

TEST-A-PACK **SYSTEMS**



**F100-2700
INTEGRITY TESTER**

OPERATOR'S MANUAL

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SYSTEM AND TESTING INTRODUCTION

2700 INTEGRITY TESTER

The 2700 Integrity Tester is used to test for leaks in the seal or package material of non-porous flexible packages. The Control console regulates the flow of vacuum to the test chamber. This causes a positive differential pressure across the package boundary and enables the user to visually detect leakage. The tests may be performed wet or dry. Employing state of the art technology, the tester offers levels of accuracy and repeatability not available with other equipment. The tester provides readings in MmHg (gauge and absolute), InHg (gauge and absolute), and altitude (feet). The alphanumeric display shows these values during the test and then allows the user to “pass” or “fail” the package. Alternatively, the test settings and results can be output to the optional Test-A-Pack printer.

IMPORTANT: Operation of the 2700 Integrity Tester is relatively self explanatory and easy, however, it is critical that you go through this manual in order to fully understand the tester and its functions. We recommend stepping through the operation of the machine with the manual for a thorough understanding of its operation and features.

SYSTEMS COMPONENTS

Included with the 2700 system:

- The F100-2700-1 control console
- One cylindrical glass water trap
- One power cord
- One 3/8 inch vacuum line

As optional equipment, the following can also be purchased:

- Oil-less, dual diaphragm vacuum pump
- Optional printer accessory kit
- Additional vacuum test chambers

UNITS AND VALUES

The 2700 Integrity Testor can provide readings in three different units of measure: absolute pressure, gauge pressure, and feet of altitude. In order to properly interpret the test results, it is important that you understand these terms

and how they are related. It is also important to know the atmospheric pressure (barometric) in your area.

ABSOLUTE PRESSURE

Refers to the actual pressure at a specific point without regard to atmospheric (barometric) pressure. The reference point is zero pressure (total vacuum). Barometric pressure is an absolute pressure measurement; therefore, if the barometric pressure in your area is 28.95 InHg today, that is the absolute pressure.

2700 EXAMPLE: If you set the value on your 2700 to 20 InHg absolute, the Control Console will allow the vacuum source to “pull” as much vacuum as necessary to reduce the absolute pressure inside the chamber down to 20 InHg.

GAUGE PRESSURE

Is the difference between absolute pressure and atmospheric (barometric) pressure. The reference point is the current atmospheric pressure at the testing site. Gauge pressure is stated as either above or below atmospheric. A pressure gauge that reads pressures below atmospheric is ordinarily called a vacuum gauge. The gauge values on the 2700 are vacuum gauge readings.

2700 EXAMPLE: If the barometric pressure is 29.15 InHg in Buffalo, NY and you set the value on your 2700 to 20 InHg Gauge, the Control Console will allow the vacuum source to reduce the chamber pressure by 20 InHg, therefore, the absolute (actual) pressure inside the chamber would be 9.15 InHg.

ALTITUDE

Is a measure of height above sea level (not ground level). A change in altitude has a corresponding effect on atmospheric (absolute) pressure. The purpose of the altitude test on the 2700 is to stimulate the effect that air travel will have on your packages. The altitude function computes altitude from absolute pressure measurements in accordance with the ARDC model atmosphere, 1959.

2700 Example: If you set the value on your 2700 to 35,000 feet, the atmospheric pressure inside the chamber will drop to the corresponding absolute pressure value.

IMPORTANT: As ground level altitude increases above sea level, atmospheric (absolute) pressure decreases. For example, the barometric pressure in Denver, Colorado (which is approximately 5,200 ft above sea level), is lower than the

barometric pressure in Buffalo, New York, (which is approximately 700 ft above sea level).

Example: Using the gauge example above, if you set your 2700 to 20 InHg in Denver (where the barometric pressure is typically 24.90); the actual (absolute) pressure in the chamber would be 4.90 InHg.

NOTE: The 2700 can not pull negative vacuum pressures. Thus, if at Denver the 2700 is set to 26 InHg, the actual chamber pressure would be approximately zero, not negative 1.1 InHg.

TESTER SET UP/ POWER UP

CAUTIONS AND NOTICES

The following warnings are presented throughout this manual, where appropriate, to ensure safe, efficient operation of the 2700 System:

WARNINGS



This symbol indicates that failure to follow the warning could result in severe bodily injury.



Eye and ear protection required for all tests.



To protect personnel from electric shock hazards; always connect the control unit to an adequately grounded 2-pole 3-wire electrical supply receptacle.

The following cautions are presented throughout this manual, where appropriate, to ensure safe, efficient operation of the 2700 System:

NOTICES



This symbol indicates that failure to follow the notice could result in damage to the test equipment that will void the warranty.



Avoid overfilling the test chamber. Introduction of liquids into the 2700 will damage the tester and void any warranty.



Use water only inside the vacuum chamber for submersion testing. Other liquids may have an adverse effect on the chamber potentially compromising structural integrity when subjected to vacuum.

BASIC OPERATIONS/FEATURES

FRONT PANEL:

The controls on the membrane keypad have the following functions (Figure 1):

UP ARROW- Moves the cursor up and increments selected characters.

DOWN ARROW- Moves the cursor down and moves the cursor to the next character on a selected line.

SET- Selects a choice from a menu.

START- Confirms settings and starts the test.

RESET- Aborts a test, cancels a choice or takes the user back to the previous screen.



Figure 1.

REAR PANEL:

To assemble the 2700 testing system, please refer to Figure 2:

1. Connect your vacuum source to PORT 1 (vacuum source port) on the rear of the machine with user supplied tubing and connectors.
2. Locate the glass water trap supplied with the unit and attach it to PORT 2 (test chamber port). The arrow on the top of the water trap should point towards the rear of the 2700.
3. Locate the test chamber vacuum line and insert one end into the quick disconnect port on the back of the water trap. Connect the other end of the line to the quick disconnect fitting on the vacuum test chamber.
4. Insert the female end of the power cord into the power module on the rear panel of the control console and plug the male end into a grounded AC power outlet.
5. If you have purchased the optional printer, you can connect the printer cable to the DB-25 connector on the rear panel of the control console. The printer manual contains full operating instructions for the printer.

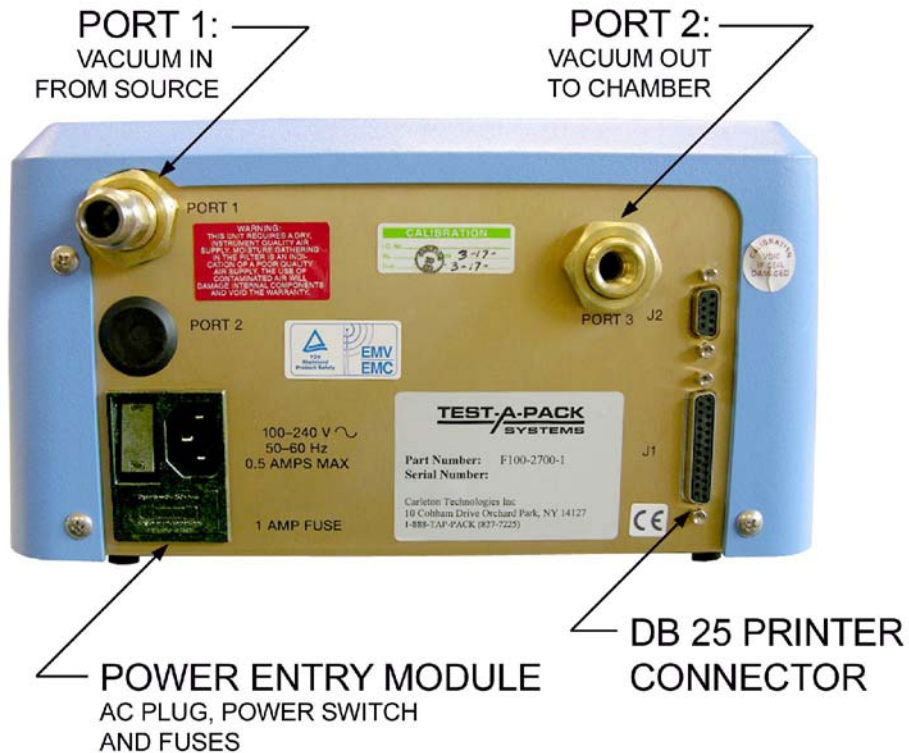


Figure 2

6. Turn on the AC power to the tester by pressing the rocker switch on the rear panel of the control console. The Carleton Technologies screen should appear (Figure 3).



Figure 3

7. Press the START key on the membrane key pad and the SELECT MODE screen will appear (Figure 4).



Figure 4

SETTING THE TIME AND DATE

The clock operates on a 24-hour military time cycle (12:00 midnight is 00:00:00; 1:00 PM is 13:00:00).

1. At the select mode screen, move the cursor to CONFIGURE and press SET. The CONFIGUR MACHINE screen will appear Figure 5).



Figure 5

2. Move the cursor to SET TIME-DATE. Press SET.

3. To set the date, move the cursor to the DATE line and press SET. This will position the cursor on the first character of the date line (denoted by the flashing character). Pressing the UP ARROW will increment the flashing character. Pressing the DOWN ARROW will move the cursor to the next character.
4. Using the ARROW buttons, change the characters to reflect the correct date. When you have entered the correct information, press SET.
5. Follow the same instructions to set the time. When you are satisfied that the Date and Time information is correct, press the START key. This will take you back to the SELECT MODE screen.

SECURITY CODE

The tester is equipped with a user-definable four character password protection feature. This feature is provided to prevent unauthorized users from changing test parameters. The security code is preset at the factory to 0000. If the factory code is left unaltered, any user can access and modify all test parameters.

SETTING A SECURITY CODE

1. At the SELECT MODE screen, position the cursor at the CONFIGURE line. Press SET. The CONFIGURE MACHINE screen will appear.
2. Move the cursor to the CHANGE PASSWORD line and press SET (Figure 6).



Figure 6

3. Move the cursor to the NEW PASSWORD line and press SET. This will move the cursor to the first character on the NEW PASSWORD line, indicated by the flashing digit.
4. Use the UP ARROW to increment the first character. When you have arrived at the desired number, press the DOWN ARROW to move to the next character. After you have chosen all four characters, press SET.
5. If you are satisfied with the four characters you have entered, press START to confirm the new code.

6. If you decide that you do not want a security code or are unhappy with the one you have chosen, press RESET and the code will revert to the factory preset.

IMPORTANT: Once you have set a security code, the 2700 will prompt you to enter it whenever you attempt to change a test parameter, and therefore, it is vital that you remember the security code.

TESTER VACUUM SENSITIVITY

Some vacuum sources may be subject to sudden flow variances. This may have an effect on how your 2700 operates. The tester has a vacuum sensitivity setting that enables the machine to operate properly with almost any vacuum source. There are three sensitivity settings to choose from: LOW, MEDIUM, and HIGH. The factory preset is LOW. Systems being used with high quality, extremely stable vacuum sources should be set to HIGH sensitivity. This will enable the 2700 to operate faster.

CHANGING THE VACUUM SENSITIVITY

If you feel it is necessary to alter the vacuum sensitivity, follow these steps:

1. At the SELECT MODE screen, position the cursor on the CONFIGURE line and press SET.
2. Move the cursor to the VACUUM SENSITIVITY line and press SET. The factory preset value (LOW) should appear. To change this, press SET.
3. Use the UP ARROW to increment the vacuum sensitivity choices. If you have been experiencing problems with the factory preset of LOW, try MEDIUM. When you arrive at your choice, press SET.
4. Press START to confirm your new vacuum sensitivity.

TEST-A-PACK PRINTER

A compact printer is available from Carleton Technologies that is specifically configured to support the data output from the 2700 control console. Full installation and operating instructions are provided with the printer. Contact Test-A-Pack for more information.

PARALLEL PRINTER PORT

The DB-25 parallel printer port connector may be used with any parallel printer supporting the Simplified Centronics printer protocol.

SCREEN SAVER FEATURE

The 2700 Control Console uses a Vacuum Fluorescent Display (VFD). In order to prevent the VFD from “burning out” due to long periods of power on, non-usage, the 2700 has a screen saver feature. After five minutes of power-on, non-use, the screen will dim and the words TEST-A-PACK will appear on the screen. You can exit the screen saver mode by touching any button on the keypad.

MAINTENANCE AND SERVICE

CLEANING

Do not use any harsh chemicals to clean the F100-2700 or its chambers. Use a soft cloth or sponge dampened with a mild detergent and water only. Use of any other chemicals or solvents could damage the exterior of the unit.

SERVICE

The electrical fuses found in the power module are the only user-serviceable parts within the F100-2700 control console. In the unlikely event that the fuses blow, this indicates that the machine experienced voltage or current levels that exceeded the rated specifications. The cause of this incident should be determined and corrected before the unit is returned to service. Blown fuses should be replaced with two 5 x 20mm, 250 volt, 1 amp, time delay fuses. Due to high voltages within the unit and the danger posed by improperly installed components, all servicing, maintenance or calibration must be performed by a factory authorized service technician. Any work performed by a non-factory authorized service technician will void the warranty and certificate of calibration and potentially place the operator of the unit in physical danger.

CALIBRATION

The F100-2700 must be returned to the factory annually for calibration/service.

TESTING NON-POROUS PACKAGES

SUBMERSION TEST

1. Pour the appropriate amount of water into the bottom half of the test chamber. Make sure that you take the size of your package into consideration so you do not overflow the chamber when submerging the package.
2. Place the lid on the vacuum chamber so that the clear retaining plate submerges your package. Depending on the size of your package, you may have to hold the lid down until the test begins.
3. At the SELECT MODE screen, move the cursor to the TEST SETUP (Figure 7). Press SET.



Figure 7

4. At the UNITS line, press SET and use the UP ARROW to choose your unit of measure. When you arrive at your choice, press SET.
5. Move the cursor to the VALUE line and press SET.
6. Use the UP ARROW to increment the flashing character and the DOWN ARROW to move the cursor to the next digit. When you have chosen a value, press SET, the ranges are as follows:

mmHg ABS: 1-760
mmHg gauge: 1-760
InHg ABS: 1-29.9
InHg gauge: 1-29.9
ft. Altitude: 700-50,000 (100 foot increments)
Max Vacuum: Upper limit of your vacuum source

7. Move the cursor to the TIME line. Press SET.
8. To select the duration of your test, use the UP ARROW to increment the flashing character and the DOWN ARROW to move to the next digit. You may choose any value between 10 and 60,000 seconds. Press SET.
9. Once all the test parameters are chosen, you are ready to begin. Press START to bring up the LEAK TEST screen (Figure 8).

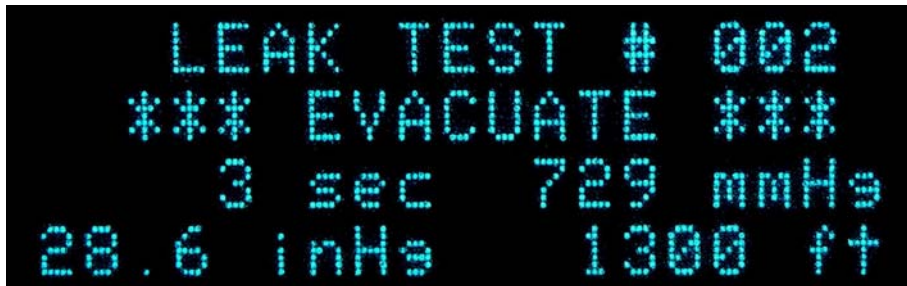


Figure 8

NOTE: Even though you have selected a particular unit of measure, the 2700 displays the corresponding values on the other scales as well.

10. To begin test #001, turn on your vacuum source and press START.

The control console will regulate the supply of vacuum to the test chamber. The timer will count upward and the display will read EVACUATE while the machine drives the chamber pressure to the value you have specified. When the control console has arrived at the correct value, the display will read HOLD and the timer will begin to count down your specified test length.

As the test is running, you should examine the package for leakage (denoted by a stream of bubbles coming from any pinholes or channels in the material or seal). After the test is completed, the display will read UP=PASS, DOWN=FAIL. You must use the appropriate ARROW control to enter the results of the test.

If you are using the optional Test-A-Pack printer, the date, time, test number, test settings and test results will be printed out automatically.

You may now continue testing using the same settings by simply reloading the test chamber with a new package and pressing START. If you need to change the test settings press RESET and go back into TEST SETUP. Any time test settings are changed, the LEAK TEST screen will revert to LEAK TEST #001.

NOTE: When performing submersion testing on a regular basis, it is important to change the water in the test chamber periodically. Clean water makes it easier to detect leakage.

DRY TEST

Dry testing is used less frequently than submersion testing. This is simply because it is more difficult to distinguish between a bad package and a good package with this method. When performing a dry test, follow the submersion test instructions with the exception of adding water to the chamber. After the test is completed and the chamber evacuates, you should check the package for

shrinkage around the product. If the package material has shrunk and wrapped tightly around the product in the package, it indicates that air has leaked out of the package during the chamber evacuation and the package has failed the test.

APPENDIX A.

QUESTIONS & ANSWERS

Q: What is the highest vacuum (lowest pressure) achievable with the 2700?

A: This depends on two factors: Your vacuum source and your geographical location. A 2700 with the appropriate vacuum pump, at sea level, is capable of pulling 29.92 InHg.

Q: Is the 2700 System capable of testing multiple packages simultaneously?

A: Yes. Contact Test-A-Pack about the availability of multiple package test chambers.

Q: Can I get a larger chamber for my 2700?

A: Yes. Contact Test-A-Pack about the availability of other package test chambers.

Q: What does the "MAX VACUUM" setting on the 2700 do?

A: The MAX VACUUM setting allows the 2700 to pull as much vacuum as your source can produce.

Q: At what value should I test my packages?

A: This should be determined by internal quality requirements based on a sound knowledge of the kind of stresses the package will need to endure. For example, will the packages be transported on an airplane? If so, at what altitude?

Q: What criteria should my vacuum source meet?

A: This depends on your testing environment and the values at which you will test. If cleanliness is important, we recommend an oil-less diaphragm pump with a dust filter (such as the Test-A-Pack model F136-1115-1). Your pump should be capable of pulling 29 InHg in order to be able to use the full scale of the 2700.

Q: Where can I purchase a printer, a vacuum pump, additional vacuum chambers, or other 2700 accessories?

A: All 2700 accessories can be purchased from Carleton Technologies Inc in Orchard Park, New York.

APPENDIX B

CE CERTIFICATION:

APPENDIX C

SPECIFICATIONS

AC Line Power: 85 to 264 Volts
47 to 63 Hz

Fuses: 5 x 20mm 1 AMP SLO-BLO

Operating Temperature: 60° F to 110° F
15° C to 43° C

Storage Temperature: 0° F to 125° F
-17°C to 51°C

Relative Humidity: 90% (max)

<u>Vacuum Range</u>	<u>mmHg</u>	<u>InHg</u>	<u>Feet</u>
Absolute Pressure (max)	760	29.92	n/a
Absolute Pressure (min)	1	1	n/a
Gauge Pressure (max)	760	29.92	n/a
Gauge Pressure (min)	1	1	n/a
Altitude (max)	n/a	n/a	50,000 (15240 m)
Altitude (min)	n/a	n/a	700 (213m)

Timer Range: 1 to 60,000 seconds

Accuracy: +/- 0.2% full scale

Parallel Printer Port: Simplified Centronics Format w/DB-25 female connector

Dimensions: Length: 15.0 inches (38.1 cm)
Width: 11.5 inches (29.21 m)
Height: 6.25 inches (15.875 cm)
Weight: 12 lbs (5.44 kg)

APPENDIX D

OPTIONAL ACCESSORIES

Vacuum Chambers:

F100-1175-1	Small test chamber 06" H X 09" W
F100-1177-2	Medium test chamber 10.5" H X 13" W
F100-1177-1	Large test chamber 20" H X 13" W

Vacuum Pumps:

F136-1115-1	120 VAC Vacuum pump
F136-1115-6	220 VAC Vacuum pump

Printers:

F100-2573-1	110Volt AC printer kit
F100-2573-4	220Volt AC printer kit

CONTACT INFORMATION

For more information:

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