



PROBE TACK TESTER
MODEL PT-2000
OPERATING INSTRUCTIONS

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PRODUCT DESCRIPTION

Congratulations on the purchase of your new ChemInstruments Probe Tack Tester. This versatile, user-friendly, carefully designed instrument allows you to determine probe tack 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.

The unit has the following features:

- Automated test sequence.
- Collected test data can be exported via USB port.
- Selectable units of measure: Kilograms, Grams, Newtons, Pounds, and Ounces.
- Compatible with EZ Data System software. See www.cheminstruments.com for details.

SPECIFICATIONS

Electrical	120/240 VAC, 50/60 Hz, 2 amps
Operating Temperature	32 – 122 degrees Fahrenheit (0 – 50 degrees Celsius)
Humidity	0 – 55% relative humidity
Speed	2 - 30 inches/minute, 1 IPM increments 1 - 12 millimeters/second, 1 mm/sec increments
Dwell Time	0.5 – 30 seconds, 0.5 second increments
Probe Diameter	5 millimeter
Annular Ring	19.6 grams
Physical Dimensions	Width: 13 inches (33 centimeters) Depth: 16 inches (41 centimeters) Height: 18 inches (46 centimeters) Weight: 25 pounds (12 kilograms)

UNPACKING

ChemInstruments has made every effort to ensure that the Probe Tack Tester 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 Probe Tack Tester consists of the following parts:

- The test frame, which includes the motor/drive mechanism and the data acquisition system.
- Probe and annular ring
- An envelope with this manual.
- Power cord.

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



ASSEMBLY

Carefully remove the test frame/data acquisition assembly 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 Probe Tack Tester in an area where temperature and humidity are controlled to standard conditions of 72 ± 2 degrees Fahrenheit and $50 \pm 5\%$ relative humidity.



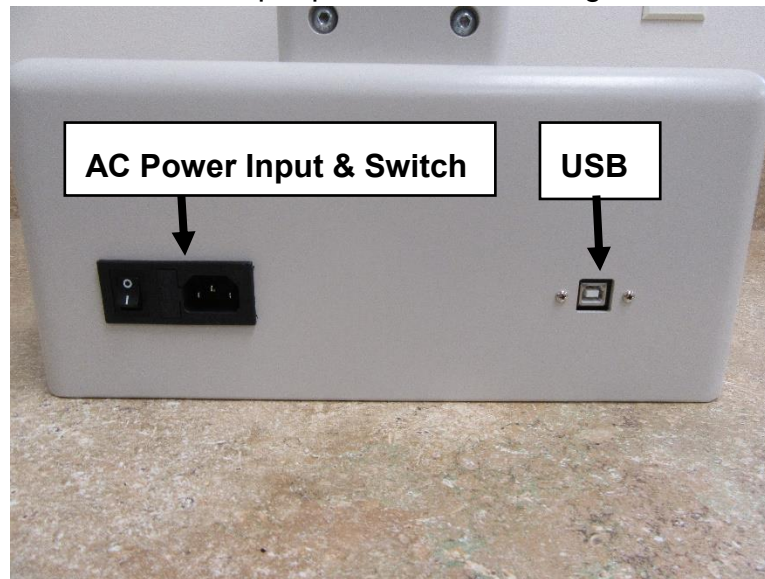
WARNING: Damage will occur if this unit is plugged into the incorrect power supply. This is a dual voltage machine. Connect either 120 or 240 VAC.

Insert the annular ring in the test platform. Attach the probe to the threaded bolt on the load cell.

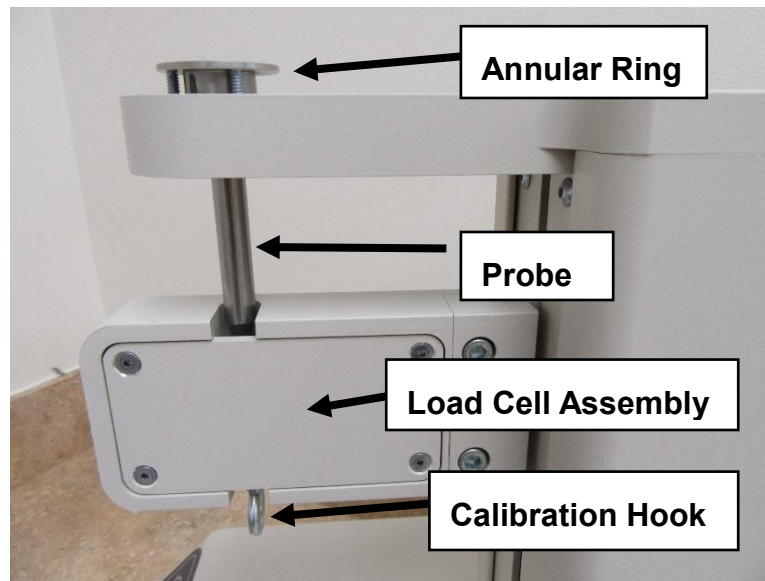
Connect the power cord to its receptacle on the backside of the control cabinet. Complete the connection by inserting the male end of the power cord into an appropriate AC outlet. Notice that the on/off power switch is located directly beside the power cord receptacle on the backside of the test frame.

KEY COMPONENTS

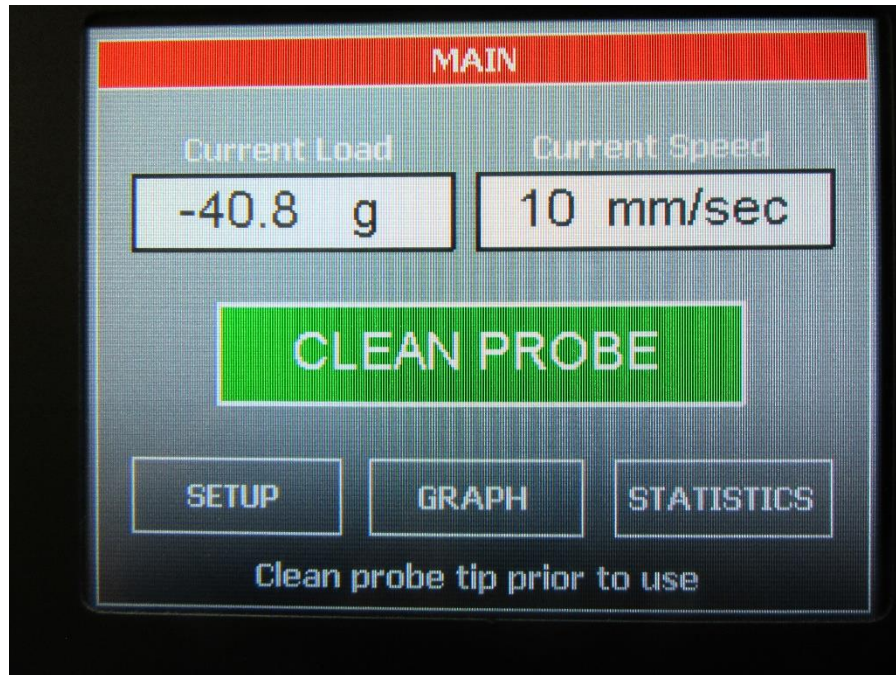
- **POWER SWITCH** is located on the back panel of the control cabinet directly beside the power cord connection.
- **USB CONNECTION** data output port for downloading test data.



- **ANNULAR RING** holds test material
- **PROBE** is used in measuring the force values of the test material
- **LOAD CELL ASSEMBLY** consists of the mounting bracket for the load cell with grip.
- **CALIBRATION HOOK** is used to hang the weights during the calibration procedure.



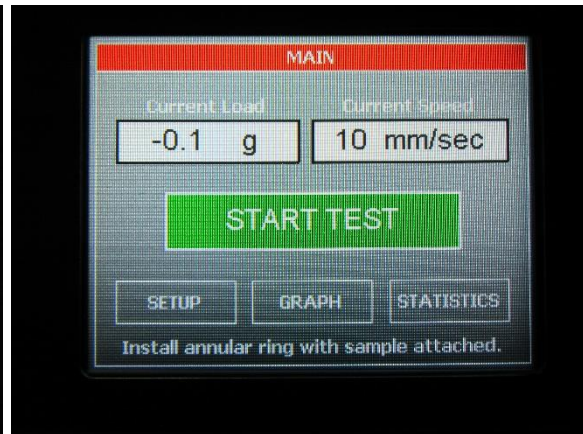
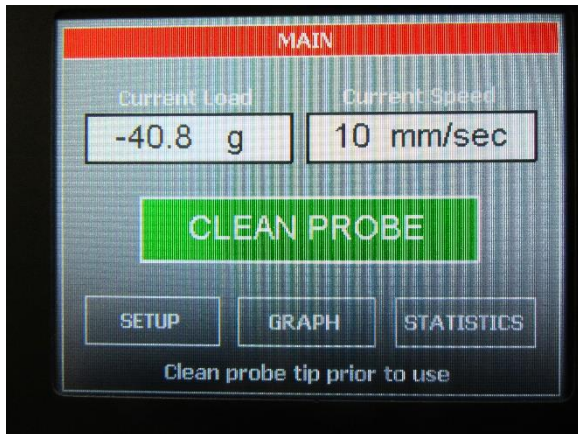
- **TOUCH SCREEN DISPLAY** is the control center for the PT-2000.



TOUCH SCREEN FORMAT

MAIN SCREEN

- **Current Load** – displays the force currently measured by the load cell.
- **Current Speed** – displays the set speed of the test.
- **Clean Probe** – will move the probe to a position so that it may be cleaned prior to running a test.
- **Start Test** – will begin the test process.
- **Setup** – will display all setup options.
- **Graph** – will display the graph, minimum, and maximum values of the last test.
- **Statistics** – will display the minimum, maximum, variance, standard deviation, and work of the last test.



SETUP SCREEN

- **Calibrate Load Cell** – allows the user to calibrate the load cell.
- **Units** – change the force units and/or the speed units.
- **Speed** – set the test platform's test speed. If the mode is set to D 2979 then speed is set to 24 in/min (or 10 mm/sec) and cannot be changed.
- **Dwell** – is used to select the dwell time. If the mode is set to D 2979 then dwell time is set to 1 second and cannot be changed.
- **Mode** – sets the mode of test operation. D 2979 will set the speed and dwell time specified in the test specification and will not allow the user to change these two settings.
- **Qualify Operation** – is used verify some of the hardware functions with the PT-2000.
- **Clean Probe** – will move the probe to a position so that it may be cleaned prior to running a test.
- **About** – retrieve the machine's software version and control board's hardware revision.
- **Exit** – go back to the main screen.

If there are 30 seconds of no screen activity when in any of the setup screens except the qualify operation screen, then the machine will exit the setup screen and return to the main screen.



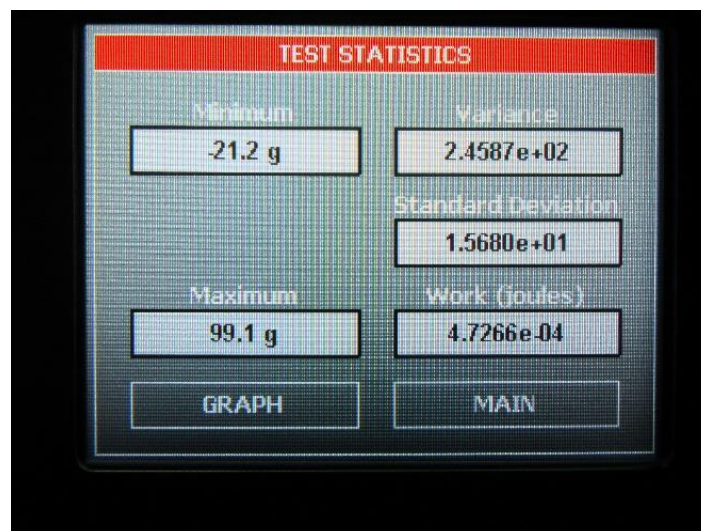
GRAPH SCREEN

The graph screen will display the graph, minimum, and maximum values of the last test. Touch anywhere on the screen to exit the graph screen and return to the main screen.



STATISTICS SCREEN

The statistics screen will display the minimum, maximum, variance, standard deviation, and work of the last test.



THEORY OF OPERATION

A test sample is secured on the annular ring per the test method and placed in the test platform. The probe is brought into contact with the test sample and retracted at a set speed. An electronic load cell measures the force, then feeds the information to a data acquisition unit. The data acquisition unit collects the data from the load cell and stores these data points in memory for use in calculating the maximum and minimum values. This data can be downloaded through the USB connection port to an appropriate receiving program on your PC.

The load cell samples at 2000 times per second. Two samples are collected, averaged, and stored as a data point. Therefore, a test will generate data points every 1 millisecond.

A maximum of 26,000 data points can be saved with any given test.

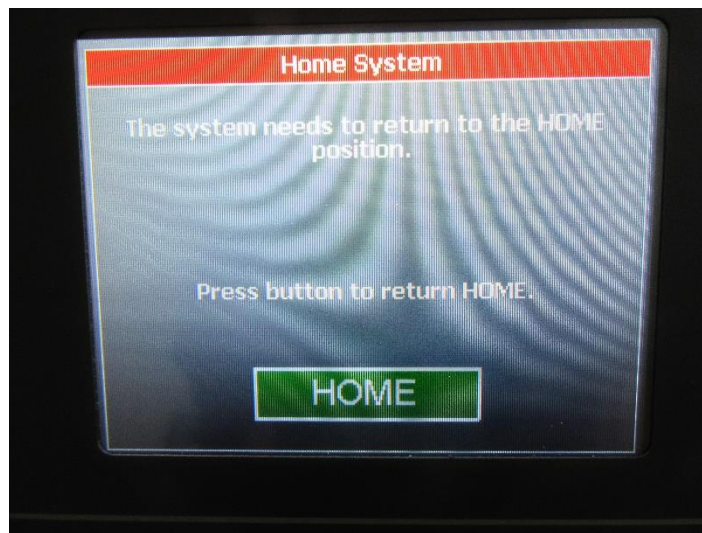
POWER UP

Turn on the master power switch located on the back panel of the control cabinet next to the power line receptacle.



WARNING: Operating temperature for this equipment is 32 to 122 degrees Fahrenheit (0 to 50 degrees Celsius). The equipment needs to be completely free of condensation, inside and out, before applying power.

The following message will always appear on power up. The system must establish the location of the home switch on power up. It will then go its starting position.



MACHINE SETUP

LOAD CELL CALIBRATION

It is important to calibrate the load cell to ensure that reliable data will be gathered. A calibration procedure is built into the software of the Probe Tack Tester. This procedure should be followed upon first use of the Probe Tack Tester and whenever necessary thereafter. The following is the step-by-step procedure for calibrating the load cell.



Make sure that the Probe Tack Tester has been powered on for 30 minutes before proceeding with calibration.



The calibration sequence defaults to grams as the unit of measure. Make sure that your calibration weights and entries are in grams.

LOAD CELL CALIBRATION PROCEDURE

1. Select SETUP from the main screen.
2. Select CALIBRATE LOAD CELL from the setup screen.
3. The first screen in the calibration process describes the 2 point calibration process. Select OK to continue.
4. The next screen measures the low calibration value (typically 0). Make sure that you do not have a weight hanging from the calibration wire and select OK.
5. The next screen measures the high calibration value. This weight should be close to the maximum rated load cell value. Hang the weight on the loop end of the calibration wire making sure that the wire is able to move freely.
6. Set the high calibration value by selecting CHANGE and entering the value of the weight in grams and select ENTER.
7. Make sure that the calibration weight is completely at rest and then select OK.

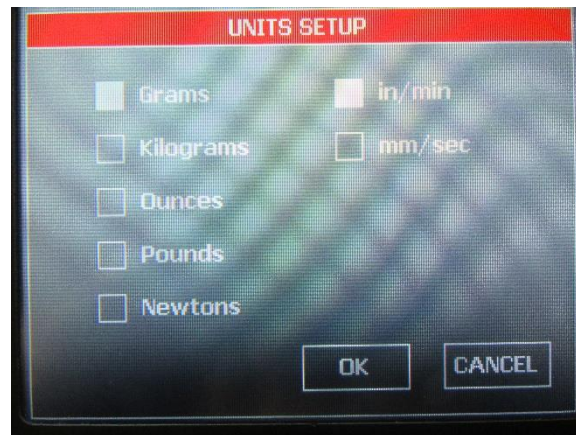
8. The display will show the main screen and the current reading of force will be displayed under CURRENT LOAD.
9. Verify the calibration by hanging a different calibration weight on the calibration wire.
10. Repeat the calibration procedure if necessary.



FORCE AND SPEED UNITS

Force and speed units can be changed with the following procedure.

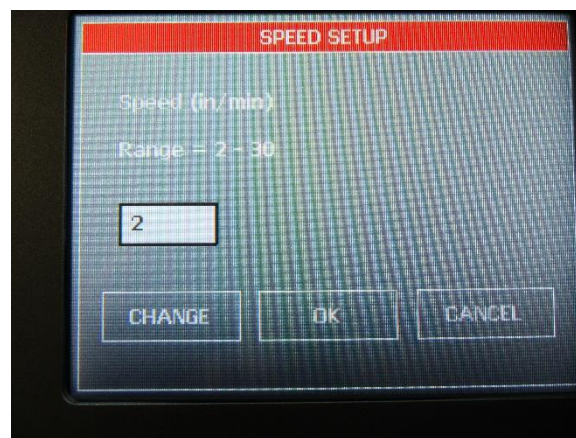
1. Select SETUP from the main screen.
2. Select UNITS from the setup screen.
3. Select the desired units. Select OK to confirm the entered units.



SPEED

To perform a test correctly, it is necessary to set the test speed in accordance with the selected test method. The following is a step-by-step procedure for setting the speed.

1. Select SETUP from the main screen.
2. Select SPEED from the setup screen.
3. Select CHANGE and enter the desired sled speed in the selected units and press ENTER. Select OK to confirm the entered speed.



DWELL

The dwell time is the amount of time that the material will stay in contact with the probe before it is pulled away. The following is a step-by-step procedure for setting the dwell time.

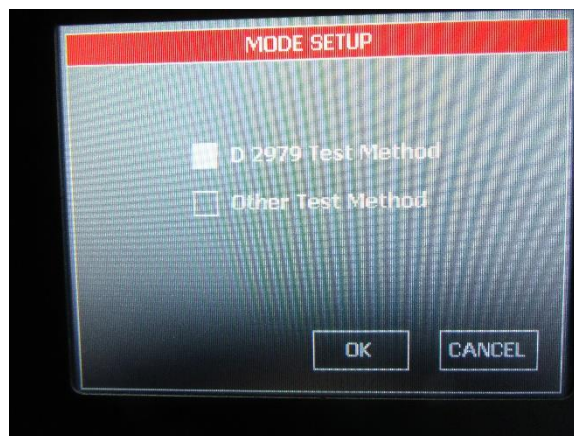
1. Select SETUP from the main screen.
2. Select DWELL from the setup screen.
3. Select CHANGE and using the arrow buttons, select the desired dwell time and select OK. Select OK again to confirm the entered dwell time.



MODE

The D 2979 test method mode will force the speed and dwell settings to match the test specification. The user will not be able to change these 2 settings while this mode is selected.

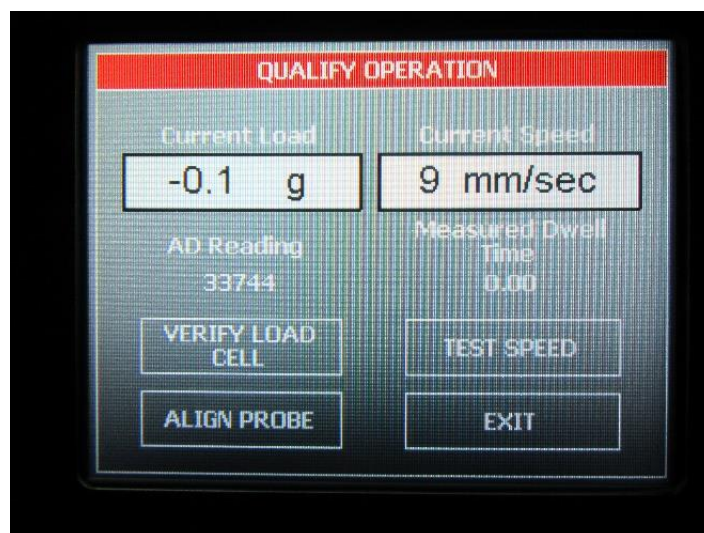
1. Select SETUP from the main screen.
2. Select MODE from the setup screen.
3. Select the appropriate mode and select OK to confirm.



QUALIFY OPERATION

Some of the hardware functions of the PT-2000 can be verified with the qualify operation screen.

- **Current Load** – displays the force currently measured by the load cell. It will be displayed in the selected units.
- **Current Speed** – displays the set speed of the test platform.
- **AD Reading** – displays the hardware counts measured on the control board from the load cell interface. Pulling on the load cell grip will display values greater than 32000. Pushing on the load cell grip will display values less than 32000.
- **Verify Load Cell** – will sample the load cell data for 10 seconds. A test can be simulated with a weight sitting on the calibration pad to verify the load cell calibration if necessary. The test platform will not move, the system will simply measure the load cell and display a graph along with the statistics when the 10 seconds is complete.
- **Align Probe** – will move the probe to the upper position. Verify that the x and y direction of the probe is level. When finished, press the OK button on the Align Probe screen to move probe to the lower position. Press OK to move the probe back to the HOME position.
- **Measured Dwell Time** – will display the measured dwell time from the previous test.
- **Test Speed** – is a method of verifying the speed of the test platform. The test platform will move 2 inches at the set speed and measure the amount of time that it takes to travel 2 inches.



RUNNING A TEST

Probe tack tests are conducted according to written test methods, such as ASTM, PSTC, TLMI and others. These tests are performed to determine the tack adhesive values of the selected PSA material as it is removed from a stainless steel test probe.

NOTE: Make sure the load cell has been calibrated before conducting a test.

CLEANING THE PROBE

After powering the PT-2000, the initial screen will require the probe to go through a cleaning sequence. Pressing the CLEAN PROBE button will raise the probe to a position that will allow it to be cleaned with a cotton swab and the appropriate solvent.

After each test, the PT-2000 will display the test results on the graph screen. Pressing anywhere on the screen will initiate the CLEAN PROBE sequence so that the probe can be cleaned before the next test.

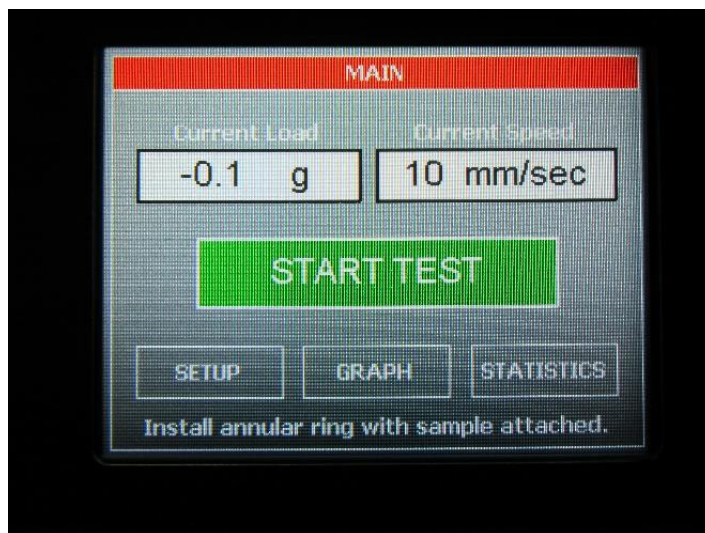
The CLEAN PROBE sequence will sense when pressure is applied to the probe and a 5 second timer will begin which will allow the user to clean the probe for 5 seconds. After the 5 second timer is finished, the probe will be lowered to the test position.



TEST PROCEDURE

The ChemInstruments Probe Tack Tester is very simple to use. The following is the correct procedure for running a Probe Tack Test.

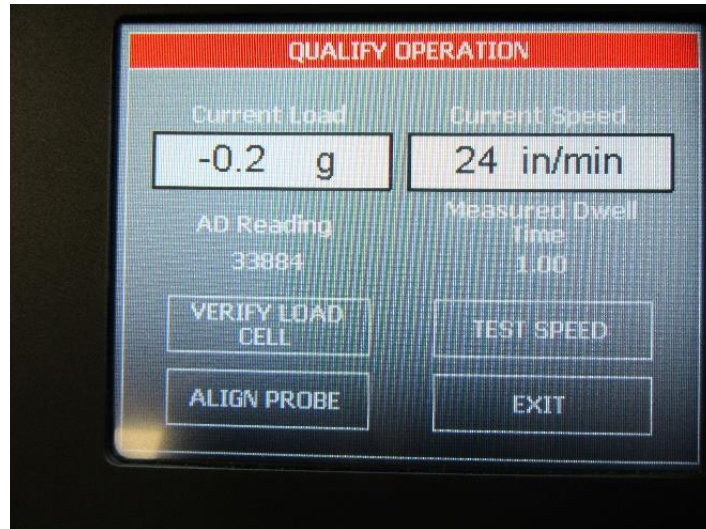
1. Secure the test sample on the annular ring per the test method.
2. Install the annular ring, press the START TEST button from the main screen. The probe will come up and make contact with the test material for 1 second. The probe will then retract while the load cell measures the test forces.
3. When the test is complete, the graph will be displayed along with the high, low and average values recorded during the test.
4. Pressing anywhere on the graph screen will initiate the CLEAN PROBE sequence as described previously.
5. Repeat the procedure for additional tests.



DWELL TIME MEASUREMENT

Dwell time is measured from the first data point that is less than -5 grams to the first data point that is greater than 0 grams. Data points are collected every 1 millisecond.

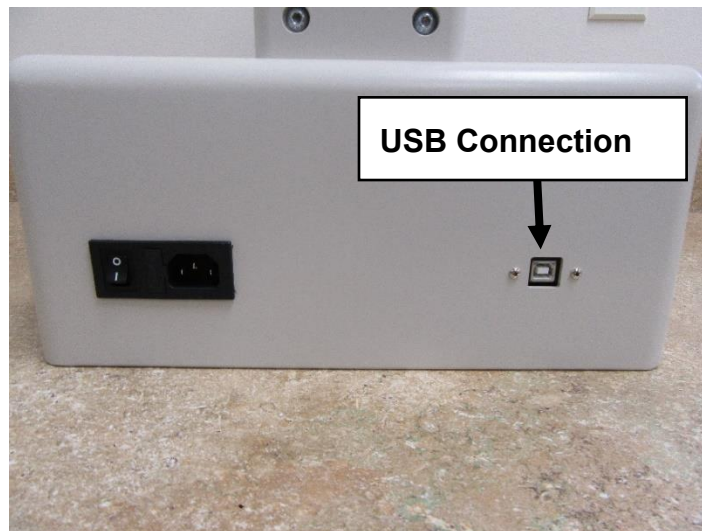
The PT-2000 will calculate the dwell time. The results can be found in the QUALIFY OPERATION screen under SETUP. See picture below.



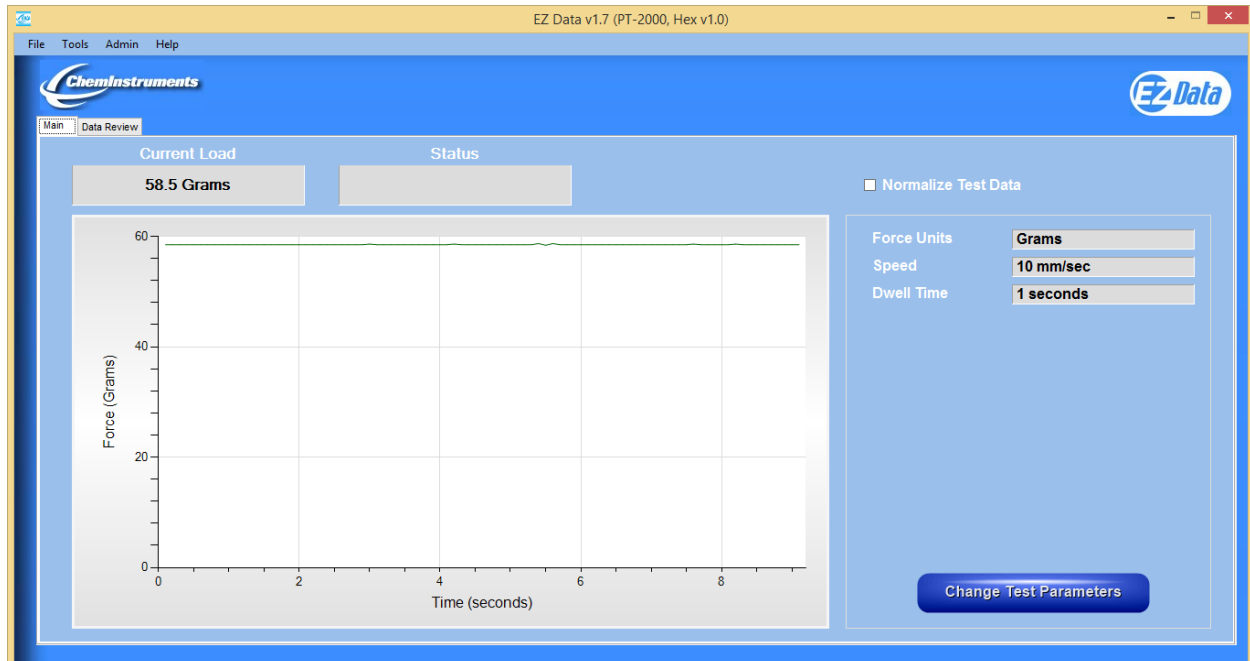
EZ DATA SOFTWARE SYSTEM

EZ Data is a ChemInstruments program that runs on your computer and will allow you to interface to your ChemInstruments machine in order to save test data files, save raw test data to excel, graph and crop test data, tabulate test data files, and overlay test data files. Please refer to the EZ Data manual for specific information on how to use the EZ Data software system.

The PT-2000 can be connected to your computer with a Type A-B, Revision 2.0 Compliant, USB cable.



The following picture is the main screen of EZ Data with a PT-2000 connected. This screen will show the current load as a value and a real time graph as data is collected from the load cell. It shows the test setup parameters. It will also allow you to change the test parameters.



The following picture shows the PT-2000 parameter setup.

The screenshot shows the PT-2000 Parameter Setup dialog box. The dialog has five sections: 'Force Units' with radio buttons for Grams (selected), Kilograms, Ounces, Pounds, and Newtons; 'Speed Units' with radio buttons for in/min (selected) and mm/sec; 'Speed' with a text input field showing 24 and a label 'SPEED RANGE: 2 - 30'; 'Dwell Time' with a text input field showing 1 and a label '1-30 seconds'; and 'Mode' with radio buttons for D 2979 Test Method (selected) and Other Test Method. 'OK' and 'Cancel' buttons are at the bottom.

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
No data collected	Not in Run Menu	Refer to running a test
Load Cell Assembly does not move during a test	Load cell assembly is in the upper idle position	Move the load cell assembly to the test position. Refer to test procedure
	Motor is not allowing the assembly to move	Replace motor
Data measurement consistently low/high	Improper calibration	Check calibration
	Bad calibration	Refer to load cell calibration
Calibration drifts	Bad or damaged load cell	Replace load cell

MAINTENANCE PROCEDURES

As with any precision equipment it is important to provide care and maintenance to ensure proper performance and long life. General cleaning and care will ensure accurate test and trouble free performance.

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.

LOAD CELL REMOVAL

The load cell assembly can be removed to send back for recertification. First, unscrew the probe. Next, carefully remove the two large screws. Make sure that you support the load cell assembly with one hand while removing the screws so that the load cell does not fall. After the two screws are removed, gently pull the assembly back, exposing the connector. Disconnect the connector. Be careful not to tug on the wires.

