6751 Consolidation Test Software

NOTE: Please read the equipment requirements, installation, and operation instructions prior to testing. Reliable test results are dependent on the operator's knowledge of both the software and applicable test methods.

INTRODUCTION

The Consolidation Test Software automatically records and graphs consolidation or swell of soil samples during incremental loading. Four tests can be recorded independently per window, each with real time graphing and tabular data. At the conclusion of a test, calculations are automatically performed in accordance with ASTM D2435, D4546, and AASHTO T 216. Test results can then be used to generate a PDF test report or imported into spreadsheet applications for further processing.

Karol-Warner Consolidation Software offers a variety of benefits including:

- User friendly interface
- Quick and easy installation and updates
- Generates professional testing reports
- Ability to collect data from multiple tests independently
- Capable of exporting data into spreadsheet applications such as Excel
- Optimized for both touch-screen and mouse/keyboard operation
- Compatible with Windows 10, 8, 7, Vista, and XP

Note: All software installation files and updates are also available for download on **www.karolwarner.com**. Log into your "My Account" to access the "Software Downloads" page.

EQUIPMENT COMPATIBILITY AND TEST SETUP

The following is required to use Karol-Warner Consolidation Test Software:

Data Readout Box & Displacement Transducer OR **Digital Dial Indicator**	**6572** or **6574 and 6152** **6820**, **6830**, or **6840 and 6800**
Windows Operating System	**Windows 10**, **8**, **7**, **Vista**, or **XP**
Computer	Any tablet, PC, or laptop using Windows XP or newer.

Below is a list of compatible equipment with the Consolidation Test Software. Please contact Karol-Warner Technical Support to inquire about compatibility of transducers and load cells not listed below.

Displacement Transducer	**6151**, **6152**, **6153**, or **6154**
Consolidation Load Frame	**1016**, **1032**, **1064**, **1100** or another manufacturer's consolidation load frame.
Consolidometer	**1240-A** thru **1240-J****, **1210-A** thru **1210-H**, or other manufacturer's consolidometer.**

*1100 Dead-Weight Consolidation Load Frame compatible with sample sizes up to 3in (76mm) diameter.

Figure 1 and Figure 2 display two typical data acquisition configurations using a pneumatic system or a dead-weight system. The software can collect data from the 6572 or 6574 readout boxes in conjunction with a displacement transducer or using Digital Dial Indicators with a USB Cable. When there are more USB connections than USB ports on the tablet or computer used during testing, a USB hub is recommended.

Figure 1: Dead-Weight Consolidation Frame with Digital Dial Indicator

Figure 2: Pneumatic Consolidation frame with 1in Displacement Transducer and Two-Channel Data Readout Box

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1

INSTALLATION

1. Two USB devices are included with the software: A Karol-Warner flash drive containing the installation files and a small, black USB security key. Insert the Karol-Warner flash drive into the tablet or PC to be used during testing. Navigate to the USB Drive in File Explorer then double click on the USB Drive to open the installation files. Save or copy these files locally. The software can be downloaded onto other devices to open and edit test data, but data collection is only enabled when the USB security key is attached.

NOTE: If running Windows 7 or below, right click on the application titled **dotNetFx40_Full_x86_x64** and select **Run as administrator.** Doing so will check the current version of the Microsoft .NET framework. If the .NET Framework is not installed or up to date, the most current version will be installed. If the most current version is already installed, the installer will complete with no further action.

2. Run the **Consol-Setup** file and follow the prompts on the screen. The software should detect any previous versions and uninstall them automatically. If a Windows Installer message appears (Figure 3), follow the prompts and uninstall the previous version of the software. Once installation is complete, close the installer.
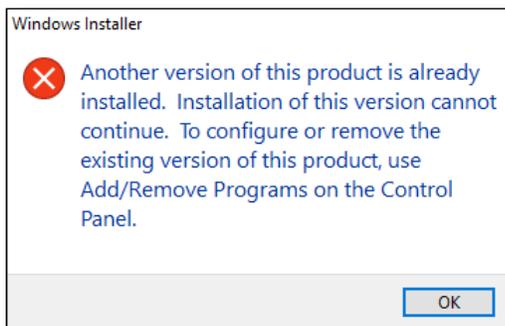

Figure 3: Windows Installer Error Message

3. Eject the USB containing installation files and insert the USB security key. Open the Consolidation Test Software. Click **Help** along the toolbar (Figure 6) then select **Activation** from the drop-down menu. Enter the provided license number, USB ID, and activation code. The software will run normally for 30 days before this information is required to continue use. Activation information can be entered at any point within the first 30 days after installation.

4. Establish the connection between the data readout box or digital dial indicator and the software.

   a. Make sure all connections between the computer and data acquisition components are secure.

   b. Select the COM port for the data readout box or digital dial indicator from the **Serial Port** drop down menu. To determine the correct COM port, navigate to **Control Panel > Device Manager** and view the devices listed under **Ports (COM & LPT)**. The data readout box or dial indicator will appear as a USB serial port. If multiple devices are listed as a USB serial port, the correct serial port can be identified by unplugging the device from the tablet or PC then identifying which serial port disappeared from the listed devices. Once identified, plug the data readout box or digital dial indicator back into the tablet or PC and click connect.

   c. Select the Indicator type, CDI for a digital dial indicator (Figure 4) or Transducer for a DISPLACEMENT TRANSDUCER (Figure 5). When using a data readout box, a **Readout Box Channel** must be selected.

   d. Once connected, the travel values will be displayed in the right corner of the **Connect to Gauge** tile. Gently move the DISPLACEMENT TRANSDUCER or digital dial indicator up and down to confirm the connection. The travel value should change.

   e. If multiple tests are to be run simultaneously, select another testing tab, Test 2, Test 3, or Test 4, then repeat step 4.

NOTE: A USB hub is useful when running multiple consolidation tests using digital dial indicators or multiple data readout boxes. Some computers and most tablets do not have enough USB ports to accommodate four USB connections.
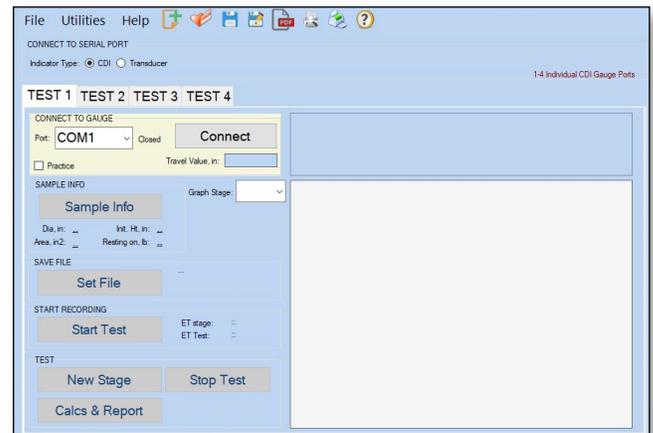

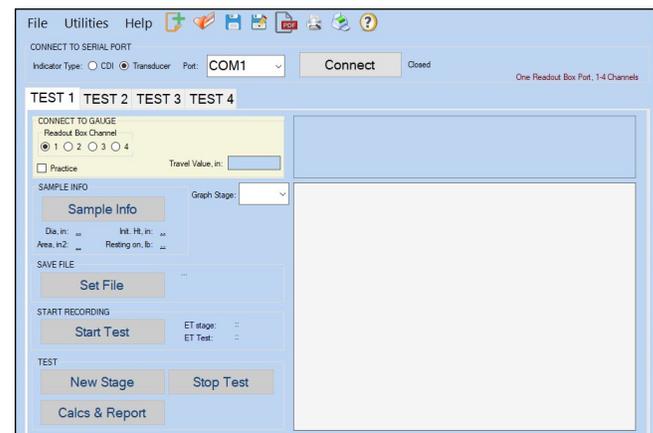**Figure 4:** Establishing a Connection to a Digital Dial Indicator

Figure 5: Establishing a Connection to a Data Readout Box

SETTINGS AND CONTROLS

The top toolbar (Figure 6) of the Consolidation Test Software consists of icons used to start, open, save, create, and print test reports. These commands are also listed under the **File** dropdown menu.
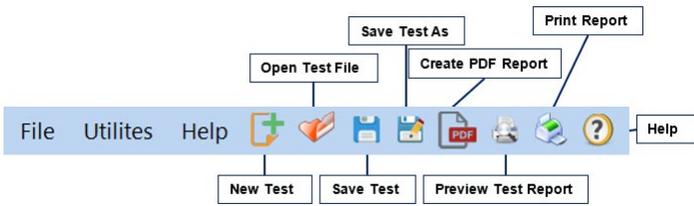

Figure 6: Toolbar

The program settings (Figure 7) can be found under the **Utilities** drop down menu on the top toolbar. Within the program settings the ASTM D2435 method used, the trim procedure, and the test condition can be selected. You can also set units and toggle popup keyboards and keypads for use with touchscreen enabled devices. Company and equipment information can also be entered here. This information will be displayed on the report generated at the completion of a test. These settings remain saved for future testing.
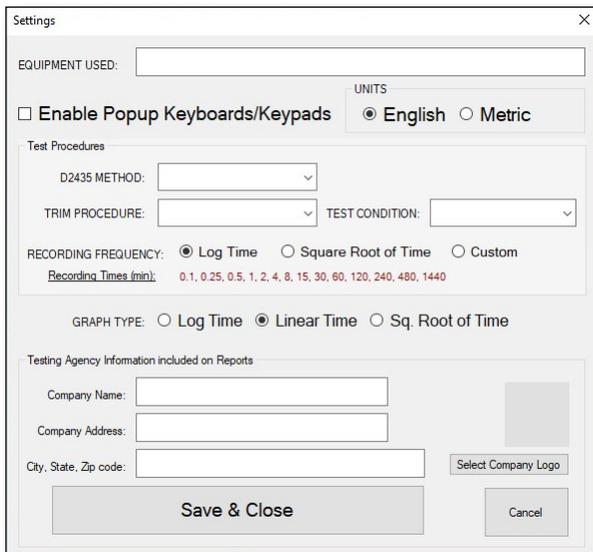

Figure 7: Program Settings

RUNNING A TEST

1. Prepare sample(s) in accordance with ASTM or AASHTO specifications.

2. Go to Settings and enter the applicable test procedure information and requested recording frequency (Figure 7).

3. Select the **Sample Inf**o button then fill in applicable project and sample information into the **Project & Sample Info** menu (Figure 8). Fields highlighted in yellow indicate required information for testing. Once completed, select **Save & Close**.
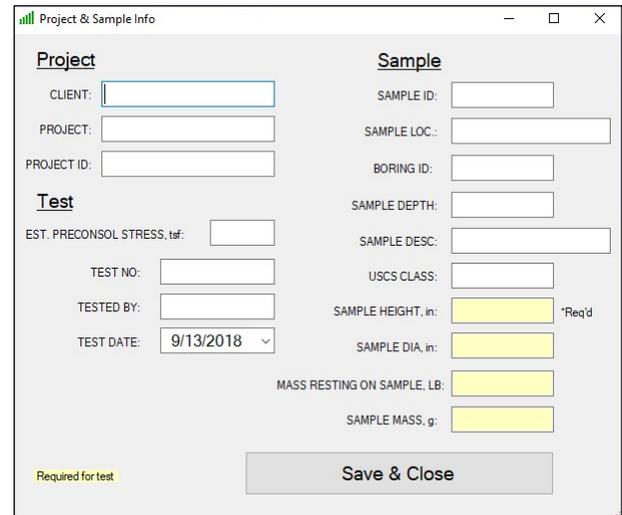

Figure 8: Project & Sample Info Menu

4. Create a file where the test will be automatically saved by selecting **Set File**. Select a file location using File Explorer then create a file name and save.

5. Click **Start Test** and enter the incremental stress value for the first stage (Figure 9). Once entered select **OK, Start Test,** then apply the load to the sample. Readings will be displayed in real time in both tabular and graphical formats when the load is applied to the sample.
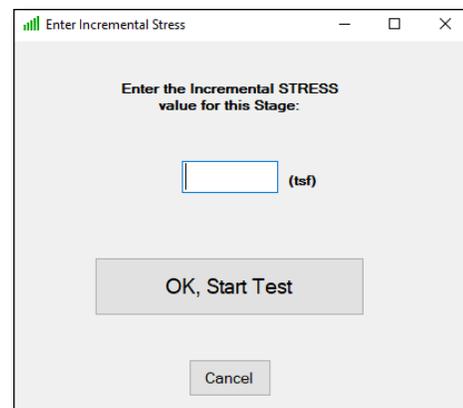

Figure 9: Incremental Stress Value for First Stage

6. After the completion of the first stage, select **New Stage** then enter the next incremental stress value (Figure 10). Once entered select **OK, Change Stage** and apply the next load to the sample. Repeat this step for each additional stage.

NOTE: The stage being displayed on the graph can be selected using the **Graph Stage** dropdown menu. You can select to view all stages or individual stages. Data for the current stage is still collected when viewing the graph from a previous stage.
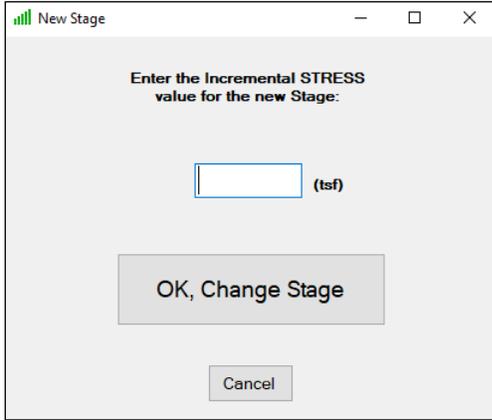

Figure 10: Incremental Stress Value for New Stage

7. At the completion of the final stage select **Stop Test.** A dialogue box confirming the data has been saved to the preselected file will appear (Figure 11). Select **OK** to continue. It is now okay to start a new test or close the program while the final sample height, moist mass, and dry mass are determined. The test data can be reopened later to perform final calculations.
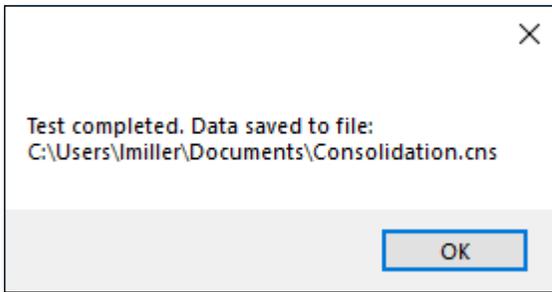

Figure 11: Data Saved to File Dialogue Box

8. Once final values have been obtained make sure the correct test file is open then select the **Calcs & Reports** button. Enter the **Specimen After Test** values and **Calculation Parameters** into the **Calculations** menu (Figure 12) then select **Calculate**. The calculated values will appear in the bottom half of the calculations menu. Select **Calculate, Save & Close** to save these calculated values to the testing report file.
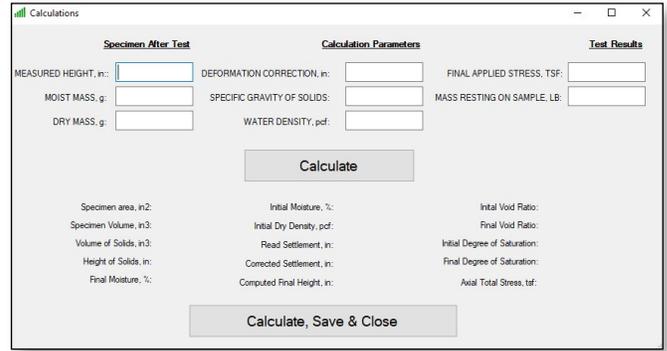

Figure 12: Calculations Menu

9. The saved file can be reopened, edited and saved using the icons on the top toolbar. The test data is saved in ASCII Comma Delimited format which can be opened for further analysis and processing using spreadsheet applications such as Excel.

EXPORTING DATA TO SPREADSHEET APPLICATION

To export spreadsheet compatible test data:

1. Open spreadsheet application. Click **File > Open > Browse** to locate the test file(s). In the bottom right corner of the file explorer (Figure 13) select **All Files** from the drop-down menu.
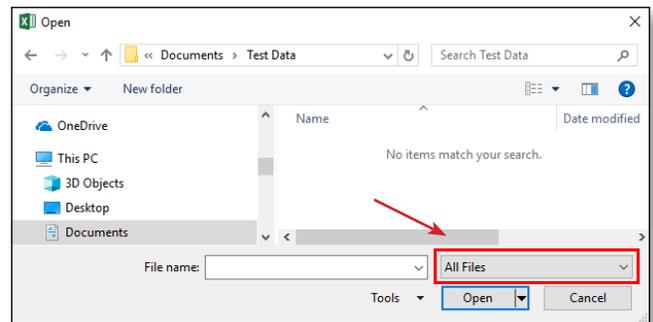

Figure 13: Excel File Explorer

2. Navigate to the test file you are trying to export.

3. Click on the file then select **Open.**

4. The **Text Import Wizard** dialog box (Figure 14) will pop up. Select **Delimited** then click next.
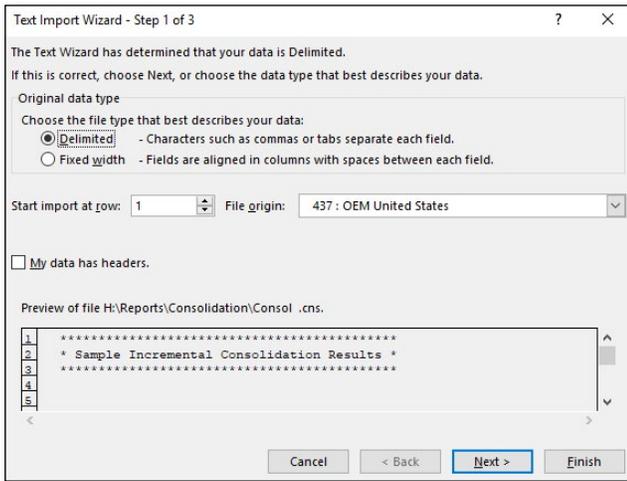
Figure 14: Text Import Wizard Step 1

5. Uncheck the box labeled **Tab** (Figure 15) and select the box labeled **Comma**. Select **Next** then **Finish**.
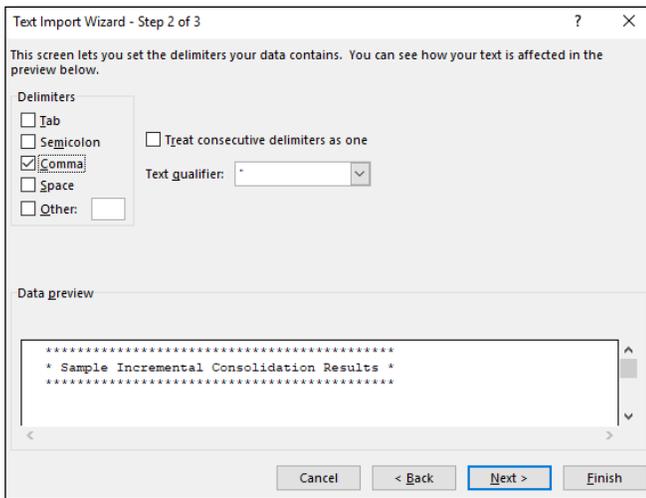

Figure 15: Text Import Wizard Step 2-3

6. The company information, sample information, and test data will be displayed on the spreadsheet.

TROUBLESHOOTING

Displacement Transducer

Confirm there is power going to the data readout box and that all connections to the box and computer are secure. Make sure all ports and connections are free of dust or debris. Open Windows Device Manager to see if the readout box is listed as a device under **Ports (COM & LPT).** Instructions for determining the correct serial port can be found in the Installation instructions. Once the readout box appears under **Ports (COM & LPT),** close then reopen the Software and try reconnecting.

Digital Dial Indicator

Confirm there is power going to the digital dial indicator and that all connections to the computer are secure. Make sure all ports and connections are free of dust or debris. Open Windows Device Manager to see if the readout box is listed as a device under **Ports (COM & LPT).** Instructions for determining the correct serial port can be found in the Installation instructions. Once the readout box appears under **Ports (COM & LPT),** close then reopen the Software and try reconnecting.

Application License Error Message Appears

This message (Figure 16) will appear when more than the allowed number of test windows is opened. If you would like more than the currently allowed test windows to be opened simultaneously, additional licenses can be purchased. Please contact Karol-Warner at **1.800.999.7645** or **customerservice@karolwarner.com** to purchase additional licenses.
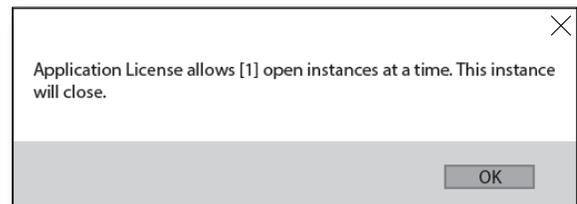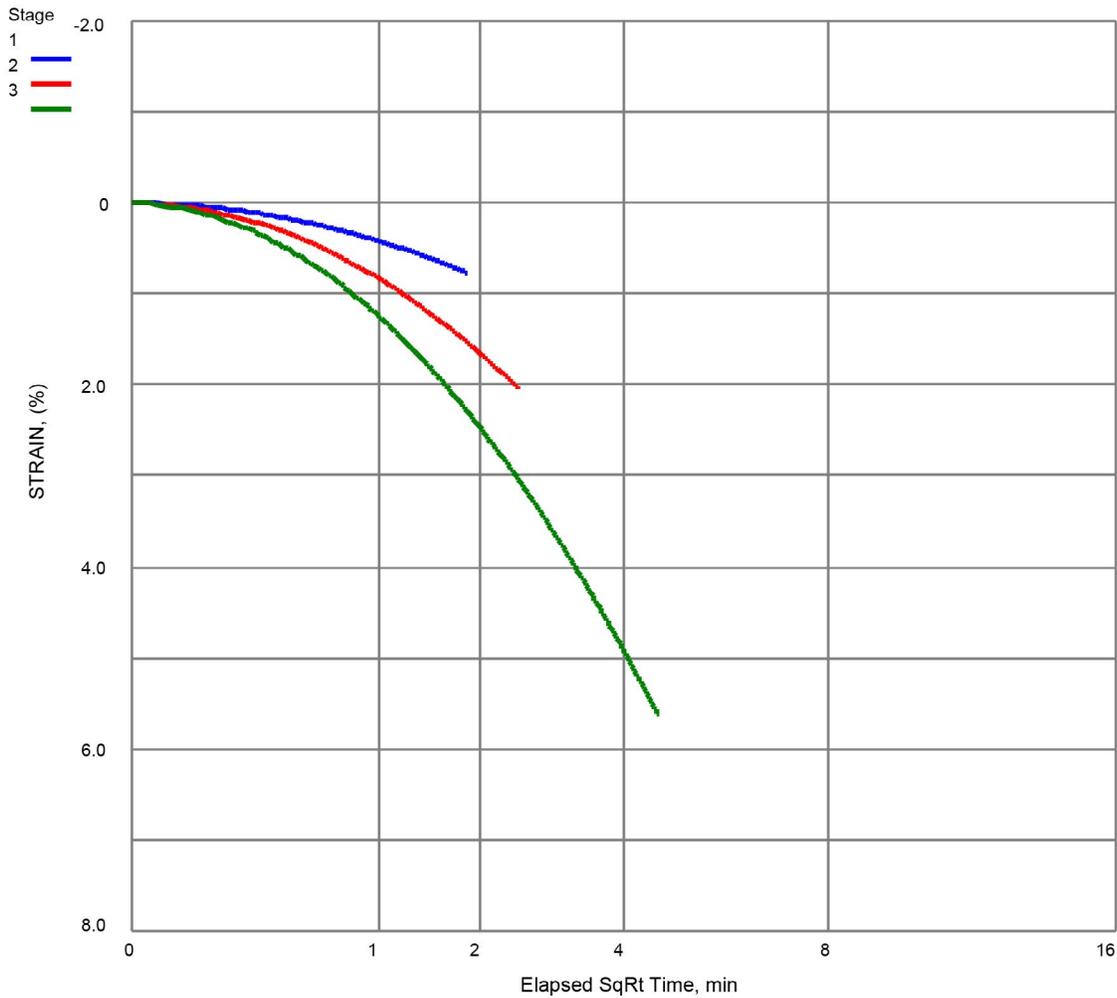

Figure 16: Application License Error Message

If you are not attempting to open more than the allowable number of test windows, open Task Manager. If you see **Consolidation Test,** select it from the list then click **End Task.** Now try reopening the Consolidation Software.

CONSOLIDATION TEST REPORT

BORING ID:	3	
SAMPLE ID:	1508	
LOCATION:		
SAMPLE DEPTH:	14	
DESCRIPTION:	SLC	
CLASSIFICATION:	SLC	
TEST NO:	1	
TESTED BY:	LM	
TEST DATE:	10/19/2018	
APPARATUS:	1032 Consolidation Frame	
TRIMMING:	Ring Lined Sampler	

TEST METHOD:	Method A
CONDITION:	Natural Moisture
PRE-STRESS, tsf:	0
INITIAL MOISTURE, %:	23.2
FINAL MOISTURE, %:	17.1
INITIAL VOID RATIO:	9.1
FINAL VOID RATIO:	9.0
INITIAL DEG. OF SATURATION:	6.9
FINAL DEG. OF SATURATION:	5.1
FINAL HEIGHT DIFFERENTIAL, in:	0.0046
FINAL AXIAL STRESS, tsf:	0.076

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CLIENT:	Materials Testing Lab
PROJECT:	Consolidation Demo
PROJECT ID:	7298