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812 W. Wabash Avenue, Eureka, CA 95501-2138

Reference: 022054.400

September 8, 2022

Matthew Trowbridge
Moffat & Nichol
600 University Street, Suite 610
Seattle, Washington 98101

Subject: Preliminary Geotechnical Data Report, Redwood Multipurpose Marine Terminal, Samoa, California

Matthew Trowbridge:

Introduction

This preliminary geotechnical data report provides the results of initial subsurface investigations at the proposed Redwood Multipurpose Marine Terminal (RMMT) site in Samoa, California. The investigation was completed to inform conceptual planning for the proposed terminal and is intended as the first of multiple phases of geotechnical investigation. Additional geotechnical investigation will follow conceptual planning and preliminary design and will become increasingly focused as specific design elements become more refined.

The preliminary geotechnical investigation was focused along the Humboldt Bay shoreline, where little existing geotechnical data is available. Previous geotechnical investigations for neighboring sites provide useful data relative to upland portions of the site, but data along the waterfront has not been developed to date.

Site Description

The RMMT site is located on the Samoa Peninsula, a narrow peninsula that separates Humboldt Bay from the Pacific Ocean (Figure 1). Where undisturbed, the Samoa Peninsula is a dune-covered surface; subsurface investigation in upland areas of the Peninsula in the site vicinity indicate 15 to 20 feet of loose, modern dune sand overlying older (Holocene and Pleistocene age) sediments. The subject site, however, has a long industrial history of timber production that has resulted in significant grading, infilling, and expansion over previous intertidal lands along the Humboldt Bay shoreline. Figure 2 shows an 1894 Humboldt Bay survey and depicts the historic encroachment over pre-existing intertidal lands. Figure 3 is a late 1950's- or early 1960's-era aerial photograph of industrial development on the Samoa Peninsula.

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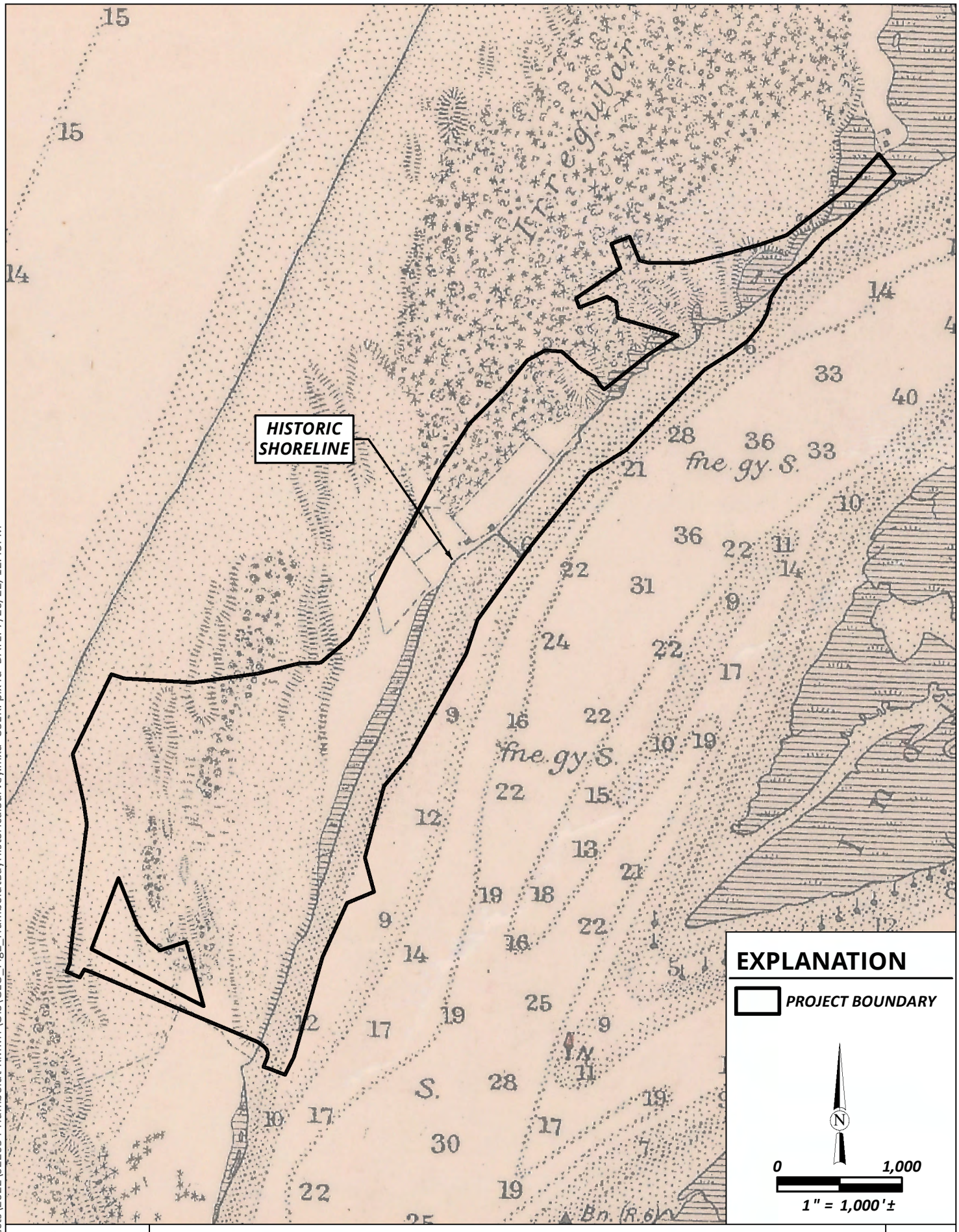
Redwood Marine Multipurpose Terminal
Preliminary Geotechnical Investigation
Samoa, California

Project Location Map

July 2022 - 022054.400

Figure 2



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Redwood Marine Multipurpose Terminal
Preliminary Geotechnical Investigation
Samoa, California

Historical Humboldt Bay Survey
US Coast and Geodetic Survey, 1894
July 2022 - 022054.400

Figure 2

Redwood Marine Multipurpose Terminal
Preliminary Geotechnical Investigation
Samoa, California

Historic Oblique Aerial Image, Circle late 1950's-1960's
View to South, Source Unknown
August 2022 - 022054.400

Figure 3

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Field Investigation

The preliminary geotechnical field investigation consisted of 10 cone penetration tests (CPTs) and three machine borings. The investigation sites are shown on Figure 4; they are also shown on Figure 2 to show their location relative to the historic shoreline (note that all but CPT 22-C10 occurred within filled areas bay-ward of the historic shoreline). The CPTs were completed first, between April 19 and 22, 2022, followed by the machine borings, which occurred between May 31 and June 3, 2022. Based on conceptual development plans, the preliminary geotechnical field exploration was focused in the central and northern parts of the site; a single exploration site occurs at the southern end of the site. Exploration locations were developed collaboratively with the RMMT geotechnical team and staffed in the field by SHN geologists.

CPT Investigation

The CPT investigation was completed by Gregg Drilling (Gregg) and a full report of their methods and the results are included as Attachment 1. CPT sites are numbered as CPT22 C-01 through CPT22 C-10. The individual probes were advanced to depths ranging from 87 feet below grade to as much as 116.7 feet. CPT provides a rapid characterization of the subsurface using a nominal 1.5-inch-diameter cone penetrometer that is hydraulically advanced into the subsurface to provide a near-continuous characterization of relative density, strength, and static and dynamic pore pressures. In addition to standard CPT assessment at each probe site (continuous profiles of equivalent soil behavior type, pore pressure, skin friction, penetration resistance, and so on), three sites were completed as "seismic CPTs," pore pressure dissipation was determined in two probes, and soil sampling was completed at one site.

Seismic cone penetration testing was completed in CPTs 22-01, 22-03, and 22-06 (referred to in Gregg's data report as "CPT22-CS-01" and so on). Seismic cone penetration testing allows determination of soil shear wave velocities at specific depth intervals.

Pore pressure dissipation testing occurred in CPT22 C-05 at a depth of 82 feet and in CPT22 C-08 at a depth of 55.6 feet. Pore pressure dissipation testing allows measurement of equilibrium water pressure.

A single soil sample was retrieved at a depth of 39 feet in CPT22 C-06 in a distinct clayey unit.

Machine Borings

Machine borings were completed by Taber Drilling of West Sacramento using mud rotary drilling methods. A truck-mounted CME-75 drill rig was utilized, equipped with an autohammer for standard penetration testing. The three borings are denoted as borings 22-B01, 22-B02, and 22-B03 and were advanced to depths between 141.5 feet (boring 22-B01) and 151.5 feet (boring 22-B02). Elevations at the boring sites were between 9 and 10 feet; therefore, the elevations of specific depths on the boring logs can be determined by subtracting approximately 10 feet. Boring logs are included as Attachment 2.

Relatively undisturbed soil samples were obtained by driving a 2.5-inch interior diameter (ID), 3.0-inch outside diameter (OD), Modified California Sampler (MCS) containing steel liners and a 1.4-inch ID, 2.0-inch OD SPT sampler without liners in accordance ASTM-International (ASTM) D1586 standards. The samplers were advanced using a 140-pound CME auto-hammer falling 30 inches per blow. The number

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Redwood Marine Multipurpose Terminal
Preliminary Geotechnical Investigation
Samoa, California

CPT and Mud Rotary Boring Locations

July 2022 - 022054.400

Figure 4

of blows required to drive the samplers the last 12 inches of an 18-inch drive is provided on the boring logs as penetration resistance (blows per foot [bpf]). The penetration resistance values (bpf) recorded for SPT sampler drives and provided on the boring logs are actual penetration resistance (N-values) that are uncorrected for depth and the energy transfer ratio of the automatic hammers used. The penetration resistance values provided on boring logs for the MCS sampler drives are field blow counts and should not be construed as SPT N-values. Equivalent SPT N-values for the MCS sampler should be considered lower by a factor of approximately 0.6. Intervals in soft materials with no, or very low, blow counts (at 45 feet in boring 22-B01, and at 30 feet in boring 22-B02) were sampled without hammer driving; rather, the samplers were advanced under the weight of the driving hammer and rods. Thin-walled shelby tubes were advanced locally, in soft fine-grained materials; the down-pressure and recovery are noted on the logs.

An SPT hammer efficiency report from Taber Drilling indicates an “average hammer efficiency” of 66%.

The earth materials encountered were logged and field classified in general accordance with the Manual-Visual Classification Method (ASTM D 2488). The final boring logs, presented in Attachment 2, were prepared based on the field logging, examination of samples in the laboratory, and the results of laboratory testing.

Water level observations were made during drilling by delaying the introduction of drilling fluid until wet conditions were encountered.

At the completion of each boring, the boreholes were backfilled with a cement slurry by tremie pipe and bentonite chips and completed to the surface to match existing conditions.

Results

In general, the results of the CPTs and machine borings were consistent, such that where borings were advanced adjacent to a previous CPT probe site, the observed soil type was consistent with the interpreted soil behavior type. Soil penetration resistance was typically low in the upper few tens of feet, becoming increasingly dense with depth, which is consistent with the geologic interpretation of the distribution and ages of subsurface materials.

Due to the intensive industrial history of the Samoa Peninsula (Figure 2), surficial soils are generally disturbed, and it appears the entire site is veneered with a layer of variable fill soils. Although the preliminary geotechnical investigation described herein was focused along the bay shore; we understand that shallow test pits excavated across the site for a recent evaluation of potential cultural resources encountered primarily fill material and only limited native soils.

Although the identification of fill soils is not possible in CPT probes, fill soils were encountered and described in each of the three machine borings. About 10 feet of apparently reworked dune sand (poorly graded fine sand) was noted in boring 22-B01. Boring 22-B02 encountered similar reworked fine sand in the upper 6.5 feet that overlies a layer of wood waste that extends to a depth of 12.5 feet.

Boring 22-B03, at the southern end of the site, encountered about 7.5 feet of fine sandy fill with some gravel and wood noted.

Beneath the veneer of surficial fills, the CPT probes and borings encountered variable, layered sedimentary deposits to the depth explored. The sedimentary materials are typical of the nearshore environment of the peninsula and consist of nearshore marine, alluvial, and estuarine soils. We note relative consistency of the subsurface profiles encountered in the borings and CPTs in the central and northern part of the site. CPT 22-C08 and boring 22-B03 at the southern end of the site are somewhat unique, and the two areas are discussed separately below.

Central and Northern Area

The upper approximately 20 to 30 feet in the northern borings and CPTs (excepting CPT 22-C08 and boring 22-B03 at the southern end of the site) encountered reworked dune sands and fill soils overlying interbedded deposits of silty to well-graded sands with localized gravels and shell fragments. Sandy silt and soft silt horizons were noted as well. The materials range from loose to dense, with SPT N-values ranging from 5 to 42. An absence of cementation was described, and fines were noted as being non-plastic. From a geologic standpoint, these materials are interpreted as Holocene age nearshore marine (beach) deposits.

Below a depth of 20 to 30 feet (elevation of -10 to -20) across the central and northern part of the study area, a lean clay deposit was encountered that is representative of a Holocene age embayment or marsh. The clay was observed extending to depths on the order of 50 to 65 feet (elevations of -40 to -55). The materials were generally soft to very soft and were noted as having low plasticity. SPT N-values ranged from 0 to 9 and thin-walled Shelby tubes were pushed with down-pressure ranging from 100 to 250 pounds per square inch (psi). Between a depth of 40 and 60 feet (elevation -30 to -50) in boring 22-B02, the lean clay is underlain by a medium stiff laminated silt deposit that is micaceous and contains thin clay seams. SPT N-values in the silt range from 8 to 13, and the material is noted to contain trace shells and wood. Thin-walled Shelby tube samples were collected at two intervals in this silt, with down-pressures from 200 to 600 psi required to advance the sampler.

Below this “upper” fine-grained interval, interbedded granular sediments similar to those in the upper section of the borings occur to a depth of 60 to 70 feet (elevation -50 to -60). SPT N-values range from 5 to 36, shells and wood fragments are noted in these materials as well.

Below 60 to 70 feet (elevation -50 to -60), a second, “lower” fine-grained interval was encountered, extending to depths ranging from 70 to 100 feet (elevations -60 to -90). The “lower” fine-grained deposit contains trace shell fragments, and the odor of decayed organics is noted on the boring logs. SPT N-values ranging from 20 to 27 were observed in borings 22-B01 and 22-B02 in this material. Based on regional mapping and radiocarbon dating, we interpret this “lower” clay to be Pleistocene in age. It appears in transects across Humboldt Bay and has been observed elsewhere in the Eureka area in subsurface investigations.

Below the “lower” fine-grained interval, all borings and CPTs encountered what is interpreted as the Pleistocene age Hookton Formation. The Hookton Formation contains bedded sedimentary materials

not unlike those that overlie it, but it is associated with a substantial increase in density and penetration resistance that is consistent with its increased age. The upper contact with Hookton Formation sediments occurs at depths ranging from 75 to 100 feet (elevations -65 to -90). The material is dense to very dense (or hard where fine-grained intervals occur), with SPT N-values ranging from 41 to 92 (with several intervals resulting in practical refusal of the SPT sampler). The Hookton Formation is a regional unit whose presence is noted in previous geotechnical transects across the bay.

Southern Area

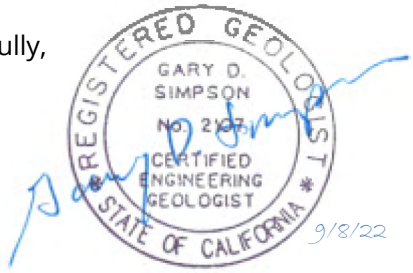
CPT 22-C08 and boring 22-B03 were advanced at the southern end of the site and generally encountered thinner intervals of fine-grained materials than the sites to the north. The majority of the stratigraphic profile in this area is characterized by interbedded sandy and silty horizons, similar to the granular deposits farther north at the site. The "upper" fine-grained interval in boring 22-B03 was observed as a stiff clayey silt occurring between a depth of 45 and 55 feet (elevation -35 to -45). Shell fragments were noted, and a Shelby tube sampler was advanced with down pressures ranging from 200 to 300 psi. The "lower" clay unit was encountered between a depth of 65 to 70 feet (elevation -55 to -60). A Shelby tube advanced in this horizon was pushed with down pressures ranging from 200 to 300 psi. Dense Hookton Formation sediments occur at a depth of about 70 feet (elevation -60) at this site.

Laboratory Testing

The results of laboratory testing are included in Attachment 3 and relevant results are included on the final boring logs in Attachment 2. Laboratory testing was completed by Cooper Testing Labs of Palo Alto, California.

Respectfully,

SHN



Gary D. Simpson
Sr. Engineering Geologist

GDS:ame

Attachments:
1. CPT Report
2. Boring Logs
3. Laboratory Test Results

CPT Report 1

CONE PENETRATION TESTING (CPT) REPORT

Gregg Drilling LLC

Prepared for: SHN
Project D2229045
April 25, 2022

Prepared by: Eleni Pateras
epateras@greggdrilling.com

Table of Contents

April 25, 2022

SHN
Attn: Giovanni Vadurro

Subject: CPT Site Investigation
364 Vance Ave.
Samoa, CA
GREGG Project Number: D2229045

Dear Mr. Vadurro:

The following report presents the results of Gregg Drilling's Cone Penetration Test investigation for the above referenced site. The following testing services were performed:

1	Cone Penetration Tests	(CPTU)	☒
2	Pore Pressure Dissipation Tests	(PPD)	☒
3	Seismic Cone Penetration Tests	(SCPTU)	☒
4	Groundwater Samples	(GWS)	☐
5	Soil Samples	(SS)	☒
6	Vapor Samples	(VS)	☐

A list of reference papers providing additional background on the specific tests conducted is provided in the bibliography following the text of the report. If you would like a copy of any of these publications or should you have any questions or comments regarding the contents of this report, please do not hesitate to contact me at 562-427-6899.

Sincerely,

CPT Reports Team
Gregg Drilling, LLC.

Cone Penetration Testing (CPT) Procedure

Gregg Drilling carries out all Cone Penetration Tests (CPT) using an integrated electronic cone system, Figure CPT.

The cone takes measurements of tip resistance (q_c), sleeve resistance (f_s), and penetration pore water pressure (u_2). Measurements are taken at either 2.5 or 5cm intervals during penetration to provide a nearly continuous profile. CPT data reduction and basic interpretation is performed in real time facilitating on-site decision making. The above mentioned parameters are stored electronically for further analysis and reference. All CPT soundings are performed in accordance with revised ASTM standards (D 5778-12).

The 5mm thick porous plastic filter element is located directly behind the cone tip in the u_2 location. A new saturated filter element is used on each sounding to measure both penetration pore pressures as well as measurements during a dissipation test (PPDT). Prior to each test, the filter element is fully saturated with oil under vacuum pressure to improve accuracy.

When the sounding is completed, the test hole is backfilled according to client specifications. If grouting is used, the procedure generally consists of pushing a hollow tremie pipe with a "knock out" plug to the termination depth of the CPT hole. Grout is then pumped under pressure as the tremie pipe is pulled from the hole. Disruption or further contamination to the site is therefore minimized.

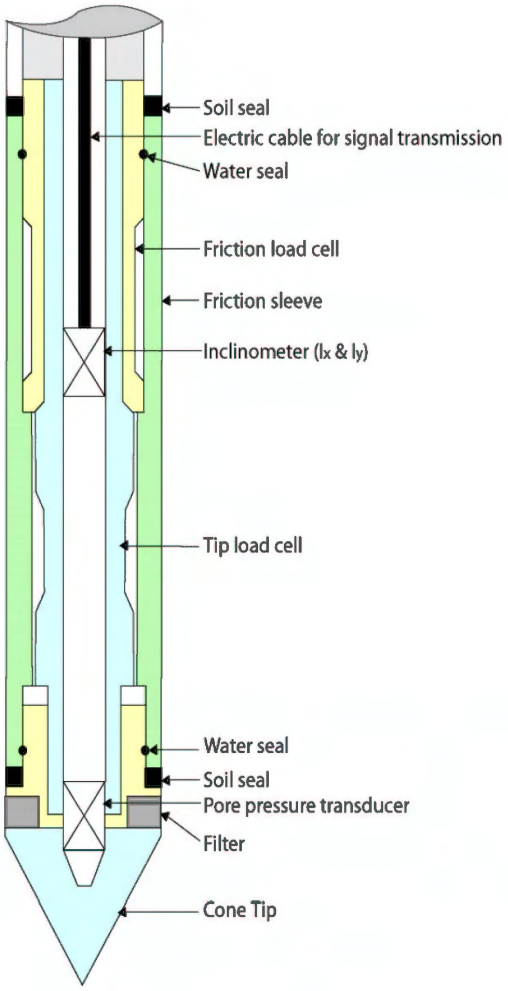


Figure CPT

15cm^2 Standard Cone Specifications

Dimensions	
Cone base area	15 cm^2
Sleeve surface area	225 cm^2
Cone net area ratio	0.80
Specifications	
Cone load cell	
Full scale range	180 kN (20 tons)
Overload capacity	150%
Full scale tip stress	120 MPa (1,200 tsf)
Repeatability	120 kPa (1.2 tsf)
Sleeve load cell	
Full scale range	31 kN (3.5 tons)
Overload capacity	150%
Full scale sleeve stress	1,400 kPa (15 tsf)
Repeatability	1.4 kPa (0.015 tsf)
Pore pressure transducer	
Full scale range	7,000 kPa (1,000 psi)
Overload capacity	150%
Repeatability	7 kPa (1 psi)

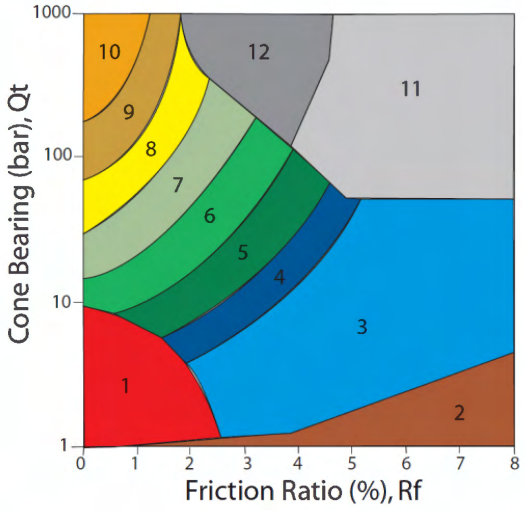
Note: The repeatability during field use will depend somewhat on ground conditions, abrasion, maintenance and zero load stability.

Cone Penetration Test Data & Interpretation

The Cone Penetration Test (CPT) data collected are presented in graphical and electronic form in the report. The plots include interpreted Soil Behavior Type (SBT) based on the charts described by Robertson (1990). Typical plots display SBT based on the non-normalized charts of Robertson et al (1990) or normalized data (2010 and 2016). For CPT soundings deeper than 30m, we recommend the use of the normalized charts of Robertson (2010 and 2016) which can be displayed as SBTn (Figure SBTn). The report also includes spreadsheet output of computer calculations of basic interpretation in terms of SBT and SBTn and various geotechnical parameters using current published correlations based on the comprehensive review by Lunne, Robertson and Powell (1997), as well as recent updates by Professor Robertson (Guide to Cone Penetration Testing, 2015). The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Gregg Drilling LLC does not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and does not assume any liability for use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software. Some interpretation methods require input of the groundwater level to calculate vertical effective stress. An estimate of the in-situ groundwater level has been made based on field observations and/or CPT results but should be verified by the user.

A summary of locations and depths is available in Table 1. Note that all penetration depths referenced in the data are with respect to the existing ground surface.

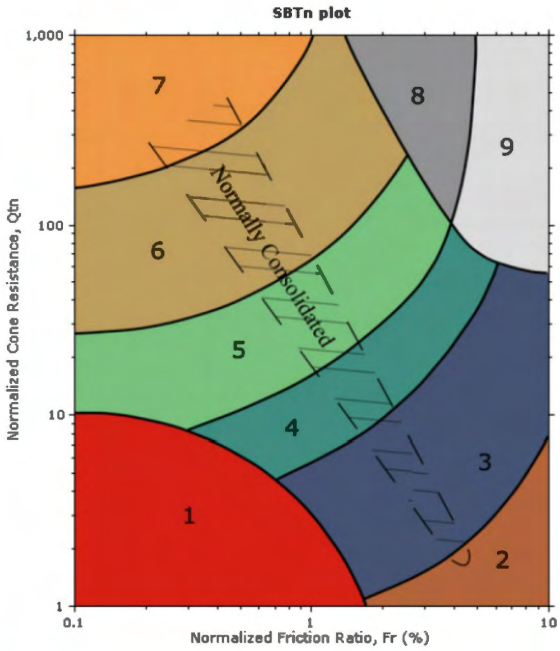
Note that it is not always possible to clearly identify a soil type based solely on q_t, f_s, and u_2. In these situations, experience, judgment, and an assessment of the pore pressure dissipation data should be used to infer the correct soil behavior type.



ZONE	Qt/N	SBT
1	2	Sensitive, fine grained
2	1	Organic materials
3	1	Clay
4	1.5	Silty clay to clay
5	2	Clayey silt to silty clay
6	2.5	Sandy silt to clayey silt
7	3	Silty sand to sandy silt
8	4	Sand to silty sand
9	5	Sand
10	6	Gravelly sand to sand
11	1	Very stiff fine grained*
12	2	Sand to clayey sand*

*over consolidated or cemented

Figure SBT (After Robertson et al., 1990) – Note: Colors may vary slightly compared to plots



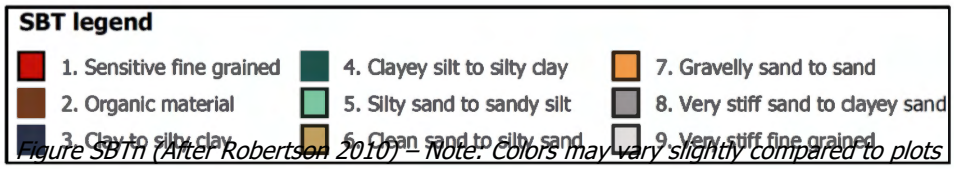


Figure SBTn (After Robertson 2010) – Note: Colors may vary slightly compared to plots

Pore Pressure Dissipation Tests (PPDTs)

Pore Pressure Dissipation Tests (PPDT's) conducted at various intervals can be used to measure equilibrium water pressure (at the time of the CPT). If conditions are hydrostatic, the equilibrium water pressure can be used to determine the approximate depth of the ground water table. A PPDT is conducted when penetration is halted at specific intervals determined by the field representative. The variation of the penetration pore pressure (*u)* with time is measured behind the tip of the cone and recorded.

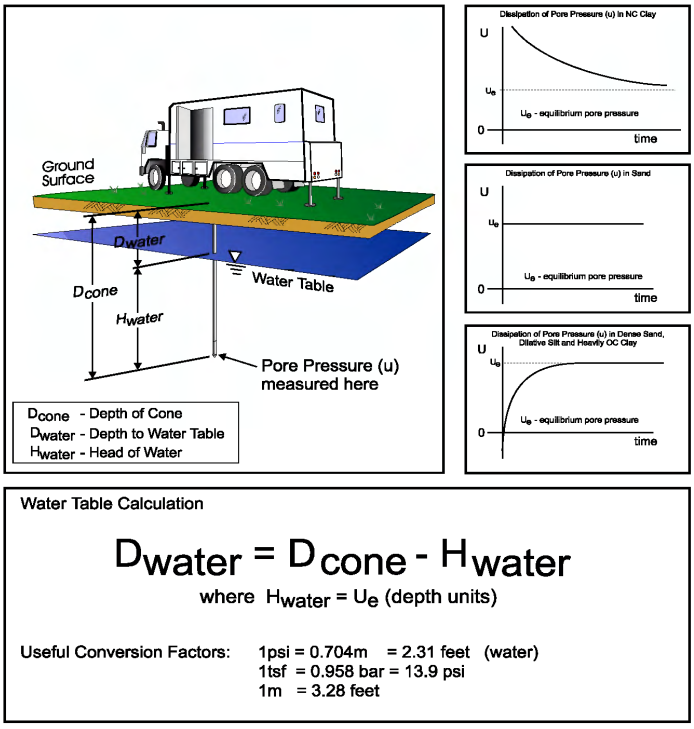
Pore pressure dissipation data can be interpreted to provide estimates of:

- Equilibrium piezometric pressure
- Phreatic Surface
- In situ horizontal coefficient of consolidation (c_h)
- In situ horizontal coefficient of permeability (k_h)

To correctly interpret the equilibrium piezometric pressure and/or the phreatic surface, the pore pressure must be monitored until it reaches equilibrium, *Figure PPDT*. This time is commonly referred to as t_{100}, the point at which 100% of the excess pore pressure has dissipated.

A complete reference on pore pressure dissipation tests is presented by Robertson et al. 1992 and Lunne et al. 1997.

A summary of the pore pressure dissipation tests completed for this project is included in Table 1.



Water Table Calculation

$$D_{water} = D_{cone} - H_{water}$$

where $H_{water} = U_e$ (depth units)

Useful Conversion Factors: 1psi = 0.704m = 2.31 feet (water)
1tsf = 0.958 bar = 13.9 psi
1m = 3.28 feet

Figure PPDT

Seismic Cone Penetration Tests (SCPT)

Seismic Cone Penetration Testing (SCPT) can be conducted at various intervals during the Cone Penetration Test. Shear wave velocity (Vs) can then be calculated over a specified interval with depth. A small interval for seismic testing, such as 1-1.5m (3-5ft) allows for a detailed look at the shear wave profile with depth. Conversely, a larger interval such as 3-6m (10-20ft) allows for a more average shear wave velocity to be calculated. Gregg Drilling's cones have a horizontally active geophone located 0.2m (0.66ft) behind the tip.

To conduct the seismic shear wave test, the penetration of the cone is stopped and the rods are decoupled from the rig. An automatic hammer is triggered to send a shear wave into the soil. The distance from the source to the cone is calculated knowing the total depth of the cone and the horizontal offset distance between the source and the cone. To calculate an interval velocity, a minimum of two tests must be performed at two different depths. The arrival times between the two wave traces are compared to obtain the difference in time (Δt). The difference in depth is calculated (Δd) and velocity can be determined using the simple equation: $v = \Delta d/\Delta t$

Multiple wave traces can be recorded at the same depth to improve quality of the data.

A complete reference on seismic cone penetration tests is presented by Robertson et al. 1986 and Lunne et al. 1997.

A summary the shear wave velocities, arrival times and wave traces are provided with the report.

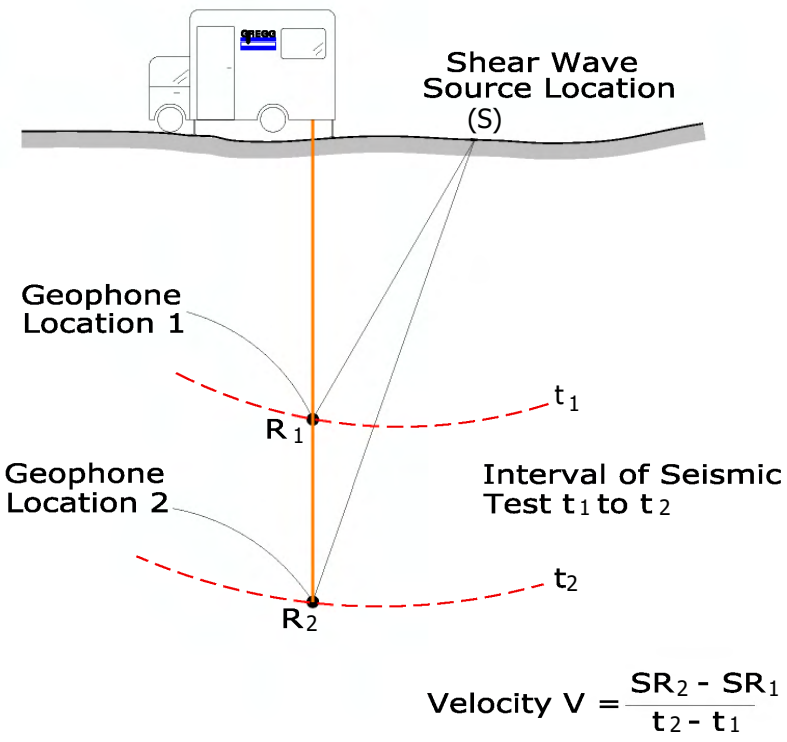


Figure SCPT

Soil Sampling

Gregg Drilling uses a piston-type push-in sampler to obtain small soil samples without generating any soil cuttings, *Figure SS*. Two different types of samplers (12 and 18 inch) are used depending on the soil type and density. The soil sampler is initially pushed in a "closed" position to the desired sampling interval using the CPT pushing equipment. Keeping the sampler closed minimizes the potential of cross contamination. The inner tip of the sampler is then retracted leaving a hollow soil sampler with inner 1¼" diameter sample tubes. The hollow sampler is then pushed in a locked "open" position to collect a soil sample. The filled sampler and push rods are then retrieved to the ground surface. Because the soil enters the sampler at a constant rate, the opportunity for 100% recovery is increased. For environmental analysis, the soil sample tube ends are sealed with Teflon and plastic caps. Often, a longer "split tube" can be used for geotechnical sampling.

For a detailed reference on direct push soil sampling, refer to Robertson et al, 1998.

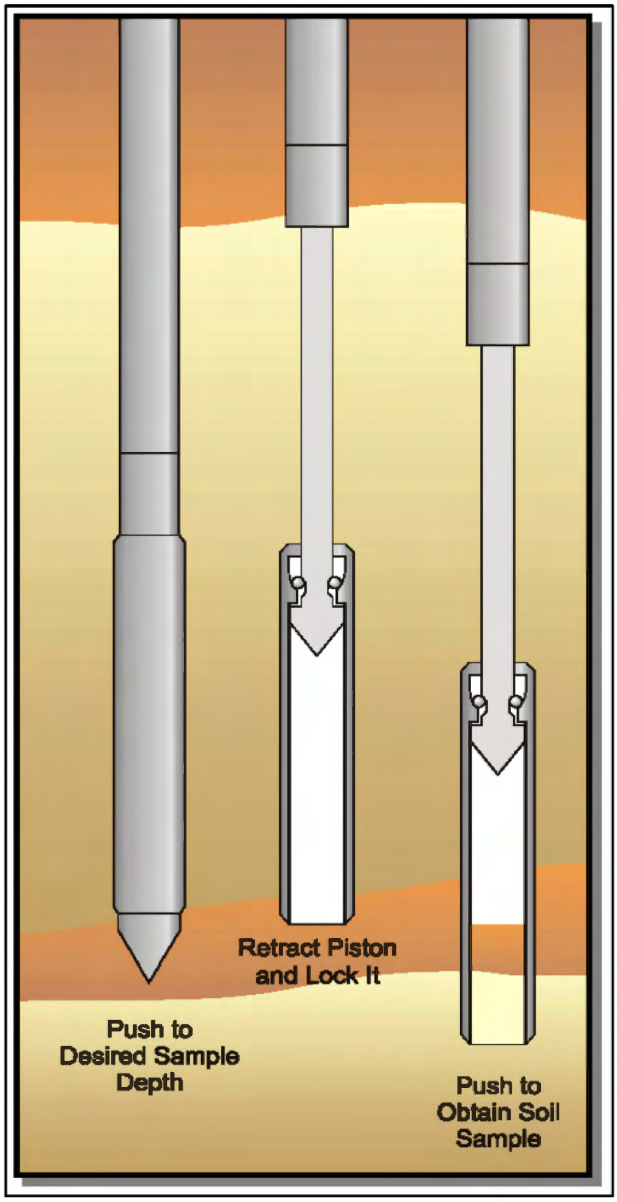


Figure SS

Ground Water Sampling

Gregg Drilling conducts groundwater sampling using a sampler as shown in *Figure GWS*. The groundwater sampler has a retrievable stainless steel or disposable PVC screen with steel drop off tip. This allows for samples to be taken at multiple depth intervals within the same sounding location. In areas of slower water recharge, provisions may be made to set temporary PVC well screens during sampling to allow the pushing equipment to advance to the next sample location while the groundwater is allowed to infiltrate.

The groundwater sampler operates by advancing 44.5mm (1¾ inch) hollow push rods with the filter tip in a closed configuration to the base of the desired sampling interval. Once at the desired sample depth, the push rods are retracted; exposing the encased filter screen and allowing groundwater to infiltrate hydrostatically from the formation into the inlet screen. A small diameter bailer (approximately ½ or ¾ inch) is lowered through the push rods into the screen section for sample collection. The number of downhole trips with the bailer and time necessary to complete the sample collection at each depth interval is a function of sampling protocols, volume requirements, and the yield characteristics and storage capacity of the formation. Upon completion of sample collection, the push rods and sampler, with the exception of the PVC screen and steel drop off tip are retrieved to the ground surface, decontaminated and prepared for the next sampling event.

For a detailed reference on direct push groundwater sampling, refer to Zemo et. al., 1992.

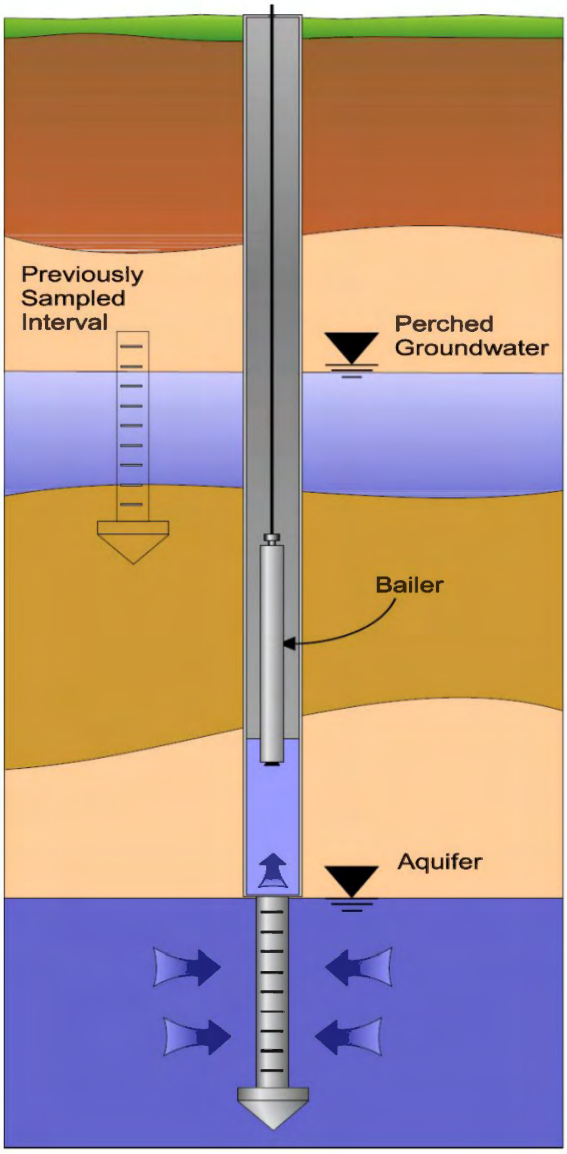


Figure GWS

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Robertson, P.K., R.G. Campanella, D. Gillespie and A. Rice, "Seismic CPT to Measure In-Situ Shear Wave Velocity", Journal of Geotechnical Engineering ASCE, Vol. 112, No. 8, 1986 pp. 791-803.

Robertson, P.K., Sully, J., Woeller, D.J., Lunne, T., Powell, J.J.M., and Gillespie, D.J., "Guidelines for Estimating Consolidation Parameters in Soils from Piezocone Tests", Canadian Geotechnical Journal, Vol. 29, No. 4, August 1992, pp. 539-550.

Robertson, P.K., T. Lunne and J.J.M. Powell, "Geo-Environmental Application of Penetration Testing", Geotechnical Site Characterization, Robertson & Mayne (editors), 1998 Balkema, Rotterdam, ISBN 90 5410 939 4 pp 35-47.

Copies of ASTM Standards are available through www.astm.org

Table 1: Cone Penetration Testing Summary

CPT Sounding Identification	Date	Termination Depth (ft)	Depth of Soil Samples (ft)	Depth of Groundwater Samples (ft)	Depth of Pore Pressure Dissipation Tests (ft)
CPT22-CS-01	4/19/2022	105.15	-	-	-
CPT22-C-02	4/19/2022	107.12	-	-	-
CPT22-CS-03	4/19/2022	108.60	-	-	-
CPT22-C-04	4/20/2022	116.47	-	-	-
CPT22-C-05	4/20/2022	114.67	-	-	82.02
CPT22-CS-06	4/21/2022	104.66	30	-	-
CPT22-C-07	4/20/2022	109.09	-	-	-
CPT22-C-08	4/21/2022	87.11	-	-	55.61
CPT22-C-09	4/21/2022	104.82	-	-	-
CPT22-C-10	4/22/2022	101.71	-	-	-

APPENDIX A:

CPT PLOTS

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

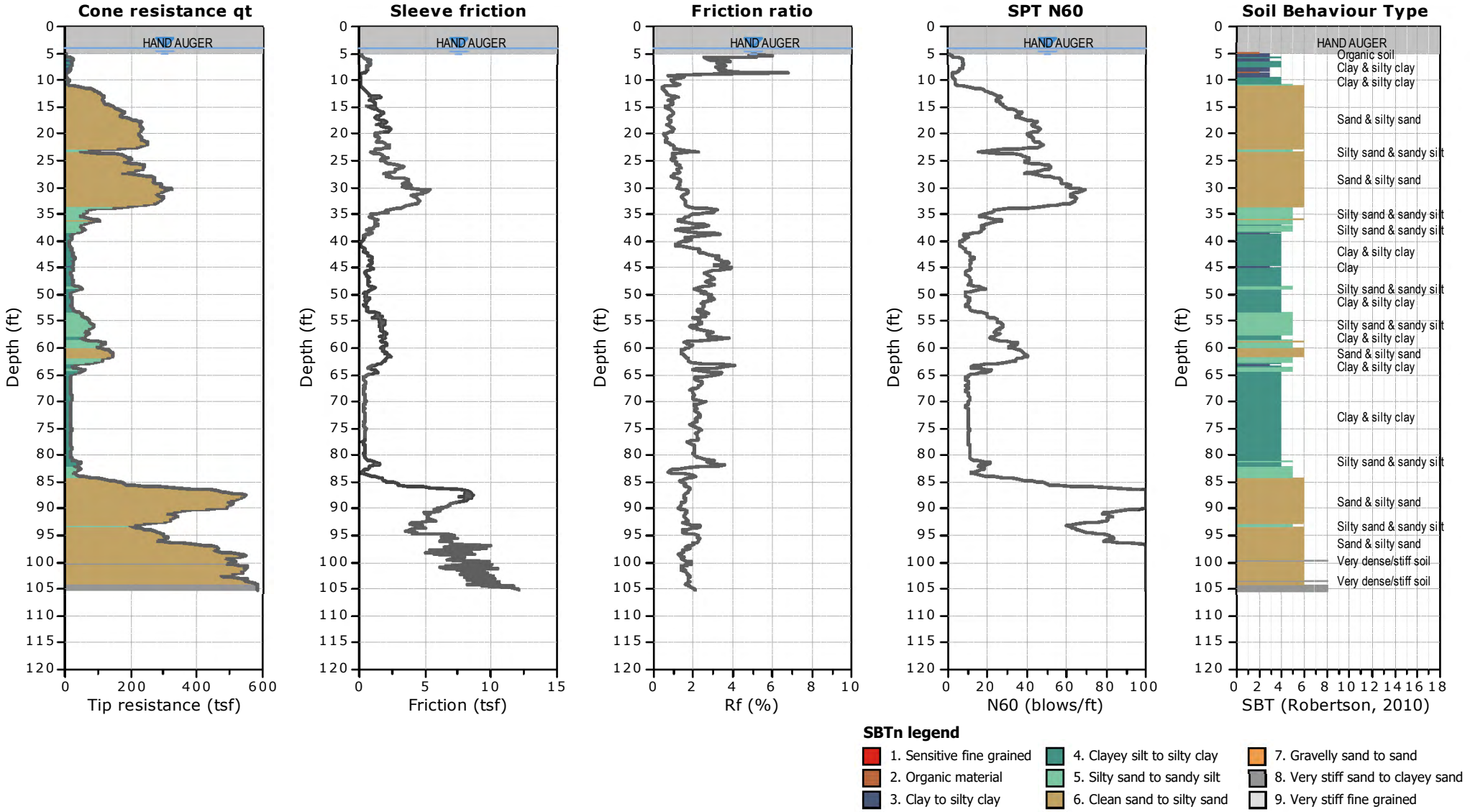
CPT: CPT22-CS-01

CLIENT: SHN

SITE: 364 VANCE AVE., SAMOA, CA

FIELD REP: GIOVANNI VADURRO
Cone ID: GDC-64

Total depth: 105.15 ft, Date: 4/19/2022



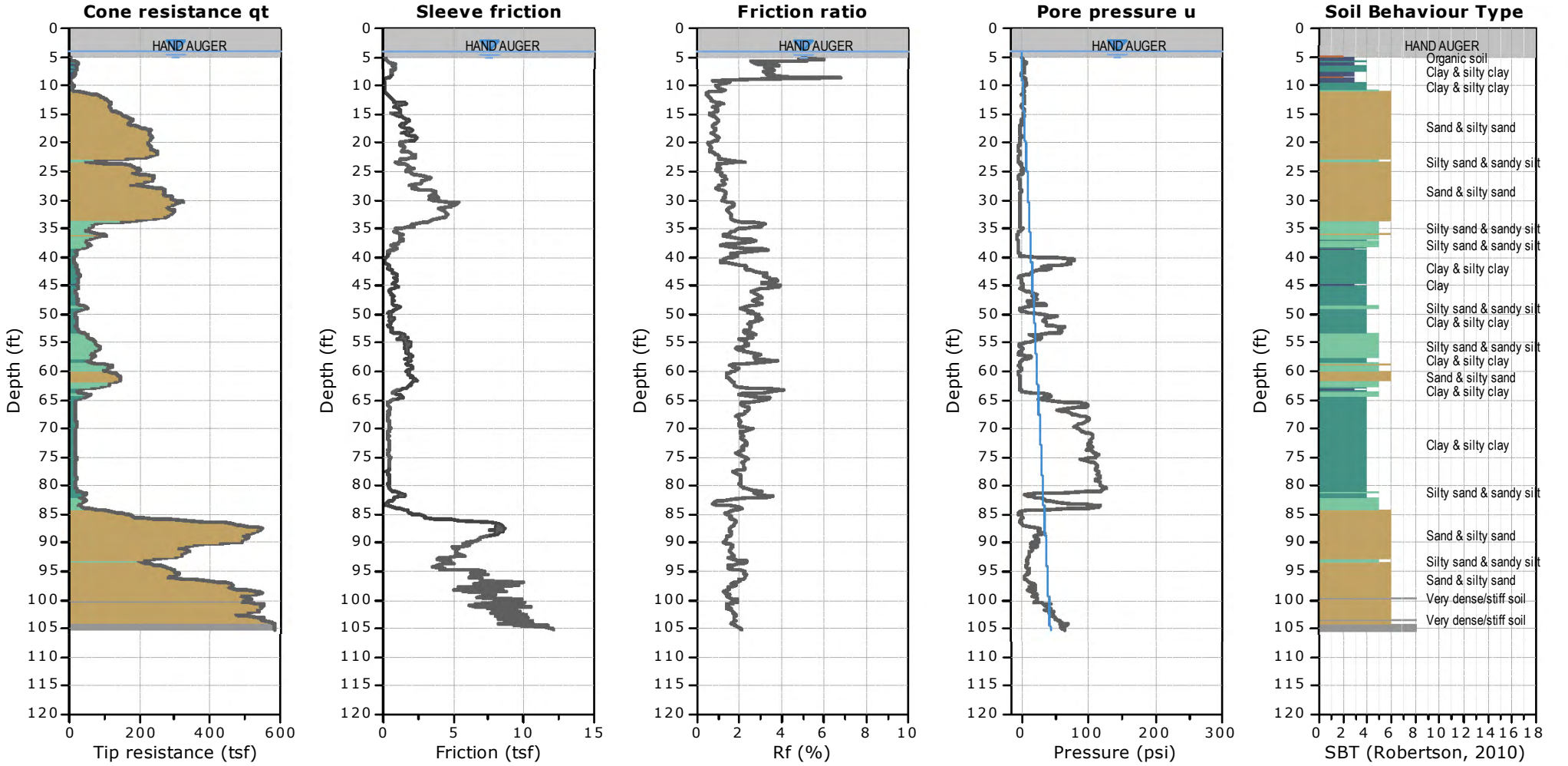
CPT: CPT22-CS-01

CLIENT: SHN

SITE: 364 VANCE AVE., SAMOA, CA

FIELD REP: GIOVANNI VADURRO
Cone ID: GDC-64

Total depth: 105.15 ft, Date: 4/19/2022



WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

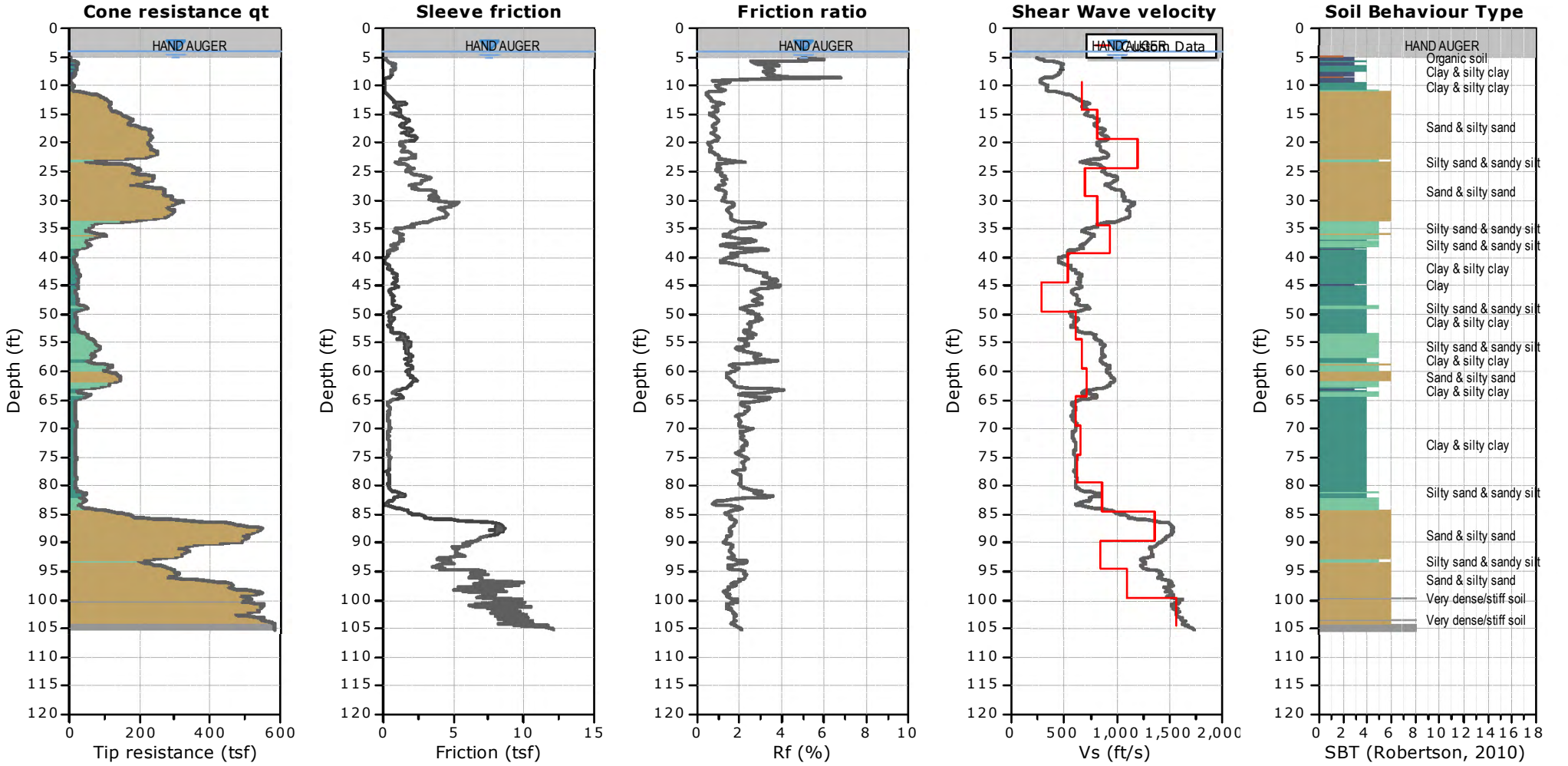
CPT: CPT22-CS-01

CLIENT: SHN

SITE: 364 VANCE AVE., SAMOA, CA

FIELD REP: GIOVANNI VADURRO
Cone ID: GDC-64

Total depth: 105.15 ft, Date: 4/19/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

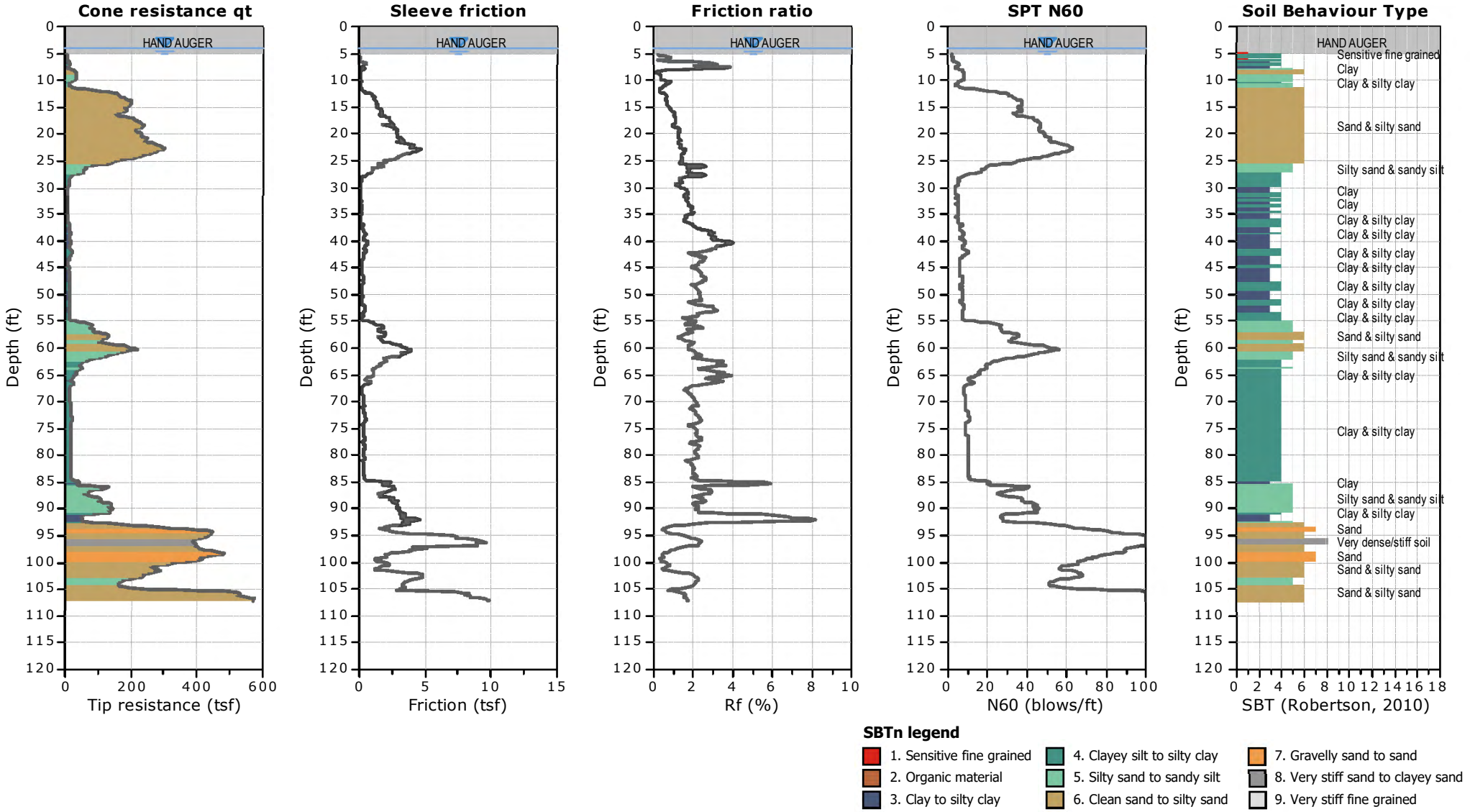
CPT: CPT22-C-02

CLIENT: SHN

SITE: 364 VANCE AVE., SAMOA, CA

FIELD REP: GIOVANNI VADURRO
Cone ID: GDC-64

Total depth: 107.12 ft, Date: 4/19/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

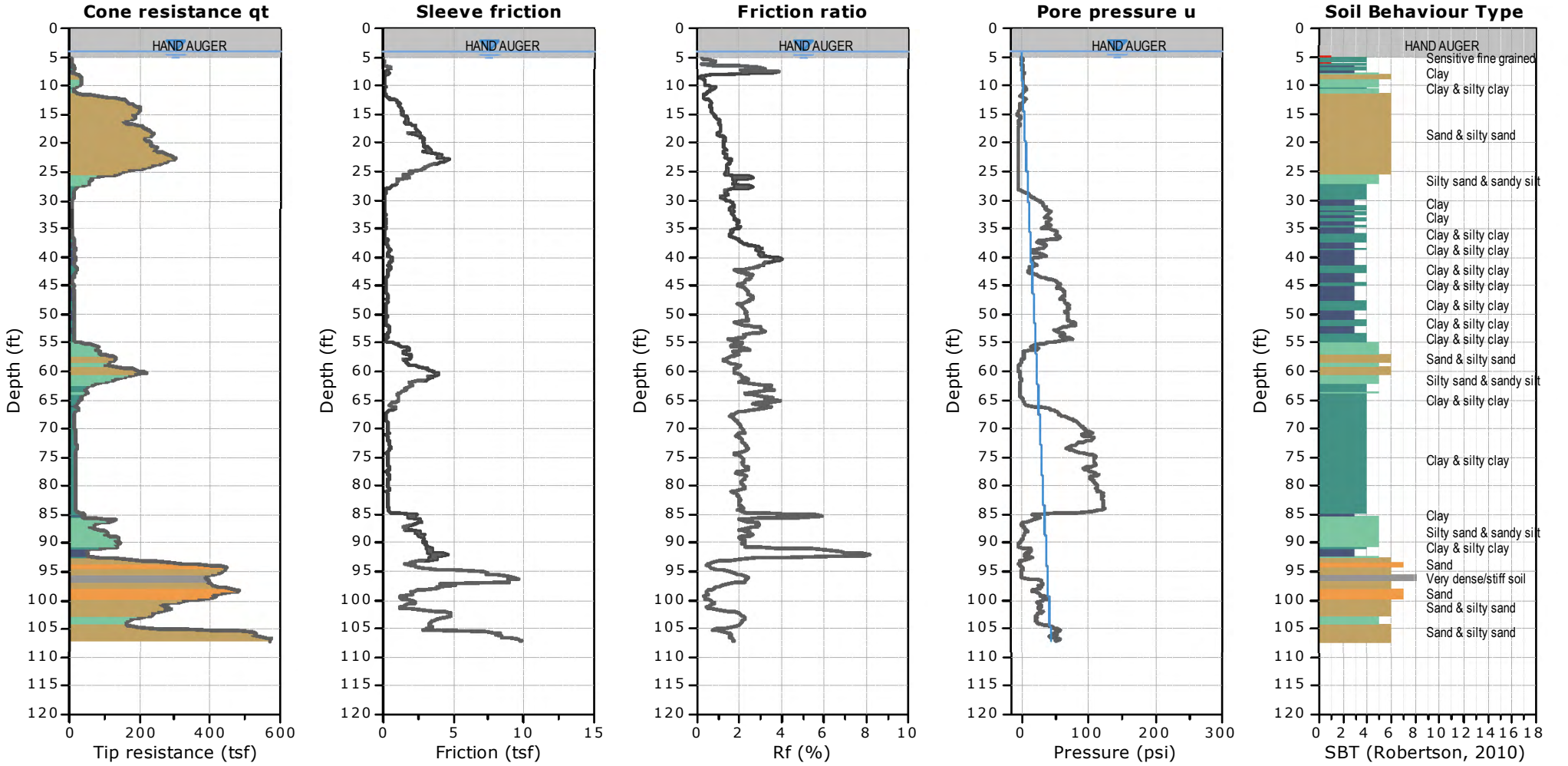
CPT: CPT22-C-02

CLIENT: SHN

SITE: 364 VANCE AVE., SAMOA, CA

FIELD REP: GIOVANNI VADURRO
Cone ID: GDC-64

Total depth: 107.12 ft, Date: 4/19/2022



WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

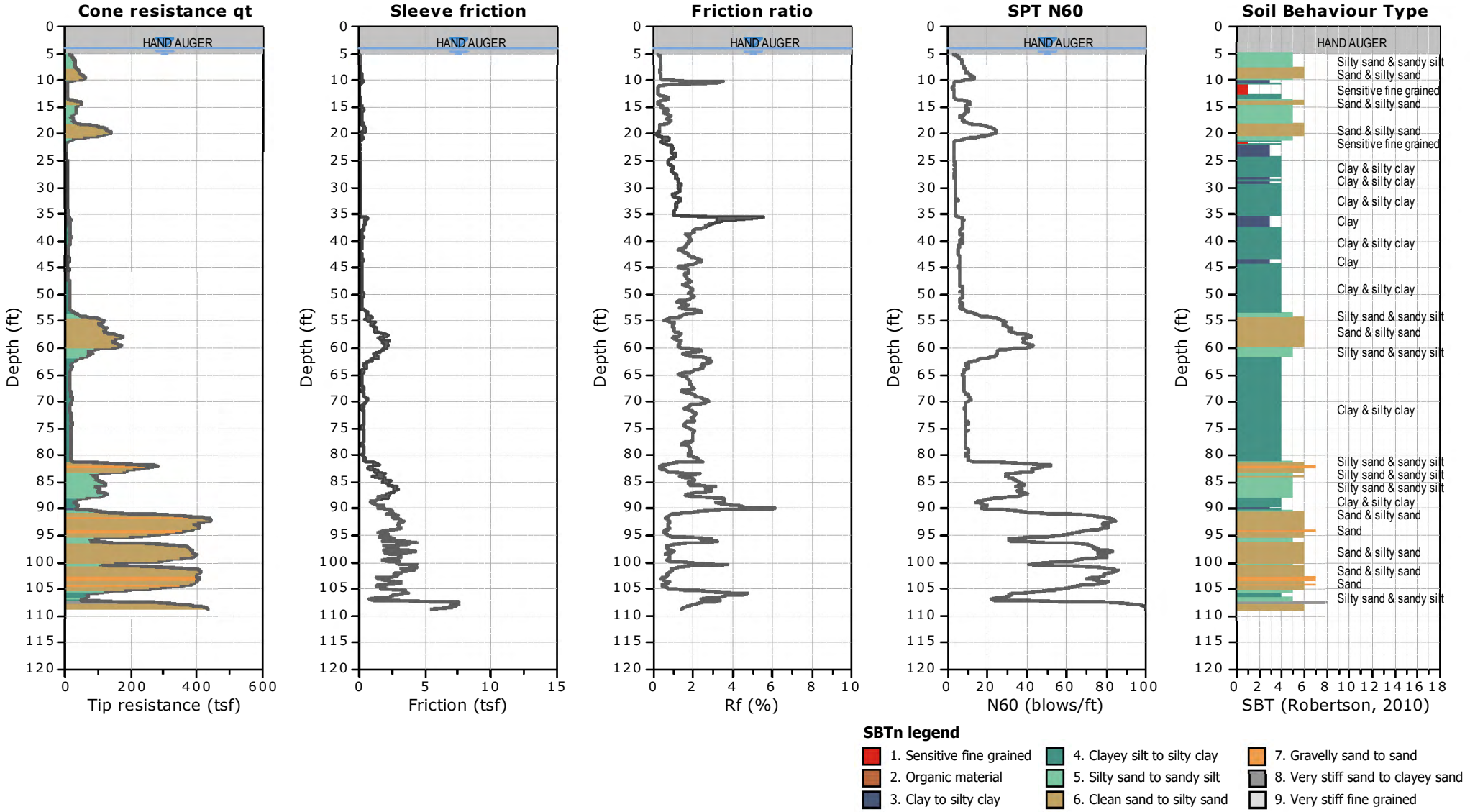
CPT: CPT22-CS-03

CLIENT: SHN

SITE: 364 VANCE AVE., SAMOA, CA

FIELD REP: GIOVANNI VADURRO
Cone ID: GDC-64

Total depth: 108.60 ft, Date: 4/19/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

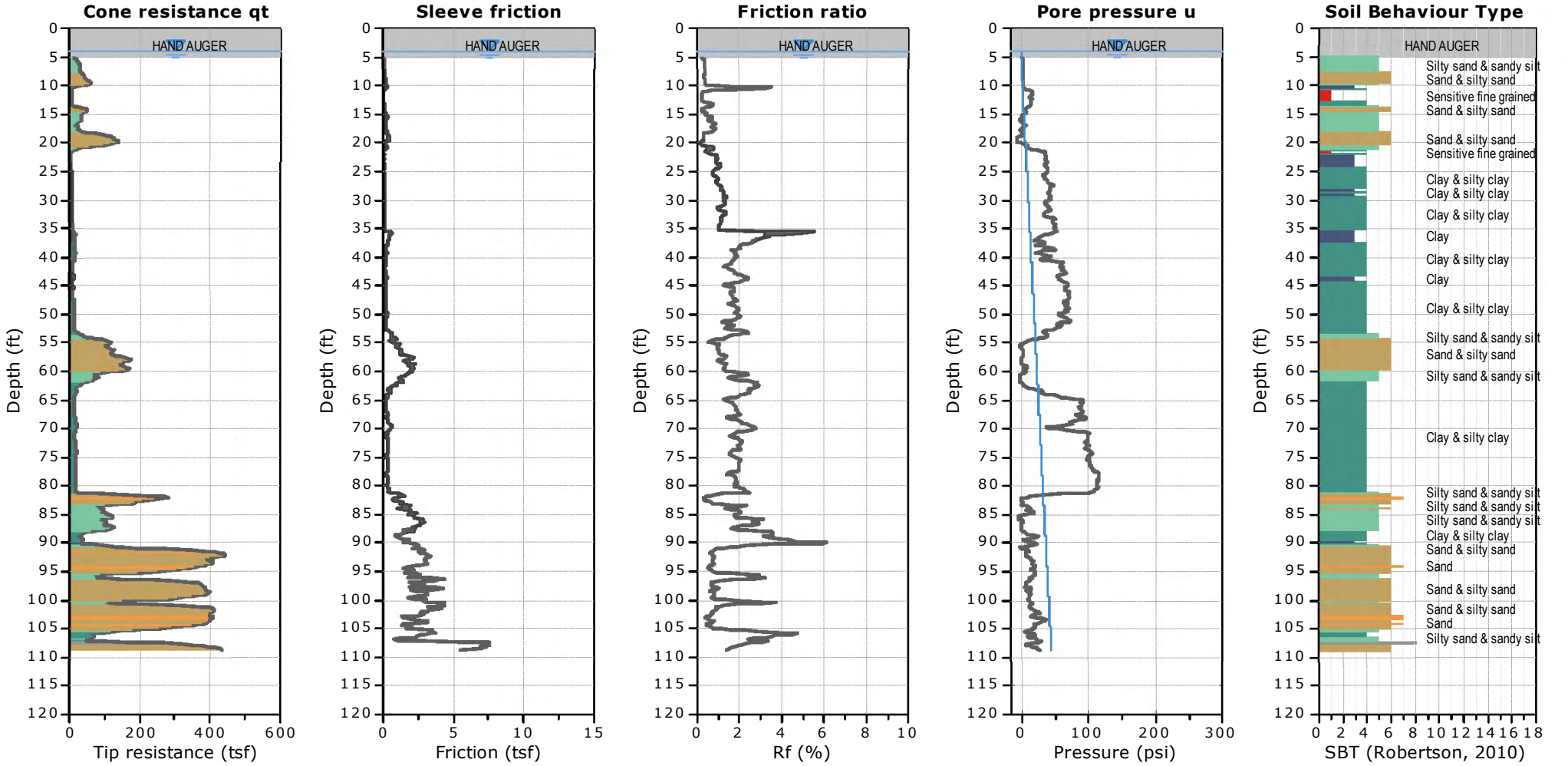
CPT: CPT22-CS-03

CLIENT: SHN

SITE: 364 VANCE AVE., SAMOA, CA

FIELD REP: GIOVANNI VADURRO
Cone ID: GDC-64

Total depth: 108.60 ft, Date: 4/19/2022



WATER TABLE FOR ESTIMATING PURPOSES ONLY

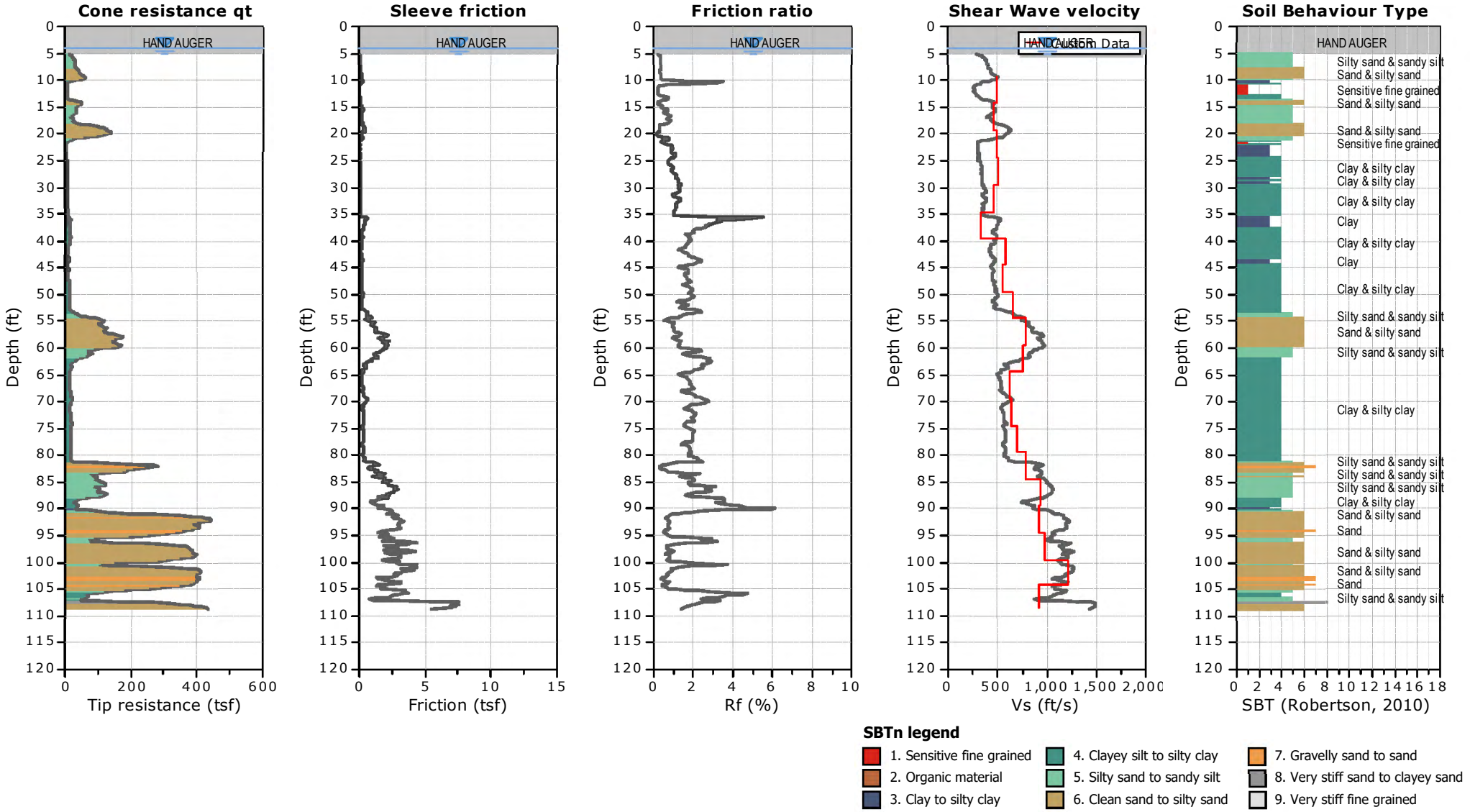
CPT: CPT22-CS-03

CLIENT: SHN

SITE: 364 VANCE AVE., SAMOA, CA

FIELD REP: GIOVANNI VADURRO
Cone ID: GDC-64

Total depth: 108.60 ft, Date: 4/19/2022



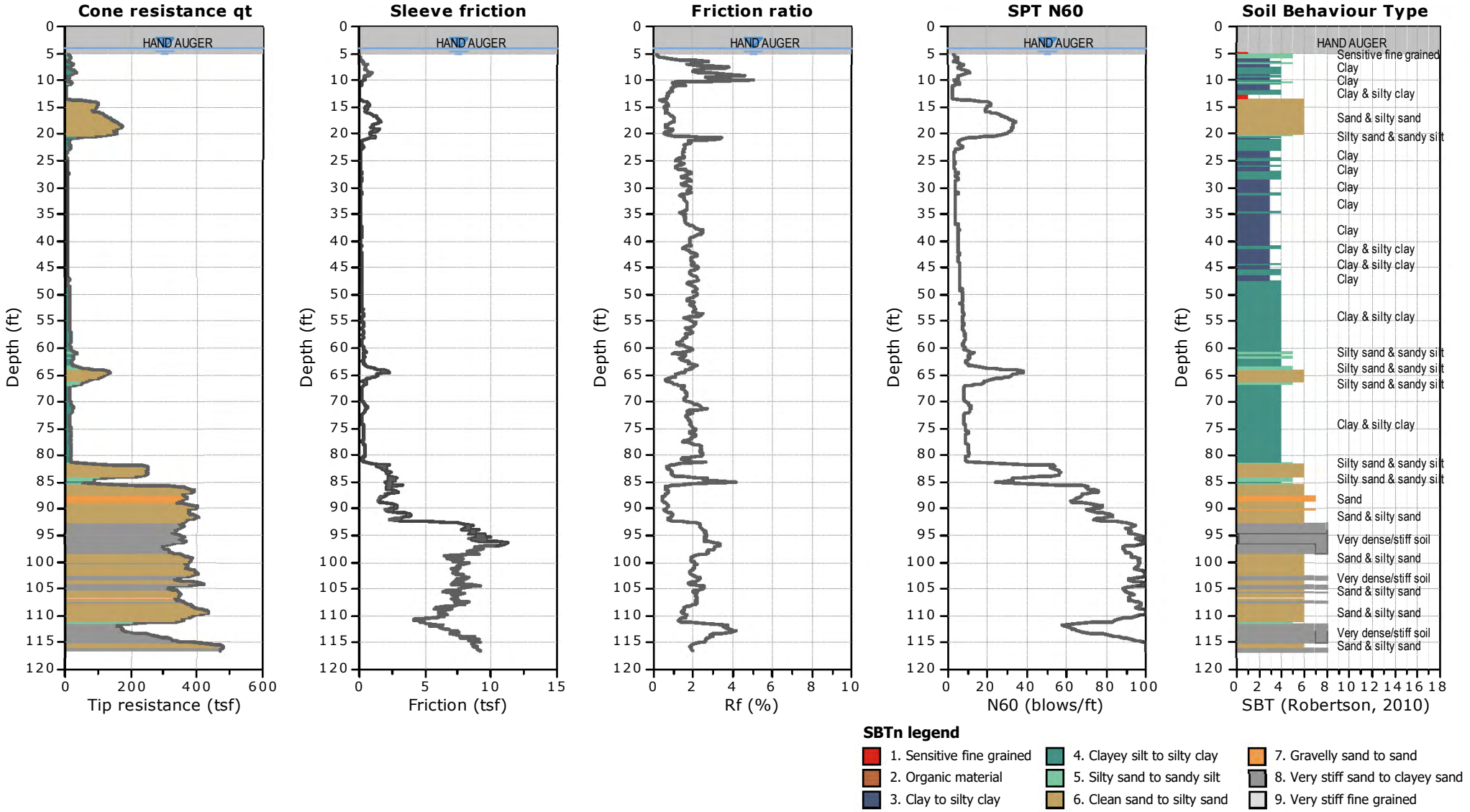
CPT: CPT22-C-04

CLIENT: SHN

SITE: 364 VANCE AVE., SAMOA, CA

FIELD REP: GIOVANNI VADURRO
Cone ID: GDC-64

Total depth: 116.47 ft, Date: 4/20/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

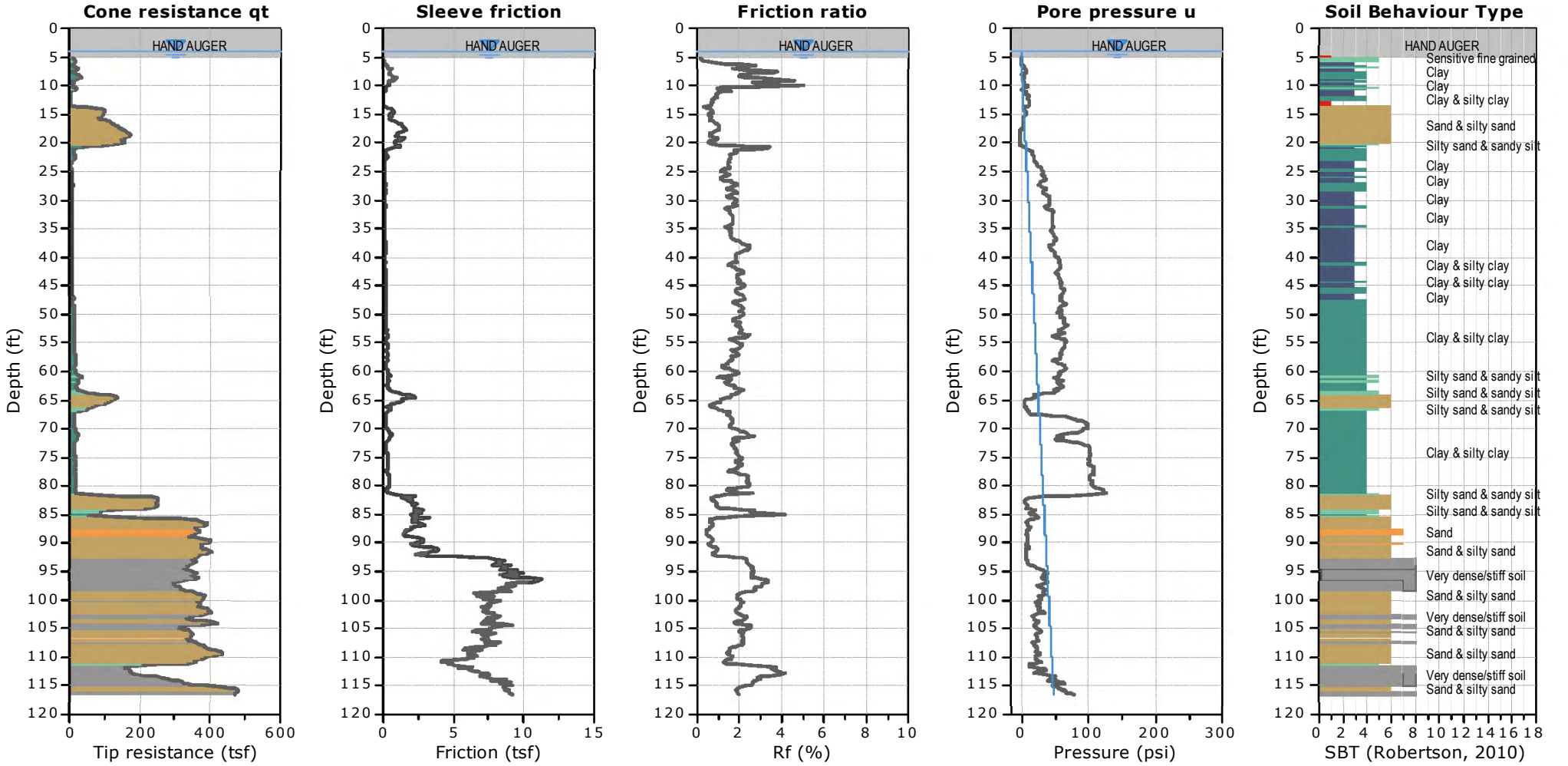
CPT: CPT22-C-04

CLIENT: SHN

SITE: 364 VANCE AVE., SAMOA, CA

FIELD REP: GIOVANNI VADURRO
Cone ID: GDC-64

Total depth: 116.47 ft, Date: 4/20/2022



WATER TABLE FOR ESTIMATING PURPOSES ONLY

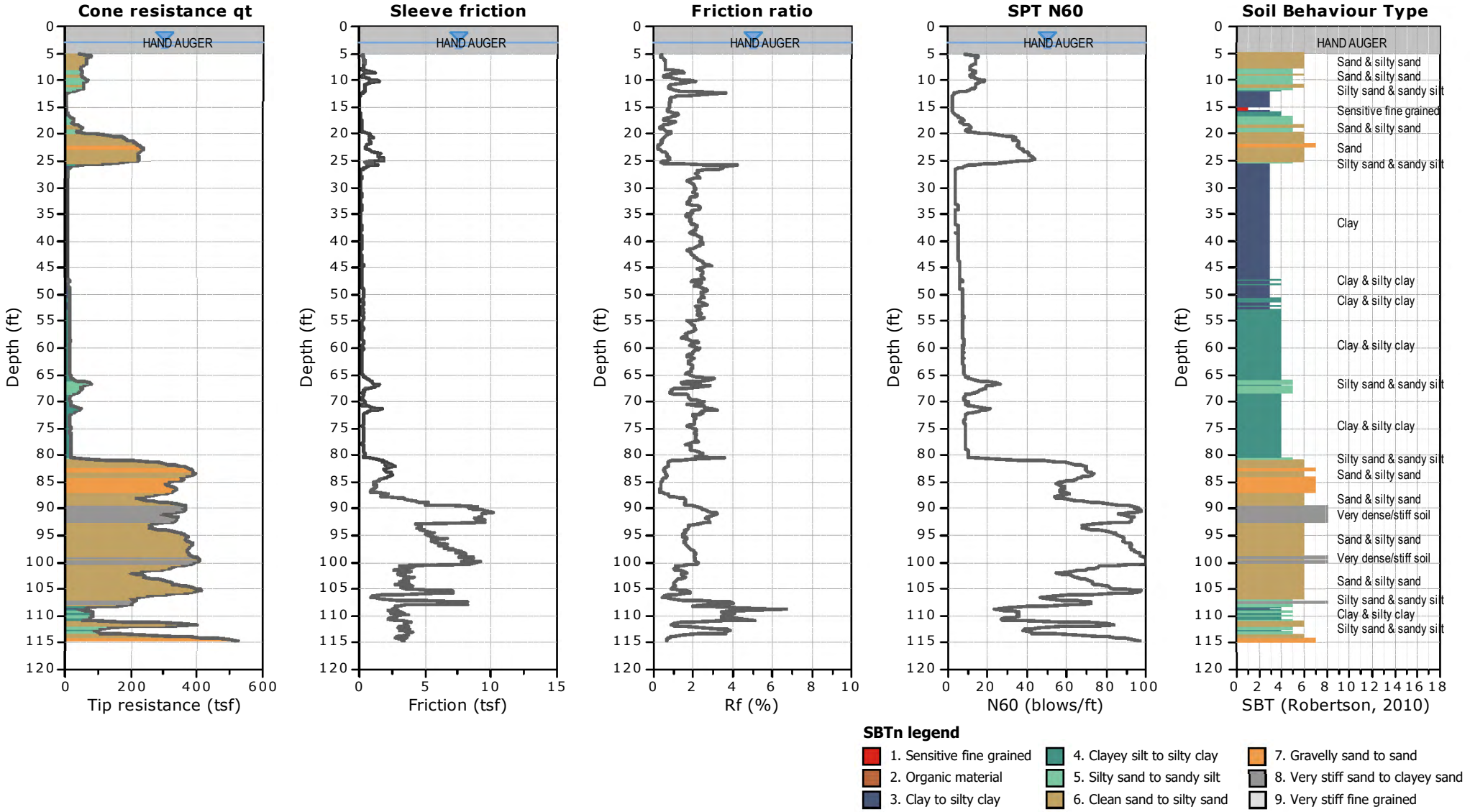
CPT: CPT22-C-05

CLIENT: SHN

SITE: 364 VANCE AVE., SAMOA, CA

FIELD REP: GIOVANNI VADURRO
Cone ID: GDC-64

Total depth: 114.67 ft, Date: 4/20/2022



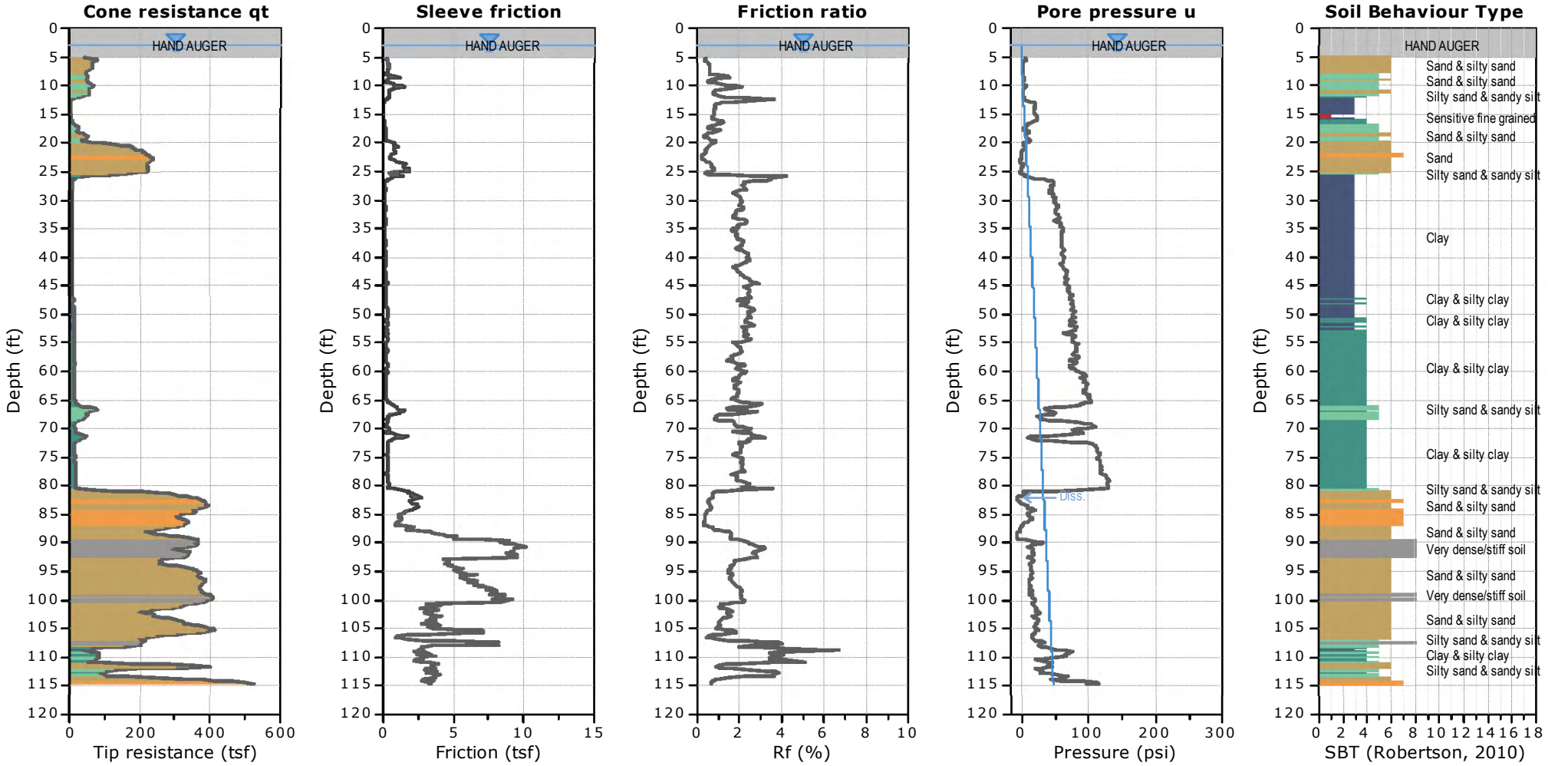
CPT: CPT22-C-05

CLIENT: SHN

SITE: 364 VANCE AVE., SAMOA, CA

FIELD REP: GIOVANNI VADURRO
Cone ID: GDC-64

Total depth: 114.67 ft, Date: 4/20/2022



WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

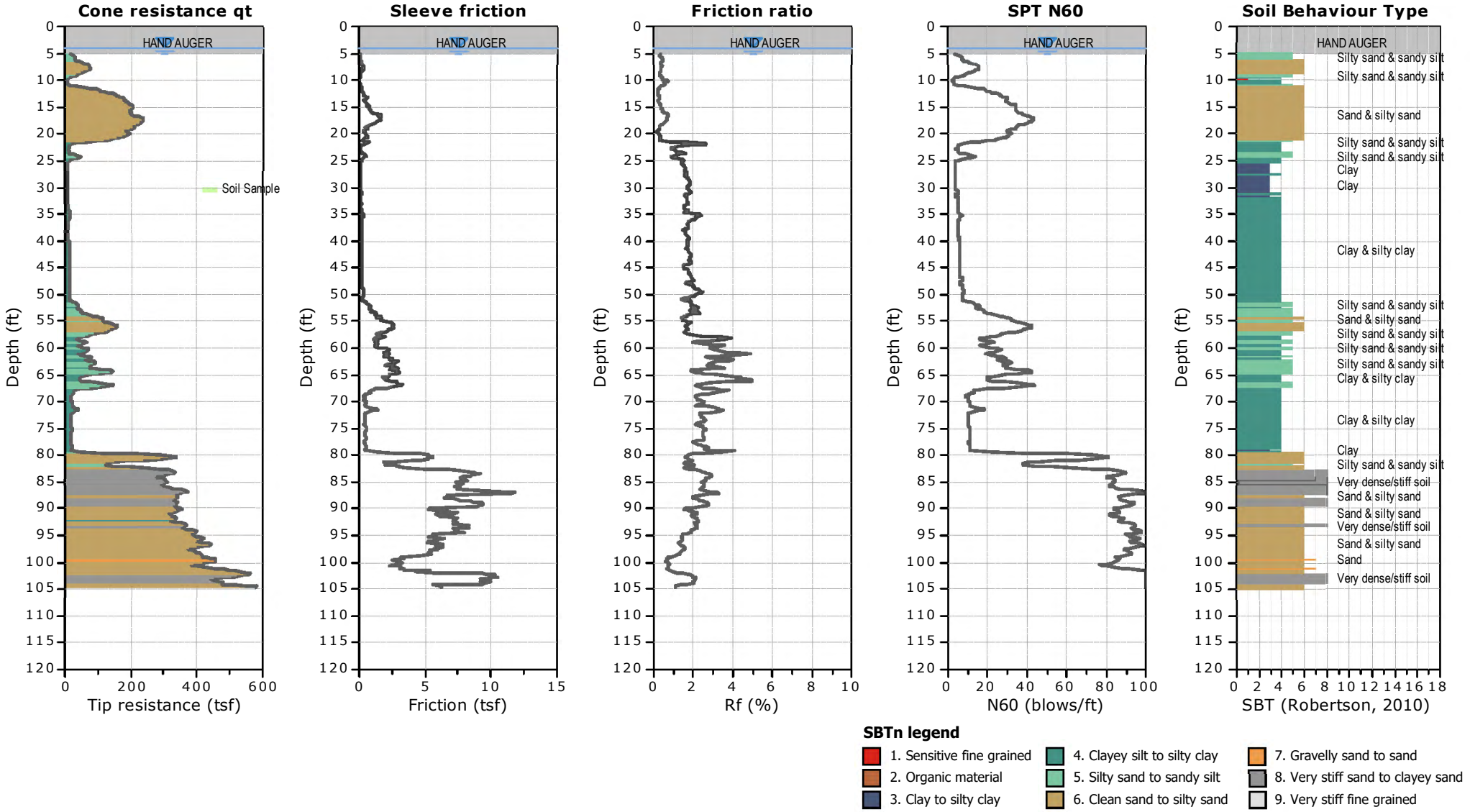
CPT: CPT22-CS-06

CLIENT: SHN

SITE: 364 VANCE AVE., SAMOA, CA

FIELD REP: GIOVANNI VADURRO
Cone ID: GDC-64

Total depth: 104.66 ft, Date: 4/21/2022



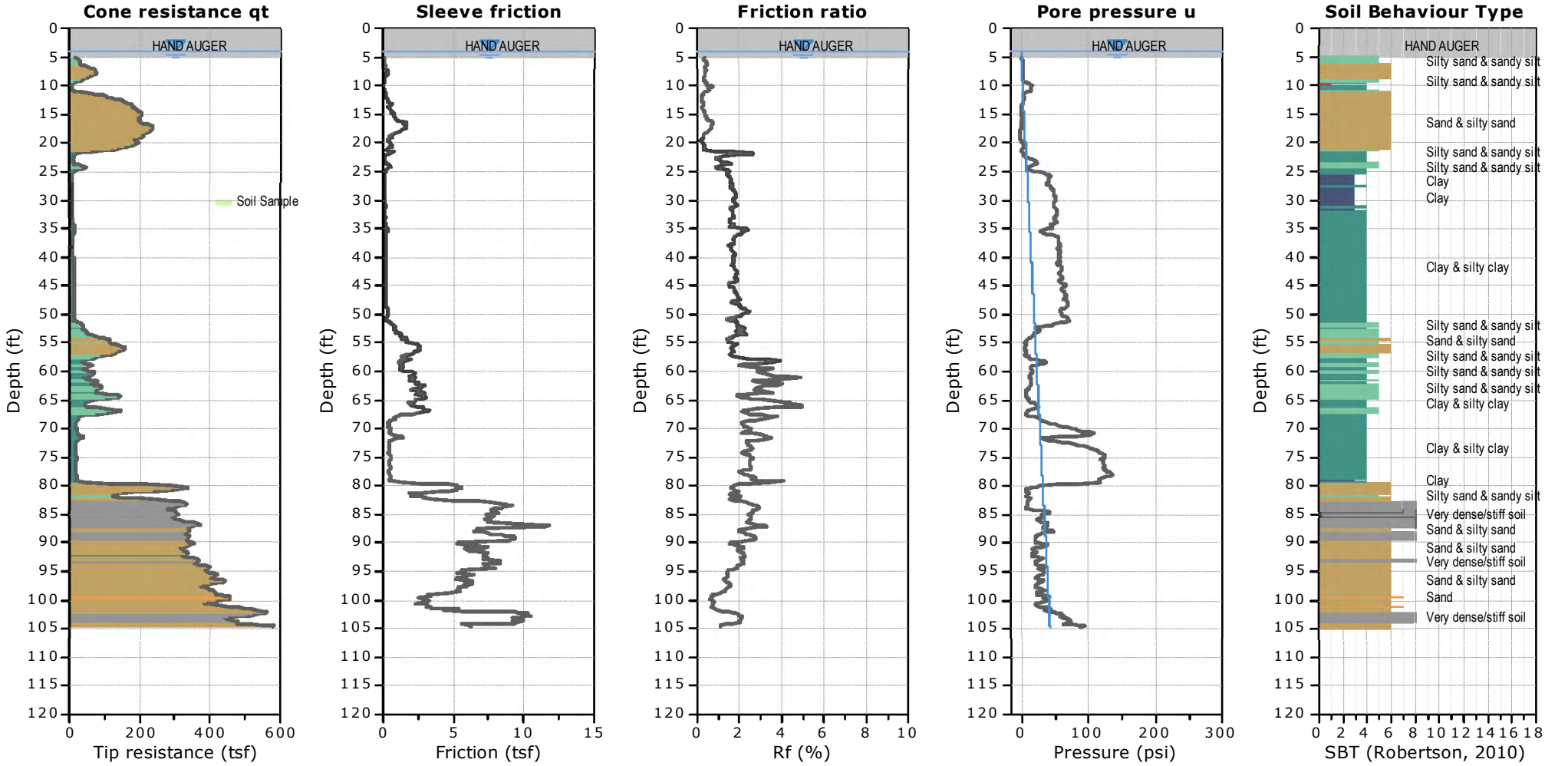
CPT: CPT22-CS-06

CLIENT: SHN

SITE: 364 VANCE AVE., SAMOA, CA

FIELD REP: GIOVANNI VADURRO
Cone ID: GDC-64

Total depth: 104.66 ft, Date: 4/21/2022



WATER TABLE FOR ESTIMATING PURPOSES ONLY

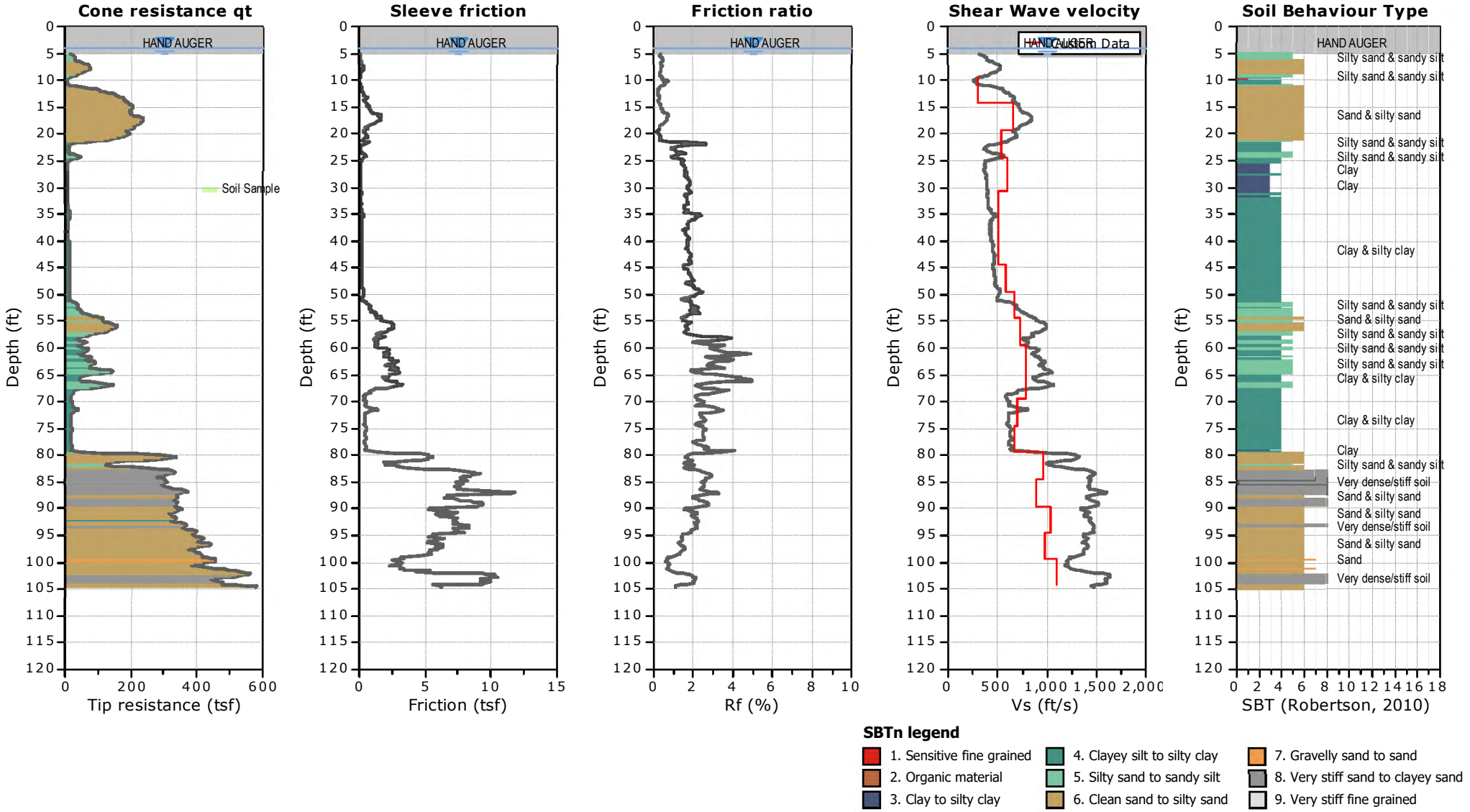
CPT: CPT22-CS-06

CLIENT: SHN

SITE: 364 VANCE AVE., SAMOA, CA

FIELD REP: GIOVANNI VADURRO
Cone ID: GDC-64

Total depth: 104.66 ft, Date: 4/21/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

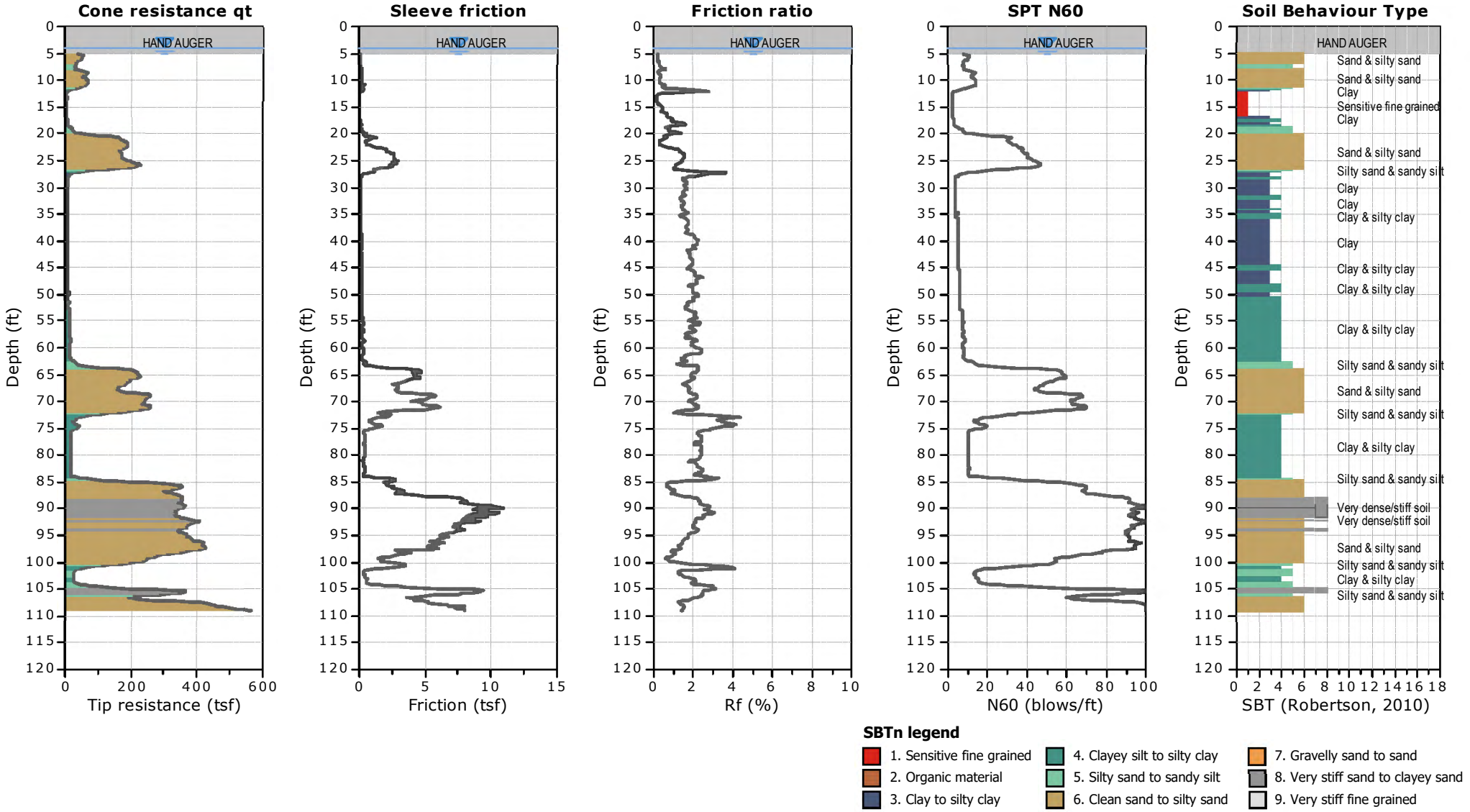
CPT: CPT22-C-07

CLIENT: SHN

SITE: 364 VANCE AVE., SAMOA, CA

FIELD REP: GIOVANNI VADURRO
Cone ID: GDC-64

Total depth: 109.09 ft, Date: 4/20/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

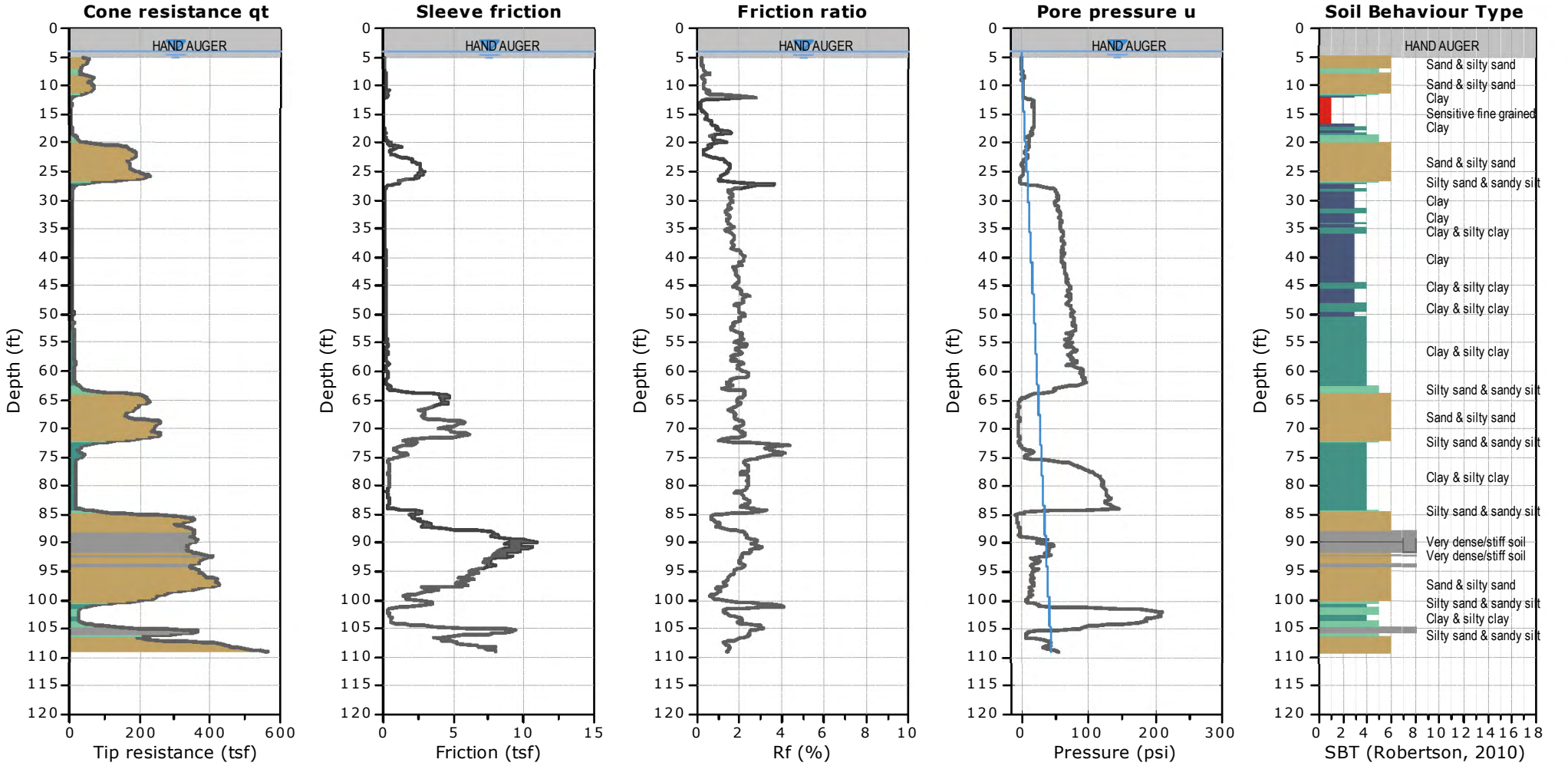
CPT: CPT22-C-07

CLIENT: SHN

SITE: 364 VANCE AVE., SAMOA, CA

FIELD REP: GIOVANNI VADURRO
Cone ID: GDC-64

Total depth: 109.09 ft, Date: 4/20/2022



WATER TABLE FOR ESTIMATING PURPOSES ONLY

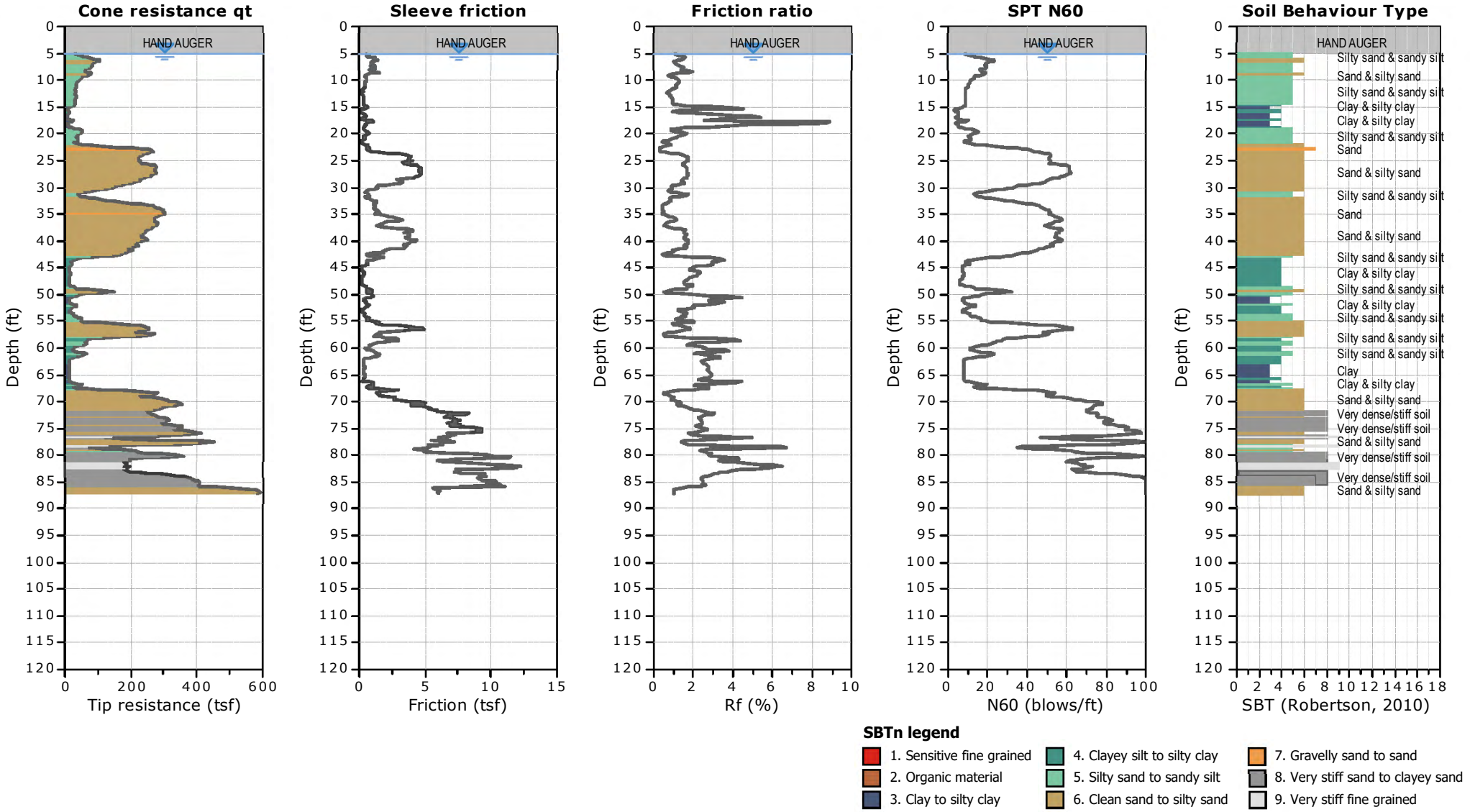
CPT: CPT22-C-08

CLIENT: SHN

SITE: 364 VANCE AVE., SAMOA, CA

FIELD REP: GIOVANNI VADURRO
Cone ID: GDC-64

Total depth: 87.11 ft, Date: 4/21/2022



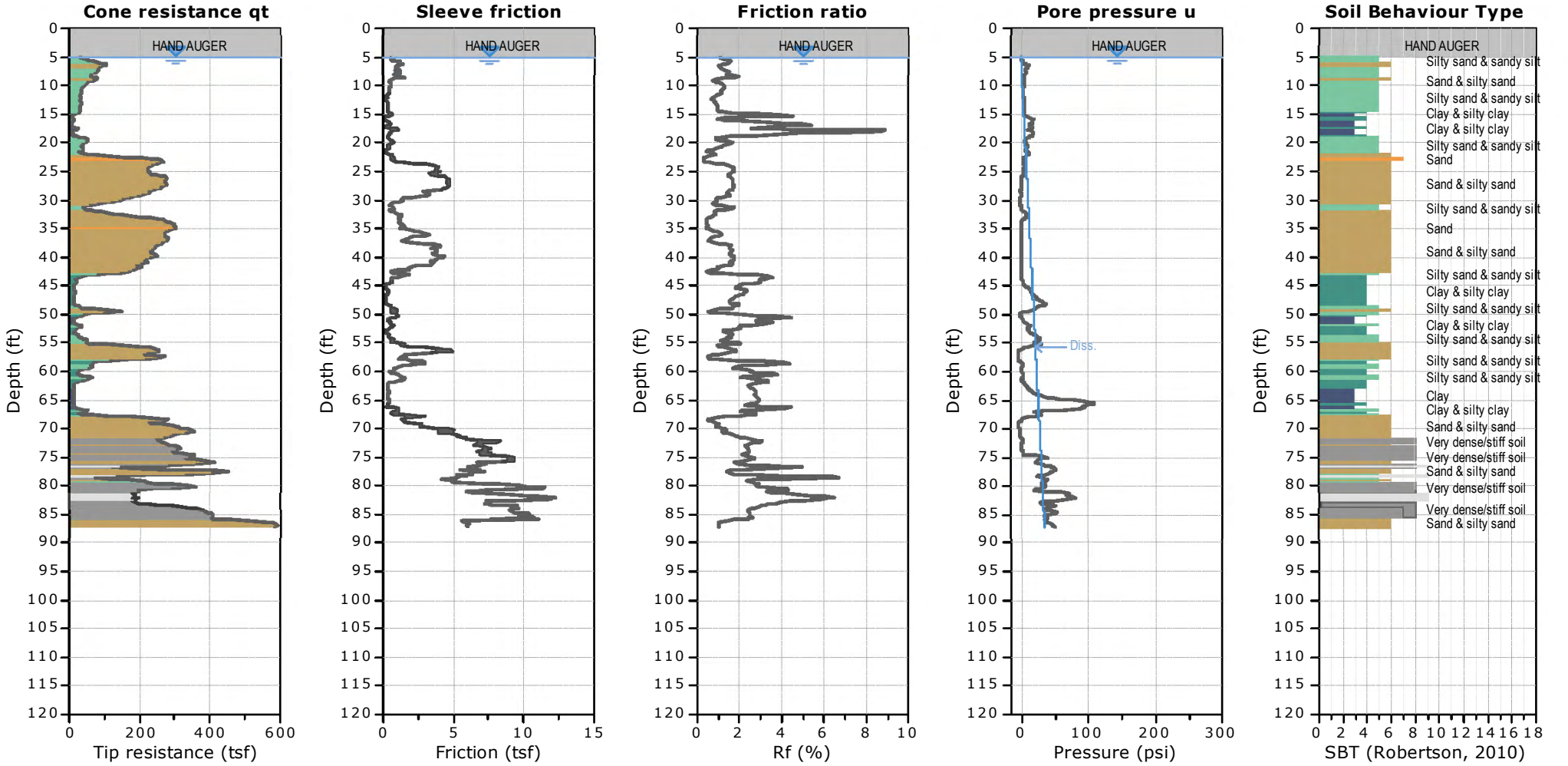
CPT: CPT22-C-08

CLIENT: SHN

SITE: 364 VANCE AVE., SAMOA, CA

FIELD REP: GIOVANNI VADURRO
Cone ID: GDC-64

Total depth: 87.11 ft, Date: 4/21/2022



WATER TABLE FOR ESTIMATING PURPOSES ONLY

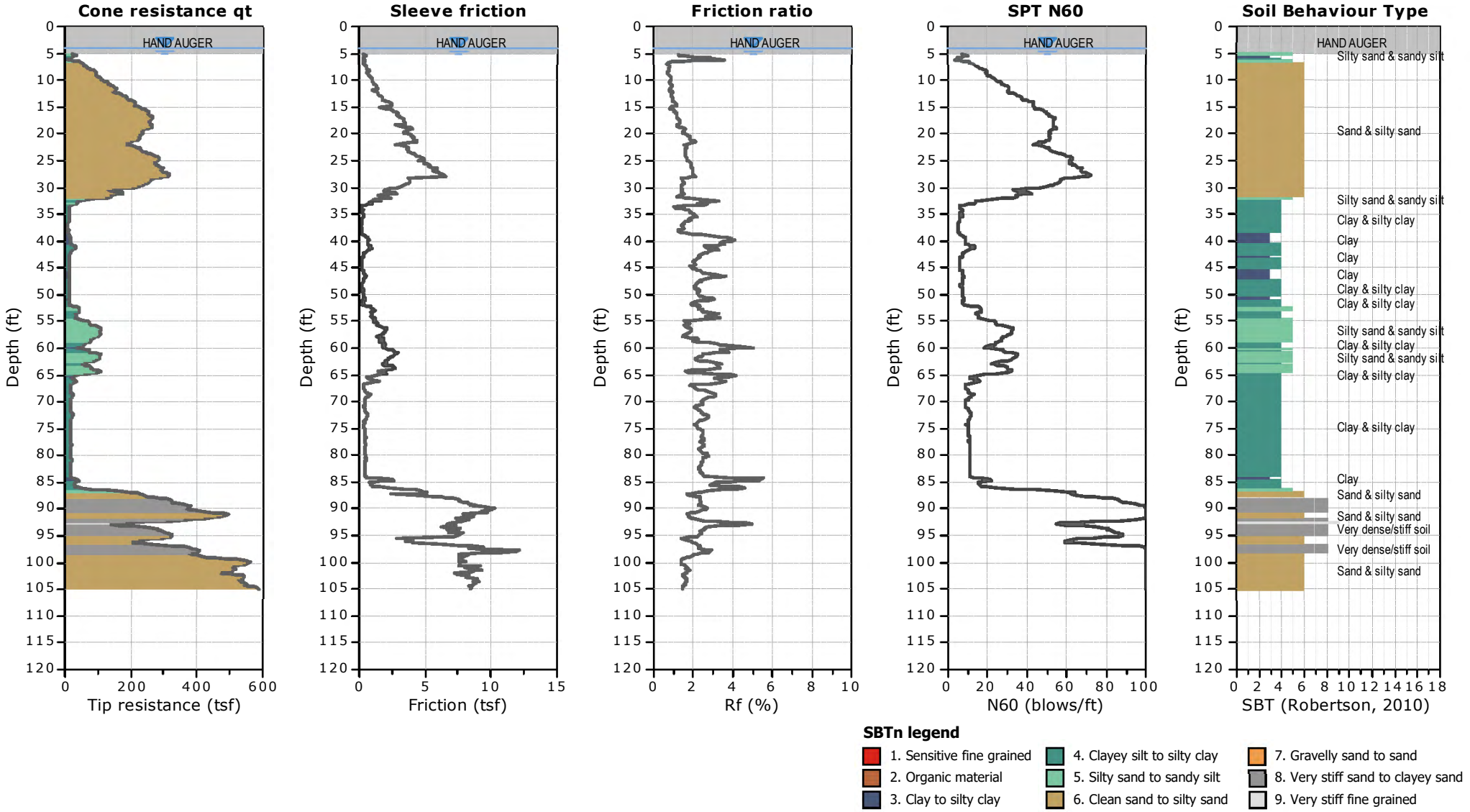
CPT: CPT22-C-09

CLIENT: SHN

SITE: 364 VANCE AVE., SAMOA, CA

FIELD REP: GIOVANNI VADURRO
Cone ID: GDC-64

Total depth: 104.82 ft, Date: 4/21/2022



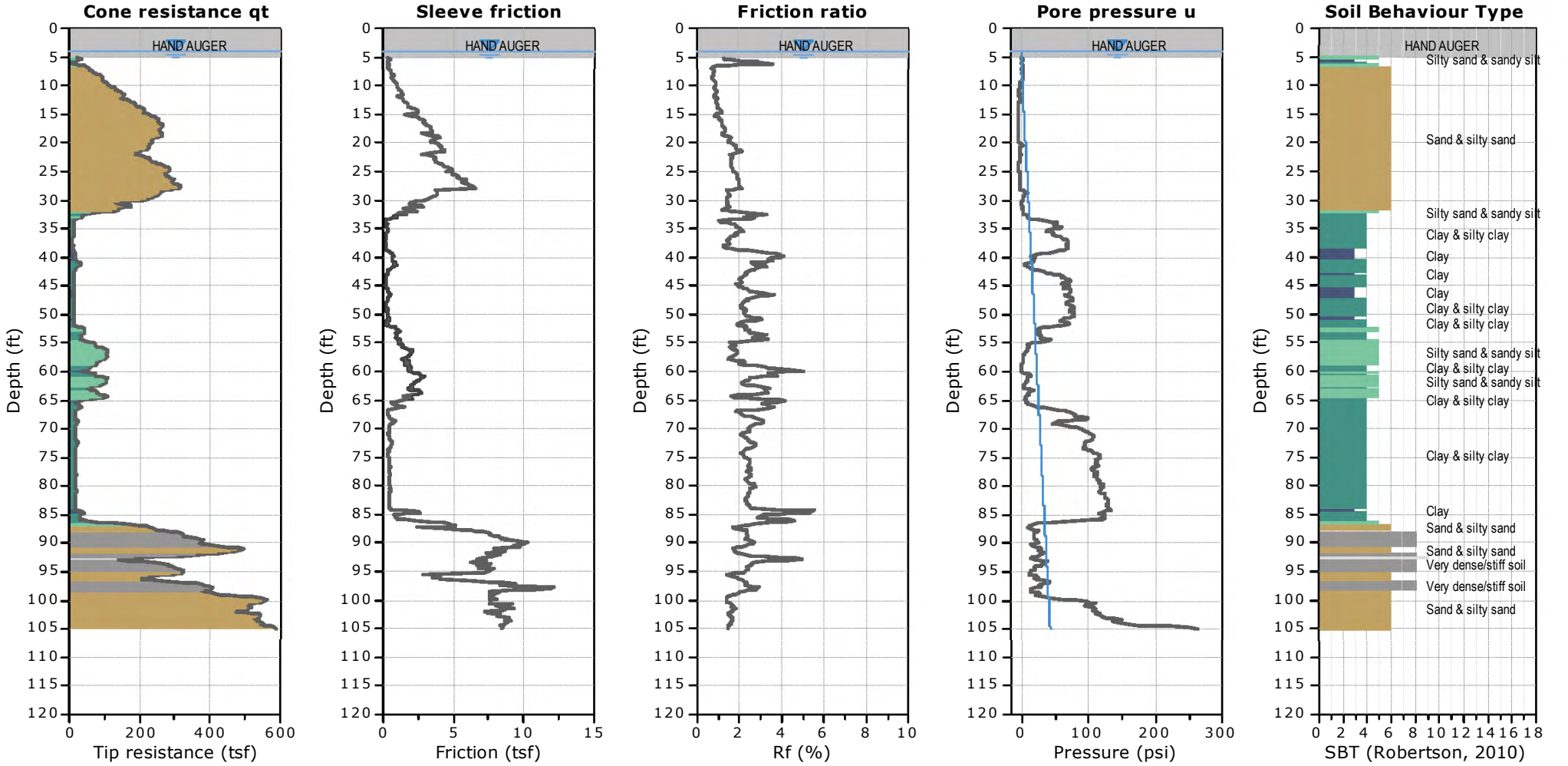
CPT: CPT22-C-09

CLIENT: SHN

SITE: 364 VANCE AVE., SAMOA, CA

FIELD REP: GIOVANNI VADURRO
Cone ID: GDC-64

Total depth: 104.82 ft, Date: 4/21/2022



SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravelly sand to sand
8. Very stiff sand to clayey sand
9. Very stiff fine grained

WATER TABLE FOR ESTIMATING PURPOSES ONLY

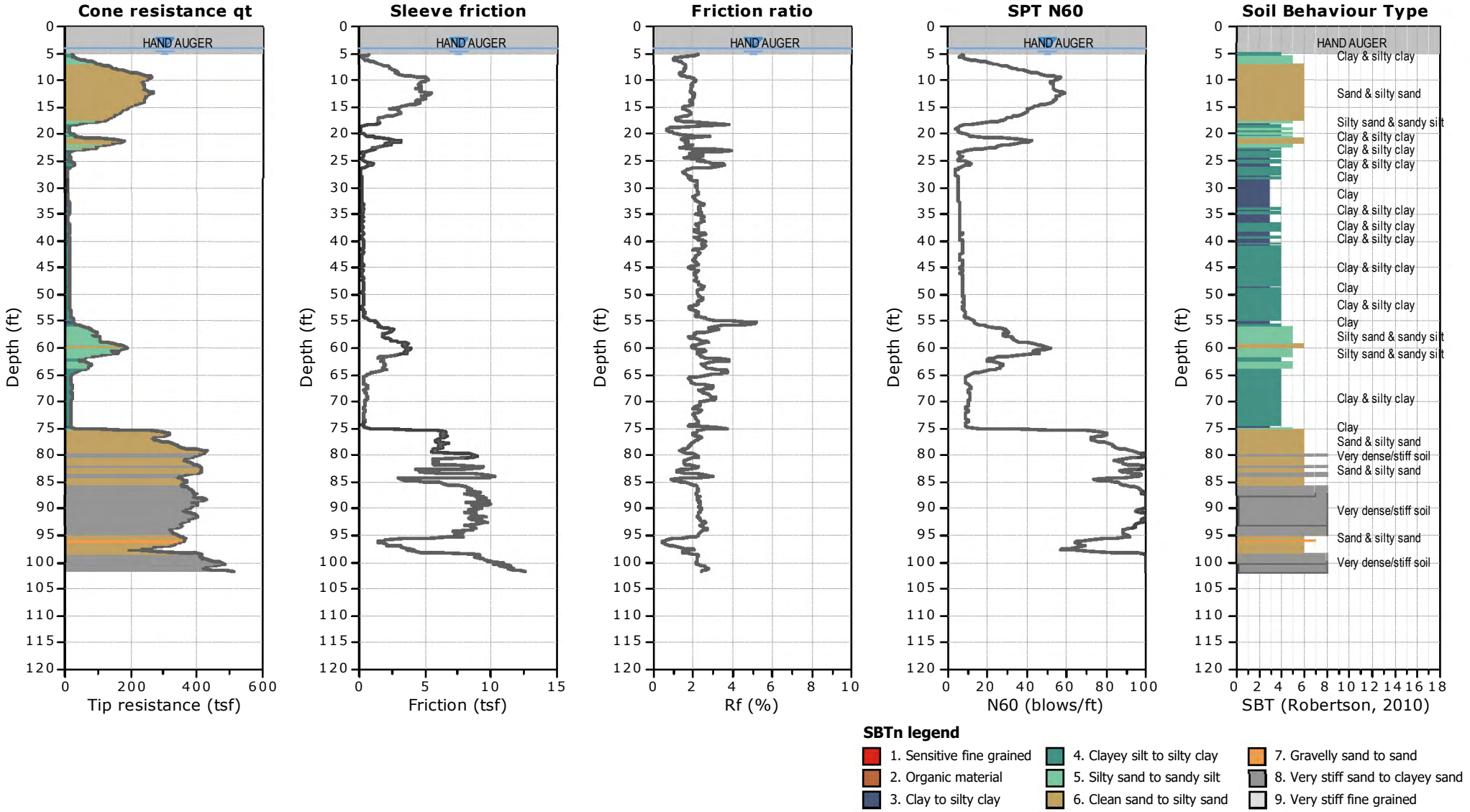
CPT: CPT22-C-10

CLIENT: SHN

SITE: 364 VANCE AVE., SAMOA, CA

FIELD REP: GIOVANNI VADURRO
Cone ID: GDC-64

Total depth: 101.71 ft, Date: 4/22/2022



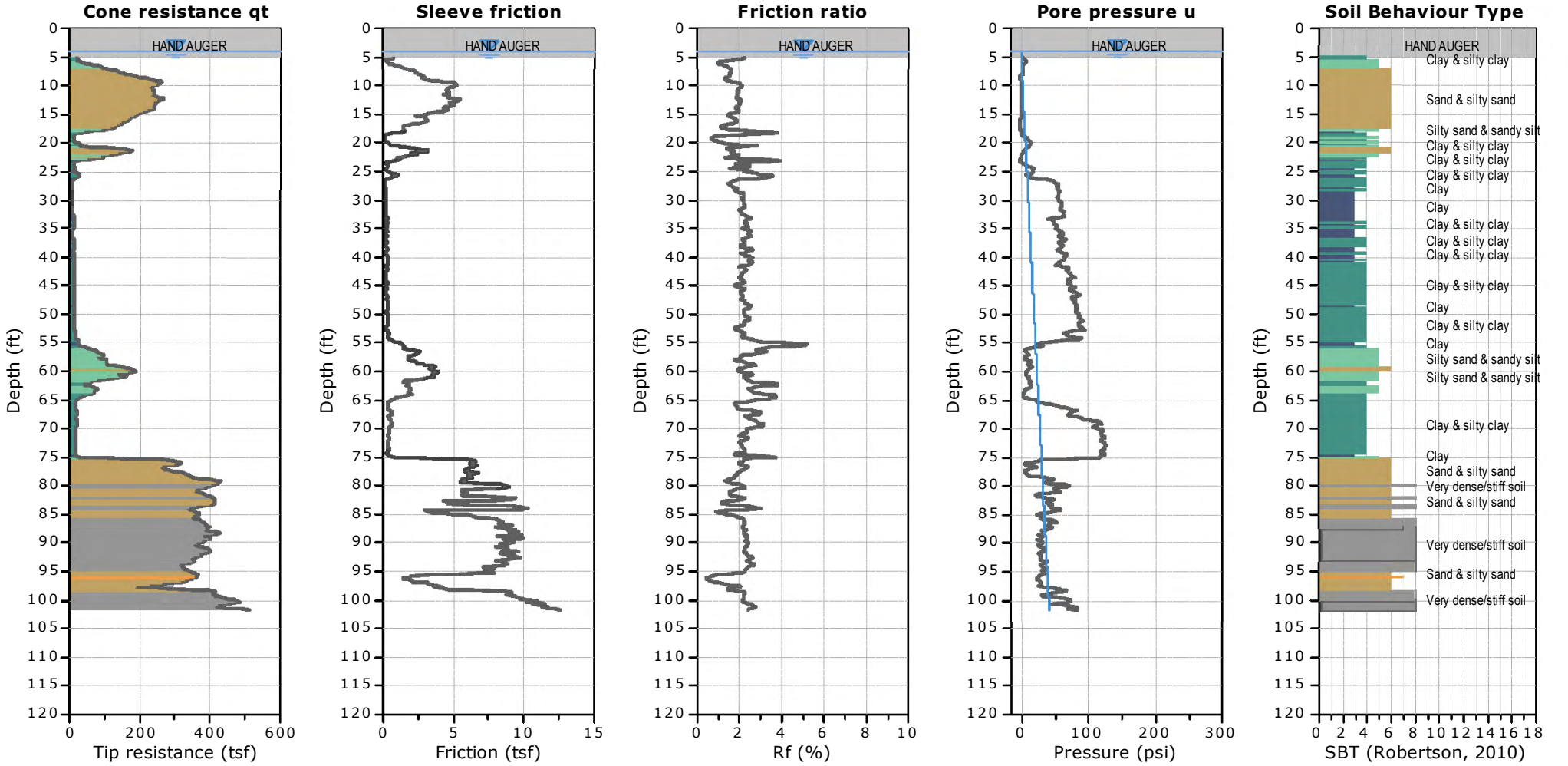
CPT: CPT22-C-10

CLIENT: SHN

SITE: 364 VANCE AVE., SAMOA, CA

FIELD REP: GIOVANNI VADURRO
Cone ID: GDC-64

Total depth: 101.71 ft, Date: 4/22/2022



WATER TABLE FOR ESTIMATING PURPOSES ONLY

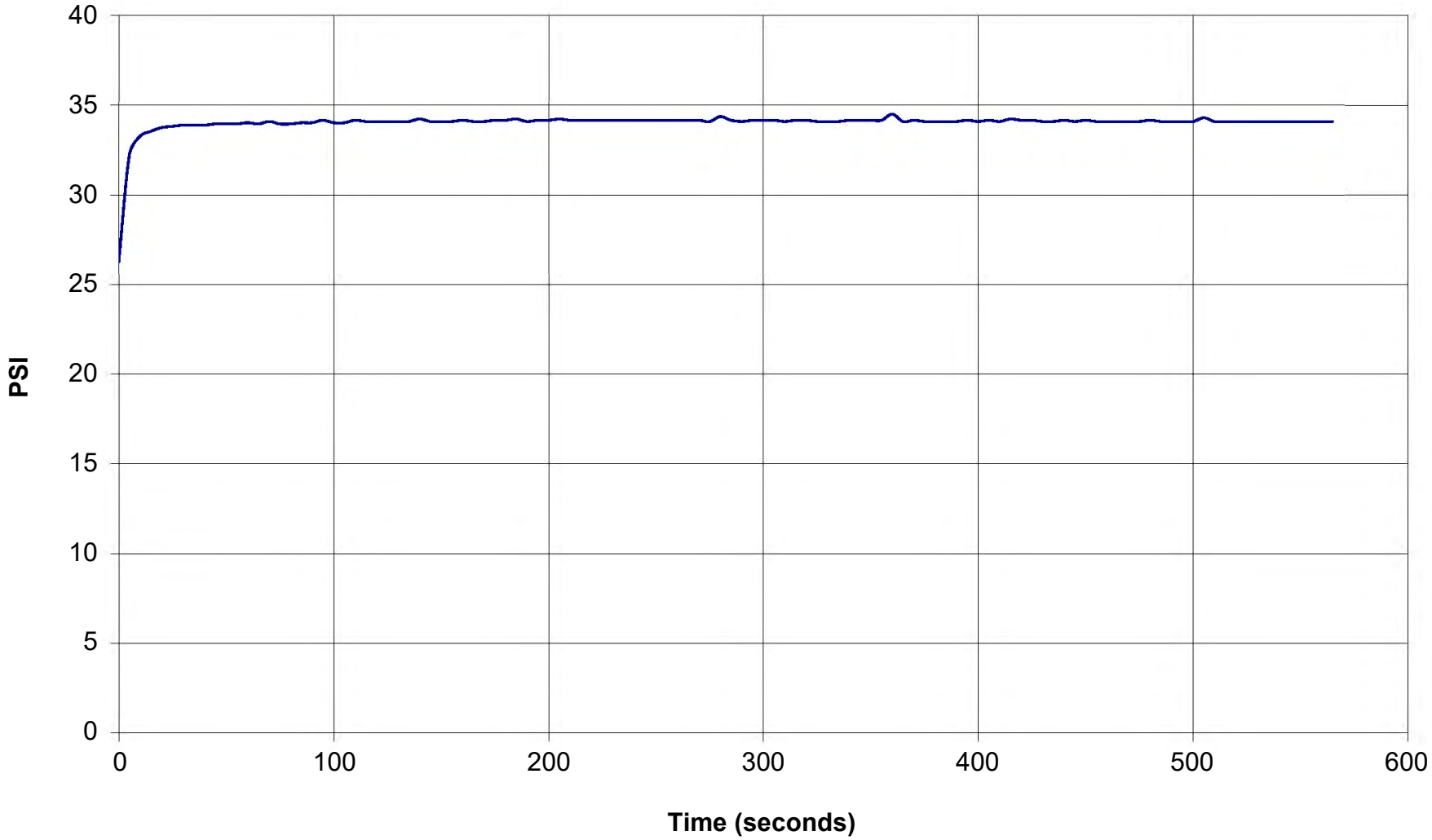
APPENDIX B:

PORE PRESSURE DISSIPATION TEST PLOTS

GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

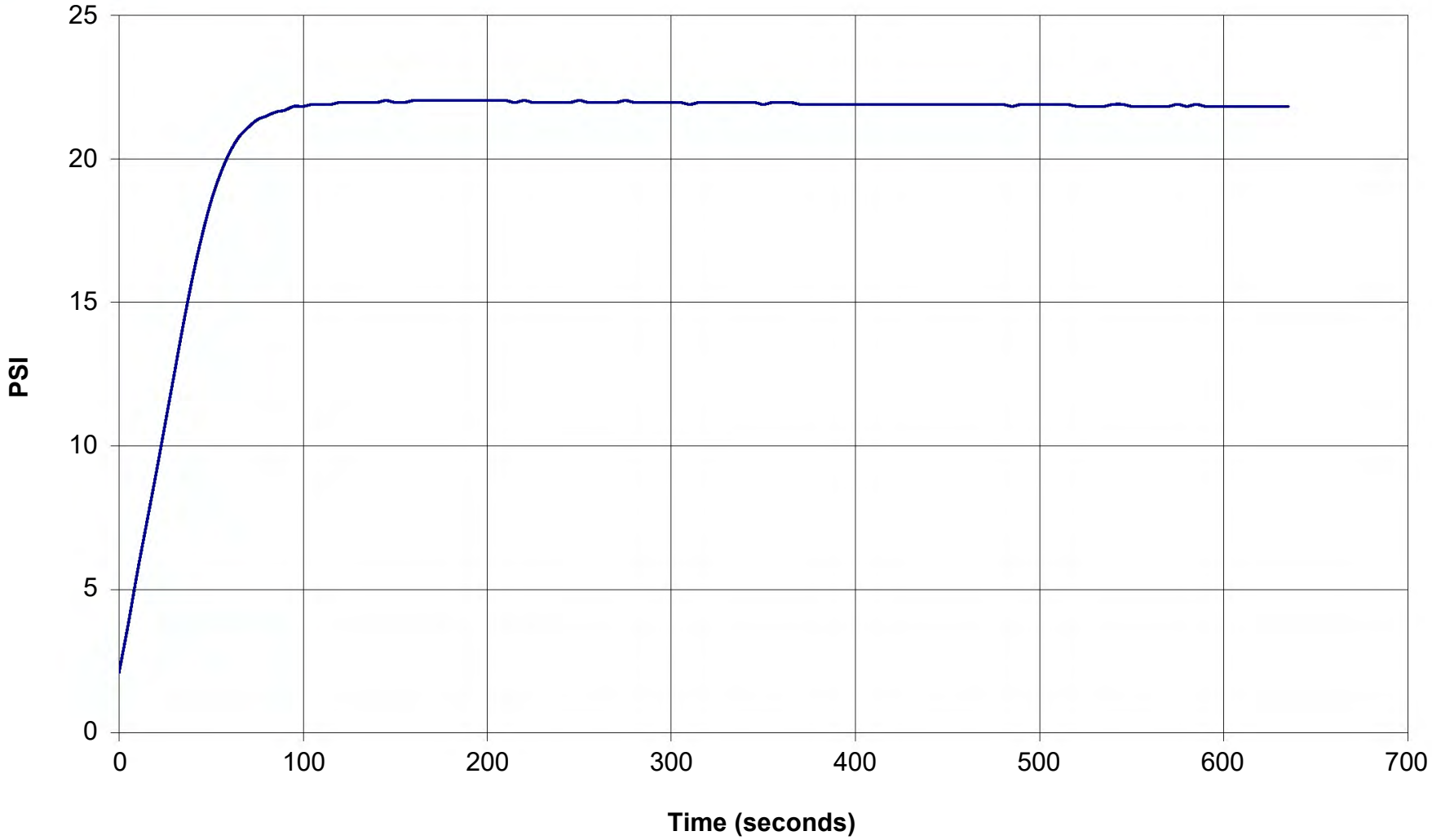
Sounding: CPT22-C-05
Depth (ft): 82.02
Site: 364 VANCE AVE.
Engineer: GIOVANNI



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: CPT22-C-08
Depth (ft): 55.61
Site: 364 VANCE AVE.
Engineer: GIOVANNI



APPENDIX C:

SEISMIC

PLOTS & TABLES

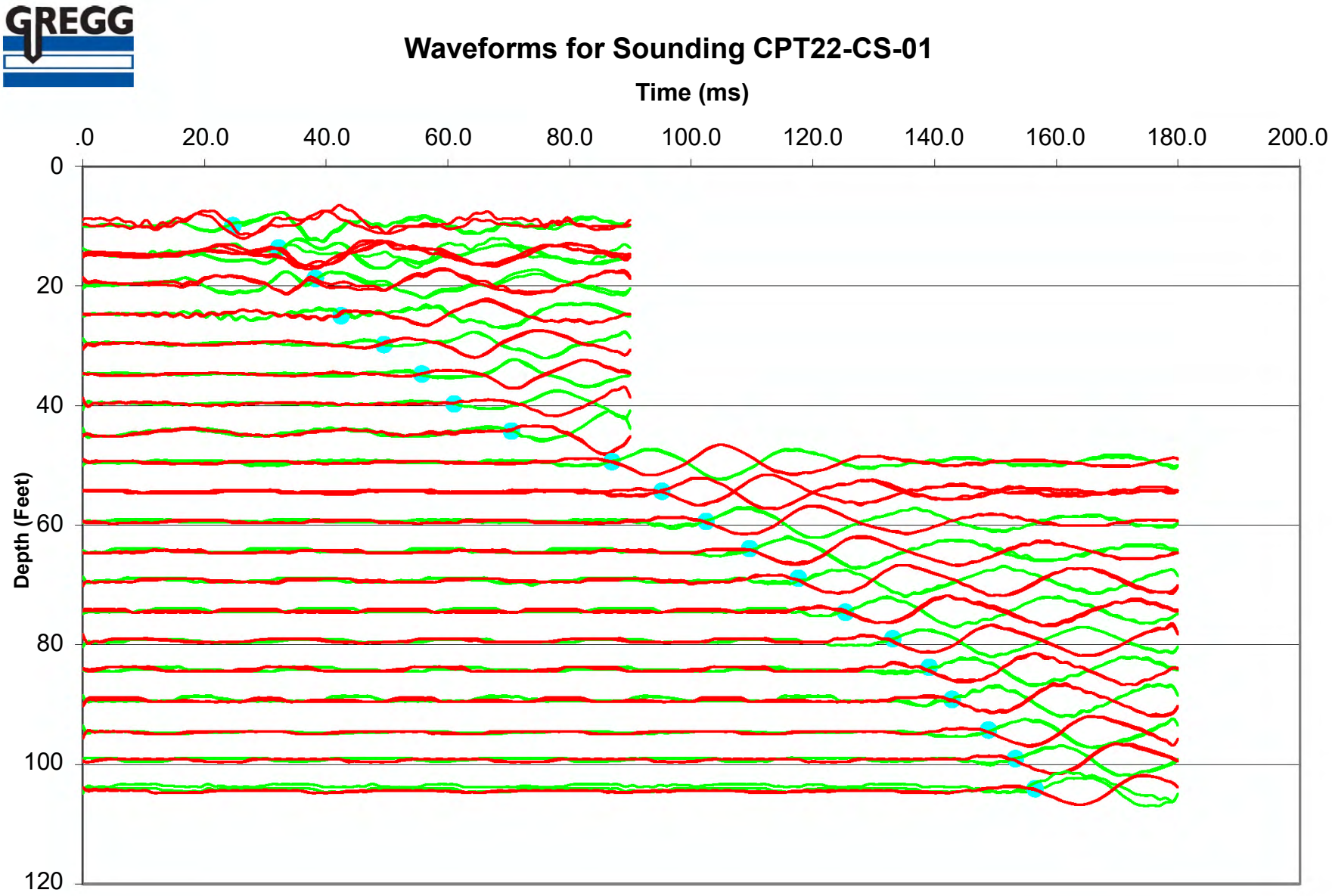
Shear Wave Velocity Calculations

364 VANCE AV.
CPT22-CS-01
CPT22-CS-01

Geophone Offset: 0.66 Feet
Source Offset: 1.67 Feet

04/19/22

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
10.01	9.35	9.49	9.49	24.5000			
15.09	14.43	14.53	5.03	32.0000	7.5000	671.1	11.89
20.01	19.35	19.42	4.90	37.9500	5.9500	823.0	16.89
25.10	24.44	24.50	5.07	42.2000	4.2500	1193.0	21.90
30.02	29.36	29.41	4.91	49.2000	7.0000	701.7	26.90
35.10	34.44	34.49	5.08	55.4000	6.2000	819.1	31.90
40.03	39.37	39.40	4.92	60.6500	5.2500	936.4	36.91
45.11	44.45	44.48	5.08	70.0000	9.3500	543.4	41.91
50.03	49.37	49.40	4.92	86.7000	16.7000	294.5	46.91
55.12	54.46	54.48	5.08	94.9000	8.2000	619.8	51.92
60.04	59.38	59.40	4.92	102.1500	7.2500	678.5	56.92
65.12	64.46	64.49	5.08	109.2500	7.1000	716.0	61.92
70.05	69.39	69.41	4.92	117.2500	8.0000	615.0	66.93
75.13	74.47	74.49	5.08	124.9500	7.7000	660.2	71.93
80.05	79.39	79.41	4.92	132.7000	7.7500	634.8	76.93
85.14	84.48	84.49	5.08	138.6500	5.9500	854.5	81.93
90.22	89.56	89.58	5.08	142.4000	3.7500	1355.8	87.02
95.31	94.65	94.66	5.08	148.4000	6.0000	847.4	92.11
100.07	99.41	99.42	4.76	152.7500	4.3500	1093.4	97.03
105.15	104.49	104.50	5.08	156.0000	3.2500	1564.5	101.95


GREGG
Waveforms for Sounding CPT22-CS-01
Time (ms)
.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
160.0
180.0
200.0
Depth (Feet)
0
20
40
60
80
100
120

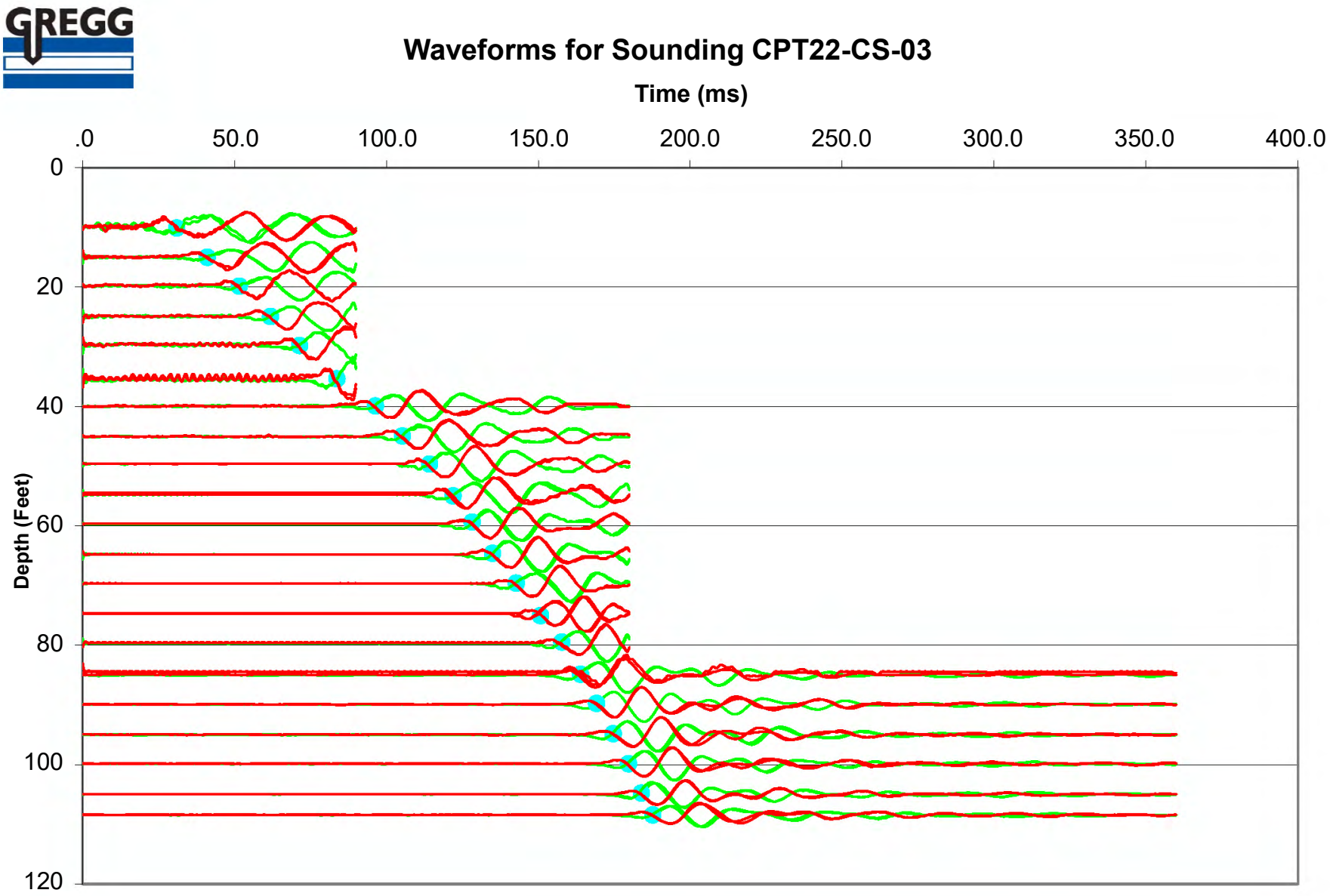
Shear Wave Velocity Calculations

364 VANCE AV.
CPT22-CS-03
CPT22-CS-03

Geophone Offset: 0.66 Feet
Source Offset: 1.67 Feet

04/19/22

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
10.01	9.35	9.49	9.49	30.8000			
15.09	14.43	14.53	5.03	40.8000	10.0000	503.4	11.89
20.01	19.35	19.42	4.90	51.2500	10.4500	468.6	16.89
25.10	24.44	24.50	5.07	61.4500	10.2000	497.1	21.90
30.02	29.36	29.41	4.91	70.9500	9.5000	517.0	26.90
35.76	35.10	35.14	5.73	83.1500	12.2000	470.0	32.23
40.03	39.37	39.40	4.26	96.1000	12.9500	329.0	37.23
45.11	44.45	44.48	5.08	104.8500	8.7500	580.7	41.91
50.03	49.37	49.40	4.92	113.8000	8.9500	549.5	46.91
55.12	54.46	54.48	5.08	121.5500	7.7500	655.8	51.92
60.04	59.38	59.40	4.92	127.8000	6.2500	787.1	56.92
65.12	64.46	64.49	5.08	134.5000	6.7000	758.7	61.92
70.05	69.39	69.41	4.92	142.2500	7.7500	634.8	66.93
75.13	74.47	74.49	5.08	150.2000	7.9500	639.5	71.93
80.05	79.39	79.41	4.92	157.2000	7.0000	702.9	76.93
85.14	84.48	84.49	5.08	163.6500	6.4500	788.3	81.93
90.06	89.40	89.41	4.92	168.9000	5.2500	937.2	86.94
95.14	94.48	94.50	5.08	174.4000	5.5000	924.4	91.94
100.07	99.41	99.42	4.92	179.4000	5.0000	984.1	96.94
105.15	104.49	104.50	5.08	183.6000	4.2000	1210.6	101.95
108.60	107.94	107.95	3.44	187.3500	3.7500	918.5	106.21


GREGG
Waveforms for Sounding CPT22-CS-03
Time (ms)
.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
Depth (Feet)
0
20
40
60
80
100
120

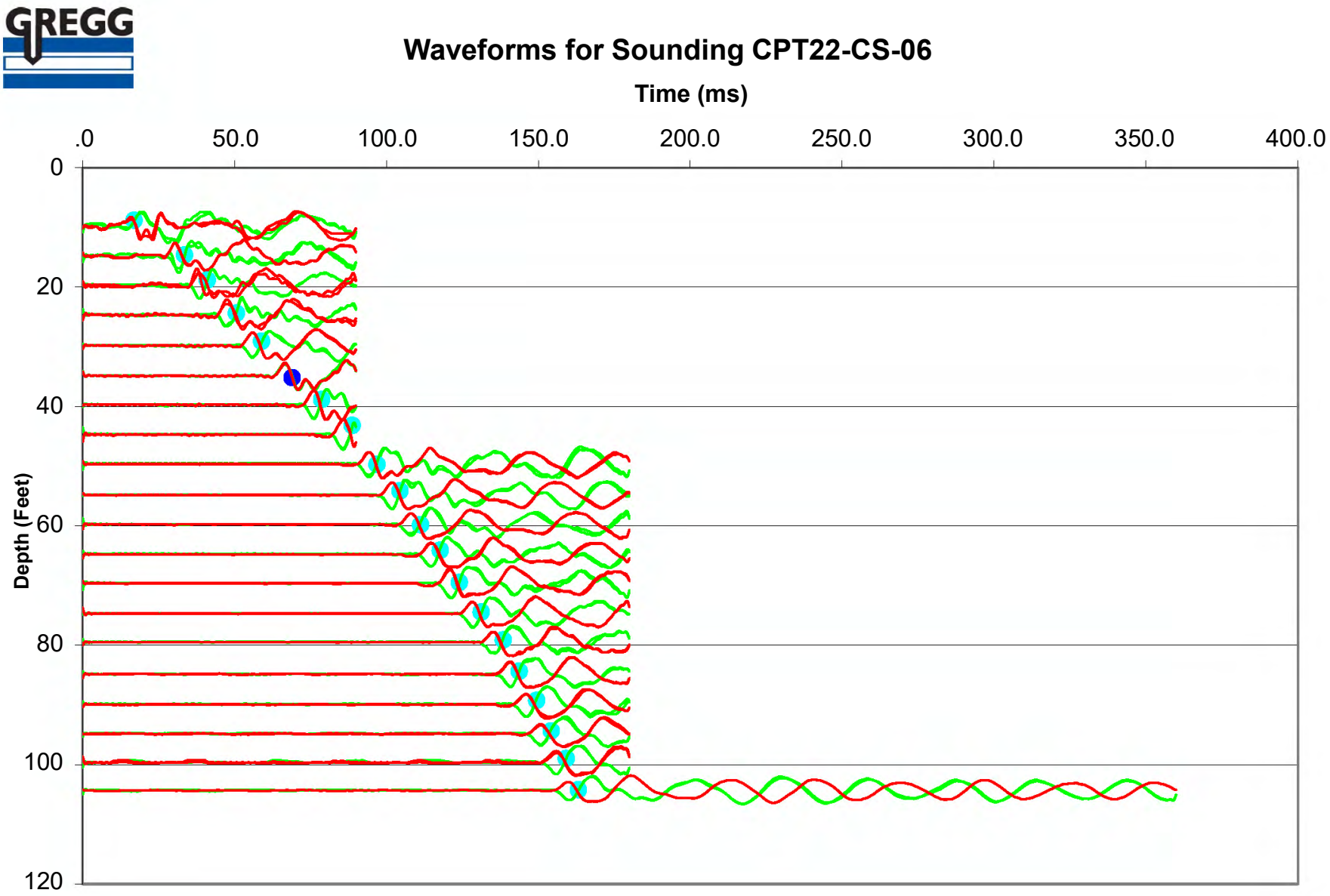
Shear Wave Velocity Calculations

364 VANCE AV.
CPT22-CS-06
CPT22-CS-06

Geophone Offset: 0.66 Feet
Source Offset: 1.67 Feet

04/21/22

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
10.01	9.35	9.49	9.49	16.8500			
15.09	14.43	14.53	5.03	33.3000	16.4500	306.0	11.89
20.01	19.35	19.42	4.90	40.8000	7.5000	652.9	16.89
25.10	24.44	24.50	5.07	50.2500	9.4500	536.5	21.90
30.02	29.36	29.41	4.91	58.5000	8.2500	595.4	26.90
40.03	39.37	39.40	9.99	78.1500	19.6500	508.6	34.36
45.11	44.45	44.48	5.08	88.1500	10.0000	508.1	41.91
50.03	49.37	49.40	4.92	96.6000	8.4500	582.0	46.91
55.12	54.46	54.48	5.08	104.1000	7.5000	677.7	51.92
60.04	59.38	59.40	4.92	110.8500	6.7500	728.8	56.92
65.12	64.46	64.49	5.08	117.3000	6.4500	788.1	61.92
70.05	69.39	69.41	4.92	123.5500	6.2500	787.2	66.93
75.13	74.47	74.49	5.08	130.7500	7.2000	706.1	71.93
80.05	79.39	79.41	4.92	138.0000	7.2500	678.6	76.93
85.14	84.48	84.49	5.08	143.2500	5.2500	968.4	81.93
90.22	89.56	89.58	5.08	148.9500	5.7000	892.0	87.02
95.14	94.48	94.50	4.92	153.7000	4.7500	1035.9	92.02
100.07	99.41	99.42	4.92	158.7000	5.0000	984.1	96.94
104.66	104.00	104.01	4.59	162.9000	4.2000	1093.5	101.70


GREGG
Waveforms for Sounding CPT22-CS-06
Time (ms)
.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
Depth (Feet)
0
20
40
60
80
100
120

Boring Logs 2

BORING NUMBER 22-B01

CLIENT Humboldt Bay Harbor and Conservation District
PROJECT NAME Redwood Marine Multipurpose Terminal
PROJECT NUMBER 022054.400
PROJECT LOCATION 364 Vance Avenue, Samoa, Humboldt County, CA
DATE STARTED 6/1/22 **COMPLETED** 6/2/22
GROUND ELEVATION 9.7 ft (approx.) **HOLE SIZE** 4-1/2"
DRILLING CONTRACTOR Taber Drilling
GROUND WATER LEVELS:
DRILLING METHOD Mud rotary (CME-75 truck-rig; autohammer ETR=66%) ▽ **AT TIME OF DRILLING** 4.00 ft / Elev 5.70 ft
LOGGED BY G. Vadurro/A. Troia **CHECKED BY** **AT END OF DRILLING** ---
NOTES Backfilled borehole w/cement slurry. **AFTER DRILLING** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		A/C paving, ~4" thick.										
		River-run gravel (FILL).										
		(SP) Poorly-graded SAND; medium dense, moist, gray; no cementation; mostly fine sand with <2% fines (FILL). ▽	SPT S1		5-4-6 (10)							
		Becomes loose and wet.	SPT S2		5-3-3 (6)							
10		(SM) SILTY SAND; loose, wet, dark bluish gray (Gley 2 4/1); no cementation; non-plastic fines.	SPT S3		4-3-2 (5)							18
		(SP) Poorly-graded SAND; dense, wet, dark gray; no cementation; clean fine sand with rapid dilatency.	SPT S4		13-15-17 (32)							
20		(SW) Well-graded SAND; medium dense, wet, dark gray; no cementation; fine to medium to coarse sand with few subrounded fine gravels.	SPT S5		7-14-15 (29)							
			SPT S6		10-11-12 (23)							6
30		Shell fragments and wood in cuttings at 28'.										
		(ML) SILT; soft, wet, dark gray (2.5Y 4/1); no cementation, medium plasticity; few shell fragments.	ST S7			0.25	79	43	45	27	18	97
		Collected thin-walled Shelby Tube sample at 30'-32.5'. Pushed 30" at 100 psi; 30" recovery. **TXUU Test**										
		Becomes stiff.	SPT S8		2-4-5 (9)							
40		Collected thin-walled Shelby Tube sample at 40'-42.5'. Pushed 30" at 200 psi; 30" recovery. **Consolidation Test**	ST S9			0.5	83	39	36	25	11	98
		Very soft at 45'. *Note* SPT sampler advanced 18" under weight of auto-hammer and rods.	SPT S10		0-0-0 (0)							
50												

(Continued Next Page)

BORING NUMBER 22-B01

CLIENT Humboldt Bay Harbor and Conservation District **PROJECT NAME** Redwood Marine Multipurpose Terminal

PROJECT NUMBER 022054.400 **PROJECT LOCATION** 364 Vance Avenue, Samoa, Humboldt County, CA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
50		(CL) LEAN CLAY; stiff, moist, very dark gray; none to weak cementation; medium plasticity with low toughness; thinly laminated. **Consolidation Test**	MC S11		5-7-9 (16)	0.75			33	23	10	100
		(SM) SILTY SAND; dense, wet, dark gray; (Gley 1 4/N); no cementation; low plasticity fines with low toughness; mostly fine sand with abundant shell fragments in upper few inches of samples.	SPT S13		14-19-17 (36)							
60		Becomes medium dense; weak cementation, low plasticity fines, slow dilatency; thin interbeds of clayey silt; few shell and wood fragments.	SPT S14		13-8-10 (18)							45
			SPT S15		5-8-11 (19)							
		(ML) SILT; moist, dark gray; weak cementation; low plasticity with low toughness.	SPT S16		14-11-7 (18)							
70		Becomes soft, wet, dark gray; no cementation, low plasticity with low toughness.	ST S17				94	29	32	26	6	67
		Collected thin-walled Shelby Tube sample at 70'-72.5'. Pushed 12" at 100 psi, 12" at 200 psi, and 6" at 600 psi; 30" recovery. **TXUU and Consolidation Test** Becomes stiff, black (Gley 1 2.5/N) to very dark gray (Gley 1 3/N); moderate cementation with medium to high plasticity and medium toughness; faintly visible laminations; faint odor of decayed organics.	MC S18		7-8-12 (20)	1.25	85	36				
80		(SM) SILTY SAND; very dense, wet, very dark gray (Gley 1 3/N); none to weak cementation; non-plastic fines, slow dilatency; mostly fine sand with common shell fragments (Pleistocene age HOOKTON FORMATION).	SPT S20		30-34-28 (62)							12
			SPT S21		33-36-32 (68)							
90			SPT S22		31-34-35 (69)							
		Slight decrease in fines content at 95'.	SPT S23		33-30-30 (60)							
100		Thin alternating interbeds of lean clay and coarse sand with fine gravel; 2" maximum gravel size consisting of well rounded chert.	SPT S24		36-30-40 (70)							

(Continued Next Page)

BORING NUMBER 22-B01

CLIENT Humboldt Bay Harbor and Conservation District **PROJECT NAME** Redwood Marine Multipurpose Terminal

PROJECT NUMBER 022054.400 **PROJECT LOCATION** 364 Vance Avenue, Samoa, Humboldt County, CA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
110		Thin alternating interbeds of lean clay and coarse sand with fine gravel; 2" maximum gravel size consisting of well rounded chert. *(continued)*										
		(ML) SANDY SILT; hard, wet, very dark greeenish gray (Gley 2 3/10G); none to weak cementation; medium plasticity with low toughness, rapid dilatency; fine sand with thin interbeds of clay.	SPT S25		19-23-40 (63)							22
120		Rig chatter between 123'-125'; hole is caving. Switched to HWT rods and reemed hole to 125' prior to sampling.										
		(SM) SILTY SAND; dense, wet; no cementation; low plasticity fines with low toughness, rapid dilatency; mostly fine sand.	SPT S26		7-11-30 (41)							16
130												
140		(SW-SM) Grades to very dense well-graded SAND with SILT; some subrounded fine gravels of chert, 3/4" maximum size; very stiff medium plasticity clay in shoe.	SPT S27		41-50-21 (71)							

Bottom of borehole at 141.5 feet.

BORING NUMBER 22-B02

CLIENT Humboldt Bay Harbor and Conservation District
PROJECT NAME Redwood Marine Multipurpose Terminal
PROJECT NUMBER 022054.400
PROJECT LOCATION 364 Vance Avenue, Samoa, Humboldt County, CA
DATE STARTED 5/31/22 **COMPLETED** 6/1/22
GROUND ELEVATION 10.3 ft (approx.) **HOLE SIZE** 4-1/2"
DRILLING CONTRACTOR Taber Drilling
GROUND WATER LEVELS:
DRILLING METHOD Mud rotary (CME-75 truck-rig; autohammer ETR=66%) ▽ **AT TIME OF DRILLING** 3.00 ft / Elev 7.30 ft
LOGGED BY G. Vadurro **CHECKED BY**
AT END OF DRILLING ---
NOTES Backfilled borehole w/cement slurry.
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		A/C paving, ~4" thick.										
		(SP) Poorly-graded SAND; loose, wet, gray; no cementation; mostly fine sand with <2% fines (FILL). ▽	SPT S1		9-4-3 (7)							
		Wood layer beginning at 6.5' and continuing to 12'. Drilled to 12.5' and sampled (FILL).										
10		(CL) Less than 2" recovery; SILTY LEAN CLAY in shoe.	SPT		3-4-6 (10)							
		(SM) SILTY SAND; loose, wet, dark gray; no cementation; low plasticity fines and slightly cohesive; mostly fine sand.	SPT S2		3-3-4 (7)							27
20		(SP) Poorly-graded SAND with SILT; medium dense, wet, very dark bluish gray (Gley 2 3/5B); no cementation; non-plastic fines.	SPT S3		13-9-5 (14)							
		Shell fragments and wood in cuttings at 23'-25'.										
		Alternating loose SILTY SAND to soft SILT.	SPT S4		12-5-3 (8)							15
30		(CL) LEAN CLAY; very soft, wet, very dark gray (2.5Y 3/1); no cementation, low plasticity with low toughness; few shell fragments. *Note* SPT sampler advanced initial 12" under weight of auto-hammer and rods.	SPT S5		0-0-1 (1)							
		Collected thin-walled Shelby Tube sample at 35'-37.5'. Pushed 30" at 200 psi; 30" recovery. **TXUU and Consolidation Test**	ST S6				81	38	36	23	13	88
40		Becomes medium stiff to stiff, moist, very dark bluish gray (Gley 2 3/10B); no cementation; low plasticity with low toughness; mica-rich silt; contains very thin laminations <2mm thick.	MC S7		4-5-8 (13)	0.5						
		Collected thin-walled Shelby Tube sample at 45'-47.5'. Pushed 30" at 250 psi; 30" recovery. **Consolidation Test**	ST S9				91	30	28	20	8	63
50												

(Continued Next Page)

BORING NUMBER 22-B02

CLIENT Humboldt Bay Harbor and Conservation District **PROJECT NAME** Redwood Marine Multipurpose Terminal

PROJECT NUMBER 022054.400 **PROJECT LOCATION** 364 Vance Avenue, Samoa, Humboldt County, CA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
50		(CL) Becomes medium stiff; very thinly laminated; trace shell and wood fragments; less micaceous than sample at 40'.	SPT S10		5-3-5 (8)							
		Collected thin-walled Shelby Tube sample at 55'-57.5'. Pushed 18" at 200 psi and 12" at 600 psi; 30" recovery. **TXUU Test**	ST S11				84	36				81
60		(SM) SILTY SAND; dense, wet, dark bluish gray (Gley 2 4/10B); no cementation; low plasticity fines; mostly fine sand.	SPT S12		19-16-19 (35)							17
		Becomes medium dense; thinly laminated with few shell fragments. **TXUU Test**	MC S13		11-12-15 (27)	1.0	102	24				29
70		(ML) Grades to medium stiff SILT w/SAND; very dark gray; no cementation; low plasticity with low toughness; micaceous sand with few shell fragments.	SPT S15		6-2-3 (5)							
		(ML) SILT; stiff, moist; weak cementation; low to medium plasticity with low toughness; trace shell fragments. **Consolidation Test**	MC S16		7-9-10 (19)	1.25	87	34	44	27	17	96
80		Contains thinly laminated fine sand.	SPT S18		3-5-8 (13)							
90		(CL) LEAN CLAY; very stiff, moist, very dark gray (5Y 3/1); weak cementation; medium plasticity with low toughness; odor of decayed organics.	SPT S19		8-10-17 (27)							
		Abundant shell fragments in silty clay cuttings beginning at 95'.										
100		(SP) Poorly-graded SAND; very dense, wet, dark gray; weak cementation; fine to medium sand with <5% fines; few shell fragments (Pleistocene age HOOKTON FORMATION).	SPT S20		40-41-42 (83)							

(Continued Next Page)

BORING NUMBER 22-B02

CLIENT Humboldt Bay Harbor and Conservation District **PROJECT NAME** Redwood Marine Multipurpose Terminal

PROJECT NUMBER 022054.400 **PROJECT LOCATION** 364 Vance Avenue, Samoa, Humboldt County, CA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
110		(SP) Poorly-graded SAND; very dense, wet, dark gray; weak cementation; fine to medium sand with <5% fines; few shell fragments (Pleistocene age HOOKTON FORMATION). *(continued)*										
		(CL) LEAN CLAY; hard, moist, dark brownish gray; moderate cementation; medium plasticity with high toughness; trace very fine wood fragments.	SPT S21		9-20-50 (70)							45
120		(SP) Poorly-graded SAND with SILT; very dense, wet, dark gray; weak cementation; wood fragments; medium to coarse sand in shoe. Subrounded to rounded fine gravel with trace shell and wood fragments in cuttings at 123'. Cuttings become fine grained from 124'-130'.	SPT S22		33-50/4"							
130		Very dense Poorly-graded SAND with SILT at 130'; contains few subrounded fine gravel, maximum size 3/8" with some coarse sand.	SPT S23		37-45-47 (92)							
140												
150		(CL) LEAN CLAY; very stiff, moist, very dark gray; moderate cementation; medium plasticity with medium toughness.	SPT S24		10-11-14 (25)							

Bottom of borehole at 151.5 feet.

BORING NUMBER 22-B03

CLIENT Humboldt Bay Harbor and Conservation District
PROJECT NAME Redwood Marine Multipurpose Terminal
PROJECT NUMBER 022054.400
PROJECT LOCATION 364 Vance Avenue, Samoa, Humboldt County, CA
DATE STARTED 6/3/22 **COMPLETED** 6/3/22
GROUND ELEVATION 9.1 ft (approx.) **HOLE SIZE** 4-1/2"
DRILLING CONTRACTOR Taber Drilling
GROUND WATER LEVELS:
DRILLING METHOD Mud rotary (CME-75 truck-rig; autohammer ETR=66%) ▽ **AT TIME OF DRILLING** 5.00 ft / Elev 4.10 ft
LOGGED BY A. Troia **CHECKED BY**
AT END OF DRILLING ---
NOTES Backfilled borehole w/cement slurry.
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		A/C paving, ~4" thick.										
		(SP) Poorly-graded SAND; medium dense, moist, dark gray (10YR 4/1); no cementation; mostly fine sand with <10% silt and few fine to coarse gravels (FILL).	SPT S1		2-5-6 (11)							
		▽ Becomes wet at 5'; increase in gravel content, 3/4" maximum size.	SPT S2		14-12-3 (15)							
		Wood in cuttings; becomes loose at 7.5'.	SPT S3		4-3-3 (6)							5
10		(SP) Poorly-graded SAND; loose, wet, dark gray; no cementation; clean fine sand.	SPT S4		1-2-3 (5)							
		Poor recovery; decayed wood in shoe.	MC S5		5-4-5 (9)		104	23				3
20		Poor recovery; mostly loose fine SAND and wood in sampler.	SPT S7		2-4-6 (10)							
		Abundant shell fragments in cuttings at 23'.										
		(SP) Poorly-graded SAND with SILT; dense, wet; none to weak cementation; non-plastic fines; mostly fine sand with trace coarse sand.	SPT S8		8-16-18 (34)							
		Abundant shell fragments and coarse sand in cuttings at 28'.										
30		Grades to SILTY SAND.	SPT S9		14-17-18 (35)							
		(SW) Well-graded SAND; dense, wet; weak cementation; low plastic; fine to medium to coarse sand with shell fragments.	SPT S10		17-20-22 (42)							
40		(SP-SM) Poorly-graded SAND with SILT; dense.	SPT S11		13-17-17 (34)							9
		(ML) SILT; stiff to very stiff, wet, very dark gray; weak cementation; low plasticity with low toughness; rapid dilatency; shell fragments with trace fine sand. Collected thin-walled Shelby Tube sample at 45'-47.5'. Pushed 18" at 100 psi, 6" at 200 psi, and 6" at 300 psi; 30"	ST S12				79	40	33	29	4	65
50												

(Continued Next Page)

CLIENT Humboldt Bay Harbor and Conservation District **PROJECT NAME** Redwood Marine Multipurpose Terminal

PROJECT NUMBER 022054.400 **PROJECT LOCATION** 364 Vance Avenue, Samoa, Humboldt County, CA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
50		recovery. **TXUU and Consolidation Test** (ML) Poor recovery.	MC S13		6-6-12 (18)	0.25						
		(ML) SILT with SAND; stiff, moist, dark gray; weak cementation; low plasticity with low toughness; few shell fragments.	SPT S15		7-6-5 (11)							39
60		(ML) SANDY SILT; very stiff, wet, very dark gray; weak cementation; low to medium plasticity with low toughness; few shells.	MC S16		15-16-16 (32)	2.0	114	18				
		(CL) LEAN CLAY; medium stiff, black (Gley 1 2.5/N); low to medium plasticity with low toughness; no dilatency; few shell fragments. Collected thin-walled Shelby Tube sample at 65'-67.5'. Pushed 18" at 200 psi and 12" at 300 psi; 30" recovery. **TXUU Test**	ST S18				84	38	46	28	18	98
70		(SW) Well-graded SAND with SILT; very dense, wet, very dark gray; weak cementation; low plasticity fines; mostly fine sand with medium to coarse sand; few fine well rounded gravels in shoe, 3/8" maximum size (Pleistocene age HOOKTON FORMATION). Abundant shells and coarse sand in cuttings from 72'-73'.	SPT S19		25-35-40 (75)							
			SPT S18		21-25-32 (57)							
80		(SC) CLAYEY SAND; very dense, wet, yellowish brown (10YR 4/6) to brownish yellow (10YR 6/8); moderate cementation; medium plasticity fines with medium toughness.	SPT S21		10-23-40 (63)							
90		Coarse sand and few fine gravels in cuttings at 90'-95'.										
		(SP) Poorly-graded SAND with SILT; very dense, wet, brown (10YR 4/3); weak cementation; non-plastic fines; mostly fine sand with about 10% silt and trace coarse sand.	SPT S22		40-50							
100		Coarse sand in cuttings at 97'-105'.										

(Continued Next Page)

BORING NUMBER 22-B03

CLIENT Humboldt Bay Harbor and Conservation District **PROJECT NAME** Redwood Marine Multipurpose Terminal

PROJECT NUMBER 022054.400 **PROJECT LOCATION** 364 Vance Avenue, Samoa, Humboldt County, CA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
110		(SP) Poorly-graded SAND with SILT; very dense, wet, brown (10YR 4/3); weak cementation; non-plastic fines; mostly fine sand with about 10% silt and trace coarse sand. *(continued)*										
		(SM) SILTY SAND; very dense; weak cementation; non-plastic fines; mostly fine sand; slow dilatency.	SPT S23		31-40-45 (85)							
120												
		(SW) Well-graded SAND with CLAY; very dense, wet, yellowish brown (10YR 5/4); moderate cementation; low to medium plasticity fines; abundant coarse sand with few fine gravels mostly <3/8" to 3/4" maximum size.	SPT S24		50-50/4"							
130												
		(SM) SILTY SAND; very dense, yellowish brown (10YR 4/4); moderate cementation; stratified well-graded sand and fine gravels; interbedded low plasticity clayey fines at 136'.	SPT S25		38-50/5"							
140												
		Coarse sand and fine gravels with thick shell fragments in cuttings at 147'.										
150		Grades to very dense, dark yellowish brown Well-graded SAND with SILT at 150'.	SPT S26		50-50/2"							

Refusal at 151.0 feet.
Bottom of borehole at 151.0 feet.

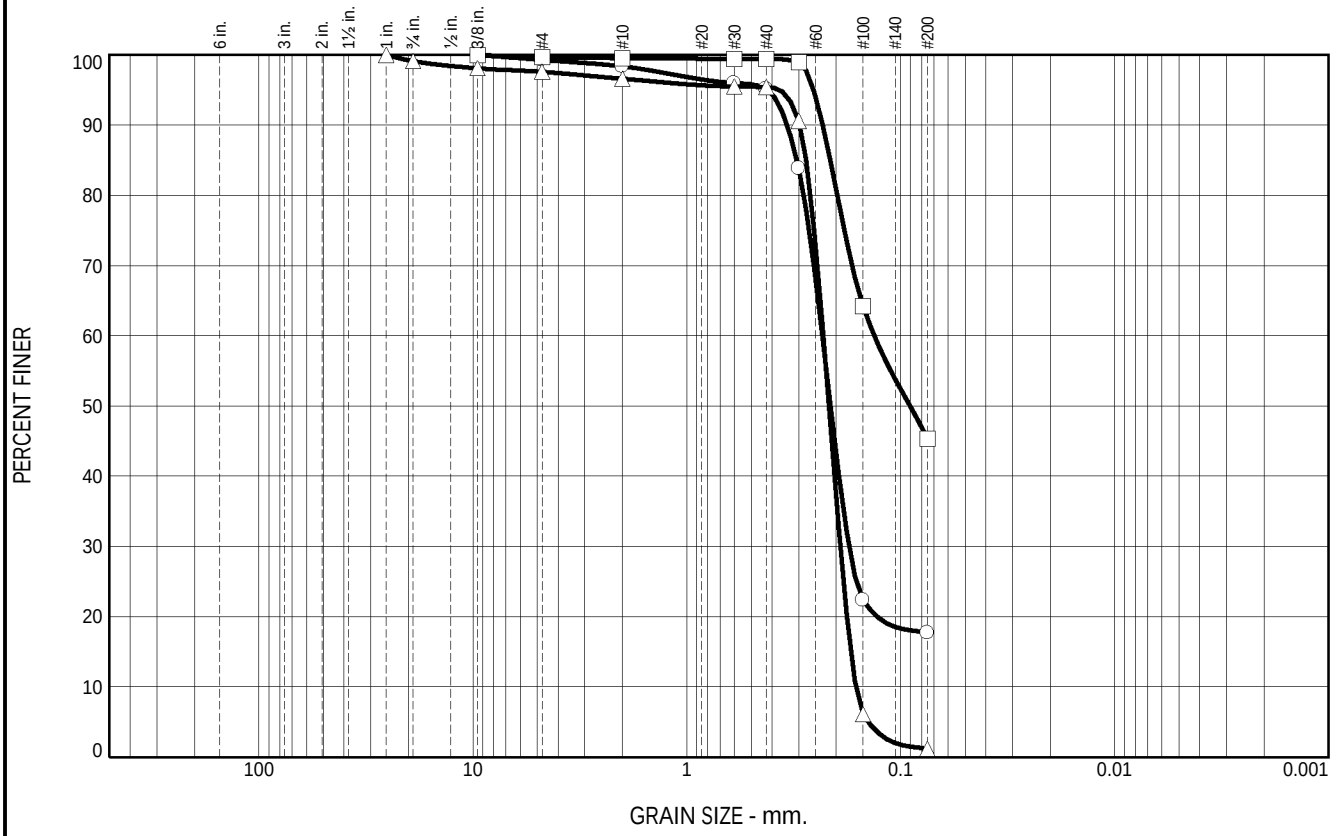
Laboratory Test Results

3

Particle Size Distribution

1

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PL	PI
○	0.0	0.7	81.6	17.7					
□	0.0	0.3	54.3	45.4					
△	0.0	2.4	96.4	1.2		SP			

SIEVE inches size	PERCENT FINER ○	□	△
1"			100.0
3/4"			99.1
3/8"	100.0	100.0	98.1
	GRAIN SIZE		
D_{60}	0.2324	0.1329	0.2300
D_{30}	0.1742		0.1914
D_{10}			0.1621
	COEFFICIENTS		
C_c			0.98
C_u			1.42

SIEVE number size	PERCENT FINER ○	□	△
#4	99.3	99.7	97.6
#10	98.4	99.5	96.6
#30	96.0	99.4	95.5
#40	95.1	99.4	95.4
#50	83.8	99.0	90.6
#100	22.4	64.2	6.1
#200	17.7	45.4	1.2

Material Description

○ Gray Clayey SAND

□ Gray Clayey SAND

△ Dark Olive Gray Poorly Graded SAND

REMARKS:

○

□

△

○ Source of Sample: 22-B01 Depth: 10-11.5' Sample Number: S3

□ Source of Sample: 22-B01 Depth: 60-61.5' Sample Number: S14

△ Source of Sample: 22-B02 Depth: 5-6.5' Sample Number: S1

COOPER TESTING LABORATORY

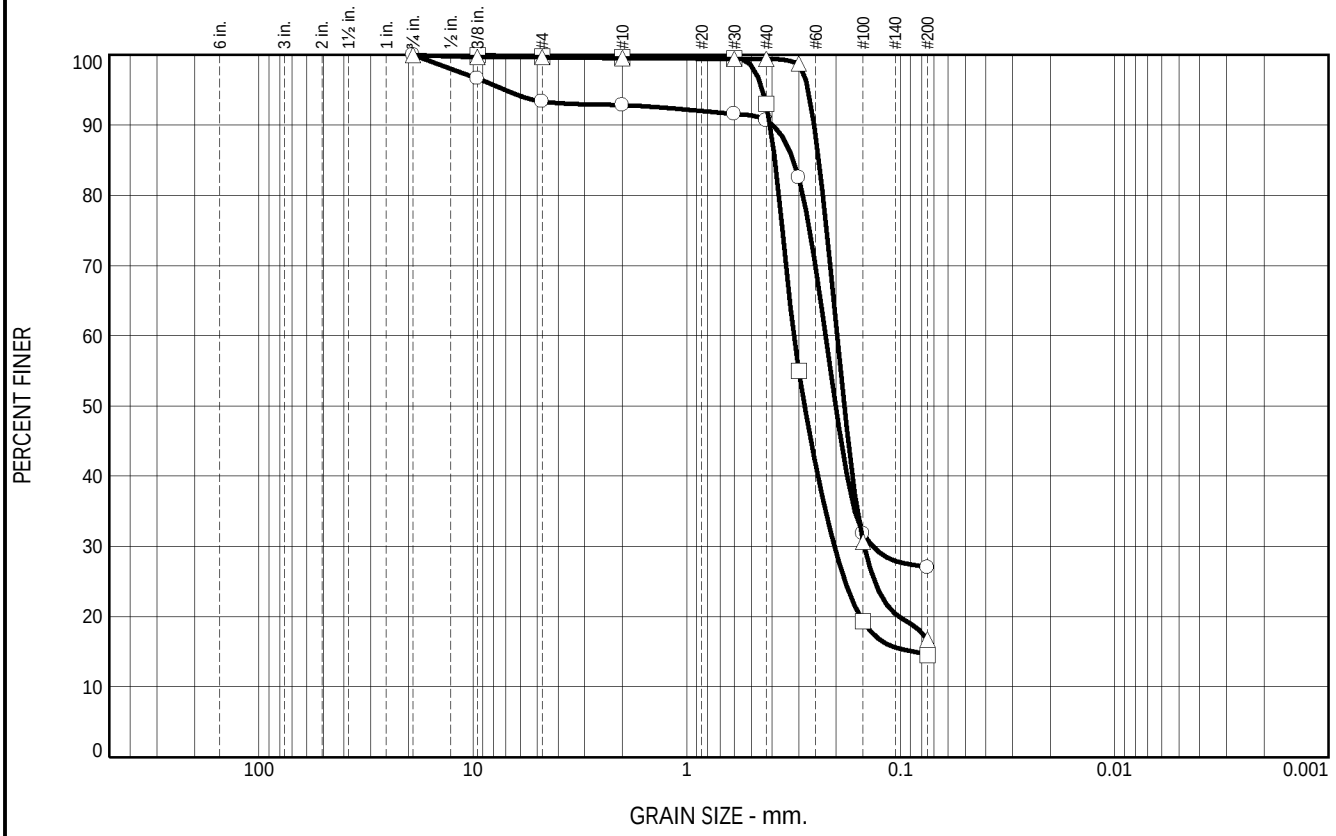
Client: SHN Engineers

Project: RMMT, Samoa Peninsula, Humboldt County - 022054.400

Project No.: 054-186

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PL	PI
○	0.0	6.6	66.4	27.0				NP	
□	0.0	0.2	85.3	14.5					
△	0.0	0.3	83.0	16.7					

SIEVE inches size	PERCENT FINER ○	□	△
3/4"	100.0		100.0
3/8"	96.6	100.0	99.7
	GRAIN SIZE		
D_{60}	0.2244	0.3161	0.1980
D_{30}	0.1350	0.2039	0.1483
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	93.4	99.8	99.7
#10	92.9	99.7	99.5
#30	91.6	99.5	99.4
#40	90.7	93.1	99.4
#50	82.5	55.0	98.8
#100	31.8	19.4	30.7
#200	27.0	14.5	16.7

Material Description

○ Dark Gray Silty SAND

□ Gray Silty SAND

△ Dark Gray Silty SAND

REMARKS:

○

□

△

○ Source of Sample: 22-B02 Depth: 15-16.5' Sample Number: S2

□ Source of Sample: 22-B02 Depth: 25-26.5' Sample Number: S4

△ Source of Sample: 22-B02 Depth: 60-61.5' Sample Number: S12

COOPER TESTING LABORATORY

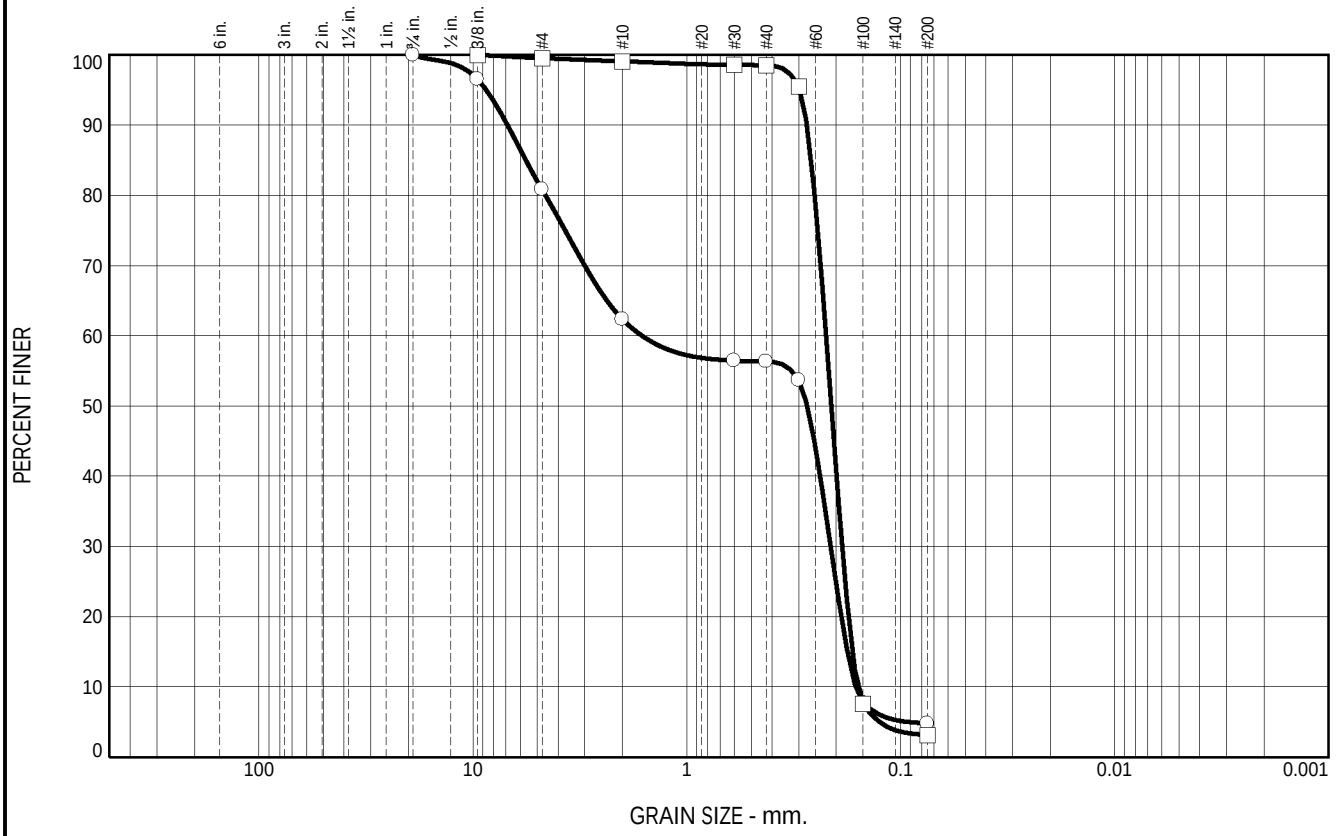
Client: SHN Engineers

Project: RMMT, Samoa Peninsula, Humboldt County - 022054.400

Project No.: 054-186

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PL	PI
○	0.0	19.2	76.0	4.8		SP			
□	0.0	0.5	96.4	3.1		SP			

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □
3/4"	100.0	
3/8"	96.5	100.0
GRAIN SIZE		
D_{60}	1.6201	0.2232
D_{30}	0.2126	0.1878
D_{10}	0.1624	0.1587
COEFFICIENTS		
C_c	0.17	1.00
C_u	9.98	1.41

SIEVE number size	PERCENT FINER ○	PERCENT FINER □
#4	80.8	99.5
#10	62.3	99.1
#30	56.5	98.6
#40	56.3	98.5
#50	53.7	95.5
#100	7.7	7.5
#200	4.8	3.1

Material Description

○ Olive Gray Poorly Graded SAND w/ Gravel

□ Dark Gray Poorly Graded SAND

REMARKS:

○

□

○ Source of Sample: 22-B03 Depth: 7.5-9' Sample Number: S3

□ Source of Sample: 22-B03 Depth: 16-16.5' Sample Number: S6

COOPER TESTING LABORATORY

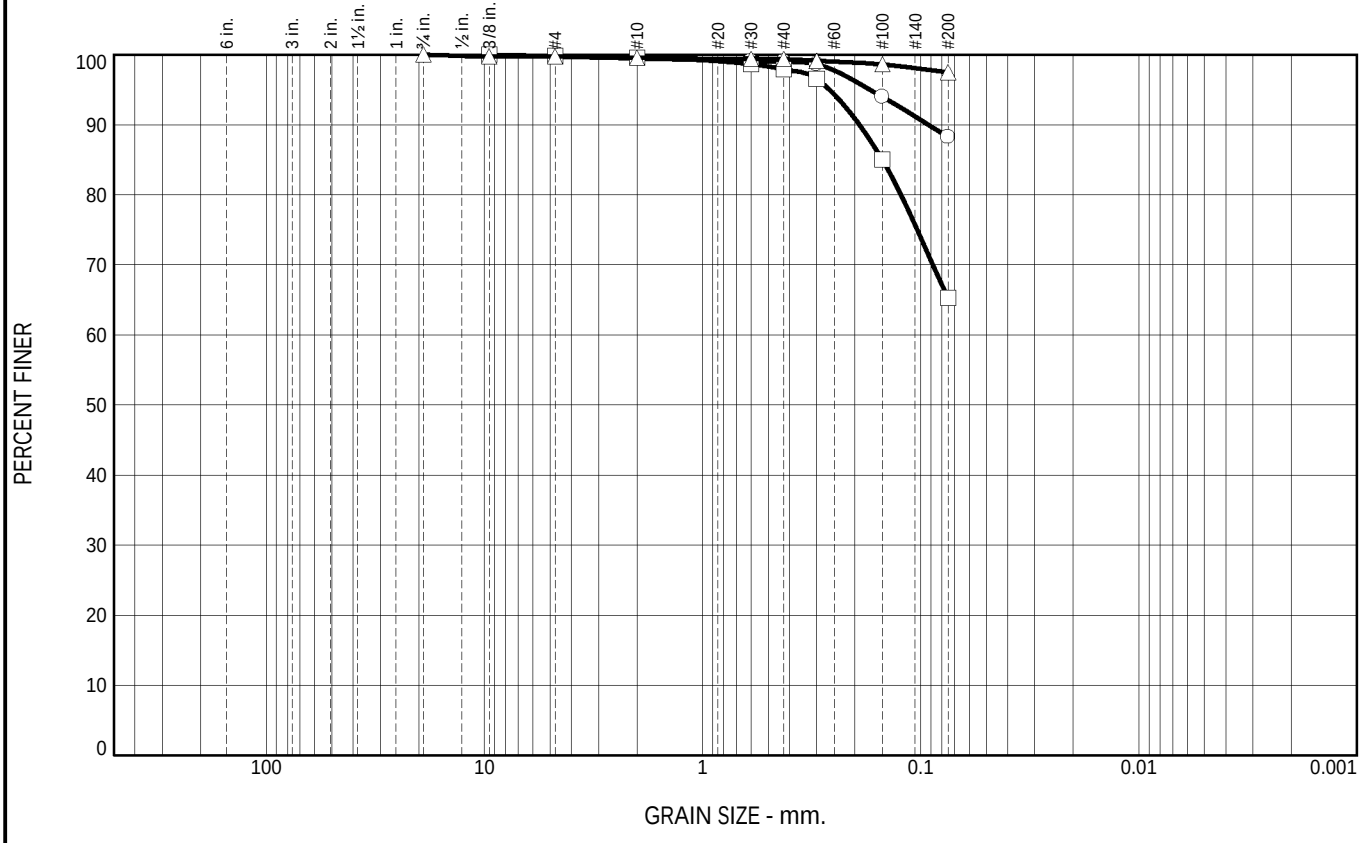
Client: SHN Engineers

Project: RMMT, Samoa Peninsula, Humboldt County - 022054.400

Project No.: 054-186

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PL	PI
○	0.0	0.3	11.4	88.3		CL	36	23	13
□	0.0	0.2	34.5	65.3		ML	33	29	4
△	0.0	0.3	2.2	97.5		ML	46	28	18

SIEVE inches size	PERCENT FINER ○	□	△
3/4"			100.0
3/8"	100.0	100.0	99.7
GRAIN SIZE			
D_{60}			
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	99.7	99.8	99.7
#10	99.5	99.6	99.5
#30	99.1	98.6	99.4
#40	99.0	97.9	99.4
#50	98.6	96.6	99.1
#100	94.0	85.0	98.6
#200	88.3	65.3	97.5

Material Description

○Greenish Gray Lean CLAY (Bay Mud)

□Dark Gray Sandy SILT

△Gray SILT

REMARKS:

○

□

△

○Source of Sample: 22-B02 Depth: 35-37.5' Sample Number: S6

□Source of Sample: 22-B03 Depth: 45-47.5' Sample Number: S12

△Source of Sample: 22-B03 Depth: 65-67.5' Sample Number: S18

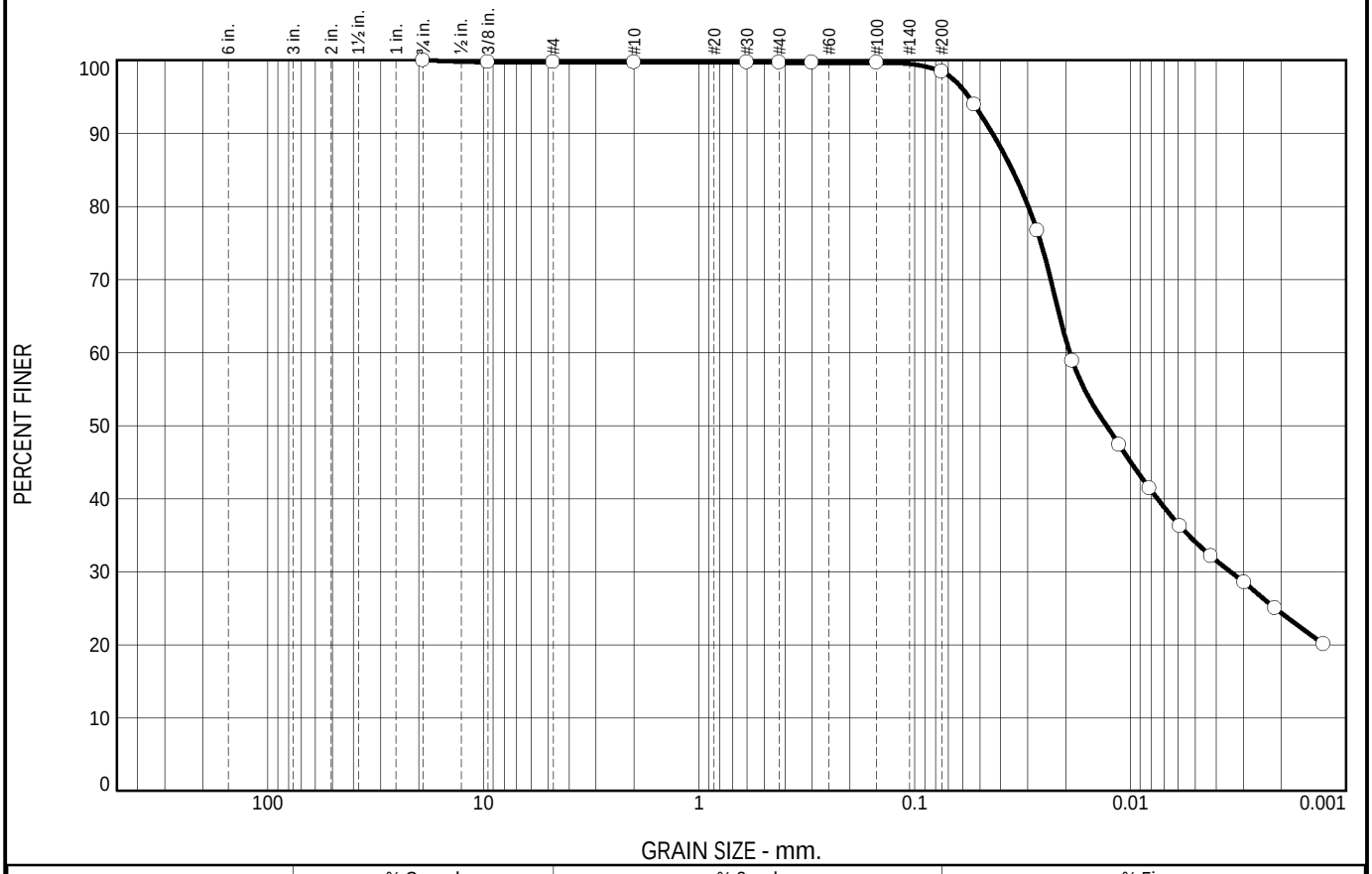
COOPER TESTING LABORATORY

Client: SHN Engineers

Project: RMMT, Samoa Penunsula, Humboldt County - 022054.400

Project No.: 054-187 Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.3	0.0	0.0	1.3	74.1	24.3

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
3/8"	99.7		
#4	99.7		
#10	99.7		
#30	99.7		
#40	99.7		
#50	99.7		
#100	99.7		
#200	98.4		
#270	93.9		
0.0270 mm.	76.7		
0.0186 mm.	58.8		
0.0113 mm.	47.4		
0.0082 mm.	41.4		
0.0059 mm.	36.2		
0.0042 mm.	32.1		
0.0030 mm.	28.5		
0.0021 mm.	25.0		
0.0013 mm.	20.1		

* (no specification provided)

Soil Description

Gray SILT

Atterberg Limits

PL= 25 LL= 36 PI= 11

Coefficients

D_{90}= 0.0436 D_{85}= 0.0353 D_{60}= 0.0192
D_{50}= 0.0129 D_{30}= 0.0034 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO= A-6(12)

Remarks

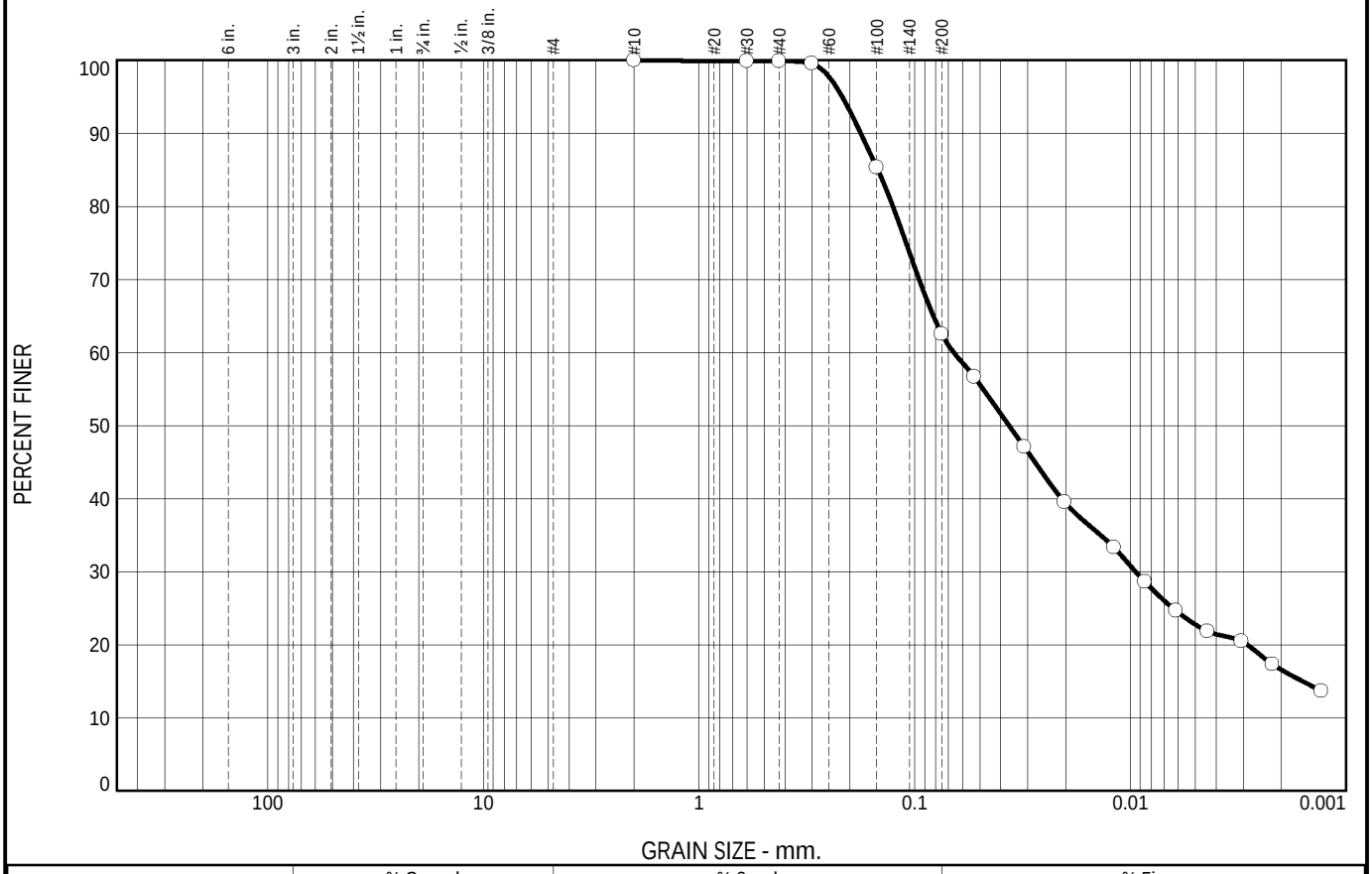
Source of Sample: 22-B01 Depth: 40-42.5'
Sample Number: S9 Date:

COOPER TESTING LABORATORY

Client: SHN Engineers
Project: RMMT, Samoa Penunsula, Humboldt County - 022054.400

Project No: 054-187 Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	37.4	45.9	16.6

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#30	99.9		
#40	99.9		
#50	99.6		
#100	85.3		
#200	62.5		
#270	56.7		
0.0311 mm.	47.1		
0.0202 mm.	39.5		
0.0119 mm.	33.3		
0.0086 mm.	28.6		
0.0062 mm.	24.7		
0.0044 mm.	21.8		
0.0031 mm.	20.5		
0.0022 mm.	17.3		
0.0013 mm.	13.6		

* (no specification provided)

Soil Description

Gray Sandy Lean CLAY

Atterberg Limits

PL= 20 LL= 28 PI= 8

Coefficients

D_{90}= 0.1779 D_{85}= 0.1482 D_{60}= 0.0661
D_{50}= 0.0365 D_{30}= 0.0095 D_{15}= 0.0016
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-4(3)

Remarks

Source of Sample: 22-B02 Depth: 45-47.5'
Sample Number: S9 Date:

COOPER TESTING LABORATORY

Client: SHN Engineers
Project: RMMT, Samoa Penunsula, Humboldt County - 022054.400

Project No: 054-187 Figure

Sieve Wash 2

COOPER TESTING LABORATORY

#200 Sieve Wash Analysis
ASTM D 1140

Job No.:	054-186a	**Project No.:**	022054.400	**Run By:**	MD
Client:	SHN Engineers	**Date:**	7/28/2022	**Checked By:**	DC
Project:	RMMT, Samoa Peninsula, Humboldt County				

Boring:	22-B01	22-B01	22-B01	22-B01	22-B01	22-B02	22-B02	22-B02
Sample:	S6	S11	S20	S25	S26	S13	S16	S21
Depth, ft.:	25-26.5	50.5-51	80-81.5	110-111.5	125-126.5	65.5-66	75.5-76	110-111.5
Soil Type:	Gray SAND w/ Clay	Dark Greenish Gray Lean CLAY	Gray Silty SAND	Dark Gray Silty SAND	Dark Gray Silty SAND	Dark Gray Silty SAND	Greenish Gray SILT (Bay Mud)	Dark Gray Lean Clayey SAND
Wt of Dish & Dry Soil, gm	859.2	353.3	737.4	550.3	531.4	429.1	411.3	470.7
Weight of Dish, gm	171.6	174.5	174.0	173.5	174.2	174.9	171.6	171.3
Weight of Dry Soil, gm	687.5	178.8	563.4	376.8	357.2	254.2	239.7	299.4
Wt. Ret. on #4 Sieve, gm	67.4	0.0	0.1	0.1	45.5	0.0	0.0	0.0
Wt. Ret. on #200 Sieve, gm	647.1	0.7	495.0	294.0	301.8	180.1	8.6	163.8
% Gravel	**9.8**	**0.0**	**0.0**	**0.0**	**12.7**	**0.0**	**0.0**	**0.0**
% Sand	**84.3**	**0.4**	**87.8**	**78.0**	**71.8**	**70.8**	**3.6**	**54.7**
% Silt & Clay	**5.9**	**99.6**	**12.1**	**22.0**	**15.5**	**29.2**	**96.4**	**45.3**

Remarks: As an added benefit to our clients, the gravel fraction may be included in this report. Whether or not it is included is dependent upon both the technician's time available and if there is a significant enough amount of gravel. The gravel is always included in the percent retained on the #200 sieve but may not be weighed separately to determine the percentage, especially if there is only a trace amount, (5% or less).

COOPER TESTING LABORATORY

#200 Sieve Wash Analysis
ASTM D 1140

Job No.:	054-187	**Project No.:**	022054.400	**Run By:**	MD
Client:	SHN Engineers	**Date:**	7/28/2022	**Checked By:**	DC
Project:	RMMT, Samoa Peninsula, Humboldt County				

Boring:	22-B01	22-B01	22-B02					
Sample:	S7	S17	S11					
Depth, ft.:	30-32.5	70-72.5	55-57.5					
Soil Type:	Gray SILT w/ shells	Gray Sandy SILT	Gray Lean CLAY w/ Sand					
Wt of Dish & Dry Soil, gm	413.8	609.3	578.1					
Weight of Dish, gm	173.9	175.4	174.4					
Weight of Dry Soil, gm	239.9	434.0	403.8					
Wt. Ret. on #4 Sieve, gm	2.2	0.0	0.5					
Wt. Ret. on #200 Sieve, gm	7.1	143.8	78.5					
% Gravel	**0.9**	**0.0**	**0.1**					
% Sand	**2.0**	**33.1**	**19.3**					
% Silt & Clay	**97.0**	**66.9**	**80.6**					

Remarks: As an added benefit to our clients, the gravel fraction may be included in this report. Whether or not it is included is dependent upon both the technician's time available and if there is a significant enough amount of gravel. The gravel is always included in the percent retained on the #200 sieve but may not be weighed separately to determine the percentage, especially if there is only a trace amount, (5% or less).

COOPER TESTING LABORATORY

#200 Sieve Wash Analysis
ASTM D 1140

Job No.:	054-186b	**Project No.:**	022054.400	**Run By:**	MD
Client:	SHN Engineers	**Date:**	7/28/2022	**Checked By:**	DC
Project:	RMMT, Samoa Peninsula, Humboldt County				

Boring:	22-B03	22-B03						
Sample:	S11	S15						
Depth, ft.:	40-41.5	55-56.5						
Soil Type:	Gray SAND w/ Silt	Gray Silty, Clayey SAND						
Wt of Dish & Dry Soil, gm	681.2	676.5						
Weight of Dish, gm	173.5	172.8						
Weight of Dry Soil, gm	507.7	503.7						
Wt. Ret. on #4 Sieve, gm	0.0	9.9						
Wt. Ret. on #200 Sieve, gm	463.2	309.5						
% Gravel	**0.0**	**2.0**						
% Sand	**91.2**	**59.5**						
% Silt & Clay	**8.8**	**38.6**						

Remarks: As an added benefit to our clients, the gravel fraction may be included in this report. Whether or not it is included is dependent upon both the technician's time available and if there is a significant enough amount of gravel. The gravel is always included in the percent retained on the #200 sieve but may not be weighed separately to determine the percentage, especially if there is only a trace amount, (5% or less).

Moisture Density 3

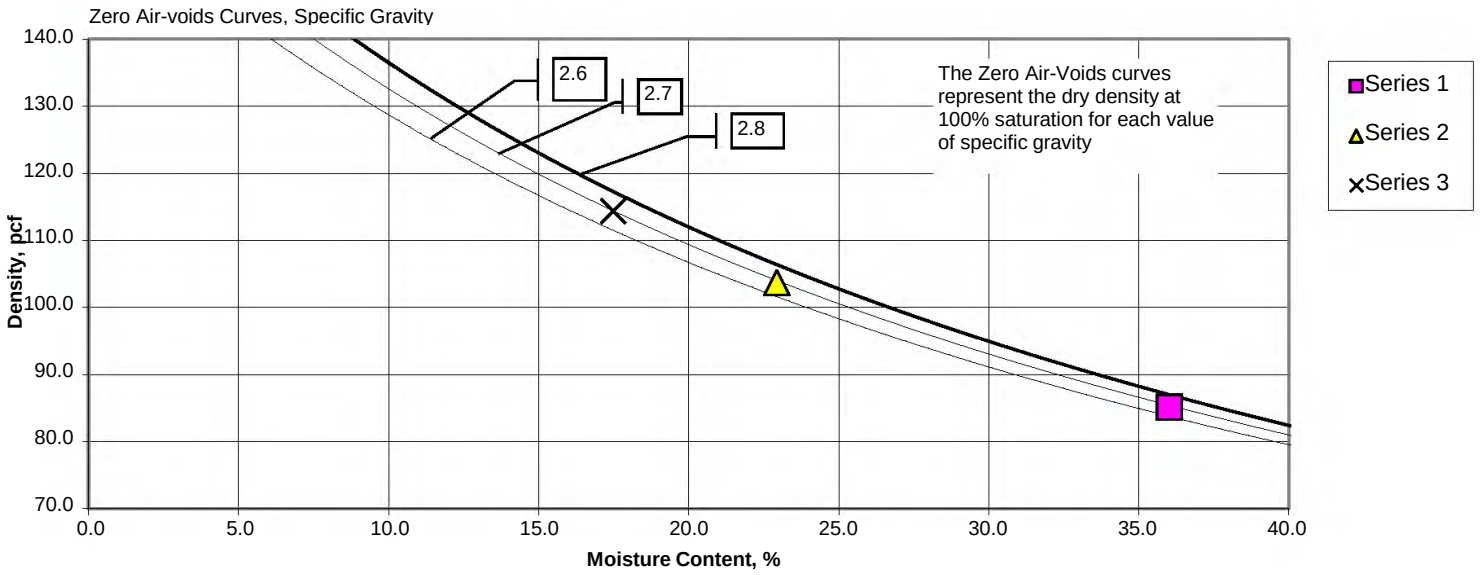
Moisture-Density-Porosity Report
Cooper Testing Labs, Inc. (ASTM D7263b)

CTL Job No:	054-186	**Project No.**	022054.400	**By:**	RU
Client:	SHN Engineers	**Date:**	07/15/22		
Project Name:	RMMT, Samoa Peninsula, Humboldt County	**Remarks:**			

Boring:	22-B01	22-B03	22-B03					
Sample:	S18	S6	S16					
Depth, ft:	75.5-76	16-16.5	60.5-61					
Visual Description:	Gray CLAY	Dark Gray Silty SAND	Olive Gray Clayey SAND w/ shells					
Actual G_s								
Assumed G_s	2.70	2.70	2.70					
Moisture, %	36.0	22.9	17.5					
Wet Unit wt, pcf	115.7	127.5	134.3					
Dry Unit wt, pcf	85.1	103.7	114.3					
Dry Bulk Dens.ρb, (g/cc)	1.36	1.66	1.83					
Saturation, %	99.1	99.1	99.6					
Total Porosity, %	49.5	38.5	32.2					
Volumetric Water Cont,Θw,%	49.1	38.1	32.0					
Volumetric Air Cont., Θa,%	0.4	0.4	0.1					
Void Ratio	0.98	0.63	0.47					
Series	1	2	3	4	5	6	7	8

Note: All reported parameters are from the as-received sample condition unless otherwise noted. If an assumed specific gravity (Gs) was used then the saturation, porosities, and void ratio should be considered approximate.

Moisture-Density

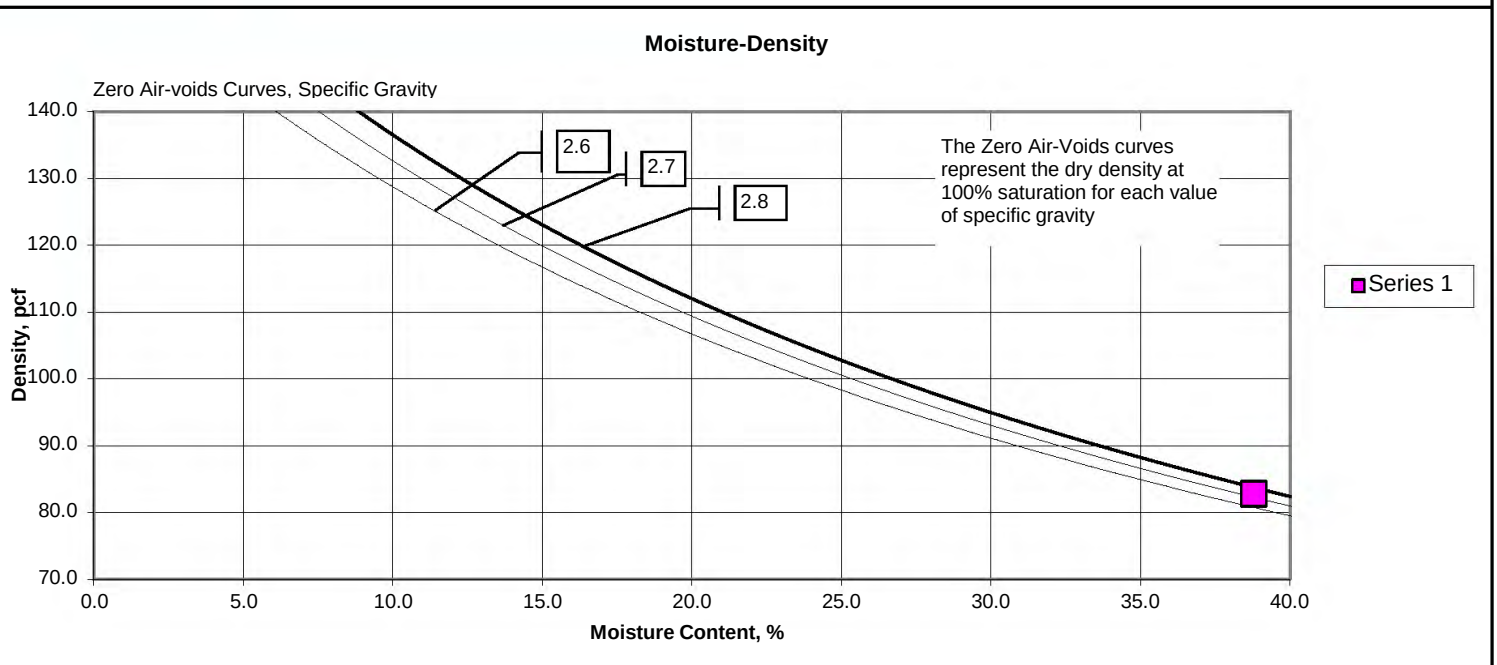


Moisture-Density-Porosity Report
Cooper Testing Labs, Inc. (ASTM D7263b)

CTL Job No:	054-187	**Project No.**	022054.400	**By:**	RU
Client:	SHN Engineer	**Date:**	07/18/22		
Project Name:	RMMT, Samoa Peninsula, Humbodt County	**Remarks:**	22-B01 @ 40-42.5' - no H:D ratio; m/d only.		

Boring:	22-B01							
Sample:	S9							
Depth, ft:	40-42.5							
Visual Description:	Gray SILT							
Actual G_s								
Assumed G_s	2.75							
Moisture, %	38.8							
Wet Unit wt, pcf	114.9							
Dry Unit wt, pcf	82.8							
Dry Bulk Dens.ρb, (g/cc)	1.33							
Saturation, %	99.4							
Total Porosity, %	51.8							
Volumetric Water Cont,Θw,%	51.4							
Volumetric Air Cont., Θa,%	0.3							
Void Ratio	1.07							
Series	1	2	3	4	5	6	7	8

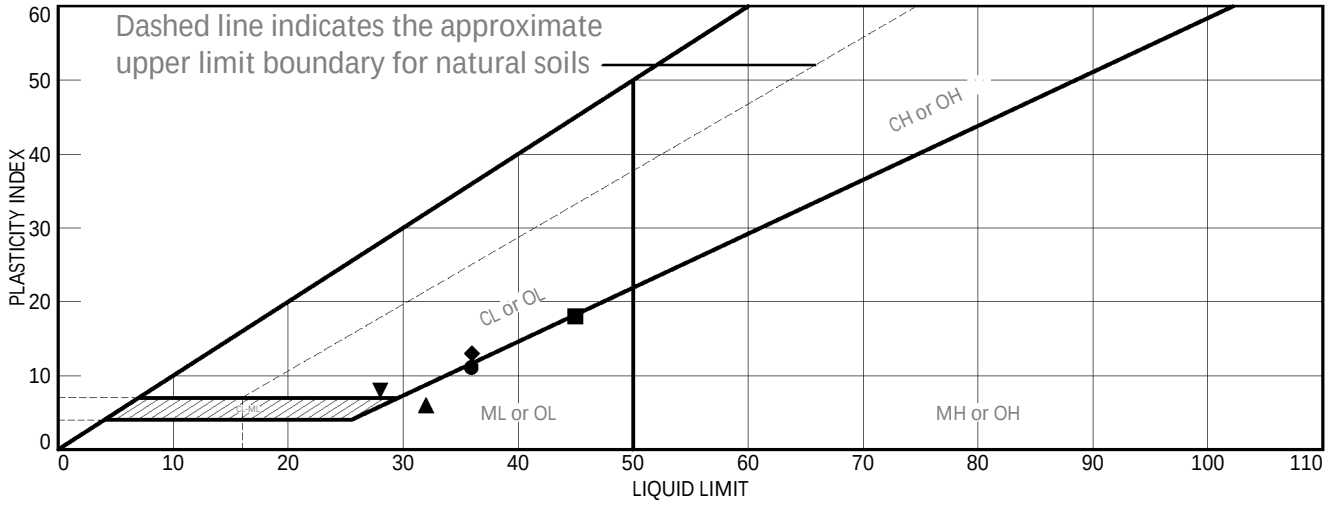
Note: All reported parameters are from the as-received sample condition unless otherwise noted. If an assumed specific gravity (Gs) was used then the saturation, porosities, and void ratio should be considered approximate.

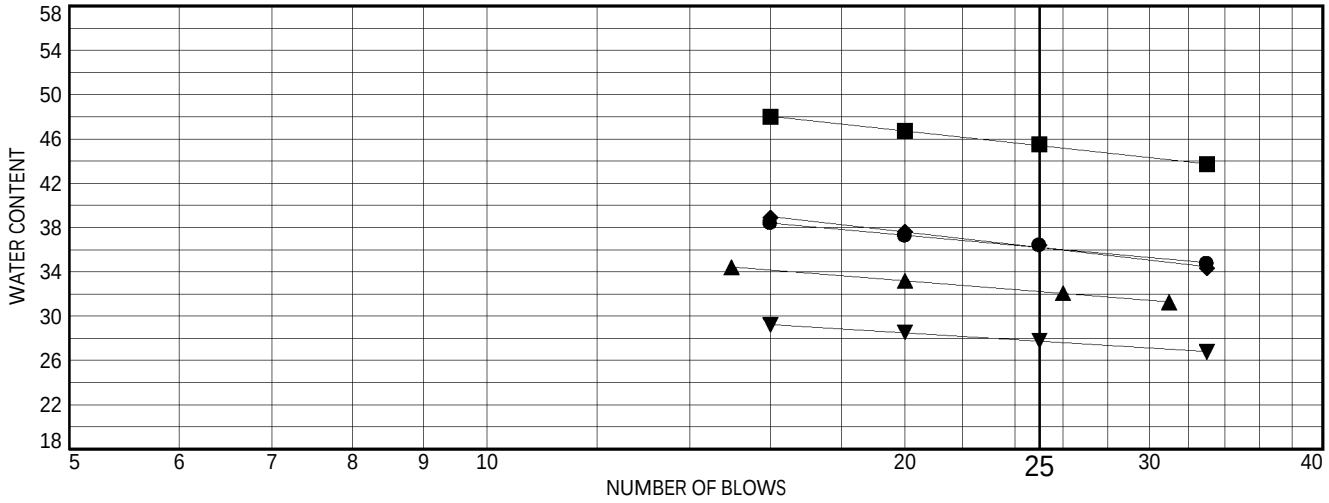


Atterberg Limits

4

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray SILT	36	25	11	99.7	98.4	ML
■	Gray SILT w/ shells	45	27	18			
▲	Gray Sandy SILT	32	26	6			
◆	Greenish Gray Lean CLAY (Bay Mud)	36	23	13	99.0	88.3	CL
▼	Gray Sandy Lean CLAY	28	20	8	99.9	62.5	CL

Project No. 054-187 Client: SHN Engineers

Project: RMMT, Samoa Penunsula, Humboldt County - 022054.400

Remarks:

●Source of Sample: 22-B01 Depth: 40-42.5' Sample Number: S9

■Source of Sample: 22-B01 Depth: 30-32.5' Sample Number: S7

▲Source of Sample: 22-B01 Depth: 70-72.5' Sample Number: S17

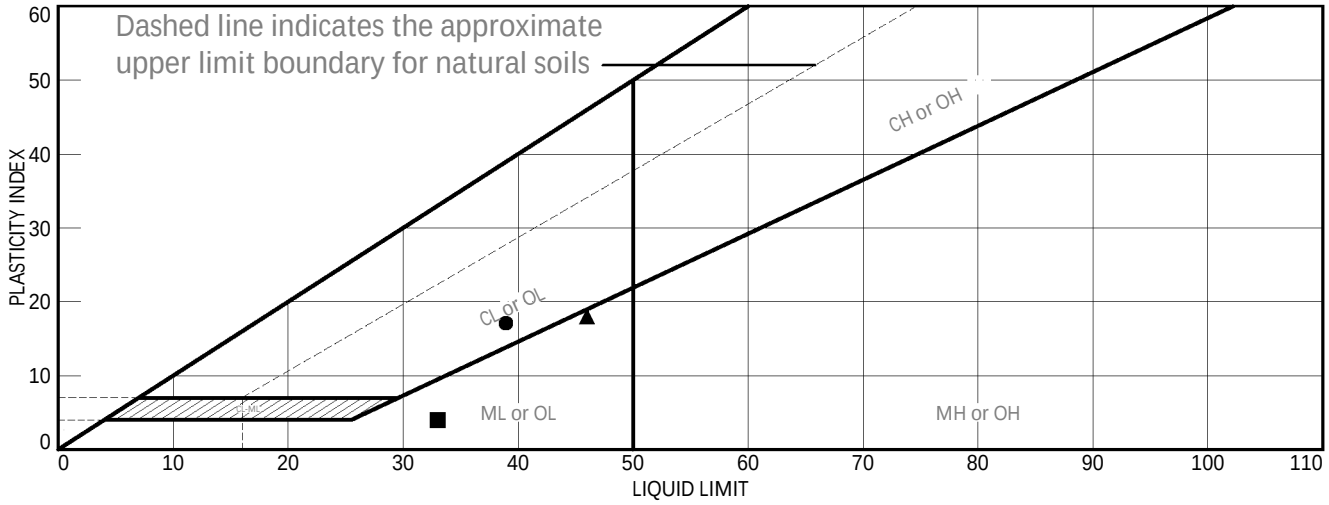
◆Source of Sample: 22-B02 Depth: 35-37.5' Sample Number: S6

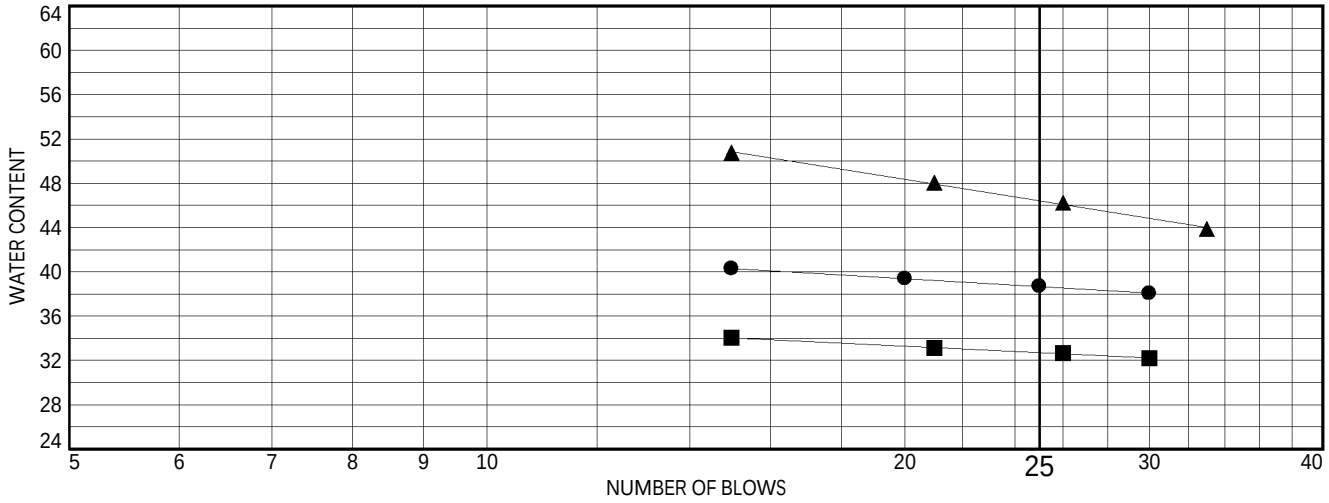
▼Source of Sample: 22-B02 Depth: 45-47.5' Sample Number: S9

COOPER TESTING LABORATORY

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray Lean CLAY w/ Sand	39	22	17			
■	Dark Gray Sandy SILT	33	29	4	97.9	65.3	ML
▲	Gray SILT	46	28	18	99.4	97.5	ML

Project No. 054-187 Client: SHN Engineers

Project: RMMT, Samoa Penunsula, Humboldt County - 022054.400

●Source of Sample: 22-B02 Depth: 55-57.5' Sample Number: S11

■Source of Sample: 22-B03 Depth: 45-47.5' Sample Number: S12

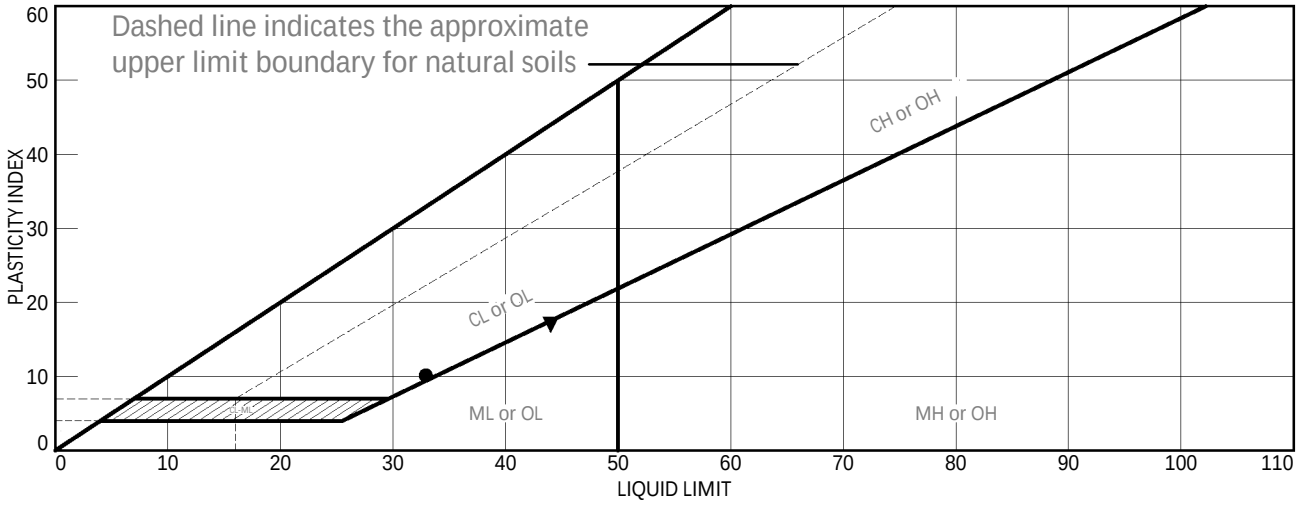
▲Source of Sample: 22-B03 Depth: 65-67.5' Sample Number: S18

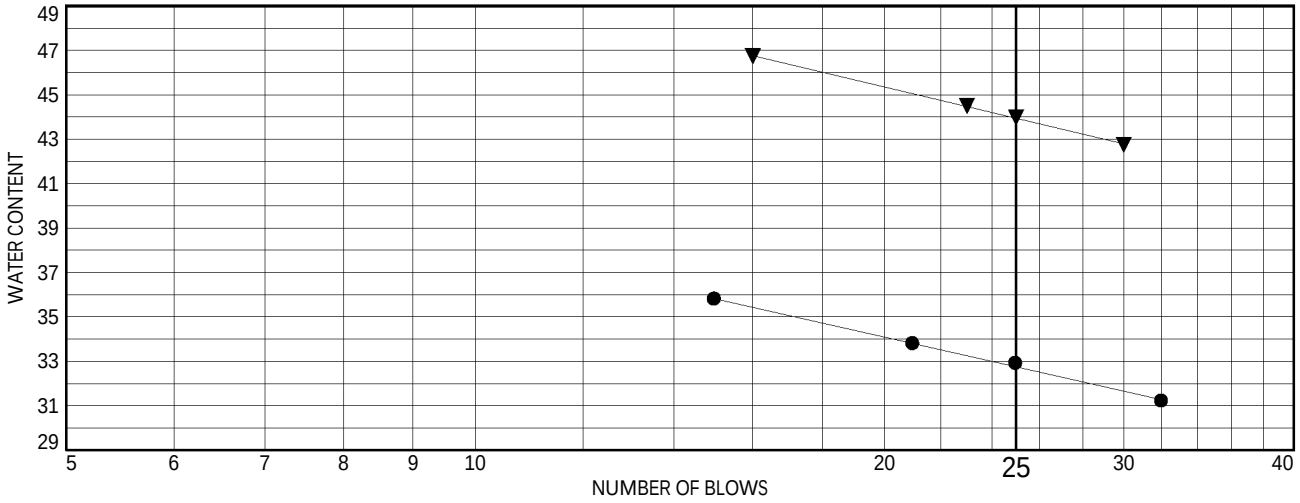
Remarks:

COOPER TESTING LABORATORY

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT (ASTM D4318)





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark Greenish Gray Lean CLAY	33	23	10			
■	Dark Gray Silty SAND		NP				
▲	Dark Gray Silty SAND		NP		90.7	27.0	
◆	Dark Gray Silty SAND		NP				
▼	Greenish Gray SILT (Bay Mud)	44	27	17			

Project No. 054-186 Client: SHN Engineers

Project: RMMT, Samoa Peninsula, Humboldt County - 022054.400

●	Source of Sample: 22-B01	Depth: 50.5-51'	Sample Number: S11
■	Source of Sample: 22-B01	Depth: 110-111.5'	Sample Number: S25
▲	Source of Sample: 22-B02	Depth: 15-16.5'	Sample Number: S2
◆	Source of Sample: 22-B02	Depth: 65.5-66'	Sample Number: S13
▼	Source of Sample: 22-B02	Depth: 75.5-76'	Sample Number: S16

Remarks:

■Could not roll out. Sample slides in bowl. Non-plastic.

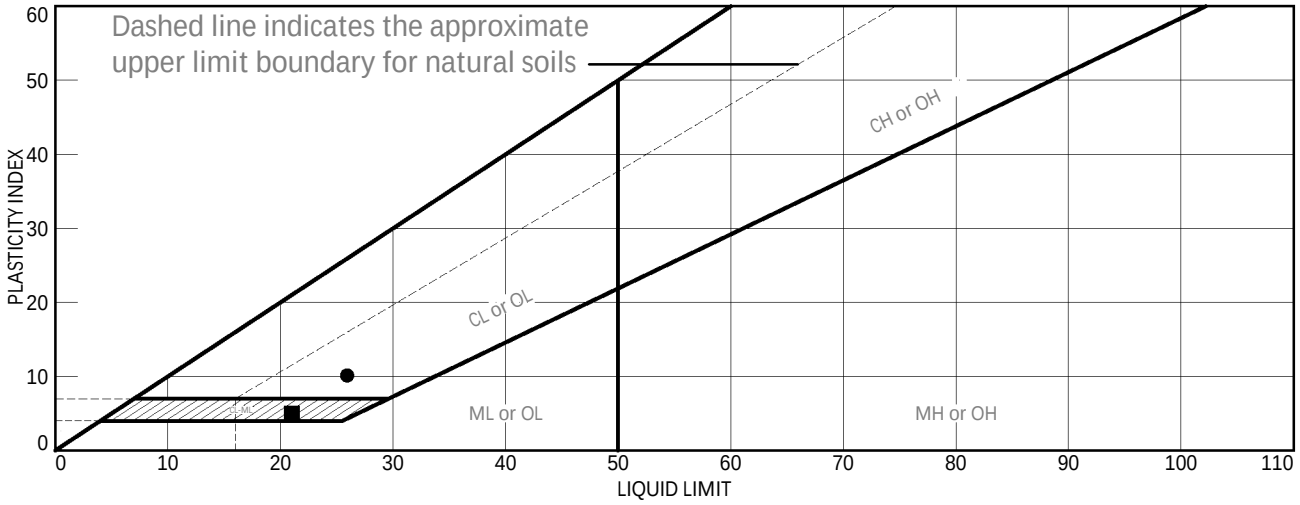
▲Could not roll out. Sample slides in bowl. Non-plastic.

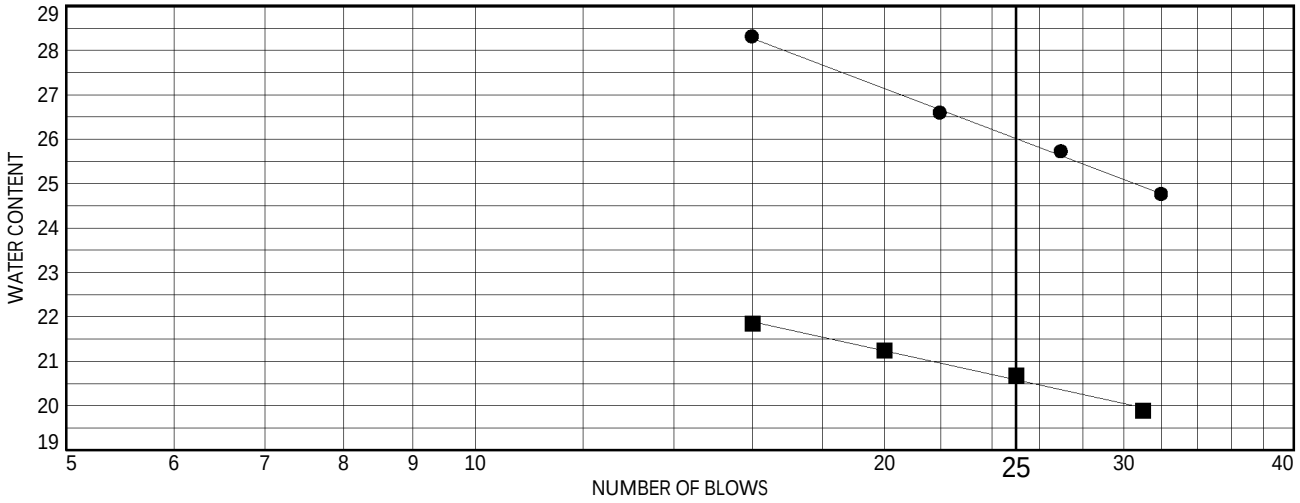
◆Could not roll out. Sample slides in bowl. Non-plastic.

COOPER TESTING LABORATORY

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT (ASTM D4318)





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark Gray Sandy Lean CLAY	26	16	10			
■	Gray Sandy Silty CLAY	21	16	5			

Project No. 054-186 Client: SHN Engineers

Project: RMMT, Samoa Peninsula, Humboldt County - 022054.400

Remarks:

●Source of Sample: 22-B02 Depth: 110-111.5' Sample Number: S21

■Source of Sample: 22-B03 Depth: 55-56.5' Sample Number: S15

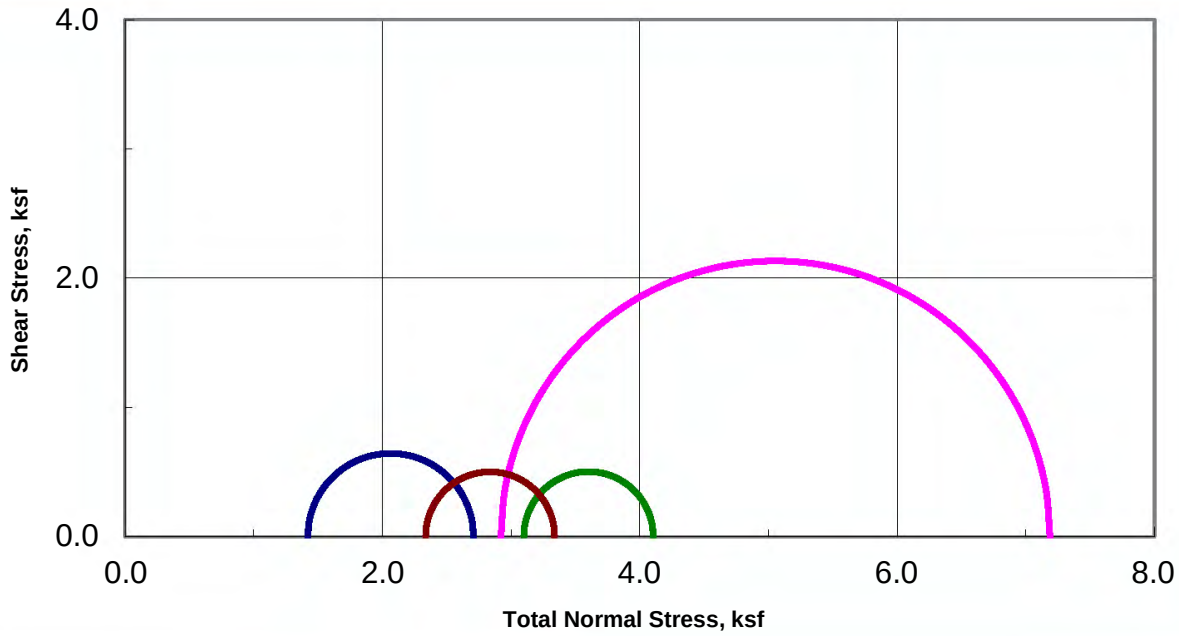
COOPER TESTING LABORATORY

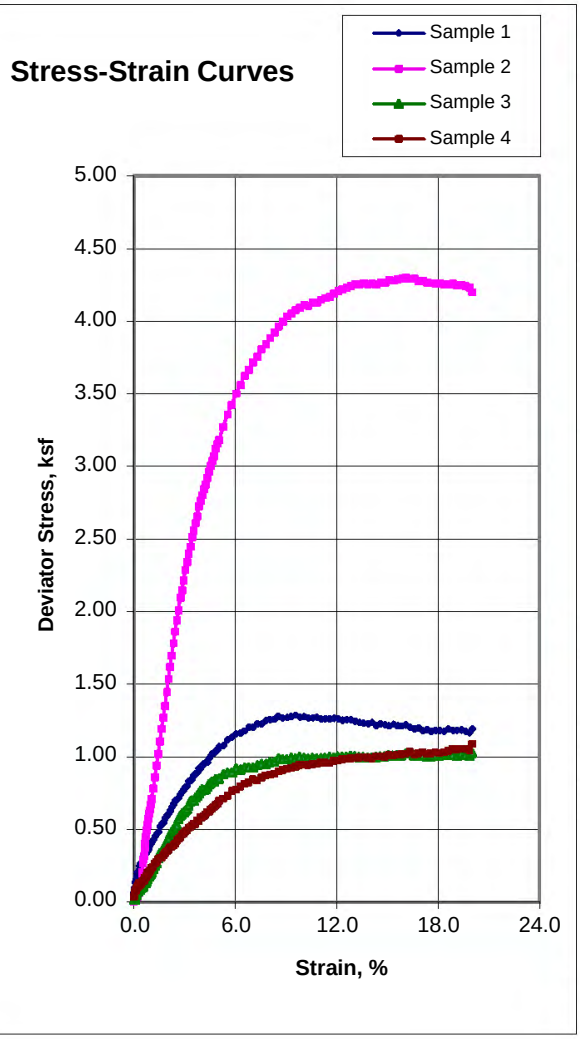
Figure

5 Triaxial Shear

Cooper Testing Labs, Inc.
937 Commercial Street
Palo Alto, CA 94303

Unconsolidated-Undrained Triaxial Test
ASTM D2850





Sample Data				
	1	2	3	4
Moisture %	42.7	29.0	38.3	36.2
Dry Den,pcf	78.6	94.3	81.4	84.0
Void Ratio	1.183	0.821	1.110	1.045
Saturation %	99.1	97.1	94.9	95.3
Height in	5.97	5.95	6.01	5.95
Diameter in	2.87	2.85	2.85	2.87
Cell psi	9.9	20.3	21.5	16.2
Strain %	9.57	15.00	15.00	15.00
Deviator, ksf	1.287	4.266	1.006	1.002
Rate %/min	1.00	1.00	1.00	1.00
in/min	0.060	0.059	0.060	0.059
Job No.:	054-187a			
Client:	SHN Engineers			
Project:	22054.400			
Boring:	22-B01	22-B01	22-B02	22-B02
Sample:	S7	S17	S6	S11
Depth ft:	30-32.5	70-72.5	35-37.5(Tip-3")	55-57.5

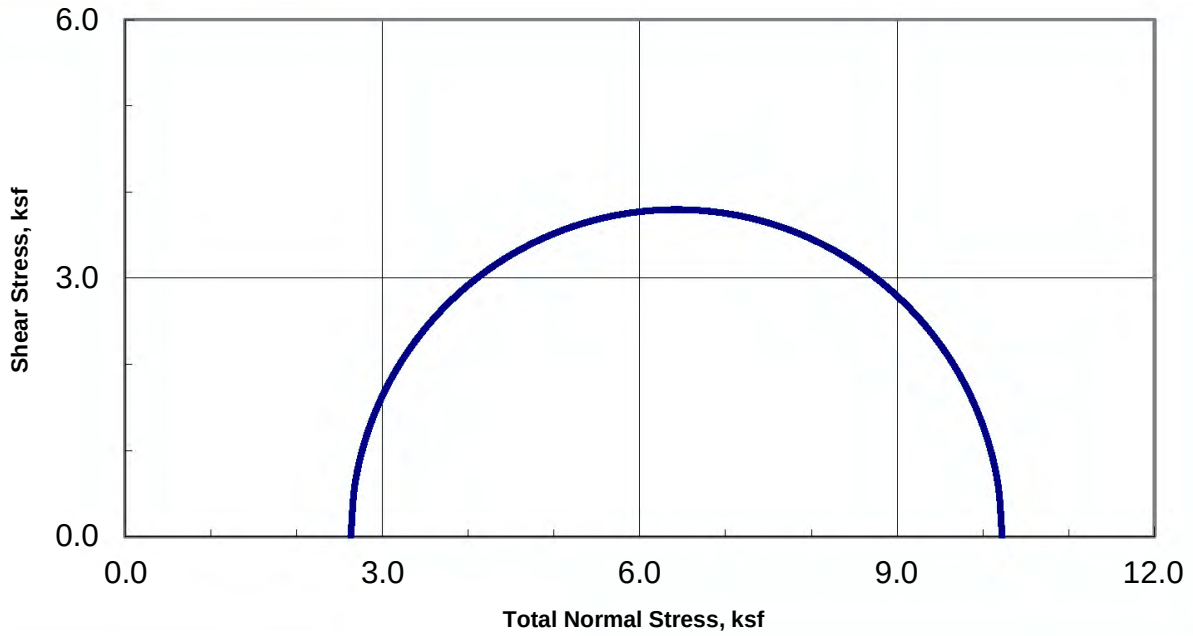
Visual Soil Description	
Sample #	
1	Gray SILT w/ shells
2	Gray Sandy SILT
3	Greenish Gray Lean CLAY (Bay Mud)
4	Gray Lean CLAY w/ Sand

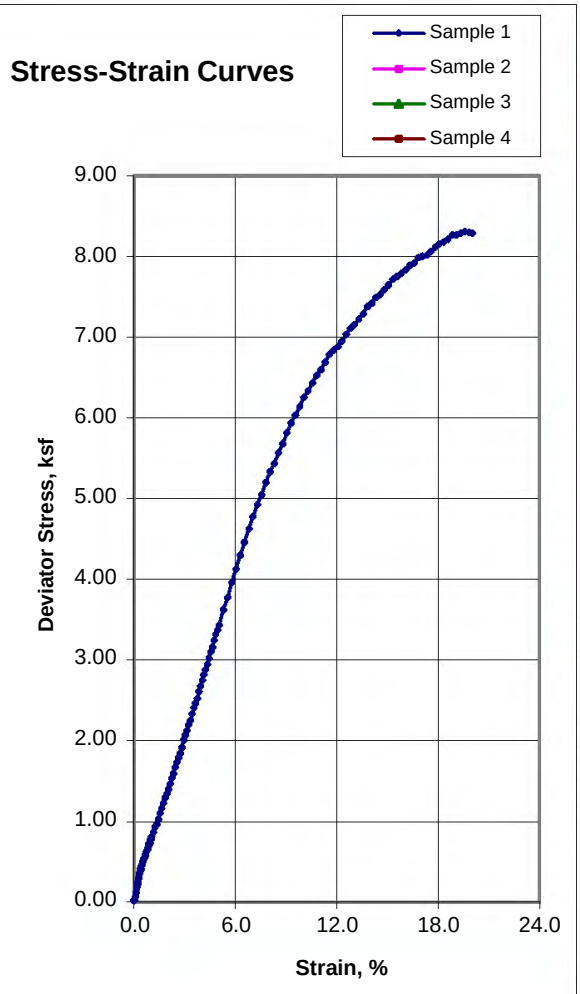
Remarks:

Note: Strengths are picked at the peak deviator stress or 15% strain which ever occurs first per ASTM D2850.

Cooper Testing Labs, Inc.
937 Commercial Street
Palo Alto, CA 94303

Unconsolidated-Undrained Triaxial Test
ASTM D2850





Sample Data	1	2	3	4
Moisture %	23.8			
Dry Den,pcf	102.2			
Void Ratio	0.650			
Saturation %	99.0			
Height in	5.00			
Diameter in	2.38			
Cell psi	18.3			
Strain %	15.00			
Deviator, ksf	7.592			
Rate %/min	1.00			
in/min	0.050			
Job No.:	054-186			
Client:	SHN Consulting			
Project:	22054			
Boring:	22-B02			
Sample:	S13			
Depth ft:	65.5-66			

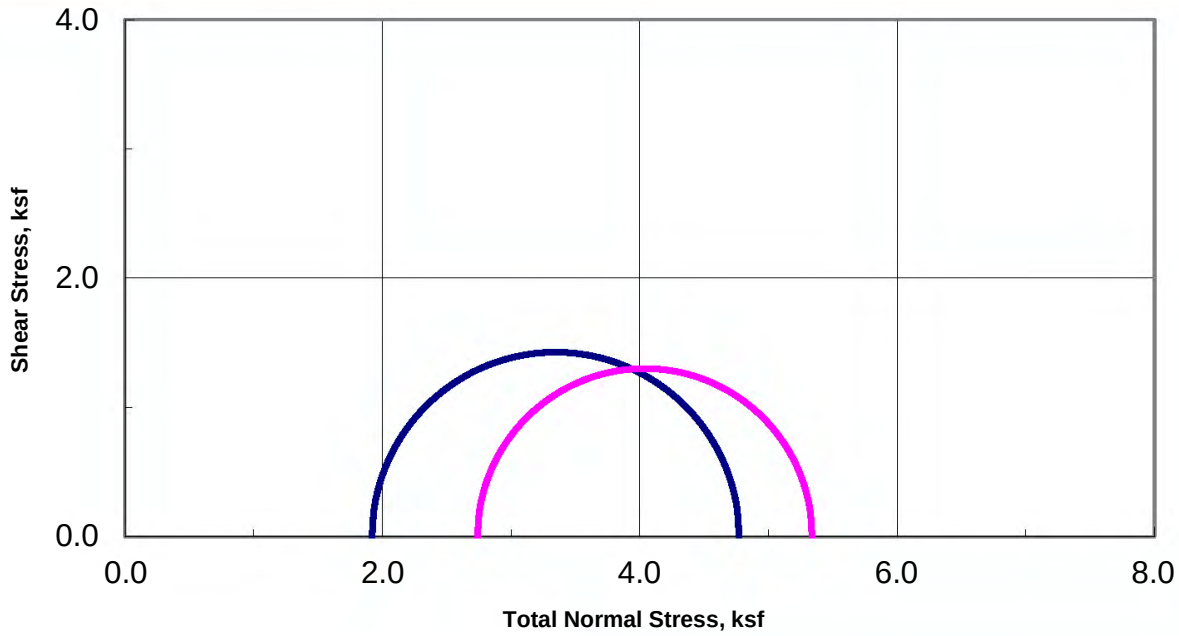
Visual Soil Description	
Sample #	
1	Dark Gray Silty SAND
2	
3	
4	

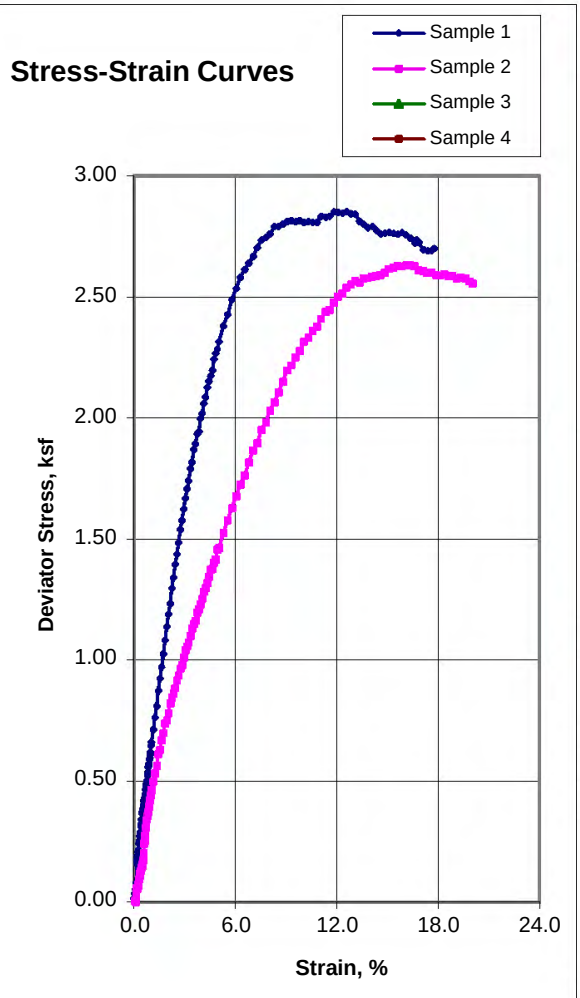
Remarks:

Note: Strengths are picked at the peak deviator stress or 15% strain which ever occurs first per ASTM D2850.

Cooper Testing Labs, Inc.
937 Commercial Street
Palo Alto, CA 94303

Unconsolidated-Undrained Triaxial Test
ASTM D2850





Sample Data				
	1	2	3	4
Moisture %	40.3	38.3		
Dry Den,pcf	78.8	83.5		
Void Ratio	1.178	1.056		
Saturation %	94.0	99.8		
Height in	5.97	5.96		
Diameter in	2.87	2.87		
Cell psi	13.3	19.0		
Strain %	12.59	15.00		
Deviator, ksf	2.853	2.600		
Rate %/min	1.00	1.00		
in/min	0.060	0.060		
Job No.:	054-187b			
Client:	SHN Engineers			
Project:	22054.400			
Boring:	22-B03	22-B03		
Sample:	S12	S18		
Depth ft:	45-47.5(Tip-4")	65-67.5		

Visual Soil Description	
Sample #	
1	Dark Gray Sandy SILT
2	Gray SILT
3	
4	

Remarks:

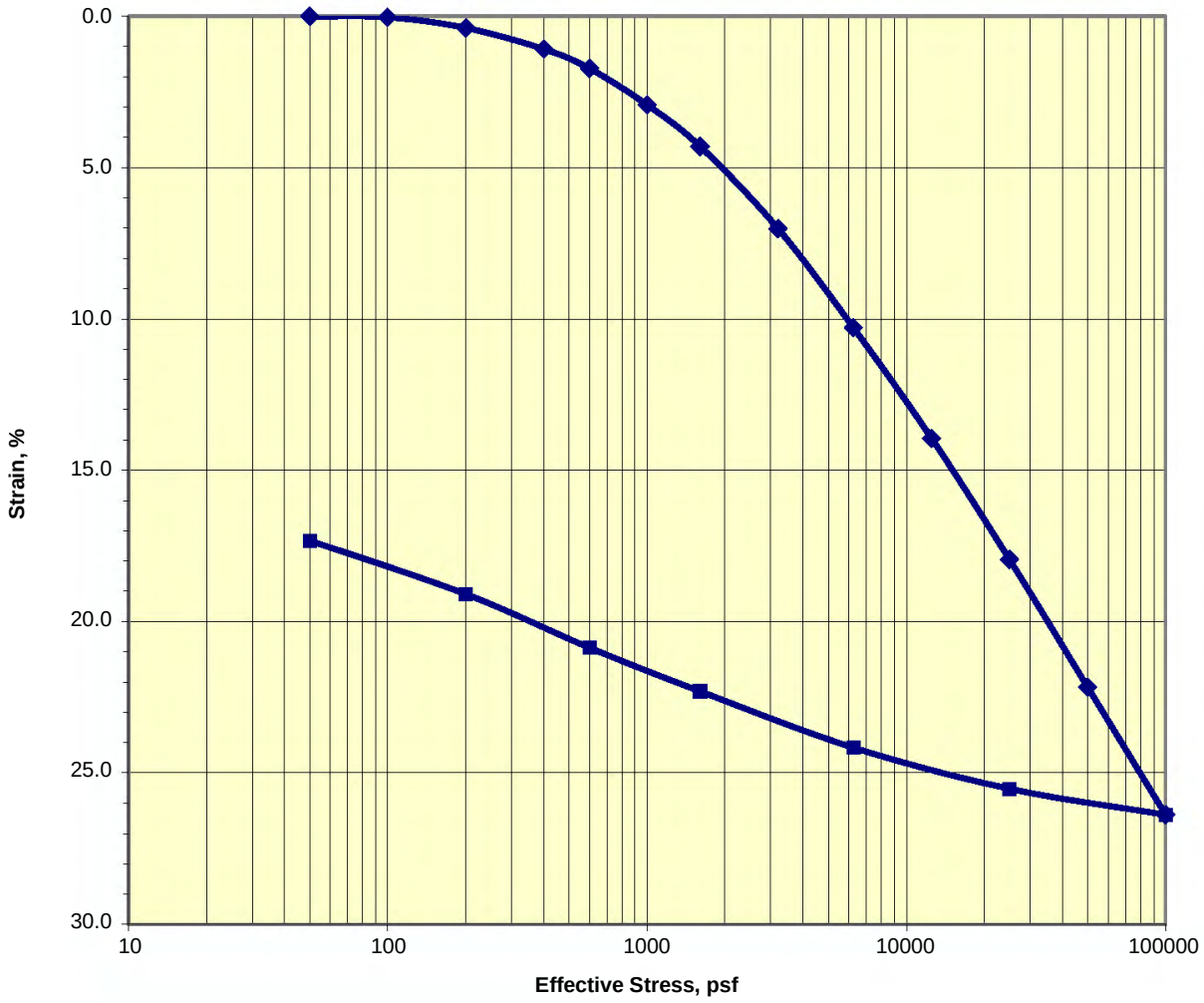
Note: Strengths are picked at the peak deviator stress or 15% strain which ever occurs first per ASTM D2850.

6 Consolidation

Consolidation Test
ASTM D2435

Job No.:	054-187	**Boring:**	22-B01	**Run By:**	MD
Client:	SHN Engineers	**Sample:**	S9	**Reduced:**	PJ
Project:	02054.400	**Depth, ft.:**	40-42.5	**Checked:**	PJ/DC
Soil Type:	Gray SILT (Bay Mud)			**Date:**	7/29/2022

Strain-Log-P Curve

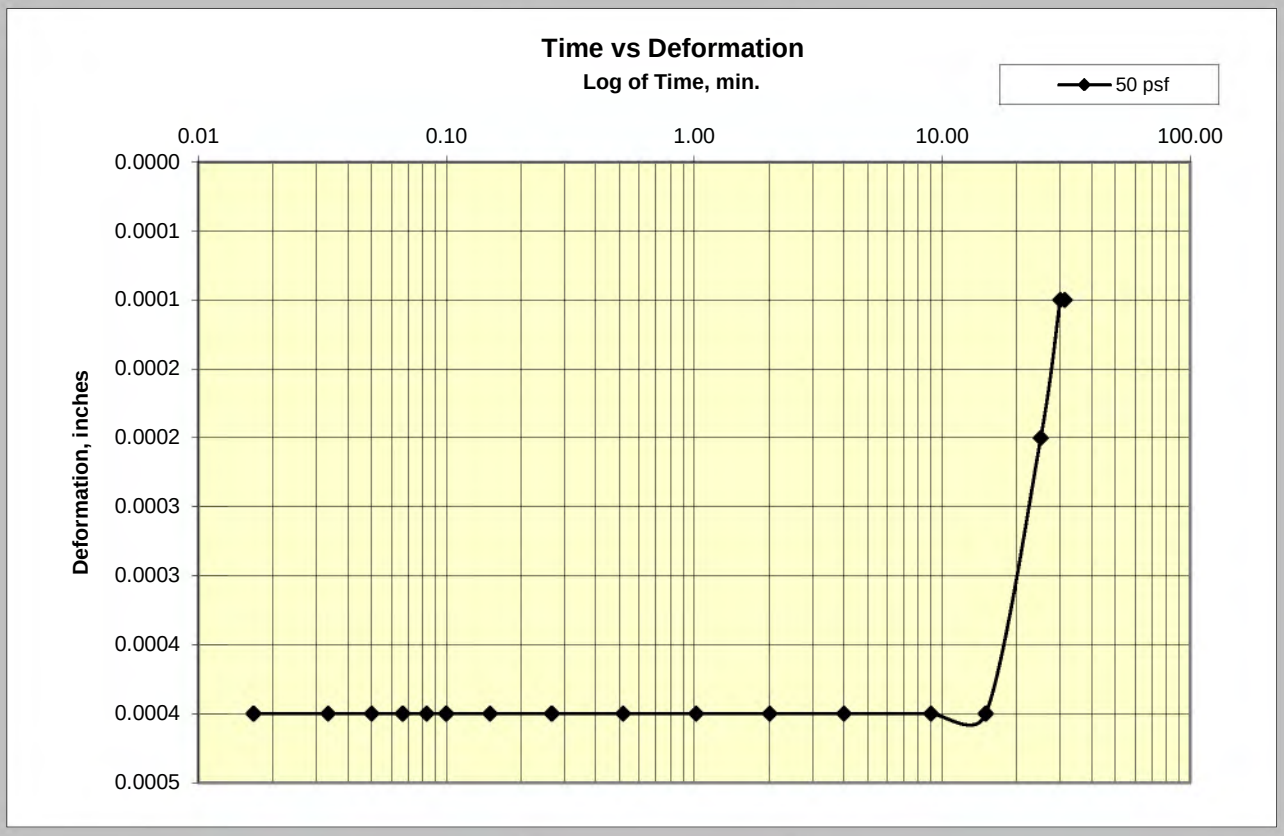


Assumed Gs 2.7	Initial	Final
Moisture %:	36.3	23.7
Dry Density, pcf:	84.5	102.7
Void Ratio:	0.994	0.641
% Saturation:	98.6	100.0

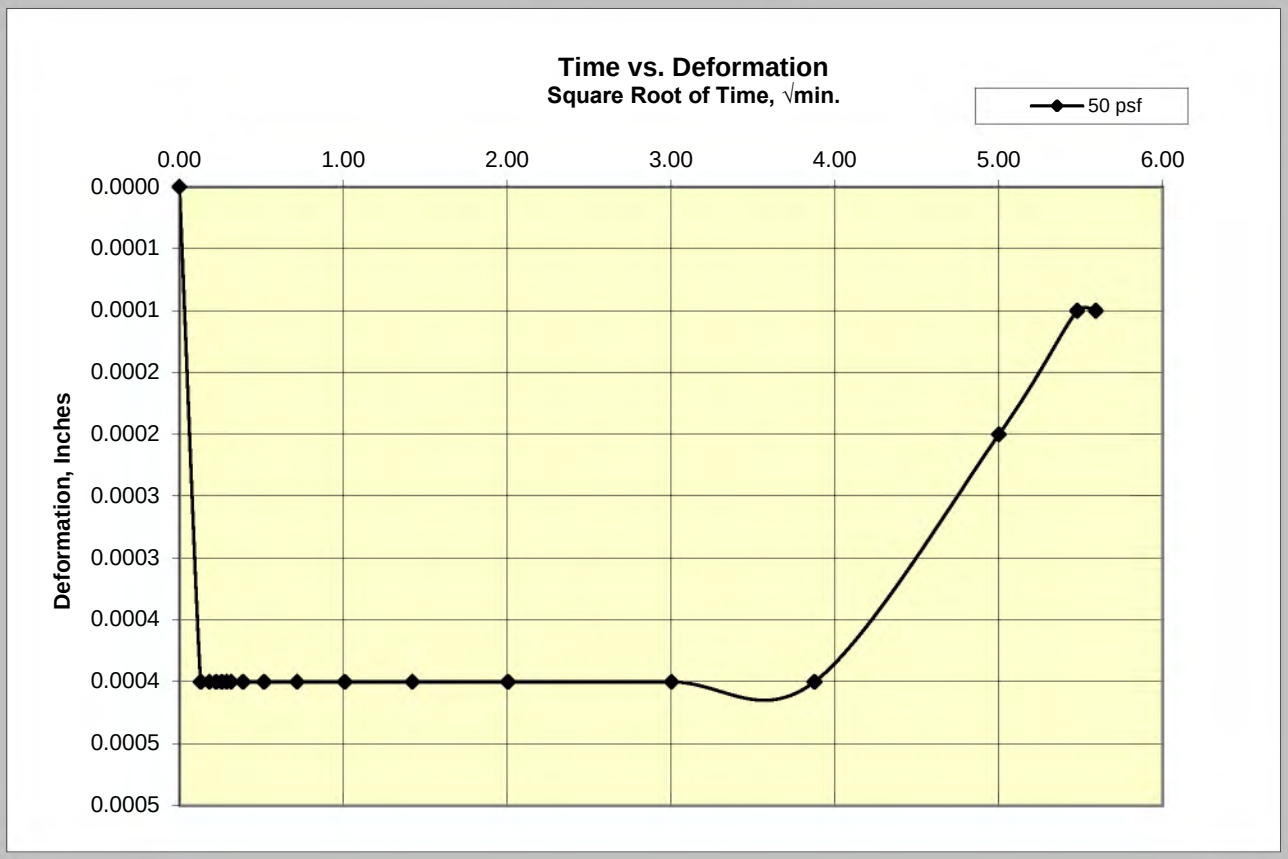
Remarks:

Cooper Testing Labs, Inc.

Load 1 | 50 psf

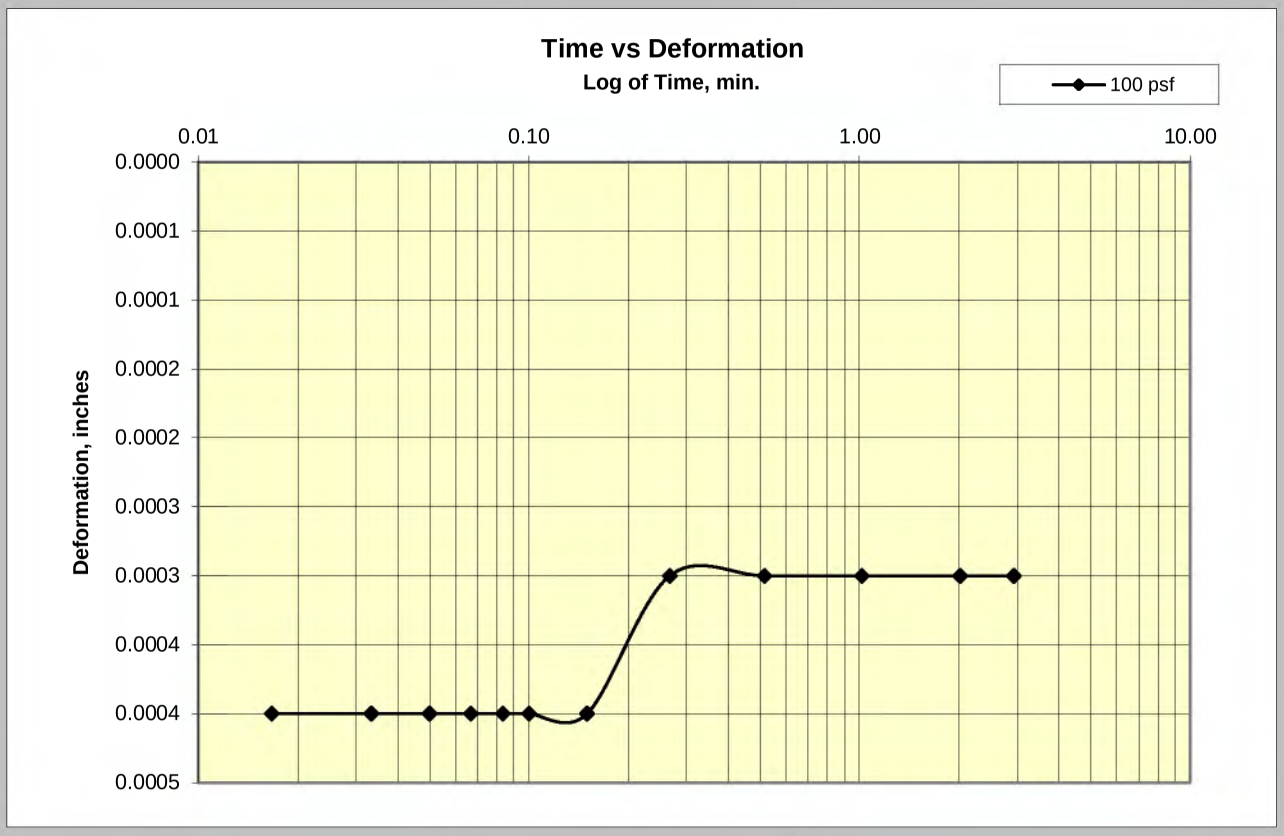


50 psf



Cooper Testing Labs, Inc.

Load 2 | 100 psf



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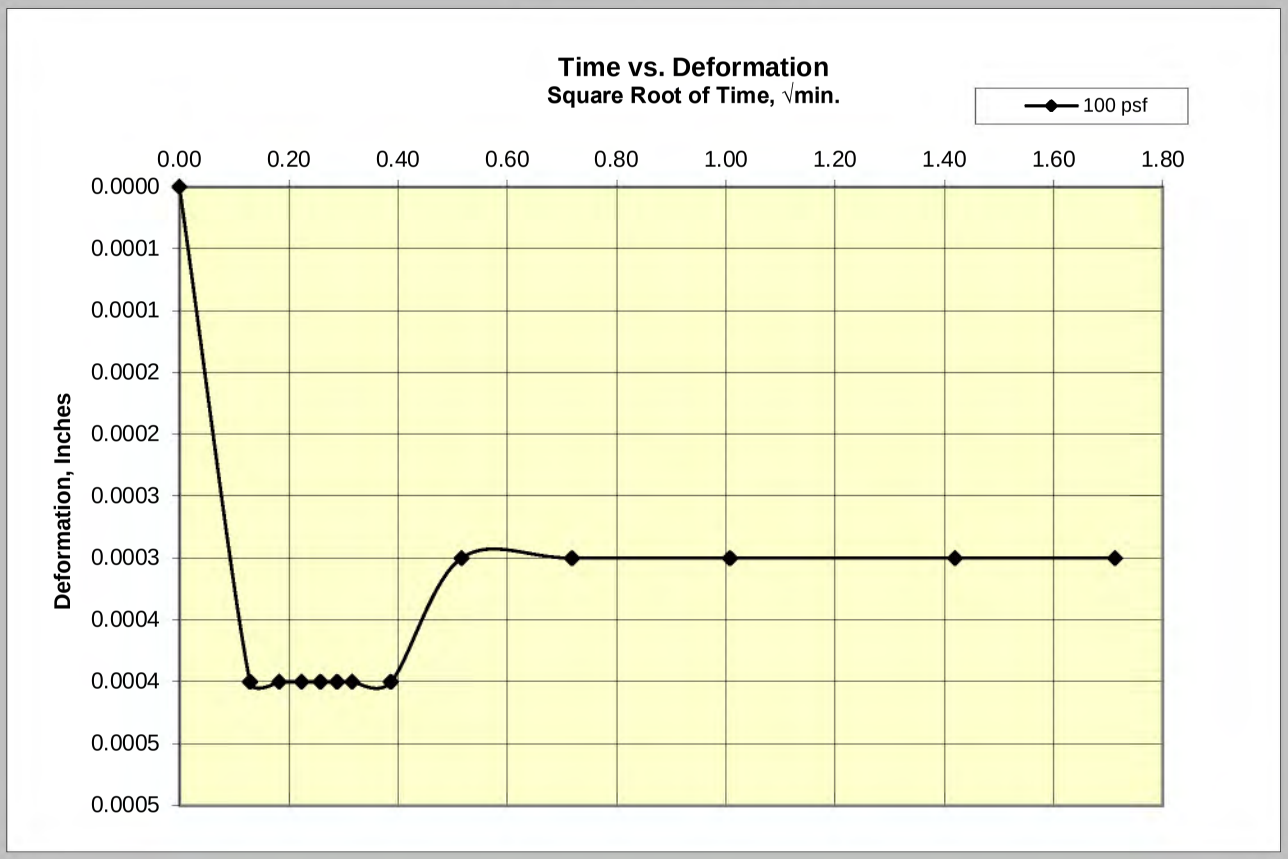
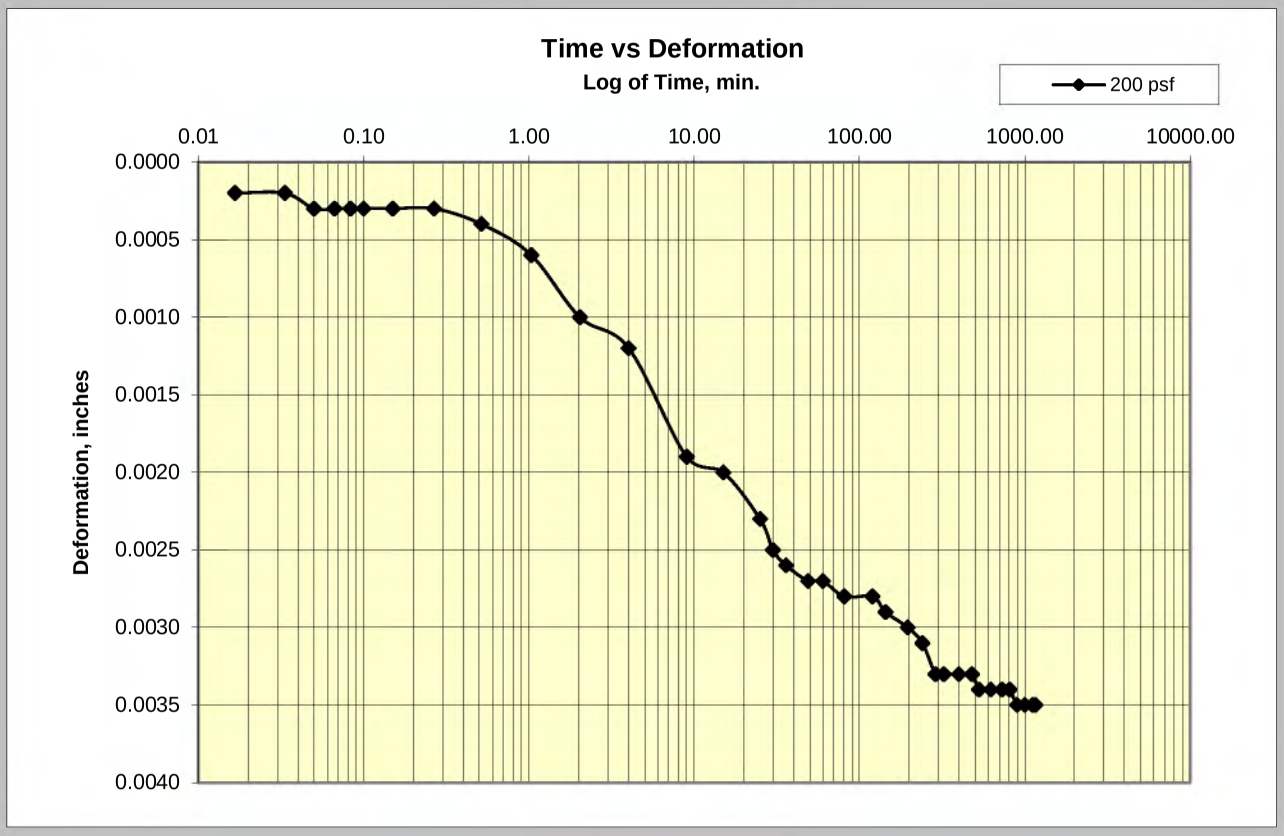


Cooper Testing Labs, Inc.

Load 3 | 200 psf



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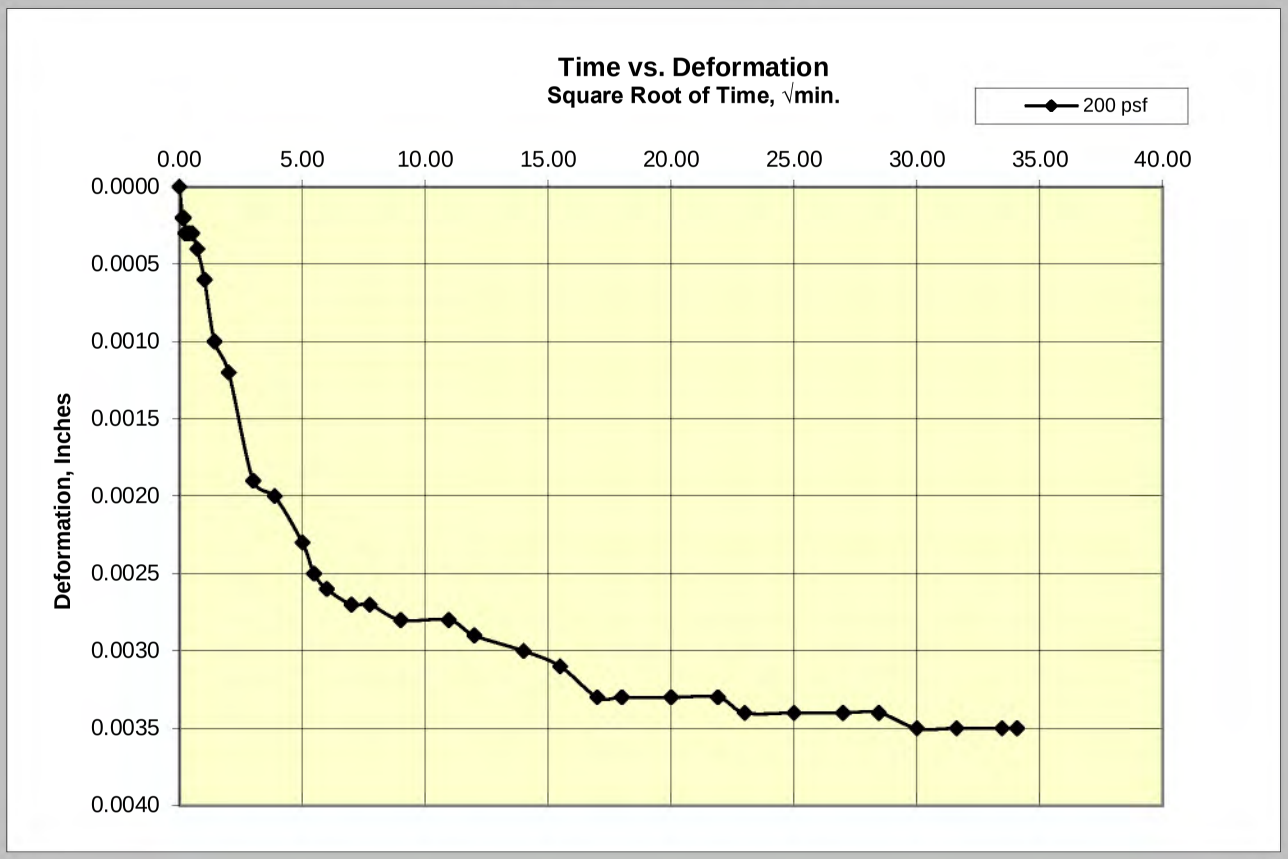

Cooper Testing Labs, Inc.

Load 4

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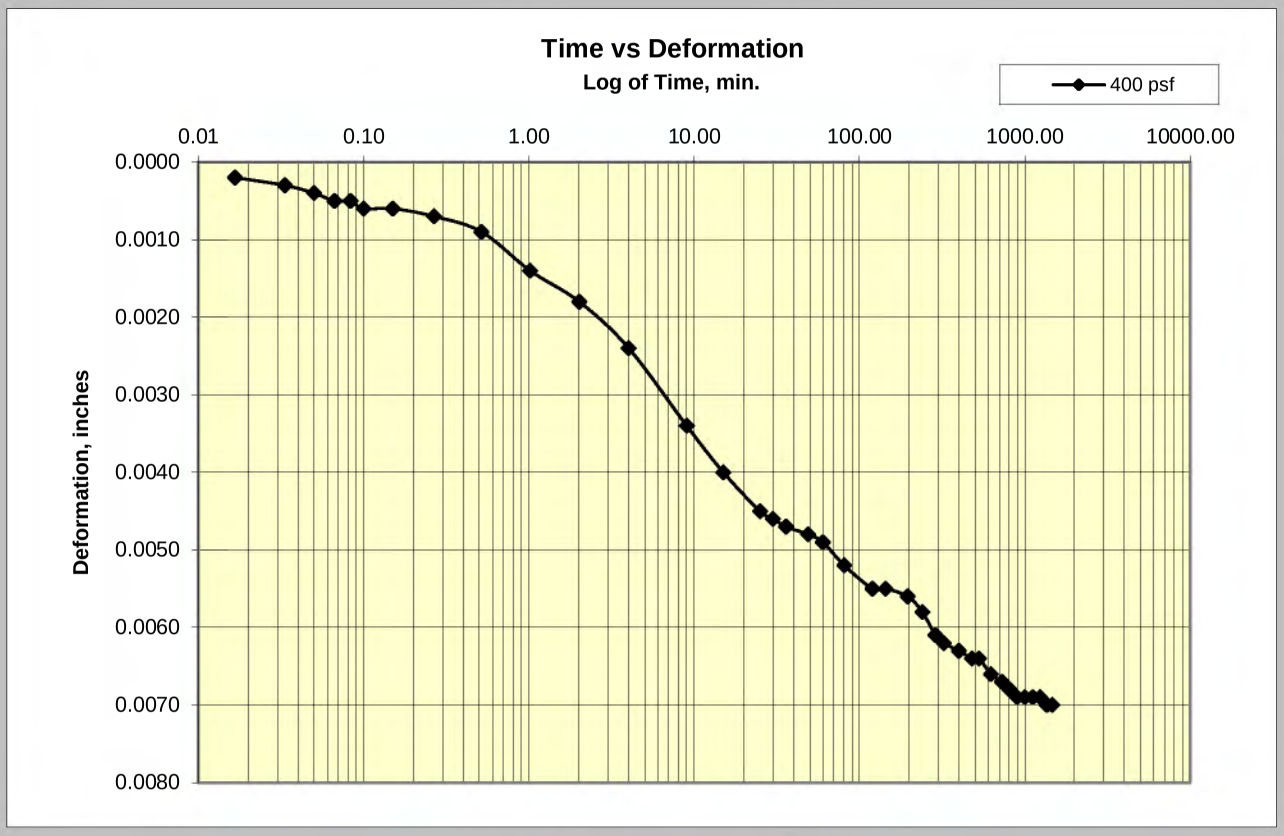

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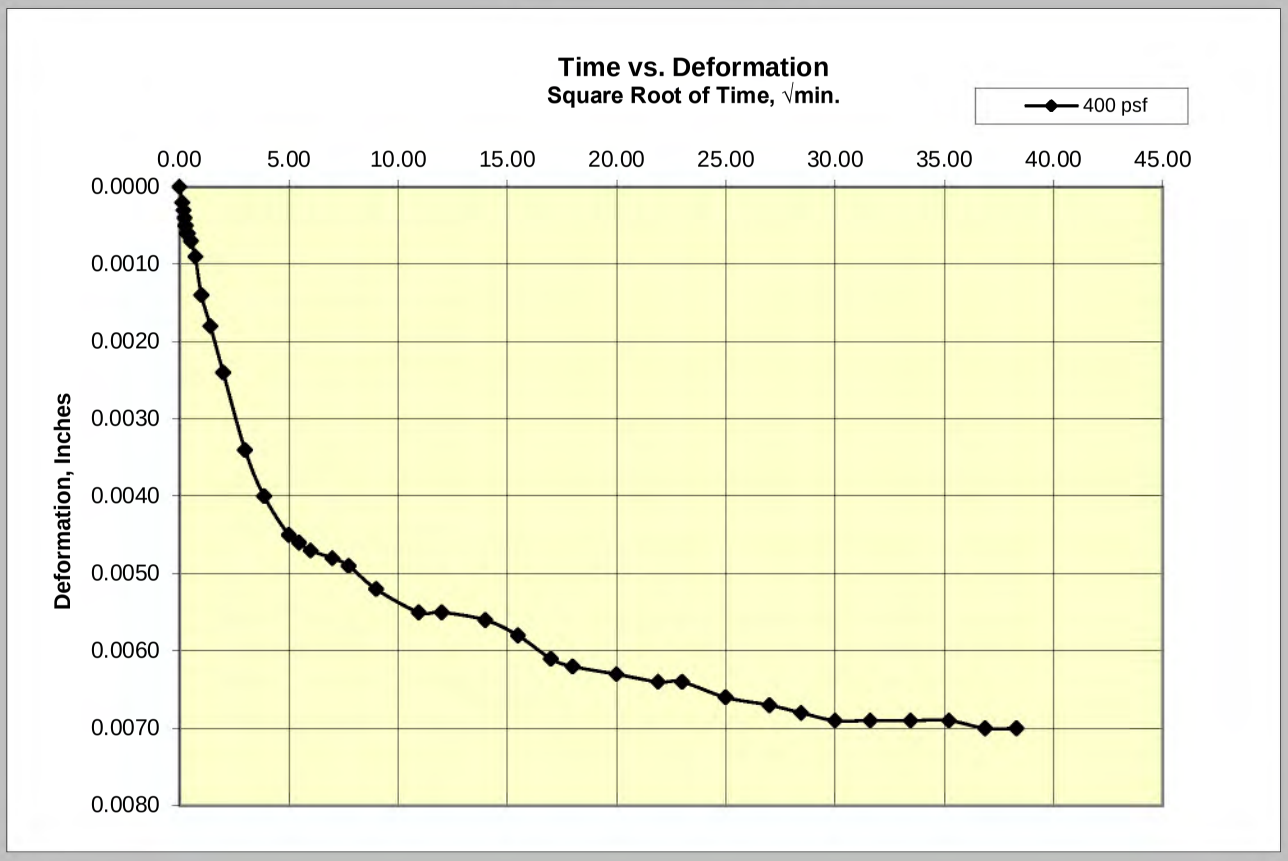

Cooper Testing Labs, Inc.

Load 5

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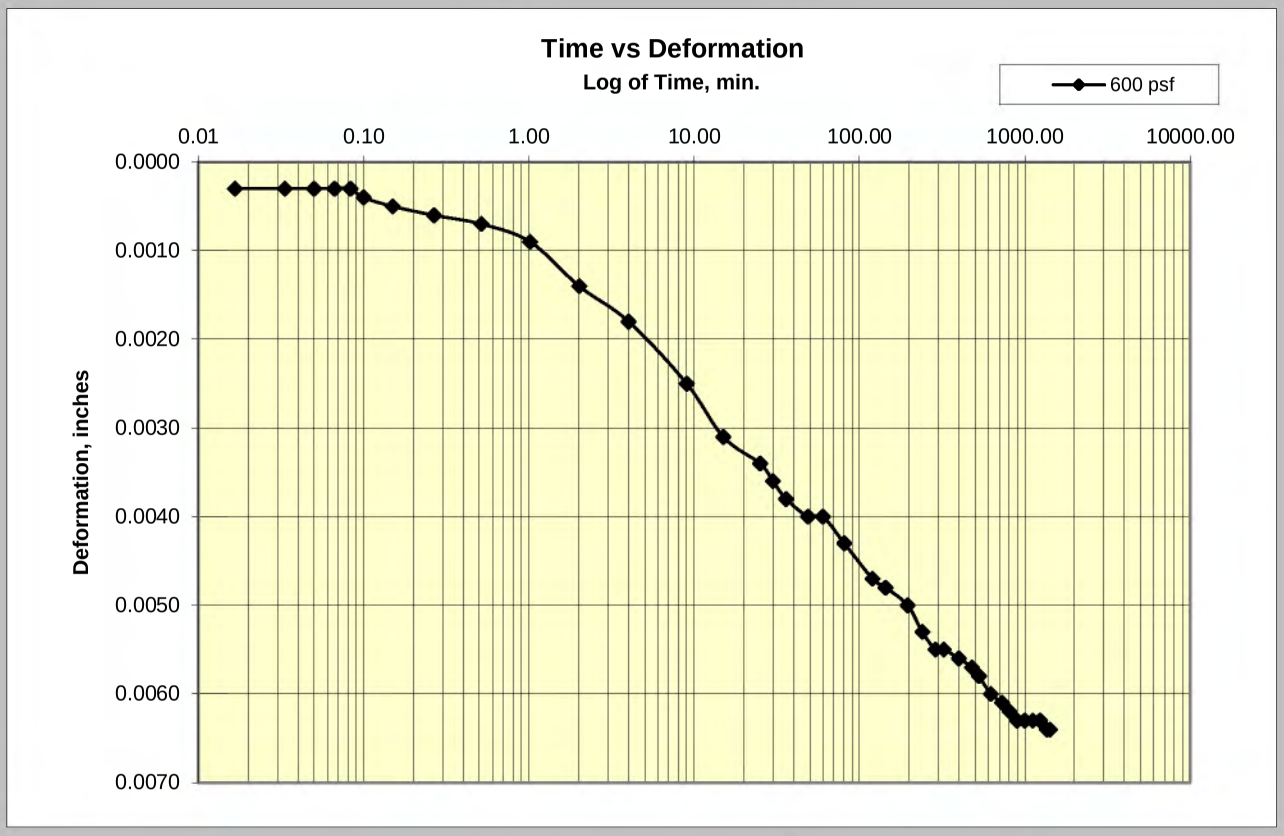

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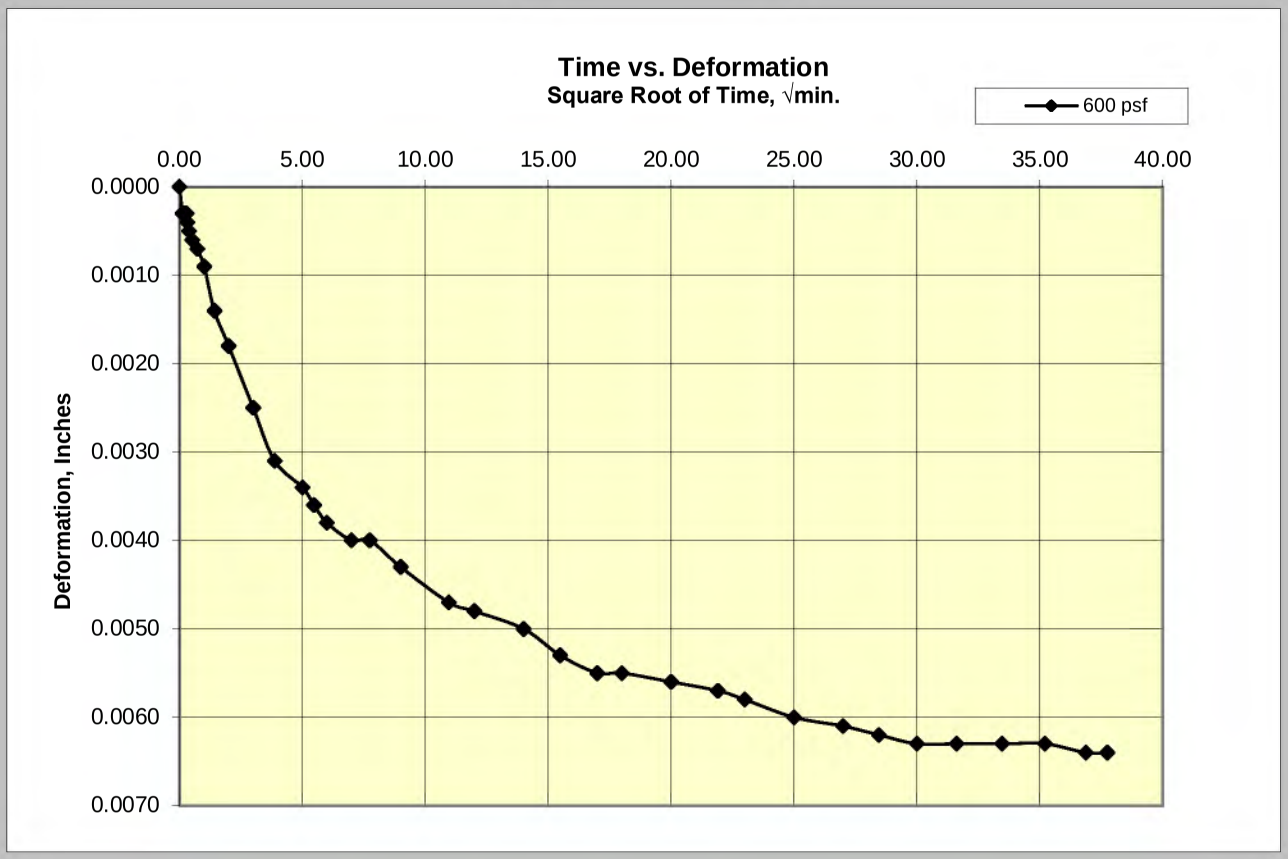
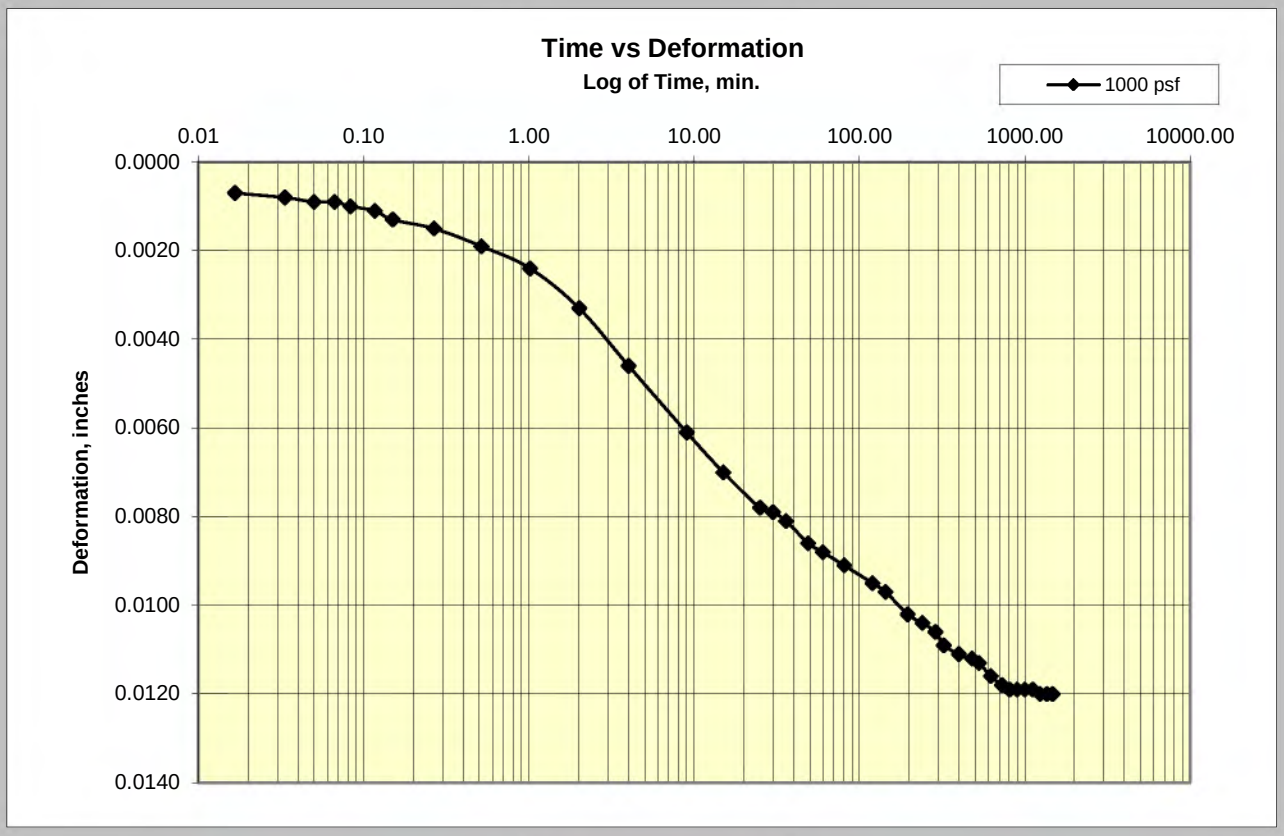
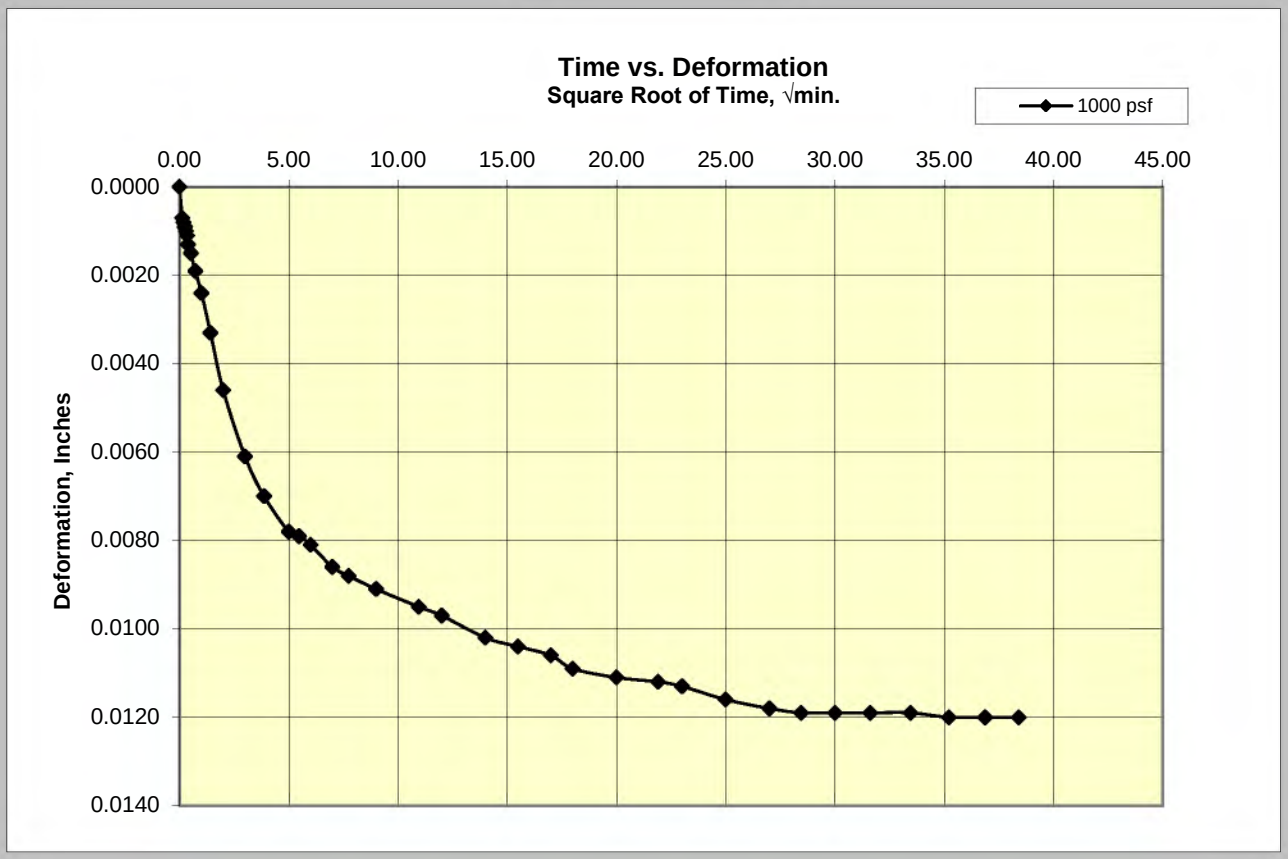


Cooper Testing Labs, Inc.

Load 6 | 1000 psf

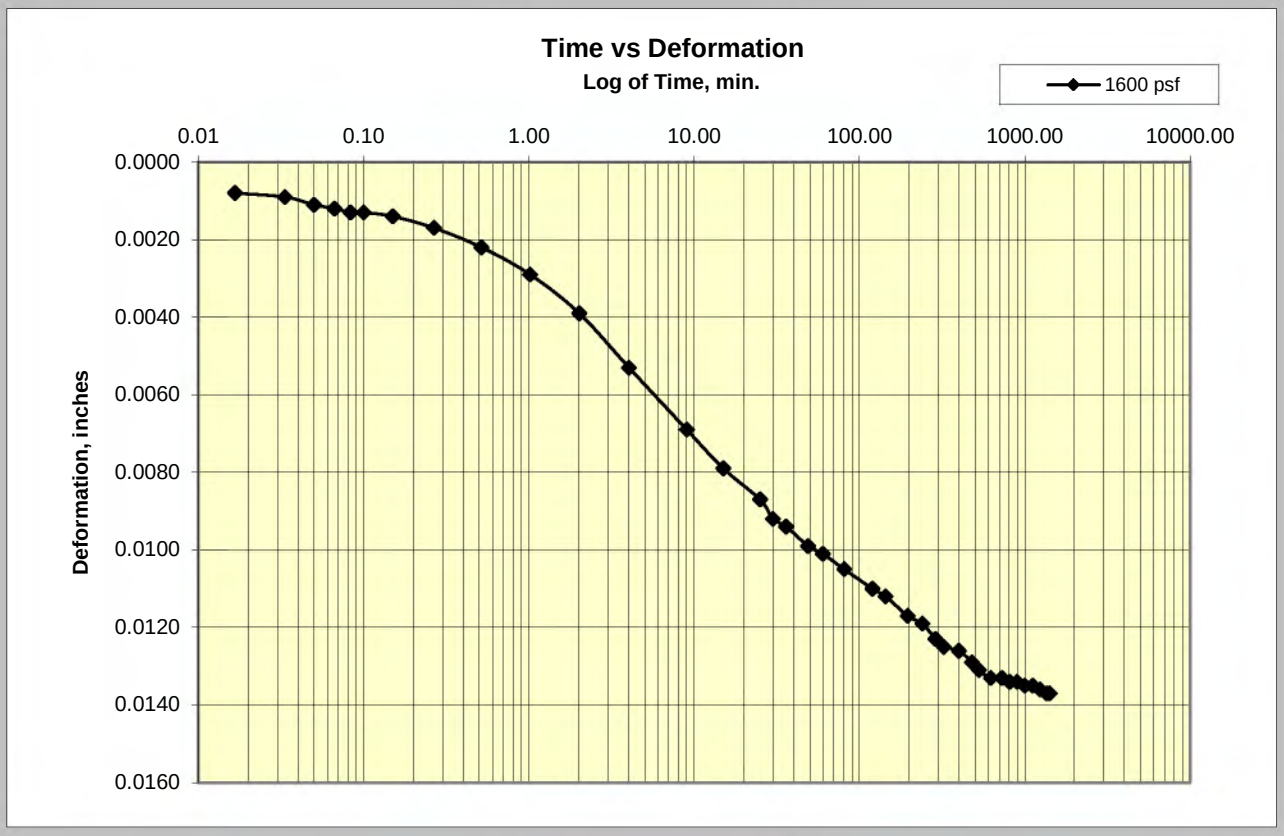


1000 psf

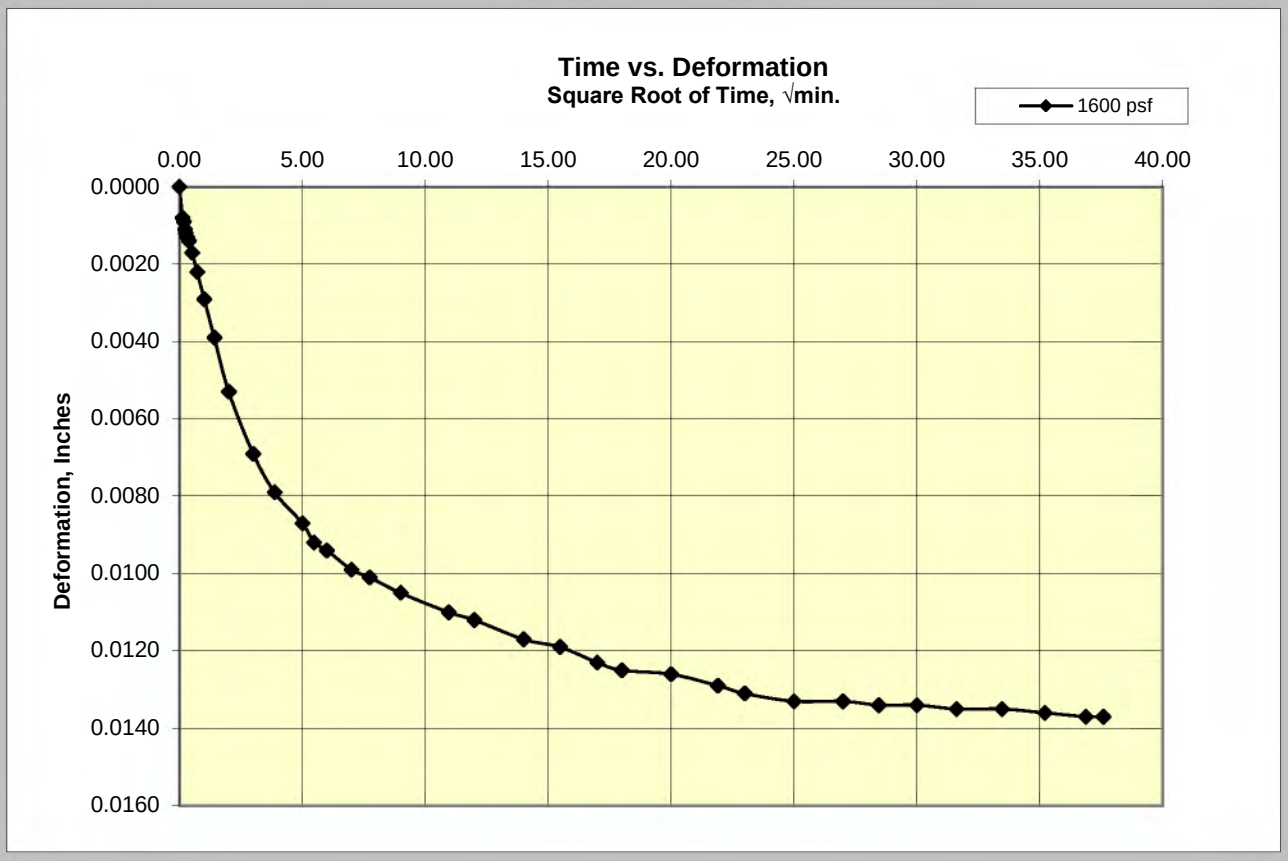


Cooper Testing Labs, Inc.

Load 7 | 1600 psf



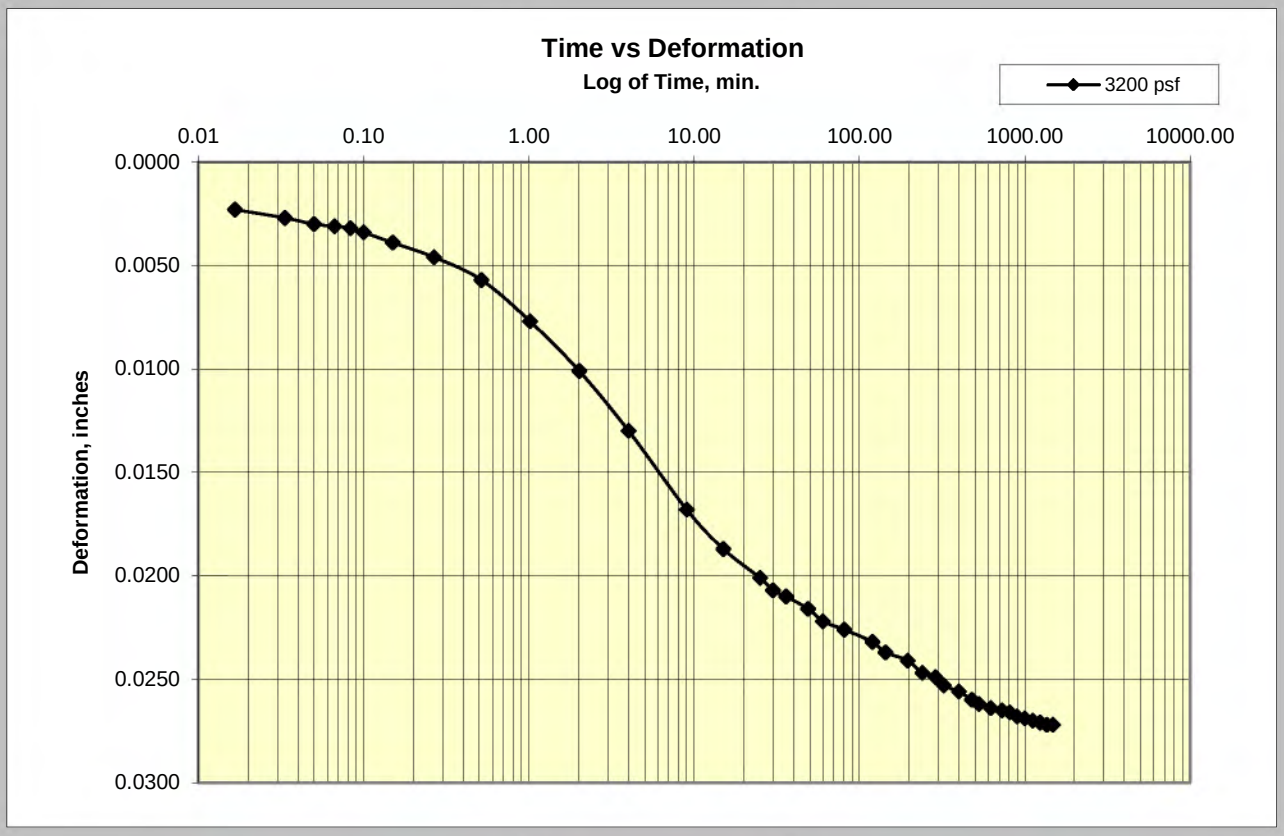
1600 psf



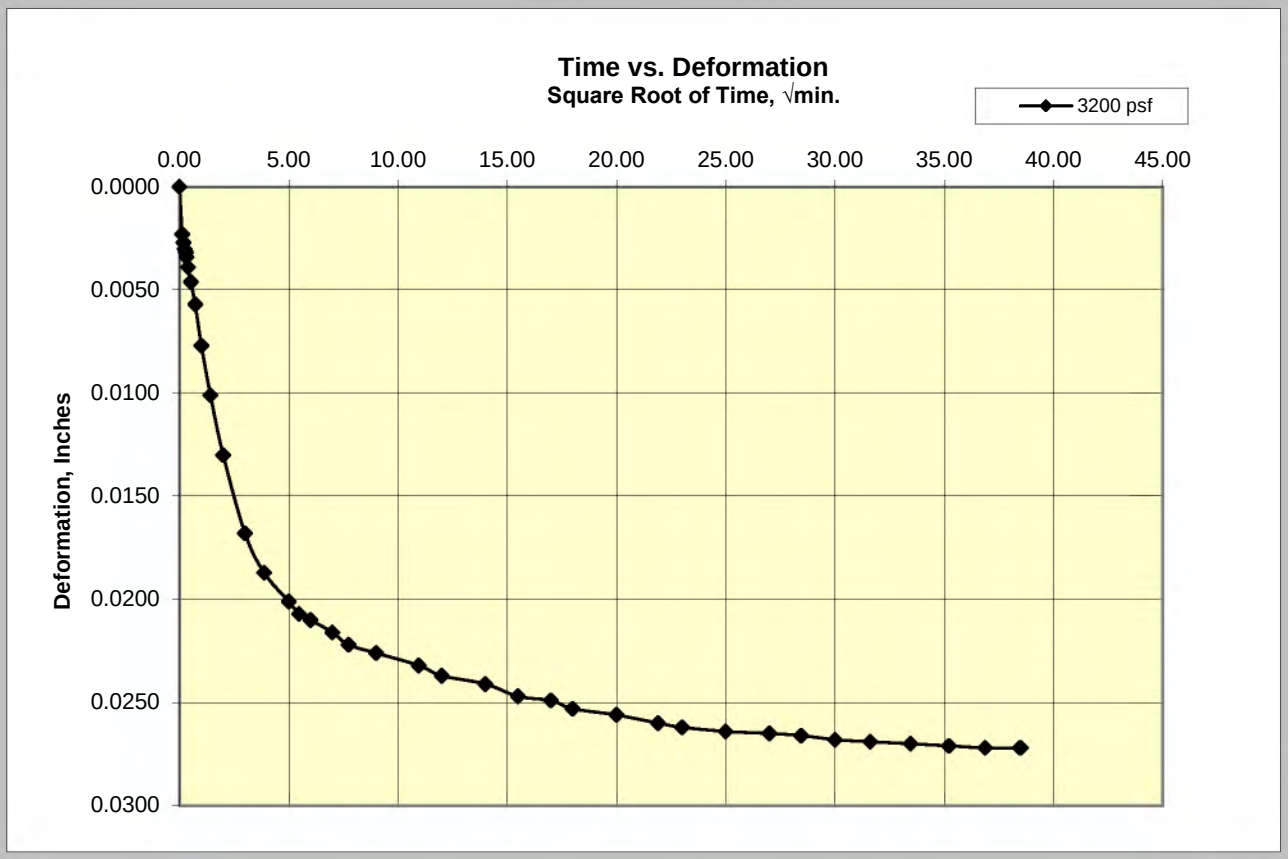
Cooper Testing Labs, Inc.

Load 8

3200 psf

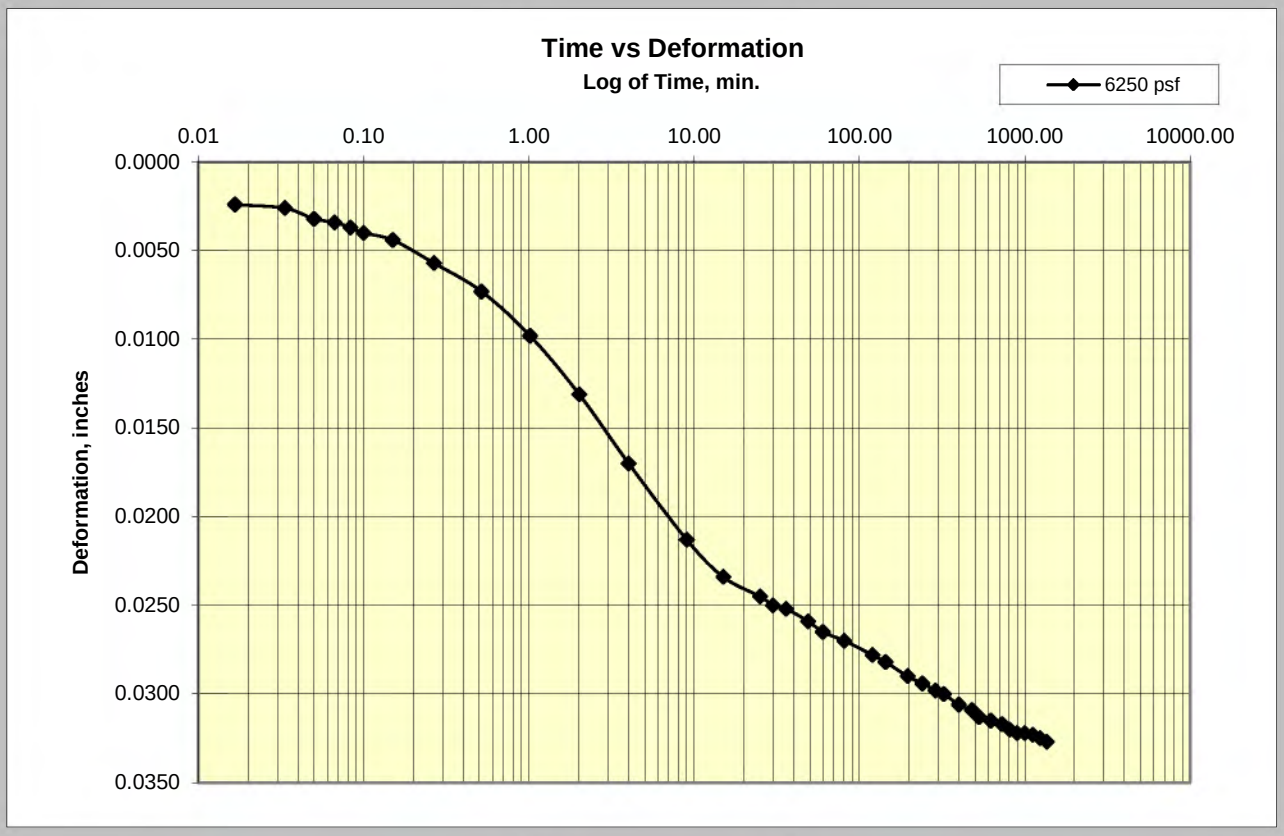


3200 psf

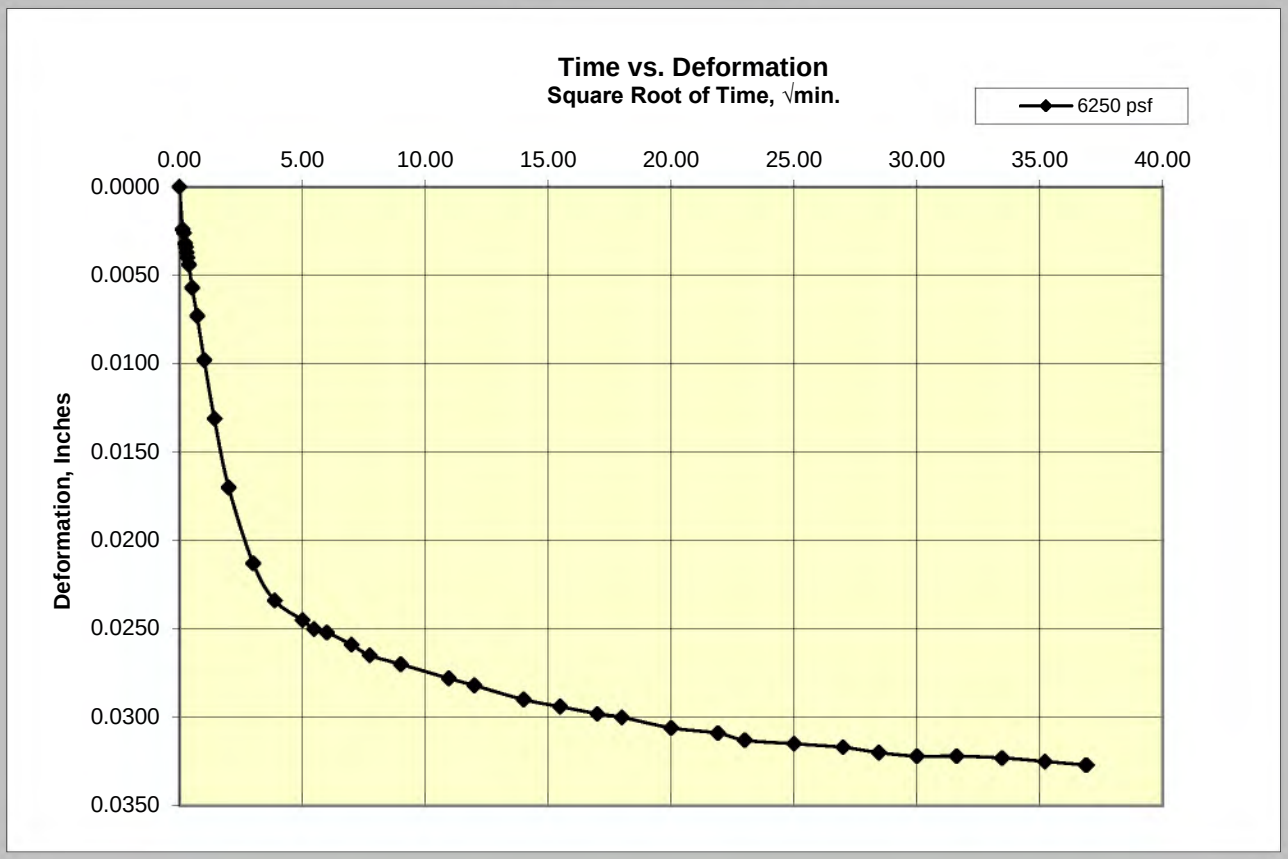


Cooper Testing Labs, Inc.

Load 9 | 6250 psf



6250 psf



Cooper Testing Labs, Inc.

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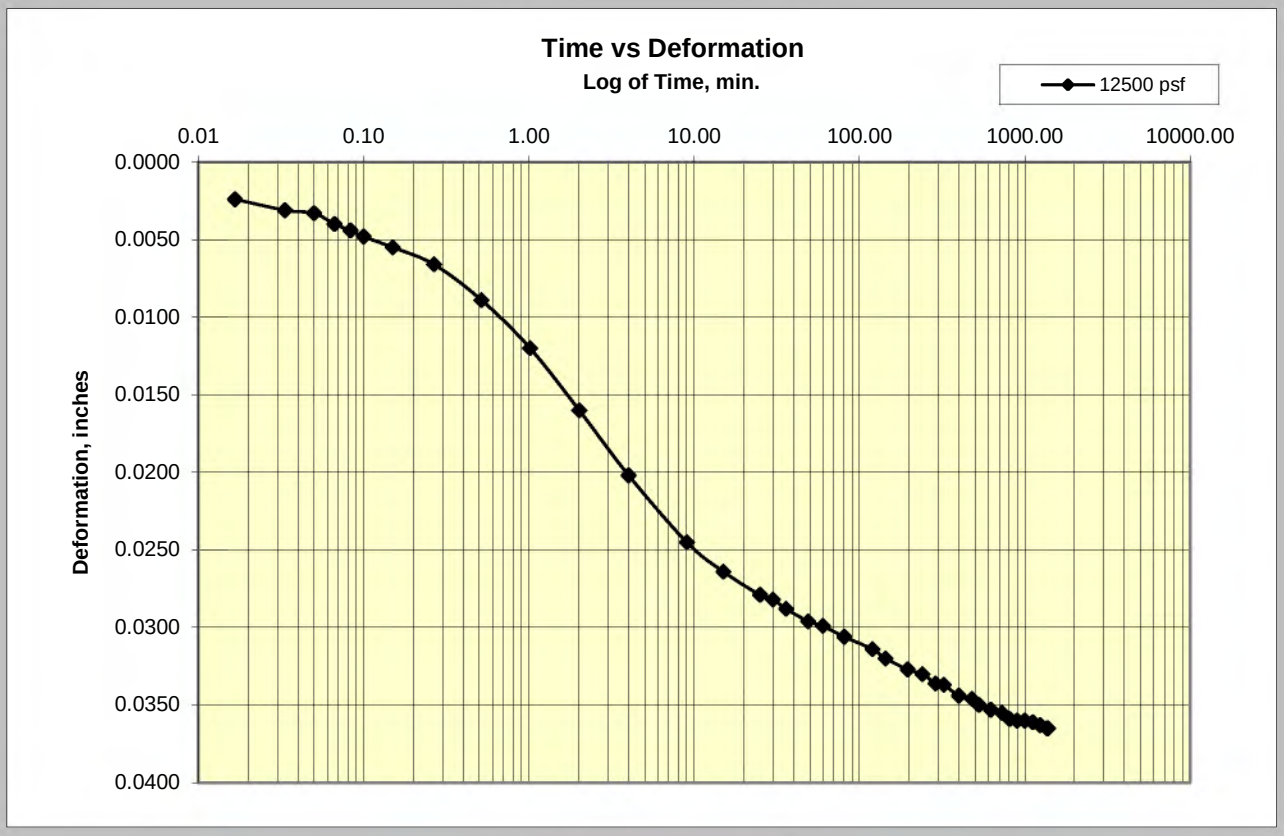
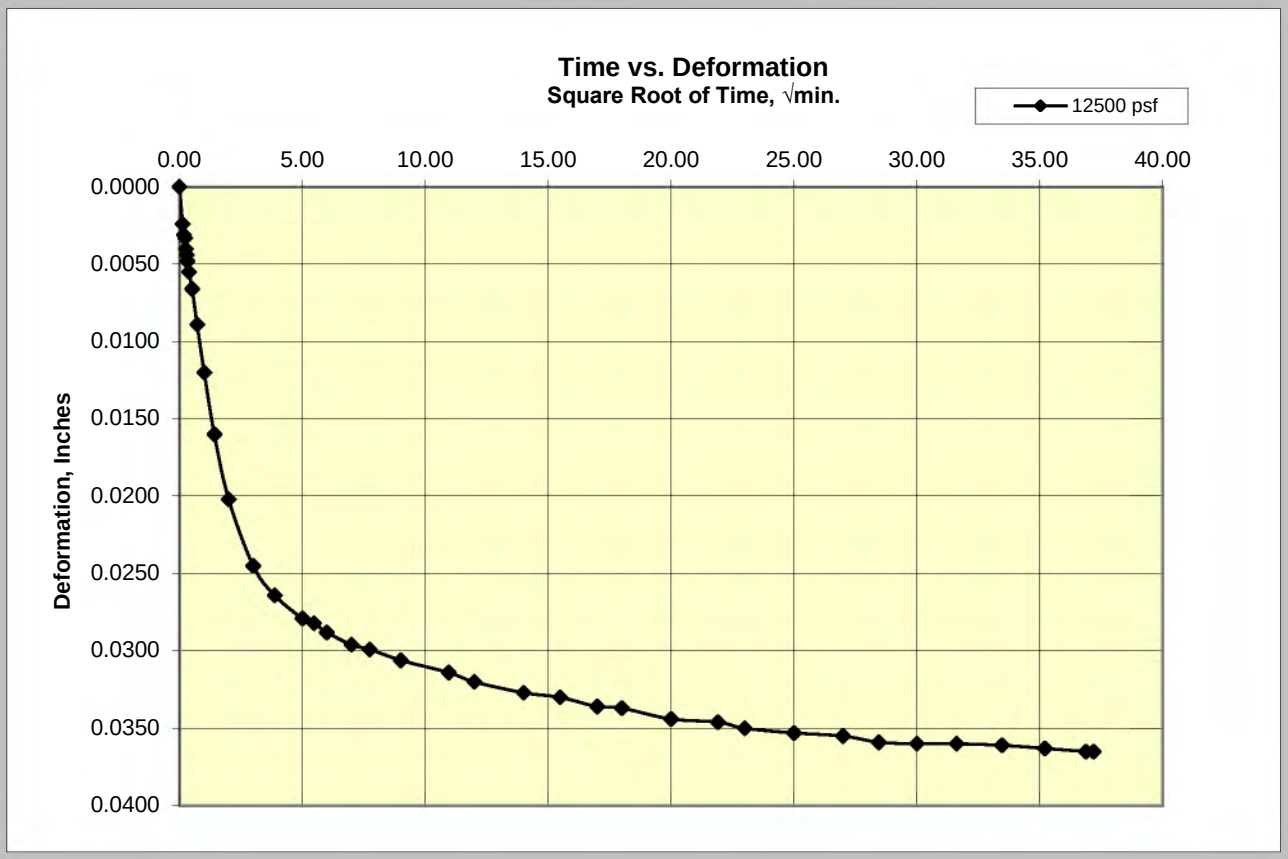


12500 psf



Cooper Testing Labs, Inc.

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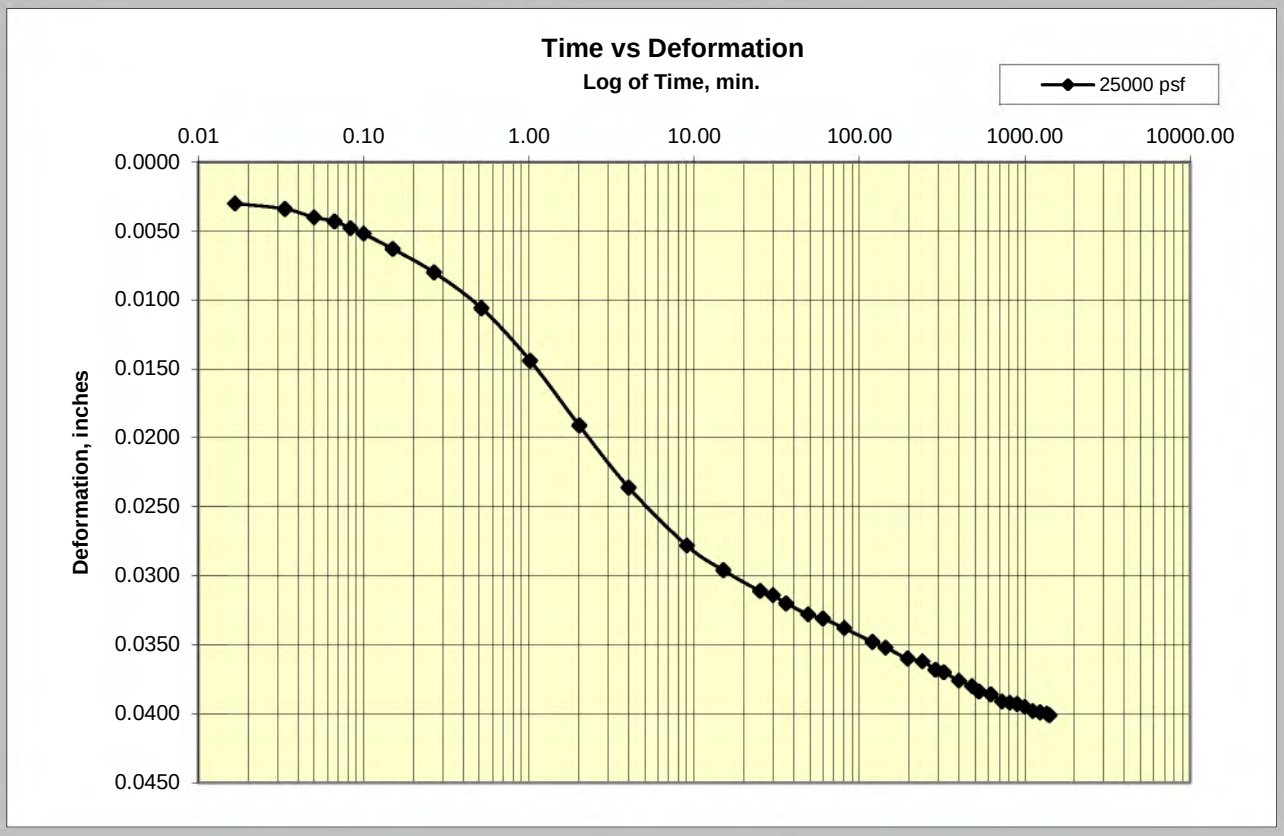
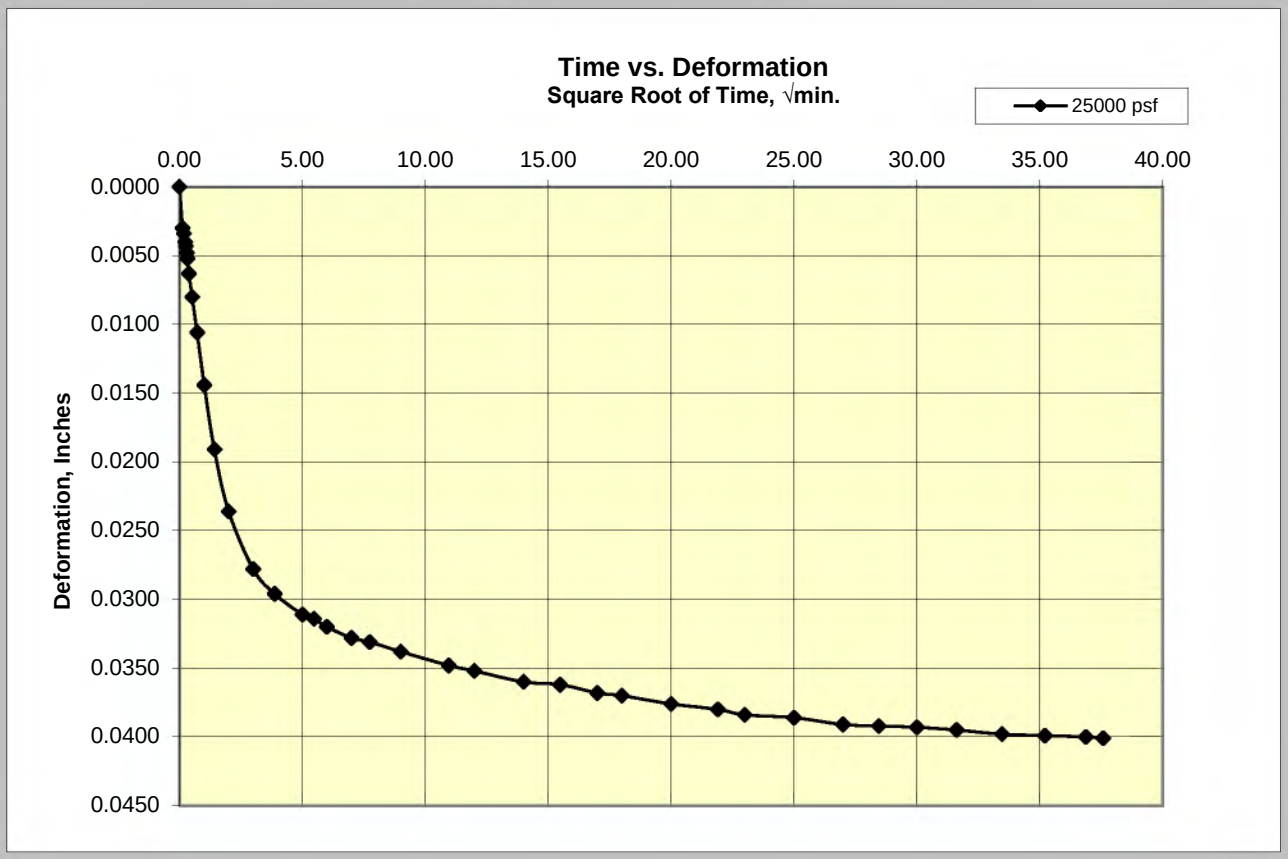


25000 psf



Cooper Testing Labs, Inc.

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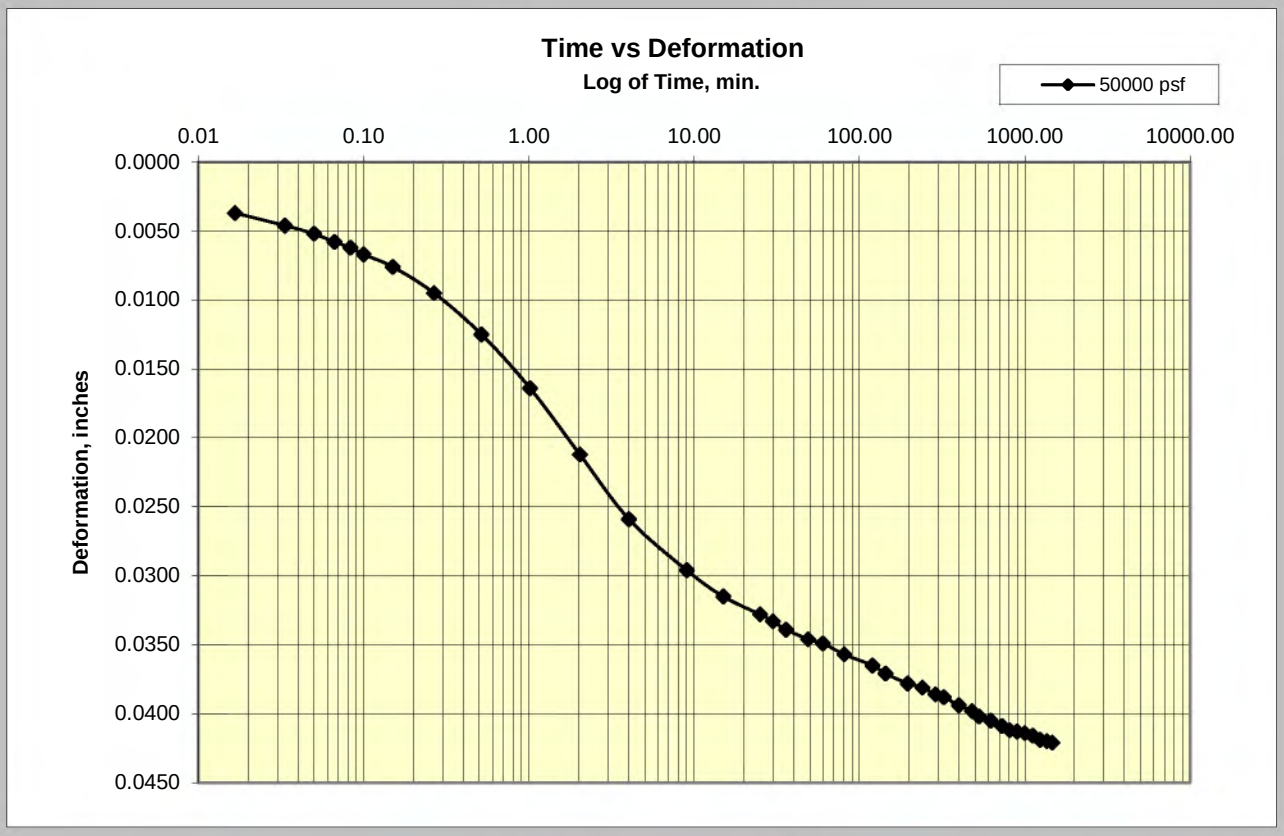
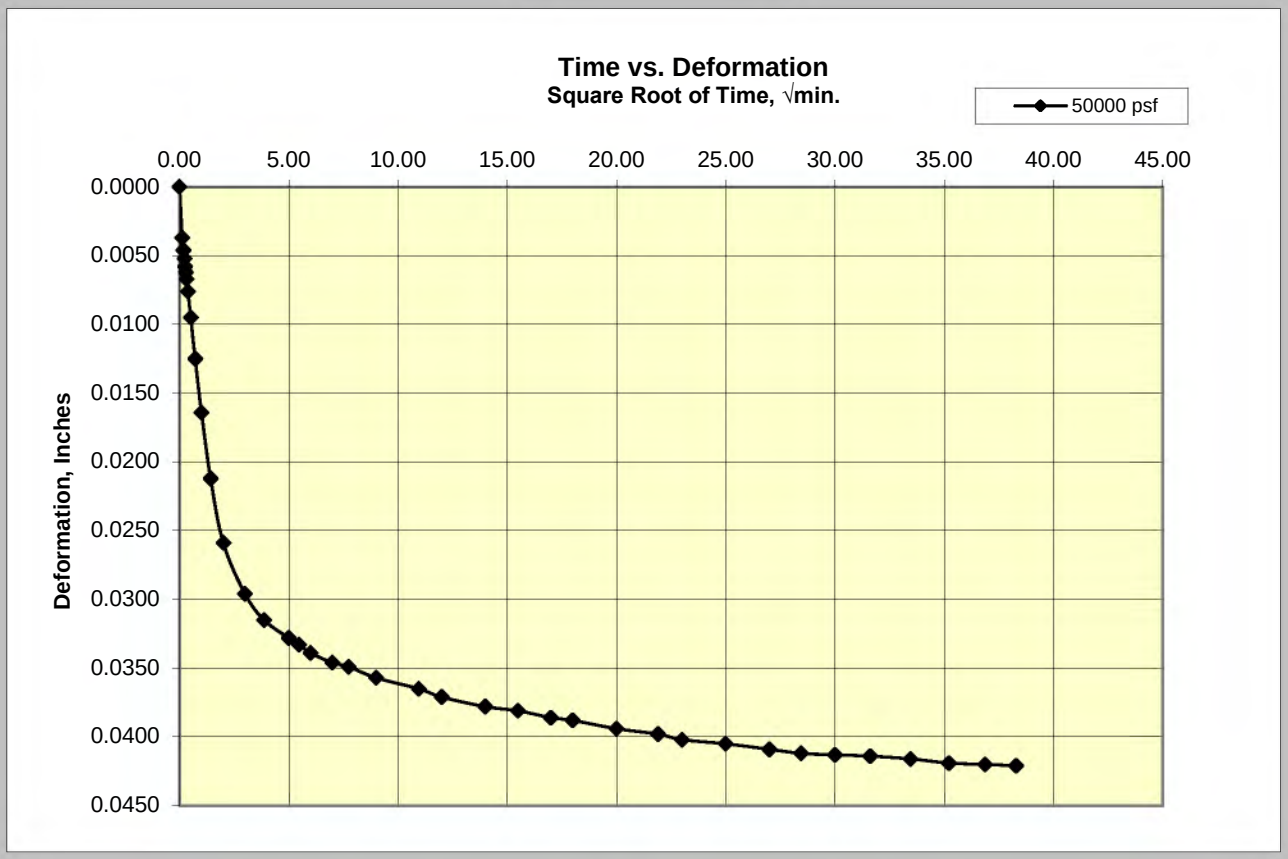
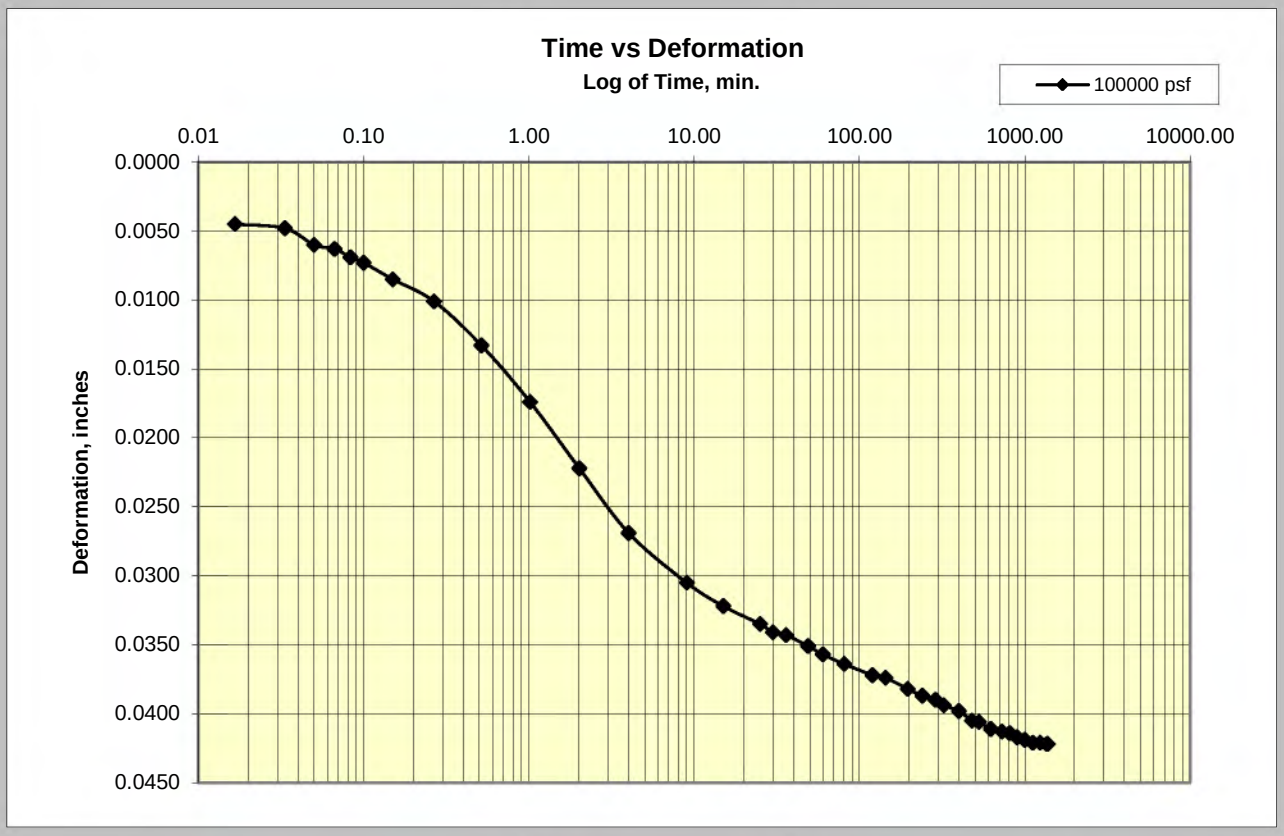


50000 psf

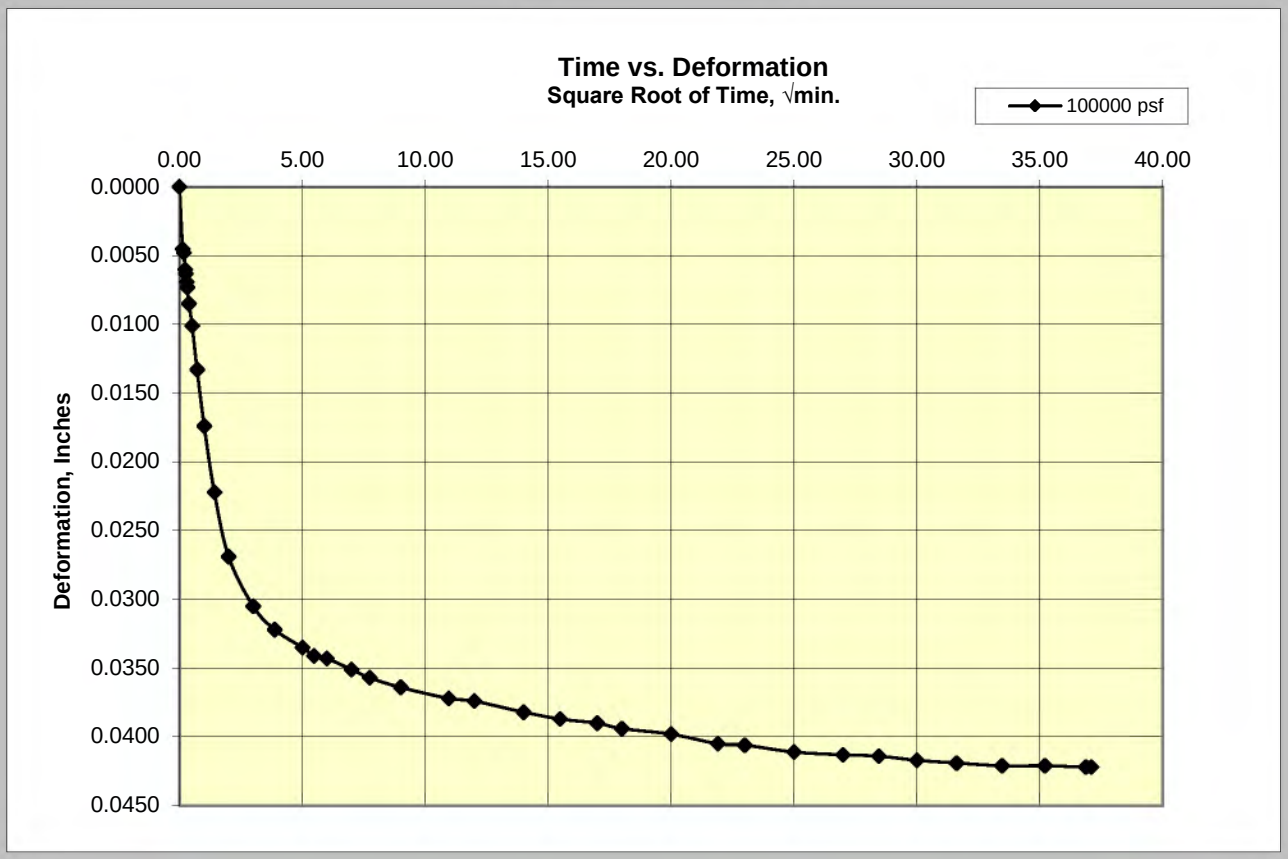


Cooper Testing Labs, Inc.

Load 13 | 100000 psf

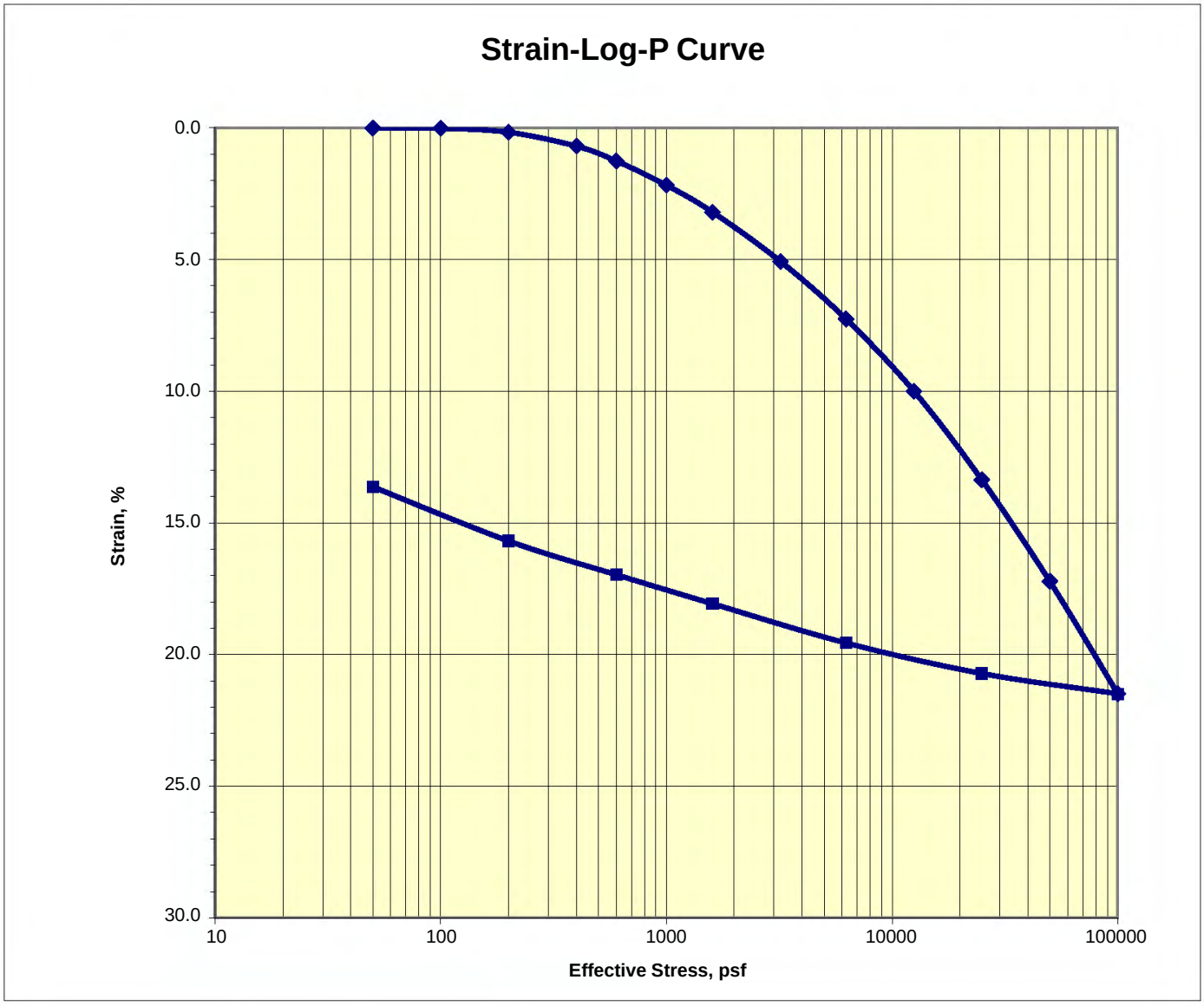


100000 psf



Consolidation Test
ASTM D2435

Job No.:	054-186	**Boring:**	22-B01	**Run By:**	MD
Client:	SHN Engineers	**Sample:**	S11	**Reduced:**	PJ
Project:	022054.400	**Depth, ft.:**	50.5-51	**Checked:**	PJ/DC
Soil Type:	Dark Greenish Gray Lean CLAY			**Date:**	7/29/2022

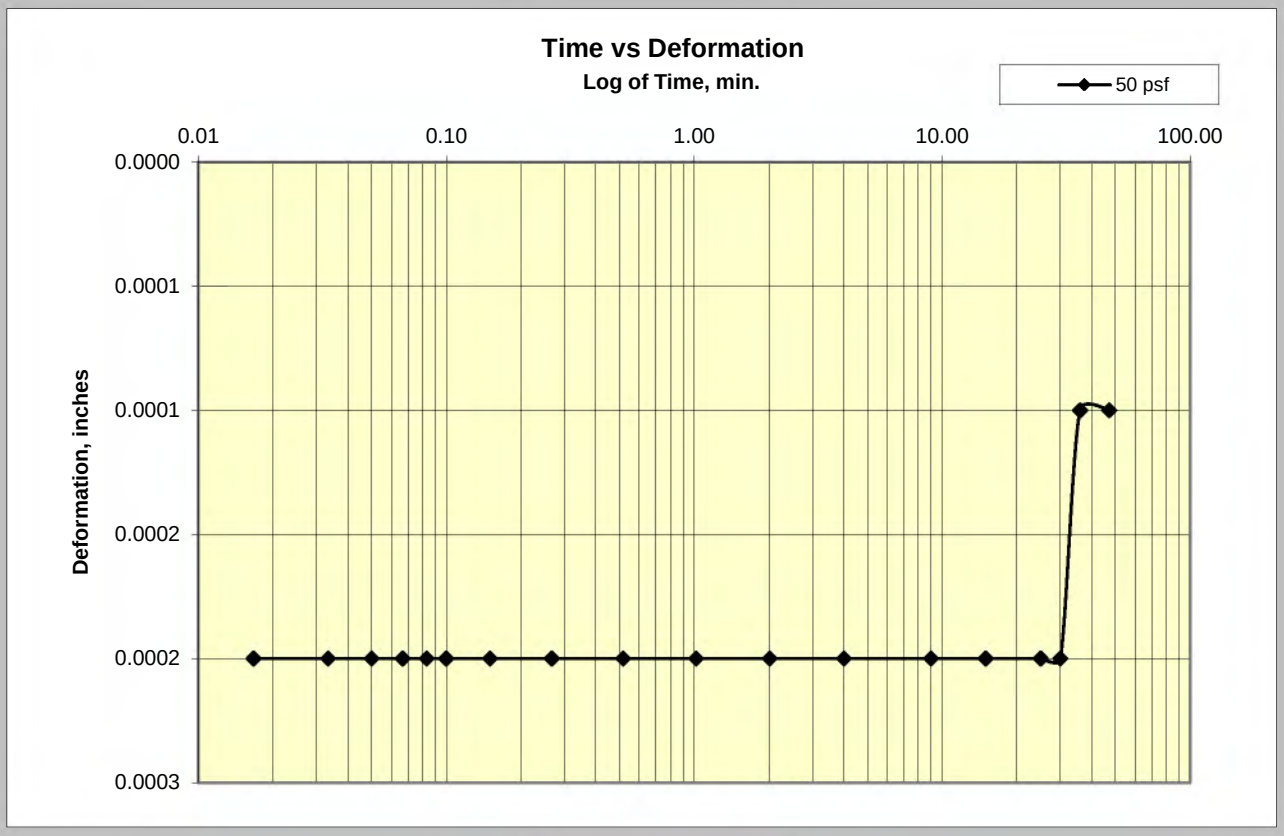


Assumed Gs 2.7	Initial	Final
Moisture %:	29.4	21.6
Dry Density, pcf:	91.5	106.5
Void Ratio:	0.843	0.583
% Saturation:	94.1	100.0

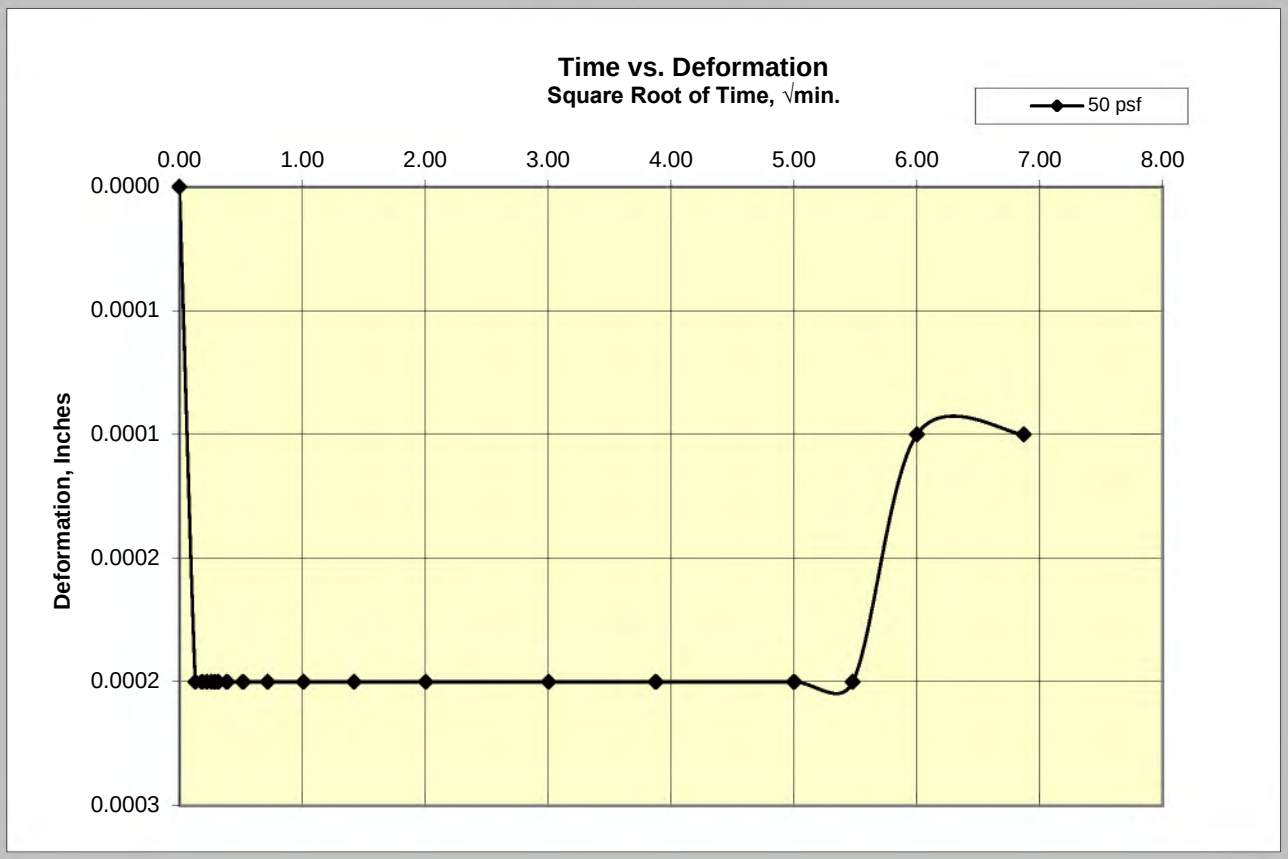
Remarks:

Cooper Testing Labs, Inc.

Load 1 | 50 psf

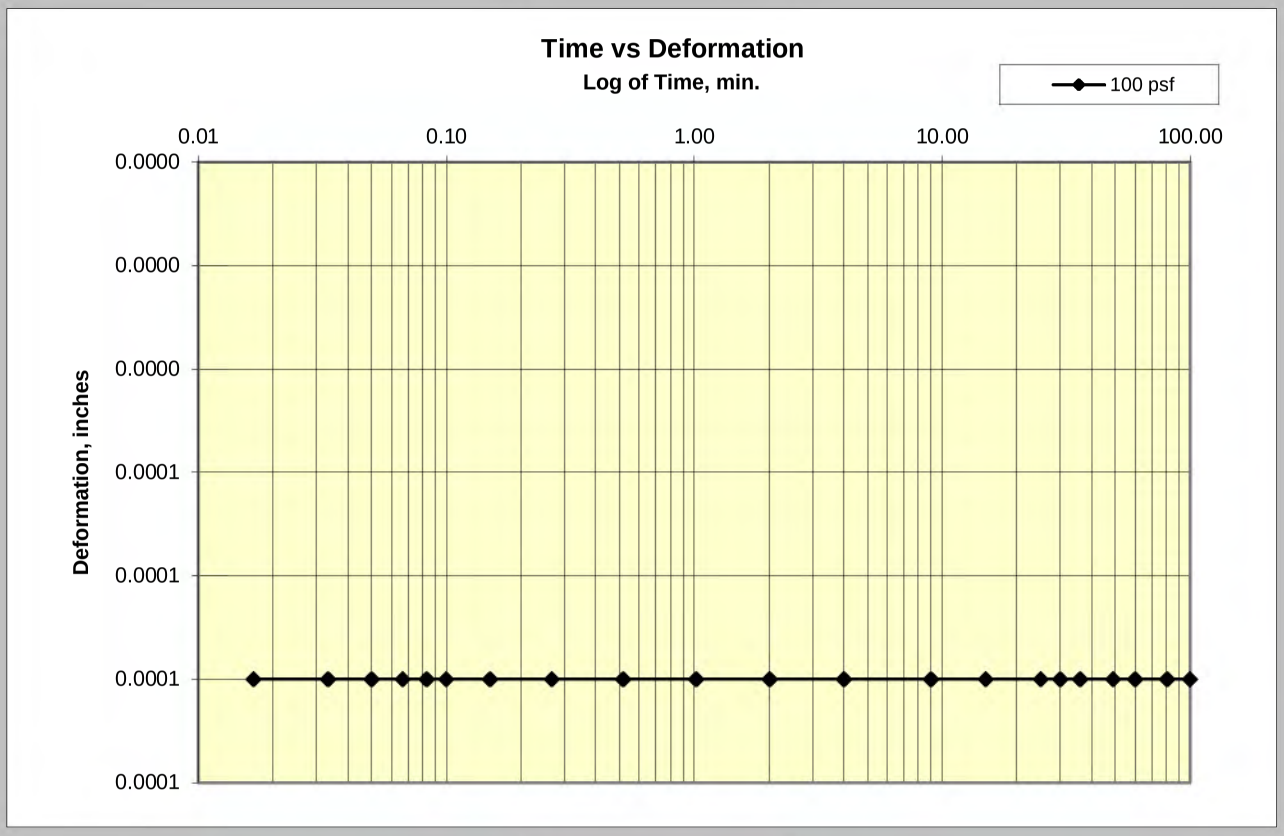


50 psf

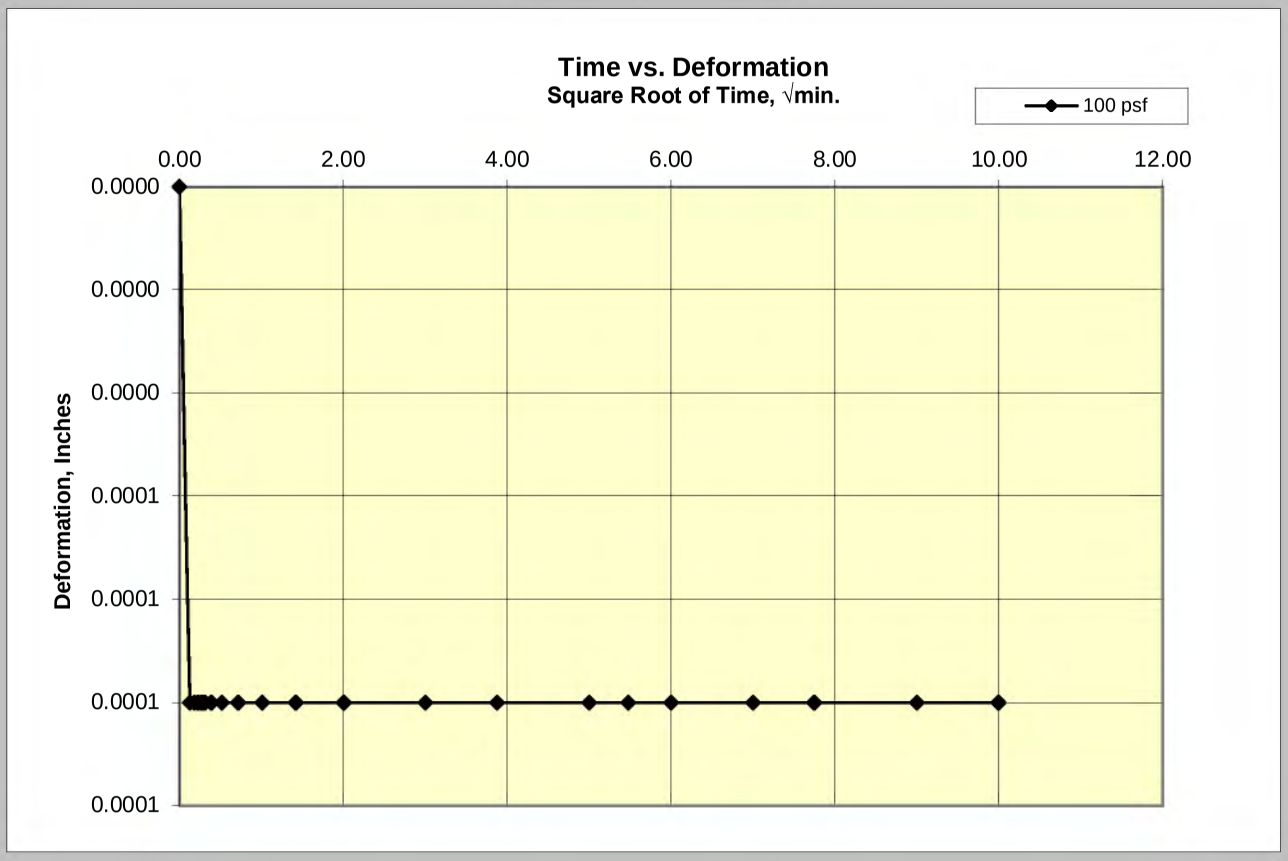


Cooper Testing Labs, Inc.

Load 2 | 100 psf



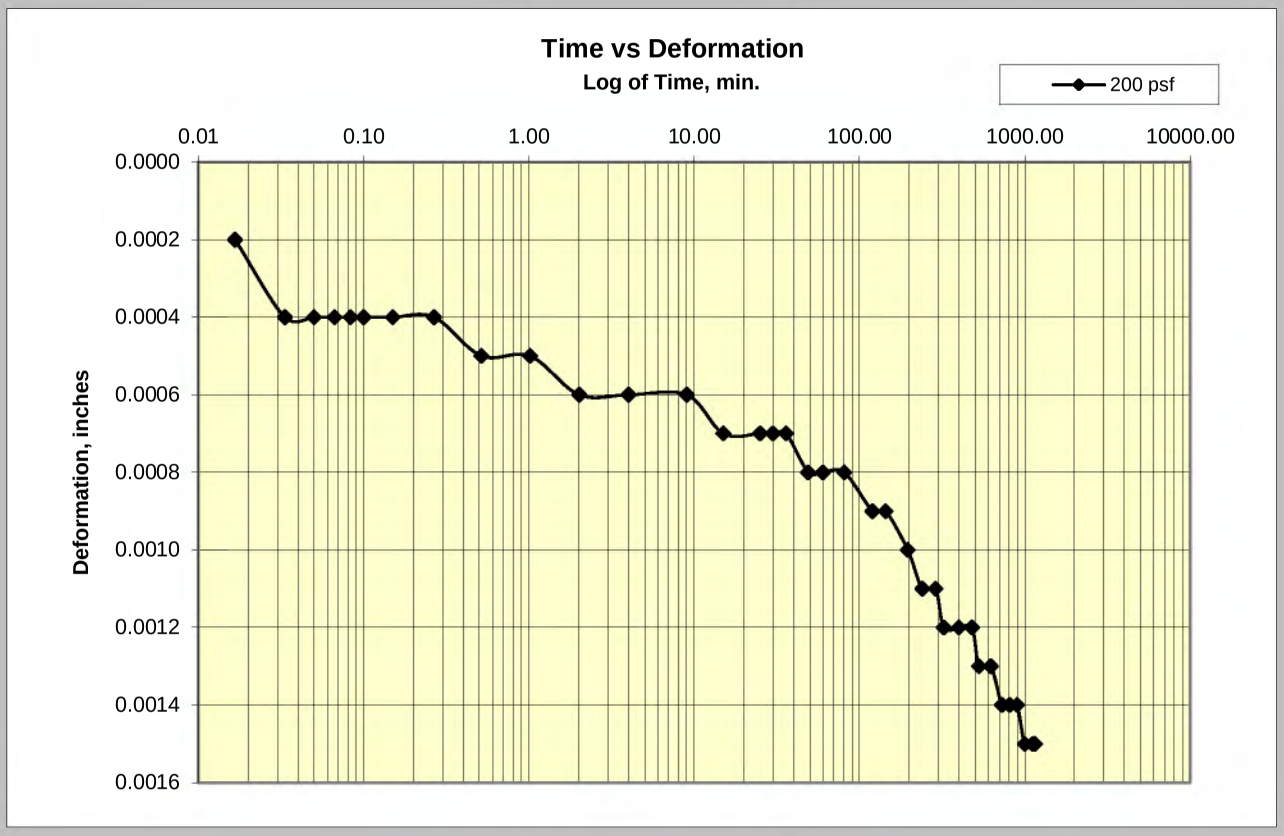
100 psf



Cooper Testing Labs, Inc.

Load 3

200 psf



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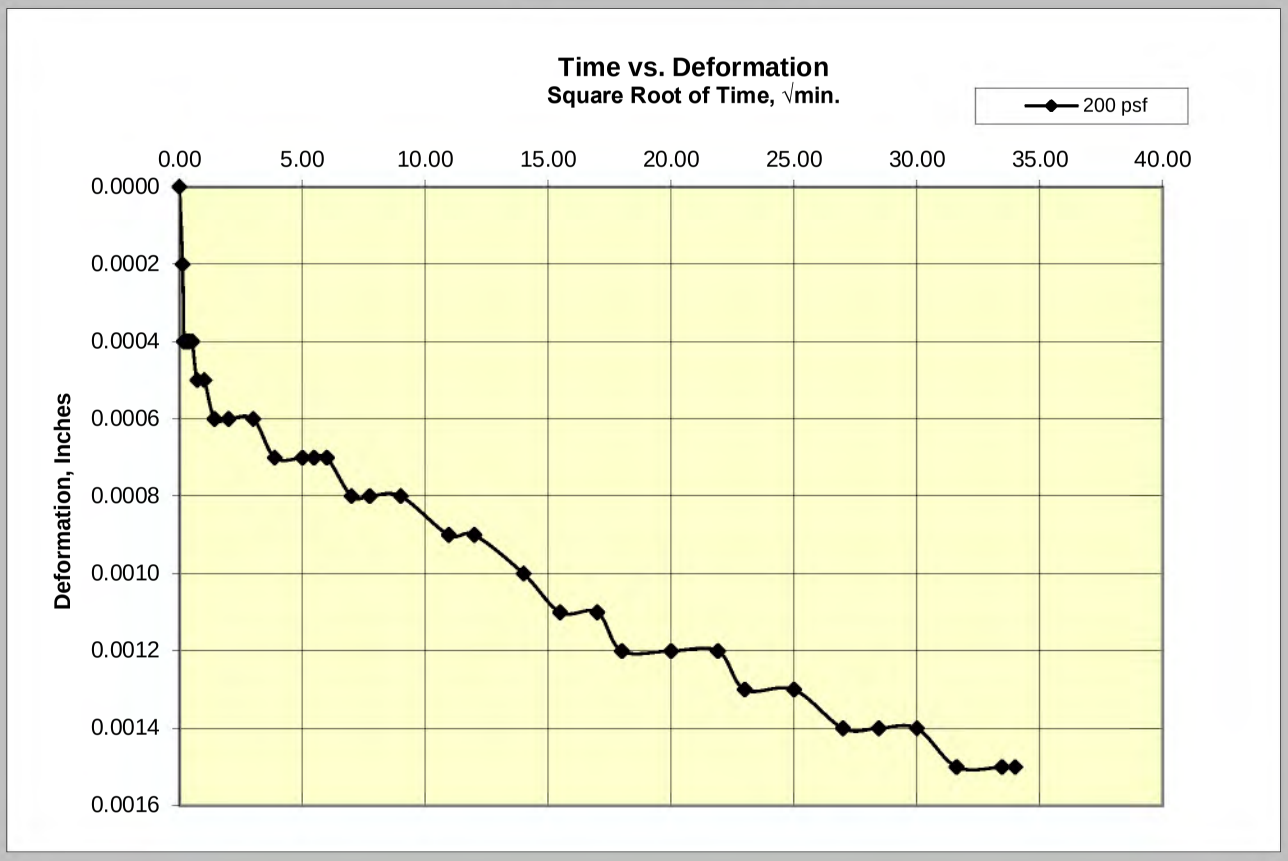
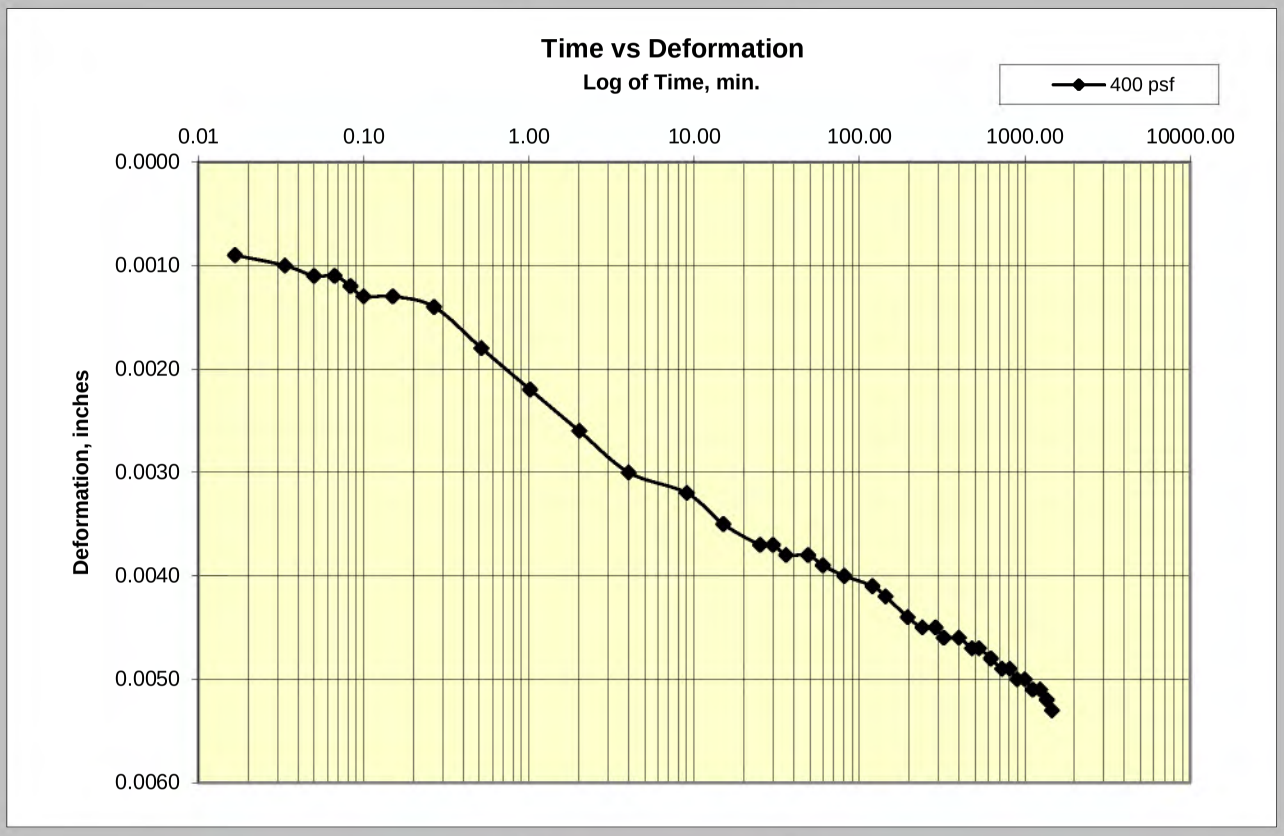
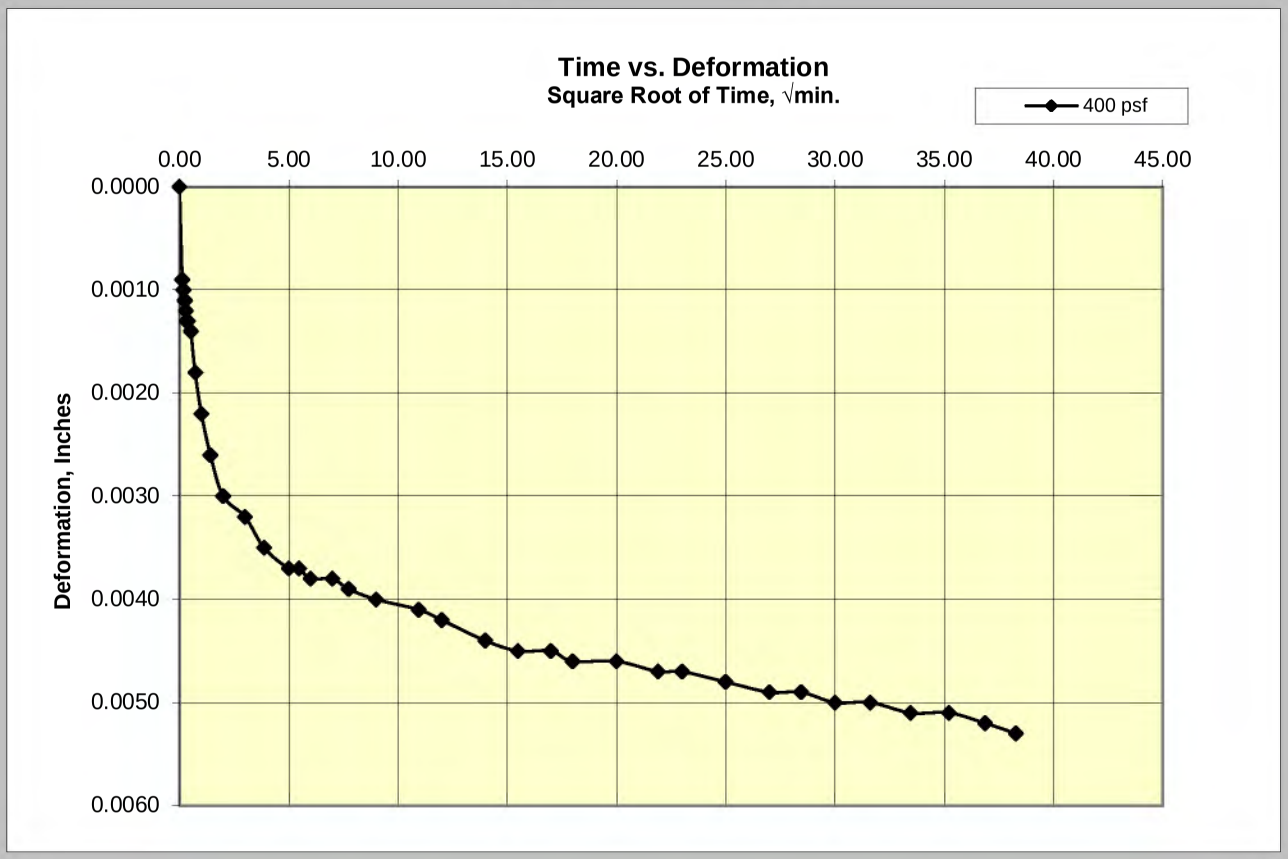


Cooper Testing Labs, Inc.

Load 4 | 400 psf

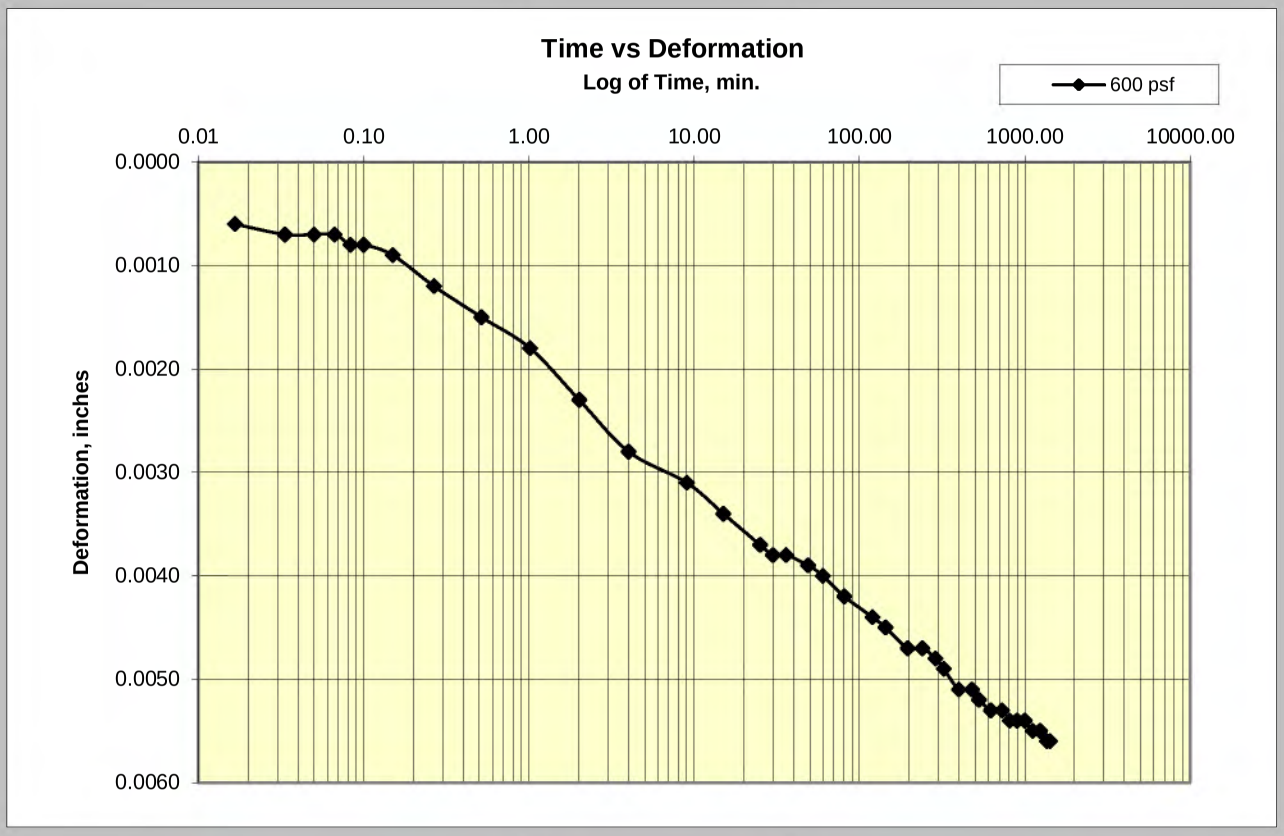


400 psf

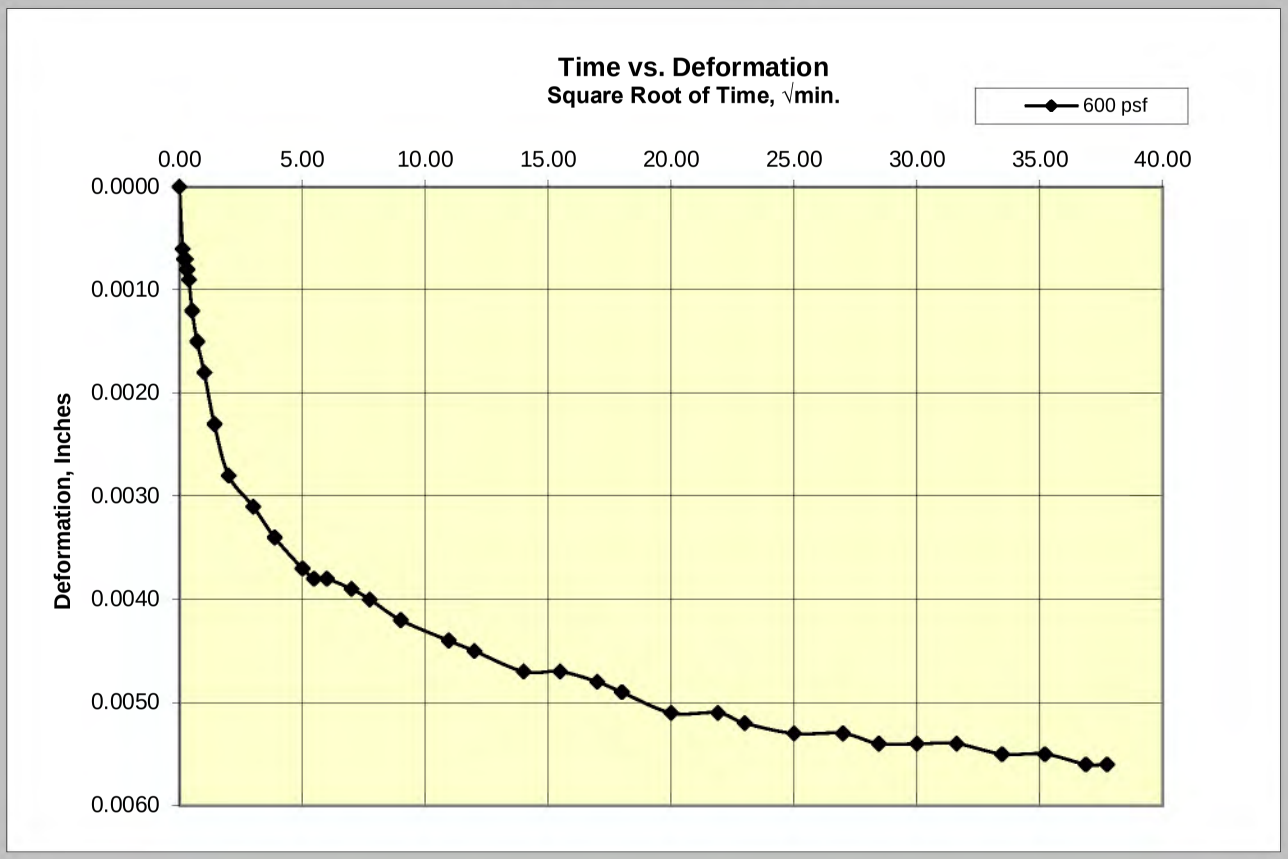


Cooper Testing Labs, Inc.

Load 5 | 600 psf

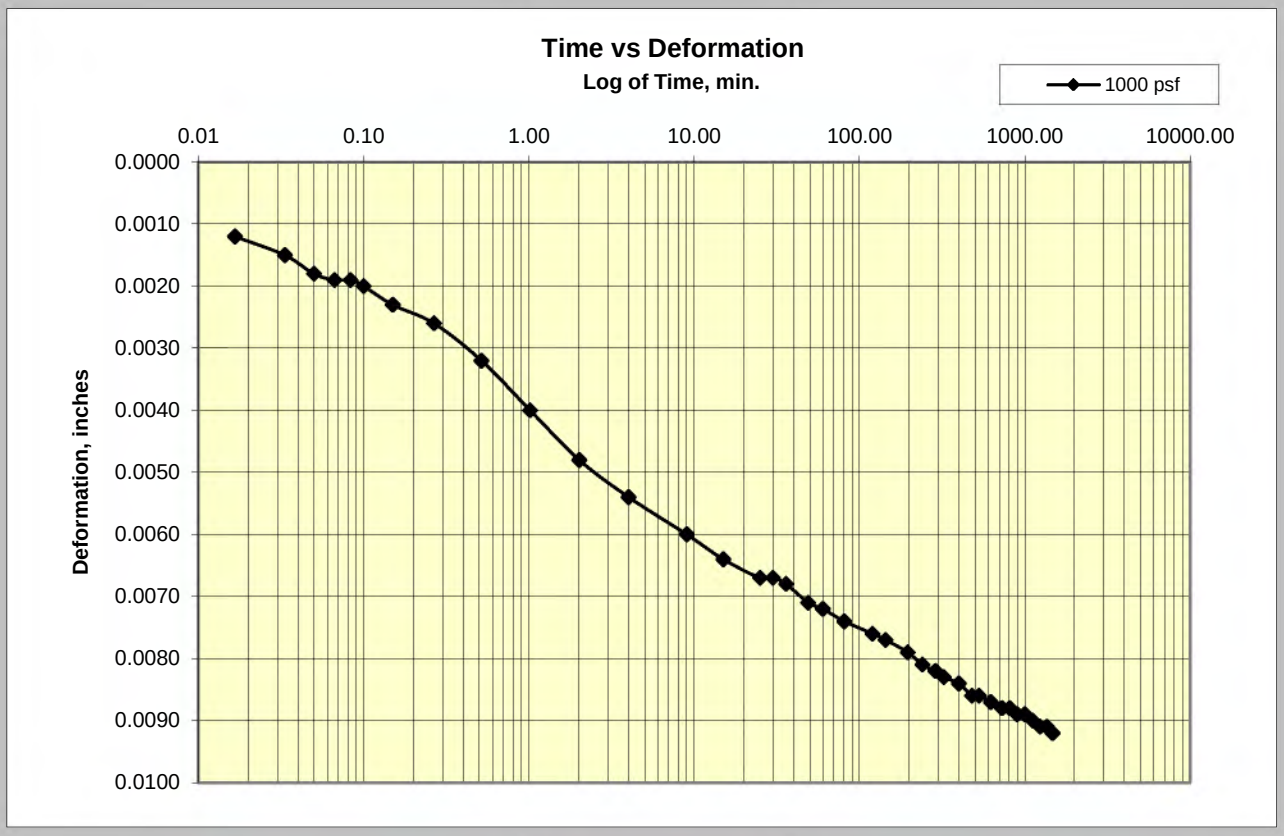


600 psf

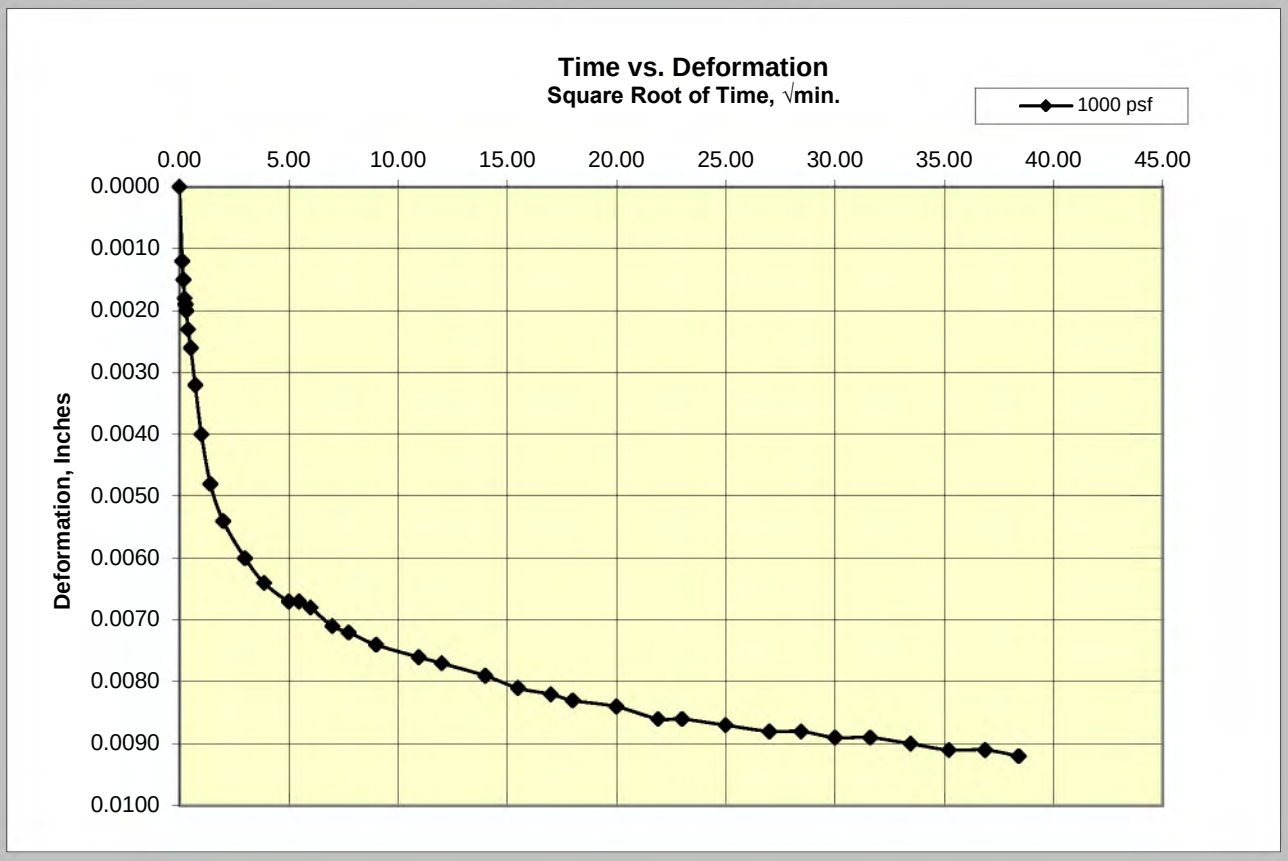


Cooper Testing Labs, Inc.

Load 6 | 1000 psf

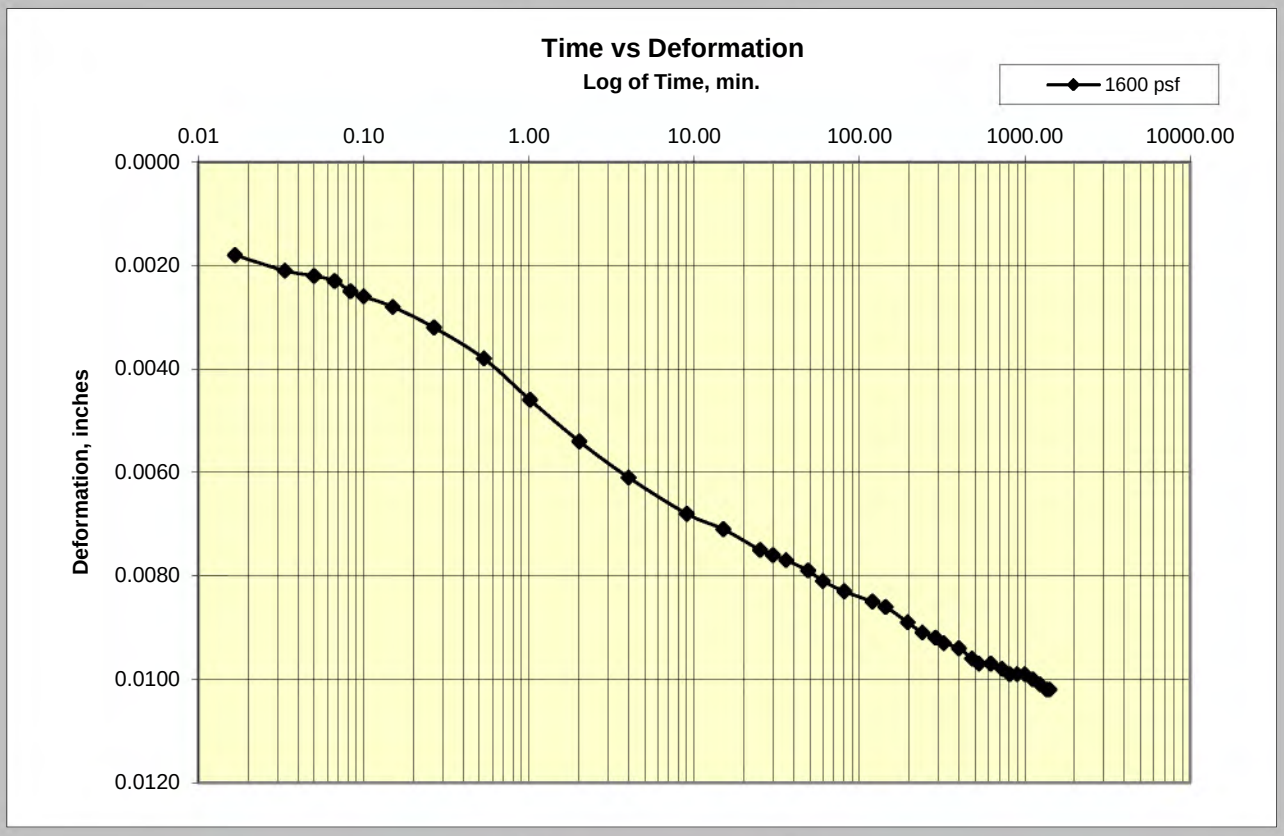


1000 psf

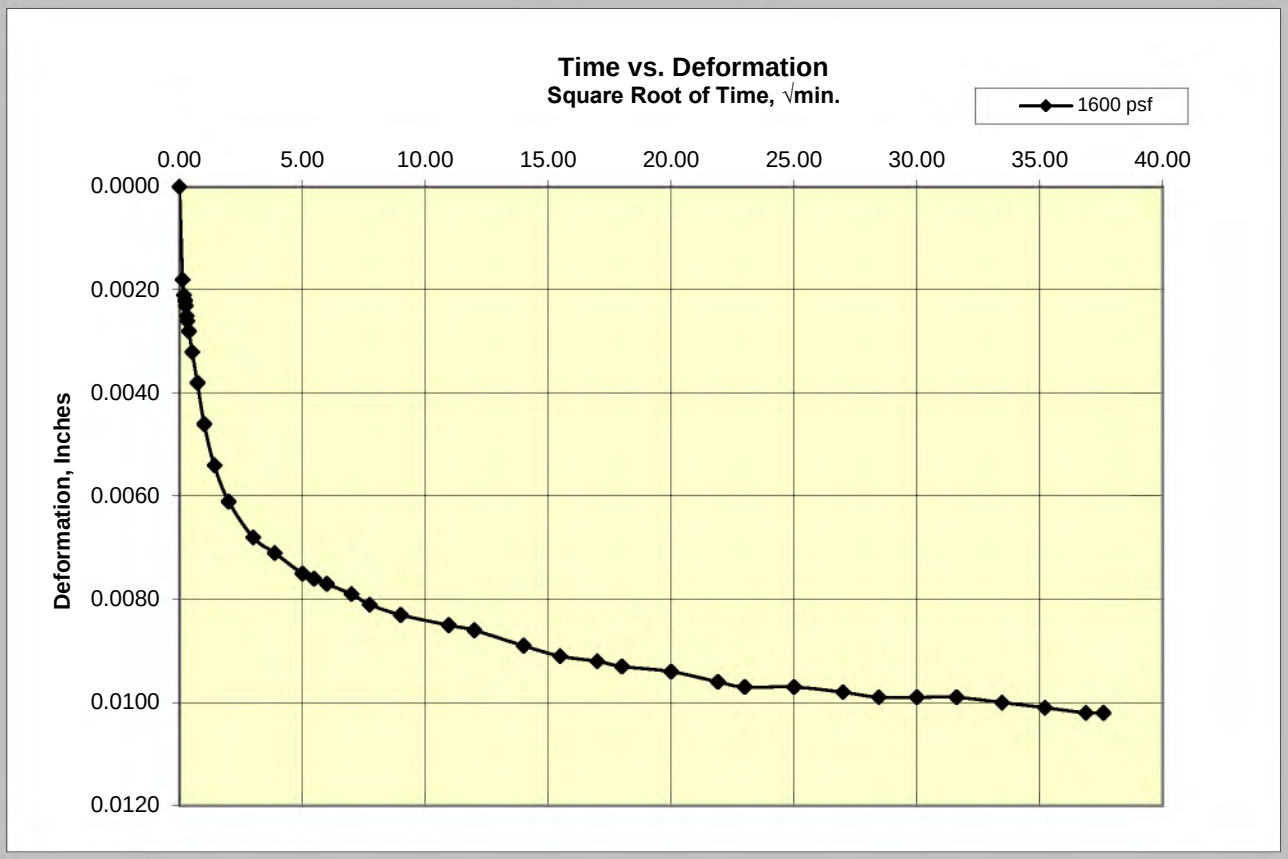


Cooper Testing Labs, Inc.

Load 7 | 1600 psf



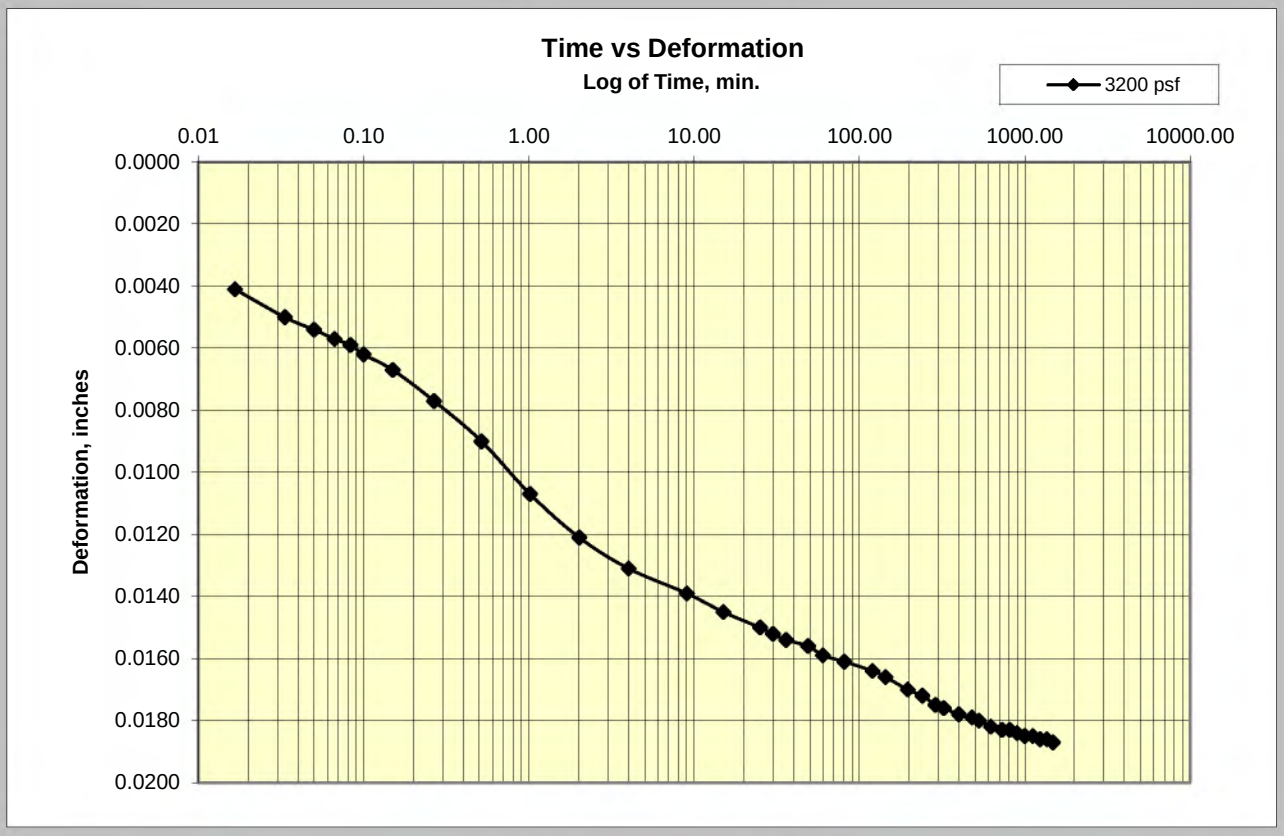
1600 psf



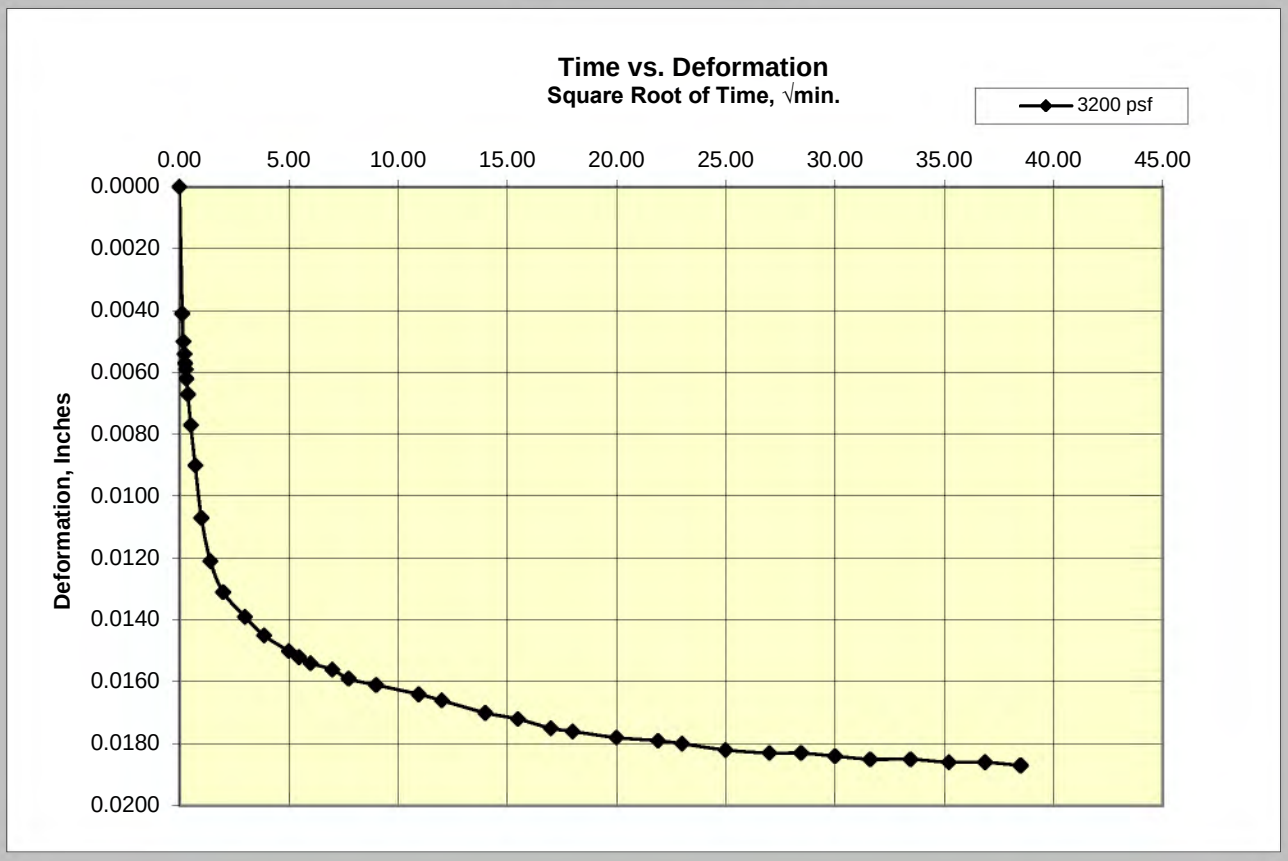
Cooper Testing Labs, Inc.

Load 8

3200 psf

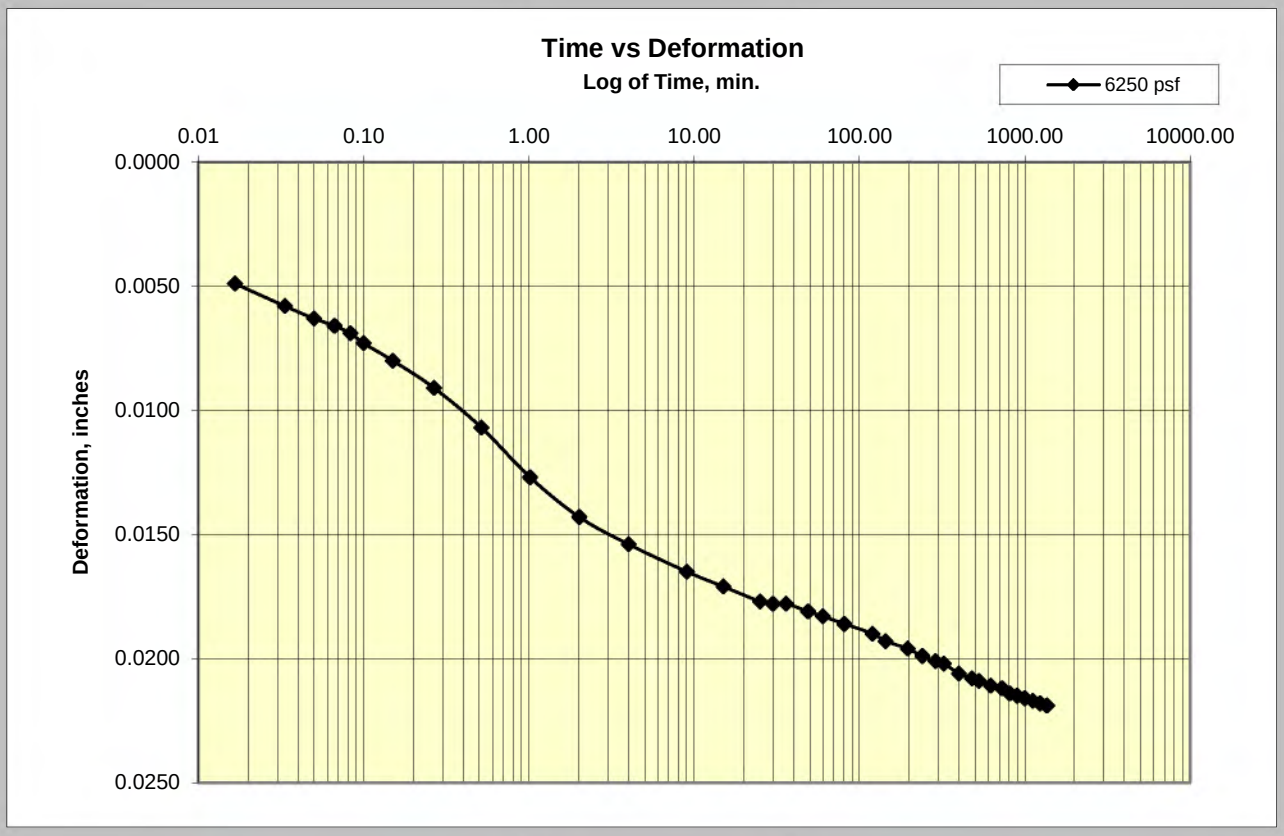


3200 psf

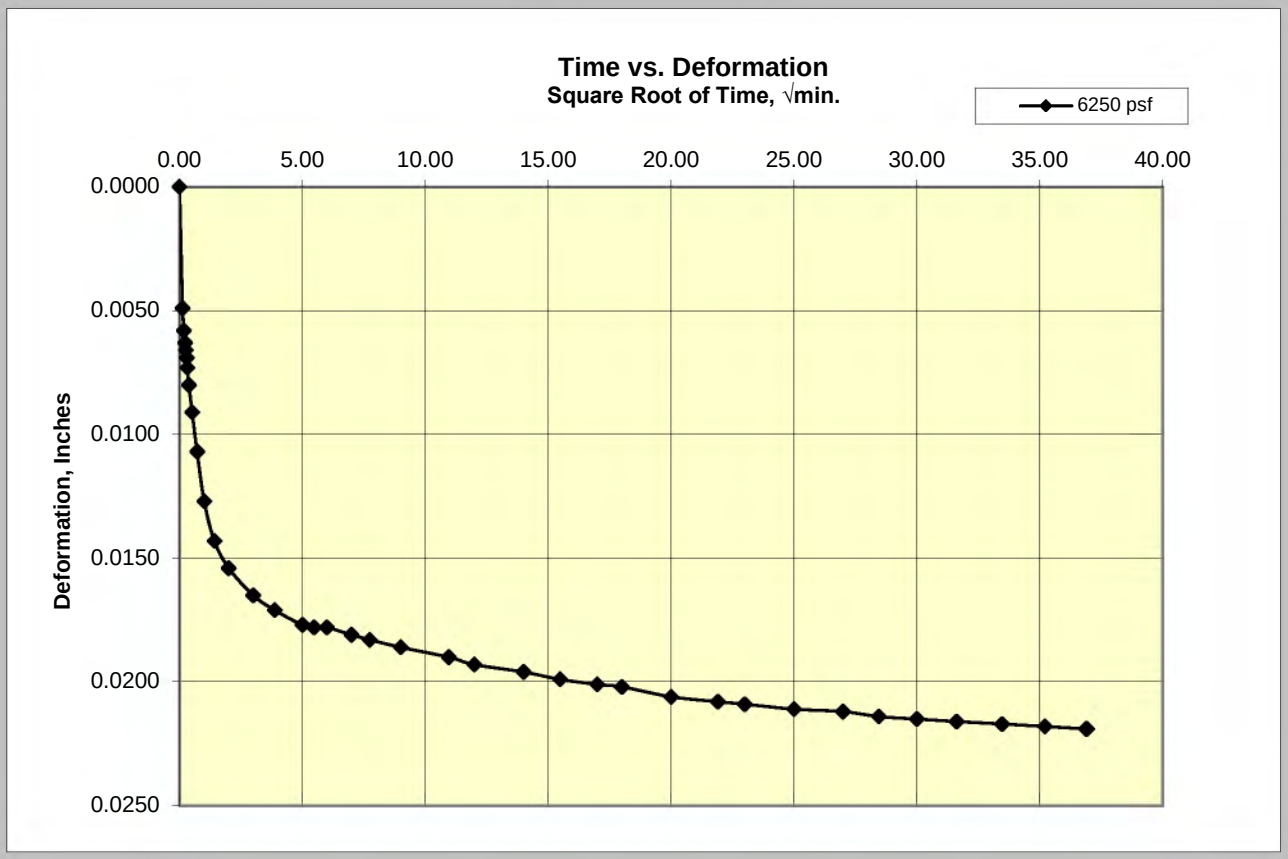


Cooper Testing Labs, Inc.

Load 9 | 6250 psf

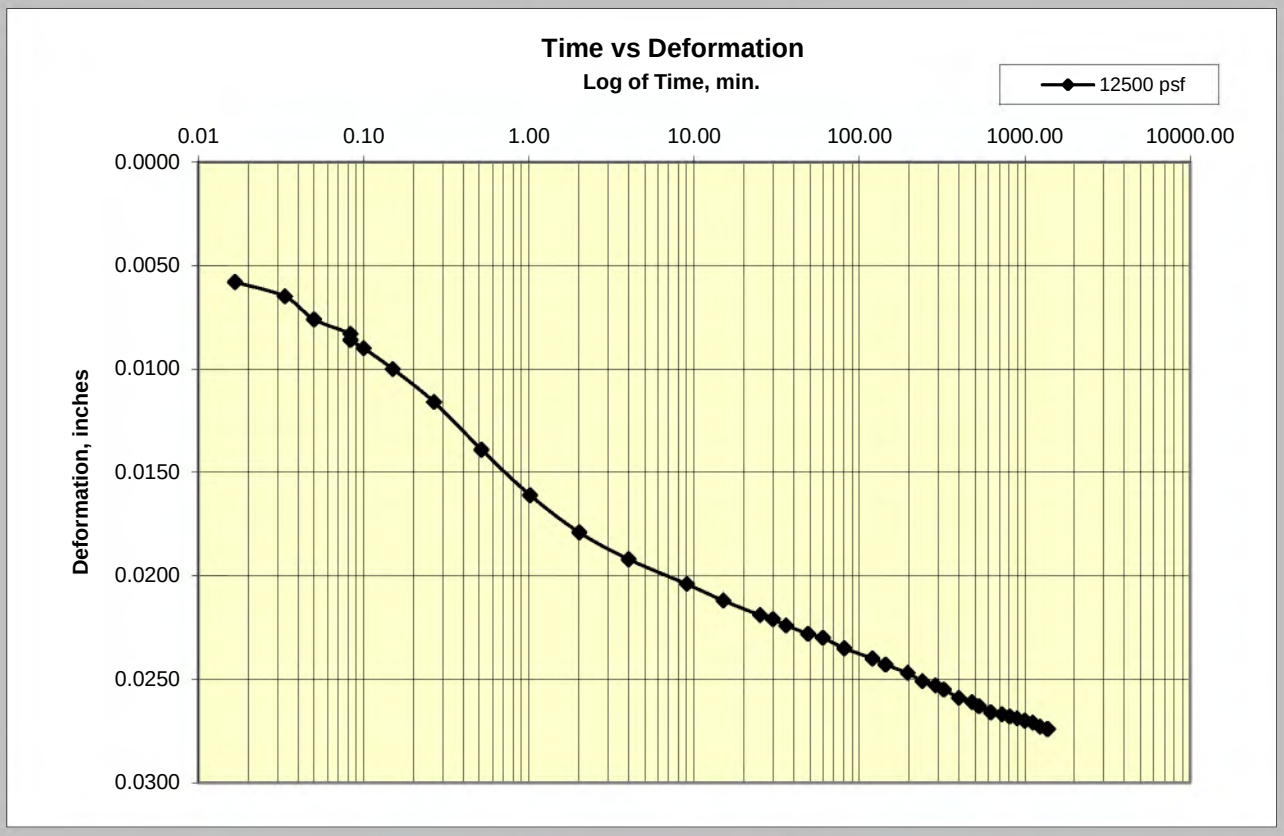


6250 psf

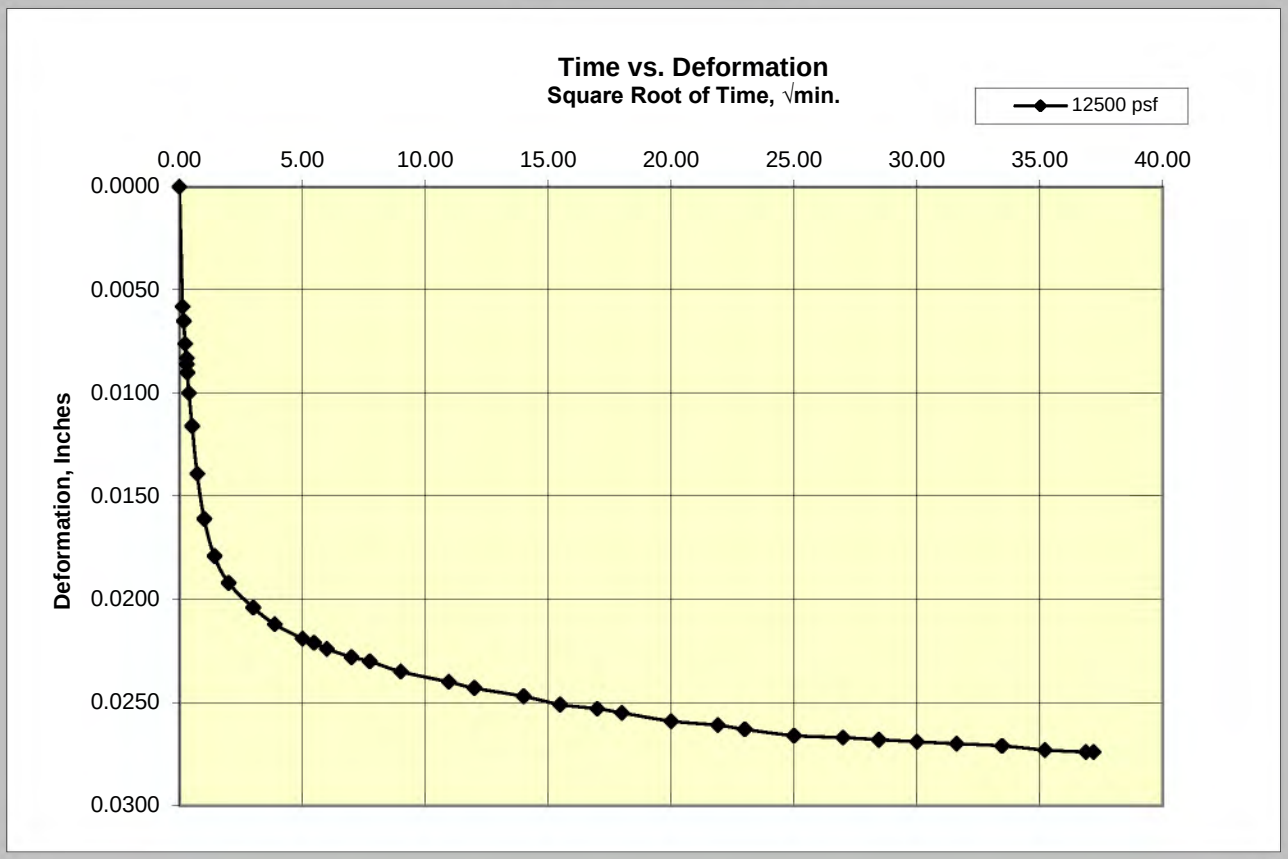


Cooper Testing Labs, Inc.

Load 10 | 12500 psf

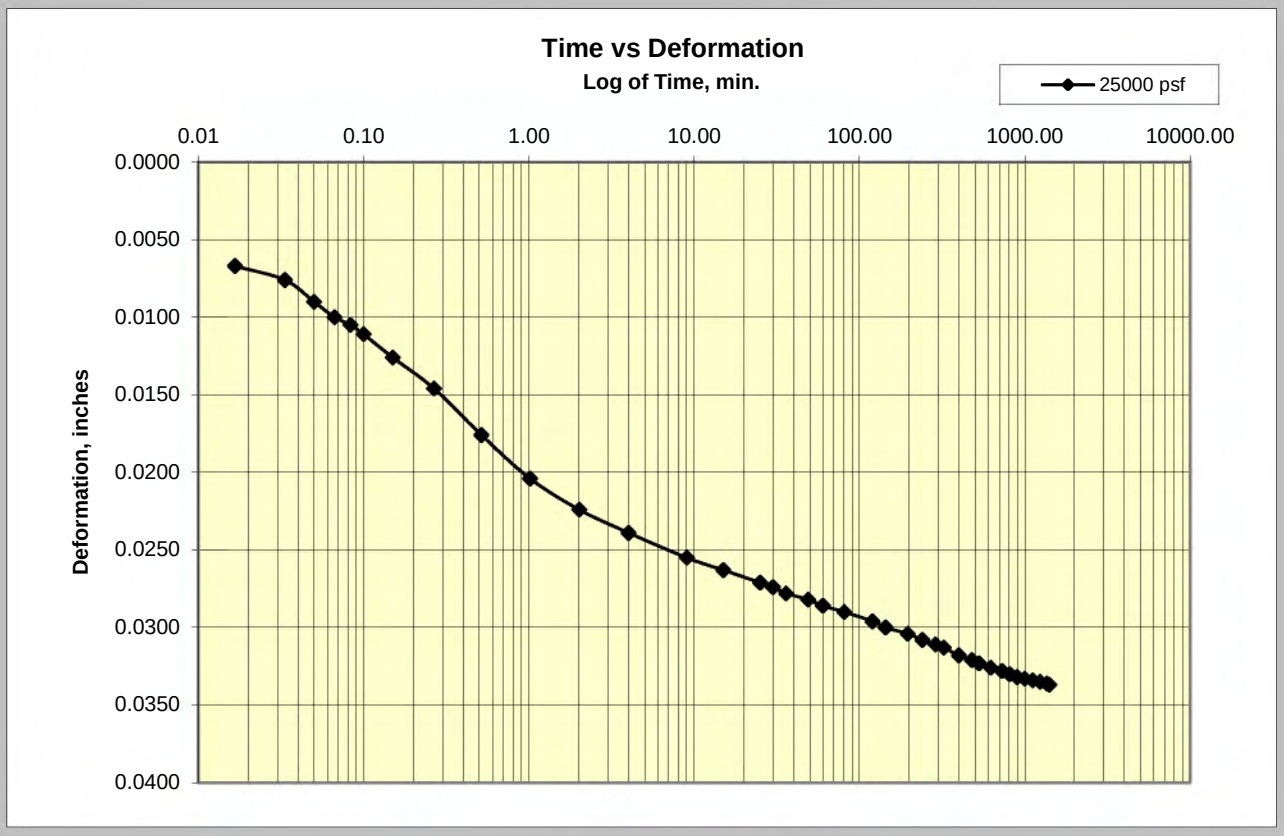


12500 psf

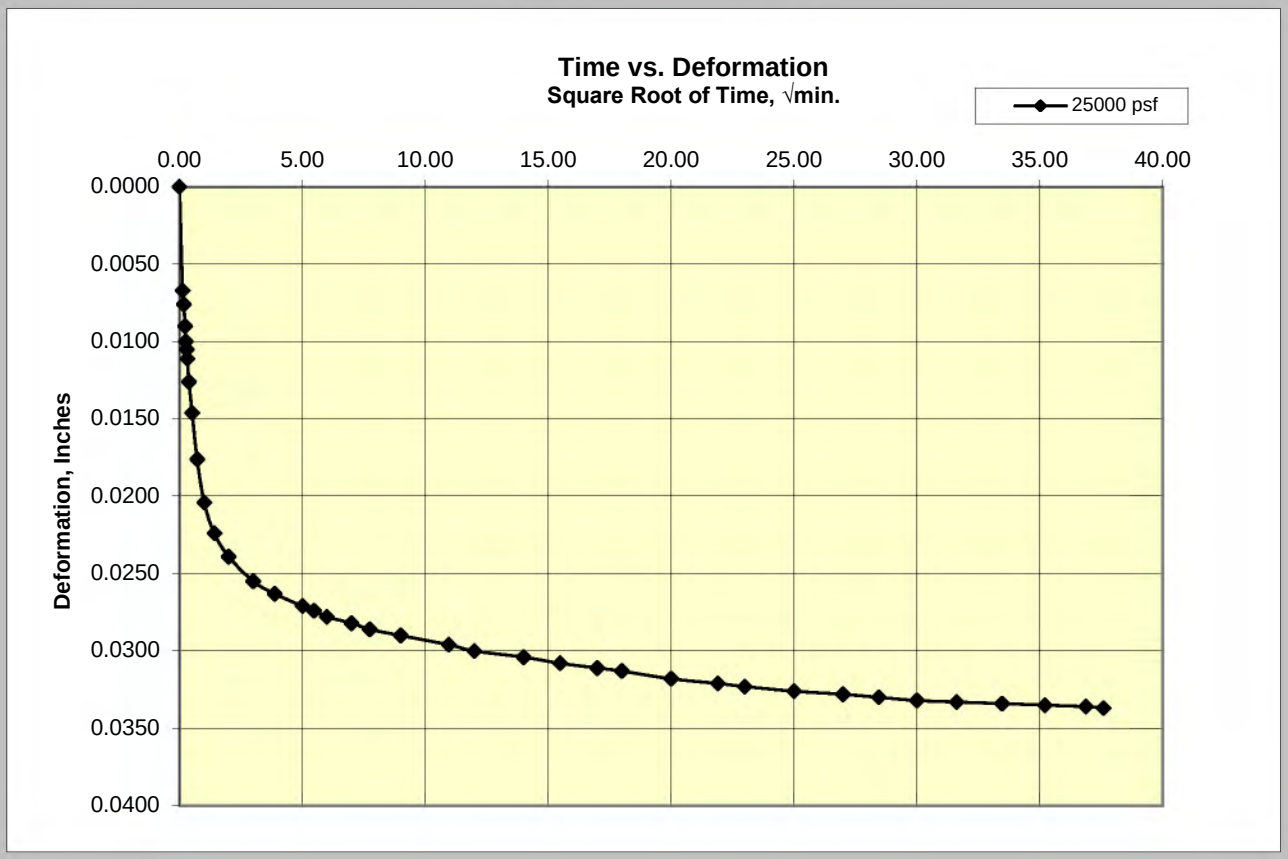


Cooper Testing Labs, Inc.

Load 11 | 25000 psf

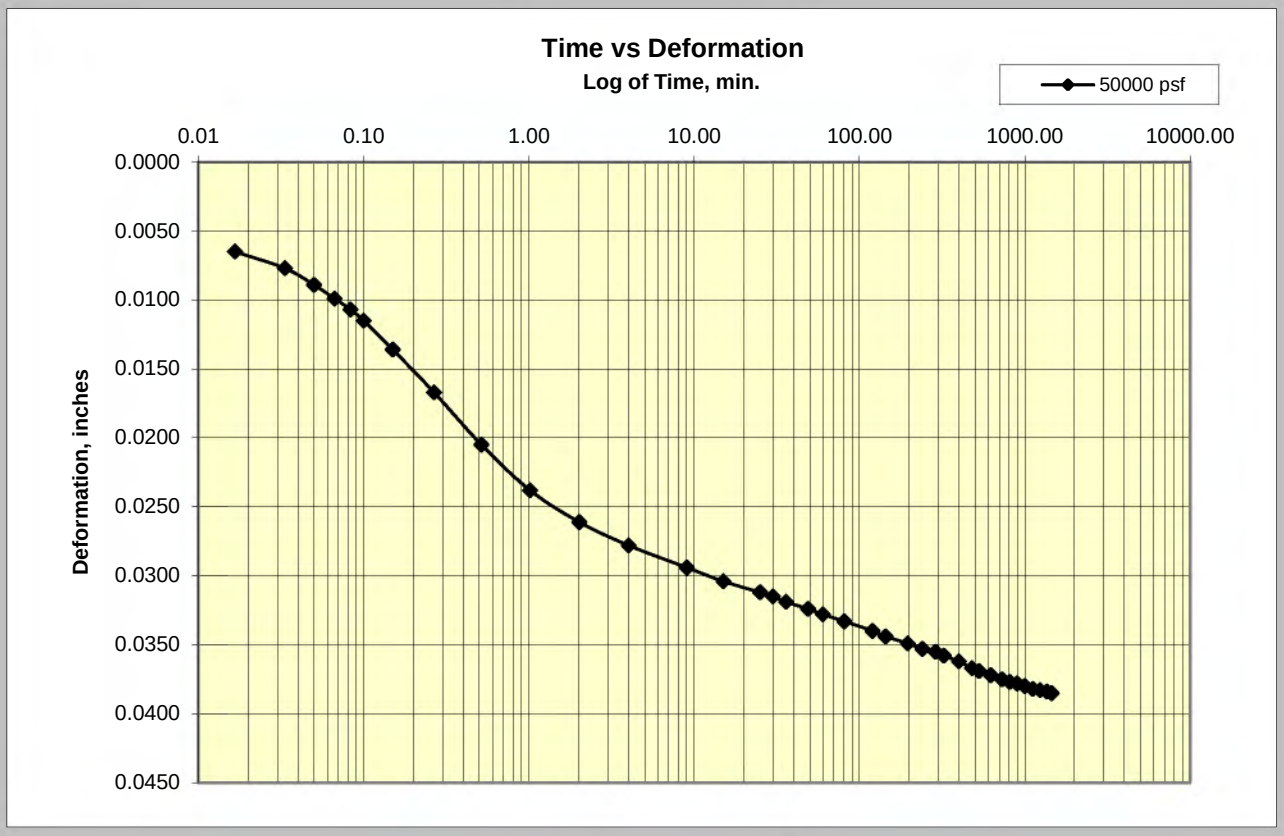


25000 psf

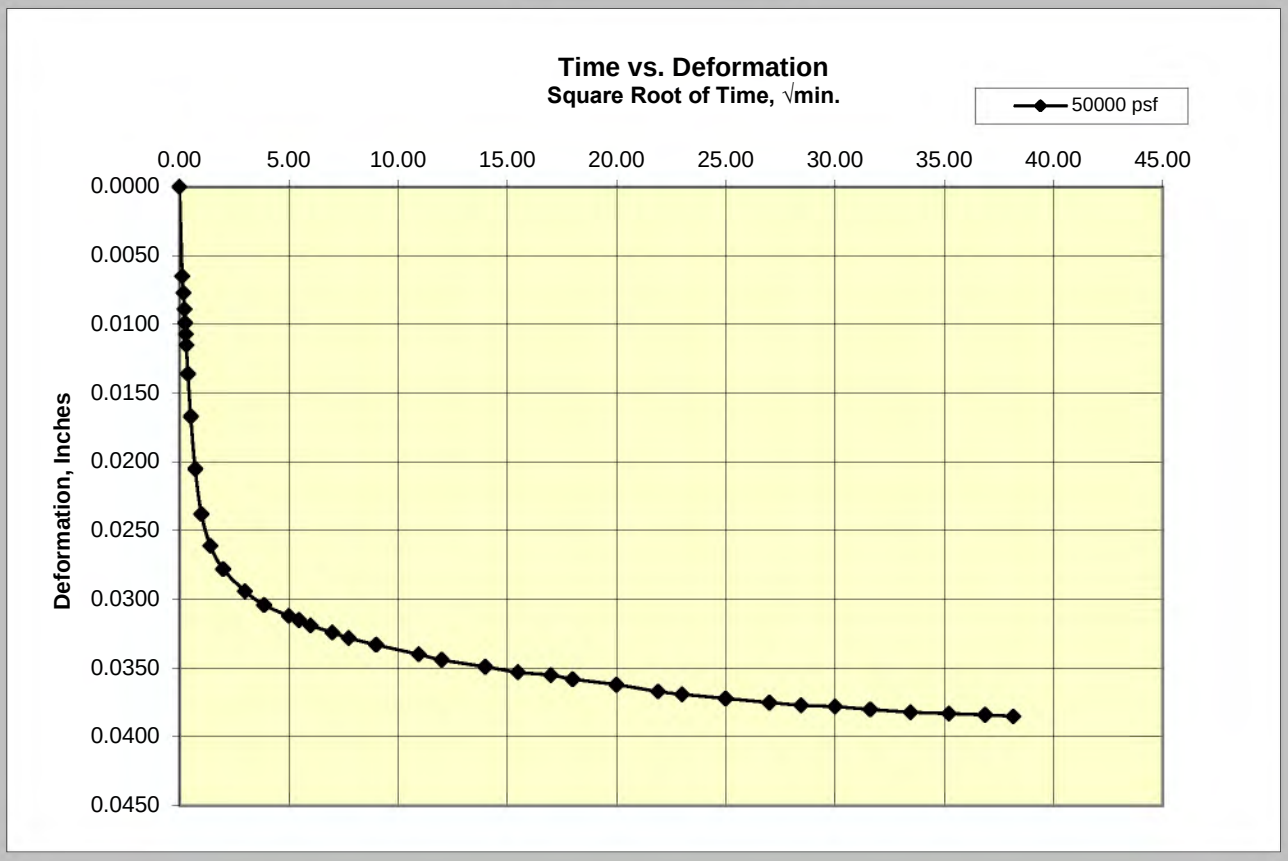


Cooper Testing Labs, Inc.

Load 12 | 50000 psf

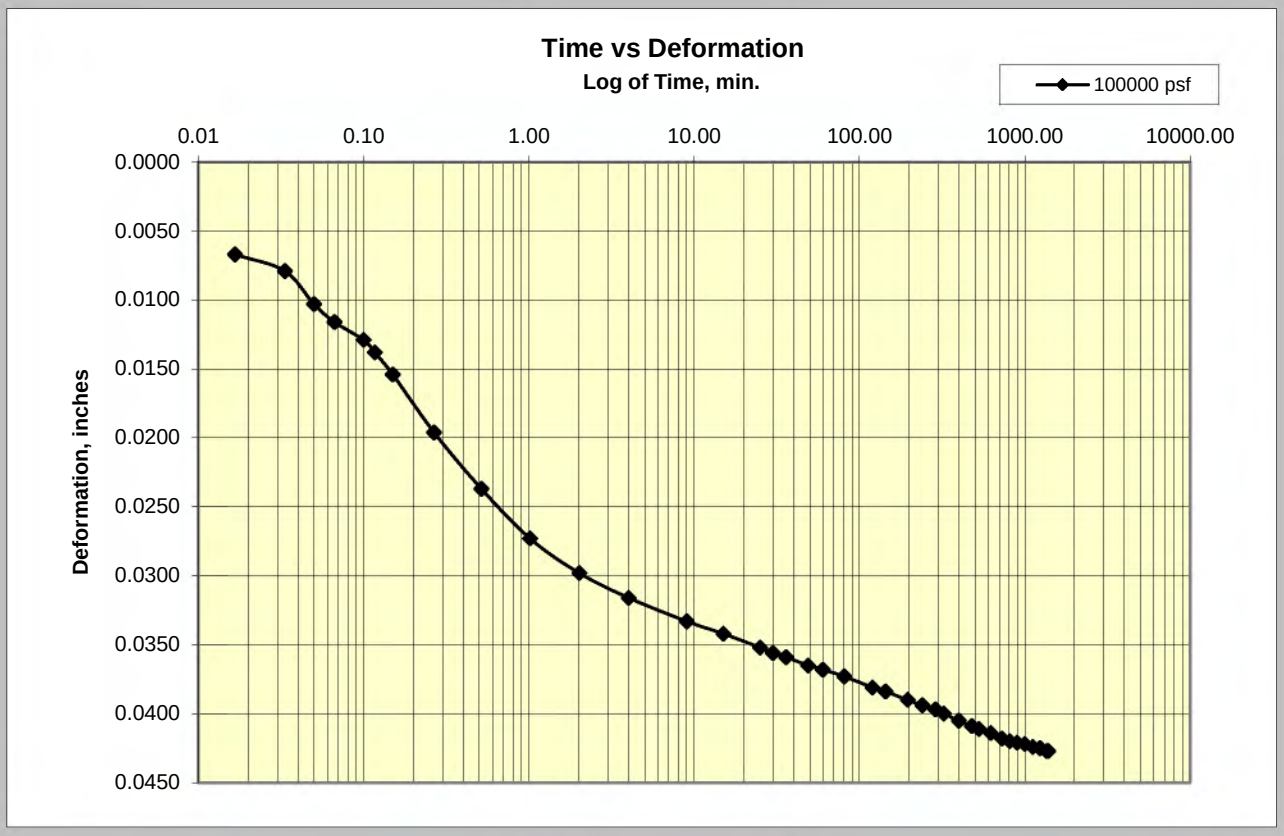


50000 psf

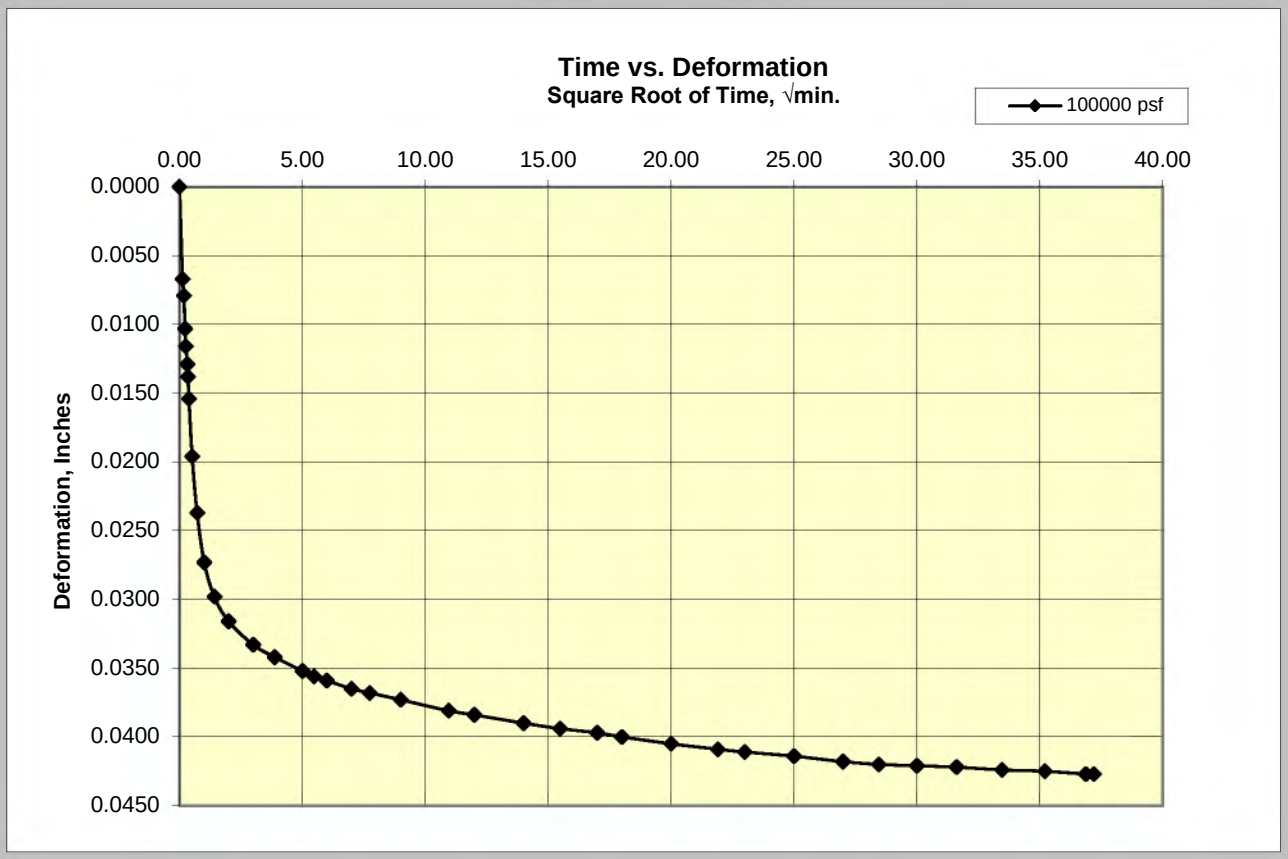


Cooper Testing Labs, Inc.

Load 13 | 100000 psf



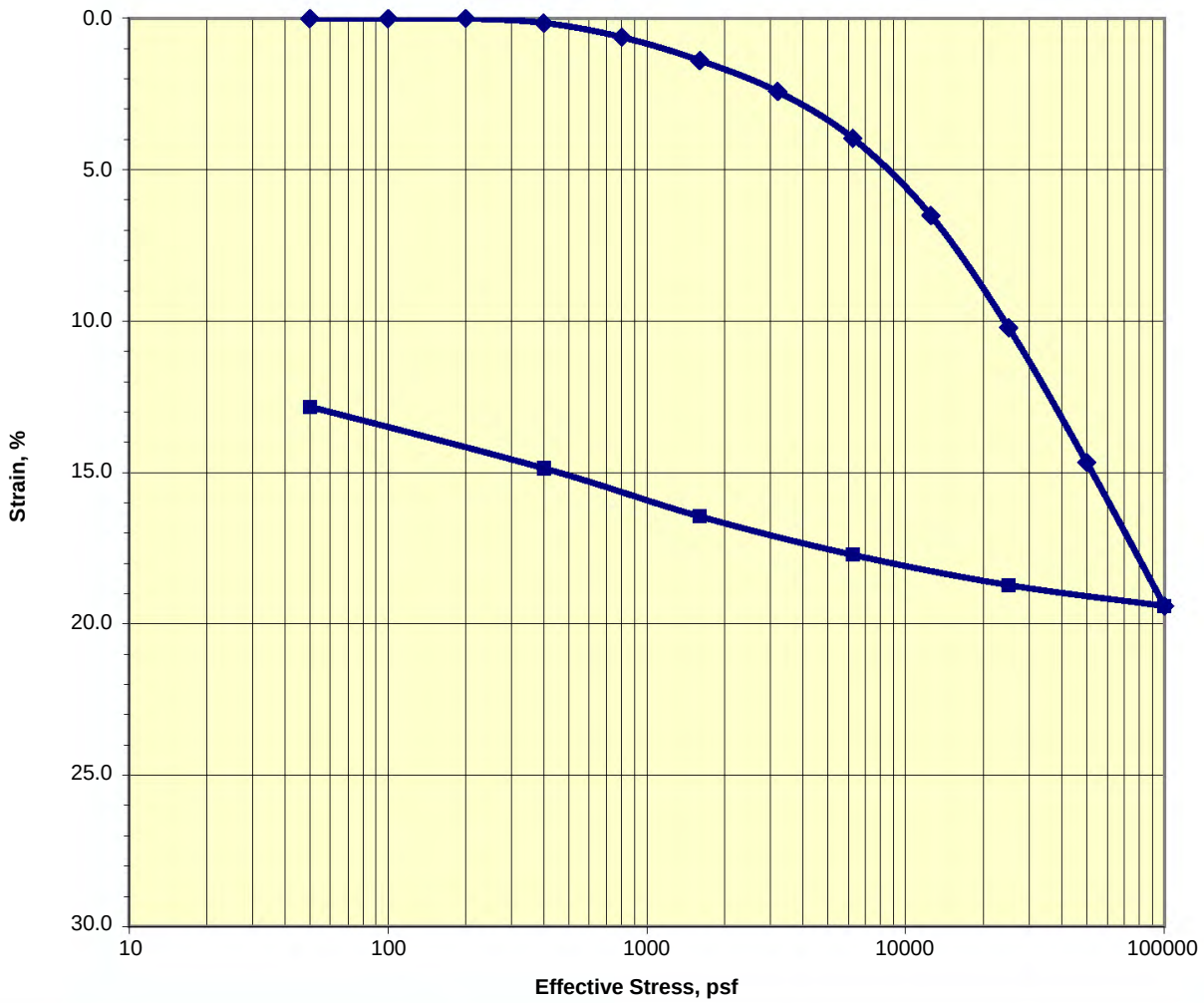
100000 psf



Consolidation Test
ASTM D2435

Job No.:	054-187	**Boring:**	22-B01	**Run By:**	MD
Client:	SHN Consulting	**Sample:**	S17	**Reduced:**	PJ
Project:	022054.400	**Depth, ft.:**	70-72.5	**Checked:**	PJ/DC
Soil Type:	Gray Sandy SILT			**Date:**	7/27/2022

Strain-Log-P Curve

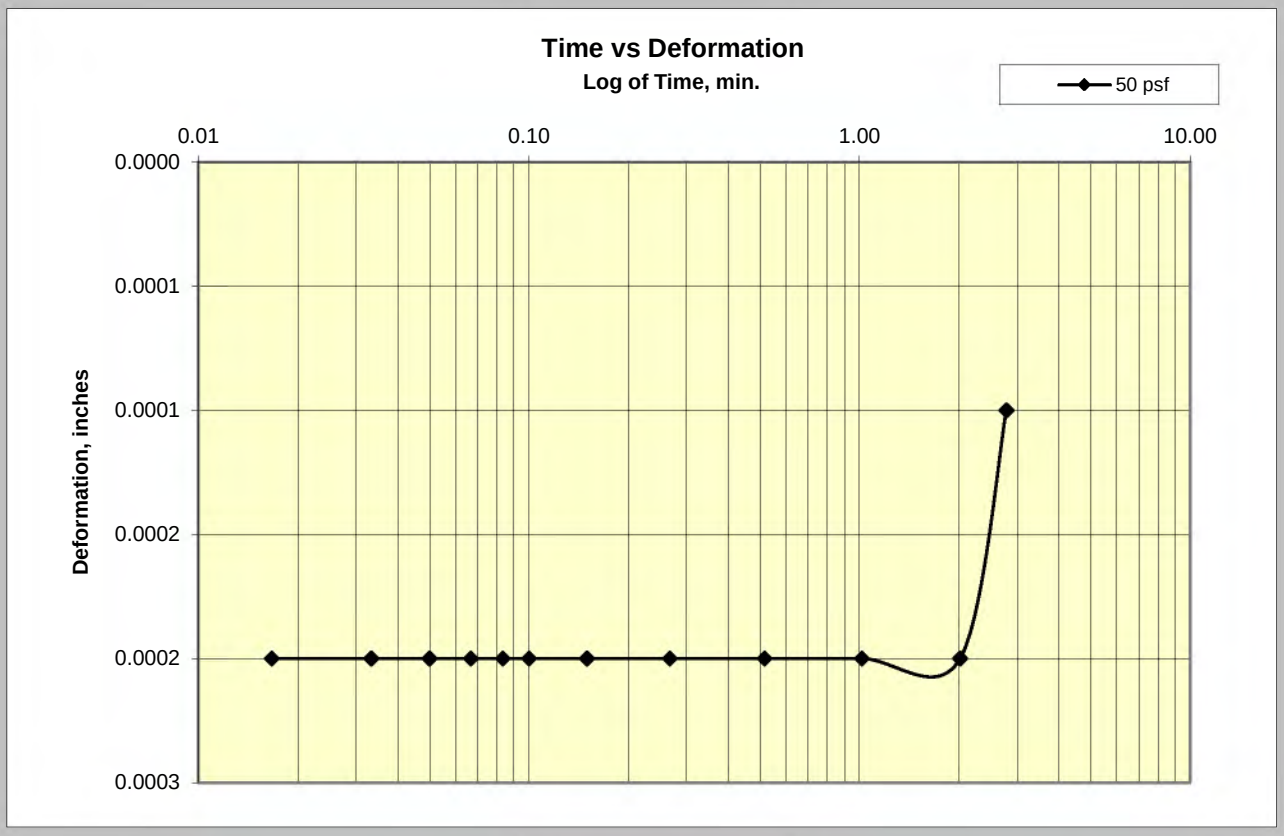


Assumed Gs 2.7	Initial	Final
Moisture %:	29.3	22.2
Dry Density, pcf:	92.4	105.5
Void Ratio:	0.824	0.598
% Saturation:	96.1	100.0

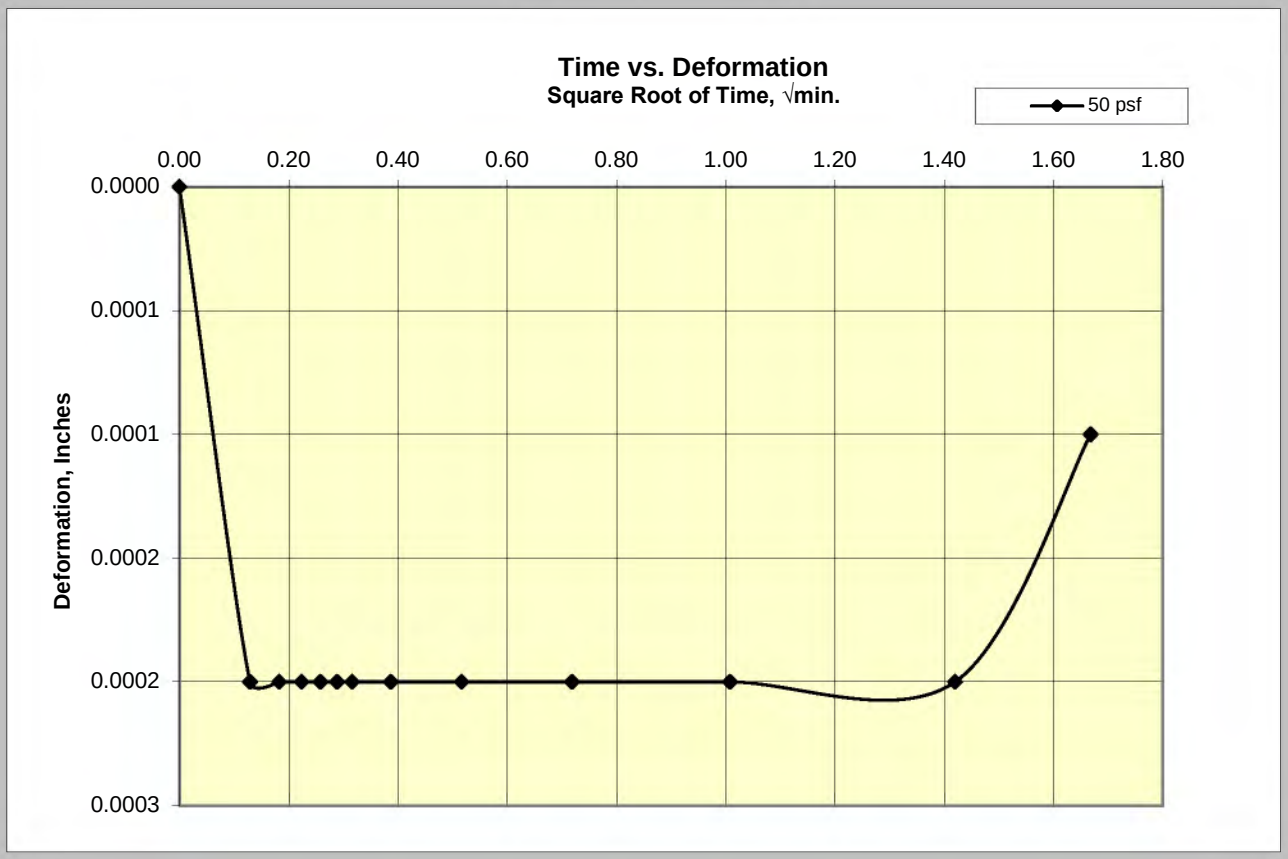
Remarks:

Cooper Testing Labs, Inc.

Load 1 | 50 psf

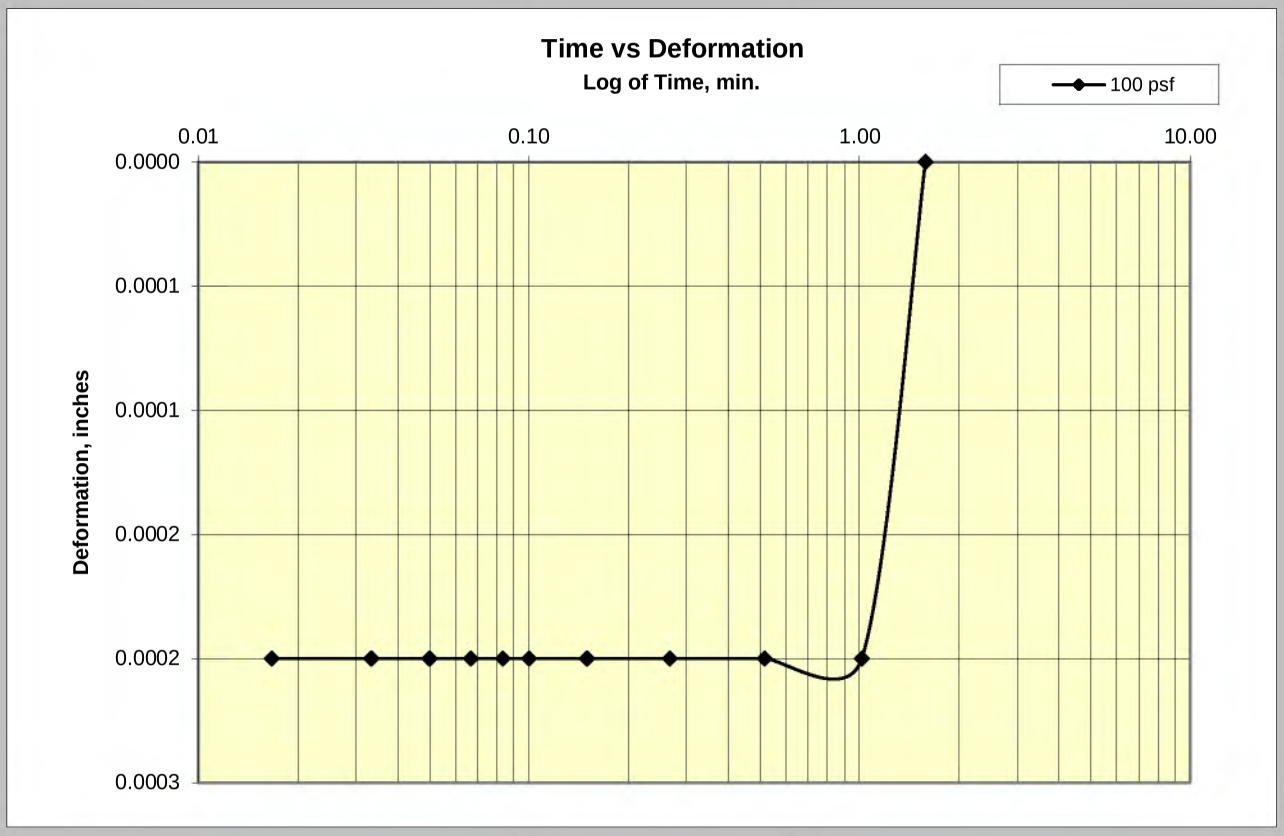


50 psf

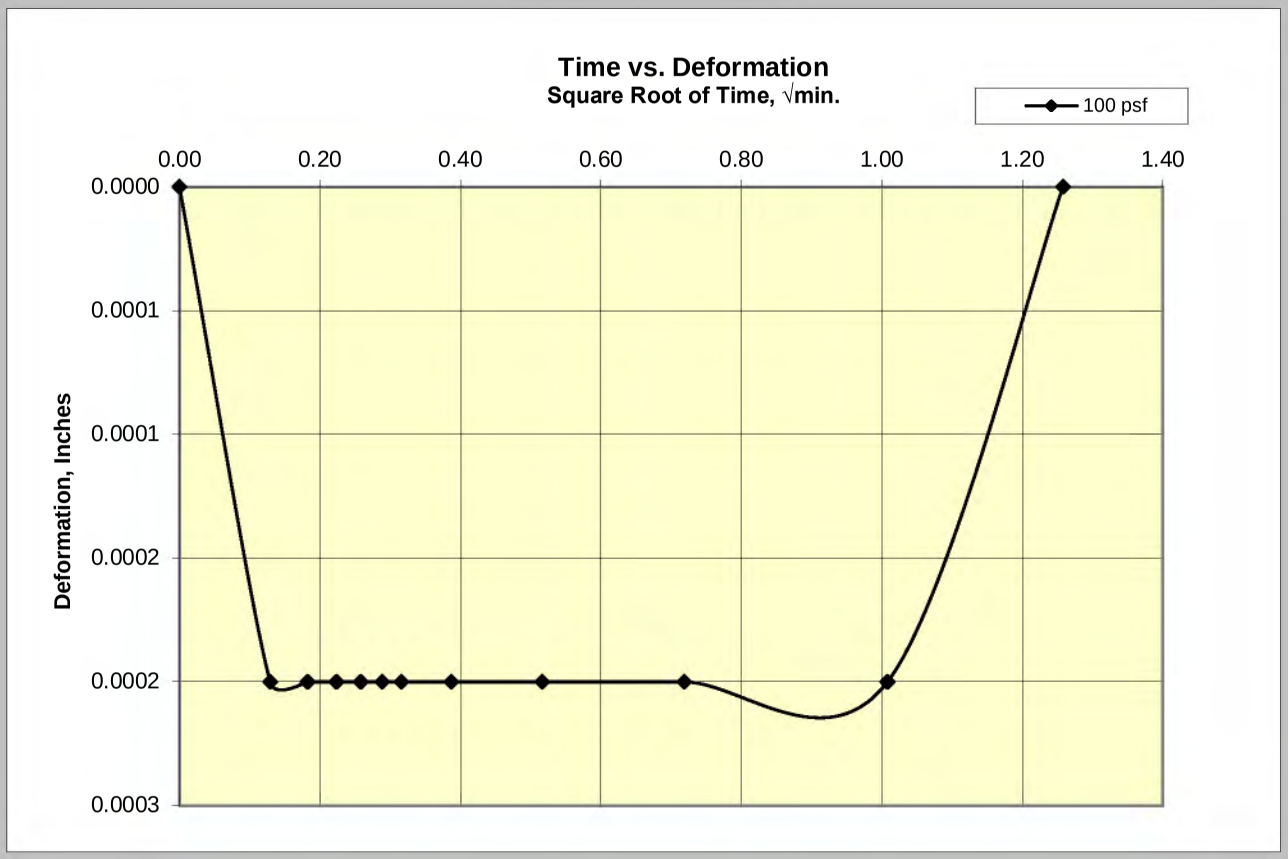


Cooper Testing Labs, Inc.

Load 2 | 100 psf

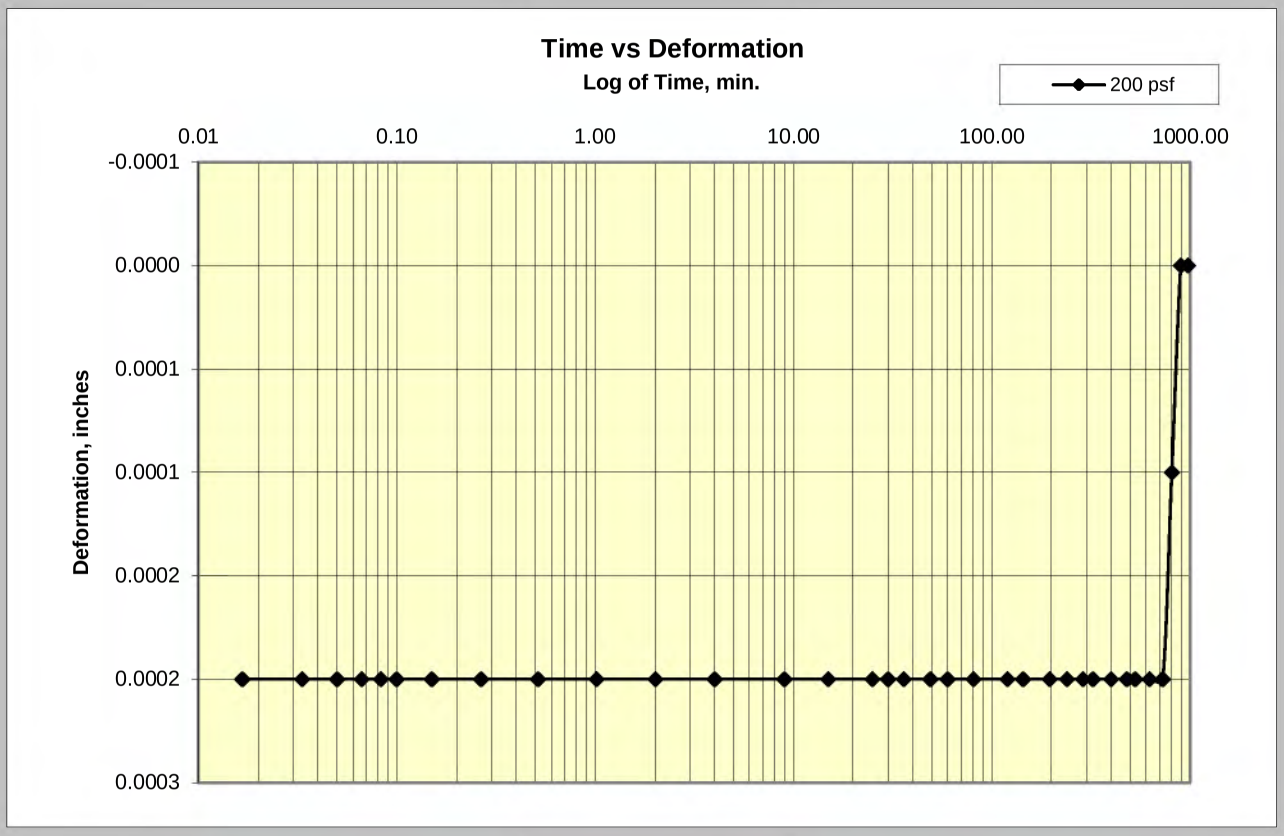


100 psf

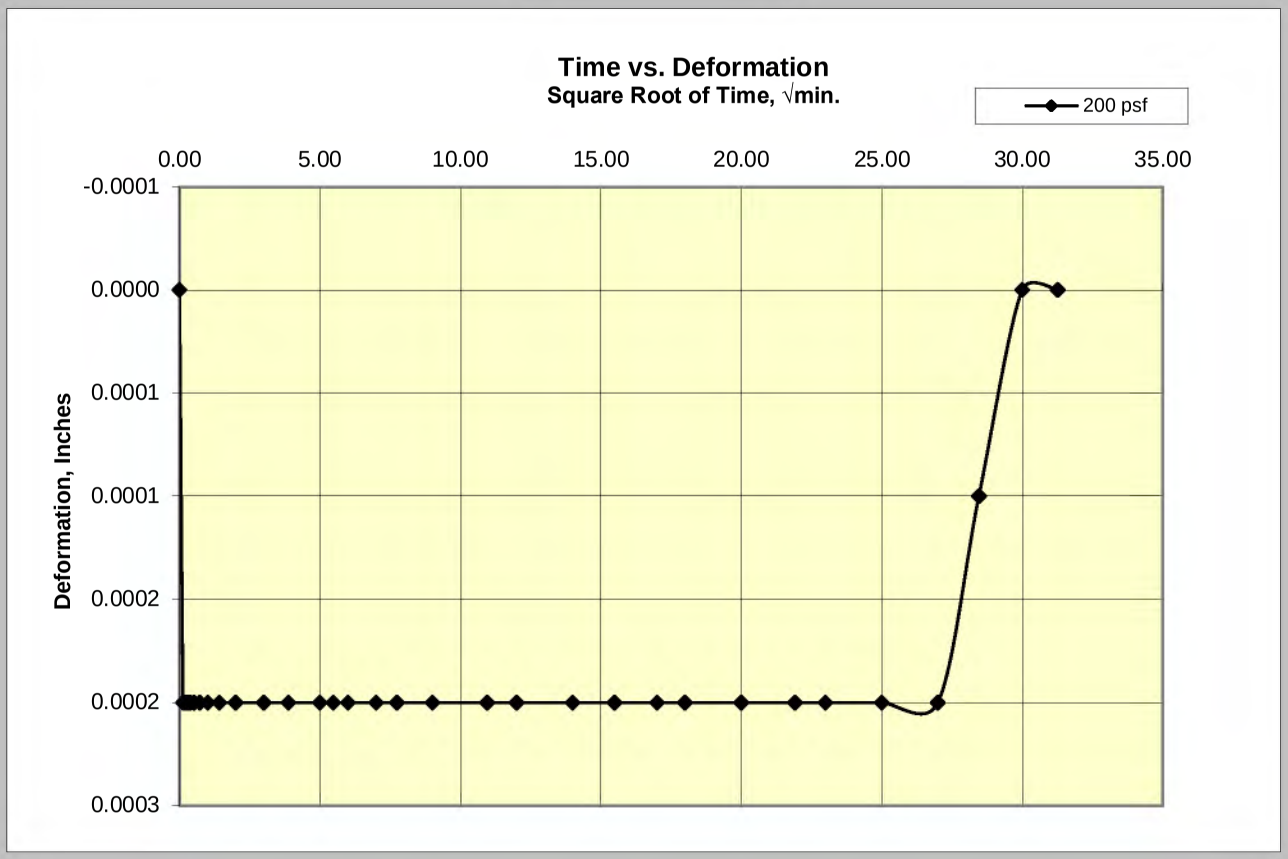


Cooper Testing Labs, Inc.

Load 3 | 200 psf

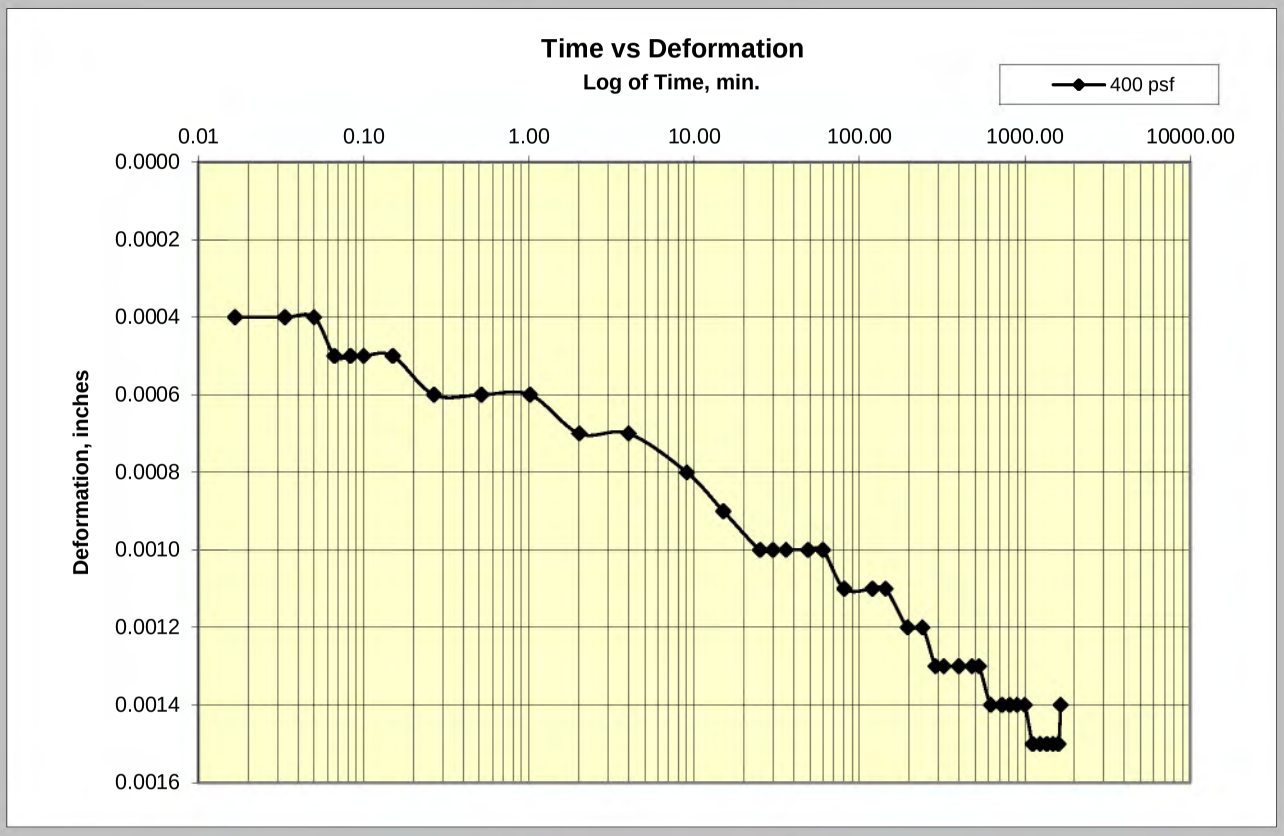


200 psf

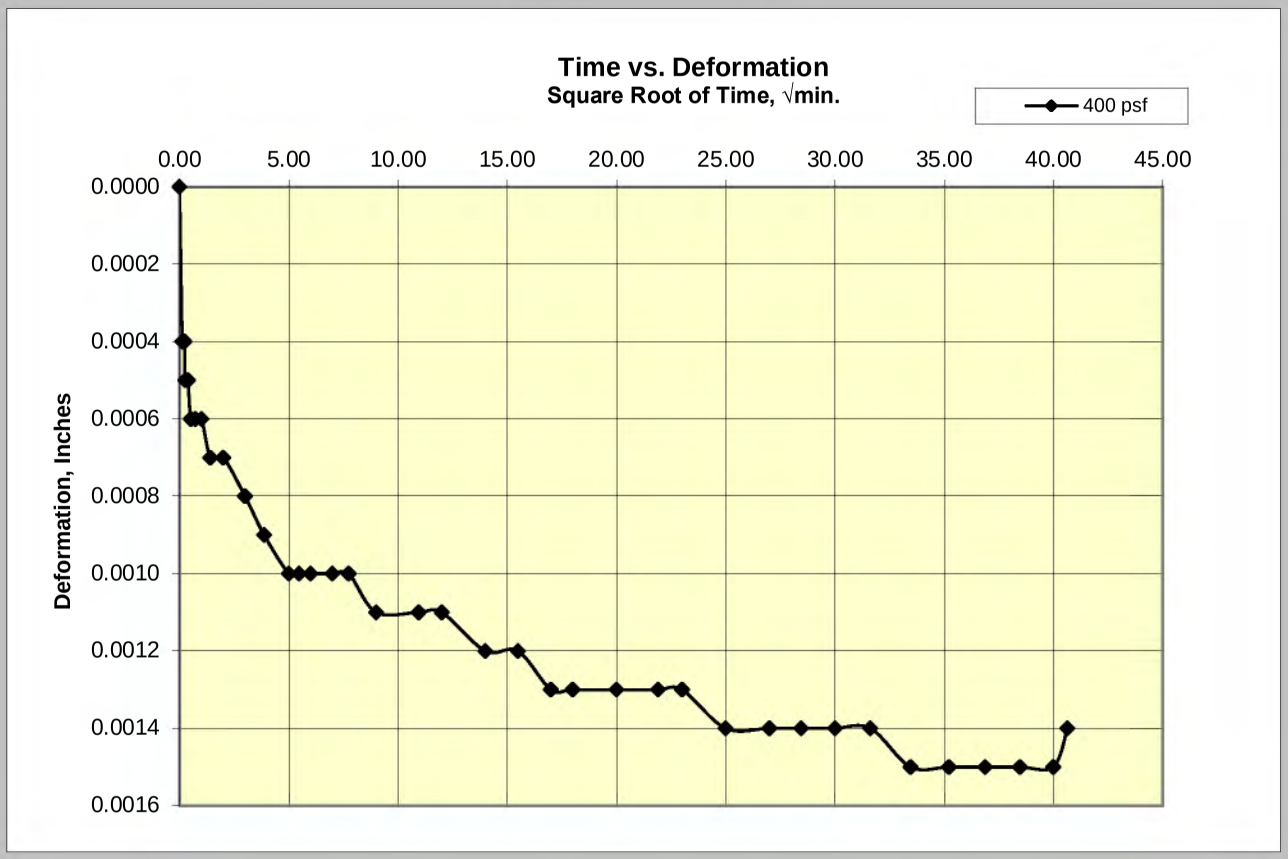


Cooper Testing Labs, Inc.

Load 4 | 400 psf

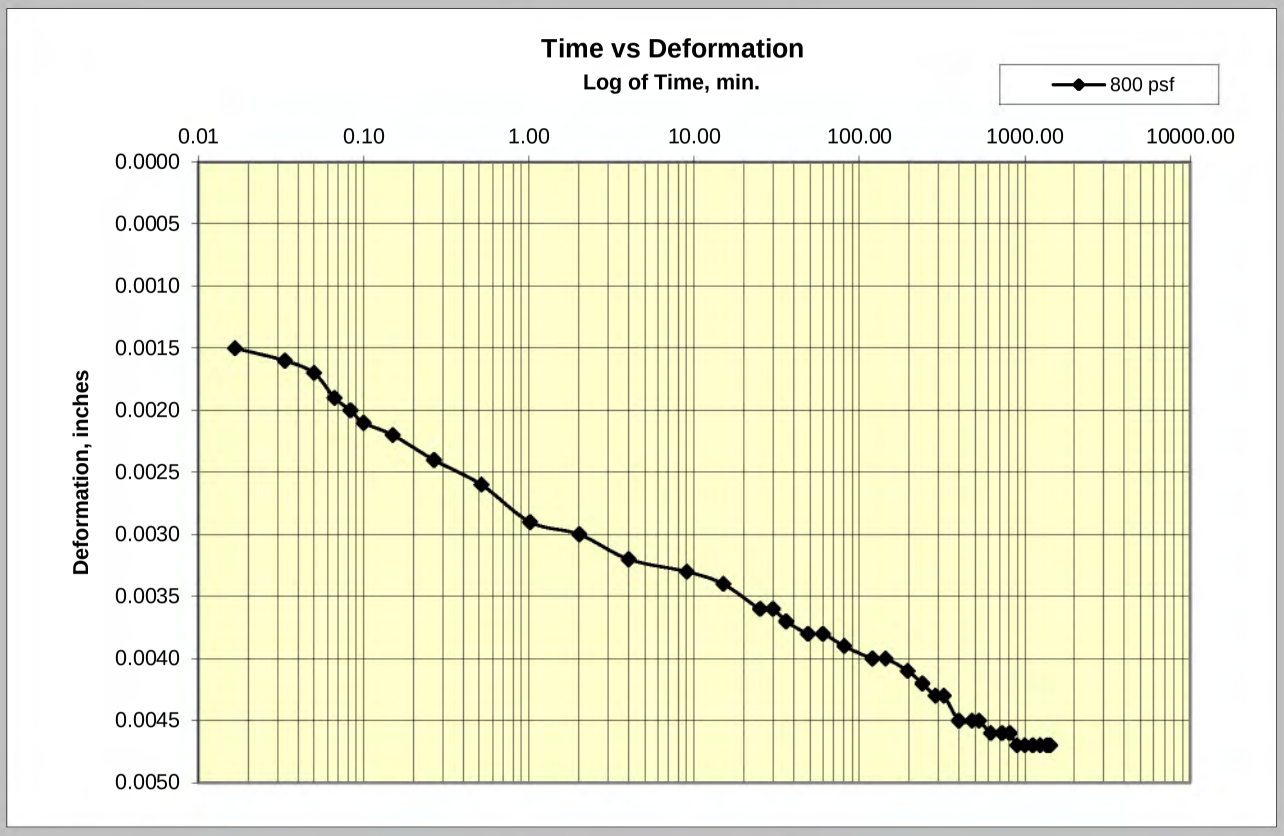


400 psf

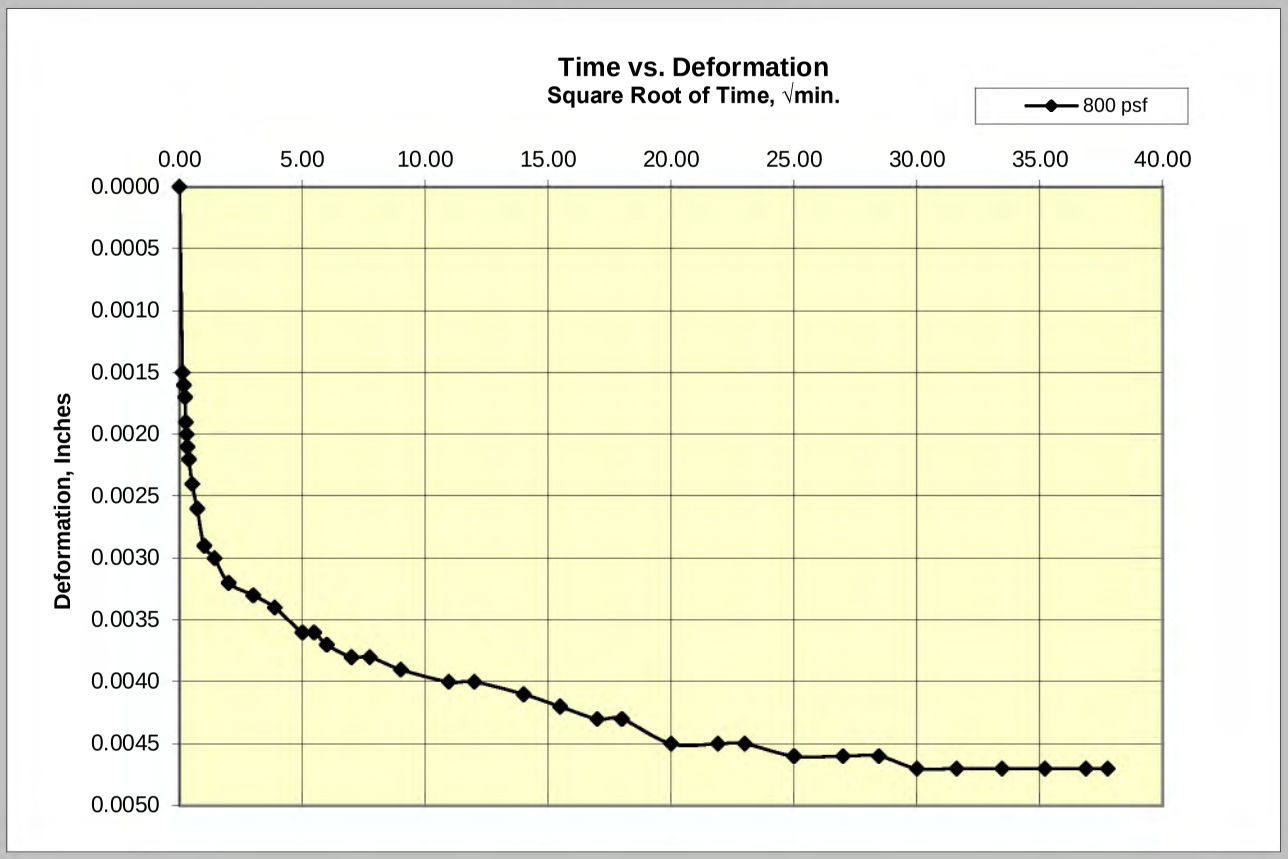


Cooper Testing Labs, Inc.

Load 5 | 800 psf

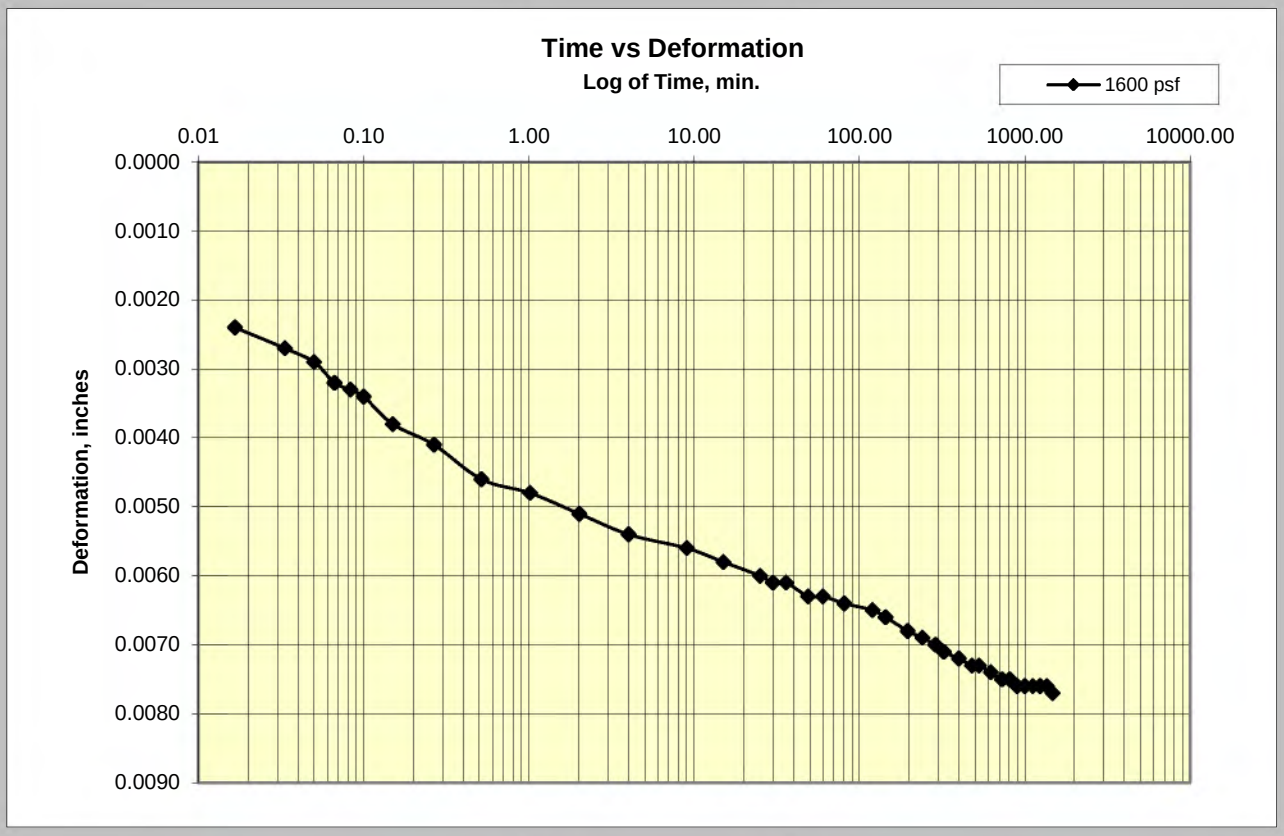


800 psf

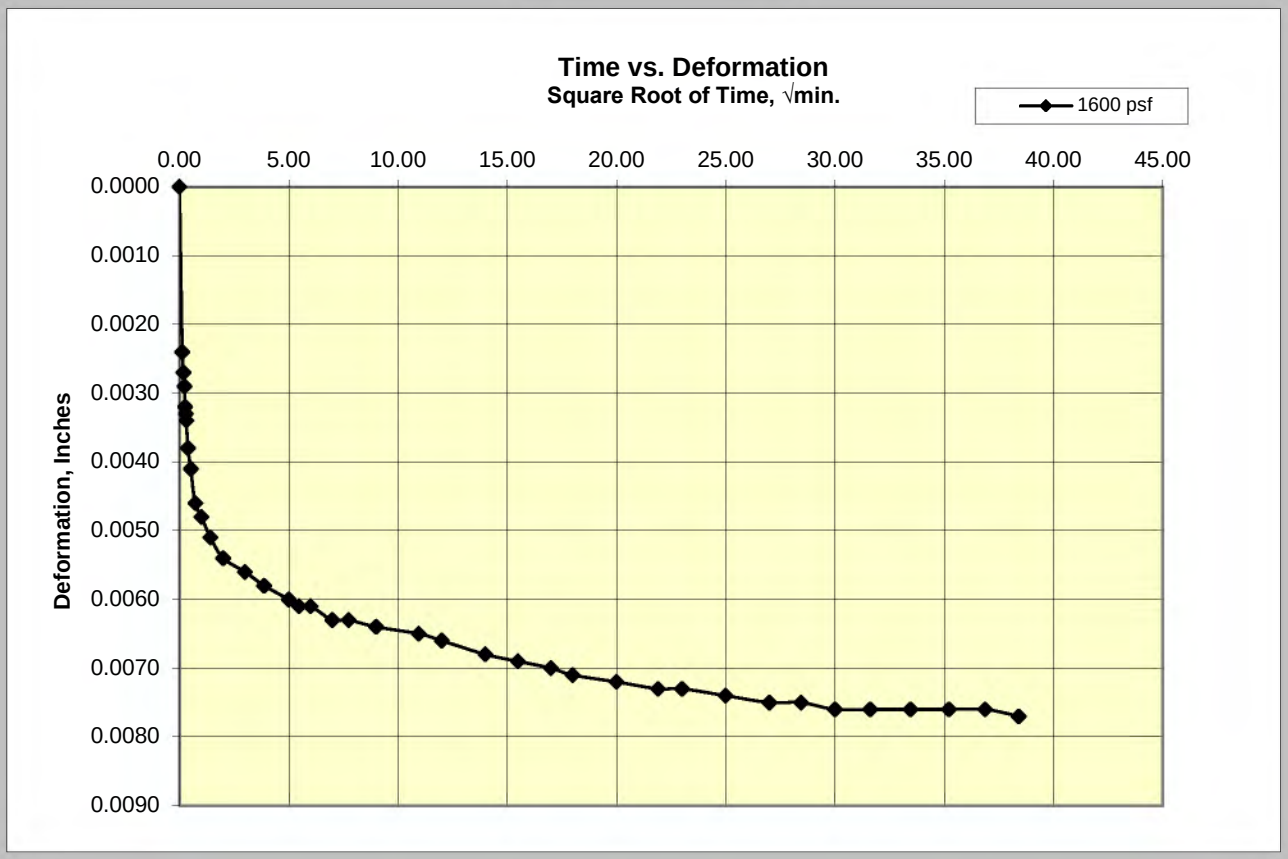


Cooper Testing Labs, Inc.

Load 6 | 1600 psf



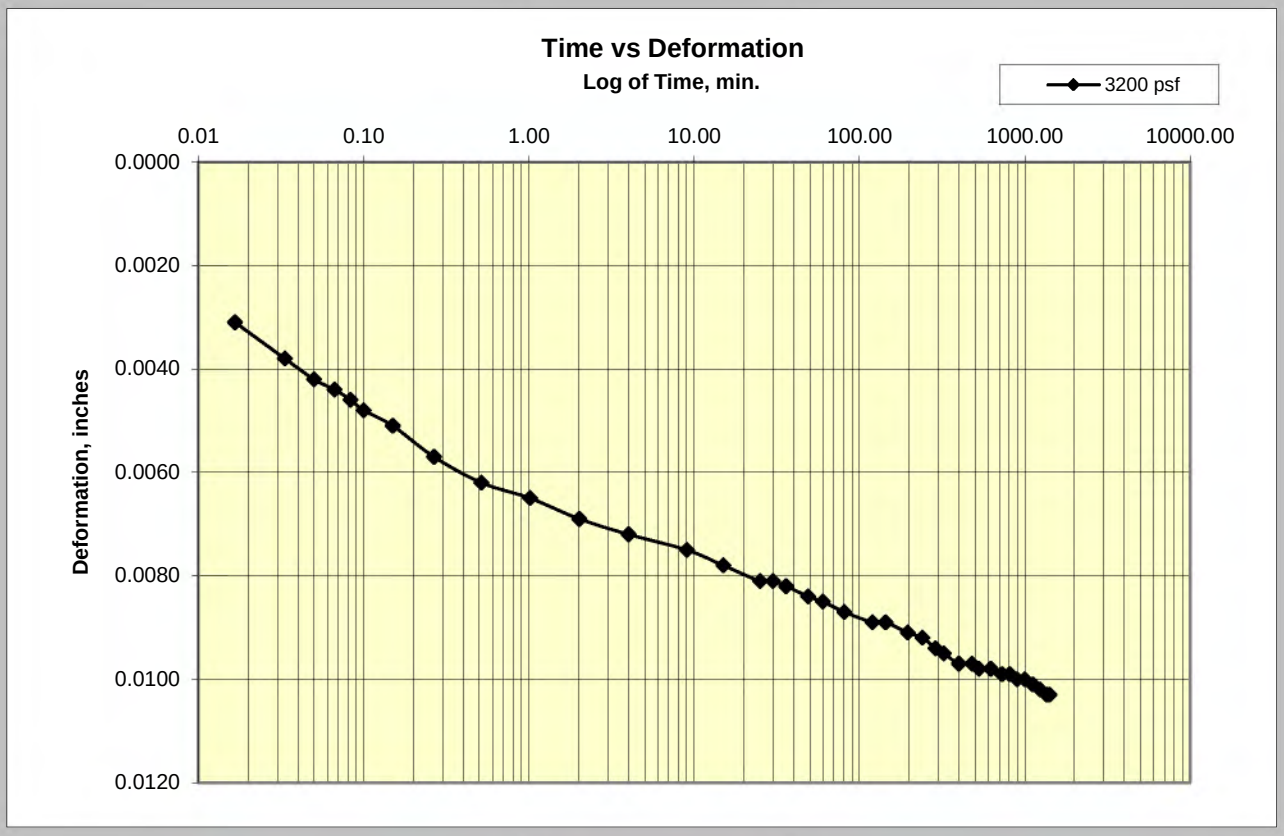
1600 psf



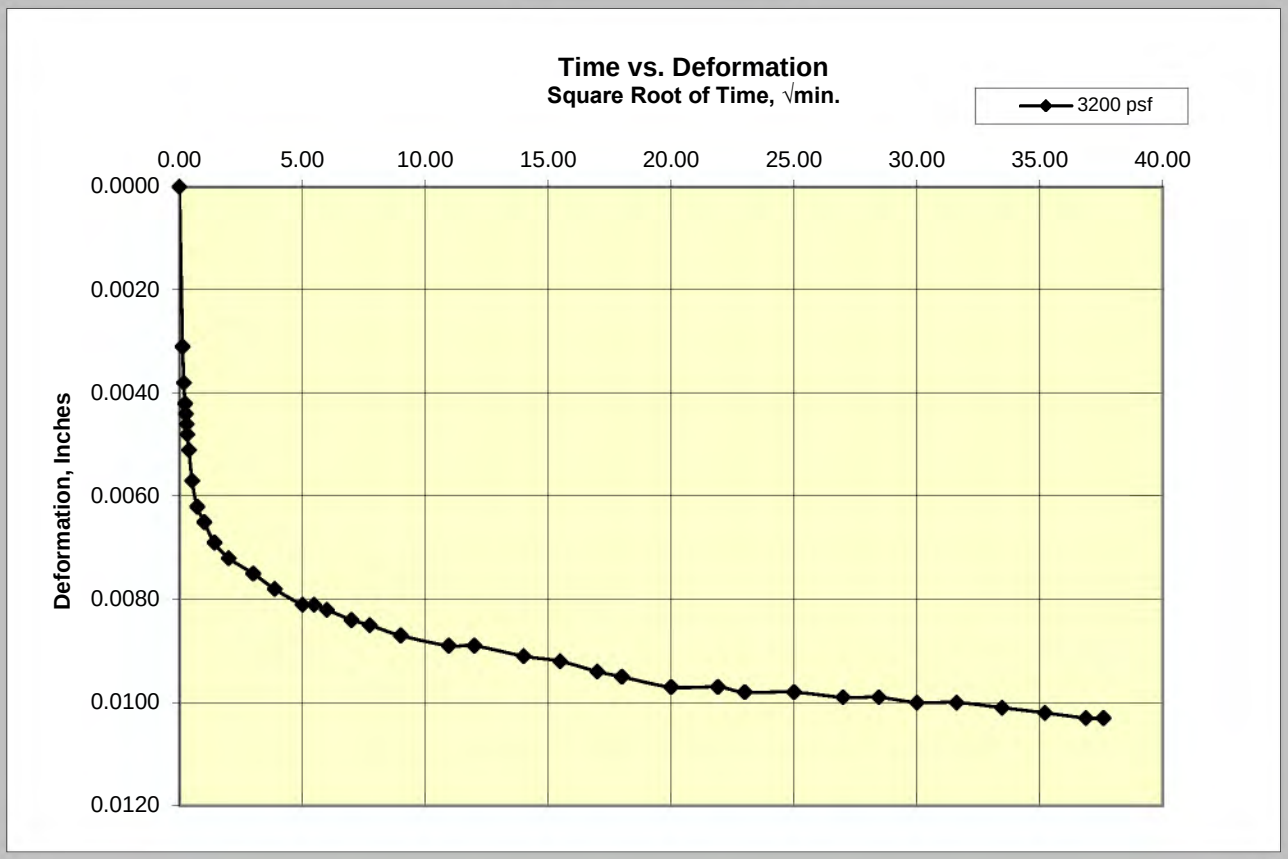
Cooper Testing Labs, Inc.

Load 7

3200 psf

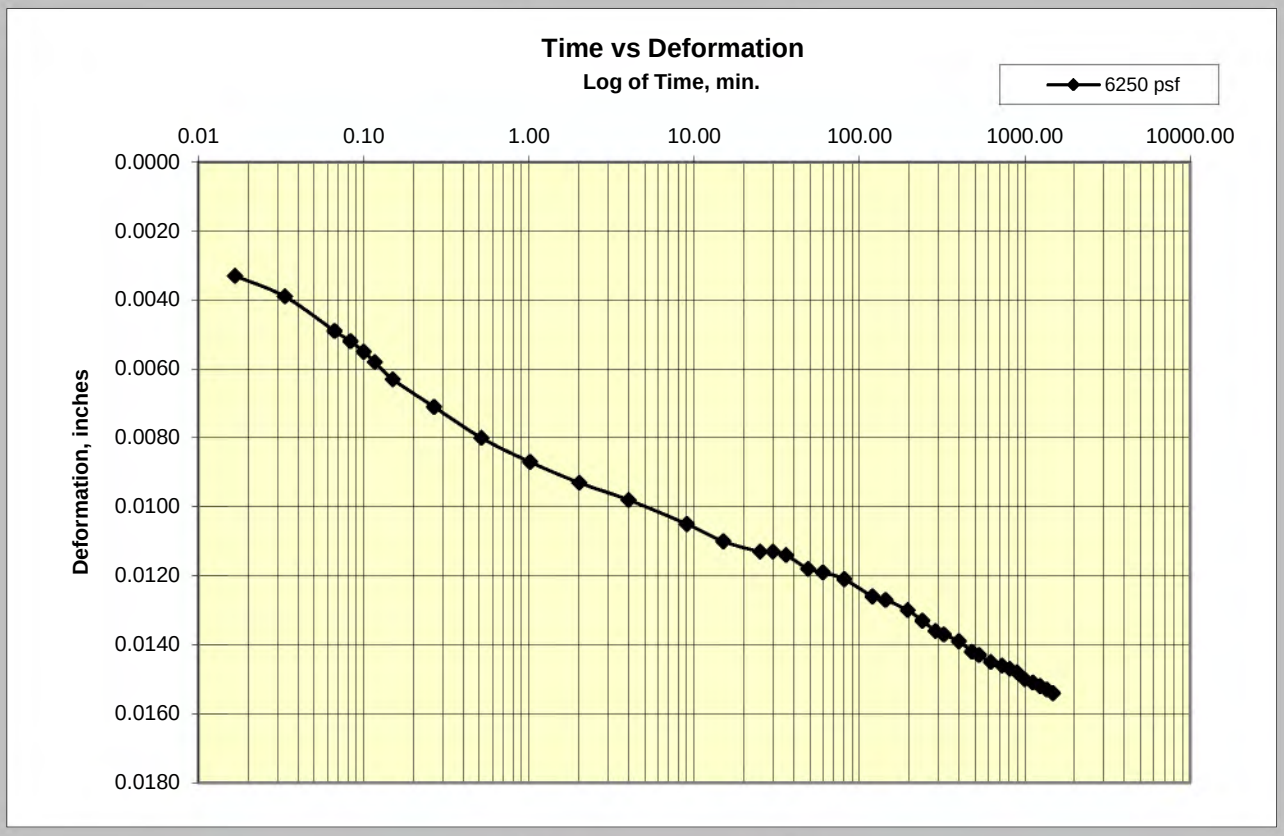


3200 psf

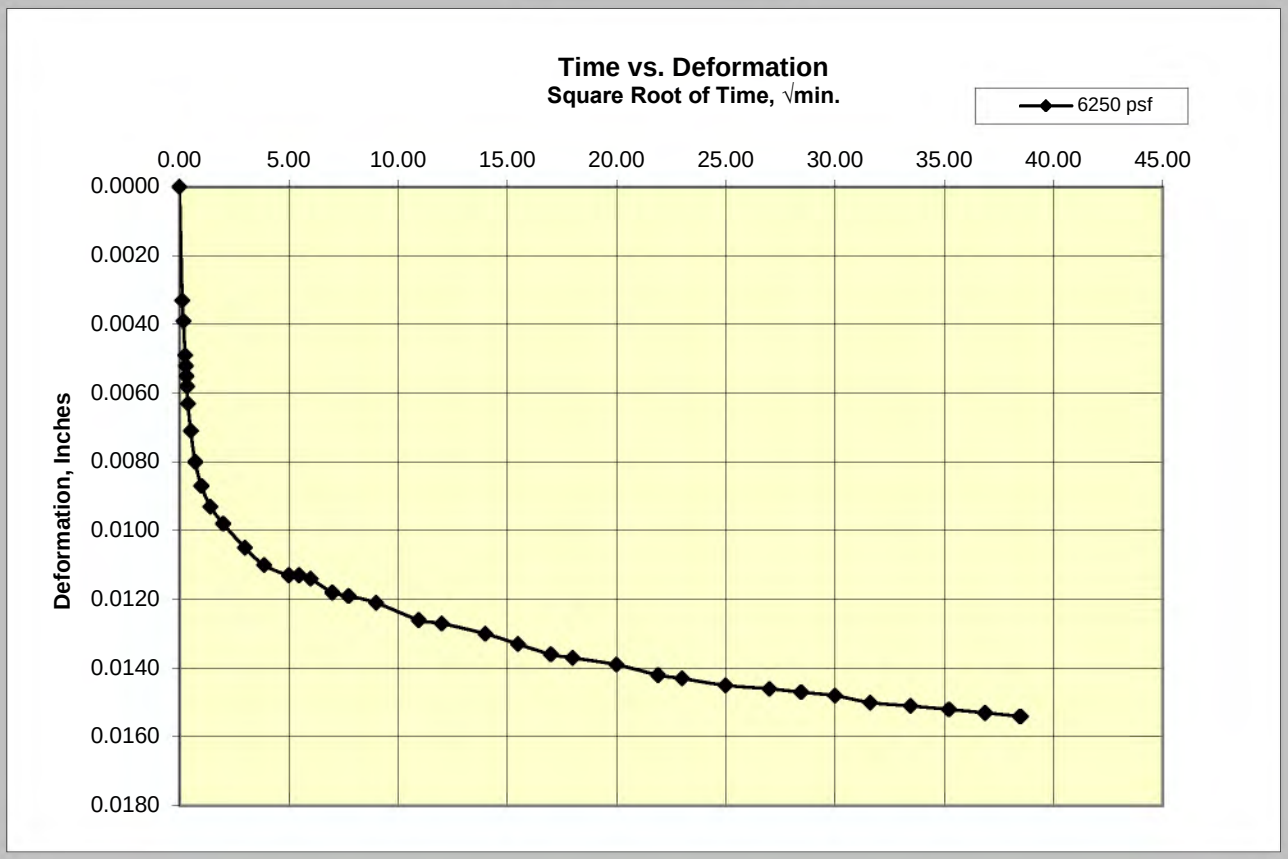


Cooper Testing Labs, Inc.

Load 8 | 6250 psf

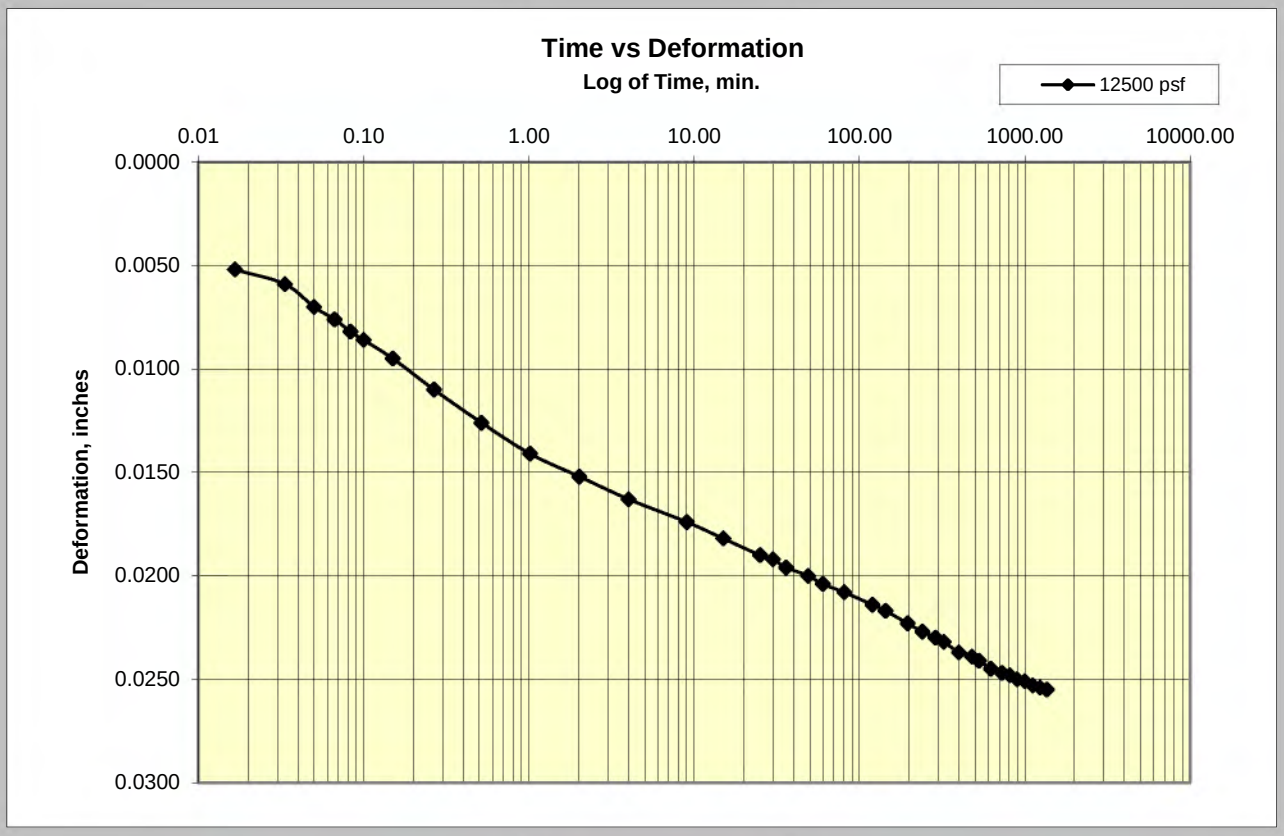


6250 psf

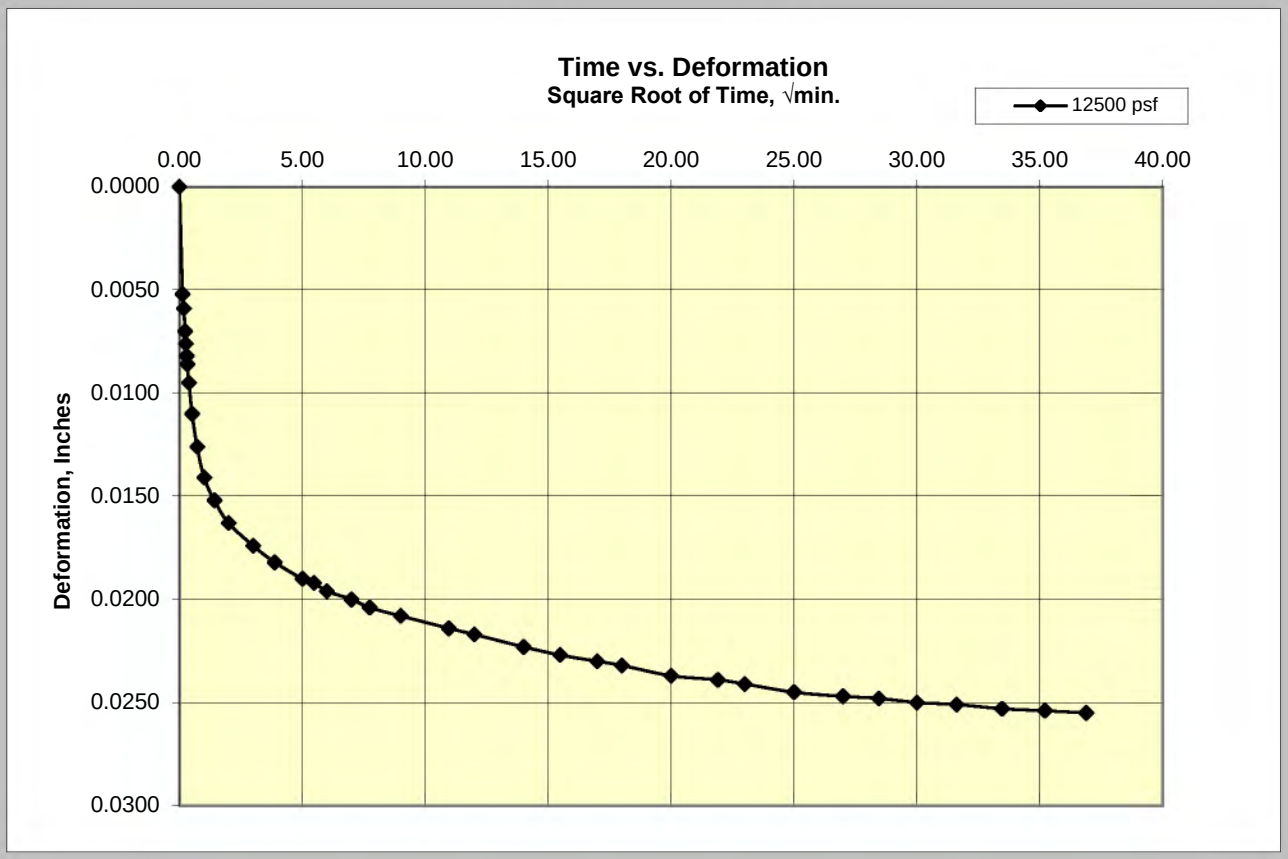


Cooper Testing Labs, Inc.

Load 9 | 12500 psf

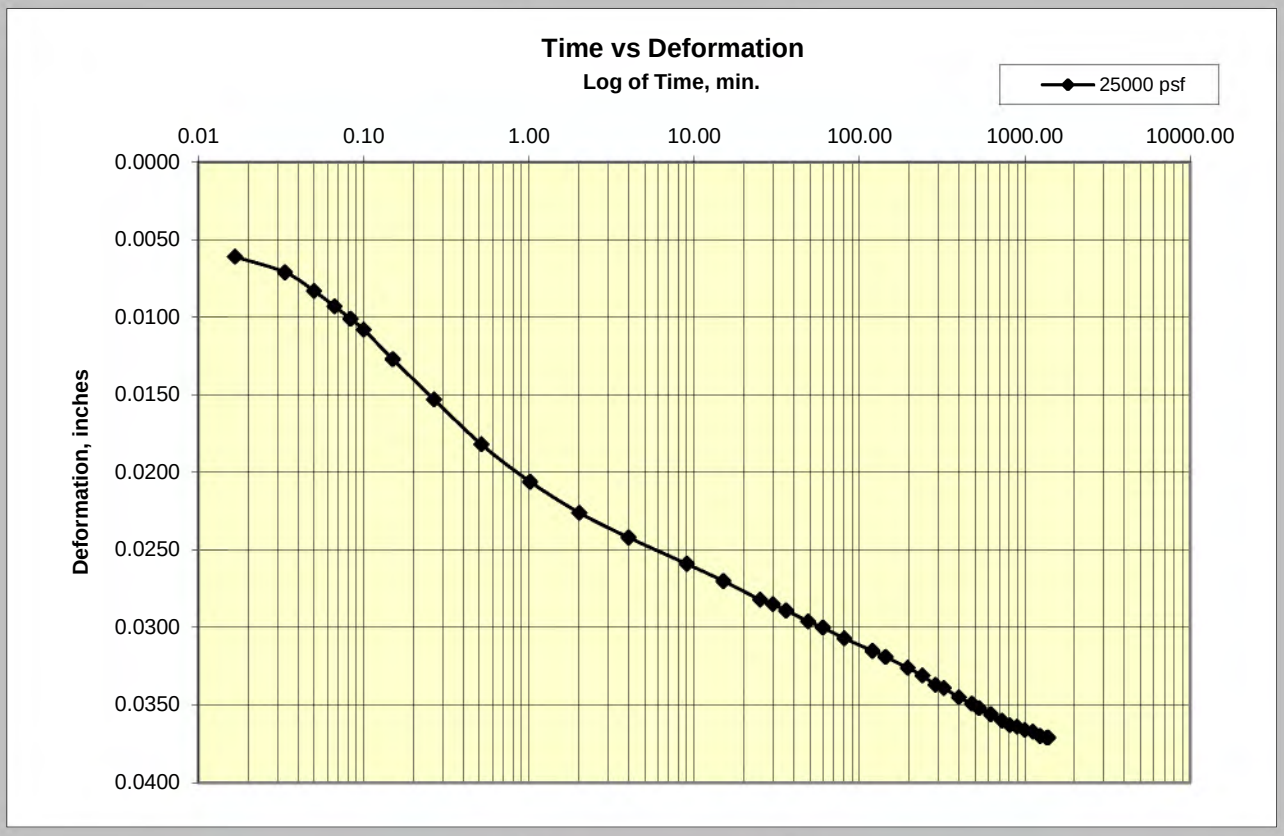


12500 psf

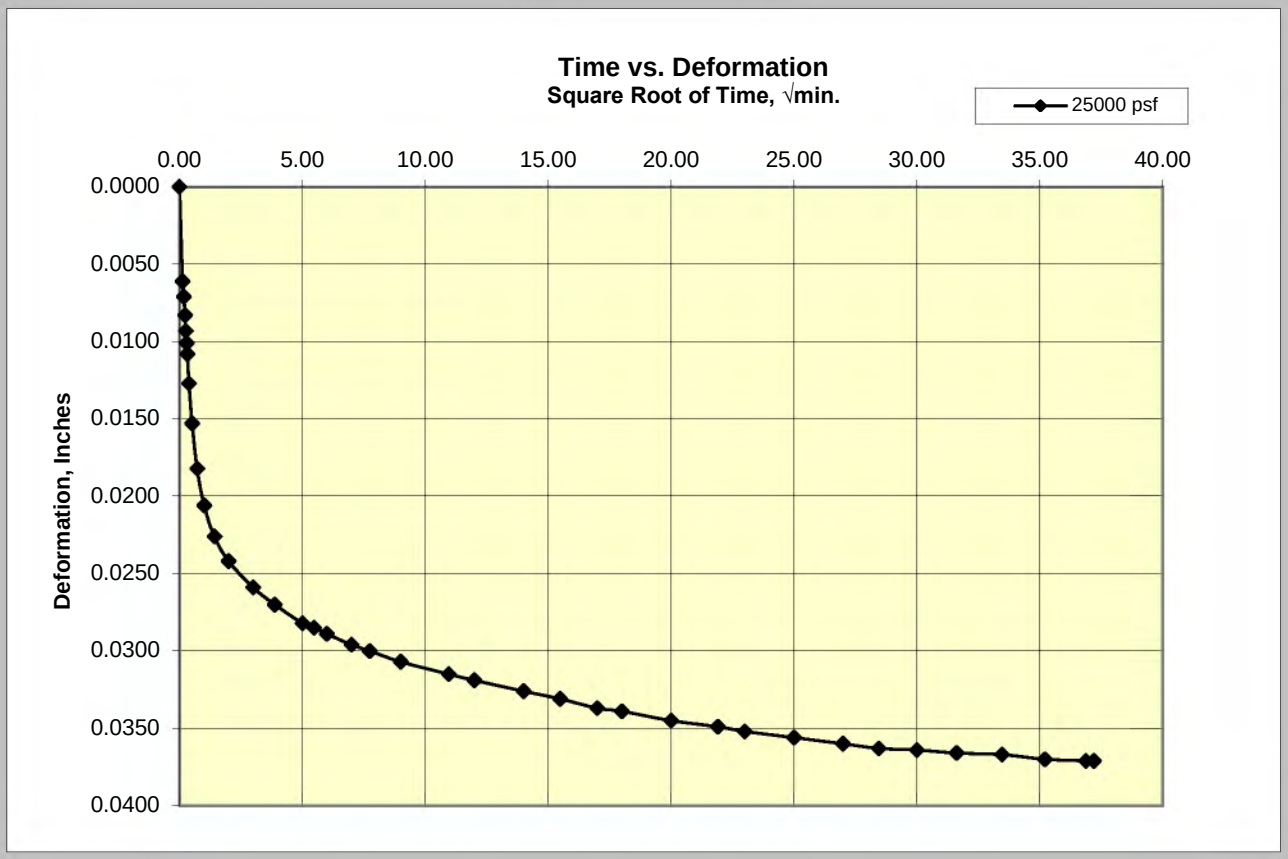


Cooper Testing Labs, Inc.

Load 10 | 25000 psf

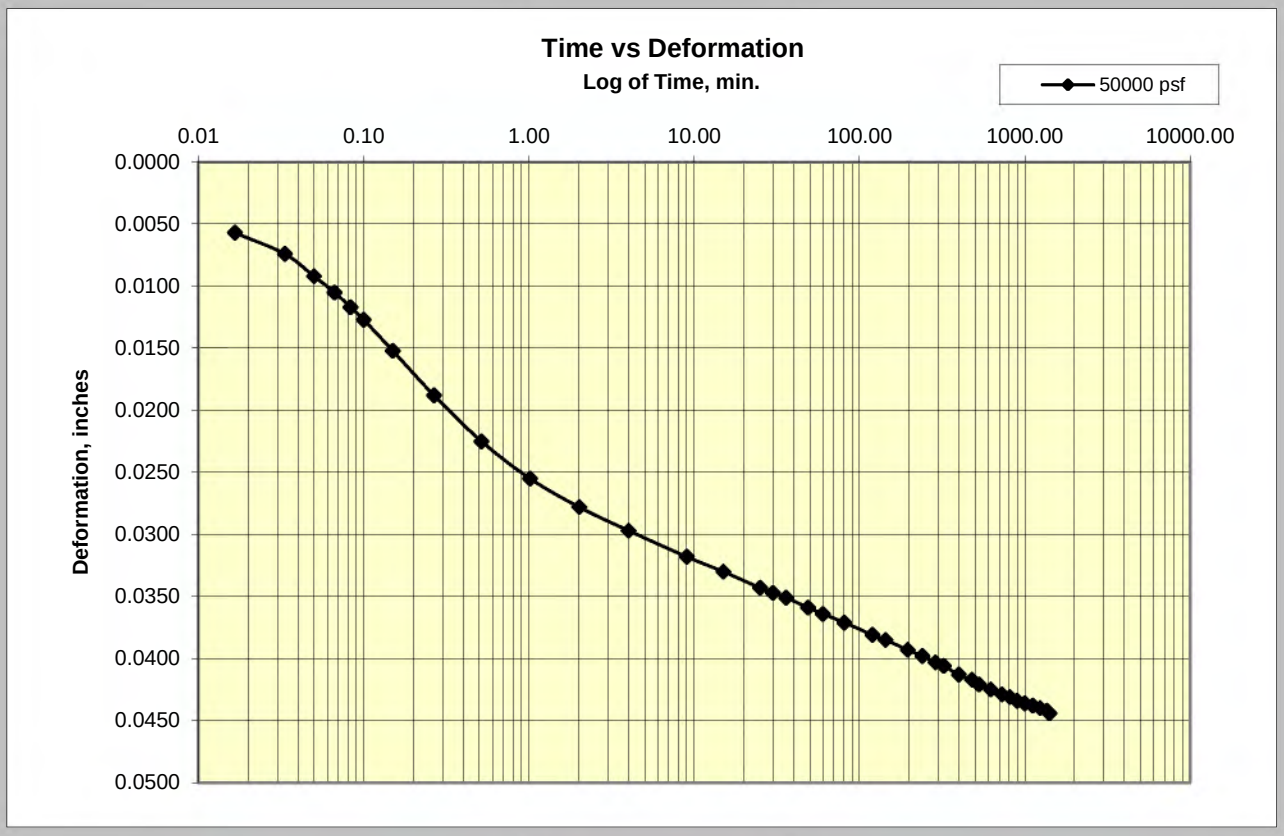


25000 psf

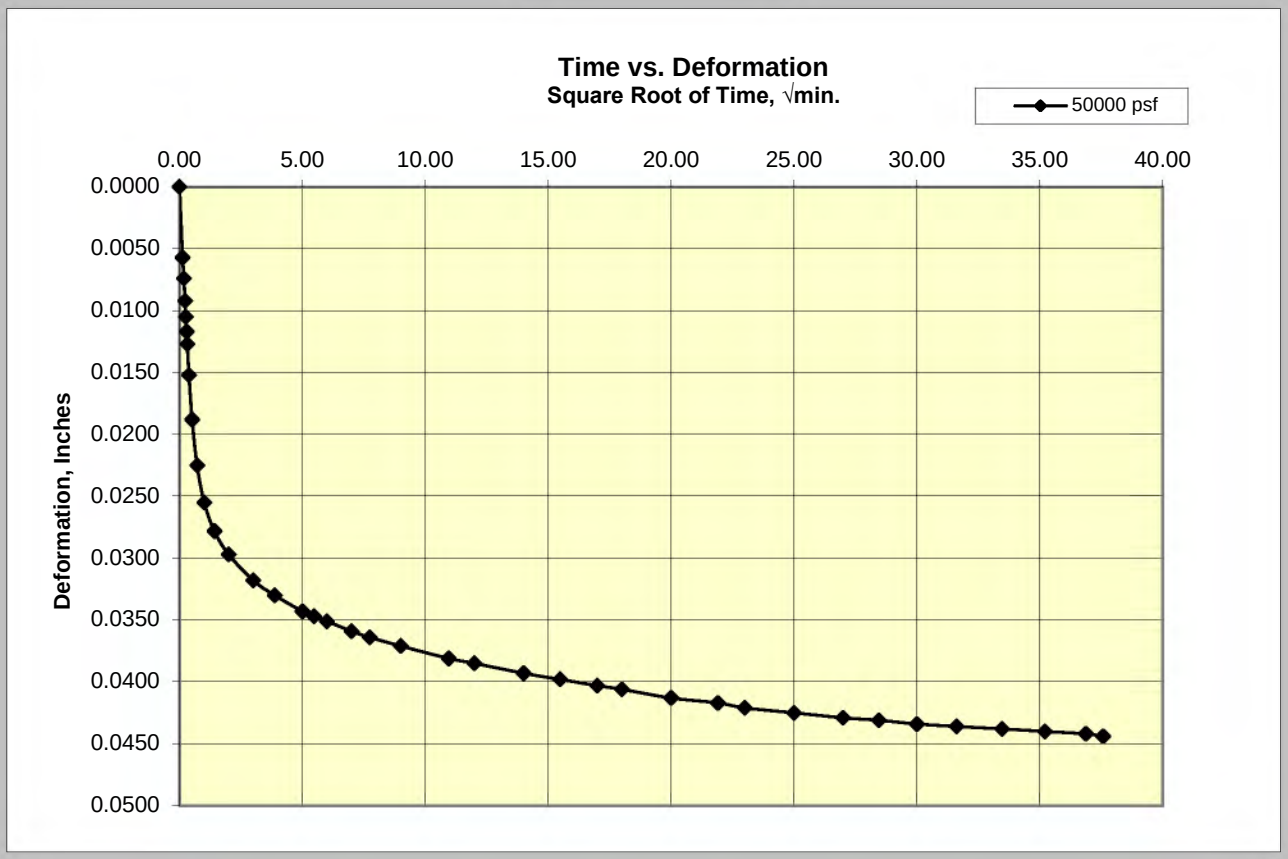


Cooper Testing Labs, Inc.

Load 11 | 50000 psf

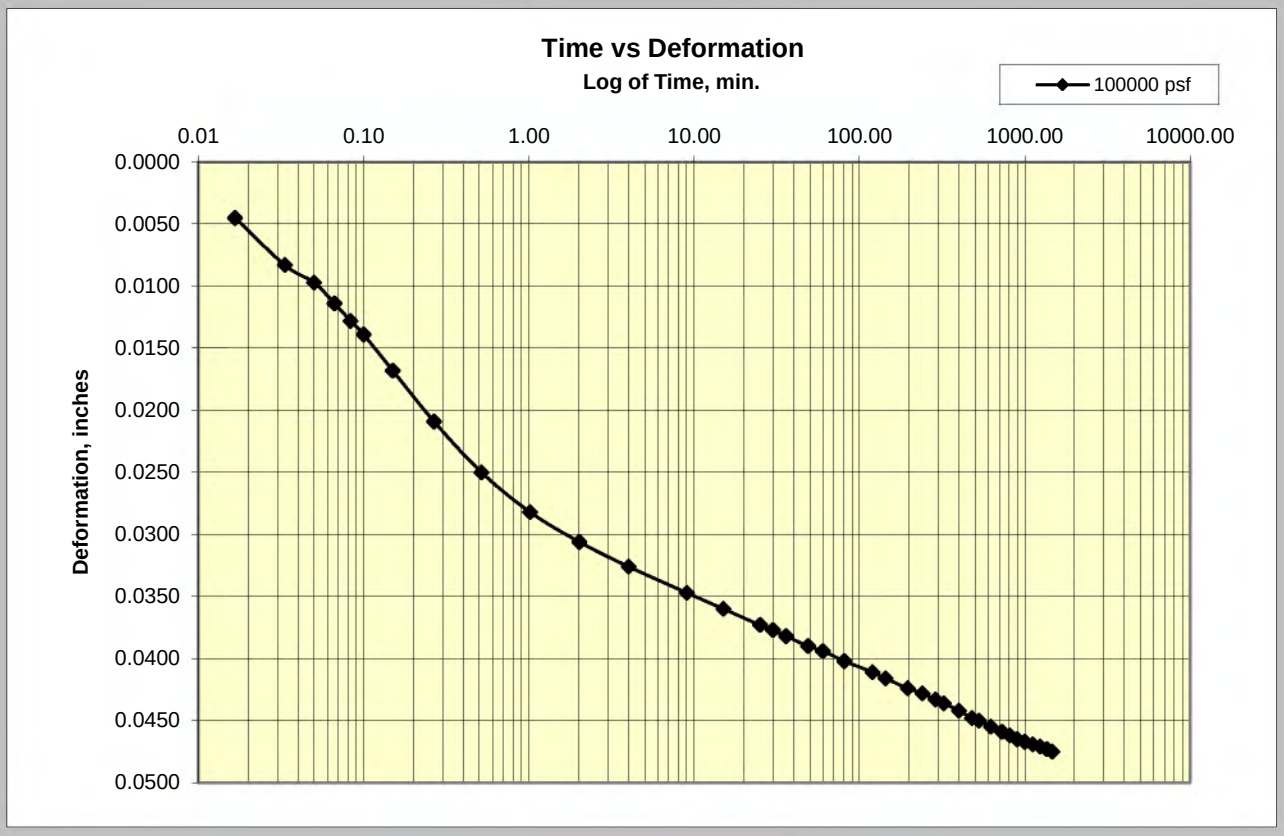


50000 psf

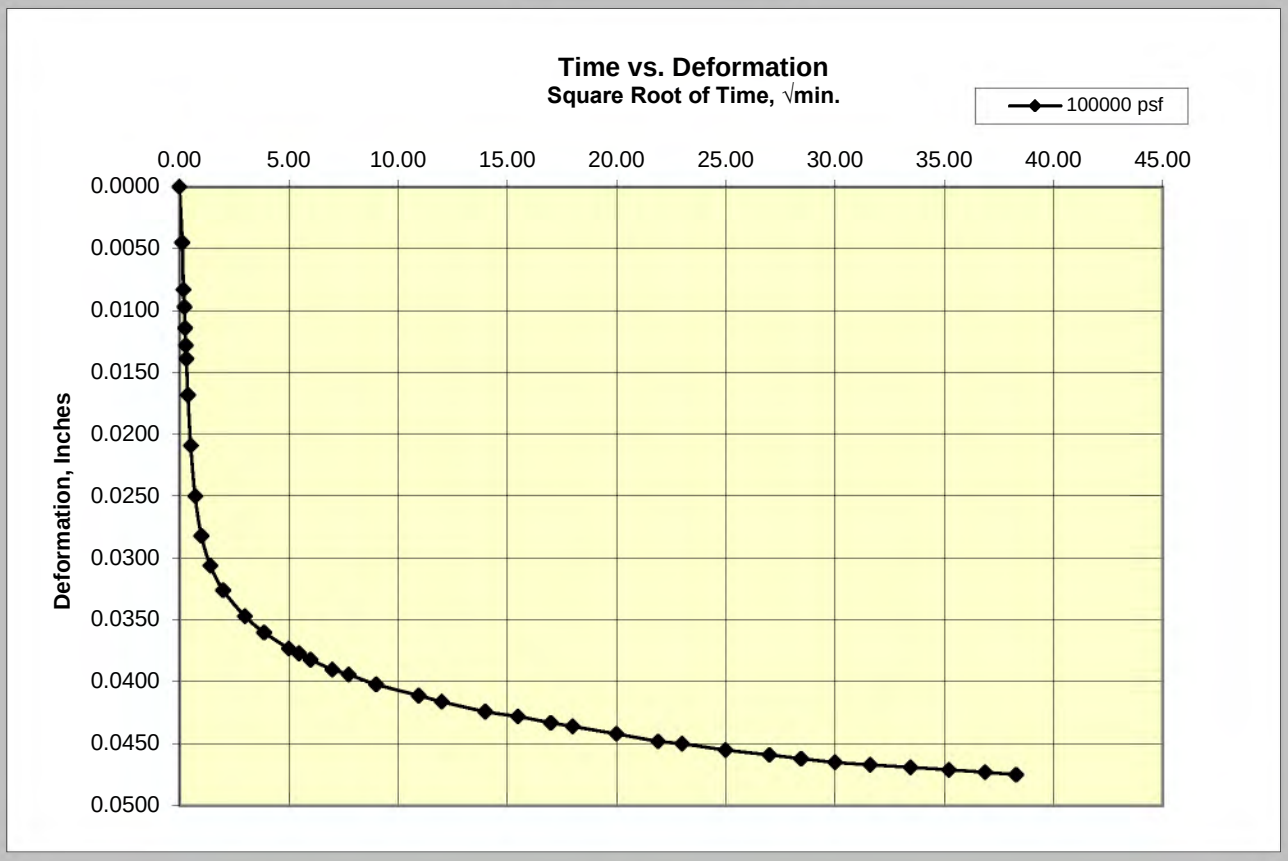


Cooper Testing Labs, Inc.

Load 12 | 100000 psf



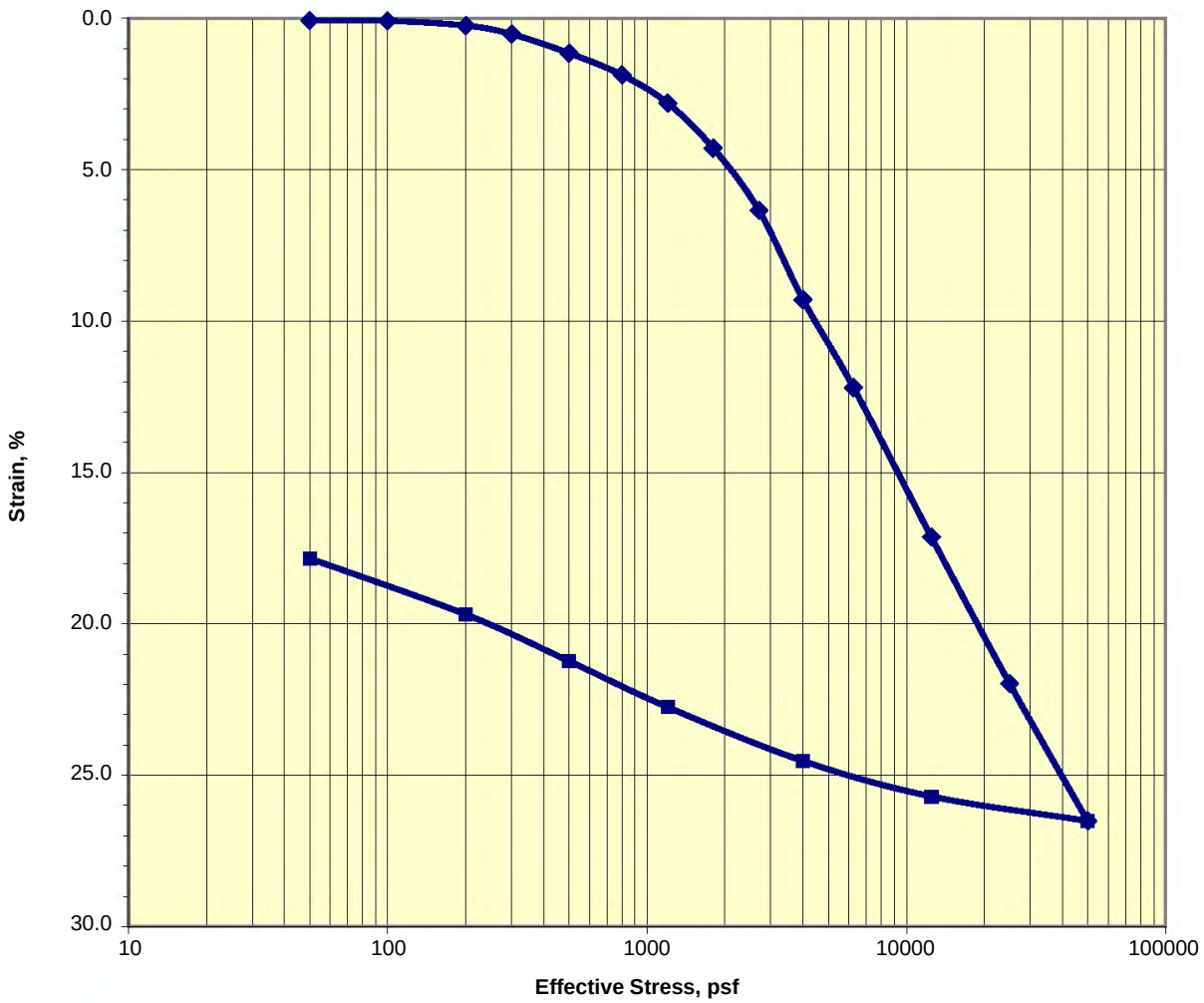
100000 psf



Consolidation Test
ASTM D2435

Job No.:	054-187	**Boring:**	22-B02	**Run By:**	MD
Client:	SHN Engineers	**Sample:**	S6	**Reduced:**	PJ
Project:	022054.400	**Depth, ft.:**	35-37.5	**Checked:**	PJ/DC
Soil Type:	Greenish Gray Lean CLAY (Bay Mud)			**Date:**	8/2/2022

Strain-Log-P Curve

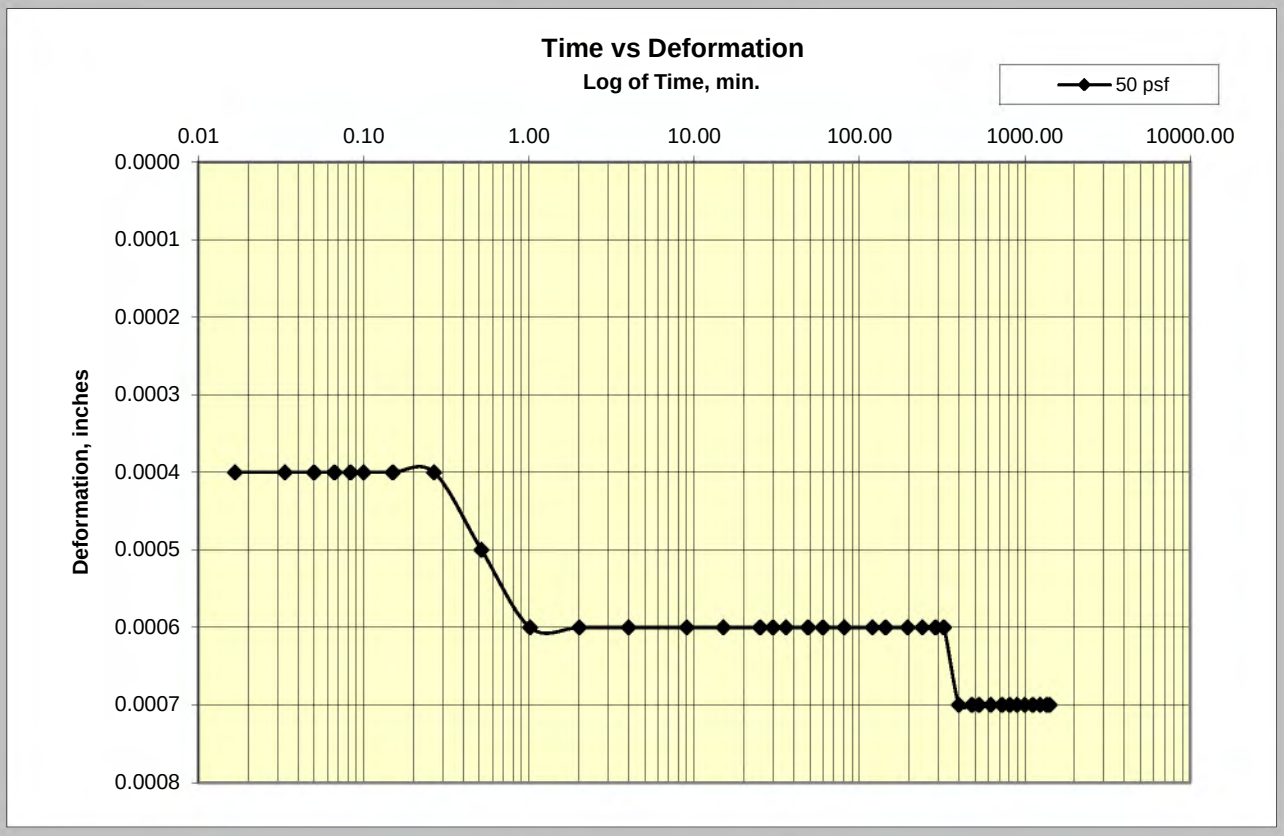


Assumed Gs 2.65	Initial	Final
Moisture %:	40.9	27.2
Dry Density, pcf:	78.6	96.2
Void Ratio:	1.104	0.720
% Saturation:	98.0	100.0

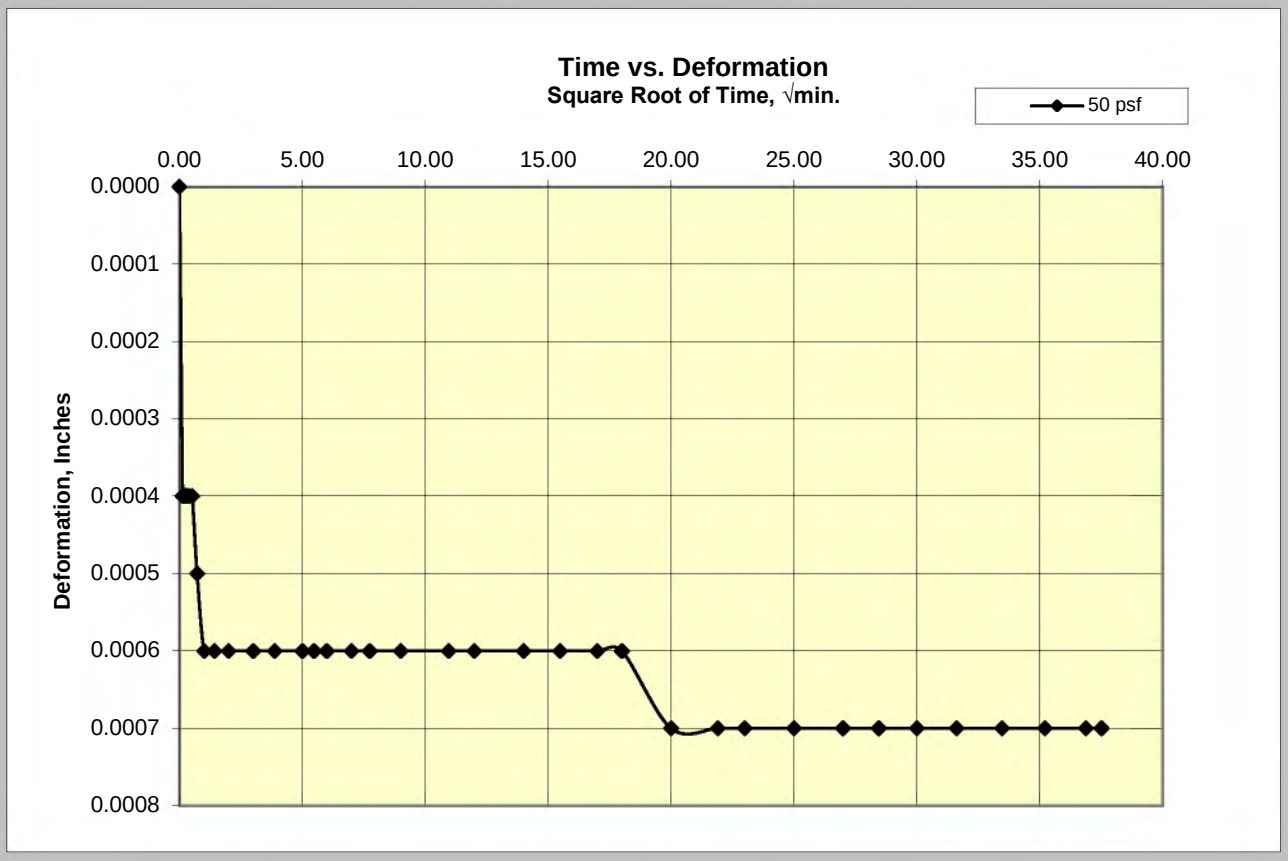
Remarks:

Cooper Testing Labs, Inc.

Load 1 | 50 psf

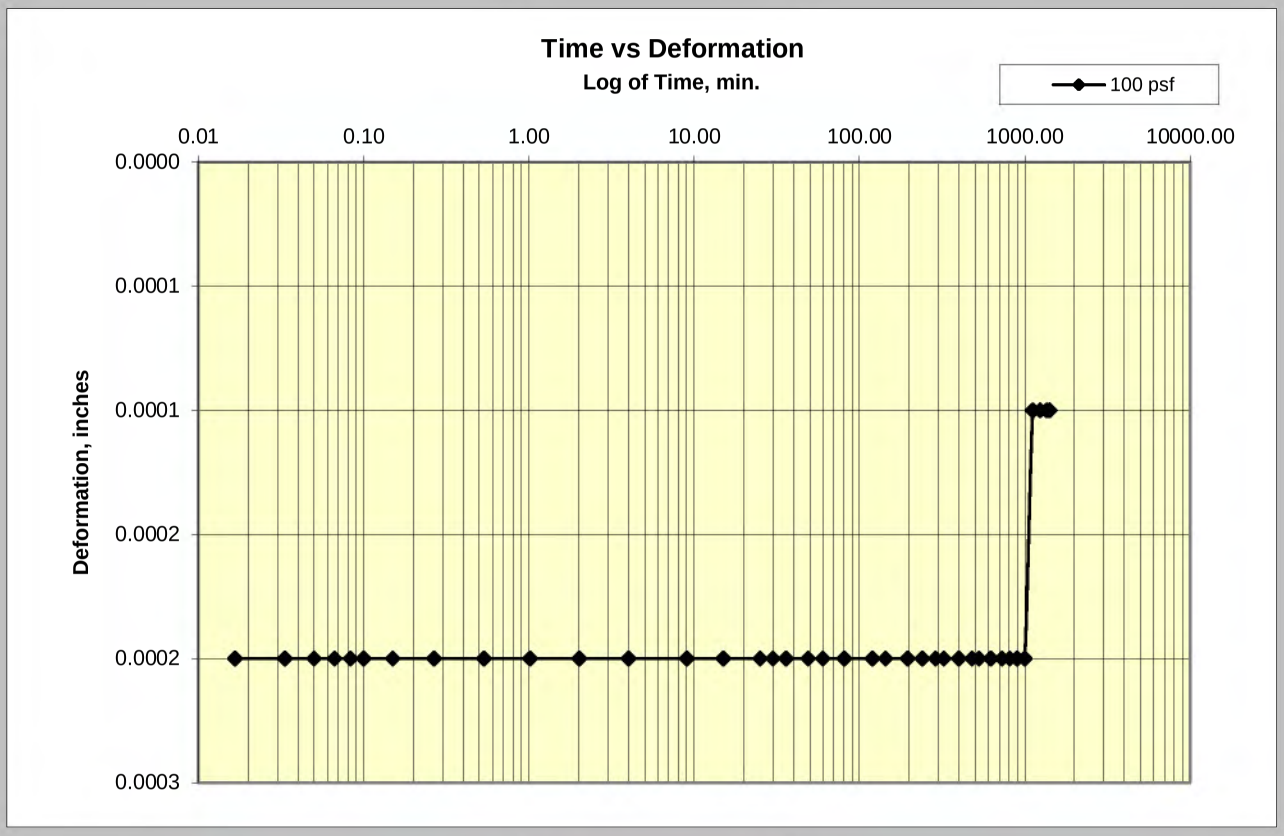


50 psf

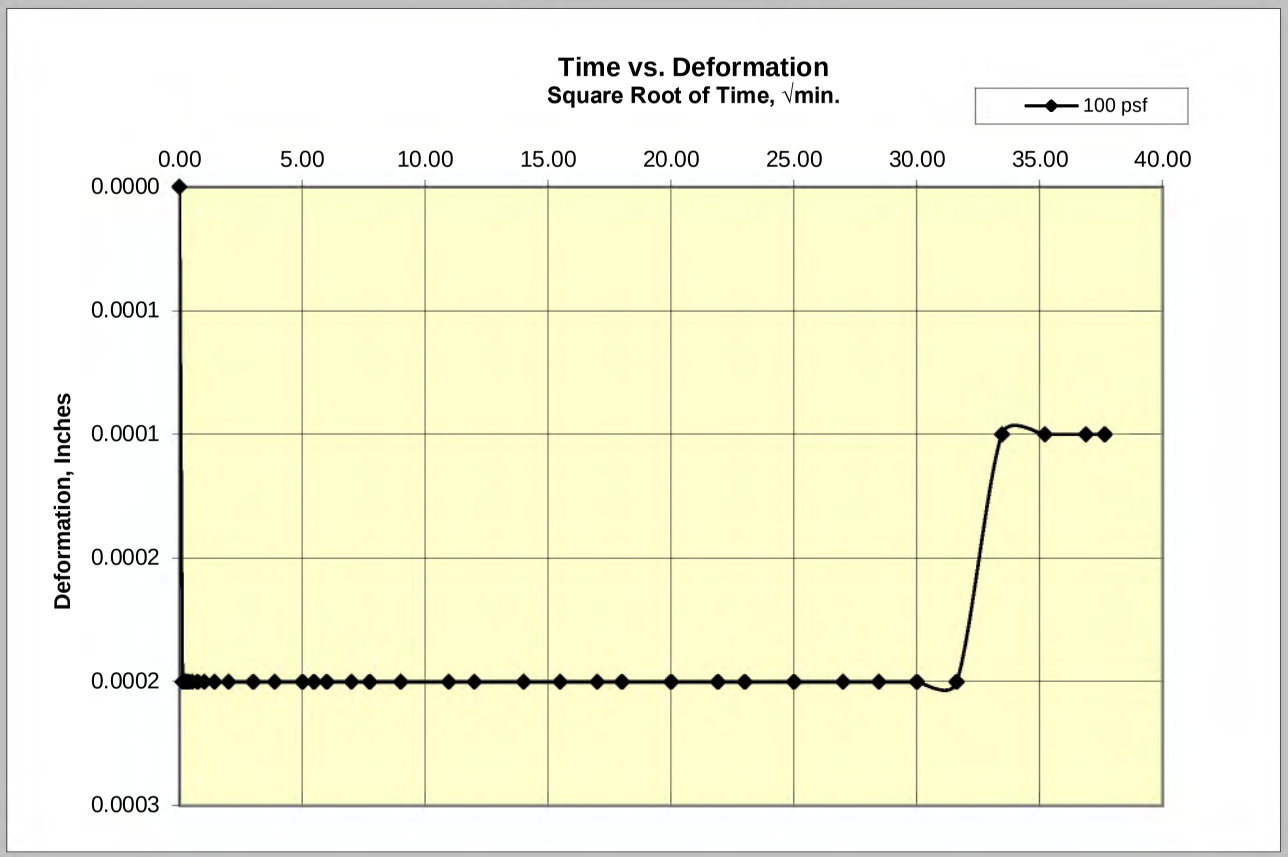


Cooper Testing Labs, Inc.

Load 2 | 100 psf



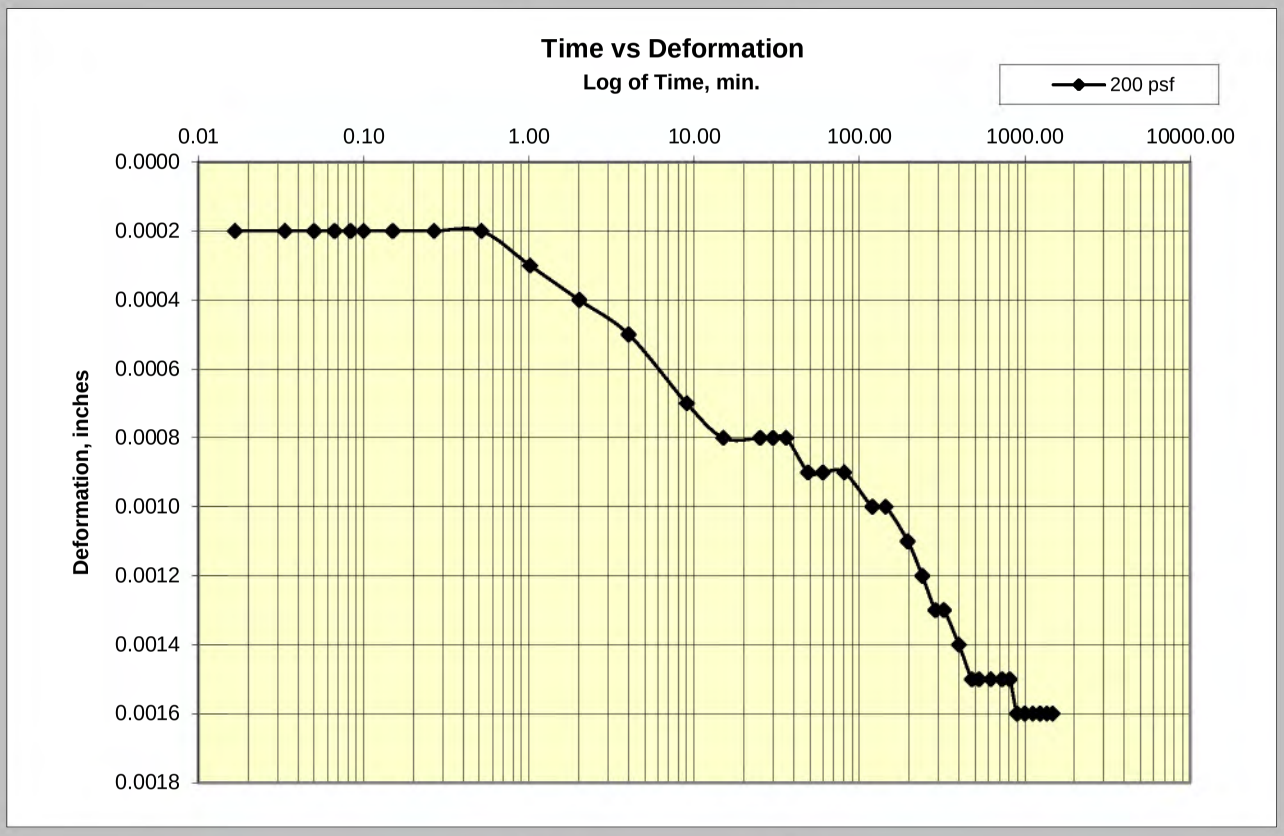
100 psf



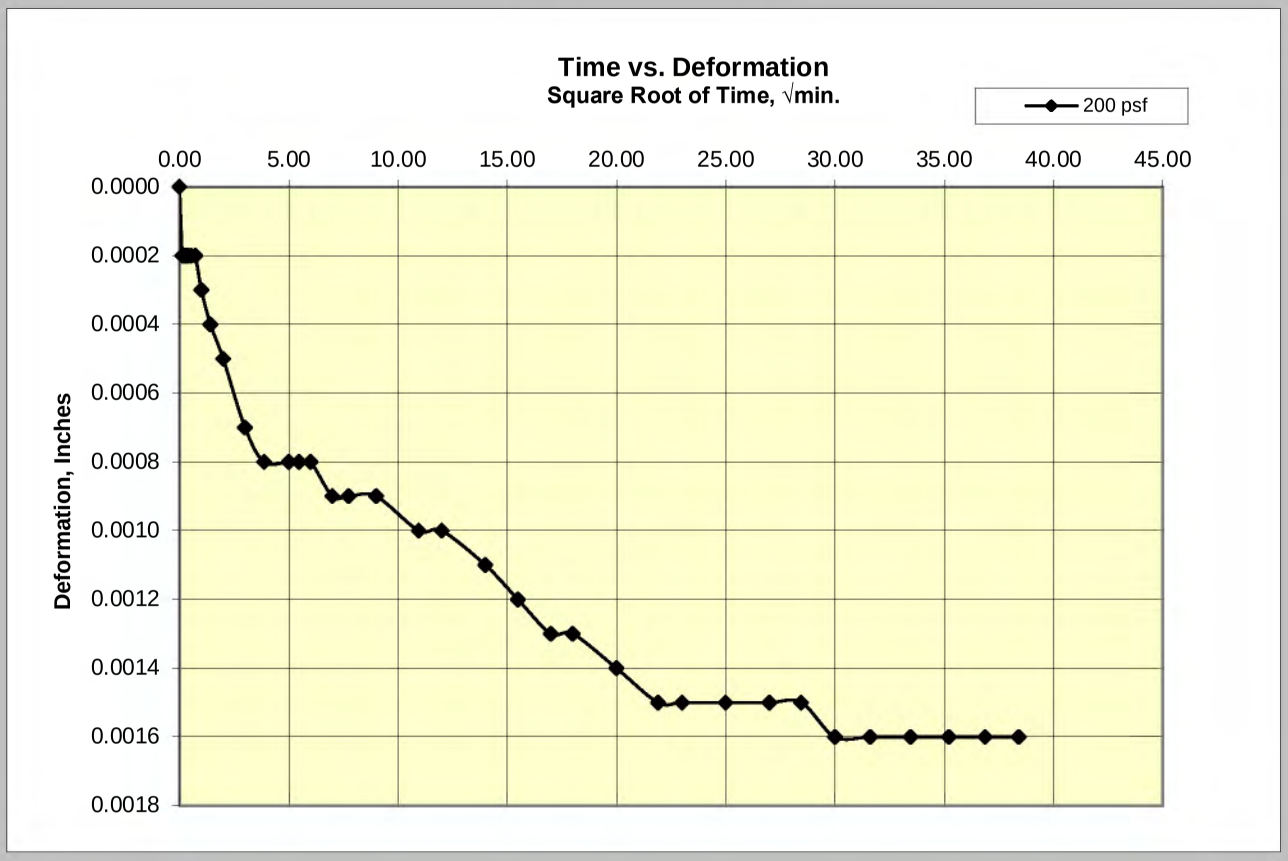
Cooper Testing Labs, Inc.

Load 3

200 psf

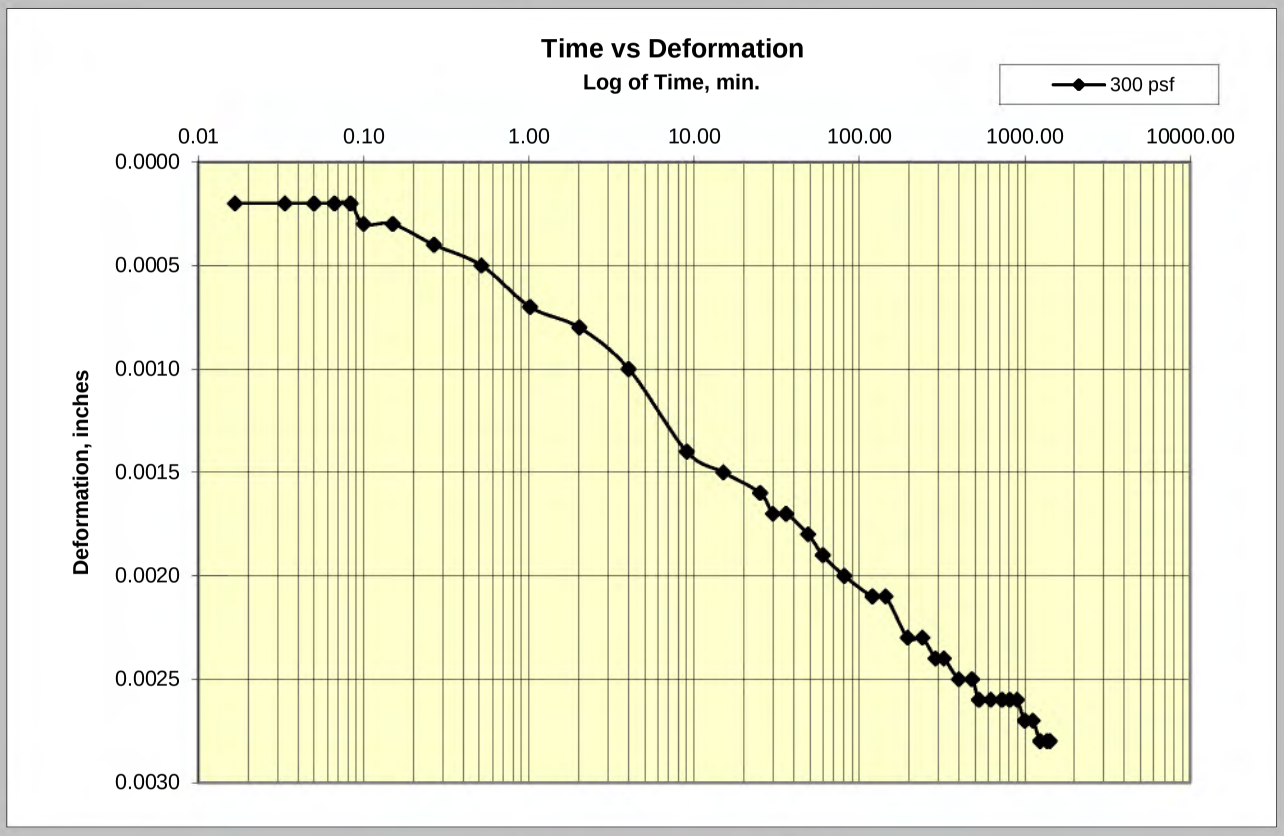


200 psf

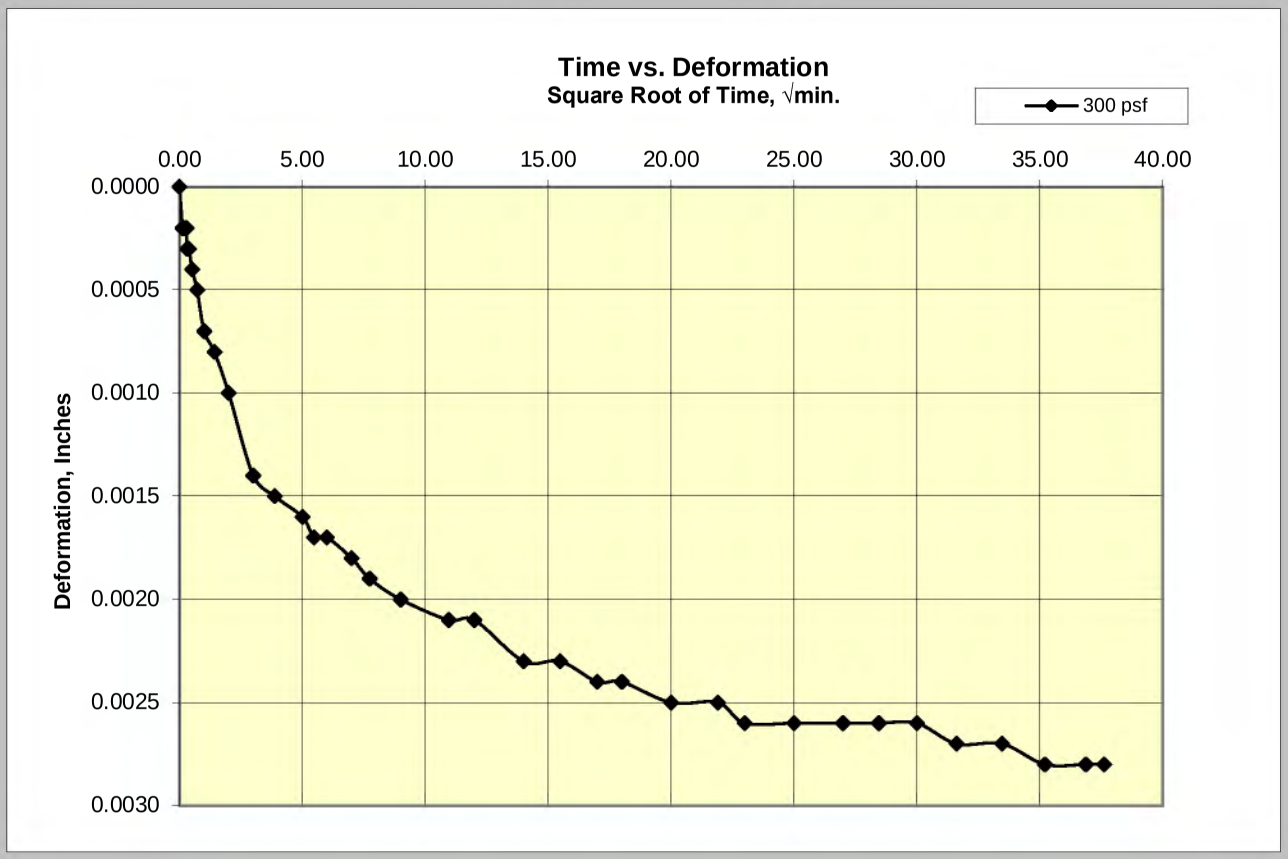


Cooper Testing Labs, Inc.

Load 4 | 300 psf

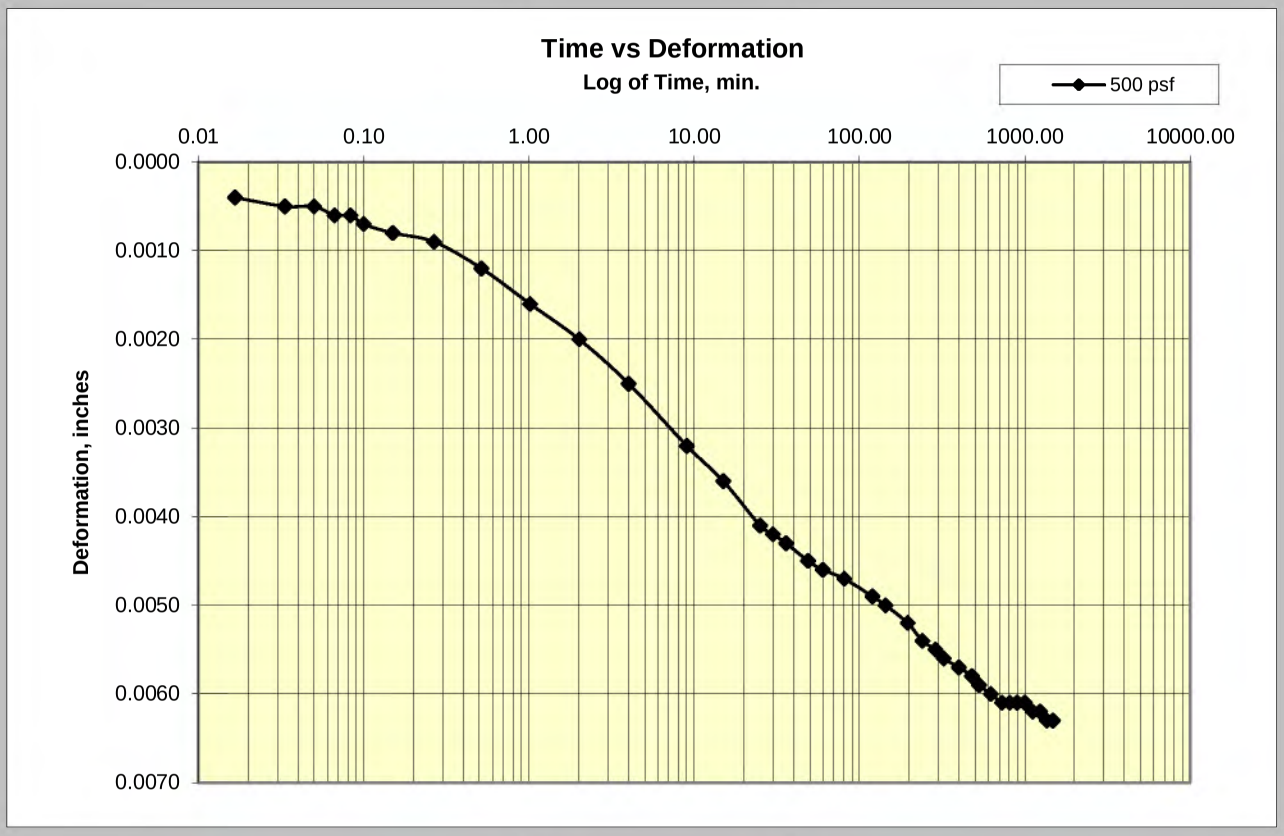


300 psf

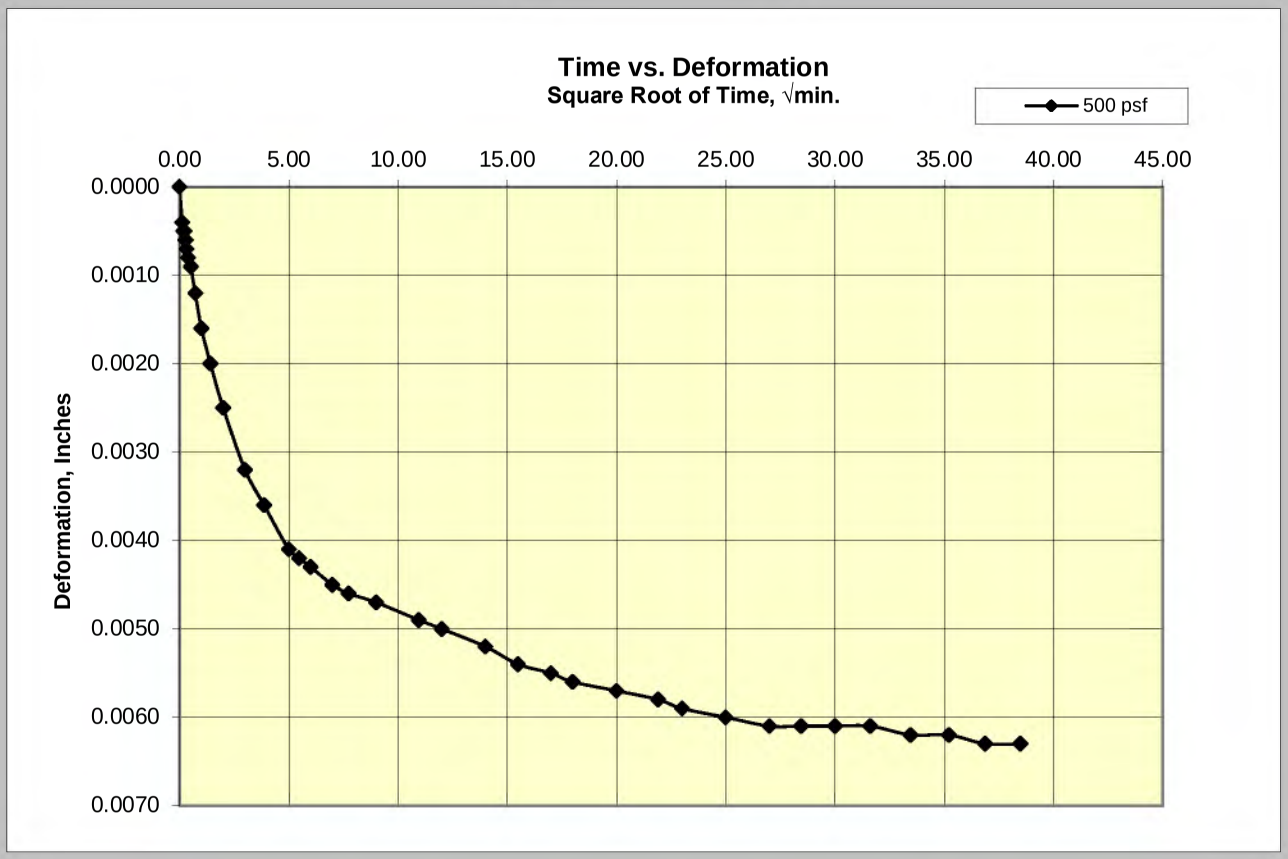


Cooper Testing Labs, Inc.

Load 5 | 500 psf

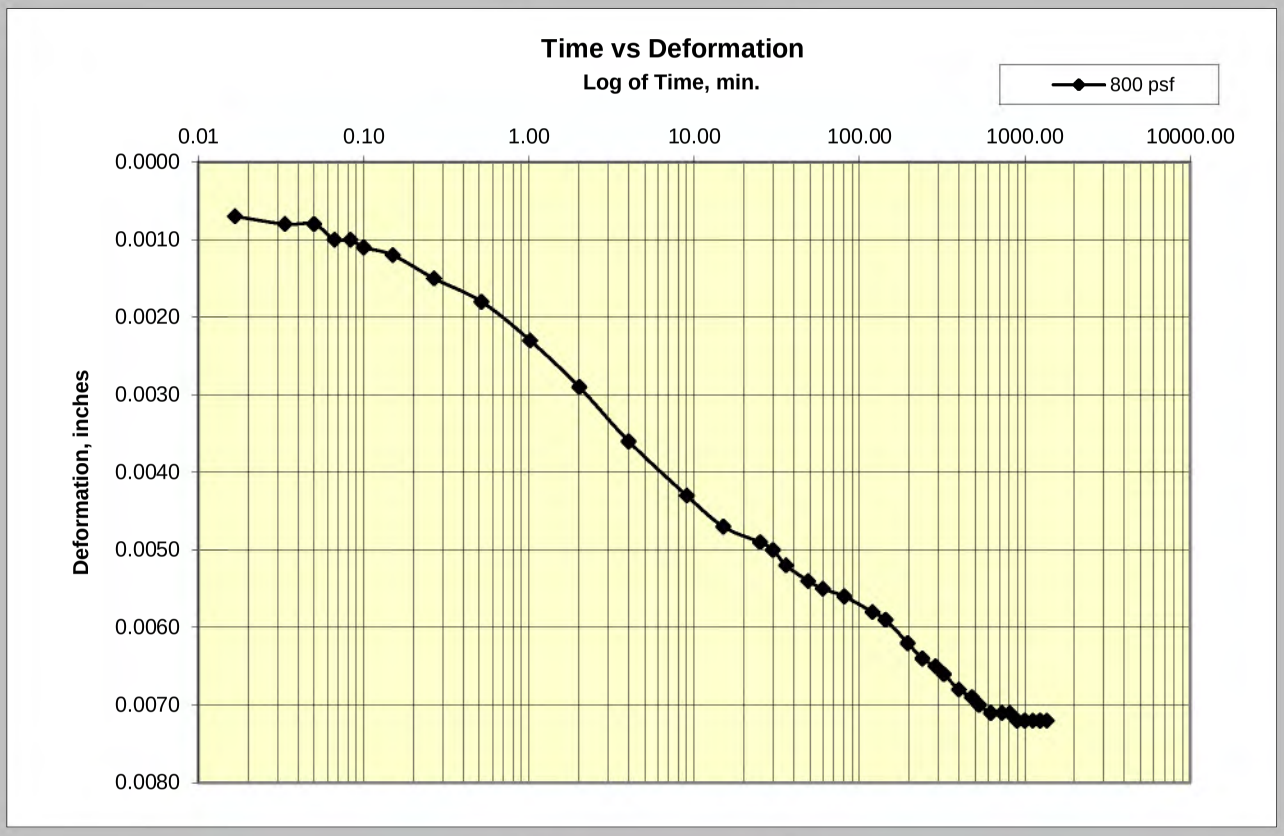


500 psf

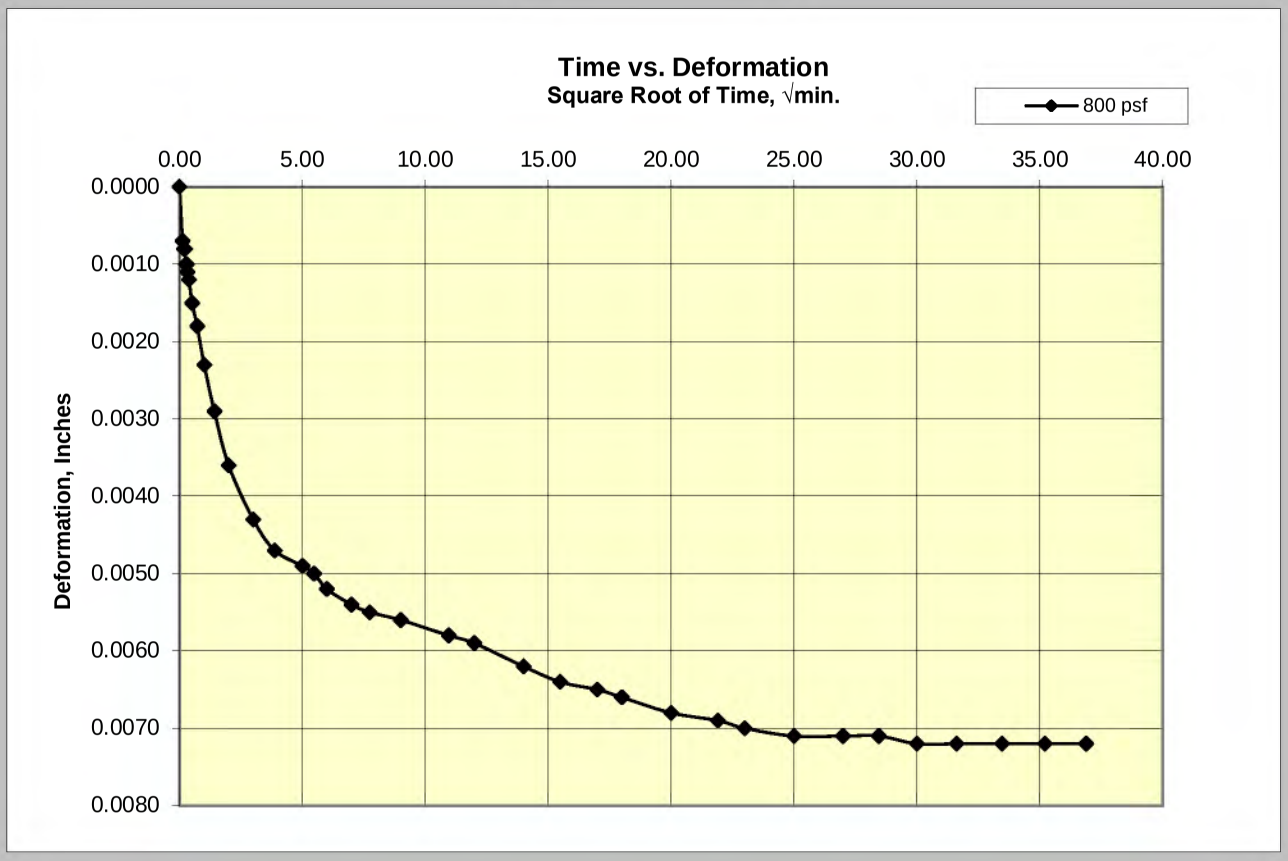


Cooper Testing Labs, Inc.

Load 6 | 800 psf

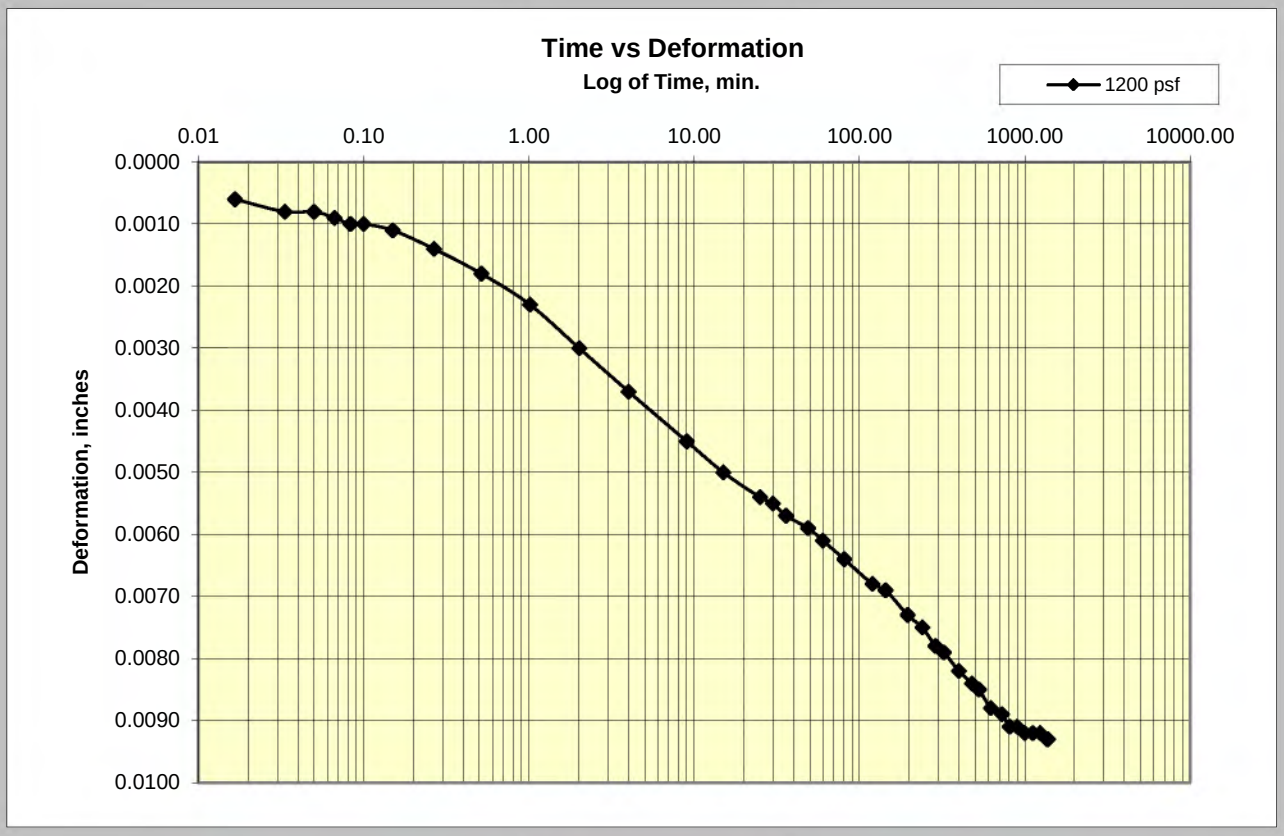


800 psf

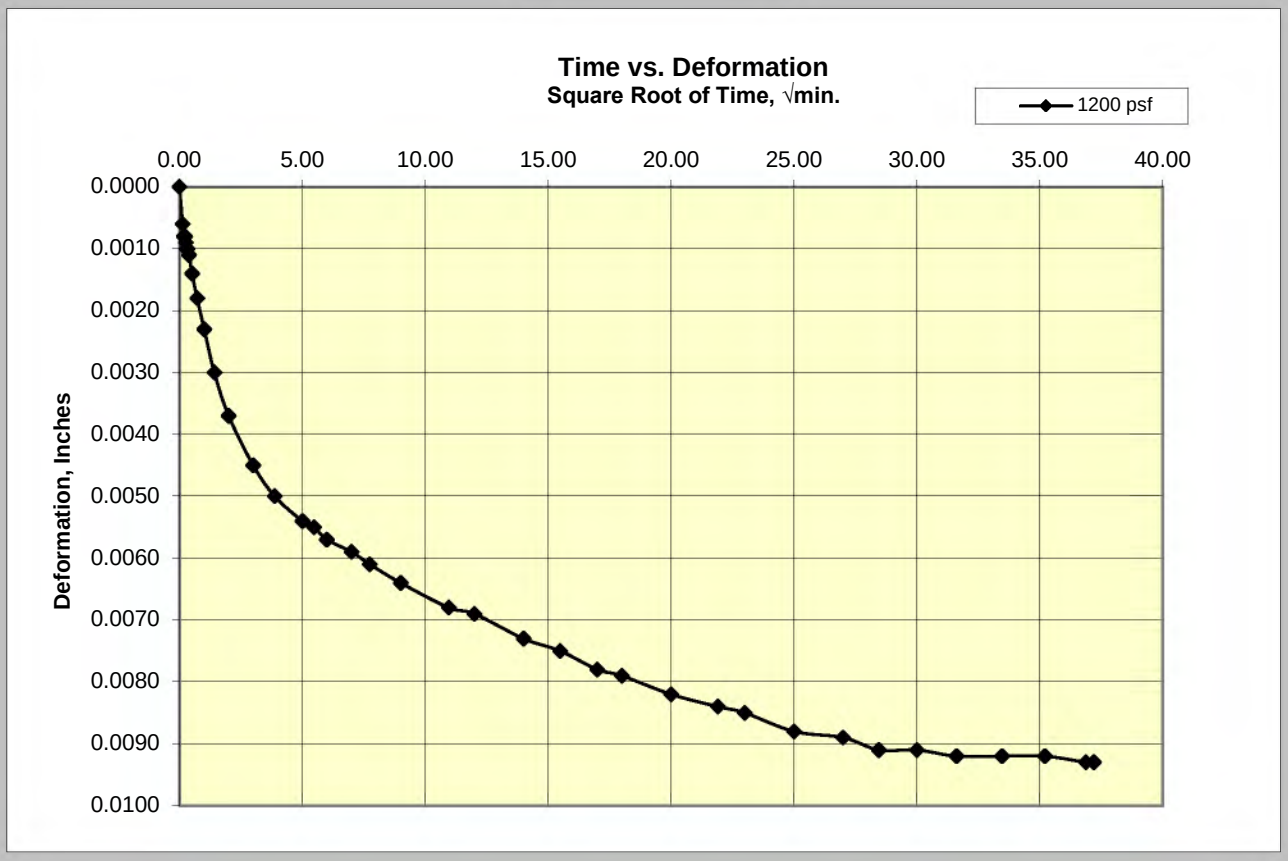


Cooper Testing Labs, Inc.

Load 7 | 1200 psf

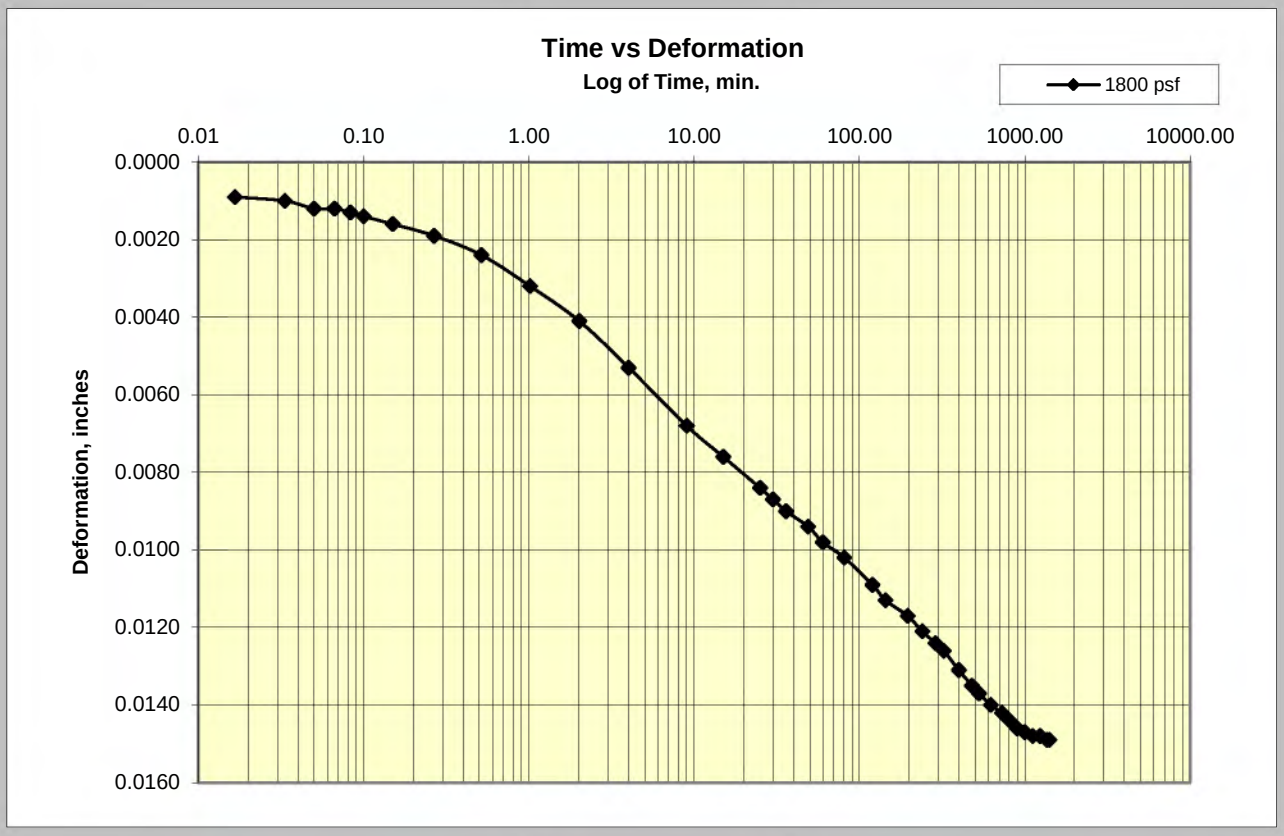


1200 psf

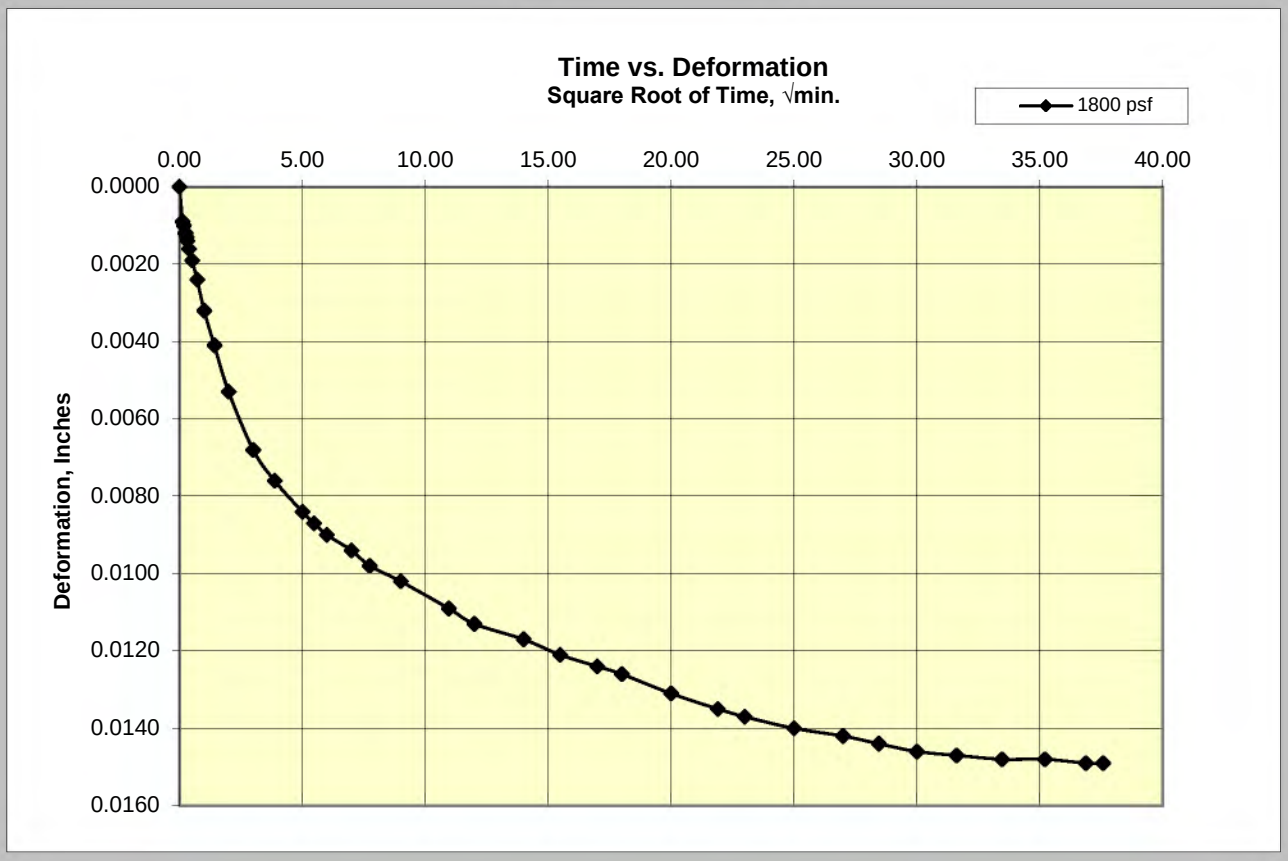


Cooper Testing Labs, Inc.

Load 8 | 1800 psf

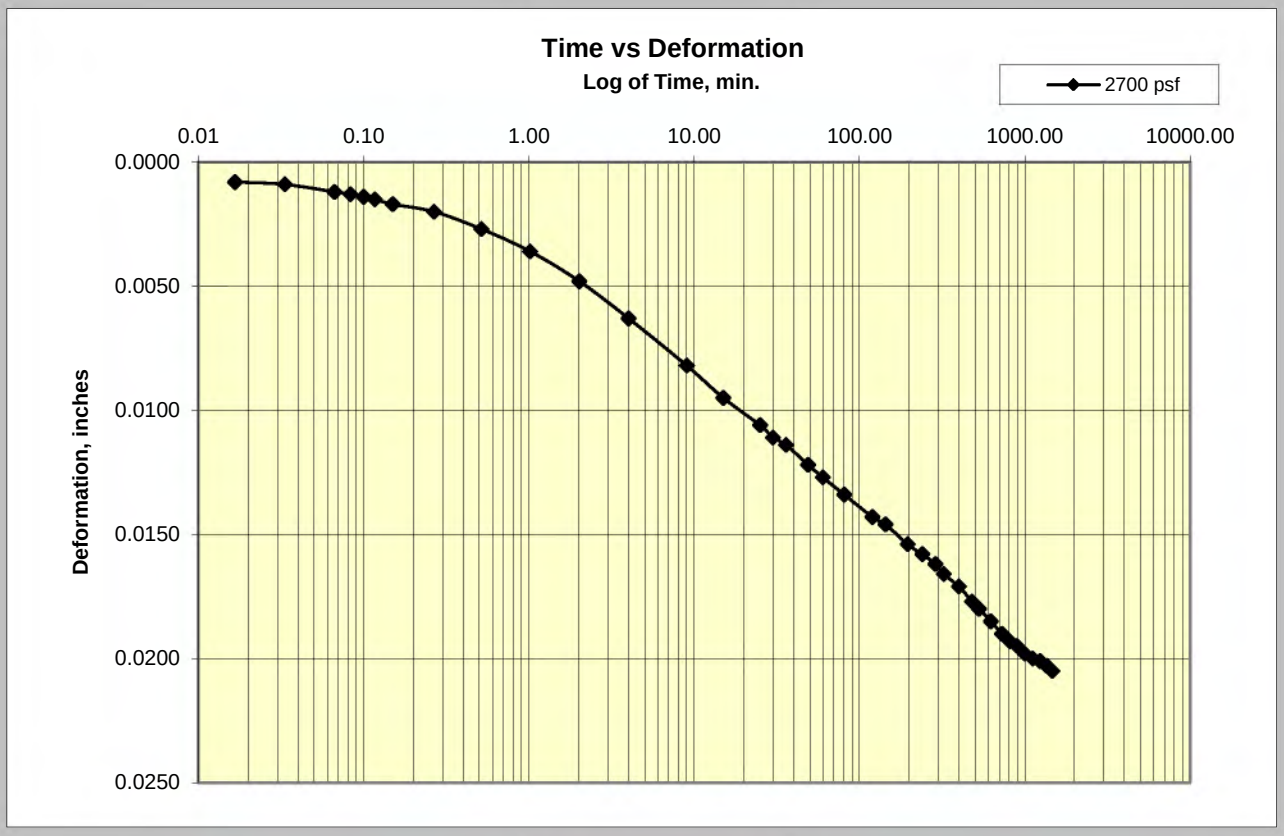


1800 psf

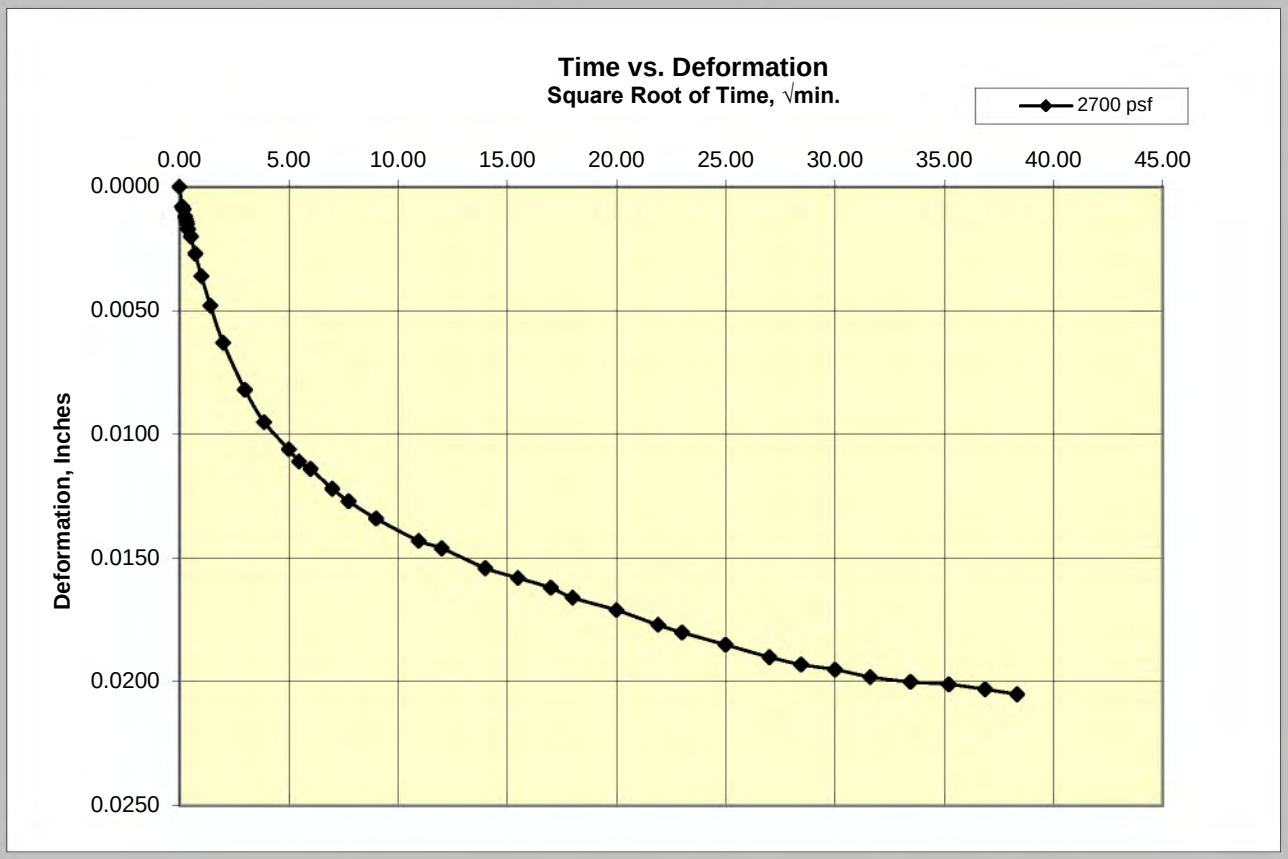


Cooper Testing Labs, Inc.

Load 9 | 2700 psf



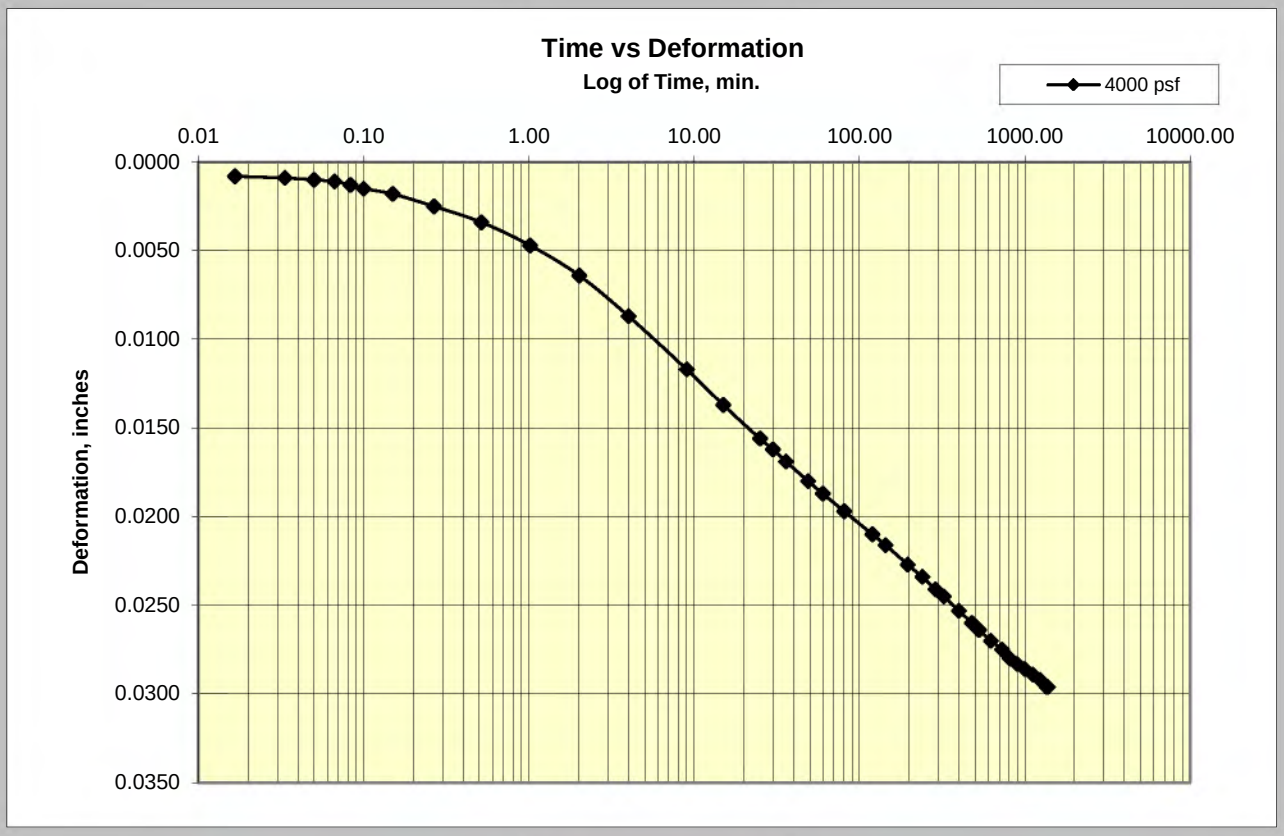
2700 psf



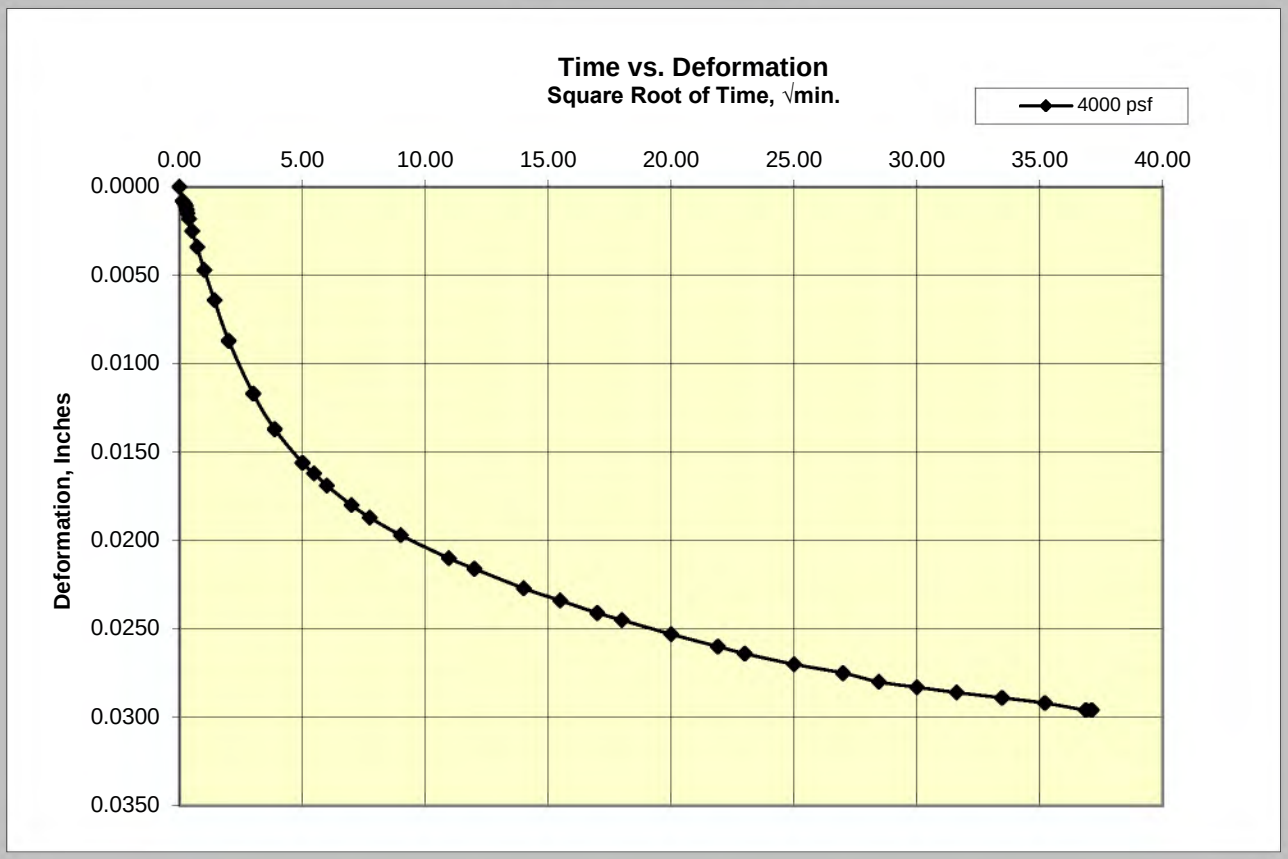
Cooper Testing Labs, Inc.

Load 10

4000 psf

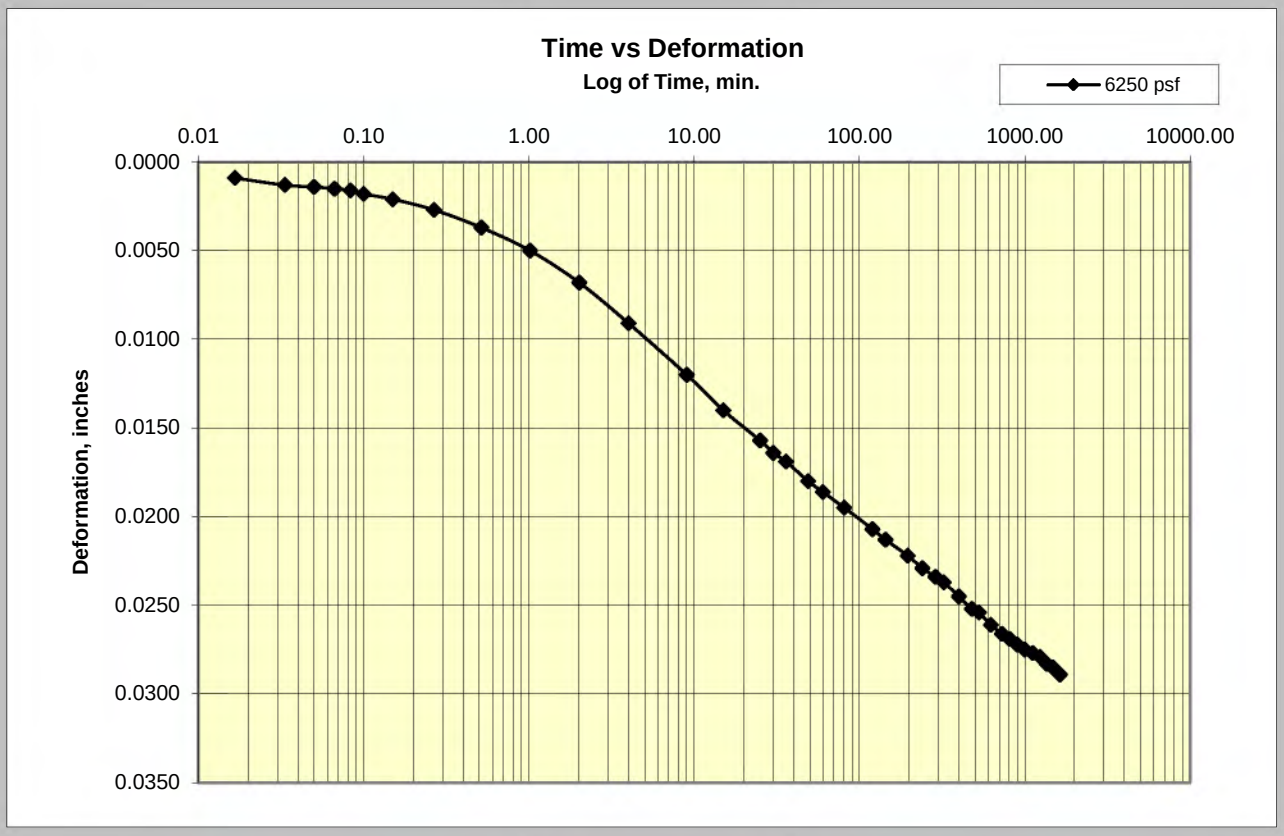


4000 psf

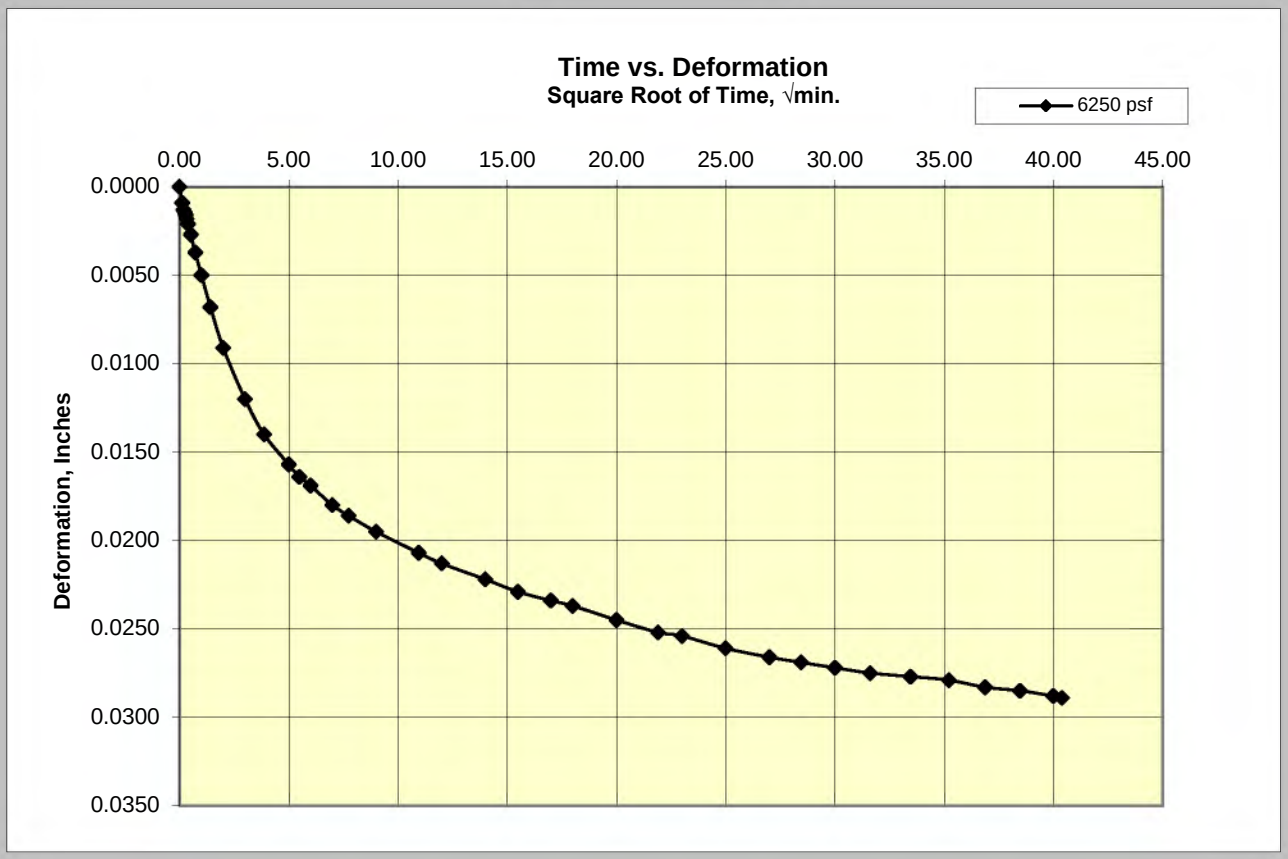


Cooper Testing Labs, Inc.

Load 11 | 6250 psf

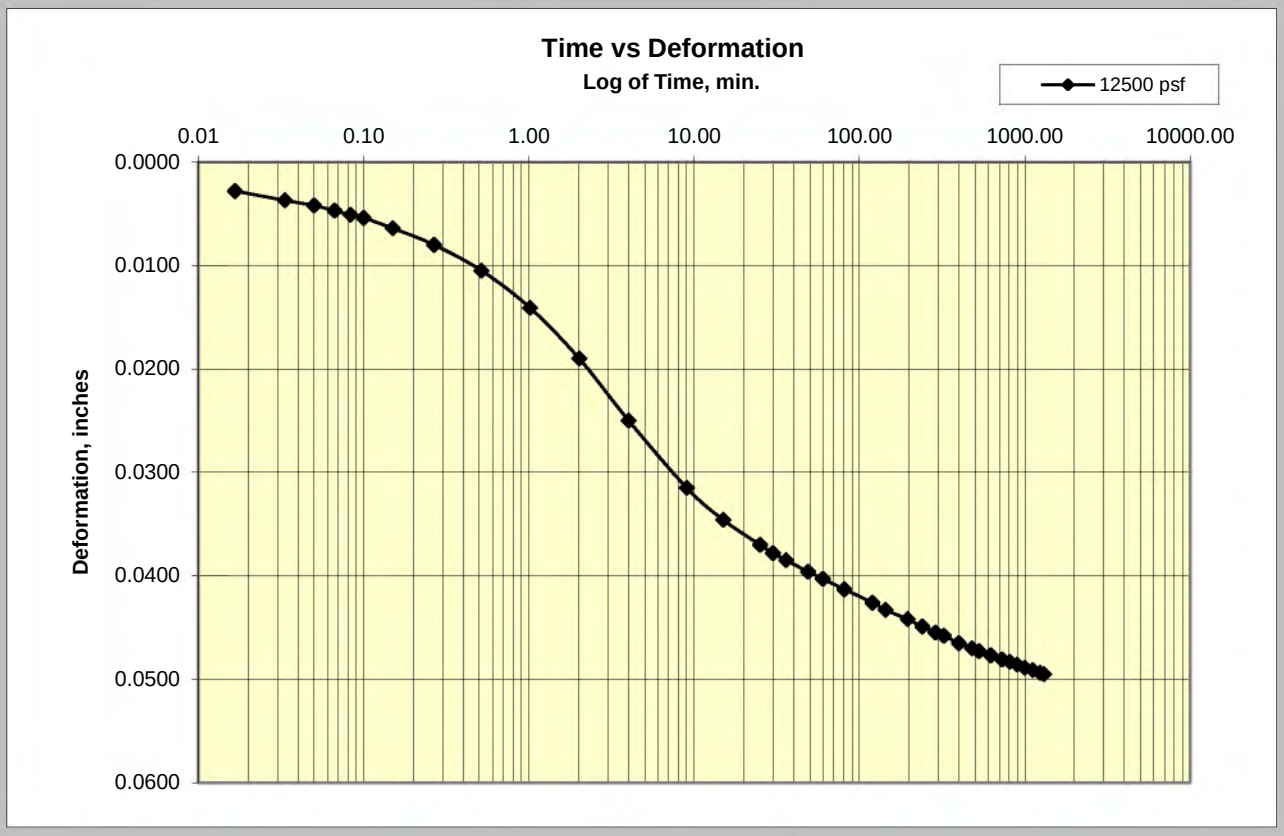


6250 psf

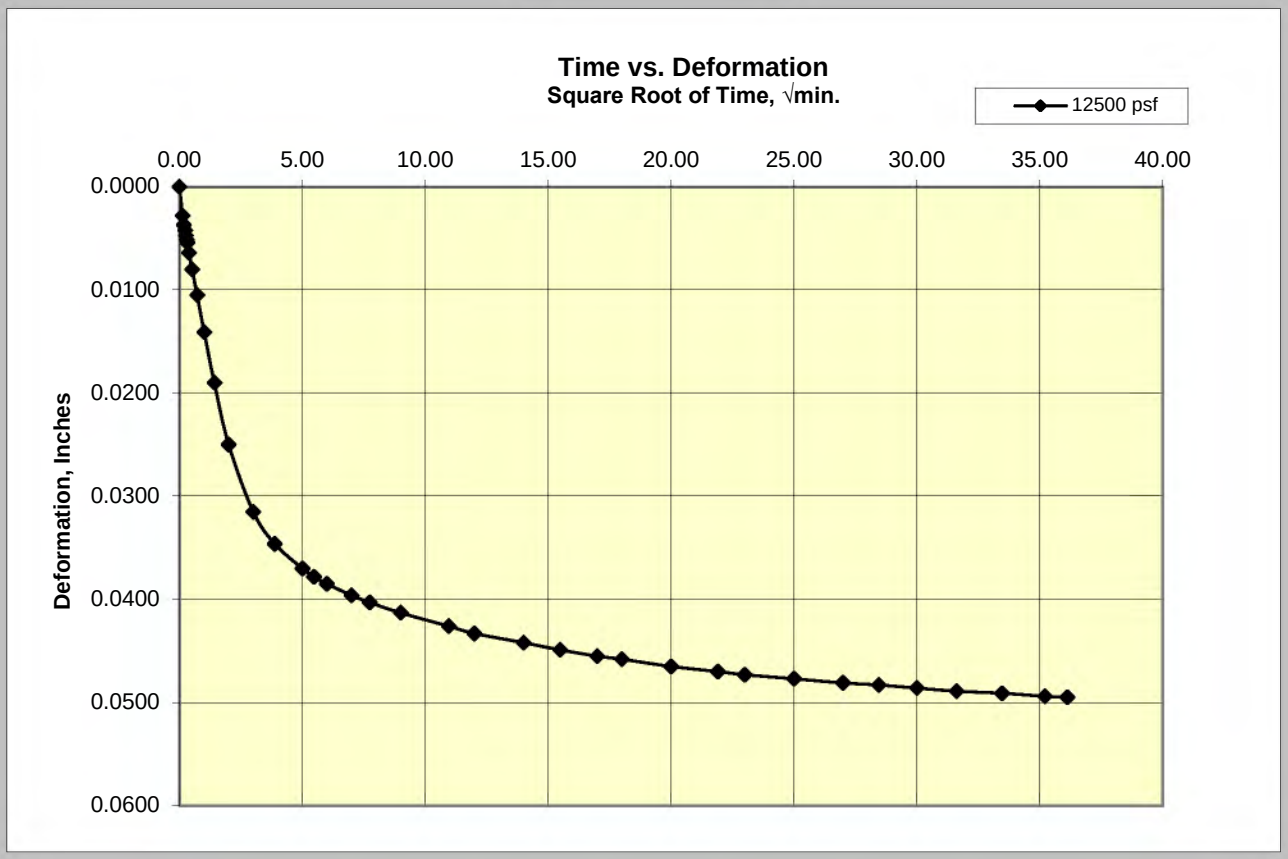


Cooper Testing Labs, Inc.

Load 12 | 12500 psf

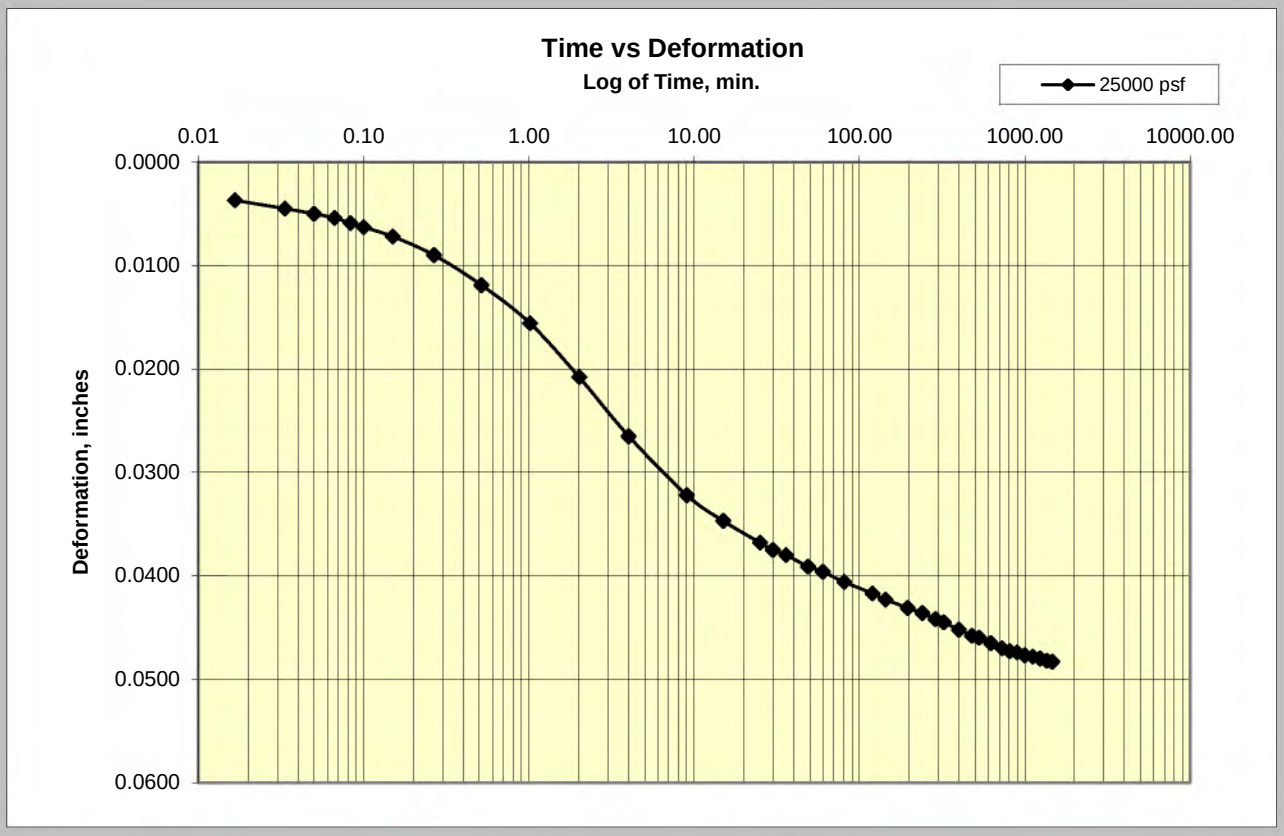


12500 psf

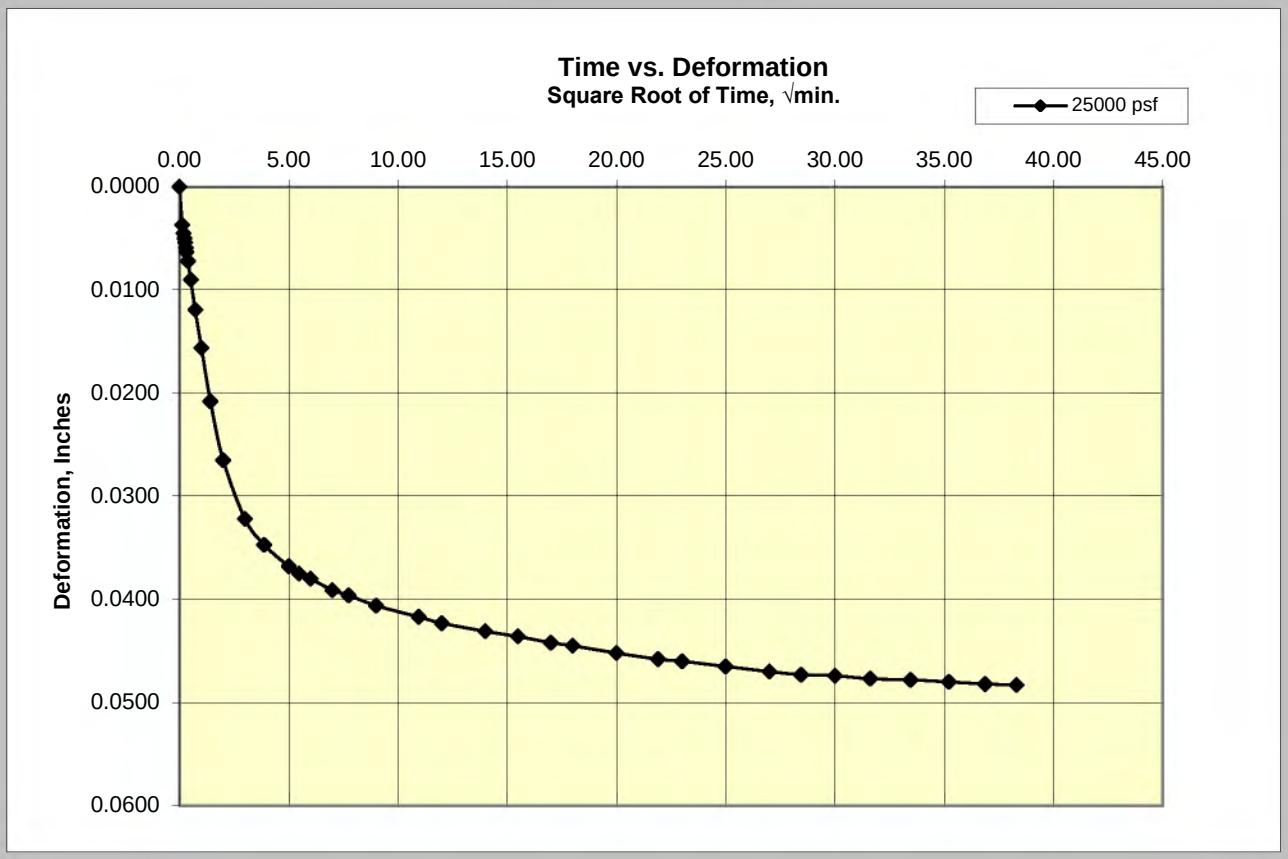


Cooper Testing Labs, Inc.

Load 13 | 25000 psf

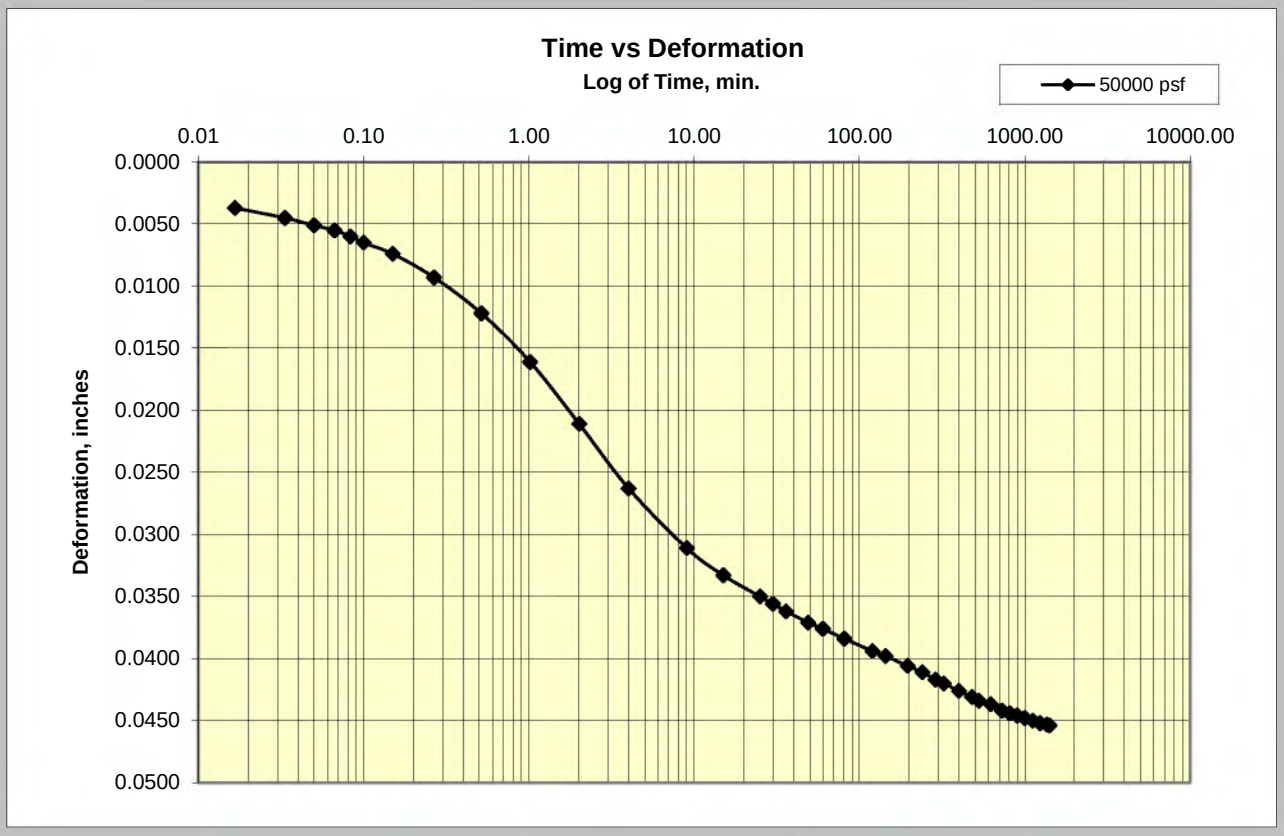


25000 psf

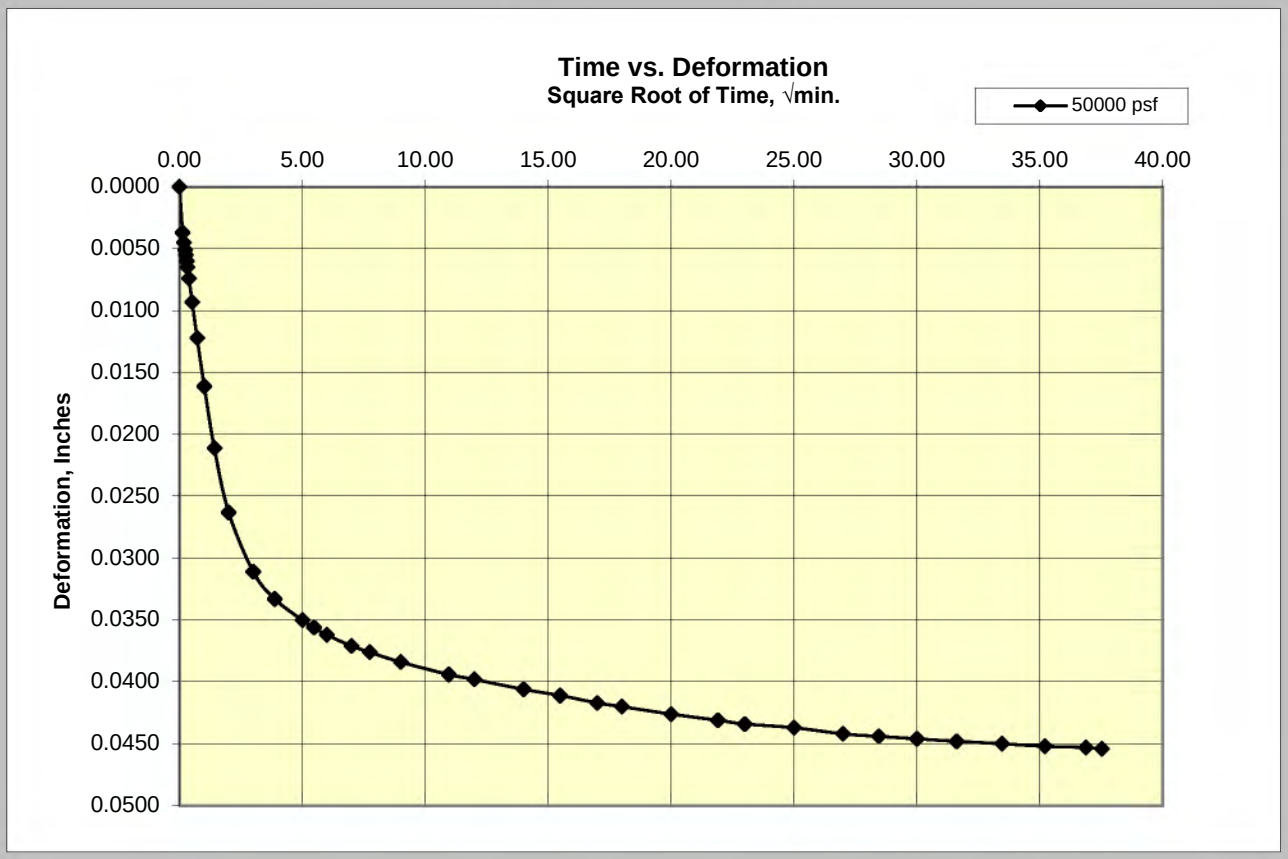


Cooper Testing Labs, Inc.

Load 14 | 50000 psf



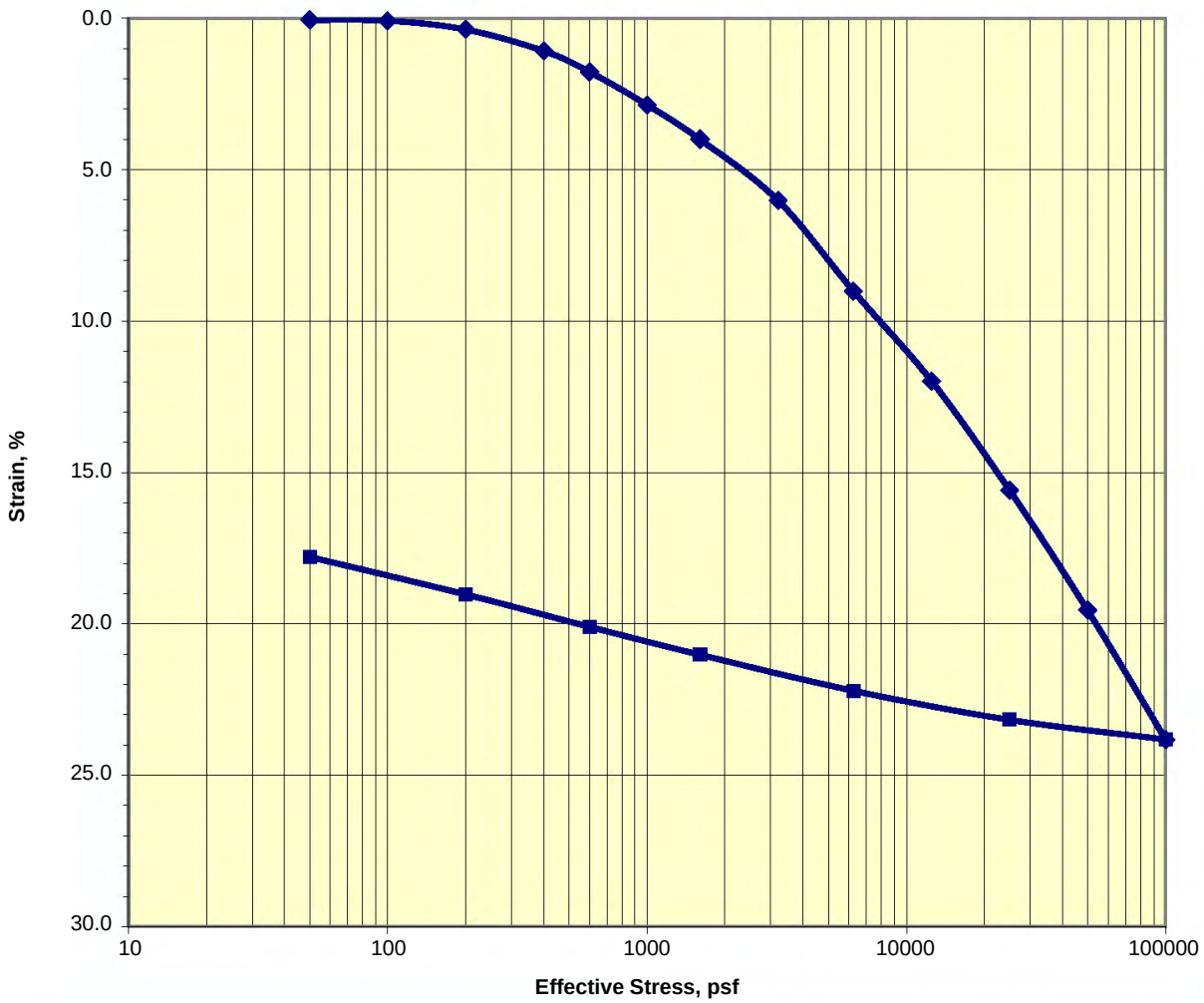
50000 psf



Consolidation Test
ASTM D2435

Job No.:	054-187	**Boring:**	22-B02	**Run By:**	MD
Client:	SHN Engineers	**Sample:**	S9	**Reduced:**	PJ
Project:	022054.400	**Depth, ft.:**	45-47.5	**Checked:**	PJ/DC
Soil Type:	Gray Sandy Lean CLAY (Bay Mud)			**Date:**	8/2/2022

Strain-Log-P Curve

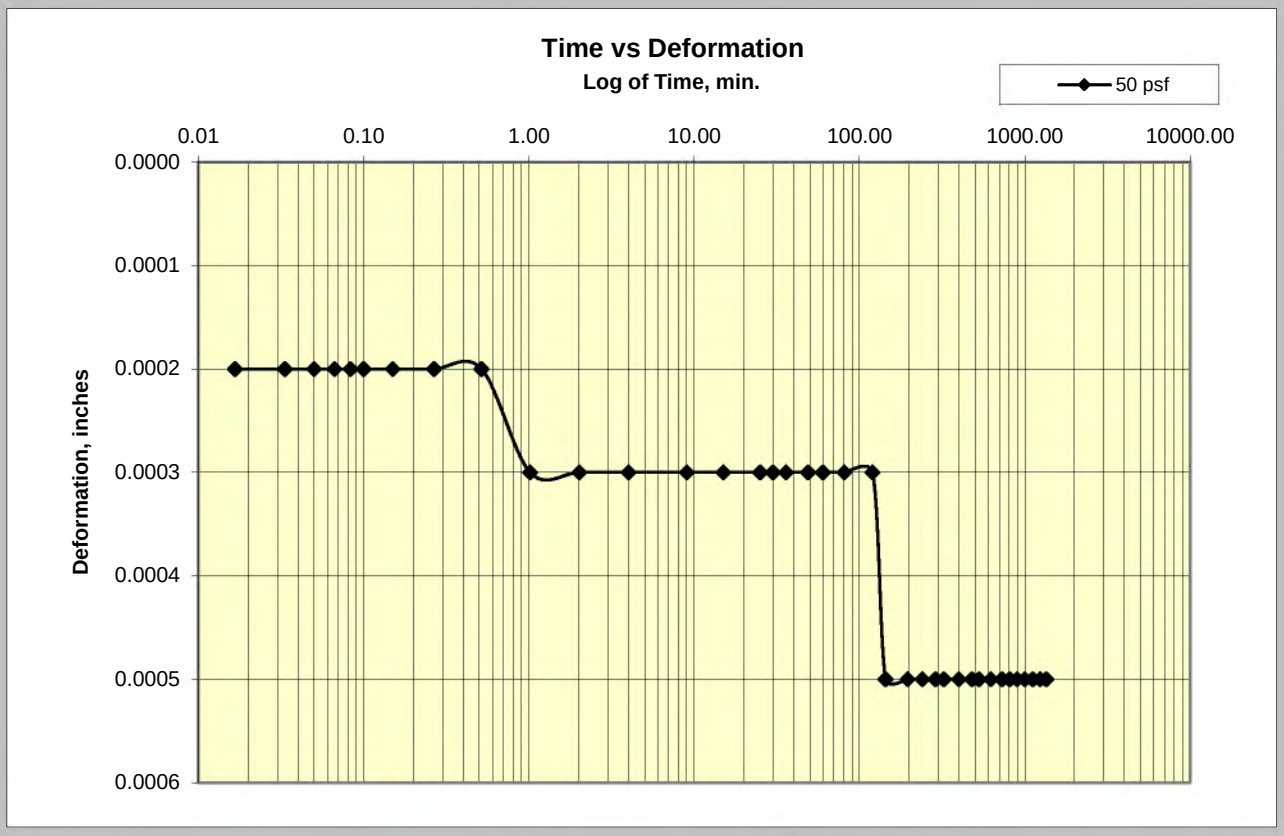


Assumed Gs 2.65	Initial	Final
Moisture %:	30.4	19.1
Dry Density, pcf:	90.7	109.8
Void Ratio:	0.825	0.507
% Saturation:	97.6	100.0

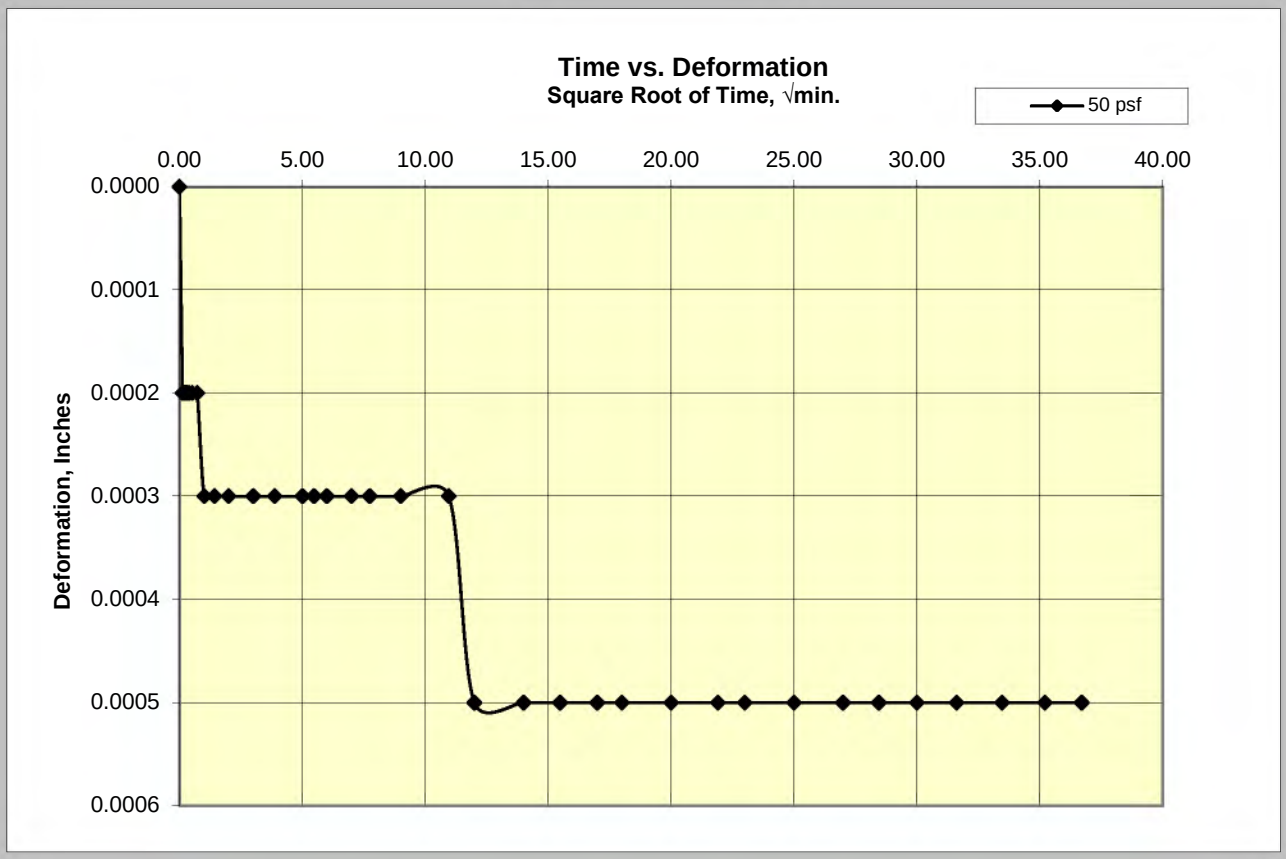
Remarks:

Cooper Testing Labs, Inc.

Load 1 | 50 psf

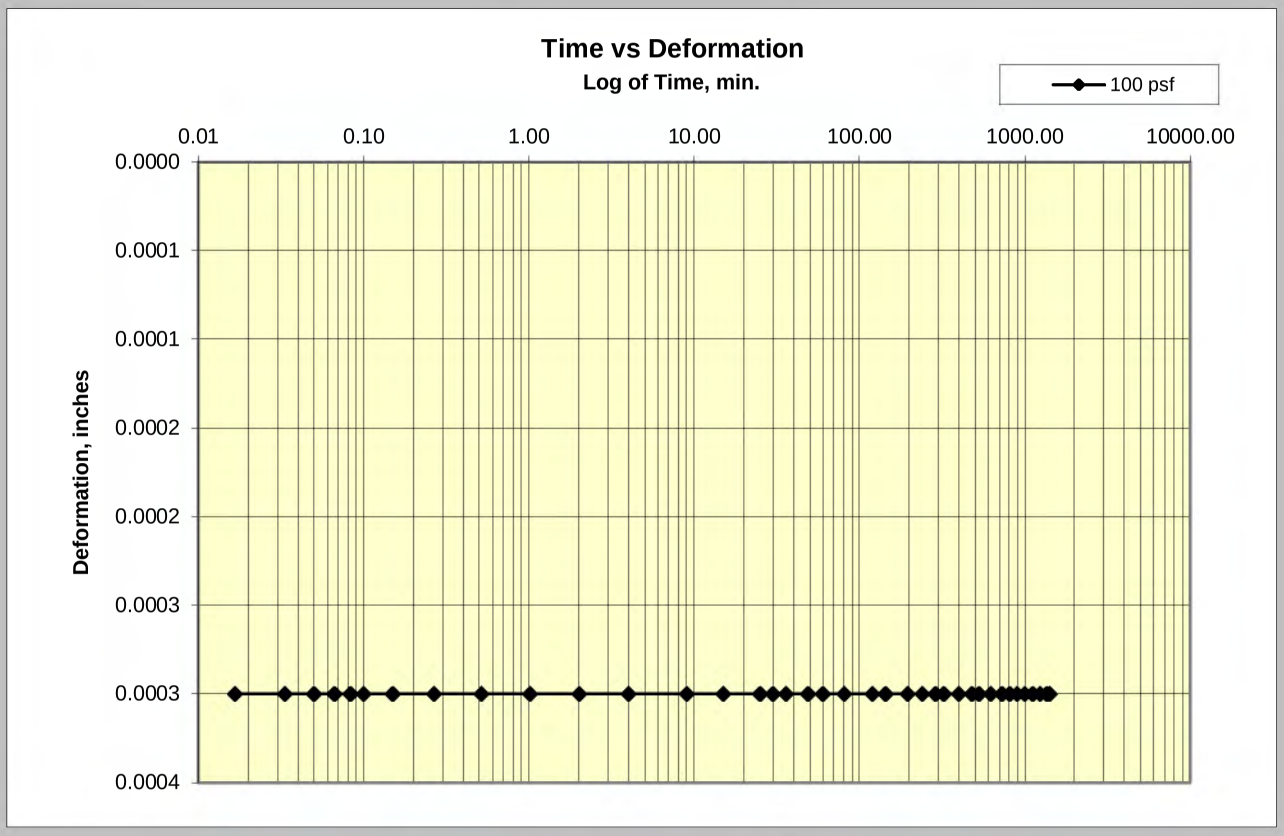


50 psf

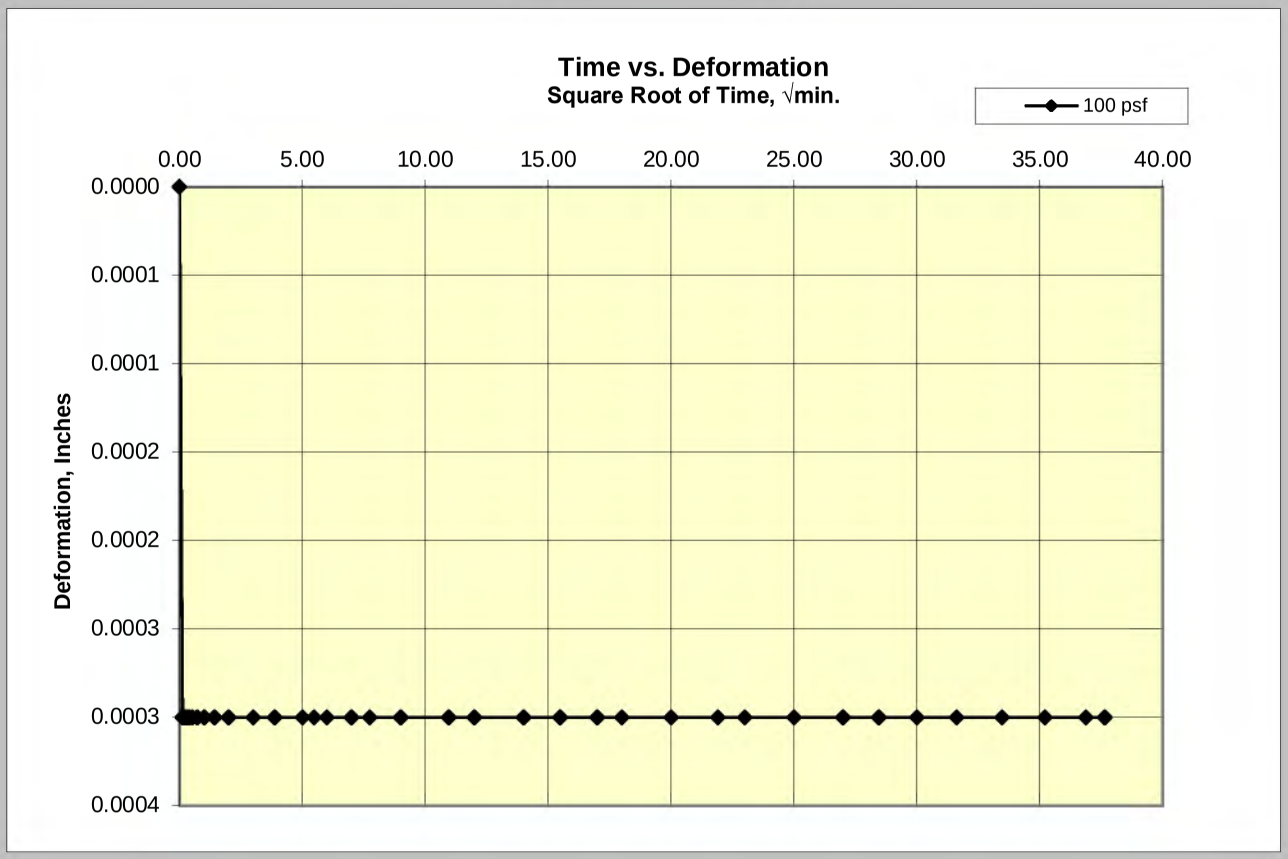


Cooper Testing Labs, Inc.

Load 2 | 100 psf

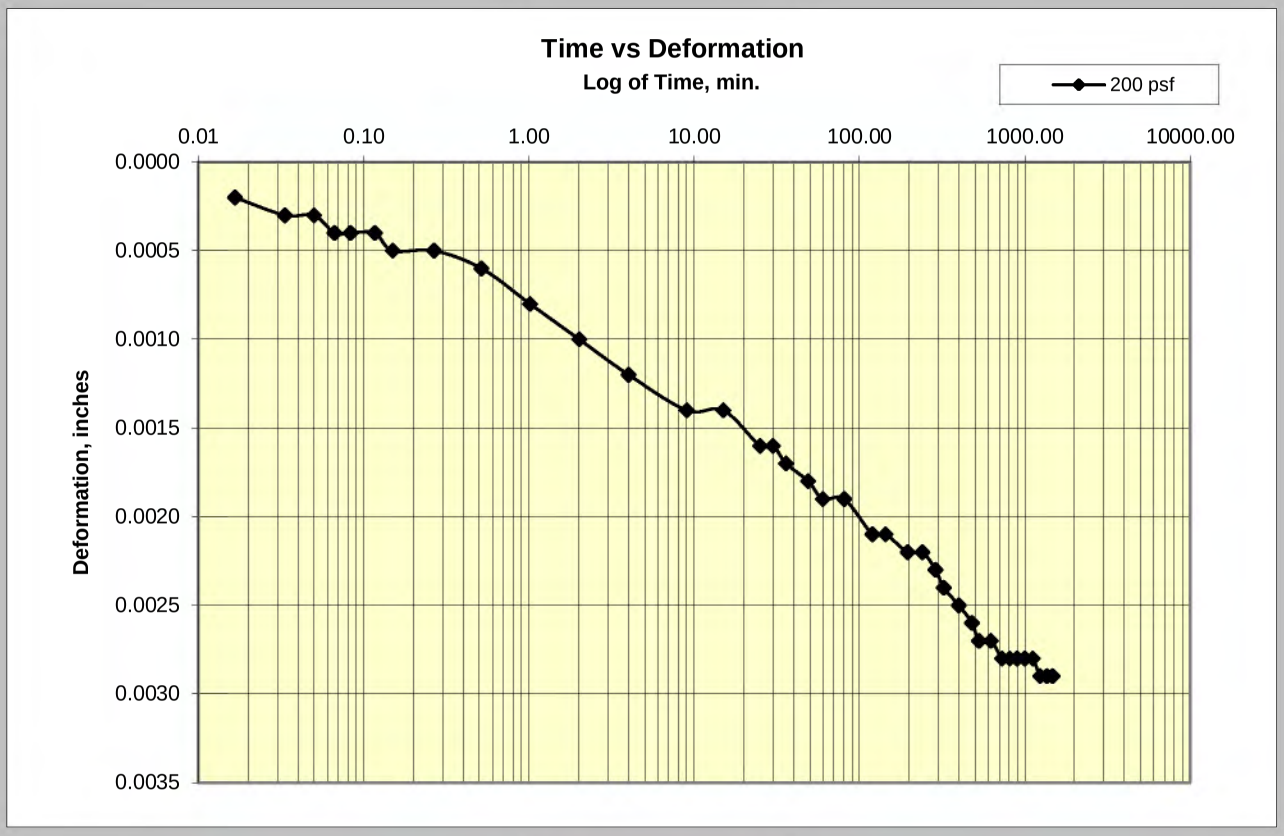


100 psf

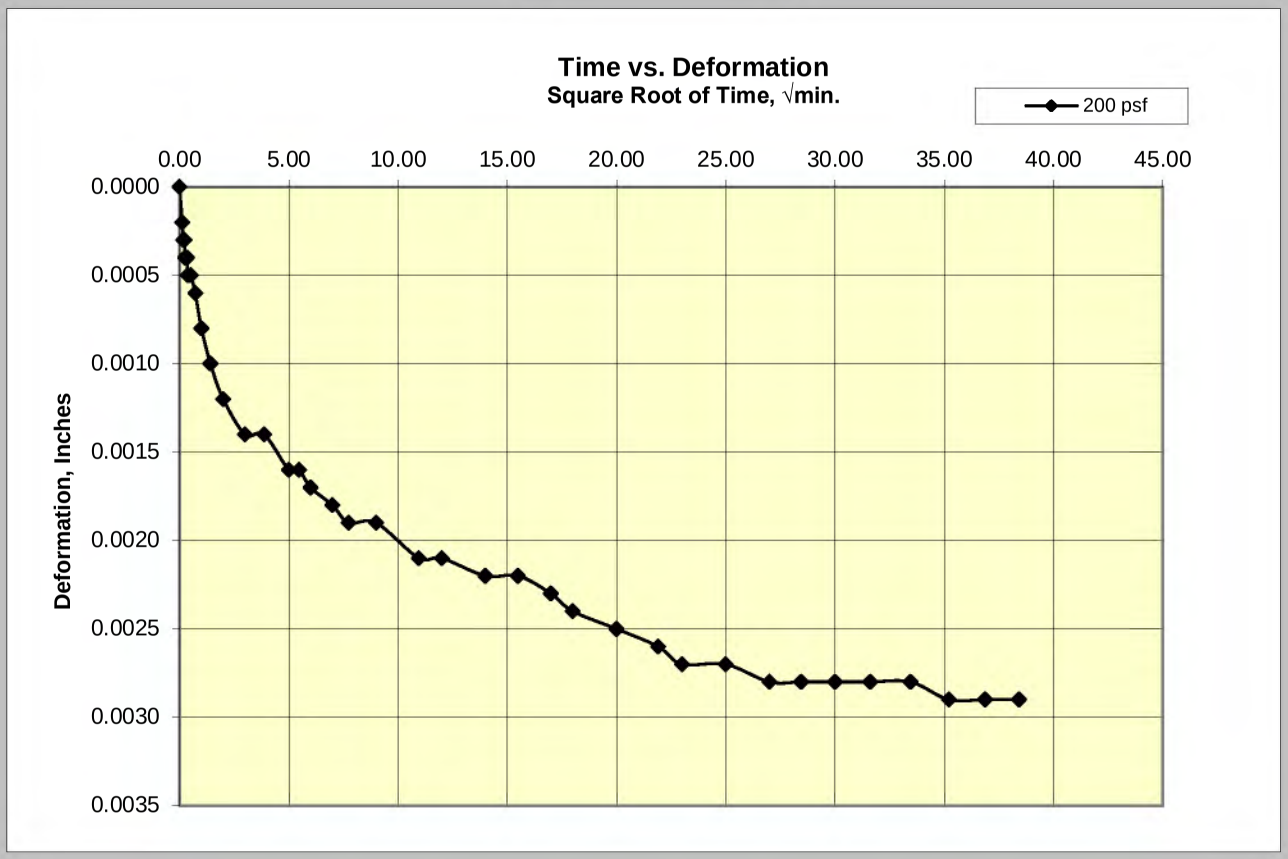


Cooper Testing Labs, Inc.

Load 3 | 200 psf

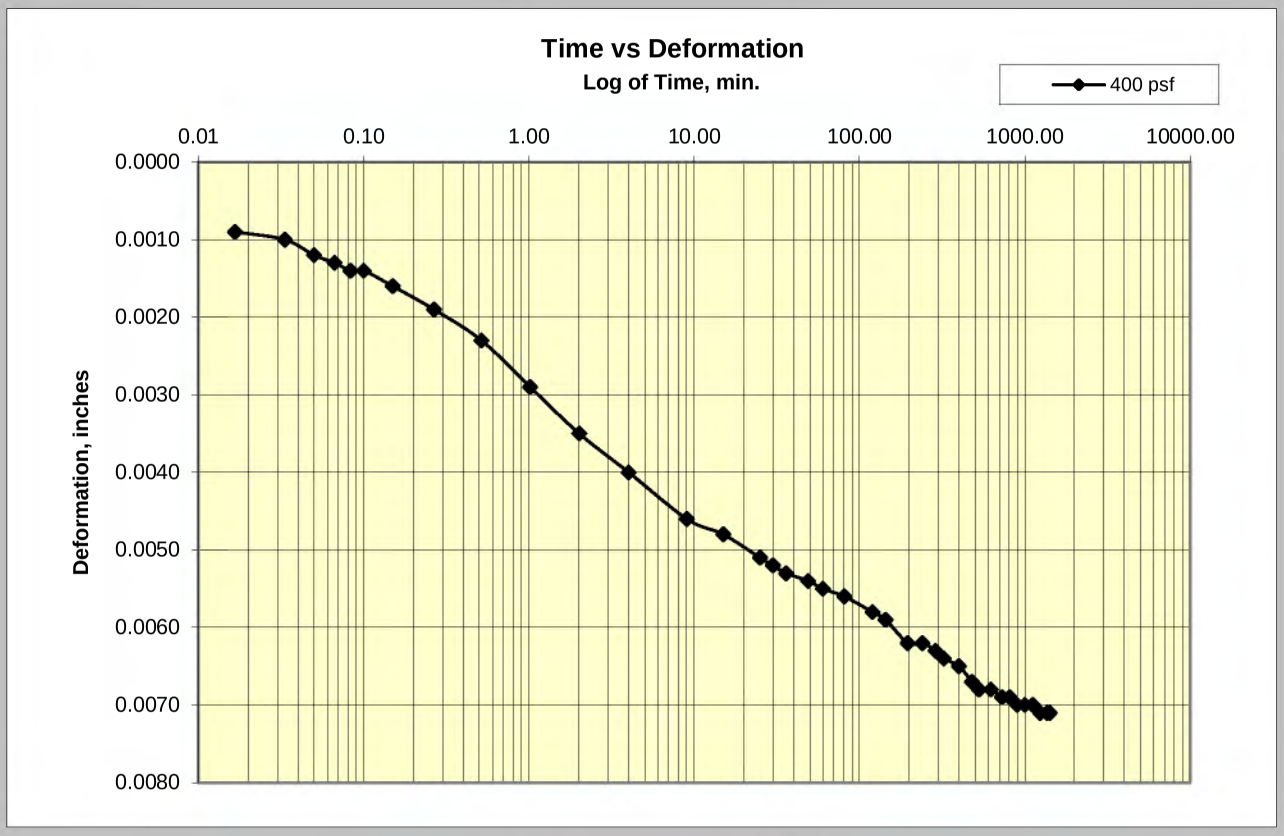


200 psf

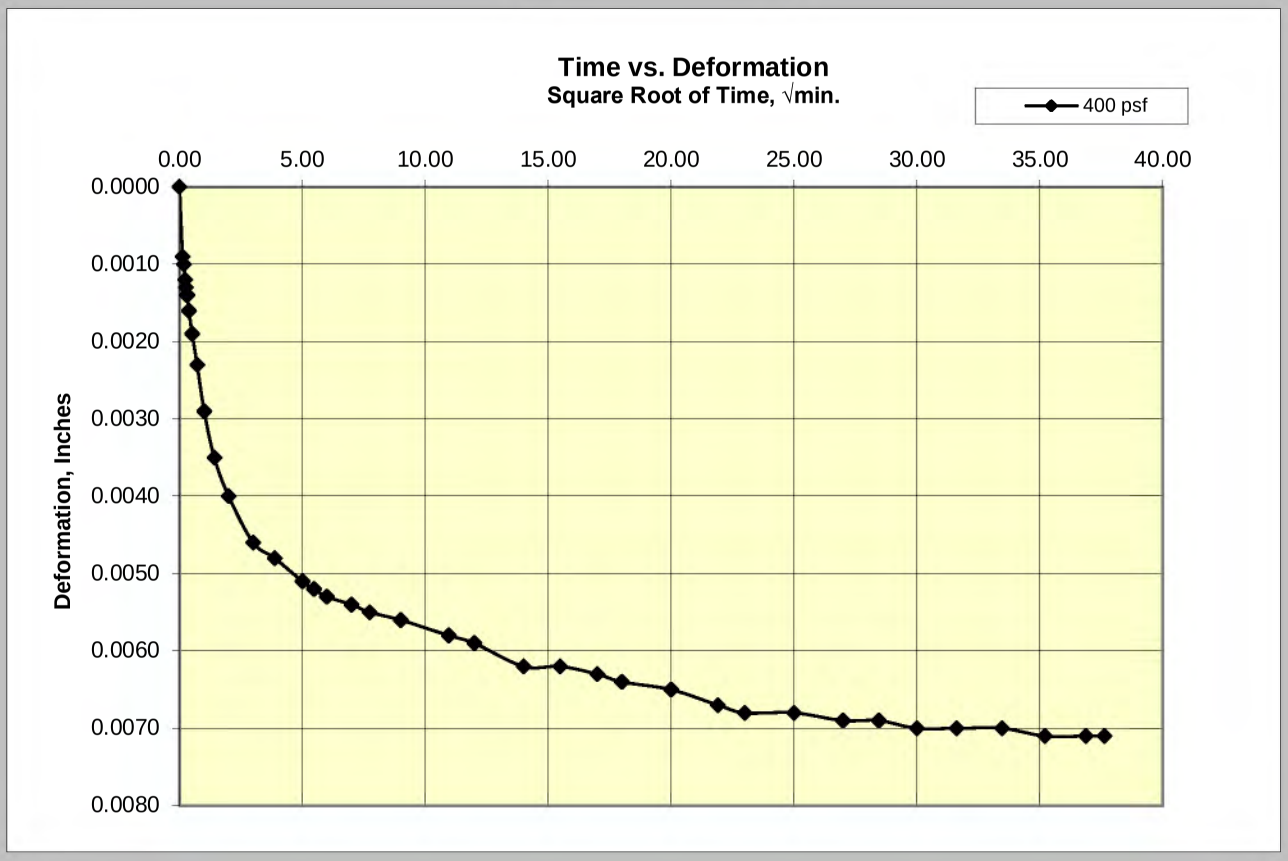


Cooper Testing Labs, Inc.

Load 4 | 400 psf

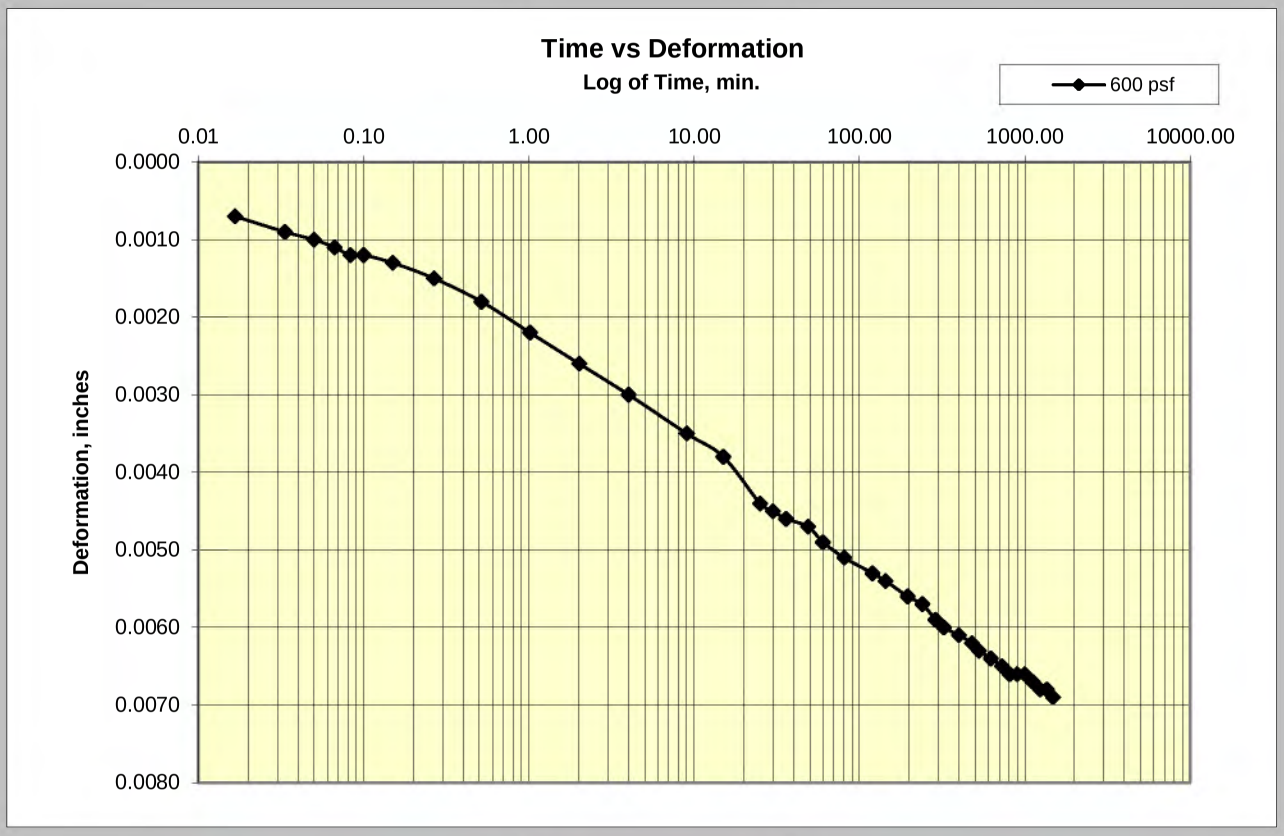


400 psf

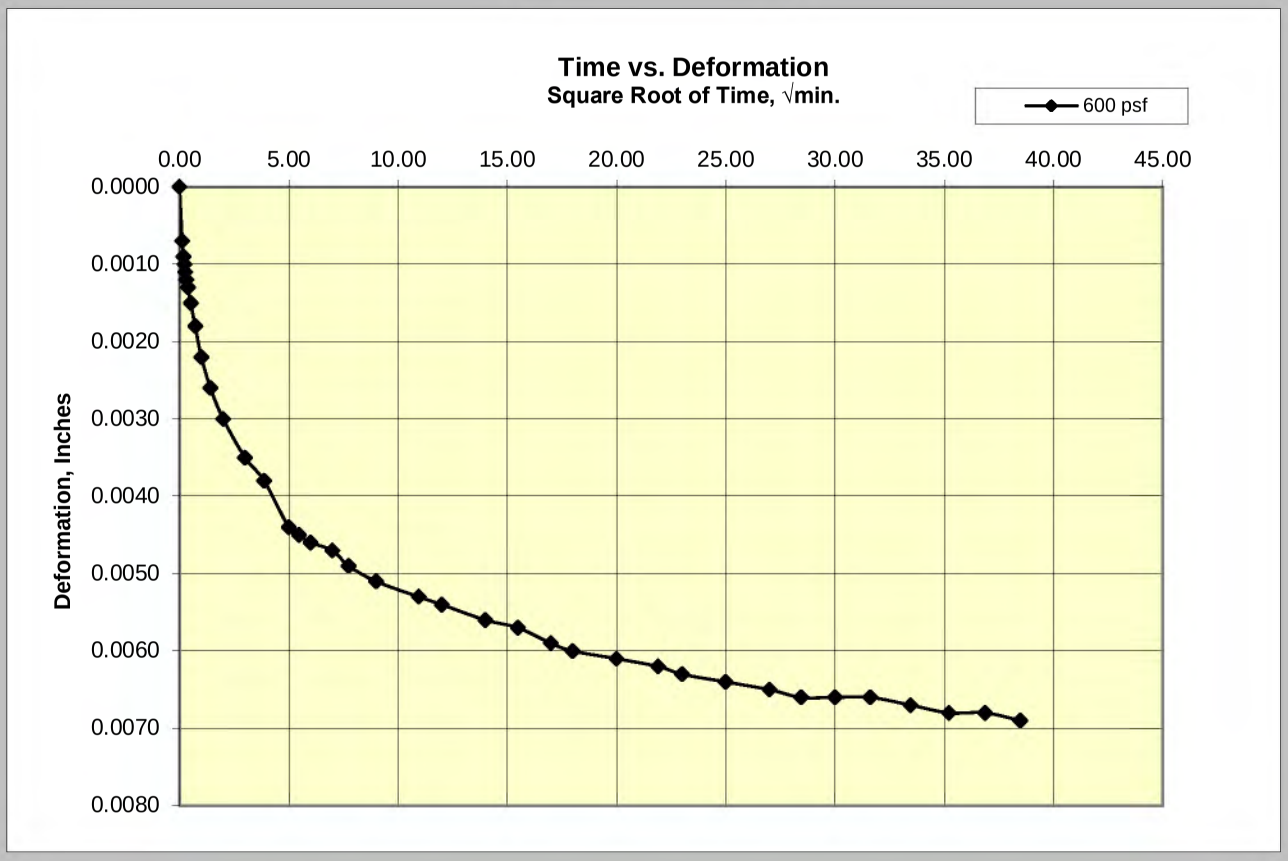


Cooper Testing Labs, Inc.

Load 5 | 600 psf

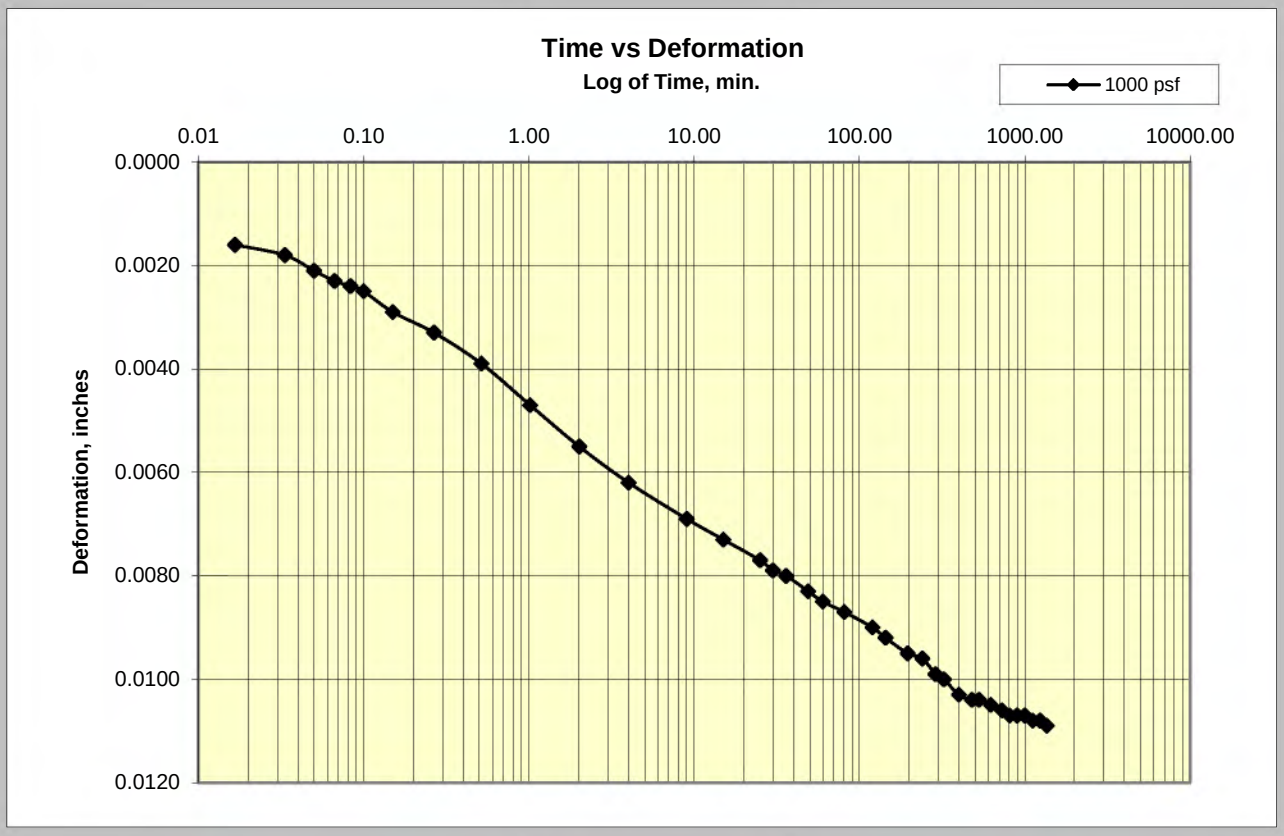


600 psf

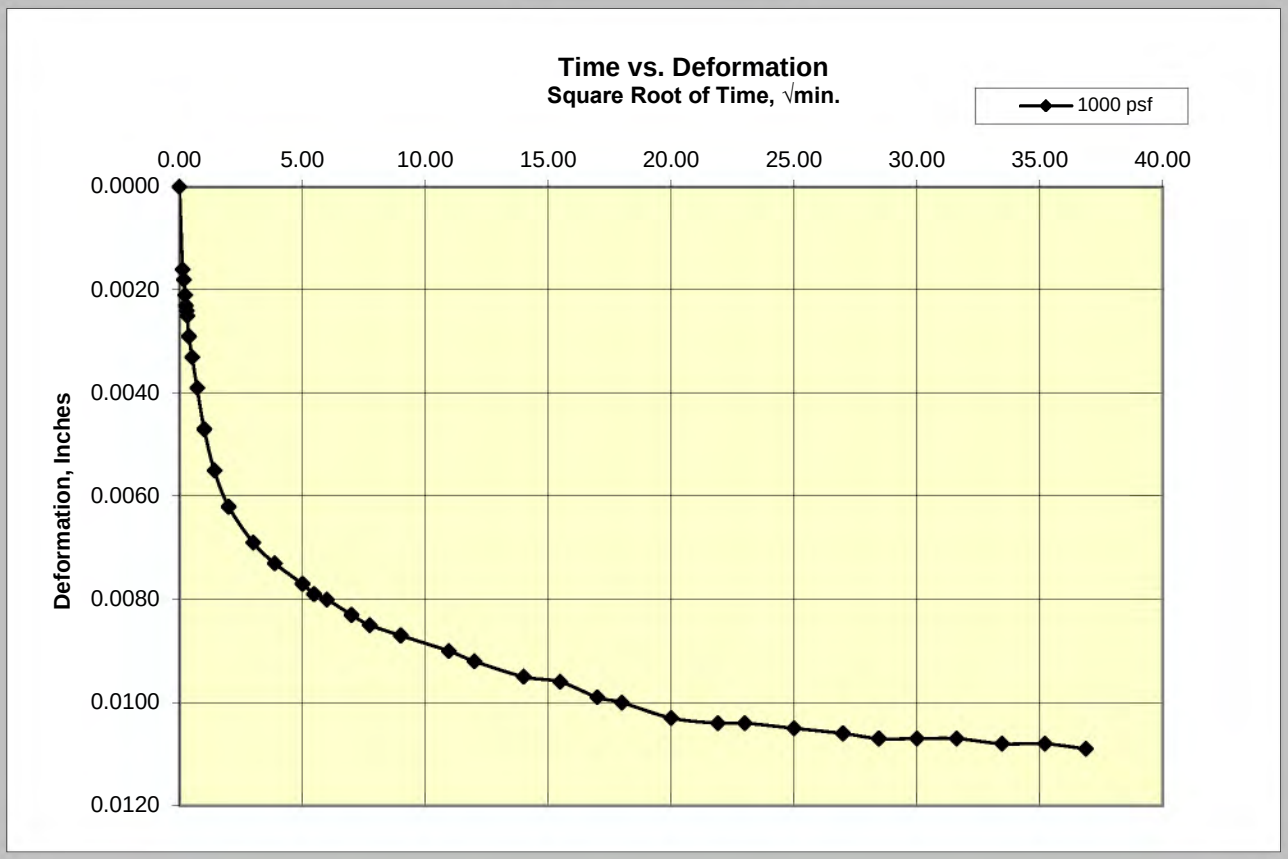


Cooper Testing Labs, Inc.

Load 6 | 1000 psf

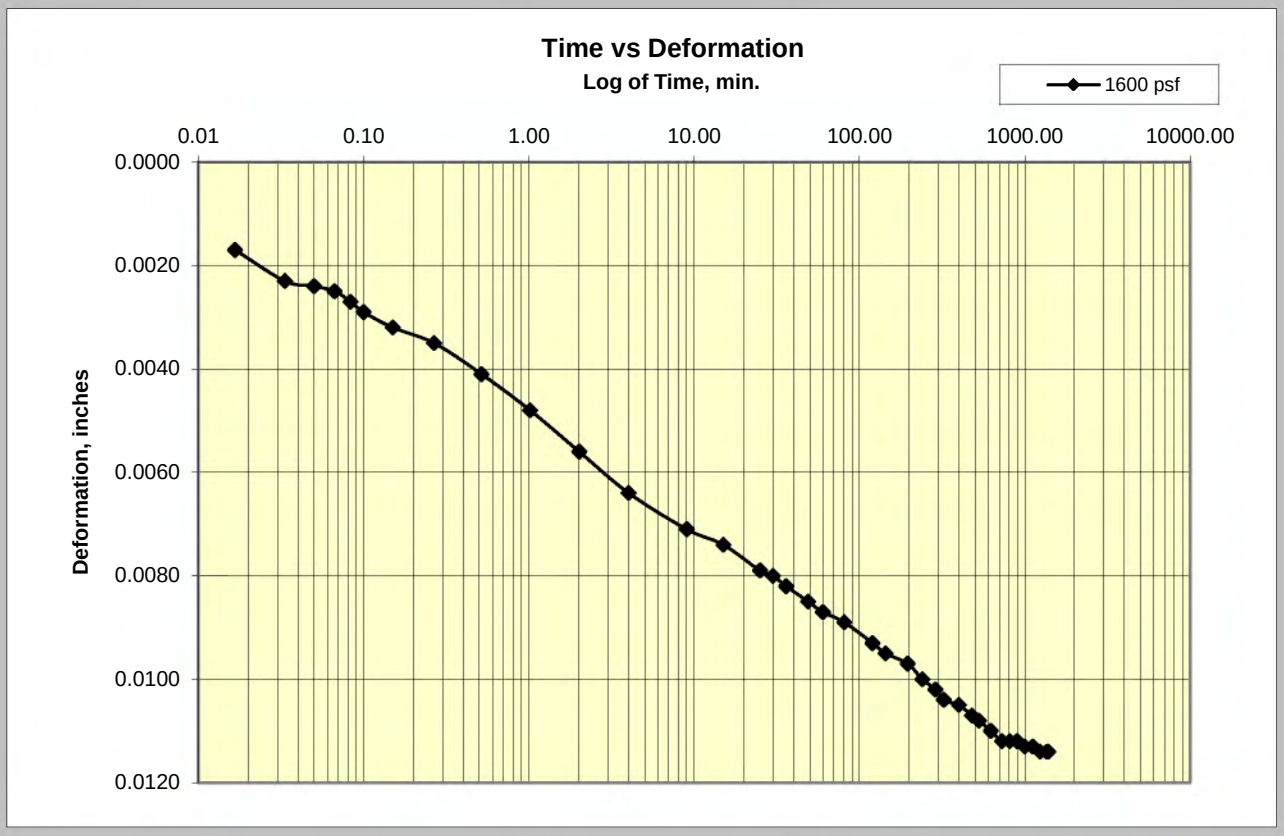


1000 psf

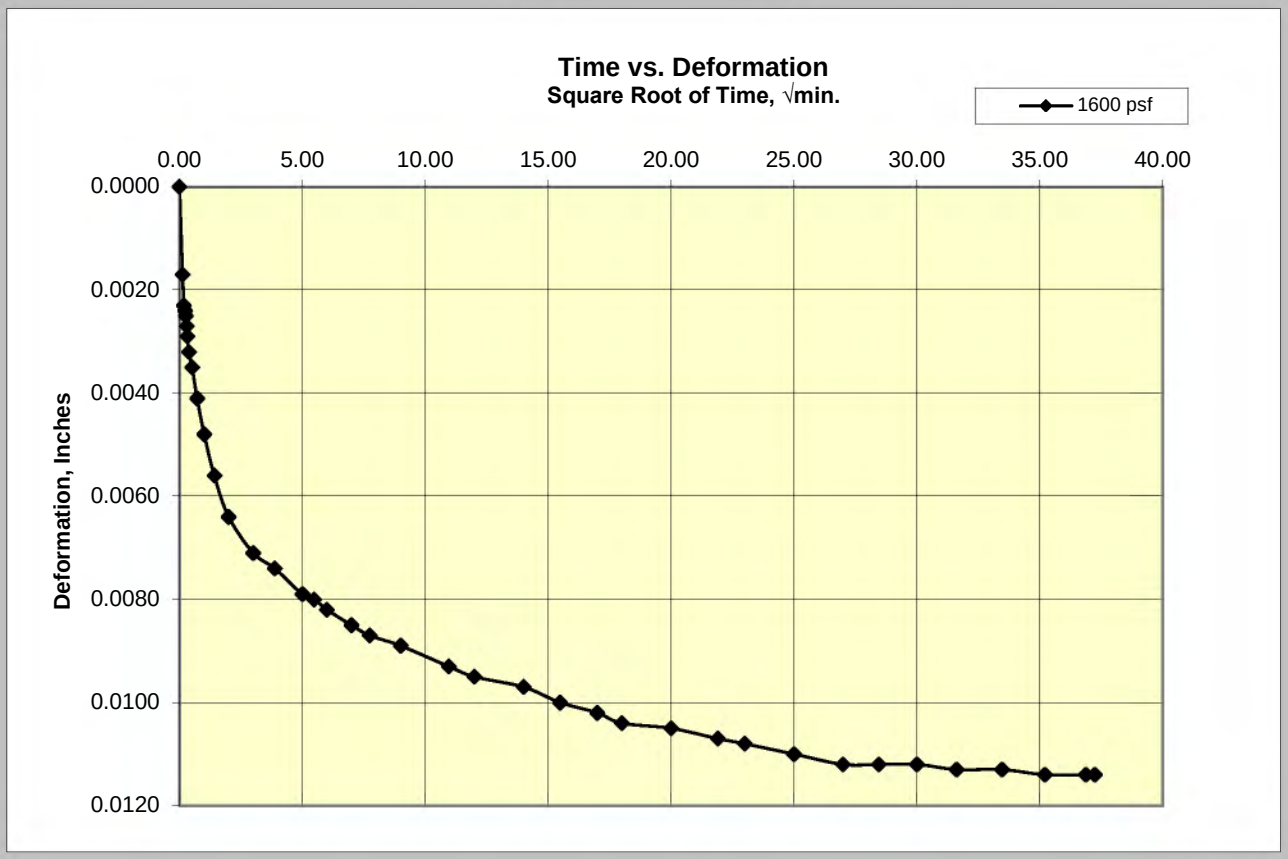


Cooper Testing Labs, Inc.

Load 7 | 1600 psf



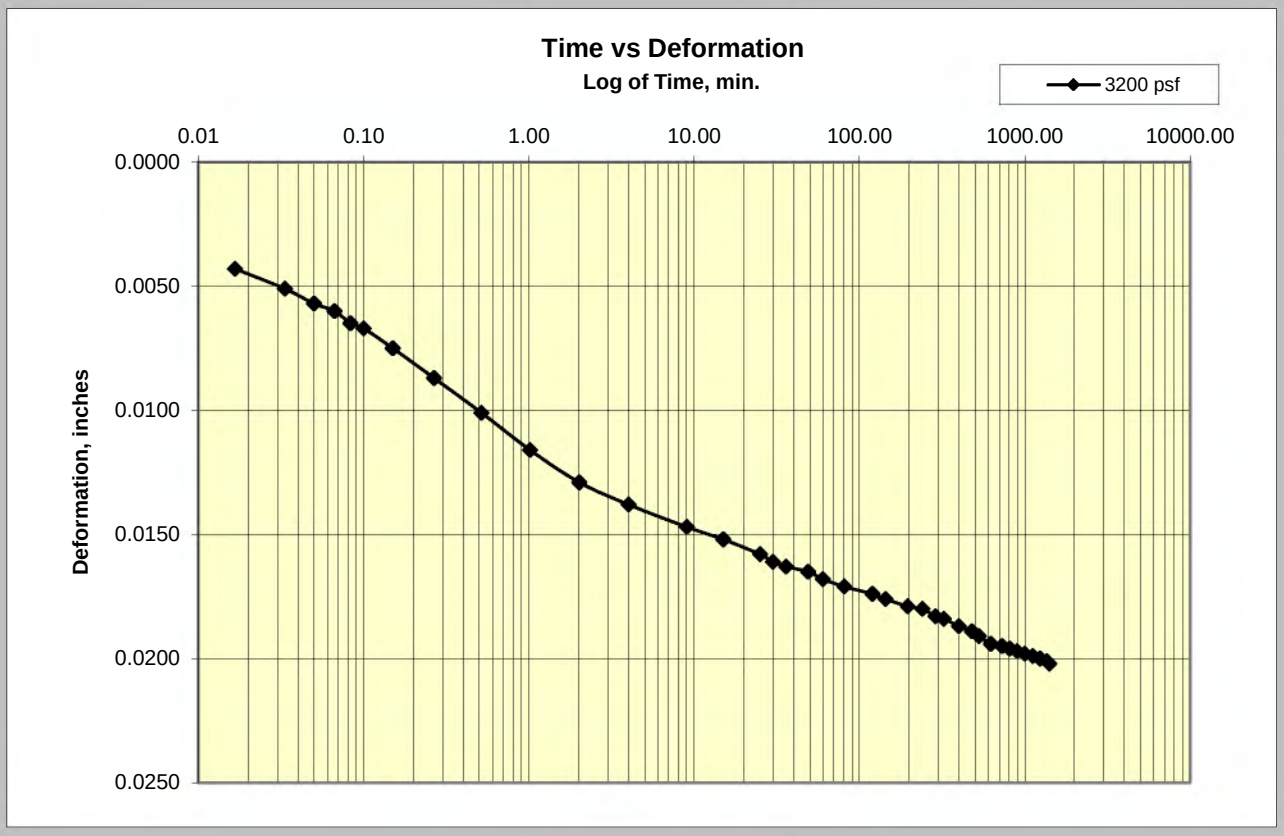
1600 psf



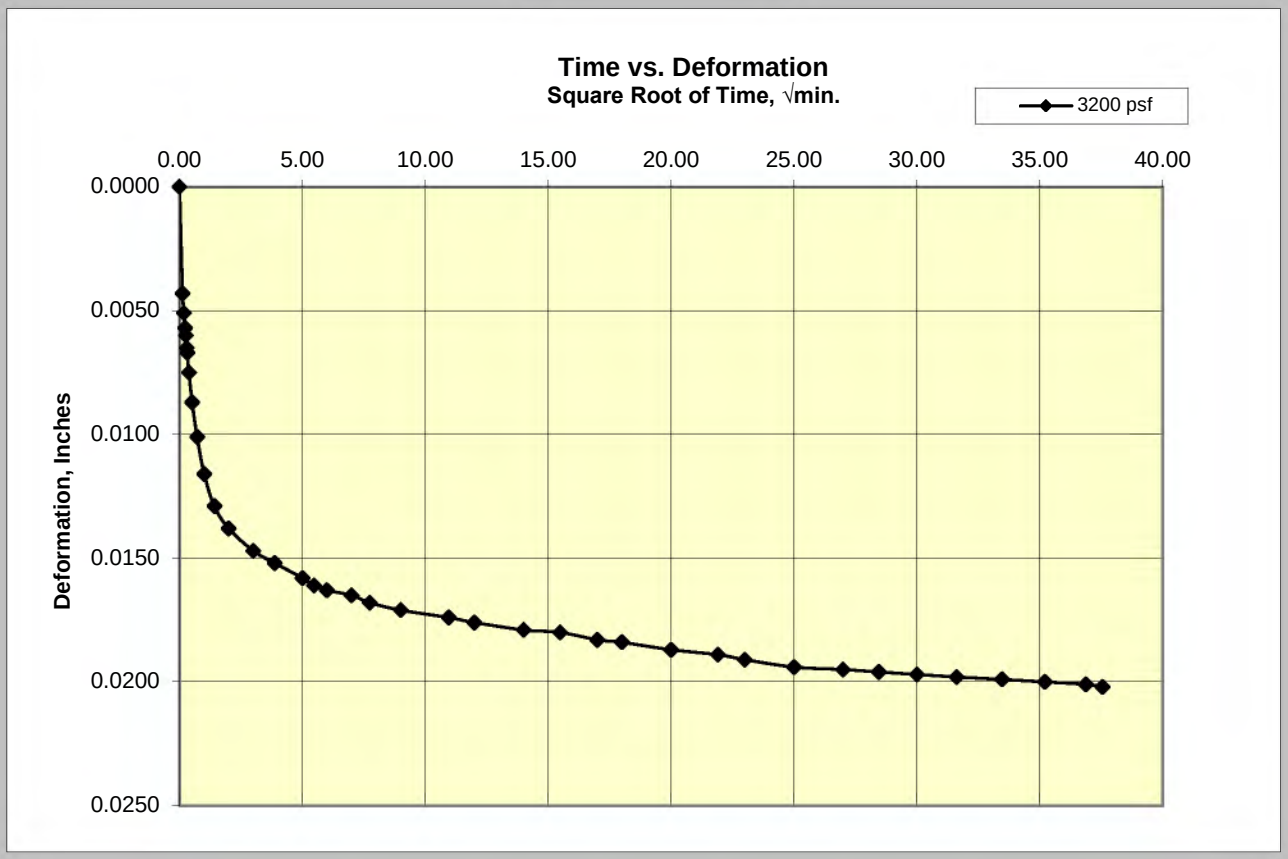
Cooper Testing Labs, Inc.

Load 8

3200 psf

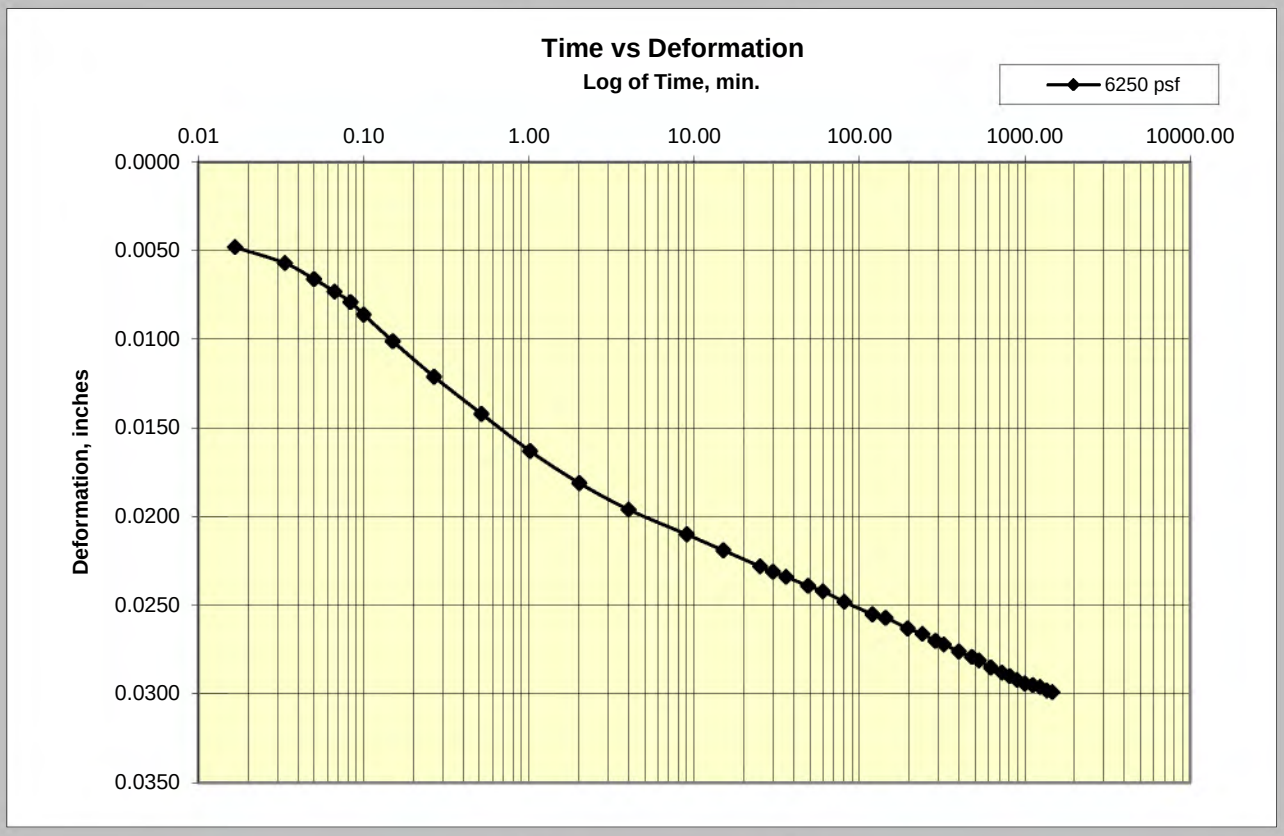


3200 psf

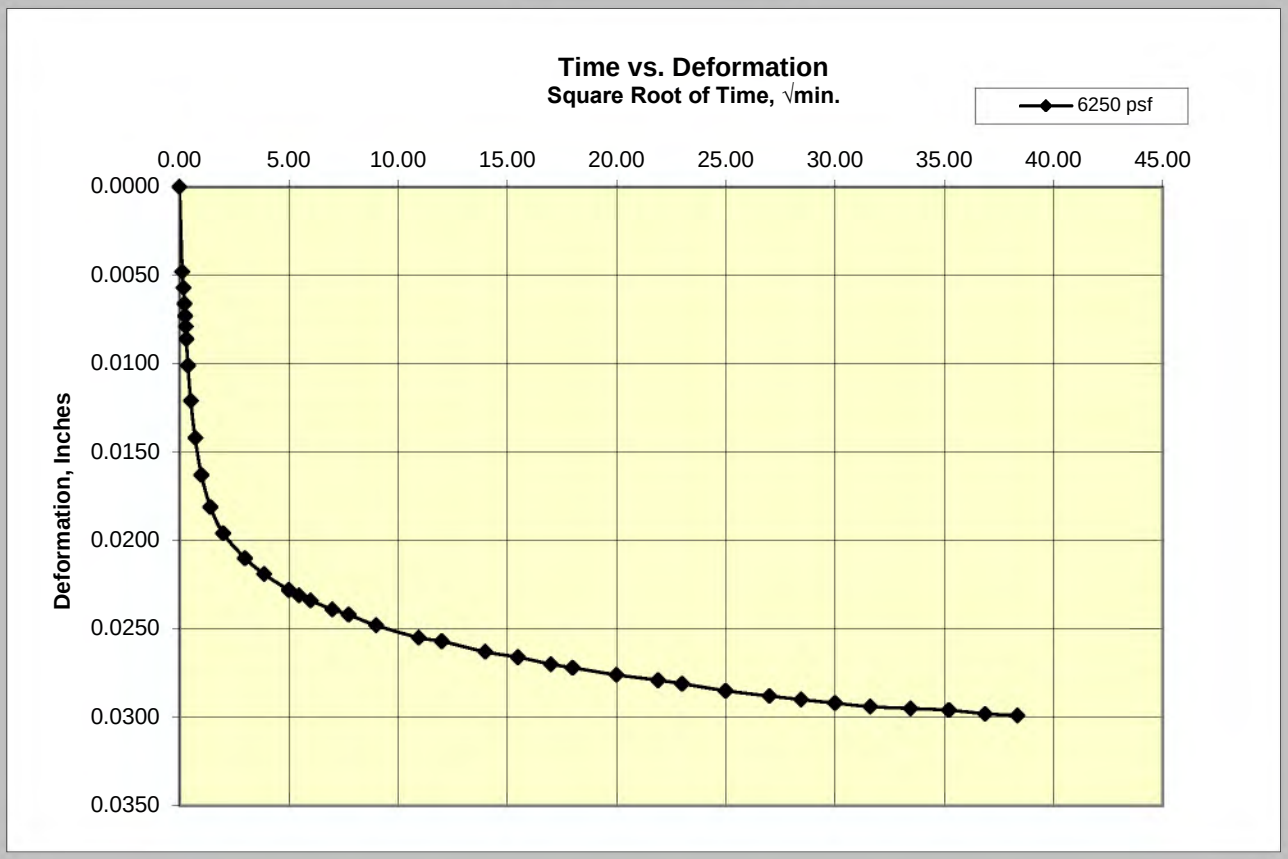


Cooper Testing Labs, Inc.

Load 9 | 6250 psf

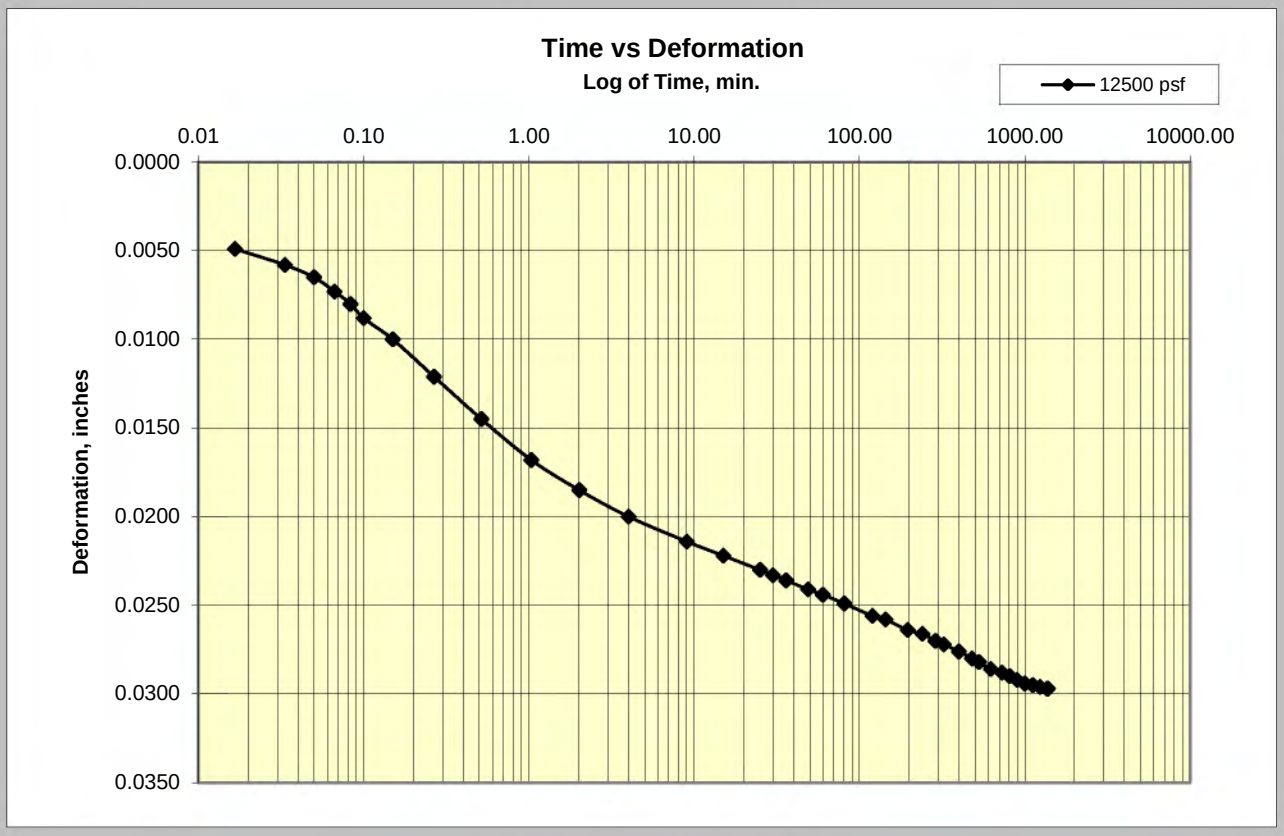


6250 psf

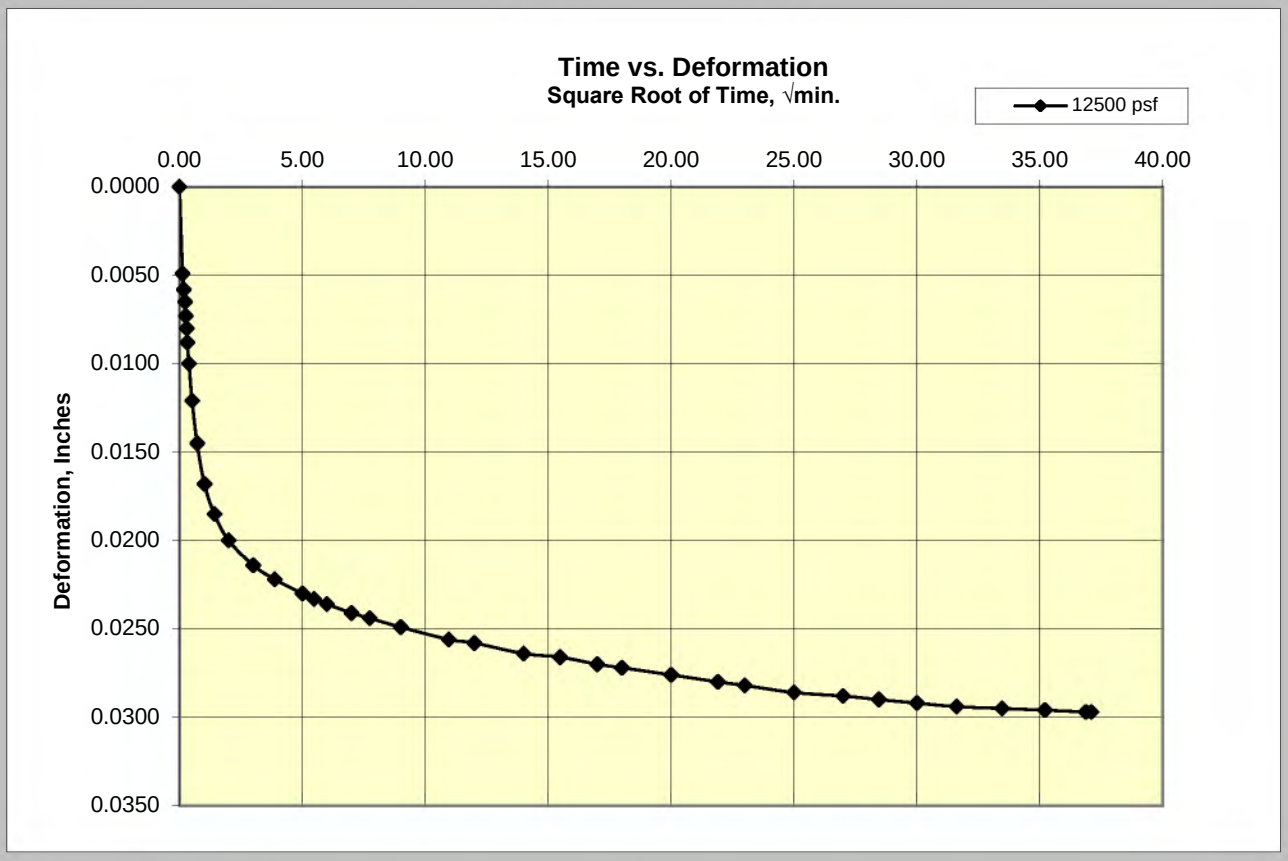


Cooper Testing Labs, Inc.

Load 10 | 12500 psf

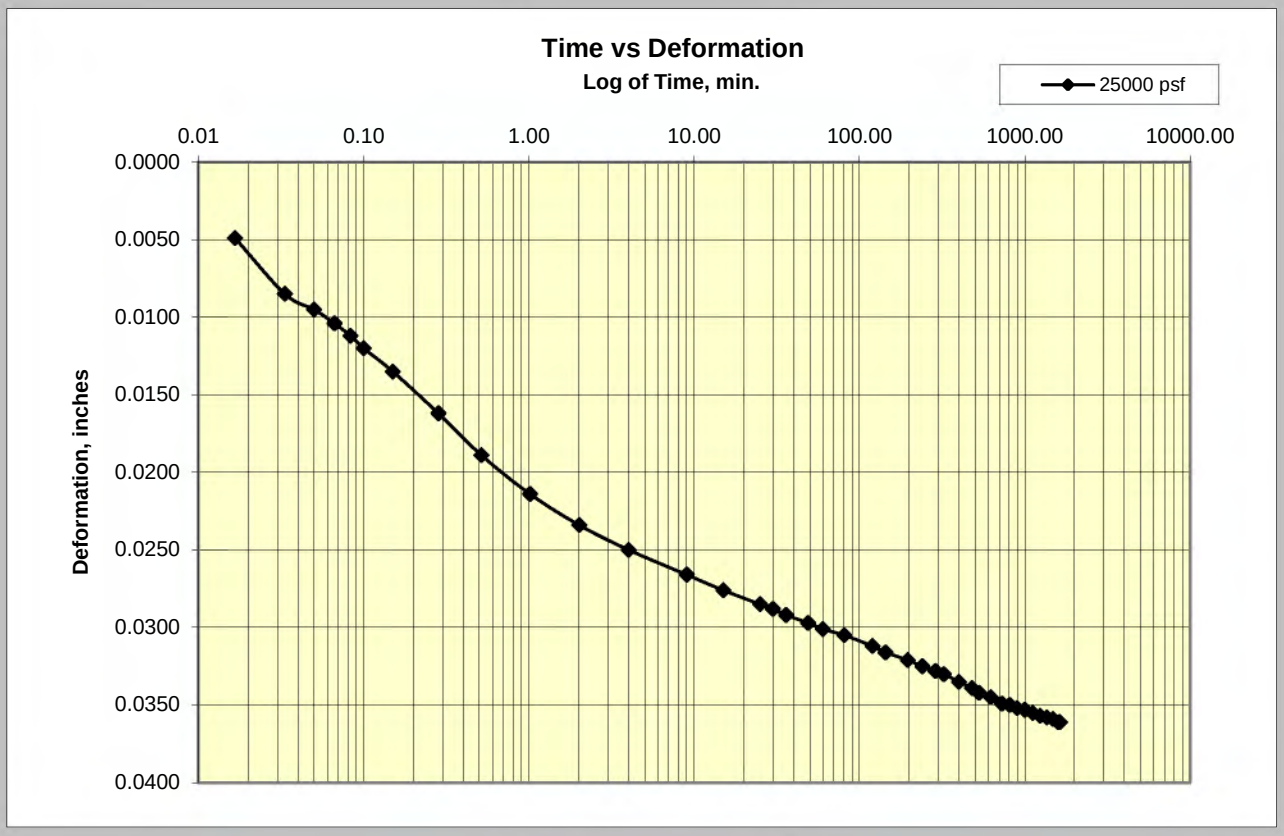


12500 psf

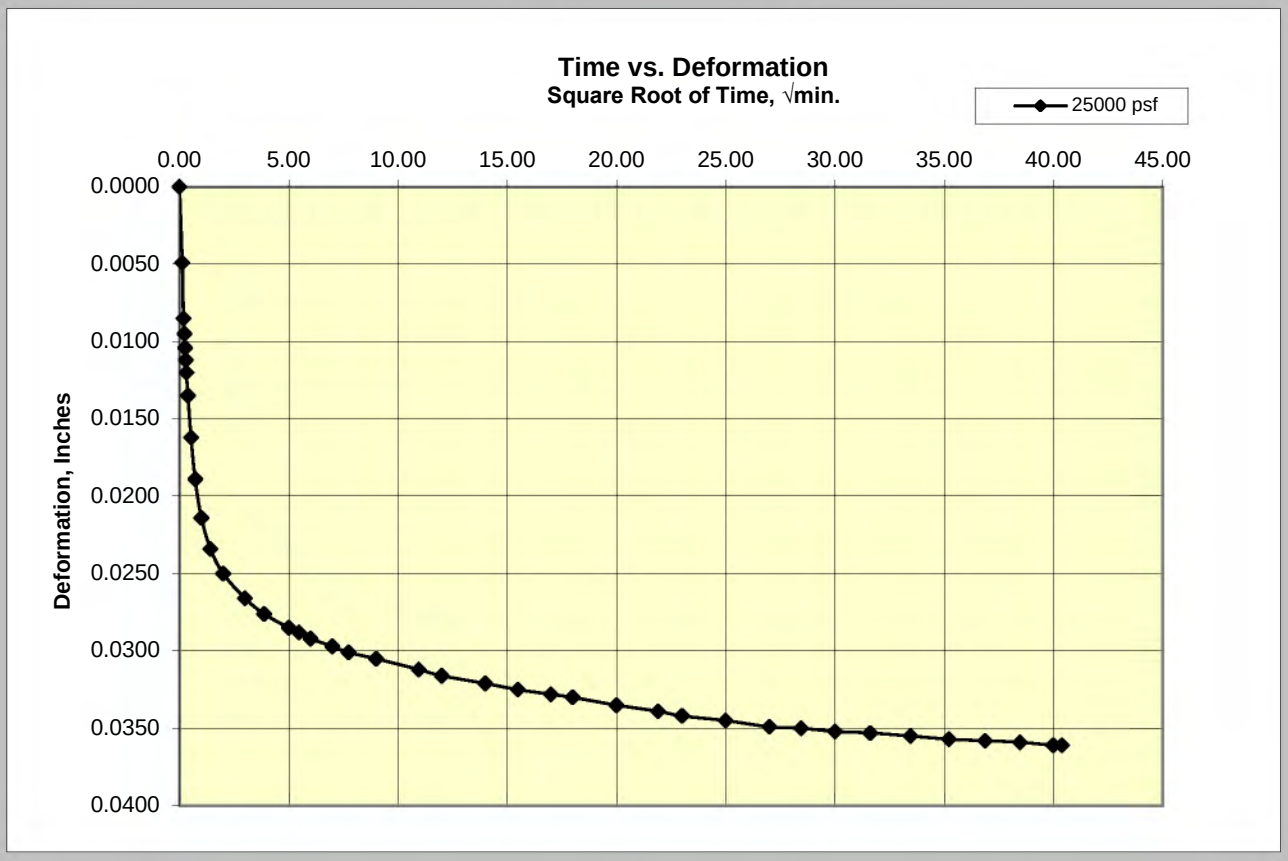


Cooper Testing Labs, Inc.

Load 11 | 25000 psf

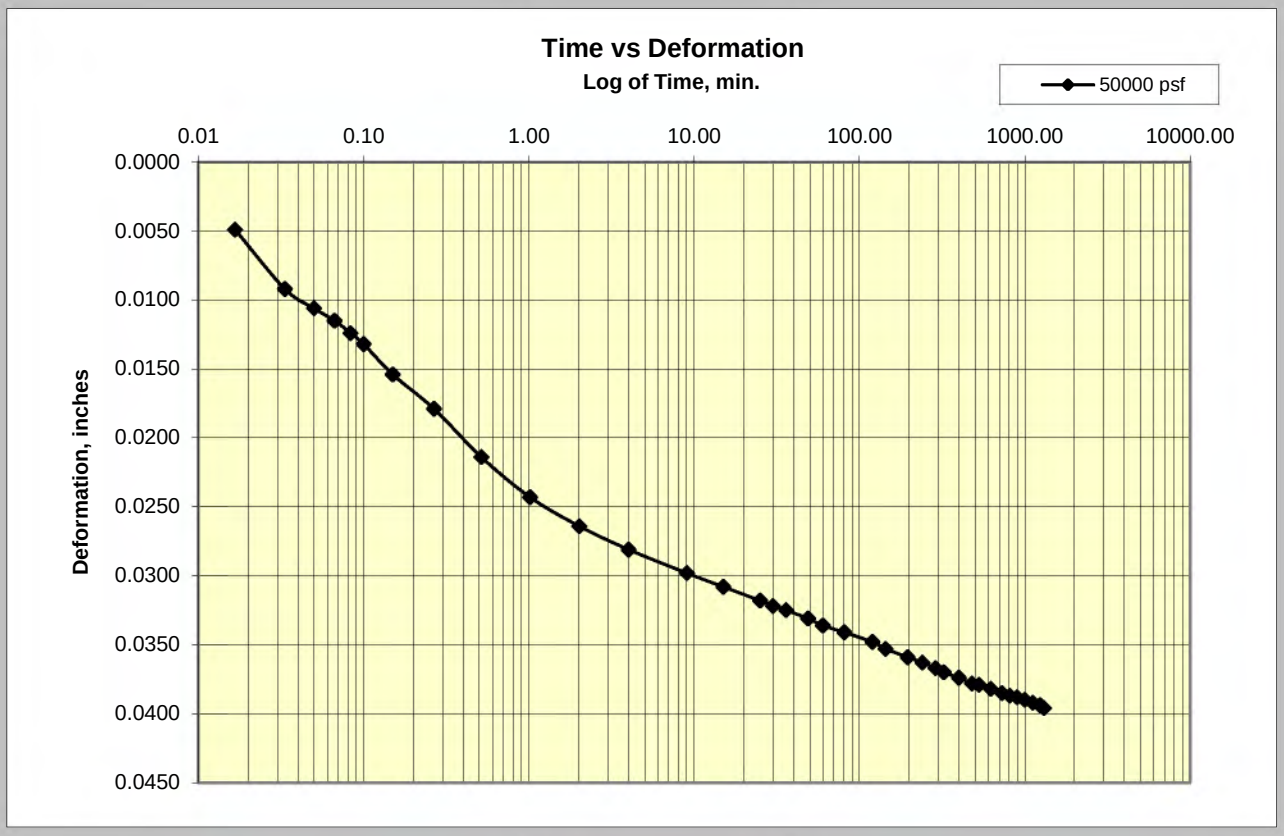


25000 psf

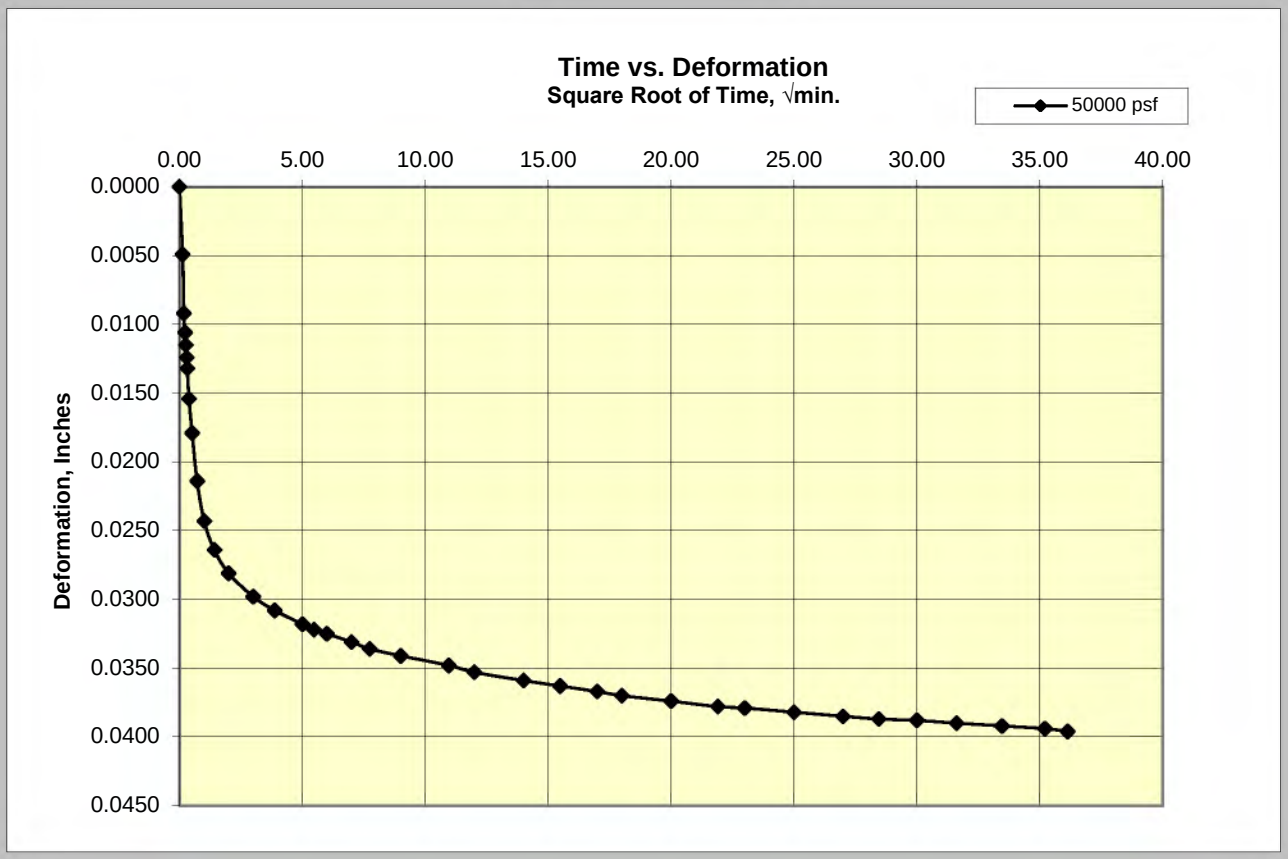


Cooper Testing Labs, Inc.

Load 12 | 50000 psf

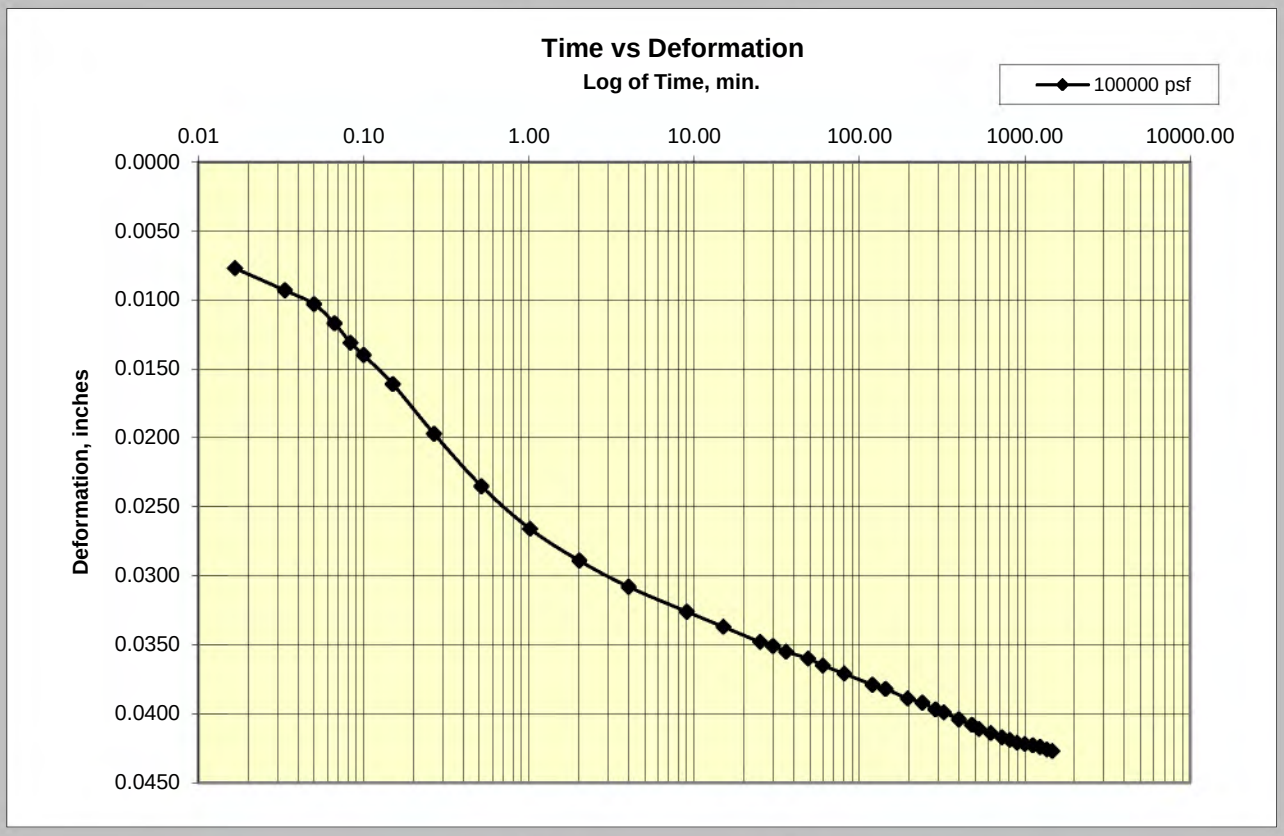


50000 psf

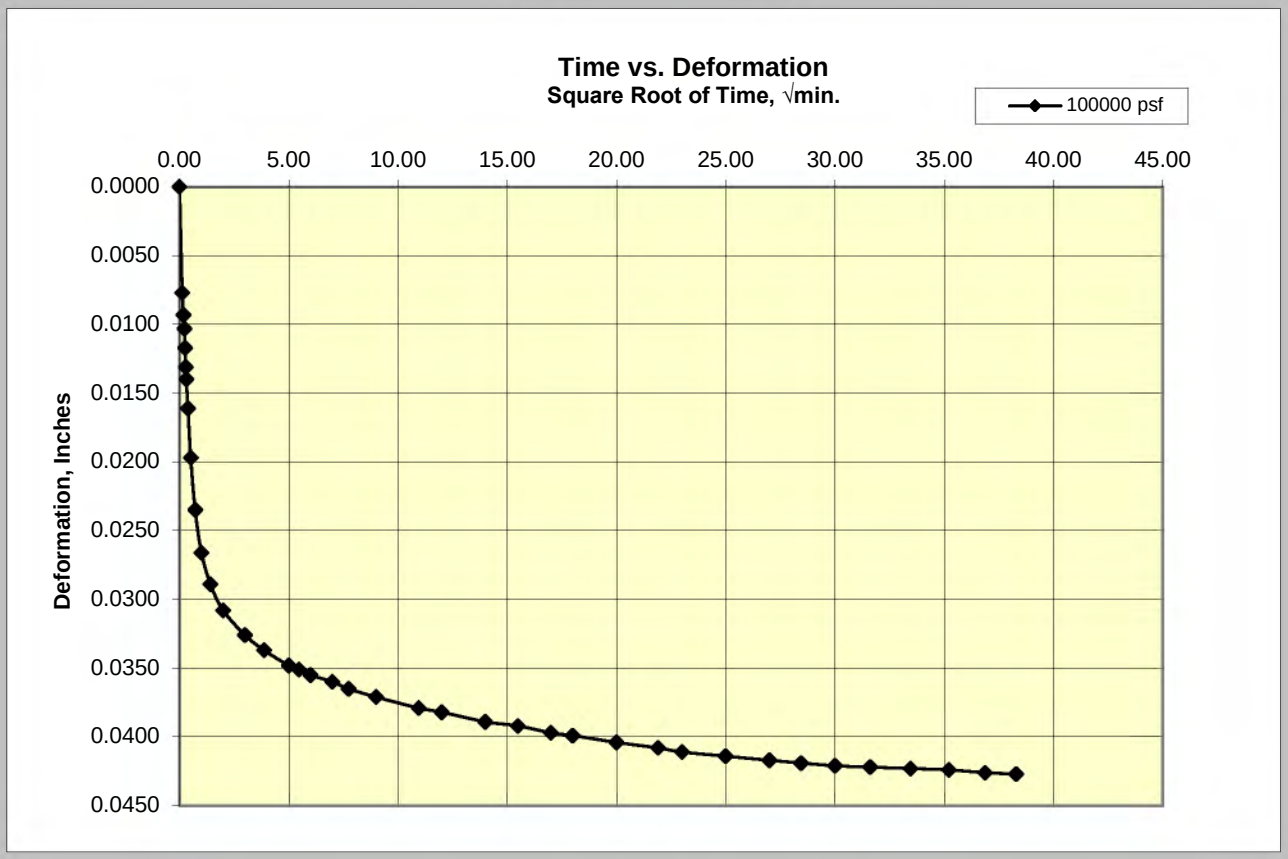


Cooper Testing Labs, Inc.

Load 13 | 100000 psf

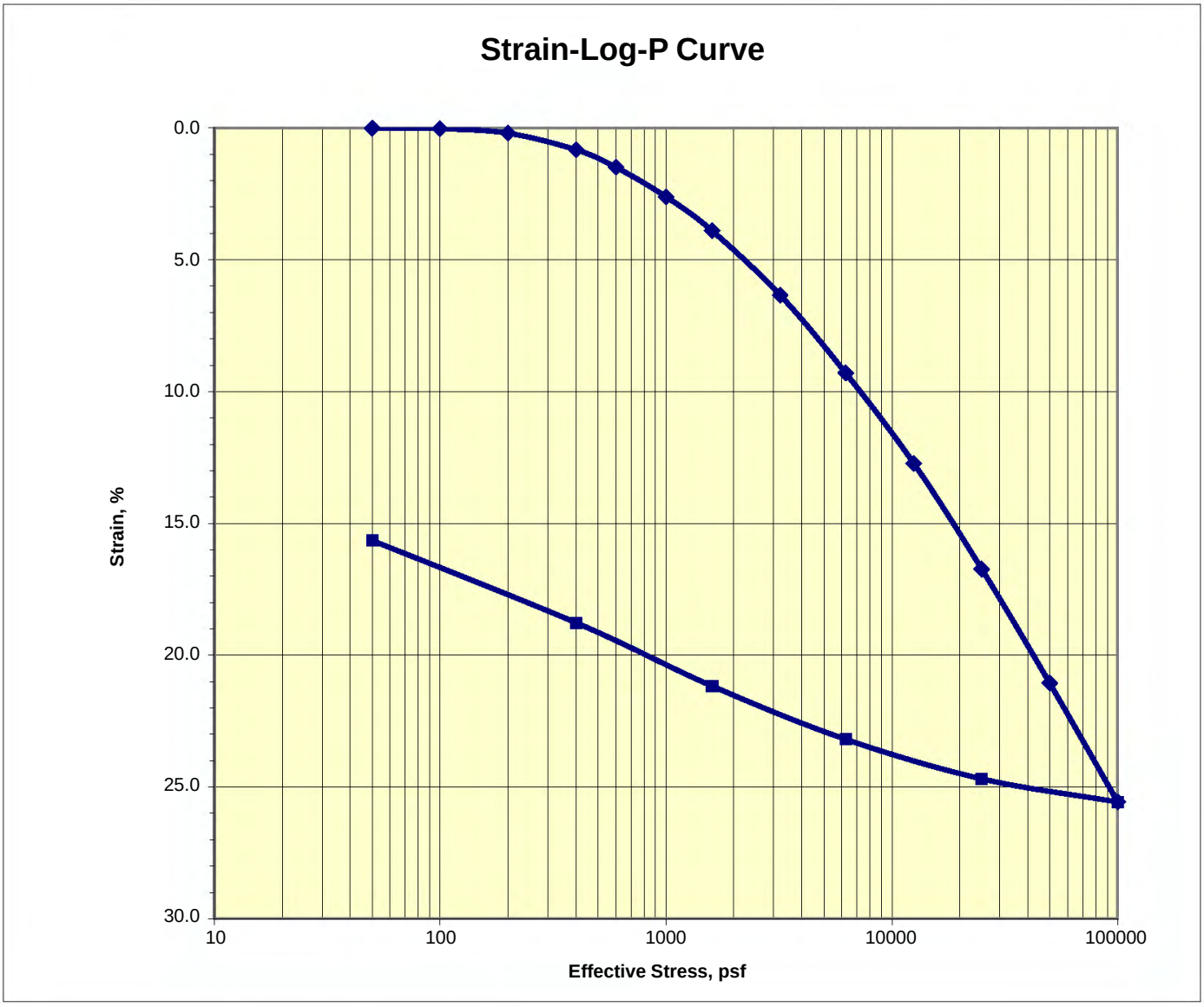


100000 psf



Consolidation Test
ASTM D2435

Job No.:	054-186	**Boring:**	22-B02	**Run By:**	MD
Client:	SHN Engineers	**Sample:**	S16	**Reduced:**	PJ
Project:	022054.400	**Depth, ft.:**	75.5-76	**Checked:**	PJ/DC
Soil Type:	Greenish Gray SILT (Bay Mud)			**Date:**	7/29/2022

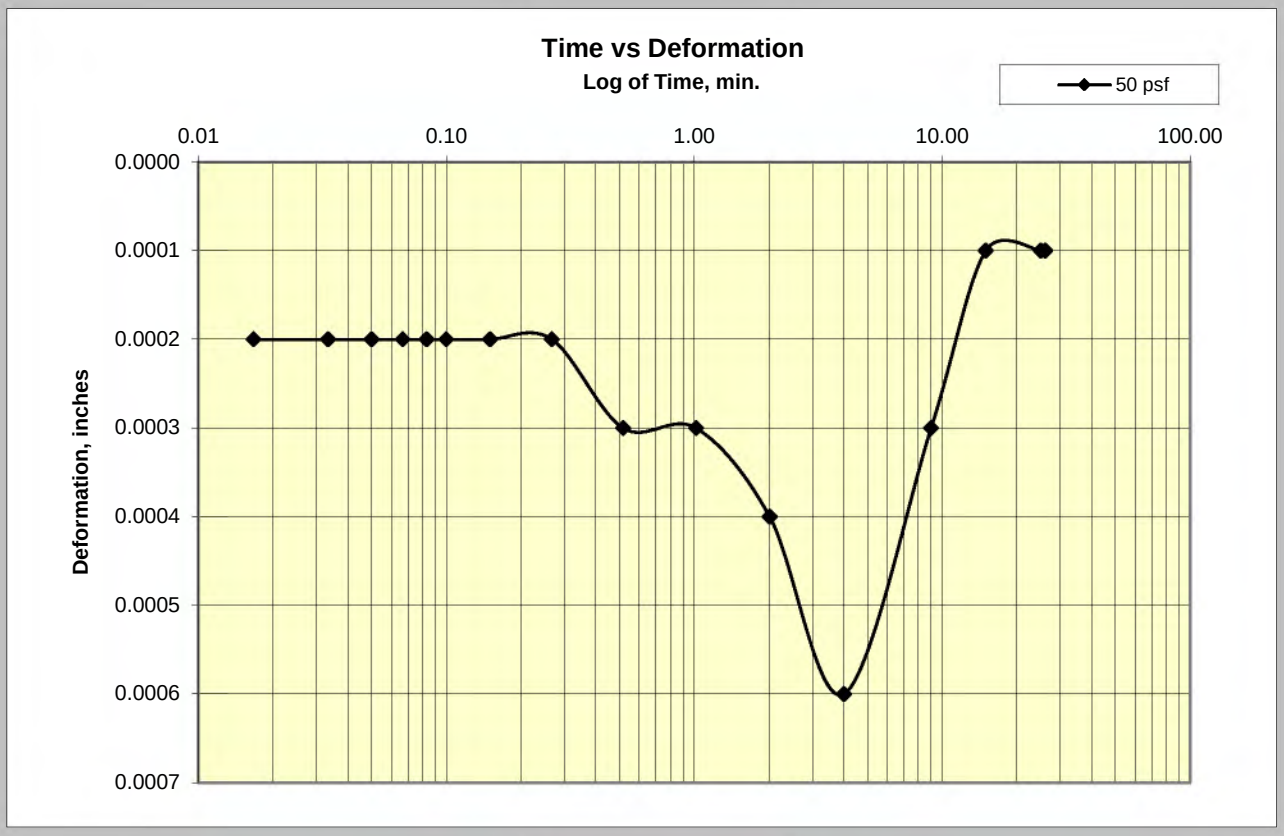


Assumed Gs 2.75	Initial	Final
Moisture %:	34.0	24.5
Dry Density, pcf:	86.6	102.6
Void Ratio:	0.983	0.673
% Saturation:	95.0	100.0

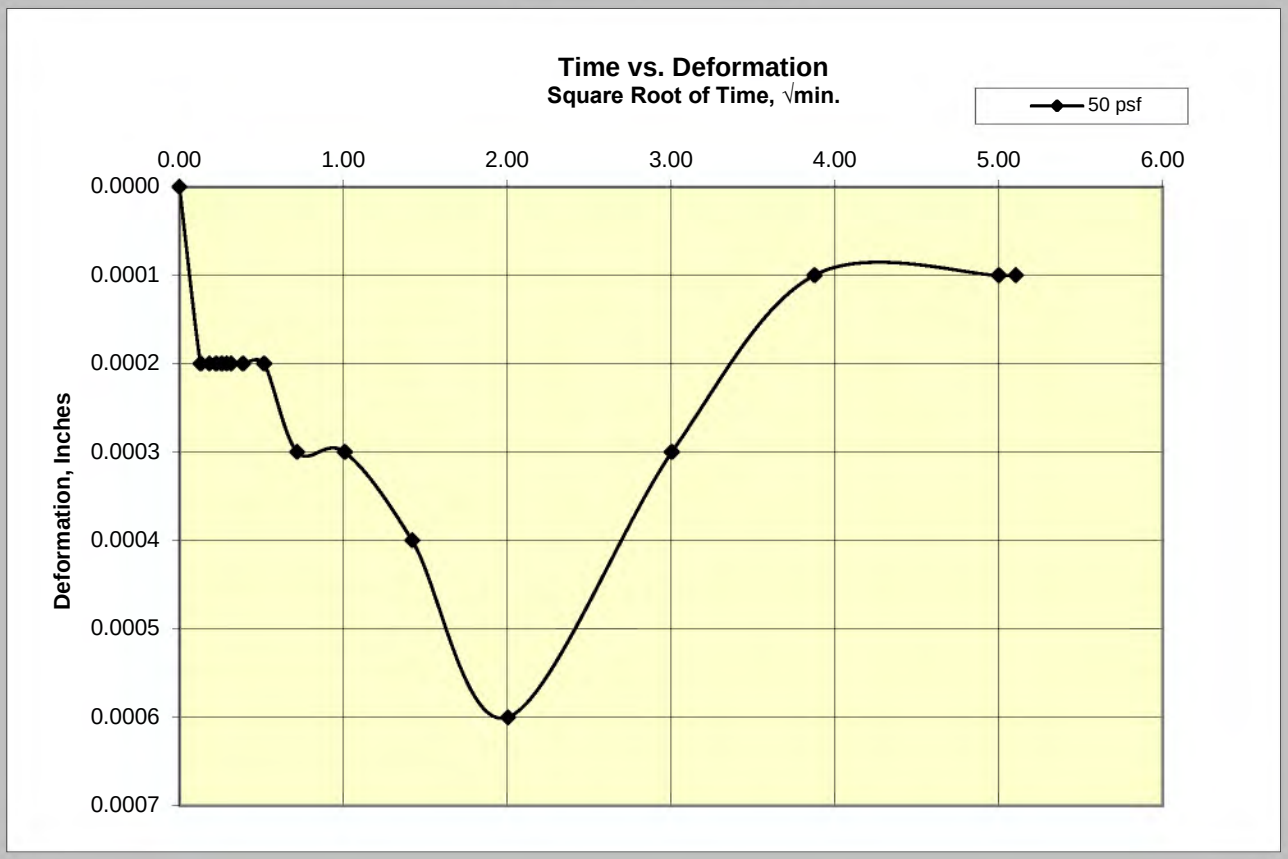
Remarks:

Cooper Testing Labs, Inc.

Load 1 | 50 psf

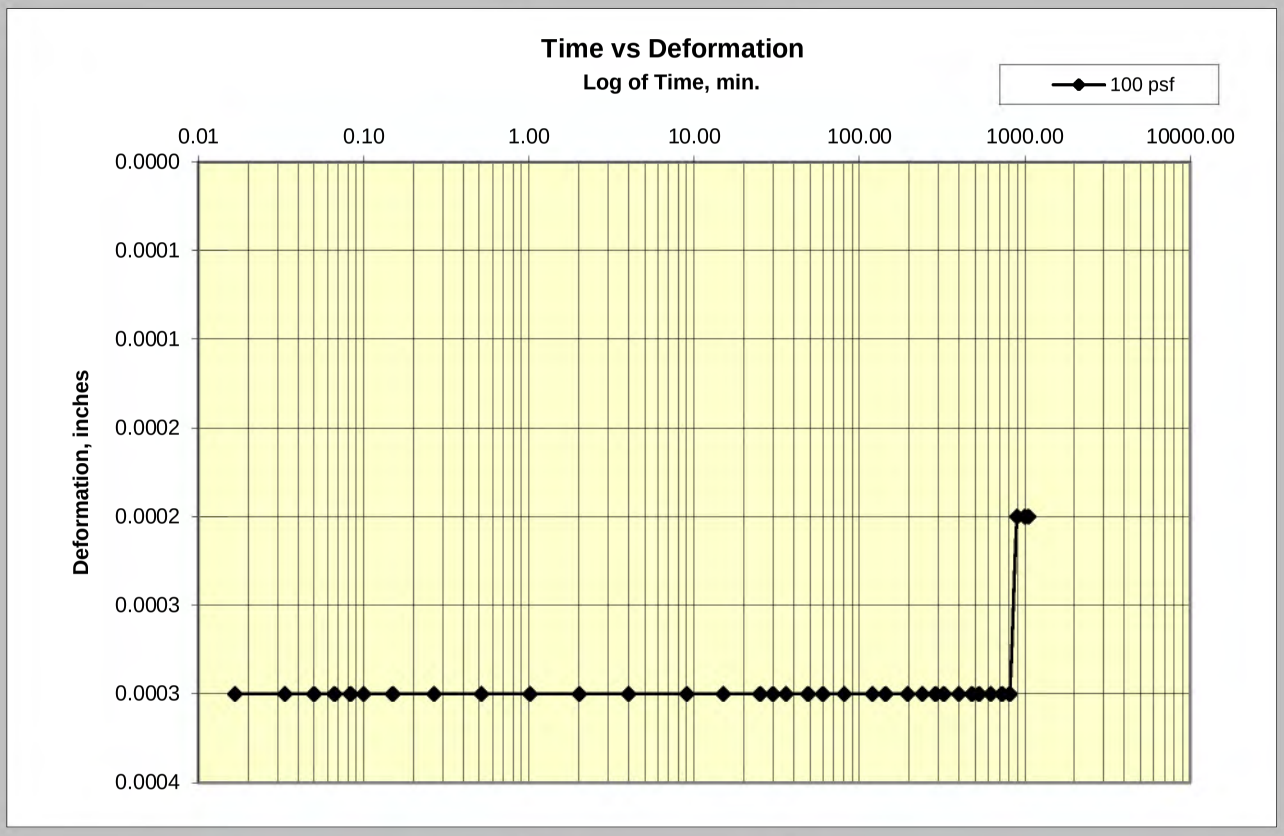


50 psf

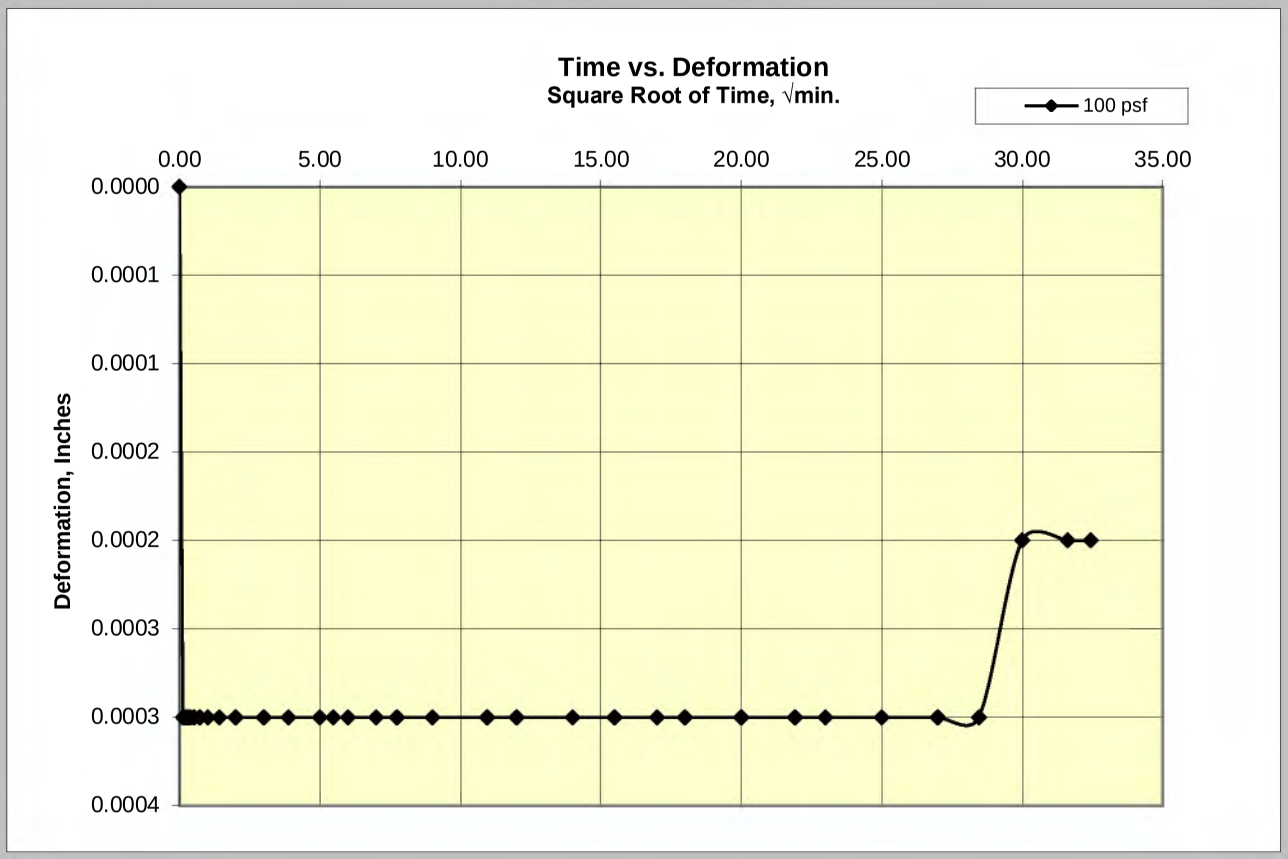


Cooper Testing Labs, Inc.

Load 2 | 100 psf

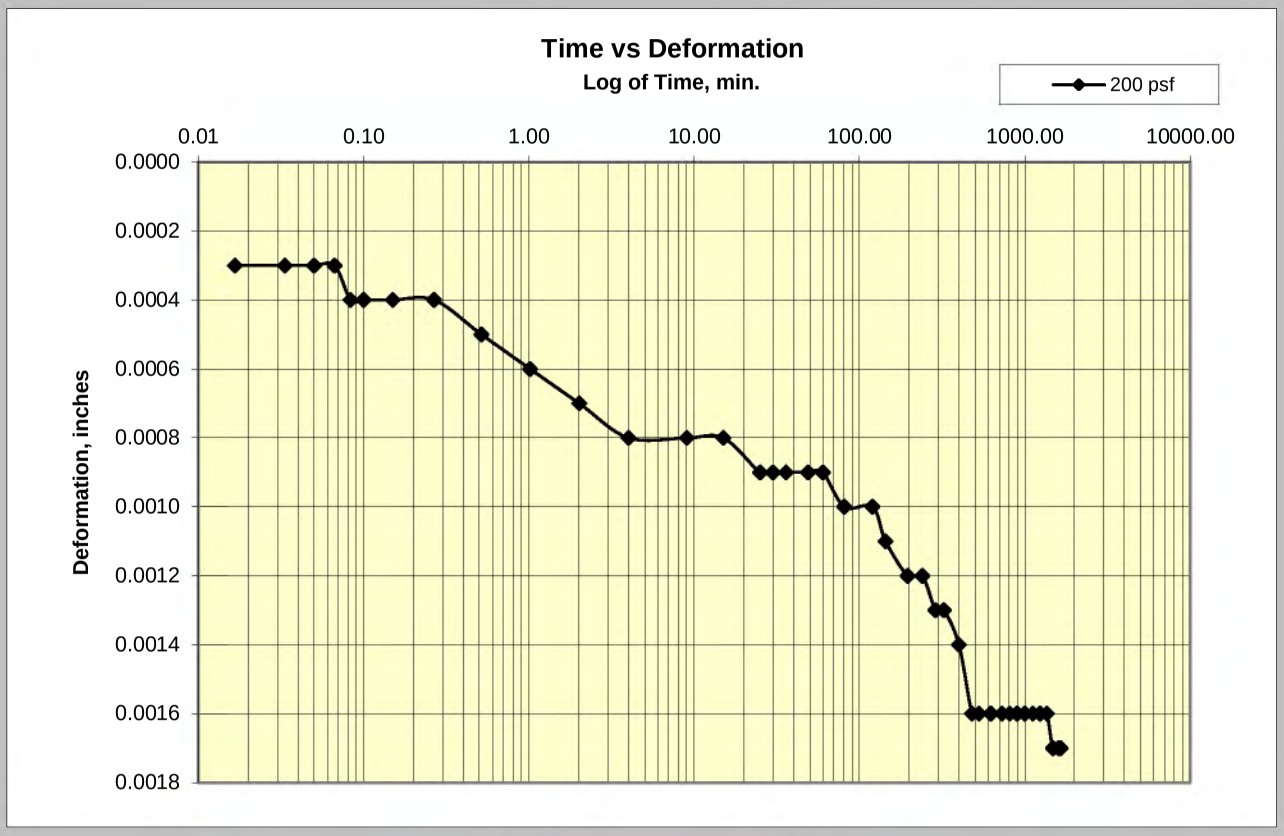


100 psf

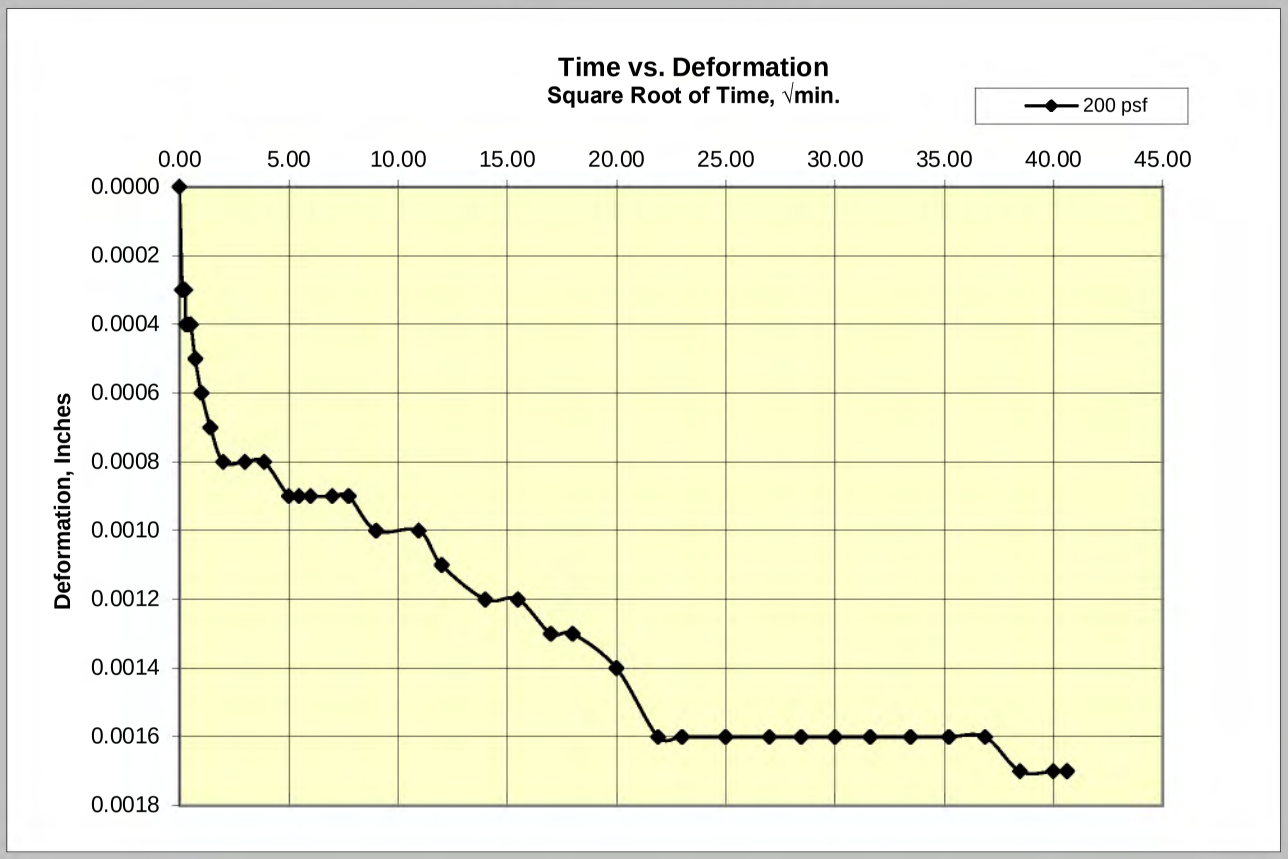


Cooper Testing Labs, Inc.

Load 3 | 200 psf

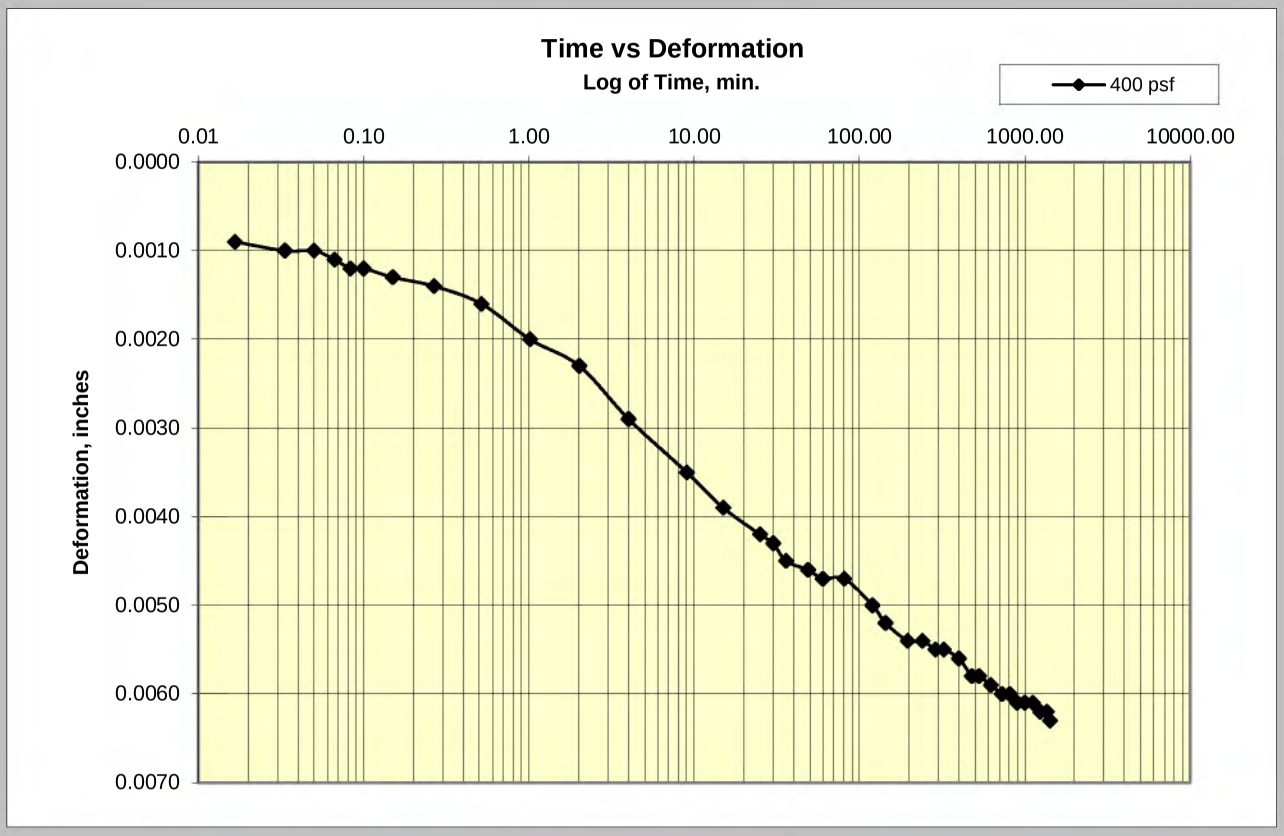


200 psf

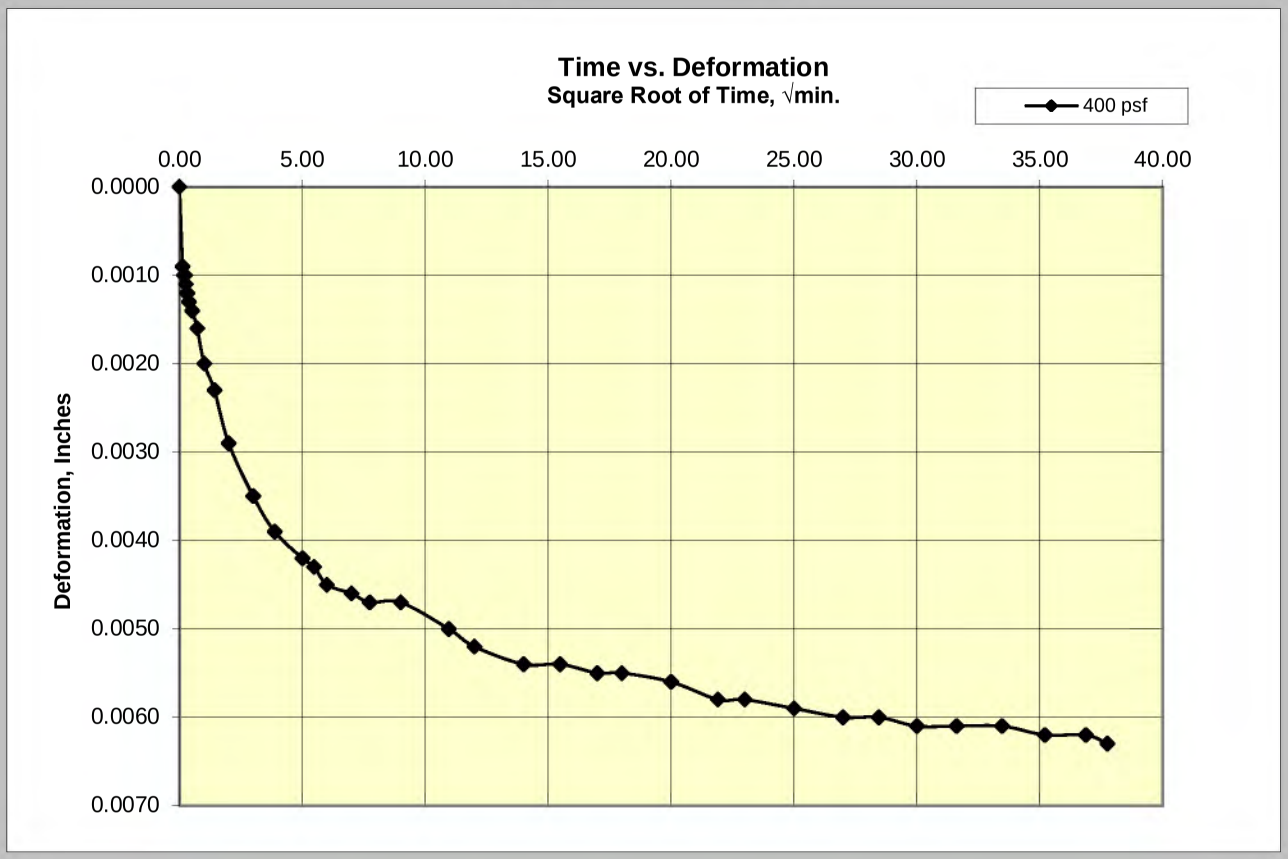


Cooper Testing Labs, Inc.

Load 4 | 400 psf

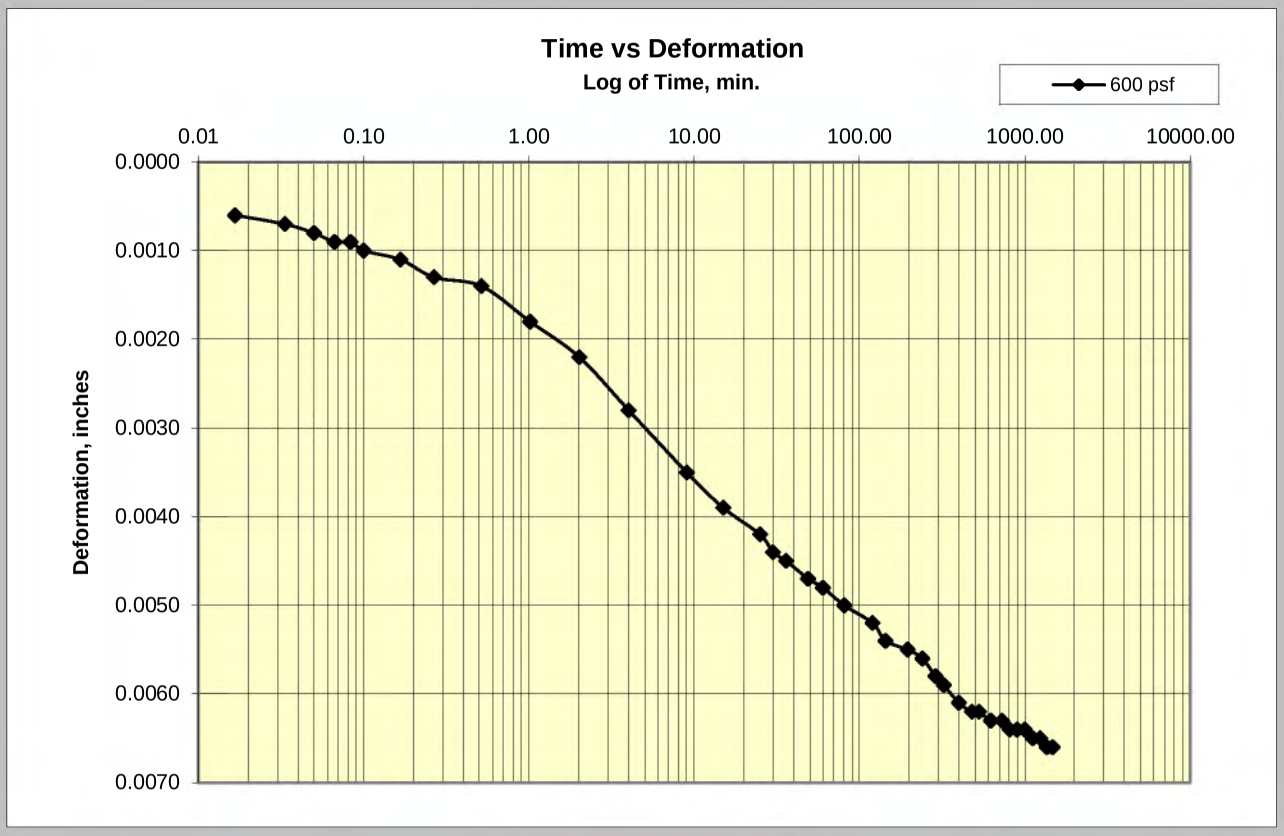


400 psf

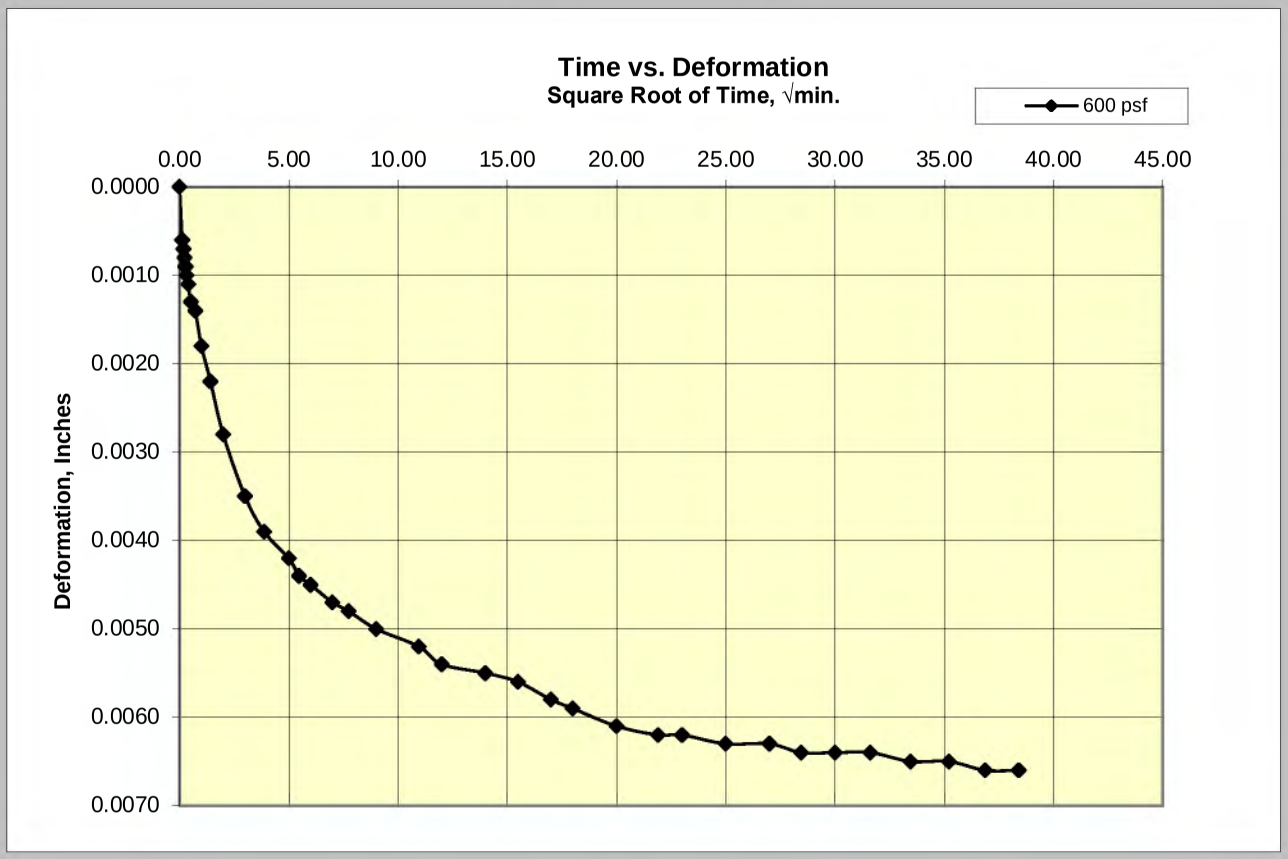


Cooper Testing Labs, Inc.

Load 5 | 600 psf

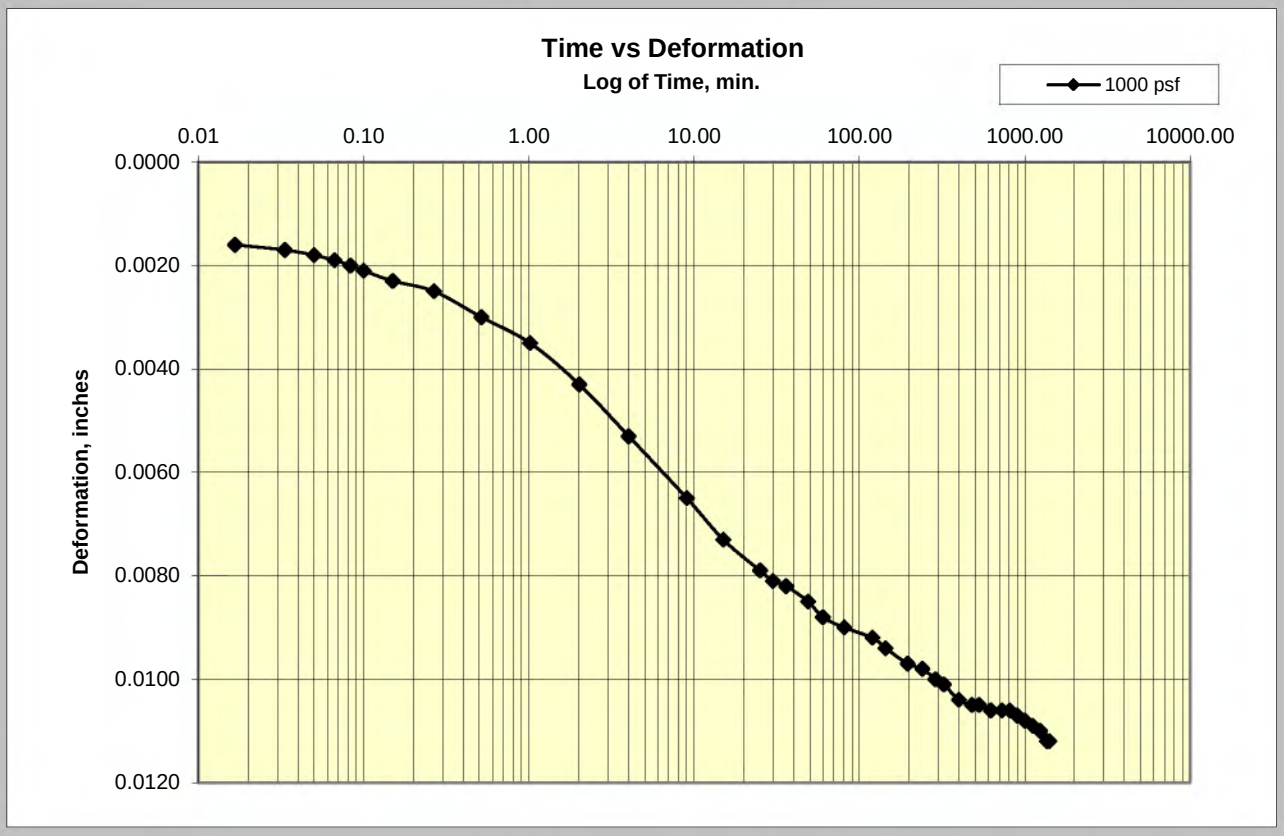


600 psf



Cooper Testing Labs, Inc.

Load 6 | 1000 psf



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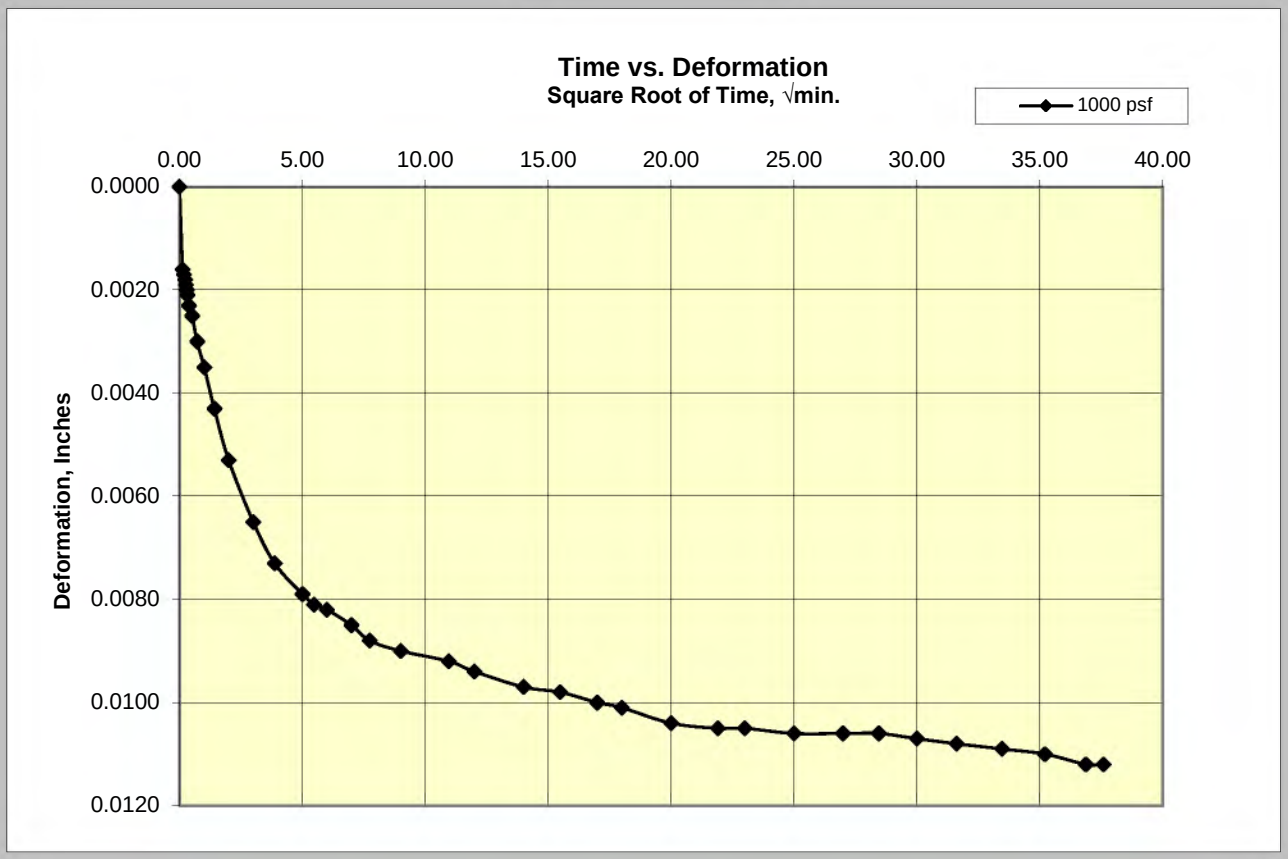
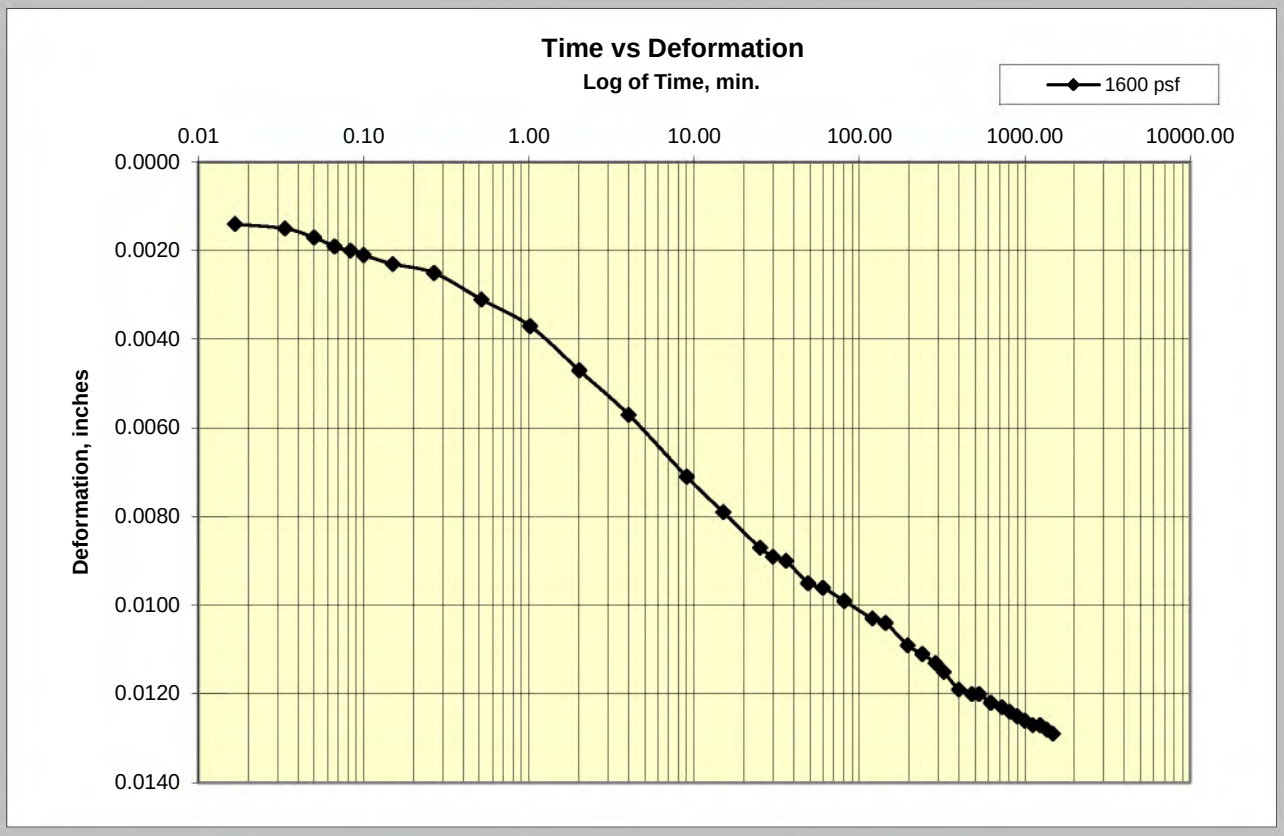
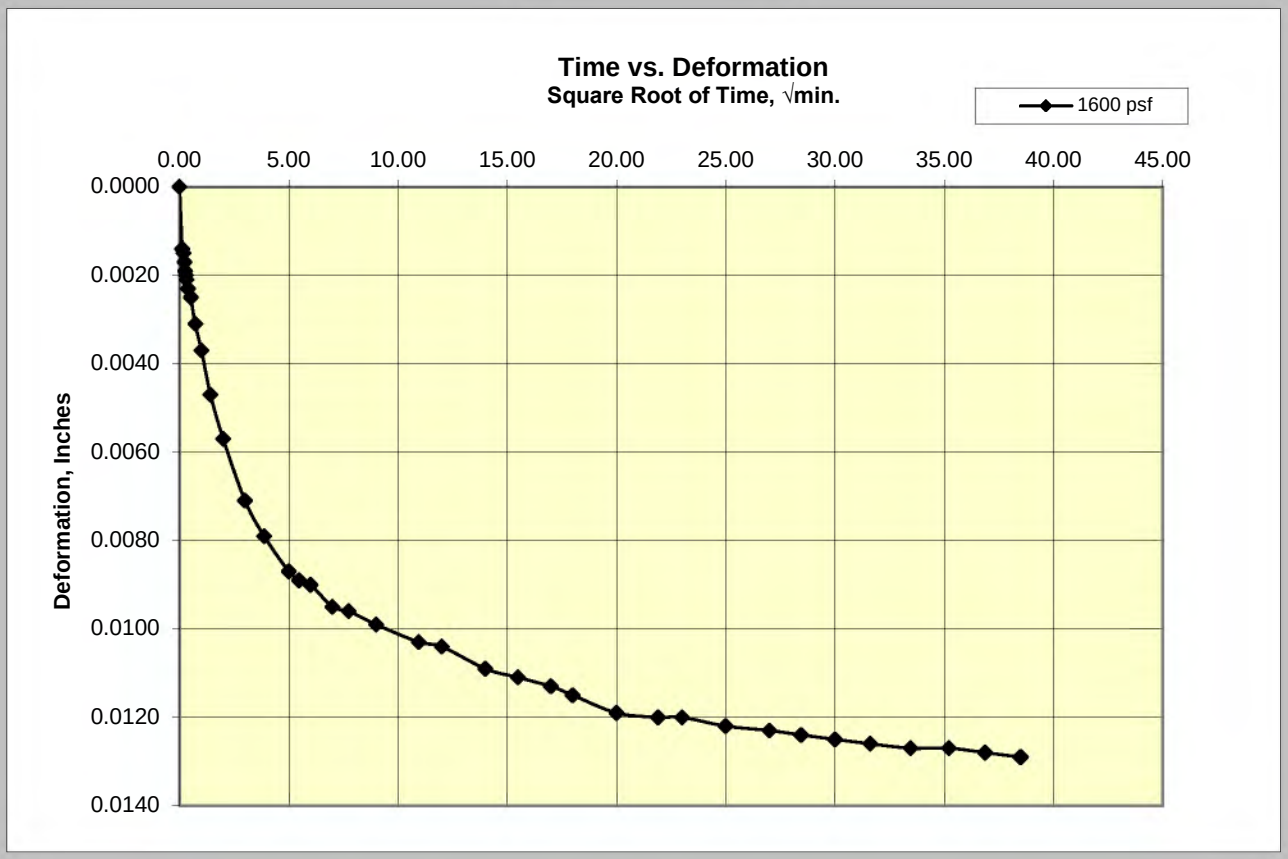


Cooper Testing Labs, Inc.

Load 7 | 1600 psf

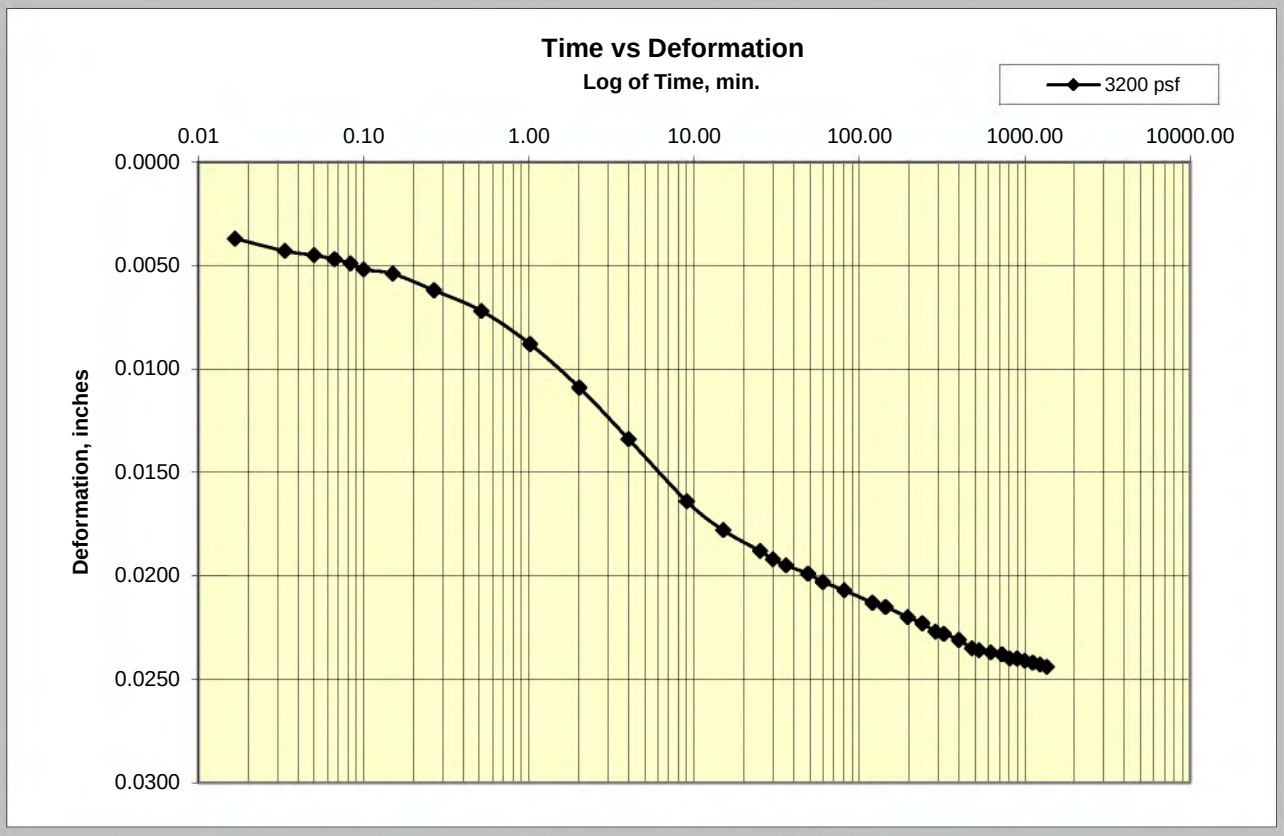


1600 psf



Cooper Testing Labs, Inc.

Load 8 | 3200 psf



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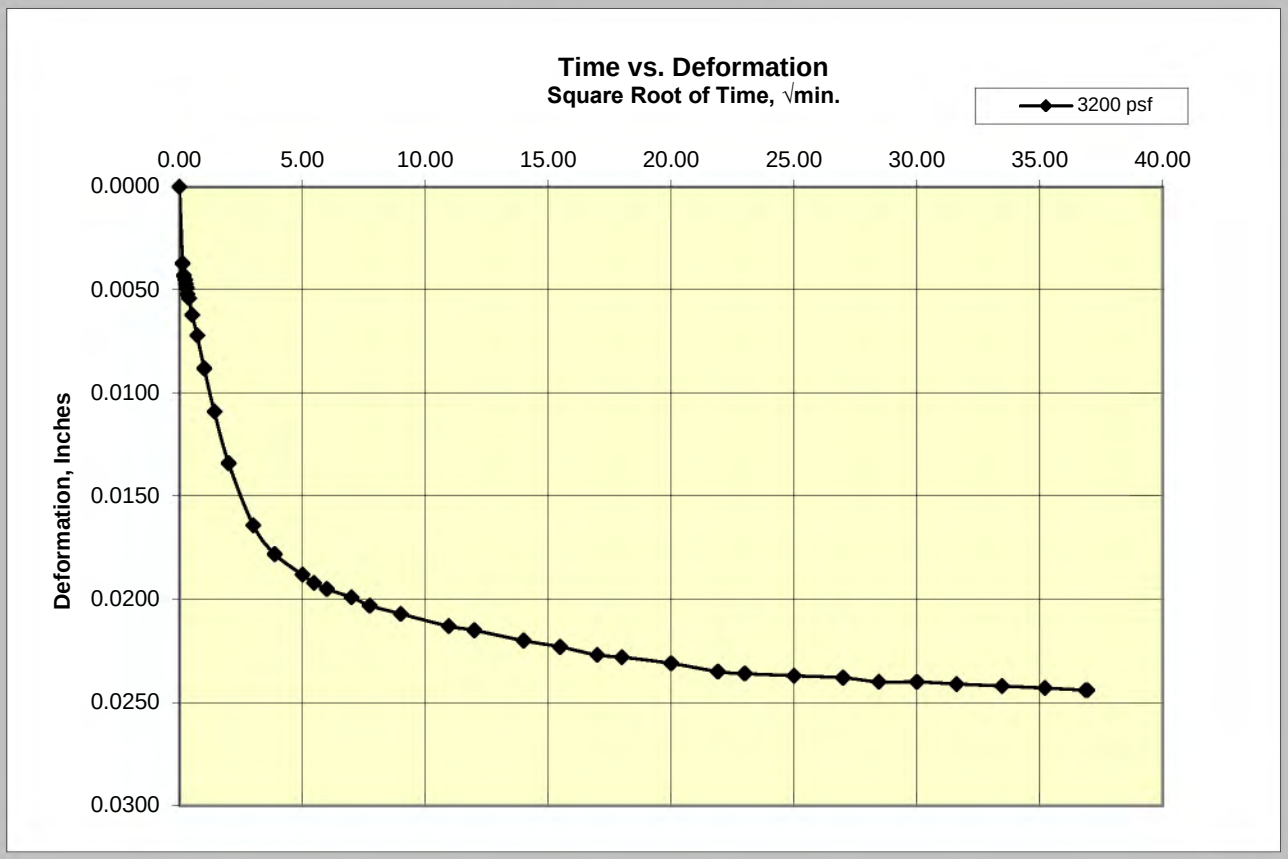
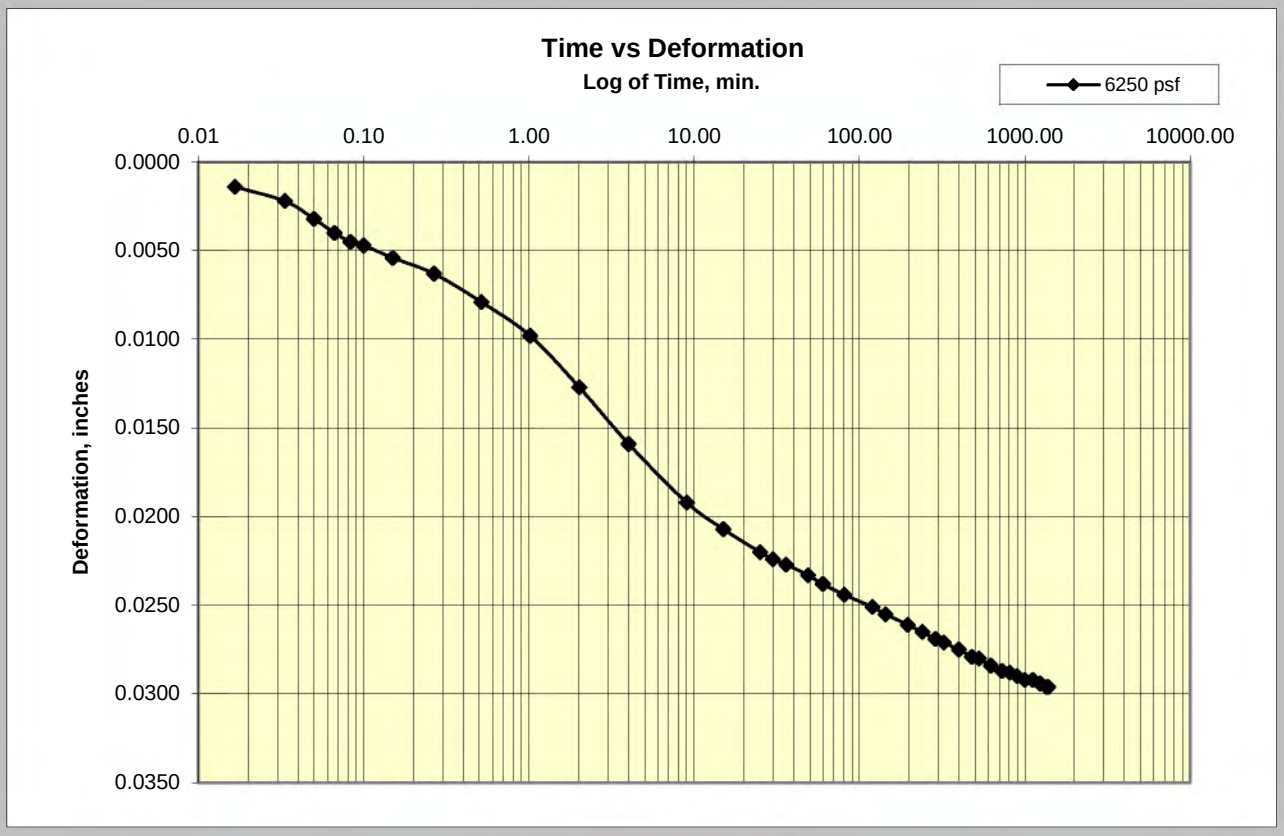
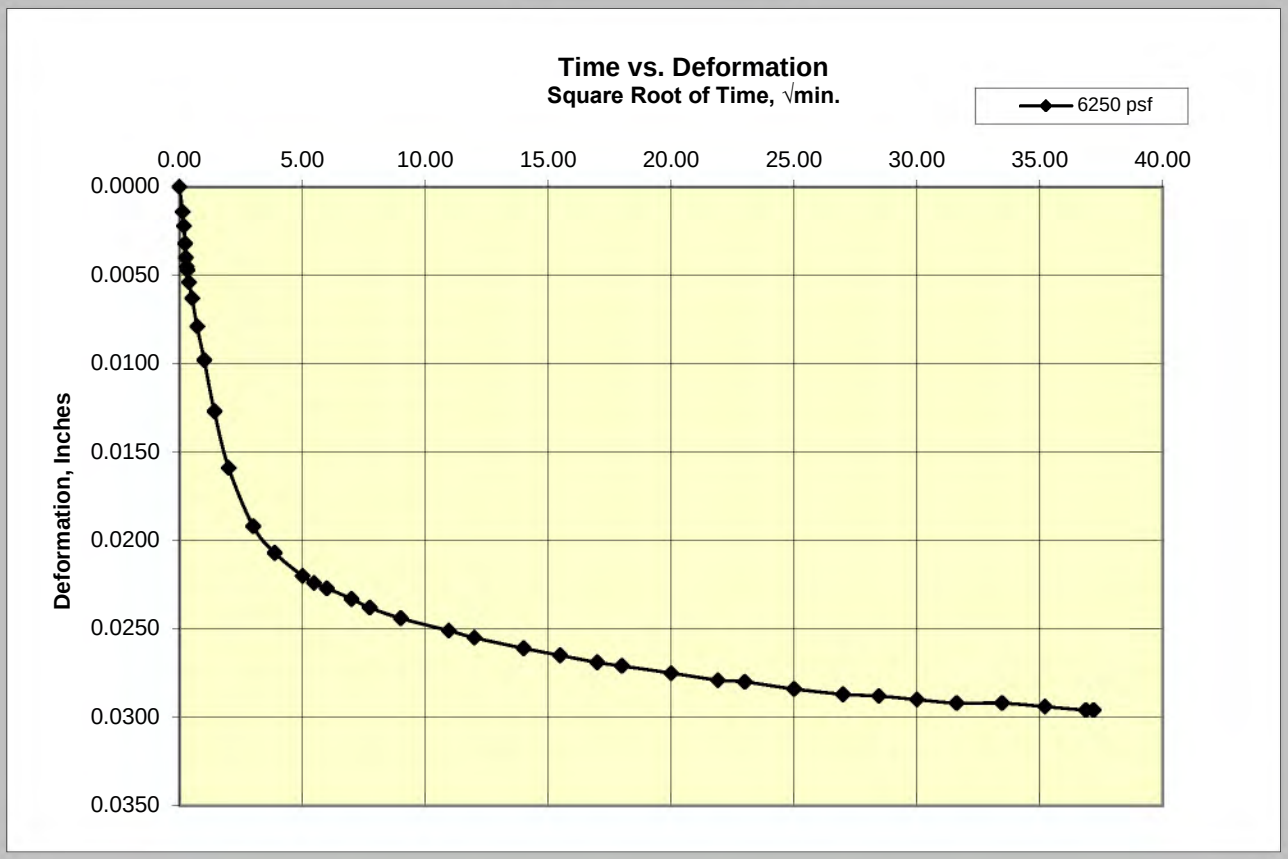


Cooper Testing Labs, Inc.

Load 9 | 6250 psf

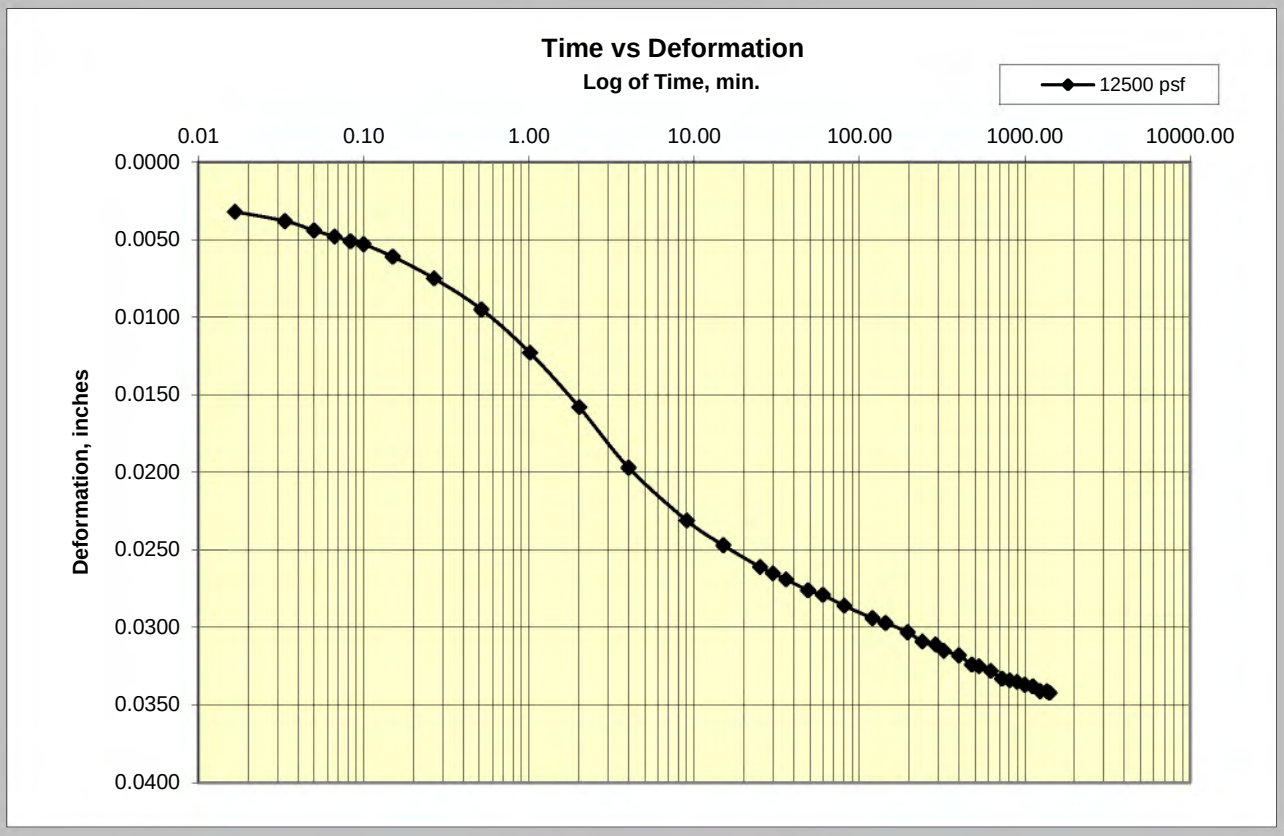


6250 psf



Cooper Testing Labs, Inc.

Load 10 | 12500 psf



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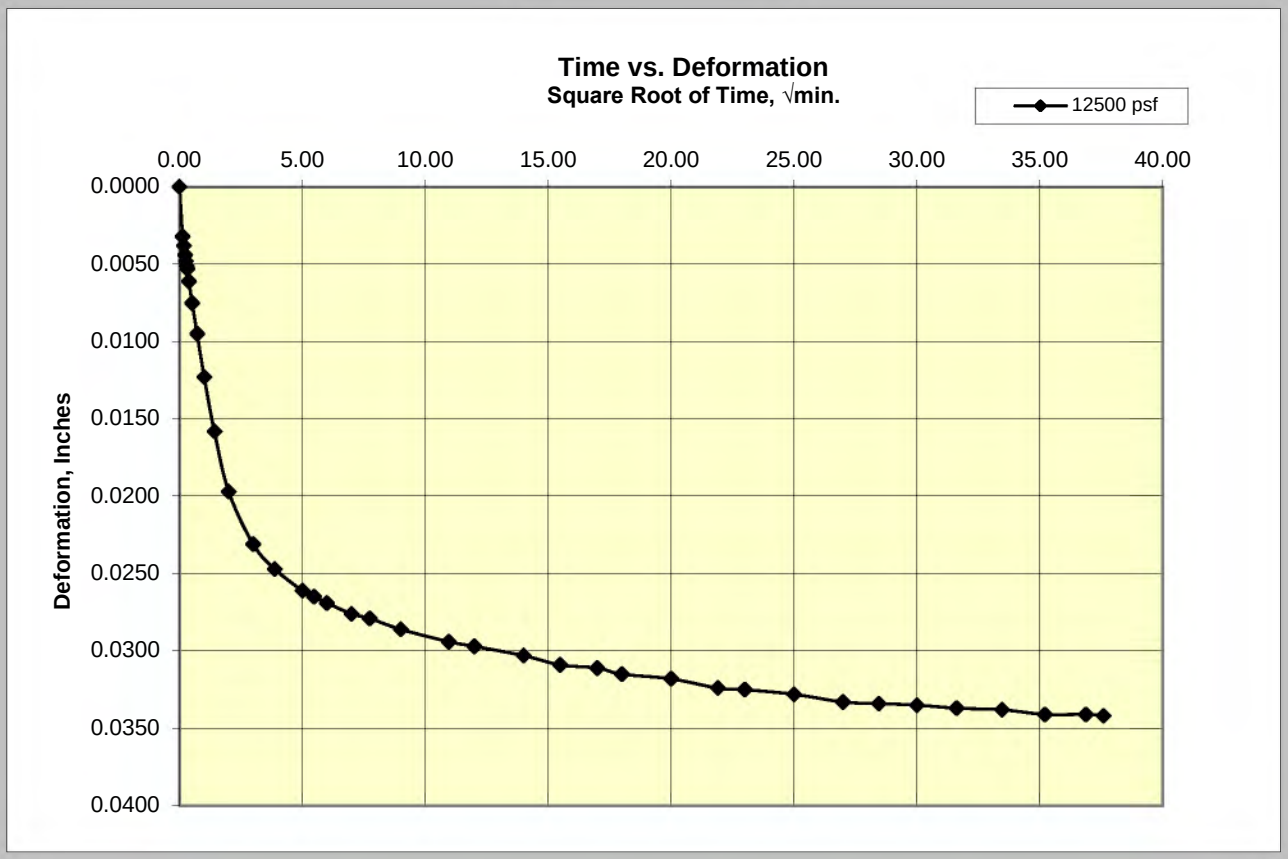
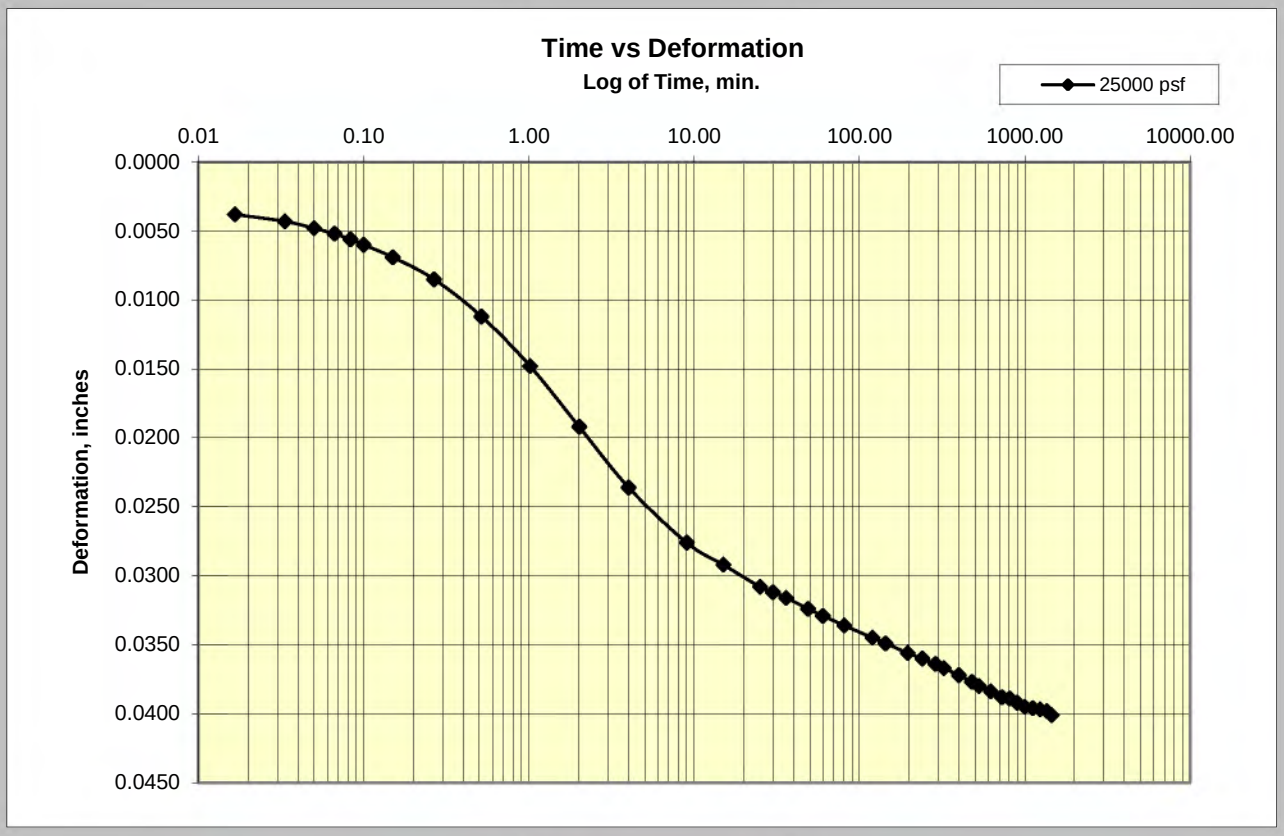


Cooper Testing Labs, Inc.

Load 11 | 25000 psf



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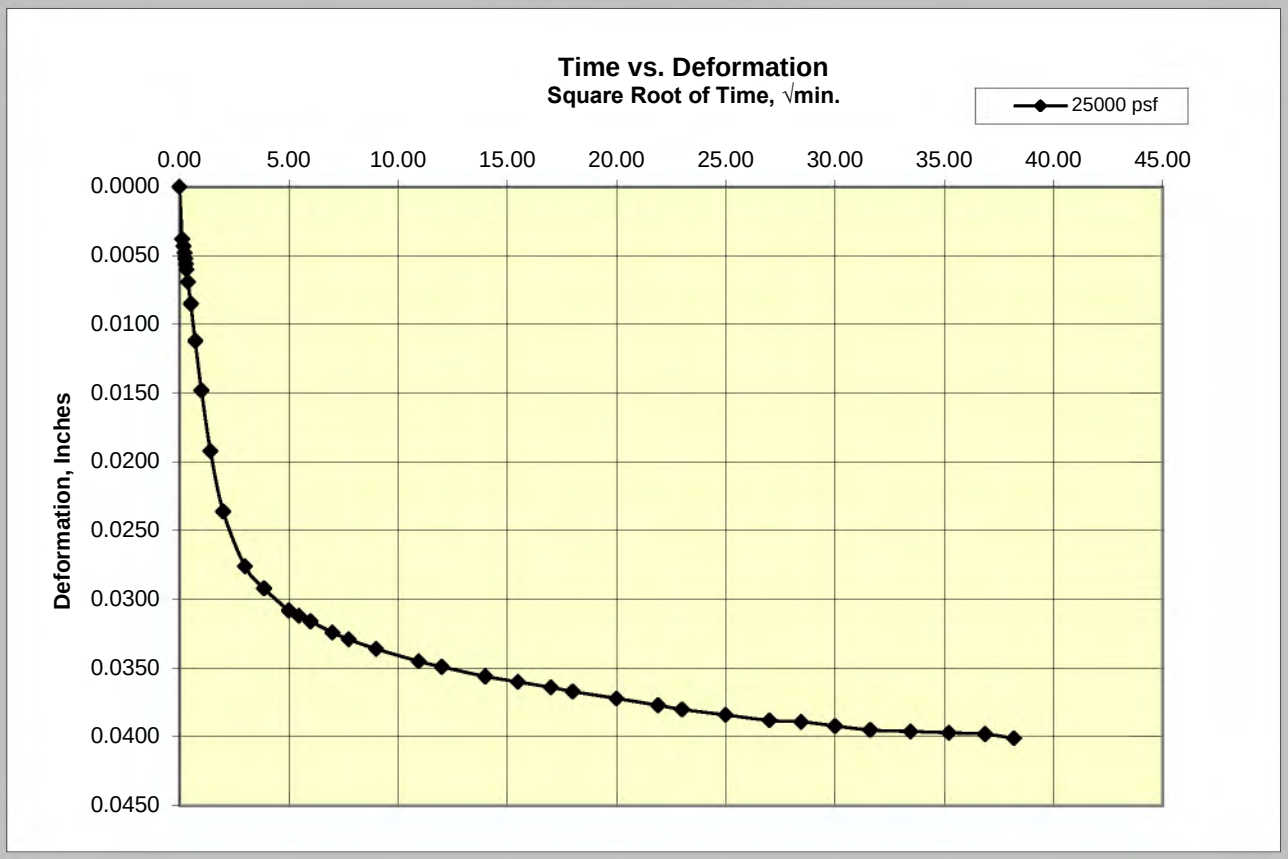
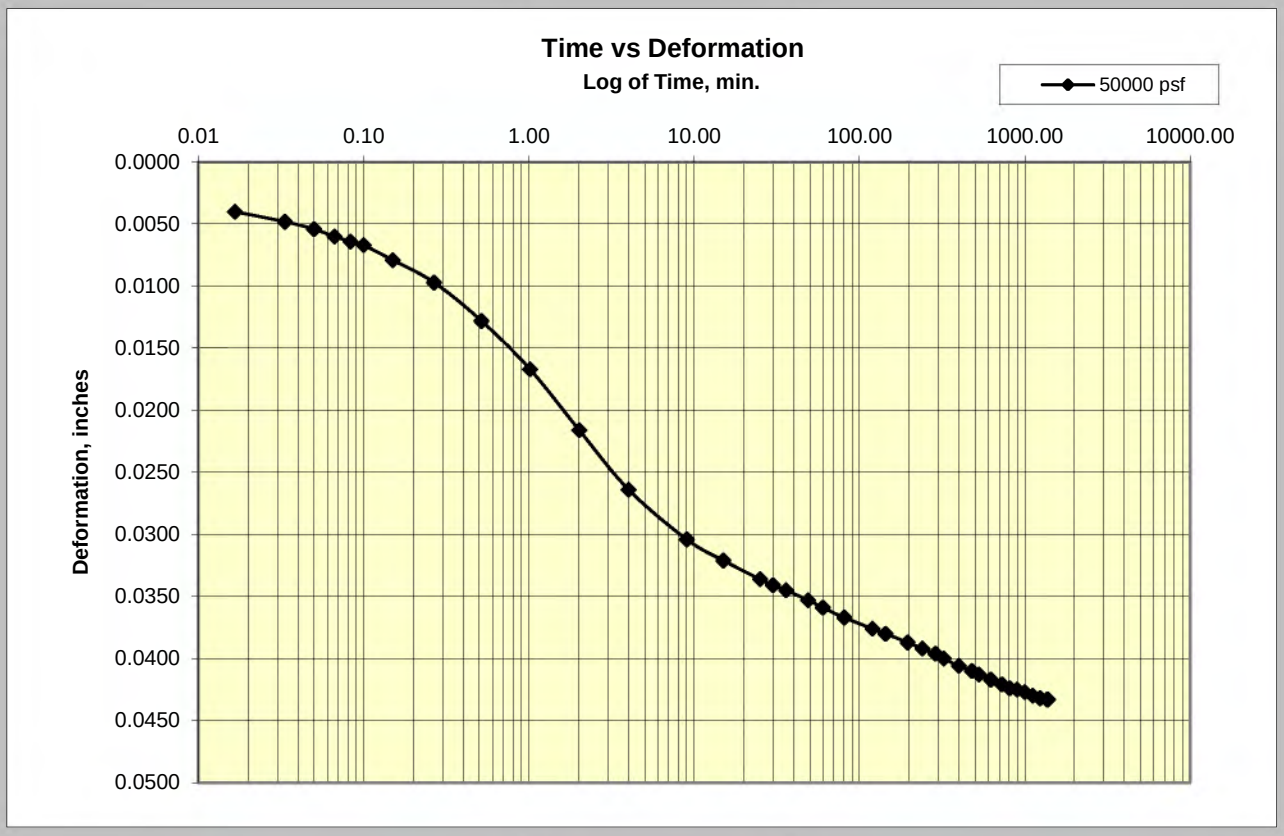


Cooper Testing Labs, Inc.

Load 12 | 50000 psf



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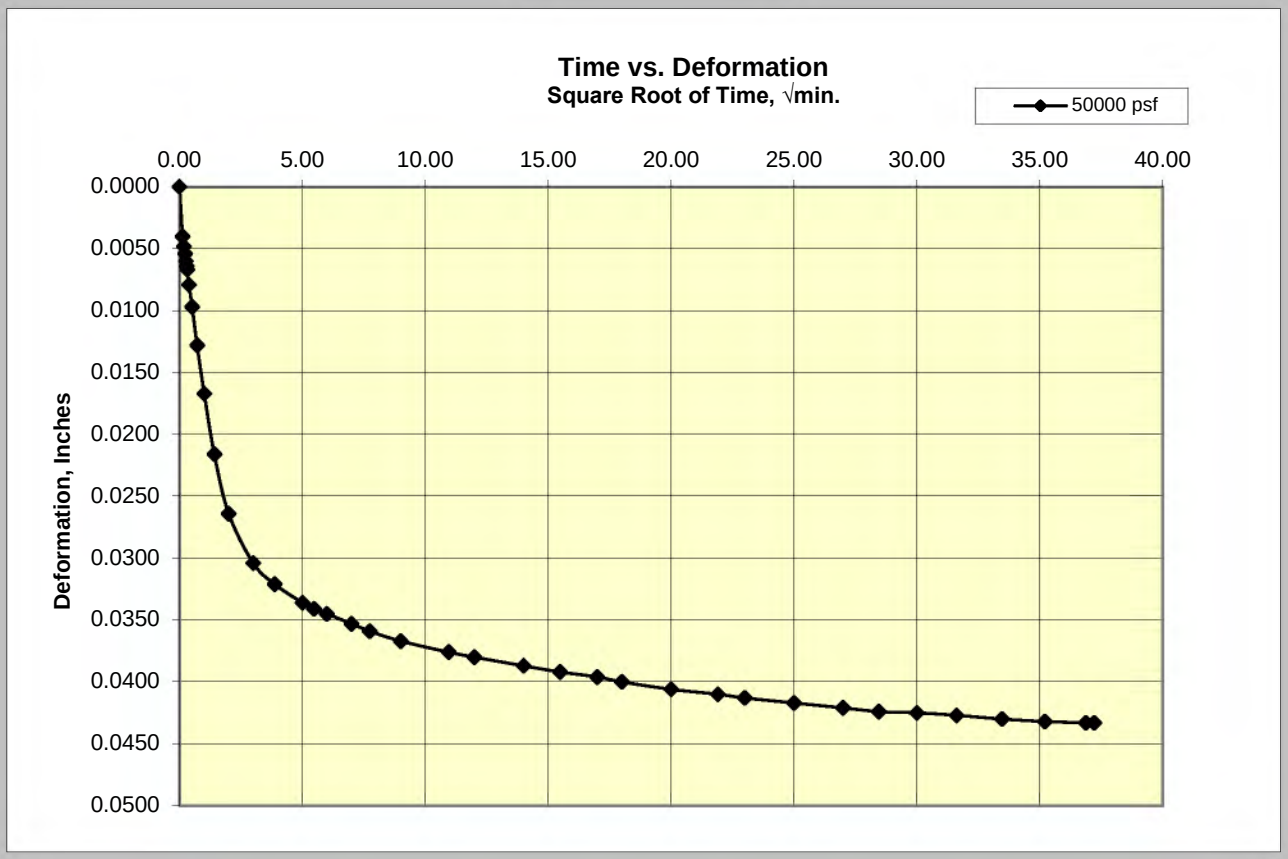
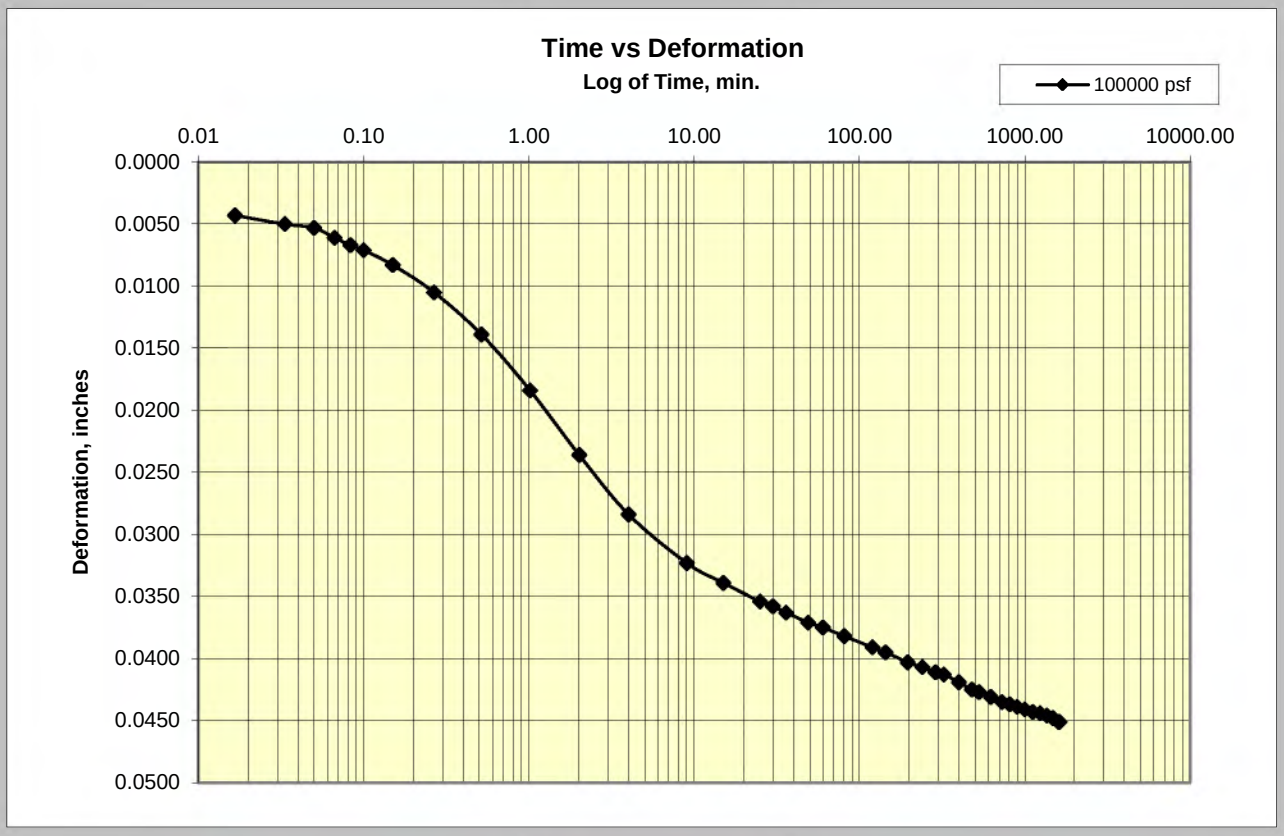
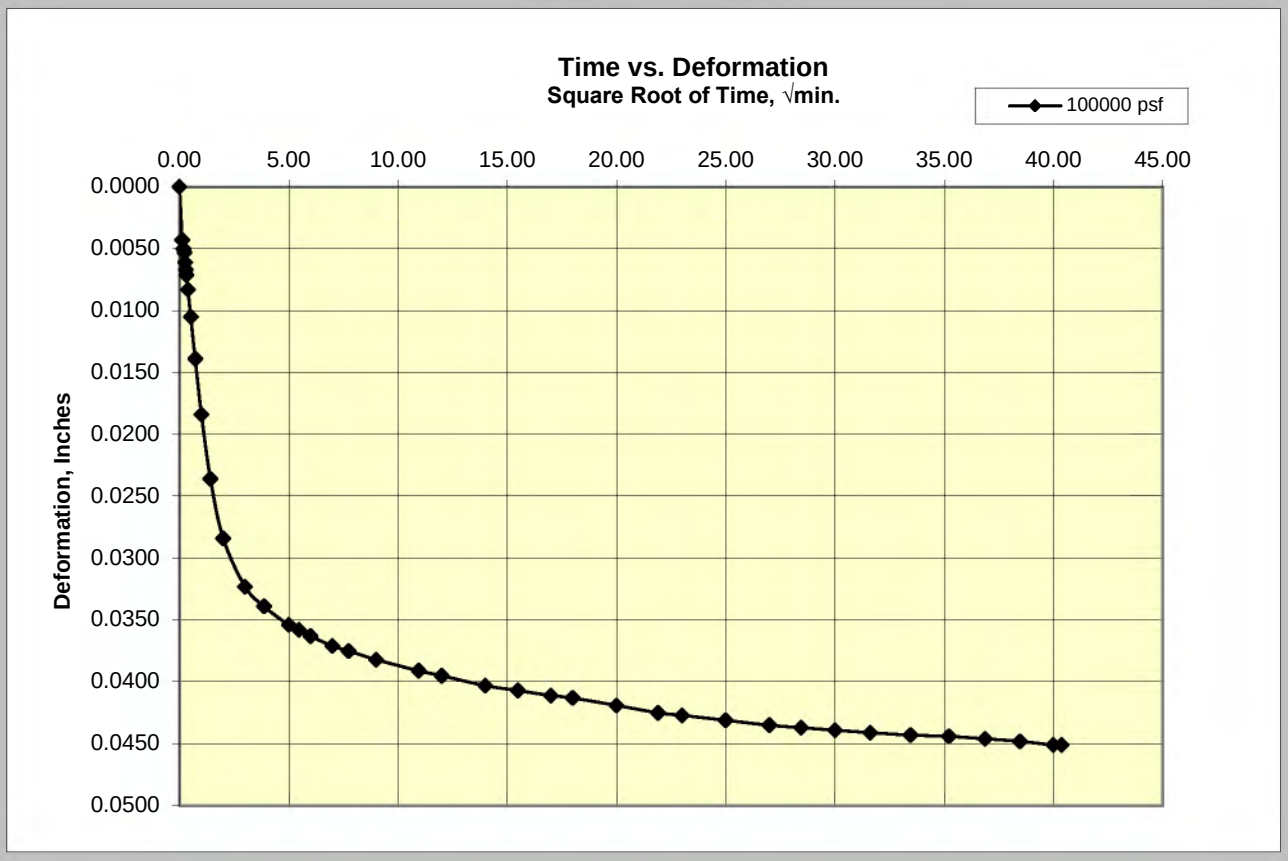


Cooper Testing Labs, Inc.

Load 13 | 100000 psf

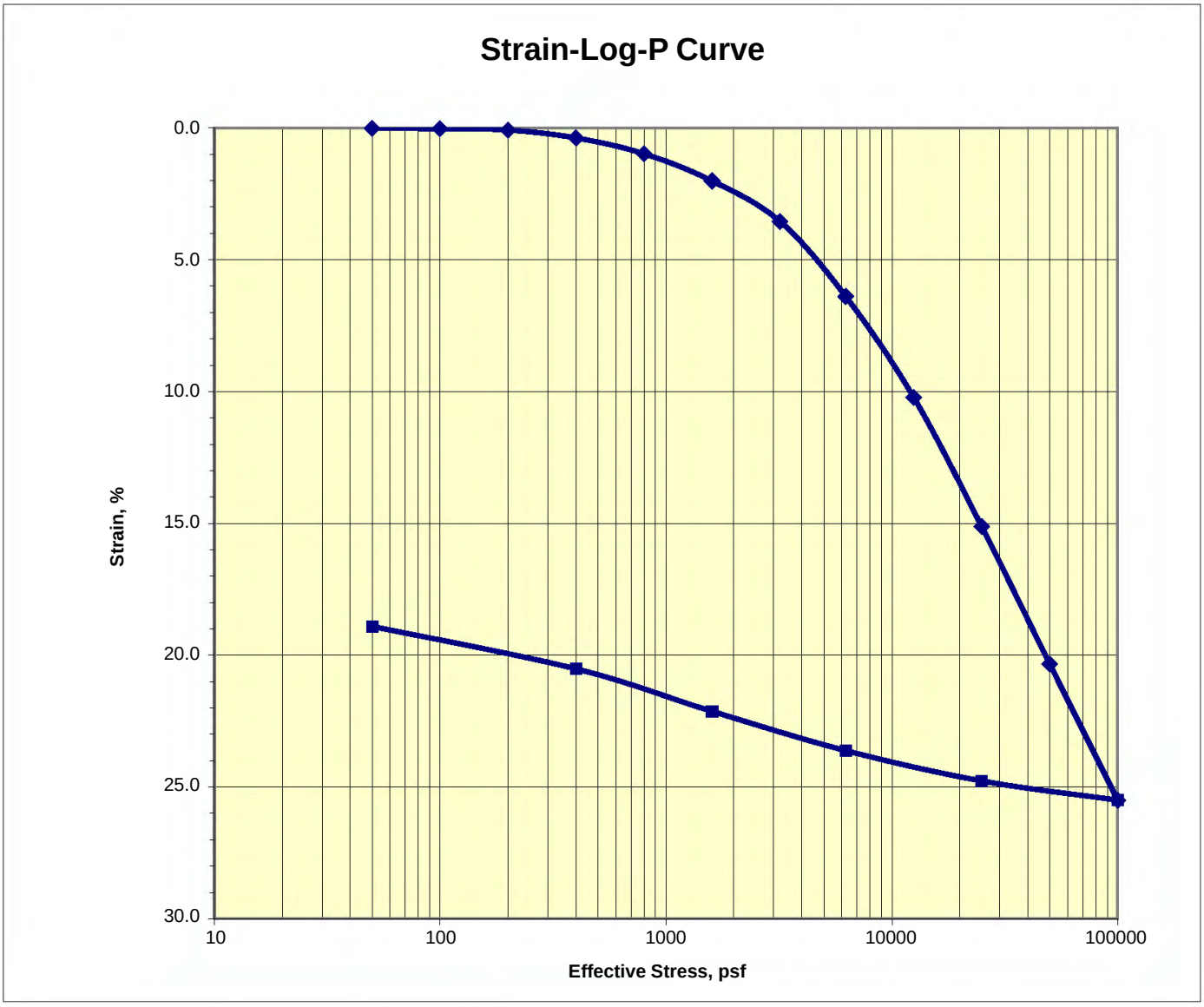


100000 psf



Consolidation Test
ASTM D2435

Job No.:	054-187	**Boring:**	22-B03	**Run By:**	MD
Client:	SHN Engineers	**Sample:**	S12	**Reduced:**	PJ
Project:	022054.400	**Depth, ft.:**	45-47.5	**Checked:**	PJ/DC
Soil Type:	Dark Gray Sandy SILT			**Date:**	7/29/2022

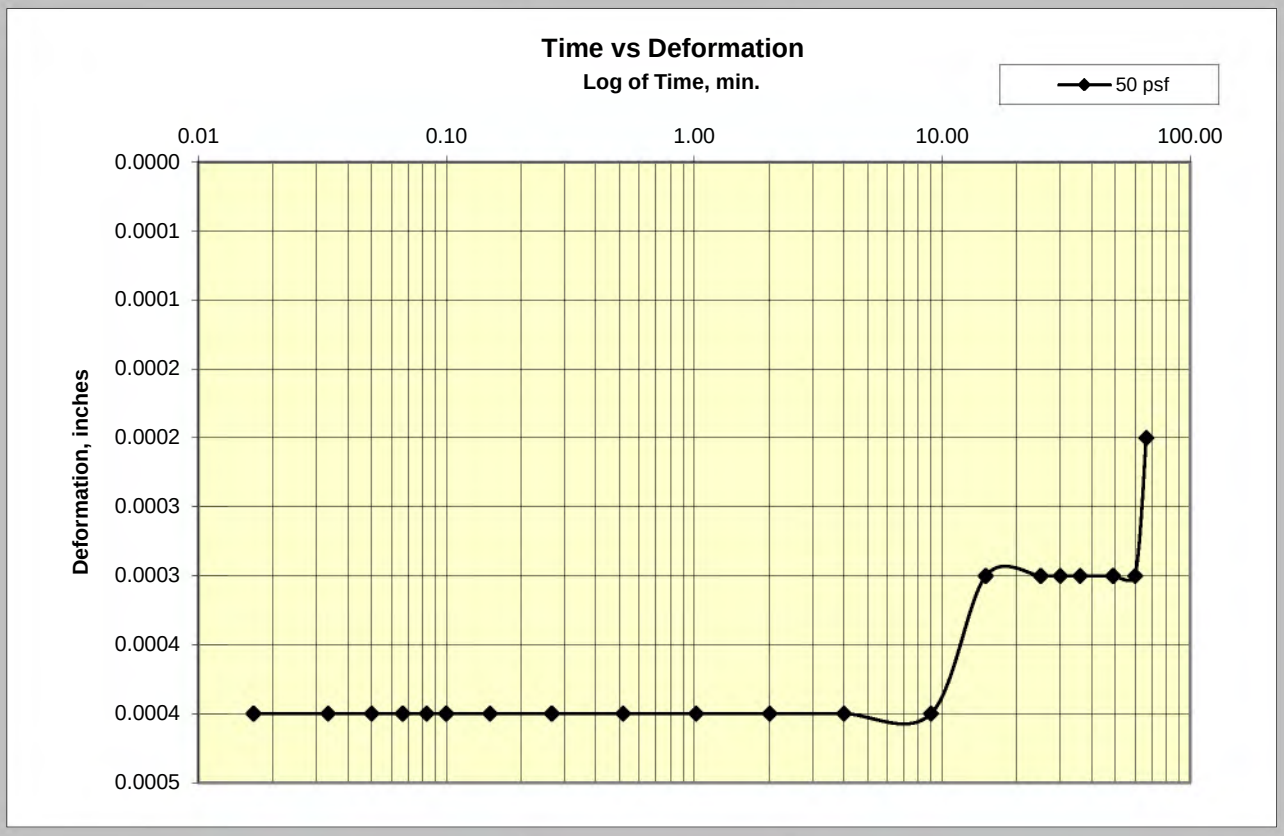


Assumed Gs 2.7	Initial	Final
Moisture %:	36.6	24.1
Dry Density, pcf:	82.4	102.1
Void Ratio:	1.045	0.651
% Saturation:	94.5	100.0

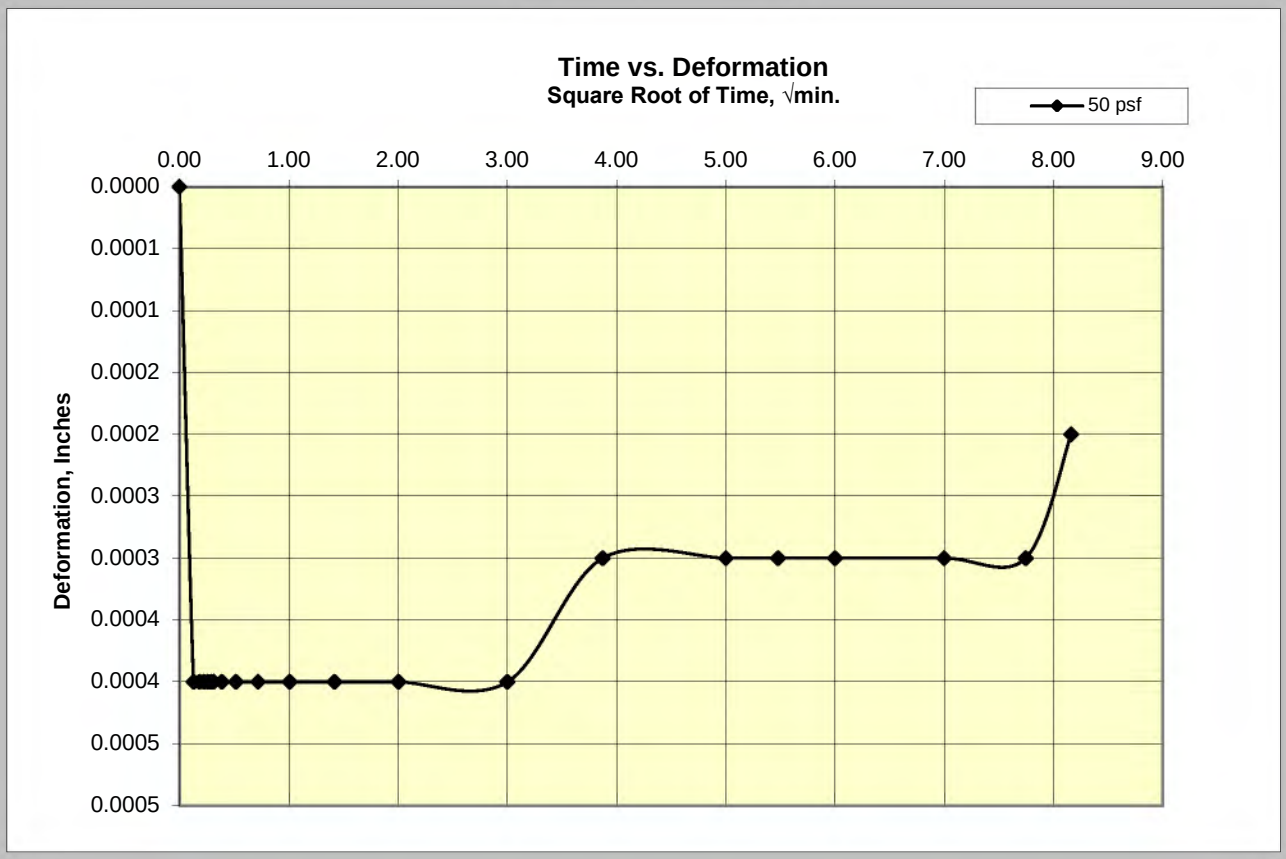
Remarks:

Cooper Testing Labs, Inc.

Load 1 | 50 psf

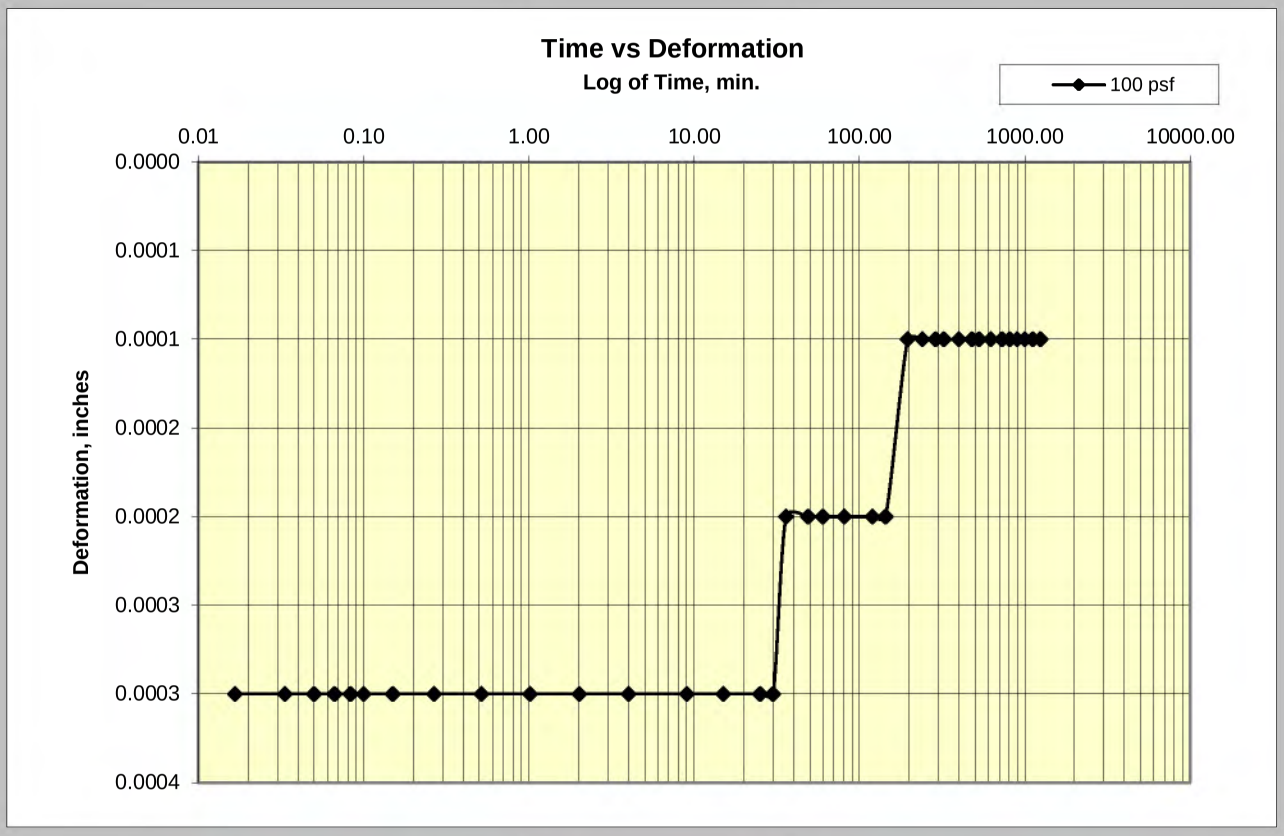


50 psf

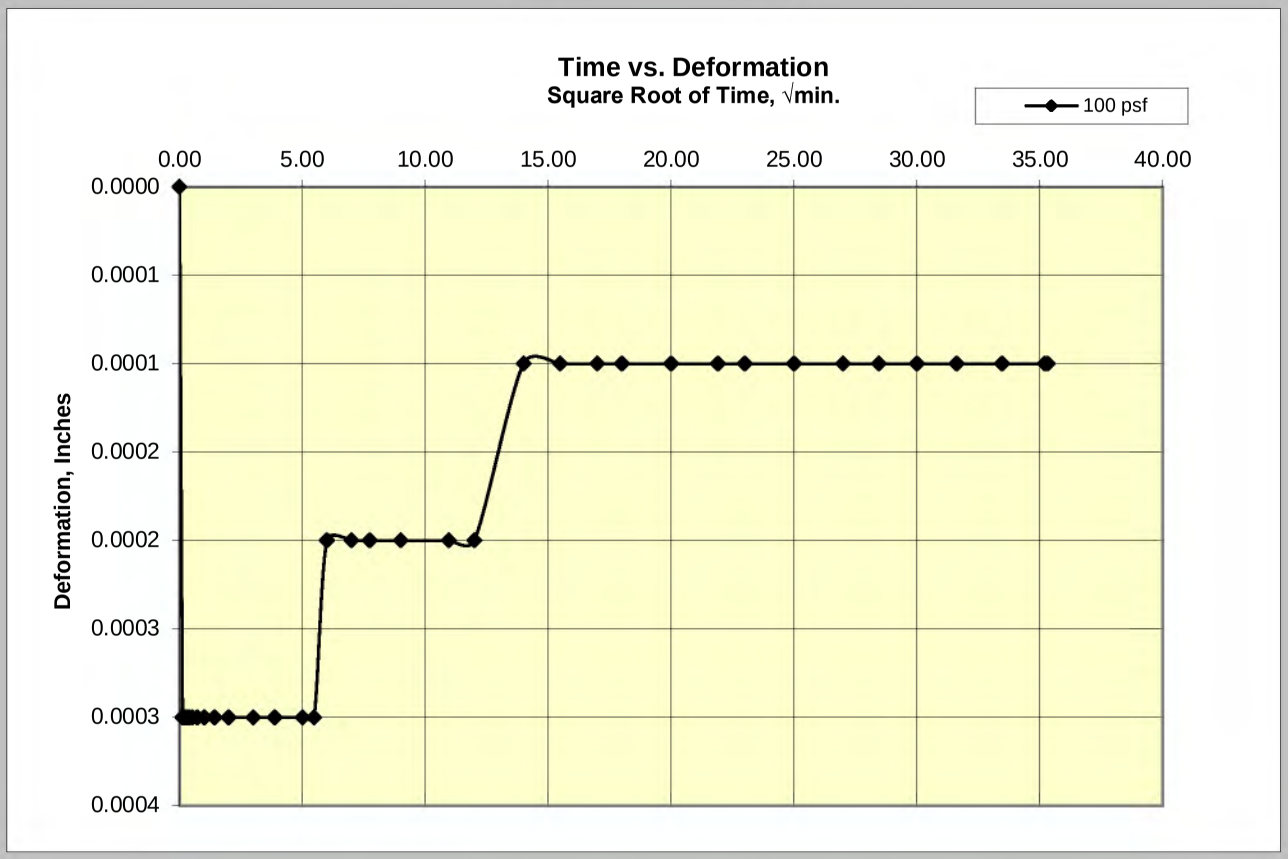


Cooper Testing Labs, Inc.

Load 2 | 100 psf

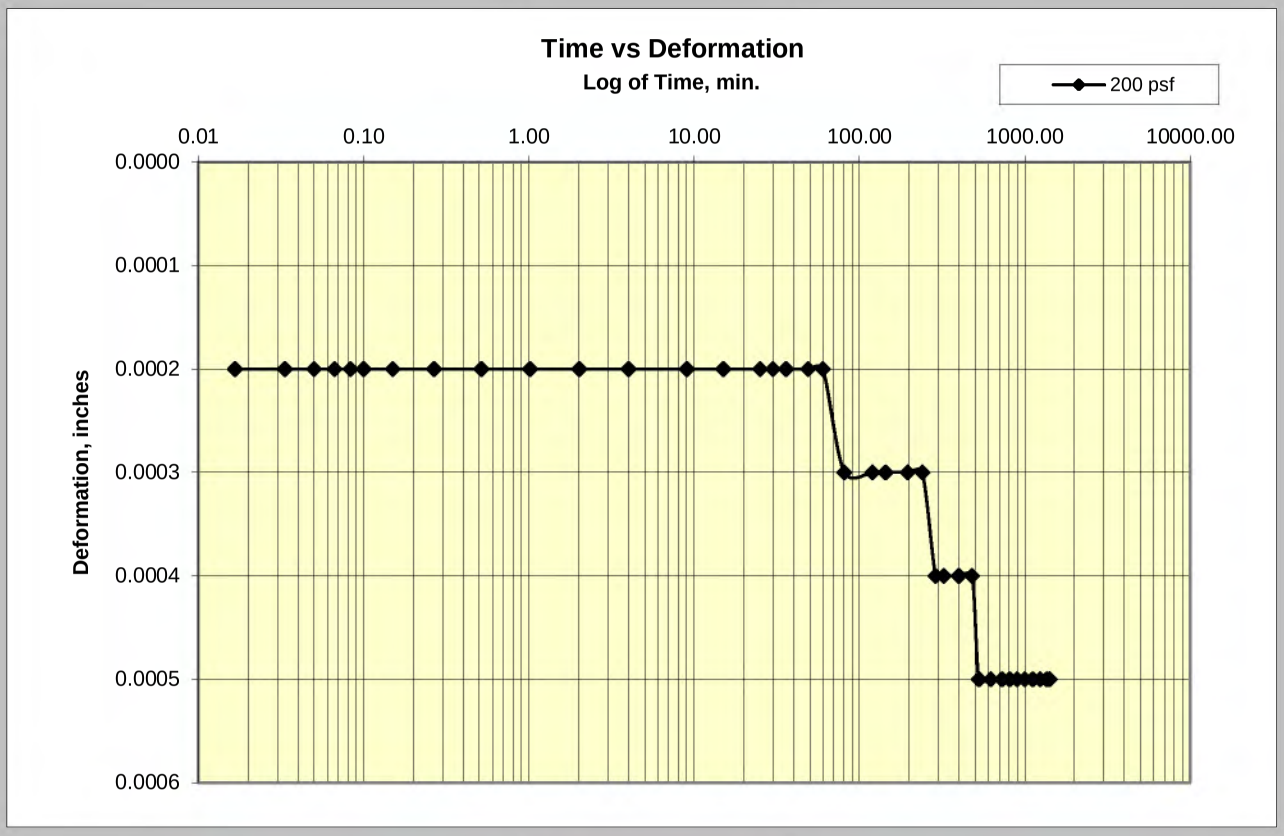


100 psf



Cooper Testing Labs, Inc.

Load 3 | 200 psf



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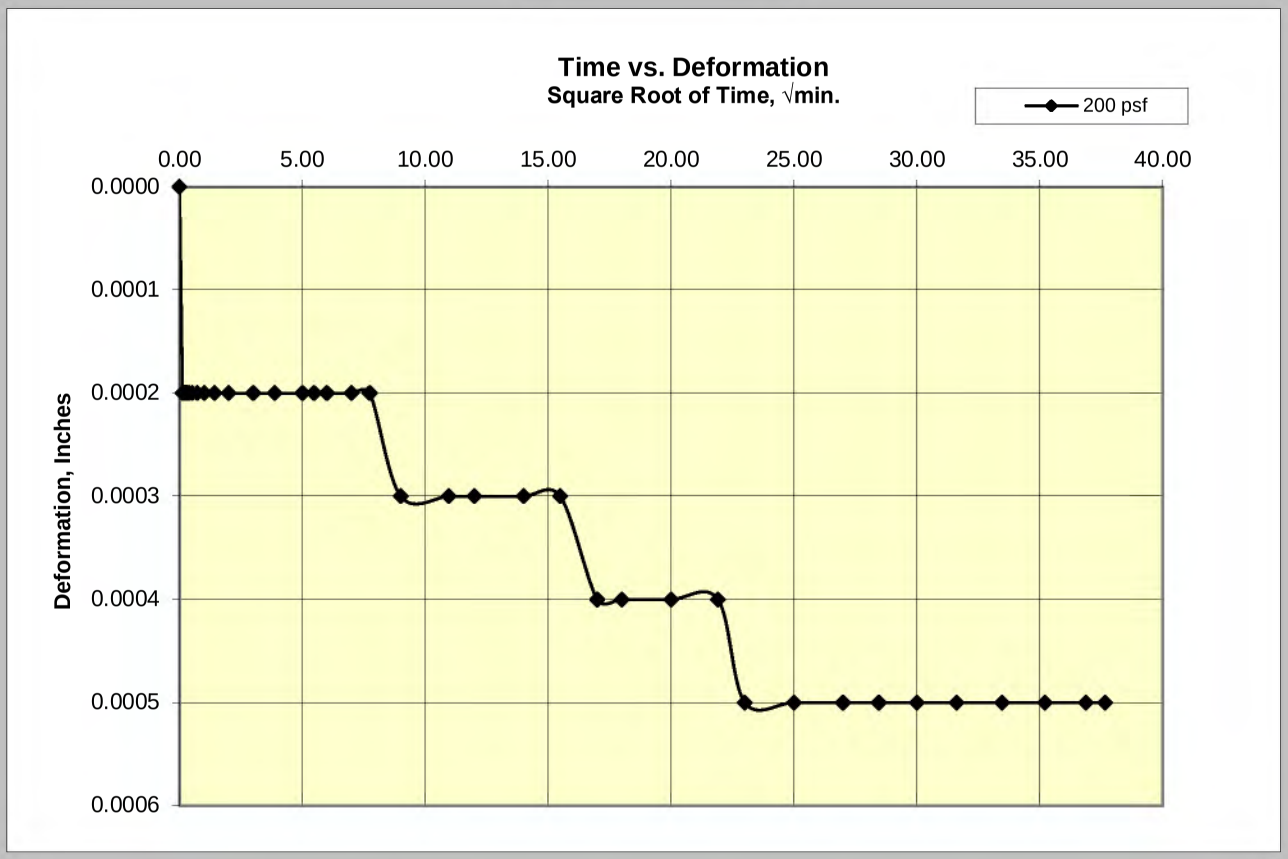
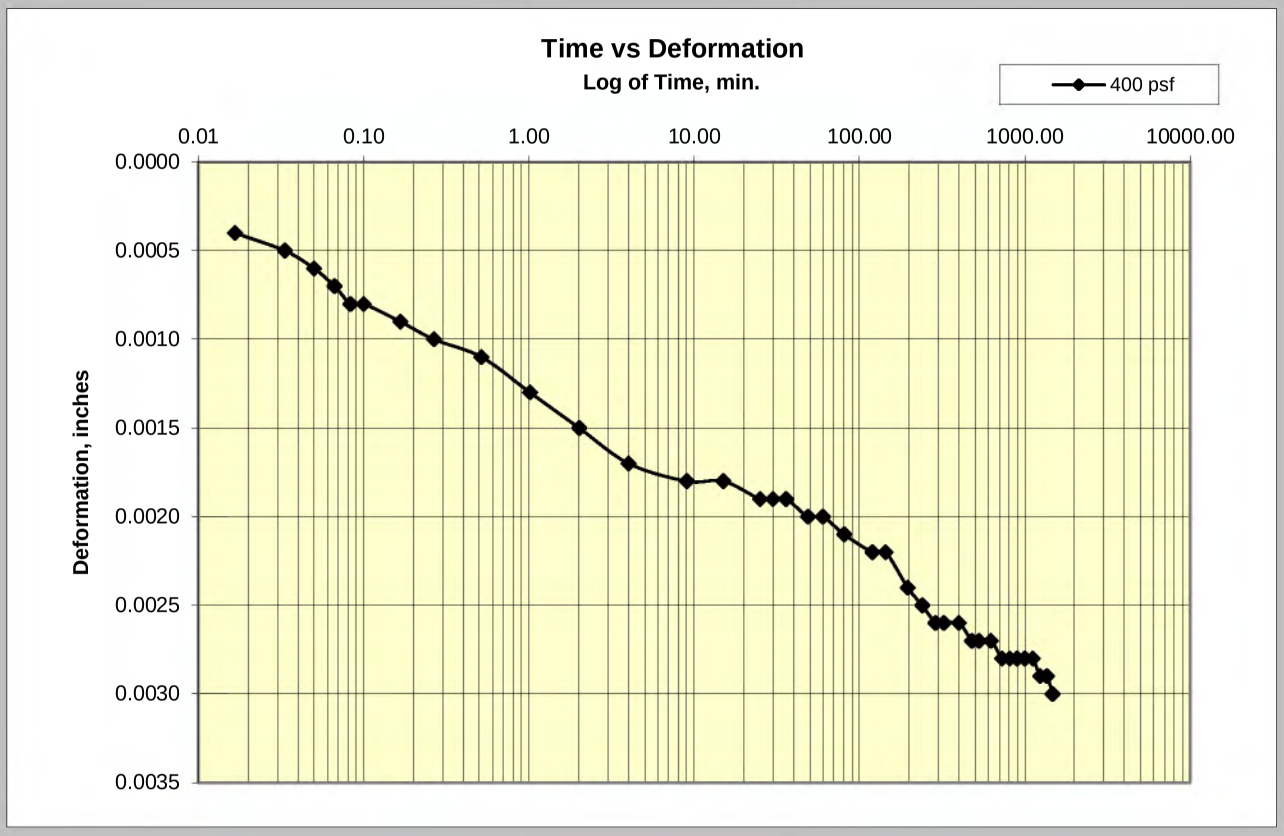
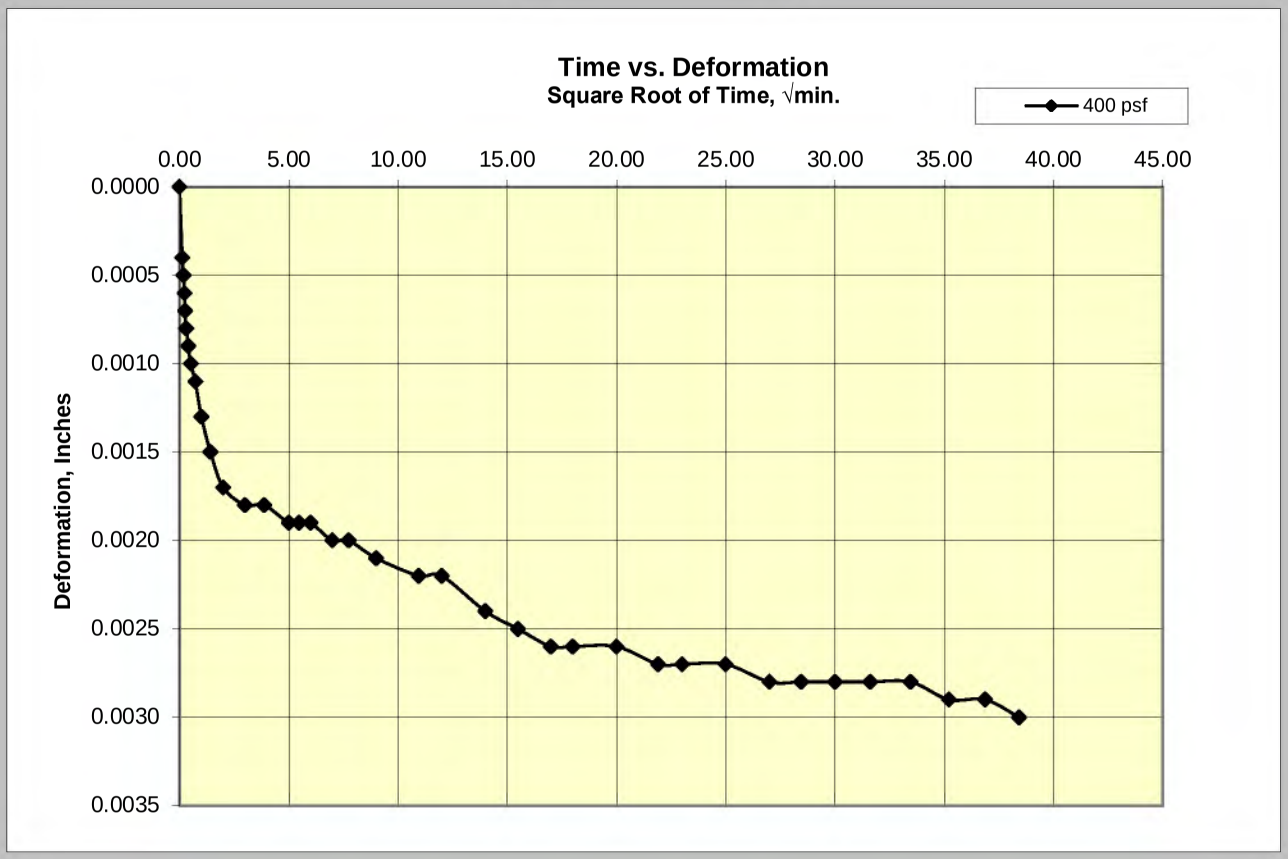


Cooper Testing Labs, Inc.

Load 4 | 400 psf

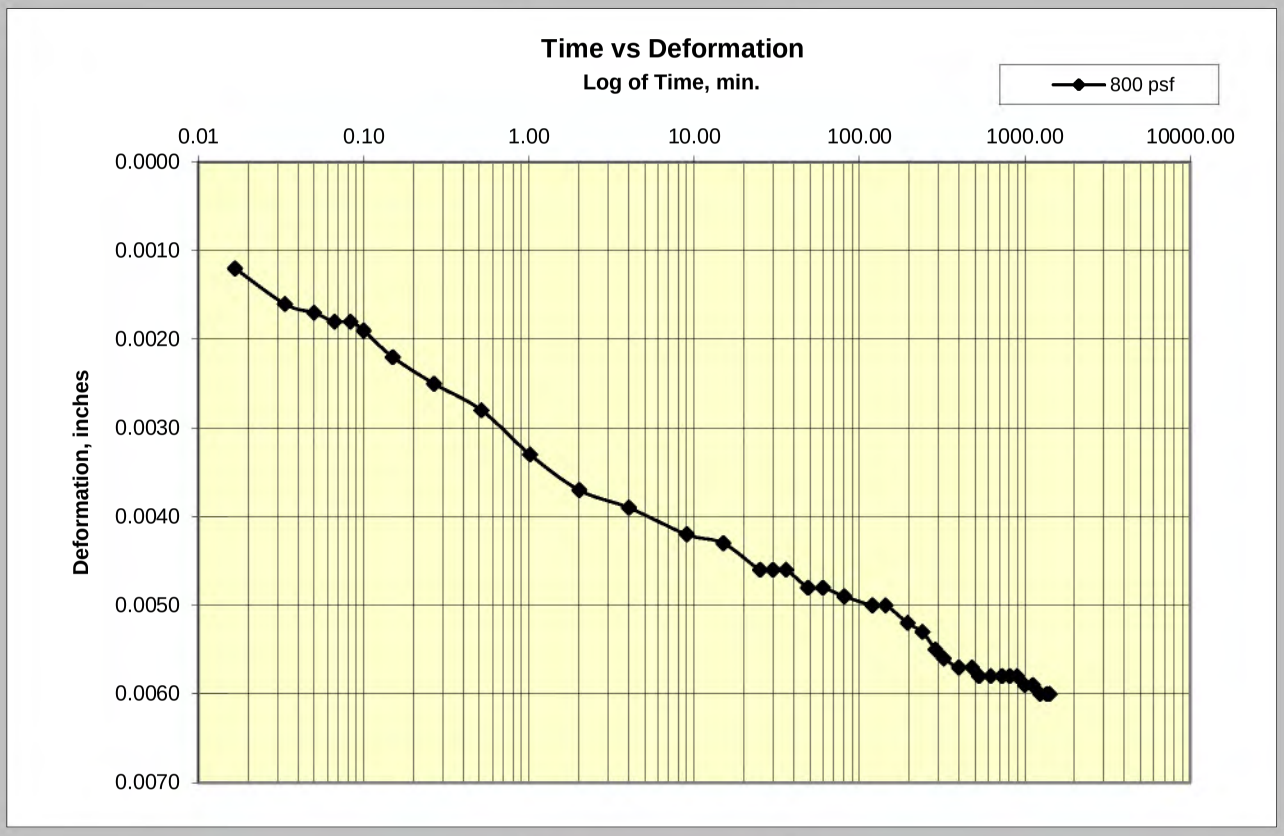


400 psf

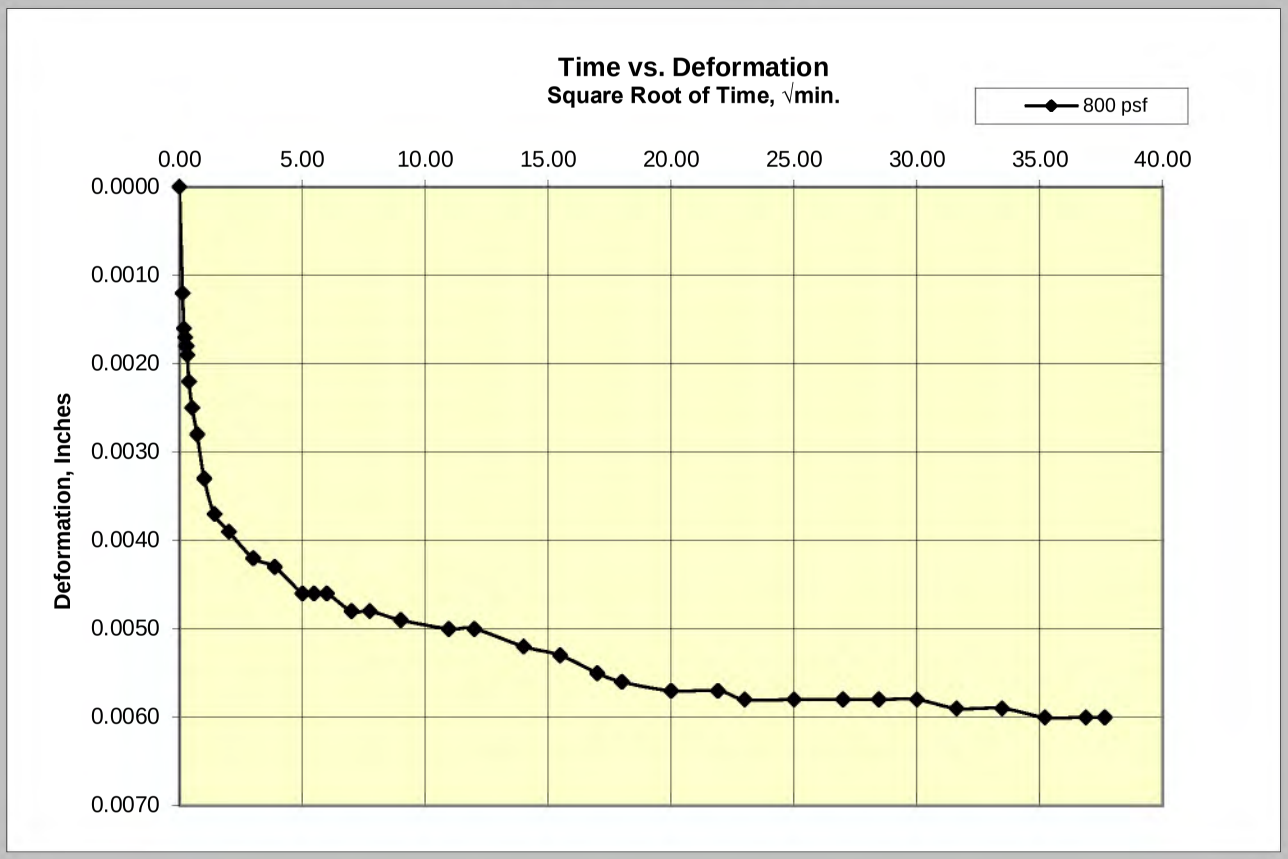


Cooper Testing Labs, Inc.

Load 5 | 800 psf

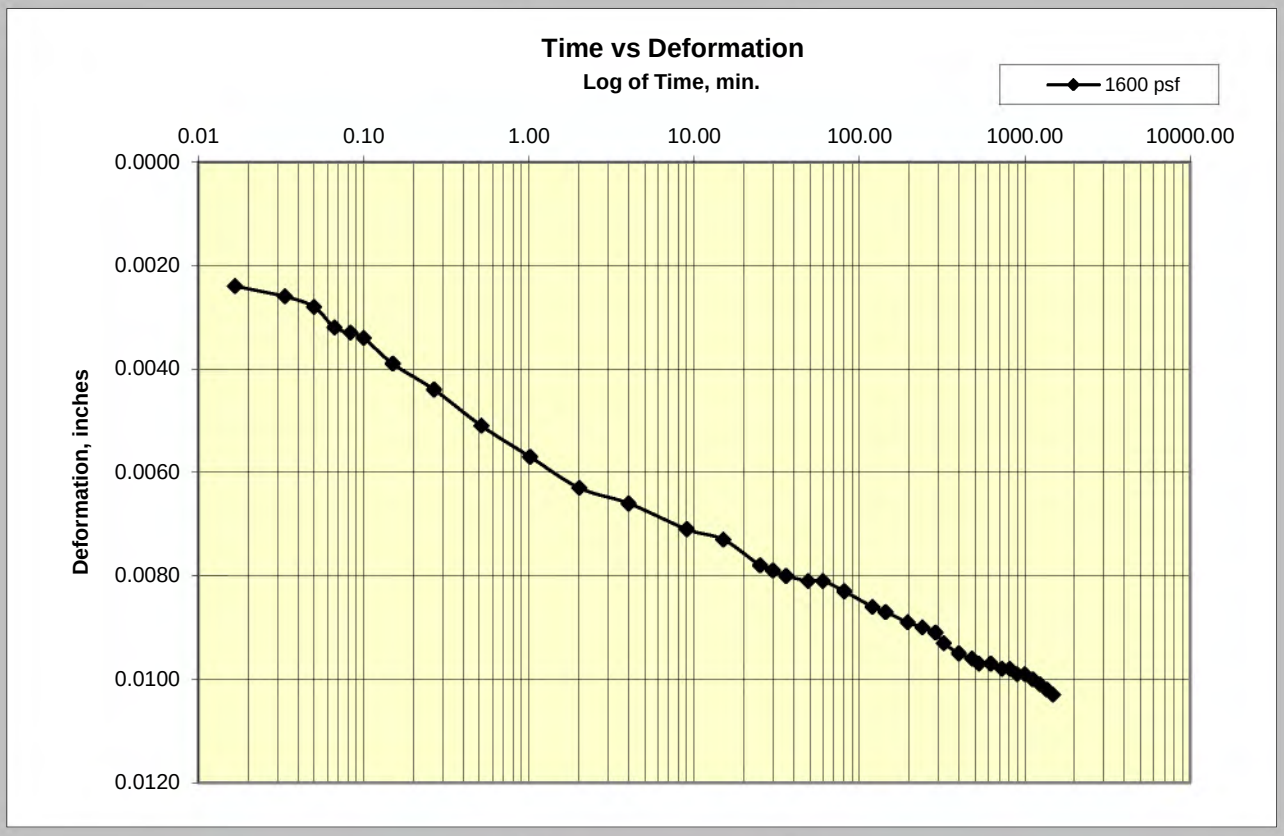


800 psf

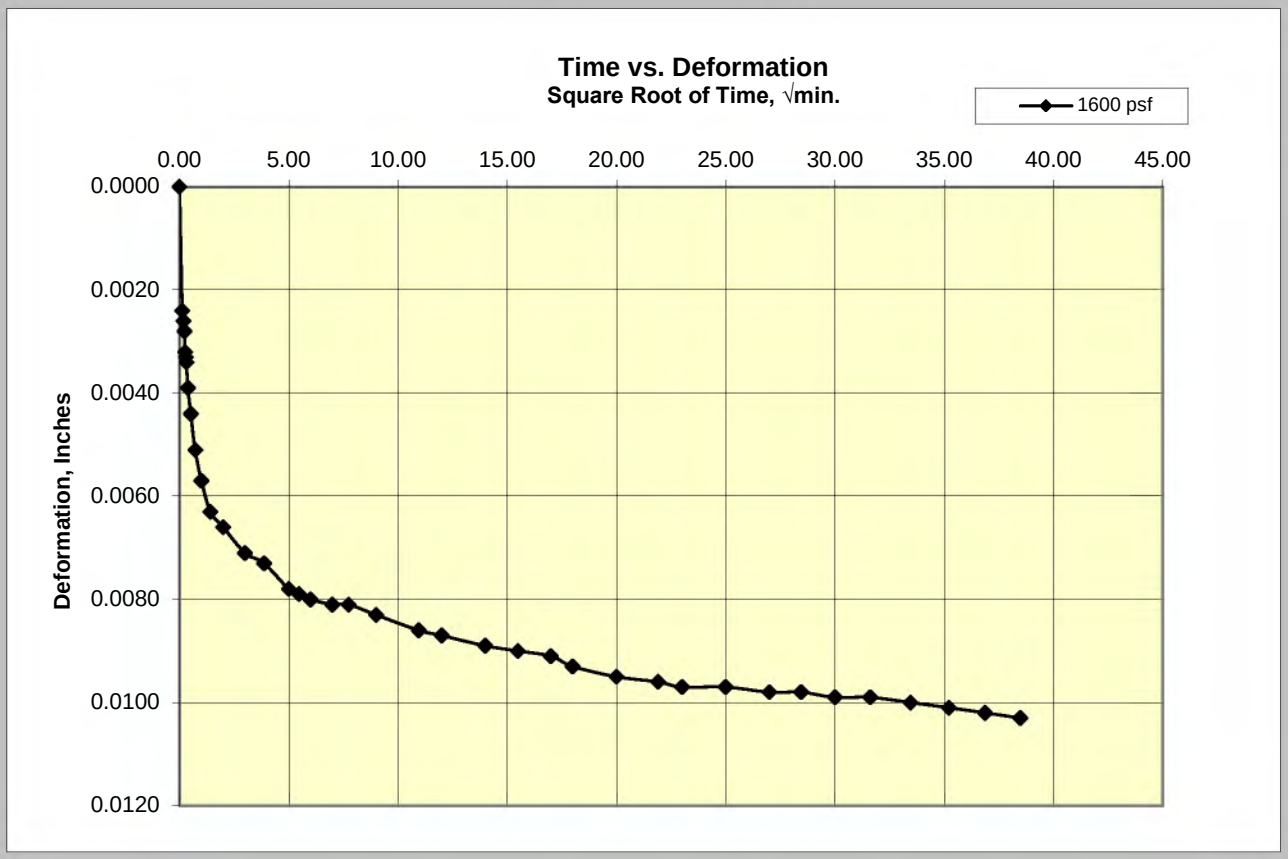


Cooper Testing Labs, Inc.

Load 6 | 1600 psf

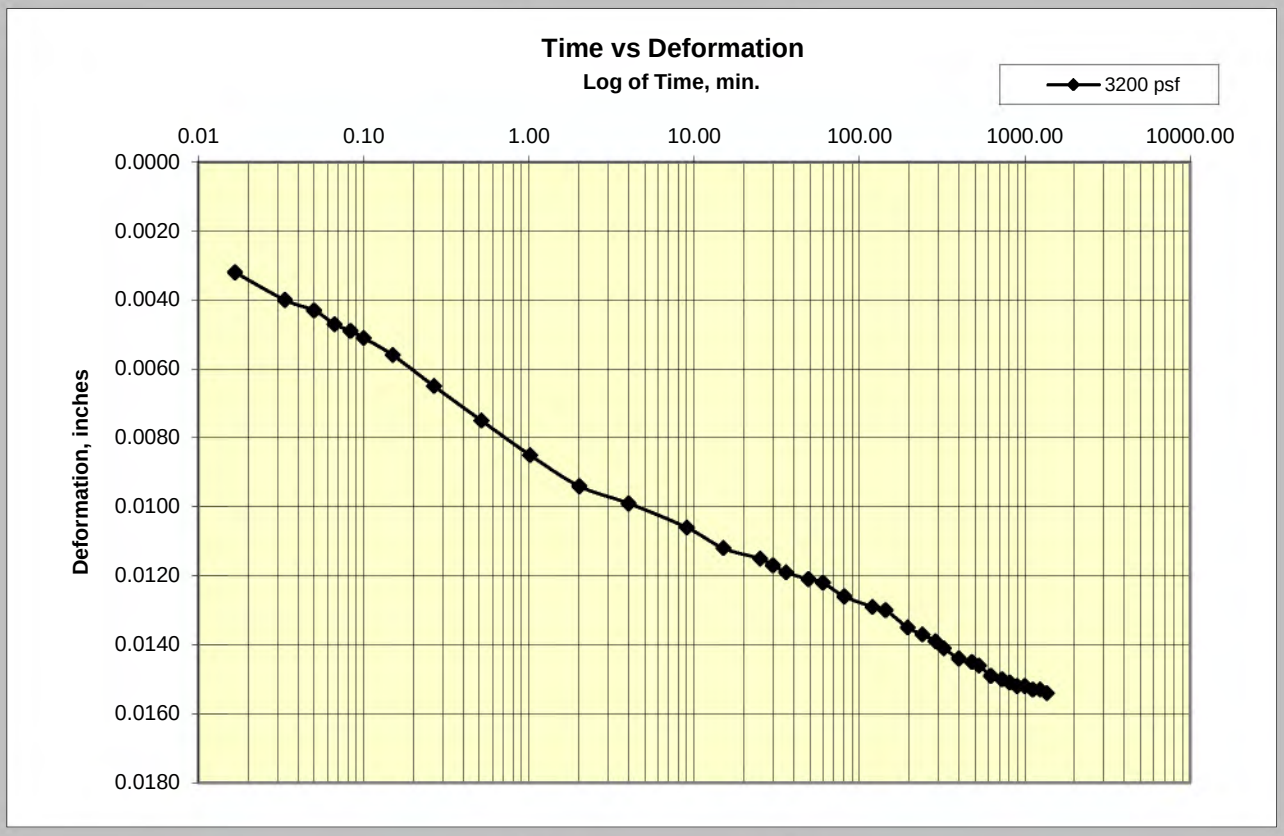


1600 psf



Cooper Testing Labs, Inc.

Load 7 | 3200 psf



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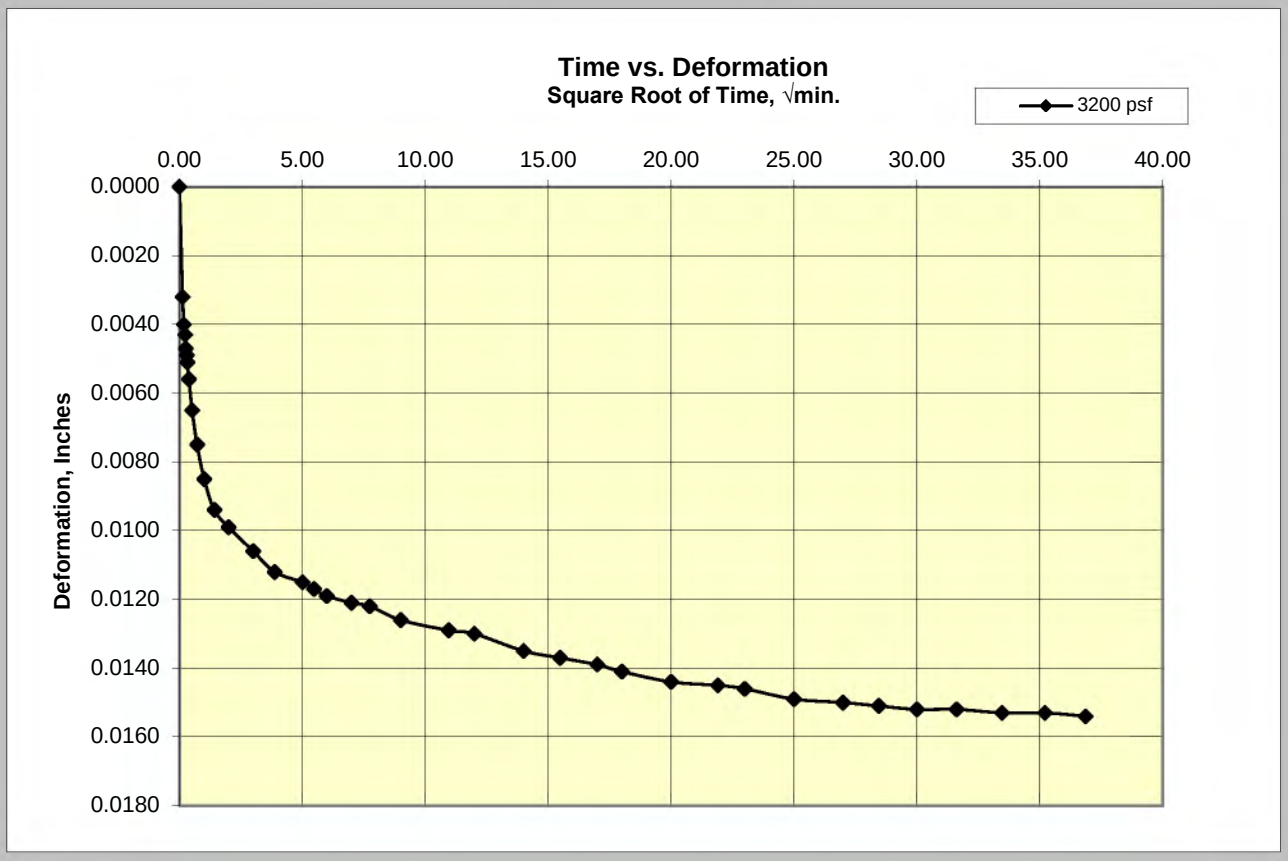
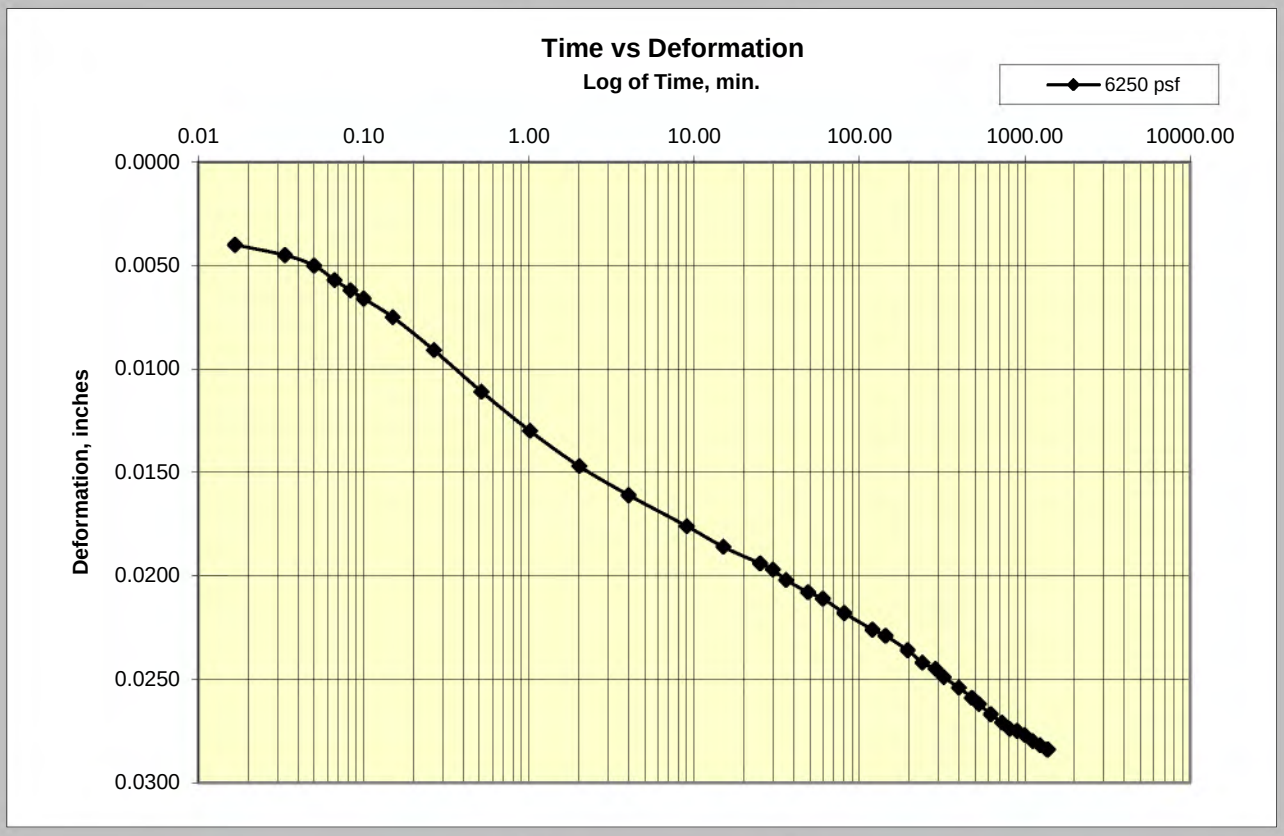
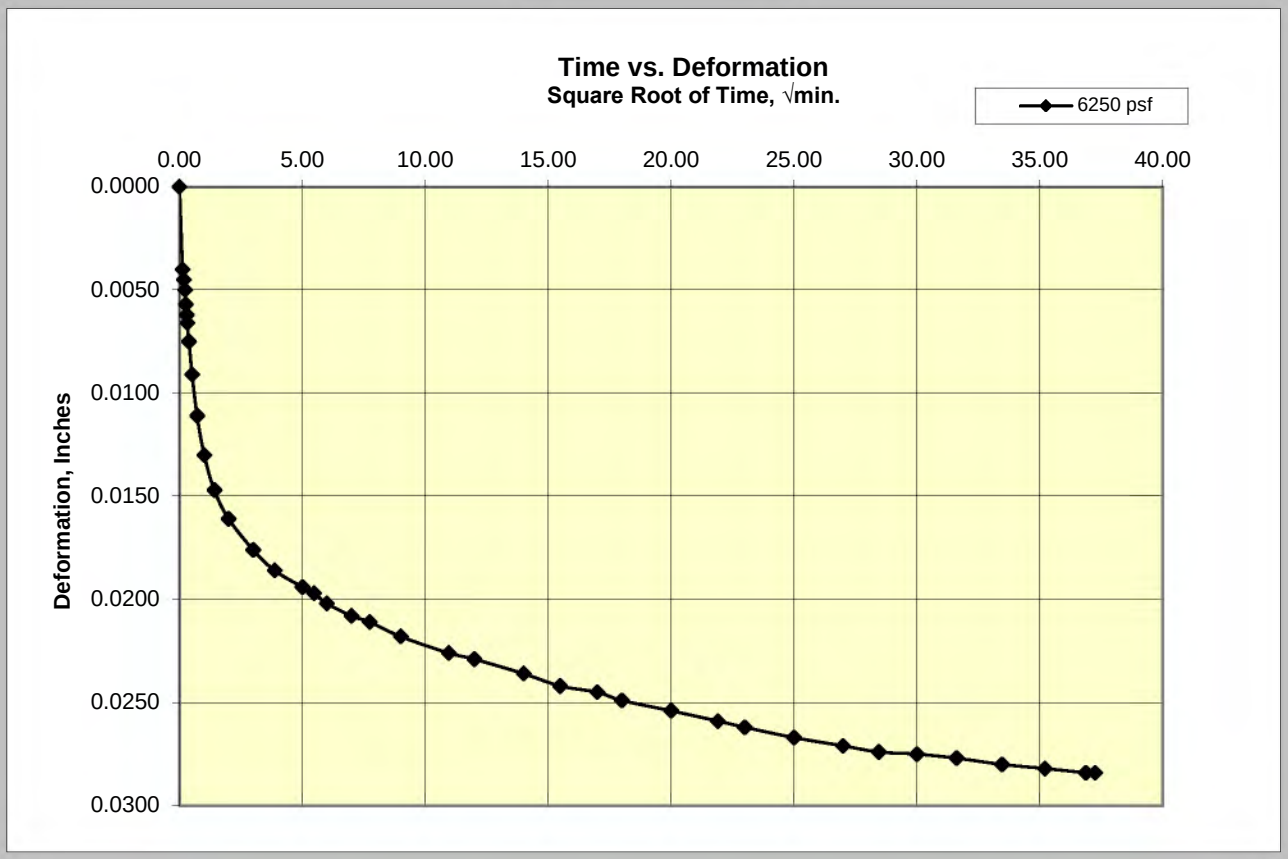


Cooper Testing Labs, Inc.

Load 8 | 6250 psf

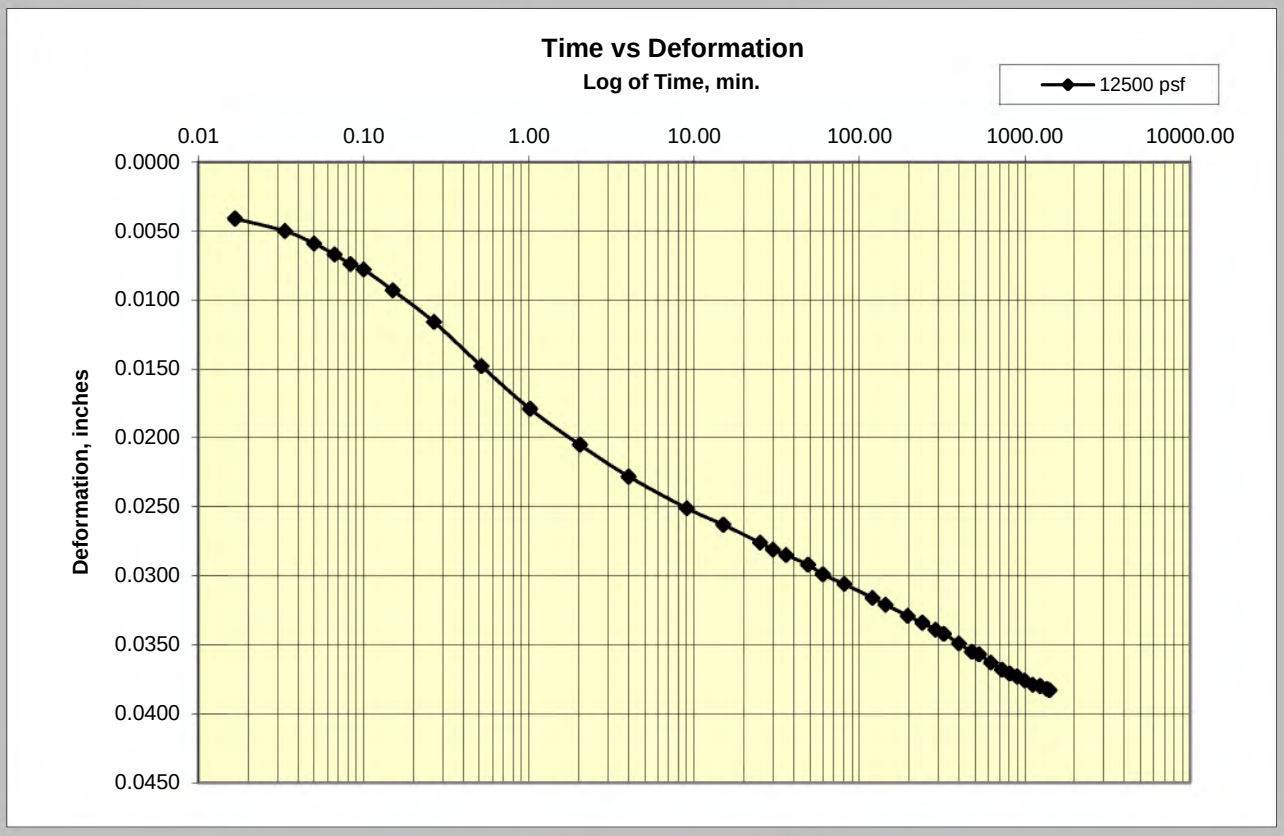


6250 psf



Cooper Testing Labs, Inc.

Load 9 | 12500 psf



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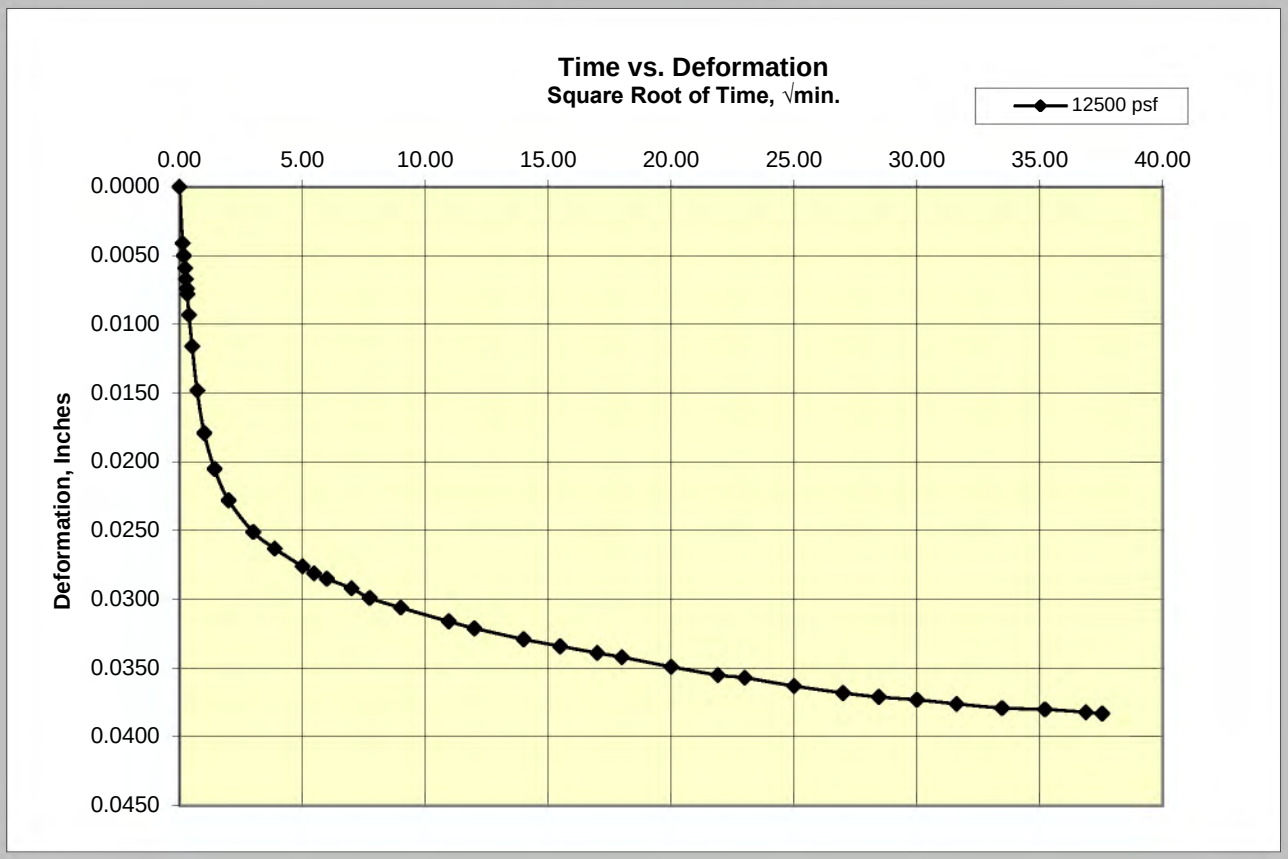
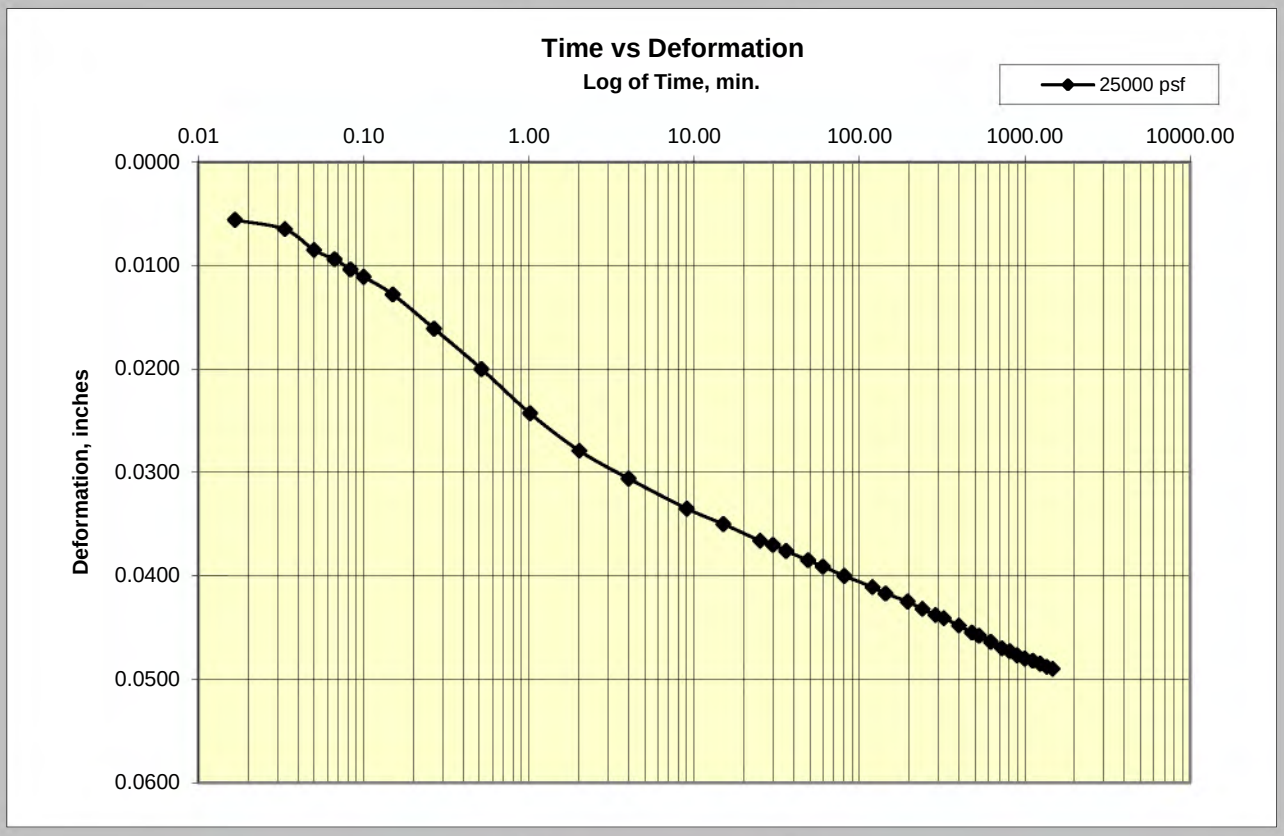


Cooper Testing Labs, Inc.

Load 10 | 25000 psf



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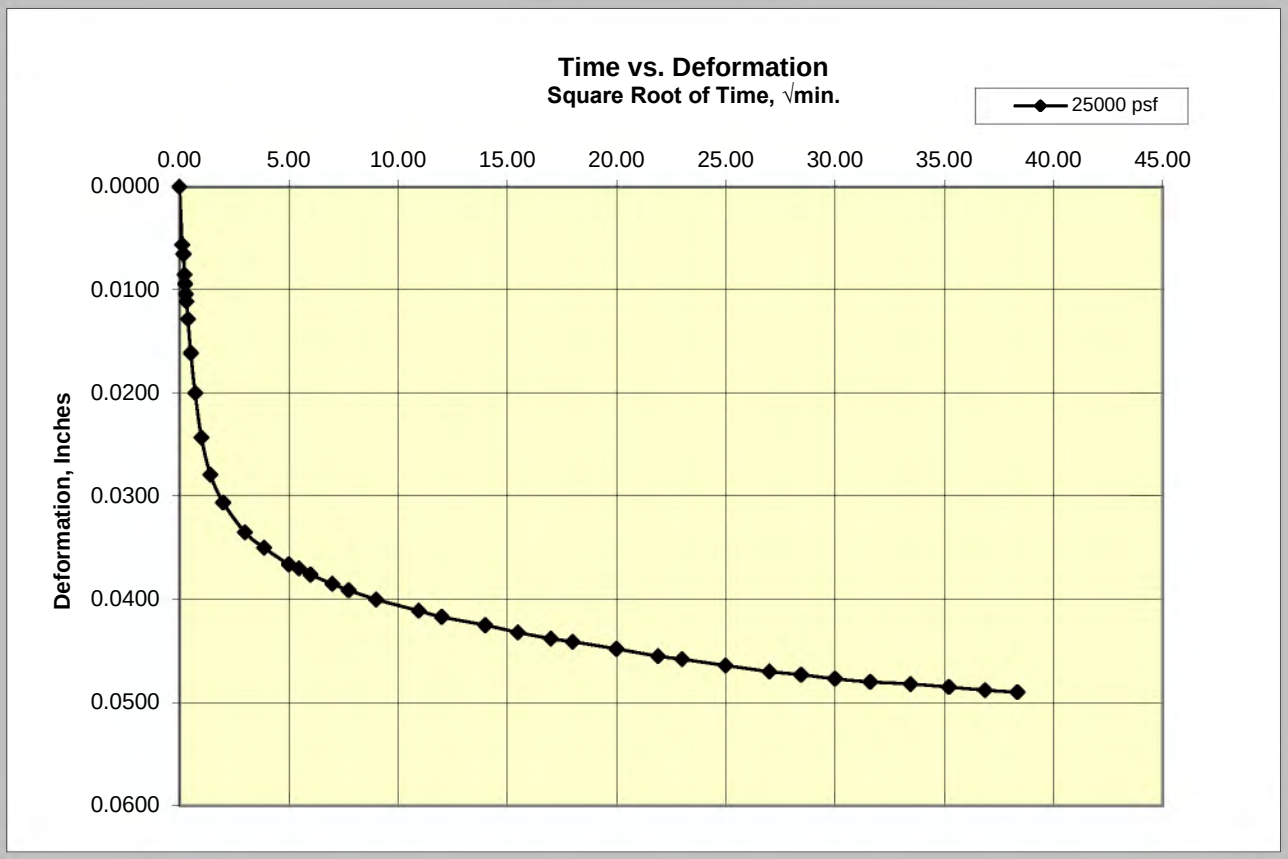
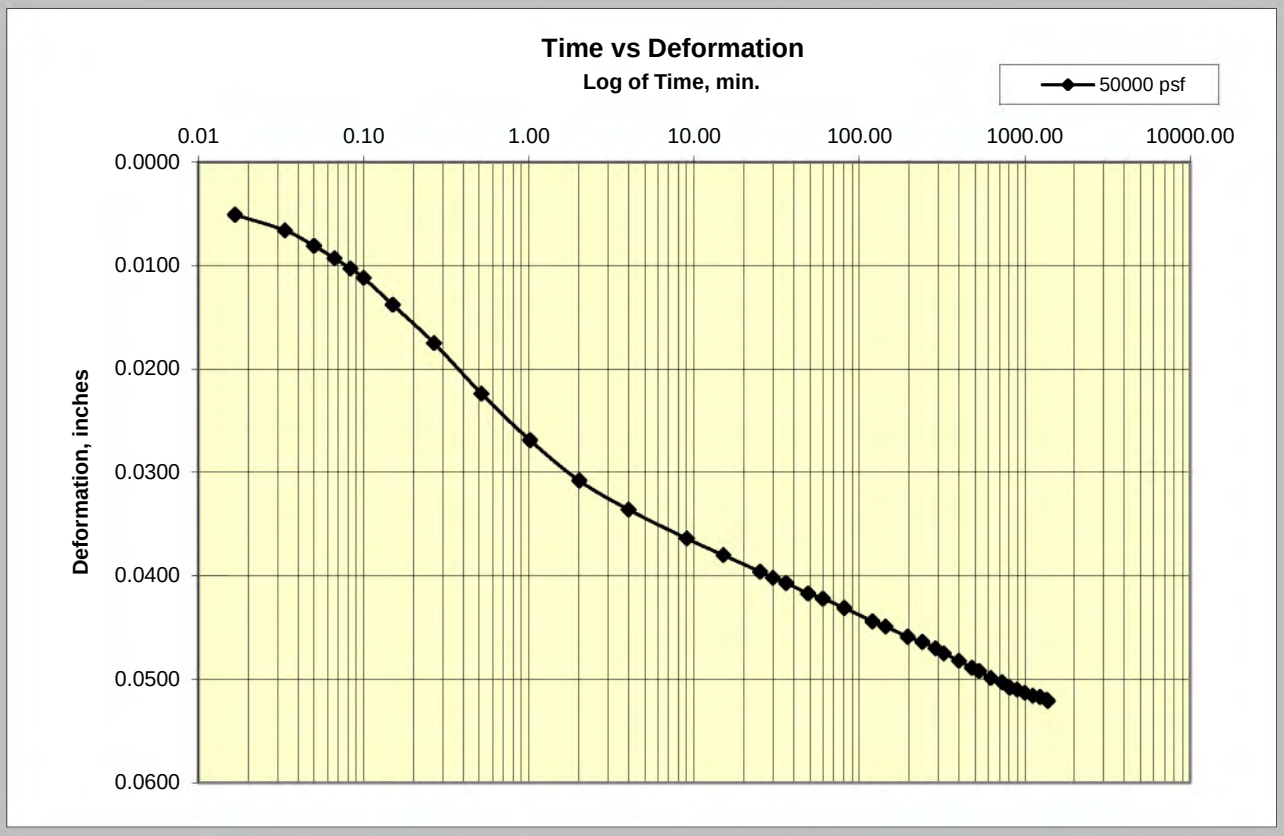


Cooper Testing Labs, Inc.

Load 11 | 50000 psf



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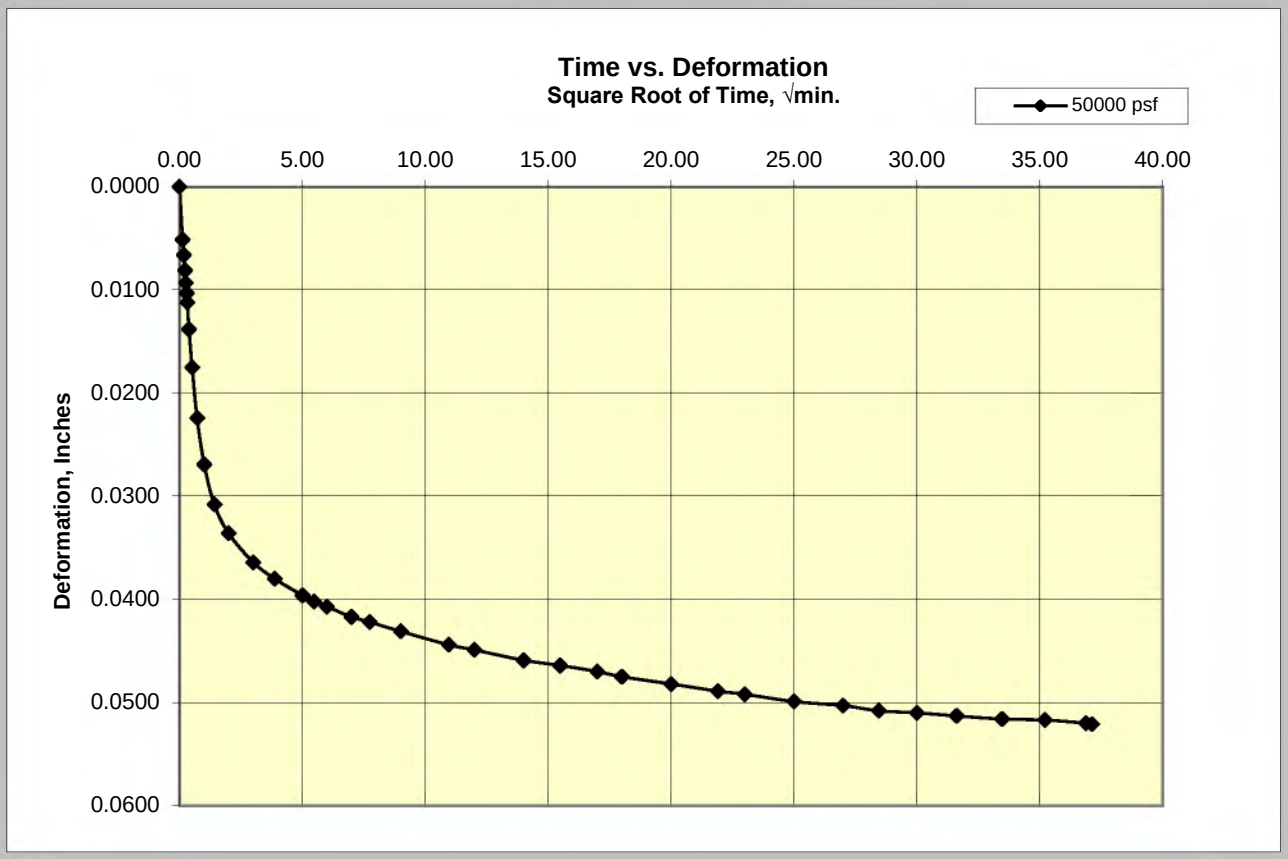
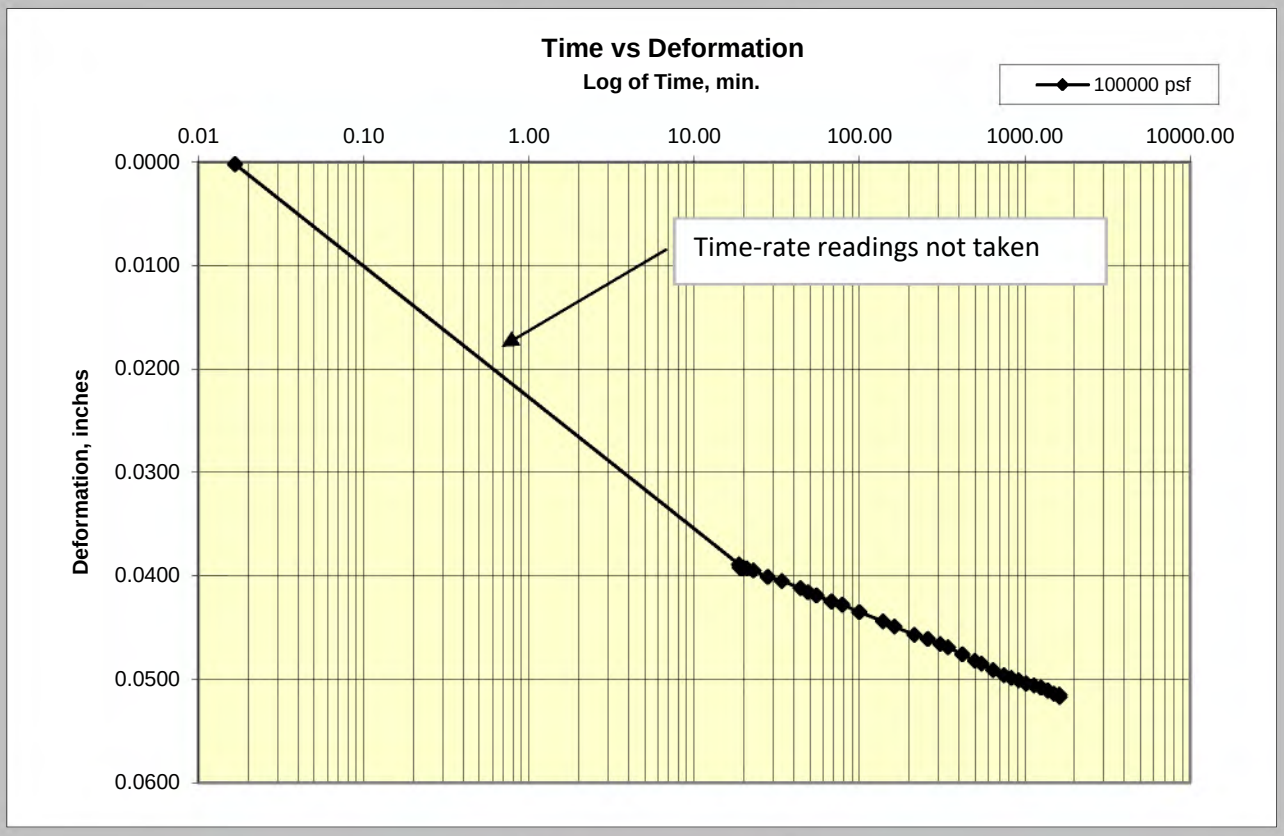


Cooper Testing Labs, Inc.

Load 12 | 100000 psf



100000 psf