STATIC SHEAR INTEGRATED OVEN

MODEL SS-OSI-8

OPERATING INSTRUCTIONS

CHEMINSTRUMENTS

510 COMMERCIAL DRIVE

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Revision 1.0

December 19, 2017

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PRODUCT DESCRIPTION

Congratulations on the purchase of your new ChemInstruments Integrated 8 Bank Shear and Oven. This versatile, user-friendly, carefully designed instrument allows you to determine shear values of adhesive laminates.

Warning: This equipment can cause injury if not used properly. It is the operator's responsibility to observe all safety rules and warnings.

Shear testers are used to measure the length of time it takes for adhesive samples to fail in shear mode. The Integrated 8 Bank Shear and Oven consist of a Shear Bank to hold the samples in place and an integrated controller to record the time interval, in minutes, and temperature of the specific test.

All units are designed to meet or exceed the requirements of specific test methods for shear testing, including but not limited to the following: PSTC-107 Procedure A, ASTM D 3654 Procedure A, FINAT – FTM 5 & 8, and AFERA 4012 P2.

Units designed for use in ovens are designed to meet or exceed the requirements of specific test methods, including but not limited to the following: PSTC -7 Procedure C, ASTM D 3654 Procedure C, FINAT FTM-5, and AFERA 4019 P2 & 4020 P2.

SPECIFICATIONS

Electrical	240 VAC, 50/60 Hz, 7.5 amps
Physical Dimensions (Oven External Dimensions)	Width: 27.6 inches (70 centimeters) Depth: 25.2 inches (64 centimeters) Height: 34.8 inches (88.5 centimeters) Weight: 141 pounds (64 kilograms)

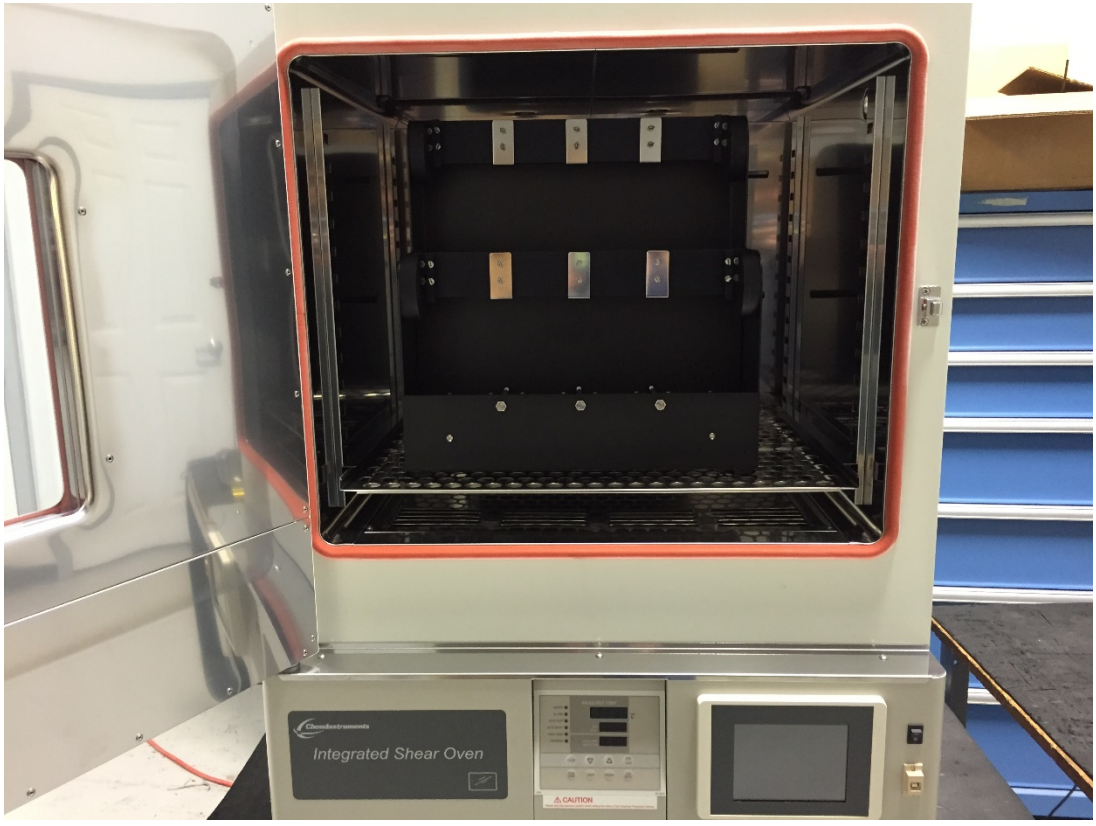
UNPACKING

ChemInstruments has made every effort to ensure that the Integrated 8 Bank Shear and Oven arrives at your location without damage. Carefully unpack the instrument and check for any damage that may have occurred during shipment. If any damage did occur during transit, notify the carrier immediately.

The ChemInstruments Integrated 8 Bank Shear and Oven consists of the following parts:

- Oven
- 8 Bank Shear Stand
- Envelope with manual

Make sure all of these components are present before discarding the packaging material.



ASSEMBLY

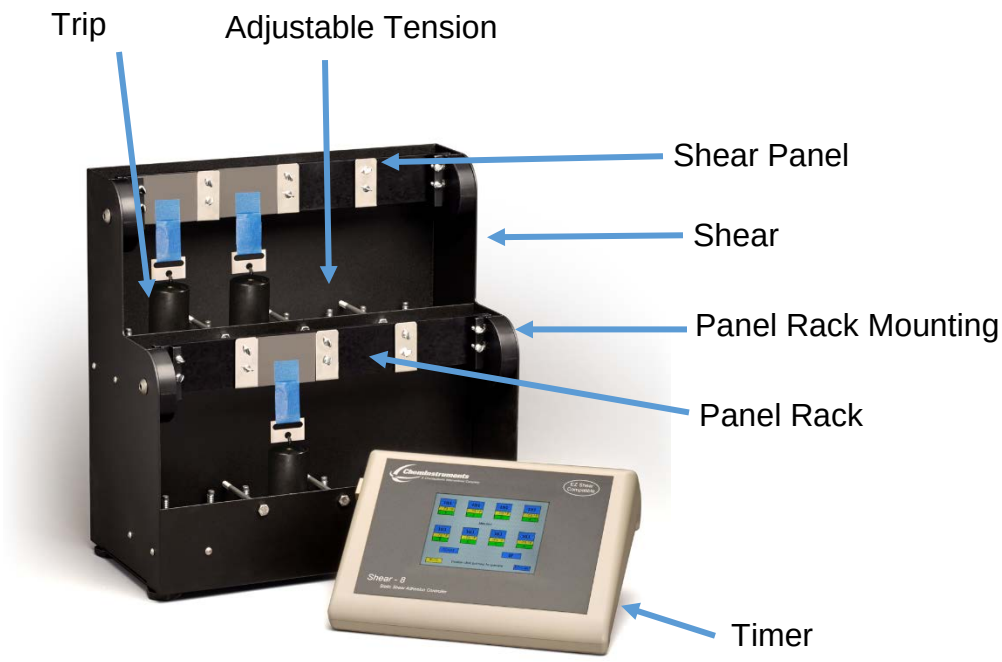
WARNING: Due to its weight and size, use two people to move the SS-OSI-8.

Carefully remove the Oven from the packaging and set it on a sturdy bench top. Check the physical dimensions listed previously for the space required for the instrument. As with any precision piece of laboratory equipment, it is preferable to locate the Oven in an area where temperature and humidity are controlled to standard conditions of 72 ± 2°F and 50 ± 5% relative humidity.

The ChemInstruments Shear Tester is now ready for calibration and use. Before proceeding with calibrating the Shear Tester, it is advisable to become familiar with the Key Components of the Shear Tester. These Key Components and a brief description of their function follow in the next section.

KEY COMPONENTS

- **SHEAR BANK** consisting of 8 shear test stands including panel holder, trip plate, panel rack, and mounting drum.
- **SHEAR PANEL HOLDER** mounted chrome clips providing a bracket to hold shear panels in place for testing purposes.
- **PANEL RACK** consisting of horizontal flat bar providing mounting points for the Shear Panel Holders.
- **PANEL RACK MOUNTING DRUM** consisting of cylinder shaped mounting points for the Panel Rack.
- **TRIP PLATE** steel plate mounted below shear station to provide switch action when the test weight (not included) drops.
- **ADJUSTABLE TENSION SPRINGS** consisting of two coil type springs providing tension for the movement of Trip Plate.



The Timer display is mounted to the front of the oven. There is not a separate Timer Box with the SS-OSI-8.

POWER

The oven and the display/shear stand control board are powered independently. Therefore, the user can use the oven without the shear stand controls. Likewise, they can use the shear stand controls without the oven.

The power switch for the shear stand controls and display is located on the front of the oven next to the touch screen display.

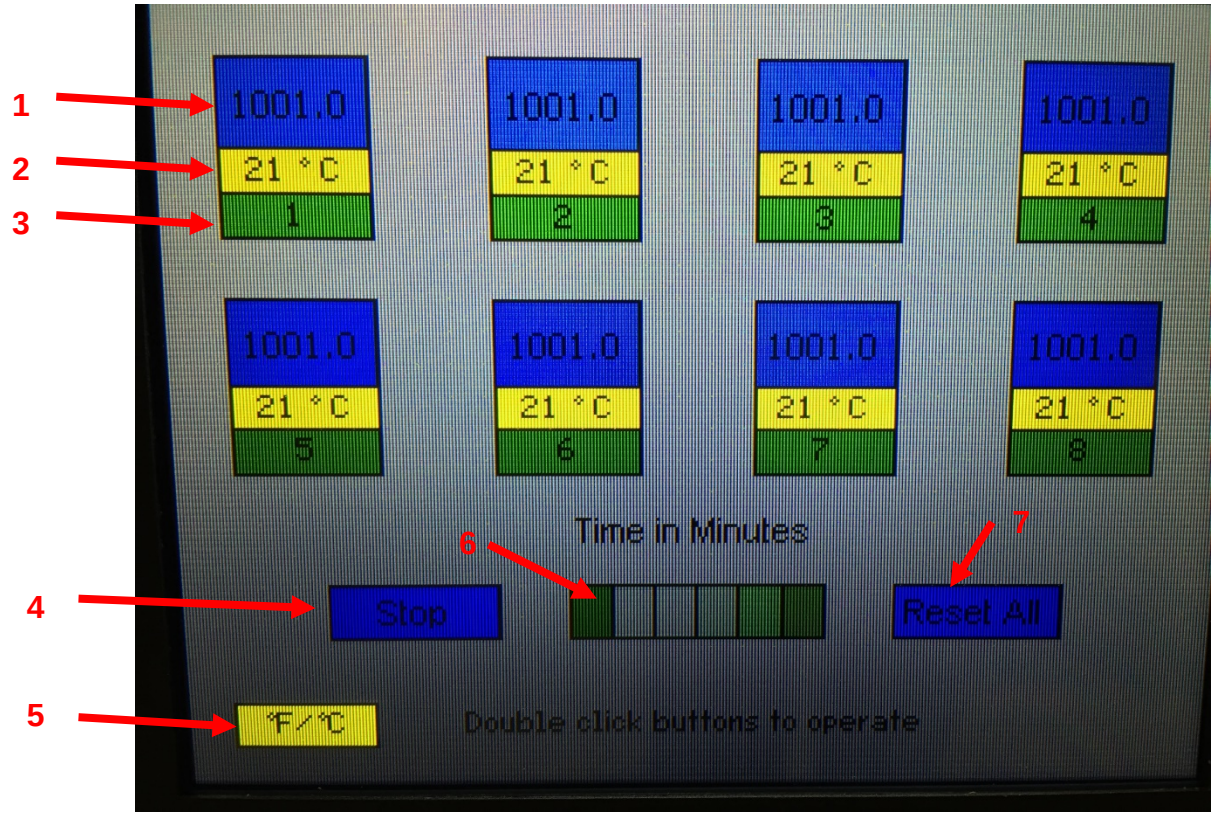
The power switch for the oven is located on the right side of the oven.

CONNECTING SHEAR STAND TO THE OVEN

There are 2 receptacles on the oven to connect a shear stand. One of them is inside the oven. The other is on the right side of the oven.

The connector from the shear stand will not fit through the shelf inside of the oven. The shelf must be removed to connect the shear stand to the receptacle in the oven.

SCREEN



1. **TIME DISPLAY:** Displays time in minutes. Double clicking a Test Bank's Time Display will reset the time to zero for that Test Bank.
2. **TEMPERATURE DISPLAY:** Displays the current temperature during testing. Once a test has ended, the temperature recorded at the end of the test will be displayed.
3. **TEST BANK POSITION:** Indicates the Test Bank position. The field is green during testing to show a test is in progress. Once a test is completed, the field will turn red to show the test is over.
4. **START/STOP:** Starts or Stops a test.
5. **TEMPERATURE CONVERSION:** Converts temperature display from Fahrenheit to Celsius.
6. **TIME IN MINUTES:** Cells light up every second, in succession, to indicate the timer is counting.
7. **RESET ALL:** Resets all Time Displays to zero.

THEORY OF OPERATION

All shear testers are used to measure the time for adhesive samples to fail in shear mode. In accordance with a test method, samples are prepared, applied to a standard test surface, and subjected to a constant gravity force. The time it takes for the sample to fail by falling off the test surface is measured and recorded for determination of performance of the adhesive in a shear position.

SHEAR BANK CALIBRATION

It is important to calibrate the Shear Bank before testing. The majority of shear test methods require a 2 degree back angle to vertical for proper position to conduct a shear test. The following procedure provides information and method for setting your Shear Bank correctly to perform a shear test.

CALIBRATION PROCEDURE

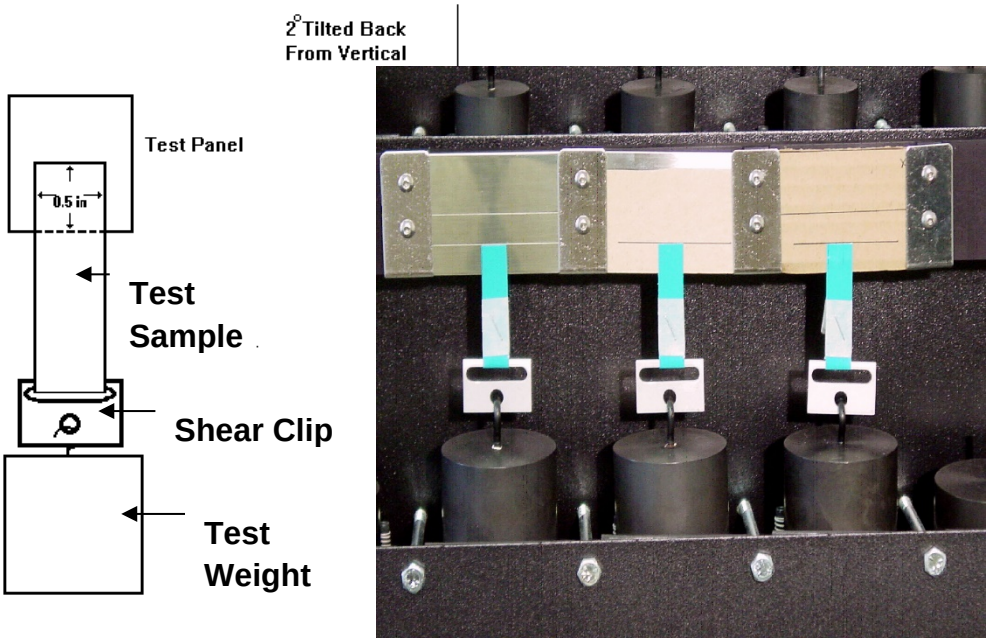
1. With the aid of a level, use the adjustable feet at the four corners of the Shear Bank to position the Shear Bank level in both the front to back and left to right directions.
2. Using an Angle/Level adjust the Panel Rack so that there is a 2 degree backward angle from vertical. There are score marks on the Panel Rack Mounting Drum indicating the proper angle. These marks were set in the factory for a two degree angle with the Shear Bank level.
3. The Adjustable Tension Springs are tighten completely down for shipping. These springs provide the tension to hold the Trip Plate in the up or off position when a test weight is not present. With an allen wrench, the socket head bolt holding each spring can be adjusted to allow the Trip Plate to close with as little as a 100 gram test weight. Turn the bolt counter clockwise to loosen the spring tension and enable lower weights to cause the Trip Plate to close.

Your shear bank is now positioned correctly for use in doing shear testing.

RUNNING A TEST

There are numerous test methods for conduction shear test published by many agencies. The most common of these require preparing either a ½ inch or 1 inch wide sample.

1. Cut the sample approximately 2.5 inches long and apply the sample according to test method to the shear panel (part # TP-23, not included).
2. Typically methods call for a 4.5 pound roller (part # HR-100, not included) to be used in applying the sample to the shear panel.
3. The sample's opposite end is then looped through a Shear Test Clip (part # STC-100, not included) and stapled or taped back on itself without disturbing the affixed portion of the sample.
4. The test panel, sample and shear clip are then loaded into the Panel Holder on the Shear Bank.
5. Hook the test weight onto the Shear Test Clip.
6. Double click the Reset All button on the Timer Box.
7. Double click the Start button on the Timer Box.
8. Once a test weight falls onto the trip plate, the TEST BANK POSITION becomes red. The TIME DISPLAY will remain at the time that the trip occurred even if the test weight is removed. The temperature that the failure occurred will also remain for that TEST BANK POSITION until the failure is cleared either by double clicking the bank's TIME DISPLAY or by issuing a RESET ALL.
9. To clear the TIME DISPLAY, double click the bank's TIME DISPLAY.


2° Tilted Back
From Vertical
Test Panel
0.5 in
Test
Sample
Shear Clip
Test
Weight

MAINTENANCE

TROUBLESHOOTING

The troubleshooting chart describes some problems that may occur over time. After determining the problem, follow one of the following maintenance procedures.

Table 1 – Troubleshooting Chart

Problem	Possible Cause	Procedure
Timer not counting	Switch is defective.	Replace with new switch. (See item A below)
Timer does not stop	Landing platform spring tension too tight.	Adjust spring tension on landing platform. (See item B below)
	Switch lever bent down.	Bend switch lever back into place. (See item C below)

MAINTENANCE PROCEDURES

After determining the problem, the cause must be determined and the proper procedure followed. Following are the proper maintenance procedures:

A. To replace a switch:

Lay the unit on its back. Remove the base of the unit. This allows access to the switches. Loosen the screws holding the wires, and then remove the screws holding the switches in place using a 5/64" Allen key. After bending the lever on the new switch (See Below - "B"), install the new switch. Make sure the wires are connected to the proper terminals, then replace the base and tighten all the screws.

B. To adjust spring tension: Using a 9/64" Allen key, turn screw clockwise to increase tension. Turn screw counter-clockwise to decrease tension. [NOTE: Increasing tension will raise the Trip Plate from the switch lever, making it

necessary to use heavier weights to trip the switch. Decreasing the tension will have the opposite effect.] (See Figure A – Trip Plate)

C. To bend switch lever: Using a 9/64" Allen key, remove both screws with springs and lift off landing platform. Press down near the rear of the lever while bending up the front end. To test if it has been bent correctly, install the landing platform and screws, and then set a weight on the panel. If the weight trips the switch, the lever has been bent correctly. This procedure may have to be repeated until the lever is adjusted properly. (See Figure B – Lever Adjustment)

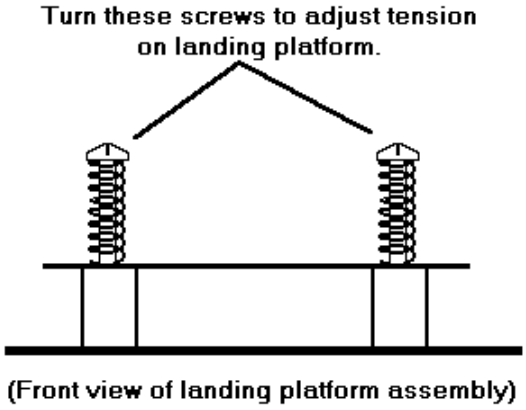


Figure A – Trip

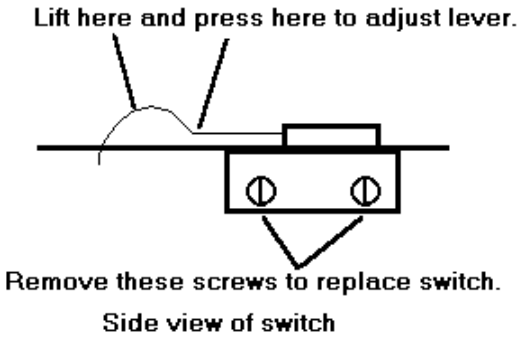


Figure B – Switch Lever Adjustment

CLEANING THE TOUCH SCREEN

It’s important to realize the touch panel is sensitive to chemicals.

Specific Cleaning Information: Use a soft, lint-free cloth. The 3M Microfiber Lens Cleaning Cloth is especially recommended for cleaning touch panels without requiring liquid cleaner. The cloth may be used dry or lightly dampened with a mild cleaner or Ethanol. Be sure the cloth is only lightly dampened, not wet. Never apply cleaner directly to the touch panel surface; if cleaner is spilled onto touch panel, soak it up immediately with absorbent cloth. Cleaner must be neither acid nor alkali (neutral pH). When using cleaner, avoid contact with the edges of the film or glass, and with the flex tail. Wipe the surface gently; if there is a directional surface texture, wipe in the same direction as the texture. Never use acidic or alkaline cleaners, or organic chemicals such as: paint thinner, acetone, toluene, xylene, propyl or isopropyl alcohol, or kerosene. Suitable cleaning products are commercially available pre-packaged for use; one example of such a product is Klear Screen™ or commercially available off-the shelf retail brands such as Glass Plus® Glass and Surface Cleaner made by Reckitt-Benckiser. Use of incorrect cleaners can result in optical impairment of touch panel and/or damage to functionality.

Note: Most products contain 1-3% Isopropyl Alcohol by volume, which is within acceptable limits for Resistive Touch Panel cleaning use.

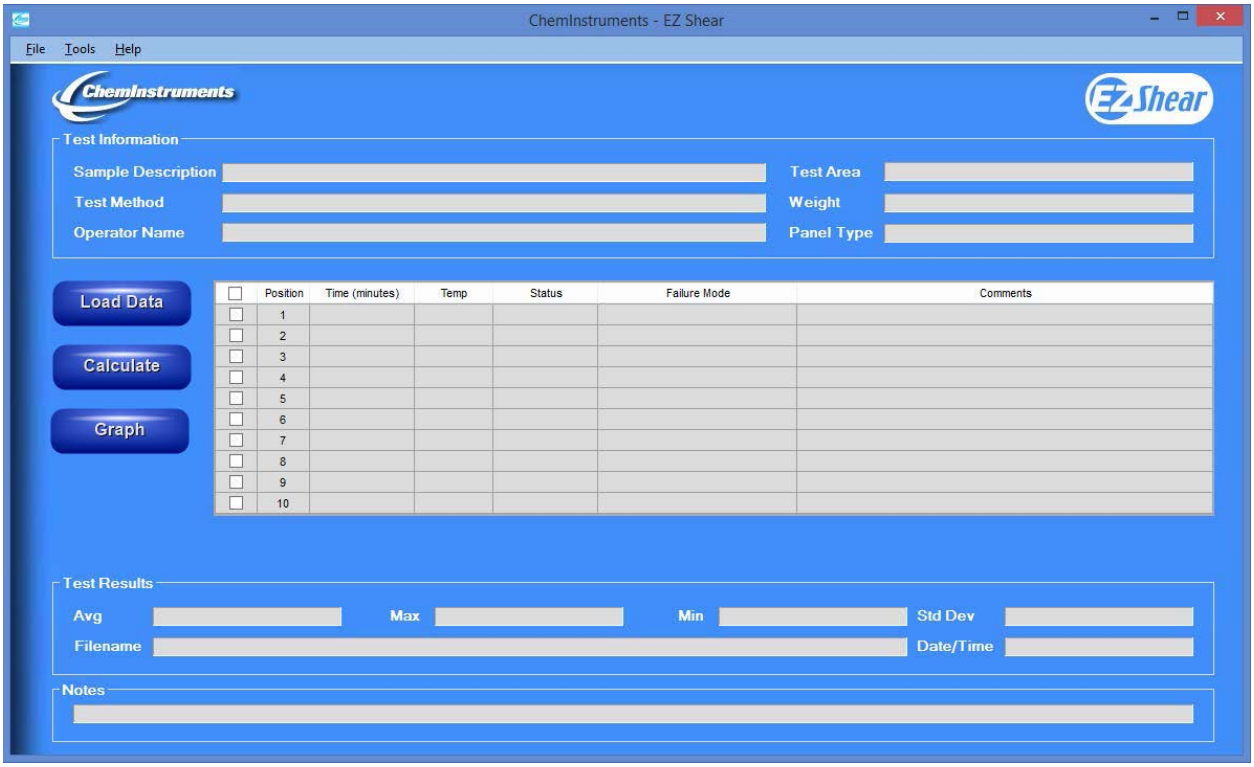
Caution: Many products contain Ammonia, Phosphates, and/or Ethylene Glycol, which are NOT ACCEPTABLE; check product content label carefully.

EZ SHEAR SOFTWARE

OVERVIEW

Congratulations on the purchase of your new ChemInstruments EZ Shear Software. The EZ Shear Software works with ChemInstruments SS-HT-8, SS-RT-10, and SS-HT-30 Shear Testers. The software will allow you to:

- Store test data
- Recall data from previously saved tests
- Graph test data
- Generate reports



TOOL BAR

FILE

- **NEW** – Clears any data from the screen.
- **OPEN** – Opens a previously saved test.
- **SAVE** – Saves the test displayed on the screen.
- **PRINT** – Prints either the Table or Graph or both.
- **EXIT** – Exits the program.

TOOLS

- **CALIBRATE THERMOCOUPLE** – ***ONLY IF OPTIONAL THERMOCOUPLE IS PURCHASED.*** Calibrates the thermocouple (thermocouple must be connected to the Shear Tester). Enter the password and click OK or hit the Enter key.
- **EXPORT TO EXCEL** – Allows test data to be saved to Excel.
- **COMPANY NAME** – The reports for the Data Table and Graph printouts display a name in the upper left corner. The name is set to default as ChemInstruments. Type in the desired name and click OK or hit the Enter key.
- **ENTER AUTHORIZATION CODE** – Each Shear Tester must be authorized to work with the EZ Shear Software. The software allows for the user to use the software as a trial for 5 tests prior to authorization. Enter the authorization code and click OK or hit the Enter key.
- **READ CURRENT SYSTEM TEMPERATURE** – ***ONLY IF OPTIONAL THERMOCOUPLE IS PURCHASED.*** Displays the current temperature measured by the thermocouple (the thermocouple must be connected to the Shear Tester).
- **READ BATTERY VOLTAGE** – Displays the current voltage level of the battery backup.

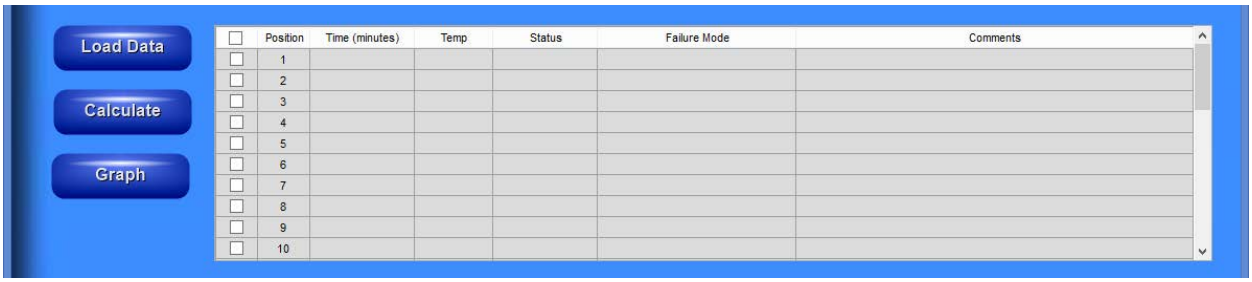
HELP

- **MANUAL** – Opens a digital copy of the manual for Shear Testers and EZ Shear Software.
- **ABOUT** – Displays the model number of machine connected (if applicable) and version number of the software.

TEST INFORMATION

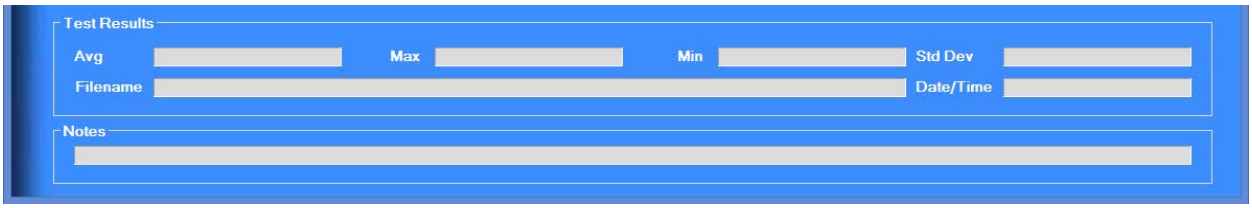
- **SAMPLE DESCRIPTION** – Enter a description of the sample and click OK or hit the Enter key.
- **TEST METHOD** – Enter your own test method or choose from the preselected list and click OK or hit the Enter key.
- **OPERATOR NAME** – Enter a description of the sample and click ok or hit the Enter key.
- **TEST AREA** – Enter your own test area or choose from the preselected list and click OK or hit the Enter key.
- **WEIGHT** – Enter your own weight or choose from the preselected list and click OK or hit the Enter key.
- **PANEL TYPE** – Enter your own test method or choose from the preselected list and click OK or hit the Enter key.

TEST DATA



- **LOAD DATA** – Click to load the test data from the Shear Tester.
- **CALCULATE** – Click to calculate the selected positions desired for statistics and graph.
- **GRAPH** – Displays a graph of the selected positions.
- **DATA TABLE** – Changes the screen back to the Data Table from the graph.
- **ZOOM** – Displays an enlarged version of the graph.
- □ – Click to select/unselect all positions. Click the box next to an individual position to select/unselect individual positions. Selected positions will be used in calculations and graph.
- **POSITION** – Displays the position of the test on the Shear Bank.
- **TIME (MINUTES)** – Displays the duration of the test in minutes.
- **TEMP** – ONLY IF OPTIONAL THERMOCOUPLE IS PURCHASED. Displays the temperature recorded at the completion of the test. If no thermocouple is being used for testing, the field will display NA.
- **STATUS** – Indicates if a test is COMPLETED or RUNNING.
- **FAILURE MODE** – Enter your own failure mode or choose from the preselected list and click OK or hit the Enter key.
- **COMMENTS** – Enter a comment and click OK or hit the Enter key.

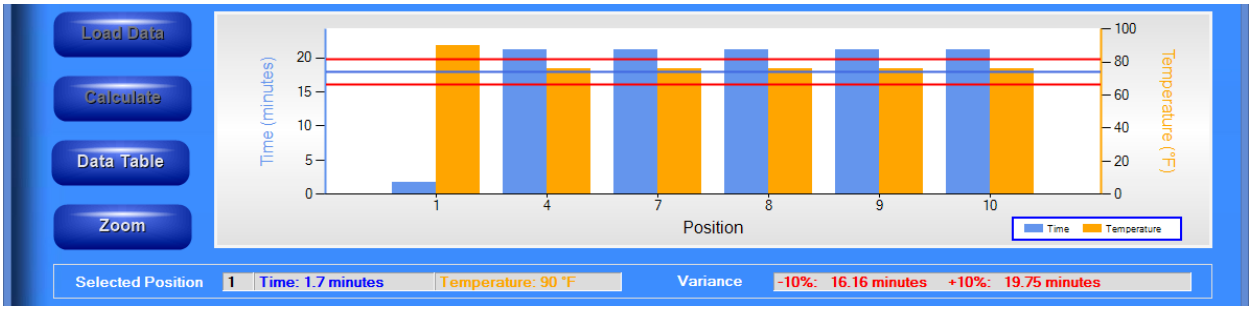
TEST RESULTS



To display the test results, select one or more positions and click the Calculate button.

- **AVG** – Displays the average from all of the selected test positions.
- **MAX** – Displays the maximum from all of the selected test positions.
- **MIN** – Displays the minimum from all of the selected test positions.
- **STD DEV** – Displays the standard deviation of all of the selected positions.
- **FILENAME** – Displays the file name if the file has been saved.
- **DATE/TIME** – Records the date and time the test data was saved.
- **NOTES** – Enter any desired notes and click OK or hit the Enter key.

GRAPH SCREEN



- **SELECTED POSITION** – Click on any of the positions on the graph and the position, time, and failure temperature will be displayed in the field.
- **VARIANCE** – Enter your own variance or choose from the preselected list and click OK or hit the Enter key. Entries must be whole numbers between 5-30%.
- **DATA TABLE** – Changes the screen back to the Data Table from the graph.
- **ZOOM** – Opens a larger version of the graph.

View of the enlarged graph using the ZOOM button.