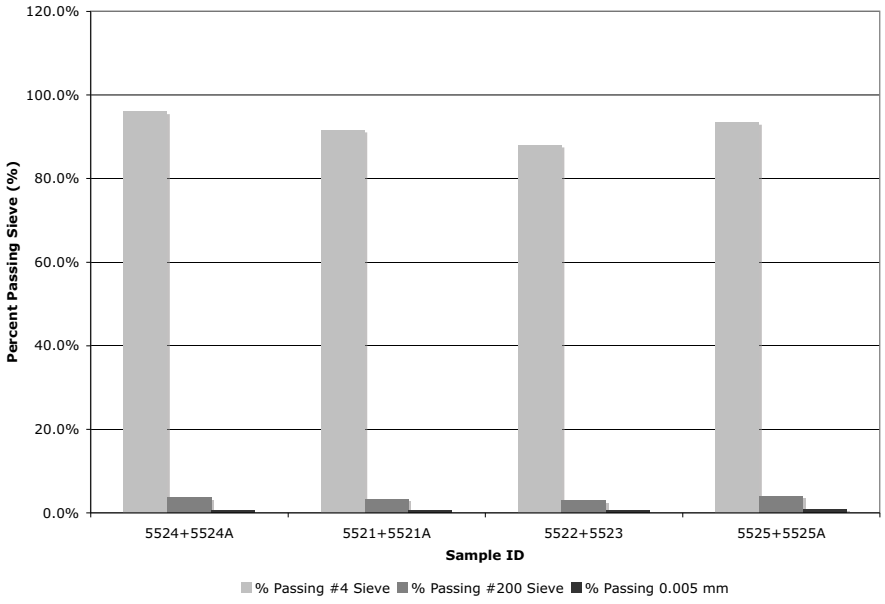
The object of a particle size analysis is to group soil particles into separate ranges of sizes and so determine the relative proportion by weight of each size range. The method used employs sieving and sedimentation of a soil/water/dispersant suspension to separate the particles. The sedimentation technique is based on an application of Stokes' law to a soil/water suspension and periodic measurement of the density of the suspension using a hydrometer.

The distribution of soil particles for this study's four samples are summarized in Table 5. All four soil samples are poorly graded sands or gravelly sands with little or no fines.

TABLE 5. Particle Distribution Summary

Location	Sample ID	% Passing #4 Sieve 4.75 mm	% Passing #200 Sieve 0.075 mm	% smaller than 0.005 mm (hydrometer)
ISS-01	5524+5524A	96.0	3.7	0.7
ISS-02	5521+5521A	91.7	3.3	0.6
ISS-03	5522+5523	88.1	2.9	0.6
ISS-04	5525+5525A	93.5	4.0	0.9

FIGURE 2. Particle Distribution



Unified Soil Classification System—ASTM D2487. This standard describes a system for classifying mineral and organo-mineral soils for engineering purposes based on laboratory determination of particle-size characteristics, liquid limit, and plasticity index and shall be used when precise classification is required.

This classification system identifies three major soil divisions: coarse-grained soils, fine-grained soils, and highly organic soils. These three divisions are further subdivided into a total of 15 basic soil groups. Based on the results of visual observations and prescribed laboratory tests, a soil is catalogued according to the basic soil groups, assigned a group symbol(s) and name, and thereby classified.

TABLE 6. Unified Soil Classification System

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES	FIELD INDENTIFICATION PROCEDURES (excluding particles larger than 3 inches and basing fractions on estimated weights)			INFORMATION REQUIRED FOR DESCRIBING SOILS
1	2		3	4	5			6
Coarse-grained Soils More than half of material is larger than No. 200 sieve size. The No. 200 sieve size is about the smallest particle visible to the naked eye.	Gravels More than half of coarse fraction is larger than No. 4 sieve size. (For visual classification, the ¼-in. size may be used as equivalent to the No. 4 sieve)	(Clean Gravels Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	Wide range in grain sizes and substantial amounts of all intermediate particle sizes			For undisturbed soils add information on stratification, degree of compactness, cementation, moisture conditions, and drainage characteristics. Give typical name: Indicate approximate percentage of sand and gravel, maximum size, angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information, and symbol in parentheses. Example: Silty sand gravelly; about 20% hard, angular gravel particles 1/2in. maximum size; rounded and subangular sand grains, coarse to fine; about 15% non plastic fines with low dry strength; well compacted and moist in place; alluvial sand (SM).
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines	Predominatly one size or a range of sizes with some intermediate sizes missing			
		(Gravels with Fines Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures	Nonplastic fines or fines with low plasticity (for identification procedures see ML below)			
			GC	Clayey gravels, gravel-sand-clay mixtures	Plastic fines (for identification see CL below)			
	Sands More than half of coarse fraction is smaller than No. 4 sieve size	Clean Sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines	Wide range in grain sizes and substantial amounts of all intermediate sizes missing			
			SP	Poorly graded sands or gravelly sands, little or no fines	Predominantly one size or a range of sizes with some intermediate sizes missing			
		Sands with Fines (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures	Nonplastic fines or fines with low plasticity (for identification			
			SC	Clayey sands, sand-clay mixtures	Plastic fines (for identification procedures see CL below)			
					Identification Procedures on Fraction smaller than No. 40 Sieve Size			
					Dry Strength (Crushing Characteristics)	*Dilatancy (Reaction to Shaking)*	*Toughness (Consistency near PL)*	
Fine-grained Soils More than half of material is smaller than No. 200 sieve size.	Silts and Clays Liquid limit is less than 50.		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	None to slight	Quick to slow	None	For undisturbed soils add information on structure, stratification, consistency in undisturbed and remolded states, moisture and drainage conditions. Give typical name, indicate degree and character or plasticity, amount and maximum size of coarse grains, color in wet conditions, odor (if any), local or geologic name, and other pertinent descriptive information, and symbol in parentheses. Example: Clayey silt, brown; slightly plastic; small percentage of fine sand; numerous vertical root holes; firm and dry and place; loess (ML).
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	Medium to high	None to very slow	Medium	
			OL	Organic silts and organic silty clays of low plasticity	Slight to medium	Slow	Slight	
	Soils and Clays Liquid limit is greater than 50.		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	Slight to medium	Slow to none	Slight to medium	
			CH	Inorganic clays of high plasticity, fat clays	High to very high	None	High	
			OH	Organic clays and silts of medium to high plasticity	Medium to high	None to very slow	Slight to medium	
Highly Organic Soils			Pt	Peat and other highly organic soils	Readily identified by color, odor, spongy feel and frequently by fibrous texture			

The soil classification of all four soil samples is SP—poorly graded sands or gravelly sands, little or no fines.

Chemical Properties

A small portion of soil from each composite sample was collected and sent to H2M Labs for determination of volatile organic compounds (VOCs), polyaro-

matic hydrocarbons (PAHs), and oil and grease concentrations as well as moisture content and pH.

Based solely on chemical characteristics, soils from ISS-01 and ISS-02 are similar and soils from ISS-03 and ISS-04 are similar. Soil from the first two sample locations appears to be less contaminated than soil from the last two locations.

TABLE 7. Pretreatment Chemical Properties

Parameter	ISS-01	ISS-02	ISS-03	ISS-04	Units
Naphthalene	64000	77000	110000	140000	µg/kg
2-Methylnaphthalene	80000	94000	150000	130000	µg/kg
Acenaphthalene	28000	42000	52000	52000	µg/kg
Acenaphthene	4300	4900	14000	6100	µg/kg
Fluorene	27000	30000	42000	36000	µg/kg
Phenanthrene	84000	83000	120000	110000	µg/kg
Anthracene	22000	23000	28000	31000	µg/kg
Fluoranthene	24000	27000	32000	36000	µg/kg
Pyrene	41000	41000	48000	49000	µg/kg
Benzo(a)anthracene	12000	16000	15000	21000	µg/kg
Chrysene	11000	16000	16000	21000	µg/kg
Benzo(b)fluoranthene	6100	7600	6100	7600	µg/kg
Benzo(k)fluoranthene	2400	4900	2700	4800	µg/kg
Benzo(a)pyrene	8200	10000	8700	11000	µg/kg
Indeno(1,2,3-cd)pyrene	1600	1900	1600	2200	µg/kg
Dibenzo(a,h)anthracene	< 740	710	750	840	µg/kg
Benzo(g,h,i)perylene	1700	1900	1600	2000	µg/kg
Total PAHs	417300	480910	648450	660540	µg/kg
Benzene	< 5.6	< 5.2	6	25	µg/kg
Toluene	130	31	150	1000	µg/kg
Ethylbenzene	130	65	500	3200	µg/kg
m,p-Xylene	1100	660	660	12000	µg/kg
o-Xylene	750	700	1000	6800	µg/kg
Total BTEX	2110	1456	2316	23025	µg/kg
Hexane Extractable Material	1170	1670	2840	2430	mg/kg
pH	5.8	6.8	7.7	7	s. u.
Percent Moisture	11.1	4.2	7.5	8.8	%

Soil Preparation

After determining each composite sample's physical characteristics, all four composite samples were sieved using a #4 sieve—4.75 mm (0.187 in.)—to remove oversize particles that might compromise geotechnical tests on small

diameter specimens. ASTM methods require that specimens prepared for unconfined compressive strength determination are required to have a minimum diameter of 30 mm (1.3 in.) and the largest particle contained within the test specimen must be smaller than one tenth of the specimen diameter. For specimens having a diameter of 72 mm (2.8 in.) or larger, the largest particle size must be smaller than one sixth of the specimen diameter. The intended specimen sizes for this study are 72 mm (2.8 in.).

After sieving the soil, the soil's moisture content was determined and compared to its pre-sieving moisture. The post-sieving moisture was used for determining dry density throughout the remainder of the study. Table 8 shows that the moisture contents pre and post sieving are approximately equal.

TABLE 8. Moisture Content

Location	Sample ID	Pre-sieving (%)	Post-sieving (%)
ISS-01	5524+5524A	15.2	15.2
ISS-02	5521+5521A	5.7	5.7
ISS-03	5522+5523	9.8	10.6
ISS-04	5525+5525A	10.4	11.0
	average	10.3	10.6

Tier I Mixes

A series of initial mixes were prepared to develop an understanding of the relative performance of test specimens prepared using varying amounts of cementitious binder (10% to 40% by dry weight of soil). All mixes were created using proportions of ground granulated blast furnace slag (GGBFS) and Portland cement (3 parts GGBFS and 1 part cement). A total of sixteen mixes were prepared; four mixes were prepared for each of the four soil samples. All mixes were prepared on a dry weight basis (i.e. mass of component to dry mass of soil). Each mix was tested for strength and hydraulic conductivity (permeability).

TABLE 9. ISS-01 Mixes

Location	Mix ID	Component	Mass (g)	Percentage (%)
ISS-01	5524+5524A-1	Soil	4000	100.0
		GGBFS	300	7.5
		Cement	100	2.5
		Water	160	
	5524+5524A-2	Soil	4000	100.0
		GGBFS	600	15.0
		Cement	200	5.0
		Water	184	
	5524+5524A-3	Soil	4000	100.0
		GGBFS	900	22.5
		Cement	300	7.5
		Water	348	
	5524+5524A-4	Soil	4000	100.0
		GGBFS	1200	30.0
		Cement	400	10.0
		Water	504	

TABLE 10. ISS-02 Mixes

Location	Mix ID	Component	Mass (g)	Percentage (%)
ISS-02	5521+5521A-1	Soil	4000	100.0
		GGBFS	300	7.5
		Cement	100	2.5
		Water	360	
	5521+5521A-2	Soil	4000	100.0
		GGBFS	600	15.0
		Cement	200	5.0
		Water	500	
	5521+5521A-3	Soil	4000	100.0
		GGBFS	900	22.5
		Cement	300	7.5
		Water	504	
	5521+5521A-4	Soil	4000	100.0
		GGBFS	1200	30.0
		Cement	400	10.0
		Water	641	

TABLE 11. ISS-03 Mixes

Location	Mix ID	Component	Mass (g)	Percentage (%)
ISS-03	5522+5523-1	Soil	3600	100.0
		GGBFS	270	7.5
		Cement	90	2.5
		Water	200	
	5522+5523-2	Soil	3600	100.0
		GGBFS	540	15.0
		Cement	180	5.0
		Water	338	
	5522+5523-3	Soil	3600	100.0
		GGBFS	810	22.5
		Cement	270	7.5
		Water	482	
	5522+5523-4	Soil	3600	100.0
		GGBFS	1080	30.0
		Cement	360	10.0
		Water	615	

TABLE 12. ISS-04 Mixes

Location	Mix ID	Component	Mass (g)	Percentage (%)
ISS-04	5525+5525A-1	Soil	3800	100.0
		GGBFS	285	7.5
		Cement	95	2.5
		Water	210	
	5525+5525A-2	Soil	3800	100.0
		GGBFS	570	15.0
		Cement	190	5.0
		Water	304	
	5525+5525A-3	Soil	3800	100.0
		GGBFS	855	22.5
		Cement	285	7.5
		Water	460	
	5525+5525A-4	Soil	3800	100.0
		GGBFS	1140	30.0
		Cement	380	10.0
		Water	600	

All mixes were prepared using the following procedure:

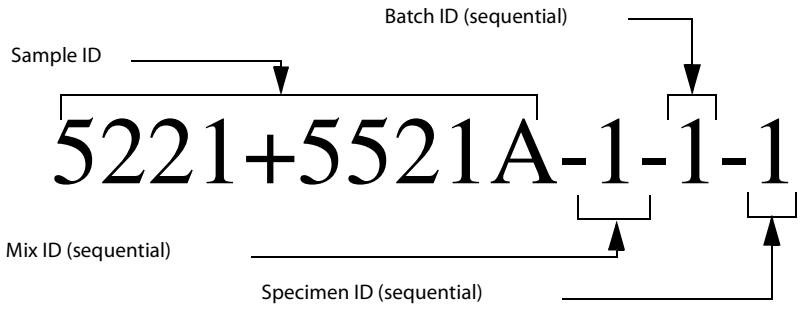
1. Weigh quantity of soil.
2. Compute the soil's dry weight.

   Assume that the soil's wet weight is 387.6 grams and its moisture content is 29.2% (weight of moisture ÷ weight of solids x 100). The soil's dry weight is computed as follows: 387.6 grams ÷ (1 + 0.292) = 300 grams.
3. Compute prescribed quantity of reagent(s).

   Assume a mix design consists of 15% cement. The weight of reagent is computed as follows: 300 grams (soil's dry weight) x 15% = 45 grams.
4. Weigh prescribed quantity of reagent(s).
5. Place the reagents and enough water to create a flowable grout into an appropriate container. Record the amount of water used to make the grout. Mix using a commercial mixer or by hand using a stainless steel spoon or other non-reactive implement until thoroughly blended.
6. Add the grout to the soil and mix until the grout is thoroughly intermixed with the soil. If the mix is too dry to achieve a uniform consistency, add water until a uniform consistency is achieved. Record the amount of water added.

   The desired consistency is similar to the consistency of controlled low strength material (CLSM). It is a fluid material with typical slumps of 2 to 6 inches.
7. Place the grouted soil into appropriate molds. Tamp the molds with a blunt object to remove any air and to allow the grouted soil to naturally compact. If the grouted soil is not self-leveling with a moderate amount of vibration, the mix is too dry. Add more water, remix, and remold.
8. Seal the ends of the specimens to prevent desiccation. Cure them in a cooler at room temperature and 100% relative humidity for a prescribed duration, then remove them from their molds and test.

FIGURE 3. Mix Design Nomenclature



Specimens were prepared for strength and hydraulic conductivity determination. Specimens for strength were molded in 3-inch diameter by 6-inch length molds. Specimens for hydraulic conductivity were molded in 3-inch diameter by 3-inch length molds. Specimens were cured for 28 days at 100% relative humidity and standard temperature and pressure. After curing, specimens were extruded from their molds and tested.

Two of this treatability study's objectives are: (1) to create a solidified material with strength appropriate for future site uses; and (2) to reduce the rate at which water flows through the stabilized material so that the leaching of contaminants is lowered. To assess the performance of the Tier 1 mixes, their strengths and their hydraulic conductivities were determined.

Strength Determination—ASTM D2166

Unconfined compressive strength is a measurement of a material's shear strength. Shear strength is the maximum stress that a material can withstand before failure in shear. Shear refers to deformation in which parallel surfaces slide past one another.

ASTM Standard D2166 is a method for determining the shear strength of cohesive, soil-like material in unsaturated undrained conditions with no lateral confinement of the specimen. The test entails placing a cylindrical specimen between two plates. The specimen is subjected to a vertical strain at a rate between 0.5 to 2 percent per minute until the specimen fails. Loading continues until the load values decrease with increasing strain, or until 15 percent strain is reached. The peak stress (at failure) is defined as the Unconfined Compressive Strength.

FIGURE 4. Compression Machine

The strengths of the Tier 1 mixes are:

TABLE 13. Tier 1 Strengths

Location	Mix ID	Dose[a] (%)	Strength (psi)
ISS-01	5524+5524A-1	10	260.2
	5524+5524A-2	20	1109.5
	5524+5524A-3	30	2358.2
	5524+5524A-4	40	2788.6
ISS-02	5521+5521A-1	10	370.8
	5521+5521A-2	20	838.2
	5521+5521A-3	30	1876.7
	5521+5521A-4	40	1974.2
ISS-03	5522+5523-1	10	428.0
	5522+5523-2	20	1102.9
	5522+5523-3	30	1730.8
	5522+5523-4	40	2509.8
ISS-04	5525+5525A-1	10	749.6
	5525+5525A-2	20	1895.7
	5525+5525A-3	30	2414.7
	5525+5525A-4	40	2786.7

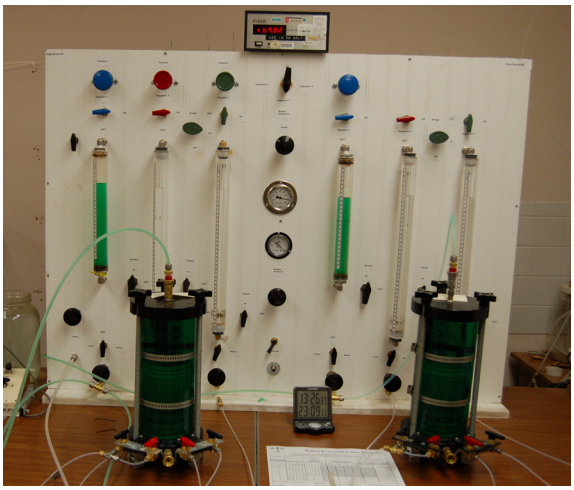
a. Total dose of cementitious materials consisting of 3 parts GGBFS and 1 part cement

Hydraulic Conductivity Determination—ASTM D5084

Hydraulic conductivity, often referred to as permeability, is a measurement of the resistance of a material to the passage of water. Permeability tests estimate the quantity and flow rate of water through material under saturated conditions.

ASTM Standard D5084 is a methodology for determining the hydraulic conductivity of water-saturated porous materials using a flexible wall permeameter. A material's permeability is determined by applying a hydraulic head of water to one end of a specimen and measuring the flow through the specimen. A pressure somewhat greater than the pressure under which liquids enter the specimen is imposed to press a flexible membrane firmly against the specimen, thereby preventing flow along the sidewall. A confining pressure of 20 psi was applied to all the specimens of this study.

FIGURE 5. Hydraulic Conductivity Apparatus



The relevance of permeability tests are best understood by comparing them to natural materials. Sand, a permeable material, has a hydraulic conductivity in the order of 10^{-2} cm/sec. Clay, a relatively impermeable material, has a hydraulic conductivity in the order of 10^{-6} cm/sec or less.

The permeabilities of the Tier 1 mixes are:

TABLE 14. Tier 1 Permeabilities

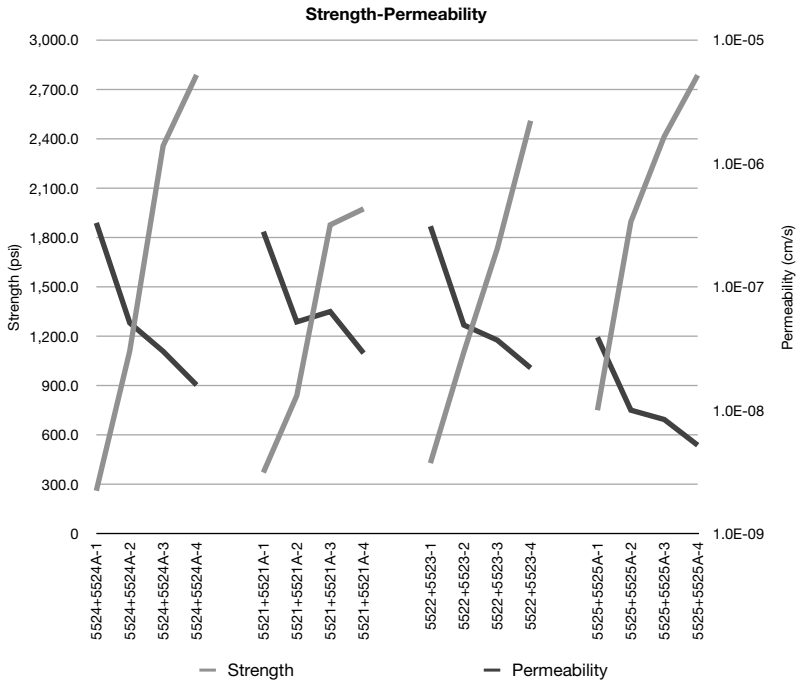
Location	Mix ID	Dose[a] (%)	Permeability (cm/sec)
ISS-01	5524+5524A-1	10	3.3×10^{-7}
	5524+5524A-2	20	5.1×10^{-8}
	5524+5524A-3	30	3.0×10^{-8}
	5524+5524A-4	40	1.6×10^{-8}
ISS-02	5521+5521A-1	10	2.8×10^{-7}
	5521+5521A-2	20	5.2×10^{-8}
	5521+5521A-3	30	6.3×10^{-8}
	5521+5521A-4	40	2.9×10^{-8}
ISS-03	5522+5523-1	10	3.1×10^{-7}
	5522+5523-2	20	4.9×10^{-8}
	5522+5523-3	30	3.7×10^{-8}
	5522+5523-4	40	2.2×10^{-8}

TABLE 14. Tier 1 Permeabilities

Location	Mix ID	Dose[a] (%)	Permeability (cm/sec)
ISS-04	5525+5525A-1	10	3.9×10^{-8}
	5525+5525A-2	20	1.0×10^{-8}
	5525+5525A-3	30	8.4×10^{-9}
	5525+5525A-4	40	5.2×10^{-9}

a. Total dose of cementitious materials consisting of 3 parts GGBFS and 1 part cement

FIGURE 6. Tier I Strength-Permeability Data



Tier I Data Analysis and Conclusions

Soil from ISS-01 (5524+5524A) was found to be the least contaminated of the four samples. This soil was no longer be used for the study. Soil from ISS-02 (5521+5521A) represents expected or average conditions. This soil continued to be used for the remainder of the study. Soil from ISS-03 (5522+5523) is moderately more contaminated than soil from ISS-02, but not significantly different to justify continuing to evaluate this soil. Therefore, soil from ISS-03 was no longer used for the study. Finally, soil from ISS-04 (5525+5525A) is the most contaminated soil. It represents worst case contaminant conditions and a slightly higher percentage of soil fines. This soil continued to be used for the remainder of the study.

All mixes for all four soil samples exceeded this project's strength (> 50 psi) and permeability (≤ 1 x 10^{-6} cm/sec) criteria. In general, strength varied directly with dose—the higher the dose the greater the strength—and permeability varies inversely with dose—the higher the dose the lower the permeability—and to generally asymptote toward 1 x 10^{-8} cm/sec. As stated previously, soil from ISS-02 and ISS-04 continued to be used for further study while the other two soil sources were discontinued. The sample locations for both soils retained for further study are within the zone impacted by coal tar DNAPL.

In summary, based on the chemical and physical data, there is no reason to continue evaluating all four soil samples. Only soil representing average conditions (ISS-02) and soil representing worst case conditions (ISS-04) continued to be used for the development of a mix design.

Tier II Objectives

The objectives of the study's second tier are three-fold:

1. To evaluate lesser doses of GGBFS-cement,
2. To evaluate the effects of additives on strength and permeability, and
3. To evaluate the relative viscosities of mixes.

Tier 1 mixes evaluated the strengths and permeabilities of mixes prepared using 10%, 20%, 30%, and 40% doses of GGBFS and cement (3 parts GGBFS and 1 part cement). Because all the Tier 1 mixes greatly exceeded the project's strength criterion, Tier 2 mixes were prepared to evaluate lesser doses of GGBFS-cement (7.5% and 5.0%), thereby fully developing dose-strength-permeability relationships. Strength values in excess of 500 psi are considered detrimental to anticipated future use of the property.

The effect on strength, permeability, and viscosity due to the addition of special additives was also evaluated. Two additives (sodium bentonite and organoclay) were evaluated. Small doses of each additive (i.e., 1% and 2%) were added to 10% GGBFS-cement mixes and the results compared to the same mix without the additive (control mix).

Tier II Mixes

A series of mixes twelve were prepared; six mixes were prepared for each of two soil samples. All mixes were created using a combination of ground granulated blast furnace slag (GGBFS) and Portland cement (3 parts GGBFS and 1 part cement) as the primary stabilization reagents. Bentonite and organoclay were added to several of the mixes for the purpose of evaluating their effect on the stabilized material's strength, permeability, and viscosity. All mixes

were prepared on a dry weight basis (i.e. mass of component to dry mass of soil).

TABLE 15. ISS-02 Mixes

Location	Mix ID	Component	Mass (g)	Percentage (%)	Water-to-Reagents Ratio
ISS-02	5521+5521A-1	Soil	2600.0	100.0	0.9
		GGBFS	195.0	7.50	
		Cement	65.0	2.50	
		Water	234.0		
	5521+5521A-5	Soil	2500.0	100.0	1.7
		GGBFS	93.8	3.75	
		Cement	31.3	1.25	
		Water	222		
	5521+5521A-6	Soil	2600.0	100.0	1.17
		GGBFS	146.3	5.625	
		Cement	48.8	1.875	
		Water	229		
	5521+5521A-7	Soil	2600.0	100.0	0.82
		GGBFS	195.0	7.50	
		Cement	65.0	2.50	
		Bentonite	26.0	1.0	
		Water	234		
	5521+5521A-8	Soil	2600.0	100.0	0.82
		GGBFS	195.0	7.50	
		Cement	65.0	2.50	
		Organoclay	26.0	1.0	
		Water	234		

TABLE 16. ISS-04 Mixes

Location	Mix ID	Component	Mass (g)	Percentage (%)	Water-to-Reagents Ratio
ISS-04	5525+5525A-1	Soil	2500.0	100.0	0.55
		GGBFS	187.5	7.5	
		Cement	62.5	2.5	
		Water	138		
	5525+5525A-5	Soil	2750.0	100.0	1.2
		GGBFS	103.1	3.75	
		Cement	34.4	1.25	
		Water	165		

TABLE 16. ISS-04 Mixes

Location	Mix ID	Component	Mass (g)	Percentage (%)	Water-to-Reagents Ratio
	5525+5525A-6	Soil	2750.0	100.0	0.77
		GGBFS	154.7	5.625	
		Cement	51.6	1.875	
		Water	158		
	5525+5525A-7	Soil	2750.0	100.0	0.76
		GGBFS	206.3	7.5	
		Cement	68.8	2.5	
		Bentonite	55.0	2.0	
		Water	252		
	5525+5525A-8	Soil	2750.0	100.0	0.76
		GGBFS	206.3	7.5	
		Cement	68.8	2.5	
		Organoclay	55.0	2.0	
		Water	252		

Mixes were prepared using the procedure described previously. From each mix that was created, specimens were prepared for strength and hydraulic conductivity determination. Specimens for strength were molded in 3-inch diameter by 6-inch length molds. Specimens for hydraulic conductivity were molded in 3-inch diameter by 3-inch length molds. Specimens were cured for 28 days at 100% relative humidity and standard temperature and pressure. After curing for the prescribed duration, specimens were extruded from their molds and tested. Table 17 is a tabulation of all data.

TABLE 17. Tier 2 Data Summary

Location	Mix ID	Dose[a] (%)	Viscosity (cP)	Strength (psi)	Permeability (cm/sec)
ISS-02	5521+5521A-5	5.0	1,360,000	21.4	4.0×10^{-5}
	5521+5521A-6	7.5	1,620,000	232.0	7.5×10^{-7}
	5521+5521A-1	10.0	1,590,000	461.8	1.6×10^{-7}
	5521+5521A-7	10.0 + 1.0 (bentonite)	1,680,000	727.4	1.1×10^{-8}
	5521+5521A-8	10.0 + 1.0 (organoclay)	1,270,000	602.0	3.6×10^{-8}
ISS-04	5525+5525A-5	5.0	818,000	118.0	5.6×10^{-6}
	5525+5525A-6	7.5	1,050,000	338.7	1.1×10^{-6}
	5525+5525A-1	10.0	1,140,000	683.3	8.8×10^{-8}
	5525+5525A-7	10.0 + 2.0 (bentonite)	907,000	434.7	7.9×10^{-9}
	5525+5525A-8	10.0 + 2.0 (organoclay)	146,000	431.3	6.4×10^{-8}

a. Total dose of cementitious materials consisting of 3 parts GGBFS and 1 part cement

Tier II Data Analysis and Conclusions

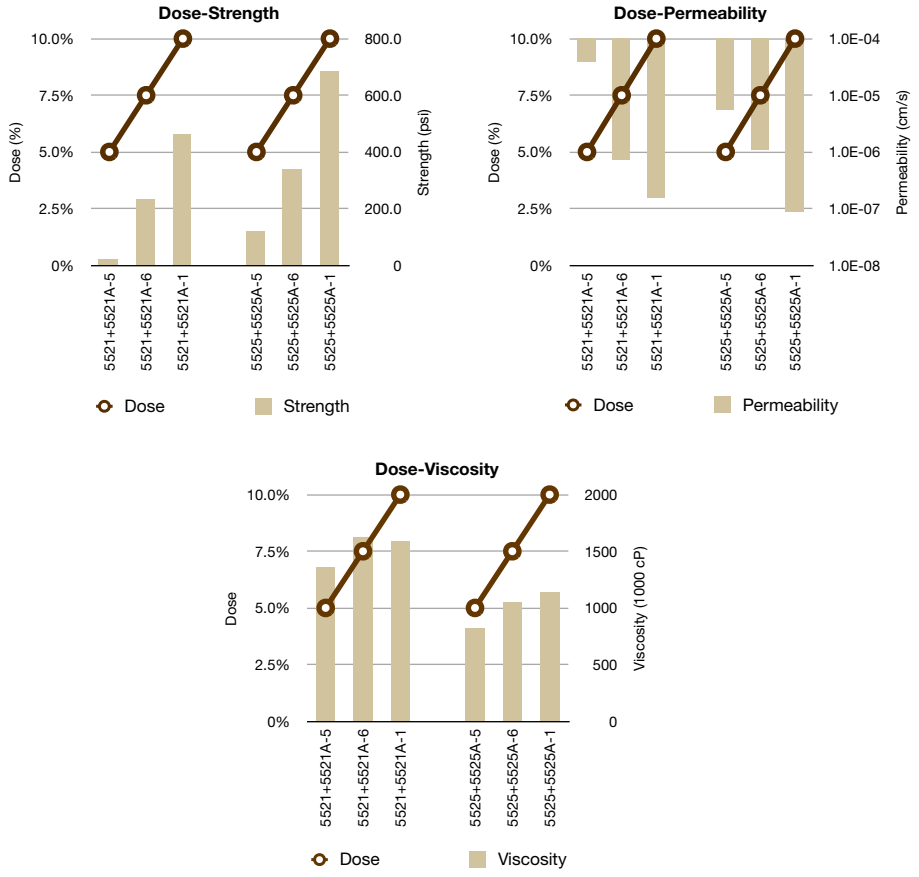
All except one mix design produced a material with strength that exceeds the project's performance criterion. The only exception was the 5% dose of GGBFS-cement when used to treat soil from ISS-02. This mix did not attain a minimum strength of 50 psi. The 5% dose did, however, produce a solidified material with sufficient strength when used to treat soil from ISS-04.

In general, strength varied depending on dose and soil source. The higher the dose the greater the strength, except when bentonite or organoclay are used. The strength of mixes created using ISS-04 soil were greater than the strengths of mixes created using ISS-02 soil and the permeabilities of mixes created using ISS-04 soil were generally less (there is one exception) than the permeabilities of mixes created using ISS-02 soil.

The 5% GGBFS-cement mixes for both ISS-02 and ISS-04 soils did not reduce the soil's permeability below the performance criterion of 1×10^{-6} cm/sec. The 5% mix for ISS-02 soil also failed to attain the strength criterion. The 7.5% GGBFS-cement mixes barely met or slightly exceeded the permeability criterion while attaining acceptable strengths. The 10% GGBFS-cement mixes easily attained both performance criteria. However, some of the 10% mixes developed excessive strengths (> 500 psi).

All of the mixes prepared using ISS-02 soil were more viscous than mixes prepared using ISS-04 soil. Both soils are the same soil-type, although ISS-04 soil is more contaminated and contains a higher moisture content. Perhaps the higher moisture and NAPL contents act as lubricants, making the ISS-04 mixes less viscous.

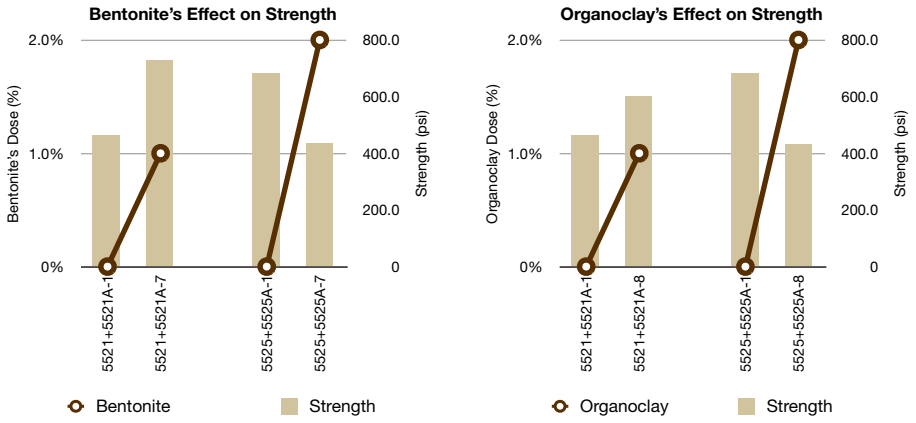
FIGURE 7. Tier II Data (No Admixtures)



Strength

When bentonite or organoclay additives were added to the mix, the amount of additive had different effects on strength. When only 1% of either additive—bentonite or organoclay—was added to the 10% dose of GGBFS-cement, strength increased compared to the 10% control mix. However, when 2% of either additive was added, strength decreased compared to the control mix. This was true for both soils.

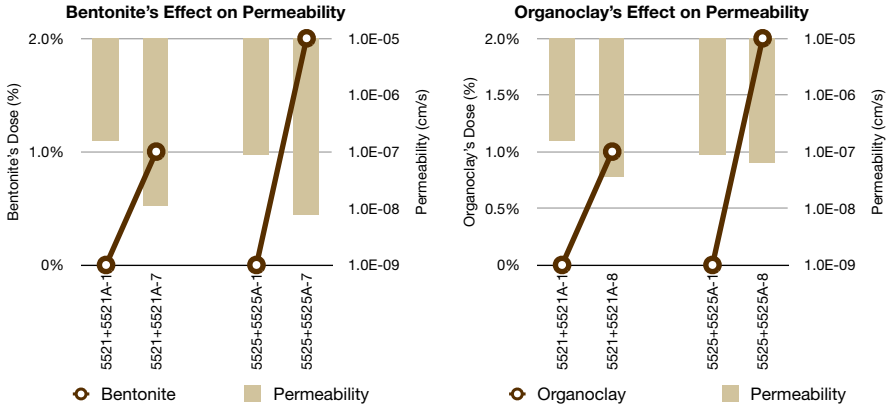
FIGURE 8. Admixture Effect on Strength



Permeability

Permeability decreased as binder dose increased, and with the addition of bentonite or organoclay. The mix that was prepared using bentonite was approximately an order of magnitude less permeable than its respective control mix. However, the benefit from increasing the bentonite dose from 1% to 2% is negligible. Whether 1% or 2% bentonite is used, permeability is reduced approximately an order of magnitude compared to a control mix. The addition of organoclay also decreases permeability when compared to a control mix, but the effect is not as pronounced as it is with bentonite.

FIGURE 9. Admixture Effect on Permeability

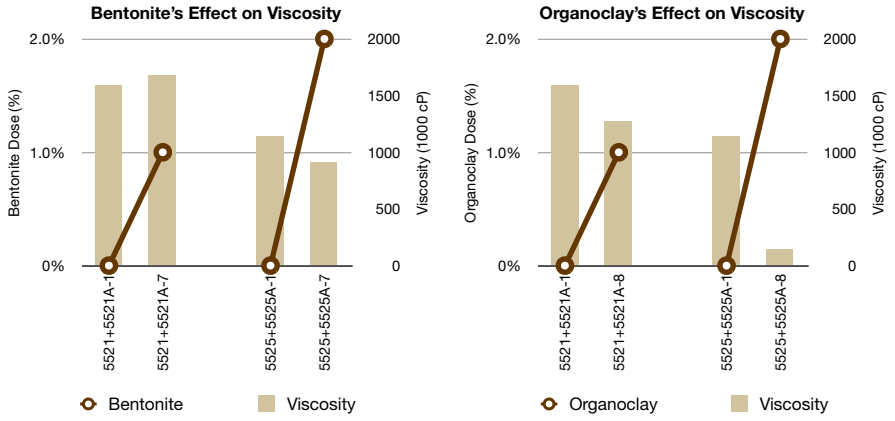


Viscosity

For both ISS-02 and ISS-04 soil, the slurry mix prepared using either of the two admixtures was generally less viscous than its respective control slurry mix, with one exception. The mixes prepared using ISS-04 soil are less viscous

than mixes prepared using ISS-02 soil, even with the addition of admixtures. The effect of Rheobuild, a plasticizing agent, is addressed in Tier III.

FIGURE 10. Admixture Effect on Viscosity



Tier III Mixes

The purpose for the treatability study's third tier is to evaluate the leaching of mixes prepared using an optimal dose of solidification reagents with and without additives.

Based on Tier 2 data, attainment of the permeability performance criterion is much more challenging than attaining the strength criterion. A minimum dose of 7.5% GGBFS-cement is required to meet the permeability performance criterion. Allowing for variations in field conditions, a minimum dose of 9% was used for the Tier 3 evaluation. A lesser dose might be as effective, but may require addition of bentonite.

Since soil from ISS-04 represents worst case contaminant concentrations, the Tier 3 leaching study focused primarily on mixes prepared using this soil. The rationale for focusing on mixes prepared using soil from ISS-04 is that a mix design which immobilizes contaminants in a more contaminated soil will also immobilize the same contaminants in less contaminated soil. This conservative approach should provide for variations in field conditions that may be encountered.

A total of five mixes were prepared using soil from ISS-04 and one mix was prepared using soil from ISS-02 to compare leaching rates from the two treated soil specimens. Strength, permeability, viscosity, and leachability of these mixes were determined.

One additional mix was prepared using each soil source to evaluate a high-range water-reducing additive (i.e., Rheobuild 1000) to decrease viscosity. This mix was originally planned to be one of the Tier 2 mixes, but a sample of

the additive was not received in time. Only strength, permeability, and viscosity of these two mixes were determined.

All mixes were created using a combination of ground granulated blast furnace slag (GGBFS) and Portland cement (3 parts GGBFS and 1 part cement) as the primary solidification reagents. All mixes were prepared on a dry weight basis (i.e. mass of component to dry mass of soil).

TABLE 18. ISS-02 Mixes

Location	Mix ID	Water-to-Reagents Ratio	Component	Mass (g)	Percentage (%)
ISS-02	5521+5521A-9	0.9	Soil	5000.0	100.0
			GGBFS	337.5	6.75
			Cement	112.5	2.25
			Water	405.0	
	5521+5521A-14	0.9	Soil	5000.0	100.0
			GGBFS	337.5	6.75
			Cement	112.5	2.25
			Rheobuild 1000[a]	22.5 mL	
			Water	405	

a. Rheobuild's dose is equal to 5 mL per 100 grams of GGBFS-cement,

TABLE 19. ISS-04 Mixes

Location	Mix ID	Water-to-Reagents Ratio	Component	Mass (g)	Percentage (%)
ISS-04	5525 A,B,C-9	0.50	Soil	12635.4	100.0
			GGBFS	852.9	6.75
			Cement	284.3	2.25
			Water	564	
	5525 A,B,C-10	0.72	Soil	6317.7	100.0
			GGBFS	426.4	6.75
			Cement	142.1	2.25
			Bentonite	63.2	1.0
			Water	455	
	5525 A,B,C-11	0.78	Soil	6317.7	100.0
			GGBFS	426.4	6.75
			Cement	142.1	2.25
			Bentonite	126.4	2.0
			Water	545	
	5525 A,B,C-12	0.64	Soil	6317.7	100.0
			GGBFS	426.4	6.75
			Cement	142.1	2.25
			Organoclay	63.2	1.0
			Water	407	
	5525 A,B,C-13	0.58	Soil	6317.7	100.0
			GGBFS	426.4	6.75
			Cement	142.1	2.25
			Organoclay	126.4	2.0
			Water	407	
	5525 A,B,C-14	0.50	Soil	6317.7	100.0
			GGBFS	426.4	6.75
			Cement	142.1	2.25
			Rheobuild 1000[a]	28.4 mL	
			Water	282	

a. Rheobuild's dose is equal to 5 mL per 100 grams of GGBFS-cement,

Mixes were prepared using the procedure described previously. Specimens were prepared for strength, hydraulic conductivity, and leachability determination. Specimens for strength and leachability determination were molded in 3-inch diameter by 6-inch length molds. Specimens for hydraulic conductivity were molded in 3-inch diameter by 3-inch length molds. Specimens were cured for 28 days at 100% relative humidity and standard temperature

and pressure. After curing, specimens were extruded from their molds and tested.

TABLE 20. Tier 3 Data

Location	Mix ID	Dose (%) GGBFS-Cement[a]	Bentonite	Organoclay	High-Range Water-Reducer[b]	Viscosity (cP)	Strength (psi)	Permeability (cm/sec)
ISS-02	5521+5521A-9	9				1260K	420.8	1.4×10^{-7}
	5521+5521A-14	9			5	968K	61.3	7.8×10^{-5}
ISS-04	5525 A,B,C-9	9				1292K	643.1	8.6×10^{-8}
	5525 A,B,C-9[c]	9				1292K	661.6	5.1×10^{-8}
	5525 A,B,C-10	9	1			996K	489.6	3.4×10^{-8}
	5525 A,B,C-11	9	2			863K	408.9	1.3×10^{-8}
	5525 A,B,C-12	9		1		757K	453.7	3.1×10^{-7}
	5525 A,B,C-13	9		2		984K	446.8	1.2×10^{-7}
	5525 A,B,C-14	9			5	1093K	447.0	4.1×10^{-5}

a. Total dose of cementitious materials consisting of 3 parts GGBFS and 1 part cement

b. 5 mL of Rheobuild 1000 per 100 grams of GGBFS-cement

c. Duplicate

Tier III Data Analysis and Conclusions

The strengths of all mixes exceeded the minimum performance criterion of 50 psi. Control mixes (mixes without additives) attained the greatest strength of all mixes for each soil source. As expected, mixes prepared using bentonite or organoclay were all weaker than the respective control mixes.

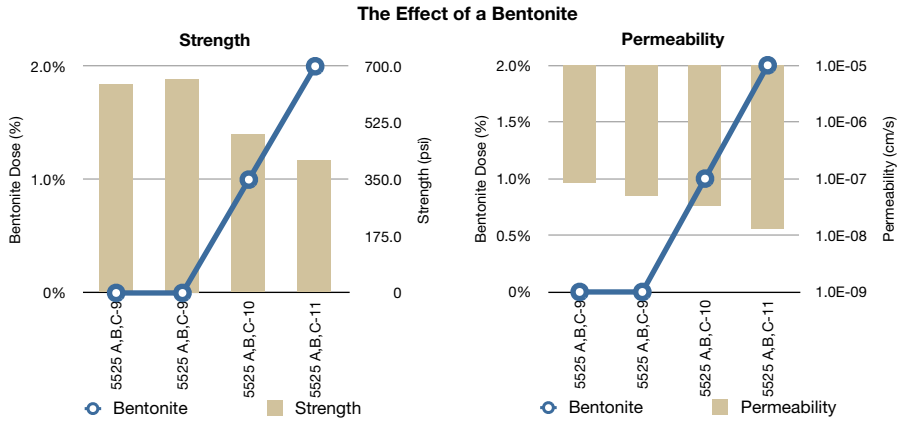
All mixes, except the two mixes prepared using a high-range water-reducing admixture (plasticizer), attained the performance criterion (less than or equal to 1×10^{-6} cm/sec).

Strength and Permeability

As expected, mixes prepared using bentonite were the least permeable of all mixes and permeability decreased as the bentonite dose increased. Bentonite was used as an additive specifically to help reduce the stabilized soil's permeability. Due to bentonite's high plasticity, some loss of strength occurred. However, even though strength decreased when bentonite was

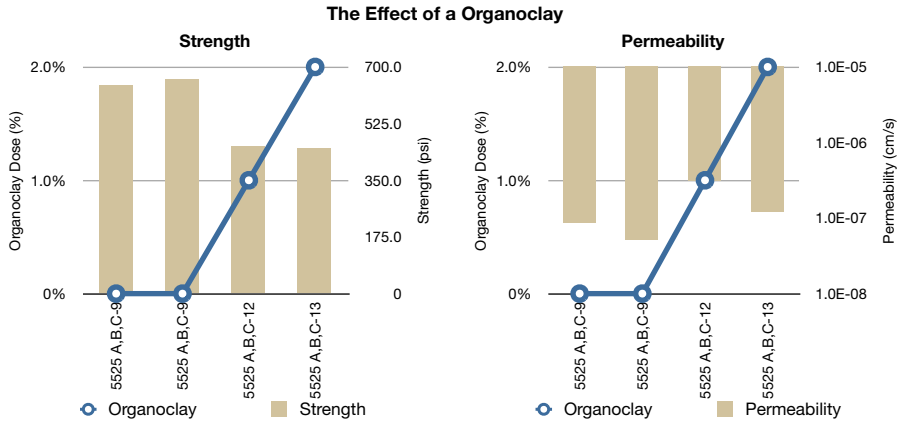
added to the mix, the strength values are still near the upper limit (500 psi) for anticipated future use of the property.

FIGURE 11. Bentonite's Effect as an Admixture



Mixes prepared using organoclay were slightly more permeable than control mixes and also attained less strength. However, organoclay was added to help reduce leachability and not to increase strength or reduce permeability.

FIGURE 12. Organoclay's Effect as an Admixture



The two mixes that were prepared to evaluate the viscosity effect of a high-range water-reducing admixture exhibited decreased strength and increased permeability. Strength decreased markedly for the ISS-02 soil, and less so for the ISS-04 soil. Permeability increased markedly for these two mixes and failed to attain the performance criterion.

Viscosity

Bentonite, organoclay, and high-range water-reducing admixture all decreased viscosity compared to control mixes. Figures 13 and 14 show that the high-range water-reducing admixture exhibited no better viscosity performance than bentonite or organoclay, and it adversely affected strength and permeability whereas bentonite and organoclay did not.

FIGURE 13. VIscosity Performance of the Tier II Mixes

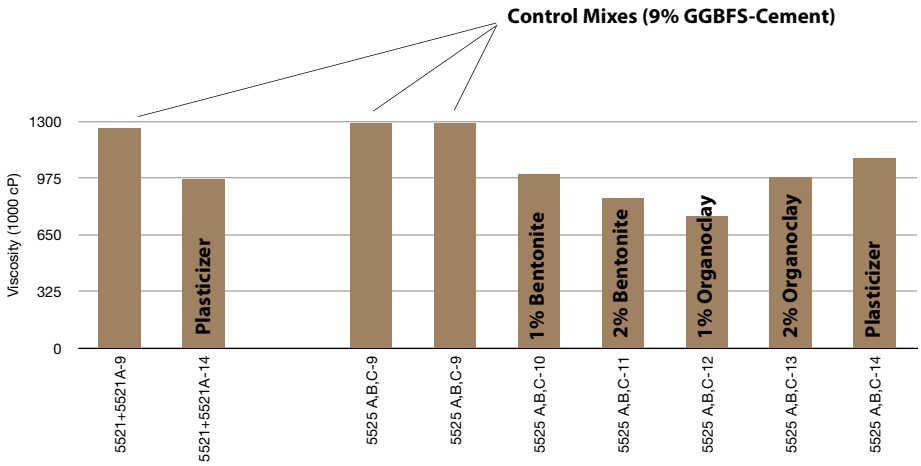
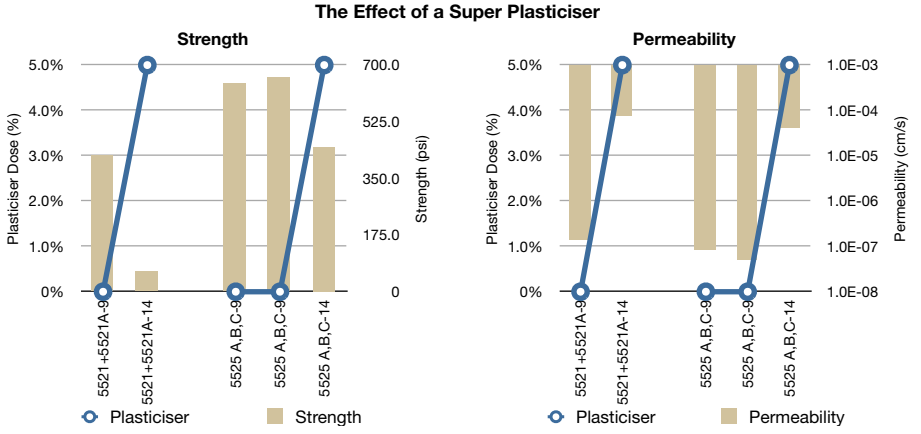


FIGURE 14. Plasticizer's Effect as an Admixture



Tier IV mixes

It was originally intended that Tier IV would produce data that could be used for quality control purposes during construction. A series of five mixes were to be prepared using the worst case soil sample (ISS-04). One mix was to be prepared at optimum moisture content, two mixes were to be prepared drier

than optimum, and two mixes were to be prepared wetter than optimum. The moisture and slump of each mix was to be determined immediately after preparation. The data—moisture content or slump—could then be used by a contractor to verify that the properties of freshly grouted soil were comparable to the properties determined during the bench-scale study. If, for example, the slump of freshly grouted soil was much greater or less than any of the slumps determined during the bench-scale study, the contractor would be alerted to potential problems.

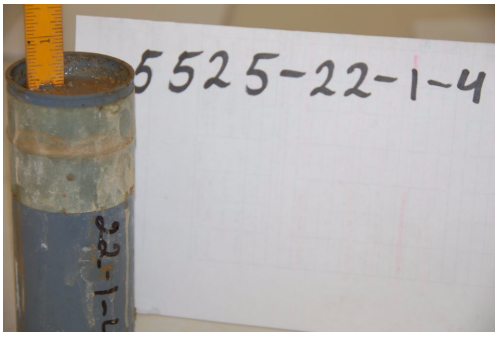
However, since these surrogate properties are not necessarily correlated with the primary performance criteria (strength and permeability), Tier IV's focus was redirected toward developing a more detailed relationship between strength, permeability, and moisture. Moisture content affects strength and permeability and is a component that contractors adjust to overcome difficulties encountered during drilling. To determine the relationship between these parameters, eight mixes were prepared. Four mixes were prepared using a 9% dose of GGBFS-cement and four were prepared using a 9% dose of GGBFS-cement plus a 2% dose of organoclay. The only variable that changed from one mix to the next was the amount of moisture used to prepare each grout. All mixes were prepared on a dry weight basis (i.e. mass of component to dry mass of soil) except for water. The amount of water used to prepare each grout was based on the amount of reagents, and varied from 0.5 to 2.0 times the mass of reagents. For comparison, the ratio of water to reagents used for the Tier III mixes ranged from 0.5 to 0.9.

TABLE 21. Tier IV Mix Designs

Mix ID	Water-to-Reagent Ratio	Component	Mass (g)	Percentage (%)
5525-15	0.5	Soil	3394.0	100
		GGBFS	229.1	6.75
		Cement	76.4	2.25
		Water	153	
5525-16	1.0	Soil	3258.0	100
		GGBFS	219.9	6.75
		Cement	73.3	2.25
		Water	293	
5525-17	1.5	Soil	3258.0	100
		GGBFS	219.9	6.75
		Cement	73.3	2.25
		Water	440	
5525-18	2.0	Soil	3258.0	100
		GGBFS	219.9	6.75
		Cement	73.3	2.25
		Water	586	

TABLE 21. Tier IV Mix Designs

Mix ID	Water-to-Reagent Ratio	Component	Mass (g)	Percentage (%)
5525-19	0.5	Soil	3394.0	100
		GGBFS	229.1	6.75
		Cement	76.4	2.25
		Organoclay	67.9	2.0
		Water	187	
5525-20	1.0	Soil	3258.0	100
		GGBFS	219.9	6.75
		Cement	73.3	2.25
		Organoclay	65.2	2.0
		Water	358	
5525-21	1.5	Soil	3258.0	100
		GGBFS	219.9	6.75
		Cement	73.3	2.25
		Organoclay	65.2	2.0
		Water	538	
5525-22	2.0	Soil	3258.0	100
		GGBFS	219.9	6.75
		Cement	73.3	2.25
		Organoclay	65.2	2.0
		Water	717	



Mixes were prepared using the procedure described previously. Immediately after each mix was created, its viscosity was determined. Then, specimens were prepared for strength, hydraulic conductivity, and volume change. Specimens for strength were molded in 2-inch diameter by 4-inch length molds. Specimens for hydraulic conductivity were molded in 3-inch diameter by 3-inch length molds. For mixes with high water to reagent ratios, some separation of solids and liquids was encountered. Molds were made longer to ensure that the test specimen would be the appropriate length after any settlement and separation. Specimens were cut the correct length after curing.

Specimens were cured for up to 28 days at 100% relative humidity and standard temperature and pressure. At predetermined times during the curing

period, specimens were removed from the curing chamber, extruded from their molds, and tested. Strength was determined after curing durations of 3, 7, 14, and 28 days. Hydraulic conductivity was determined after curing durations of 7 and 28 days.

Volume change was determined by comparing the pre-treatment volume of soil to the post-treatment volume of stabilized material. Pre-treatment volume was calculated using the wet mass of soil used for a batch of treated material and its density.

$$v = m \times \rho$$

where m = mass and ρ = density **(EQ 2)**

Example: $v = 3750.4g \times \frac{cm^3}{2.014g} = 1862cm^3$ **(EQ 3)**

The post-treatment volume was determined by measuring the dimensions of each cylindrical specimen created from a batch of treated soil, calculating its volume, and then totaling the volumes of all the specimens that were created from that batch of treated soil.

TABLE 22. Tier IV Data

		Strength (psi)				Permeability (cm/sec)		
Sample ID	Viscosity (cP)	3-day	7-day	14-day	28-day	7-day	28-day	Volume Increase (%)
5525-15	967K	25.8	93.1	320.3	615.5	2.0×10^{-5}	8.6×10^{-7}	9.4
5525-16	172K	19.8	70.1	197.1	375.2	4.2×10^{-5}	3.1×10^{-6}	19.7
5525-17	186K	9.1	32.0	118.2	320.2	6.7×10^{-5}	2.3×10^{-6}	18.5
5525-18	257K	5.5	31.6	132.0	192.7	1.0×10^{-4}	1.1×10^{-5}	22.1
5525-19	1268K	56.9	119.8	357.5	720.3	1.5×10^{-5}	7.7×10^{-7}	11.2
5525-20	117K	23.4	64.5	193.8	317.3	5.5×10^{-5}	3.3×10^{-6}	21.7
5525-21	285K	20.2	36.9	114.5	248.9	9.5×10^{-5}	2.6×10^{-6}	14.8
5525-22	265K	8.4	22.5	86.6	122.5	1.0×10^{-4}	1.6×10^{-5}	18.7

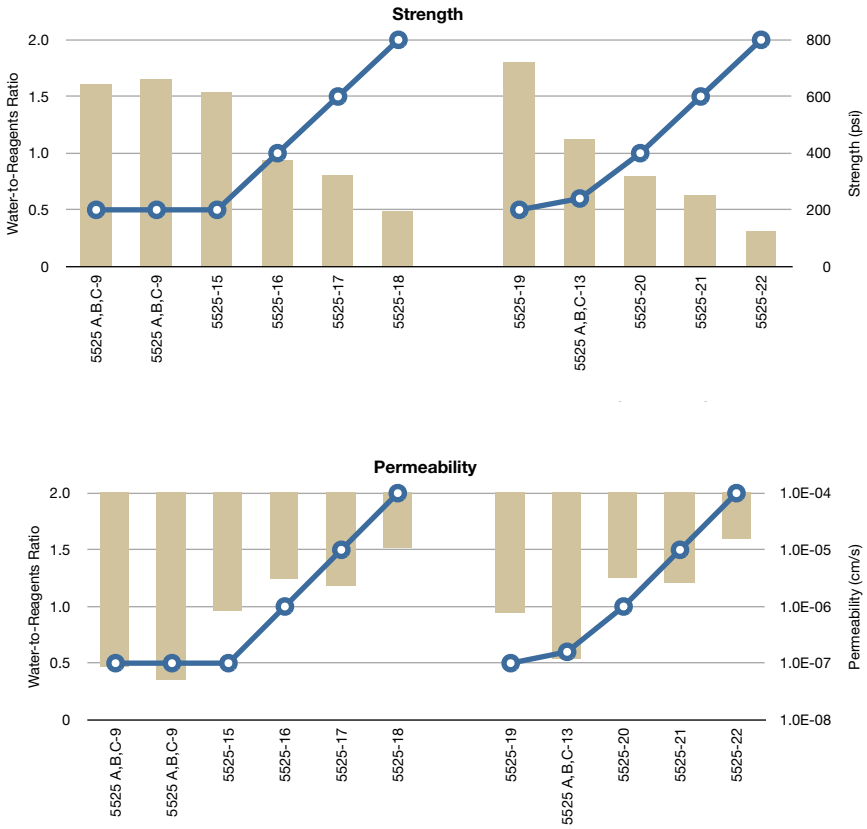
Tier IV Data Analysis and Conclusions

As expected, strength decreased and permeability increased as the ratio of water to reagents increased. However, even the wettest mix exceeded the required minimum strength. Permeability was a different matter. Only mixes created using the least amount of water (0.5 water-to-reagent ratio) were less permeable than the performance criterion. Mixes created using more water were all more permeable than the performance criterion.

Strength and Permeability

Mixes prepared using organoclay generally attained less strength than mixes prepared without organoclay and permeability was almost identical whether organoclay was used or not used (i.e., no beneficial effect). The strength values for the mixes prepared using a 0.5 water-to-reagent ratio were unacceptably high. The following graphs include comparable performance data from Tier III and Tier IV mixes.

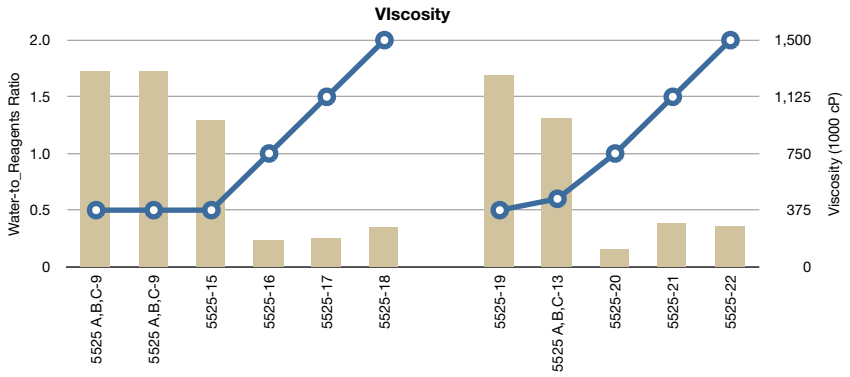
FIGURE 15. Moisture's Effect on Strength and Permeability



Viscosity

Viscosity generally decreased as the moisture content increased, and viscosities were almost identical, whether organoclay was used or not used.

FIGURE 16. Moisture's Effect on Viscosity



Tier V Mixes

Tier V was not part of the original treatability study scope. Tier V was added to evaluate mixes that approximate the upper and lower limits of mix designs that a contractor might use for either deep soil mixing or jet grouting, and to evaluate lesser doses of GGBFS-cement so as to reduce strength while not increasing permeability.

The first objective was to create mixes that approximate the upper and lower limits of mix designs that a contractor might use for deep soil mixing or jet grouting. Because the two technologies are significantly different, the mix designs utilized are also significantly different. Deep soil mixing is a process whereby the soil is mechanically loosened and blended with grout whereas jet grouting erodes and blends the soil matrix as a grout is injected directionally under high pressure.

The second objective was to investigate lesser doses of GGBFS-cement and higher doses of bentonite with the goal of producing less strength without increasing permeability. All previous mixes attained more than adequate strength, but permeability generally increased more than desired in the lower strength mixes.

A total of four mixes were prepared. Two mixes were prepared to approximate the upper and lower limits of mix designs that a contractor might use for deep soil mixing and two mixes were prepared to approximate the upper and lower limits of mix designs that a contractor might use for jet grouting.

Because all soil from ISS-04 area had been consumed during previous phases of the study, URS went to the field and collected additional soil from the most highly impacted portion of the site (i.e., location ISS-04) for further testing. From this phase of the study forward, the sample ID for ISS-04 material changes from 5525 to 8800.

The mixes prepared for deep soil mixing are typical solidification mixes. Mixes were prepared using the procedure described previously. One mix utilized a 6% dose of GGBFS-cement and the other utilized a 6% dose of GGBFS-cement plus 2% bentonite. Both mixes used a water-to-reagents ratio of 1-to-1.

The mixes prepared for jet grouting were prepared quite differently. Rather than adding reagents to soil on a mass basis, grout was added to soil on a volumetric basis. This procedure is typical of the manner jet grouting projects are executed.

One jet grout mix was prepared by combining a 3-to-1 blend of GGBFS and cement with water equal to two times the cementitious materials' mass plus bentonite equal to 5% of the water's mass. Water and bentonite were combined first using a high-shear mixer and then the GGBFS-cement blend was added. The second jet grout mix was prepared by combining GGBFS and cement with water equal to six times the cementitious materials' mass plus bentonite equal to 5% of the water's mass. Water and bentonite were combined first using a high-shear mixer and then the GGBFS-cement blend was added. After each grout was prepared, a volume of grout equal to 50% of the soil's volume was mixed with untreated ISS-04 soil to simulate jet grouting.

TABLE 23. Tier V Mix Designs for Deep Soil Mixing

Mix ID	Water-to-Reagent Ratio	Component	Mass (g)	Percentage (%)
8800-1	1.0	Soil	6000.0	100
		GGBFS	270.0	4.50
		Cement	90.0	1.50
		Water	360	
8800-2	1.0	Soil	6000.0	100
		GGBFS	270.0	4.50
		Cement	90.0	1.50
		Bentonite	120.0	2.0
		Water	480	

TABLE 24. Tier V Mix Designs for jet grouting

Mix ID	Component	Mass (g)	Volume (mL)
8800-3	Soil	6690.0	3321.7[a]
	Grout[b]	2160.8[c]	1660.9
8800-4	Soil	6690.0	3321.7
	Grout[d]	1878.5[e]	1660.9

a. Soil's specific gravity = 2.014 g/mL.

$$v = 6690g \times \frac{1mL}{2.014g} = 3321.7mL$$

b. Grout was created by mixing together 90.0 g bentonite with 1800 mL water using a high-shear mixer and then adding 675.0 g GGBFS and 225.0 g cement.

c. Grout's specific gravity = 1.301.

$$m = 1660.9mL \times \frac{1.301g}{mL} = 2160.8g$$

d. Grout was created by mixing together 90.0 g bentonite with 1800 mL water using a high-shear mixer and then adding 225.0 g GGBFS and 75.0 g cement.

e. Grout's specific gravity = 1.131 g/mL.

$$m = 1660.9mL \times \frac{1.131g}{mL} = 1878.5g$$

Specimens were prepared for strength, hydraulic conductivity, and volume change. Specimens for strength were molded in 2-inch diameter by 4-inch length molds. Specimens for hydraulic conductivity were molded in 3-inch diameter by 3-inch length molds. For mixes with high water to reagent ratios, some separation of solids and liquids was expected. Molds were made longer to ensure that test specimens would have sufficient length after any settlement and separation. Specimens were cut to the correct length after curing.

Volume change was determined by comparing the pre-treatment volume of soil to the post-treatment volume of treated material. Pre-treatment volume was calculated using the wet mass of soil used for a batch of treated material and its density.

$$v = m \times \rho$$

where m = mass and ρ = density **(EQ 4)**

Example: $v = 3750.4g \times \frac{cm^3}{2.014g} = 1862cm^3$ **(EQ 5)**

The post-treatment volume was determined by measuring the dimensions of each cylindrical specimen created from a batch of treated soil, calculating its volume, and then totaling the volumes of all the specimens that were created from that batch of treated soil.

Specimens were cured for up to 28 days at 100% relative humidity and standard temperature and pressure. At predetermined times, specimens were removed from the curing chamber, extruded from their molds, and tested.

Strength and hydraulic conductivity were determined after curing durations of 3, 7, 14, and 28 days.

TABLE 25. Tier V Data

	Strength (psi)			
Sample ID	**3-day**	**7-day**	**14-day**	**28-day**
8800-1	16.4	74.1	185.7	287.4
8800-2	60.0	200.7	324.0	419.8
8800-3	26.1	114.1	277.9	411.5
8800-4	8.3	26.0	44.6	65.1

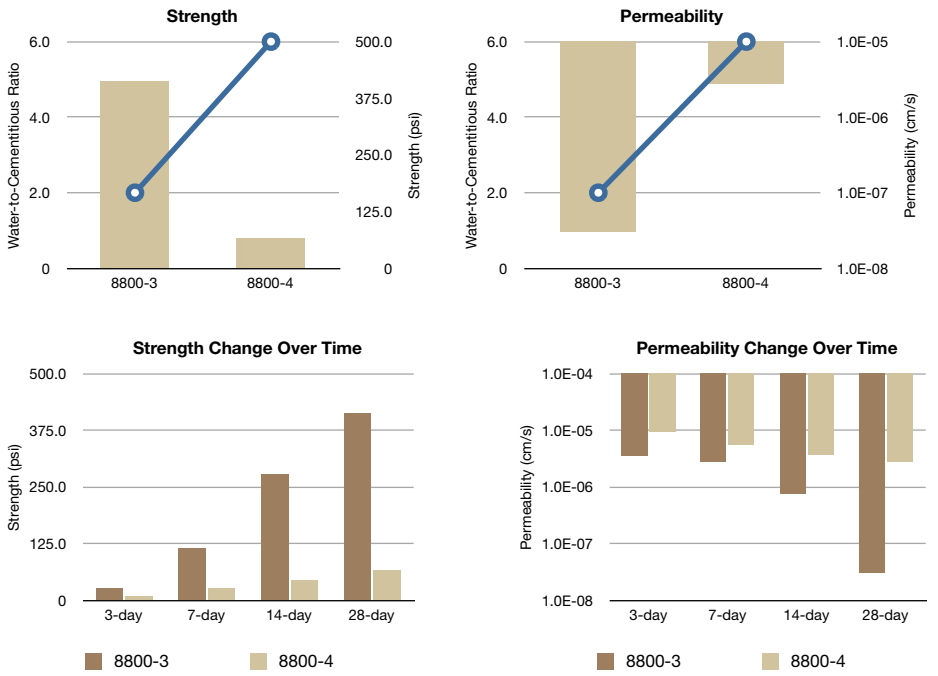
	Permeability (cm/sec)			
Sample ID	**3-day**	**7-day**	**14-day**	**28-day**
8800-1	2.5×10^{-5}	1.9×10^{-5}	8.2×10^{-6}	9.0×10^{-7}
8800-2	8.0×10^{-7}	3.3×10^{-8}	1.8×10^{-8}	8.8×10^{-9}
8800-3	3.6×10^{-6}	2.8×10^{-6}	7.7×10^{-7}	3.1×10^{-8}
8800-4	9.4×10^{-6}	5.7×10^{-6}	3.7×10^{-6}	2.8×10^{-6}

Sample ID	**Volume (%)**
8800-1	9.4
8800-2	12.5
8800-3	25.6
8800-4	17.4

Tier V Data Analysis and Conclusions

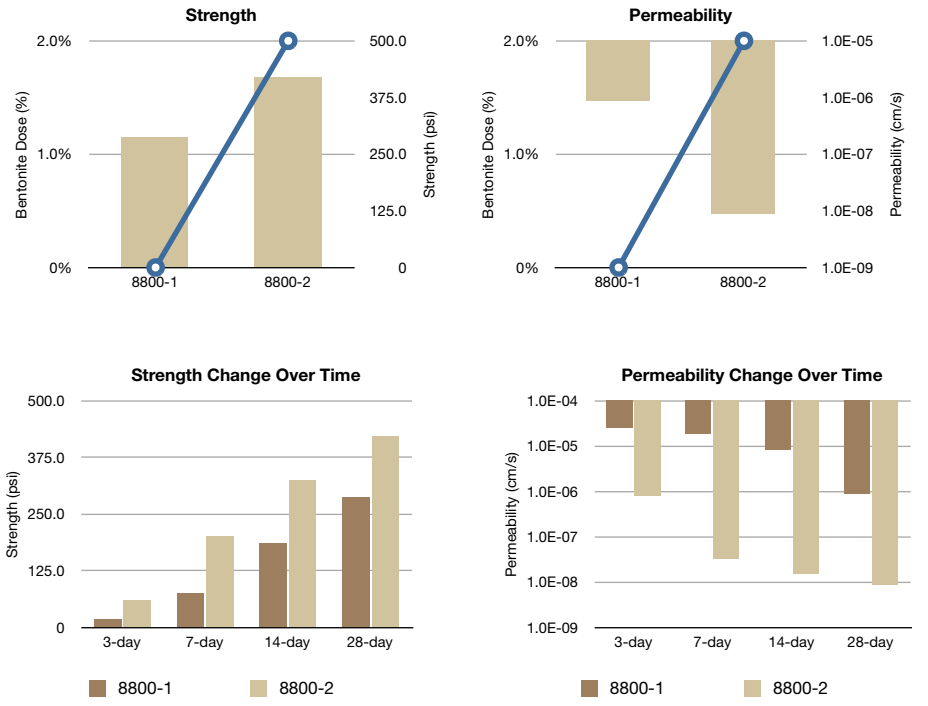
Both deep soil mixing mixes exceeded the performance criteria for strength and permeability, although the mix created without bentonite only marginally attained the permeability criterion. The use of bentonite reduced permeability by two orders of magnitude compared to the same mix without bentonite. Unexpectedly, bentonite also increased strength in these mixes. Usually, bentonite decreases strength due to bentonite's plasticity and moisture adsorbing capacity. For this site, bentonite may increase strength because bentonite particles fill the interstitial spaces of the porous soil (poorly graded sands or gravelly sands, little or no fines), thereby creating a better graded soil more resistant to shear stress.

FIGURE 17. Deep Soil Mixing



Both jet grouting mixes exceeded the performance criterion for strength, but only one mix attained the permeability criterion. The mix created using a high water-to-cementitious ratio was too permeable. Notice that the permeability of the mix created using a high water-to-cementitious ratio decreased less than an order of magnitude during the curing process. The permeability of the mix created using a lesser water-to-cementitious ratio decreased two orders of magnitude during the curing process, with nearly half of the permeability reduction occurring between days 14 and 28.

FIGURE 18. jet grouting



Tier VI Mixes

Like Tier V, Tier VI was not part of the study's original scope. These mixes were added to define strength and permeability characteristics for mixes prepared using lower doses of GGBFS-cement with added bentonite than tested previously. A total of four mixes were prepared, two using a GGBFS-cement dose of 4.5% and two using a GGBFS-cement dose of 5%. Each pair of mixes used bentonite as an admixture. One of the two mixes used a bentonite dose of 0.5% and the other a bentonite dose of 1.0%. All mixes were prepared using a water-to-reagent ratio of one. The narrow range of additives included in Tier VI is an attempt to develop an optimal mix design that attains performance criteria with the lowest possible additive dosage.

TABLE 26. Tier VI Mix Designs

Mix ID	Component	Mass (g)	Percentage (%)
8800-5	Soil	2000.0	100
	GGBFS	67.5	3.375
	Cement	22.5	1.125
	Bentonite	10.0	0.5
	Water	100	

TABLE 26. Tier VI Mix Designs

Mix ID	Component	Mass (g)	Percentage (%)
8800-6	Soil	3000.0	100
	GGBFS	101.3	3.375
	Cement	33.8	1.125
	Bentonite	30.0	1.0
	Water	165	
8800-7	Soil	3000.0	100
	GGBFS	112.5	3.750
	Cement	37.5	1.250
	Bentonite	15.0	0.5
	Water	165	
8800-8	Soil	3000.0	100
	GGBFS	112.5	3.750
	Cement	37.5	1.250
	Bentonite	30.0	1.0
	Water	180	

Mixes were prepared using the same procedure utilized for Tiers I to V. From each mix that was created, specimens were prepared for strength and hydraulic conductivity determination. Specimens for strength were molded in 2-inch diameter by 4-inch length molds. Specimens for hydraulic conductivity were molded in 3-inch diameter by 3-inch length molds. Specimens were cured for up to 28 days at 100% relative humidity and standard temperature and pressure. After curing for the prescribed duration, specimens were extruded from their molds and tested. Strength and hydraulic conductivity were determined after curing durations of 7 and 28 days. Table 27 is a tabulation of all data.

TABLE 27. Tier VI Data

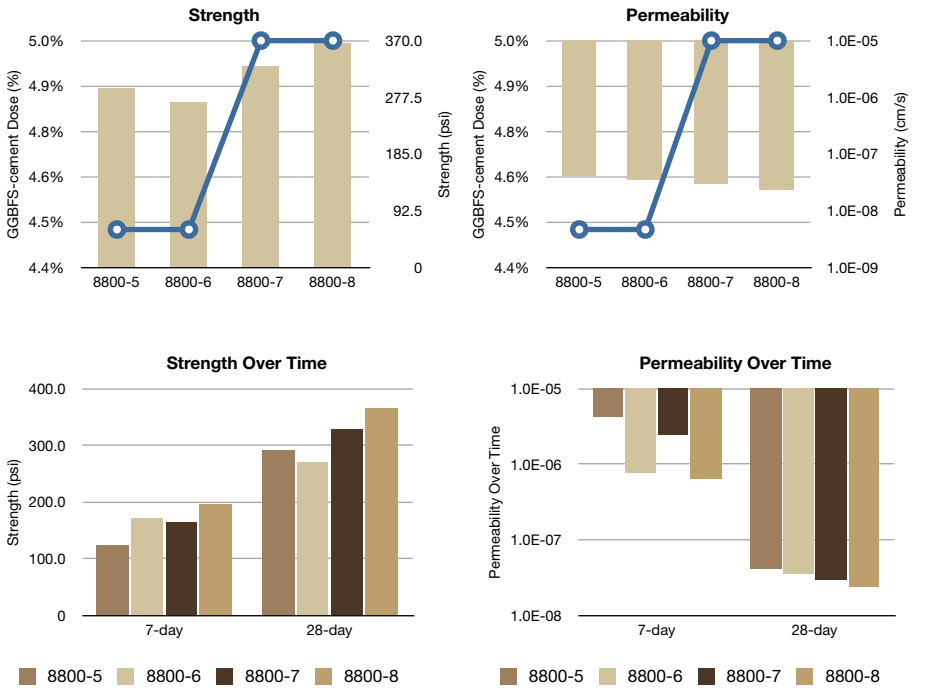
			Strength (psi)		Permeability (cm/sec)	
Mix ID	GGBFS-cement (%)	Bentonite (%)	7-day	28-day	7-day	28-day
8800-5	4.5	0.5	123.1	291.7	4.3×10^{-6}	4.2×10^{-8}
8800-6	4.5	1.0	171.2	269.8	7.8×10^{-7}	3.6×10^{-8}
8800-7	5.0	0.5	164.3	327.7	2.5×10^{-6}	3.0×10^{-8}
8800-8	5.0	1.0	195.5	365.4	6.4×10^{-7}	2.4×10^{-8}

Tier VI Data Analysis and Conclusions

All four mixes attained the performance criteria for strength without developing excessive strength. As expected, the two mixes created using 4.5% GGBFS-cement gained less strength and were more permeable than to two mixes created using 5.0% GGBFS-cement. However, the differential between

the two sets of mixes is nominal. Short-term (7-day) strength was greater and permeability less for mixes that used a 1.0% bentonite dose than for the mixes that used 0.5% bentonite dose. However, longer-term (28-day) strength and permeability were almost identical whether a 0.5% dose or 1.0% dose of bentonite was used.

FIGURE 19. Tier VI Data



Attachments

TIMELY ENGINEERING SOIL TESTS, LLC
1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

SUMMARY of TESTING

T.E.S.T. Project Number: 838

Project Name: National Grid Hempstead,NY MGP

DRAFT

Sample Identification												Grain Size Distribution			Atterberg Limits			Unit Weight		
T.E.S.T. Sample No.	Client Base Material No.	Mix Design No.	Batch No.	Spec. No.	USCS	Admix GGBFS/ Cem. (3/1) %	Curing Age, days	UCS, psi	Moisture Content, %	Viscosity cP (mPa s)		% Finer #4 Sieve	% Finer #200 Sieve	% Finer 0.005mm	LL, %	PL, %	PI, %	Wet Density, pcf	Dry Density, pcf	Hydraul. Conduct. cm/sec
838-01																				
5521+ 5521A	ISS-02/10'-35'	-	-	-	SP		-	-	5.7			91.7	3.3	0.6	NP	NP	NP	121.0	114.7	-
5521+ 5521A	ISS-02/10'-35'	1	1	1		10	28	370.8	10.5				-	-	-	-	-	120.3	108.8	-
5521+ 5521A	ISS-02/10'-35'	1	1	2		10	28	-	10.1				-	-	-	-	-	118.1	107.3	2.8E-07
5521+ 5521A	ISS-02/10'-35'	2	1	1		20	28	838.2	10.5				-	-	-	-	-	117.2	106.0	-
5521+ 5521A	ISS-02/10'-35'	2	1	2		20	28	-	10.8				-	-	-	-	-	115.1	103.9	5.2E-08
5521+ 5521A	ISS-02/10'-35'	3	1	1		30	28	1876.7	10.1				-	-	-	-	-	124.4	113.0	-
5521+ 5521A	ISS-02/10'-35'	3	1	2		30	28	-	9.6				-	-	-	-	-	126.0	115.0	6.3E-08
5521+ 5521A	ISS-02/10'-35'	4	1	1		40	28	1974.2	10.9				-	-	-	-	-	122.2	110.1	-
5521+ 5521A	ISS-02/10'-35'	4	1	2		40	28	-	10.1				-	-	-	-	-	123.0	111.7	2.9E-08
5522+ 5523	ISS-03/10'-50'	-	-	-	SP		-	-	9.8			88.1	2.9	0.6	NP	NP	NP	129.1	117.3	-
5522+ 5523	ISS-03/10'-50'	1	1	1		10	28	428.0	10.7				-	-	-	-	-	122.4	110.5	-
5522+ 5523	ISS-03/10'-50'	1	1	2		10	28	-	10.3				-	-	-	-	-	119.7	108.5	3.1E-07
5522+ 5523	ISS-03/10'-50'	2	1	1		20	28	1102.9	12.5				-	-	-	-	-	123.4	109.7	-
5522+ 5523	ISS-03/10'-50'	2	1	2		20	28	-	10.9				-	-	-	-	-	123.4	111.3	4.9E-08
5522+ 5523	ISS-03/10'-50'	3	1	1		30	28	1730.8	12.1				-	-	-	-	-	128.7	114.8	-
5522+ 5523	ISS-03/10'-50'	3	1	2		30	28	-	11.6				-	-	-	-	-	126.9	113.7	3.7E-08
5522+ 5523	ISS-03/10'-50'	4	1	1		40	28	2509.8	13.6				-	-	-	-	-	128.6	113.2	-

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SUMMARY of TESTING

T.E.S.T. Project Number: 838

Project Name: National Grid Hempstead,NY MGP

DRAFT

Sample Identification					USCS	Admix	Curing	UCS,	Moisture	Viscosity	Grain Size Distribution			Atterberg Limits			Unit Weight		Hydraul.
T.E.S.T. Sample No.	Client Base Material No.	Mix Design No.	Batch No.	Spec. No.		GGBFS/ Cem. (3/1) %	Age, days	psi	Content, %	cP (mPa s)	% Finer #4 Sieve	% Finer #200 Sieve	% Finer 0.005mm	LL, %	PL, %	PI, %	Wet Density, pcf	Dry Density, pcf	Conduct. cm/sec
5522+ 5523	ISS-03/10'-50'	4	1	2		40	28	-	12.8			-	-	-	-	-	126.2	111.9	2.2E-08
5524+ 5524A	ISS-01/25'-70'	-	-	-	SP		-	-	15.2		96.0	3.7	0.7	NP	NP	NP	128.3	114.8	-
5524+ 5524A	ISS-01/25'-70'	1	1	1		10	28	260.2	14.2			-	-	-	-	-	114.0	99.8	-
5524+ 5524A	ISS-01/25'-70'	1	1	2		10	28	-	13.9			-	-	-	-	-	113.7	99.8	3.5E-07
5524+ 5524A	ISS-01/25'-70'	2	1	1		20	28	1109.5	12.6			-	-	-	-	-	118.2	105.0	-
5524+ 5524A	ISS-01/25'-70'	2	1	2		20	28	-	12.1			-	-	-	-	-	118.7	105.9	5.1E-08
5524+ 5524A	ISS-01/25'-70'	3	1	1		30	28	2358.2	13.5			-	-	-	-	-	125.0	110.1	-
5524+ 5524A	ISS-01/25'-70'	3	1	2		30	28	-	12.8			-	-	-	-	-	125.7	111.4	3.0E-08
5524+ 5524A	ISS-01/25'-70'	4	1	1		40	28	2788.6	13.9			-	-	-	-	-	126.1	110.7	-
5524+ 5524A	ISS-01/25'-70'	4	1	2		40	28	-	13.2			-	-	-	-	-	126.1	111.4	1.6E-08
5525+ 5525A	ISS-04/20'-40'	-	-	-	SP		-	-	10.4		93.5	4.0	0.9	NP	NP	NP	125.7	114.0	-
5525+ 5525A	ISS-04/20'-40'	1	1	1		10	28	749.6	12.4			-	-	-	-	-	129.5	115.2	-
5525+ 5525A	ISS-04/20'-40'	1	1	2		10	28	-	12.0			-	-	-	-	-	128.2	114.5	3.9E-08
5525+ 5525A	ISS-04/20'-40'	2	1	1		20	28	1895.7	11.8			-	-	-	-	-	127.2	113.7	-
5525+ 5525A	ISS-04/20'-40'	2	1	2		20	28	-	11.6			-	-	-	-	-	127.3	114.1	1.0E-08
5525+ 5525A	ISS-04/20'-40'	3	1	1		30	28	2414.7	12.5			-	-	-	-	-	129.2	114.9	-
5525+ 5525A	ISS-04/20'-40'	3	1	2		30	28	-	12.0			-	-	-	-	-	129.6	115.7	8.4E-09
5525+ 5525A	ISS-04/20'-40'	4	1	1		40	28	2786.7	13.4			-	-	-	-	-	129.3	113.9	-
5525+ 5525A	ISS-04/20'-40'	4	1	2		40	28	-	12.9			-	-	-	-	-	128.1	113.5	5.2E-09

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Web: www.test-llc.com

Tested By	RI
Date	10/10/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Bulk
Sample ID	5521+5521A / ISS-02	Depth/Elev.	10'-35'
Location	-	Add. Info	-

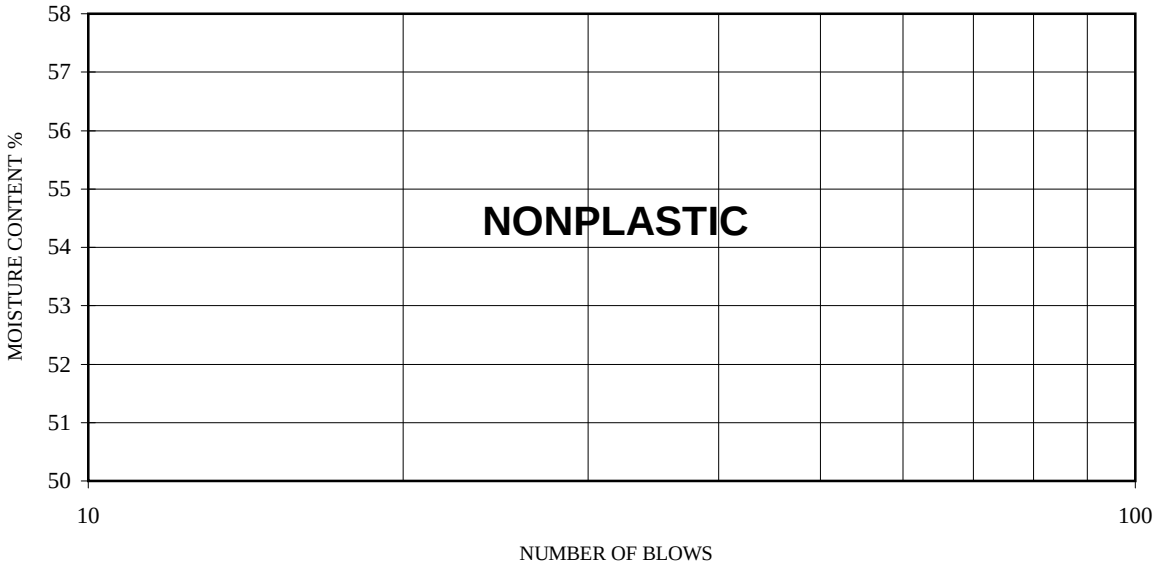
ASTM D 4318

Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)

	LIQUID LIMIT	
Number of Blows	5	5
Weight of Wet Sample & Tare, g	33.78	37.91
Weight of Dry Soil & Tare, g	33.12	37.23
Weight of Tare, g	23.95	27.93
Moisture Content, %	7.20	7.31

Liquid Limit Device ID # 56

NOTES: 1. Material appears to be Nonplastic. (Liquid Limit or Plastic Limit test could not be performed.)
2. Material passing No. 40 sieve was used for test.



	PLASTIC LIMIT	
Weight of Wet Soil & Tare, g	31.63	28.56
Weight of Dry Soil & Tare, g	31.00	28.00
Weight of Tare, g	22.28	20.16
Moisture Content, %	7.22	7.14

PREPARATION PROCEDURE: DRY

Oven ID Number: 12/13/14/15

Balance ID Number: 2

	NATURAL MOISTURE
Weight of Wet Soil & Tare, g	899.30
Weight of Dry Soil & Tare, g	859.00
Weight of Tare, g	157.60
Moisture Content, %	5.75

LIQUID LIMIT (LL)	NP
PLASTIC LIMIT (PL)	NP
PLASTICITY INDEX (PI)	NP
LIQUIDITY INDEX (LI)	-

DESCRIPTION: Strong Brown Poorly Graded Sand

USCS (ASTM D2487;2488): SP

AASHTO (M 145): NA

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Tested By	RI
Date	10/09/08
Checked By	LB

Client Pr. #		Lab. PR. #	
Pr. Name	Nationa	S. Type	
Sample ID	5	Depth/Elev.	
Location		Add. Info	

ASTM D 422/AASHTO T 88
Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)

As-Received Moisture Content

Mass of Wet Sample & Tare, g	899.30
Mass of Dry Sample & Tare, g	859.00
Mass of Tare, g	157.60
Moisture Content, %	5.7

Mass of Wet Sample & Tare, g	745.60
Mass of Dry Sample & Tare, g	710.30
Mass of Tare, g	92.90
Moisture Content, %	5.7

Mass of Total Sample before separation on #4 sieve & Tare, g	54400.00
Mass of Tare, g	0.00
Total Mass of Dry Sample, g	51457.88

Mass of Sample used for hydrometer analysis, g	120.06
Dry Mass, g	113.57
% of Total Sample passing #4 sieve	91.7

SIEVE ANALYSIS

Mass of Tare, g: 0.00

Sieve Size		Sample & Tare, g	% RETAINED	%PASSING
12"	COBBLES		0.0	100.0
3"			0.0	100.0
2.5"	COARSE		0.0	100.0
2"	GRAVEL		0.0	100.0
1.5"			0.0	100.0
1"		0.00	0.0	100.0
.75"		284.00	0.6	99.4
.5"	FINE GRAVEL	1095.00	2.1	97.9
.375"		1855.00	3.6	96.4
#4	COARSE SAND	4257.00	8.3	91.7

PORTION OF SAMPLE PASSING #4 SIEVE (Hydrometer Backsieve)

Sieve Size		Cumulative Mass retained, g	% PASSING
#10	MEDIUM	10.29	83.4
#20	SAND	34.15	64.1
#40		72.88	32.9
#60	FINE SAND	99.35	11.5
#100		107.54	4.9
#200	FINES	109.46	3.3

Remarks

HYDROMETER ANALYSIS

Length of Dispersion Period	1 Minute
Mechanical Dispersion Device ID #	61
Amount of Dispersing Agent (ml)	125.0
Specific Gravity (assumed)	2.700
Specific Gravity (tested)	
Starting time	10:25

PARTICLE-SIZE ANALYSIS

% COBBLES	0.0	% MEDIUM SAND	50.6
% COARSE GRAVEL	0.6	% FINE SAND	29.5
% FINE GRAVEL	7.7	% FINES	3.3
% COARSE SAND	8.3	% TOTAL SAMPLE	100.0
% CLAY(<0.005mm)	0.6	% CLAY(<0.002mm)	0.1

Date	Time	Testing time (min)	Reading	Temp (°C)	K	Composite Correction	Actual Reading	Effective Depth (cm)	a	Particle Diam. (mm)	Percent Passing
10/13/08	10:27	2	8.5	26.5	0.01239	5.0	3.5	15.8	0.99	0.0348	2.8
10/13/08	10:30	5	8.0	26.5	0.01239	5.0	3.0	15.9	0.99	0.0221	2.4
10/13/08	10:40	15	7.0	26.5	0.01239	5.0	2.0	16.0	0.99	0.0128	1.6
10/13/08	10:55	30	6.5	26.5	0.01239	5.0	1.5	16.1	0.99	0.0091	1.2
10/13/08	11:25	60	6.0	26.5	0.01239	5.0	1.0	16.2	0.99	0.0064	0.8
10/13/08	14:35	250	5.5	26.5	0.01239	5.0	0.5	16.3	0.99	0.0032	0.4
10/14/08	10:25	1440	5.0	26.5	0.01239	5.0	0.0	16.4	0.99	0.0013	0.0

Hydrometer 152H ID #	451190	Oven ID #	12/13/14/15
Sieve Shaker ID #	54/130	Balance ID#	1/6/7

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Web: www.test-llc.com

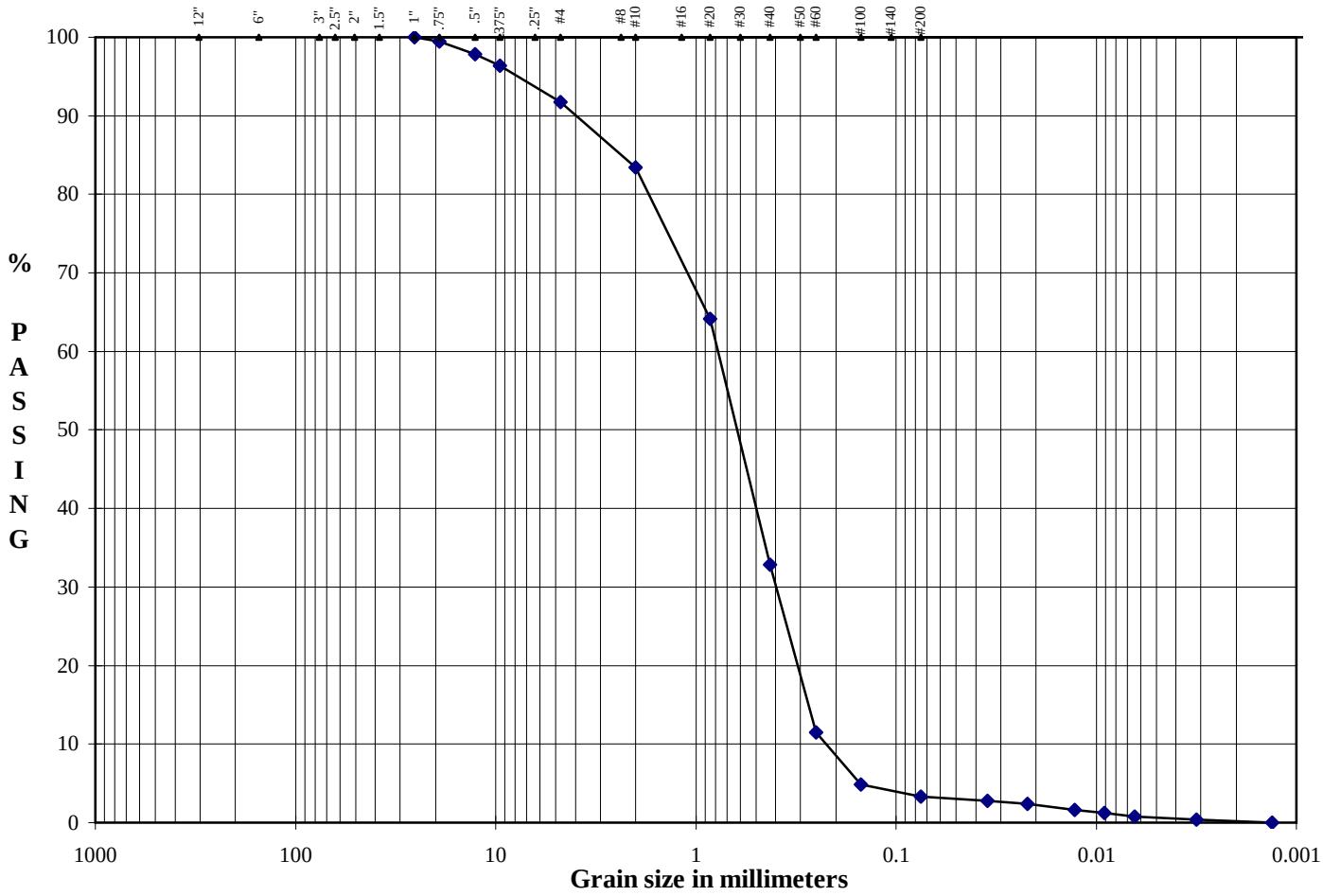
Tested By	RI
Date	10/09/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Bulk
Sample ID	5521+5521A / ISS-02	Depth/Elev.	10'-35'
Location	-	Add. Info	-

ASTM D 422/AASHTO T 88

Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)

Particle-Size Analysis



Boulders	Cobbles	Gravel: Coarse	Gravel: Fine	Sand: Coarse	Sand: Medium	Sand: Fine	Fines: Silt or Clay

D_{10}	0.23	mm
D_{30}	0.40	mm
D_{60}	0.79	mm
Cu	3.5	
Cc	0.9	

DESCRIPTION: Strong Brown Poorly Graded Sand

USCS (ASTM D2487; D2488): SP

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Tested By	RI
Date	10/09/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Bulk
Sample ID	5521+5521A / ISS-02	Depth/Elev.	10'-35'
Location	-	Add. Info	-

ASTM D 698
Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600kN-m/m^3))

DETERMINATION OF TEST PROCEDURE

	wet	dry
Mass of Soil before sieving, g	NA	NA
Mass of Mat. Retained on No. 4 sieve, g	NA	NA
Mass of Mat. Retained on 3/8" sieve, g	NA	NA
Mass of Mat. Retained on 3/4" sieve, g	NA	NA

Material Retained on No. 4 Sieve, %	NA
Material Retained on 3/8" Sieve, %	NA
Material Retained on 3/4" Sieve, %	NA
Total, % (oversized)	NA

MOISTURE CONTENT

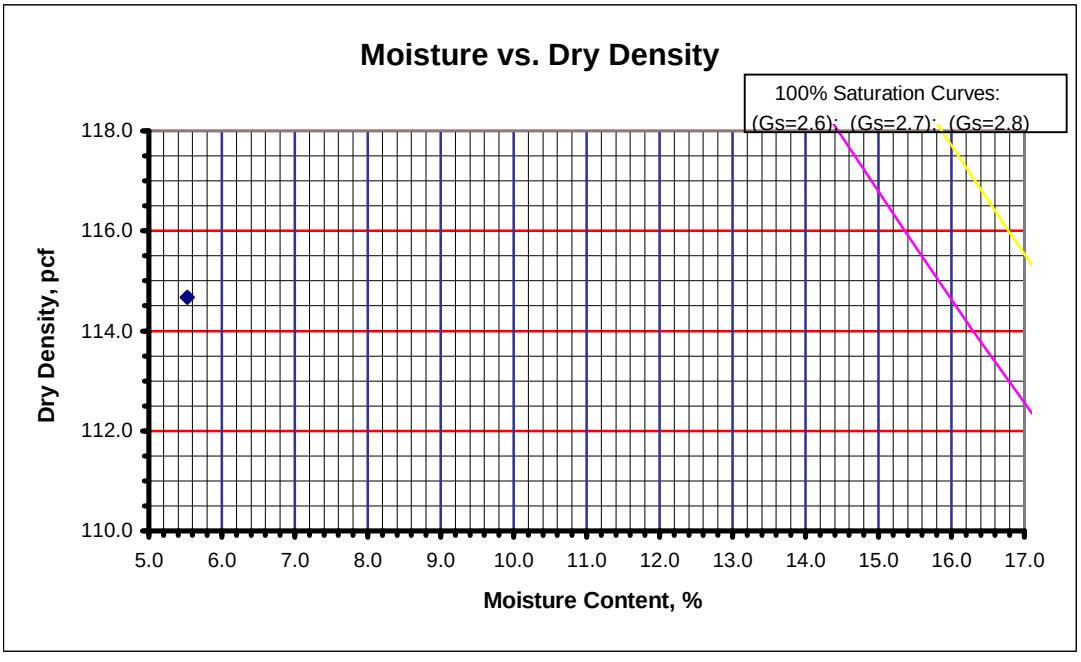
	Coarse + Fine Fraction	Coarse Fraction
Mass of Wet Sample & Tare, g	899.3	
Mass of Dry Sample & Tare, g	859.0	
Mass of Tare, g	157.6	
Moisture Content, %	5.7	

Procedure: C

TEST DATA

Points	1	2	3	4	5
Mass of Mold and Soil, g	9844.0				
Mass of Wet Sample & Tare, g	859.0				
Mass of Dry Sample & Tare, g	819.0				
Mass of Tare, g	95.5				
Moisture Content, %	5.5				
Wet Density, pcf	121.0				
Dry Density, pcf	114.7				

Mold ID Number	19
Mass of Mold, g	5727.0
Volume of Mold, ft^3	0.075
Hammer ID Number	20
Number of Blows per layer	56
Number of Layers	3



Method A: Material retained on No. 4 ≤ 20%

Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%

Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

Material was compacted at as-received moisture content prior to screening on #4 Sieve

DESCRIPTION

Strong Brown Poorly Graded Sand

USCS (ASTM D2487; D2488): SP

Maximum Dry Density, pcf	
Optimum Moisture Content, %	

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Tested By	RI
Date	10/10/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Bulk
Sample ID	5522+5523 / ISS-03	Depth/Elev.	10'-50'
Location	-	Add. Info	-

ASTM D 4318

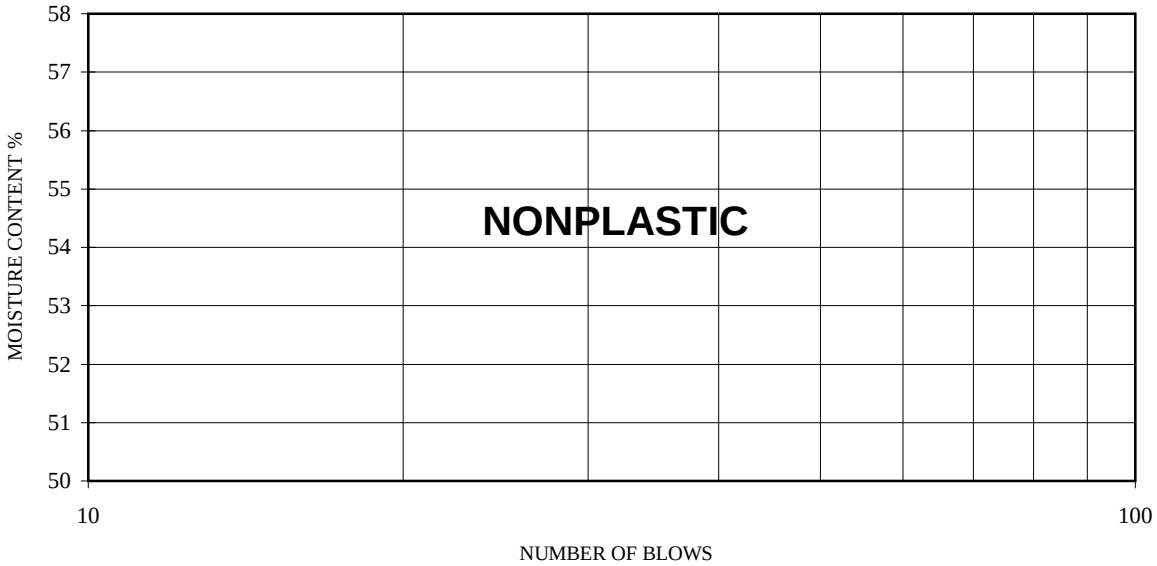
Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)

LIQUID LIMIT

Number of Blows	5	5
Weight of Wet Sample & Tare, g	34.16	34.20
Weight of Dry Soil & Tare, g	33.29	33.31
Weight of Tare, g	24.66	24.31
Moisture Content, %	10.08	9.89

Liquid Limit Device ID # 56

NOTES: 1. Material appears to be Nonplastic. (Liquid Limit or Plastic Limit test could not be performed.)
2. Material passing No. 40 sieve was used for test.



PLASTIC LIMIT

Weight of Wet Soil & Tare, g	29.54	28.27
Weight of Dry Soil & Tare, g	28.75	27.45
Weight of Tare, g	20.75	18.89
Moisture Content, %	9.87	9.58

PREPARATION PROCEDURE	DRY
Oven ID Number	12/13/14/15
Balance ID Number	2

NATURAL MOISTURE

Weight of Wet Soil & Tare, g	971.20
Weight of Dry Soil & Tare, g	898.80
Weight of Tare, g	161.90
Moisture Content, %	9.82

LIQUID LIMIT (LL)	NP
PLASTIC LIMIT (PL)	NP
PLASTICITY INDEX (PI)	NP
LIQUIDITY INDEX (LI)	-

DESCRIPTION: Dark Brown Poorly Graded Sand

USCS (ASTM D2487;2488): SP

AASHTO (M 145): NA

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Tested By	RI
Date	10/09/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Bulk
Sample ID	5522+5523 / ISS-03	Depth/Elev.	10'-50'
Location	-	Add. Info	-

ASTM D 422/AASHTO T 88
Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)

As-Received Moisture Content

Mass of Wet Sample & Tare, g	971.20
Mass of Dry Sample & Tare, g	898.80
Mass of Tare, g	161.90
Moisture Content, %	9.8

Moisture Content of Material Used for Hydrometer Analysis

Mass of Wet Sample & Tare, g	784.90
Mass of Dry Sample & Tare, g	718.50
Mass of Tare, g	89.70
Moisture Content, %	10.6

Mass of Total Sample before separation on #4 sieve & Tare, g	59250.00
Mass of Tare, g	0.00
Total Mass of Dry Sample, g	53590.91

Mass of Sample used for hydrometer analysis, g	120.02
Dry Mass, g	108.56
% of Total Sample passing #4 sieve	88.1

SIEVE ANALYSIS

PORTION OF SAMPLE RETAINED ON #4 SIEVE

Mass of Tare, g: 0.00

Sieve Size		Sample & Tare, g	% RETAINED	%PASSING
12"	COBBLES		0.0	100.0
3"			0.0	100.0
2.5"	COARSE		0.0	100.0
2"	GRAVEL		0.0	100.0
1.5"		0.00	0.0	100.0
1"		25.00	0.0	100.0
.75"		173.00	0.3	99.7
.5"	FINE GRAVEL	1394.00	2.6	97.4
.375"		2376.00	4.4	95.6
#4	COARSE SAND	6367.00	11.9	88.1

PORTION OF SAMPLE PASSING #4 SIEVE (Hydrometer Backsieve)

Sieve Size		Cumulative Mass retained, g	% PASSING
#10	MEDIUM	15.57	75.5
#20	SAND	37.90	57.4
#40		64.41	35.8
#60	FINE SAND	91.76	13.6
#100		101.91	5.4
#200	FINES	104.93	2.9

Remarks

HYDROMETER ANALYSIS

Length of Dispersion Period	1 Minute
Mechanical Dispersion Device ID #	61
Amount of Dispersing Agent (ml)	125.0
Specific Gravity (assumed)	2.700
Specific Gravity (tested)	
Starting time	10:27

PARTICLE-SIZE ANALYSIS

% COBBLES	0.0	% MEDIUM SAND	39.6
% COARSE GRAVEL	0.3	% FINE SAND	32.9
% FINE GRAVEL	11.6	% FINES	2.9
% COARSE SAND	12.6	% TOTAL SAMPLE	100.0
% CLAY(<0.005mm)	0.6	% CLAY(<0.002mm)	0.1

Date	Time	Testing time (min)	Reading	Temp (^{o}C)	K	Composite Correction	Actual Reading	Effective Depth (cm)	a	Particle Diam. (mm)	Percent Passing
10/13/08	10:29	2	8.5	26.5	0.01239	5.0	3.5	15.8	0.99	0.0348	2.8
10/13/08	10:32	5	7.5	26.5	0.01239	5.0	2.5	16.0	0.99	0.0221	2.0
10/13/08	10:42	15	7.0	26.5	0.01239	5.0	2.0	16.0	0.99	0.0128	1.6
10/13/08	10:57	30	6.5	26.5	0.01239	5.0	1.5	16.1	0.99	0.0091	1.2
10/13/08	11:27	60	6.0	26.5	0.01239	5.0	1.0	16.2	0.99	0.0064	0.8
10/13/08	14:37	250	5.5	26.5	0.01239	5.0	0.5	16.3	0.99	0.0032	0.4
10/14/08	10:27	1440	5.0	26.5	0.01239	5.0	0.0	16.4	0.99	0.0013	0.0

Hydrometer 152H ID #	451190	Oven ID #	12/13/14/15
Sieve Shaker ID #	54/130	Balance ID#	1/6/7

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Fax: 770-923-8973
Web: www.test-llc.com

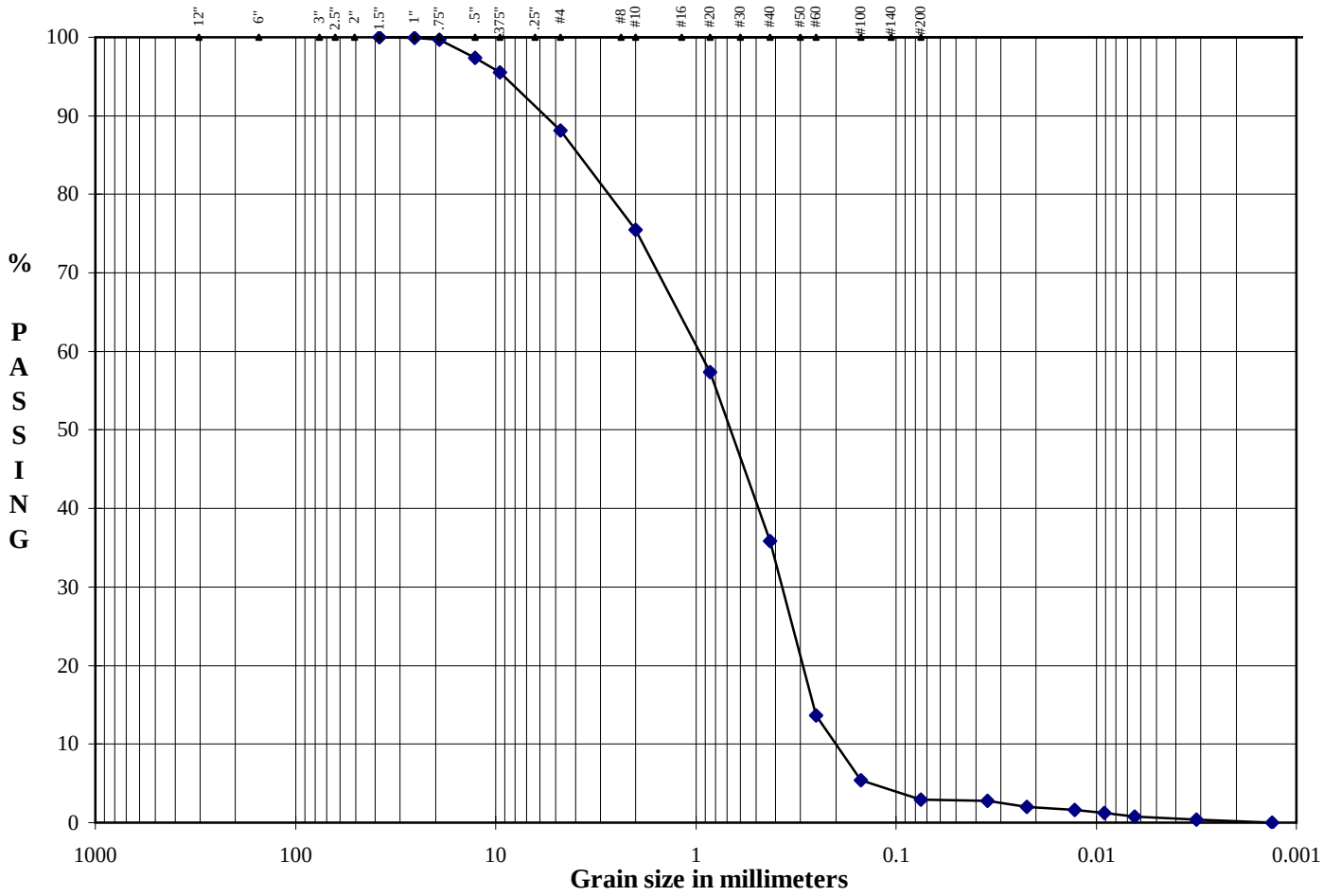
Tested By	RI
Date	10/09/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Bulk
Sample ID	5522+5523 / ISS-03	Depth/Elev.	10'-50'
Location	-	Add. Info	-

ASTM D 422/AASHTO T 88

Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)

Particle-Size Analysis



Boulders	Cobbles	Gravel: Coarse	Gravel: Fine	Sand: Coarse	Sand: Medium	Sand: Fine	Fines: Silt or Clay

D_{10}	0.21	mm
D_{30}	0.38	mm
D_{60}	1.02	mm
Cu	4.9	
Cc	0.7	

DESCRIPTION: Dark Brown Poorly Graded Sand

USCS (ASTM D2487; D2488): SP

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Tested By	RI
Date	10/09/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Bulk
Sample ID	5522+5523 / ISS-03	Depth/Elev.	10'-50'
Location	-	Add. Info	-

ASTM D 698
Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600kN-m/m^3))

DETERMINATION OF TEST PROCEDURE

	wet	dry
Mass of Soil before sieving, g	NA	NA
Mass of Mat. Retained on No. 4 sieve, g	NA	NA
Mass of Mat. Retained on 3/8" sieve, g	NA	NA
Mass of Mat. Retained on 3/4" sieve, g	NA	NA

Material Retained on No. 4 Sieve, %	NA
Material Retained on 3/8" Sieve, %	NA
Material Retained on 3/4" Sieve, %	NA
Total, % (oversized)	NA

MOISTURE CONTENT

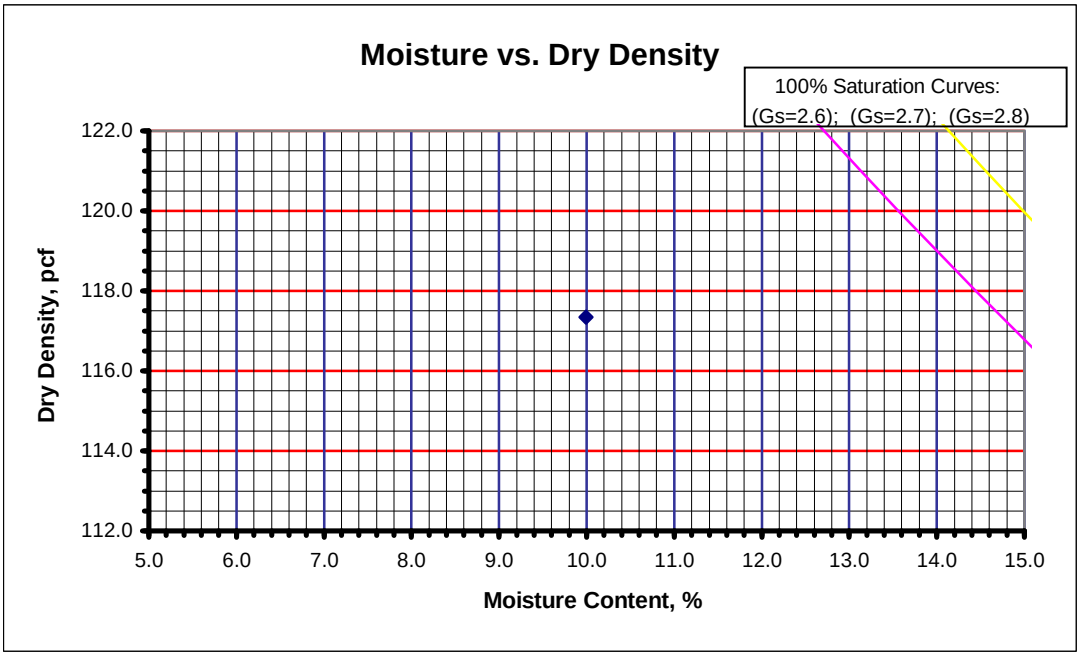
	Coarse + Fine Fraction	Coarse Fraction
Mass of Wet Sample & Tare, g	971.2	
Mass of Dry Sample & Tare, g	898.8	
Mass of Tare, g	161.9	
Moisture Content, %	9.8	

Procedure: C

TEST DATA

Points	1	2	3	4	5
Mass of Mold and Soil, g	10118.0				
Mass of Wet Sample & Tare, g	905.0				
Mass of Dry Sample & Tare, g	832.0				
Mass of Tare, g	101.5				
Moisture Content, %	10.0				
Wet Density, pcf	129.1				
Dry Density, pcf	117.3				

Mold ID Number	19
Mass of Mold, g	5727.0
Volume of Mold, ft^3	0.075
Hammer ID Number	20
Number of Blows per layer	56
Number of Layers	3



Method A: Material retained on No. 4 ≤ 20%

Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%

Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

Material was compacted at as-received moisture content prior to screening on #4 Sieve

DESCRIPTION

Dark Brown Poorly Graded Sand

USCS (ASTM D2487; D2488): SP

Maximum Dry Density, pcf	
Optimum Moisture Content, %	

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Tested By	RI
Date	10/10/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Bulk
Sample ID	5524+5524A / ISS-01	Depth/Elev.	25'-70'
Location	-	Add. Info	-

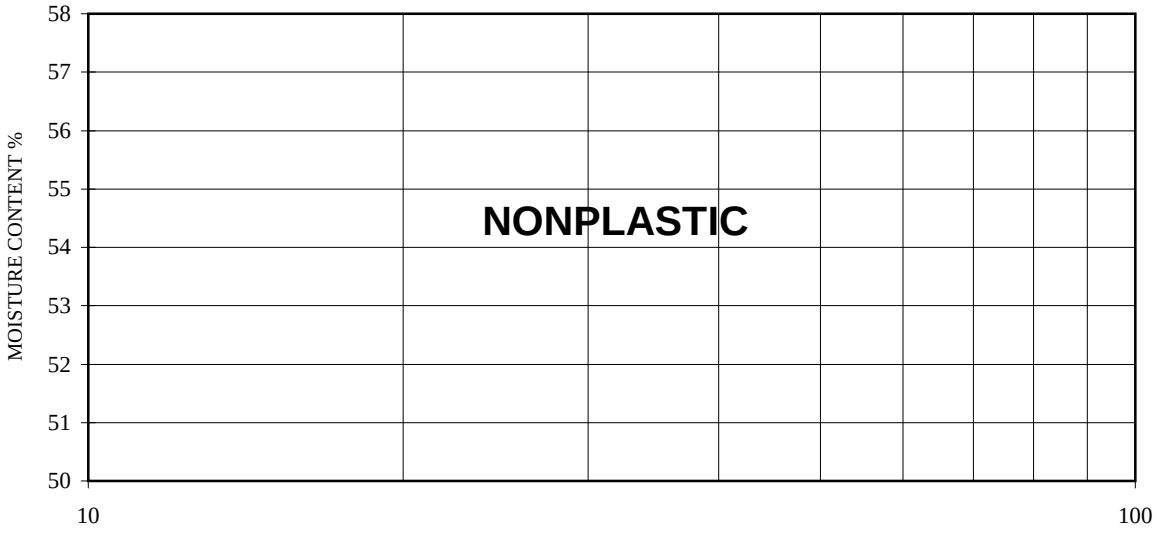
ASTM D 4318

Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)

LIQUID LIMIT		
Number of Blows	5	5
Weight of Wet Sample & Tare, g	34.11	38.38
Weight of Dry Soil & Tare, g	32.99	37.20
Weight of Tare, g	24.62	28.50
Moisture Content, %	13.38	13.56

Liquid Limit Device ID # 56

NOTES: 1. Material appears to be Nonplastic. (Liquid Limit or Plastic Limit test could not be performed.)
2. Material passing No. 40 sieve was used for test.



PLASTIC LIMIT		
Weight of Wet Soil & Tare, g	31.54	28.17
Weight of Dry Soil & Tare, g	30.53	27.11
Weight of Tare, g	22.77	19.29
Moisture Content, %	13.02	13.55

NATURAL MOISTURE	
Weight of Wet Soil & Tare, g	909.90
Weight of Dry Soil & Tare, g	811.00
Weight of Tare, g	161.80
Moisture Content, %	15.23

PREPARATION PROCEDURE	DRY
Oven ID Number	12/13/14/15
Balance ID Number	2
LIQUID LIMIT (LL)	NP
PLASTIC LIMIT (PL)	NP
PLASTICITY INDEX (PI)	NP
LIQUIDITY INDEX (LI)	-

DESCRIPTION: Dark Brown Poorly Graded Sand

USCS (ASTM D2487;2488): SP

AASHTO (M 145): NA

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Tested By	RI
Date	10/09/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Bulk
Sample ID	5524+5524A / ISS-01	Depth/Elev.	25'-70'
Location	-	Add. Info	-

ASTM D 422/AASHTO T 88
Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)

As-Received Moisture Content

Mass of Wet Sample & Tare, g	909.90
Mass of Dry Sample & Tare, g	811.00
Mass of Tare, g	161.80
Moisture Content, %	15.2

Moisture Content of Material Used for Hydrometer Analysis

Mass of Wet Sample & Tare, g	722.50
Mass of Dry Sample & Tare, g	641.80
Mass of Tare, g	112.60
Moisture Content, %	15.2

Mass of Total Sample before separation on #4 sieve & Tare, g	64500.00
Mass of Tare, g	0.00
Total Mass of Dry Sample, g	55965.57

Mass of Sample used for hydrometer analysis, g	120.88
Dry Mass, g	104.89
% of Total Sample passing #4 sieve	96.0

SIEVE ANALYSIS

PORTION OF SAMPLE RETAINED ON #4 SIEVE

Mass of Tare, g: 0.00

Sieve Size		Sample & Tare, g	% RETAINED	%PASSING
12"	COBBLES		0.0	100.0
3"			0.0	100.0
2.5"	COARSE		0.0	100.0
2"	GRAVEL		0.0	100.0
1.5"			0.0	100.0
1"		0.00	0.0	100.0
.75"		85.00	0.2	99.8
.5"	FINE GRAVEL	524.00	0.9	99.1
.375"		665.00	1.2	98.8
#4	COARSE SAND	2265.00	4.0	96.0

PORTION OF SAMPLE PASSING #4 SIEVE (Hydrometer Backsieve)

Sieve Size		Cumulative Mass retained, g	% PASSING
#10	MEDIUM	11.30	85.6
#20	SAND	28.11	70.2
#40		55.78	44.9
#60	FINE SAND	81.92	21.0
#100		95.62	8.5
#200	FINES	100.79	3.7

Remarks

HYDROMETER ANALYSIS

Length of Dispersion Period	1 Minute
Mechanical Dispersion Device ID #	61
Amount of Dispersing Agent (ml)	125.0
Specific Gravity (assumed)	2.700
Specific Gravity (tested)	
Starting time	10:29

PARTICLE-SIZE ANALYSIS

% COBBLES	0.0	% MEDIUM SAND	40.7
% COARSE GRAVEL	0.2	% FINE SAND	41.2
% FINE GRAVEL	3.9	% FINES	3.7
% COARSE SAND	10.3	% TOTAL SAMPLE	100.0
% CLAY(<0.005mm)	0.7	% CLAY(<0.002mm)	0.2

Date	Time	Testing time (min)	Reading	Temp (°C)	K	Composite Correction	Actual Reading	Effective Depth (cm)	a	Particle Diam. (mm)	Percent Passing
10/13/08	10:31	2	8.5	26.5	0.01239	5.0	3.5	15.8	0.99	0.0348	3.2
10/13/08	10:34	5	8.0	26.5	0.01239	5.0	3.0	15.9	0.99	0.0221	2.7
10/13/08	10:44	15	7.0	26.5	0.01239	5.0	2.0	16.0	0.99	0.0128	1.8
10/13/08	10:59	30	7.0	26.5	0.01239	5.0	2.0	16.0	0.99	0.0091	1.8
10/13/08	11:29	60	6.0	26.5	0.01239	5.0	1.0	16.2	0.99	0.0064	0.9
10/13/08	14:39	250	5.5	26.5	0.01239	5.0	0.5	16.3	0.99	0.0032	0.5
10/14/08	10:29	1440	5.0	26.5	0.01239	5.0	0.0	16.4	0.99	0.0013	0.0

Hydrometer 152H ID #	451190	Oven ID #	12/13/14/15
Sieve Shaker ID #	54/130	Balance ID#	1/6/7

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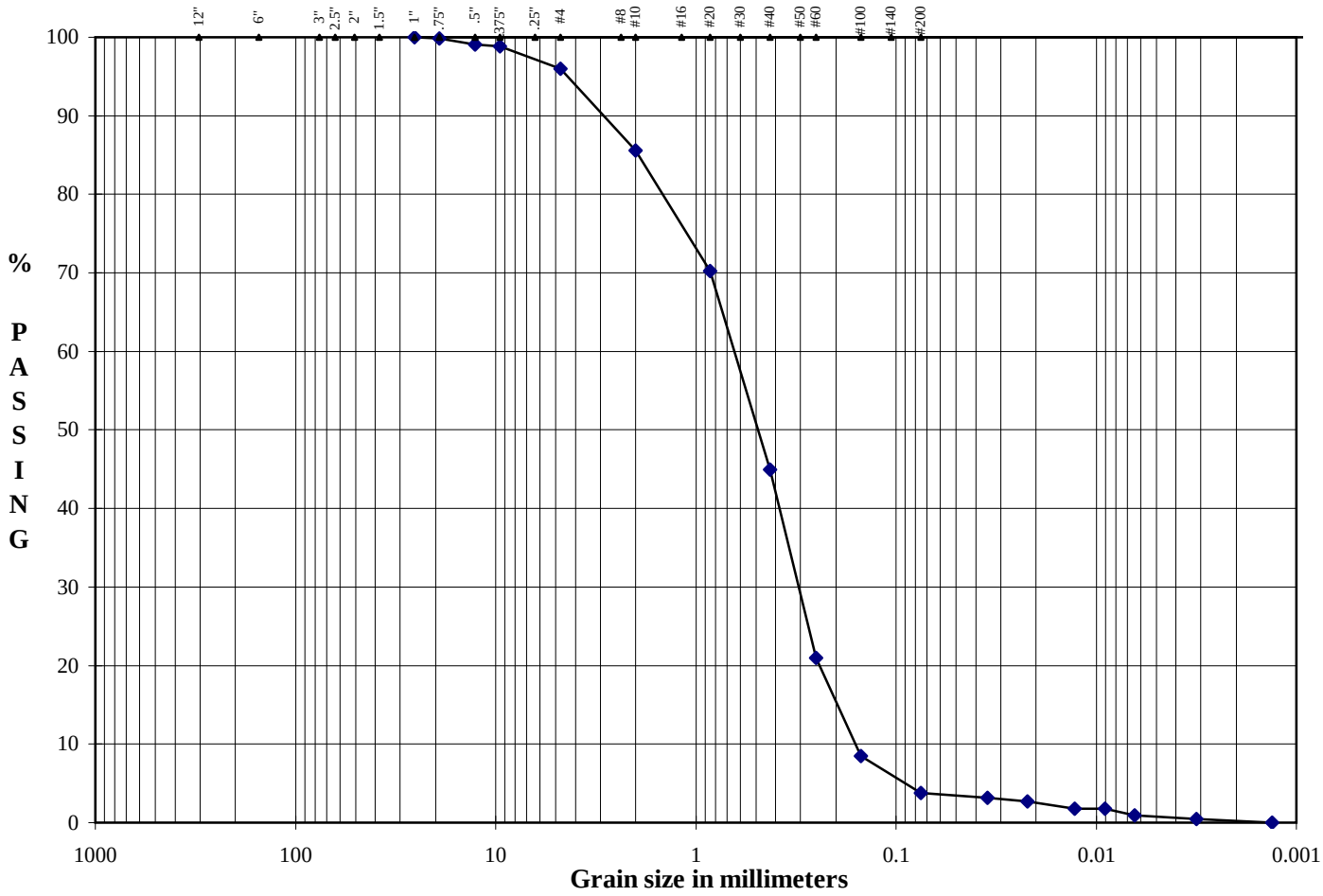
Tested By	RI
Date	10/09/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Bulk
Sample ID	5524+5524A / ISS-01	Depth/Elev.	25'-70'
Location	-	Add. Info	-

ASTM D 422/AASHTO T 88

Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)

Particle-Size Analysis



Boulders	Cobbles	Gravel: Coarse	Gravel: Fine	Sand: Coarse	Sand: Medium	Sand: Fine	Fines: Silt or Clay

D_{10}	0.16	mm
D_{30}	0.32	mm
D_{60}	0.68	mm
Cu	4.2	
Cc	0.9	

DESCRIPTION: Dark Brown Poorly Graded Sand

USCS (ASTM D2487; D2488): SP

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Tested By	RI
Date	10/09/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Bulk
Sample ID	5524+5524A / ISS-01	Depth/Elev.	25'-70'
Location	-	Add. Info	-

ASTM D 698
Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600kN-m/m^3))

DETERMINATION OF TEST PROCEDURE

	wet	dry
Mass of Soil before sieving, g	NA	NA
Mass of Mat. Retained on No. 4 sieve, g	NA	NA
Mass of Mat. Retained on 3/8" sieve, g	NA	NA
Mass of Mat. Retained on 3/4" sieve, g	NA	NA

Material Retained on No. 4 Sieve, %	NA
Material Retained on 3/8" Sieve, %	NA
Material Retained on 3/4" Sieve, %	NA
Total, % (oversized)	NA

MOISTURE CONTENT

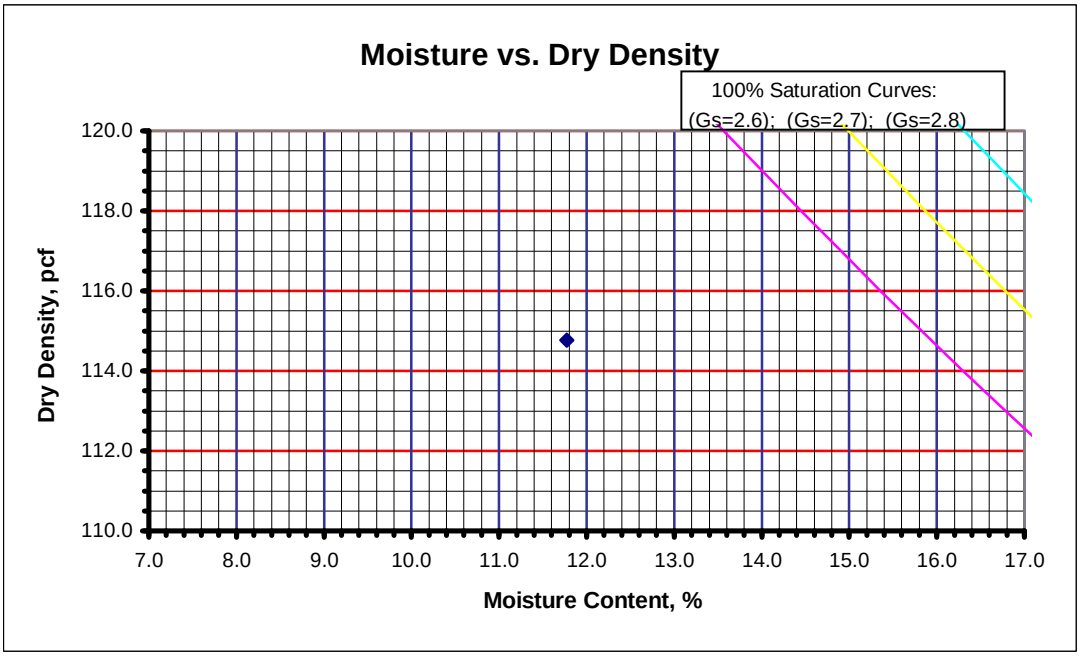
	Coarse + Fine Fraction	Coarse Fraction
Mass of Wet Sample & Tare, g	909.9	
Mass of Dry Sample & Tare, g	811.0	
Mass of Tare, g	161.8	
Moisture Content, %	15.2	

Procedure: C

TEST DATA

Points	1	2	3	4	5
Mass of Mold and Soil, g	10091.0				
Mass of Wet Sample & Tare, g	692.0				
Mass of Dry Sample & Tare, g	629.5				
Mass of Tare, g	98.5				
Moisture Content, %	11.8				
Wet Density, pcf	128.3				
Dry Density, pcf	114.8				

Mold ID Number	19
Mass of Mold, g	5727.0
Volume of Mold, ft^3	0.075
Hammer ID Number	20
Number of Blows per layer	56
Number of Layers	3



Method A: Material retained on No. 4 ≤ 20%

Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%

Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

Material was compacted at as-received moisture content prior to screening on #4 Sieve

DESCRIPTION

Dark Brown Poorly Graded Sand

USCS (ASTM D2487; D2488): SP

Maximum Dry Density, pcf	
Optimum Moisture Content, %	

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Tested By	RI
Date	10/10/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Bulk
Sample ID	5525+5525A / ISS-04	Depth/Elev.	20'-40'
Location	-	Add. Info	-

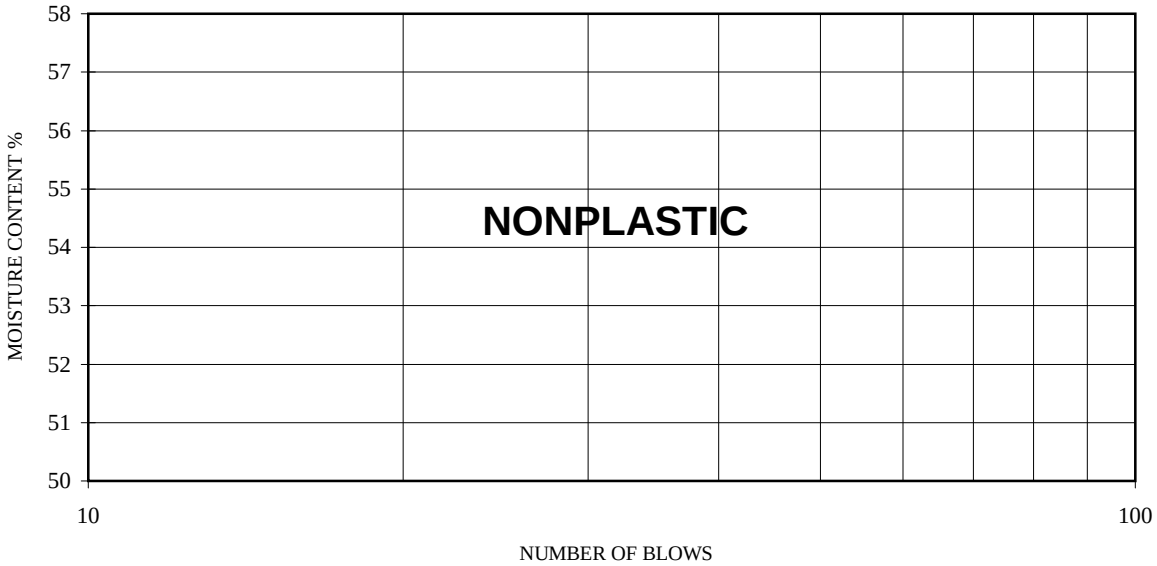
ASTM D 4318
Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)

LIQUID LIMIT

Number of Blows	5	5
Weight of Wet Sample & Tare, g	36.13	33.75
Weight of Dry Soil & Tare, g	35.16	32.78
Weight of Tare, g	25.44	22.99
Moisture Content, %	9.98	9.91

Liquid Limit Device ID # 56

NOTES: 1. Material appears to be Nonplastic. (Liquid Limit or Plastic Limit test could not be performed.)
2. Material passing No. 40 sieve was used for test.



PLASTIC LIMIT

Weight of Wet Soil & Tare, g	27.05	28.60
Weight of Dry Soil & Tare, g	26.42	27.80
Weight of Tare, g	19.72	19.30
Moisture Content, %	9.40	9.41

PREPARATION PROCEDURE: DRY

Oven ID Number: 12/13/14/15

Balance ID Number: 2

NATURAL MOISTURE

Weight of Wet Soil & Tare, g	924.20
Weight of Dry Soil & Tare, g	851.90
Weight of Tare, g	154.80
Moisture Content, %	10.37

LIQUID LIMIT (LL)	NP
PLASTIC LIMIT (PL)	NP
PLASTICITY INDEX (PI)	NP
LIQUIDITY INDEX (LI)	-

DESCRIPTION: Yellowish Brown Poorly Graded Sand

USCS (ASTM D2487;2488): SP

AASHTO (M 145): NA

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Tested By	RI
Date	10/10/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Bulk
Sample ID	5525+5525A / ISS-04	Depth/Elev.	20'-40'
Location	-	Add. Info	-

ASTM D 422/AASHTO T 88
Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)

As-Received Moisture Content

Mass of Wet Sample & Tare, g	924.20
Mass of Dry Sample & Tare, g	851.90
Mass of Tare, g	154.80
Moisture Content, %	10.4

Moisture Content of Material Used for Hydrometer Analysis

Mass of Wet Sample & Tare, g	631.70
Mass of Dry Sample & Tare, g	578.70
Mass of Tare, g	98.60
Moisture Content, %	11.0

Mass of Total Sample before separation on #4 sieve & Tare, g	65600.00
Mass of Tare, g	0.00
Total Mass of Dry Sample, g	59078.15

Mass of Sample used for hydrometer analysis, g	120.04
Dry Mass, g	108.11
% of Total Sample passing #4 sieve	93.5

SIEVE ANALYSIS

PORTION OF SAMPLE RETAINED ON #4 SIEVE

Mass of Tare, g: 0.00

Sieve Size		Sample & Tare, g	% RETAINED	%PASSING
12"	COBBLES		0.0	100.0
3"			0.0	100.0
2.5"	COARSE		0.0	100.0
2"	GRAVEL		0.0	100.0
1.5"			0.0	100.0
1"		0.00	0.0	100.0
.75"		203.00	0.3	99.7
.5"	FINE GRAVEL	874.00	1.5	98.5
.375"		1498.00	2.5	97.5
#4	COARSE SAND	3847.00	6.5	93.5

PORTION OF SAMPLE PASSING #4 SIEVE (Hydrometer Backsieve)

Sieve Size		Cumulative Mass retained, g	% PASSING
#10	MEDIUM	9.54	85.2
#20	SAND	28.60	68.8
#40		58.72	42.7
#60	FINE SAND	88.31	17.1
#100		99.88	7.1
#200	FINES	103.45	4.0

Remarks

HYDROMETER ANALYSIS

Length of Dispersion Period	1 Minute
Mechanical Dispersion Device ID #	61
Amount of Dispersing Agent (ml)	125.0
Specific Gravity (assumed)	2.700
Specific Gravity (tested)	
Starting time	10:31

PARTICLE-SIZE ANALYSIS

% COBBLES	0.0	% MEDIUM SAND	42.5
% COARSE GRAVEL	0.3	% FINE SAND	38.7
% FINE GRAVEL	6.2	% FINES	4.0
% COARSE SAND	8.3	% TOTAL SAMPLE	100.0
% CLAY(<0.005mm)	0.9	% CLAY(<0.002mm)	0.2

Date	Time	Testing time (min)	Reading	Temp (°C)	K	Composite Correction	Actual Reading	Effective Depth (cm)	a	Particle Diam. (mm)	Percent Passing
10/13/08	10:33	2	9.0	26.5	0.01239	5.0	4.0	15.7	0.99	0.0347	3.4
10/13/08	10:36	5	8.0	26.5	0.01239	5.0	3.0	15.9	0.99	0.0221	2.6
10/13/08	10:46	15	7.5	26.5	0.01239	5.0	2.5	16.0	0.99	0.0128	2.1
10/13/08	11:01	30	7.0	26.5	0.01239	5.0	2.0	16.0	0.99	0.0091	1.7
10/13/08	11:31	60	6.5	26.5	0.01239	5.0	1.5	16.1	0.99	0.0064	1.3
10/13/08	14:41	250	5.5	26.5	0.01239	5.0	0.5	16.3	0.99	0.0032	0.4
10/14/08	10:31	1440	5.0	26.5	0.01239	5.0	0.0	16.4	0.99	0.0013	0.0

Hydrometer 152H ID #	451190	Oven ID #	12/13/14/15
Sieve Shaker ID #	54/130	Balance ID#	1/6/7

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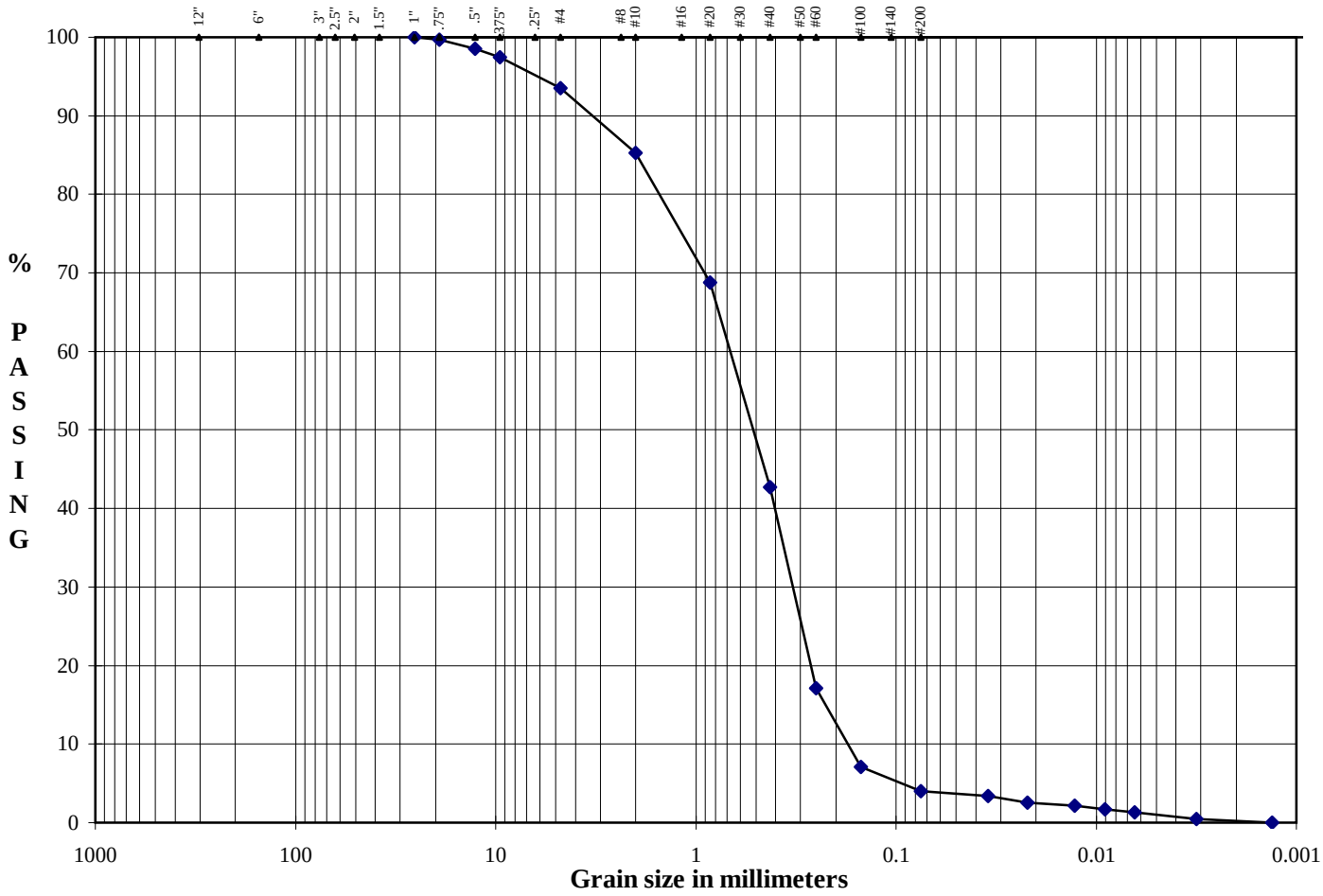
Tested By	RI
Date	10/10/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Bulk
Sample ID	5525+5525A / ISS-04	Depth/Elev.	20'-40'
Location	-	Add. Info	-

ASTM D 422/AASHTO T 88

Standard Test Method for Particle-Size Analysis of Soils (with Hydrometer Analysis)

Particle-Size Analysis



Boulders	Cobbles	Gravel: Coarse	Gravel: Fine	Sand: Coarse	Sand: Medium	Sand: Fine	Fines: Silt or Clay

D_{10}	0.18	mm
D_{30}	0.34	mm
D_{60}	0.71	mm
Cu	3.9	
Cc	0.9	

DESCRIPTION: Yellowish Brown Poorly Graded Sand

USCS (ASTM D2487; D2488): SP

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Tested By	RI
Date	10/10/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Bulk
Sample ID	5525+5525A / ISS-04	Depth/Elev.	20'-40'
Location	-	Add. Info	-

ASTM D 698
Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600kN-m/m^3))

DETERMINATION OF TEST PROCEDURE

	wet	dry
Mass of Soil before sieving, g	NA	NA
Mass of Mat. Retained on No. 4 sieve, g	NA	NA
Mass of Mat. Retained on 3/8" sieve, g	NA	NA
Mass of Mat. Retained on 3/4" sieve, g	NA	NA

Material Retained on No. 4 Sieve, %	NA
Material Retained on 3/8" Sieve, %	NA
Material Retained on 3/4" Sieve, %	NA
Total, % (oversized)	NA

MOISTURE CONTENT

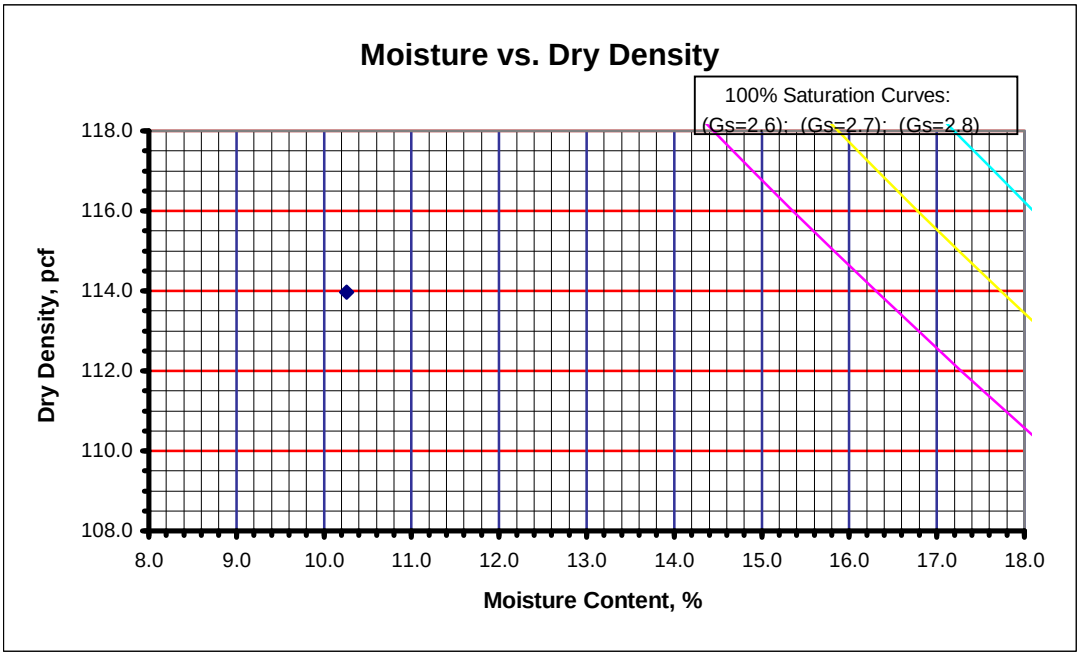
	Coarse + Fine Fraction	Coarse Fraction
Mass of Wet Sample & Tare, g	924.2	
Mass of Dry Sample & Tare, g	851.9	
Mass of Tare, g	154.8	
Moisture Content, %	10.4	

Procedure: C

TEST DATA

Points	1	2	3	4	5
Mass of Mold and Soil, g	10002.0				
Mass of Wet Sample & Tare, g	801.5				
Mass of Dry Sample & Tare, g	736.0				
Mass of Tare, g	97.5				
Moisture Content, %	10.3				
Wet Density, pcf	125.7				
Dry Density, pcf	114.0				

Mold ID Number	19
Mass of Mold, g	5727.0
Volume of Mold, ft^3	0.075
Hammer ID Number	20
Number of Blows per layer	56
Number of Layers	3



Method A: Material retained on No. 4 ≤ 20%

Method B: Material retained on No. 4 > 20% and material retained on 3/8" ≤ 20%

Method C: Material retained on 3/8" > 20% and material retained on 3/4" < 30%

REMARKS

Material was compacted at as-received moisture content prior to screening on #4 Sieve

DESCRIPTION

Yellowish Brown Poorly Graded Sand

USCS (ASTM D2487; D2488): SP

Maximum Dry Density, pcf	
Optimum Moisture Content, %	

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Tested By	RI
Date	10/09/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	Sample Type	Bulk
Sample ID	Various(See below)	Depth/Elev.	Various(See below)
Location	-	Add. Info	-

ASTM D 2216; MOISTURE CONTENT DETERMINATION

Date	Tech	Sample ID	Mass of Wet Sample & Tare (g)	Mass of Dry Sample & Tare (g)	Mass of Tare (g)	Moisture Content (%)	Comments
10/9/2008	RI	5521+5521A / (ISS-02/10'-35')	745.60	710.30	92.90	5.7	1
10/9/2008	RI	5522+5523 / (ISS-03/10'-50')	784.90	718.50	89.70	10.6	1
10/9/2008	RI	5524+5524A / (ISS-01/25'-70')	722.50	641.80	112.60	15.2	1
10/9/2008	RI	5525+5525A / (ISS-04/20'-40')	631.70	578.70	98.60	11.0	1

REMARKS

1. Passing #4 Sieve Material

Balance ID Number	1/6/7
Oven ID Number	12/13/14/15

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Tested By	RI/KI
Date	07/05/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-3
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-8-1	Depth/Elev.	20-40'
Subsample	3	Add. Info	Curing Age: 7 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.833	in	7.20	cm
Diameter	3.003	in	7.63	cm
Area	7.08	in^2	45.69	cm^2
Volume	328.81	cm^3	0.0116	ft^3
Mass	667.50	g	1.47	lb
Specific Gravity	2.550	(Assumed)		
Dry Density	111.1	pcf		

Moisture Content

Mass of wet sample & tare	667.50	g
Mass of dry sample & tare	585.20	g
Mass of tare	0.00	g
% Moisture	14.1	

Test Data

Speed	8	
Board Number	2	
Cell Number	5	
Flow Pump Number	1B	
Flow Pump Rate	8.96E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	187.81	cm
Min Head	186.40	cm
Maximum Gradient	26.13	
Minimum Gradient	25.93	

Final Data (After Test)

Average Height of Sample			2.830	in	7.19	cm
Average Diameter of Sample			3.001	in	7.62	cm
Area	7.07	in^2	45.63	cm^2		
Volume	328.03	cm^3	0.0116	ft^3		
Mass	679.30	g	1.50	lb		

Dry Density	111.3	pcf
Vol. of Voids	98.54	cm^3
Vol. of Solids	229.49	cm^3
Void Ratio	0.43	
Saturation	95.5	%

Moisture Content

Mass of wet sample & tare	781.70	g
Mass of dry sample & tare	687.60	g
Mass of tare	102.40	g
% Moisture	16.1	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
07/05/10	11	30	-	2.65	186.40	25.93	27.0	-	-	-	
07/05/10	11	40	600	2.66	187.10	26.03	27.0	7.56E-07	0.850	6.43E-07	
07/05/10	11	50	600	2.65	186.40	25.93	27.0	7.56E-07	0.850	6.43E-07	
07/05/10	12	0	600	2.66	187.10	26.03	27.0	7.56E-07	0.850	6.43E-07	*
07/05/10	12	10	600	2.67	187.81	26.13	27.0	7.53E-07	0.850	6.40E-07	*
07/05/10	12	20	600	2.66	187.10	26.03	27.0	7.53E-07	0.850	6.40E-07	*
07/05/10	12	30	600	2.67	187.81	26.13	27.0	7.53E-07	0.850	6.40E-07	*

Reported Average Hydraulic Conductivity* 6.4E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	22	Balance ID #	1/6/7	Differential Pressure Transducer ID #	70/68
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	64
Syringe ID #	141			Pore Pressure Transducer ID #	26/27

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Tested By	RI
Date	07/27/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-3
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-8-1	Depth/Elev.	20-40'
Subsample	4	Add. Info	Curing Age: 28 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.976	in	7.56	cm
Diameter	3.011	in	7.65	cm
Area	7.12	in^2	45.94	cm^2
Volume	347.25	cm^3	0.0123	ft^3
Mass	713.30	g	1.57	lb
Specific Gravity	2.550	(Assumed)		
Dry Density	113.0	pcf		

Moisture Content

Mass of wet sample & tare	713.30	g
Mass of dry sample & tare	629.10	g
Mass of tare	0.00	g
% Moisture	13.4	

Test Data

Speed	15	
Board Number	6	
Cell Number	7	
Flow Pump Number	2B	
Flow Pump Rate	7.00E-06	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	40.09	cm
Min Head	39.39	cm
Maximum Gradient	5.30	
Minimum Gradient	5.21	

Final Data (After Test)

Average Height of Sample			2.978	in	7.56 cm
Average Diameter of Sample			3.010	in	7.65 cm
Area	7.12	in^2	45.91	cm^2	
Volume	347.25	cm^3	0.0123	ft^3	
Mass	724.70	g	1.60	lb	

Dry Density	112.9	pcf
Vol. of Voids	100.82	cm^3
Vol. of Solids	246.43	cm^3
Void Ratio	0.41	
Saturation	95.5	%

Moisture Content

Mass of wet sample & tare	821.70	g
Mass of dry sample & tare	725.30	g
Mass of tare	96.20	g
% Moisture	15.3	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
07/27/10	12	20	-	0.57	40.09	5.30	28.5	-	-	-	
07/27/10	12	30	600	0.57	40.09	5.30	28.5	2.88E-08	0.822	2.37E-08	
07/27/10	12	40	600	0.56	39.39	5.21	28.5	2.90E-08	0.822	2.39E-08	
07/27/10	12	50	600	0.57	40.09	5.30	28.5	2.90E-08	0.822	2.39E-08	*
07/27/10	13	0	600	0.56	39.39	5.21	28.5	2.90E-08	0.822	2.39E-08	*
07/27/10	13	10	600	0.57	40.09	5.30	28.5	2.90E-08	0.822	2.39E-08	*
07/27/10	13	20	600	0.57	40.09	5.30	28.5	2.88E-08	0.822	2.37E-08	*

Reported Average Hydraulic Conductivity* 2.4E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	246			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	07/05/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-3
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-8-1	Depth/Elev.	20-40'
Subsample	1	Add. Info	Curing Age: 7 Days

ASTM D 2166

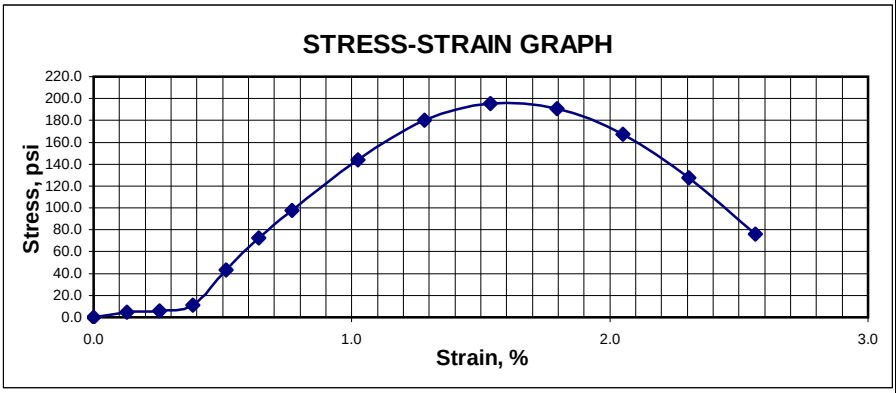
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.902
Initial Diameter, in	1.981
Height-to-Diameter Ratio	1.97
Initial Area, in^2	3.08
Initial Volume, in^3	12.03
Mass of Sample, g	405.20
Wet Density, pcf	128.3
Dry Density, pcf	112.3
Machine Speed, in/min	0.025
Strain Rate, % / min	0.64

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	478.00
Mass of Dry Sample and Tare, g	428.50
Mass of Tare, g	79.70
Moisture, %	14.2

TEST DATA

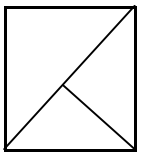
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	10	0.0	3.08	0.0
0.2	0.005	24	0.1	3.09	4.5
0.4	0.010	28	0.3	3.09	5.8
0.6	0.015	44	0.4	3.09	11.0
0.8	0.020	145	0.5	3.10	43.6
1.0	0.025	235	0.6	3.10	72.5
1.2	0.030	313	0.8	3.11	97.6
1.6	0.040	459	1.0	3.11	144.2
2.0	0.050	572	1.3	3.12	180.0
2.4	0.060	622	1.5	3.13	195.5
2.8	0.070	609	1.8	3.14	190.9
3.2	0.080	536	2.1	3.15	167.2
3.6	0.090	412	2.3	3.15	127.4
4.0	0.100	250	2.6	3.16	75.9

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	195.5
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	97.8
STRAIN AT FAILURE, %	1.5

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Tested By	RI
Date	07/26/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-3
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-8-1	Depth/Elev.	20-40'
Subsample	2	Add. Info	Curing Age: 28 Days

ASTM D 2166

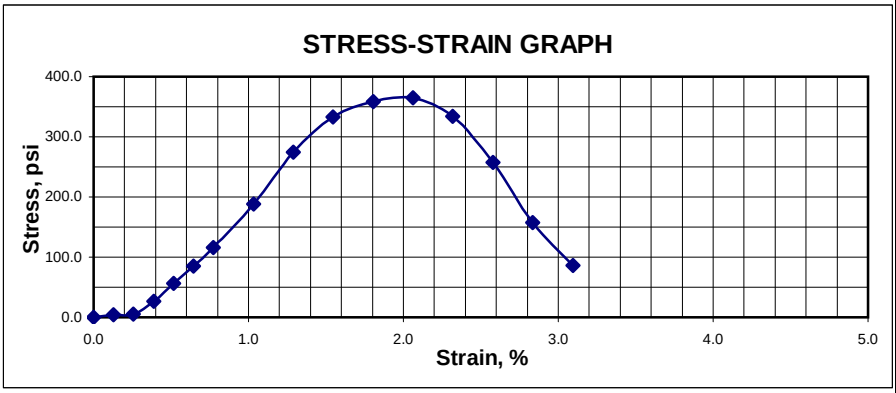
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.879
Initial Diameter, in	1.975
Height-to-Diameter Ratio	1.96
Initial Area, in^2	3.06
Initial Volume, in^3	11.88
Mass of Sample, g	399.10
Wet Density, pcf	127.9
Dry Density, pcf	112.3
Machine Speed, in/min	0.025
Strain Rate, % / min	0.64

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	478.00
Mass of Dry Sample and Tare, g	429.60
Mass of Tare, g	79.70
Moisture, %	13.8

TEST DATA

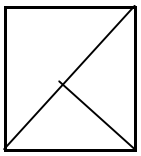
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	9	0.0	3.06	0.0
0.2	0.005	21	0.1	3.07	3.9
0.4	0.010	25	0.3	3.07	5.2
0.6	0.015	92	0.4	3.08	27.0
0.8	0.020	182	0.5	3.08	56.2
1.0	0.025	271	0.6	3.08	85.0
1.2	0.030	367	0.8	3.09	116.0
1.6	0.040	591	1.0	3.10	188.0
2.0	0.050	860	1.3	3.10	274.2
2.4	0.060	1044	1.5	3.11	332.6
2.8	0.070	1127	1.8	3.12	358.4
3.2	0.080	1152	2.1	3.13	365.4
3.6	0.090	1056	2.3	3.14	333.8
4.0	0.100	820	2.6	3.14	257.9
4.4	0.110	505	2.8	3.15	157.3
4.8	0.120	282	3.1	3.16	86.4

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	365.4
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	182.7
STRAIN AT FAILURE, %	2.1

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Batch Worksheet

BATCH-SAMPLE ID	8800-8-1			BATCH #	1
PR. NUMBER	1010-01-3	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	6/28/2010

Time Batch Mixing Started		**Soil Moisture Mass, g**	**345.0**
Total Time Batch was Mixed, min		**Soil Moisture Content, %**	**11.5**
Time Batch Completely in Molds		Type of Cement Used	I/II
		Grout Water/Cem. Mat (Solids) Ratio*	**1.00**
		Mass of Dry Soil, g	**3000.0**
		Total Water/Cem. Mat. Ratio	**2.917**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
8800	**Soil (wet)**	100.0	**3345.0**
8917	GGBFS	3.750	**112.5**
8918	Cement	1.250	**37.5**
5914	Bentonite	1.0	**30.0**
	Water, mL	180	

Remarks

* Cementous Materials (solids) is total mass of GGBFS, cement and Bentonite (if it was used for this mix)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
8800-8-1-1	UCS	2	4					7 days
8800-8-1-2	UCS	2	4					28 days
8800-8-1-3	Perm	3	3					7 days
8800-8-1-4	Perm	3	3					28 days

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Tested By	RI/KI
Date	07/05/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-3
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-7-1	Depth/Elev.	20-40'
Subsample	3	Add. Info	Curing Age: 7 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.860	in	7.26	cm
Diameter	3.000	in	7.62	cm
Area	7.07	in^2	45.60	cm^2
Volume	331.28	cm^3	0.0117	ft^3
Mass	684.50	g	1.51	lb
Specific Gravity	2.550	(Assumed)		
Dry Density	113.5	pcf		

Moisture Content

Mass of wet sample & tare	684.50	g
Mass of dry sample & tare	602.60	g
Mass of tare	0.00	g
% Moisture	13.6	

Test Data

Speed	8	
Board Number	1	
Cell Number	11	
Flow Pump Number	1A	
Flow Pump Rate	8.96E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	49.24	cm
Min Head	48.53	cm
Maximum Gradient	6.78	
Minimum Gradient	6.69	

Final Data (After Test)

Average Height of Sample			2.858	in	7.26	cm
Average Diameter of Sample			3.001	in	7.62	cm
Area	7.07	in^2	45.63	cm^2		
Volume	331.27	cm^3	0.0117	ft^3		
Mass	693.70	g	1.53	lb		

Dry Density	113.5	pcf
Vol. of Voids	94.92	cm^3
Vol. of Solids	236.35	cm^3
Void Ratio	0.40	
Saturation	95.9	%

Moisture Content

Mass of wet sample & tare	783.80	g
Mass of dry sample & tare	692.80	g
Mass of tare	90.20	g
% Moisture	15.1	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
07/05/10	11	30	-	0.69	48.53	6.69	27.0	-	-	-	
07/05/10	11	40	600	0.69	48.53	6.69	27.0	2.94E-06	0.850	2.50E-06	
07/05/10	11	50	600	0.70	49.24	6.78	27.0	2.92E-06	0.850	2.48E-06	
07/05/10	12	0	600	0.70	49.24	6.78	27.0	2.89E-06	0.850	2.46E-06	*
07/05/10	12	10	600	0.69	48.53	6.69	27.0	2.92E-06	0.850	2.48E-06	*
07/05/10	12	20	600	0.70	49.24	6.78	27.0	2.92E-06	0.850	2.48E-06	*
07/05/10	12	30	600	0.70	49.24	6.78	27.0	2.89E-06	0.850	2.46E-06	*

Reported Average Hydraulic Conductivity* 2.5E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	22	Balance ID #	1/6/7	Differential Pressure Transducer ID #	24/25
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	64
Syringe ID #	140			Pore Pressure Transducer ID #	26/27

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Web: www.test-llc.com

Tested By	RI
Date	07/27/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-3
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-7-1	Depth/Elev.	20-40'
Subsample	4	Add. Info	Curing Age: 28 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.963	in	7.53	cm
Diameter	3.010	in	7.65	cm
Area	7.12	in^2	45.91	cm^2
Volume	345.51	cm^3	0.0122	ft^3
Mass	710.60	g	1.57	lb
Specific Gravity	2.550	(Assumed)		
Dry Density	114.0	pcf		

Moisture Content

Mass of wet sample & tare	710.60	g
Mass of dry sample & tare	631.00	g
Mass of tare	0.00	g
% Moisture	12.6	

Test Data

Speed	13	
Board Number	5	
Cell Number	5	
Flow Pump Number	2A	
Flow Pump Rate	2.80E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	125.21	cm
Min Head	123.80	cm
Maximum Gradient	16.63	
Minimum Gradient	16.44	

Final Data (After Test)

Average Height of Sample			2.964	in	7.53	cm
Average Diameter of Sample			3.011	in	7.65	cm
Area	7.12	in^2	45.94	cm^2		
Volume	345.85	cm^3	0.0122	ft^3		
Mass	729.40	g	1.61	lb		

Dry Density	113.9	pcf
Vol. of Voids	98.33	cm^3
Vol. of Solids	247.52	cm^3
Void Ratio	0.40	
Saturation	99.9	%

Moisture Content

Mass of wet sample & tare	818.40	g
Mass of dry sample & tare	720.20	g
Mass of tare	89.20	g
% Moisture	15.6	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
07/27/10	10	20	-	1.76	123.80	16.44	28.6	-	-	-	
07/27/10	10	30	600	1.77	124.50	16.54	28.6	3.70E-08	0.821	3.03E-08	
07/27/10	10	40	600	1.78	125.21	16.63	28.6	3.68E-08	0.821	3.02E-08	
07/27/10	10	50	600	1.76	123.80	16.44	28.6	3.69E-08	0.821	3.02E-08	*
07/27/10	11	0	600	1.76	123.80	16.44	28.6	3.71E-08	0.821	3.04E-08	*
07/27/10	11	10	600	1.77	124.50	16.54	28.6	3.70E-08	0.821	3.03E-08	*
07/27/10	11	20	600	1.78	125.21	16.63	28.6	3.68E-08	0.821	3.02E-08	*

Reported Average Hydraulic Conductivity* 3.0E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	07/05/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-3
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-7-1	Depth/Elev.	20-40'
Subsample	1	Add. Info	Curing Age: 7 Days

ASTM D 2166

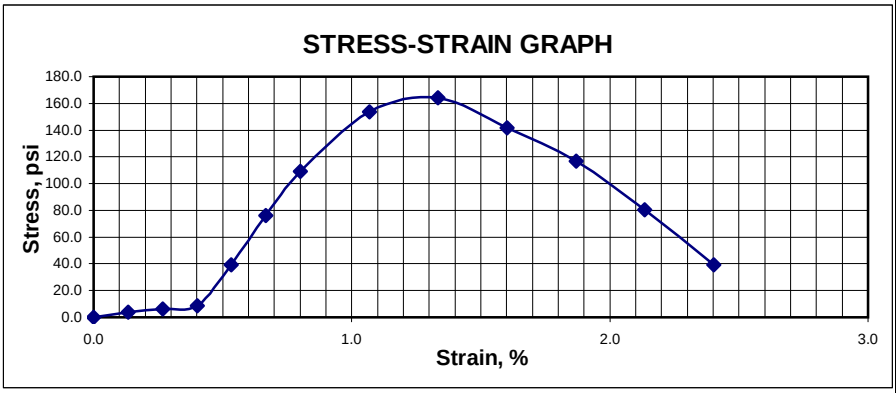
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.746
Initial Diameter, in	1.973
Height-to-Diameter Ratio	1.90
Initial Area, in^2	3.06
Initial Volume, in^3	11.45
Mass of Sample, g	388.50
Wet Density, pcf	129.2
Dry Density, pcf	113.7
Machine Speed, in/min	0.025
Strain Rate, % / min	0.67

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	462.20
Mass of Dry Sample and Tare, g	416.50
Mass of Tare, g	80.60
Moisture, %	13.6

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

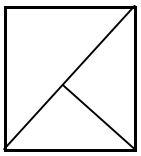
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	10	0.0	3.06	0.0
0.2	0.005	22	0.1	3.06	3.9
0.4	0.010	29	0.3	3.07	6.2
0.6	0.015	36	0.4	3.07	8.5
0.8	0.020	130	0.5	3.07	39.0
1.0	0.025	244	0.7	3.08	76.0
1.2	0.030	346	0.8	3.08	109.0
1.6	0.040	485	1.1	3.09	153.7
2.0	0.050	519	1.3	3.10	164.3
2.4	0.060	451	1.6	3.11	141.9
2.8	0.070	374	1.9	3.12	116.8
3.2	0.080	261	2.1	3.12	80.3
3.6	0.090	133	2.4	3.13	39.3

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	164.3
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	82.1
STRAIN AT FAILURE, %	1.3

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Tested By	RI
Date	07/26/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-3
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-7-1	Depth/Elev.	20-40'
Subsample	2	Add. Info	Curing Age: 28 Days

ASTM D 2166

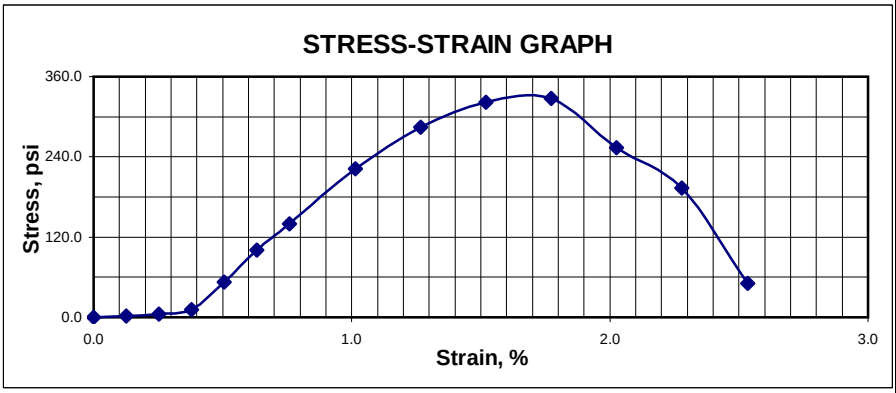
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.948
Initial Diameter, in	1.978
Height-to-Diameter Ratio	2.00
Initial Area, in^2	3.07
Initial Volume, in^3	12.13
Mass of Sample, g	410.00
Wet Density, pcf	128.7
Dry Density, pcf	113.7
Machine Speed, in/min	0.025
Strain Rate, % / min	0.63

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	488.20
Mass of Dry Sample and Tare, g	440.70
Mass of Tare, g	79.60
Moisture, %	13.2

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

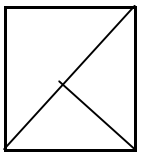
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	9	0.0	3.07	0.0
0.2	0.005	15	0.1	3.08	2.0
0.4	0.010	23	0.3	3.08	4.5
0.6	0.015	45	0.4	3.08	11.7
0.8	0.020	172	0.5	3.09	52.8
1.0	0.025	320	0.6	3.09	100.6
1.2	0.030	442	0.8	3.10	139.8
1.6	0.040	699	1.0	3.10	222.3
2.0	0.050	895	1.3	3.11	284.7
2.4	0.060	1014	1.5	3.12	322.1
2.8	0.070	1034	1.8	3.13	327.7
3.2	0.080	804	2.0	3.14	253.5
3.6	0.090	617	2.3	3.14	193.4
4.0	0.100	170	2.5	3.15	51.1

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	327.7
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	163.8
STRAIN AT FAILURE, %	1.8

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Batch Worksheet

BATCH-SAMPLE ID	8800-7-1			BATCH #	1
PR. NUMBER	1010-01-3	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	6/28/2010

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**345.0**
Soil Moisture Content, %	**11.5**
Type of Cement Used	I/II
Grout Water/Cem. Mat (Solids) Ratio*	**1.00**
Mass of Dry Soil, g	**3000.0**
Total Water/Cem. Mat. Ratio	**3.091**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
8800	**Soil (wet)**	100.0	**3345.0**
8917	GGBFS	3.750	**112.5**
8918	Cement	1.250	**37.5**
5914	Bentonite	0.5	**15.0**
	Water, mL	165	

Remarks

* Cementous Materials (solids) is total mass of GGBFS, cement and Bentonite (if it was used for this mix)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
8800-7-1-1	UCS	2	4					7 days
8800-7-1-2	UCS	2	4					28 days
8800-7-1-3	Perm	3	3					7 days
8800-7-1-4	Perm	3	3					28 days

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Tested By	RI/KI
Date	07/05/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-3
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-6-1	Depth/Elev.	20-40'
Subsample	3	Add. Info	Curing Age: 7 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.798	in	7.11	cm
Diameter	3.010	in	7.65	cm
Area	7.12	in^2	45.91	cm^2
Volume	326.27	cm^3	0.0115	ft^3
Mass	664.70	g	1.47	lb
Specific Gravity	2.550	(Assumed)		
Dry Density	111.7	pcf		

Moisture Content

Mass of wet sample & tare	664.70	g
Mass of dry sample & tare	584.20	g
Mass of tare	0.00	g
% Moisture	13.8	

Test Data

Speed	8	
Board Number	6	
Cell Number	19	
Flow Pump Number	2B	
Flow Pump Rate	8.96E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	149.82	cm
Min Head	148.42	cm
Maximum Gradient	21.10	
Minimum Gradient	20.90	

Final Data (After Test)

Average Height of Sample			2.796	in	7.10	cm
Average Diameter of Sample			3.009	in	7.64	cm
Area	7.11	in^2	45.88	cm^2		
Volume	325.82	cm^3	0.0115	ft^3		
Mass	676.80	g	1.49	lb		

Dry Density	111.9	pcf
Vol. of Voids	96.62	cm^3
Vol. of Solids	229.20	cm^3
Void Ratio	0.42	
Saturation	95.6	%

Moisture Content

Mass of wet sample & tare	771.70	g
Mass of dry sample & tare	679.40	g
Mass of tare	95.20	g
% Moisture	15.8	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
07/04/10	12	40	-	2.11	148.42	20.90	27.5	-	-	-	
07/04/10	12	50	600	2.12	149.12	21.00	27.5	9.32E-07	0.841	7.84E-07	
07/04/10	13	0	600	2.11	148.42	20.90	27.5	9.32E-07	0.841	7.84E-07	
07/04/10	13	10	600	2.12	149.12	21.00	27.5	9.32E-07	0.841	7.84E-07	*
07/04/10	13	20	600	2.13	149.82	21.10	27.5	9.28E-07	0.841	7.80E-07	*
07/04/10	13	30	600	2.12	149.12	21.00	27.5	9.28E-07	0.841	7.80E-07	*
07/04/10	13	40	600	2.13	149.82	21.10	27.5	9.28E-07	0.841	7.80E-07	*

Reported Average Hydraulic Conductivity* 7.8E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	246			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	07/27/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-3
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-6-1	Depth/Elev.	20-40'
Subsample	4	Add. Info	Curing Age: 28 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.964	in	7.53	cm
Diameter	3.009	in	7.64	cm
Area	7.11	in^2	45.88	cm^2
Volume	345.39	cm^3	0.0122	ft^3
Mass	703.60	g	1.55	lb
Specific Gravity	2.550	(Assumed)		
Dry Density	112.0	pcf		

Moisture Content

Mass of wet sample & tare	703.60	g
Mass of dry sample & tare	620.20	g
Mass of tare	0.00	g
% Moisture	13.4	

Test Data

Speed	12	
Board Number	8	
Cell Number	2	
Flow Pump Number	2A	
Flow Pump Rate	5.60E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	208.91	cm
Min Head	207.50	cm
Maximum Gradient	27.81	
Minimum Gradient	27.62	

Final Data (After Test)

Average Height of Sample			2.958	in	7.51	cm
Average Diameter of Sample			3.002	in	7.63	cm
Area	7.08	in^2	45.66	cm^2		
Volume	343.09	cm^3	0.0121	ft^3		
Mass	715.70	g	1.58	lb		

Dry Density	112.8	pcf
Vol. of Voids	99.84	cm^3
Vol. of Solids	243.25	cm^3
Void Ratio	0.41	
Saturation	95.6	%

Moisture Content

Mass of wet sample & tare	823.00	g
Mass of dry sample & tare	727.60	g
Mass of tare	107.40	g
% Moisture	15.4	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
07/27/10	17	0	-	2.95	207.50	27.62	28.6	-	-	-	
07/27/10	17	10	600	2.96	208.21	27.71	28.6	4.43E-08	0.821	3.64E-08	
07/27/10	17	20	600	2.95	207.50	27.62	28.6	4.43E-08	0.821	3.64E-08	
07/27/10	17	30	600	2.96	208.21	27.71	28.6	4.43E-08	0.821	3.64E-08	*
07/27/10	17	40	600	2.97	208.91	27.81	28.6	4.42E-08	0.821	3.63E-08	*
07/27/10	17	50	600	2.96	208.21	27.71	28.6	4.42E-08	0.821	3.63E-08	*
07/27/10	18	0	600	2.97	208.91	27.81	28.6	4.42E-08	0.821	3.63E-08	*

Reported Average Hydraulic Conductivity* 3.6E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Web: www.test-llc.com

Tested By	RI
Date	07/05/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-3
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-6-1	Depth/Elev.	20-40'
Subsample	1	Add. Info	Curing Age: 7 Days

ASTM D 2166

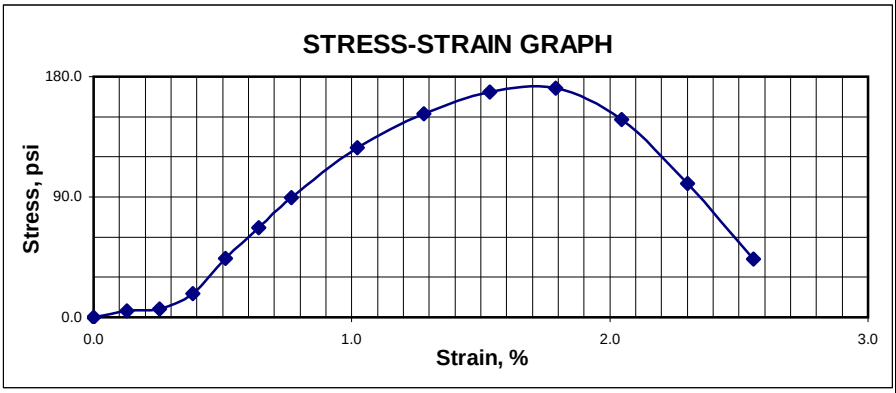
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.912
Initial Diameter, in	1.975
Height-to-Diameter Ratio	1.98
Initial Area, in^2	3.06
Initial Volume, in^3	11.98
Mass of Sample, g	401.50
Wet Density, pcf	127.6
Dry Density, pcf	112.3
Machine Speed, in/min	0.025
Strain Rate, % / min	0.64

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	474.20
Mass of Dry Sample and Tare, g	427.10
Mass of Tare, g	79.70
Moisture, %	13.6

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

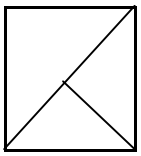
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	10	0.0	3.06	0.0
0.2	0.005	24	0.1	3.07	4.6
0.4	0.010	29	0.3	3.07	6.2
0.6	0.015	65	0.4	3.08	17.9
0.8	0.020	146	0.5	3.08	44.2
1.0	0.025	217	0.6	3.08	67.1
1.2	0.030	286	0.8	3.09	89.4
1.6	0.040	402	1.0	3.10	126.6
2.0	0.050	482	1.3	3.10	152.1
2.4	0.060	535	1.5	3.11	168.7
2.8	0.070	544	1.8	3.12	171.2
3.2	0.080	473	2.0	3.13	148.0
3.6	0.090	323	2.3	3.14	99.8
4.0	0.100	147	2.6	3.14	43.6

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	171.2
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	85.6
STRAIN AT FAILURE, %	1.8

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Web: www.test-llc.com

Tested By	RI
Date	07/26/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-3
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-6-1	Depth/Elev.	20-40'
Subsample	2	Add. Info	Curing Age: 28 Days

ASTM D 2166

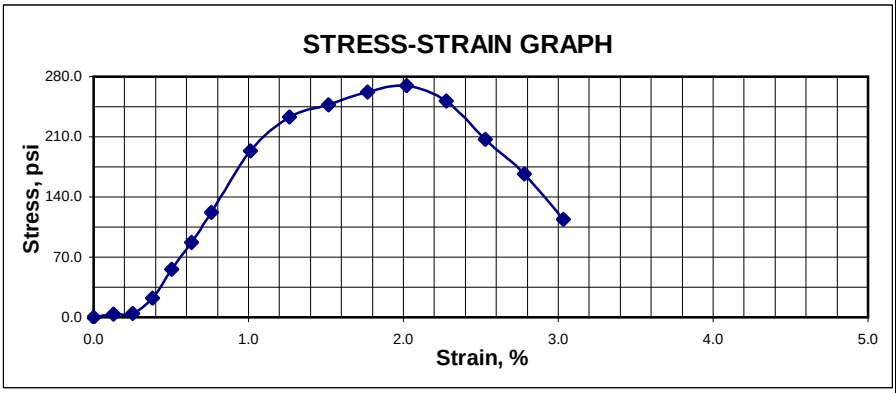
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.956
Initial Diameter, in	1.980
Height-to-Diameter Ratio	2.00
Initial Area, in^2	3.08
Initial Volume, in^3	12.18
Mass of Sample, g	404.70
Wet Density, pcf	126.6
Dry Density, pcf	111.6
Machine Speed, in/min	0.025
Strain Rate, % / min	0.63

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	484.10
Mass of Dry Sample and Tare, g	436.50
Mass of Tare, g	80.60
Moisture, %	13.4

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

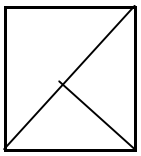
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	8	0.0	3.08	0.0
0.2	0.005	20	0.1	3.08	3.9
0.4	0.010	21	0.3	3.09	4.2
0.6	0.015	78	0.4	3.09	22.6
0.8	0.020	181	0.5	3.09	55.9
1.0	0.025	279	0.6	3.10	87.5
1.2	0.030	386	0.8	3.10	121.8
1.6	0.040	611	1.0	3.11	193.9
2.0	0.050	735	1.3	3.12	233.1
2.4	0.060	780	1.5	3.13	246.9
2.8	0.070	830	1.8	3.13	262.2
3.2	0.080	856	2.0	3.14	269.8
3.6	0.090	800	2.3	3.15	251.4
4.0	0.100	661	2.5	3.16	206.7
4.4	0.110	536	2.8	3.17	166.7
4.8	0.120	370	3.0	3.18	114.0

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	269.8
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	134.9
STRAIN AT FAILURE, %	2.0

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Batch Worksheet

BATCH-SAMPLE ID	8800-6-1			BATCH #	1
PR. NUMBER	1010-01-3	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	6/28/2010

Time Batch Mixing Started		**Soil Moisture Mass, g**	**345.0**
Total Time Batch was Mixed, min		**Soil Moisture Content, %**	**11.5**
Time Batch Completely in Molds		Type of Cement Used	I/II
		Grout Water/Cem. Mat (Solids) Ratio*	**1.00**
		Mass of Dry Soil, g	**3000.0**
		Total Water/Cem. Mat. Ratio	**3.091**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
8800	**Soil (wet)**	100.0	**3345.0**
8917	GGBFS	3.375	**101.3**
8918	Cement	1.125	**33.8**
5914	Bentonite	1.0	**30.0**
	Water, mL	165	

Remarks

* Cementous Materials (solids) is total mass of GGBFS, cement and Bentonite (if it was used for this mix)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
8800-6-1-1	UCS	2	4					7 days
8800-6-1-2	UCS	2	4					28 days
8800-6-1-3	Perm	3	3					7 days
8800-6-1-4	Perm	3	3					28 days

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Tested By	RI/KI
Date	07/05/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-3
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-5-1	Depth/Elev.	20-40'
Subsample	3	Add. Info	Curing Age: 7 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.805	in	7.12	cm
Diameter	3.010	in	7.65	cm
Area	7.12	in^2	45.91	cm^2
Volume	327.08	cm^3	0.0116	ft^3
Mass	673.60	g	1.49	lb
Specific Gravity	2.550	(Assumed)		
Dry Density	113.2	pcf		

Moisture Content

Mass of wet sample & tare	673.60	g
Mass of dry sample & tare	593.60	g
Mass of tare	0.00	g
% Moisture	13.5	

Test Data

Speed	8	
Board Number	5	
Cell Number	15	
Flow Pump Number	2A	
Flow Pump Rate	8.96E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	27.43	cm
Min Head	26.73	cm
Maximum Gradient	3.85	
Minimum Gradient	3.75	

Final Data (After Test)

Average Height of Sample			2.804	in	7.12	cm
Average Diameter of Sample			3.009	in	7.64	cm
Area	7.11	in^2	45.88	cm^2		
Volume	326.75	cm^3	0.0115	ft^3		
Mass	683.10	g	1.51	lb		

Dry Density	113.4	pcf
Vol. of Voids	93.93	cm^3
Vol. of Solids	232.82	cm^3
Void Ratio	0.40	
Saturation	95.2	%

Moisture Content

Mass of wet sample & tare	785.10	g
Mass of dry sample & tare	695.70	g
Mass of tare	102.10	g
% Moisture	15.1	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
07/05/10	12	40	-	0.38	26.73	3.75	27.5	-	-	-	
07/05/10	12	50	600	0.39	27.43	3.85	27.5	5.14E-06	0.841	4.32E-06	
07/05/10	13	0	600	0.38	26.73	3.75	27.5	5.14E-06	0.841	4.32E-06	
07/05/10	13	10	600	0.39	27.43	3.85	27.5	5.14E-06	0.841	4.32E-06	*
07/05/10	13	20	600	0.38	26.73	3.75	27.5	5.14E-06	0.841	4.32E-06	*
07/05/10	13	30	600	0.39	27.43	3.85	27.5	5.14E-06	0.841	4.32E-06	*
07/05/10	13	40	600	0.39	27.43	3.85	27.5	5.07E-06	0.841	4.26E-06	*

Reported Average Hydraulic Conductivity* 4.3E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	07/27/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-3
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-5-1	Depth/Elev.	20-40'
Subsample	4	Add. Info	Curing Age: 28 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.943	in	7.48	cm
Diameter	3.006	in	7.64	cm
Area	7.10	in^2	45.79	cm^2
Volume	342.26	cm^3	0.0121	ft^3
Mass	708.50	g	1.56	lb
Specific Gravity	2.550	(Assumed)		
Dry Density	114.2	pcf		

Moisture Content

Mass of wet sample & tare	708.50	g
Mass of dry sample & tare	626.40	g
Mass of tare	0.00	g
% Moisture	13.1	

Test Data

Speed	12	
Board Number	7	
Cell Number	14	
Flow Pump Number	2A	
Flow Pump Rate	5.60E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	180.77	cm
Min Head	179.37	cm
Maximum Gradient	24.17	
Minimum Gradient	23.99	

Final Data (After Test)

Average Height of Sample			2.944	in	7.48	cm
Average Diameter of Sample			3.008	in	7.64	cm
Area	7.11	in^2	45.85	cm^2		
Volume	342.83	cm^3	0.0121	ft^3		
Mass	721.10	g	1.59	lb		

Dry Density	114.0	pcf
Vol. of Voids	97.12	cm^3
Vol. of Solids	245.72	cm^3
Void Ratio	0.40	
Saturation	97.3	%

Moisture Content

Mass of wet sample & tare	820.50	g
Mass of dry sample & tare	726.00	g
Mass of tare	99.60	g
% Moisture	15.1	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
07/27/10	9	0	-	2.55	179.37	23.99	28.6	-	-	-	
07/27/10	9	10	600	2.56	180.07	24.08	28.6	5.08E-08	0.821	4.17E-08	
07/27/10	9	20	600	2.55	179.37	23.99	28.6	5.08E-08	0.821	4.17E-08	
07/27/10	9	30	600	2.56	180.07	24.08	28.6	5.08E-08	0.821	4.17E-08	*
07/27/10	9	40	600	2.57	180.77	24.17	28.6	5.06E-08	0.821	4.15E-08	*
07/27/10	9	50	600	2.56	180.07	24.08	28.6	5.06E-08	0.821	4.15E-08	*
07/27/10	10	0	600	2.57	180.77	24.17	28.6	5.06E-08	0.821	4.15E-08	*

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Reported Average Hydraulic Conductivity* 4.2E-08 cm/sec

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	07/05/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-3
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-5-1	Depth/Elev.	20-40'
Subsample	1	Add. Info	Curing Age: 7 Days

ASTM D 2166

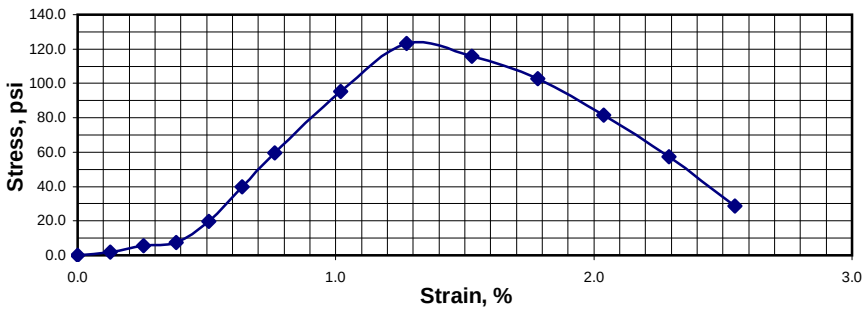
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.927
Initial Diameter, in	1.975
Height-to-Diameter Ratio	1.99
Initial Area, in^2	3.06
Initial Volume, in^3	12.03
Mass of Sample, g	401.20
Wet Density, pcf	127.0
Dry Density, pcf	113.2
Machine Speed, in/min	0.025
Strain Rate, % / min	0.64

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	473.70
Mass of Dry Sample and Tare, g	431.00
Mass of Tare, g	79.50
Moisture, %	12.1

TEST DATA

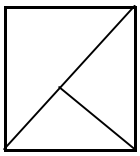
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	10	0.0	3.06	0.0
0.2	0.005	16	0.1	3.07	2.0
0.4	0.010	27	0.3	3.07	5.5
0.6	0.015	33	0.4	3.08	7.5
0.8	0.020	71	0.5	3.08	19.8
1.0	0.025	133	0.6	3.08	39.9
1.2	0.030	194	0.8	3.09	59.6
1.6	0.040	305	1.0	3.10	95.3
2.0	0.050	392	1.3	3.10	123.1
2.4	0.060	370	1.5	3.11	115.7
2.8	0.070	330	1.8	3.12	102.6
3.2	0.080	265	2.0	3.13	81.5
3.6	0.090	190	2.3	3.14	57.4
4.0	0.100	100	2.5	3.14	28.6

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	123.1
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	61.6
STRAIN AT FAILURE, %	1.3

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Tested By	RI
Date	07/26/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-3
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-5-1	Depth/Elev.	20-40'
Subsample	2	Add. Info	Curing Age: 28 Days

ASTM D 2166

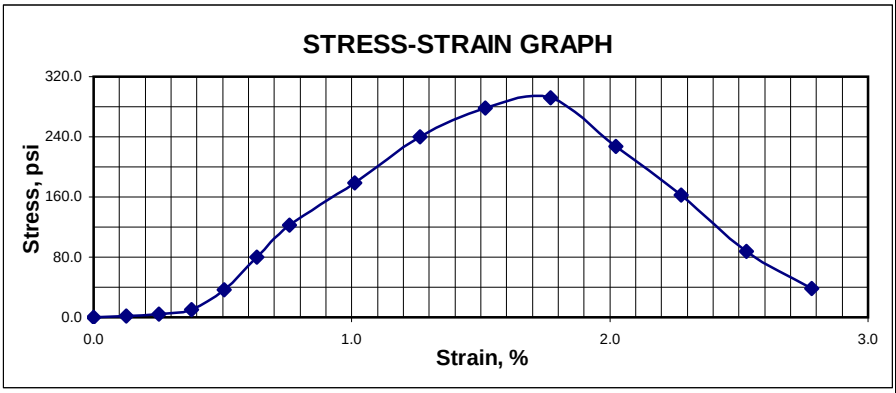
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.955
Initial Diameter, in	1.971
Height-to-Diameter Ratio	2.01
Initial Area, in^2	3.05
Initial Volume, in^3	12.07
Mass of Sample, g	403.30
Wet Density, pcf	127.3
Dry Density, pcf	112.3
Machine Speed, in/min	0.025
Strain Rate, % / min	0.63

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	482.30
Mass of Dry Sample and Tare, g	435.10
Mass of Tare, g	79.70
Moisture, %	13.3

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

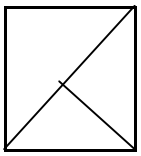
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	8	0.0	3.05	0.0
0.2	0.005	13	0.1	3.06	1.6
0.4	0.010	22	0.3	3.06	4.6
0.6	0.015	40	0.4	3.06	10.4
0.8	0.020	119	0.5	3.07	36.2
1.0	0.025	254	0.6	3.07	80.1
1.2	0.030	384	0.8	3.07	122.3
1.6	0.040	559	1.0	3.08	178.8
2.0	0.050	750	1.3	3.09	240.1
2.4	0.060	871	1.5	3.10	278.6
2.8	0.070	914	1.8	3.11	291.7
3.2	0.080	715	2.0	3.11	227.0
3.6	0.090	516	2.3	3.12	162.7
4.0	0.100	283	2.5	3.13	87.9
4.4	0.110	127	2.8	3.14	37.9

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	291.7
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	145.8
STRAIN AT FAILURE, %	1.8

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Batch Worksheet

BATCH-SAMPLE ID	8800-5-1			BATCH #	1
PR. NUMBER	1010-01-3	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	6/28/2010

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**230.0**
Soil Moisture Content, %	**11.5**
Type of Cement Used	I/II
Grout Water/Cem. Mat (Solids) Ratio*	**1.00**
Mass of Dry Soil, g	**2000.0**
Total Water/Cem. Mat. Ratio	**3.300**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
8800	**Soil (wet)**	100.0	**2230.0**
8917	GGBFS	3.375	**67.5**
8918	Cement	1.125	**22.5**
5914	Bentonite	0.5	**10.0**
	Water, mL	100	

Remarks

* Cementous Materials (solids) is total mass of GGBFS, cement and Bentonite (if it was used for this mix)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
8800-5-1-1	UCS	2	4					7 days
8800-5-1-2	UCS	2	4					28 days
8800-5-1-3	Perm	3	3					7 days
8800-5-1-4	Perm	3	3					28 days

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Tested By	RI/KI
Date	04/29/10
Checked By	

Client Pr. #		Lab. PR. #	1010-01-2
Pr. Name	National Grid Hempstead, NY MGP	S. Type	Mold
Location	ISS-04	Depth/Elev.	20-40'
		Add. Info	

Volume Increase Determination

Sub-Sample ID	Empty Mold Mass, g	Mold + Soil/Grout Mass, g	Soil/Grout Mass, g	Initial Soil Volume Calculated, cm^3	Sample Volume cm^3	Mold's Headspace Volume, cm^3	Final Soil/Grout Volume, cm^3	% Volume Change
1-11	NA	NA	NA	NA	3899.2	0.0	3899.2	-
				NA				-
				NA				-
TOTAL	NA	**NA**	**NA**	**3321.1**	**3899.2**	0.00	**3899.2**	**17.4**

Proctor wet density of soil used for initial volume calculation: 125.7 pcf **2.014** g/cm^3

Initial vol. of soil (based on 100% of Proctor wet density): **3321.1** cm^3

Mix Design # 8800-4-1

Ingredient	Amount	Unit	Portion of entire mix
Soil (Waste)	6690.00	g	0.753
Water	1800.00	mL	0.203
GGBFS	225.00	g	0.025
Cement	75.00	g	0.008
Bentonite	90.00	g	0.010
		g	
Total	8880.00	-	1.000

REMARKS

Volume of Grout (prepared per table above) used **only 1660.9mL (1/2 volume of soil)**

Cementous Materials (solids) is total mass of GGBFS and cement. Amount of bentonite calculated based on 5% of water in Grout (90g). **Free water separated on top of samples is not included in volume calculations**

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Tested By	RI/KI
Date	04/29/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-2
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800	Depth/Elev.	-
Location	-	Add. Info	-

Final Total Volume DETERMINATION (after mixing)

Sample ID	Mold #	Mass of Mold, g	Mass of Wet Sample & Mold, g	Height of Mold, in.	Diameter of Mold, in.	Volume of Mold, ft^3	Wet Density, pcf	Comments
8800-4-1-1	-	-	-	5.8	2.0	0.01050	NA	
8800-4-1-2	-	-	-	5.8	2.0	0.01050	NA	
8800-4-1-3	-	-	-	5.9	2.0	0.01063	NA	
8800-4-1-4	-	-	-	5.8	2.0	0.01047	NA	
8800-4-1-5	-	-	-	3.8	3.0	0.01537	NA	
8800-4-1-6	-	-	-	3.8	3.0	0.01537	NA	
8800-4-1-7	-	-	-	3.7	3.0	0.01529	NA	
8800-4-1-8	-	-	-	3.8	3.0	0.01570	NA	
8800-4-1-9	-	-	-	3.9	3.0	0.01574	NA	
8800-4-1-10	-	-	-	4.2	2.0	0.00769	NA	
8800-4-1-11	-	-	-	5.7	2.0	0.01043	NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
Total						0.13770		

Comments

Total Volume	**3899.2**	**cm^3**

Balance ID Number	12/13/14/15
Oven ID Number	1/6/7
Caliper ID Number	16

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Tested By	RI
Date	05/01/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-4-1	Depth/Elev.	20-40'
Subsample	5	Add. Info	Curing Age: 3 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.976	in	7.56	cm
Diameter	2.973	in	7.55	cm
Area	6.94	in^2	44.79	cm^2
Volume	338.54	cm^3	0.0120	ft^3
Mass	672.00	g	1.48	lb
Specific Gravity	2.600	(Assumed)		
Dry Density	99.2	pcf		

Moisture Content

Mass of wet sample & tare	672.00	g
Mass of dry sample & tare	538.00	g
Mass of tare	0.00	g
% Moisture	24.9	

Test Data

Speed	7	
Board Number	9	
Cell Number	2	
Flow Pump Number	2A	
Flow Pump Rate	1.79E-03	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	30.95	cm
Min Head	30.25	cm
Maximum Gradient	4.10	
Minimum Gradient	4.01	

Final Data (After Test)

Average Height of Sample		2.973	in	7.55	cm
Average Diameter of Sample		2.965	in	7.53	cm
Area	6.90 in^2	44.55	cm^2		
Volume	336.38 cm^3	0.0119	ft^3		
Mass	668.50 g	1.47	lb		

Dry Density	99.8	pcf
Vol. of Voids	129.43	cm^3
Vol. of Solids	206.95	cm^3
Void Ratio	0.63	
Saturation	100.8	%

Moisture Content

Mass of wet sample & tare	758.50	g
Mass of dry sample & tare	628.10	g
Mass of tare	90.10	g
% Moisture	24.2	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
05/01/10	16	40	-	0.43	30.25	4.01	22.0	-	-	-	
05/01/10	16	45	300	0.44	30.95	4.10	22.0	9.93E-06	0.953	9.46E-06	
05/01/10	16	50	300	0.43	30.25	4.01	22.0	9.93E-06	0.953	9.46E-06	
05/01/10	16	55	300	0.44	30.95	4.10	22.0	9.93E-06	0.953	9.46E-06	*
05/01/10	17	0	300	0.43	30.25	4.01	22.0	9.93E-06	0.953	9.46E-06	*
05/01/10	17	5	300	0.44	30.95	4.10	22.0	9.93E-06	0.953	9.46E-06	*
05/01/10	17	10	300	0.44	30.95	4.10	22.0	9.82E-06	0.953	9.36E-06	*

Reported Average Hydraulic Conductivity* 9.4E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	05/05/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-4-1	Depth/Elev.	20-40'
Subsample	6	Add. Info	Curing Age: 7 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.887	in	7.33	cm
Diameter	3.002	in	7.63	cm
Area	7.08	in^2	45.66	cm^2
Volume	334.86	cm^3	0.0118	ft^3
Mass	656.50	g	1.45	lb
Specific Gravity	2.700	(Assumed)		
Dry Density	96.8	pcf		

Moisture Content

Mass of wet sample & tare	656.50	g
Mass of dry sample & tare	519.60	g
Mass of tare	0.00	g
% Moisture	26.3	

Test Data

Speed	8	
Board Number	8	
Cell Number	5	
Flow Pump Number	2A	
Flow Pump Rate	8.96E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	23.21	cm
Min Head	22.51	cm
Maximum Gradient	3.16	
Minimum Gradient	3.07	

Final Data (After Test)

Average Height of Sample			2.890	in	7.34	cm
Average Diameter of Sample			3.005	in	7.63	cm
Area	7.09	in^2	45.76	cm^2		
Volume	335.87	cm^3	0.0119	ft^3		
Mass	656.10	g	1.45	lb		

Dry Density	96.5	pcf
Vol. of Voids	143.40	cm^3
Vol. of Solids	192.47	cm^3
Void Ratio	0.75	
Saturation	95.1	%

Moisture Content

Mass of wet sample & tare	748.70	g
Mass of dry sample & tare	612.30	g
Mass of tare	92.70	g
% Moisture	26.3	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
05/05/10	9	40	-	0.32	22.51	3.07	23.8	-	-	-	
05/05/10	9	45	300	0.33	23.21	3.16	23.8	6.29E-06	0.914	5.75E-06	
05/05/10	9	50	300	0.32	22.51	3.07	23.8	6.29E-06	0.914	5.75E-06	
05/05/10	9	55	300	0.33	23.21	3.16	23.8	6.29E-06	0.914	5.75E-06	*
05/05/10	10	0	300	0.32	22.51	3.07	23.8	6.29E-06	0.914	5.75E-06	*
05/05/10	10	5	300	0.33	23.21	3.16	23.8	6.29E-06	0.914	5.75E-06	*
05/05/10	10	10	300	0.33	23.21	3.16	23.8	6.19E-06	0.914	5.66E-06	*

Reported Average Hydraulic Conductivity* 5.7E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	05/11/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-4-1	Depth/Elev.	20-40'
Subsample	7	Add. Info	Curing Age: 14 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.985	in	7.58	cm
Diameter	3.000	in	7.62	cm
Area	7.07	in^2	45.60	cm^2
Volume	345.76	cm^3	0.0122	ft^3
Mass	670.60	g	1.48	lb
Specific Gravity	2.700	(Assumed)		
Dry Density	95.3	pcf		

Moisture Content

Mass of wet sample & tare	670.60	g
Mass of dry sample & tare	527.80	g
Mass of tare	0.00	g
% Moisture	27.1	

Test Data

Speed	8	
Board Number	5	
Cell Number	5	
Flow Pump Number	2A	
Flow Pump Rate	8.96E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	37.98	cm
Min Head	37.28	cm
Maximum Gradient	5.01	
Minimum Gradient	4.91	

Final Data (After Test)

Average Height of Sample		2.987	in	7.59	cm
Average Diameter of Sample		3.002	in	7.63	cm
Area	7.08 in^2	45.66	cm^2		
Volume	346.46 cm^3	0.0122	ft^3		
Mass	672.10 g	1.48	lb		

Dry Density	95.1	pcf
Vol. of Voids	150.94	cm^3
Vol. of Solids	195.51	cm^3
Void Ratio	0.77	
Saturation	95.5	%

Moisture Content

Mass of wet sample & tare	762.20	g
Mass of dry sample & tare	618.00	g
Mass of tare	90.20	g
% Moisture	27.3	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
05/11/10	13	0	-	0.53	37.28	4.91	22.5	-	-	-	
05/11/10	13	10	600	0.54	37.98	5.01	22.5	3.96E-06	0.942	3.73E-06	
05/11/10	13	20	600	0.53	37.28	4.91	22.5	3.96E-06	0.942	3.73E-06	
05/11/10	13	30	600	0.54	37.98	5.01	22.5	3.96E-06	0.942	3.73E-06	*
05/11/10	13	40	600	0.53	37.28	4.91	22.5	3.96E-06	0.942	3.73E-06	*
05/11/10	13	50	600	0.54	37.98	5.01	22.5	3.96E-06	0.942	3.73E-06	*
05/11/10	14	0	600	0.54	37.98	5.01	22.5	3.92E-06	0.942	3.69E-06	*

Reported Average Hydraulic Conductivity* 3.7E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	KI
Date	05/25/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-4-1	Depth/Elev.	20-40'
Subsample	6	Add. Info	Curing Age: 28 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	3.055	in	7.76	cm
Diameter	3.002	in	7.63	cm
Area	7.08	in^2	45.66	cm^2
Volume	354.34	cm^3	0.0125	ft^3
Mass	690.70	g	1.52	lb
Specific Gravity	2.700	(Assumed)		
Dry Density	96.5	pcf		

Moisture Content

Mass of wet sample & tare	690.70	g
Mass of dry sample & tare	548.20	g
Mass of tare	0.00	g
% Moisture	26.0	

Test Data

Speed	8	
Board Number	5	
Cell Number	15	
Flow Pump Number	2A	
Flow Pump Rate	8.96E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	48.53	cm
Min Head	47.83	cm
Maximum Gradient	6.25	
Minimum Gradient	6.16	

Final Data (After Test)

Average Height of Sample		3.055	in	7.76	cm
Average Diameter of Sample		3.002	in	7.63	cm
Area	7.08 in^2	45.66	cm^2		
Volume	354.34 cm^3	0.0125	ft^3		
Mass	693.40 g	1.53	lb		

Dry Density	96.5	pcf
Vol. of Voids	151.31	cm^3
Vol. of Solids	203.04	cm^3
Void Ratio	0.75	
Saturation	96.0	%

Moisture Content

Mass of wet sample & tare	789.10	g
Mass of dry sample & tare	643.90	g
Mass of tare	95.70	g
% Moisture	26.5	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
05/25/10	9	5	-	0.68	47.83	6.16	25.4	-	-	-	
05/25/10	9	10	300	0.68	47.83	6.16	25.4	3.18E-06	0.881	2.81E-06	
05/25/10	9	15	300	0.69	48.53	6.25	25.4	3.16E-06	0.881	2.78E-06	
05/25/10	9	20	300	0.69	48.53	6.25	25.4	3.14E-06	0.881	2.76E-06	*
05/25/10	9	25	300	0.68	47.83	6.16	25.4	3.16E-06	0.881	2.78E-06	*
05/25/10	9	30	300	0.68	47.83	6.16	25.4	3.18E-06	0.881	2.81E-06	*
05/25/10	9	35	300	0.68	47.83	6.16	25.4	3.18E-06	0.881	2.81E-06	*

Reported Average Hydraulic Conductivity* 2.8E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	04/30/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-4-1	Depth/Elev.	20-40'
Subsample	1	Add. Info	Curing Age: 3 Days

ASTM D 2166

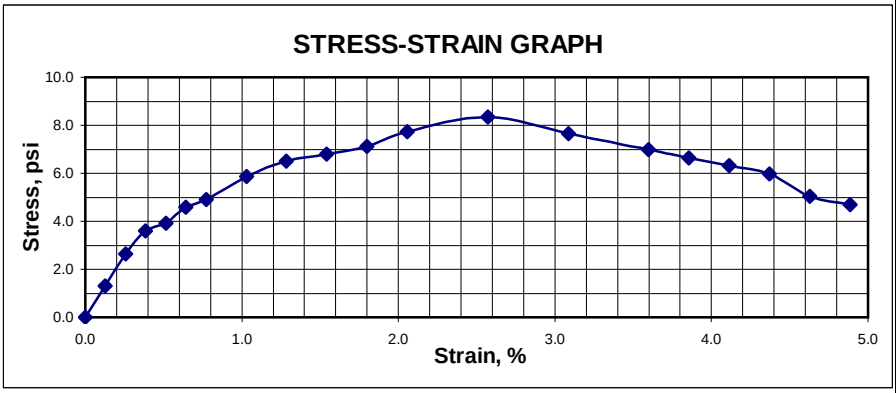
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.890
Initial Diameter, in	1.966
Height-to-Diameter Ratio	1.98
Initial Area, in^2	3.04
Initial Volume, in^3	11.81
Mass of Sample, g	379.40
Wet Density, pcf	122.4
Dry Density, pcf	97.4
Machine Speed, in/min	0.025
Strain Rate, % / min	0.64

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	458.40
Mass of Dry Sample and Tare, g	381.10
Mass of Tare, g	79.70
Moisture, %	25.6

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

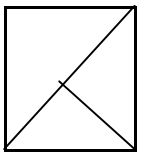
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	4	0.0	3.04	0.0
0.2	0.005	8	0.1	3.04	1.3
0.4	0.010	12	0.3	3.04	2.6
0.6	0.015	15	0.4	3.05	3.6
0.8	0.020	16	0.5	3.05	3.9
1.0	0.025	18	0.6	3.06	4.6
1.2	0.030	19	0.8	3.06	4.9
1.6	0.040	22	1.0	3.07	5.9
2.0	0.050	24	1.3	3.08	6.5
2.4	0.060	25	1.5	3.08	6.8
2.8	0.070	26	1.8	3.09	7.1
3.2	0.080	28	2.1	3.10	7.7
4.0	0.100	30	2.6	3.12	8.3
4.8	0.120	28	3.1	3.13	7.7
5.6	0.140	26	3.6	3.15	7.0
6.0	0.150	25	3.9	3.16	6.7
6.4	0.160	24	4.1	3.17	6.3
6.8	0.170	23	4.4	3.17	6.0
7.2	0.180	20	4.6	3.18	5.0
7.6	0.190	19	4.9	3.19	4.7

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	8.3
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	4.2
STRAIN AT FAILURE, %	2.6

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Web: www.test-llc.com

Tested By	RI
Date	05/04/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-4-1	Depth/Elev.	20-40'
Subsample	2	Add. Info	Curing Age: 7 Days

ASTM D 2166

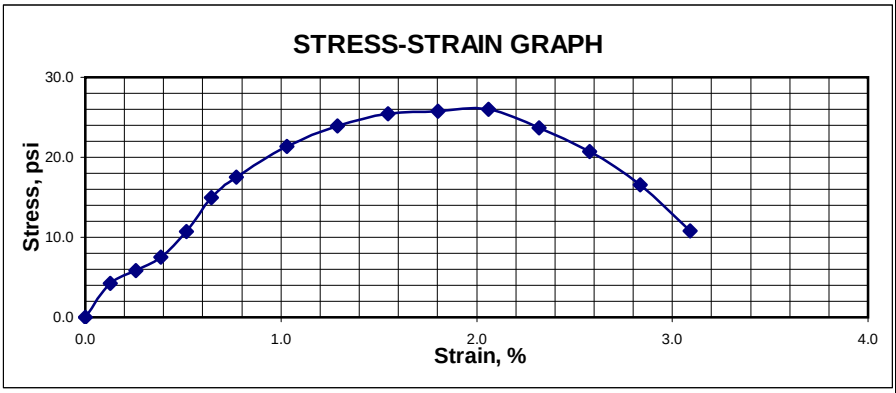
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.881
Initial Diameter, in	1.972
Height-to-Diameter Ratio	1.97
Initial Area, in^2	3.05
Initial Volume, in^3	11.85
Mass of Sample, g	384.60
Wet Density, pcf	123.6
Dry Density, pcf	98.1
Machine Speed, in/min	0.025
Strain Rate, % / min	0.64

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	462.80
Mass of Dry Sample and Tare, g	384.00
Mass of Tare, g	79.80
Moisture, %	25.9

TEST DATA

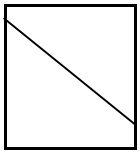
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	8	0.0	3.05	0.0
0.2	0.005	21	0.1	3.06	4.3
0.4	0.010	26	0.3	3.06	5.9
0.6	0.015	31	0.4	3.07	7.5
0.8	0.020	41	0.5	3.07	10.7
1.0	0.025	54	0.6	3.07	15.0
1.2	0.030	62	0.8	3.08	17.5
1.6	0.040	74	1.0	3.09	21.4
2.0	0.050	82	1.3	3.09	23.9
2.4	0.060	87	1.5	3.10	25.5
2.8	0.070	88	1.8	3.11	25.7
3.2	0.080	89	2.1	3.12	26.0
3.6	0.090	82	2.3	3.13	23.7
4.0	0.100	73	2.6	3.14	20.7
4.4	0.110	60	2.8	3.14	16.5
4.8	0.120	42	3.1	3.15	10.8

REMARKS

Failure Code: 4

Failure Sketch



Failure Type: Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	26.0
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	13.0
STRAIN AT FAILURE, %	2.1

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Web: www.test-llc.com

Tested By	RI
Date	05/11/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-4-1	Depth/Elev.	20-40'
Subsample	3	Add. Info	Curing Age: 14 Days

ASTM D 2166

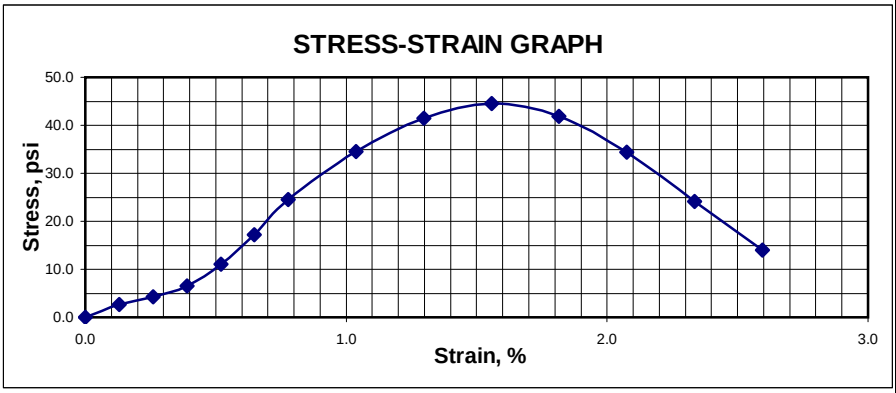
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.854
Initial Diameter, in	1.977
Height-to-Diameter Ratio	1.95
Initial Area, in^2	3.07
Initial Volume, in^3	11.83
Mass of Sample, g	381.30
Wet Density, pcf	122.8
Dry Density, pcf	97.6
Machine Speed, in/min	0.025
Strain Rate, % / min	0.65

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	459.90
Mass of Dry Sample and Tare, g	382.00
Mass of Tare, g	79.70
Moisture, %	25.8

TEST DATA

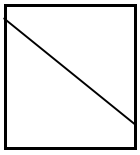
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	9	0.0	3.07	0.0
0.2	0.005	17	0.1	3.07	2.6
0.4	0.010	22	0.3	3.08	4.2
0.6	0.015	29	0.4	3.08	6.5
0.8	0.020	43	0.5	3.09	11.0
1.0	0.025	62	0.6	3.09	17.2
1.2	0.030	85	0.8	3.09	24.6
1.6	0.040	116	1.0	3.10	34.5
2.0	0.050	138	1.3	3.11	41.5
2.4	0.060	148	1.6	3.12	44.6
2.8	0.070	140	1.8	3.13	41.9
3.2	0.080	117	2.1	3.13	34.5
3.6	0.090	85	2.3	3.14	24.2
4.0	0.100	53	2.6	3.15	14.0

REMARKS

Failure Code: 4

Failure Sketch



Failure Type: Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	44.6
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	22.3
STRAIN AT FAILURE, %	1.6

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Tested By	KI
Date	05/25/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-4-1	Depth/Elev.	20-40'
Subsample	4	Add. Info	Curing Age: 28 Days

ASTM D 2166

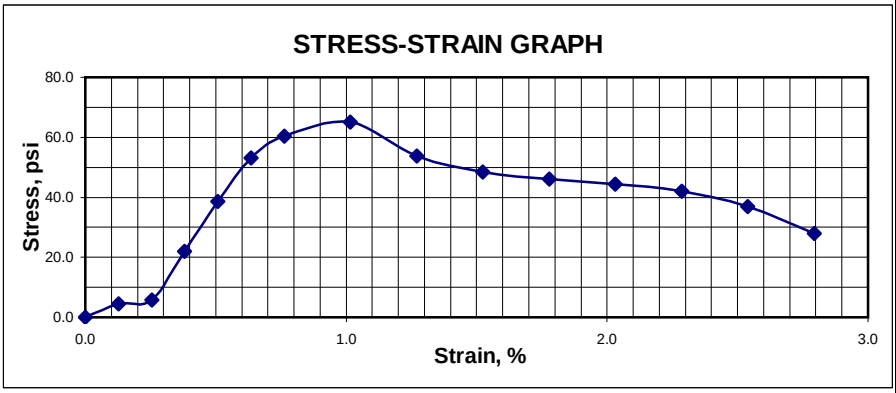
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.938
Initial Diameter, in	1.982
Height-to-Diameter Ratio	1.99
Initial Area, in^2	3.09
Initial Volume, in^3	12.15
Mass of Sample, g	387.30
Wet Density, pcf	121.4
Dry Density, pcf	96.5
Machine Speed, in/min	0.025
Strain Rate, % / min	0.63

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	465.00
Mass of Dry Sample and Tare, g	385.90
Mass of Tare, g	79.70
Moisture, %	25.8

TEST DATA

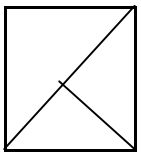
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	3.09	0.0
0.2	0.005	19	0.1	3.09	4.5
0.4	0.010	23	0.3	3.09	5.8
0.6	0.015	73	0.4	3.10	22.0
0.8	0.020	125	0.5	3.10	38.7
1.0	0.025	170	0.6	3.11	53.1
1.2	0.030	193	0.8	3.11	60.5
1.6	0.040	208	1.0	3.12	65.1
2.0	0.050	173	1.3	3.12	53.8
2.4	0.060	157	1.5	3.13	48.5
2.8	0.070	150	1.8	3.14	46.2
3.2	0.080	145	2.0	3.15	44.5
3.6	0.090	138	2.3	3.16	42.1
4.0	0.100	122	2.5	3.17	37.0
4.4	0.110	94	2.8	3.17	28.0

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	65.1
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	32.6
STRAIN AT FAILURE, %	1.0

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Batch Worksheet

	BATCH-SAMPLE ID	8800-4-1		BATCH #	1
PR. NUMBER	1010-01-2	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	4/27/2010

Time Batch Mixing Started		**Soil Moisture Mass, g**	
Total Time Batch was Mixed, min		**Soil Moisture Content, %**	**11.5**
Time Batch Completely in Molds		Type of Cement Used	I/II
		Grout Water/Cem. Mat (Solids) Ratio*	**6.00**
		Mass of Dry Soil, g	**6000.0**
		Total Water/Cem. Mat. Ratio	

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
8800	**Soil (wet)**	100.0	**6690.0**
8917	GGBFS	3.75	**225.0**
8918	Cement	1.25	**75.0**
5914	Bentonite	1.5	**90.0**
	Water, mL	1800	

Remarks

Grout Specific Gravity was 1.131 (780.1g/690mL)

Volume of soil was 3321.7mL (6690/2.014)

Volume of Grout (prepared per table on left) used **only 1660.9mL (1/2 volume of soil)**

* Cementous Materials (solids) is total mass of GGBFS and cement. Amount of bentonite calculated based on 5% of water in Grout (90g)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
8800-4-1-1	UCS	2	6					3 days
8800-4-1-2	UCS	2	6					7 days
8800-4-1-3	UCS	2	6					14 days
8800-4-1-4	UCS	2	6					28 days
8800-4-1-5	Perm	3	4					3 days
8800-4-1-6	Perm	3	4					7 days
8800-4-1-7	Perm	3	4					14 days
8800-4-1-8	Perm	3	4					28 days
8800-4-1-9	Vol. Change	3	4					
8800-4-1-10	Vol. Change	2	6					partial
8800-4-1-11	Vol. Change	2	6					

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Tested By	RI/KI
Date	04/29/10
Checked By	

Client Pr. #		Lab. PR. #	1010-01-2
Pr. Name	National Grid Hempstead, NY MGP	S. Type	Mold
Location	ISS-04	Depth/Elev.	20-40'
		Add. Info	

Volume Increase Determination

Sub-Sample ID	Empty Mold Mass, g	Mold + Soil/Grout Mass, g	Soil/Grout Mass, g	Initial Soil Volume Calculated, cm^3	Sample Volume cm^3	Mold's Headspace Volume, cm^3	Final Soil/Grout Volume, cm^3	% Volume Change
1-12	NA	NA	NA	NA	4169.9	0.0	4169.9	-
				NA				-
				NA				-
TOTAL	NA	**NA**	**NA**	**3321.1**	**4169.9**	0.00	**4169.9**	**25.6**

Proctor wet density of soil used for initial volume calculation: 125.7 pcf **2.014** g/cm^3

Initial vol. of soil (based on 100% of Proctor wet density): **3321.1** cm^3

Mix Design # 8800-3-1

Ingredient	Amount	Unit	Portion of entire mix
Soil (Waste)	6690.00	g	0.706
Water	1800.00	mL	0.190
GGBFS	675.00	g	0.071
Cement	225.00	g	0.024
Bentonite	90.00	g	0.009
		g	
Total	9480.00	-	1.000

REMARKS

Volume of Grout (prepared per table above) used **only 1660.9mL (1/2 volume of soil)**

Cementous Materials (solids) is total mass of GGBFS and cement. Amount of bentonite calculated based on 5% of water in Grout (90g)

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Tested By	RI/KI
Date	04/29/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-2
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800	Depth/Elev.	-
Location	-	Add. Info	-

Final Total Volume DETERMINATION (after mixing)

Sample ID	Mold #	Mass of Mold, g	Mass of Wet Sample & Mold, g	Height of Mold, in.	Diameter of Mold, in.	Volume of Mold, ft^3	Wet Density, pcf	Comments
8800-3-1-1	-	-	-	4.9	2.0	0.00881	NA	
8800-3-1-2	-	-	-	4.9	2.0	0.00882	NA	
8800-3-1-3	-	-	-	4.9	2.0	0.00883	NA	
8800-3-1-4	-	-	-	4.8	2.0	0.00870	NA	
8800-3-1-5	-	-	-	3.9	3.0	0.01574	NA	
8800-3-1-6	-	-	-	3.9	3.0	0.01578	NA	
8800-3-1-7	-	-	-	3.9	3.0	0.01574	NA	
8800-3-1-8	-	-	-	3.9	3.0	0.01578	NA	
8800-3-1-9	-	-	-	3.8	3.0	0.01570	NA	
8800-3-1-10	-	-	-	3.8	3.0	0.01570	NA	
8800-3-1-11	-	-	-	4.9	2.0	0.00885	NA	
8800-3-1-12	-	-	-	4.8	2.0	0.00879	NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
Total						0.14726		

Comments

Total Volume	**4169.9**	**cm^3**

Balance ID Number	12/13/14/15
Oven ID Number	1/6/7
Caliper ID Number	16

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Tested By	RI
Date	04/30/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-3-1	Depth/Elev.	20-40'
Subsample	5	Add. Info	Curing Age: 3 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.978	in	7.56	cm
Diameter	3.001	in	7.62	cm
Area	7.07	in^2	45.63	cm^2
Volume	345.18	cm^3	0.0122	ft^3
Mass	667.20	g	1.47	lb
Specific Gravity	2.600	(Assumed)		
Dry Density	98.4	pcf		

Moisture Content

Mass of wet sample & tare	667.20	g
Mass of dry sample & tare	544.60	g
Mass of tare	0.00	g
% Moisture	22.5	

Test Data

Speed	7	
Board Number	8	
Cell Number	17	
Flow Pump Number	2B	
Flow Pump Rate	1.79E-03	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	78.08	cm
Min Head	77.37	cm
Maximum Gradient	10.32	
Minimum Gradient	10.22	

Final Data (After Test)

Average Height of Sample			2.980	in	7.57	cm
Average Diameter of Sample			3.000	in	7.62	cm
Area	7.07	in^2	45.60	cm^2		
Volume	345.18	cm^3	0.0122	ft^3		
Mass	676.00	g	1.49	lb		

Dry Density	98.5	pcf
Vol. of Voids	135.66	cm^3
Vol. of Solids	209.52	cm^3
Void Ratio	0.65	
Saturation	96.7	%

Moisture Content

Mass of wet sample & tare	765.10	g
Mass of dry sample & tare	633.90	g
Mass of tare	89.30	g
% Moisture	24.1	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
04/30/10	11	40	-	1.11	78.08	10.32	22.0	-	-	-	
04/30/10	11	50	600	1.10	77.37	10.22	22.0	3.83E-06	0.953	3.65E-06	
04/30/10	12	0	600	1.11	78.08	10.32	22.0	3.83E-06	0.953	3.65E-06	
04/30/10	12	10	600	1.10	77.37	10.22	22.0	3.83E-06	0.953	3.65E-06	*
04/30/10	12	20	600	1.11	78.08	10.32	22.0	3.83E-06	0.953	3.65E-06	*
04/30/10	12	30	600	1.10	77.37	10.22	22.0	3.83E-06	0.953	3.65E-06	*
04/30/10	12	40	600	1.11	78.08	10.32	22.0	3.83E-06	0.953	3.65E-06	*

Reported Average Hydraulic Conductivity* 3.6E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	246			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	05/04/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-3-1	Depth/Elev.	20-40'
Subsample	xxx	Add. Info	Curing Age: xx Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.934	in	7.45	cm
Diameter	2.999	in	7.62	cm
Area	7.06	in^2	45.57	cm^2
Volume	339.63	cm^3	0.0120	ft^3
Mass	655.70	g	1.45	lb
Specific Gravity	2.600	(Assumed)		
Dry Density	97.0	pcf		

Moisture Content

Mass of wet sample & tare	655.70	g
Mass of dry sample & tare	527.80	g
Mass of tare	0.00	g
% Moisture	24.2	

Test Data

Speed	8	
Board Number	9	
Cell Number	14	
Flow Pump Number	2A	
Flow Pump Rate	8.96E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	49.24	cm
Min Head	48.53	cm
Maximum Gradient	6.60	
Minimum Gradient	6.51	

Final Data (After Test)

Average Height of Sample			2.936	in	7.46	cm
Average Diameter of Sample			2.999	in	7.62	cm
Area	7.06	in^2	45.57	cm^2		
Volume	339.86	cm^3	0.0120	ft^3		
Mass	665.30	g	1.47	lb		

Dry Density	96.9	pcf
Vol. of Voids	136.83	cm^3
Vol. of Solids	203.03	cm^3
Void Ratio	0.67	
Saturation	100.4	%

Moisture Content

Mass of wet sample & tare	970.70	g
Mass of dry sample & tare	833.30	g
Mass of tare	305.50	g
% Moisture	26.0	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
05/04/10	13	0	-	0.69	48.53	6.51	23.5	-	-	-	
05/04/10	13	10	600	0.70	49.24	6.60	23.5	3.00E-06	0.920	2.76E-06	
05/04/10	13	20	600	0.69	48.53	6.51	23.5	3.00E-06	0.920	2.76E-06	
05/04/10	13	30	600	0.70	49.24	6.60	23.5	3.00E-06	0.920	2.76E-06	*
05/04/10	13	40	600	0.69	48.53	6.51	23.5	3.00E-06	0.920	2.76E-06	*
05/04/10	13	50	600	0.70	49.24	6.60	23.5	3.00E-06	0.920	2.76E-06	*
05/04/10	14	0	600	0.70	49.24	6.60	23.5	2.98E-06	0.920	2.74E-06	*

Reported Average Hydraulic Conductivity* 2.8E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	05/10/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-3-1	Depth/Elev.	20-40'
Subsample	7	Add. Info	Curing Age: 14 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	3.096	in	7.86	cm
Diameter	3.005	in	7.63	cm
Area	7.09	in^2	45.76	cm^2
Volume	359.82	cm^3	0.0127	ft^3
Mass	692.20	g	1.53	lb
Specific Gravity	2.600	(Assumed)		
Dry Density	95.2	pcf		

Moisture Content

Mass of wet sample & tare	692.20	g
Mass of dry sample & tare	549.20	g
Mass of tare	0.00	g
% Moisture	26.0	

Test Data

Speed	10	
Board Number	6	
Cell Number	5	
Flow Pump Number	2B	
Flow Pump Rate	2.24E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	47.13	cm
Min Head	46.42	cm
Maximum Gradient	5.99	
Minimum Gradient	5.90	

Final Data (After Test)

Average Height of Sample			3.097	in	7.87 cm
Average Diameter of Sample			3.004	in	7.63 cm
Area	7.09	in^2	45.73	cm^2	
Volume	359.69	cm^3	0.0127	ft^3	
Mass	694.80	g	1.53	lb	

Dry Density	95.3	pcf
Vol. of Voids	148.43	cm^3
Vol. of Solids	211.26	cm^3
Void Ratio	0.70	
Saturation	98.0	%

Moisture Content

Mass of wet sample & tare	796.60	g
Mass of dry sample & tare	651.10	g
Mass of tare	101.90	g
% Moisture	26.5	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
05/10/10	11	0	-	0.66	46.42	5.90	23.0	-	-	-	
05/10/10	11	10	600	0.67	47.13	5.99	23.0	8.24E-07	0.931	7.67E-07	
05/10/10	11	20	600	0.66	46.42	5.90	23.0	8.24E-07	0.931	7.67E-07	
05/10/10	11	30	600	0.67	47.13	5.99	23.0	8.24E-07	0.931	7.67E-07	*
05/10/10	11	40	600	0.66	46.42	5.90	23.0	8.24E-07	0.931	7.67E-07	*
05/10/10	11	50	600	0.67	47.13	5.99	23.0	8.24E-07	0.931	7.67E-07	*
05/10/10	12	0	600	0.67	47.13	5.99	23.0	8.18E-07	0.931	7.61E-07	*

Reported Average Hydraulic Conductivity* 7.7E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	246			Pore Pressure Transducer ID #	28

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Tested By	RI/KI
Date	05/24/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-3-1	Depth/Elev.	20-40'
Subsample	8	Add. Info	Curing Age: 28 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	3.007	in	7.64	cm
Diameter	3.007	in	7.64	cm
Area	7.10	in^2	45.82	cm^2
Volume	349.94	cm^3	0.0124	ft^3
Mass	668.60	g	1.47	lb
Specific Gravity	2.600	(Assumed)		
Dry Density	96.4	pcf		

Moisture Content

Mass of wet sample & tare	668.60	g
Mass of dry sample & tare	540.60	g
Mass of tare	0.00	g
% Moisture	23.7	

Test Data

Speed	13	
Board Number	5	
Cell Number	2	
Flow Pump Number	2A	
Flow Pump Rate	2.80E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	133.65	cm
Min Head	132.94	cm
Maximum Gradient	17.49	
Minimum Gradient	17.40	

Final Data (After Test)

Average Height of Sample		3.008	in	7.64	cm
Average Diameter of Sample		3.000	in	7.62	cm
Area	7.07 in^2	45.60	cm^2		
Volume	348.43 cm^3	0.0123	ft^3		
Mass	678.70 g	1.50	lb		

Dry Density	96.8	pcf
Vol. of Voids	140.44	cm^3
Vol. of Solids	207.98	cm^3
Void Ratio	0.68	
Saturation	98.2	%

Moisture Content

Mass of wet sample & tare	773.40	g
Mass of dry sample & tare	635.50	g
Mass of tare	94.90	g
% Moisture	25.5	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
05/24/10	11	35	-	1.90	133.65	17.49	26.1	-	-	-	
05/24/10	11	45	600	1.89	132.94	17.40	26.1	3.52E-08	0.867	3.05E-08	
05/24/10	11	55	600	1.89	132.94	17.40	26.1	3.53E-08	0.867	3.06E-08	
05/24/10	12	5	600	1.90	133.65	17.49	26.1	3.52E-08	0.867	3.05E-08	*
05/24/10	12	15	600	1.89	132.94	17.40	26.1	3.52E-08	0.867	3.05E-08	*
05/24/10	12	25	600	1.89	132.94	17.40	26.1	3.53E-08	0.867	3.06E-08	*
05/24/10	12	35	600	1.89	132.94	17.40	26.1	3.53E-08	0.867	3.06E-08	*

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Reported Average Hydraulic Conductivity* 3.1E-08 cm/sec

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	KI
Date	04/29/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-3-1	Depth/Elev.	20-40'
Subsample	1	Add. Info	Curing Age: 3 Days

ASTM D 2166

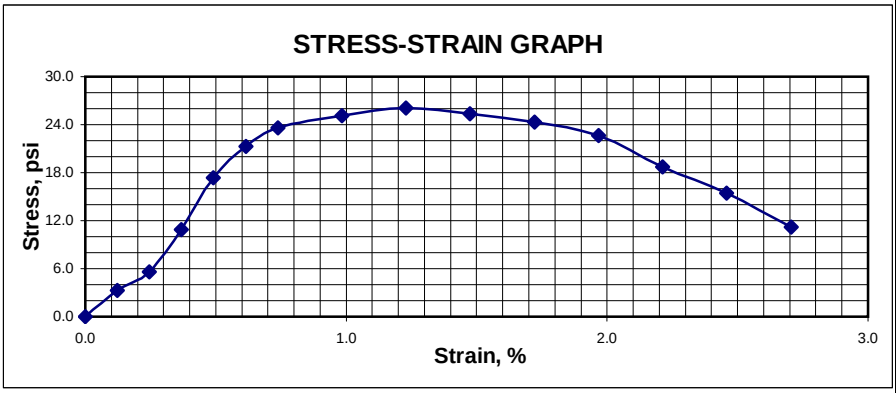
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	4.067
Initial Diameter, in	1.965
Height-to-Diameter Ratio	2.07
Initial Area, in^2	3.03
Initial Volume, in^3	12.33
Mass of Sample, g	390.10
Wet Density, pcf	120.5
Dry Density, pcf	97.9
Machine Speed, in/min	0.025
Strain Rate, % / min	0.61

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	469.70
Mass of Dry Sample and Tare, g	396.70
Mass of Tare, g	80.20
Moisture, %	23.1

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

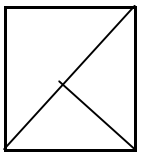
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	8	0.0	3.03	0.0
0.2	0.005	18	0.1	3.04	3.3
0.4	0.010	25	0.2	3.04	5.6
0.6	0.015	41	0.4	3.04	10.8
0.8	0.020	61	0.5	3.05	17.4
1.0	0.025	73	0.6	3.05	21.3
1.2	0.030	80	0.7	3.06	23.6
1.6	0.040	85	1.0	3.06	25.1
2.0	0.050	88	1.2	3.07	26.1
2.4	0.060	86	1.5	3.08	25.3
2.8	0.070	83	1.7	3.09	24.3
3.2	0.080	78	2.0	3.09	22.6
3.6	0.090	66	2.2	3.10	18.7
4.0	0.100	56	2.5	3.11	15.4
4.4	0.110	43	2.7	3.12	11.2

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	26.1
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	13.0
STRAIN AT FAILURE, %	1.2

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Tested By	RI
Date	05/03/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-3-1	Depth/Elev.	20-40'
Subsample	2	Add. Info	Curing Age: 7 Days

ASTM D 2166

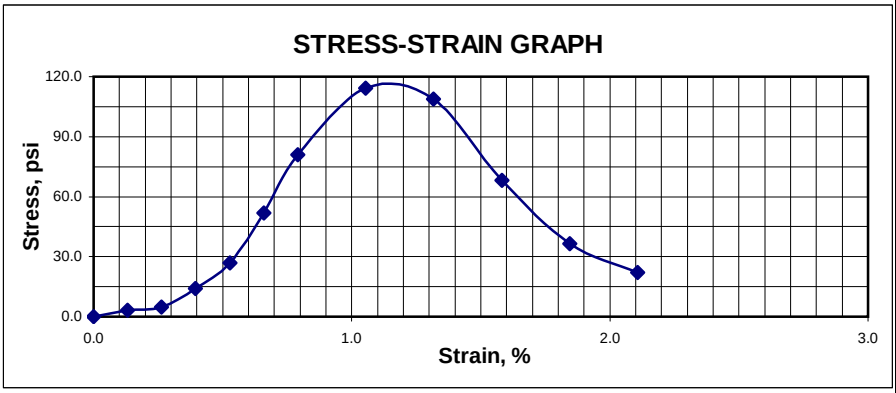
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.795
Initial Diameter, in	1.977
Height-to-Diameter Ratio	1.92
Initial Area, in^2	3.07
Initial Volume, in^3	11.65
Mass of Sample, g	365.30
Wet Density, pcf	119.5
Dry Density, pcf	95.8
Machine Speed, in/min	0.025
Strain Rate, % / min	0.66

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	666.80
Mass of Dry Sample and Tare, g	594.80
Mass of Tare, g	302.30
Moisture, %	24.6

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

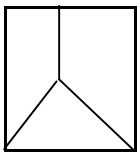
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	9	0.0	3.07	0.0
0.2	0.005	19	0.1	3.07	3.3
0.4	0.010	24	0.3	3.08	4.9
0.6	0.015	52	0.4	3.08	14.0
0.8	0.020	92	0.5	3.09	26.9
1.0	0.025	169	0.7	3.09	51.8
1.2	0.030	260	0.8	3.09	81.1
1.6	0.040	363	1.1	3.10	114.1
2.0	0.050	347	1.3	3.11	108.7
2.4	0.060	222	1.6	3.12	68.3
2.8	0.070	123	1.8	3.13	36.5
3.2	0.080	78	2.1	3.14	22.0

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	114.1
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	57.1
STRAIN AT FAILURE, %	1.1

REMARKS

Failure Code: 2

Failure Sketch



Failure Type: Cone and Split

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Tested By	RI
Date	05/10/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-3-1	Depth/Elev.	20-40'
Subsample	3	Add. Info	Curing Age: 14 Days

ASTM D 2166

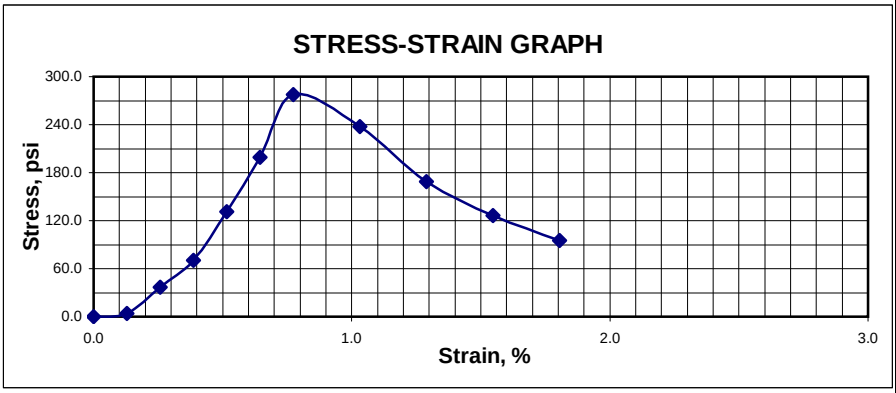
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.880
Initial Diameter, in	1.975
Height-to-Diameter Ratio	1.96
Initial Area, in^2	3.06
Initial Volume, in^3	11.89
Mass of Sample, g	377.70
Wet Density, pcf	121.0
Dry Density, pcf	97.2
Machine Speed, in/min	0.025
Strain Rate, % / min	0.64

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	465.40
Mass of Dry Sample and Tare, g	391.40
Mass of Tare, g	89.40
Moisture, %	24.5

TEST DATA

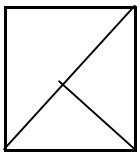
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	8	0.0	3.06	0.0
0.2	0.005	21	0.1	3.07	4.2
0.4	0.010	121	0.3	3.07	36.8
0.6	0.015	225	0.4	3.08	70.6
0.8	0.020	412	0.5	3.08	131.2
1.0	0.025	623	0.6	3.08	199.5
1.2	0.030	866	0.8	3.09	277.9
1.6	0.040	744	1.0	3.10	237.8
2.0	0.050	531	1.3	3.10	168.5
2.4	0.060	401	1.5	3.11	126.3
2.8	0.070	304	1.8	3.12	94.9

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	277.9
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	139.0
STRAIN AT FAILURE, %	0.8

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Tested By	RI
Date	05/24/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-3-1	Depth/Elev.	20-40'
Subsample	4	Add. Info	Curing Age: 28 Days

ASTM D 2166

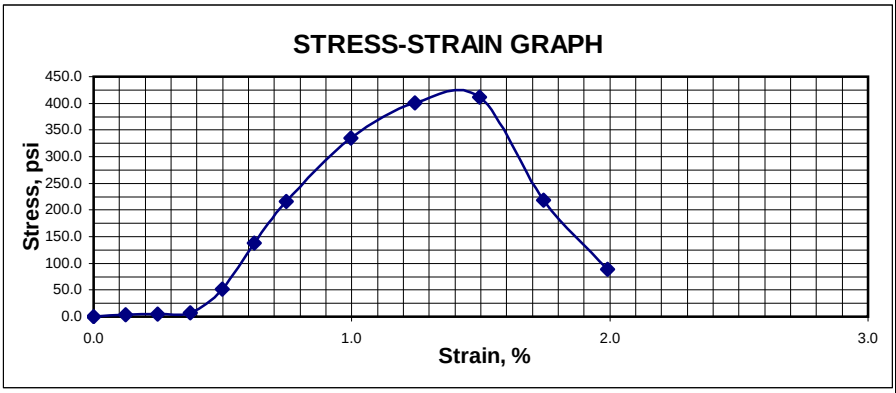
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	4.016
Initial Diameter, in	1.972
Height-to-Diameter Ratio	2.04
Initial Area, in^2	3.05
Initial Volume, in^3	12.27
Mass of Sample, g	390.30
Wet Density, pcf	121.2
Dry Density, pcf	98.5
Machine Speed, in/min	0.025
Strain Rate, % / min	0.62

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	469.30
Mass of Dry Sample and Tare, g	396.40
Mass of Tare, g	79.80
Moisture, %	23.0

TEST DATA

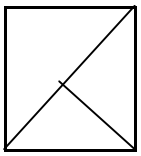
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	3.05	0.0
0.2	0.005	15	0.1	3.06	3.3
0.4	0.010	19	0.2	3.06	4.6
0.6	0.015	28	0.4	3.07	7.5
0.8	0.020	162	0.5	3.07	51.1
1.0	0.025	430	0.6	3.07	138.3
1.2	0.030	671	0.7	3.08	216.4
1.6	0.040	1036	1.0	3.08	334.2
2.0	0.050	1245	1.2	3.09	400.9
2.4	0.060	1281	1.5	3.10	411.5
2.8	0.070	683	1.7	3.11	218.1
3.2	0.080	280	2.0	3.12	88.2

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	411.5
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	205.8
STRAIN AT FAILURE, %	1.5

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Batch Worksheet

	BATCH-SAMPLE ID	8800-3-1		BATCH #	1
PR. NUMBER	1010-01-2	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	4/26/2010

Time Batch Mixing Started		**Soil Moisture Mass, g**	
Total Time Batch was Mixed, min		**Soil Moisture Content, %**	**11.5**
Time Batch Completely in Molds		Type of Cement Used	I/II
		Grout Water/Cem. Mat (Solids) Ratio*	**2.00**
		Mass of Dry Soil, g	**6000.0**
		Total Water/Cem. Mat. Ratio	

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
8800	**Soil (wet)**	100.0	**6690.0**
8917	GGBFS	11.25	**675.0**
8918	Cement	3.75	**225.0**
5914	Bentonite	1.5	**90.0**
	Water, mL	1800	

Remarks

Grout Specific Gravity was 1.301 (898g/690mL)

Volume of soil was 3321.7mL (6690/2.014)

Volume of Grout (prepared per table on left) used **only 1660.9mL (1/2 volume of soil)**

* Cementous Materials (solids) is total mass of GGBFS and cement. Amount of bentonite calculated based on 5% of water in Grout (90g)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
8800-3-1-1	UCS	2	5					3 days
8800-3-1-2	UCS	2	5					7 days
8800-3-1-3	UCS	2	5					14 days
8800-3-1-4	UCS	2	5					28 days
8800-3-1-5	Perm	3	4					3 days
8800-3-1-6	Perm	3	4					7 days
8800-3-1-7	Perm	3	4					14 days
8800-3-1-8	Perm	3	4					28 days
8800-3-1-9	Vol. Change	3	4					
8800-3-1-10	Vol. Change	3	4					
8800-3-1-11	Vol. Change	2	5					
8800-3-1-12	Vol. Change	2	5					

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Tested By	RI/KI
Date	04/29/10
Checked By	

Client Pr. #		Lab. PR. #	1010-01-2
Pr. Name	National Grid Hempstead, NY MGP	S. Type	Mold
Location	ISS-04	Depth/Elev.	20-40'
		Add. Info	

Volume Increase Determination

Sub-Sample ID	Empty Mold Mass, g	Mold + Soil/Grout Mass, g	Soil/Grout Mass, g	Initial Soil Volume Calculated, cm^3	Sample Volume cm^3	Mold's Headspace Volume, cm^3	Final Soil/Grout Volume, cm^3	% Volume Change
1-13	NA	NA	NA	NA	3735.7	0.0	3735.7	-
				NA				-
				NA				-
TOTAL	NA	**NA**	**NA**	**3321.1**	**3735.7**	0.00	**3735.7**	**12.5**

Proctor wet density of soil used for initial volume calculation: 125.7 pcf **2.014** g/cm^3

Initial vol. of soil (based on 100% of Proctor wet density): **3321.1** cm^3

Mix Design # 8800-2-1

Ingredient	Amount	Unit	Portion of entire mix
Soil (Waste)	6690.00	g	0.875
Water	480.00	mL	0.063
GGBFS	270.00	g	0.035
Cement	90.00	g	0.012
Bentonite	120.00	g	0.016
		g	
Total	7650.00	-	1.000

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Tested By	RI/KI
Date	04/29/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-2
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800	Depth/Elev.	-
Location	-	Add. Info	-

Final Total Volume DETERMINATION (after mixing)

Sample ID	Mold #	Mass of Mold, g	Mass of Wet Sample & Mold, g	Height of Mold, in.	Diameter of Mold, in.	Volume of Mold, ft^3	Wet Density, pcf	Comments
8800-2-1-1	-	-	-	4.0	2.0	0.00723	NA	
8800-2-1-2	-	-	-	4.0	2.0	0.00721	NA	
8800-2-1-3	-	-	-	4.0	2.0	0.00721	NA	
8800-2-1-4	-	-	-	4.0	2.0	0.00723	NA	
8800-2-1-5	-	-	-	3.0	3.0	0.01218	NA	
8800-2-1-6	-	-	-	3.0	3.0	0.01222	NA	
8800-2-1-7	-	-	-	3.0	3.0	0.01218	NA	
8800-2-1-8	-	-	-	3.0	3.0	0.01218	NA	
8800-2-1-9	-	-	-	3.0	3.0	0.01218	NA	
8800-2-1-10	-	-	-	3.0	3.0	0.01218	NA	
8800-2-1-11	-	-	-	4.0	2.0	0.00720	NA	
8800-2-1-12	-	-	-	4.0	2.0	0.00720	NA	
8800-2-1-13	-	-	-	3.8	3.0	0.01550	NA	
		-	-				NA	
		-	-				NA	
Total						0.13192		

Comments			
	Total Volume	**3735.7**	**cm^3**

Balance ID Number	12/13/14/15
Oven ID Number	1/6/7
Caliper ID Number	16

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Tested By	RI
Date	04/30/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-2-1	Depth/Elev.	20-40'
Subsample	5	Add. Info	Curing Age: 3 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.892	in	7.35	cm
Diameter	3.008	in	7.64	cm
Area	7.11	in^2	45.85	cm^2
Volume	336.78	cm^3	0.0119	ft^3
Mass	659.40	g	1.45	lb
Specific Gravity	2.500	(Assumed)		
Dry Density	106.1	pcf		

Moisture Content

Mass of wet sample & tare	659.40	g
Mass of dry sample & tare	572.90	g
Mass of tare	0.00	g
% Moisture	15.1	

Test Data

Speed	9	
Board Number	7	
Cell Number	15	
Flow Pump Number	2A	
Flow Pump Rate	4.48E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	85.81	cm
Min Head	85.11	cm
Maximum Gradient	11.68	
Minimum Gradient	11.59	

Final Data (After Test)

Average Height of Sample		2.892	in	7.35	cm
Average Diameter of Sample		3.005	in	7.63	cm
Area	7.09 in^2	45.76	cm^2		
Volume	336.11 cm^3	0.0119	ft^3		
Mass	676.50 g	1.49	lb		

Dry Density	106.4	pcf
Vol. of Voids	106.91	cm^3
Vol. of Solids	229.19	cm^3
Void Ratio	0.47	
Saturation	96.8	%

Moisture Content

Mass of wet sample & tare	760.10	g
Mass of dry sample & tare	656.60	g
Mass of tare	83.70	g
% Moisture	18.1	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
04/30/10	12	50	-	1.22	85.81	11.68	22.0	-	-	-	
04/30/10	13	0	600	1.21	85.11	11.59	22.0	8.42E-07	0.953	8.02E-07	
04/30/10	13	10	600	1.22	85.81	11.68	22.0	8.42E-07	0.953	8.02E-07	
04/30/10	13	20	600	1.21	85.11	11.59	22.0	8.42E-07	0.953	8.02E-07	*
04/30/10	13	30	600	1.22	85.81	11.68	22.0	8.42E-07	0.953	8.02E-07	*
04/30/10	13	40	600	1.22	85.81	11.68	22.0	8.38E-07	0.953	7.99E-07	*
04/30/10	13	50	600	1.22	85.81	11.68	22.0	8.38E-07	0.953	7.99E-07	*

Reported Average Hydraulic Conductivity* 8.0E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	05/04/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-2-1	Depth/Elev.	20-40'
Subsample	6	Add. Info	Curing Age: 7 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.841	in	7.22	cm
Diameter	3.006	in	7.64	cm
Area	7.10	in^2	45.79	cm^2
Volume	330.40	cm^3	0.0117	ft^3
Mass	653.30	g	1.44	lb
Specific Gravity	2.550	(Assumed)		
Dry Density	106.0	pcf		

Moisture Content

Mass of wet sample & tare	653.30	g
Mass of dry sample & tare	561.40	g
Mass of tare	0.00	g
% Moisture	16.4	

Test Data

Speed	13	
Board Number	6	
Cell Number	5	
Flow Pump Number	2A	
Flow Pump Rate	2.80E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	123.80	cm
Min Head	122.39	cm
Maximum Gradient	17.15	
Minimum Gradient	16.95	

Final Data (After Test)

Average Height of Sample			2.842	in	7.22	cm
Average Diameter of Sample			3.006	in	7.64	cm
Area	7.10	in^2	45.79	cm^2		
Volume	330.52	cm^3	0.0117	ft^3		
Mass	667.50	g	1.47	lb		

Dry Density	106.0	pcf
Vol. of Voids	110.33	cm^3
Vol. of Solids	220.19	cm^3
Void Ratio	0.50	
Saturation	96.1	%

Moisture Content

Mass of wet sample & tare	768.90	g
Mass of dry sample & tare	662.90	g
Mass of tare	101.50	g
% Moisture	18.9	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
05/04/10	8	50	-	1.74	122.39	16.95	23.4	-	-	-	
05/04/10	9	0	600	1.75	123.10	17.05	23.4	3.60E-08	0.923	3.32E-08	
05/04/10	9	10	600	1.74	122.39	16.95	23.4	3.60E-08	0.923	3.32E-08	
05/04/10	9	20	600	1.75	123.10	17.05	23.4	3.60E-08	0.923	3.32E-08	*
05/04/10	9	30	600	1.76	123.80	17.15	23.4	3.58E-08	0.923	3.30E-08	*
05/04/10	9	40	600	1.75	123.10	17.05	23.4	3.58E-08	0.923	3.30E-08	*
05/04/10	9	50	600	1.76	123.80	17.15	23.4	3.58E-08	0.923	3.30E-08	*

Reported Average Hydraulic Conductivity* 3.3E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	05/10/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-2-1	Depth/Elev.	20-40'
Subsample	7	Add. Info	Curing Age: 14 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.821	in	7.17	cm
Diameter	3.008	in	7.64	cm
Area	7.11	in^2	45.85	cm^2
Volume	328.51	cm^3	0.0116	ft^3
Mass	644.50	g	1.42	lb
Specific Gravity	2.550	(Assumed)		
Dry Density	104.9	pcf		

Moisture Content

Mass of wet sample & tare	644.50	g
Mass of dry sample & tare	552.30	g
Mass of tare	0.00	g
% Moisture	16.7	

Test Data

Speed	14	
Board Number	8	
Cell Number	15	
Flow Pump Number	2A	
Flow Pump Rate	1.40E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	132.94	cm
Min Head	131.54	cm
Maximum Gradient	18.55	
Minimum Gradient	18.36	

Final Data (After Test)

Average Height of Sample			2.821	in	7.17	cm
Average Diameter of Sample			3.004	in	7.63	cm
Area	7.09	in^2	45.73	cm^2		
Volume	327.64	cm^3	0.0116	ft^3		
Mass	659.80	g	1.45	lb		

Dry Density	105.2	pcf
Vol. of Voids	110.98	cm^3
Vol. of Solids	216.65	cm^3
Void Ratio	0.51	
Saturation	96.7	%

Moisture Content

Mass of wet sample & tare	762.10	g
Mass of dry sample & tare	654.80	g
Mass of tare	102.50	g
% Moisture	19.4	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
05/10/10	14	0	-	1.87	131.54	18.36	23.0	-	-	-	
05/10/10	14	10	600	1.88	132.24	18.46	23.0	1.66E-08	0.931	1.55E-08	
05/10/10	14	20	600	1.89	132.94	18.55	23.0	1.65E-08	0.931	1.54E-08	
05/10/10	14	30	600	1.88	132.24	18.46	23.0	1.65E-08	0.931	1.54E-08	*
05/10/10	14	40	600	1.89	132.94	18.55	23.0	1.65E-08	0.931	1.54E-08	*
05/10/10	14	50	600	1.88	132.24	18.46	23.0	1.65E-08	0.931	1.54E-08	*
05/10/10	15	0	600	1.89	132.94	18.55	23.0	1.65E-08	0.931	1.54E-08	*

Reported Average Hydraulic Conductivity* 1.5E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	RI/KI
Date	05/24/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-2-1	Depth/Elev.	20-40'
Subsample	8	Add. Info	Curing Age: 28 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.843	in	7.22	cm
Diameter	3.003	in	7.63	cm
Area	7.08	in^2	45.69	cm^2
Volume	329.97	cm^3	0.0117	ft^3
Mass	656.70	g	1.45	lb
Specific Gravity	2.500	(Assumed)		
Dry Density	107.2	pcf		

Moisture Content

Mass of wet sample & tare	656.70	g
Mass of dry sample & tare	566.80	g
Mass of tare	0.00	g
% Moisture	15.9	

Test Data

Speed	14	
Board Number	8	
Cell Number	19	
Flow Pump Number	2B	
Flow Pump Rate	1.40E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	218.05	cm
Min Head	217.35	cm
Maximum Gradient	30.20	
Minimum Gradient	30.10	

Final Data (After Test)

Average Height of Sample			2.843	in	7.22	cm
Average Diameter of Sample			3.003	in	7.63	cm
Area	7.08	in^2	45.69	cm^2		
Volume	329.97	cm^3	0.0117	ft^3		
Mass	665.80	g	1.47	lb		

Dry Density	107.2	pcf
Vol. of Voids	103.18	cm^3
Vol. of Solids	226.79	cm^3
Void Ratio	0.45	
Saturation	95.8	%

Moisture Content

Mass of wet sample & tare	764.40	g
Mass of dry sample & tare	665.60	g
Mass of tare	98.80	g
% Moisture	17.4	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
05/24/10	10	20	-	3.10	218.05	30.20	26.1	-	-	-	
05/24/10	10	30	600	3.09	217.35	30.10	26.1	1.02E-08	0.867	8.82E-09	
05/24/10	10	40	600	3.10	218.05	30.20	26.1	1.02E-08	0.867	8.82E-09	
05/24/10	10	50	600	3.10	218.05	30.20	26.1	1.01E-08	0.867	8.80E-09	*
05/24/10	11	0	600	3.09	217.35	30.10	26.1	1.02E-08	0.867	8.82E-09	*
05/24/10	11	10	600	3.09	217.35	30.10	26.1	1.02E-08	0.867	8.83E-09	*
05/24/10	11	20	600	3.09	217.35	30.10	26.1	1.02E-08	0.867	8.83E-09	*

Reported Average Hydraulic Conductivity* 8.8E-09 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	246			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	04/29/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-2-1	Depth/Elev.	20-40'
Subsample	1	Add. Info	Curing Age: 3 Days

ASTM D 2166

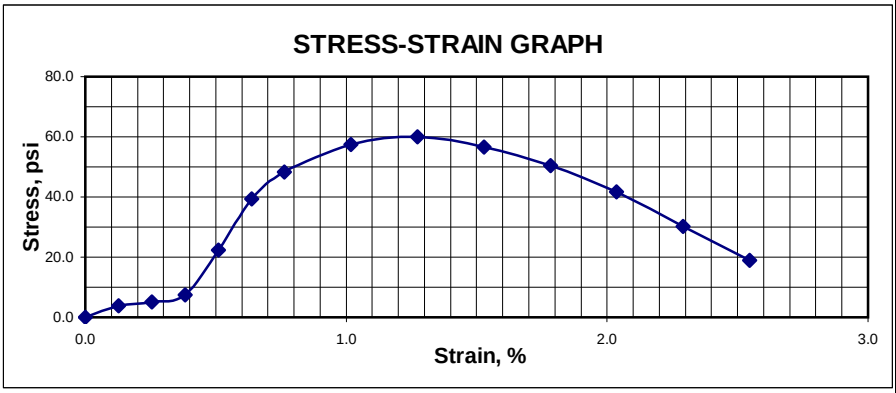
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.927
Initial Diameter, in	1.980
Height-to-Diameter Ratio	1.98
Initial Area, in^2	3.08
Initial Volume, in^3	12.09
Mass of Sample, g	391.00
Wet Density, pcf	123.2
Dry Density, pcf	106.5
Machine Speed, in/min	0.025
Strain Rate, % / min	0.64

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	470.00
Mass of Dry Sample and Tare, g	417.10
Mass of Tare, g	79.50
Moisture, %	15.7

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

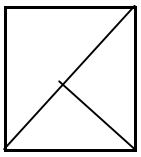
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	7	0.0	3.08	0.0
0.2	0.005	19	0.1	3.08	3.9
0.4	0.010	23	0.3	3.09	5.2
0.6	0.015	30	0.4	3.09	7.4
0.8	0.020	76	0.5	3.09	22.3
1.0	0.025	129	0.6	3.10	39.4
1.2	0.030	157	0.8	3.10	48.3
1.6	0.040	186	1.0	3.11	57.5
2.0	0.050	194	1.3	3.12	60.0
2.4	0.060	184	1.5	3.13	56.6
2.8	0.070	165	1.8	3.13	50.4
3.2	0.080	138	2.0	3.14	41.7
3.6	0.090	102	2.3	3.15	30.1
4.0	0.100	67	2.5	3.16	19.0

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	60.0
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	30.0
STRAIN AT FAILURE, %	1.3

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Web: www.test-llc.com

Tested By	RI
Date	05/03/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-2-1	Depth/Elev.	20-40'
Subsample	2	Add. Info	Curing Age: 7 Days

ASTM D 2166

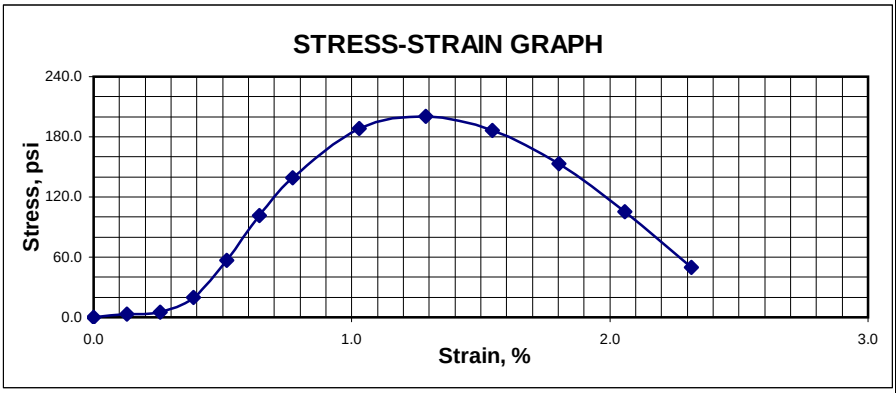
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.886
Initial Diameter, in	1.977
Height-to-Diameter Ratio	1.97
Initial Area, in^2	3.07
Initial Volume, in^3	11.93
Mass of Sample, g	391.30
Wet Density, pcf	125.0
Dry Density, pcf	107.3
Machine Speed, in/min	0.025
Strain Rate, % / min	0.64

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	691.30
Mass of Dry Sample and Tare, g	636.10
Mass of Tare, g	300.60
Moisture, %	16.5

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

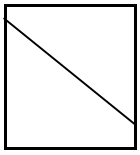
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	9	0.0	3.07	0.0
0.2	0.005	19	0.1	3.07	3.3
0.4	0.010	24	0.3	3.08	4.9
0.6	0.015	69	0.4	3.08	19.5
0.8	0.020	185	0.5	3.09	57.0
1.0	0.025	323	0.6	3.09	101.6
1.2	0.030	440	0.8	3.09	139.3
1.6	0.040	593	1.0	3.10	188.3
2.0	0.050	633	1.3	3.11	200.7
2.4	0.060	591	1.5	3.12	186.7
2.8	0.070	488	1.8	3.13	153.2
3.2	0.080	340	2.1	3.13	105.6
3.6	0.090	166	2.3	3.14	50.0

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	200.7
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	100.3
STRAIN AT FAILURE, %	1.3

REMARKS

Failure Code: 4

Failure Sketch



Failure Type: Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Web: www.test-llc.com

Tested By	RI
Date	05/10/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-2-1	Depth/Elev.	20-40'
Subsample	3	Add. Info	Curing Age: 14 Days

ASTM D 2166

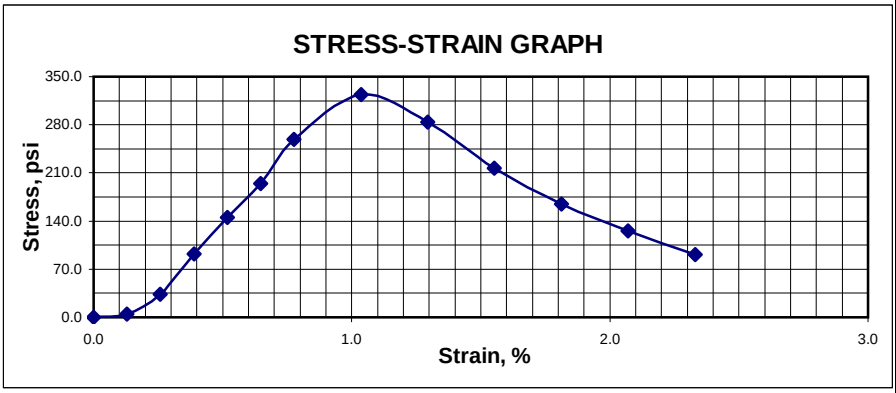
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.863
Initial Diameter, in	1.979
Height-to-Diameter Ratio	1.95
Initial Area, in^2	3.08
Initial Volume, in^3	11.88
Mass of Sample, g	390.30
Wet Density, pcf	125.1
Dry Density, pcf	107.5
Machine Speed, in/min	0.025
Strain Rate, % / min	0.65

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	479.10
Mass of Dry Sample and Tare, g	424.60
Mass of Tare, g	90.20
Moisture, %	16.3

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

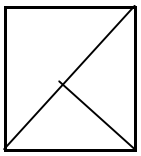
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	8	0.0	3.08	0.0
0.2	0.005	23	0.1	3.08	4.9
0.4	0.010	111	0.3	3.08	33.4
0.6	0.015	294	0.4	3.09	92.6
0.8	0.020	457	0.5	3.09	145.2
1.0	0.025	609	0.6	3.10	194.1
1.2	0.030	811	0.8	3.10	259.0
1.6	0.040	1015	1.0	3.11	324.0
2.0	0.050	894	1.3	3.12	284.3
2.4	0.060	687	1.6	3.12	217.3
2.8	0.070	523	1.8	3.13	164.4
3.2	0.080	403	2.1	3.14	125.8
3.6	0.090	294	2.3	3.15	90.8

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	324.0
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	162.0
STRAIN AT FAILURE, %	1.0

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Tested By	RI/KI
Date	05/24/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-2-1	Depth/Elev.	20-40'
Subsample	4	Add. Info	Curing Age: 28 Days

ASTM D 2166

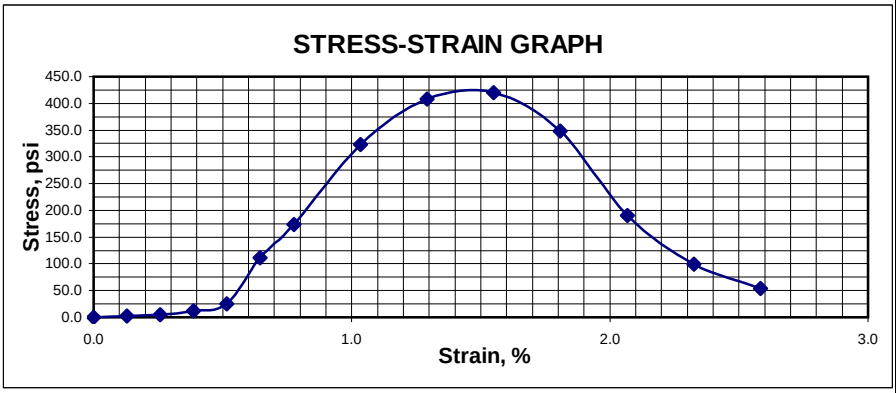
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.871
Initial Diameter, in	1.986
Height-to-Diameter Ratio	1.95
Initial Area, in^2	3.10
Initial Volume, in^3	11.99
Mass of Sample, g	390.70
Wet Density, pcf	124.1
Dry Density, pcf	106.6
Machine Speed, in/min	0.025
Strain Rate, % / min	0.65

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	470.20
Mass of Dry Sample and Tare, g	415.20
Mass of Tare, g	80.20
Moisture, %	16.4

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

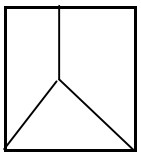
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	3.10	0.0
0.2	0.005	12	0.1	3.10	2.3
0.4	0.010	19	0.3	3.11	4.5
0.6	0.015	43	0.4	3.11	12.2
0.8	0.020	82	0.5	3.11	24.7
1.0	0.025	351	0.6	3.12	111.0
1.2	0.030	548	0.8	3.12	173.9
1.6	0.040	1017	1.0	3.13	323.3
2.0	0.050	1285	1.3	3.14	407.9
2.4	0.060	1326	1.5	3.15	419.8
2.8	0.070	1105	1.8	3.15	348.7
3.2	0.080	606	2.1	3.16	190.0
3.6	0.090	319	2.3	3.17	99.0
4.0	0.100	175	2.6	3.18	53.5

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	419.8
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	209.9
STRAIN AT FAILURE, %	1.5

REMARKS

Failure Code: 2

Failure Sketch



Failure Type: Cone and Split

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Batch Worksheet

	BATCH-SAMPLE ID	8800-2-1		BATCH #	1
PR. NUMBER	1010-01-2	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	4/26/2010

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**690.0**
Soil Moisture Content, %	**11.5**
Type of Cement Used	I/II
Grout Water/Cem. Mat (Solids) Ratio*	**1.00**
Mass of Dry Soil, g	**6000.0**
Total Water/Cem. Mat. Ratio	**2.438**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
8800	**Soil (wet)**	100.0	**6690.0**
8917	GGBFS	4.50	**270.0**
8918	Cement	1.50	**90.0**
5914	Bentonite	2.0	**120.0**
	Water, mL	480	

Remarks

* Cementous Materials (solids) is total mass of GGBFS, cement and Bentonite (if it was used for this mix)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
8800-2-1-1	UCS	2	4					3 days
8800-2-1-2	UCS	2	4					7 days
8800-2-1-3	UCS	2	4					14 days
8800-2-1-4	UCS	2	4					28 days
8800-2-1-5	Perm	3	3					3 days
8800-2-1-6	Perm	3	3					7 days
8800-2-1-7	Perm	3	3					14 days
8800-2-1-8	Perm	3	3					28 days
8800-2-1-9	Vol. Change	3	3					
8800-2-1-10	Vol. Change	3	3					
8800-2-1-11	Vol. Change	2	4					
8800-2-1-12	Vol. Change	2	4					
8800-2-1-13	Vol. Change	3	6					partial

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Tested By	RI/KI
Date	04/29/10
Checked By	

Client Pr. #		Lab. PR. #	1010-01-2
Pr. Name	National Grid Hempstead, NY MGP	S. Type	Mold
Location	ISS-04	Depth/Elev.	20-40'
		Add. Info	

Volume Increase Determination

Sub-Sample ID	Empty Mold Mass, g	Mold + Soil/Grout Mass, g	Soil/Grout Mass, g	Initial Soil Volume Calculated, cm^3	Sample Volume cm^3	Mold's Headspace Volume, cm^3	Final Soil/Grout Volume, cm^3	% Volume Change
1-13	NA	NA	NA	NA	3435.5	0.0	3435.5	-
				NA				-
				NA				-
TOTAL	NA	**NA**	**NA**	**3321.1**	**3435.5**	0.00	**3435.5**	**3.4**

Proctor wet density of soil used for initial volume calculation: 125.7 pcf **2.014** g/cm^3

Initial vol. of soil (based on 100% of Proctor wet density): **3321.1** cm^3

Mix Design # 8800-1-1

Ingredient	Amount	Unit	Portion of entire mix
Soil (Waste)	6690.00	g	0.903
Water	360.00	mL	0.049
GGBFS	270.00	g	0.036
Cement	90.00	g	0.012
Bentonite	0.00	g	0.000
		g	
Total	7410.00	-	1.000

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Tested By	RI/KI
Date	04/29/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-2
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800	Depth/Elev.	-
Location	-	Add. Info	-

Final Total Volume DETERMINATION (after mixing)

Sample ID	Mold #	Mass of Mold, g	Mass of Wet Sample & Mold, g	Height of Mold, in.	Diameter of Mold, in.	Volume of Mold, ft^3	Wet Density, pcf	Comments
8800-1-1-1	-	-	-	3.9	2.0	0.00702	NA	
8800-1-1-2	-	-	-	3.9	2.0	0.00712	NA	
8800-1-1-3	-	-	-	3.9	2.0	0.00711	NA	
8800-1-1-4	-	-	-	3.9	2.0	0.00702	NA	
8800-1-1-5	-	-	-	2.9	3.0	0.01173	NA	
8800-1-1-6	-	-	-	2.9	3.0	0.01173	NA	
8800-1-1-7	-	-	-	2.9	3.0	0.01182	NA	
8800-1-1-8	-	-	-	2.9	3.0	0.01173	NA	
8800-1-1-9	-	-	-	2.9	3.0	0.01165	NA	
8800-1-1-10	-	-	-	2.9	3.0	0.01169	NA	
8800-1-1-11	-	-	-	3.9	2.0	0.00709	NA	
8800-1-1-12	-	-	-	3.9	2.0	0.00709	NA	
8800-1-1-13	-	-	-	2.1	3.0	0.00850	NA	
		-	-				NA	
		-	-				NA	
Total						0.12133		

Comments	**Total Volume**	**3435.5**	**cm^3**

Balance ID Number	12/13/14/15
Oven ID Number	1/6/7
Caliper ID Number	16

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Tested By	RI
Date	04/30/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-1-1	Depth/Elev.	20-40'
Subsample	5	Add. Info	Curing Age: 3 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.813	in	7.15	cm
Diameter	2.993	in	7.60	cm
Area	7.04	in^2	45.39	cm^2
Volume	324.32	cm^3	0.0115	ft^3
Mass	670.90	g	1.48	lb
Specific Gravity	2.550	(Assumed)		
Dry Density	114.1	pcf		

Moisture Content

Mass of wet sample & tare	670.90	g
Mass of dry sample & tare	593.00	g
Mass of tare	0.00	g
% Moisture	13.1	

Test Data

Speed	5	
Board Number	7	
Cell Number	19	
Flow Pump Number	2A	
Flow Pump Rate	7.17E-03	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	42.20	cm
Min Head	42.20	cm
Maximum Gradient	5.91	
Minimum Gradient	5.91	

Final Data (After Test)

Average Height of Sample			2.813	in	7.15	cm
Average Diameter of Sample			2.994	in	7.60	cm
Area	7.04	in^2	45.42	cm^2		
Volume	324.54	cm^3	0.0115	ft^3		
Mass	680.80	g	1.50	lb		

Dry Density	114.0	pcf
Vol. of Voids	91.95	cm^3
Vol. of Solids	232.58	cm^3
Void Ratio	0.40	
Saturation	95.4	%

Moisture Content

Mass of wet sample & tare	774.90	g
Mass of dry sample & tare	687.20	g
Mass of tare	94.20	g
% Moisture	14.8	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
04/30/10	11	0	-	0.60	42.20	5.91	22.0	-	-	-	
04/30/10	11	5	300	0.60	42.20	5.91	22.0	2.67E-05	0.953	2.55E-05	
04/30/10	11	10	300	0.60	42.20	5.91	22.0	2.67E-05	0.953	2.55E-05	
04/30/10	11	15	300	0.60	42.20	5.91	22.0	2.67E-05	0.953	2.55E-05	*
04/30/10	11	20	300	0.60	42.20	5.91	22.0	2.67E-05	0.953	2.55E-05	*
04/30/10	11	25	300	0.60	42.20	5.91	22.0	2.67E-05	0.953	2.55E-05	*
04/30/10	11	30	300	0.60	42.20	5.91	22.0	2.67E-05	0.953	2.55E-05	*

Reported Average Hydraulic Conductivity* 2.5E-05 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	05/04/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-1-1	Depth/Elev.	20-40'
Subsample	6	Add. Info	Curing Age: 7 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.774	in	7.05	cm
Diameter	3.003	in	7.63	cm
Area	7.08	in^2	45.69	cm^2
Volume	321.96	cm^3	0.0114	ft^3
Mass	662.60	g	1.46	lb
Specific Gravity	2.550	(Assumed)		
Dry Density	111.8	pcf		

Moisture Content

Mass of wet sample & tare	662.60	g
Mass of dry sample & tare	576.60	g
Mass of tare	0.00	g
% Moisture	14.9	

Test Data

Speed	6	
Board Number	5	
Cell Number	19	
Flow Pump Number	2A	
Flow Pump Rate	3.58E-03	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	26.73	cm
Min Head	26.03	cm
Maximum Gradient	3.79	
Minimum Gradient	3.69	

Final Data (After Test)

Average Height of Sample			2.775	in	7.05	cm
Average Diameter of Sample			3.004	in	7.63	cm
Area	7.09	in^2	45.73	cm^2		
Volume	322.29	cm^3	0.0114	ft^3		
Mass	670.50	g	1.48	lb		

Dry Density	111.7	pcf
Vol. of Voids	96.11	cm^3
Vol. of Solids	226.19	cm^3
Void Ratio	0.42	
Saturation	97.5	%

Moisture Content

Mass of wet sample & tare	763.60	g
Mass of dry sample & tare	669.90	g
Mass of tare	93.30	g
% Moisture	16.3	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
05/04/10	8	10	-	0.37	26.03	3.69	23.4	-	-	-	
05/04/10	8	15	300	0.38	26.73	3.79	23.4	2.09E-05	0.923	1.93E-05	
05/04/10	8	20	300	0.37	26.03	3.69	23.4	2.09E-05	0.923	1.93E-05	
05/04/10	8	25	300	0.38	26.73	3.79	23.4	2.09E-05	0.923	1.93E-05	*
05/04/10	8	30	300	0.37	26.03	3.69	23.4	2.09E-05	0.923	1.93E-05	*
05/04/10	8	35	300	0.38	26.73	3.79	23.4	2.09E-05	0.923	1.93E-05	*
05/04/10	8	40	300	0.37	26.03	3.69	23.4	2.09E-05	0.923	1.93E-05	*

Reported Average Hydraulic Conductivity* 1.9E-05 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	05/10/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-1-1	Depth/Elev.	20-40'
Subsample	7	Add. Info	Curing Age: 14 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.789	in	7.08	cm
Diameter	3.005	in	7.63	cm
Area	7.09	in^2	45.76	cm^2
Volume	324.14	cm^3	0.0114	ft^3
Mass	663.60	g	1.46	lb
Specific Gravity	2.550	(Assumed)		
Dry Density	111.8	pcf		

Moisture Content

Mass of wet sample & tare	663.60	g
Mass of dry sample & tare	580.60	g
Mass of tare	0.00	g
% Moisture	14.3	

Test Data

Speed	7	
Board Number	7	
Cell Number	11	
Flow Pump Number	2A	
Flow Pump Rate	1.79E-03	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	31.65	cm
Min Head	30.95	cm
Maximum Gradient	4.47	
Minimum Gradient	4.37	

Final Data (After Test)

Average Height of Sample			2.790	in	7.09	cm
Average Diameter of Sample			3.004	in	7.63	cm
Area	7.09	in^2	45.73	cm^2		
Volume	324.04	cm^3	0.0114	ft^3		
Mass	674.10	g	1.49	lb		

Dry Density	111.8	pcf
Vol. of Voids	96.32	cm^3
Vol. of Solids	227.72	cm^3
Void Ratio	0.42	
Saturation	97.0	%

Moisture Content

Mass of wet sample & tare	775.10	g
Mass of dry sample & tare	681.70	g
Mass of tare	101.10	g
% Moisture	16.1	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
05/10/10	9	50	-	0.44	30.95	4.37	23.0	-	-	-	
05/10/10	10	0	600	0.45	31.65	4.47	23.0	8.87E-06	0.931	8.26E-06	
05/10/10	10	10	600	0.44	30.95	4.37	23.0	8.87E-06	0.931	8.26E-06	
05/10/10	10	20	600	0.45	31.65	4.47	23.0	8.87E-06	0.931	8.26E-06	*
05/10/10	10	30	600	0.44	30.95	4.37	23.0	8.87E-06	0.931	8.26E-06	*
05/10/10	10	40	600	0.45	31.65	4.47	23.0	8.87E-06	0.931	8.26E-06	*
05/10/10	10	50	600	0.45	31.65	4.47	23.0	8.77E-06	0.931	8.17E-06	*

Reported Average Hydraulic Conductivity* 8.2E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	RI/KI
Date	05/24/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-1-1	Depth/Elev.	20-40'
Subsample	8	Add. Info	Curing Age: 28 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.732	in	6.94	cm
Diameter	3.004	in	7.63	cm
Area	7.09	in^2	45.73	cm^2
Volume	317.30	cm^3	0.0112	ft^3
Mass	651.20	g	1.44	lb
Specific Gravity	2.550	(Assumed)		
Dry Density	112.6	pcf		

Moisture Content

Mass of wet sample & tare	651.20	g
Mass of dry sample & tare	572.80	g
Mass of tare	0.00	g
% Moisture	13.7	

Test Data

Speed	10	
Board Number	7	
Cell Number	5	
Flow Pump Number	2A	
Flow Pump Rate	2.24E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	33.06	cm
Min Head	32.36	cm
Maximum Gradient	4.75	
Minimum Gradient	4.64	

Final Data (After Test)

Average Height of Sample			2.743	in	6.97	cm
Average Diameter of Sample			3.004	in	7.63	cm
Area	7.09	in^2	45.73	cm^2		
Volume	318.58	cm^3	0.0113	ft^3		
Mass	662.80	g	1.46	lb		

Dry Density	112.3	pcf
Vol. of Voids	93.82	cm^3
Vol. of Solids	224.76	cm^3
Void Ratio	0.42	
Saturation	95.6	%

Moisture Content

Mass of wet sample & tare	757.40	g
Mass of dry sample & tare	667.80	g
Mass of tare	95.00	g
% Moisture	15.6	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
05/24/10	9	10	-	0.46	32.36	4.64	26.1	-	-	-	
05/24/10	9	20	600	0.46	32.36	4.64	26.1	1.05E-06	0.867	9.15E-07	
05/24/10	9	30	600	0.47	33.06	4.75	26.1	1.04E-06	0.867	9.05E-07	
05/24/10	9	40	600	0.46	32.36	4.64	26.1	1.04E-06	0.867	9.05E-07	*
05/24/10	9	50	600	0.47	33.06	4.75	26.1	1.04E-06	0.867	9.05E-07	*
05/24/10	10	0	600	0.47	33.06	4.75	26.1	1.03E-06	0.867	8.96E-07	*
05/24/10	10	10	600	0.47	33.06	4.75	26.1	1.03E-06	0.867	8.96E-07	*

Reported Average Hydraulic Conductivity* 9.0E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Web: www.test-llc.com

Tested By	KI
Date	04/29/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-1-1	Depth/Elev.	20-40'
Subsample	1	Add. Info	Curing Age: 3 Days

ASTM D 2166

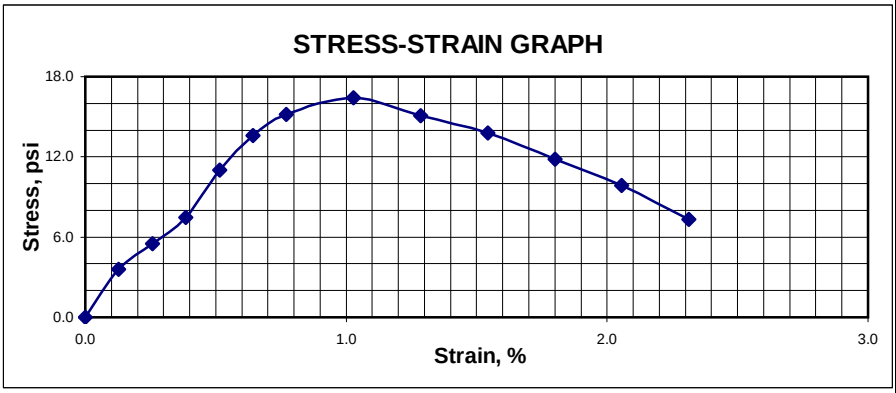
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.890
Initial Diameter, in	1.978
Height-to-Diameter Ratio	1.97
Initial Area, in^2	3.07
Initial Volume, in^3	11.95
Mass of Sample, g	400.90
Wet Density, pcf	127.8
Dry Density, pcf	112.1
Machine Speed, in/min	0.025
Strain Rate, % / min	0.64

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	481.00
Mass of Dry Sample and Tare, g	432.20
Mass of Tare, g	80.60
Moisture, %	13.9

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

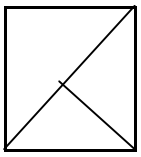
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	6	0.0	3.07	0.0
0.2	0.005	17	0.1	3.08	3.6
0.4	0.010	23	0.3	3.08	5.5
0.6	0.015	29	0.4	3.08	7.5
0.8	0.020	40	0.5	3.09	11.0
1.0	0.025	48	0.6	3.09	13.6
1.2	0.030	53	0.8	3.10	15.2
1.6	0.040	57	1.0	3.10	16.4
2.0	0.050	53	1.3	3.11	15.1
2.4	0.060	49	1.5	3.12	13.8
2.8	0.070	43	1.8	3.13	11.8
3.2	0.080	37	2.1	3.14	9.9
3.6	0.090	29	2.3	3.15	7.3
	0.100				
	0.110				
	0.120				
	0.130				
	0.140				
	0.150				
	0.160				
	0.170				

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	16.4
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	8.2
STRAIN AT FAILURE, %	1.0

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Tested By	RI
Date	05/03/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-1-1	Depth/Elev.	20-40'
Subsample	2	Add. Info	Curing Age: 7 Days

ASTM D 2166

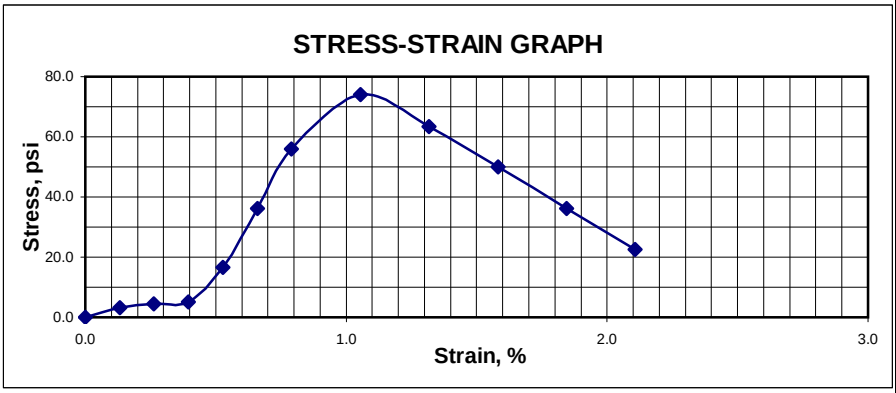
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.795
Initial Diameter, in	1.977
Height-to-Diameter Ratio	1.92
Initial Area, in^2	3.07
Initial Volume, in^3	11.65
Mass of Sample, g	398.50
Wet Density, pcf	130.3
Dry Density, pcf	113.9
Machine Speed, in/min	0.025
Strain Rate, % / min	0.66

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	698.40
Mass of Dry Sample and Tare, g	648.60
Mass of Tare, g	301.10
Moisture, %	14.3

TEST DATA

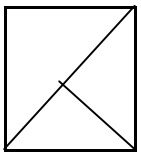
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	7	0.0	3.07	0.0
0.2	0.005	17	0.1	3.07	3.3
0.4	0.010	21	0.3	3.08	4.5
0.6	0.015	23	0.4	3.08	5.2
0.8	0.020	58	0.5	3.09	16.5
1.0	0.025	119	0.7	3.09	36.2
1.2	0.030	180	0.8	3.09	55.9
1.6	0.040	237	1.1	3.10	74.1
2.0	0.050	204	1.3	3.11	63.3
2.4	0.060	163	1.6	3.12	50.0
2.8	0.070	120	1.8	3.13	36.1
3.2	0.080	78	2.1	3.14	22.6

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488): NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	74.1
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	37.1
STRAIN AT FAILURE, %	1.1

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Tested By	RI
Date	05/10/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-1-1	Depth/Elev.	20-40'
Subsample	3	Add. Info	Curing Age: 14 Days

ASTM D 2166

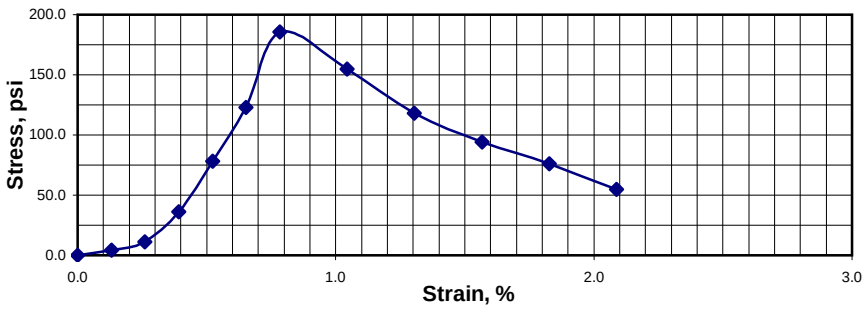
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.831
Initial Diameter, in	1.990
Height-to-Diameter Ratio	1.93
Initial Area, in^2	3.11
Initial Volume, in^3	11.92
Mass of Sample, g	397.50
Wet Density, pcf	127.1
Dry Density, pcf	111.4
Machine Speed, in/min	0.025
Strain Rate, % / min	0.65

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	492.30
Mass of Dry Sample and Tare, g	443.50
Mass of Tare, g	96.50
Moisture, %	14.1

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

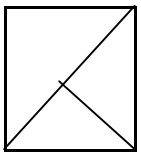
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	8	0.0	3.11	0.0
0.2	0.005	22	0.1	3.11	4.5
0.4	0.010	43	0.3	3.12	11.2
0.6	0.015	121	0.4	3.12	36.2
0.8	0.020	253	0.5	3.13	78.4
1.0	0.025	392	0.7	3.13	122.7
1.2	0.030	590	0.8	3.13	185.7
1.6	0.040	495	1.0	3.14	154.9
2.0	0.050	380	1.3	3.15	118.0
2.4	0.060	305	1.6	3.16	94.0
2.8	0.070	249	1.8	3.17	76.1
3.2	0.080	182	2.1	3.18	54.8

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	185.7
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	92.8
STRAIN AT FAILURE, %	0.8

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Tested By	RI
Date	05/24/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	8800-1-1	Depth/Elev.	20-40'
Subsample	4	Add. Info	Curing Age: 28 Days

ASTM D 2166

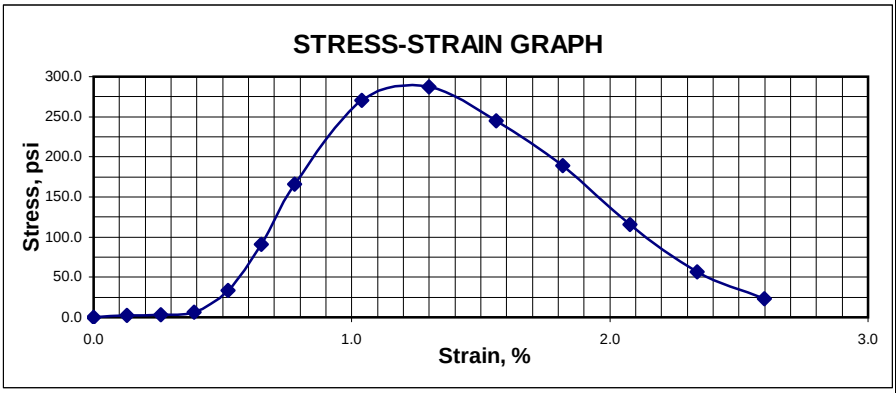
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.850
Initial Diameter, in	1.986
Height-to-Diameter Ratio	1.94
Initial Area, in^2	3.10
Initial Volume, in^3	11.93
Mass of Sample, g	403.70
Wet Density, pcf	128.9
Dry Density, pcf	113.0
Machine Speed, in/min	0.025
Strain Rate, % / min	0.65

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	482.50
Mass of Dry Sample and Tare, g	432.70
Mass of Tare, g	79.70
Moisture, %	14.1

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

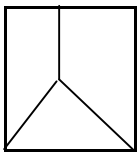
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	6	0.0	3.10	0.0
0.2	0.005	13	0.1	3.10	2.3
0.4	0.010	17	0.3	3.11	3.5
0.6	0.015	26	0.4	3.11	6.4
0.8	0.020	110	0.5	3.11	33.4
1.0	0.025	289	0.6	3.12	90.8
1.2	0.030	524	0.8	3.12	165.9
1.6	0.040	853	1.0	3.13	270.6
2.0	0.050	908	1.3	3.14	287.4
2.4	0.060	776	1.6	3.15	244.7
2.8	0.070	603	1.8	3.16	189.2
3.2	0.080	373	2.1	3.16	116.0
3.6	0.090	186	2.3	3.17	56.7
4.0	0.100	80	2.6	3.18	23.3

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	287.4
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	143.7
STRAIN AT FAILURE, %	1.3

REMARKS

Failure Code: 2

Failure Sketch



Failure Type: Cone and Split

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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ENGINEERING
SOIL
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Batch Worksheet

	BATCH-SAMPLE ID	8800-1-1		BATCH #	1
PR. NUMBER	1010-01-2	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	4/26/2010

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**690.0**
Soil Moisture Content, %	**11.5**
Type of Cement Used	I/II
Grout Water/Cem. Mat (Solids) Ratio*	**1.00**
Mass of Dry Soil, g	**6000.0**
Total Water/Cem. Mat. Ratio	**2.917**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
8800	**Soil (wet)**	100.0	**6690.0**
8917	GGBFS	4.50	**270.0**
8918	Cement	1.50	**90.0**
5914	Bentonite	0.0	**0.0**
	Water, mL	360	

Remarks

* Cementous Materials (solids) is total mass of GGBFS, cement and Bentonite (if it was used for this mix)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
8800-1-1-1	UCS	2	4					3 days
8800-1-1-2	UCS	2	4					7 days
8800-1-1-3	UCS	2	4					14 days
8800-1-1-4	UCS	2	4					28 days
8800-1-1-5	Perm	3	3					3 days
8800-1-1-6	Perm	3	3					7 days
8800-1-1-7	Perm	3	3					14 days
8800-1-1-8	Perm	3	3					28 days
8800-1-1-9	Vol. Change	3	3					
8800-1-1-10	Vol. Change	3	3					
8800-1-1-11	Vol. Change	2	4					
8800-1-1-12	Vol. Change	2	4					
8800-1-1-13	Vol. Change	3	3					Partial

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Web: www.test-llc.com

Tested By	RI
Date	01/09/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-02
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525+5525A / ISS-04/8-1-2	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.877	in	7.31	cm
Diameter	3.002	in	7.63	cm
Area	7.08	in^2	45.66	cm^2
Volume	333.70	cm^3	0.0118	ft^3
Mass	682.50	g	1.50	lb
Specific Gravity	2.600	(Assumed)		
Dry Density	112.1	pcf		

Moisture Content

Mass of wet sample & tare	682.50	g
Mass of dry sample & tare	599.50	g
Mass of tare	0.00	g
% Moisture	13.8	

Test Data

Speed	13	
Board Number	9	
Cell Number	11	
Flow Pump Number	2B	
Flow Pump Rate	2.80E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	76.67	cm
Min Head	75.26	cm
Maximum Gradient	10.48	
Minimum Gradient	10.29	

Final Data (After Test)

Average Height of Sample			2.881	in	7.32	cm
Average Diameter of Sample			3.000	in	7.62	cm
Area	7.07	in^2	45.60	cm^2		
Volume	333.72	cm^3	0.0118	ft^3		
Mass	697.60	g	1.54	lb		

Dry Density	112.1	pcf
Vol. of Voids	103.14	cm^3
Vol. of Solids	230.58	cm^3
Void Ratio	0.45	
Saturation	95.1	%

Moisture Content

Mass of wet sample & tare	791.80	g
Mass of dry sample & tare	693.70	g
Mass of tare	94.20	g
% Moisture	16.4	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
01/09/09	13	0	-	1.08	75.97	10.38	17.0	-	-	-	
01/09/09	13	10	600	1.07	75.26	10.29	17.0	5.94E-08	1.079	6.41E-08	
01/09/09	13	20	600	1.08	75.97	10.38	17.0	5.94E-08	1.079	6.41E-08	
01/09/09	13	30	600	1.09	76.67	10.48	17.0	5.89E-08	1.079	6.35E-08	*
01/09/09	13	40	600	1.08	75.97	10.38	17.0	5.89E-08	1.079	6.35E-08	*
01/09/09	13	50	600	1.07	75.26	10.29	17.0	5.94E-08	1.079	6.41E-08	*
01/09/09	14	0	600	1.09	76.67	10.48	17.0	5.91E-08	1.079	6.38E-08	*

Reported Average Hydraulic Conductivity* 6.4E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	246			Pore Pressure Transducer ID #	28

TIMELY ENGINEERING SOIL TESTS, LLC
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Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

Tested By	RI
Date	01/09/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-02
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525+5525A / ISS-04/8-1-1	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

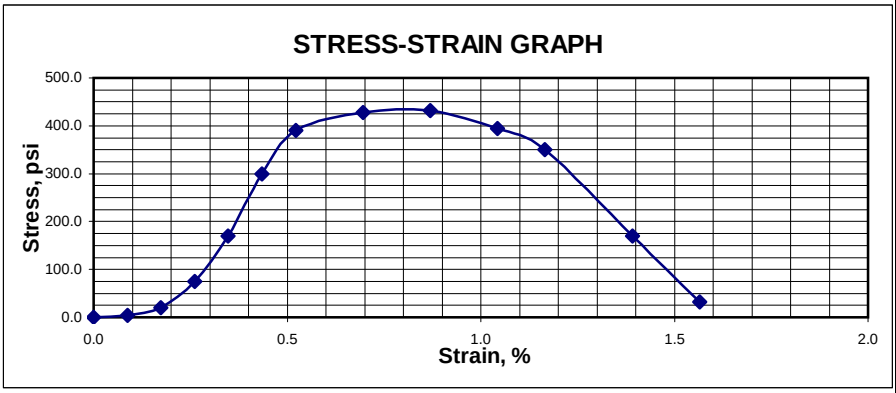
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.750
Initial Diameter, in	3.005
Height-to-Diameter Ratio	1.91
Initial Area, in^2	7.09
Initial Volume, in^3	40.78
Mass of Sample, g	1368.10
Wet Density, pcf	127.8
Dry Density, pcf	112.0
Machine Speed, in/min	0.025
Strain Rate, % / min	0.43

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1560.00
Mass of Dry Sample and Tare, g	1392.00
Mass of Tare, g	194.40
Moisture, %	14.0

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

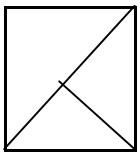
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	4	0.0	7.09	0.0
0.2	0.005	29	0.1	7.10	3.5
0.4	0.010	150	0.2	7.10	20.6
0.6	0.015	533	0.3	7.11	74.4
0.8	0.020	1214	0.3	7.12	170.0
1.0	0.025	2138	0.4	7.12	299.6
1.2	0.030	2783	0.5	7.13	389.8
1.6	0.040	3055	0.7	7.14	427.2
2.0	0.050	3090	0.9	7.15	431.3
2.4	0.060	2835	1.0	7.17	395.0
2.7	0.067	2515	1.2	7.18	349.9
3.2	0.080	1224	1.4	7.19	169.6
3.6	0.090	231	1.6	7.20	31.5

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	431.3
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	215.7
STRAIN AT FAILURE, %	0.9

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

TIMELY ENGINEERING SOIL TESTS, LLC
1874 Forge Street Tucker, GA 30084
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Tested By	RI
Date	01/09/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-02
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525+5525A / ISS-04/7-1-2	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.956	in	7.51	cm
Diameter	3.000	in	7.62	cm
Area	7.07	in^2	45.60	cm^2
Volume	342.40	cm^3	0.0121	ft^3
Mass	667.50	g	1.47	lb
Specific Gravity	2.600	(Assumed)		
Dry Density	106.0	pcf		

Moisture Content

Mass of wet sample & tare	667.50	g
Mass of dry sample & tare	581.90	g
Mass of tare	0.00	g
% Moisture	14.7	

Test Data

Speed	15	
Board Number	6	
Cell Number	4	
Flow Pump Number	2A	
Flow Pump Rate	7.00E-06	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	158.97	cm
Min Head	157.56	cm
Maximum Gradient	21.17	
Minimum Gradient	20.98	

Final Data (After Test)

Average Height of Sample		2.957	in	7.51	cm
Average Diameter of Sample		3.001	in	7.62	cm
Area	7.07 in^2	45.63	cm^2		
Volume	342.75 cm^3	0.0121	ft^3		
Mass	697.90 g	1.54	lb		

Dry Density	106.0	pcf
Vol. of Voids	118.81	cm^3
Vol. of Solids	223.94	cm^3
Void Ratio	0.53	
Saturation	97.4	%

Moisture Content

Mass of wet sample & tare	792.50	g
Mass of dry sample & tare	676.90	g
Mass of tare	95.00	g
% Moisture	19.9	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
01/09/09	11	20	-	2.25	158.27	21.07	16.8	-	-	-	
01/09/09	11	30	600	2.26	158.97	21.17	16.8	7.26E-09	1.084	7.88E-09	
01/09/09	11	40	600	2.24	157.56	20.98	16.8	7.28E-09	1.084	7.89E-09	
01/09/09	11	50	600	2.25	158.27	21.07	16.8	7.30E-09	1.084	7.91E-09	*
01/09/09	12	0	600	2.25	158.27	21.07	16.8	7.28E-09	1.084	7.89E-09	*
01/09/09	12	10	600	2.25	158.27	21.07	16.8	7.28E-09	1.084	7.89E-09	*
01/09/09	12	20	600	2.26	158.97	21.17	16.8	7.26E-09	1.084	7.88E-09	*

Reported Average Hydraulic Conductivity* 7.9E-09 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	01/09/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-02
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525+5525A / ISS-04/7-1-1	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

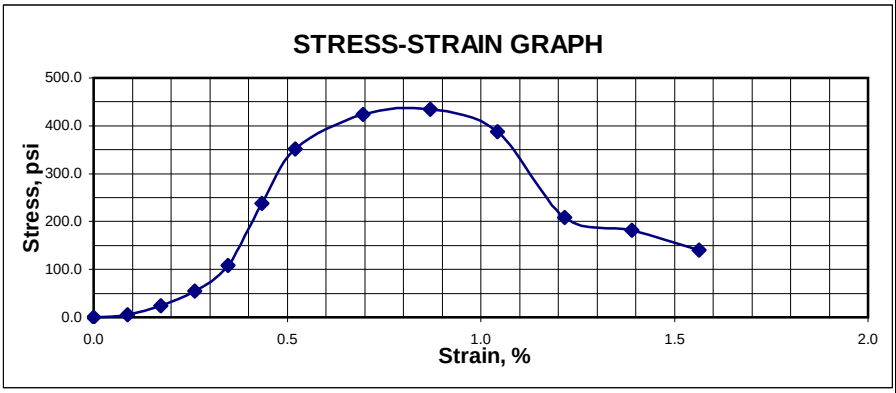
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.754
Initial Diameter, in	3.006
Height-to-Diameter Ratio	1.91
Initial Area, in^2	7.10
Initial Volume, in^3	40.84
Mass of Sample, g	1303.80
Wet Density, pcf	121.6
Dry Density, pcf	105.1
Machine Speed, in/min	0.025
Strain Rate, % / min	0.43

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1490.80
Mass of Dry Sample and Tare, g	1314.20
Mass of Tare, g	190.50
Moisture, %	15.7

TEST DATA

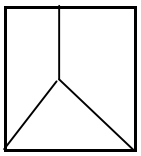
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	7.10	0.0
0.2	0.005	46	0.1	7.10	5.8
0.4	0.010	174	0.2	7.11	23.8
0.6	0.015	399	0.3	7.12	55.4
0.8	0.020	773	0.3	7.12	107.8
1.0	0.025	1697	0.4	7.13	237.4
1.2	0.030	2518	0.5	7.13	352.3
1.6	0.040	3038	0.7	7.15	424.4
2.0	0.050	3117	0.9	7.16	434.7
2.4	0.060	2785	1.0	7.17	387.6
2.8	0.070	1505	1.2	7.18	208.8
3.2	0.080	1316	1.4	7.20	182.2
3.6	0.090	1017	1.6	7.21	140.4

REMARKS

Failure Code: 2

Failure Sketch



Failure Type: Cone and Split

DESCRIPTION

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	434.7
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	217.3
STRAIN AT FAILURE, %	0.9

USCS (ASTM D2487: D2488): NA

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Tested By	RI
Date	01/09/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-02
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525+5525A / ISS-04/6-1-2	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.940	in	7.47	cm
Diameter	3.003	in	7.63	cm
Area	7.08	in^2	45.69	cm^2
Volume	341.23	cm^3	0.0121	ft^3
Mass	705.80	g	1.56	lb
Specific Gravity	2.600	(Assumed)		
Dry Density	115.8	pcf		

Moisture Content

Mass of wet sample & tare	705.80	g
Mass of dry sample & tare	633.20	g
Mass of tare	0.00	g
% Moisture	11.5	

Test Data

Speed	8	
Board Number	12	
Cell Number	8	
Flow Pump Number	2A	
Flow Pump Rate	8.96E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	132.94	cm
Min Head	131.54	cm
Maximum Gradient	17.81	
Minimum Gradient	17.62	

Final Data (After Test)

Average Height of Sample			2.939	in	7.47	cm
Average Diameter of Sample			3.000	in	7.62	cm
Area	7.07	in^2	45.60	cm^2		
Volume	340.43	cm^3	0.0120	ft^3		
Mass	728.20	g	1.61	lb		

Dry Density	116.1	pcf
Vol. of Voids	96.86	cm^3
Vol. of Solids	243.57	cm^3
Void Ratio	0.40	
Saturation	98.0	%

Moisture Content

Mass of wet sample & tare	827.90	g
Mass of dry sample & tare	733.00	g
Mass of tare	99.80	g
% Moisture	15.0	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
01/09/09	8	40	-	1.88	132.24	17.71	19.5	-	-	-	
01/09/09	8	45	300	1.87	131.54	17.62	19.5	1.11E-06	1.013	1.13E-06	
01/09/09	8	50	300	1.88	132.24	17.71	19.5	1.11E-06	1.013	1.13E-06	
01/09/09	8	55	300	1.89	132.94	17.81	19.5	1.11E-06	1.013	1.12E-06	*
01/09/09	9	0	300	1.88	132.24	17.71	19.5	1.11E-06	1.013	1.12E-06	*
01/09/09	9	5	300	1.89	132.94	17.81	19.5	1.11E-06	1.013	1.12E-06	*
01/09/09	9	10	300	1.88	132.24	17.71	19.5	1.11E-06	1.013	1.12E-06	*

Reported Average Hydraulic Conductivity* 1.1E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Web: www.test-llc.com

Tested By	RI
Date	01/09/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-02
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525+5525A / ISS-04/6-1-1	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

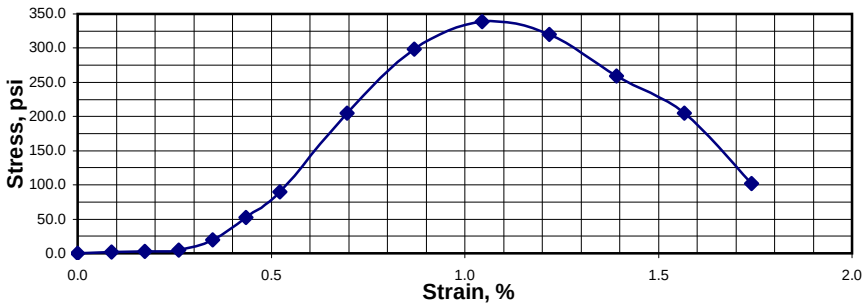
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.746
Initial Diameter, in	3.009
Height-to-Diameter Ratio	1.91
Initial Area, in^2	7.11
Initial Volume, in^3	40.86
Mass of Sample, g	1384.20
Wet Density, pcf	129.1
Dry Density, pcf	115.3
Machine Speed, in/min	0.025
Strain Rate, % / min	0.44

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1587.90
Mass of Dry Sample and Tare, g	1440.70
Mass of Tare, g	205.40
Moisture, %	11.9

TEST DATA

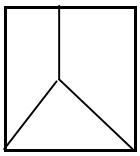
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	7.11	0.0
0.2	0.005	16	0.1	7.12	1.5
0.4	0.010	23	0.2	7.12	2.5
0.6	0.015	38	0.3	7.13	4.6
0.8	0.020	145	0.3	7.14	19.6
1.0	0.025	379	0.4	7.14	52.4
1.2	0.030	647	0.5	7.15	89.8
1.6	0.040	1473	0.7	7.16	205.0
2.0	0.050	2148	0.9	7.17	298.7
2.4	0.060	2439	1.0	7.19	338.7
2.8	0.070	2312	1.2	7.20	320.5
3.2	0.080	1873	1.4	7.21	259.0
3.6	0.090	1487	1.6	7.22	205.1
4.0	0.100	745	1.7	7.24	102.3

REMARKS

Failure Code: 2

Failure Sketch



Failure Type: Cone and Split

DESCRIPTION

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	338.7
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	169.4
STRAIN AT FAILURE, %	1.0

USCS (ASTM D2487: D2488): NA

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Tested By	RI
Date	01/09/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-02
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525+5525A / ISS-04/5-1-2	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	3.011	in	7.65	cm
Diameter	2.839	in	7.21	cm
Area	6.33	in^2	40.84	cm^2
Volume	312.34	cm^3	0.0110	ft^3
Mass	639.10	g	1.41	lb
Specific Gravity	2.600	(Assumed)		
Dry Density	112.8	pcf		

Moisture Content

Mass of wet sample & tare	639.10	g
Mass of dry sample & tare	564.50	g
Mass of tare	0.00	g
% Moisture	13.2	

Test Data

Speed	6	
Board Number	9	
Cell Number	7	
Flow Pump Number	2B	
Flow Pump Rate	3.58E-03	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	120.98	cm
Min Head	119.58	cm
Maximum Gradient	15.81	
Minimum Gradient	15.62	

Final Data (After Test)

Average Height of Sample		3.013	in	7.65	cm
Average Diameter of Sample		2.839	in	7.21	cm
Area	6.33 in^2	40.84	cm^2		
Volume	312.55 cm^3	0.0110	ft^3		
Mass	659.30 g	1.45	lb		

Dry Density	112.8	pcf
Vol. of Voids	95.34	cm^3
Vol. of Solids	217.21	cm^3
Void Ratio	0.44	
Saturation	99.2	%

Moisture Content

Mass of wet sample & tare	754.70	g
Mass of dry sample & tare	660.20	g
Mass of tare	95.70	g
% Moisture	16.7	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
01/07/09	10	0	-	1.70	119.58	15.62	19.5	-	-	-	
01/07/09	10	5	300	1.71	120.28	15.72	19.5	5.60E-06	1.013	5.67E-06	
01/07/09	10	10	300	1.70	119.58	15.62	19.5	5.60E-06	1.013	5.67E-06	
01/07/09	10	15	300	1.71	120.28	15.72	19.5	5.60E-06	1.013	5.67E-06	*
01/07/09	10	20	300	1.72	120.98	15.81	19.5	5.57E-06	1.013	5.64E-06	*
01/07/09	10	25	300	1.71	120.28	15.72	19.5	5.57E-06	1.013	5.64E-06	*
01/07/09	10	30	300	1.72	120.98	15.81	19.5	5.57E-06	1.013	5.64E-06	*

Reported Average Hydraulic Conductivity* 5.6E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	246			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	01/09/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-02
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525+5525A / ISS-04/5-1-1	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

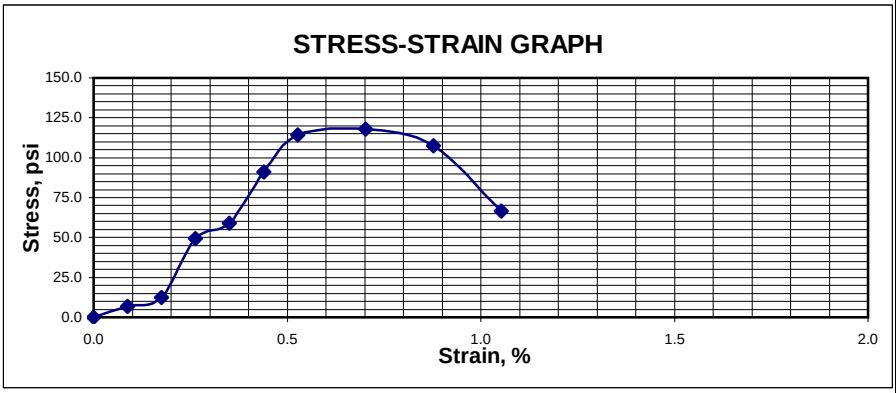
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.696
Initial Diameter, in	3.009
Height-to-Diameter Ratio	1.89
Initial Area, in^2	7.11
Initial Volume, in^3	40.50
Mass of Sample, g	1375.90
Wet Density, pcf	129.4
Dry Density, pcf	115.4
Machine Speed, in/min	0.025
Strain Rate, % / min	0.44

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1541.90
Mass of Dry Sample and Tare, g	1398.00
Mass of Tare, g	208.70
Moisture, %	12.1

TEST DATA

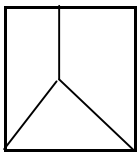
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	7.11	0.0
0.2	0.005	53	0.1	7.12	6.7
0.4	0.010	93	0.2	7.12	12.4
0.6	0.015	358	0.3	7.13	49.5
0.8	0.020	427	0.4	7.14	59.1
1.0	0.025	655	0.4	7.14	91.0
1.2	0.030	821	0.5	7.15	114.1
1.6	0.040	850	0.7	7.16	118.0
2.0	0.050	775	0.9	7.17	107.3
2.4	0.060	483	1.1	7.19	66.5

REMARKS

Failure Code: 2

Failure Sketch



Failure Type: Cone and Split

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	118.0
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	59.0
STRAIN AT FAILURE, %	0.7

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Phone: 770-938-8233 Cell: 678-612-6534
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Web: www.test-llc.com

Tested By	RI
Date	04/21/10
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	1010-01-2
Pr. Name	National Grid Hempstead,NY MGP	Sample Type	-
Sample ID	8800 / ISS-04	Depth/Elev.	-
Location	-	Add. Info	-

ASTM D 2216; MOISTURE CONTENT DETERMINATION

Date	Tech	Sample ID	Mass of Wet Sample & Tare (g)	Mass of Dry Sample & Tare (g)	Mass of Tare (g)	Moisture Content (%)	Comments
1/12/2010	RI	8800/ISS-04	1876.00	1728.70	452.50	11.5	

REMARKS

Balance ID Number	1/6/7
Oven ID Number	12/13/14/15

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SUMMARY of TESTING

T.E.S.T. Project Number: 838

DRAFT

Project Name: National Grid Hempstead,NY MGP

Sample Identification					USCS	Admix	Curing		Moisture	Viscosity	Grain Size Distribution			Atterberg Limits			Unit Weight		Hydraul.
T.E.S.T. Sample No.	Client Base Material No.	Mix Design No.	Batch No.	Spec. No.		GGBFS/ Cem. (3/1) %	Age, days	UCS, psi	Content, %	cP (mPa s)	% Finer #4 Sieve	% Finer #200 Sieve	% Finer 0.005mm	LL, %	PL, %	PI, %	Wet Density, pcf	Dry Density, pcf	Conduct. cm/sec
838-02																			
5521+ 5521A	ISS-02/10'-35'	5	1	1		5	28	21.4	11.3	1360K		-	-	-	-	-	121.2	108.8	-
5521+ 5521A	ISS-02/10'-35'	5	1	2		5	28	-	12.9	1360K		-	-	-	-	-	117.5	104.1	4.0E-05
5521+ 5521A	ISS-02/10'-35'	6	1	1		7.5	28	232.0	10.5	1620K		-	-	-	-	-	120.7	109.2	-
5521+ 5521A	ISS-02/10'-35'	6	1	2		7.5	28	-	10.7	1620K		-	-	-	-	-	116.7	105.4	7.5E-07
5521+ 5521A	ISS-02/10'-35'	1	2	1		10	28	461.8	10.7	1590K		-	-	-	-	-	113.9	102.8	-
5521+ 5521A	ISS-02/10'-35'	1	2	2		10	28	-	11.3	1590K		-	-	-	-	-	114.3	102.7	1.6E-07
5521+ 5521A	ISS-02/10'-35'	7	1	1		10+1%B	28	726.1	10.6	1680K		-	-	-	-	-	122.2	110.4	-
5521+ 5521A	ISS-02/10'-35'	7	1	2		10+1%B	28	-	10.0	1680K		-	-	-	-	-	121.2	110.2	1.1E-08
5521+ 5521A	ISS-02/10'-35'	8	1	1		10+1%OC	28	598.8	10.1	1270K		-	-	-	-	-	118.9	108.0	-
5521+ 5521A	ISS-02/10'-35'	8	1	2		10+1%OC	28	-	10.1	1270K		-	-	-	-	-	118.9	108.0	3.6E-08
5525+ 5525A	ISS-04/20'-40'	5	1	1		5	28	117.6	12.1	818K		-	-	-	-	-	129.4	115.4	-
5525+ 5525A	ISS-04/20'-40'	5	1	2		5	28	-	13.2	818K		-	-	-	-	-	127.7	112.8	5.6E-06
5525+ 5525A	ISS-04/20'-40'	6	1	1		7.5	28	338.7	11.9	1050K		-	-	-	-	-	129.1	115.3	-
5525+ 5525A	ISS-04/20'-40'	6	1	2		7.5	28	-	11.5	1050K		-	-	-	-	-	129.1	115.8	1.1E-06
5525+ 5525A	ISS-04/20'-40'	1	2	1		10	28	680.8	11.2	1140K		-	-	-	-	-	130.3	117.1	-
5525+ 5525A	ISS-04/20'-40'	1	2	2		10	28	-	11.4	1140K		-	-	-	-	-	127.1	114.1	8.8E-08
5525+ 5525A	ISS-04/20'-40'	7	1	1		10+2%B	28	433.2	15.7	907K		-	-	-	-	-	121.6	105.1	-
5525+ 5525A	ISS-04/20'-40'	7	1	2		10+2%B	28	-	14.7	907K		-	-	-	-	-	121.6	106.0	7.9E-09

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SUMMARY of TESTING

T.E.S.T. Project Number: 838
Project Name: National Grid Hempstead,NY MGP

DRAFT

Sample Identification					USCS	Admix	Curing		Moisture	Viscosity	Grain Size Distribution			Atterberg Limits			Unit Weight		Hydraul.
T.E.S.T. Sample No.	Client Base Material No.	Mix Design No.	Batch No.	Spec. No.		GGBFS/ Cem. (3/1) %	Age, days	UCS, psi	Content, %	cP (mPa s)	% Finer #4 Sieve	% Finer #200 Sieve	% Finer 0.005mm	LL, %	PL, %	PI, %	Wet Density, pcf	Dry Density, pcf	Conduct. cm/sec
5525+ 5525A	ISS-04/20'-40'	8	1	1		10+2%OC	28	430.1	14.0	146K		-	-	-	-	-	127.8	112.0	-
5525+ 5525A	ISS-04/20'-40'	8	1	2		10+2%OC	28	-	13.8	146K		-	-	-	-	-	127.6	112.1	6.4E-08
838-03																			
5521+ 5521A	ISS-02/10'-35'	9	1	1		9	28	-	-	1260K		-	-	-	-	-	-	-	-
5521+ 5521A	ISS-02/10'-35'	9	1	2		9	28	-	-	1260K		-	-	-	-	-	-	-	-
5521+ 5521A	ISS-02/10'-35'	14	1	1		9+5ml/100g R.	28	-	-	968K		-	-	-	-	-	-	-	-
5521+ 5521A	ISS-02/10'-35'	14	1	2		9+5ml/100g R.	28	-	-	968K		-	-	-	-	-	-	-	-
5525 A,B,C	ISS-04/20'-40'	9	1	1		9	28	-	-	1292K		-	-	-	-	-	-	-	-
5525 A,B,C	ISS-04/20'-40'	9	1	2		9	28	-	-	1292K		-	-	-	-	-	-	-	-
5525 A,B,C	ISS-04/20'-40'	9	1	3(Dupl)		9	28	-	-	1292K		-	-	-	-	-	-	-	-
5525 A,B,C	ISS-04/20'-40'	9	1	4(Dupl)		9	28	-	-	1292K		-	-	-	-	-	-	-	-
5525 A,B,C	ISS-04/20'-40'	10	1	1		9+1%B.	28	-	-	996K		-	-	-	-	-	-	-	-
5525 A,B,C	ISS-04/20'-40'	10	1	2		9+1%B.	28	-	-	996K		-	-	-	-	-	-	-	-
5525 A,B,C	ISS-04/20'-40'	11	1	1		9+2%B.	28	-	-	863K		-	-	-	-	-	-	-	-
5525 A,B,C	ISS-04/20'-40'	11	1	2		9+2%B.	28	-	-	863K		-	-	-	-	-	-	-	-
5525 A,B,C	ISS-04/20'-40'	12	1	1		9+1% OC.	28	-	-	757K		-	-	-	-	-	-	-	-
5525 A,B,C	ISS-04/20'-40'	12	1	2		9+1% OC.	28	-	-	757K		-	-	-	-	-	-	-	-
5525 A,B,C	ISS-04/20'-40'	13	1	1		9+2% OC.	28	-	-	984K		-	-	-	-	-	-	-	-
5525 A,B,C	ISS-04/20'-40'	13	1	2		9+2% OC.	28	-	-	984K		-	-	-	-	-	-	-	-

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SUMMARY of TESTING

T.E.S.T. Project Number: 838

DRAFT

Project Name: National Grid Hempstead,NY MGP

Sample Identification					USCS	Admix	Curing	UCS,	Moisture	Viscosity	Grain Size Distribution			Atterberg Limits			Unit Weight		Hydraul.
T.E.S.T. Sample No.	Client Base Material No.	Mix Design No.	Batch No.	Spec. No.		GGBFS/ Cem. (3/1) %	Age, days	psi	Content, %	cP (mPa s)	% Finer #4 Sieve	% Finer #200 Sieve	% Finer 0.005mm	LL, %	PL, %	PI, %	Wet Density, pcf	Dry Density, pcf	Conduct. cm/sec
5525 A,B,C	ISS-04/20'-40'	14	1	1		9+5ml/100g R.	28	-	-	1093K		-	-	-	-	-	-	-	-
5525 A,B,C	ISS-04/20'-40'	14	1	2		9+5ml/100g R.	28	-	-	1093K		-	-	-	-	-	-	-	-

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Tested By	RI
Date	11/18/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525+5525A / ISS-04/4-1-2	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	3.081	in	7.83	cm
Diameter	3.015	in	7.66	cm
Area	7.14	in^2	46.06	cm^2
Volume	360.46	cm^3	0.0127	ft^3
Mass	740.70	g	1.63	lb
Specific Gravity	2.600	(Assumed)		
Dry Density	113.5	pcf		

Moisture Content

Mass of wet sample & tare	740.70	g
Mass of dry sample & tare	655.90	g
Mass of tare	0.00	g
% Moisture	12.9	

Test Data

Speed	15	
Board Number	3	
Cell Number	11	
Flow Pump Number	1A	
Flow Pump Rate	7.00E-06	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	237.75	cm
Min Head	236.34	cm
Maximum Gradient	30.39	
Minimum Gradient	30.21	

Final Data (After Test)

Average Height of Sample			3.080	in	7.82 cm
Average Diameter of Sample			3.017	in	7.66 cm
Area	7.15	in^2	46.12	cm^2	
Volume	360.82	cm^3	0.0127	ft^3	
Mass	760.10	g	1.68	lb	

Dry Density	113.3	pcf
Vol. of Voids	108.82	cm^3
Vol. of Solids	252.00	cm^3
Void Ratio	0.43	
Saturation	96.4	%

Moisture Content

Mass of wet sample & tare	855.90	g
Mass of dry sample & tare	750.90	g
Mass of tare	95.00	g
% Moisture	16.0	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
11/18/08	13	10	-	3.36	236.34	30.21	18.5	-	-	-	
11/18/08	13	20	600	3.37	237.05	30.30	18.5	5.02E-09	1.038	5.21E-09	
11/18/08	13	30	600	3.36	236.34	30.21	18.5	5.02E-09	1.038	5.21E-09	
11/18/08	13	40	600	3.37	237.05	30.30	18.5	5.02E-09	1.038	5.21E-09	*
11/18/08	13	50	600	3.38	237.75	30.39	18.5	5.00E-09	1.038	5.19E-09	*
11/18/08	14	0	600	3.37	237.05	30.30	18.5	5.00E-09	1.038	5.19E-09	*
11/18/08	14	10	600	3.38	237.75	30.39	18.5	5.00E-09	1.038	5.19E-09	*

Reported Average Hydraulic Conductivity* 5.2E-09 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	22	Balance ID #	1/6/7	Differential Pressure Transducer ID #	24/25
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	29
Syringe ID #	140			Pore Pressure Transducer ID #	26/27

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Tested By	RI
Date	11/18/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525+5525A / ISS-04/4-1-1	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

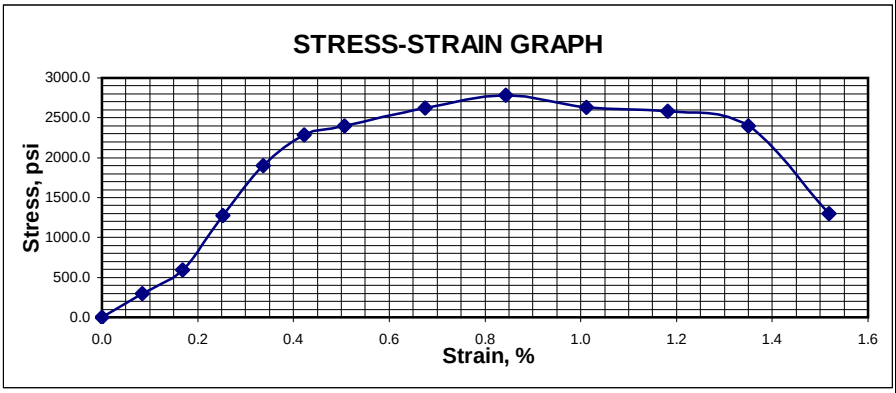
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.926
Initial Diameter, in	3.010
Height-to-Diameter Ratio	1.97
Initial Area, in^2	7.12
Initial Volume, in^3	42.17
Mass of Sample, g	1431.00
Wet Density, pcf	129.3
Dry Density, pcf	113.9
Machine Speed, in/min	0.025
Strain Rate, % / min	0.42

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1592.80
Mass of Dry Sample and Tare, g	1423.30
Mass of Tare, g	161.50
Moisture, %	13.4

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

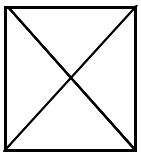
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	8	0.0	7.12	0.0
0.2	0.005	2120	0.1	7.12	296.6
0.4	0.010	4260	0.2	7.13	596.5
0.6	0.015	9120	0.3	7.13	1277.3
0.8	0.020	13562	0.3	7.14	1898.4
1.0	0.025	16340	0.4	7.15	2285.5
1.2	0.030	17150	0.5	7.15	2396.8
1.6	0.040	18790	0.7	7.16	2621.7
2.0	0.050	20006	0.8	7.18	2786.7
2.4	0.060	18950	1.0	7.19	2635.0
2.8	0.070	18610	1.2	7.20	2583.3
3.2	0.080	17300	1.3	7.21	2397.3
3.6	0.090	9420	1.5	7.23	1302.6
	0.100				
	0.110				
	0.120				
	0.130				
	0.140				
	0.150				
	0.160				
	0.170				

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	2786.7
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	1393.3
STRAIN AT FAILURE, %	0.8

REMARKS

Failure Code: 1

Failure Sketch



Failure Type: Cone

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Web: www.test-llc.com

Tested By	RI
Date	11/18/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525+5525A / ISS-04/3-1-2	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	3.004	in	7.63	cm
Diameter	3.005	in	7.63	cm
Area	7.09	in^2	45.76	cm^2
Volume	349.12	cm^3	0.0123	ft^3
Mass	725.00	g	1.60	lb
Specific Gravity	2.600	(Assumed)		
Dry Density	115.7	pcf		

Moisture Content

Mass of wet sample & tare	725.00	g
Mass of dry sample & tare	647.50	g
Mass of tare	0.00	g
% Moisture	12.0	

Test Data

Speed	15	
Board Number	2	
Cell Number	10	
Flow Pump Number	2B	
Flow Pump Rate	7.00E-06	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	145.60	cm
Min Head	144.20	cm
Maximum Gradient	19.06	
Minimum Gradient	18.88	

Final Data (After Test)

Average Height of Sample		3.007	in	7.64	cm
Average Diameter of Sample		3.004	in	7.63	cm
Area	7.09 in^2	45.73	cm^2		
Volume	349.24 cm^3	0.0123	ft^3		
Mass	747.30 g	1.65	lb		

Dry Density	115.7	pcf
Vol. of Voids	100.17	cm^3
Vol. of Solids	249.07	cm^3
Void Ratio	0.40	
Saturation	99.5	%

Moisture Content

Mass of wet sample & tare	845.80	g
Mass of dry sample & tare	746.10	g
Mass of tare	98.60	g
% Moisture	15.4	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
11/18/08	13	10	-	2.05	144.20	18.88	18.5	-	-	-	
11/18/08	13	20	600	2.05	144.20	18.88	18.5	8.11E-09	1.038	8.42E-09	
11/18/08	13	30	600	2.06	144.90	18.97	18.5	8.09E-09	1.038	8.40E-09	
11/18/08	13	40	600	2.06	144.90	18.97	18.5	8.07E-09	1.038	8.38E-09	*
11/18/08	13	50	600	2.06	144.90	18.97	18.5	8.07E-09	1.038	8.38E-09	*
11/18/08	14	0	600	2.07	145.60	19.06	18.5	8.05E-09	1.038	8.36E-09	*
11/18/08	14	10	600	2.07	145.60	19.06	18.5	8.03E-09	1.038	8.34E-09	*

Reported Average Hydraulic Conductivity* 8.4E-09 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	64
Syringe ID #	246			Pore Pressure Transducer ID #	26/27

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Tested By	RI
Date	11/18/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525+5525A / ISS-04/3-1-1	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

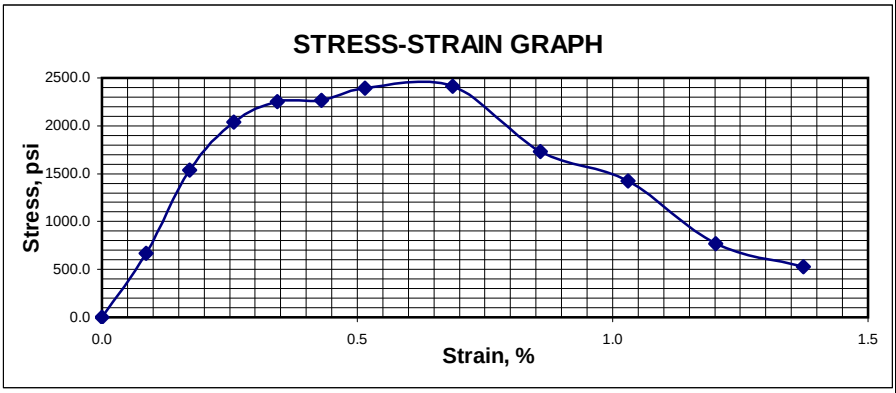
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.824
Initial Diameter, in	3.010
Height-to-Diameter Ratio	1.93
Initial Area, in^2	7.12
Initial Volume, in^3	41.44
Mass of Sample, g	1406.00
Wet Density, pcf	129.2
Dry Density, pcf	114.9
Machine Speed, in/min	0.025
Strain Rate, % / min	0.43

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1445.10
Mass of Dry Sample and Tare, g	1303.50
Mass of Tare, g	167.80
Moisture, %	12.5

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

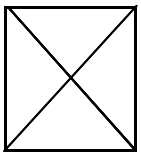
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	7.12	0.0
0.2	0.005	4744	0.1	7.12	665.4
0.4	0.010	10964	0.2	7.13	1537.5
0.6	0.015	14560	0.3	7.13	2040.2
0.8	0.020	16100	0.3	7.14	2254.1
1.0	0.025	16217	0.4	7.15	2268.5
1.2	0.030	17102	0.5	7.15	2390.3
1.6	0.040	17306	0.7	7.16	2414.7
2.0	0.050	12452	0.9	7.18	1734.2
2.4	0.060	10240	1.0	7.19	1423.5
2.8	0.070	5548	1.2	7.20	769.6
3.2	0.080	3805	1.4	7.21	526.7
	0.090				
	0.100				
	0.110				
	0.120				
	0.130				
	0.140				
	0.150				
	0.160				
	0.170				

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	2414.7
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	1207.3
STRAIN AT FAILURE, %	0.7

REMARKS

Failure Code: 1

Failure Sketch



Failure Type: Cone

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

TIMELY ENGINEERING SOIL TESTS, LLC
1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

Tested By	RI
Date	11/18/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525+5525A / ISS-04/2-1-2	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.925	in	7.43	cm
Diameter	3.009	in	7.64	cm
Area	7.11	in^2	45.88	cm^2
Volume	340.85	cm^3	0.0120	ft^3
Mass	695.50	g	1.53	lb
Specific Gravity	2.600	(Assumed)		
Dry Density	114.1	pcf		

Moisture Content

Mass of wet sample & tare	695.50	g
Mass of dry sample & tare	623.20	g
Mass of tare	0.00	g
% Moisture	11.6	

Test Data

Speed	14	
Board Number	6	
Cell Number	3	
Flow Pump Number	2A	
Flow Pump Rate	1.40E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	227.20	cm
Min Head	225.79	cm
Maximum Gradient	30.63	
Minimum Gradient	30.44	

Final Data (After Test)

Average Height of Sample			2.920	in	7.42	cm
Average Diameter of Sample			3.008	in	7.64	cm
Area	7.11	in^2	45.85	cm^2		
Volume	340.04	cm^3	0.0120	ft^3		
Mass	719.60	g	1.59	lb		

Dry Density	114.4	pcf
Vol. of Voids	100.31	cm^3
Vol. of Solids	239.73	cm^3
Void Ratio	0.42	
Saturation	96.0	%

Moisture Content

Mass of wet sample & tare	818.40	g
Mass of dry sample & tare	722.10	g
Mass of tare	98.90	g
% Moisture	15.5	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
11/18/08	11	0	-	3.21	225.79	30.44	18.5	-	-	-	
11/18/08	11	10	600	3.22	226.49	30.54	18.5	1.00E-08	1.038	1.04E-08	
11/18/08	11	20	600	3.21	225.79	30.44	18.5	1.00E-08	1.038	1.04E-08	
11/18/08	11	30	600	3.22	226.49	30.54	18.5	1.00E-08	1.038	1.04E-08	*
11/18/08	11	40	600	3.23	227.20	30.63	18.5	9.98E-09	1.038	1.04E-08	*
11/18/08	11	50	600	3.22	226.49	30.54	18.5	9.98E-09	1.038	1.04E-08	*
11/18/08	12	0	600	3.23	227.20	30.63	18.5	9.98E-09	1.038	1.04E-08	*

Reported Average Hydraulic Conductivity* 1.0E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	11/18/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525+5525A / ISS-04/2-1-1	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

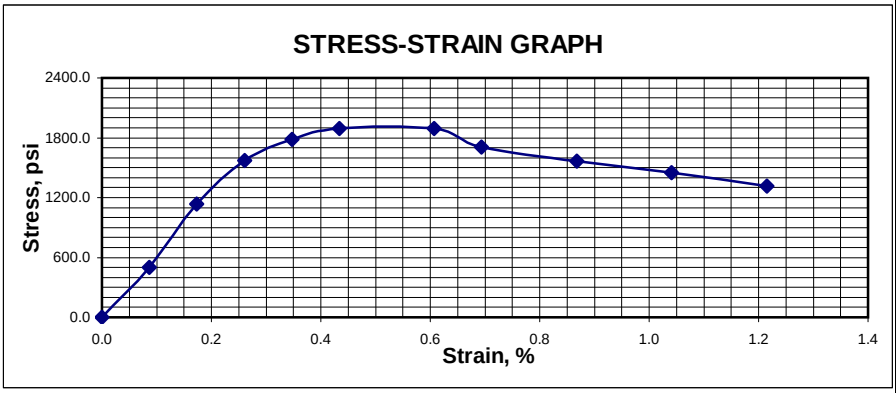
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.763
Initial Diameter, in	3.006
Height-to-Diameter Ratio	1.92
Initial Area, in^2	7.10
Initial Volume, in^3	40.90
Mass of Sample, g	1365.90
Wet Density, pcf	127.2
Dry Density, pcf	113.7
Machine Speed, in/min	0.025
Strain Rate, % / min	0.43

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1523.00
Mass of Dry Sample and Tare, g	1379.20
Mass of Tare, g	161.90
Moisture, %	11.8

TEST DATA

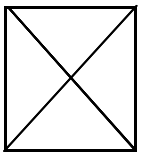
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	8	0.0	7.10	0.0
0.2	0.005	3570	0.1	7.10	501.5
0.4	0.010	8072	0.2	7.11	1134.3
0.6	0.015	11185	0.3	7.12	1570.8
0.8	0.020	12725	0.3	7.12	1785.7
1.0	0.025	13482	0.4	7.13	1890.3
1.4	0.035	13544	0.6	7.14	1895.7
1.6	0.040	12216	0.7	7.15	1708.3
2.0	0.050	11216	0.9	7.16	1565.6
2.4	0.060	10402	1.0	7.17	1449.3
2.8	0.070	9442	1.2	7.18	1313.2
	0.080				
	0.090				
	0.100				
	0.110				
	0.120				
	0.130				
	0.140				
	0.150				
	0.160				
	0.170				

REMARKS

Failure Code: 1

Failure Sketch



Failure Type: Cone

DESCRIPTION

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	1895.7
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	947.9
STRAIN AT FAILURE, %	0.6

USCS (ASTM D2487: D2488): NA

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Tested By	RI
Date	01/09/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-02
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525+5525A / ISS-04/1-2-2	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.991	in	7.60	cm
Diameter	3.013	in	7.65	cm
Area	7.13	in^2	46.00	cm^2
Volume	349.47	cm^3	0.0123	ft^3
Mass	711.70	g	1.57	lb
Specific Gravity	2.600	(Assumed)		
Dry Density	114.1	pcf		

Moisture Content

Mass of wet sample & tare	711.70	g
Mass of dry sample & tare	639.10	g
Mass of tare	0.00	g
% Moisture	11.4	

Test Data

Speed	11	
Board Number	13	
Cell Number	5	
Flow Pump Number	2A	
Flow Pump Rate	1.12E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	228.61	cm
Min Head	227.20	cm
Maximum Gradient	30.09	
Minimum Gradient	29.91	

Final Data (After Test)

Average Height of Sample		2.991	in	7.60	cm
Average Diameter of Sample		3.012	in	7.65	cm
Area	7.13 in^2	45.97	cm^2		
Volume	349.23 cm^3	0.0123	ft^3		
Mass	738.20 g	1.63	lb		

Dry Density	114.2	pcf
Vol. of Voids	103.36	cm^3
Vol. of Solids	245.87	cm^3
Void Ratio	0.42	
Saturation	95.7	%

Moisture Content

Mass of wet sample & tare	835.50	g
Mass of dry sample & tare	736.60	g
Mass of tare	97.50	g
% Moisture	15.5	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
01/09/09	13	0	-	3.23	227.20	29.91	16.8	-	-	-	
01/09/09	13	10	600	3.24	227.90	30.00	16.8	8.13E-08	1.084	8.82E-08	
01/09/09	13	20	600	3.23	227.20	29.91	16.8	8.13E-08	1.084	8.82E-08	
01/09/09	13	30	600	3.24	227.90	30.00	16.8	8.13E-08	1.084	8.82E-08	*
01/09/09	13	40	600	3.25	228.61	30.09	16.8	8.11E-08	1.084	8.79E-08	*
01/09/09	13	50	600	3.24	227.90	30.00	16.8	8.11E-08	1.084	8.79E-08	*
01/09/09	14	0	600	3.25	228.61	30.09	16.8	8.11E-08	1.084	8.79E-08	*

Reported Average Hydraulic Conductivity* 8.8E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Web: www.test-llc.com

Tested By	RI
Date	01/09/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-02
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525+5525A / ISS-04/1-2-1	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

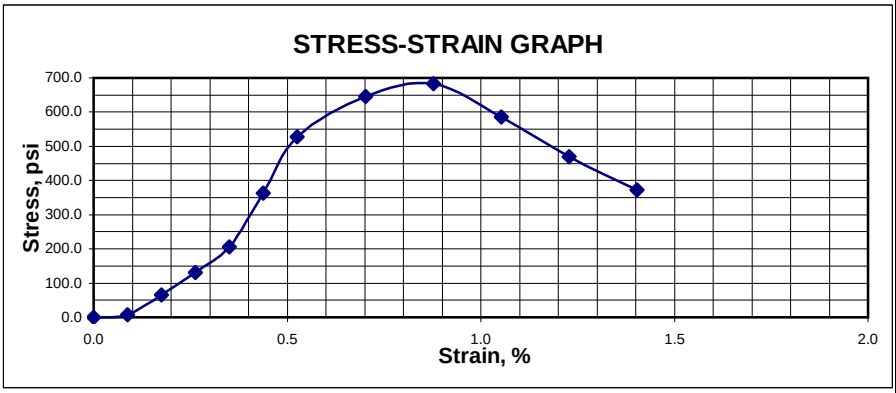
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.700
Initial Diameter, in	3.010
Height-to-Diameter Ratio	1.89
Initial Area, in^2	7.12
Initial Volume, in^3	40.56
Mass of Sample, g	1387.50
Wet Density, pcf	130.3
Dry Density, pcf	117.1
Machine Speed, in/min	0.025
Strain Rate, % / min	0.44

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1583.10
Mass of Dry Sample and Tare, g	1443.90
Mass of Tare, g	205.00
Moisture, %	11.2

TEST DATA

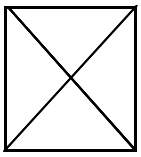
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	4	0.0	7.12	0.0
0.2	0.005	63	0.1	7.12	8.3
0.4	0.010	465	0.2	7.13	64.7
0.6	0.015	945	0.3	7.13	131.9
0.8	0.020	1478	0.4	7.14	206.4
1.0	0.025	2593	0.4	7.15	362.2
1.2	0.030	3775	0.5	7.15	527.2
1.6	0.040	4637	0.7	7.17	646.5
2.0	0.050	4909	0.9	7.18	683.3
2.4	0.060	4220	1.1	7.19	586.2
2.8	0.070	3388	1.2	7.20	469.7
3.2	0.080	2690	1.4	7.22	372.2

REMARKS

Failure Code: 1

Failure Sketch



Failure Type: Cone

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	683.3
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	341.6
STRAIN AT FAILURE, %	0.9

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Tested By	RI
Date	11/18/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525+5525A / ISS-04/1-1-2	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.946	in	7.48	cm
Diameter	3.002	in	7.63	cm
Area	7.08	in^2	45.66	cm^2
Volume	341.70	cm^3	0.0121	ft^3
Mass	702.00	g	1.55	lb
Specific Gravity	2.600	(Assumed)		
Dry Density	114.5	pcf		

Moisture Content

Mass of wet sample & tare	702.00	g
Mass of dry sample & tare	626.80	g
Mass of tare	0.00	g
% Moisture	12.0	

Test Data

Speed	13	
Board Number	1	
Cell Number	3	
Flow Pump Number	2B	
Flow Pump Rate	2.80E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	122.39	cm
Min Head	120.98	cm
Maximum Gradient	16.35	
Minimum Gradient	16.16	

Final Data (After Test)

Average Height of Sample			2.948	in	7.49	cm
Average Diameter of Sample			3.004	in	7.63	cm
Area	7.09	in^2	45.73	cm^2		
Volume	342.39	cm^3	0.0121	ft^3		
Mass	723.40	g	1.59	lb		

Dry Density	114.2	pcf
Vol. of Voids	101.34	cm^3
Vol. of Solids	241.04	cm^3
Void Ratio	0.42	
Saturation	95.4	%

Moisture Content

Mass of wet sample & tare	816.40	g
Mass of dry sample & tare	719.70	g
Mass of tare	92.90	g
% Moisture	15.4	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
11/18/08	11	0	-	1.72	120.98	16.16	18.6	-	-	-	
11/18/08	11	10	600	1.73	121.69	16.25	18.6	3.78E-08	1.036	3.91E-08	
11/18/08	11	20	600	1.72	120.98	16.16	18.6	3.78E-08	1.036	3.91E-08	
11/18/08	11	30	600	1.73	121.69	16.25	18.6	3.78E-08	1.036	3.91E-08	*
11/18/08	11	40	600	1.74	122.39	16.35	18.6	3.76E-08	1.036	3.89E-08	*
11/18/08	11	50	600	1.73	121.69	16.25	18.6	3.76E-08	1.036	3.89E-08	*
11/18/08	12	0	600	1.74	122.39	16.35	18.6	3.76E-08	1.036	3.89E-08	*

Reported Average Hydraulic Conductivity* 3.9E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	64
Syringe ID #	246			Pore Pressure Transducer ID #	26/27

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Tested By	RI
Date	11/18/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525+5525A / ISS-04/1-1-1	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

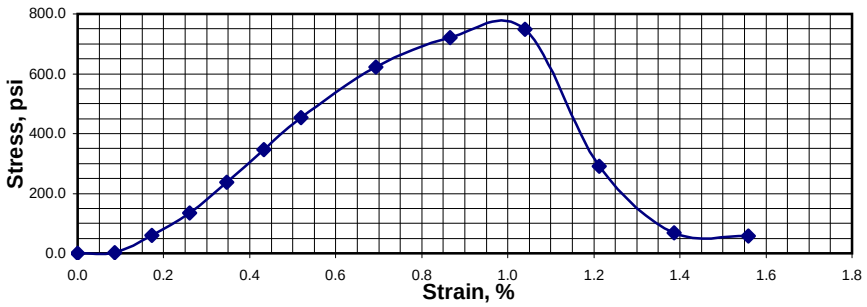
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.772
Initial Diameter, in	3.003
Height-to-Diameter Ratio	1.92
Initial Area, in^2	7.08
Initial Volume, in^3	40.88
Mass of Sample, g	1389.90
Wet Density, pcf	129.5
Dry Density, pcf	115.2
Machine Speed, in/min	0.025
Strain Rate, % / min	0.43

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1540.70
Mass of Dry Sample and Tare, g	1388.20
Mass of Tare, g	153.90
Moisture, %	12.4

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

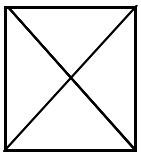
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	8	0.0	7.08	0.0
0.2	0.005	30	0.1	7.09	3.1
0.4	0.010	429	0.2	7.10	59.3
0.6	0.015	962	0.3	7.10	134.3
0.8	0.020	1690	0.3	7.11	236.7
1.0	0.025	2470	0.4	7.11	346.1
1.2	0.030	3240	0.5	7.12	453.9
1.6	0.040	4449	0.7	7.13	622.7
2.0	0.050	5156	0.9	7.14	720.5
2.4	0.060	5373	1.0	7.16	749.6
2.8	0.070	2100	1.2	7.17	291.8
3.2	0.080	500	1.4	7.18	68.5
3.6	0.090	417	1.6	7.19	56.8
	0.100				
	0.110				
	0.120				
	0.130				
	0.140				
	0.150				
	0.160				
	0.170				

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	749.6
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	374.8
STRAIN AT FAILURE, %	1.0

REMARKS

Failure Code: 1

Failure Sketch



Failure Type: Cone

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

TIMELY ENGINEERING SOIL TESTS, LLC
1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

Tested By	RI
Date	02/27/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-03
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525(A,B,C) / ISS-04/14-1-2	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.854	in	7.25	cm
Diameter	3.005	in	7.63	cm
Area	7.09	in^2	45.76	cm^2
Volume	331.69	cm^3	0.0117	ft^3
Mass	696.20	g	1.53	lb
Specific Gravity	2.600	(Assumed)		
Dry Density	118.6	pcf		

Moisture Content

Mass of wet sample & tare	696.20	g
Mass of dry sample & tare	630.50	g
Mass of tare	0.00	g
% Moisture	10.4	

Test Data

Speed	4	
Board Number	8	
Cell Number	11	
Flow Pump Number	2B	
Flow Pump Rate	1.43E-02	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	57.68	cm
Min Head	57.68	cm
Maximum Gradient	7.94	
Minimum Gradient	7.94	

Final Data (After Test)

Average Height of Sample			2.859	in	7.26 cm
Average Diameter of Sample			3.007	in	7.64 cm
Area	7.10	in^2	45.82	cm^2	
Volume	332.71	cm^3	0.0117	ft^3	
Mass	716.40	g	1.58	lb	

Dry Density	118.2	pcf
Vol. of Voids	90.25	cm^3
Vol. of Solids	242.47	cm^3
Void Ratio	0.37	
Saturation	95.3	%

Moisture Content

Mass of wet sample & tare	801.80	g
Mass of dry sample & tare	715.80	g
Mass of tare	85.30	g
% Moisture	13.6	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
02/27/09	9	0	-	0.82	57.68	7.94	18.3	-	-	-	
02/27/09	9	5	300	0.82	57.68	7.94	18.3	3.94E-05	1.043	4.11E-05	
02/27/09	9	10	300	0.82	57.68	7.94	18.3	3.94E-05	1.043	4.11E-05	
02/27/09	9	15	300	0.82	57.68	7.94	18.3	3.94E-05	1.043	4.11E-05	*
02/27/09	9	20	300	0.82	57.68	7.94	18.3	3.94E-05	1.043	4.11E-05	*
02/27/09	9	25	300	0.82	57.68	7.94	18.3	3.94E-05	1.043	4.11E-05	*
02/27/09	9	30	300	0.82	57.68	7.94	18.3	3.94E-05	1.043	4.11E-05	*

Reported Average Hydraulic Conductivity* 4.1E-05 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	246			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	02/27/09
Checked By	VB

Client Pr. #	11175065-00011	Lab. PR. #	838-03
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525(A,B,C) / ISS-04/14-1-1	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

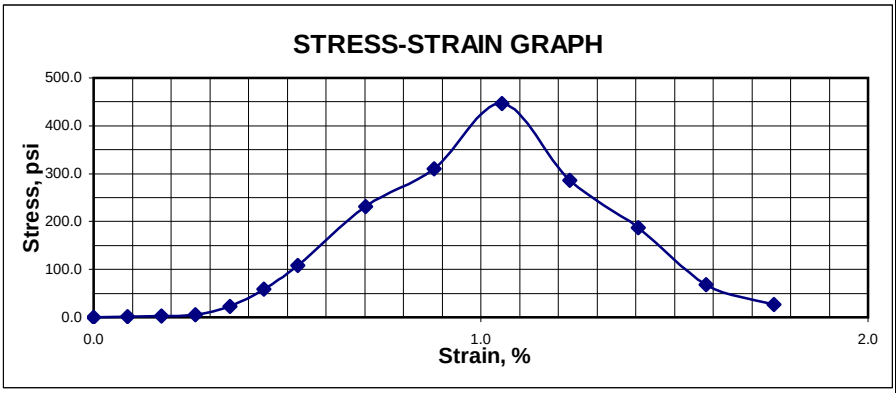
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.690
Initial Diameter, in	3.013
Height-to-Diameter Ratio	1.89
Initial Area, in^2	7.13
Initial Volume, in^3	40.57
Mass of Sample, g	1406.50
Wet Density, pcf	132.1
Dry Density, pcf	118.8
Machine Speed, in/min	0.025
Strain Rate, % / min	0.44

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1611.10
Mass of Dry Sample and Tare, g	1470.20
Mass of Tare, g	205.40
Moisture, %	11.1

TEST DATA

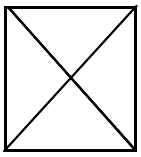
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	6	0.0	7.13	0.0
0.2	0.005	20	0.1	7.14	2.0
0.4	0.010	24	0.2	7.14	2.5
0.6	0.015	49	0.3	7.15	6.0
0.8	0.020	168	0.4	7.16	22.6
1.0	0.025	430	0.4	7.16	59.2
1.2	0.030	780	0.5	7.17	108.0
1.6	0.040	1667	0.7	7.18	231.3
2.0	0.050	2233	0.9	7.19	309.6
2.4	0.060	3227	1.1	7.21	447.0
2.8	0.070	2075	1.2	7.22	286.6
3.2	0.080	1356	1.4	7.23	186.7
3.6	0.090	501	1.6	7.24	68.3
4.0	0.100	200	1.8	7.26	26.7

REMARKS

Failure Code: 1

Failure Sketch



Failure Type: Cone

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	447.0
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	223.5
STRAIN AT FAILURE, %	1.1

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Tested By	RI
Date	02/27/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-03
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525(A,B,C) / ISS-04/13-1-2	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.990	in	7.59	cm
Diameter	2.854	in	7.25	cm
Area	6.40	in^2	41.27	cm^2
Volume	313.45	cm^3	0.0111	ft^3
Mass	626.30	g	1.38	lb
Specific Gravity	2.575	(Assumed)		
Dry Density	110.8	pcf		

Moisture Content

Mass of wet sample & tare	626.30	g
Mass of dry sample & tare	556.70	g
Mass of tare	0.00	g
% Moisture	12.5	

Test Data

Speed	11	
Board Number	6	
Cell Number	12	
Flow Pump Number	1A	
Flow Pump Rate	1.12E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	177.26	cm
Min Head	175.85	cm
Maximum Gradient	23.35	
Minimum Gradient	23.16	

Final Data (After Test)

Average Height of Sample			2.989	in	7.59	cm
Average Diameter of Sample			2.850	in	7.24	cm
Area	6.38	in^2	41.16	cm^2		
Volume	312.47	cm^3	0.0110	ft^3		
Mass	648.90	g	1.43	lb		

Dry Density	111.2	pcf
Vol. of Voids	96.21	cm^3
Vol. of Solids	216.26	cm^3
Void Ratio	0.44	
Saturation	95.7	%

Moisture Content

Mass of wet sample & tare	741.70	g
Mass of dry sample & tare	649.70	g
Mass of tare	93.00	g
% Moisture	16.5	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
02/27/09	11	0	-	2.50	175.85	23.16	17.6	-	-	-	
02/27/09	11	10	600	2.51	176.55	23.26	17.6	1.17E-07	1.062	1.25E-07	
02/27/09	11	20	600	2.50	175.85	23.16	17.6	1.17E-07	1.062	1.25E-07	
02/27/09	11	30	600	2.51	176.55	23.26	17.6	1.17E-07	1.062	1.25E-07	*
02/27/09	11	40	600	2.52	177.26	23.35	17.6	1.17E-07	1.062	1.24E-07	*
02/27/09	11	50	600	2.51	176.55	23.26	17.6	1.17E-07	1.062	1.24E-07	*
02/27/09	12	0	600	2.52	177.26	23.35	17.6	1.17E-07	1.062	1.24E-07	*

Reported Average Hydraulic Conductivity* 1.2E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	22	Balance ID #	1/6/7	Differential Pressure Transducer ID #	24/25
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	140			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	02/27/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-03
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525(A,B,C) / ISS-04/13-1-1	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

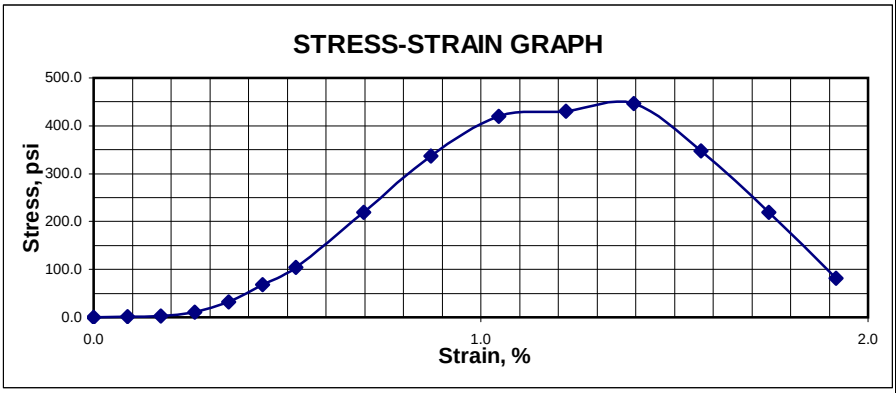
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.735
Initial Diameter, in	3.008
Height-to-Diameter Ratio	1.91
Initial Area, in^2	7.11
Initial Volume, in^3	40.75
Mass of Sample, g	1362.40
Wet Density, pcf	127.3
Dry Density, pcf	112.4
Machine Speed, in/min	0.025
Strain Rate, % / min	0.44

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1547.80
Mass of Dry Sample and Tare, g	1388.20
Mass of Tare, g	188.00
Moisture, %	13.3

TEST DATA

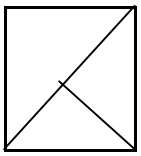
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	7	0.0	7.11	0.0
0.2	0.005	17	0.1	7.11	1.4
0.4	0.010	25	0.2	7.12	2.5
0.6	0.015	79	0.3	7.12	10.1
0.8	0.020	237	0.3	7.13	32.3
1.0	0.025	498	0.4	7.14	68.8
1.2	0.030	753	0.5	7.14	104.4
1.6	0.040	1579	0.7	7.16	219.7
2.0	0.050	2423	0.9	7.17	337.0
2.4	0.060	3017	1.0	7.18	419.1
2.8	0.070	3101	1.2	7.19	430.1
3.2	0.080	3227	1.4	7.21	446.8
3.6	0.090	2520	1.6	7.22	348.1
4.0	0.100	1590	1.7	7.23	218.9
4.4	0.110	601	1.9	7.25	82.0

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	446.8
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	223.4
STRAIN AT FAILURE, %	1.4

USCS (ASTM D2487: D2488): NA

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Tested By	RI
Date	02/27/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-03
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525(A,B,C) / ISS-04/12-1-2	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.955	in	7.51	cm
Diameter	2.811	in	7.14	cm
Area	6.21	in^2	40.04	cm^2
Volume	300.52	cm^3	0.0106	ft^3
Mass	621.00	g	1.37	lb
Specific Gravity	2.600	(Assumed)		
Dry Density	115.0	pcf		

Moisture Content

Mass of wet sample & tare	621.00	g
Mass of dry sample & tare	553.70	g
Mass of tare	0.00	g
% Moisture	12.2	

Test Data

Speed	11	
Board Number	5	
Cell Number	17	
Flow Pump Number	2B	
Flow Pump Rate	1.12E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	72.45	cm
Min Head	71.04	cm
Maximum Gradient	9.61	
Minimum Gradient	9.43	

Final Data (After Test)

Average Height of Sample			2.967	in	7.54	cm
Average Diameter of Sample			2.825	in	7.18	cm
Area	6.27	in^2	40.44	cm^2		
Volume	304.75	cm^3	0.0108	ft^3		
Mass	641.50	g	1.41	lb		

Dry Density	113.4	pcf
Vol. of Voids	91.76	cm^3
Vol. of Solids	212.99	cm^3
Void Ratio	0.43	
Saturation	95.6	%

Moisture Content

Mass of wet sample & tare	732.20	g
Mass of dry sample & tare	644.50	g
Mass of tare	90.80	g
% Moisture	15.8	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
02/27/09	11	0	-	1.01	71.04	9.43	17.6	-	-	-	
02/27/09	11	10	600	1.01	71.04	9.43	17.6	2.94E-07	1.062	3.12E-07	
02/27/09	11	20	600	1.02	71.75	9.52	17.6	2.92E-07	1.062	3.10E-07	
02/27/09	11	30	600	1.02	71.75	9.52	17.6	2.91E-07	1.062	3.09E-07	*
02/27/09	11	40	600	1.03	72.45	9.61	17.6	2.90E-07	1.062	3.07E-07	*
02/27/09	11	50	600	1.02	71.75	9.52	17.6	2.90E-07	1.062	3.07E-07	*
02/27/09	12	0	600	1.03	72.45	9.61	17.6	2.90E-07	1.062	3.07E-07	*

Reported Average Hydraulic Conductivity* 3.1E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	246			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	02/27/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-03
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525(A,B,C) / ISS-04/12-1-1	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.687
Initial Diameter, in	3.004
Height-to-Diameter Ratio	1.89
Initial Area, in^2	7.09
Initial Volume, in^3	40.31
Mass of Sample, g	1358.60
Wet Density, pcf	128.4
Dry Density, pcf	113.7
Machine Speed, in/min	0.025
Strain Rate, % / min	0.44

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1551.50
Mass of Dry Sample and Tare, g	1396.30
Mass of Tare, g	194.40
Moisture, %	12.9

TEST DATA

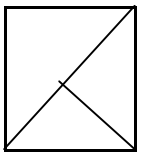
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	8	0.0	7.09	0.0
0.2	0.005	22	0.1	7.09	2.0
0.4	0.010	29	0.2	7.10	3.0
0.6	0.015	170	0.3	7.11	22.8
0.8	0.020	377	0.4	7.11	51.9
1.0	0.025	668	0.4	7.12	92.7
1.2	0.030	1030	0.5	7.13	143.4
1.6	0.040	2052	0.7	7.14	286.4
2.0	0.050	2816	0.9	7.15	392.7
2.4	0.060	3258	1.1	7.16	453.7
2.8	0.070	3182	1.2	7.18	442.3
3.2	0.080	2579	1.4	7.19	357.7
3.6	0.090	1770	1.6	7.20	244.7
4.0	0.100	1104	1.8	7.21	151.9
4.4	0.110	497	1.9	7.23	67.7

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	453.7
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	226.9
STRAIN AT FAILURE, %	1.1

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Tested By	RI
Date	02/27/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-03
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525(A,B,C) / ISS-04/11-1-2	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.979	in	7.57	cm
Diameter	2.841	in	7.22	cm
Area	6.34	in^2	40.90	cm^2
Volume	309.46	cm^3	0.0109	ft^3
Mass	605.00	g	1.33	lb
Specific Gravity	2.600	(Assumed)		
Dry Density	106.4	pcf		

Moisture Content

Mass of wet sample & tare	605.00	g
Mass of dry sample & tare	527.80	g
Mass of tare	0.00	g
% Moisture	14.6	

Test Data

Speed	14	
Board Number	8	
Cell Number	9	
Flow Pump Number	2B	
Flow Pump Rate	1.40E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	209.61	cm
Min Head	208.21	cm
Maximum Gradient	27.71	
Minimum Gradient	27.53	

Final Data (After Test)

Average Height of Sample			2.978	in	7.56	cm
Average Diameter of Sample			2.850	in	7.24	cm
Area	6.38	in^2	41.16	cm^2		
Volume	311.32	cm^3	0.0110	ft^3		
Mass	631.00	g	1.39	lb		

Dry Density	105.8	pcf
Vol. of Voids	108.29	cm^3
Vol. of Solids	203.03	cm^3
Void Ratio	0.53	
Saturation	95.2	%

Moisture Content

Mass of wet sample & tare	727.40	g
Mass of dry sample & tare	624.30	g
Mass of tare	96.50	g
% Moisture	19.5	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
02/27/09	10	30	-	2.96	208.21	27.53	17.6	-	-	-	
02/27/09	10	40	600	2.97	208.91	27.62	17.6	1.23E-08	1.062	1.31E-08	
02/27/09	10	50	600	2.96	208.21	27.53	17.6	1.23E-08	1.062	1.31E-08	
02/27/09	11	0	600	2.97	208.91	27.62	17.6	1.23E-08	1.062	1.31E-08	*
02/27/09	11	10	600	2.98	209.61	27.71	17.6	1.23E-08	1.062	1.31E-08	*
02/27/09	11	20	600	2.97	208.91	27.62	17.6	1.23E-08	1.062	1.31E-08	*
02/27/09	11	30	600	2.98	209.61	27.71	17.6	1.23E-08	1.062	1.31E-08	*

Reported Average Hydraulic Conductivity* 1.3E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	246			Pore Pressure Transducer ID #	28

TIMELY ENGINEERING SOIL TESTS, LLC
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Web: www.test-llc.com

Tested By	RI
Date	02/27/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-03
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525(A,B,C) / ISS-04/11-1-1	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

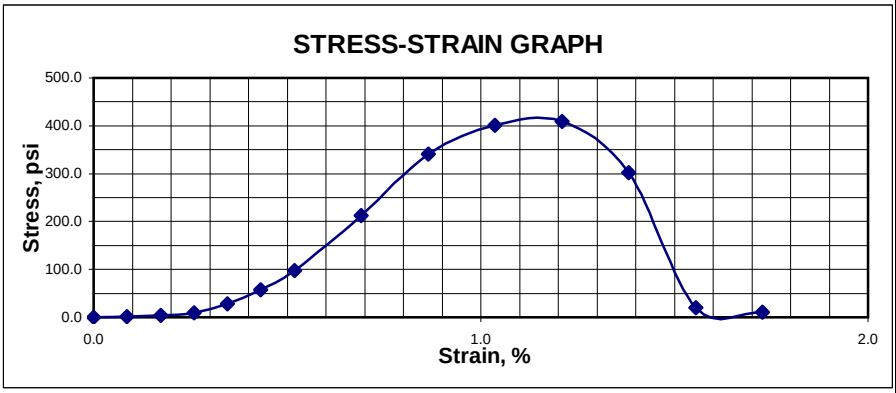
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.788
Initial Diameter, in	3.009
Height-to-Diameter Ratio	1.92
Initial Area, in^2	7.11
Initial Volume, in^3	41.16
Mass of Sample, g	1310.80
Wet Density, pcf	121.3
Dry Density, pcf	104.9
Machine Speed, in/min	0.025
Strain Rate, % / min	0.43

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1500.60
Mass of Dry Sample and Tare, g	1324.10
Mass of Tare, g	191.00
Moisture, %	15.6

TEST DATA

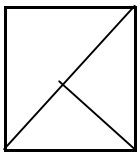
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	9	0.0	7.11	0.0
0.2	0.005	21	0.1	7.12	1.7
0.4	0.010	36	0.2	7.12	3.8
0.6	0.015	78	0.3	7.13	9.7
0.8	0.020	206	0.3	7.14	27.6
1.0	0.025	415	0.4	7.14	56.8
1.2	0.030	705	0.5	7.15	97.4
1.6	0.040	1534	0.7	7.16	213.0
2.0	0.050	2450	0.9	7.17	340.3
2.4	0.060	2895	1.0	7.19	401.6
2.8	0.070	2952	1.2	7.20	408.9
3.2	0.080	2186	1.4	7.21	301.9
3.6	0.090	150	1.6	7.22	19.5
4.0	0.100	86	1.7	7.24	10.6

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488): NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	408.9
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	204.4
STRAIN AT FAILURE, %	1.2

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Tested By	RI
Date	02/27/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-03
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525(A,B,C) / ISS-04/10-1-2	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	3.014	in	7.66	cm
Diameter	2.861	in	7.27	cm
Area	6.43	in^2	41.48	cm^2
Volume	317.52	cm^3	0.0112	ft^3
Mass	620.50	g	1.37	lb
Specific Gravity	2.600	(Assumed)		
Dry Density	108.1	pcf		

Moisture Content

Mass of wet sample & tare	620.50	g
Mass of dry sample & tare	550.20	g
Mass of tare	0.00	g
% Moisture	12.8	

Test Data

Speed	14	
Board Number	7	
Cell Number	18	
Flow Pump Number	2A	
Flow Pump Rate	1.40E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	82.30	cm
Min Head	80.89	cm
Maximum Gradient	10.75	
Minimum Gradient	10.56	

Final Data (After Test)

Average Height of Sample			3.015	in	7.66	cm
Average Diameter of Sample			2.860	in	7.26	cm
Area	6.42	in^2	41.45	cm^2		
Volume	317.40	cm^3	0.0112	ft^3		
Mass	651.10	g	1.44	lb		

Dry Density	108.2	pcf
Vol. of Voids	105.69	cm^3
Vol. of Solids	211.71	cm^3
Void Ratio	0.50	
Saturation	95.2	%

Moisture Content

Mass of wet sample & tare	759.30	g
Mass of dry sample & tare	658.70	g
Mass of tare	108.50	g
% Moisture	18.3	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
02/27/09	10	30	-	1.15	80.89	10.56	17.6	-	-	-	
02/27/09	10	40	600	1.16	81.59	10.65	17.6	3.18E-08	1.062	3.38E-08	
02/27/09	10	50	600	1.15	80.89	10.56	17.6	3.18E-08	1.062	3.38E-08	
02/27/09	11	0	600	1.16	81.59	10.65	17.6	3.18E-08	1.062	3.38E-08	*
02/27/09	11	10	600	1.17	82.30	10.75	17.6	3.16E-08	1.062	3.35E-08	*
02/27/09	11	20	600	1.16	81.59	10.65	17.6	3.16E-08	1.062	3.35E-08	*
02/27/09	11	30	600	1.17	82.30	10.75	17.6	3.16E-08	1.062	3.35E-08	*

Reported Average Hydraulic Conductivity* 3.4E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Web: www.test-llc.com

Tested By	RI
Date	02/27/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-03
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525(A,B,C) / ISS-04/10-1-1	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

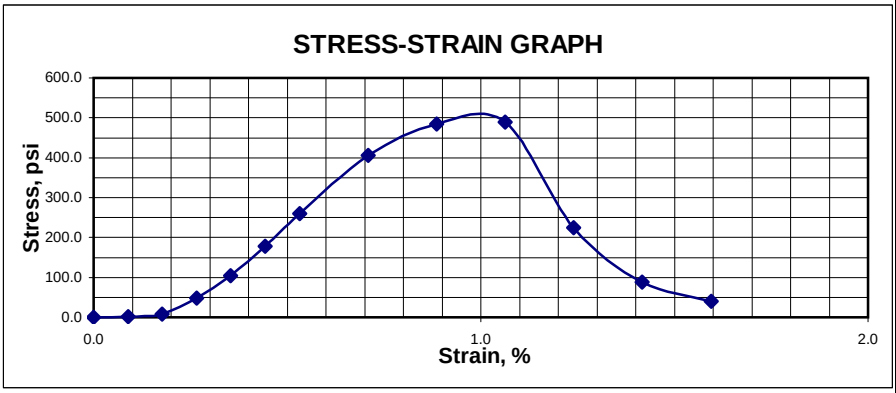
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.645
Initial Diameter, in	3.007
Height-to-Diameter Ratio	1.88
Initial Area, in^2	7.10
Initial Volume, in^3	40.09
Mass of Sample, g	1346.20
Wet Density, pcf	127.9
Dry Density, pcf	112.8
Machine Speed, in/min	0.025
Strain Rate, % / min	0.44

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1552.40
Mass of Dry Sample and Tare, g	1394.10
Mass of Tare, g	208.40
Moisture, %	13.4

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

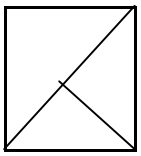
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	9	0.0	7.10	0.0
0.2	0.005	25	0.1	7.11	2.3
0.4	0.010	70	0.2	7.11	8.6
0.6	0.015	346	0.3	7.12	47.3
0.8	0.020	750	0.4	7.13	104.0
1.0	0.025	1276	0.4	7.13	177.6
1.2	0.030	1861	0.5	7.14	259.4
1.6	0.040	2910	0.7	7.15	405.6
2.0	0.050	3476	0.9	7.17	483.9
2.4	0.060	3523	1.1	7.18	489.6
2.8	0.070	1621	1.2	7.19	224.2
3.2	0.080	639	1.4	7.20	87.5
3.6	0.090	296	1.6	7.22	39.8

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	489.6
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	244.8
STRAIN AT FAILURE, %	1.1

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Web: www.test-llc.com

Tested By	KI
Date	02/26/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-03
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525(A,B,C) / ISS-04/9-1-4	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.982	in	7.57	cm
Diameter	3.002	in	7.63	cm
Area	7.08	in^2	45.66	cm^2
Volume	345.88	cm^3	0.0122	ft^3
Mass	709.60	g	1.56	lb
Specific Gravity	2.600	(Assumed)		
Dry Density	116.2	pcf		

Moisture Content

Mass of wet sample & tare	709.60	g
Mass of dry sample & tare	643.90	g
Mass of tare	0.00	g
% Moisture	10.2	

Test Data

Speed	13	
Board Number	8	
Cell Number	11	
Flow Pump Number	2B	
Flow Pump Rate	2.80E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	99.88	cm
Min Head	98.48	cm
Maximum Gradient	13.19	
Minimum Gradient	13.00	

Final Data (After Test)

Average Height of Sample		2.982	in	7.57	cm
Average Diameter of Sample		3.002	in	7.63	cm
Area	7.08 in^2	45.66	cm^2		
Volume	345.88 cm^3	0.0122	ft^3		
Mass	737.80 g	1.63	lb		

Dry Density	116.4	pcf
Vol. of Voids	97.82	cm^3
Vol. of Solids	248.06	cm^3
Void Ratio	0.39	
Saturation	94.9	%

Moisture Content

Mass of wet sample & tare	820.40	g
Mass of dry sample & tare	727.70	g
Mass of tare	83.80	g
% Moisture	14.4	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
02/26/09	9	15	-	1.41	99.18	13.09	16.7	-	-	-	
02/26/09	9	25	600	1.40	98.48	13.00	16.7	4.70E-08	1.087	5.11E-08	
02/26/09	9	35	600	1.42	99.88	13.19	16.7	4.68E-08	1.087	5.09E-08	
02/26/09	9	45	600	1.41	99.18	13.09	16.7	4.67E-08	1.087	5.07E-08	*
02/26/09	9	55	600	1.41	99.18	13.09	16.7	4.68E-08	1.087	5.09E-08	*
02/26/09	10	5	600	1.42	99.88	13.19	16.7	4.67E-08	1.087	5.07E-08	*
02/26/09	10	15	600	1.42	99.88	13.19	16.7	4.65E-08	1.087	5.05E-08	*

Reported Average Hydraulic Conductivity* 5.1E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	246			Pore Pressure Transducer ID #	28

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Web: www.test-llc.com

Tested By	RI
Date	02/27/09
Checked By	LB

Client Pr. #	11175065-00011	Lab. PR. #	838-03
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525(A,B,C) / ISS-04/9-1-3	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

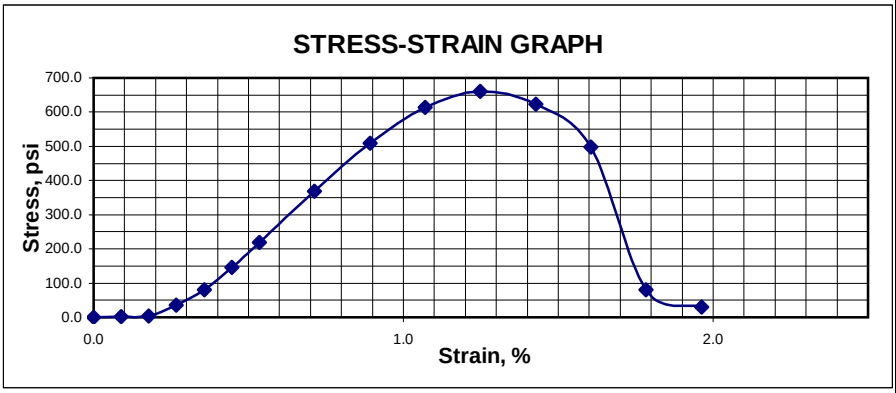
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.607
Initial Diameter, in	3.002
Height-to-Diameter Ratio	1.87
Initial Area, in^2	7.08
Initial Volume, in^3	39.69
Mass of Sample, g	1348.00
Wet Density, pcf	129.4
Dry Density, pcf	116.2
Machine Speed, in/min	0.025
Strain Rate, % / min	0.45

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1553.90
Mass of Dry Sample and Tare, g	1417.60
Mass of Tare, g	207.30
Moisture, %	11.3

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

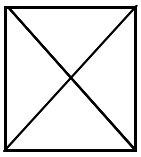
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	8	0.0	7.08	0.0
0.2	0.005	18	0.1	7.08	1.4
0.4	0.010	37	0.2	7.09	4.1
0.6	0.015	261	0.3	7.10	35.6
0.8	0.020	574	0.4	7.10	79.7
1.0	0.025	1044	0.4	7.11	145.7
1.2	0.030	1562	0.5	7.12	218.4
1.6	0.040	2630	0.7	7.13	367.8
2.0	0.050	3645	0.9	7.14	509.3
2.4	0.060	4396	1.1	7.15	613.3
2.8	0.070	4750	1.2	7.17	661.6
3.2	0.080	4490	1.4	7.18	624.2
3.6	0.090	3589	1.6	7.19	497.8
4.0	0.100	593	1.8	7.21	81.2
4.4	0.110	230	2.0	7.22	30.7

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	661.6
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	330.8
STRAIN AT FAILURE, %	1.2

REMARKS

Failure Code: 1

Failure Sketch



Failure Type: Cone

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Web: www.test-llc.com

Tested By	KI
Date	02/26/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-03
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525(A,B,C) / ISS-04/9-1-2	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	3.008	in	7.64	cm
Diameter	2.999	in	7.62	cm
Area	7.06	in^2	45.57	cm^2
Volume	348.19	cm^3	0.0123	ft^3
Mass	703.50	g	1.55	lb
Specific Gravity	2.600	(Assumed)		
Dry Density	114.0	pcf		

Moisture Content

Mass of wet sample & tare	703.50	g
Mass of dry sample & tare	636.40	g
Mass of tare	0.00	g
% Moisture	10.5	

Test Data

Speed	13	
Board Number	7	
Cell Number	4	
Flow Pump Number	2A	
Flow Pump Rate	2.80E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	59.79	cm
Min Head	58.38	cm
Maximum Gradient	7.82	
Minimum Gradient	7.64	

Final Data (After Test)

Average Height of Sample			3.009	in	7.64 cm
Average Diameter of Sample			3.002	in	7.63 cm
Area	7.08	in^2	45.66	cm^2	
Volume	349.01	cm^3	0.0123	ft^3	
Mass	735.90	g	1.62	lb	

Dry Density	114.0	pcf
Vol. of Voids	103.77	cm^3
Vol. of Solids	245.24	cm^3
Void Ratio	0.42	
Saturation	94.7	%

Moisture Content

Mass of wet sample & tare	833.20	g
Mass of dry sample & tare	735.10	g
Mass of tare	98.70	g
% Moisture	15.4	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
02/26/09	9	15	-	0.83	58.38	7.64	16.7	-	-	-	
02/26/09	9	25	600	0.85	59.79	7.82	16.7	7.93E-08	1.087	8.62E-08	
02/26/09	9	35	600	0.84	59.09	7.73	16.7	7.88E-08	1.087	8.57E-08	
02/26/09	9	45	600	0.83	58.38	7.64	16.7	7.98E-08	1.087	8.67E-08	*
02/26/09	9	55	600	0.84	59.09	7.73	16.7	7.98E-08	1.087	8.67E-08	*
02/26/09	10	5	600	0.84	59.09	7.73	16.7	7.93E-08	1.087	8.62E-08	*
02/26/09	10	15	600	0.85	59.79	7.82	16.7	7.88E-08	1.087	8.57E-08	*

Reported Average Hydraulic Conductivity* 8.6E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	02/27/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-03
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525(A,B,C) / ISS-04/9-1-1	Depth/Elev.	20'-40'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

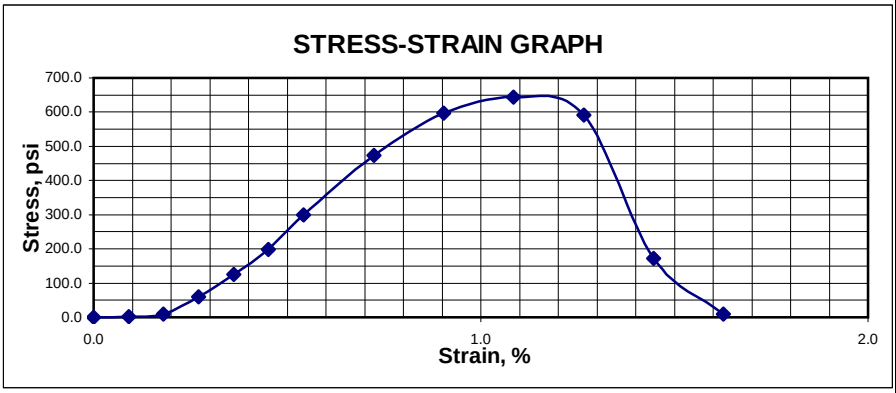
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.531
Initial Diameter, in	3.002
Height-to-Diameter Ratio	1.84
Initial Area, in^2	7.08
Initial Volume, in^3	39.15
Mass of Sample, g	1335.40
Wet Density, pcf	129.9
Dry Density, pcf	116.7
Machine Speed, in/min	0.025
Strain Rate, % / min	0.45

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1540.00
Mass of Dry Sample and Tare, g	1404.30
Mass of Tare, g	205.80
Moisture, %	11.3

TEST DATA

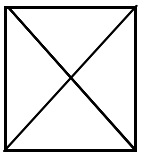
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	9	0.0	7.08	0.0
0.2	0.005	20	0.1	7.08	1.6
0.4	0.010	69	0.2	7.09	8.5
0.6	0.015	430	0.3	7.10	59.3
0.8	0.020	901	0.4	7.10	125.6
1.0	0.025	1426	0.5	7.11	199.3
1.2	0.030	2136	0.5	7.12	298.9
1.6	0.040	3390	0.7	7.13	474.2
2.0	0.050	4270	0.9	7.14	596.6
2.4	0.060	4611	1.1	7.16	643.1
2.8	0.070	4244	1.3	7.17	590.8
3.2	0.080	1240	1.4	7.18	171.4
3.6	0.090	77	1.6	7.20	9.5

REMARKS

Failure Code: 1

Failure Sketch



Failure Type: Cone

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	643.1
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	321.6
STRAIN AT FAILURE, %	1.1

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Batch Worksheet

BATCH-SAMPLE ID	5525(A, B, C)-14-1			BATCH #	1
PR. NUMBER	838-03	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	01/30/09

Time Batch Mixing Started		**Soil Moisture Mass, g**	**682.3**
Total Time Batch was Mixed, min		**Soil Moisture Content, %**	**10.8**
Time Batch Completely in Molds		Type of Cement Used	I/II
		Grout Water/Cem. Mat. Ratio	**0.50**
		Mass of Dry Soil, g	**6317.7**
		Total Water/Cem. Mat. Ratio	**1.696**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5525(A,B,C)	**Soil (wet)**	100.0	**7000.0**
5527	GGBFS	6.75	**426.4**
5526	Cement	2.25	**142.1**
5915	Rheobuildt 1000	28.4ml	
	Water, mL	282	

Remarks

Max. Viscosity @1 RPM about 1093K cP (mPa s)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5525A,B,C)-14-1-1	UCS	3	6					28 days
(5525A,B,C)-14-1-2	Perm	3	3					28 days
(5525A,B,C)-14-1-3	Analytical	3	6					28 days
(5525A,B,C)-14-1-4	Perm	3	3					Extra
(5525A,B,C)-14-1-5	UCS	3	6					Extra
(5525A,B,C)-14-1-6		3	6					Extra

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Batch Worksheet

BATCH-SAMPLE ID	5525(A, B, C)-13-1			BATCH #	1
PR. NUMBER	838-03	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	01/30/09

Time Batch Mixing Started		**Soil Moisture Mass, g**	**682.3**
Total Time Batch was Mixed, min		**Soil Moisture Content, %**	**10.8**
Time Batch Completely in Molds		Type of Cement Used	I/II
		Grout Water/Cem. Mat. Ratio	**0.59**
		Mass of Dry Soil, g	**6317.7**
		Total Water/Cem. Mat. Ratio	**1.568**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5525(A,B,C)	**Soil (wet)**	100.0	**7000.0**
5527	GGBFS	6.75	**426.4**
5526	Cement	2.25	**142.1**
5751	Organoclay	2.0	**126.4**
	Water, mL	407	

Remarks
Max. Viscosity @1 RPM about 984K cP (mPa s)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5525A,B,C)-13-1-1	UCS	3	6					28 days
(5525A,B,C)-13-1-2	Perm	3	3					28 days
(5525A,B,C)-13-1-3	Analytical	3	6					28 days
(5525A,B,C)-13-1-4	Perm	3	3					Extra
(5525A,B,C)-13-1-5	UCS	3	6					Extra
(5525A,B,C)-13-1-6		3	6					Extra

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Batch Worksheet

BATCH-SAMPLE ID	5525(A, B, C)-12-1			BATCH #	1
PR. NUMBER	838-03	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	01/30/09

Time Batch Mixing Started		**Soil Moisture Mass, g**	**682.3**
Total Time Batch was Mixed, min		**Soil Moisture Content, %**	**10.8**
Time Batch Completely in Molds		Type of Cement Used	I/II
		Grout Water/Cem. Mat. Ratio	**0.64**
		Mass of Dry Soil, g	**6317.7**
		Total Water/Cem. Mat. Ratio	**1.724**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5525(A,B,C)	**Soil (wet)**	100.0	**7000.0**
5527	GGBFS	6.75	**426.4**
5526	Cement	2.25	**142.1**
5751	Organoclay	1.0	**63.2**
	Water, mL	407	

Remarks

Max. Viscosity @1 RPM about 757K cP (mPa s)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5525A,B,C)-12-1-1	UCS	3	6					28 days
(5525A,B,C)-12-1-2	Perm	3	3					28 days
(5525A,B,C)-12-1-3	Analytical	3	6					28 days
(5525A,B,C)-12-1-4	Perm	3	3					Extra
(5525A,B,C)-12-1-5	UCS	3	6					Extra
(5525A,B,C)-12-1-6		3	6					Extra

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Batch Worksheet

BATCH-SAMPLE ID	5525(A, B, C)-11-1			BATCH #	1
PR. NUMBER	838-03	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	01/30/09

Time Batch Mixing Started		**Soil Moisture Mass, g**	**682.3**
Total Time Batch was Mixed, min		**Soil Moisture Content, %**	**10.8**
Time Batch Completely in Molds		Type of Cement Used	I/II
		Grout Water/Cem. Mat. Ratio	**0.78**
		Mass of Dry Soil, g	**6317.7**
		Total Water/Cem. Mat. Ratio	**1.766**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5525(A,B,C)	**Soil (wet)**	100.0	**7000.0**
5527	GGBFS	6.75	**426.4**
5526	Cement	2.25	**142.1**
5914	Bentonite	2.0	**126.4**
	Water, mL	545	

Remarks
Max. Viscosity @1 RPM about 863K cP (mPa s)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5525A,B,C)-11-1-1	UCS	3	6					28 days
(5525A,B,C)-11-1-2	Perm	3	3					28 days
(5525A,B,C)-11-1-3	Analytical	3	6					28 days
(5525A,B,C)-11-1-4	Perm	3	3					Extra
(5525A,B,C)-11-1-5	UCS	3	6					Extra
(5525A,B,C)-11-1-6		3	6					Extra

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Batch Worksheet

BATCH-SAMPLE ID	5525(A, B, C)-10-1			BATCH #	1
PR. NUMBER	838-03	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	01/30/09

Time Batch Mixing Started		**Soil Moisture Mass, g**	**682.3**
Total Time Batch was Mixed, min		**Soil Moisture Content, %**	**10.8**
Time Batch Completely in Molds		Type of Cement Used	I/II
		Grout Water/Cem. Mat. Ratio	**0.72**
		Mass of Dry Soil, g	**6317.7**
		Total Water/Cem. Mat. Ratio	**1.800**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5525(A,B,C)	**Soil (wet)**	100.0	**7000.0**
5527	GGBFS	6.75	**426.4**
5526	Cement	2.25	**142.1**
5914	Bentonite	1.0	**63.2**
	Water, mL	455	

Remarks
Max. Viscosity @1 RPM about 996K cP (mPa s)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5525A,B,C)-10-1-1	UCS	3	6					28 days
(5525A,B,C)-10-1-2	Perm	3	3					28 days
(5525A,B,C)-10-1-3	Analytical	3	6					28 days
(5525A,B,C)-10-1-4	Perm	3	3					Extra
(5525A,B,C)-10-1-5	UCS	3	6					Extra
(5525A,B,C)-10-1-6		3	6					Extra

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Batch Worksheet

BATCH-SAMPLE ID	5525(A, B, C)-9-1			BATCH #	1
PR. NUMBER	838-03	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	01/30/09

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**1364.6**
Soil Moisture Content, %	**10.8**
Type of Cement Used	I/II
Grout Water/Cem. Mat. Ratio	**0.50**
Mass of Dry Soil, g	**12635.4**
Total Water/Cem. Mat. Ratio	**1.696**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5525(A,B,C)	**Soil (wet)**	100.0	**14000.0**
5527	GGBFS	6.75	**852.9**
5526	Cement	2.25	**284.3**
	Water, mL	564	

Remarks

Max. Viscosity @1 RPM about 1292K cP (mPa s)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5525A,B,C)-9-1-1	UCS	3	6					28 days
(5525A,B,C)-9-1-2	Perm	3	3					28 days
(5525A,B,C)-9-1-3	UCS	3	6					28 days duplicate
(5525A,B,C)-9-1-4	Perm	3	3					28 days duplicate
(5525A,B,C)-9-1-5	UCS	3	6					Extra
(5525A,B,C)-9-1-6	Perm	3	3					Extra
(5525A,B,C)-9-1-7	UCS	3	6					Extra
(5525A,B,C)-9-1-8	Perm	3	3					Extra
(5525A,B,C)-9-1-9	Analytical	3	6					28 days
(5525A,B,C)-9-1-10	Analytical	3	6					28 days duplicate
(5525A,B,C)-9-1-11		3	6					Extra
(5525A,B,C)-9-1-12		3	6					Extra
(5525A,B,C)-9-1-13		3	6					Extra

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Tested By	RI
Date	02/16/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-22-1	Depth/Elev.	20-40'
Subsample	5	Add. Info	Curing Age: 7 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.428	in	6.17	cm
Diameter	3.000	in	7.62	cm
Area	7.07	in^2	45.60	cm^2
Volume	281.24	cm^3	0.0099	ft^3
Mass	574.00	g	1.27	lb
Specific Gravity	2.575	(Assumed)		
Dry Density	107.0	pcf		

Moisture Content

Mass of wet sample & tare	574.00	g
Mass of dry sample & tare	482.20	g
Mass of tare	0.00	g
% Moisture	19.0	

Test Data

Speed	4	
Board Number	6	
Cell Number	11	
Flow Pump Number	2B	
Flow Pump Rate	1.43E-02	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	21.81	cm
Min Head	21.81	cm
Maximum Gradient	3.53	
Minimum Gradient	3.53	

Final Data (After Test)

Average Height of Sample		2.429	in	6.17	cm
Average Diameter of Sample		3.002	in	7.63	cm
Area	7.08 in^2	45.66	cm^2		
Volume	281.73 cm^3	0.0099	ft^3		
Mass	577.20 g	1.27	lb		

Dry Density	106.8	pcf
Vol. of Voids	94.41	cm^3
Vol. of Solids	187.33	cm^3
Void Ratio	0.50	
Saturation	100.5	%

Moisture Content

Mass of wet sample & tare	676.90	g
Mass of dry sample & tare	582.10	g
Mass of tare	99.90	g
% Moisture	19.7	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
02/16/10	11	0	-	0.31	21.81	3.53	15.2	-	-	-	
02/16/10	11	5	300	0.31	21.81	3.53	15.2	8.88E-05	1.131	1.00E-04	
02/16/10	11	10	300	0.31	21.81	3.53	15.2	8.88E-05	1.131	1.00E-04	
02/16/10	11	15	300	0.31	21.81	3.53	15.2	8.88E-05	1.131	1.00E-04	*
02/16/10	11	20	300	0.31	21.81	3.53	15.2	8.88E-05	1.131	1.00E-04	*
02/16/10	11	25	300	0.31	21.81	3.53	15.2	8.88E-05	1.131	1.00E-04	*
02/16/10	11	30	300	0.31	21.81	3.53	15.2	8.88E-05	1.131	1.00E-04	*

Reported Average Hydraulic Conductivity* 1.0E-04 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	246			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	02/11/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-22-1	Depth/Elev.	20-40'
Subsample	1	Add. Info	Curing Age: 3 Days

ASTM D 2166

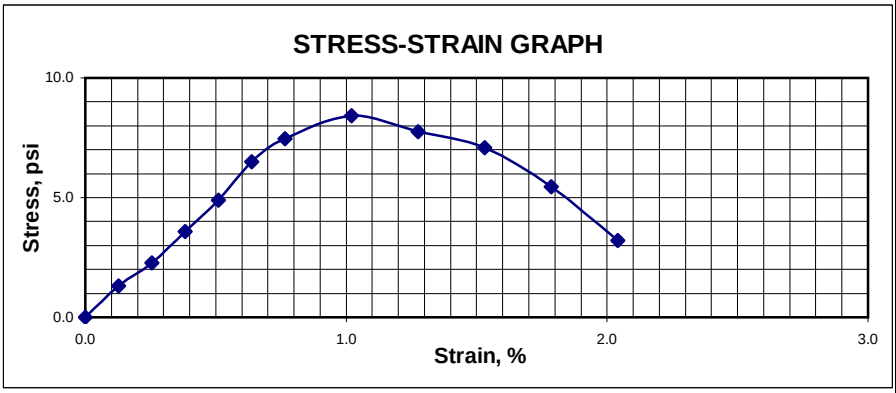
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.919
Initial Diameter, in	1.973
Height-to-Diameter Ratio	1.99
Initial Area, in^2	3.06
Initial Volume, in^3	11.98
Mass of Sample, g	403.10
Wet Density, pcf	128.2
Dry Density, pcf	108.2
Machine Speed, in/min	0.025
Strain Rate, % / min	0.64

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	482.30
Mass of Dry Sample and Tare, g	419.90
Mass of Tare, g	80.60
Moisture, %	18.4

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

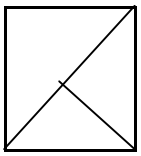
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	8	0.0	3.06	0.0
0.2	0.005	12	0.1	3.06	1.3
0.4	0.010	15	0.3	3.07	2.3
0.6	0.015	19	0.4	3.07	3.6
0.8	0.020	23	0.5	3.07	4.9
1.0	0.025	28	0.6	3.08	6.5
1.2	0.030	31	0.8	3.08	7.5
1.6	0.040	34	1.0	3.09	8.4
2.0	0.050	32	1.3	3.10	7.7
2.4	0.060	30	1.5	3.10	7.1
2.8	0.070	25	1.8	3.11	5.5
3.2	0.080	18	2.0	3.12	3.2

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	8.4
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	4.2
STRAIN AT FAILURE, %	1.0

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Tested By	RI
Date	02/15/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-22-1	Depth/Elev.	20-40'
Subsample	2	Add. Info	Curing Age: 7 Days

ASTM D 2166

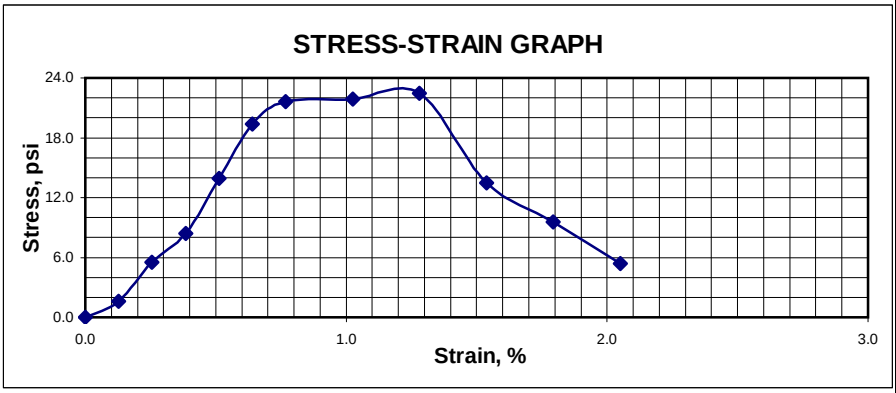
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.902
Initial Diameter, in	1.979
Height-to-Diameter Ratio	1.97
Initial Area, in^2	3.08
Initial Volume, in^3	12.00
Mass of Sample, g	399.00
Wet Density, pcf	126.6
Dry Density, pcf	107.7
Machine Speed, in/min	0.025
Strain Rate, % / min	0.64

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

WATER CONTENT DETERMINATION

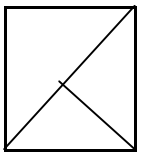
Mass of Wet Sample and Tare, g	500.40
Mass of Dry Sample and Tare, g	441.10
Mass of Tare, g	102.80
Moisture, %	17.5

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	10	0.0	3.08	0.0
0.2	0.005	15	0.1	3.08	1.6
0.4	0.010	27	0.3	3.08	5.5
0.6	0.015	36	0.4	3.09	8.4
0.8	0.020	53	0.5	3.09	13.9
1.0	0.025	70	0.6	3.10	19.4
1.2	0.030	77	0.8	3.10	21.6
1.6	0.040	78	1.0	3.11	21.9
2.0	0.050	80	1.3	3.12	22.5
2.4	0.060	52	1.5	3.12	13.4
2.8	0.070	40	1.8	3.13	9.6
3.2	0.080	27	2.1	3.14	5.4

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	22.5
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	11.2
STRAIN AT FAILURE, %	1.3

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Tested By	RI
Date	02/23/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-22-1	Depth/Elev.	20-40'
Subsample	3	Add. Info	Curing Age: 14 Days

ASTM D 2166

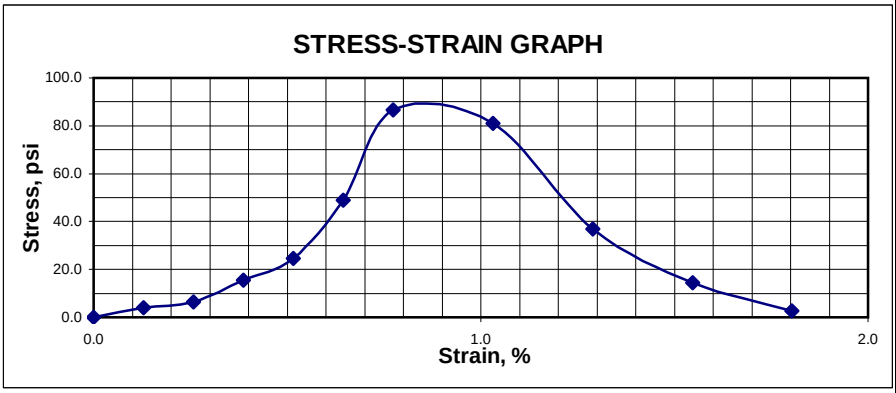
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.880
Initial Diameter, in	1.977
Height-to-Diameter Ratio	1.96
Initial Area, in^2	3.07
Initial Volume, in^3	11.91
Mass of Sample, g	392.00
Wet Density, pcf	125.4
Dry Density, pcf	105.9
Machine Speed, in/min	0.025
Strain Rate, % / min	0.64

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	474.50
Mass of Dry Sample and Tare, g	414.00
Mass of Tare, g	83.60
Moisture, %	18.3

TEST DATA

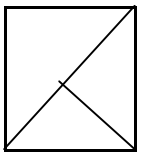
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	10	0.0	3.07	0.0
0.2	0.005	22	0.1	3.07	3.9
0.4	0.010	30	0.3	3.08	6.5
0.6	0.015	58	0.4	3.08	15.6
0.8	0.020	86	0.5	3.09	24.6
1.0	0.025	161	0.6	3.09	48.9
1.2	0.030	278	0.8	3.09	86.6
1.6	0.040	261	1.0	3.10	80.9
2.0	0.050	125	1.3	3.11	37.0
2.4	0.060	55	1.5	3.12	14.4
2.8	0.070	18	1.8	3.13	2.6

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	86.6
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	43.3
STRAIN AT FAILURE, %	0.8

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Tested By	RI/KI
Date	02/12/10
Checked By	

Client Pr. #		Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead, NY MGP	S. Type	Mold
Location	ISS-04	Depth/Elev.	20-40'
		Add. Info	

Volume Increase Determination

Sub-Sample ID	Empty Mold Mass, g	Mold + Soil/Grout Mass, g	Soil/Grout Mass, g	Initial Soil Volume Calculated, cm^3	Sample Volume cm^3	Mold's Headspace Volume, cm^3	Final Soil/Grout Volume, cm^3	% Volume Change
1-9	NA	NA	NA	NA	2121.2	0.0	2121.2	-
				NA				-
				NA				-
TOTAL	NA	**NA**	**NA**	**1787.2**	**2121.2**	0.00	**2121.2**	**18.7**

Proctor wet density of soil used for initial volume calculation:	125.7	pcf	**2.014**	g/cm^3
Initial vol. of soil (based on 100% of Proctor wet density):	**1787.2**	cm^3		
Mix Design #	22-1			

Ingredient	Amount	Unit	Portion of entire mix
Soil (Waste)	3600.10	g	0.770
Water	717.00	mL	0.153
GGBFS	219.90	g	0.047
Cement	73.30	g	0.016
Organoclay	65.20	g	0.014
		g	
Total	4675.50	-	1.000

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Date	02/12/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525	Depth/Elev.	-
Location	-	Add. Info	-

Final Total Volume DETERMINATION (after mixing)

Sample ID	Mold #	Mass of Mold, g	Mass of Wet Sample & Mold, g	Height of Mold, in.	Diameter of Mold, in.	Volume of Mold, ft^3	Wet Density, pcf	Comments
5525-22-1-1	-	-	-	4.5	2.0	0.00818	NA	
5525-22-1-2	-	-	-	4.4	2.0	0.00800	NA	
5525-22-1-3	-	-	-	4.5	2.0	0.00818	NA	
5525-22-1-4	-	-	-	4.5	2.0	0.00818	NA	
5525-22-1-5	-	-	-	2.6	3.0	0.01063	NA	
5525-22-1-6	-	-	-	2.5	3.0	0.01022	NA	
5525-22-1-7	-	-	-	4.6	2.0	0.00836	NA	
5525-22-1-8	-	-	-	2.6	3.0	0.01063	NA	
5525-22-1-9	-	-	-	1.4	2.0	0.00254	NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
Total						0.07491		

Comments			
Calculated Volume is not including separated free water (about 1/2") on top of sample. Dimensions of only solidified material were obtained	**Total Volume**	**2121.2**	**cm^3**

Balance ID Number	12/13/14/15
Oven ID Number	1/6/7
Caliper ID Number	16

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Tested By	RI
Date	03/09/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-22-1	Depth/Elev.	20-40'
Subsample	6	Add. Info	Curing Age: 28 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.359	in	5.99	cm
Diameter	2.999	in	7.62	cm
Area	7.06	in^2	45.57	cm^2
Volume	273.07	cm^3	0.0096	ft^3
Mass	551.40	g	1.22	lb
Specific Gravity	2.575	(Assumed)		
Dry Density	104.4	pcf		

Moisture Content

Mass of wet sample & tare	551.40	g
Mass of dry sample & tare	457.00	g
Mass of tare	0.00	g
% Moisture	20.7	

Test Data

Speed	6	
Board Number	7	
Cell Number	6	
Flow Pump Number	2B	
Flow Pump Rate	3.58E-03	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	34.47	cm
Min Head	33.76	cm
Maximum Gradient	5.75	
Minimum Gradient	5.64	

Final Data (After Test)

Average Height of Sample		2.358	in	5.99	cm
Average Diameter of Sample		3.000	in	7.62	cm
Area	7.07 in^2	45.60	cm^2		
Volume	273.13 cm^3	0.0096	ft^3		
Mass	552.70 g	1.22	lb		

Dry Density	104.4	pcf
Vol. of Voids	95.63	cm^3
Vol. of Solids	177.51	cm^3
Void Ratio	0.54	
Saturation	100.0	%

Moisture Content

Mass of wet sample & tare	639.80	g
Mass of dry sample & tare	544.20	g
Mass of tare	87.20	g
% Moisture	20.9	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
03/09/10	11	30	-	0.49	34.47	5.75	15.4	-	-	-	
03/09/10	11	35	300	0.49	34.47	5.75	15.4	1.37E-05	1.125	1.54E-05	
03/09/10	11	40	300	0.48	33.76	5.64	15.4	1.38E-05	1.125	1.55E-05	
03/09/10	11	45	300	0.48	33.76	5.64	15.4	1.39E-05	1.125	1.57E-05	*
03/09/10	11	50	300	0.48	33.76	5.64	15.4	1.39E-05	1.125	1.57E-05	*
03/09/10	11	55	300	0.49	34.47	5.75	15.4	1.38E-05	1.125	1.55E-05	*
03/09/10	12	0	300	0.48	33.76	5.64	15.4	1.38E-05	1.125	1.55E-05	*

Reported Average Hydraulic Conductivity* 1.6E-05 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	246			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	03/09/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-22-1	Depth/Elev.	20-40'
Subsample	4	Add. Info	Curing Age: 28 Days

ASTM D 2166

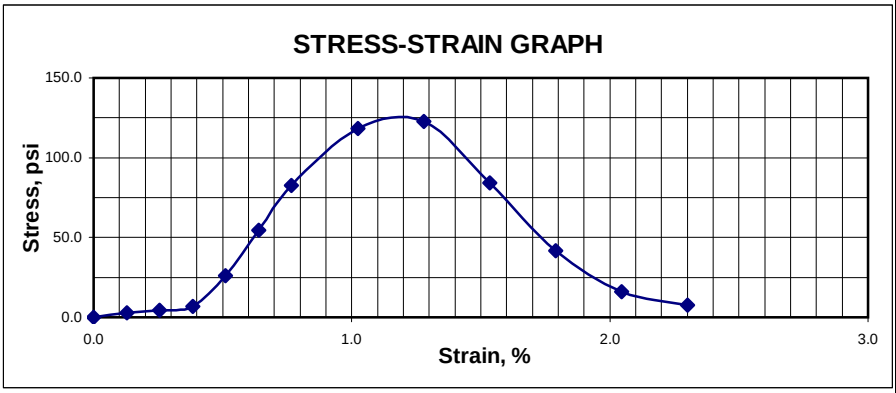
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.910
Initial Diameter, in	1.977
Height-to-Diameter Ratio	1.98
Initial Area, in^2	3.07
Initial Volume, in^3	12.00
Mass of Sample, g	399.30
Wet Density, pcf	126.7
Dry Density, pcf	106.6
Machine Speed, in/min	0.025
Strain Rate, % / min	0.64

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	707.30
Mass of Dry Sample and Tare, g	644.20
Mass of Tare, g	308.70
Moisture, %	18.8

TEST DATA

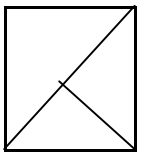
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	9	0.0	3.07	0.0
0.2	0.005	18	0.1	3.07	2.9
0.4	0.010	23	0.3	3.08	4.5
0.6	0.015	30	0.4	3.08	6.8
0.8	0.020	89	0.5	3.09	25.9
1.0	0.025	177	0.6	3.09	54.4
1.2	0.030	264	0.8	3.09	82.4
1.6	0.040	376	1.0	3.10	118.3
2.0	0.050	390	1.3	3.11	122.5
2.4	0.060	272	1.5	3.12	84.4
2.8	0.070	139	1.8	3.13	41.6
3.2	0.080	59	2.0	3.13	16.0
3.6	0.090	33	2.3	3.14	7.6

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	122.5
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	61.3
STRAIN AT FAILURE, %	1.3

USCS (ASTM D2487: D2488): NA

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Batch Worksheet

BATCH-SAMPLE ID	5525-22-1			BATCH #	1
PR. NUMBER	1010-01-1	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	02/09/10

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**342.1**
Soil Moisture Content, %	**10.5**
Type of Cement Used	I/II
Grout Water/Cem. Mat (Solids) Ratio*	**2.00**
Mass of Dry Soil, g	**3258.0**
Total Water/Cem. Mat. Ratio	**2.955**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5525	**Soil (wet)**	100.0	**3600.1**
5527	GGBFS	6.75	**219.9**
5526	Cement	2.25	**73.3**
6088	Organoclay	2.0	**65.2**
	Water, mL	717	

Remarks

Max. Viscosity @1 RPM about 265K cP (mPa s)

* Cementous Materials (solids) is total mass of GGBFS, cement and organoclay (if it was used for this mix)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
5525-22-1-1	UCS	2	4					3 days
5525-22-1-2	UCS	2	4					7 days
5525-22-1-3	UCS	2	4					14 days
5525-22-1-4	UCS	2	4					28 days
5525-22-1-5	Perm	3	3					7 days
5525-22-1-6	Perm	3	3					28 days
5525-22-1-7	Vol. Change	2	4					Extra
5525-22-1-8	Vol. Change	3	3					Extra

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Web: www.test-llc.com

Tested By	RI
Date	02/15/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-21-1	Depth/Elev.	20-40'
Subsample	5	Add. Info	Curing Age: 7 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.735	in	6.95	cm
Diameter	2.999	in	7.62	cm
Area	7.06	in^2	45.57	cm^2
Volume	316.59	cm^3	0.0112	ft^3
Mass	652.40	g	1.44	lb
Specific Gravity	2.575	(Assumed)		
Dry Density	110.5	pcf		

Moisture Content

Mass of wet sample & tare	652.40	g
Mass of dry sample & tare	560.50	g
Mass of tare	0.00	g
% Moisture	16.4	

Test Data

Speed	4	
Board Number	6	
Cell Number	7	
Flow Pump Number	2B	
Flow Pump Rate	1.43E-02	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	26.03	cm
Min Head	26.03	cm
Maximum Gradient	3.74	
Minimum Gradient	3.74	

Final Data (After Test)

Average Height of Sample		2.737	in	6.95	cm
Average Diameter of Sample		3.001	in	7.62	cm
Area	7.07 in^2	45.63	cm^2		
Volume	317.25 cm^3	0.0112	ft^3		
Mass	661.00 g	1.46	lb		

Dry Density	110.3	pcf
Vol. of Voids	99.48	cm^3
Vol. of Solids	217.77	cm^3
Void Ratio	0.46	
Saturation	100.8	%

Moisture Content

Mass of wet sample & tare	763.30	g
Mass of dry sample & tare	663.10	g
Mass of tare	102.60	g
% Moisture	17.9	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
02/15/10	17	20	-	0.37	26.03	3.74	15.2	-	-	-	
02/15/10	17	22	120	0.37	26.03	3.74	15.2	8.39E-05	1.131	9.49E-05	
02/15/10	17	24	120	0.37	26.03	3.74	15.2	8.39E-05	1.131	9.49E-05	
02/15/10	17	26	120	0.37	26.03	3.74	15.2	8.39E-05	1.131	9.49E-05	*
02/15/10	17	28	120	0.37	26.03	3.74	15.2	8.39E-05	1.131	9.49E-05	*
02/15/10	17	30	120	0.37	26.03	3.74	15.2	8.39E-05	1.131	9.49E-05	*
02/15/10	17	32	120	0.37	26.03	3.74	15.2	8.39E-05	1.131	9.49E-05	*

Reported Average Hydraulic Conductivity* 9.5E-05 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	246			Pore Pressure Transducer ID #	28

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Tested By	RI/KI
Date	02/11/10
Checked By	KB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-21-1	Depth/Elev.	20-40'
Subsample	1	Add. Info	Curing Age: 3 Days

ASTM D 2166

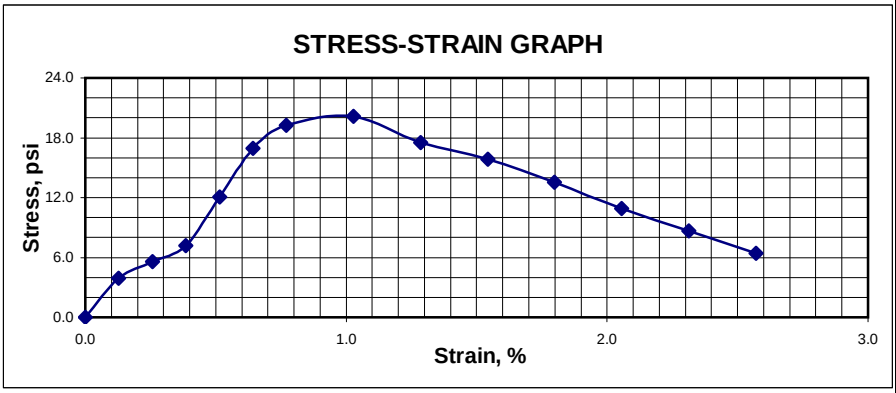
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.891
Initial Diameter, in	1.969
Height-to-Diameter Ratio	1.98
Initial Area, in^2	3.04
Initial Volume, in^3	11.85
Mass of Sample, g	401.00
Wet Density, pcf	128.9
Dry Density, pcf	111.2
Machine Speed, in/min	0.025
Strain Rate, % / min	0.64

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	499.10
Mass of Dry Sample and Tare, g	444.00
Mass of Tare, g	98.50
Moisture, %	15.9

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

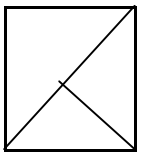
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	6	0.0	3.04	0.0
0.2	0.005	18	0.1	3.05	3.9
0.4	0.010	23	0.3	3.05	5.6
0.6	0.015	28	0.4	3.06	7.2
0.8	0.020	43	0.5	3.06	12.1
1.0	0.025	58	0.6	3.06	17.0
1.2	0.030	65	0.8	3.07	19.2
1.6	0.040	68	1.0	3.08	20.2
2.0	0.050	60	1.3	3.08	17.5
2.4	0.060	55	1.5	3.09	15.8
2.8	0.070	48	1.8	3.10	13.5
3.2	0.080	40	2.1	3.11	10.9
3.6	0.090	33	2.3	3.12	8.7
4.0	0.100	26	2.6	3.13	6.4

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	20.2
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	10.1
STRAIN AT FAILURE, %	1.0

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

Tested By	RI
Date	02/15/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-21-1	Depth/Elev.	20-40'
Subsample	2	Add. Info	Curing Age: 7 Days

ASTM D 2166

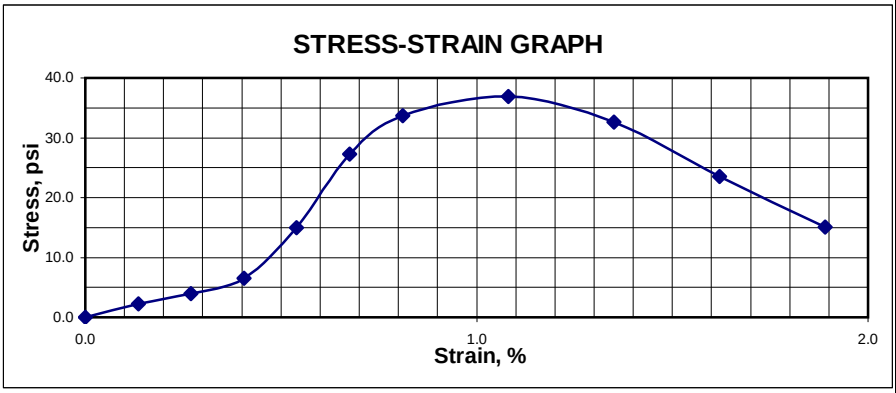
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.702
Initial Diameter, in	1.973
Height-to-Diameter Ratio	1.88
Initial Area, in^2	3.06
Initial Volume, in^3	11.32
Mass of Sample, g	381.50
Wet Density, pcf	128.4
Dry Density, pcf	109.6
Machine Speed, in/min	0.025
Strain Rate, % / min	0.68

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	480.40
Mass of Dry Sample and Tare, g	424.90
Mass of Tare, g	100.10
Moisture, %	17.1

TEST DATA

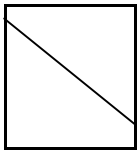
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	8	0.0	3.06	0.0
0.2	0.005	15	0.1	3.06	2.3
0.4	0.010	20	0.3	3.07	3.9
0.6	0.015	28	0.4	3.07	6.5
0.8	0.020	54	0.5	3.07	15.0
1.0	0.025	92	0.7	3.08	27.3
1.2	0.030	112	0.8	3.08	33.7
1.6	0.040	122	1.1	3.09	36.9
2.0	0.050	109	1.4	3.10	32.6
2.4	0.060	81	1.6	3.11	23.5
2.8	0.070	55	1.9	3.12	15.1

REMARKS

Failure Code: 4

Failure Sketch



Failure Type: Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	36.9
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	18.4
STRAIN AT FAILURE, %	1.1

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Tested By	RI
Date	02/22/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-21-1	Depth/Elev.	20-40'
Subsample	3	Add. Info	Curing Age: 14 Days

ASTM D 2166

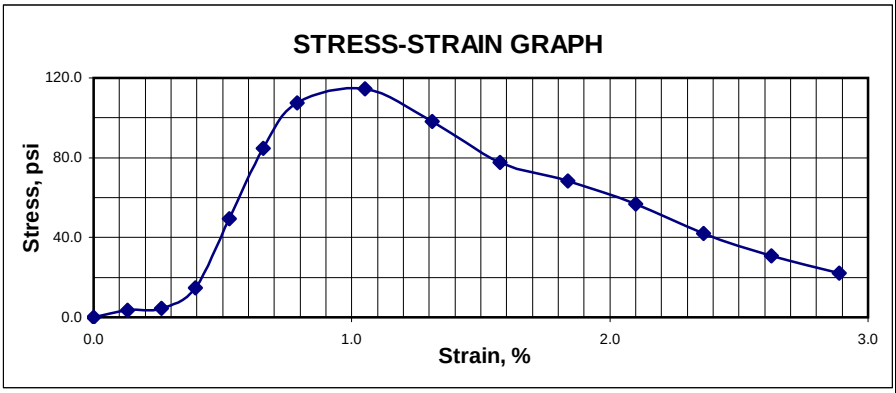
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.809
Initial Diameter, in	1.976
Height-to-Diameter Ratio	1.93
Initial Area, in^2	3.07
Initial Volume, in^3	11.68
Mass of Sample, g	388.50
Wet Density, pcf	126.7
Dry Density, pcf	108.4
Machine Speed, in/min	0.025
Strain Rate, % / min	0.66

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	467.80
Mass of Dry Sample and Tare, g	411.80
Mass of Tare, g	79.70
Moisture, %	16.9

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

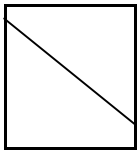
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	10	0.0	3.07	0.0
0.2	0.005	21	0.1	3.07	3.6
0.4	0.010	24	0.3	3.07	4.6
0.6	0.015	55	0.4	3.08	14.6
0.8	0.020	162	0.5	3.08	49.3
1.0	0.025	271	0.7	3.09	84.6
1.2	0.030	342	0.8	3.09	107.4
1.6	0.040	365	1.1	3.10	114.5
2.0	0.050	315	1.3	3.11	98.2
2.4	0.060	252	1.6	3.12	77.7
2.8	0.070	224	1.8	3.12	68.5
3.2	0.080	188	2.1	3.13	56.8
3.6	0.090	142	2.4	3.14	42.0
4.0	0.100	107	2.6	3.15	30.8
4.4	0.110	80	2.9	3.16	22.2

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	114.5
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	57.3
STRAIN AT FAILURE, %	1.1

REMARKS

Failure Code: 4

Failure Sketch



Failure Type: Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Tested By	RI/KI
Date	02/12/10
Checked By	

Client Pr. #		Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead, NY MGP	S. Type	Mold
Location	ISS-04	Depth/Elev.	20-40'
		Add. Info	

Volume Increase Determination

Sub-Sample ID	Empty Mold Mass, g	Mold + Soil/Grout Mass, g	Soil/Grout Mass, g	Initial Soil Volume Calculated, cm^3	Sample Volume cm^3	Mold's Headspace Volume, cm^3	Final Soil/Grout Volume, cm^3	% Volume Change
1-9	NA	NA	NA	NA	2051.8	0.0	2051.8	-
				NA				-
				NA				-
TOTAL	NA	**NA**	**NA**	**1787.2**	**2051.8**	0.00	**2051.8**	**14.8**

Proctor wet density of soil used for initial volume calculation:	125.7	pcf	**2.014**	g/cm^3
Initial vol. of soil (based on 100% of Proctor wet density):	**1787.2**	cm^3		
Mix Design #	21-1			

Ingredient	Amount	Unit	Portion of entire mix
Soil (Waste)	3600.10	g	0.801
Water	538.00	mL	0.120
GGBFS	219.90	g	0.049
Cement	73.30	g	0.016
Organoclay	65.20	g	0.015
		g	
Total	4496.50	-	1.000

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Tested By	RI/KI
Date	02/12/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525	Depth/Elev.	-
Location	-	Add. Info	-

Final Total Volume DETERMINATION (after mixing)

Sample ID	Mold #	Mass of Mold, g	Mass of Wet Sample & Mold, g	Height of Mold, in.	Diameter of Mold, in.	Volume of Mold, ft^3	Wet Density, pcf	Comments
5525-21-1-1	-	-	-	3.8	2.0	0.00691	NA	
5525-21-1-2	-	-	-	3.8	2.0	0.00691	NA	
5525-21-1-3	-	-	-	3.8	2.0	0.00691	NA	
5525-21-1-4	-	-	-	3.9	2.0	0.00709	NA	
5525-21-1-5	-	-	-	2.8	3.0	0.01145	NA	
5525-21-1-6	-	-	-	2.8	3.0	0.01145	NA	
5525-21-1-7	-	-	-	3.7	2.0	0.00672	NA	
5525-21-1-8	-	-	-	2.7	3.0	0.01104	NA	
5525-21-1-9	-	-	-	2.2	2.0	0.00400	NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
Total						0.07246		

Comments			
Calculated Volume is not including separated free water (about 1/4") on top of sample. Dimensions of only solidified material were obtained	**Total Volume**	**2051.8**	**cm^3**

Balance ID Number	12/13/14/15
Oven ID Number	1/6/7
Caliper ID Number	16

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Tested By	RI/KI
Date	03/08/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-21-1	Depth/Elev.	20-40'
Subsample	6	Add. Info	Curing Age: 28 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.663	in	6.76	cm
Diameter	3.004	in	7.63	cm
Area	7.09	in^2	45.73	cm^2
Volume	309.29	cm^3	0.0109	ft^3
Mass	634.50	g	1.40	lb
Specific Gravity	2.575	(Assumed)		
Dry Density	109.7	pcf		

Moisture Content

Mass of wet sample & tare	634.50	g
Mass of dry sample & tare	543.60	g
Mass of tare	0.00	g
% Moisture	16.7	

Test Data

Speed	9	
Board Number	6	
Cell Number	15	
Flow Pump Number	2B	
Flow Pump Rate	4.48E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	28.84	cm
Min Head	28.14	cm
Maximum Gradient	4.25	
Minimum Gradient	4.15	

Final Data (After Test)

Average Height of Sample			2.670	in	6.78 cm
Average Diameter of Sample			3.002	in	7.63 cm
Area	7.08	in^2	45.66	cm^2	
Volume	309.69	cm^3	0.0109	ft^3	
Mass	642.80	g	1.42	lb	

Dry Density	109.5	pcf
Vol. of Voids	98.58	cm^3
Vol. of Solids	211.11	cm^3
Void Ratio	0.47	
Saturation	100.6	%

Moisture Content

Mass of wet sample & tare	755.40	g
Mass of dry sample & tare	656.20	g
Mass of tare	112.60	g
% Moisture	18.2	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
03/08/10	10	30	-	0.40	28.14	4.15	15.4	-	-	-	
03/08/10	10	40	600	0.41	28.84	4.25	15.4	2.34E-06	1.125	2.63E-06	
03/08/10	10	50	600	0.40	28.14	4.15	15.4	2.34E-06	1.125	2.63E-06	
03/08/10	11	0	600	0.41	28.84	4.25	15.4	2.34E-06	1.125	2.63E-06	*
03/08/10	11	10	600	0.40	28.14	4.15	15.4	2.34E-06	1.125	2.63E-06	*
03/08/10	11	20	600	0.41	28.84	4.25	15.4	2.34E-06	1.125	2.63E-06	*
03/08/10	11	30	600	0.41	28.84	4.25	15.4	2.31E-06	1.125	2.60E-06	*

Reported Average Hydraulic Conductivity* 2.6E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	246			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	03/08/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-21-1	Depth/Elev.	20-40'
Subsample	4	Add. Info	Curing Age: 28 Days

ASTM D 2166

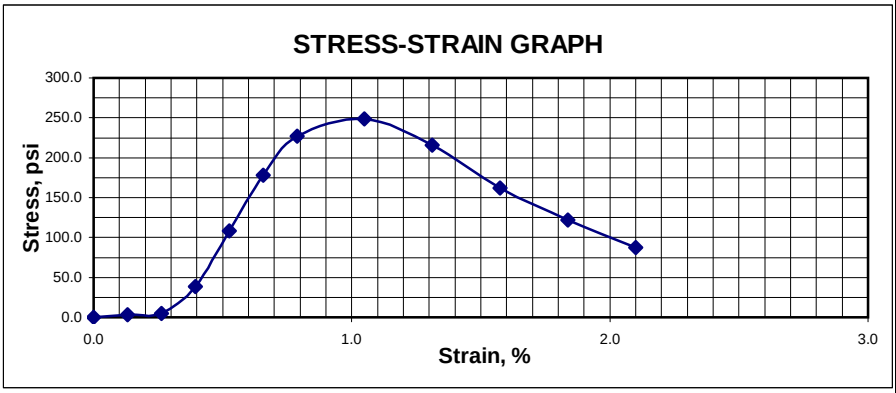
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.810
Initial Diameter, in	1.978
Height-to-Diameter Ratio	1.93
Initial Area, in^2	3.07
Initial Volume, in^3	11.71
Mass of Sample, g	390.70
Wet Density, pcf	127.1
Dry Density, pcf	109.6
Machine Speed, in/min	0.025
Strain Rate, % / min	0.66

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	469.20
Mass of Dry Sample and Tare, g	415.60
Mass of Tare, g	79.90
Moisture, %	16.0

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

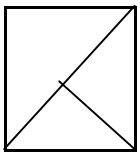
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	10	0.0	3.07	0.0
0.2	0.005	21	0.1	3.08	3.6
0.4	0.010	25	0.3	3.08	4.9
0.6	0.015	130	0.4	3.09	38.9
0.8	0.020	345	0.5	3.09	108.4
1.0	0.025	562	0.7	3.09	178.5
1.2	0.030	714	0.8	3.10	227.3
1.6	0.040	783	1.0	3.11	248.9
2.0	0.050	683	1.3	3.11	216.1
2.4	0.060	515	1.6	3.12	161.8
2.8	0.070	392	1.8	3.13	122.0
3.2	0.080	284	2.1	3.14	87.3

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	248.9
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	124.5
STRAIN AT FAILURE, %	1.0

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Batch Worksheet

BATCH-SAMPLE ID	5525-21-1			BATCH #	1
PR. NUMBER	1010-01-1	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	02/08/10

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**342.1**
Soil Moisture Content, %	**10.5**
Type of Cement Used	I/II
Grout Water/Cem. Mat (Solids) Ratio*	**1.50**
Mass of Dry Soil, g	**3258.0**
Total Water/Cem. Mat. Ratio	**2.455**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5525	**Soil (wet)**	100.0	**3600.1**
5527	GGBFS	6.75	**219.9**
5526	Cement	2.25	**73.3**
6088	Organoclay	2.0	**65.2**
	Water, mL	538	

Remarks

Max. Viscosity @1 RPM about 285K cP (mPa s)

* Cementous Materials (solids) is total mass of GGBFS, cement and organoclay (if it was used for this mix)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
5525-21-1-1	UCS	2	4					3 days
5525-21-1-2	UCS	2	4					7 days
5525-21-1-3	UCS	2	4					14 days
5525-21-1-4	UCS	2	4					28 days
5525-21-1-5	Perm	3	3					7 days
5525-21-1-6	Perm	3	3					28 days
5525-21-1-7	Vol. Change	2	4					Extra
5525-21-1-8	Vol. Change	3	3					Extra

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Tested By	RI
Date	02/16/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-20-1	Depth/Elev.	20-40'
Subsample	5	Add. Info	Curing Age: 7 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.719	in	6.91	cm
Diameter	2.998	in	7.61	cm
Area	7.06	in^2	45.54	cm^2
Volume	314.53	cm^3	0.0111	ft^3
Mass	593.30	g	1.31	lb
Specific Gravity	2.500	(Assumed)		
Dry Density	103.4	pcf		

Moisture Content

Mass of wet sample & tare	593.30	g
Mass of dry sample & tare	521.30	g
Mass of tare	0.00	g
% Moisture	13.8	

Test Data

Speed	5	
Board Number	5	
Cell Number	7	
Flow Pump Number	2A	
Flow Pump Rate	7.17E-03	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	22.51	cm
Min Head	22.51	cm
Maximum Gradient	3.26	
Minimum Gradient	3.26	

Final Data (After Test)

Average Height of Sample			2.715	in	6.90	cm
Average Diameter of Sample			2.996	in	7.61	cm
Area	7.05	in^2	45.48	cm^2		
Volume	313.65	cm^3	0.0111	ft^3		
Mass	621.60	g	1.37	lb		

Dry Density	103.7	pcf
Vol. of Voids	105.06	cm^3
Vol. of Solids	208.59	cm^3
Void Ratio	0.50	
Saturation	95.3	%

Moisture Content

Mass of wet sample & tare	718.70	g
Mass of dry sample & tare	618.60	g
Mass of tare	97.30	g
% Moisture	19.2	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
02/16/10	11	0	-	0.32	22.51	3.26	15.2	-	-	-	
02/16/10	11	5	300	0.32	22.51	3.26	15.2	4.83E-05	1.131	5.46E-05	
02/16/10	11	10	300	0.32	22.51	3.26	15.2	4.83E-05	1.131	5.46E-05	
02/16/10	11	15	300	0.32	22.51	3.26	15.2	4.83E-05	1.131	5.46E-05	*
02/16/10	11	20	300	0.32	22.51	3.26	15.2	4.83E-05	1.131	5.46E-05	*
02/16/10	11	25	300	0.32	22.51	3.26	15.2	4.83E-05	1.131	5.46E-05	*
02/16/10	11	30	300	0.32	22.51	3.26	15.2	4.83E-05	1.131	5.46E-05	*

Reported Average Hydraulic Conductivity* 5.5E-05 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	02/12/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-20-1	Depth/Elev.	20-40'
Subsample	1	Add. Info	Curing Age: 3 Days

ASTM D 2166

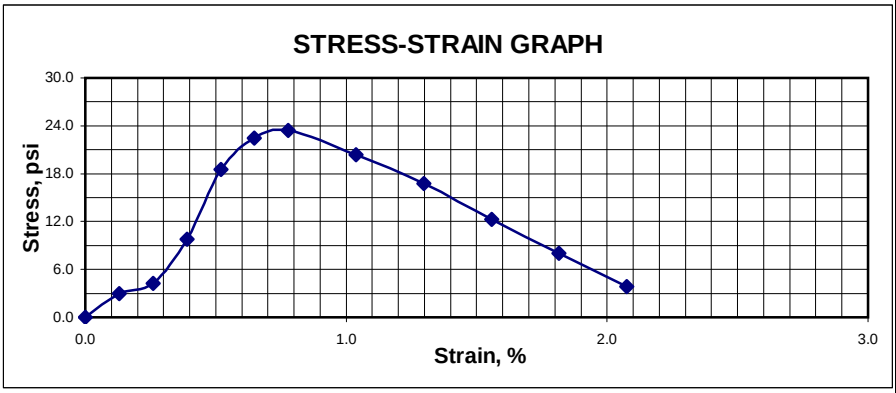
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.854
Initial Diameter, in	1.972
Height-to-Diameter Ratio	1.95
Initial Area, in^2	3.05
Initial Volume, in^3	11.77
Mass of Sample, g	363.60
Wet Density, pcf	117.7
Dry Density, pcf	103.8
Machine Speed, in/min	0.025
Strain Rate, % / min	0.65

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	441.90
Mass of Dry Sample and Tare, g	399.30
Mass of Tare, g	79.70
Moisture, %	13.3

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

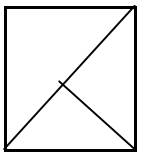
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	10	0.0	3.05	0.0
0.2	0.005	19	0.1	3.06	2.9
0.4	0.010	23	0.3	3.06	4.2
0.6	0.015	40	0.4	3.07	9.8
0.8	0.020	67	0.5	3.07	18.6
1.0	0.025	79	0.6	3.07	22.4
1.2	0.030	82	0.8	3.08	23.4
1.6	0.040	73	1.0	3.09	20.4
2.0	0.050	62	1.3	3.09	16.8
2.4	0.060	48	1.6	3.10	12.2
2.8	0.070	35	1.8	3.11	8.0
3.2	0.080	22	2.1	3.12	3.8

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	23.4
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	11.7
STRAIN AT FAILURE, %	0.8

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Web: www.test-llc.com

Tested By	RI
Date	02/16/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-20-1	Depth/Elev.	20-40'
Subsample	2	Add. Info	Curing Age: 7 Days

ASTM D 2166

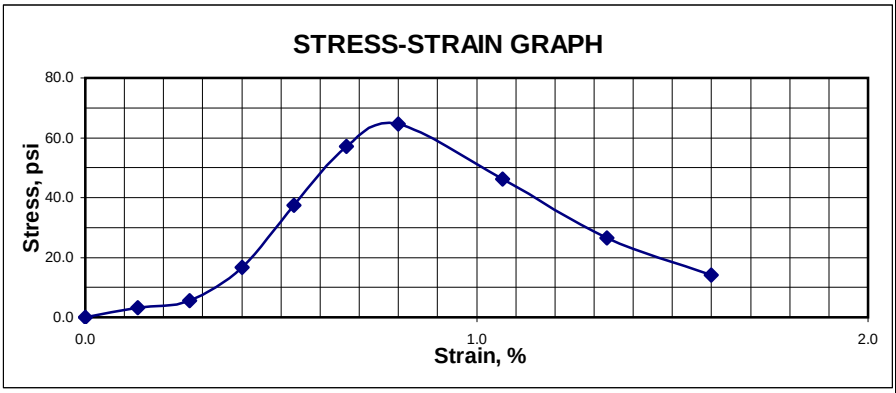
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.750
Initial Diameter, in	1.974
Height-to-Diameter Ratio	1.90
Initial Area, in^2	3.06
Initial Volume, in^3	11.48
Mass of Sample, g	351.00
Wet Density, pcf	116.5
Dry Density, pcf	103.0
Machine Speed, in/min	0.025
Strain Rate, % / min	0.67

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	449.90
Mass of Dry Sample and Tare, g	409.50
Mass of Tare, g	99.50
Moisture, %	13.0

TEST DATA

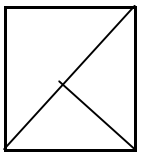
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	10	0.0	3.06	0.0
0.2	0.005	20	0.1	3.06	3.3
0.4	0.010	27	0.3	3.07	5.5
0.6	0.015	61	0.4	3.07	16.6
0.8	0.020	125	0.5	3.08	37.4
1.0	0.025	186	0.7	3.08	57.1
1.2	0.030	209	0.8	3.09	64.5
1.6	0.040	153	1.1	3.09	46.2
2.0	0.050	92	1.3	3.10	26.4
2.4	0.060	54	1.6	3.11	14.1

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488): NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	64.5
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	32.3
STRAIN AT FAILURE, %	0.8

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Tested By	RI
Date	02/23/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-20-1	Depth/Elev.	20-40'
Subsample	3	Add. Info	Curing Age: 14 Days

ASTM D 2166

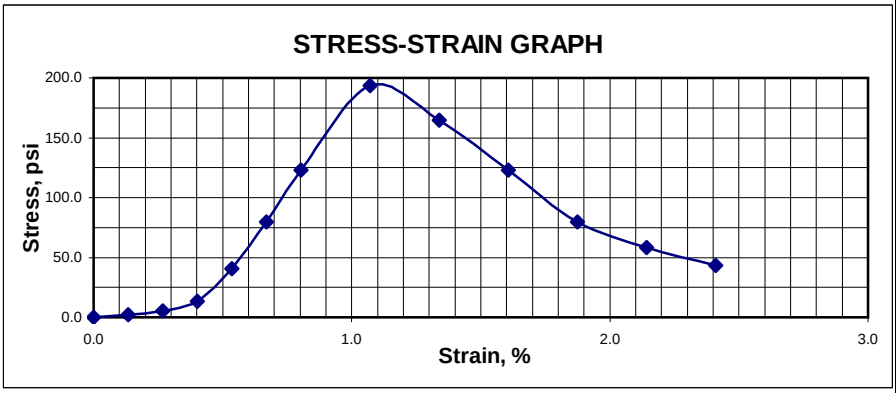
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.735
Initial Diameter, in	1.978
Height-to-Diameter Ratio	1.89
Initial Area, in^2	3.07
Initial Volume, in^3	11.48
Mass of Sample, g	349.30
Wet Density, pcf	115.9
Dry Density, pcf	102.2
Machine Speed, in/min	0.025
Strain Rate, % / min	0.67

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	449.60
Mass of Dry Sample and Tare, g	408.50
Mass of Tare, g	100.80
Moisture, %	13.4

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

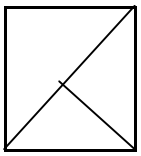
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	10	0.0	3.07	0.0
0.2	0.005	17	0.1	3.08	2.3
0.4	0.010	27	0.3	3.08	5.5
0.6	0.015	51	0.4	3.09	13.3
0.8	0.020	136	0.5	3.09	40.8
1.0	0.025	256	0.7	3.09	79.5
1.2	0.030	391	0.8	3.10	123.0
1.6	0.040	612	1.1	3.11	193.8
2.0	0.050	523	1.3	3.11	164.7
2.4	0.060	394	1.6	3.12	123.0
2.8	0.070	260	1.9	3.13	79.8
3.2	0.080	193	2.1	3.14	58.3
3.6	0.090	146	2.4	3.15	43.2

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	193.8
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	96.9
STRAIN AT FAILURE, %	1.1

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Web: www.test-llc.com

Tested By	RI/KI
Date	02/12/10
Checked By	

Client Pr. #		Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead, NY MGP	S. Type	Mold
Location	ISS-04	Depth/Elev.	20-40'
		Add. Info	

Volume Increase Determination

Sub-Sample ID	Empty Mold Mass, g	Mold + Soil/Grout Mass, g	Soil/Grout Mass, g	Initial Soil Volume Calculated, cm^3	Sample Volume cm^3	Mold's Headspace Volume, cm^3	Final Soil/Grout Volume, cm^3	% Volume Change
1-9	NA	NA	NA	NA	2175.3	0.0	2175.3	-
				NA				-
				NA				-
TOTAL	NA	**NA**	**NA**	**1787.2**	**2175.3**	0.00	**2175.3**	**21.7**

Proctor wet density of soil used for initial volume calculation:	125.7	pcf	**2.014**	g/cm^3
Initial vol. of soil (based on 100% of Proctor wet density):	**1787.2**	cm^3		
Mix Design #	20-1			

Ingredient	Amount	Unit	Portion of entire mix
Soil (Waste)	3600.10	g	0.834
Water	358.00	mL	0.083
GGBFS	219.90	g	0.051
Cement	73.30	g	0.017
Organoclay	65.20	g	0.015
		g	
Total	4316.50	-	1.000

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Tested By	RI/KI
Date	02/12/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525	Depth/Elev.	-
Location	-	Add. Info	-

Final Total Volume DETERMINATION (after mixing)

Sample ID	Mold #	Mass of Mold, g	Mass of Wet Sample & Mold, g	Height of Mold, in.	Diameter of Mold, in.	Volume of Mold, ft^3	Wet Density, pcf	Comments
5525-20-1-1	-	-	-	3.9	2.0	0.00709	NA	
5525-20-1-2	-	-	-	3.8	2.0	0.00691	NA	
5525-20-1-3	-	-	-	3.9	2.0	0.00709	NA	
5525-20-1-4	-	-	-	3.9	2.0	0.00709	NA	
5525-20-1-5	-	-	-	2.9	3.0	0.01186	NA	
5525-20-1-6	-	-	-	2.9	3.0	0.01186	NA	
5525-20-1-7	-	-	-	3.9	2.0	0.00709	NA	
5525-20-1-8	-	-	-	2.9	3.0	0.01186	NA	
5525-20-1-9	-	-	-	3.3	2.0	0.00600	NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
Total						0.07682		

Comments			
Calculated Volume is not including separated free water (about 1/10") on top of sample. Dimensions of only solidified material were obtained	**Total Volume**	**2175.3**	**cm^3**

Balance ID Number	12/13/14/15
Oven ID Number	1/6/7
Caliper ID Number	16

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Tested By	RI
Date	03/09/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-20-1	Depth/Elev.	20-40'
Subsample	6	Add. Info	Curing Age: 28 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.710	in	6.88	cm
Diameter	2.997	in	7.61	cm
Area	7.05	in^2	45.51	cm^2
Volume	313.28	cm^3	0.0111	ft^3
Mass	579.70	g	1.28	lb
Specific Gravity	2.475	(Assumed)		
Dry Density	103.0	pcf		

Moisture Content

Mass of wet sample & tare	579.70	g
Mass of dry sample & tare	517.10	g
Mass of tare	0.00	g
% Moisture	12.1	

Test Data

Speed	8	
Board Number	2	
Cell Number	5	
Flow Pump Number	2A	
Flow Pump Rate	8.96E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	46.42	cm
Min Head	45.72	cm
Maximum Gradient	6.75	
Minimum Gradient	6.65	

Final Data (After Test)

Average Height of Sample			2.708	in	6.88	cm
Average Diameter of Sample			2.994	in	7.60	cm
Area	7.04	in^2	45.42	cm^2		
Volume	312.42	cm^3	0.0110	ft^3		
Mass	615.70	g	1.36	lb		

Dry Density	103.3	pcf
Vol. of Voids	103.46	cm^3
Vol. of Solids	208.96	cm^3
Void Ratio	0.50	
Saturation	95.2	%

Moisture Content

Mass of wet sample & tare	723.00	g
Mass of dry sample & tare	624.50	g
Mass of tare	107.40	g
% Moisture	19.0	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
03/09/10	13	20	-	0.65	45.72	6.65	15.4	-	-	-	
03/09/10	13	25	300	0.66	46.42	6.75	15.4	2.95E-06	1.125	3.31E-06	
03/09/10	13	30	300	0.65	45.72	6.65	15.4	2.95E-06	1.125	3.31E-06	
03/09/10	13	35	300	0.66	46.42	6.75	15.4	2.95E-06	1.125	3.31E-06	*
03/09/10	13	40	300	0.65	45.72	6.65	15.4	2.95E-06	1.125	3.31E-06	*
03/09/10	13	45	300	0.66	46.42	6.75	15.4	2.95E-06	1.125	3.31E-06	*
03/09/10	13	50	300	0.66	46.42	6.75	15.4	2.92E-06	1.125	3.29E-06	*

Reported Average Hydraulic Conductivity* 3.3E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	64
Syringe ID #	245			Pore Pressure Transducer ID #	26/27

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Web: www.test-llc.com

Tested By	RI
Date	03/09/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-20-1	Depth/Elev.	20-40'
Subsample	4	Add. Info	Curing Age: 28 Days

ASTM D 2166

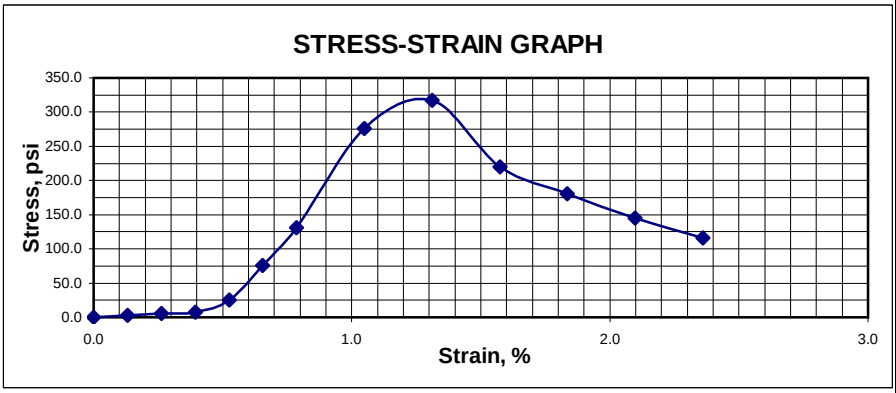
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.814
Initial Diameter, in	1.973
Height-to-Diameter Ratio	1.93
Initial Area, in^2	3.06
Initial Volume, in^3	11.66
Mass of Sample, g	351.50
Wet Density, pcf	114.8
Dry Density, pcf	102.0
Machine Speed, in/min	0.025
Strain Rate, % / min	0.66

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	651.70
Mass of Dry Sample and Tare, g	612.60
Mass of Tare, g	300.70
Moisture, %	12.5

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

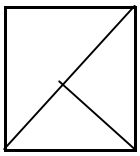
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	8	0.0	3.06	0.0
0.2	0.005	18	0.1	3.06	3.3
0.4	0.010	24	0.3	3.07	5.2
0.6	0.015	31	0.4	3.07	7.5
0.8	0.020	85	0.5	3.07	25.1
1.0	0.025	240	0.7	3.08	75.4
1.2	0.030	413	0.8	3.08	131.4
1.6	0.040	860	1.0	3.09	275.8
2.0	0.050	991	1.3	3.10	317.3
2.4	0.060	691	1.6	3.11	219.9
2.8	0.070	570	1.8	3.11	180.4
3.2	0.080	461	2.1	3.12	145.1
3.6	0.090	371	2.4	3.13	115.9

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	317.3
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	158.7
STRAIN AT FAILURE, %	1.3

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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SOIL
TESTS, LLC

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Batch Worksheet

BATCH-SAMPLE ID	5525-20-1			BATCH #	1
PR. NUMBER	1010-01-1	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	02/09/10

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**342.1**
Soil Moisture Content, %	**10.5**
Type of Cement Used	I/II
Grout Water/Cem. Mat (Solids) Ratio*	**1.00**
Mass of Dry Soil, g	**3258.0**
Total Water/Cem. Mat. Ratio	**1.955**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5525	**Soil (wet)**	100.0	**3600.1**
5527	GGBFS	6.75	**219.9**
5526	Cement	2.25	**73.3**
6088	Organoclay	2.0	**65.2**
	Water, mL	358	

Remarks

Max. Viscosity @1 RPM about 117K cP (mPa s)

* Cementous Materials (solids) is total mass of GGBFS, cement and organoclay (if it was used for this mix)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
5525-20-1-1	UCS	2	4					3 days
5525-20-1-2	UCS	2	4					7 days
5525-20-1-3	UCS	2	4					14 days
5525-20-1-4	UCS	2	4					28 days
5525-20-1-5	Perm	3	3					7 days
5525-20-1-6	Perm	3	3					28 days
5525-20-1-7	Vol. Change	2	4					Extra
5525-20-1-8	Vol. Change	3	3					Extra

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1874 Forge Street Tucker, GA 30084
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Fax: 770-923-8973
Web: www.test-llc.com

Tested By	RI
Date	02/15/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-19-1	Depth/Elev.	20-40'
Subsample	5	Add. Info	Curing Age: 7 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.886	in	7.33	cm
Diameter	2.999	in	7.62	cm
Area	7.06	in^2	45.57	cm^2
Volume	334.07	cm^3	0.0118	ft^3
Mass	688.50	g	1.52	lb
Specific Gravity	2.575	(Assumed)		
Dry Density	115.5	pcf		

Moisture Content

Mass of wet sample & tare	688.50	g
Mass of dry sample & tare	618.40	g
Mass of tare	0.00	g
% Moisture	11.3	

Test Data

Speed	6	
Board Number	5	
Cell Number	19	
Flow Pump Number	2A	
Flow Pump Rate	3.58E-03	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	42.20	cm
Min Head	42.20	cm
Maximum Gradient	5.76	
Minimum Gradient	5.76	

Final Data (After Test)

Average Height of Sample			2.887	in	7.33	cm
Average Diameter of Sample			3.001	in	7.62	cm
Area	7.07	in^2	45.63	cm^2		
Volume	334.63	cm^3	0.0118	ft^3		
Mass	709.60	g	1.56	lb		

Dry Density	115.4	pcf
Vol. of Voids	94.34	cm^3
Vol. of Solids	240.29	cm^3
Void Ratio	0.39	
Saturation	96.3	%

Moisture Content

Mass of wet sample & tare	804.50	g
Mass of dry sample & tare	713.70	g
Mass of tare	95.30	g
% Moisture	14.7	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
02/15/10	16	40	-	0.60	42.20	5.76	15.2	-	-	-	
02/15/10	16	45	300	0.60	42.20	5.76	15.2	1.36E-05	1.131	1.54E-05	
02/15/10	16	50	300	0.60	42.20	5.76	15.2	1.36E-05	1.131	1.54E-05	
02/15/10	16	55	300	0.60	42.20	5.76	15.2	1.36E-05	1.131	1.54E-05	*
02/15/10	17	0	300	0.60	42.20	5.76	15.2	1.36E-05	1.131	1.54E-05	*
02/15/10	17	5	300	0.60	42.20	5.76	15.2	1.36E-05	1.131	1.54E-05	*
02/15/10	17	10	300	0.60	42.20	5.76	15.2	1.36E-05	1.131	1.54E-05	*

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Reported Average Hydraulic Conductivity* 1.5E-05 cm/sec

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	RI/KI
Date	02/11/10
Checked By	KB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-19-1	Depth/Elev.	20-40'
Subsample	1	Add. Info	Curing Age: 3 Days

ASTM D 2166

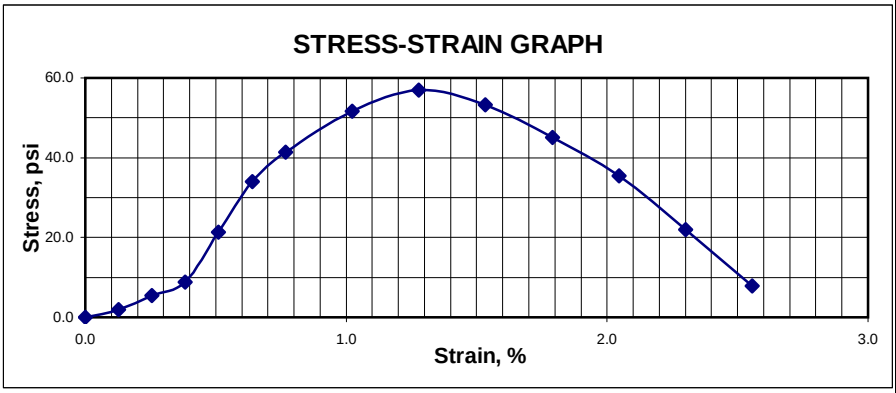
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.911
Initial Diameter, in	1.977
Height-to-Diameter Ratio	1.98
Initial Area, in^2	3.07
Initial Volume, in^3	12.01
Mass of Sample, g	398.60
Wet Density, pcf	126.5
Dry Density, pcf	114.1
Machine Speed, in/min	0.025
Strain Rate, % / min	0.64

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	490.80
Mass of Dry Sample and Tare, g	452.10
Mass of Tare, g	92.70
Moisture, %	10.8

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

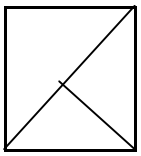
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	6	0.0	3.07	0.0
0.2	0.005	12	0.1	3.07	2.0
0.4	0.010	23	0.3	3.08	5.5
0.6	0.015	33	0.4	3.08	8.8
0.8	0.020	72	0.5	3.09	21.4
1.0	0.025	111	0.6	3.09	34.0
1.2	0.030	134	0.8	3.09	41.4
1.6	0.040	166	1.0	3.10	51.6
2.0	0.050	183	1.3	3.11	56.9
2.4	0.060	172	1.5	3.12	53.2
2.8	0.070	147	1.8	3.13	45.1
3.2	0.080	117	2.0	3.13	35.4
3.6	0.090	75	2.3	3.14	22.0
4.0	0.100	31	2.6	3.15	7.9

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	56.9
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	28.5
STRAIN AT FAILURE, %	1.3

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Tested By	RI
Date	02/15/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-19-1	Depth/Elev.	20-40'
Subsample	2	Add. Info	Curing Age: 7 Days

ASTM D 2166

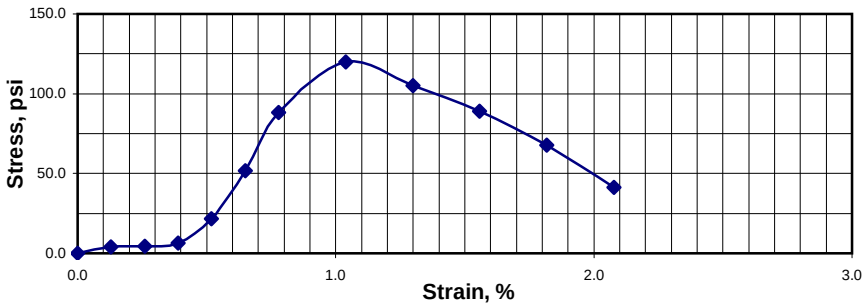
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.851
Initial Diameter, in	1.975
Height-to-Diameter Ratio	1.95
Initial Area, in^2	3.06
Initial Volume, in^3	11.80
Mass of Sample, g	392.90
Wet Density, pcf	126.9
Dry Density, pcf	114.8
Machine Speed, in/min	0.025
Strain Rate, % / min	0.65

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	493.20
Mass of Dry Sample and Tare, g	456.10
Mass of Tare, g	101.30
Moisture, %	10.5

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

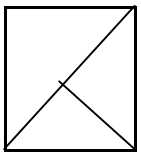
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	9	0.0	3.06	0.0
0.2	0.005	21	0.1	3.07	3.9
0.4	0.010	23	0.3	3.07	4.6
0.6	0.015	29	0.4	3.08	6.5
0.8	0.020	76	0.5	3.08	21.8
1.0	0.025	168	0.6	3.08	51.6
1.2	0.030	281	0.8	3.09	88.1
1.6	0.040	380	1.0	3.10	119.8
2.0	0.050	335	1.3	3.10	105.0
2.4	0.060	286	1.6	3.11	89.0
2.8	0.070	221	1.8	3.12	67.9
3.2	0.080	138	2.1	3.13	41.2

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	119.8
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	59.9
STRAIN AT FAILURE, %	1.0

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Web: www.test-llc.com

Tested By	RI
Date	02/22/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-19-1	Depth/Elev.	20-40'
Subsample	3	Add. Info	Curing Age: 14 Days

ASTM D 2166

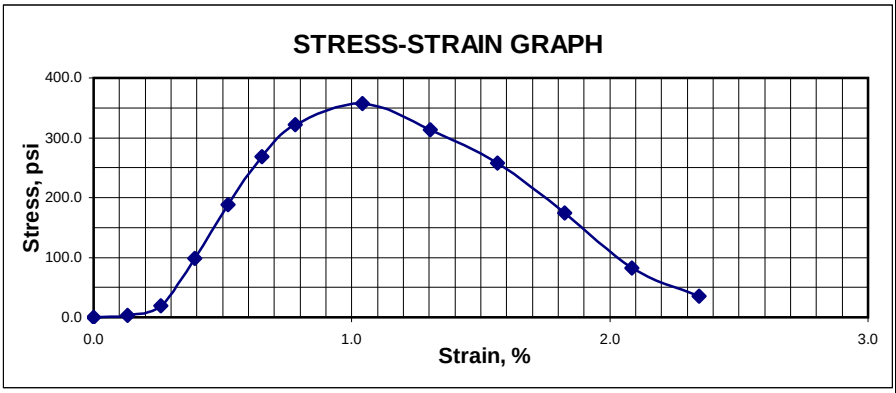
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.837
Initial Diameter, in	1.976
Height-to-Diameter Ratio	1.94
Initial Area, in^2	3.07
Initial Volume, in^3	11.77
Mass of Sample, g	391.50
Wet Density, pcf	126.7
Dry Density, pcf	114.8
Machine Speed, in/min	0.025
Strain Rate, % / min	0.65

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	470.90
Mass of Dry Sample and Tare, g	434.20
Mass of Tare, g	79.80
Moisture, %	10.4

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

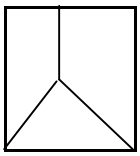
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	10	0.0	3.07	0.0
0.2	0.005	20	0.1	3.07	3.3
0.4	0.010	70	0.3	3.07	19.5
0.6	0.015	312	0.4	3.08	98.1
0.8	0.020	591	0.5	3.08	188.5
1.0	0.025	837	0.7	3.09	267.9
1.2	0.030	1005	0.8	3.09	321.9
1.6	0.040	1118	1.0	3.10	357.5
2.0	0.050	983	1.3	3.11	313.2
2.4	0.060	813	1.6	3.12	257.8
2.8	0.070	554	1.8	3.12	174.2
3.2	0.080	267	2.1	3.13	82.1
3.6	0.090	120	2.3	3.14	35.0

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	357.5
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	178.8
STRAIN AT FAILURE, %	1.0

REMARKS

Failure Code: 2

Failure Sketch



Failure Type: Cone and Split

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Web: www.test-llc.com

Tested By	RI/KI
Date	02/12/10
Checked By	

Client Pr. #		Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead, NY MGP	S. Type	Mold
Location	ISS-04	Depth/Elev.	20-40'
		Add. Info	

Volume Increase Determination

Sub-Sample ID	Empty Mold Mass, g	Mold + Soil/Grout Mass, g	Soil/Grout Mass, g	Initial Soil Volume Calculated, cm^3	Sample Volume cm^3	Mold's Headspace Volume, cm^3	Final Soil/Grout Volume, cm^3	% Volume Change
1-8	NA	NA	NA	NA	2071.1	0.0	2071.1	-
				NA				-
				NA				-
TOTAL	NA	**NA**	**NA**	**1861.8**	**2071.1**	0.00	**2071.1**	**11.2**

Proctor wet density of soil used for initial volume calculation:	125.7	pcf	**2.014**	g/cm^3
Initial vol. of soil (based on 100% of Proctor wet density):	**1861.8**	cm^3		
Mix Design #	19-1			

Ingredient	Amount	Unit	Portion of entire mix
Soil (Waste)	3750.40	g	0.870
Water	187.00	mL	0.043
GGBFS	229.10	g	0.053
Cement	76.40	g	0.018
Organoclay	67.90	g	0.016
		g	
Total	4310.80	-	1.000

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Web: www.test-llc.com

Tested By	RI/KI
Date	02/12/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525	Depth/Elev.	-
Location	-	Add. Info	-

Final Total Volume DETERMINATION (after mixing)

Sample ID	Mold #	Mass of Mold, g	Mass of Wet Sample & Mold, g	Height of Mold, in.	Diameter of Mold, in.	Volume of Mold, ft^3	Wet Density, pcf	Comments
5525-19-1-1	-	-	-	4.0	2.0	0.00727	NA	
5525-19-1-2	-	-	-	4.0	2.0	0.00727	NA	
5525-19-1-3	-	-	-	4.0	2.0	0.00727	NA	
5525-19-1-4	-	-	-	4.0	2.0	0.00727	NA	
5525-19-1-5	-	-	-	3.0	3.0	0.01227	NA	
5525-19-1-6	-	-	-	3.0	3.0	0.01227	NA	
5525-19-1-7	-	-	-	4.0	2.0	0.00727	NA	
5525-19-1-8	-	-	-	3.0	3.0	0.01227	NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
Total						0.07314		

Comments			
	Total Volume	**2071.1**	**cm^3**

Balance ID Number	12/13/14/15
Oven ID Number	1/6/7
Caliper ID Number	16

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Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

Tested By	RI/KI
Date	03/08/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-19-1	Depth/Elev.	20-40'
Subsample	6	Add. Info	Curing Age: 28 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.911	in	7.39	cm
Diameter	2.995	in	7.61	cm
Area	7.05	in^2	45.45	cm^2
Volume	336.07	cm^3	0.0119	ft^3
Mass	689.60	g	1.52	lb
Specific Gravity	2.575	(Assumed)		
Dry Density	115.9	pcf		

Moisture Content

Mass of wet sample & tare	689.60	g
Mass of dry sample & tare	624.30	g
Mass of tare	0.00	g
% Moisture	10.5	

Test Data

Speed	9	
Board Number	5	
Cell Number	19	
Flow Pump Number	2A	
Flow Pump Rate	4.48E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	106.92	cm
Min Head	105.51	cm
Maximum Gradient	14.47	
Minimum Gradient	14.27	

Final Data (After Test)

Average Height of Sample			2.910	in	7.39	cm
Average Diameter of Sample			2.994	in	7.60	cm
Area	7.04	in^2	45.42	cm^2		
Volume	335.73	cm^3	0.0119	ft^3		
Mass	713.70	g	1.57	lb		

Dry Density	116.1	pcf
Vol. of Voids	93.18	cm^3
Vol. of Solids	242.55	cm^3
Void Ratio	0.38	
Saturation	95.7	%

Moisture Content

Mass of wet sample & tare	812.00	g
Mass of dry sample & tare	722.90	g
Mass of tare	98.60	g
% Moisture	14.3	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
03/08/10	10	30	-	1.50	105.51	14.27	15.3	-	-	-	
03/08/10	10	40	600	1.51	106.21	14.37	15.3	6.89E-07	1.128	7.77E-07	
03/08/10	10	50	600	1.50	105.51	14.27	15.3	6.89E-07	1.128	7.77E-07	
03/08/10	11	0	600	1.51	106.21	14.37	15.3	6.89E-07	1.128	7.77E-07	*
03/08/10	11	10	600	1.52	106.92	14.47	15.3	6.84E-07	1.128	7.72E-07	*
03/08/10	11	20	600	1.51	106.21	14.37	15.3	6.84E-07	1.128	7.72E-07	*
03/08/10	11	30	600	1.52	106.92	14.47	15.3	6.84E-07	1.128	7.72E-07	*

Reported Average Hydraulic Conductivity* 7.7E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	245			Pore Pressure Transducer ID #	28

TIMELY ENGINEERING SOIL TESTS, LLC
1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

Tested By	RI
Date	03/08/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-19-1	Depth/Elev.	20-40'
Subsample	4	Add. Info	Curing Age: 28 Days

ASTM D 2166

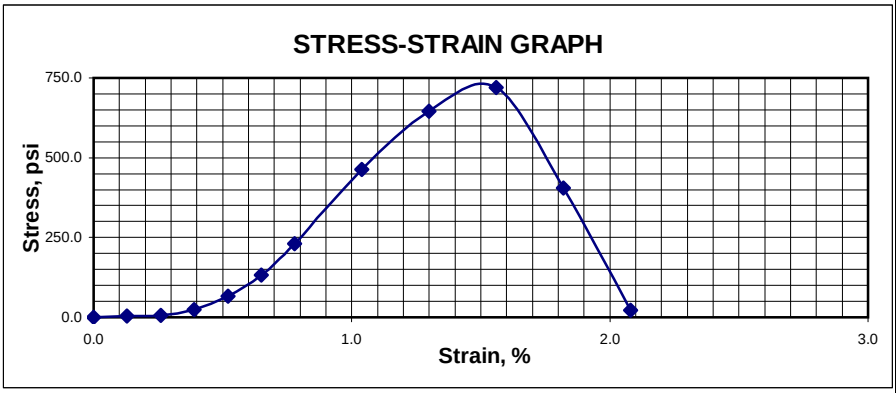
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.848
Initial Diameter, in	1.976
Height-to-Diameter Ratio	1.95
Initial Area, in^2	3.07
Initial Volume, in^3	11.80
Mass of Sample, g	394.00
Wet Density, pcf	127.2
Dry Density, pcf	115.8
Machine Speed, in/min	0.025
Strain Rate, % / min	0.65

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	472.60
Mass of Dry Sample and Tare, g	437.70
Mass of Tare, g	79.60
Moisture, %	9.7

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

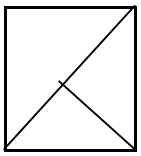
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	10	0.0	3.07	0.0
0.2	0.005	20	0.1	3.07	3.3
0.4	0.010	30	0.3	3.07	6.5
0.6	0.015	86	0.4	3.08	24.7
0.8	0.020	211	0.5	3.08	65.2
1.0	0.025	419	0.6	3.09	132.5
1.2	0.030	723	0.8	3.09	230.7
1.6	0.040	1447	1.0	3.10	463.7
2.0	0.050	2017	1.3	3.11	646.0
2.4	0.060	2254	1.6	3.12	720.3
2.8	0.070	1277	1.8	3.12	405.6
3.2	0.080	81	2.1	3.13	22.7

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	720.3
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	360.2
STRAIN AT FAILURE, %	1.6

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Batch Worksheet

BATCH-SAMPLE ID	5525-19-1			BATCH #	1
PR. NUMBER	1010-01-1	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	02/08/10

Time Batch Mixing Started		**Soil Moisture Mass, g**	**356.4**
Total Time Batch was Mixed, min		**Soil Moisture Content, %**	**10.5**
Time Batch Completely in Molds		Type of Cement Used	I/II
		Grout Water/Cem. Mat (Solids) Ratio*	**0.50**
		Mass of Dry Soil, g	**3394.0**
		Total Water/Cem. Mat. Ratio	**1.455**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5525	**Soil (wet)**	100.0	**3750.4**
5527	GGBFS	6.75	**229.1**
5526	Cement	2.25	**76.4**
6088	Organoclay	2.0	**67.9**
	Water, mL	187	

Remarks

Max. Viscosity @1 RPM about 1268K cP (mPa s)

* Cementous Materials (solids) is total mass of GGBFS, cement and organoclay (if it was used for this mix)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
5525-19-1-1	UCS	2	4					3 days
5525-19-1-2	UCS	2	4					7 days
5525-19-1-3	UCS	2	4					14 days
5525-19-1-4	UCS	2	4					28 days
5525-19-1-5	Perm	3	3					7 days
5525-19-1-6	Perm	3	3					28 days
5525-19-1-7	Vol. Change	2	4					Extra
5525-19-1-8	Vol. Change	3	3					Extra

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Tested By	RI
Date	02/16/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-18-1	Depth/Elev.	20-40'
Subsample	5	Add. Info	Curing Age: 7 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.421	in	6.15	cm
Diameter	3.000	in	7.62	cm
Area	7.07	in^2	45.60	cm^2
Volume	280.43	cm^3	0.0099	ft^3
Mass	586.40	g	1.29	lb
Specific Gravity	2.600	(Assumed)		
Dry Density	111.0	pcf		

Moisture Content

Mass of wet sample & tare	586.40	g
Mass of dry sample & tare	498.70	g
Mass of tare	0.00	g
% Moisture	17.6	

Test Data

Speed	4	
Board Number	8	
Cell Number	19	
Flow Pump Number	2B	
Flow Pump Rate	1.43E-02	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	21.10	cm
Min Head	21.10	cm
Maximum Gradient	3.43	
Minimum Gradient	3.43	

Final Data (After Test)

Average Height of Sample			2.420	in	6.15 cm
Average Diameter of Sample			3.002	in	7.63 cm
Area	7.08	in^2	45.66	cm^2	
Volume	280.69	cm^3	0.0099	ft^3	
Mass	588.20	g	1.30	lb	

Dry Density	110.9	pcf
Vol. of Voids	88.85	cm^3
Vol. of Solids	191.84	cm^3
Void Ratio	0.46	
Saturation	100.6	%

Moisture Content

Mass of wet sample & tare	683.10	g
Mass of dry sample & tare	593.70	g
Mass of tare	95.00	g
% Moisture	17.9	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
02/16/10	10	0	-	0.30	21.10	3.43	15.2	-	-	-	
02/16/10	10	5	300	0.30	21.10	3.43	15.2	9.14E-05	1.131	1.03E-04	
02/16/10	10	10	300	0.30	21.10	3.43	15.2	9.14E-05	1.131	1.03E-04	
02/16/10	10	15	300	0.30	21.10	3.43	15.2	9.14E-05	1.131	1.03E-04	*
02/16/10	10	20	300	0.30	21.10	3.43	15.2	9.14E-05	1.131	1.03E-04	*
02/16/10	10	25	300	0.30	21.10	3.43	15.2	9.14E-05	1.131	1.03E-04	*
02/16/10	10	30	300	0.30	21.10	3.43	15.2	9.14E-05	1.131	1.03E-04	*

Reported Average Hydraulic Conductivity* 1.0E-04 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	246			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	02/11/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-18-1	Depth/Elev.	20-40'
Subsample	1	Add. Info	Curing Age: 3 Days

ASTM D 2166

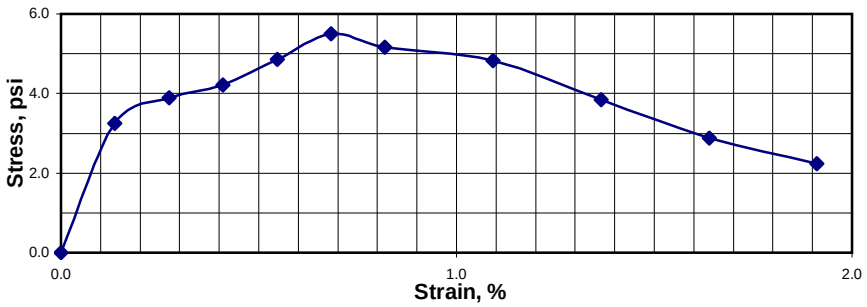
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.662
Initial Diameter, in	1.978
Height-to-Diameter Ratio	1.85
Initial Area, in^2	3.07
Initial Volume, in^3	11.25
Mass of Sample, g	371.40
Wet Density, pcf	125.7
Dry Density, pcf	107.0
Machine Speed, in/min	0.025
Strain Rate, % / min	0.68

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

WATER CONTENT DETERMINATION

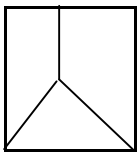
Mass of Wet Sample and Tare, g	449.80
Mass of Dry Sample and Tare, g	394.80
Mass of Tare, g	79.80
Moisture, %	17.5

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	2	0.0	3.07	0.0
0.2	0.005	12	0.1	3.08	3.2
0.4	0.010	14	0.3	3.08	3.9
0.6	0.015	15	0.4	3.09	4.2
0.8	0.020	17	0.5	3.09	4.9
1.0	0.025	19	0.7	3.09	5.5
1.2	0.030	18	0.8	3.10	5.2
1.6	0.040	17	1.1	3.11	4.8
2.0	0.050	14	1.4	3.12	3.9
2.4	0.060	11	1.6	3.12	2.9
2.8	0.070	9	1.9	3.13	2.2

REMARKS

Failure Code: 2

Failure Sketch



Failure Type: Cone and Split

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	5.5
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	2.7
STRAIN AT FAILURE, %	0.7

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Tested By	RI
Date	02/16/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-18-1	Depth/Elev.	20-40'
Subsample	2	Add. Info	Curing Age: 7 Days

ASTM D 2166

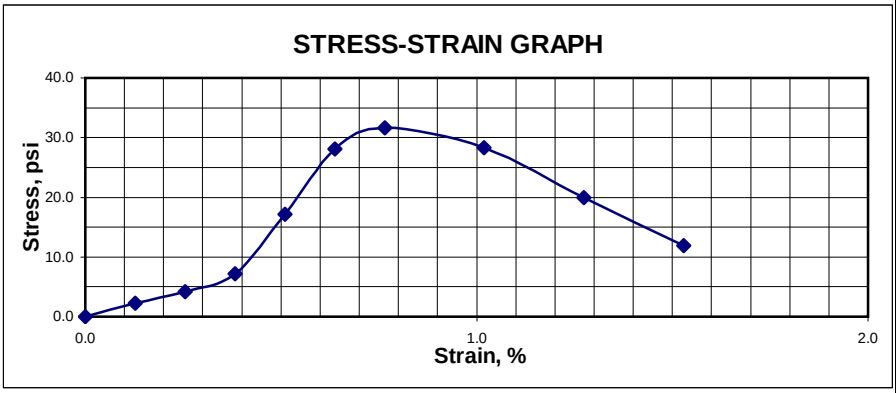
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.924
Initial Diameter, in	1.978
Height-to-Diameter Ratio	1.98
Initial Area, in^2	3.07
Initial Volume, in^3	12.06
Mass of Sample, g	410.40
Wet Density, pcf	129.7
Dry Density, pcf	111.4
Machine Speed, in/min	0.025
Strain Rate, % / min	0.64

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	515.50
Mass of Dry Sample and Tare, g	458.10
Mass of Tare, g	105.90
Moisture, %	16.3

TEST DATA

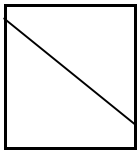
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	9	0.0	3.07	0.0
0.2	0.005	16	0.1	3.08	2.3
0.4	0.010	22	0.3	3.08	4.2
0.6	0.015	31	0.4	3.08	7.1
0.8	0.020	62	0.5	3.09	17.2
1.0	0.025	96	0.6	3.09	28.1
1.2	0.030	107	0.8	3.10	31.6
1.6	0.040	97	1.0	3.10	28.3
2.0	0.050	71	1.3	3.11	19.9
2.4	0.060	46	1.5	3.12	11.9

REMARKS

Failure Code: 4

Failure Sketch



Failure Type: Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488): NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	31.6
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	15.8
STRAIN AT FAILURE, %	0.8

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Tested By	RI
Date	02/23/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-18-1	Depth/Elev.	20-40'
Subsample	3	Add. Info	Curing Age: 14 Days

ASTM D 2166

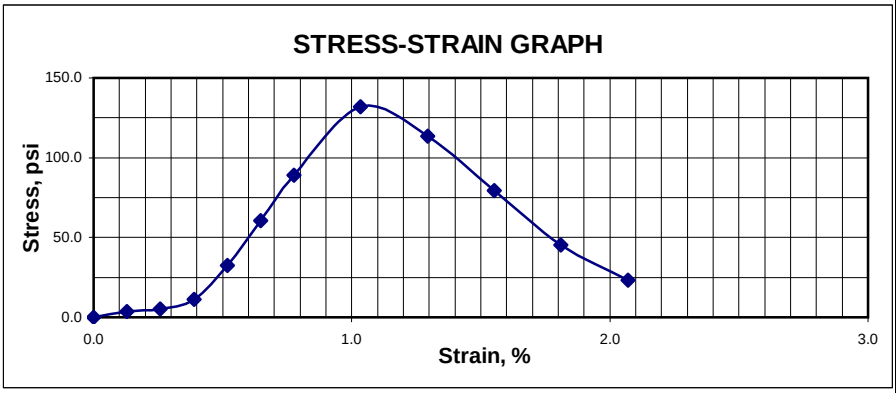
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.865
Initial Diameter, in	1.976
Height-to-Diameter Ratio	1.96
Initial Area, in^2	3.07
Initial Volume, in^3	11.85
Mass of Sample, g	401.70
Wet Density, pcf	129.1
Dry Density, pcf	112.0
Machine Speed, in/min	0.025
Strain Rate, % / min	0.65

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	502.00
Mass of Dry Sample and Tare, g	449.00
Mass of Tare, g	101.20
Moisture, %	15.2

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

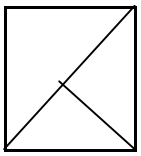
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	9	0.0	3.07	0.0
0.2	0.005	20	0.1	3.07	3.6
0.4	0.010	25	0.3	3.07	5.2
0.6	0.015	43	0.4	3.08	11.0
0.8	0.020	109	0.5	3.08	32.4
1.0	0.025	196	0.6	3.09	60.6
1.2	0.030	284	0.8	3.09	89.0
1.6	0.040	418	1.0	3.10	132.0
2.0	0.050	362	1.3	3.11	113.6
2.4	0.060	256	1.6	3.12	79.3
2.8	0.070	150	1.8	3.12	45.1
3.2	0.080	82	2.1	3.13	23.3

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	132.0
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	66.0
STRAIN AT FAILURE, %	1.0

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Tested By	RI/KI
Date	02/12/10
Checked By	

Client Pr. #		Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead, NY MGP	S. Type	Mold
Location	ISS-04	Depth/Elev.	20-40'
		Add. Info	

Volume Increase Determination

Sub-Sample ID	Empty Mold Mass, g	Mold + Soil/Grout Mass, g	Soil/Grout Mass, g	Initial Soil Volume Calculated, cm^3	Sample Volume cm^3	Mold's Headspace Volume, cm^3	Final Soil/Grout Volume, cm^3	% Volume Change
1-9	NA	NA	NA	NA	2183.0	0.0	2183.0	-
				NA				-
				NA				-
TOTAL	NA	**NA**	**NA**	**1787.2**	**2183.0**	0.00	**2183.0**	**22.1**

Proctor wet density of soil used for initial volume calculation:	125.7	pcf	**2.014**	g/cm^3
Initial vol. of soil (based on 100% of Proctor wet density):	**1787.2**	cm^3		
Mix Design #	18-1			

Ingredient	Amount	Unit	Portion of entire mix
Soil (Waste)	3600.10	g	0.804
Water	586.00	mL	0.131
GGBFS	219.90	g	0.049
Cement	73.30	g	0.016
Organoclay	0.00	g	0.000
		g	
Total	4479.30	-	1.000

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Tested By	RI/KI
Date	02/12/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525	Depth/Elev.	-
Location	-	Add. Info	-

Final Total Volume DETERMINATION (after mixing)

Sample ID	Mold #	Mass of Mold, g	Mass of Wet Sample & Mold, g	Height of Mold, in.	Diameter of Mold, in.	Volume of Mold, ft^3	Wet Density, pcf	Comments
5525-18-1-1	-	-	-	4.4	2.0	0.00800	NA	
5525-18-1-2	-	-	-	4.6	2.0	0.00836	NA	
5525-18-1-3	-	-	-	4.2	2.0	0.00763	NA	
5525-18-1-4	-	-	-	4.5	2.0	0.00818	NA	
5525-18-1-5	-	-	-	2.6	3.0	0.01063	NA	
5525-18-1-6	-	-	-	2.5	3.0	0.01022	NA	
5525-18-1-7	-	-	-	3.6	2.0	0.00654	NA	
5525-18-1-8	-	-	-	2.6	3.0	0.01063	NA	
5525-18-1-9	-	-	-	3.8	2.0	0.00691	NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
Total						0.07709		

Comments			
Calculated Volume is not including separated free water (about 1/2") on top of sample. Dimensions of only solidified material were obtained	**Total Volume**	**2183.0**	**cm^3**

Balance ID Number	12/13/14/15
Oven ID Number	1/6/7
Caliper ID Number	16

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Tested By	RI
Date	03/09/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-18-1	Depth/Elev.	20-40'
Subsample	6	Add. Info	Curing Age: 28 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.355	in	5.98	cm
Diameter	3.014	in	7.66	cm
Area	7.13	in^2	46.03	cm^2
Volume	275.34	cm^3	0.0097	ft^3
Mass	565.50	g	1.25	lb
Specific Gravity	2.600	(Assumed)		
Dry Density	108.3	pcf		

Moisture Content

Mass of wet sample & tare	565.50	g
Mass of dry sample & tare	477.90	g
Mass of tare	0.00	g
% Moisture	18.3	

Test Data

Speed	6	
Board Number	8	
Cell Number	15	
Flow Pump Number	2B	
Flow Pump Rate	3.58E-03	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	49.24	cm
Min Head	48.53	cm
Maximum Gradient	8.24	
Minimum Gradient	8.12	

Final Data (After Test)

Average Height of Sample		2.353	in	5.98	cm
Average Diameter of Sample		3.013	in	7.65	cm
Area	7.13 in^2	46.00	cm^2		
Volume	274.92 cm^3	0.0097	ft^3		
Mass	567.10 g	1.25	lb		

Dry Density	108.5	pcf
Vol. of Voids	91.05	cm^3
Vol. of Solids	183.87	cm^3
Void Ratio	0.50	
Saturation	97.8	%

Moisture Content

Mass of wet sample & tare	672.90	g
Mass of dry sample & tare	583.90	g
Mass of tare	106.00	g
% Moisture	18.6	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
03/09/10	10	0	-	0.70	49.24	8.24	15.4	-	-	-	
03/09/10	10	5	300	0.69	48.53	8.12	15.4	9.53E-06	1.125	1.07E-05	
03/09/10	10	10	300	0.70	49.24	8.24	15.4	9.53E-06	1.125	1.07E-05	
03/09/10	10	15	300	0.69	48.53	8.12	15.4	9.53E-06	1.125	1.07E-05	*
03/09/10	10	20	300	0.70	49.24	8.24	15.4	9.53E-06	1.125	1.07E-05	*
03/09/10	10	25	300	0.69	48.53	8.12	15.4	9.53E-06	1.125	1.07E-05	*
03/09/10	10	30	300	0.70	49.24	8.24	15.4	9.53E-06	1.125	1.07E-05	*

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Reported Average Hydraulic Conductivity* 1.1E-05 cm/sec

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	246			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	03/09/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-18-1	Depth/Elev.	20-40'
Subsample	4	Add. Info	Curing Age: 28 Days

ASTM D 2166

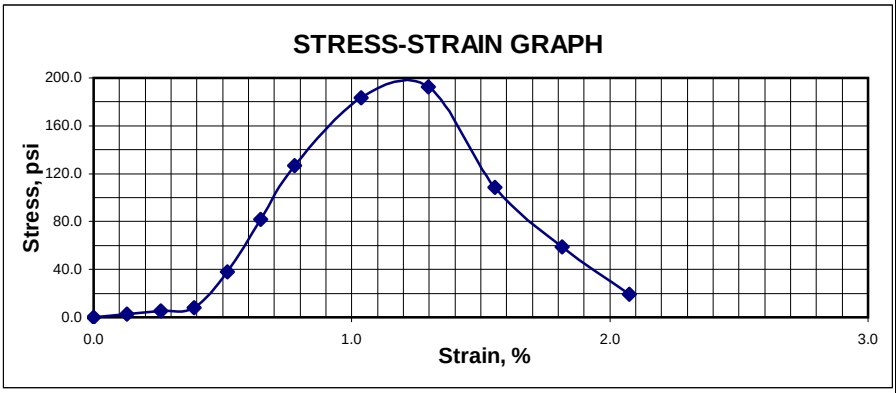
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.857
Initial Diameter, in	1.975
Height-to-Diameter Ratio	1.95
Initial Area, in^2	3.06
Initial Volume, in^3	11.82
Mass of Sample, g	403.20
Wet Density, pcf	130.0
Dry Density, pcf	111.8
Machine Speed, in/min	0.025
Strain Rate, % / min	0.65

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	704.50
Mass of Dry Sample and Tare, g	648.40
Mass of Tare, g	302.20
Moisture, %	16.2

TEST DATA

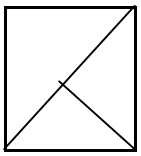
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	8	0.0	3.06	0.0
0.2	0.005	17	0.1	3.07	2.9
0.4	0.010	24	0.3	3.07	5.2
0.6	0.015	33	0.4	3.08	8.1
0.8	0.020	125	0.5	3.08	38.0
1.0	0.025	260	0.6	3.08	81.7
1.2	0.030	399	0.8	3.09	126.6
1.6	0.040	576	1.0	3.10	183.5
2.0	0.050	606	1.3	3.10	192.7
2.4	0.060	346	1.6	3.11	108.6
2.8	0.070	192	1.8	3.12	59.0
3.2	0.080	68	2.1	3.13	19.2

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488): NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	192.7
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	96.3
STRAIN AT FAILURE, %	1.3

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Batch Worksheet

BATCH-SAMPLE ID	5525-18-1			BATCH #	1
PR. NUMBER	1010-01-1	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	02/09/10

Time Batch Mixing Started		**Soil Moisture Mass, g**	**342.1**
Total Time Batch was Mixed, min		**Soil Moisture Content, %**	**10.5**
Time Batch Completely in Molds		Type of Cement Used	I/II
		Grout Water/Cem. Mat (Solids) Ratio*	**2.00**
		Mass of Dry Soil, g	**3258.0**
		Total Water/Cem. Mat. Ratio	**3.167**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5525	**Soil (wet)**	100.0	**3600.1**
5527	GGBFS	6.75	**219.9**
5526	Cement	2.25	**73.3**
	Water, mL	586	

Remarks

Max. Viscosity @1 RPM about 257K cP (mPa s)

* Cementous Materials (solids) is total mass of GGBFS, cement and organoclay (if it was used for this mix)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
5525-18-1-1	UCS	2	4					3 days
5525-18-1-2	UCS	2	4					7 days
5525-18-1-3	UCS	2	4					14 days
5525-18-1-4	UCS	2	4					28 days
5525-18-1-5	Perm	3	3					7 days
5525-18-1-6	Perm	3	3					28 days
5525-18-1-7	Vol. Change	2	4					Extra
5525-18-1-8	Vol. Change	3	3					Extra

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Tested By	RI
Date	02/15/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-17-1	Depth/Elev.	20-40'
Subsample	5	Add. Info	Curing Age: 7 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.752	in	6.99	cm
Diameter	2.998	in	7.61	cm
Area	7.06	in^2	45.54	cm^2
Volume	318.35	cm^3	0.0112	ft^3
Mass	629.40	g	1.39	lb
Specific Gravity	2.550	(Assumed)		
Dry Density	105.8	pcf		

Moisture Content

Mass of wet sample & tare	629.40	g
Mass of dry sample & tare	540.00	g
Mass of tare	0.00	g
% Moisture	16.6	

Test Data

Speed	5	
Board Number	8	
Cell Number	15	
Flow Pump Number	2B	
Flow Pump Rate	7.17E-03	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	18.99	cm
Min Head	18.29	cm
Maximum Gradient	2.71	
Minimum Gradient	2.61	

Final Data (After Test)

Average Height of Sample			2.754	in	7.00	cm
Average Diameter of Sample			3.000	in	7.62	cm
Area	7.07	in^2	45.60	cm^2		
Volume	319.00	cm^3	0.0113	ft^3		
Mass	645.40	g	1.42	lb		

Dry Density	105.6	pcf
Vol. of Voids	107.21	cm^3
Vol. of Solids	211.80	cm^3
Void Ratio	0.51	
Saturation	98.2	%

Moisture Content

Mass of wet sample & tare	740.60	g
Mass of dry sample & tare	635.30	g
Mass of tare	95.30	g
% Moisture	19.5	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
02/15/10	16	0	-	0.26	18.29	2.61	15.2	-	-	-	
02/15/10	16	5	300	0.26	18.29	2.61	15.2	6.01E-05	1.131	6.80E-05	
02/15/10	16	10	300	0.27	18.99	2.71	15.2	5.90E-05	1.131	6.67E-05	
02/15/10	16	15	300	0.27	18.99	2.71	15.2	5.79E-05	1.131	6.55E-05	*
02/15/10	16	20	300	0.26	18.29	2.61	15.2	5.90E-05	1.131	6.67E-05	*
02/15/10	16	25	300	0.26	18.29	2.61	15.2	6.01E-05	1.131	6.80E-05	*
02/15/10	16	30	300	0.26	18.29	2.61	15.2	6.01E-05	1.131	6.80E-05	*

Reported Average Hydraulic Conductivity* 6.7E-05 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	246			Pore Pressure Transducer ID #	28

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Tested By	RI/KI
Date	02/11/10
Checked By	KB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-17-1	Depth/Elev.	20-40'
Subsample	1	Add. Info	Curing Age: 3 Days

ASTM D 2166

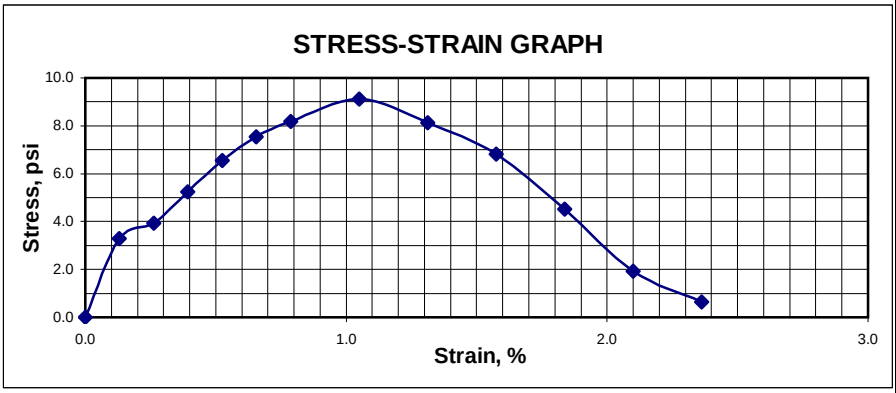
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.810
Initial Diameter, in	1.966
Height-to-Diameter Ratio	1.94
Initial Area, in^2	3.04
Initial Volume, in^3	11.57
Mass of Sample, g	372.50
Wet Density, pcf	122.7
Dry Density, pcf	106.8
Machine Speed, in/min	0.025
Strain Rate, % / min	0.66

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	479.70
Mass of Dry Sample and Tare, g	431.50
Mass of Tare, g	107.30
Moisture, %	14.9

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

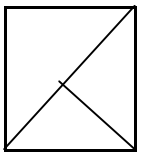
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	3.04	0.0
0.2	0.005	15	0.1	3.04	3.3
0.4	0.010	17	0.3	3.04	3.9
0.6	0.015	21	0.4	3.05	5.2
0.8	0.020	25	0.5	3.05	6.6
1.0	0.025	28	0.7	3.06	7.5
1.2	0.030	30	0.8	3.06	8.2
1.6	0.040	33	1.0	3.07	9.1
2.0	0.050	30	1.3	3.08	8.1
2.4	0.060	26	1.6	3.08	6.8
2.8	0.070	19	1.8	3.09	4.5
3.2	0.080	11	2.1	3.10	1.9
3.6	0.090	7	2.4	3.11	0.6

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	9.1
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	4.6
STRAIN AT FAILURE, %	1.0

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Web: www.test-llc.com

Tested By	RI
Date	02/15/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-17-1	Depth/Elev.	20-40'
Subsample	2	Add. Info	Curing Age: 7 Days

ASTM D 2166

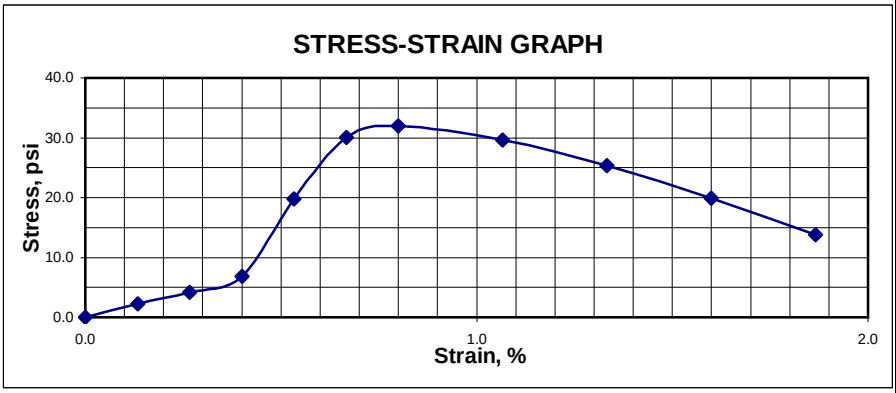
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.750
Initial Diameter, in	1.977
Height-to-Diameter Ratio	1.90
Initial Area, in^2	3.07
Initial Volume, in^3	11.51
Mass of Sample, g	372.20
Wet Density, pcf	123.2
Dry Density, pcf	106.5
Machine Speed, in/min	0.025
Strain Rate, % / min	0.67

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	465.70
Mass of Dry Sample and Tare, g	415.40
Mass of Tare, g	94.00
Moisture, %	15.7

TEST DATA

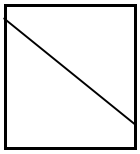
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	8	0.0	3.07	0.0
0.2	0.005	15	0.1	3.07	2.3
0.4	0.010	21	0.3	3.08	4.2
0.6	0.015	29	0.4	3.08	6.8
0.8	0.020	69	0.5	3.09	19.8
1.0	0.025	101	0.7	3.09	30.1
1.2	0.030	107	0.8	3.09	32.0
1.6	0.040	100	1.1	3.10	29.7
2.0	0.050	87	1.3	3.11	25.4
2.4	0.060	70	1.6	3.12	19.9
2.8	0.070	51	1.9	3.13	13.7

REMARKS

Failure Code: 4

Failure Sketch



Failure Type: Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	32.0
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	16.0
STRAIN AT FAILURE, %	0.8

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Tested By	RI
Date	02/22/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-17-1	Depth/Elev.	20-40'
Subsample	3	Add. Info	Curing Age: 14 Days

ASTM D 2166

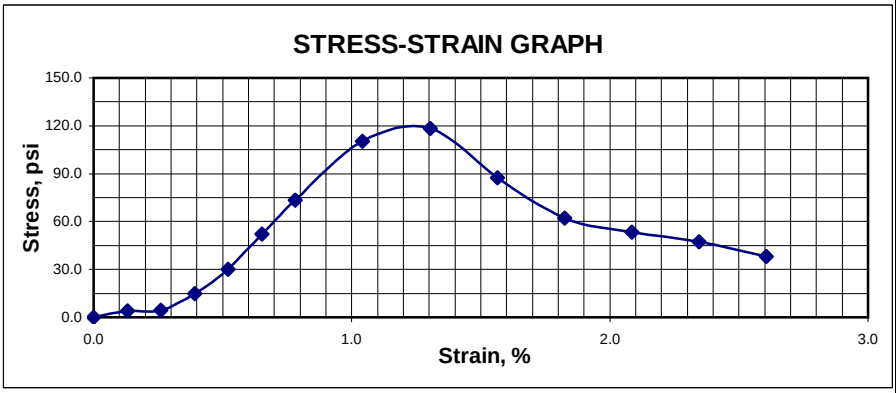
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.837
Initial Diameter, in	1.973
Height-to-Diameter Ratio	1.94
Initial Area, in^2	3.06
Initial Volume, in^3	11.73
Mass of Sample, g	371.70
Wet Density, pcf	120.7
Dry Density, pcf	105.0
Machine Speed, in/min	0.025
Strain Rate, % / min	0.65

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	449.70
Mass of Dry Sample and Tare, g	401.80
Mass of Tare, g	79.50
Moisture, %	14.9

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

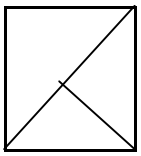
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	9	0.0	3.06	0.0
0.2	0.005	21	0.1	3.06	3.9
0.4	0.010	23	0.3	3.07	4.6
0.6	0.015	54	0.4	3.07	14.7
0.8	0.020	101	0.5	3.07	29.9
1.0	0.025	169	0.7	3.08	52.0
1.2	0.030	235	0.8	3.08	73.3
1.6	0.040	350	1.0	3.09	110.4
2.0	0.050	375	1.3	3.10	118.2
2.4	0.060	280	1.6	3.11	87.3
2.8	0.070	202	1.8	3.11	62.0
3.2	0.080	175	2.1	3.12	53.2
3.6	0.090	157	2.3	3.13	47.3
4.0	0.100	128	2.6	3.14	37.9

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	118.2
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	59.1
STRAIN AT FAILURE, %	1.3

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Web: www.test-llc.com

Tested By	RI/KI
Date	02/12/10
Checked By	

Client Pr. #		Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead, NY MGP	S. Type	Mold
Location	ISS-04	Depth/Elev.	20-40'
		Add. Info	

Volume Increase Determination

Sub-Sample ID	Empty Mold Mass, g	Mold + Soil/Grout Mass, g	Soil/Grout Mass, g	Initial Soil Volume Calculated, cm^3	Sample Volume cm^3	Mold's Headspace Volume, cm^3	Final Soil/Grout Volume, cm^3	% Volume Change
1-9	NA	NA	NA	NA	2117.4	0.0	2117.4	-
				NA				-
				NA				-
TOTAL	NA	**NA**	**NA**	**1787.2**	**2117.4**	0.00	**2117.4**	**18.5**

Proctor wet density of soil used for initial volume calculation:	125.7	pcf	**2.014**	g/cm^3
Initial vol. of soil (based on 100% of Proctor wet density):	**1787.2**	cm^3		
Mix Design #	17-1			

Ingredient	Amount	Unit	Portion of entire mix
Soil (Waste)	3600.10	g	0.831
Water	440.00	mL	0.102
GGBFS	219.90	g	0.051
Cement	73.30	g	0.017
Organoclay	0.00	g	0.000
		g	
Total	4333.30	-	1.000

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Web: www.test-llc.com

Tested By	RI/KI
Date	02/12/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525	Depth/Elev.	-
Location	-	Add. Info	-

Final Total Volume DETERMINATION (after mixing)

Sample ID	Mold #	Mass of Mold, g	Mass of Wet Sample & Mold, g	Height of Mold, in.	Diameter of Mold, in.	Volume of Mold, ft^3	Wet Density, pcf	Comments
5525-17-1-1	-	-	-	3.8	2.0	0.00691	NA	
5525-17-1-2	-	-	-	3.7	2.0	0.00672	NA	
5525-17-1-3	-	-	-	3.9	2.0	0.00709	NA	
5525-17-1-4	-	-	-	3.8	2.0	0.00691	NA	
5525-17-1-5	-	-	-	2.9	3.0	0.01186	NA	
5525-17-1-6	-	-	-	2.9	3.0	0.01186	NA	
5525-17-1-7	-	-	-	3.8	2.0	0.00691	NA	
5525-17-1-8	-	-	-	2.8	3.0	0.01145	NA	
5525-17-1-9	-	-	-	2.8	2.0	0.00509	NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
Total						0.07477		

Comments			
Calculated Volume is not including separated free water (about 1/4") on top of sample. Dimensions of only solidified material were obtained	**Total Volume**	**2117.4**	**cm^3**

Balance ID Number	12/13/14/15
Oven ID Number	1/6/7
Caliper ID Number	16

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Tested By	RI
Date	03/08/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-17-1	Depth/Elev.	20-40'
Subsample	6	Add. Info	Curing Age: 28 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.689	in	6.83	cm
Diameter	3.005	in	7.63	cm
Area	7.09	in^2	45.76	cm^2
Volume	312.51	cm^3	0.0110	ft^3
Mass	605.40	g	1.33	lb
Specific Gravity	2.550	(Assumed)		
Dry Density	104.8	pcf		

Moisture Content

Mass of wet sample & tare	605.40	g
Mass of dry sample & tare	525.10	g
Mass of tare	0.00	g
% Moisture	15.3	

Test Data

Speed	9	
Board Number	2	
Cell Number	6	
Flow Pump Number	1A	
Flow Pump Rate	4.48E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	33.06	cm
Min Head	32.36	cm
Maximum Gradient	4.83	
Minimum Gradient	4.73	

Final Data (After Test)

Average Height of Sample		2.693	in	6.84	cm
Average Diameter of Sample		3.003	in	7.63	cm
Area	7.08 in^2	45.69	cm^2		
Volume	312.56 cm^3	0.0110	ft^3		
Mass	627.50 g	1.38	lb		

Dry Density	104.8	pcf
Vol. of Voids	106.64	cm^3
Vol. of Solids	205.92	cm^3
Void Ratio	0.52	
Saturation	96.0	%

Moisture Content

Mass of wet sample & tare	726.10	g
Mass of dry sample & tare	623.70	g
Mass of tare	98.60	g
% Moisture	19.5	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
03/08/10	10	0	-	0.46	32.36	4.73	15.6	-	-	-	
03/08/10	10	10	600	0.47	33.06	4.83	15.6	2.05E-06	1.119	2.29E-06	
03/08/10	10	20	600	0.46	32.36	4.73	15.6	2.05E-06	1.119	2.29E-06	
03/08/10	10	30	600	0.47	33.06	4.83	15.6	2.05E-06	1.119	2.29E-06	*
03/08/10	10	40	600	0.46	32.36	4.73	15.6	2.05E-06	1.119	2.29E-06	*
03/08/10	10	50	600	0.47	33.06	4.83	15.6	2.05E-06	1.119	2.29E-06	*
03/08/10	11	0	600	0.47	33.06	4.83	15.6	2.03E-06	1.119	2.27E-06	*

Reported Average Hydraulic Conductivity* 2.3E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	22	Balance ID #	1/6/7	Differential Pressure Transducer ID #	24/25
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	64
Syringe ID #	140			Pore Pressure Transducer ID #	26/27

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Tested By	RI
Date	03/08/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-17-1	Depth/Elev.	20-40'
Subsample	4	Add. Info	Curing Age: 28 Days

ASTM D 2166

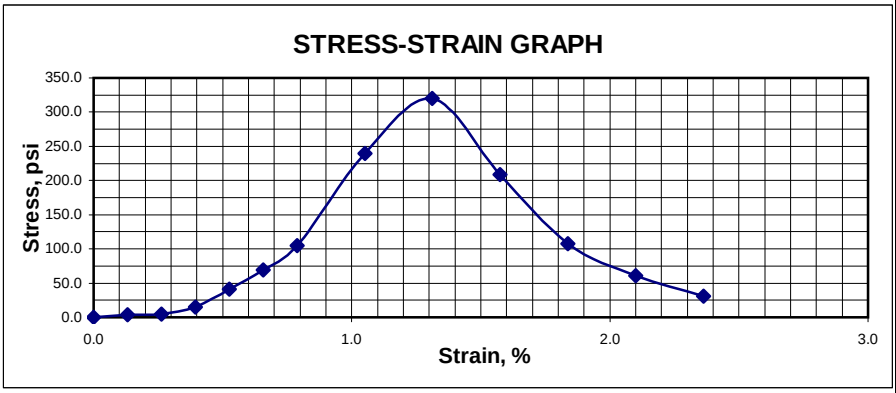
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.809
Initial Diameter, in	1.971
Height-to-Diameter Ratio	1.93
Initial Area, in^2	3.05
Initial Volume, in^3	11.62
Mass of Sample, g	370.20
Wet Density, pcf	121.3
Dry Density, pcf	105.9
Machine Speed, in/min	0.025
Strain Rate, % / min	0.66

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	448.60
Mass of Dry Sample and Tare, g	401.70
Mass of Tare, g	79.70
Moisture, %	14.6

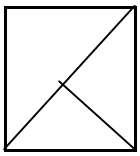
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	10	0.0	3.05	0.0
0.2	0.005	21	0.1	3.06	3.6
0.4	0.010	24	0.3	3.06	4.6
0.6	0.015	56	0.4	3.06	15.0
0.8	0.020	137	0.5	3.07	41.4
1.0	0.025	222	0.7	3.07	69.0
1.2	0.030	332	0.8	3.08	104.7
1.6	0.040	749	1.1	3.08	239.7
2.0	0.050	1000	1.3	3.09	320.2
2.4	0.060	656	1.6	3.10	208.4
2.8	0.070	345	1.8	3.11	107.8
3.2	0.080	201	2.1	3.12	61.3
3.6	0.090	106	2.4	3.12	30.7

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	320.2
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	160.1
STRAIN AT FAILURE, %	1.3

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Batch Worksheet

BATCH-SAMPLE ID	5525-17-1			BATCH #	1
PR. NUMBER	1010-01-1	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	02/08/10

Time Batch Mixing Started		**Soil Moisture Mass, g**	**342.1**
Total Time Batch was Mixed, min		**Soil Moisture Content, %**	**10.5**
Time Batch Completely in Molds		Type of Cement Used	I/II
		Grout Water/Cem. Mat (Solids) Ratio*	**1.50**
		Mass of Dry Soil, g	**3258.0**
		Total Water/Cem. Mat. Ratio	**2.667**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5525	**Soil (wet)**	100.0	**3600.1**
5527	GGBFS	6.75	**219.9**
5526	Cement	2.25	**73.3**
	Water, mL	440	

Remarks

Max. Viscosity @1 RPM about 186K cP (mPa s)

* Cementous Materials (solids) is total mass of GGBFS, cement and organoclay (if it was used for this mix)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
5525-17-1-1	UCS	2	4					3 days
5525-17-1-2	UCS	2	4					7 days
5525-17-1-3	UCS	2	4					14 days
5525-17-1-4	UCS	2	4					28 days
5525-17-1-5	Perm	3	3					7 days
5525-17-1-6	Perm	3	3					28 days
5525-17-1-7	Vol. Change	2	4					Extra
5525-17-1-8	Vol. Change	3	3					Extra

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Tested By	RI
Date	02/16/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-16-1	Depth/Elev.	20-40'
Subsample	5	Add. Info	Curing Age: 7 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.625	in	6.67	cm
Diameter	2.990	in	7.59	cm
Area	7.02	in^2	45.30	cm^2
Volume	302.04	cm^3	0.0107	ft^3
Mass	569.50	g	1.26	lb
Specific Gravity	2.500	(Assumed)		
Dry Density	104.2	pcf		

Moisture Content

Mass of wet sample & tare	569.50	g
Mass of dry sample & tare	504.40	g
Mass of tare	0.00	g
% Moisture	12.9	

Test Data

Speed	5	
Board Number	7	
Cell Number	15	
Flow Pump Number	2A	
Flow Pump Rate	7.17E-03	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	28.14	cm
Min Head	28.14	cm
Maximum Gradient	4.22	
Minimum Gradient	4.22	

Final Data (After Test)

Average Height of Sample		2.624	in	6.66	cm
Average Diameter of Sample		2.990	in	7.59	cm
Area	7.02 in^2	45.30	cm^2		
Volume	301.92 cm^3	0.0107	ft^3		
Mass	600.30 g	1.32	lb		

Dry Density	104.3	pcf
Vol. of Voids	100.00	cm^3
Vol. of Solids	201.93	cm^3
Void Ratio	0.50	
Saturation	95.5	%

Moisture Content

Mass of wet sample & tare	740.40	g
Mass of dry sample & tare	645.00	g
Mass of tare	140.60	g
% Moisture	18.9	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
02/16/10	10	0	-	0.40	28.14	4.22	15.2	-	-	-	
02/16/10	10	5	300	0.40	28.14	4.22	15.2	3.75E-05	1.131	4.24E-05	
02/16/10	10	10	300	0.40	28.14	4.22	15.2	3.75E-05	1.131	4.24E-05	
02/16/10	10	15	300	0.40	28.14	4.22	15.2	3.75E-05	1.131	4.24E-05	*
02/16/10	10	20	300	0.40	28.14	4.22	15.2	3.75E-05	1.131	4.24E-05	*
02/16/10	10	25	300	0.40	28.14	4.22	15.2	3.75E-05	1.131	4.24E-05	*
02/16/10	10	30	300	0.40	28.14	4.22	15.2	3.75E-05	1.131	4.24E-05	*

Reported Average Hydraulic Conductivity* 4.2E-05 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	02/12/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-16-1	Depth/Elev.	20-40'
Subsample	1	Add. Info	Curing Age: 3 Days

ASTM D 2166

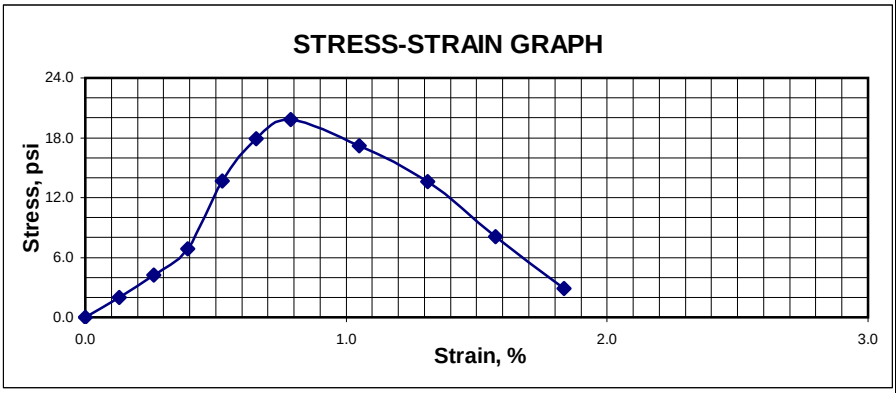
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.813
Initial Diameter, in	1.971
Height-to-Diameter Ratio	1.93
Initial Area, in^2	3.05
Initial Volume, in^3	11.63
Mass of Sample, g	357.70
Wet Density, pcf	117.1
Dry Density, pcf	104.6
Machine Speed, in/min	0.025
Strain Rate, % / min	0.66

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	436.00
Mass of Dry Sample and Tare, g	398.10
Mass of Tare, g	79.50
Moisture, %	11.9

TEST DATA

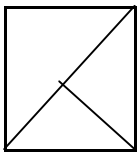
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	9	0.0	3.05	0.0
0.2	0.005	15	0.1	3.06	2.0
0.4	0.010	22	0.3	3.06	4.2
0.6	0.015	30	0.4	3.06	6.9
0.8	0.020	51	0.5	3.07	13.7
1.0	0.025	64	0.7	3.07	17.9
1.2	0.030	70	0.8	3.08	19.8
1.6	0.040	62	1.0	3.08	17.2
2.0	0.050	51	1.3	3.09	13.6
2.4	0.060	34	1.6	3.10	8.1
2.8	0.070	18	1.8	3.11	2.9

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	19.8
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	9.9
STRAIN AT FAILURE, %	0.8

USCS (ASTM D2487: D2488)

NA

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Web: www.test-llc.com

Tested By	RI
Date	02/16/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-16-1	Depth/Elev.	20-40'
Subsample	2	Add. Info	Curing Age: 7 Days

ASTM D 2166

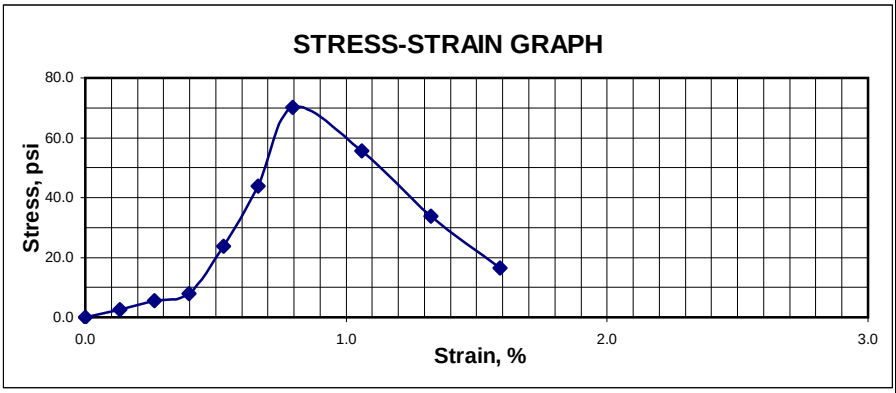
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.773
Initial Diameter, in	1.973
Height-to-Diameter Ratio	1.91
Initial Area, in^2	3.06
Initial Volume, in^3	11.54
Mass of Sample, g	350.00
Wet Density, pcf	115.6
Dry Density, pcf	103.6
Machine Speed, in/min	0.025
Strain Rate, % / min	0.66

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	444.20
Mass of Dry Sample and Tare, g	408.00
Mass of Tare, g	95.00
Moisture, %	11.6

TEST DATA

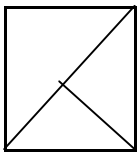
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	9	0.0	3.06	0.0
0.2	0.005	17	0.1	3.06	2.6
0.4	0.010	26	0.3	3.07	5.5
0.6	0.015	33	0.4	3.07	7.8
0.8	0.020	82	0.5	3.07	23.8
1.0	0.025	144	0.7	3.08	43.9
1.2	0.030	225	0.8	3.08	70.1
1.6	0.040	181	1.1	3.09	55.7
2.0	0.050	114	1.3	3.10	33.9
2.4	0.060	60	1.6	3.11	16.4

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488): NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	70.1
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	35.0
STRAIN AT FAILURE, %	0.8

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Tested By	RI
Date	02/23/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-16-1	Depth/Elev.	20-40'
Subsample	3	Add. Info	Curing Age: 14 Days

ASTM D 2166

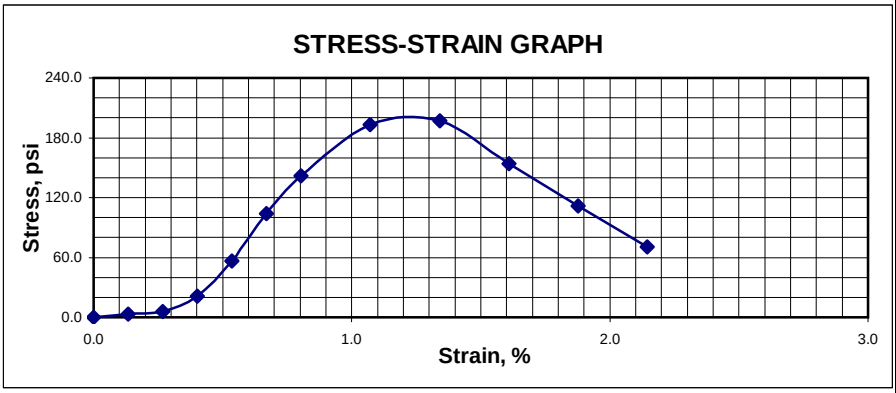
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.731
Initial Diameter, in	1.980
Height-to-Diameter Ratio	1.88
Initial Area, in^2	3.08
Initial Volume, in^3	11.49
Mass of Sample, g	347.40
Wet Density, pcf	115.2
Dry Density, pcf	102.6
Machine Speed, in/min	0.025
Strain Rate, % / min	0.67

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	440.80
Mass of Dry Sample and Tare, g	402.90
Mass of Tare, g	94.00
Moisture, %	12.3

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

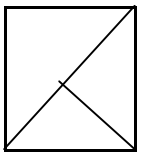
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	9	0.0	3.08	0.0
0.2	0.005	19	0.1	3.08	3.2
0.4	0.010	27	0.3	3.09	5.8
0.6	0.015	74	0.4	3.09	21.0
0.8	0.020	184	0.5	3.10	56.5
1.0	0.025	331	0.7	3.10	103.9
1.2	0.030	450	0.8	3.10	142.1
1.6	0.040	611	1.1	3.11	193.4
2.0	0.050	624	1.3	3.12	197.1
2.4	0.060	490	1.6	3.13	153.7
2.8	0.070	360	1.9	3.14	111.9
3.2	0.080	231	2.1	3.15	70.6

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	197.1
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	98.5
STRAIN AT FAILURE, %	1.3

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Web: www.test-llc.com

Tested By	RI/KI
Date	02/12/10
Checked By	

Client Pr. #		Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead, NY MGP	S. Type	Mold
Location	ISS-04	Depth/Elev.	20-40'
		Add. Info	

Volume Increase Determination

Sub-Sample ID	Empty Mold Mass, g	Mold + Soil/Grout Mass, g	Soil/Grout Mass, g	Initial Soil Volume Calculated, cm^3	Sample Volume cm^3	Mold's Headspace Volume, cm^3	Final Soil/Grout Volume, cm^3	% Volume Change
1-9	NA	NA	NA	NA	2139.3	0.0	2139.3	-
				NA				-
				NA				-
TOTAL	NA	**NA**	**NA**	**1787.2**	**2139.3**	0.00	**2139.3**	**19.7**

Proctor wet density of soil used for initial volume calculation:	125.7	pcf	**2.014**	g/cm^3
Initial vol. of soil (based on 100% of Proctor wet density):	**1787.2**	cm^3		
Mix Design #	16-1			

Ingredient	Amount	Unit	Portion of entire mix
Soil (Waste)	3600.10	g	0.860
Water	293.00	mL	0.070
GGBFS	219.90	g	0.053
Cement	73.30	g	0.018
Organoclay	0.00	g	0.000
		g	
Total	4186.30	-	1.000

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Tested By	RI/KI
Date	02/12/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525	Depth/Elev.	-
Location	-	Add. Info	-

Final Total Volume DETERMINATION (after mixing)

Sample ID	Mold #	Mass of Mold, g	Mass of Wet Sample & Mold, g	Height of Mold, in.	Diameter of Mold, in.	Volume of Mold, ft^3	Wet Density, pcf	Comments
5525-16-1-1	-	-	-	3.9	2.0	0.00709	NA	
5525-16-1-2	-	-	-	3.9	2.0	0.00709	NA	
5525-16-1-3	-	-	-	3.8	2.0	0.00691	NA	
5525-16-1-4	-	-	-	3.9	2.0	0.00709	NA	
5525-16-1-5	-	-	-	2.9	3.0	0.01186	NA	
5525-16-1-6	-	-	-	2.9	3.0	0.01186	NA	
5525-16-1-7	-	-	-	3.9	2.0	0.00709	NA	
5525-16-1-8	-	-	-	2.9	3.0	0.01186	NA	
5525-16-1-9	-	-	-	2.6	2.0	0.00472	NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
Total						0.07555		

Comments			
Calculated Volume is not including separated free water (about 1/10") on top of sample. Dimensions of only solidified material were obtained	**Total Volume**	**2139.3**	**cm^3**

Balance ID Number	12/13/14/15
Oven ID Number	1/6/7
Caliper ID Number	16

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Tested By	RI
Date	03/09/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-16-1	Depth/Elev.	20-40'
Subsample	6	Add. Info	Curing Age: 28 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.688	in	6.83	cm
Diameter	2.995	in	7.61	cm
Area	7.05	in^2	45.45	cm^2
Volume	310.32	cm^3	0.0110	ft^3
Mass	569.40	g	1.26	lb
Specific Gravity	2.450	(Assumed)		
Dry Density	103.0	pcf		

Moisture Content

Mass of wet sample & tare	569.40	g
Mass of dry sample & tare	512.30	g
Mass of tare	0.00	g
% Moisture	11.1	

Test Data

Speed	9	
Board Number	7	
Cell Number	19	
Flow Pump Number	2A	
Flow Pump Rate	4.48E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	24.62	cm
Min Head	23.92	cm
Maximum Gradient	3.60	
Minimum Gradient	3.50	

Final Data (After Test)

Average Height of Sample		2.689	in	6.83	cm
Average Diameter of Sample		2.995	in	7.61	cm
Area	7.05 in^2	45.45	cm^2		
Volume	310.44 cm^3	0.0110	ft^3		
Mass	608.90 g	1.34	lb		

Dry Density	103.0	pcf
Vol. of Voids	101.27	cm^3
Vol. of Solids	209.17	cm^3
Void Ratio	0.48	
Saturation	95.2	%

Moisture Content

Mass of wet sample & tare	717.10	g
Mass of dry sample & tare	620.70	g
Mass of tare	108.40	g
% Moisture	18.8	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
03/09/10	12	15	-	0.35	24.62	3.60	15.4	-	-	-	
03/09/10	12	20	300	0.34	23.92	3.50	15.4	2.77E-06	1.125	3.12E-06	
03/09/10	12	25	300	0.35	24.62	3.60	15.4	2.77E-06	1.125	3.12E-06	
03/09/10	12	30	300	0.34	23.92	3.50	15.4	2.77E-06	1.125	3.12E-06	*
03/09/10	12	35	300	0.35	24.62	3.60	15.4	2.77E-06	1.125	3.12E-06	*
03/09/10	12	40	300	0.34	23.92	3.50	15.4	2.77E-06	1.125	3.12E-06	*
03/09/10	12	45	300	0.35	24.62	3.60	15.4	2.77E-06	1.125	3.12E-06	*

Reported Average Hydraulic Conductivity* 3.1E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	03/08/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-16-1	Depth/Elev.	20-40'
Subsample	4	Add. Info	Curing Age: 28 Days

ASTM D 2166

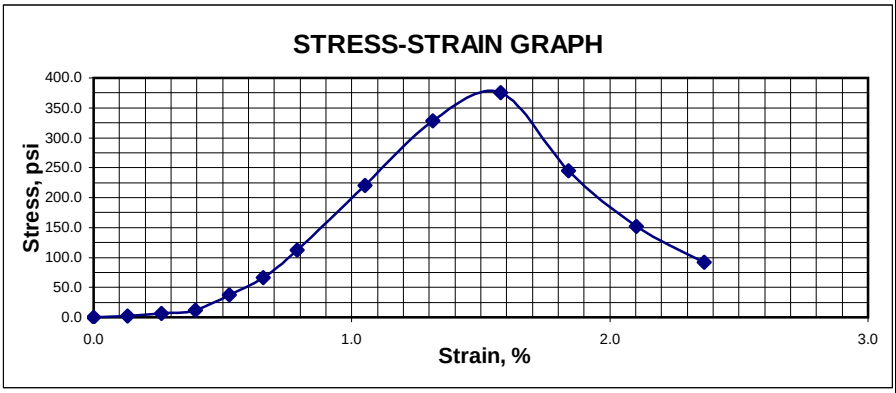
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.804
Initial Diameter, in	1.971
Height-to-Diameter Ratio	1.93
Initial Area, in^2	3.05
Initial Volume, in^3	11.61
Mass of Sample, g	348.50
Wet Density, pcf	114.4
Dry Density, pcf	102.9
Machine Speed, in/min	0.025
Strain Rate, % / min	0.66

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	647.90
Mass of Dry Sample and Tare, g	613.10
Mass of Tare, g	300.00
Moisture, %	11.1

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

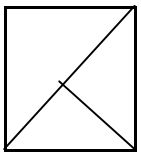
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	9	0.0	3.05	0.0
0.2	0.005	16	0.1	3.06	2.3
0.4	0.010	29	0.3	3.06	6.5
0.6	0.015	44	0.4	3.06	11.4
0.8	0.020	125	0.5	3.07	37.8
1.0	0.025	212	0.7	3.07	66.1
1.2	0.030	355	0.8	3.08	112.5
1.6	0.040	688	1.1	3.08	220.2
2.0	0.050	1025	1.3	3.09	328.6
2.4	0.060	1172	1.6	3.10	375.2
2.8	0.070	771	1.8	3.11	245.1
3.2	0.080	483	2.1	3.12	152.1
3.6	0.090	295	2.4	3.13	91.5

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	375.2
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	187.6
STRAIN AT FAILURE, %	1.6

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Batch Worksheet

BATCH-SAMPLE ID	5525-16-1			BATCH #	1
PR. NUMBER	1010-01-1	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	02/09/10

Time Batch Mixing Started		**Soil Moisture Mass, g**	**342.1**
Total Time Batch was Mixed, min		**Soil Moisture Content, %**	**10.5**
Time Batch Completely in Molds		Type of Cement Used	I/II
		Grout Water/Cem. Mat (Solids) Ratio*	**1.00**
		Mass of Dry Soil, g	**3258.0**
		Total Water/Cem. Mat. Ratio	**2.167**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5525	**Soil (wet)**	100.0	**3600.1**
5527	GGBFS	6.75	**219.9**
5526	Cement	2.25	**73.3**
	Water, mL	293	

Remarks

Max. Viscosity @1 RPM about 172K cP (mPa s)

* Cementous Materials (solids) is total mass of GGBFS, cement and organoclay (if it was used for this mix)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
5525-16-1-1	UCS	2	4					3 days
5525-16-1-2	UCS	2	4					7 days
5525-16-1-3	UCS	2	4					14 days
5525-16-1-4	UCS	2	4					28 days
5525-16-1-5	Perm	3	3					7 days
5525-16-1-6	Perm	3	3					28 days
5525-16-1-7	Vol. Change	2	4					Extra
5525-16-1-8	Vol. Change	3	3					Extra

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Tested By	RI
Date	02/15/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-15-1	Depth/Elev.	20-40'
Subsample	5	Add. Info	Curing Age: 7 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.803	in	7.12	cm
Diameter	2.999	in	7.62	cm
Area	7.06	in^2	45.57	cm^2
Volume	324.46	cm^3	0.0115	ft^3
Mass	651.40	g	1.44	lb
Specific Gravity	2.550	(Assumed)		
Dry Density	113.0	pcf		

Moisture Content

Mass of wet sample & tare	651.40	g
Mass of dry sample & tare	587.50	g
Mass of tare	0.00	g
% Moisture	10.9	

Test Data

Speed	6	
Board Number	7	
Cell Number	11	
Flow Pump Number	2A	
Flow Pump Rate	3.58E-03	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	30.95	cm
Min Head	30.95	cm
Maximum Gradient	4.35	
Minimum Gradient	4.35	

Final Data (After Test)

Average Height of Sample		2.804	in	7.12	cm
Average Diameter of Sample		3.001	in	7.62	cm
Area	7.07 in^2	45.63	cm^2		
Volume	325.01 cm^3	0.0115	ft^3		
Mass	678.80 g	1.50	lb		

Dry Density	112.9	pcf
Vol. of Voids	94.35	cm^3
Vol. of Solids	230.66	cm^3
Void Ratio	0.41	
Saturation	96.0	%

Moisture Content

Mass of wet sample & tare	779.90	g
Mass of dry sample & tare	689.40	g
Mass of tare	101.90	g
% Moisture	15.4	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
02/15/10	16	0	-	0.44	30.95	4.35	15.2	-	-	-	
02/15/10	16	5	300	0.44	30.95	4.35	15.2	1.81E-05	1.131	2.04E-05	
02/15/10	16	10	300	0.44	30.95	4.35	15.2	1.81E-05	1.131	2.04E-05	
02/15/10	16	15	300	0.44	30.95	4.35	15.2	1.81E-05	1.131	2.04E-05	*
02/15/10	16	20	300	0.44	30.95	4.35	15.2	1.81E-05	1.131	2.04E-05	*
02/15/10	16	25	300	0.44	30.95	4.35	15.2	1.81E-05	1.131	2.04E-05	*
02/15/10	16	30	300	0.44	30.95	4.35	15.2	1.81E-05	1.131	2.04E-05	*

Reported Average Hydraulic Conductivity* 2.0E-05 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	RI/KI
Date	02/11/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-15-1	Depth/Elev.	20-40'
Subsample	1	Add. Info	Curing Age: 3 Days

ASTM D 2166

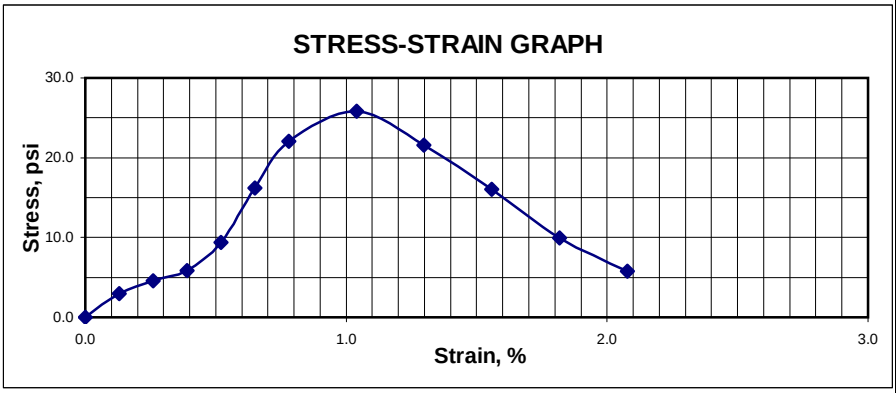
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.850
Initial Diameter, in	1.975
Height-to-Diameter Ratio	1.95
Initial Area, in^2	3.06
Initial Volume, in^3	11.79
Mass of Sample, g	392.40
Wet Density, pcf	126.7
Dry Density, pcf	114.0
Machine Speed, in/min	0.025
Strain Rate, % / min	0.65

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	482.80
Mass of Dry Sample and Tare, g	443.60
Mass of Tare, g	91.00
Moisture, %	11.1

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

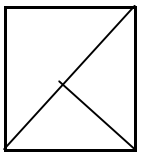
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	6	0.0	3.06	0.0
0.2	0.005	15	0.1	3.07	2.9
0.4	0.010	20	0.3	3.07	4.6
0.6	0.015	24	0.4	3.08	5.9
0.8	0.020	35	0.5	3.08	9.4
1.0	0.025	56	0.6	3.08	16.2
1.2	0.030	74	0.8	3.09	22.0
1.6	0.040	86	1.0	3.10	25.8
2.0	0.050	73	1.3	3.10	21.6
2.4	0.060	56	1.6	3.11	16.1
2.8	0.070	37	1.8	3.12	9.9
3.2	0.080	24	2.1	3.13	5.8

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	25.8
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	12.9
STRAIN AT FAILURE, %	1.0

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Tested By	RI
Date	02/15/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-15-1	Depth/Elev.	20-40'
Subsample	2	Add. Info	Curing Age: 7 Days

ASTM D 2166

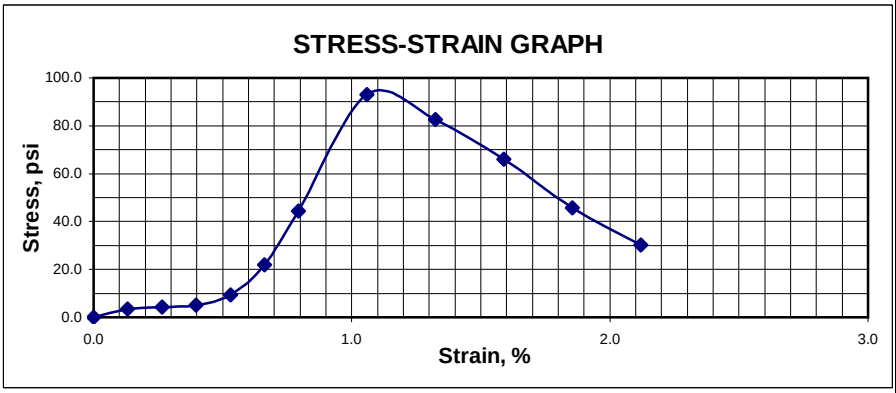
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.776
Initial Diameter, in	1.977
Height-to-Diameter Ratio	1.91
Initial Area, in^2	3.07
Initial Volume, in^3	11.59
Mass of Sample, g	385.00
Wet Density, pcf	126.5
Dry Density, pcf	114.3
Machine Speed, in/min	0.025
Strain Rate, % / min	0.66

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	483.00
Mass of Dry Sample and Tare, g	445.90
Mass of Tare, g	98.50
Moisture, %	10.7

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

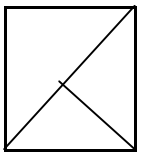
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	9	0.0	3.07	0.0
0.2	0.005	20	0.1	3.07	3.6
0.4	0.010	22	0.3	3.08	4.2
0.6	0.015	25	0.4	3.08	5.2
0.8	0.020	38	0.5	3.09	9.4
1.0	0.025	77	0.7	3.09	22.0
1.2	0.030	146	0.8	3.09	44.3
1.6	0.040	298	1.1	3.10	93.1
2.0	0.050	266	1.3	3.11	82.6
2.4	0.060	215	1.6	3.12	66.0
2.8	0.070	152	1.9	3.13	45.7
3.2	0.080	104	2.1	3.14	30.3

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	93.1
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	46.6
STRAIN AT FAILURE, %	1.1

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Tested By	RI
Date	02/22/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-15-1	Depth/Elev.	20-40'
Subsample	3	Add. Info	Curing Age: 14 Days

ASTM D 2166

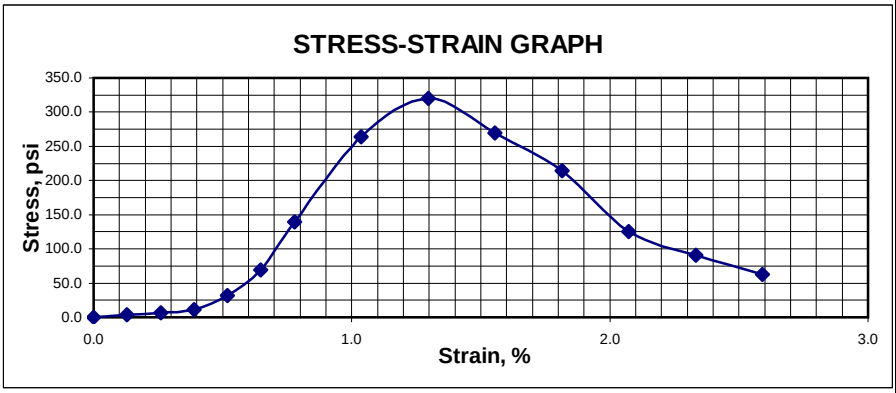
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.859
Initial Diameter, in	1.975
Height-to-Diameter Ratio	1.95
Initial Area, in^2	3.06
Initial Volume, in^3	11.82
Mass of Sample, g	391.40
Wet Density, pcf	126.1
Dry Density, pcf	114.7
Machine Speed, in/min	0.025
Strain Rate, % / min	0.65

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

WATER CONTENT DETERMINATION

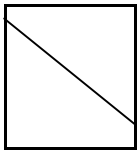
Mass of Wet Sample and Tare, g	471.70
Mass of Dry Sample and Tare, g	436.30
Mass of Tare, g	80.70
Moisture, %	10.0

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	10	0.0	3.06	0.0
0.2	0.005	22	0.1	3.07	3.9
0.4	0.010	30	0.3	3.07	6.5
0.6	0.015	45	0.4	3.08	11.4
0.8	0.020	109	0.5	3.08	32.1
1.0	0.025	223	0.6	3.08	69.1
1.2	0.030	440	0.8	3.09	139.3
1.6	0.040	828	1.0	3.10	264.2
2.0	0.050	1004	1.3	3.10	320.3
2.4	0.060	850	1.6	3.11	269.9
2.8	0.070	680	1.8	3.12	214.7
3.2	0.080	401	2.1	3.13	125.0
3.6	0.090	295	2.3	3.14	90.9
4.0	0.100	207	2.6	3.15	62.6

REMARKS

Failure Code: 4

Failure Sketch



Failure Type: Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	320.3
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	160.1
STRAIN AT FAILURE, %	1.3

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Tested By	RI/KI
Date	02/12/10
Checked By	

Client Pr. #		Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead, NY MGP	S. Type	Mold
Location	ISS-04	Depth/Elev.	20-40'
		Add. Info	

Volume Increase Determination

Sub-Sample ID	Empty Mold Mass, g	Mold + Soil/Grout Mass, g	Soil/Grout Mass, g	Initial Soil Volume Calculated, cm^3	Sample Volume cm^3	Mold's Headspace Volume, cm^3	Final Soil/Grout Volume, cm^3	% Volume Change
1-8	NA	NA	NA	NA	2036.3	0.0	2036.3	-
				NA				-
				NA				-
TOTAL	NA	**NA**	**NA**	**1861.8**	**2036.3**	0.00	**2036.3**	**9.4**

Proctor wet density of soil used for initial volume calculation:	125.7	pcf	**2.014**	g/cm^3
Initial vol. of soil (based on 100% of Proctor wet density):	**1861.8**	cm^3		
Mix Design #	15-1			

Ingredient	Amount	Unit	Portion of entire mix
Soil (Waste)	3750.40	g	0.891
Water	153.00	mL	0.036
GGBFS	229.10	g	0.054
Cement	76.40	g	0.018
Organoclay	0.00	g	0.000
		g	
Total	4208.90	-	1.000

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Tested By	RI/KI
Date	02/12/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525	Depth/Elev.	-
Location	-	Add. Info	-

Final Total Volume DETERMINATION (after mixing)

Sample ID	Mold #	Mass of Mold, g	Mass of Wet Sample & Mold, g	Height of Mold, in.	Diameter of Mold, in.	Volume of Mold, ft^3	Wet Density, pcf	Comments
5525-15-1-1	-	-	-	4.0	2.0	0.00727	NA	
5525-15-1-2	-	-	-	4.0	2.0	0.00727	NA	
5525-15-1-3	-	-	-	4.0	2.0	0.00727	NA	
5525-15-1-4	-	-	-	4.0	2.0	0.00727	NA	
5525-15-1-5	-	-	-	3.0	3.0	0.01227	NA	
5525-15-1-6	-	-	-	3.0	3.0	0.01227	NA	
5525-15-1-7	-	-	-	4.0	2.0	0.00727	NA	
5525-15-1-8	-	-	-	2.7	3.0	0.01104	NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
		-	-				NA	
Total						0.07191		

Comments

Total Volume	**2036.3**	**cm^3**

Balance ID Number	12/13/14/15
Oven ID Number	1/6/7
Caliper ID Number	16

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Tested By	RI/KI
Date	03/08/10
Checked By	

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-15-1	Depth/Elev.	20-40'
Subsample	6	Add. Info	Curing Age: 28 Days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.932	in	7.45	cm
Diameter	2.999	in	7.62	cm
Area	7.06	in^2	45.57	cm^2
Volume	339.40	cm^3	0.0120	ft^3
Mass	675.50	g	1.49	lb
Specific Gravity	2.550	(Assumed)		
Dry Density	113.4	pcf		

Moisture Content

Mass of wet sample & tare	675.50	g
Mass of dry sample & tare	616.60	g
Mass of tare	0.00	g
% Moisture	9.6	

Test Data

Speed	10	
Board Number	7	
Cell Number	7	
Flow Pump Number	2B	
Flow Pump Rate	2.24E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	48.53	cm
Min Head	47.83	cm
Maximum Gradient	6.52	
Minimum Gradient	6.43	

Final Data (After Test)

Average Height of Sample			2.929	in	7.44	cm
Average Diameter of Sample			2.999	in	7.62	cm
Area	7.06	in^2	45.57	cm^2		
Volume	339.05	cm^3	0.0120	ft^3		
Mass	709.80	g	1.56	lb		

Dry Density	113.5	pcf
Vol. of Voids	97.11	cm^3
Vol. of Solids	241.94	cm^3
Void Ratio	0.40	
Saturation	95.6	%

Moisture Content

Mass of wet sample & tare	802.20	g
Mass of dry sample & tare	709.40	g
Mass of tare	92.80	g
% Moisture	15.1	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
03/08/10	12	0	-	0.69	48.53	6.52	15.4	-	-	-	
03/08/10	12	10	600	0.69	48.53	6.52	15.4	7.53E-07	1.125	8.48E-07	
03/08/10	12	20	600	0.68	47.83	6.43	15.4	7.59E-07	1.125	8.54E-07	
03/08/10	12	30	600	0.68	47.83	6.43	15.4	7.65E-07	1.125	8.60E-07	*
03/08/10	12	40	600	0.69	48.53	6.52	15.4	7.59E-07	1.125	8.54E-07	*
03/08/10	12	50	600	0.68	47.83	6.43	15.4	7.59E-07	1.125	8.54E-07	*
03/08/10	13	0	600	0.68	47.83	6.43	15.4	7.65E-07	1.125	8.60E-07	*

Reported Average Hydraulic Conductivity* 8.6E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	377	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	246			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	03/08/10
Checked By	LB

Client Pr. #	-	Lab. PR. #	1010-01-1
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5525-15-1	Depth/Elev.	20-40'
Subsample	4	Add. Info	Curing Age: 28 Days

ASTM D 2166

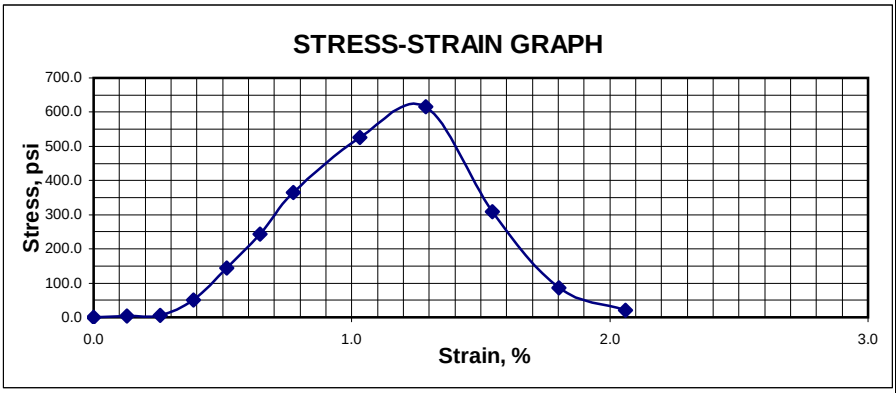
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	3.882
Initial Diameter, in	1.977
Height-to-Diameter Ratio	1.96
Initial Area, in^2	3.07
Initial Volume, in^3	11.92
Mass of Sample, g	393.00
Wet Density, pcf	125.6
Dry Density, pcf	114.7
Machine Speed, in/min	0.025
Strain Rate, % / min	0.64

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	472.70
Mass of Dry Sample and Tare, g	438.60
Mass of Tare, g	80.60
Moisture, %	9.5

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

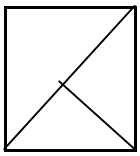
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	9	0.0	3.07	0.0
0.2	0.005	19	0.1	3.07	3.3
0.4	0.010	27	0.3	3.08	5.8
0.6	0.015	166	0.4	3.08	50.9
0.8	0.020	455	0.5	3.09	144.5
1.0	0.025	760	0.6	3.09	243.1
1.2	0.030	1136	0.8	3.09	364.3
1.6	0.040	1640	1.0	3.10	525.8
2.0	0.050	1923	1.3	3.11	615.5
2.4	0.060	970	1.5	3.12	308.2
2.8	0.070	278	1.8	3.13	86.0
3.2	0.080	73	2.1	3.13	20.4

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	615.5
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	307.7
STRAIN AT FAILURE, %	1.3

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Batch Worksheet

BATCH-SAMPLE ID	5525-15-1			BATCH #	1
PR. NUMBER	1010-01-1	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	02/08/10

Time Batch Mixing Started		**Soil Moisture Mass, g**	**356.4**
Total Time Batch was Mixed, min		**Soil Moisture Content, %**	**10.5**
Time Batch Completely in Molds		Type of Cement Used	I/II
		Grout Water/Cem. Mat (Solids) Ratio*	**0.50**
		Mass of Dry Soil, g	**3394.0**
		Total Water/Cem. Mat. Ratio	**1.667**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5525	**Soil (wet)**	100.0	**3750.4**
5527	GGBFS	6.75	**229.1**
5526	Cement	2.25	**76.4**
	Water, mL	153	

Remarks

Max. Viscosity @1 RPM about 967K cP (mPa s)

* Cementous Materials (solids) is total mass of GGBFS, cement and organoclay (if it was used for this mix)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
5525-15-1-1	UCS	2	4					3 days
5525-15-1-2	UCS	2	4					7 days
5525-15-1-3	UCS	2	4					14 days
5525-15-1-4	UCS	2	4					28 days
5525-15-1-5	Perm	3	3					7 days
5525-15-1-6	Perm	3	3					28 days
5525-15-1-7	Vol. Change	2	4					Extra
5525-15-1-8	Vol. Change	3	3					Extra

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Tested By	RI
Date	11/18/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5524+5524A / ISS-01/4-1-2	Depth/Elev.	25'-70'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	3.049	in	7.74	cm
Diameter	2.847	in	7.23	cm
Area	6.37	in^2	41.07	cm^2
Volume	318.07	cm^3	0.0112	ft^3
Mass	642.70	g	1.42	lb
Specific Gravity	2.550	(Assumed)		
Dry Density	111.4	pcf		

Moisture Content

Mass of wet sample & tare	642.70	g
Mass of dry sample & tare	567.80	g
Mass of tare	0.00	g
% Moisture	13.2	

Test Data

Speed	14	
Board Number	4	
Cell Number	4	
Flow Pump Number	2B	
Flow Pump Rate	1.40E-05	cm^3/sec
B - Value	0.96	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	167.41	cm
Min Head	166.00	cm
Maximum Gradient	21.58	
Minimum Gradient	21.40	

Final Data (After Test)

Average Height of Sample		3.054	in	7.76	cm
Average Diameter of Sample		2.845	in	7.23	cm
Area	6.36 in^2	41.01	cm^2		
Volume	318.14 cm^3	0.0112	ft^3		
Mass	663.90 g	1.46	lb		

Dry Density	111.4	pcf
Vol. of Voids	95.44	cm^3
Vol. of Solids	222.70	cm^3
Void Ratio	0.43	
Saturation	100.6	%

Moisture Content

Mass of wet sample & tare	776.30	g
Mass of dry sample & tare	680.30	g
Mass of tare	112.50	g
% Moisture	16.9	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
11/18/08	17	10	-	2.36	166.00	21.40	18.5	-	-	-	
11/18/08	17	20	600	2.37	166.71	21.49	18.5	1.59E-08	1.038	1.65E-08	
11/18/08	17	30	600	2.36	166.00	21.40	18.5	1.59E-08	1.038	1.65E-08	
11/18/08	17	40	600	2.37	166.71	21.49	18.5	1.59E-08	1.038	1.65E-08	*
11/18/08	17	50	600	2.38	167.41	21.58	18.5	1.59E-08	1.038	1.65E-08	*
11/18/08	18	0	600	2.37	166.71	21.49	18.5	1.59E-08	1.038	1.65E-08	*
11/18/08	18	10	600	2.38	167.41	21.58	18.5	1.59E-08	1.038	1.65E-08	*

Reported Average Hydraulic Conductivity* 1.6E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	29
Syringe ID #	246			Pore Pressure Transducer ID #	26/27

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Tested By	RI
Date	04/18/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5524+5524A / ISS-01/4-1-1	Depth/Elev.	25'-70'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

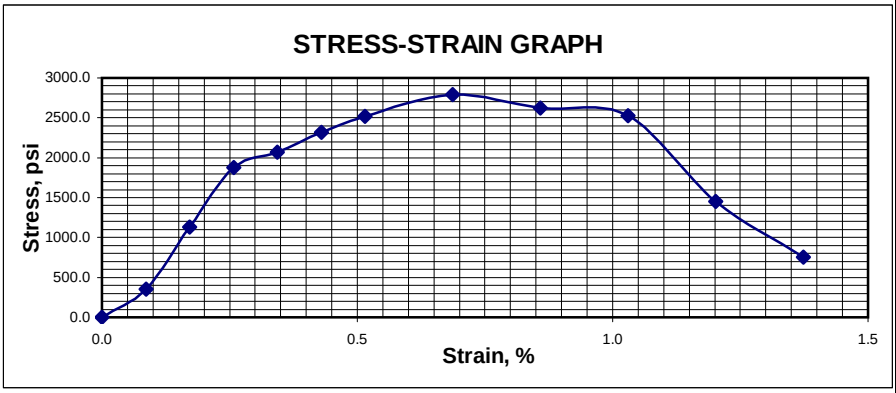
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.823
Initial Diameter, in	3.008
Height-to-Diameter Ratio	1.94
Initial Area, in^2	7.11
Initial Volume, in^3	41.38
Mass of Sample, g	1370.20
Wet Density, pcf	126.1
Dry Density, pcf	110.7
Machine Speed, in/min	0.025
Strain Rate, % / min	0.43

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1524.20
Mass of Dry Sample and Tare, g	1357.40
Mass of Tare, g	158.90
Moisture, %	13.9

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

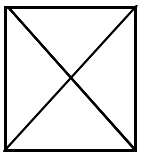
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	8	0.0	7.11	0.0
0.2	0.005	2540	0.1	7.11	356.0
0.4	0.010	8080	0.2	7.12	1133.9
0.6	0.015	13380	0.3	7.12	1876.9
0.8	0.020	14740	0.3	7.13	2066.0
1.0	0.025	16550	0.4	7.14	2317.8
1.2	0.030	18010	0.5	7.14	2520.2
1.6	0.040	19962	0.7	7.16	2788.6
2.0	0.050	18800	0.9	7.17	2621.7
2.4	0.060	18140	1.0	7.18	2525.2
2.8	0.070	10450	1.2	7.19	1451.7
3.2	0.080	5420	1.4	7.21	751.1
	0.090				
	0.100				
	0.110				
	0.120				
	0.130				
	0.140				
	0.150				
	0.160				
	0.170				

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	2788.6
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	1394.3
STRAIN AT FAILURE, %	0.7

REMARKS

Failure Code: 1

Failure Sketch



Failure Type: Cone

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Web: www.test-llc.com

Tested By	RI
Date	11/18/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5524+5524A / ISS-01/3-1-2	Depth/Elev.	25'-70'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	3.031	in	7.70	cm
Diameter	2.843	in	7.22	cm
Area	6.35	in^2	40.96	cm^2
Volume	315.30	cm^3	0.0111	ft^3
Mass	635.10	g	1.40	lb
Specific Gravity	2.550	(Assumed)		
Dry Density	111.4	pcf		

Moisture Content

Mass of wet sample & tare	635.10	g
Mass of dry sample & tare	563.00	g
Mass of tare	0.00	g
% Moisture	12.8	

Test Data

Speed	13	
Board Number	1	
Cell Number	7	
Flow Pump Number	1A	
Flow Pump Rate	2.80E-05	cm^3/sec
B - Value	0.96	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	180.77	cm
Min Head	179.37	cm
Maximum Gradient	23.49	
Minimum Gradient	23.31	

Final Data (After Test)

Average Height of Sample			3.030	in	7.70	cm
Average Diameter of Sample			2.842	in	7.22	cm
Area	6.34	in^2	40.93	cm^2		
Volume	314.98	cm^3	0.0111	ft^3		
Mass	656.10	g	1.45	lb		

Dry Density	111.6	pcf
Vol. of Voids	94.13	cm^3
Vol. of Solids	220.85	cm^3
Void Ratio	0.43	
Saturation	98.7	%

Moisture Content

Mass of wet sample & tare	741.30	g
Mass of dry sample & tare	648.40	g
Mass of tare	85.40	g
% Moisture	16.5	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
11/18/08	15	20	-	2.55	179.37	23.31	18.5	-	-	-	
11/18/08	15	30	600	2.56	180.07	23.40	18.5	2.93E-08	1.038	3.04E-08	
11/18/08	15	40	600	2.55	179.37	23.31	18.5	2.93E-08	1.038	3.04E-08	
11/18/08	15	50	600	2.56	180.07	23.40	18.5	2.93E-08	1.038	3.04E-08	*
11/18/08	16	0	600	2.57	180.77	23.49	18.5	2.92E-08	1.038	3.03E-08	*
11/18/08	16	10	600	2.56	180.07	23.40	18.5	2.92E-08	1.038	3.03E-08	*
11/18/08	16	20	600	2.57	180.77	23.49	18.5	2.92E-08	1.038	3.03E-08	*

Reported Average Hydraulic Conductivity* 3.0E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	22	Balance ID #	1/6/7	Differential Pressure Transducer ID #	24/25
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	64
Syringe ID #	140			Pore Pressure Transducer ID #	26/27

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1874 Forge Street Tucker, GA 30084
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Web: www.test-llc.com

Tested By	RI
Date	11/18/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5524+5524A / ISS-01/3-1-1	Depth/Elev.	25'-70'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

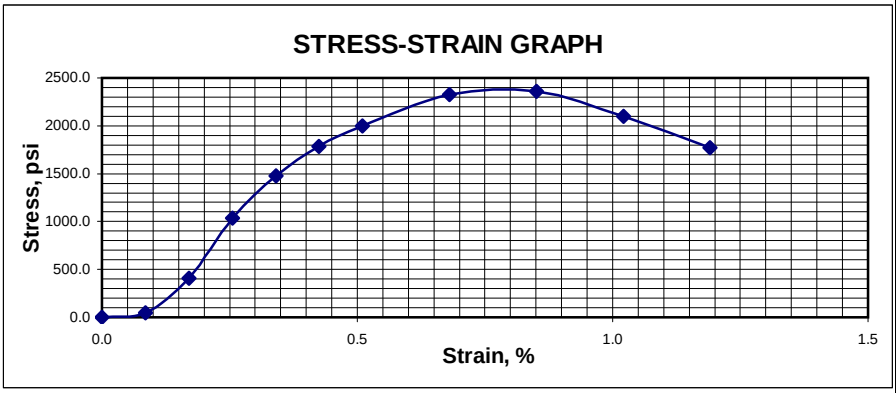
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.878
Initial Diameter, in	3.008
Height-to-Diameter Ratio	1.95
Initial Area, in^2	7.11
Initial Volume, in^3	41.77
Mass of Sample, g	1370.10
Wet Density, pcf	125.0
Dry Density, pcf	110.1
Machine Speed, in/min	0.025
Strain Rate, % / min	0.43

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1478.30
Mass of Dry Sample and Tare, g	1321.30
Mass of Tare, g	154.90
Moisture, %	13.5

TEST DATA

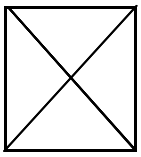
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	6	0.0	7.11	0.0
0.2	0.005	325	0.1	7.11	44.9
0.4	0.010	2920	0.2	7.12	409.4
0.6	0.015	7370	0.3	7.12	1033.6
0.8	0.020	10540	0.3	7.13	1477.3
1.0	0.025	12753	0.4	7.14	1786.1
1.2	0.030	14300	0.5	7.14	2001.2
1.6	0.040	16630	0.7	7.16	2323.4
2.0	0.050	16908	0.9	7.17	2358.2
2.4	0.060	15090	1.0	7.18	2100.9
2.8	0.070	12730	1.2	7.19	1769.2
	0.080				
	0.090				
	0.100				
	0.110				
	0.120				
	0.130				
	0.140				
	0.150				
	0.160				
	0.170				

REMARKS

Failure Code: 1

Failure Sketch



Failure Type: Cone

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	2358.2
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	1179.1
STRAIN AT FAILURE, %	0.9

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Tested By	RI
Date	11/18/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5524+5524A / ISS-01/2-1-2	Depth/Elev.	25'-70'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	3.048	in	7.74	cm
Diameter	2.845	in	7.23	cm
Area	6.36	in^2	41.01	cm^2
Volume	317.52	cm^3	0.0112	ft^3
Mass	604.50	g	1.33	lb
Specific Gravity	2.500	(Assumed)		
Dry Density	105.9	pcf		

Moisture Content

Mass of wet sample & tare	604.50	g
Mass of dry sample & tare	539.10	g
Mass of tare	0.00	g
% Moisture	12.1	

Test Data

Speed	12	
Board Number	5	
Cell Number	1	
Flow Pump Number	2B	
Flow Pump Rate	5.60E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	213.83	cm
Min Head	212.43	cm
Maximum Gradient	27.65	
Minimum Gradient	27.47	

Final Data (After Test)

Average Height of Sample			3.045	in	7.73	cm
Average Diameter of Sample			2.844	in	7.22	cm
Area	6.35	in^2	40.98	cm^2		
Volume	316.98	cm^3	0.0112	ft^3		
Mass	641.60	g	1.41	lb		

Dry Density	106.2	pcf
Vol. of Voids	101.18	cm^3
Vol. of Solids	215.81	cm^3
Void Ratio	0.47	
Saturation	100.9	%

Moisture Content

Mass of wet sample & tare	725.00	g
Mass of dry sample & tare	623.00	g
Mass of tare	83.90	g
% Moisture	18.9	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
11/18/08	9	10	-	3.02	212.43	27.47	18.5	-	-	-	
11/18/08	9	20	600	3.03	213.13	27.56	18.5	4.97E-08	1.038	5.16E-08	
11/18/08	9	30	600	3.02	212.43	27.47	18.5	4.97E-08	1.038	5.16E-08	
11/18/08	9	40	600	3.03	213.13	27.56	18.5	4.97E-08	1.038	5.16E-08	*
11/18/08	9	50	600	3.04	213.83	27.65	18.5	4.95E-08	1.038	5.14E-08	*
11/18/08	10	0	600	3.03	213.13	27.56	18.5	4.95E-08	1.038	5.14E-08	*
11/18/08	10	10	600	3.04	213.83	27.65	18.5	4.95E-08	1.038	5.14E-08	*

Reported Average Hydraulic Conductivity* 5.1E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	246			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	11/18/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5524+5524A / ISS-01/2-1-1	Depth/Elev.	25'-70'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

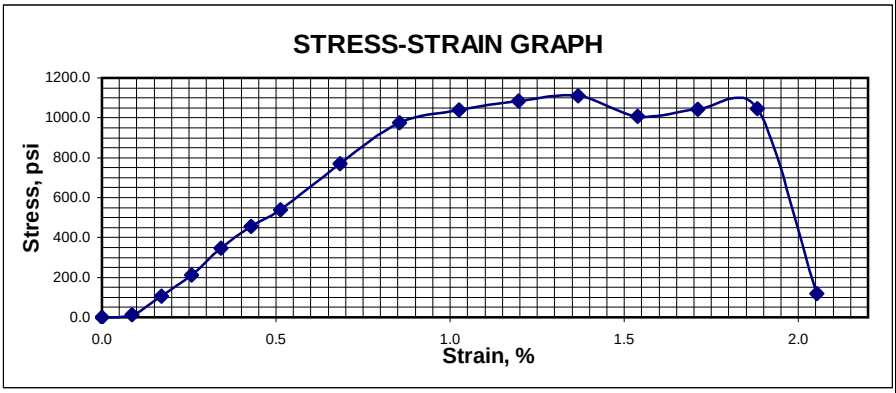
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.847
Initial Diameter, in	3.006
Height-to-Diameter Ratio	1.95
Initial Area, in^2	7.10
Initial Volume, in^3	41.50
Mass of Sample, g	1287.80
Wet Density, pcf	118.2
Dry Density, pcf	105.0
Machine Speed, in/min	0.025
Strain Rate, % / min	0.43

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1435.50
Mass of Dry Sample and Tare, g	1293.10
Mass of Tare, g	161.80
Moisture, %	12.6

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

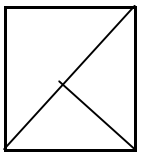
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	9	0.0	7.10	0.0
0.2	0.005	97	0.1	7.10	12.4
0.4	0.010	760	0.2	7.11	105.6
0.6	0.015	1515	0.3	7.12	211.7
0.8	0.020	2471	0.3	7.12	345.7
1.0	0.025	3260	0.4	7.13	456.1
1.2	0.030	3850	0.5	7.13	538.4
1.6	0.040	5501	0.7	7.15	768.6
2.0	0.050	6980	0.9	7.16	973.9
2.4	0.060	7460	1.0	7.17	1039.1
2.8	0.070	7800	1.2	7.18	1084.7
3.2	0.080	7992	1.4	7.20	1109.5
3.6	0.090	7260	1.5	7.21	1006.0
4.0	0.100	7530	1.7	7.22	1041.6
4.4	0.110	7567	1.9	7.23	1044.9
4.8	0.120	860	2.1	7.25	117.5
	0.130				
	0.140				
	0.150				
	0.160				
	0.170				

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	1109.5
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	554.7
STRAIN AT FAILURE, %	1.4

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
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Web: www.test-llc.com

Tested By	RI
Date	11/18/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5524+5524A / ISS-01/1-1-2	Depth/Elev.	25'-70'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.867	in	7.28	cm
Diameter	3.013	in	7.65	cm
Area	7.13	in^2	46.00	cm^2
Volume	334.98	cm^3	0.0118	ft^3
Mass	610.30	g	1.35	lb
Specific Gravity	2.450	(Assumed)		
Dry Density	99.8	pcf		

Moisture Content

Mass of wet sample & tare	610.30	g
Mass of dry sample & tare	535.90	g
Mass of tare	0.00	g
% Moisture	13.9	

Test Data

Speed	11	
Board Number	2	
Cell Number	13	
Flow Pump Number	2A	
Flow Pump Rate	1.12E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	53.46	cm
Min Head	52.05	cm
Maximum Gradient	7.35	
Minimum Gradient	7.15	

Final Data (After Test)

Average Height of Sample		2.865	in	7.28	cm
Average Diameter of Sample		3.003	in	7.63	cm
Area	7.08 in^2	45.69	cm^2		
Volume	332.53 cm^3	0.0117	ft^3		
Mass	650.30 g	1.43	lb		

Dry Density	100.6	pcf
Vol. of Voids	113.72	cm^3
Vol. of Solids	218.80	cm^3
Void Ratio	0.52	
Saturation	100.4	%

Moisture Content

Mass of wet sample & tare	741.10	g
Mass of dry sample & tare	626.90	g
Mass of tare	91.00	g
% Moisture	21.3	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
11/18/08	15	20	-	0.74	52.05	7.15	18.6	-	-	-	
11/18/08	15	30	600	0.75	52.76	7.25	18.6	3.40E-07	1.036	3.52E-07	
11/18/08	15	40	600	0.74	52.05	7.15	18.6	3.40E-07	1.036	3.52E-07	
11/18/08	15	50	600	0.75	52.76	7.25	18.6	3.40E-07	1.036	3.52E-07	*
11/18/08	16	0	600	0.76	53.46	7.35	18.6	3.36E-07	1.036	3.48E-07	*
11/18/08	16	10	600	0.75	52.76	7.25	18.6	3.36E-07	1.036	3.48E-07	*
11/18/08	16	20	600	0.76	53.46	7.35	18.6	3.36E-07	1.036	3.48E-07	*

Reported Average Hydraulic Conductivity* 3.5E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	64
Syringe ID #	245			Pore Pressure Transducer ID #	26/27

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Web: www.test-llc.com

Tested By	RI
Date	11/18/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5524+5524A / ISS-01/1-1-1	Depth/Elev.	25'-70'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

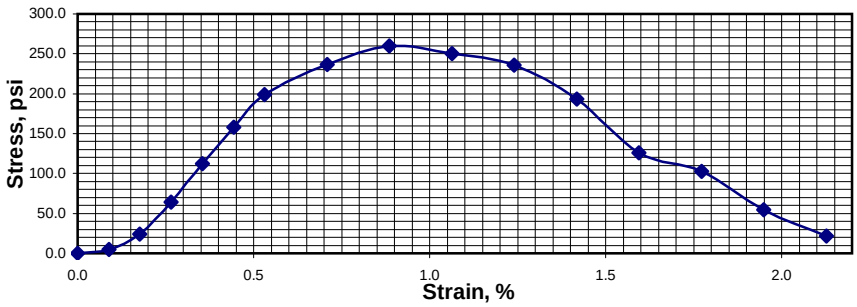
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.642
Initial Diameter, in	3.009
Height-to-Diameter Ratio	1.88
Initial Area, in^2	7.11
Initial Volume, in^3	40.12
Mass of Sample, g	1201.10
Wet Density, pcf	114.0
Dry Density, pcf	99.8
Machine Speed, in/min	0.025
Strain Rate, % / min	0.44

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1392.70
Mass of Dry Sample and Tare, g	1243.90
Mass of Tare, g	194.50
Moisture, %	14.2

TEST DATA

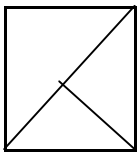
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	8	0.0	7.11	0.0
0.2	0.005	42	0.1	7.12	4.8
0.4	0.010	178	0.2	7.12	23.9
0.6	0.015	468	0.3	7.13	64.5
0.8	0.020	810	0.4	7.14	112.4
1.0	0.025	1136	0.4	7.14	157.9
1.2	0.030	1428	0.5	7.15	198.6
1.6	0.040	1705	0.7	7.16	237.0
2.0	0.050	1875	0.9	7.17	260.2
2.4	0.060	1806	1.1	7.19	250.2
2.8	0.070	1706	1.2	7.20	235.8
3.2	0.080	1400	1.4	7.21	193.0
3.6	0.090	920	1.6	7.23	126.2
4.0	0.100	751	1.8	7.24	102.6
4.4	0.110	405	1.9	7.25	54.7
4.8	0.120	166	2.1	7.27	21.7
	0.130				
	0.140				
	0.150				
	0.160				
	0.170				

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	260.2
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	130.1
STRAIN AT FAILURE, %	0.9

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Web: www.test-llc.com

Tested By	RI
Date	11/17/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5522+5523 / ISS-03/4-1-2	Depth/Elev.	10'-50'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	3.047	in	7.74	cm
Diameter	2.847	in	7.23	cm
Area	6.37	in^2	41.07	cm^2
Volume	317.86	cm^3	0.0112	ft^3
Mass	642.80	g	1.42	lb
Specific Gravity	2.550	(Assumed)		
Dry Density	111.9	pcf		

Moisture Content

Mass of wet sample & tare	642.80	g
Mass of dry sample & tare	570.10	g
Mass of tare	0.00	g
% Moisture	12.8	

Test Data

Speed	13	
Board Number	2	
Cell Number	19	
Flow Pump Number	2B	
Flow Pump Rate	2.80E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	244.08	cm
Min Head	242.67	cm
Maximum Gradient	31.43	
Minimum Gradient	31.25	

Final Data (After Test)

Average Height of Sample			3.057	in	7.76	cm
Average Diameter of Sample			2.855	in	7.25	cm
Area	6.40	in^2	41.30	cm^2		
Volume	320.70	cm^3	0.0113	ft^3		
Mass	668.10	g	1.47	lb		

Dry Density	110.9	pcf
Vol. of Voids	97.10	cm^3
Vol. of Solids	223.60	cm^3
Void Ratio	0.43	
Saturation	100.8	%

Moisture Content

Mass of wet sample & tare	770.00	g
Mass of dry sample & tare	672.10	g
Mass of tare	102.00	g
% Moisture	17.2	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
11/17/08	11	0	-	3.45	242.67	31.25	18.5	-	-	-	
11/17/08	11	10	600	3.46	243.38	31.34	18.5	2.17E-08	1.038	2.25E-08	
11/17/08	11	20	600	3.45	242.67	31.25	18.5	2.17E-08	1.038	2.25E-08	
11/17/08	11	30	600	3.46	243.38	31.34	18.5	2.17E-08	1.038	2.25E-08	*
11/17/08	11	40	600	3.47	244.08	31.43	18.5	2.16E-08	1.038	2.24E-08	*
11/17/08	11	50	600	3.46	243.38	31.34	18.5	2.16E-08	1.038	2.24E-08	*
11/17/08	12	0	600	3.47	244.08	31.43	18.5	2.16E-08	1.038	2.24E-08	*

Reported Average Hydraulic Conductivity* 2.2E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	64
Syringe ID #	246			Pore Pressure Transducer ID #	26/27

TIMELY ENGINEERING SOIL TESTS, LLC
1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

Tested By	RI
Date	11/17/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5522+5523 / ISS-03/4-1-1	Depth/Elev.	10'-50'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

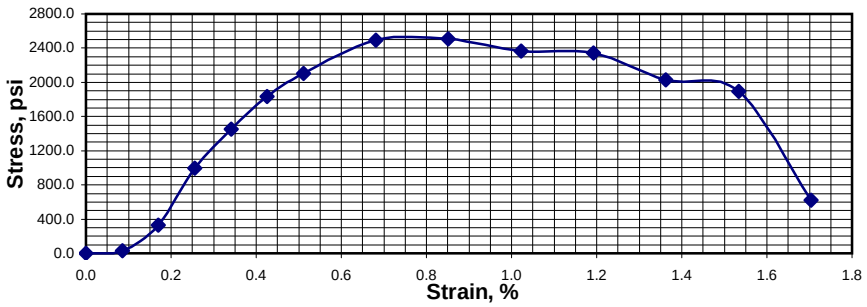
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.870
Initial Diameter, in	3.004
Height-to-Diameter Ratio	1.95
Initial Area, in^2	7.09
Initial Volume, in^3	41.60
Mass of Sample, g	1404.20
Wet Density, pcf	128.6
Dry Density, pcf	113.2
Machine Speed, in/min	0.025
Strain Rate, % / min	0.43

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1512.90
Mass of Dry Sample and Tare, g	1350.80
Mass of Tare, g	156.70
Moisture, %	13.6

TEST DATA

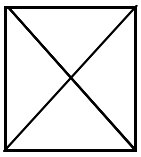
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	7.09	0.0
0.2	0.005	200	0.1	7.09	27.5
0.4	0.010	2350	0.2	7.10	330.3
0.6	0.015	7080	0.3	7.11	995.7
0.8	0.020	10340	0.3	7.11	1453.2
1.0	0.025	13036	0.4	7.12	1830.8
1.2	0.030	14996	0.5	7.12	2104.3
1.6	0.040	17796	0.7	7.14	2493.1
2.0	0.050	17946	0.9	7.15	2509.8
2.4	0.060	16950	1.0	7.16	2366.4
2.8	0.070	16835	1.2	7.17	2346.3
3.2	0.080	14560	1.4	7.19	2025.6
3.6	0.090	13645	1.5	7.20	1895.0
4.0	0.100	4500	1.7	7.21	623.4
	0.110				
	0.120				
	0.130				
	0.140				
	0.150				
	0.160				
	0.170				

REMARKS

Failure Code: 1

Failure Sketch



Failure Type: Cone

DESCRIPTION

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	2509.8
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	1254.9
STRAIN AT FAILURE, %	0.9

USCS (ASTM D2487: D2488): NA

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Tested By	RI
Date	11/17/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5522+5523 / ISS-03/3-1-2	Depth/Elev.	10'-50'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	3.031	in	7.70	cm
Diameter	2.828	in	7.18	cm
Area	6.28	in^2	40.52	cm^2
Volume	311.99	cm^3	0.0110	ft^3
Mass	634.60	g	1.40	lb
Specific Gravity	2.575	(Assumed)		
Dry Density	113.7	pcf		

Moisture Content

Mass of wet sample & tare	634.60	g
Mass of dry sample & tare	568.50	g
Mass of tare	0.00	g
% Moisture	11.6	

Test Data

Speed	15	
Board Number	1	
Cell Number	17	
Flow Pump Number	2A	
Flow Pump Rate	7.00E-06	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	37.28	cm
Min Head	35.87	cm
Maximum Gradient	4.85	
Minimum Gradient	4.67	

Final Data (After Test)

Average Height of Sample			3.024	in	7.68	cm
Average Diameter of Sample			2.831	in	7.19	cm
Area	6.29	in^2	40.61	cm^2		
Volume	311.93	cm^3	0.0110	ft^3		
Mass	659.70	g	1.45	lb		

Dry Density	113.7	pcf
Vol. of Voids	91.15	cm^3
Vol. of Solids	220.78	cm^3
Void Ratio	0.41	
Saturation	100.1	%

Moisture Content

Mass of wet sample & tare	750.70	g
Mass of dry sample & tare	659.50	g
Mass of tare	91.00	g
% Moisture	16.0	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
11/17/08	12	50	-	0.51	35.87	4.67	18.5	-	-	-	
11/17/08	13	0	600	0.52	36.58	4.76	18.5	3.65E-08	1.038	3.79E-08	
11/17/08	13	10	600	0.51	35.87	4.67	18.5	3.65E-08	1.038	3.79E-08	
11/17/08	13	20	600	0.52	36.58	4.76	18.5	3.65E-08	1.038	3.79E-08	*
11/17/08	13	30	600	0.53	37.28	4.85	18.5	3.59E-08	1.038	3.72E-08	*
11/17/08	13	40	600	0.52	36.58	4.76	18.5	3.59E-08	1.038	3.72E-08	*
11/17/08	13	50	600	0.53	37.28	4.85	18.5	3.59E-08	1.038	3.72E-08	*

Reported Average Hydraulic Conductivity* 3.7E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	64
Syringe ID #	245			Pore Pressure Transducer ID #	26/27

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Tested By	RI
Date	11/17/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5522+5523 / ISS-03/3-1-1	Depth/Elev.	10'-50'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

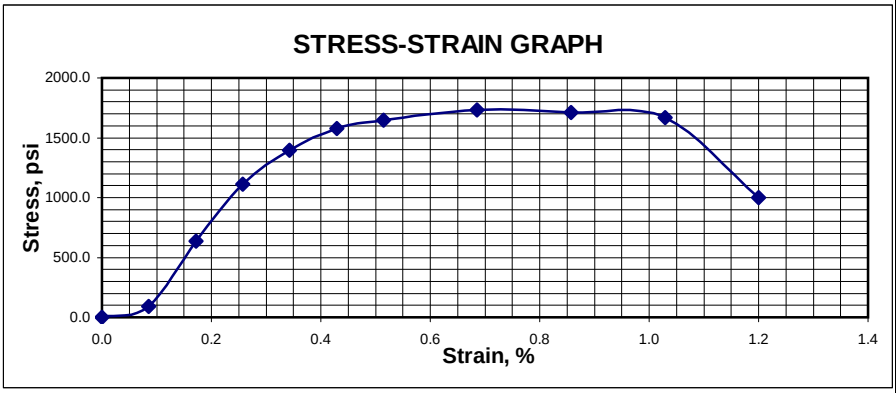
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.832
Initial Diameter, in	3.005
Height-to-Diameter Ratio	1.94
Initial Area, in^2	7.09
Initial Volume, in^3	41.36
Mass of Sample, g	1397.20
Wet Density, pcf	128.7
Dry Density, pcf	114.8
Machine Speed, in/min	0.025
Strain Rate, % / min	0.43

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1542.80
Mass of Dry Sample and Tare, g	1393.70
Mass of Tare, g	158.60
Moisture, %	12.1

TEST DATA

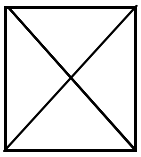
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	7.09	0.0
0.2	0.005	658	0.1	7.10	92.0
0.4	0.010	4528	0.2	7.10	636.7
0.6	0.015	7910	0.3	7.11	1111.7
0.8	0.020	9940	0.3	7.12	1396.0
1.0	0.025	11250	0.4	7.12	1578.8
1.2	0.030	11740	0.5	7.13	1646.1
1.6	0.040	12365	0.7	7.14	1730.8
2.0	0.050	12250	0.9	7.15	1711.8
2.4	0.060	11960	1.0	7.17	1668.3
2.8	0.070	7200	1.2	7.18	1002.3
	0.080				
	0.090				
	0.100				
	0.110				
	0.120				
	0.130				
	0.140				
	0.150				
	0.160				
	0.170				

REMARKS

Failure Code: 1

Failure Sketch



Failure Type: Cone

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	1730.8
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	865.4
STRAIN AT FAILURE, %	0.7

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Tested By	KI
Date	11/17/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5522+5523 / ISS-03/2-1-2	Depth/Elev.	10'-50'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.979	in	7.57	cm
Diameter	2.842	in	7.22	cm
Area	6.34	in^2	40.93	cm^2
Volume	309.68	cm^3	0.0109	ft^3
Mass	612.80	g	1.35	lb
Specific Gravity	2.500	(Assumed)		
Dry Density	111.3	pcf		

Moisture Content

Mass of wet sample & tare	612.80	g
Mass of dry sample & tare	552.40	g
Mass of tare	0.00	g
% Moisture	10.9	

Test Data

Speed	12	
Board Number	6	
Cell Number	9	
Flow Pump Number	1A	
Flow Pump Rate	5.60E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	212.43	cm
Min Head	210.32	cm
Maximum Gradient	28.08	
Minimum Gradient	27.80	

Final Data (After Test)

Average Height of Sample			2.978	in	7.56	cm
Average Diameter of Sample			2.840	in	7.21	cm
Area	6.33	in^2	40.87	cm^2		
Volume	309.14	cm^3	0.0109	ft^3		
Mass	641.00	g	1.41	lb		

Dry Density	111.5	pcf
Vol. of Voids	88.18	cm^3
Vol. of Solids	220.96	cm^3
Void Ratio	0.40	
Saturation	100.5	%

Moisture Content

Mass of wet sample & tare	735.40	g
Mass of dry sample & tare	646.80	g
Mass of tare	94.40	g
% Moisture	16.0	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
11/17/08	15	10	-	2.99	210.32	27.80	20.0	-	-	-	
11/17/08	15	20	600	3.00	211.02	27.90	20.0	4.92E-08	1.000	4.92E-08	
11/17/08	15	30	600	3.00	211.02	27.90	20.0	4.91E-08	1.000	4.91E-08	
11/17/08	15	40	600	3.01	211.72	27.99	20.0	4.90E-08	1.000	4.90E-08	*
11/17/08	15	50	600	3.02	212.43	28.08	20.0	4.89E-08	1.000	4.89E-08	*
11/17/08	16	0	600	3.01	211.72	27.99	20.0	4.89E-08	1.000	4.89E-08	*
11/17/08	16	10	600	3.02	212.43	28.08	20.0	4.89E-08	1.000	4.89E-08	*

Reported Average Hydraulic Conductivity* 4.9E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	22	Balance ID #	1/6/7	Differential Pressure Transducer ID #	24/25
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	140			Pore Pressure Transducer ID #	28

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Fax: 770-923-8973
Web: www.test-llc.com

Tested By	KI
Date	11/17/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5522+5523 / ISS-03/1-1-2	Depth/Elev.	10'-50'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	3.022	in	7.68	cm
Diameter	2.828	in	7.18	cm
Area	6.28	in^2	40.52	cm^2
Volume	311.06	cm^3	0.0110	ft^3
Mass	596.80	g	1.32	lb
Specific Gravity	2.500	(Assumed)		
Dry Density	108.5	pcf		

Moisture Content

Mass of wet sample & tare	596.80	g
Mass of dry sample & tare	541.10	g
Mass of tare	0.00	g
% Moisture	10.3	

Test Data

Speed	11	
Board Number	5	
Cell Number	7	
Flow Pump Number	2B	
Flow Pump Rate	1.12E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	72.45	cm
Min Head	71.04	cm
Maximum Gradient	9.44	
Minimum Gradient	9.26	

Final Data (After Test)

Average Height of Sample		3.022	in	7.68	cm
Average Diameter of Sample		2.826	in	7.18	cm
Area	6.27 in^2	40.47	cm^2		
Volume	310.62 cm^3	0.0110	ft^3		
Mass	632.00 g	1.39	lb		

Dry Density	108.7	pcf
Vol. of Voids	94.15	cm^3
Vol. of Solids	216.47	cm^3
Void Ratio	0.43	
Saturation	96.5	%

Moisture Content

Mass of wet sample & tare	728.10	g
Mass of dry sample & tare	637.30	g
Mass of tare	96.20	g
% Moisture	16.8	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
11/17/08	9	10	-	1.02	71.75	9.35	18.5	-	-	-	
11/17/08	9	20	600	1.03	72.45	9.44	18.5	2.95E-07	1.038	3.06E-07	
11/17/08	9	30	600	1.02	71.75	9.35	18.5	2.95E-07	1.038	3.06E-07	
11/17/08	9	40	600	1.02	71.75	9.35	18.5	2.96E-07	1.038	3.07E-07	*
11/17/08	9	50	600	1.01	71.04	9.26	18.5	2.98E-07	1.038	3.09E-07	*
11/17/08	10	0	600	1.03	72.45	9.44	18.5	2.96E-07	1.038	3.07E-07	*
11/17/08	10	10	600	1.02	71.75	9.35	18.5	2.95E-07	1.038	3.06E-07	*

Reported Average Hydraulic Conductivity* 3.1E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	246			Pore Pressure Transducer ID #	28

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1874 Forge Street Tucker, GA 30084
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Fax: 770-923-8973
Web: www.test-llc.com

Tested By	RI
Date	11/17/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5522+5523 / ISS-03/1-1-1	Depth/Elev.	10'-50'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

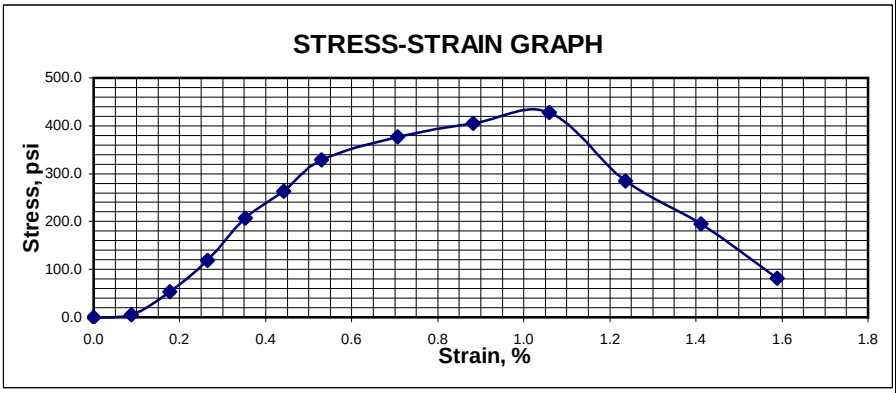
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.665
Initial Diameter, in	3.006
Height-to-Diameter Ratio	1.88
Initial Area, in^2	7.10
Initial Volume, in^3	40.20
Mass of Sample, g	1291.50
Wet Density, pcf	122.4
Dry Density, pcf	110.5
Machine Speed, in/min	0.025
Strain Rate, % / min	0.44

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1475.10
Mass of Dry Sample and Tare, g	1350.20
Mass of Tare, g	187.90
Moisture, %	10.7

TEST DATA

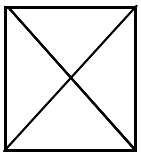
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	7	0.0	7.10	0.0
0.2	0.005	45	0.1	7.10	5.3
0.4	0.010	385	0.2	7.11	53.2
0.6	0.015	854	0.3	7.12	119.0
0.8	0.020	1485	0.4	7.12	207.5
1.0	0.025	1882	0.4	7.13	263.0
1.2	0.030	2350	0.5	7.13	328.4
1.6	0.040	2699	0.7	7.15	376.6
2.0	0.050	2910	0.9	7.16	405.4
2.4	0.060	3077	1.1	7.17	428.0
2.8	0.070	2052	1.2	7.19	284.6
3.2	0.080	1410	1.4	7.20	194.9
3.6	0.090	598	1.6	7.21	82.0
	0.100				
	0.110				
	0.120				
	0.130				
	0.140				
	0.150				
	0.160				
	0.170				

REMARKS

Failure Code: 1

Failure Sketch



Failure Type: Cone

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	428.0
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	214.0
STRAIN AT FAILURE, %	1.1

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1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
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Web: www.test-llc.com

Tested By	RI
Date	02/27/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-03
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5521+5521A / ISS-02/14-1-2	Depth/Elev.	10'-35'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.896	in	7.36	cm
Diameter	2.999	in	7.62	cm
Area	7.06	in^2	45.57	cm^2
Volume	335.23	cm^3	0.0118	ft^3
Mass	676.10	g	1.49	lb
Specific Gravity	2.450	(Assumed)		
Dry Density	113.7	pcf		

Moisture Content

Mass of wet sample & tare	676.10	g
Mass of dry sample & tare	610.90	g
Mass of tare	0.00	g
% Moisture	10.7	

Test Data

Speed	4	
Board Number	7	
Cell Number	4	
Flow Pump Number	2A	
Flow Pump Rate	1.43E-02	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	30.95	cm
Min Head	30.95	cm
Maximum Gradient	4.20	
Minimum Gradient	4.20	

Final Data (After Test)

Average Height of Sample			2.900	in	7.37	cm
Average Diameter of Sample			3.001	in	7.62	cm
Area	7.07	in^2	45.63	cm^2		
Volume	336.14	cm^3	0.0119	ft^3		
Mass	693.70	g	1.53	lb		

Dry Density	113.5	pcf
Vol. of Voids	86.58	cm^3
Vol. of Solids	249.56	cm^3
Void Ratio	0.35	
Saturation	95.0	%

Moisture Content

Mass of wet sample & tare	793.70	g
Mass of dry sample & tare	711.50	g
Mass of tare	100.60	g
% Moisture	13.5	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
02/27/09	9	0	-	0.44	30.95	4.20	18.3	-	-	-	
02/27/09	9	5	300	0.44	30.95	4.20	18.3	7.48E-05	1.043	7.80E-05	
02/27/09	9	10	300	0.44	30.95	4.20	18.3	7.48E-05	1.043	7.80E-05	
02/27/09	9	15	300	0.44	30.95	4.20	18.3	7.48E-05	1.043	7.80E-05	*
02/27/09	9	20	300	0.44	30.95	4.20	18.3	7.48E-05	1.043	7.80E-05	*
02/27/09	9	25	300	0.44	30.95	4.20	18.3	7.48E-05	1.043	7.80E-05	*
02/27/09	9	30	300	0.44	30.95	4.20	18.3	7.48E-05	1.043	7.80E-05	*

Reported Average Hydraulic Conductivity* 7.8E-05 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	02/26/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-03
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5521+5521A / ISS-02/14-1-1	Depth/Elev.	10'-35'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

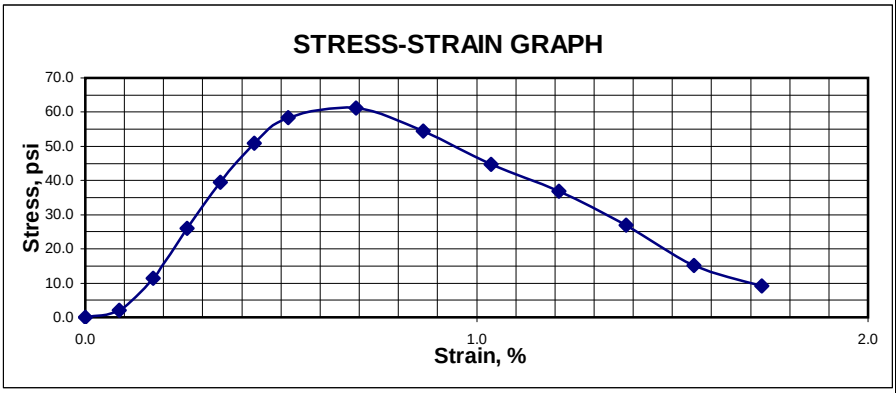
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.786
Initial Diameter, in	3.010
Height-to-Diameter Ratio	1.92
Initial Area, in^2	7.12
Initial Volume, in^3	41.17
Mass of Sample, g	1356.00
Wet Density, pcf	125.5
Dry Density, pcf	113.4
Machine Speed, in/min	0.025
Strain Rate, % / min	0.43

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1559.10
Mass of Dry Sample and Tare, g	1429.00
Mass of Tare, g	205.10
Moisture, %	10.6

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

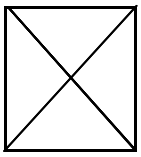
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	9	0.0	7.12	0.0
0.2	0.005	23	0.1	7.12	2.0
0.4	0.010	91	0.2	7.13	11.5
0.6	0.015	194	0.3	7.13	25.9
0.8	0.020	291	0.3	7.14	39.5
1.0	0.025	373	0.4	7.15	50.9
1.2	0.030	427	0.5	7.15	58.4
1.6	0.040	448	0.7	7.17	61.3
2.0	0.050	400	0.9	7.18	54.5
2.4	0.060	330	1.0	7.19	44.6
2.8	0.070	274	1.2	7.20	36.8
3.2	0.080	203	1.4	7.22	26.9
3.6	0.090	119	1.6	7.23	15.2
4.0	0.100	76	1.7	7.24	9.3

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	61.3
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	30.6
STRAIN AT FAILURE, %	0.7

REMARKS

Failure Code: 1

Failure Sketch



Failure Type: Cone

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Tested By	RI
Date	02/26/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-03
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5521+5521A / ISS-02/9-1-2	Depth/Elev.	10'-35'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.981	in	7.57	cm
Diameter	3.008	in	7.64	cm
Area	7.11	in^2	45.85	cm^2
Volume	347.14	cm^3	0.0123	ft^3
Mass	669.30	g	1.48	lb
Specific Gravity	2.450	(Assumed)		
Dry Density	109.8	pcf		

Moisture Content

Mass of wet sample & tare	669.30	g
Mass of dry sample & tare	611.00	g
Mass of tare	0.00	g
% Moisture	9.5	

Test Data

Speed	11	
Board Number	2	
Cell Number	3	
Flow Pump Number	1A	
Flow Pump Rate	1.12E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	145.60	cm
Min Head	144.20	cm
Maximum Gradient	19.24	
Minimum Gradient	19.05	

Final Data (After Test)

Average Height of Sample			2.980	in	7.57	cm
Average Diameter of Sample			3.010	in	7.65	cm
Area	7.12	in^2	45.91	cm^2		
Volume	347.49	cm^3	0.0123	ft^3		
Mass	704.70	g	1.55	lb		

Dry Density	109.9	pcf
Vol. of Voids	97.60	cm^3
Vol. of Solids	249.88	cm^3
Void Ratio	0.39	
Saturation	94.8	%

Moisture Content

Mass of wet sample & tare	797.50	g
Mass of dry sample & tare	705.20	g
Mass of tare	94.20	g
% Moisture	15.1	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
02/26/09	10	0	-	2.05	144.20	19.05	15.5	-	-	-	
02/26/09	10	10	600	2.06	144.90	19.14	15.5	1.28E-07	1.122	1.43E-07	
02/26/09	10	20	600	2.05	144.20	19.05	15.5	1.28E-07	1.122	1.43E-07	
02/26/09	10	30	600	2.06	144.90	19.14	15.5	1.28E-07	1.122	1.43E-07	*
02/26/09	10	40	600	2.07	145.60	19.24	15.5	1.27E-07	1.122	1.43E-07	*
02/26/09	10	50	600	2.06	144.90	19.14	15.5	1.27E-07	1.122	1.43E-07	*
02/26/09	11	0	600	2.07	145.60	19.24	15.5	1.27E-07	1.122	1.43E-07	*

Reported Average Hydraulic Conductivity* 1.4E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	22	Balance ID #	1/6/7	Differential Pressure Transducer ID #	24/25
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	64
Syringe ID #	140			Pore Pressure Transducer ID #	26/27

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Tested By	RI
Date	02/26/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-03
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5521+5521A / ISS-02/9-1-1	Depth/Elev.	10'-35'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

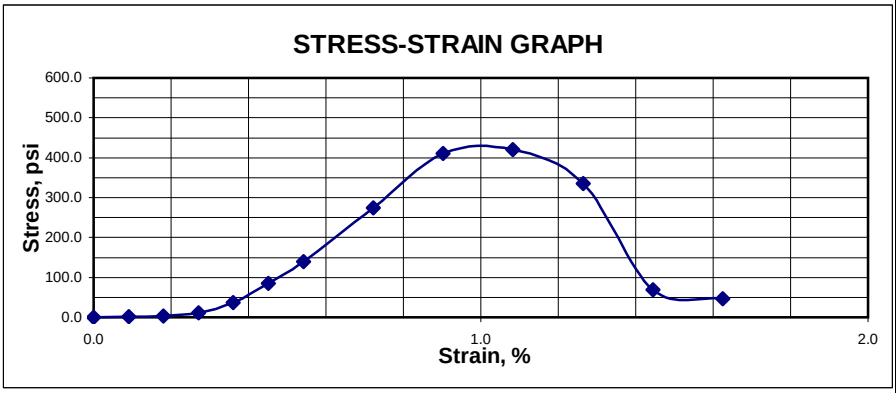
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.538
Initial Diameter, in	3.007
Height-to-Diameter Ratio	1.84
Initial Area, in^2	7.10
Initial Volume, in^3	39.33
Mass of Sample, g	1258.20
Wet Density, pcf	121.9
Dry Density, pcf	110.9
Machine Speed, in/min	0.025
Strain Rate, % / min	0.45

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1463.70
Mass of Dry Sample and Tare, g	1350.80
Mass of Tare, g	206.80
Moisture, %	9.9

TEST DATA

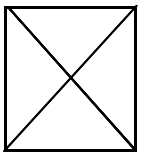
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	9	0.0	7.10	0.0
0.2	0.005	20	0.1	7.11	1.5
0.4	0.010	29	0.2	7.11	2.8
0.6	0.015	84	0.3	7.12	10.5
0.8	0.020	275	0.4	7.13	37.3
1.0	0.025	619	0.5	7.13	85.5
1.2	0.030	1011	0.5	7.14	140.3
1.6	0.040	1971	0.7	7.15	274.3
2.0	0.050	2948	0.9	7.17	410.1
2.4	0.060	3030	1.1	7.18	420.8
2.8	0.070	2420	1.3	7.19	335.2
3.2	0.080	510	1.4	7.21	69.5
3.6	0.090	340	1.6	7.22	45.9

REMARKS

Failure Code: 1

Failure Sketch



Failure Type: Cone

DESCRIPTION

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	420.8
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	210.4
STRAIN AT FAILURE, %	1.1

USCS (ASTM D2487: D2488): NA

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Tested By	RI
Date	01/08/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-02
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5521+5521A / ISS-02/8-1-2	Depth/Elev.	10'-35'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.969	in	7.54	cm
Diameter	3.002	in	7.63	cm
Area	7.08	in^2	45.66	cm^2
Volume	344.37	cm^3	0.0122	ft^3
Mass	656.20	g	1.45	lb
Specific Gravity	2.450	(Assumed)		
Dry Density	108.0	pcf		

Moisture Content

Mass of wet sample & tare	656.20	g
Mass of dry sample & tare	595.80	g
Mass of tare	0.00	g
% Moisture	10.1	

Test Data

Speed	13	
Board Number	2	
Cell Number	11	
Flow Pump Number	1A	
Flow Pump Rate	2.80E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	138.57	cm
Min Head	137.16	cm
Maximum Gradient	18.39	
Minimum Gradient	18.20	

Final Data (After Test)

Average Height of Sample		2.967	in	7.54	cm
Average Diameter of Sample		3.002	in	7.63	cm
Area	7.08 in^2	45.66	cm^2		
Volume	344.14 cm^3	0.0122	ft^3		
Mass	695.90 g	1.53	lb		

Dry Density	108.1	pcf
Vol. of Voids	100.85	cm^3
Vol. of Solids	243.29	cm^3
Void Ratio	0.41	
Saturation	99.0	%

Moisture Content

Mass of wet sample & tare	803.30	g
Mass of dry sample & tare	703.50	g
Mass of tare	107.70	g
% Moisture	16.8	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
01/09/09	13	30	-	1.95	137.16	18.20	16.7	-	-	-	
01/09/09	13	40	600	1.96	137.87	18.29	16.7	3.36E-08	1.087	3.65E-08	
01/09/09	13	50	600	1.97	138.57	18.39	16.7	3.34E-08	1.087	3.63E-08	
01/09/09	14	0	600	1.96	137.87	18.29	16.7	3.34E-08	1.087	3.63E-08	*
01/09/09	14	10	600	1.95	137.16	18.20	16.7	3.36E-08	1.087	3.65E-08	*
01/09/09	14	20	600	1.97	138.57	18.39	16.7	3.35E-08	1.087	3.64E-08	*
01/09/09	14	30	600	1.96	137.87	18.29	16.7	3.34E-08	1.087	3.63E-08	*

Reported Average Hydraulic Conductivity* 3.6E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	22	Balance ID #	1/6/7	Differential Pressure Transducer ID #	24/25
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	64
Syringe ID #	140			Pore Pressure Transducer ID #	26/27

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Web: www.test-llc.com

Tested By	RI
Date	01/08/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-02
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5521+5521A / ISS-02/8-1-1	Depth/Elev.	10'-35'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

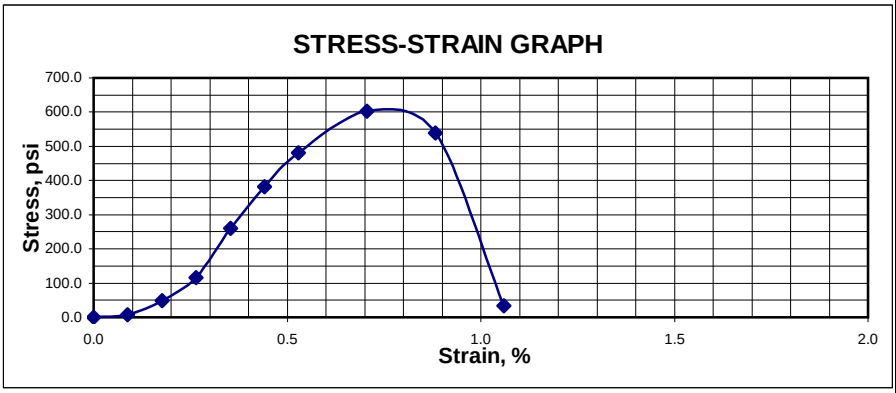
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.664
Initial Diameter, in	3.006
Height-to-Diameter Ratio	1.88
Initial Area, in^2	7.10
Initial Volume, in^3	40.20
Mass of Sample, g	1254.70
Wet Density, pcf	118.9
Dry Density, pcf	108.0
Machine Speed, in/min	0.025
Strain Rate, % / min	0.44

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1460.90
Mass of Dry Sample and Tare, g	1346.30
Mass of Tare, g	208.50
Moisture, %	10.1

TEST DATA

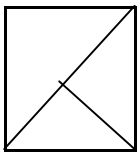
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	7.10	0.0
0.2	0.005	63	0.1	7.10	8.2
0.4	0.010	346	0.2	7.11	48.0
0.6	0.015	834	0.3	7.12	116.5
0.8	0.020	1853	0.4	7.12	259.5
1.0	0.025	2723	0.4	7.13	381.3
1.2	0.030	3435	0.5	7.13	480.8
1.6	0.040	4308	0.7	7.15	602.0
2.0	0.050	3871	0.9	7.16	539.9
2.4	0.060	247	1.1	7.17	33.7

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	602.0
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	301.0
STRAIN AT FAILURE, %	0.7

USCS (ASTM D2487: D2488)

NA

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Fax: 770-923-8973
Web: www.test-llc.com

Tested By	RI
Date	01/08/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-02
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5521+5521A / ISS-02/7-1-2	Depth/Elev.	10'-35'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.935	in	7.45	cm
Diameter	3.008	in	7.64	cm
Area	7.11	in^2	45.85	cm^2
Volume	341.79	cm^3	0.0121	ft^3
Mass	663.50	g	1.46	lb
Specific Gravity	2.600	(Assumed)		
Dry Density	110.2	pcf		

Moisture Content

Mass of wet sample & tare	663.50	g
Mass of dry sample & tare	603.40	g
Mass of tare	0.00	g
% Moisture	10.0	

Test Data

Speed	14	
Board Number	6	
Cell Number	10	
Flow Pump Number	2B	
Flow Pump Rate	1.40E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	219.46	cm
Min Head	218.05	cm
Maximum Gradient	29.44	
Minimum Gradient	29.25	

Final Data (After Test)

Average Height of Sample		2.935	in	7.45	cm
Average Diameter of Sample		3.008	in	7.64	cm
Area	7.11 in^2	45.85	cm^2		
Volume	341.79 cm^3	0.0121	ft^3		
Mass	709.80 g	1.56	lb		

Dry Density	110.2	pcf
Vol. of Voids	109.64	cm^3
Vol. of Solids	232.14	cm^3
Void Ratio	0.47	
Saturation	96.9	%

Moisture Content

Mass of wet sample & tare	802.90	g
Mass of dry sample & tare	696.70	g
Mass of tare	93.30	g
% Moisture	17.6	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
01/08/09	10	0	-	3.10	218.05	29.25	16.8	-	-	-	
01/08/09	10	10	600	3.11	218.76	29.34	16.8	1.04E-08	1.084	1.13E-08	
01/08/09	10	20	600	3.10	218.05	29.25	16.8	1.04E-08	1.084	1.13E-08	
01/08/09	10	30	600	3.11	218.76	29.34	16.8	1.04E-08	1.084	1.13E-08	*
01/08/09	10	40	600	3.12	219.46	29.44	16.8	1.04E-08	1.084	1.13E-08	*
01/08/09	10	50	600	3.11	218.76	29.34	16.8	1.04E-08	1.084	1.13E-08	*
01/08/09	11	0	600	3.12	219.46	29.44	16.8	1.04E-08	1.084	1.13E-08	*

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Reported Average Hydraulic Conductivity* 1.1E-08 cm/sec

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	246			Pore Pressure Transducer ID #	28

TIMELY ENGINEERING SOIL TESTS, LLC
1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

Tested By	RI
Date	01/08/09
Checked By	LB

Client Pr. #	11175065-00011	Lab. PR. #	838-02
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5521+5521A / ISS-02/7-1-1	Depth/Elev.	10'-35'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

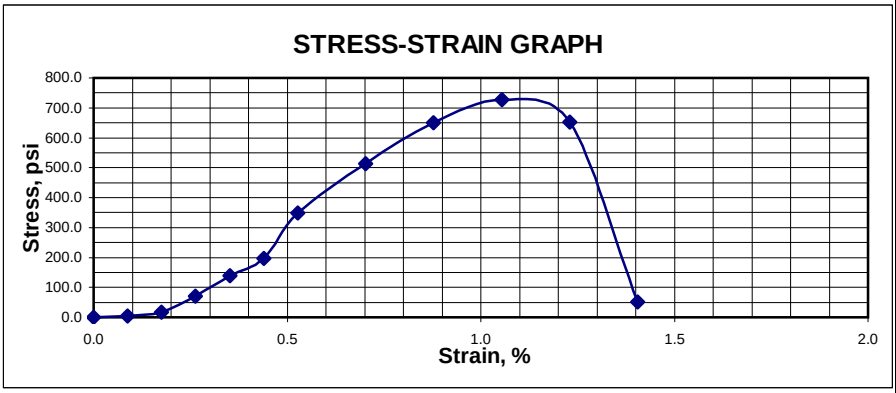
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.692
Initial Diameter, in	3.005
Height-to-Diameter Ratio	1.89
Initial Area, in^2	7.09
Initial Volume, in^3	40.37
Mass of Sample, g	1294.40
Wet Density, pcf	122.2
Dry Density, pcf	110.4
Machine Speed, in/min	0.025
Strain Rate, % / min	0.44

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1497.10
Mass of Dry Sample and Tare, g	1373.50
Mass of Tare, g	205.80
Moisture, %	10.6

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

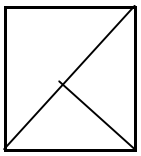
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	7.09	0.0
0.2	0.005	42	0.1	7.10	5.2
0.4	0.010	121	0.2	7.10	16.3
0.6	0.015	501	0.3	7.11	69.8
0.8	0.020	1002	0.4	7.12	140.1
1.0	0.025	1411	0.4	7.12	197.4
1.2	0.030	2485	0.5	7.13	347.8
1.6	0.040	3674	0.7	7.14	513.7
2.0	0.050	4651	0.9	7.16	649.3
2.4	0.060	5219	1.1	7.17	727.4
2.8	0.070	4690	1.2	7.18	652.5
3.2	0.080	373	1.4	7.19	51.2

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	727.4
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	363.7
STRAIN AT FAILURE, %	1.1

REMARKS

Failure Code: 3

Failure Sketch



Failure Type: Cone and Shear

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Web: www.test-llc.com

Tested By	RI
Date	01/08/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-02
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5521+5521A / ISS-02/6-1-2	Depth/Elev.	10'-35'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.895	in	7.35	cm
Diameter	3.007	in	7.64	cm
Area	7.10	in^2	45.82	cm^2
Volume	336.90	cm^3	0.0119	ft^3
Mass	629.50	g	1.39	lb
Specific Gravity	2.425	(Assumed)		
Dry Density	105.4	pcf		

Moisture Content

Mass of wet sample & tare	629.50	g
Mass of dry sample & tare	568.80	g
Mass of tare	0.00	g
% Moisture	10.7	

Test Data

Speed	8	
Board Number	8	
Cell Number	12	
Flow Pump Number	2A	
Flow Pump Rate	8.96E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	208.91	cm
Min Head	207.50	cm
Maximum Gradient	28.45	
Minimum Gradient	28.26	

Final Data (After Test)

Average Height of Sample			2.891	in	7.34	cm
Average Diameter of Sample			3.005	in	7.63	cm
Area	7.09	in^2	45.76	cm^2		
Volume	335.99	cm^3	0.0119	ft^3		
Mass	665.20	g	1.47	lb		

Dry Density	105.7	pcf
Vol. of Voids	101.40	cm^3
Vol. of Solids	234.59	cm^3
Void Ratio	0.43	
Saturation	95.0	%

Moisture Content

Mass of wet sample & tare	760.60	g
Mass of dry sample & tare	664.30	g
Mass of tare	95.50	g
% Moisture	16.9	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
01/09/09	12	0	-	2.95	207.50	28.26	16.8	-	-	-	
01/09/09	12	10	600	2.96	208.21	28.35	16.8	6.92E-07	1.084	7.50E-07	
01/09/09	12	20	600	2.95	207.50	28.26	16.8	6.92E-07	1.084	7.50E-07	
01/09/09	12	30	600	2.96	208.21	28.35	16.8	6.92E-07	1.084	7.50E-07	*
01/09/09	12	40	600	2.97	208.91	28.45	16.8	6.89E-07	1.084	7.48E-07	*
01/09/09	12	50	600	2.96	208.21	28.35	16.8	6.89E-07	1.084	7.48E-07	*
01/09/09	13	0	600	2.97	208.91	28.45	16.8	6.89E-07	1.084	7.48E-07	*

Reported Average Hydraulic Conductivity* 7.5E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Web: www.test-llc.com

Tested By	RI
Date	01/08/09
Checked By	VB

Client Pr. #	11175065-00011	Lab. PR. #	838-02
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5521+5521A / ISS-02/6-1-1	Depth/Elev.	10'-35'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

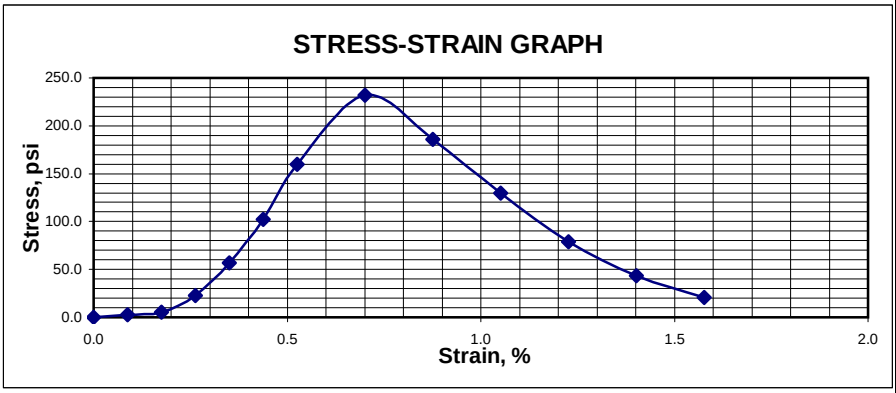
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.709
Initial Diameter, in	3.008
Height-to-Diameter Ratio	1.90
Initial Area, in^2	7.11
Initial Volume, in^3	40.57
Mass of Sample, g	1285.90
Wet Density, pcf	120.7
Dry Density, pcf	109.2
Machine Speed, in/min	0.025
Strain Rate, % / min	0.44

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1490.00
Mass of Dry Sample and Tare, g	1367.80
Mass of Tare, g	206.80
Moisture, %	10.5

TEST DATA

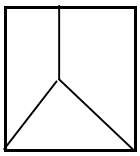
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	2	0.0	7.11	0.0
0.2	0.005	20	0.1	7.11	2.5
0.4	0.010	40	0.2	7.12	5.3
0.6	0.015	165	0.3	7.13	22.9
0.8	0.020	406	0.4	7.13	56.7
1.0	0.025	730	0.4	7.14	102.0
1.2	0.030	1143	0.5	7.14	159.7
1.6	0.040	1662	0.7	7.16	232.0
2.0	0.050	1333	0.9	7.17	185.7
2.4	0.060	931	1.1	7.18	129.4
2.8	0.070	570	1.2	7.19	78.9
3.2	0.080	314	1.4	7.21	43.3
3.6	0.090	152	1.6	7.22	20.8

REMARKS

Failure Code: 2

Failure Sketch



Failure Type: Cone and Split

DESCRIPTION

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	232.0
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	116.0
STRAIN AT FAILURE, %	0.7

USCS (ASTM D2487: D2488): NA

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Web: www.test-llc.com

Tested By	RI
Date	01/08/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-02
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5521+5521A / ISS-02/5-1-2	Depth/Elev.	10'-35'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.385	in	6.06	cm
Diameter	2.994	in	7.60	cm
Area	7.04	in^2	45.42	cm^2
Volume	275.16	cm^3	0.0097	ft^3
Mass	518.10	g	1.14	lb
Specific Gravity	2.450	(Assumed)		
Dry Density	104.1	pcf		

Moisture Content

Mass of wet sample & tare	518.10	g
Mass of dry sample & tare	459.00	g
Mass of tare	0.00	g
% Moisture	12.9	

Test Data

Speed	5	
Board Number	7	
Cell Number	13	
Flow Pump Number	2B	
Flow Pump Rate	7.17E-03	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	26.03	cm
Min Head	26.03	cm
Maximum Gradient	4.29	
Minimum Gradient	4.29	

Final Data (After Test)

Average Height of Sample			2.388	in	6.07	cm
Average Diameter of Sample			2.997	in	7.61	cm
Area	7.05	in^2	45.51	cm^2		
Volume	276.06	cm^3	0.0097	ft^3		
Mass	544.30	g	1.20	lb		

Dry Density	103.8	pcf
Vol. of Voids	88.61	cm^3
Vol. of Solids	187.45	cm^3
Void Ratio	0.47	
Saturation	96.0	%

Moisture Content

Mass of wet sample & tare	644.70	g
Mass of dry sample & tare	559.70	g
Mass of tare	100.70	g
% Moisture	18.5	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
01/09/09	13	30	-	0.37	26.03	4.29	16.8	-	-	-	
01/09/09	13	40	600	0.37	26.03	4.29	16.8	3.67E-05	1.084	3.98E-05	
01/09/09	13	50	600	0.37	26.03	4.29	16.8	3.67E-05	1.084	3.98E-05	
01/09/09	14	0	600	0.37	26.03	4.29	16.8	3.67E-05	1.084	3.98E-05	*
01/09/09	14	10	600	0.37	26.03	4.29	16.8	3.67E-05	1.084	3.98E-05	*
01/09/09	14	20	600	0.37	26.03	4.29	16.8	3.67E-05	1.084	3.98E-05	*
01/09/09	14	30	600	0.37	26.03	4.29	16.8	3.67E-05	1.084	3.98E-05	*

Reported Average Hydraulic Conductivity* 4.0E-05 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	246			Pore Pressure Transducer ID #	28

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Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

Tested By	RI
Date	01/08/09
Checked By	LB

Client Pr. #	11175065-00011	Lab. PR. #	838-02
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5521+5521A / ISS-02/5-1-1	Depth/Elev.	10'-35'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

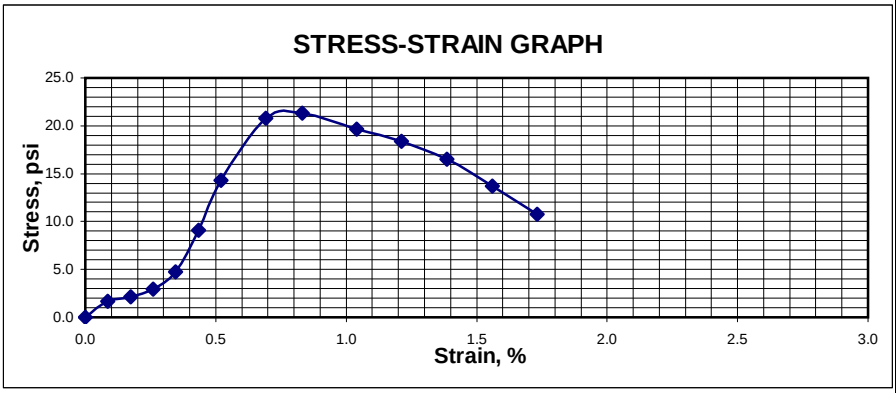
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.773
Initial Diameter, in	3.008
Height-to-Diameter Ratio	1.92
Initial Area, in^2	7.11
Initial Volume, in^3	41.02
Mass of Sample, g	1305.50
Wet Density, pcf	121.2
Dry Density, pcf	108.8
Machine Speed, in/min	0.025
Strain Rate, % / min	0.43

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1510.40
Mass of Dry Sample and Tare, g	1377.70
Mass of Tare, g	207.40
Moisture, %	11.3

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

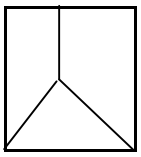
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	7.11	0.0
0.2	0.005	17	0.1	7.11	1.7
0.4	0.010	20	0.2	7.12	2.1
0.6	0.015	26	0.3	7.12	2.9
0.8	0.020	39	0.3	7.13	4.8
1.0	0.025	70	0.4	7.14	9.1
1.2	0.030	107	0.5	7.14	14.3
1.6	0.040	154	0.7	7.16	20.8
1.9	0.048	158	0.8	7.17	21.4
2.4	0.060	146	1.0	7.18	19.6
2.8	0.070	137	1.2	7.19	18.3
3.2	0.080	124	1.4	7.21	16.5
3.6	0.090	104	1.6	7.22	13.7
4.0	0.100	83	1.7	7.23	10.8

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	21.4
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	10.7
STRAIN AT FAILURE, %	0.8

REMARKS

Failure Code: 2

Failure Sketch



Failure Type: Cone and Split

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Fax: 770-923-8973
Web: www.test-llc.com

Tested By	RI
Date	11/17/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5521+5521A / ISS-02/4-1-2	Depth/Elev.	10'-35'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	3.004	in	7.63	cm
Diameter	2.821	in	7.17	cm
Area	6.25	in^2	40.32	cm^2
Volume	307.68	cm^3	0.0109	ft^3
Mass	606.80	g	1.34	lb
Specific Gravity	2.500	(Assumed)		
Dry Density	111.7	pcf		

Moisture Content

Mass of wet sample & tare	606.80	g
Mass of dry sample & tare	551.00	g
Mass of tare	0.00	g
% Moisture	10.1	

Test Data

Speed	13	
Board Number	3	
Cell Number	15	
Flow Pump Number	2A	
Flow Pump Rate	2.80E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	189.21	cm
Min Head	187.81	cm
Maximum Gradient	24.77	
Minimum Gradient	24.58	

Final Data (After Test)

Average Height of Sample			3.008	in	7.64	cm
Average Diameter of Sample			2.820	in	7.16	cm
Area	6.25	in^2	40.30	cm^2		
Volume	307.87	cm^3	0.0109	ft^3		
Mass	637.70	g	1.41	lb		

Dry Density	111.7	pcf
Vol. of Voids	87.47	cm^3
Vol. of Solids	220.40	cm^3
Void Ratio	0.40	
Saturation	99.1	%

Moisture Content

Mass of wet sample & tare	738.80	g
Mass of dry sample & tare	652.10	g
Mass of tare	101.10	g
% Moisture	15.7	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
11/17/08	11	0	-	2.67	187.81	24.58	18.5	-	-	-	
11/17/08	11	10	600	2.68	188.51	24.67	18.5	2.82E-08	1.038	2.93E-08	
11/17/08	11	20	600	2.67	187.81	24.58	18.5	2.82E-08	1.038	2.93E-08	
11/17/08	11	30	600	2.68	188.51	24.67	18.5	2.82E-08	1.038	2.93E-08	*
11/17/08	11	40	600	2.69	189.21	24.77	18.5	2.81E-08	1.038	2.92E-08	*
11/17/08	11	50	600	2.68	188.51	24.67	18.5	2.81E-08	1.038	2.92E-08	*
11/17/08	12	0	600	2.69	189.21	24.77	18.5	2.81E-08	1.038	2.92E-08	*

Reported Average Hydraulic Conductivity* 2.9E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	29
Syringe ID #	245			Pore Pressure Transducer ID #	26/27

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Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

Tested By	RI
Date	11/17/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5521+5521A / ISS-02/4-1-1	Depth/Elev.	10'-35'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

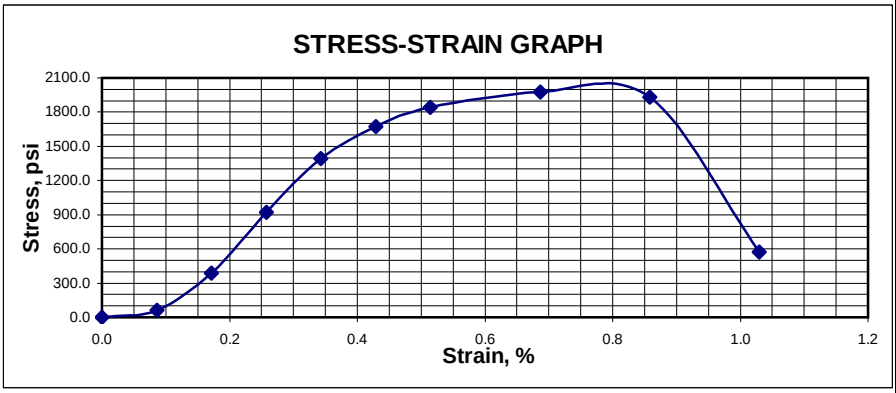
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.828
Initial Diameter, in	3.013
Height-to-Diameter Ratio	1.93
Initial Area, in^2	7.13
Initial Volume, in^3	41.55
Mass of Sample, g	1332.70
Wet Density, pcf	122.2
Dry Density, pcf	110.1
Machine Speed, in/min	0.025
Strain Rate, % / min	0.43

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1460.80
Mass of Dry Sample and Tare, g	1331.30
Mass of Tare, g	145.80
Moisture, %	10.9

TEST DATA

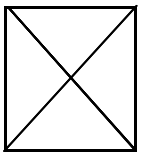
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	5	0.0	7.13	0.0
0.2	0.005	450	0.1	7.14	62.4
0.4	0.010	2780	0.2	7.14	388.5
0.6	0.015	6570	0.3	7.15	918.4
0.8	0.020	9980	0.3	7.15	1394.2
1.0	0.025	11986	0.4	7.16	1673.2
1.2	0.030	13200	0.5	7.17	1841.1
1.6	0.040	14178	0.7	7.18	1974.2
2.0	0.050	13900	0.9	7.19	1932.1
2.4	0.060	4150	1.0	7.20	575.4
	0.070				
	0.080				
	0.090				
	0.100				
	0.110				
	0.120				
	0.130				
	0.140				
	0.150				
	0.160				
	0.170				

REMARKS

Failure Code: 1

Failure Sketch



Failure Type: Cone

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	1974.2
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	987.1
STRAIN AT FAILURE, %	0.7

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1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
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Web: www.test-llc.com

Tested By	RI
Date	11/17/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5521+5521A / ISS-02/3-1-2	Depth/Elev.	10'-35'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	3.005	in	7.63	cm
Diameter	2.824	in	7.17	cm
Area	6.26	in^2	40.41	cm^2
Volume	308.44	cm^3	0.0109	ft^3
Mass	622.80	g	1.37	lb
Specific Gravity	2.550	(Assumed)		
Dry Density	115.0	pcf		

Moisture Content

Mass of wet sample & tare	622.80	g
Mass of dry sample & tare	568.40	g
Mass of tare	0.00	g
% Moisture	9.6	

Test Data

Speed	12	
Board Number	8	
Cell Number	4	
Flow Pump Number	1A	
Flow Pump Rate	5.60E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	173.74	cm
Min Head	172.33	cm
Maximum Gradient	22.78	
Minimum Gradient	22.59	

Final Data (After Test)

Average Height of Sample		3.003	in	7.63	cm
Average Diameter of Sample		2.832	in	7.19	cm
Area	6.30 in^2	40.64	cm^2		
Volume	309.98 cm^3	0.0109	ft^3		
Mass	652.70 g	1.44	lb		

Dry Density	114.5	pcf
Vol. of Voids	87.01	cm^3
Vol. of Solids	222.97	cm^3
Void Ratio	0.39	
Saturation	96.7	%

Moisture Content

Mass of wet sample & tare	756.80	g
Mass of dry sample & tare	672.70	g
Mass of tare	104.30	g
% Moisture	14.8	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
11/17/08	12	50	-	2.45	172.33	22.59	18.6	-	-	-	
11/17/08	13	0	600	2.46	173.04	22.69	18.6	6.09E-08	1.036	6.30E-08	
11/17/08	13	10	600	2.45	172.33	22.59	18.6	6.09E-08	1.036	6.30E-08	
11/17/08	13	20	600	2.46	173.04	22.69	18.6	6.09E-08	1.036	6.30E-08	*
11/17/08	13	30	600	2.47	173.74	22.78	18.6	6.06E-08	1.036	6.28E-08	*
11/17/08	13	40	600	2.47	173.74	22.78	18.6	6.05E-08	1.036	6.26E-08	*
11/17/08	13	50	600	2.47	173.74	22.78	18.6	6.05E-08	1.036	6.26E-08	*

Reported Average Hydraulic Conductivity* 6.3E-08 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	22	Balance ID #	1/6/7	Differential Pressure Transducer ID #	24/25
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	140			Pore Pressure Transducer ID #	28

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1874 Forge Street Tucker, GA 30084
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Fax: 770-923-8973
Web: www.test-llc.com

Tested By	RI
Date	11/17/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5521+5521A / ISS-02/3-1-1	Depth/Elev.	10'-35'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

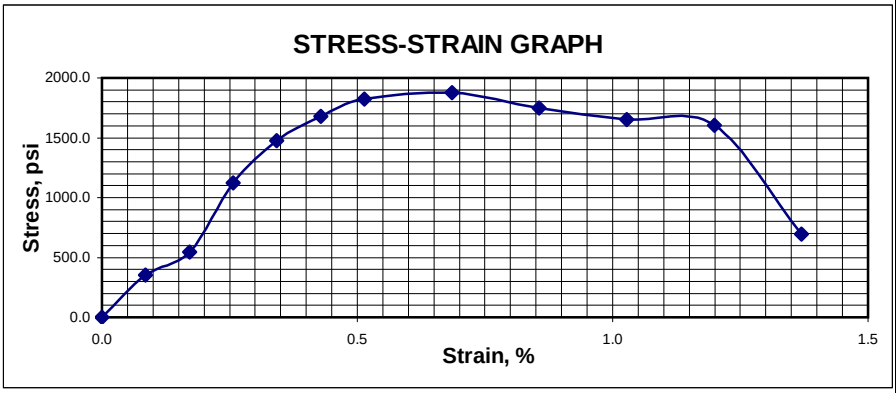
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.840
Initial Diameter, in	3.014
Height-to-Diameter Ratio	1.94
Initial Area, in^2	7.13
Initial Volume, in^3	41.67
Mass of Sample, g	1360.90
Wet Density, pcf	124.4
Dry Density, pcf	113.0
Machine Speed, in/min	0.025
Strain Rate, % / min	0.43

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1510.80
Mass of Dry Sample and Tare, g	1386.60
Mass of Tare, g	152.90
Moisture, %	10.1

TEST DATA

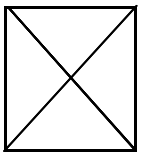
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	8	0.0	7.13	0.0
0.2	0.005	2510	0.1	7.14	350.4
0.4	0.010	3890	0.2	7.15	543.2
0.6	0.015	8060	0.3	7.15	1125.7
0.8	0.020	10590	0.3	7.16	1478.1
1.0	0.025	12040	0.4	7.17	1679.2
1.2	0.030	13100	0.5	7.17	1825.5
1.6	0.040	13490	0.7	7.18	1876.7
2.0	0.050	12610	0.9	7.20	1751.2
2.4	0.060	11936	1.0	7.21	1654.7
2.8	0.070	11600	1.2	7.22	1605.3
3.2	0.080	5040	1.4	7.23	695.6
	0.090				
	0.100				
	0.110				
	0.120				
	0.130				
	0.140				
	0.150				
	0.160				
	0.170				

REMARKS

Failure Code: 1

Failure Sketch



Failure Type: Cone

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	1876.7
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	938.3
STRAIN AT FAILURE, %	0.7

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Web: www.test-llc.com

Tested By	LB/RI
Date	11/17/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5521+5521A / ISS-02/2-1-2	Depth/Elev.	10'-35'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	3.008	in	7.64	cm
Diameter	2.833	in	7.20	cm
Area	6.30	in^2	40.67	cm^2
Volume	310.71	cm^3	0.0110	ft^3
Mass	572.80	g	1.26	lb
Specific Gravity	2.500	(Assumed)		
Dry Density	103.9	pcf		

Moisture Content

Mass of wet sample & tare	572.80	g
Mass of dry sample & tare	517.20	g
Mass of tare	0.00	g
% Moisture	10.8	

Test Data

Speed	12	
Board Number	2	
Cell Number	7	
Flow Pump Number	2A	
Flow Pump Rate	5.60E-05	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	201.88	cm
Min Head	200.47	cm
Maximum Gradient	26.55	
Minimum Gradient	26.36	

Final Data (After Test)

Average Height of Sample			2.994	in	7.60	cm
Average Diameter of Sample			2.840	in	7.21	cm
Area	6.33	in^2	40.87	cm^2		
Volume	310.80	cm^3	0.0110	ft^3		
Mass	619.20	g	1.37	lb		

Dry Density	103.9	pcf
Vol. of Voids	103.89	cm^3
Vol. of Solids	206.91	cm^3
Void Ratio	0.50	
Saturation	98.1	%

Moisture Content

Mass of wet sample & tare	718.70	g
Mass of dry sample & tare	616.80	g
Mass of tare	99.60	g
% Moisture	19.7	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
11/17/08	17	10	-	2.85	200.47	26.36	19.9	-	-	-	
11/17/08	17	20	600	2.87	201.88	26.55	19.9	5.18E-08	1.003	5.19E-08	
11/17/08	17	30	600	2.86	201.17	26.45	19.9	5.17E-08	1.003	5.18E-08	
11/17/08	17	40	600	2.87	201.88	26.55	19.9	5.17E-08	1.003	5.18E-08	*
11/17/08	17	50	600	2.87	201.88	26.55	19.9	5.16E-08	1.003	5.18E-08	*
11/17/08	18	0	600	2.87	201.88	26.55	19.9	5.16E-08	1.003	5.18E-08	*
11/17/08	18	10	600	2.87	201.88	26.55	19.9	5.16E-08	1.003	5.18E-08	*

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Reported Average Hydraulic Conductivity* 5.2E-08 cm/sec

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	64
Syringe ID #	245			Pore Pressure Transducer ID #	26/27

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Fax: 770-923-8973
Web: www.test-llc.com

Tested By	RI
Date	11/17/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5521+5521A / ISS-02/2-1-1	Depth/Elev.	10'-35'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

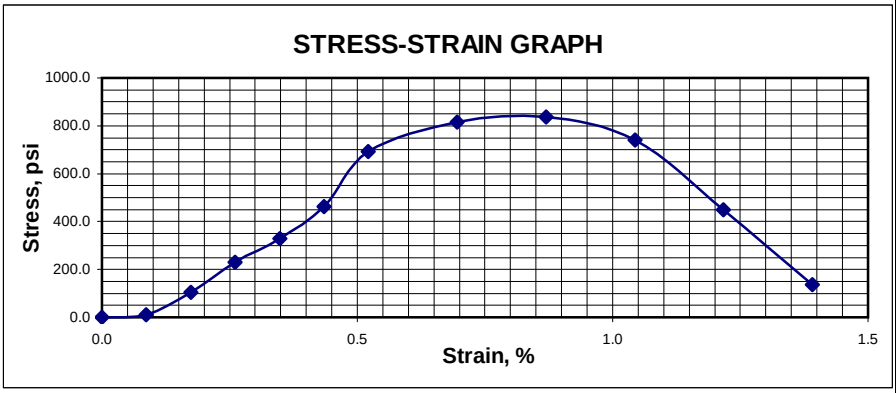
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.750
Initial Diameter, in	3.007
Height-to-Diameter Ratio	1.91
Initial Area, in^2	7.10
Initial Volume, in^3	40.83
Mass of Sample, g	1255.80
Wet Density, pcf	117.2
Dry Density, pcf	106.0
Machine Speed, in/min	0.025
Strain Rate, % / min	0.43

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1456.90
Mass of Dry Sample and Tare, g	1338.00
Mass of Tare, g	205.00
Moisture, %	10.5

TEST DATA

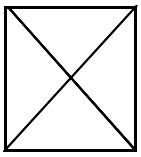
Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	9	0.0	7.10	0.0
0.2	0.005	93	0.1	7.11	11.8
0.4	0.010	745	0.2	7.11	103.5
0.6	0.015	1640	0.3	7.12	229.1
0.8	0.020	2351	0.3	7.13	328.6
1.0	0.025	3311	0.4	7.13	462.9
1.2	0.030	4960	0.5	7.14	693.5
1.6	0.040	5843	0.7	7.15	815.8
2.0	0.050	6014	0.9	7.16	838.2
2.4	0.060	5320	1.0	7.18	740.1
2.8	0.070	3240	1.2	7.19	449.4
3.2	0.080	990	1.4	7.20	136.2
	0.090				
	0.100				
	0.110				
	0.120				
	0.130				
	0.140				
	0.150				
	0.160				
	0.170				

REMARKS

Failure Code: 1

Failure Sketch



Failure Type: Cone

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	838.2
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	419.1
STRAIN AT FAILURE, %	0.9

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1874 Forge Street Tucker, GA 30084
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Web: www.test-llc.com

Tested By	RI
Date	01/08/09
Checked By	LB

Client Pr. #	11175065-00011	Lab. PR. #	838-02
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5521+5521A / ISS-02/1-2-2	Depth/Elev.	10'-35'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.957	in	7.51	cm
Diameter	3.006	in	7.64	cm
Area	7.10	in^2	45.79	cm^2
Volume	343.89	cm^3	0.0121	ft^3
Mass	629.90	g	1.39	lb
Specific Gravity	2.450	(Assumed)		
Dry Density	102.7	pcf		

Moisture Content

Mass of wet sample & tare	629.90	g
Mass of dry sample & tare	565.90	g
Mass of tare	0.00	g
% Moisture	11.3	

Test Data

Speed	11	
Board Number	5	
Cell Number	3	
Flow Pump Number	2A	
Flow Pump Rate	1.12E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	117.47	cm
Min Head	116.06	cm
Maximum Gradient	15.65	
Minimum Gradient	15.46	

Final Data (After Test)

Average Height of Sample			2.955	in	7.51	cm
Average Diameter of Sample			3.003	in	7.63	cm
Area	7.08	in^2	45.69	cm^2		
Volume	342.97	cm^3	0.0121	ft^3		
Mass	673.10	g	1.48	lb		

Dry Density	103.0	pcf
Vol. of Voids	111.89	cm^3
Vol. of Solids	231.08	cm^3
Void Ratio	0.48	
Saturation	95.6	%

Moisture Content

Mass of wet sample & tare	767.90	g
Mass of dry sample & tare	661.00	g
Mass of tare	95.10	g
% Moisture	18.9	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
01/09/09	10	30	-	1.66	116.76	15.56	19.8	-	-	-	
01/09/09	10	40	600	1.65	116.06	15.46	19.8	1.58E-07	1.005	1.59E-07	
01/09/09	10	50	600	1.66	116.76	15.56	19.8	1.58E-07	1.005	1.59E-07	
01/09/09	11	0	600	1.67	117.47	15.65	19.8	1.57E-07	1.005	1.58E-07	*
01/09/09	11	10	600	1.65	116.06	15.46	19.8	1.58E-07	1.005	1.58E-07	*
01/09/09	11	20	600	1.66	116.76	15.56	19.8	1.58E-07	1.005	1.59E-07	*
01/09/09	11	30	600	1.67	117.47	15.65	19.8	1.57E-07	1.005	1.58E-07	*

Reported Average Hydraulic Conductivity* 1.6E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	245			Pore Pressure Transducer ID #	28

TIMELY ENGINEERING SOIL TESTS, LLC
1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
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Web: www.test-llc.com

Tested By	RI
Date	01/08/09
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-02
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5521+5521A / ISS-02/1-2-1	Depth/Elev.	10'-35'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

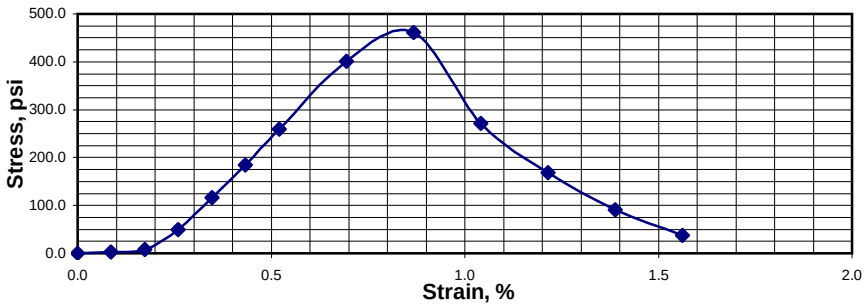
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.762
Initial Diameter, in	3.010
Height-to-Diameter Ratio	1.91
Initial Area, in^2	7.12
Initial Volume, in^3	41.00
Mass of Sample, g	1226.00
Wet Density, pcf	113.9
Dry Density, pcf	102.8
Machine Speed, in/min	0.025
Strain Rate, % / min	0.43

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

WATER CONTENT DETERMINATION

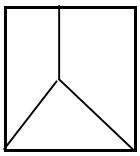
Mass of Wet Sample and Tare, g	1427.20
Mass of Dry Sample and Tare, g	1308.50
Mass of Tare, g	203.80
Moisture, %	10.7

Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	2	0.0	7.12	0.0
0.2	0.005	20	0.1	7.12	2.5
0.4	0.010	57	0.2	7.13	7.7
0.6	0.015	351	0.3	7.13	48.9
0.8	0.020	834	0.3	7.14	116.5
1.0	0.025	1325	0.4	7.15	185.1
1.2	0.030	1853	0.5	7.15	258.8
1.6	0.040	2880	0.7	7.17	401.6
2.0	0.050	3317	0.9	7.18	461.8
2.4	0.060	1950	1.0	7.19	270.9
2.8	0.070	1212	1.2	7.20	168.0
3.2	0.080	657	1.4	7.22	90.8
3.6	0.090	270	1.6	7.23	37.1

REMARKS

Failure Code: 2

Failure Sketch



Failure Type: Cone and Split

DESCRIPTION

NA

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	461.8
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	230.9
STRAIN AT FAILURE, %	0.9

USCS (ASTM D2487: D2488): NA

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Tested By	KI
Date	11/17/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5521+5521A / ISS-02/1-1-2	Depth/Elev.	10'-35'
Location	-	Add. Info	Curing age-28 days

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	2.929	in	7.44	cm
Diameter	3.007	in	7.64	cm
Area	7.10	in^2	45.82	cm^2
Volume	340.86	cm^3	0.0120	ft^3
Mass	645.00	g	1.42	lb
Specific Gravity	2.450	(Assumed)		
Dry Density	107.3	pcf		

Moisture Content

Mass of wet sample & tare	645.00	g
Mass of dry sample & tare	586.00	g
Mass of tare	0.00	g
% Moisture	10.1	

Test Data

Speed	11	
Board Number	7	
Cell Number	13	
Flow Pump Number	2A	
Flow Pump Rate	1.12E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	110.0	psi
Back Pressure	90.0	psi
Confining (Effective) Pressure	20.0	psi
Max Head	68.23	cm
Min Head	67.53	cm
Maximum Gradient	9.18	
Minimum Gradient	9.08	

Final Data (After Test)

Average Height of Sample			2.927	in	7.43	cm
Average Diameter of Sample			3.002	in	7.63	cm
Area	7.08	in^2	45.66	cm^2		
Volume	339.50	cm^3	0.0120	ft^3		
Mass	687.30	g	1.52	lb		

Dry Density	107.7	pcf
Vol. of Voids	100.28	cm^3
Vol. of Solids	239.22	cm^3
Void Ratio	0.42	
Saturation	100.9	%

Moisture Content

Mass of wet sample & tare	788.20	g
Mass of dry sample & tare	687.00	g
Mass of tare	101.00	g
% Moisture	17.3	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
11/17/08	9	10	-	0.97	68.23	9.18	18.5	-	-	-	
11/17/08	9	20	600	0.96	67.53	9.08	18.5	2.69E-07	1.038	2.79E-07	
11/17/08	9	30	600	0.97	68.23	9.18	18.5	2.69E-07	1.038	2.79E-07	
11/17/08	9	40	600	0.97	68.23	9.18	18.5	2.67E-07	1.038	2.77E-07	*
11/17/08	9	50	600	0.96	67.53	9.08	18.5	2.69E-07	1.038	2.79E-07	*
11/17/08	10	0	600	0.97	68.23	9.18	18.5	2.69E-07	1.038	2.79E-07	*
11/17/08	10	10	600	0.96	67.53	9.08	18.5	2.69E-07	1.038	2.79E-07	*

Reported Average Hydraulic Conductivity* 2.8E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: NA

USCS (ASTM D2487;2488): NA

REMARKS:

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	RI
Date	11/17/08
Checked By	

Client Pr. #	11175065-00011	Lab. PR. #	838-01
Pr. Name	National Grid Hempstead,NY MGP	S. Type	Mold
Sample ID	5521+5521A / ISS-02/1-1-1	Depth/Elev.	10'-35'
Location	-	Add. Info	Curing age-28 days

ASTM D 2166

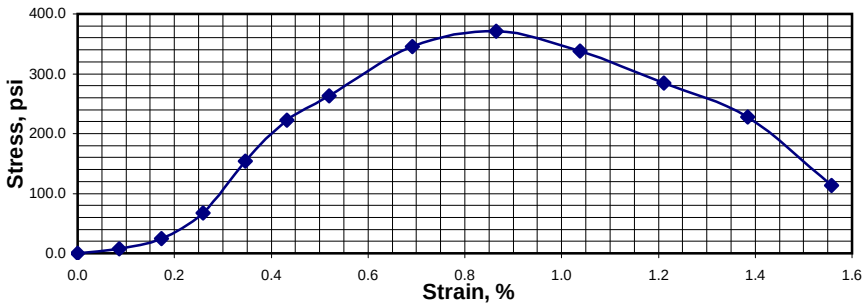
Standard Test Method for Unconfined Compressive Strength of Soils

SAMPLE DATA

Initial Height, in	5.780
Initial Diameter, in	3.009
Height-to-Diameter Ratio	1.92
Initial Area, in^2	7.11
Initial Volume, in^3	41.10
Mass of Sample, g	1298.20
Wet Density, pcf	120.3
Dry Density, pcf	108.8
Machine Speed, in/min	0.025
Strain Rate, % / min	0.43

Note: Water content was obtained after shear from partial sample.

STRESS-STRAIN GRAPH



WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1500.30
Mass of Dry Sample and Tare, g	1377.50
Mass of Tare, g	208.10
Moisture, %	10.5

TEST DATA

Balance ID	1/7	Oven ID	12/13/14/15
Load Cell ID	11	Caliper ID	16/17
Apparatus ID	10	Def. Indicator ID	9/93

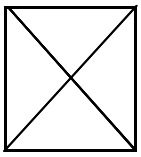
Elapsed Time (min)	Deformation (inch)	Axial Load (lb)	Total Strain (%)	Corrected Area (in^2)	Compressive Stress (psi)
0.0	0.000	8	0.0	7.11	0.0
0.2	0.005	62	0.1	7.12	7.6
0.4	0.010	184	0.2	7.12	24.7
0.6	0.015	485	0.3	7.13	66.9
0.8	0.020	1109	0.3	7.14	154.3
1.0	0.025	1594	0.4	7.14	222.1
1.2	0.030	1886	0.5	7.15	262.7
1.6	0.040	2483	0.7	7.16	345.6
2.0	0.050	2668	0.9	7.17	370.8
2.4	0.060	2435	1.0	7.19	337.8
2.8	0.070	2055	1.2	7.20	284.4
3.2	0.080	1652	1.4	7.21	228.0
3.6	0.090	830	1.6	7.22	113.8
4.0	0.100	520	1.7	7.24	70.8
	0.110				
	0.120				
	0.130				
	0.140				
	0.150				
	0.160				
	0.170				

UNCONFINED COMPRESSIVE STRENGTH AT FAILURE, q_u (psi)	370.8
UNCONFINED SHEAR STRENGTH AT FAILURE, s_u (psi)	185.4
STRAIN AT FAILURE, %	0.9

REMARKS

Failure Code: 1

Failure Sketch



Failure Type: Cone

DESCRIPTION

NA

USCS (ASTM D2487: D2488)

NA

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Batch Worksheet

BATCH-SAMPLE ID	(5525+5525A)-8-1			BATCH #	1
PR. NUMBER	838-02	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	12/12/2008

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**302.5**
Soil Moisture Content, %	**11.0**
Type of Cement Used	I/II
Grout Water/Cem. Mat. Ratio	**0.76**
Mass of Dry Soil, g	**2750.0**
Total Water/Cem. Mat. Ratio	**1.680**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5525+5525A	**Soil (wet)**	100.0	**3052.5**
5527	GGBFS	7.5	**206.3**
5526	Cement	2.5	**68.8**
5751	Organoclay	2.0	**55.0**
	Water, mL	252	

Remarks

Max. Viscosity @1 RPM about 146K cP (mPa s)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5525+5525A)-8-1-1	UCS	3	6					28 days
(5525+5525A)-8-1-2	Perm	3	3					28 days
(5525+5525A)-8-1-3	UCS	2	4					EXTRA
(5525+5525A)-8-1-4	Perm	3	3					EXTRA

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Batch Worksheet

BATCH-SAMPLE ID	(5525+5525A)-7-1			BATCH #	1
PR. NUMBER	838-02	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	12/12/2008

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**302.5**
Soil Moisture Content, %	**11.0**
Type of Cement Used	I/II
Grout Water/Cem. Mat. Ratio	**0.76**
Mass of Dry Soil, g	**2750.0**
Total Water/Cem. Mat. Ratio	**1.680**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5525+5525A	**Soil (wet)**	100.0	**3052.5**
5527	GGBFS	7.5	**206.3**
5526	Cement	2.5	**68.8**
3472	Bentonite	2.0	**55.0**
	Water, mL	252	

Remarks

Max. Viscosity @1 RPM about 907K cP (mPa s)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5525+5525A)-7-1-1	UCS	3	6					28 days
(5525+5525A)-7-1-2	Perm	3	3					28 days
(5525+5525A)-7-1-3	UCS	2	4					EXTRA
(5525+5525A)-7-1-4	Perm	3	3					EXTRA

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Batch Worksheet

BATCH-SAMPLE ID	(5525+5525A)-6-1			BATCH #	1
PR. NUMBER	838-02	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	12/12/2008

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**302.5**
Soil Moisture Content, %	**11.0**
Type of Cement Used	I/II
Grout Water/Cem. Mat. Ratio	**0.77**
Mass of Dry Soil, g	**2750.0**
Total Water/Cem. Mat. Ratio	**2.230**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5525+5525A	**Soil (wet)**	100.0	**3052.5**
5527	GGBFS	5.625	**154.7**
5526	Cement	1.875	**51.6**
	Water, mL	158	

Remarks

Max. Viscosity @1 RPM about 1050K cP (mPa s)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5525+5525A)-6-1-1	UCS	3	6					28 days
(5525+5525A)-6-1-2	Perm	3	3					28 days
(5525+5525A)-6-1-3	UCS	2	4					EXTRA
(5525+5525A)-6-1-4	Perm	3	3					EXTRA

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Batch Worksheet

BATCH-SAMPLE ID	(5525+5525A)-5-1			BATCH #	1
PR. NUMBER	838-02	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	12/12/2008

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**302.5**
Soil Moisture Content, %	**11.0**
Type of Cement Used	I/II
Grout Water/Cem. Mat. Ratio	**1.20**
Mass of Dry Soil, g	**2750.0**
Total Water/Cem. Mat. Ratio	**3.400**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5525+5525A	**Soil (wet)**	100.0	**3052.5**
5527	GGBFS	3.75	**103.1**
5526	Cement	1.25	**34.4**
	Water, mL	165	

Remarks

Max. Viscosity @1 RPM about 818K cP (mPa s)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5525+5525A)-5-1-1	UCS	3	6					28 days
(5525+5525A)-5-1-2	Perm	3	3					28 days
(5525+5525A)-5-1-3	UCS	2	4					EXTRA
(5525+5525A)-5-1-4	Perm	3	3					EXTRA

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Batch Worksheet

BATCH-SAMPLE ID	(5525+5525A)-4-1			BATCH #	1
PR. NUMBER	838-01	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	10/21/08

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**418.0**
Soil Moisture Content, %	**11.0**
Type of Cement Used	I/II
Grout Water/Cem. Mat. Ratio	**0.40**
Mass of Dry Soil, g	**3800.0**
Total Water/Cem. Mat. Ratio	**0.67**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5525+5525A	**Soil (wet)**	100.0	**4218.0**
5527	GGBFS	30.0	**1140.0**
5526	Cement	10.0	**380.0**
	Water, mL	600	

Remarks

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5525+5525A)-4-1-1	UCS	3	6					28 days
(5525+5525A)-4-1-2	Perm	3	3					28 days
(5525+5525A)-4-1-3	UCS	3	6					EXTRA
(5525+5525A)-4-1-4	Perm	3	3					EXTRA

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Batch Worksheet

BATCH-SAMPLE ID	(5525+5525A)-3-1			BATCH #	1
PR. NUMBER	838-01	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	10/21/08

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**418.0**
Soil Moisture Content, %	**11.0**
Type of Cement Used	I/II
Grout Water/Cem. Mat. Ratio	**0.40**
Mass of Dry Soil, g	**3800.0**
Total Water/Cem. Mat. Ratio	**0.77**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5525+5525A	**Soil (wet)**	100.0	**4218.0**
5527	GGBFS	22.5	**855.0**
5526	Cement	7.5	**285.0**
	Water, mL	460	

Remarks

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5525+5525A)-3-1-1	UCS	3	6					28 days
(5525+5525A)-3-1-2	Perm	3	3					28 days
(5525+5525A)-3-1-3	UCS	3	6					EXTRA
(5525+5525A)-3-1-4	Perm	3	3					EXTRA

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Batch Worksheet

BATCH-SAMPLE ID	(5525+5525A)-2-1			BATCH #	1
PR. NUMBER	838-01	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	10/21/08

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**418.0**
Soil Moisture Content, %	**11.0**
Type of Cement Used	I/II
Grout Water/Cem. Mat. Ratio	**0.40**
Mass of Dry Soil, g	**3800.0**
Total Water/Cem. Mat. Ratio	**0.95**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5525+5525A	**Soil (wet)**	100.0	**4218.0**
5527	GGBFS	15.0	**570.0**
5526	Cement	5.0	**190.0**
	Water, mL	304	

Remarks

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5525+5525A)-2-1-1	UCS	3	6					28 days
(5525+5525A)-2-1-2	Perm	3	3					28 days
(5525+5525A)-2-1-3	UCS	3	6					EXTRA
(5525+5525A)-2-1-4	Perm	3	3					EXTRA

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Batch Worksheet

BATCH-SAMPLE ID	(5525+5525A)-1-2			BATCH #	2
PR. NUMBER	838-02	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	12/12/2008

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**275.0**
Soil Moisture Content, %	**11.0**
Type of Cement Used	I/II
Grout Water/Cem. Mat. Ratio	**0.55**
Mass of Dry Soil, g	**2500.0**
Total Water/Cem. Mat. Ratio	**1.652**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5525+5525A	**Soil (wet)**	100.0	**2775.0**
5527	GGBFS	7.5	**187.5**
5526	Cement	2.5	**62.5**
	Water, mL	138	

Remarks

Max. Viscosity @1 RPM about 1140K cP (mPa s)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5525+5525A)-1-2-1	UCS	3	6					28 days
(5525+5525A)-1-2-2	Perm	3	3					28 days
(5525+5525A)-1-2-3	UCS	2	4					EXTRA
(5525+5525A)-1-2-4	Perm	3	3					EXTRA

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Batch Worksheet

BATCH-SAMPLE ID	(5525+5525A)-1-1			BATCH #	1
PR. NUMBER	838-01	LOCATION	ISS-04 (20-40")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	10/21/08

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**418.0**
Soil Moisture Content, %	**11.0**
Type of Cement Used	I/II
Grout Water/Cem. Mat. Ratio	**0.55**
Mass of Dry Soil, g	**3800.0**
Total Water/Cem. Mat. Ratio	**1.652**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5525+5525A	**Soil (wet)**	100.0	**4218.0**
5527	GGBFS	7.5	**285.0**
5526	Cement	2.5	**95.0**
	Water, mL	210	

Remarks

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5525+5525A)-1-1-1	UCS	3	6					28 days
(5525+5525A)-1-1-2	Perm	3	3					28 days
(5525+5525A)-1-1-3	UCS	3	6					EXTRA
(5525+5525A)-1-1-4	Perm	3	3					EXTRA

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Batch Worksheet

BATCH-SAMPLE ID	(5524+5524A)-4-1			BATCH #	1
PR. NUMBER	838-01	LOCATION	ISS-01 (25-70")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	10/21/08

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**608.0**
Soil Moisture Content, %	**15.2**
Type of Cement Used	I/II
Grout Water/Cem. Mat. Ratio	**0.32**
Mass of Dry Soil, g	**4000.0**
Total Water/Cem. Mat. Ratio	**0.695**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5524+5524A	**Soil (wet)**	100.0	**4608.0**
5527	GGBFS	30.0	**1200.0**
5526	Cement	10.0	**400.0**
	Water, mL	504	

Remarks

Due to free water presence in material (about 3.4% based on proctor test) w/c ratio in grout was adjusted to reflect excess water in the sample. W/C ratio of Grout with excess water(136g) would be (504+136)/1600=0.40

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5524+5524A)-4-1-1	UCS	3	6					28 days
(5524+5524A)-4-1-2	Perm	3	3					28 days
(5524+5524A)-4-1-3	UCS	3	6					EXTRA
(5524+5524A)-4-1-4	Perm	3	3					EXTRA

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Batch Worksheet

BATCH-SAMPLE ID	(5524+5524A)-3-1			BATCH #	1
PR. NUMBER	838-01	LOCATION	ISS-01 (25-70")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	10/21/08

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**608.0**
Soil Moisture Content, %	**15.2**
Type of Cement Used	I/II
Grout Water/Cem. Mat. Ratio	**0.29**
Mass of Dry Soil, g	**4000.0**
Total Water/Cem. Mat. Ratio	**0.797**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5524+5524A	**Soil (wet)**	100.0	**4608.0**
5527	GGBFS	22.5	**900.0**
5526	Cement	7.5	**300.0**
	Water, mL	348	

Remarks

Due to free water presence in material (about 3.4% based on proctor test) w/c ratio in grout was adjusted to reflect excess water in the sample. W/C ratio of Grout with excess water(136g) would be (348+136)/1200=0.40

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5524+5524A)-3-1-1	UCS	3	6					28 days
(5524+5524A)-3-1-2	Perm	3	3					28 days
(5524+5524A)-3-1-3	UCS	3	6					EXTRA
(5524+5524A)-3-1-4	Perm	3	3					EXTRA

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Batch Worksheet

BATCH-SAMPLE ID	(5524+5524A)-2-1			BATCH #	1
PR. NUMBER	838-01	LOCATION	ISS-01 (25-70")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	10/21/08

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**608.0**
Soil Moisture Content, %	**15.2**
Type of Cement Used	I/II
Grout Water/Cem. Mat. Ratio	**0.23**
Mass of Dry Soil, g	**4000.0**
Total Water/Cem. Mat. Ratio	**0.99**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5524+5524A	**Soil (wet)**	100.0	**4608.0**
5527	GGBFS	15.0	**600.0**
5526	Cement	5.0	**200.0**
	Water, mL	184	

Remarks

Due to free water presence in material (about 3.4% based on proctor test) w/c ratio in grout was adjusted to reflect excess water in the sample. W/C ratio of Grout with excess water(136g) would be (184+136)/800=0.40

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5524+5524A)-2-1-1	UCS	3	6					28 days
(5524+5524A)-2-1-2	Perm	3	3					28 days
(5524+5524A)-2-1-3	UCS	3	6					EXTRA
(5524+5524A)-2-1-4	Perm	3	3					EXTRA

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Batch Worksheet

BATCH-SAMPLE ID	(5524+5524A)-1-1			BATCH #	1
PR. NUMBER	838-01	LOCATION	ISS-01 (25-70")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	10/21/08

Time Batch Mixing Started		**Soil Moisture Mass, g**	**608.0**
Total Time Batch was Mixed, min		**Soil Moisture Content, %**	**15.2**
Time Batch Completely in Molds		Type of Cement Used	I/II
		Grout Water/Cem. Mat. Ratio	**0.40**
		Mass of Dry Soil, g	**4000.0**
		Total Water/Cem. Mat. Ratio	**1.92**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5524+5524A	**Soil (wet)**	100.0	**4608.0**
5527	GGBFS	7.5	**300.0**
5526	Cement	2.5	**100.0**
	Water, mL	160	

Remarks

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5524+5524A)-1-1-1	UCS	3	6					28 days
(5524+5524A)-1-1-2	Perm	3	3					28 days
(5524+5524A)-1-1-3	UCS	3	6					EXTRA
(5524+5524A)-1-1-4	Perm	3	3					EXTRA

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Batch Worksheet

BATCH-SAMPLE ID	(5522+5523)-4-1			BATCH #	1
PR. NUMBER	838-01	LOCATION	ISS-03 (10-50")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	10/20/08

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**381.6**
Soil Moisture Content, %	**10.6**
Type of Cement Used	I/II
Grout Water/Cem. Mat. Ratio	**0.43**
Mass of Dry Soil, g	**3600.0**
Total Water/Cem. Mat. Ratio	**0.692**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5522+5523	**Soil (wet)**	100.0	**3981.6**
5527	GGBFS	30.0	**1080.0**
5526	Cement	10.0	**360.0**
	Water, mL	615	

Remarks

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5522+5523)-4-1-1	UCS	3	6					28 days
(5522+5523)-4-1-2	Perm	3	3					28 days
(5522+5523)-4-1-3	UCS	3	6					EXTRA
(5522+5523)-4-1-4	Perm	3	3					EXTRA

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BATCH-SAMPLE ID	(5522+5523)-3-1			BATCH #	1
PR. NUMBER	838-01	LOCATION	ISS-03 (10-50")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	10/20/08

Time Batch Mixing Started		**Soil Moisture Mass, g**	**381.6**
Total Time Batch was Mixed, min		**Soil Moisture Content, %**	**10.6**
Time Batch Completely in Molds		Type of Cement Used	I/II
		Grout Water/Cem. Mat. Ratio	**0.45**
		Mass of Dry Soil, g	**3600.0**
		Total Water/Cem. Mat. Ratio	**0.80**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5522+5523	**Soil (wet)**	100.0	**3981.6**
5527	GGBFS	22.5	**810.0**
5526	Cement	7.5	**270.0**
	Water, mL	482	

Remarks

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5522+5523)-3-1-1	UCS	3	6					28 days
(5522+5523)-3-1-2	Perm	3	3					28 days
(5522+5523)-3-1-3	UCS	3	6					EXTRA
(5522+5523)-3-1-4	Perm	3	3					EXTRA

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BATCH-SAMPLE ID	(5522+5523)-2-1			BATCH #	1
PR. NUMBER	838-01	LOCATION	ISS-03 (10-50")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	10/20/08

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**381.6**
Soil Moisture Content, %	**10.6**
Type of Cement Used	I/II
Grout Water/Cem. Mat. Ratio	**0.47**
Mass of Dry Soil, g	**3600.0**
Total Water/Cem. Mat. Ratio	**1.00**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5522+5523	**Soil (wet)**	100.0	**3981.6**
5527	GGBFS	15.0	**540.0**
5526	Cement	5.0	**180.0**
	Water, mL	338	

Remarks

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5522+5523)-2-1-1	UCS	3	6					28 days
(5522+5523)-2-1-2	Perm	3	3					28 days
(5522+5523)-2-1-3	UCS	3	6					EXTRA
(5522+5523)-2-1-4	Perm	3	3					EXTRA

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BATCH-SAMPLE ID	(5522+5523)-1-1			BATCH #	1
PR. NUMBER	838-01	LOCATION	ISS-03 (10-50")	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	10/20/08

Time Batch Mixing Started		**Soil Moisture Mass, g**	**381.6**
Total Time Batch was Mixed, min		**Soil Moisture Content, %**	**10.6**
Time Batch Completely in Molds		Type of Cement Used	I/II
		Grout Water/Cem. Mat. Ratio	**0.55**
		Mass of Dry Soil, g	**3600.0**
		Total Water/Cem. Mat. Ratio	**1.62**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5522+5523	**Soil (wet)**	100.0	**3981.6**
5527	GGBFS	7.5	**270.0**
5526	Cement	2.5	**90.0**
	Water, mL	200	

Remarks

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5522+5523)-1-1-1	UCS	3	6					28 days
(5522+5523)-1-1-2	Perm	3	3					28 days
(5522+5523)-1-1-3	UCS	3	6					EXTRA
(5522+5523)-1-1-4	Perm	3	3					EXTRA

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BATCH-SAMPLE ID	(5521+5521A)-14-1			BATCH #	1
PR. NUMBER	838-03	LOCATION	ISS-02 (10-35')	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	01/29/09

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**260.0**
Soil Moisture Content, %	**5.2**
Type of Cement Used	I/II
Grout Water/Cem. Mat. Ratio	**0.90**
Mass of Dry Soil, g	**5000.0**
Total Water/Cem. Mat. Ratio	**1.48**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5521+5521A	**Soil (wet)**	100.0	**5260.0**
5527	GGBFS	6.75	**337.5**
5526	Cement	2.25	**112.5**
5915	Rheobuildt 1000	22.5ml	
	Water, mL	405	

Remarks

Max. Viscosity @1 RPM about 968K cP (mPa s)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5521+5521A)-14-1-1	UCS	3	6					28 days
(5521+5521A)-14-1-2	Perm	3	3					28 days
(5521+5521A)-14-1-3	UCS	3	6					EXTRA
(5521+5521A)-14-1-4	Perm	3	3					EXTRA
(5521+5521A)-14-1-5		3	6					EXTRA
(5521+5521A)-14-1-6		2	4					EXTRA

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Batch Worksheet

BATCH-SAMPLE ID	(5521+5521A)-9-1			BATCH #	1
PR. NUMBER	838-03	LOCATION	ISS-02 (10-35')	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	01/29/09

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**260.0**
Soil Moisture Content, %	**5.2**
Type of Cement Used	I/II
Grout Water/Cem. Mat. Ratio	**0.90**
Mass of Dry Soil, g	**5000.0**
Total Water/Cem. Mat. Ratio	**1.48**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5521+5521A	**Soil (wet)**	100.0	**5260.0**
5527	GGBFS	6.75	**337.5**
5526	Cement	2.25	**112.5**
	Water, mL	405	

Remarks

Max. Viscosity @1 RPM about 1260K cP (mPa s)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5521+5521A)-9-1-1	UCS	3	6					28 days
(5521+5521A)-9-1-2	Perm	3	3					28 days
(5521+5521A)-9-1-3	UCS	3	6					EXTRA
(5521+5521A)-9-1-4	Perm	3	3					EXTRA
(5521+5521A)-9-1-5		3	6					EXTRA
(5521+5521A)-9-1-6		2	4					EXTRA

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Batch Worksheet

BATCH-SAMPLE ID	(5521+5521A)-8-1			BATCH #	1
PR. NUMBER	838-02	LOCATION	ISS-02 (10-35')	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	12/12/2008

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**148.2**
Soil Moisture Content, %	**5.7**
Type of Cement Used	I/II
Grout Water/Cem. Mat. Ratio	**0.82**
Mass of Dry Soil, g	**2600.0**
Total Water/Cem. Mat. Ratio	**1.34**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5521+5521A	**Soil (wet)**	100.0	**2748.2**
5527	GGBFS	7.50	**195.0**
5526	Cement	2.50	**65.0**
5751	Organoclay	1.0	**26.0**
	Water, mL	234	

Remarks

Max. Viscosity @1 RPM about 1270K cP (mPa s)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5521+5521A)-8-1-1	UCS	3	6					28 days
(5521+5521A)-8-1-2	Perm	3	3					28 days
(5521+5521A)-8-1-3	UCS	2	4					EXTRA
(5521+5521A)-8-1-4	Perm	3	3					EXTRA

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Batch Worksheet

BATCH-SAMPLE ID	(5521+5521A)-7-1			BATCH #	1
PR. NUMBER	838-02	LOCATION	ISS-02 (10-35')	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	12/12/2008

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**148.2**
Soil Moisture Content, %	**5.7**
Type of Cement Used	I/II
Grout Water/Cem. Mat. Ratio	**0.82**
Mass of Dry Soil, g	**2600.0**
Total Water/Cem. Mat. Ratio	**1.34**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5521+5521A	**Soil (wet)**	100.0	**2748.2**
5527	GGBFS	7.50	**195.0**
5526	Cement	2.50	**65.0**
3472	Bentonite	1.0	**26.0**
	Water, mL	234	

Remarks

Max. Viscosity @1 RPM about 1680K cP (mPa s)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5521+5521A)-7-1-1	UCS	3	6					28 days
(5521+5521A)-7-1-2	Perm	3	3					28 days
(5521+5521A)-7-1-3	UCS	2	4					EXTRA
(5521+5521A)-7-1-4	Perm	3	3					EXTRA

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Batch Worksheet

BATCH-SAMPLE ID	(5521+5521A)-6-1			BATCH #	1
PR. NUMBER	838-02	LOCATION	ISS-02 (10-35')	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	12/11/2008

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**148.2**
Soil Moisture Content, %	**5.7**
Type of Cement Used	I/II
Grout Water/Cem. Mat. Ratio	**1.17**
Mass of Dry Soil, g	**2600.0**
Total Water/Cem. Mat. Ratio	**1.94**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5521+5521A	**Soil (wet)**	100.0	**2748.2**
5527	GGBFS	5.625	**146.3**
5526	Cement	1.875	**48.8**
	Water, mL	229	

Remarks

Max. Viscosity @1 RPM about 1620K cP (mPa s)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5521+5521A)-6-1-1	UCS	3	6					28 days
(5521+5521A)-6-1-2	Perm	3	3					28 days
(5521+5521A)-6-1-3	UCS	2	4					EXTRA
(5521+5521A)-6-1-4	Perm	3	3					EXTRA

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Batch Worksheet

BATCH-SAMPLE ID	(5521+5521A)-5-1			BATCH #	1
PR. NUMBER	838-02	LOCATION	ISS-02 (10-35')	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	12/11/2008

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**142.5**
Soil Moisture Content, %	**5.7**
Type of Cement Used	I/II
Grout Water/Cem. Mat. Ratio	**1.78**
Mass of Dry Soil, g	**2500.0**
Total Water/Cem. Mat. Ratio	**2.92**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5521+5521A	**Soil (wet)**	100.0	**2642.5**
5527	GGBFS	3.75	**93.8**
5526	Cement	1.25	**31.3**
	Water, mL	222	

Remarks

Max. Viscosity @1 RPM about 1360K cP (mPa s)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5521+5521A)-5-1-1	UCS	3	6					28 days
(5521+5521A)-5-1-2	Perm	3	3					28 days
(5521+5521A)-5-1-3	UCS	2	4					EXTRA
(5521+5521A)-5-1-4	Perm	3	3					EXTRA

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BATCH-SAMPLE ID	(5521+5521A)-4-1			BATCH #	1
PR. NUMBER	838-01	LOCATION	ISS-02 (10-35')	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	10/20/08

Time Batch Mixing Started		**Soil Moisture Mass, g**	**228.0**
Total Time Batch was Mixed, min		**Soil Moisture Content, %**	**5.7**
Time Batch Completely in Molds		Type of Cement Used	I/II
		Grout Water/Cem. Mat. Ratio	**0.40**
		Mass of Dry Soil, g	**4000.0**
		Total Water/Cem. Mat. Ratio	**0.543**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5521+5521A	**Soil (wet)**	100.0	**4228.0**
5527	GGBFS	30.0	**1200.0**
5526	Cement	10.0	**400.0**
	Water, mL	641	

Remarks

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5521+5521A)-4-1-1	UCS	3	6					28 days
(5521+5521A)-4-1-2	Perm	3	3					28 days
(5521+5521A)-4-1-3	UCS	3	6					EXTRA
(5521+5521A)-4-1-4	Perm	3	3					EXTRA

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Batch Worksheet

BATCH-SAMPLE ID	(5521+5521A)-3-1			BATCH #	1
PR. NUMBER	838-01	LOCATION	ISS-02 (10-35')	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	10/20/08

Time Batch Mixing Started		**Soil Moisture Mass, g**	**228.0**
Total Time Batch was Mixed, min		**Soil Moisture Content, %**	**5.7**
Time Batch Completely in Molds		Type of Cement Used	I/II
		Grout Water/Cem. Mat. Ratio	**0.42**
		Mass of Dry Soil, g	**4000.0**
		Total Water/Cem. Mat. Ratio	**0.61**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5521+5521A	**Soil (wet)**	100.0	**4228.0**
5527	GGBFS	22.5	**900.0**
5526	Cement	7.5	**300.0**
	Water, mL	504	

Remarks

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5521+5521A)-3-1-1	UCS	3	6					28 days
(5521+5521A)-3-1-2	Perm	3	3					28 days
(5521+5521A)-3-1-3	UCS	3	6					EXTRA
(5521+5521A)-3-1-4	Perm	3	3					EXTRA

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Batch Worksheet

BATCH-SAMPLE ID	(5521+5521A)-2-1			BATCH #	1
PR. NUMBER	838-01	LOCATION	ISS-02 (10-35')	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	10/20/08

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**228.0**
Soil Moisture Content, %	**5.7**
Type of Cement Used	I/II
Grout Water/Cem. Mat. Ratio	**0.63**
Mass of Dry Soil, g	**4000.0**
Total Water/Cem. Mat. Ratio	**0.91**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5521+5521A	**Soil (wet)**	100.0	**4228.0**
5527	GGBFS	15.0	**600.0**
5526	Cement	5.0	**200.0**
	Water, mL	500	

Remarks

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5521+5521A)-2-1-1	UCS	3	6					28 days
(5521+5521A)-2-1-2	Perm	3	3					28 days
(5521+5521A)-2-1-3	UCS	3	6					EXTRA
(5521+5521A)-2-1-4	Perm	3	3					EXTRA

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Batch Worksheet

BATCH-SAMPLE ID	(5521+5521A)-1-2			BATCH #	2
PR. NUMBER	838-02	LOCATION	ISS-02 (10-35')	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	12/11/2008

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**148.2**
Soil Moisture Content, %	**5.7**
Type of Cement Used	I/II
Grout Water/Cem. Mat. Ratio	**0.90**
Mass of Dry Soil, g	**2600.0**
Total Water/Cem. Mat. Ratio	**1.47**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5521+5521A	**Soil (wet)**	100.0	**2748.2**
5527	GGBFS	7.50	**195.0**
5526	Cement	2.50	**65.0**
	Water, mL	234	

Remarks

Max. Viscosity @1 RPM about 1590K cP (mPa s)

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5521+5521A)-1-2-1	UCS	3	6					28 days
(5521+5521A)-1-2-2	Perm	3	3					28 days
(5521+5521A)-1-2-3	UCS	2	4					EXTRA
(5521+5521A)-1-2-4	Perm	3	3					EXTRA

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Batch Worksheet

BATCH-SAMPLE ID	(5521+5521A)-1-1			BATCH #	1
PR. NUMBER	838-01	LOCATION	ISS-02 (10-35')	MIXING TECH	KI/RI
PR. NAME	National Grid Hempstead,NY MGP	SAMPLE TYPE	Mold	BATCH DATE	10/20/08

Time Batch Mixing Started	
Total Time Batch was Mixed, min	
Time Batch Completely in Molds	

Soil Moisture Mass, g	**228.0**
Soil Moisture Content, %	**5.7**
Type of Cement Used	I/II
Grout Water/Cem. Mat. Ratio	**0.90**
Mass of Dry Soil, g	**4000.0**
Total Water/Cem. Mat. Ratio	**1.47**

Mix Constituents:

Component ID	Component Name	Amount, % (based on soil dry mass)	Amount, g
5521+5521A	**Soil (wet)**	100.0	**4228.0**
5527	GGBFS	7.5	**300.0**
5526	Cement	2.5	**100.0**
	Water, mL	360	

Remarks

Sample ID	Required Test	Nominal Mold Size		Tamping Tech	End Preparation			
		Diam., in.	Height, in.		Removal Tech	Trim Tech	Method	Comments
(5521+5521A)-1-1-1	UCS	3	6					28 days
(5521+5521A)-1-1-2	Perm	3	3					28 days
(5521+5521A)-1-1-3	UCS	3	6					EXTRA
(5521+5521A)-1-1-4	Perm	3	3					EXTRA