

**CHEMINSTRUMENTS**  
**STATIC SHEAR TESTER**  
**MODELS SS-RT-10, SS-HT-8, & SS-HT 30**  
**OPERATING INSTRUCTIONS**

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## PRODUCT DESCRIPTION

Congratulations on the purchase of your new ChemInstruments Static Shear Tester. This versatile, user-friendly, carefully designed instrument allows you to determine shear values of adhesive laminates.

Shear testers are used to measure the length of time it takes for adhesive samples to fail in shear mode. Shear testers consist of a Shear Bank to hold the samples in place and a Timer Box to record the time interval, in minutes, 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 and designated by the term “High Temperature” in their description, (models SS-HT-8 & SS-HT-30) 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.



# UNPACKING

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

The ChemInstruments Static Shear Tester consists of the following parts:

- Shear Bank (8, 10, or 30)
- Timer Box (10 bank is self-contained)
- Envelope with manual.

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

# ASSEMBLY

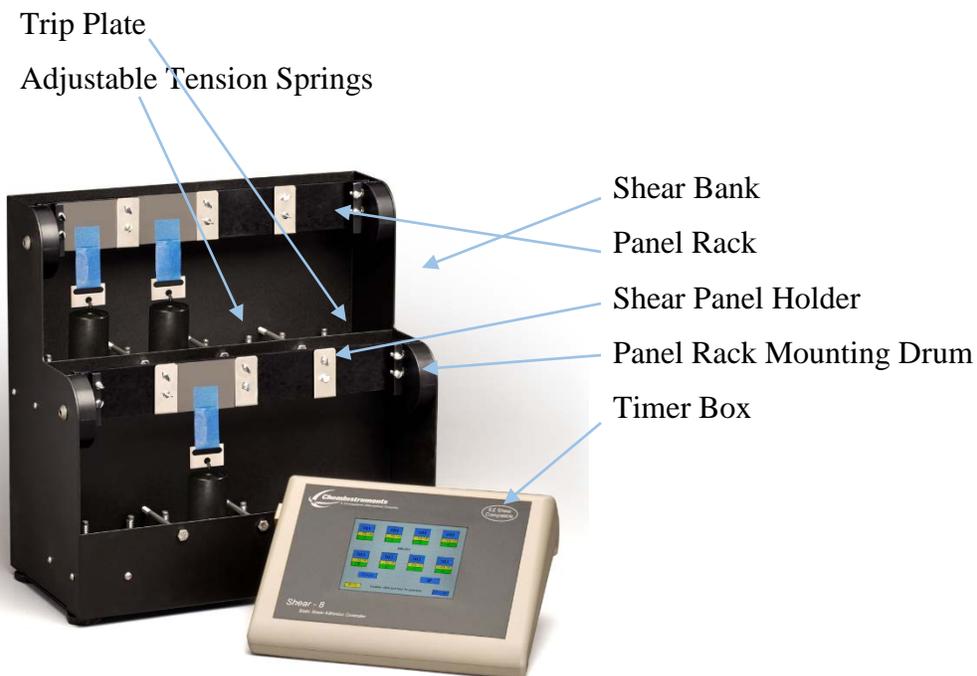
Carefully remove the Shear Bank and Timer Box from the packaging and set them on a sturdy bench top. As with any precision piece of test equipment, it is preferable to locate the Room Temperature Shear Tester in an area where temperature and humidity are controlled to standard conditions ( $72 \pm 2^{\circ}\text{F}$ ,  $50 \pm 5\%$  relative humidity).

High Temperature Shear Testers are designed to place only the Shear Bank in an oven. The matching Timer Box is to be connected to the Shear Bank by the provided cable. Make sure the appropriate cable is connected to the matching connector on the Shear Bank.

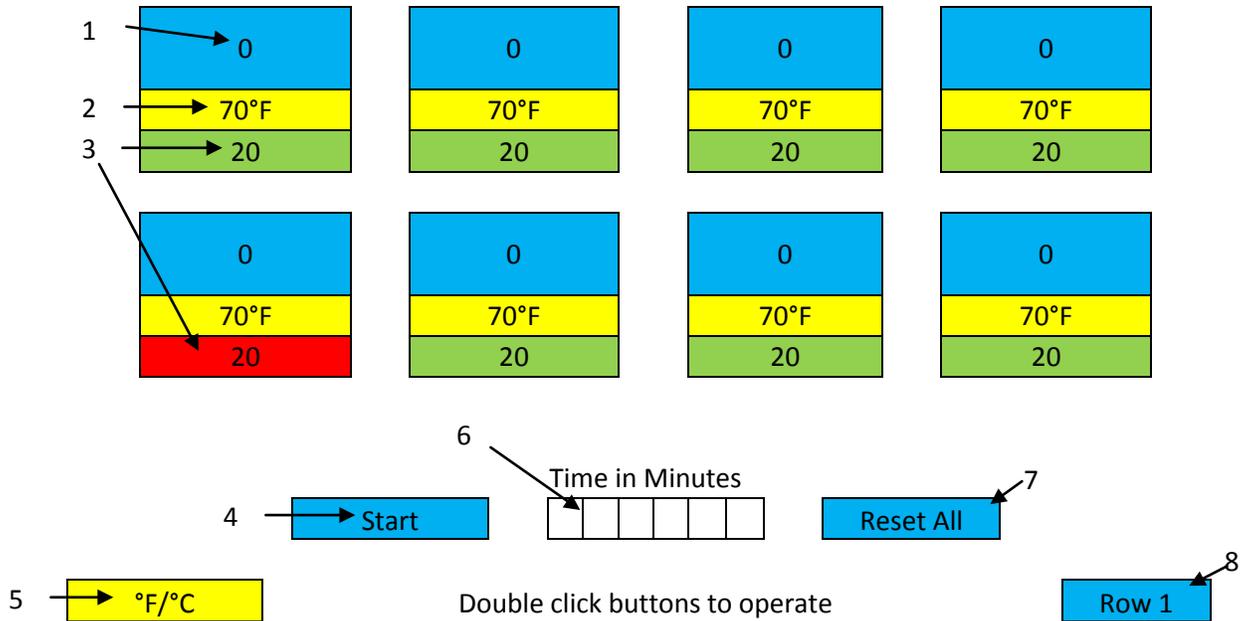
The ChemInstruments Shear Tester is now ready for calibration and use. Before proceeding with calibrating the Shear Tester, it is advisable to become familiar with the Key Components of the Shear Tester. These Key Components and a brief description of their function follow in the next section.

## KEY COMPONENTS (See photos below)

- **SHEAR BANK** consisting of 8, 10, or 30 shear test stands including panel holder, trip plate, panel rack, and mounting drum.
- **TIMER BOX** displays test bank position, time, & temperature.
- **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.



# TIMER BOX SCREEN



1. **TIME DISPLAY:** Displays time in minutes. 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.
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.
4. **START/STOP:** Starts and/or Stops a test.
5. **TEMPERATURE CONVERSION:** Only displays if using the optional thermocouple. The thermocouple must be connected to the Timer Box prior to turning on the power. 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.
8. **ROW:** Button only appears on the SS-HT-30 model. Scrolls between rows 1, 2, & 3 of the Shear Bank.

# OPERATION

## 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

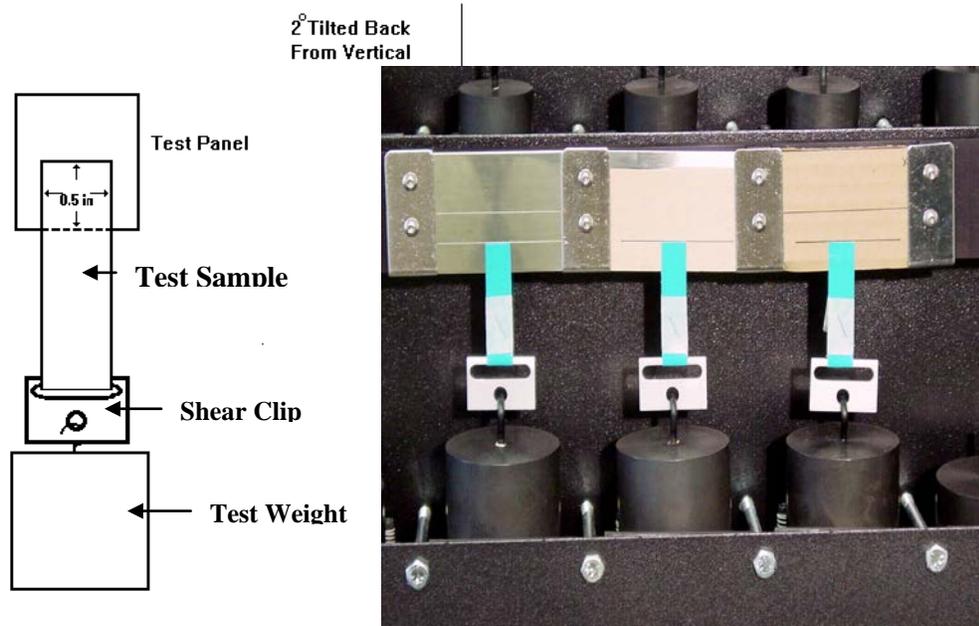
1. With the aid of a level, use the adjustable feet at the four corners of the Shear Bank to position the Shear Bank level in both the front to back and left to right directions.
2. Using an Angle/Level adjust the Panel Rack so that there is a 2 degree backward angle from vertical. There are score marks 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.



# TROUBLESHOOTING

| PROBLEM              | PROBABLE CAUSE                             | PROCEDURE   |
|----------------------|--|---|
| Timers not counting. | Switch is defective.                       | Replace with new switch. (SEE BELOW -A)                     |
| Timer does not stop. | Landing platform spring tension too tight. | Adjust spring tension on landing platform. (SEE BELOW -- B) |
|                      | Switch lever bent down.                    | Bend switch lever back into place. (SEE BELOW -- C)         |

# MAINTENANCE

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:

1. Eight bank units: 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  $\frac{5}{64}$ " Allen key. After bending the lever on the new switch (See Below - "D"), install the new switch. Make sure the wires are connected to the proper terminals, then replace the base and tighten all the screws.

2. Ten bank units: Remove eight (8) screws holding the face panel in place and carefully lower the face panel. Do not pull any wires loose from their connections! Lay the unit on its back to allow easier access to the switches. Loosen the screws holding the wires, and then remove the screws holding the switches in place using a  $\frac{5}{64}$ " Allen key. After bending the lever on the new switch (See Below - "D"), install the new switch. Make sure the wires are connected to the proper terminals, and then replace the face panel.

3. Thirty bank oven units: Lay the switch bank 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  $\frac{5}{64}$ " Allen key. After

bending the lever on the new switch (See Below - "D"), install the new switch. Make sure the wires are connected to the proper terminals, and then replace the base.

- B) To adjust spring tension: Using a  $\frac{9}{64}$ " 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  $\frac{9}{64}$ " 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)

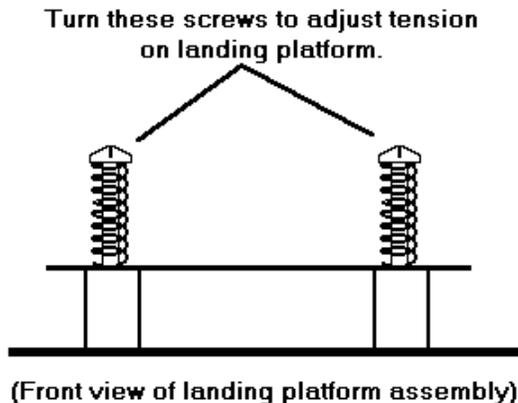


Figure A – Trip Plate

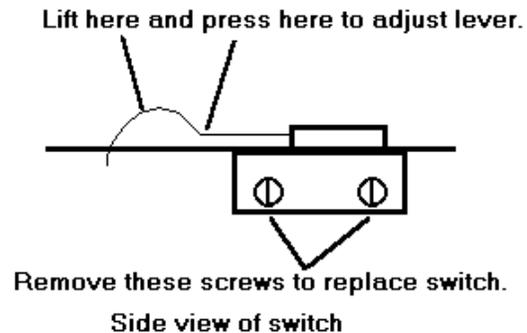


Figure B – Switch Lever Adjustment