



180 DEGREE PEEL TESTER

MODEL PA-1000-180

OPERATING INSTRUCTIONS

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PRODUCT DESCRIPTION

Congratulations on the purchase of your new ChemInstruments PA-1000-180, 180 Degree Peel Tester. This versatile, user-friendly, carefully designed instrument allows you to determine 180 degree adhesive and release values of many different materials according to many test methods including ASTM D-3330.



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:

- Internal load cell (standard 10 pound) accurate to 0.1% of full scale.
- One step test sequence.
- Small enough to fit on a desktop.
- Collected test data can be exported via RS232 port.
- Selectable units of measure: Kilograms, Grams, Newtons, Pounds, & Ounces.
- Compatible with EZ-Lab System software. See www.cheminstruments.com for details.

SPECIFICATIONS

Electrical	120/240 VAC, 50/60 Hz, 2 amps
Operating Temperature	32 – 150 degrees Fahrenheit (0 – 70 degrees Celsius)
Speed	6, 12, 24 inches per minute (15, 30, 60 centimeters per minute)
Peel Length	0.5 – 4.5 inches (1.25 – 11.25 centimeters)
Physical Dimensions	Width: 23 inches (58 centimeters) Depth: 12 inches (30 centimeters) Height: 8 inches (20 centimeters) Weight: 29 pounds (13 kilograms)

UNPACKING

ChemInstruments has made every effort to ensure that the PA-1000-180 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 PA-1000-180 consists of the following parts:

- 180 degree peel tester.
- An envelope with this manual.
- Calibration cable (attached).
- 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 PA-1000-180 in an area where temperature and humidity are controlled to standard conditions of 72 ± 2 degrees Fahrenheit and $50 \pm 5\%$ relative humidity.



WARNING: Make sure the power source matches the requirements of the 180 Degree Peel Tester. Damage will occur if this unit is plugged into the incorrect power supply.

Level the PA-1000-180 tester by adjusting the four leveling feet located at each corner of the unit.

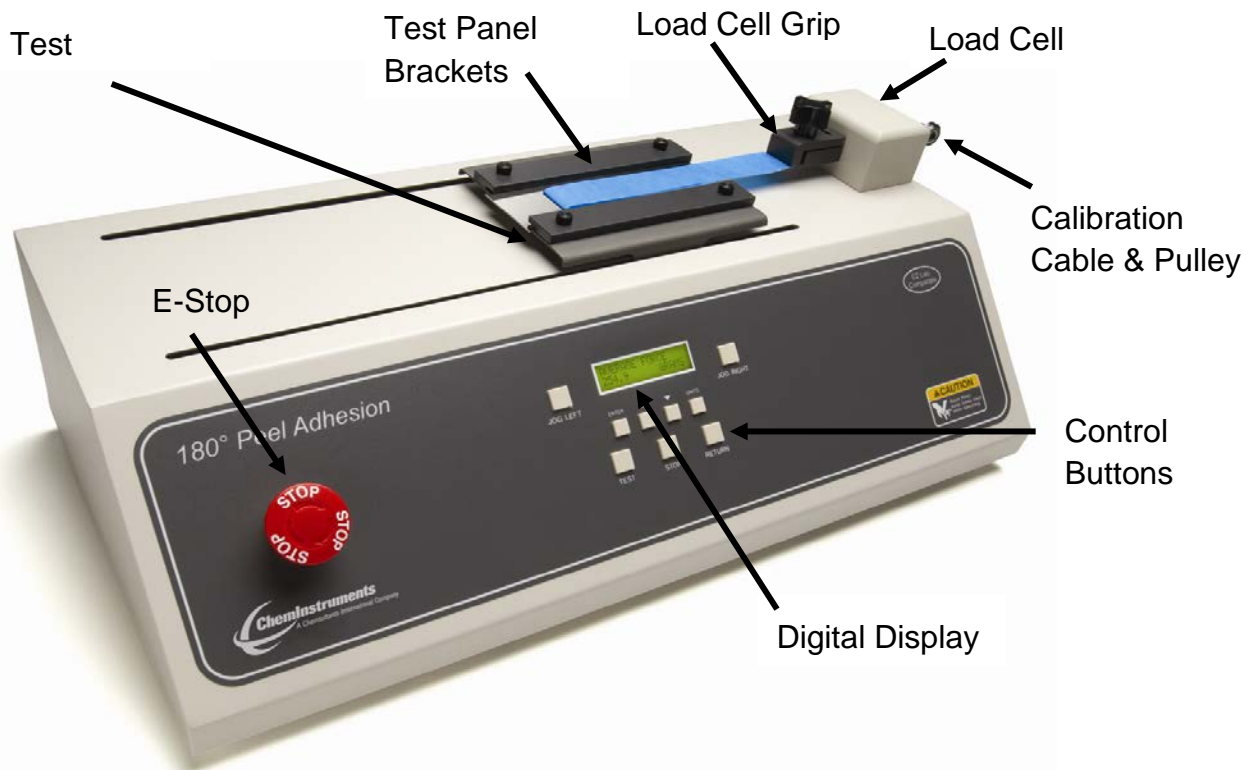
Connect the power cord to its receptacle on the backside of the control cabinet. Complete the connection by inserting the male end of the power cord into an appropriate AC outlet. Notice that the on/off power switch is located directly beside the power cord receptacle on the backside of the test frame.



WARNING: Before proceeding with using the PA-1000-180, it is advisable to become familiar with the Key Components. These Key Components and a brief description of their function follow in the next section.

KEY COMPONENTS

- **POWER SWITCH** is located on the back panel of the 180 degree peel tester at the lower left hand side.
- **TEST PLATFORM** consists of the moving platform with test panel brackets.
- **TEST PANEL BRACKETS** hold standard 2 inch wide test panels during testing.
- **LOAD CELL** measures the forces involved with a peel test. (Normally equipped with 10 pound standard load cell)
- **LOAD CELL GRIP** holds the sample and is attached to the load cell.
- **CALIBRATION CABLE & PULLEY** consist of a cable connected to the load cell and threaded over the pulley to allow you to hang a weight during the calibration sequence
- **E-STOP** emergency stop button
- **DIGITAL DISPLAY** provides test data results and system status information.
- **CONTROL BUTTONS** consist of 9 buttons (Jog Left, Jog Right, Enter, Up Arrow, Down Arrow, Units, Test, Stop, & Return) for control of the test sequence and other machine functions.



THEORY OF OPERATION

An adhesive sample is peeled at a 180 degree angle while attached to the load cell grip. 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, minimum and average values.

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 150 degrees Fahrenheit (0 to 70 degrees Celsius). The equipment needs to be completely free of condensation, inside and out, before applying power.

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 PA-1000-180. This procedure should be followed upon first use of the PA-1000-180 and whenever necessary thereafter. The following is the step-by-step procedure for calibrating the load cell.



Make sure that the PA-1000-180 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. Simultaneously press the Up and Down Arrow keys for 3 seconds to access the Setup mode.
2. Use the Up Arrow key to cycle to “Load Cell Setup” on the display. Press the Enter button.
3. At the “LO CAL” display, determine the Low Offset Value desired (typically 0.00). Make sure that you **do not** have a weight hanging, and press the Enter key. The display will change to “HI CAL” for high calibration value.
4. At the “HI CAL” display select a calibration weight close to the maximum expected test value. Hang that weight using the calibration cable and pulley.
5. Set the High Offset Value on the Display to correspond with the selected calibration weight. You can change the displayed value by pressing the Up and Down Arrow keys.
6. Verify that the hanging weight is completely at rest without any movement. Press the Enter key to complete calibration. The display will change to the “INSTANT FORCE” mode showing the current reading of force.
7. Verify the calibration by hanging a **different calibration weight**. Confirm that the instantaneous force reading is the same as the selected weight hanging on the calibration wire and pulley.
8. Repeat the calibration procedure if necessary.



UNITS OF MEASURE

Use the UNITS button to change the units of measure for the force reading. Pressing the UNITS button will cycle the units from Grams, Kilograms, Ounces, Pounds, and Newtons.

CURRENT FORCE READING

A current force reading is available by accessing the “INSTANT FORCE” mode. To access this mode, simply press the Up Arrow button until the display shows “INSTANT FORCE”. The second line of the display will be the current force being measured with the selected units. This reading should be used only as a quick reference.

NOTE: It is important to remember that the load cell is measuring forces at a rate of 400 times per second. The rate of display on the display screen cannot cycle at this speed. Therefore, the value in the “INSTANT FORCE” reading is an average of the data points that the load cell is measuring.

SPEED SETUP

The test platform can be set to travel at any one of three different speeds. The following procedure describes how to set the test platform speed.

1. Press both the Up and Down Arrow keys together for 3 seconds to enter the Setup Mode.
2. Use the Up Arrow key to cycle the display to “Speed Setup”.
3. Press the Enter key.
4. Press the Up Arrow key to cycle from 6, 12, to 24 inches per minute (15, 30, to 60 centimeters per minute).
5. Press the Enter key to record your speed selection. The display will return to the “INSTANT FORCE” reading.

TENSION SETUP

The test platform may be set to collect data immediately upon the start of a test, or it may be set to not begin collecting data until the load cell measures 20 grams of tension or more. TENSION should be set to OFF if the substrate being tested will yield results under 20 grams. If the substrate being tested will yield results higher than 20 grams, TENSION should be set to ON.

1. Press both the Up and Down Arrow keys together for 3 seconds to enter the Setup Mode.
2. Use the Up or Down Arrow key to cycle the Display to “Tension Setup”.
3. Press the Enter key.
4. Press the Up or Down Arrow key to choose ON or OFF.
5. Press the Enter key to record your selection. The display will return to the “INSTANT FORCE” reading.

NOTE: If TENSION is set to “OFF”, data is collected immediately after pushing the test button. To produce a representative average value for your test in this mode, there must not be any slack in the sample at start up. If you are using EZ-Lab software, you can use the crop feature to obtain a representative average value.

PEEL LENGTH SETUP

Set the peel length for the sample to be tested. The peel length is the distance that the system will measure forces while the sample is being peeled. See the explanation below for an understanding of the automated sequence for testing and collecting data during a test.

Follow the procedure below to set the test length parameter for your test and particular sample size.

1. Press both the Up and Down Arrow keys together for 3 seconds to enter the Setup Mode.

2. Use the Up and Down Arrow keys to cycle the Display to “Test Setup”.
3. Press the Enter key.
4. Use the Up and Down Arrow keys to change the length of the peel displayed. The choice for test length is (Range=0.5-4.5 inches in 0.5 inch increments)
5. Remember that this value is the length of the peel that data will be collected, not the entire length of the sample.
6. Press the Enter key to record the chosen setting. The PA-1000-180 is now ready to measure your test samples.

TENSION SETUP = ON

After pressing the TEST button, the test platform begins to move, but no data is stored. The test starts when more than 20 grams of sample tension is sensed. From that point, the test continues for ½ inch of peel, but no data is stored. Then the test stores peel data for the length of the parameter chosen in step 4 above. The test continues for an additional ½ inch peel after the data collection parameter length has been achieved, but no data is stored. Once this final ½ inch of travel has been completed the test platform stops.

TENSION SETUP = OFF

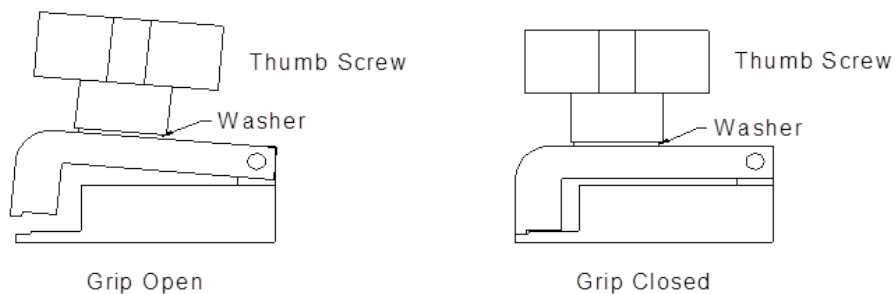
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RUNNING A TEST

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

GRIP OPERATION

The grip opens by turning the thumb screw counter-clockwise. Insert the free end of the sample into the open grip and close the grip by turning the thumb screw clockwise.



NOTE: The grip is attached directly to the load cell. Do not move the grip sideways or up and down. When opening and closing the grip, support it with one hand and operate the thumb screw with the other hand to avoid damaging the load cell. For proper operation of the load cell it is necessary for the grip to be mounted with a space between the load cell housing and the grip. **DO NOT TIGHTEN THE GRIP AGAINST THE LOAD CELL HOUSING.**



WARNING: Rotating the grip on the threaded mounting rod, causing the grip to come in contact with the wall of the load cell housing will damage the load cell. There must be a physical gap maintained between the grip and the load cell housing for the load cell to function correctly.

TEST PROCEDURE

The following procedure will describe a normal test sequence for the PA-1000-180 peel tester.

1. Prepare your sample according to the chosen test method, and slide the test panel into the Test Panel Bracket.
2. Place the leading loose end of your sample in the Load Cell Grip.



WARNING: Before proceeding, make sure there is nothing in the path of the test platform.

3. Push the Test key on the control panel.
4. Wait for the test platform to come to a complete stop.
5. The internal computer will calculate the average, high, and low values measure during the preset peel length.
6. The display will default to the average value. Other values are accessed by pushing the Up or Down Arrow keys.



WARNING: Make sure there are no objects in the test platform's path before pushing the Return button

7. Pushing the Return key will return the test platform to the start position for the next test.

MAINTENANCE

TROUBLESHOOTING

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

Troubleshooting Chart

Problem	Possible Cause	Procedure
No data collected	Display is in SETUP screen	Go to MAIN screen to run a test
Test platform does not move during a test	Motor is not allowing the assembly to move	Replace motor or drive
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.