Test-A-Pack Systems

F100-2800-2
MULTIFUNCTION PACKAGE TESTER

OPERATOR'S MANUAL

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<table>
<thead>
<tr>
<th>Rev.</th>
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</tr>
</thead>
<tbody>
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</tr>
</tbody>
</table>
TABLE OF CONTENTS

WARNINGS AND NOTICES ............................................................................................................. v

SECTION 1: SYSTEM SETUP
  UNPACKING YOUR NEW SYSTEM ........................................................................................... 1
    Shipping Contents ................................................................................................................. 1
    Installing the Control Console ............................................................................................ 1
    Other Test Fixtures ............................................................................................................. 2
  SETTING UP YOUR NEW SYSTEM .......................................................................................... 3
    Pneumatic System Setup (Rear Panel) ................................................................................. 3
    Electrical System Setup (Side Panel) .................................................................................. 4
    Connecting Other Testing Fixtures ..................................................................................... 4
    Installing a Local Printer ..................................................................................................... 4
    Network Capability ............................................................................................................. 5

SECTION 2: TEST DESCRIPTIONS
  TEST MODE OVERVIEW ........................................................................................................... 6
    Burst Test .............................................................................................................................. 6
    Creep Test ............................................................................................................................. 7
    Creep-to-Burst Test .............................................................................................................. 7
    Stepped Creep Test .............................................................................................................. 8
    Mass Flow Test ..................................................................................................................... 9
    Mass Flow-to-Burst Test ....................................................................................................... 9
    Pressure Decay Test ............................................................................................................ 10
    Pressure Decay-to-Burst Test ............................................................................................. 10

SECTION 3: OPERATING INSTRUCTIONS
  BURST TEST, INCLUDING GENERAL OPERATING INSTRUCTIONS
    Accessing the Test Screens ................................................................................................ 11
    Entering a Password ........................................................................................................... 12
    On-Screen Keypad .............................................................................................................. 12
    Changing the Password ...................................................................................................... 13
    Burst Test Setup Panel ....................................................................................................... 13
      Selecting a Test Type ........................................................................................................ 13
      Creating a Test Filename .................................................................................................. 13
      Pressure Units ................................................................................................................ 13
      Sensitivity ....................................................................................................................... 13
      Burst High and Low Control Limits ............................................................................... 13
      Setting Optional Data Column Headers ........................................................................ 14
      Auto Start ....................................................................................................................... 14
      Saving the Test Setup ...................................................................................................... 14
      The Load Button ............................................................................................................. 14
      Selecting a Test to Run ................................................................................................... 15
### TABLE OF CONTENTS (continued)

**BURST TEST, INCLUDING GENERAL OPERATING INSTRUCTIONS (continued)**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Panel</td>
<td>16</td>
</tr>
<tr>
<td>Filling in the Optional Data Column Header Fields</td>
<td>16</td>
</tr>
<tr>
<td>Selecting a Previously Performed Test</td>
<td>17</td>
</tr>
<tr>
<td>Initiating a Test</td>
<td>17</td>
</tr>
<tr>
<td>Burst Test Panel</td>
<td>17</td>
</tr>
<tr>
<td>Status Bar</td>
<td>18</td>
</tr>
<tr>
<td>Anomaly Flag</td>
<td>19</td>
</tr>
<tr>
<td>Viewing Test Results</td>
<td>19</td>
</tr>
<tr>
<td>Filtering Saved Data</td>
<td>20</td>
</tr>
<tr>
<td>Viewing Graphs</td>
<td>21</td>
</tr>
<tr>
<td>Generating a CSV File</td>
<td>21</td>
</tr>
<tr>
<td><strong>CREEP TEST</strong></td>
<td></td>
</tr>
<tr>
<td>Creep Test Setup</td>
<td>22</td>
</tr>
<tr>
<td>Pressure Units</td>
<td>22</td>
</tr>
<tr>
<td>Set Pressure</td>
<td>22</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>22</td>
</tr>
<tr>
<td>Hold Time</td>
<td>22</td>
</tr>
<tr>
<td>Test Time</td>
<td>22</td>
</tr>
<tr>
<td>Test Setup Panel</td>
<td>22</td>
</tr>
<tr>
<td>Test Panel</td>
<td>23</td>
</tr>
<tr>
<td><strong>STEPPED CREEP TEST</strong></td>
<td></td>
</tr>
<tr>
<td>Stepped Creep Test Setup</td>
<td>25</td>
</tr>
<tr>
<td>Pressure Units</td>
<td>25</td>
</tr>
<tr>
<td>Test Setup Panel</td>
<td>25</td>
</tr>
<tr>
<td>Specify Step Pressure or Number of Steps</td>
<td>25</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>25</td>
</tr>
<tr>
<td>Hold Time</td>
<td>26</td>
</tr>
<tr>
<td>Test Time</td>
<td>26</td>
</tr>
<tr>
<td>Test Panel</td>
<td>26</td>
</tr>
<tr>
<td><strong>CREEP-TO-BURST TEST</strong></td>
<td></td>
</tr>
<tr>
<td>Creep-to-Burst Test Setup</td>
<td>28</td>
</tr>
<tr>
<td>Pressure Units</td>
<td>28</td>
</tr>
<tr>
<td>Set Pressure</td>
<td>28</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>28</td>
</tr>
<tr>
<td>Hold Time</td>
<td>28</td>
</tr>
<tr>
<td>Test Time</td>
<td>28</td>
</tr>
<tr>
<td>Test Setup Panel</td>
<td>28</td>
</tr>
<tr>
<td>Test Panel</td>
<td>29</td>
</tr>
</tbody>
</table>
TABLE OF CONTENTS (continued)

MASS FLOW TEST
Mass Flow Test Setup ................................................................. 31
  Pressure Units ........................................................................... 31
  Set Pressure ............................................................................. 31
  Sensitivity ................................................................................ 31
  Hold Time ............................................................................... 31
  Stable Time ............................................................................. 31
  Test Time ................................................................................. 31
  Flow Limit ................................................................................ 31
Test Setup Panel ........................................................................... 31
Test Panel ..................................................................................... 32

MASS FLOW-TO-BURST TEST
Mass Flow-to-Burst Test Setup ..................................................... 34
  Pressure Units ........................................................................... 34
  Set Pressure ............................................................................. 34
  Sensitivity ................................................................................ 34
  Hold Time ............................................................................... 34
  Stable Time ............................................................................. 34
Test Setup Panel ........................................................................... 34
Test Panel ..................................................................................... 35
  Test Time ................................................................................. 35
  Flow Limit ................................................................................ 35
  Burst High and Low Control Limits ........................................... 35
Test Panel ..................................................................................... 35

PRESSURE DECAY TEST
Pressure Decay Test Setup .......................................................... 37
  Pressure Units ........................................................................... 37
  Set Pressure ............................................................................. 37
  Sensitivity ................................................................................ 37
  Hold Time ............................................................................... 37
  Stable Time ............................................................................. 37
  Test Time ............................................................................... 37
  Decay Limit ............................................................................. 37
Test Setup Panel ........................................................................... 37
Test Panel ..................................................................................... 38

PRESSURE DECAY-TO-BURST TEST
Pressure Decay-to-Burst Test Setup .............................................. 40
  Pressure Units ........................................................................... 40
  Set Pressure ............................................................................. 40
  Sensitivity ................................................................................ 40
Test Setup Panel ........................................................................... 40
  Hold Time ............................................................................... 41
  Stable Time ............................................................................. 41
  Test Time ............................................................................... 41
  Decay Limit ............................................................................. 41
  Burst High and Low Control Limits ........................................... 41
Test Panel ..................................................................................... 41
TABLE OF CONTENTS (continued)

APPENDICES

APPENDIX A: SPECIAL TERMS ................................................................. App-1
APPENDIX B: SELF-TEST FUNCTION ....................................................... App-2
APPENDIX C: ADVANCED PID PROGRAMMING ..................................... App-3
APPENDIX D: BASIC TROUBLESHOOTING ........................................... App-5
APPENDIX E: MAINTENANCE AND SERVICE ......................................... App-8
APPENDIX F: WARRANTIES ................................................................. App-9
APPENDIX G: F100-2800-2 SPECIFICATIONS ....................................... App-10
APPENDIX H: COMPATIBLE CARLETON TEST FIXTURES .................. App-12
APPENDIX I: CONTACT INFORMATION ............................................... App-14
WARNINGS AND NOTICES

The following warnings are presented to ensure safe, efficient operation of the F100-2800-2 Multifunction Package Tester.

Warnings

This symbol indicates that failure to follow the warning could result in severe bodily injury and/or result in damage to the test equipment that will void the warranty.

- Use eye and ear protection 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.
- Rigid packages and/or package contents can become hazardous airborne projectiles. Personnel must be shielded from packages during testing.
- Exercise caution when using the Closed Package Test Fixture. The exposed needle probes are extremely sharp and can cause injury. When the START switch is pressed and the display shows PREFILL or TESTING, air is being fed to the needle probe assembly. To prevent self-injection with pressurized air, do not handle the needle probe during Prefill or Testing.
WARNINGS AND NOTICES (continued)

There are no user serviceable components or systems within the F100-2800-2 tester. The possibility of electric shock exists. Have all service performed by trained Carleton factory technicians.

Avoid testing packages containing fluids. Introduction of moisture through the pressure sensing line during testing will damage internal components and will void any warranty.

Avoid testing packages containing fluids. Introduction of moisture through the pressure sensing line during testing will damage the F100-2800-2 control console and will void any warranty.

The F100-2800-2 control console requires a clean, dry, oil-free air supply. The use of a contaminated air source may damage internal components and will void any warranty.
WARNINGS AND NOTICES (continued)

NOTICE

The F100-2800-2 Multifunction Package Tester runs on an Intel-based personal computer (PC). This PC has been fully tested for functionality prior to shipment. Because it is a PC, the user has the ability to “add to” or “subtract from” the “as delivered” PC configuration by installing personal software.

If any changes or additions to the PC by the user cause the function of the tester to malfunction, it is the responsibility of the user to find solutions to that malfunction.

Carleton Technologies does not, nor will not, provide a troubleshooting service for problems caused by altering the configuration or adding software to the “as delivered” system.

NOTICE

The proper operation of the F100-2800-2 Multifunction tester depends on the continuous application of power to the internal components. This device has been configured at the factory to run continuously.

Do not change the Power Save option in Microsoft Windows to allow the computer to go into Sleep Mode. If the computer is set up to go into Sleep Mode, the tester will become inoperable and will need to be shut down and restarted each time it goes into Sleep Mode.

The screen saver is set to activate after two hours of inactivity. The screen saver timer may be reset as desired.
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SECTION 1: SYSTEM SETUP

Inspect all shipping containers and equipment for damage that might have occurred during transport. Report any damage to the carrier.

UNPACKING YOUR NEW SYSTEM

Shipping Contents

- F100-2800-2 Seal Multifunction Package Tester (MPT)
- N.I.S.T. traceable Certificate of Calibration
- Operator’s Manual
- 110-volt power cord
- 3’ long, 1/4” diameter pressure Sensing Line tube with compression fittings
- 3’ long, 3/8” diameter Air to Fixture tube with compression fittings

Installing the Control Console

a. Unpack the unit from its shipping carton and packing material.

![WARNING]

Use proper lifting techniques when removing the unit from packaging. When possible, use team lifting and back support.

![NOTICE]

Save the shipping carton and packing material.

It was designed for maximum protection against undesirable impacts and rough handling. Use this reusable container to ship the console back to Carleton Technologies for calibration, service, or repairs. Carleton Technologies will not be responsible for damage to the console caused by inadequate packaging.
Installing the Control Console (continued)

b. Inspect the unit. If parts are missing, contact Test-A-Pack Systems.

c. For safety, place the console on a sturdy table capable of supporting the weight of the test console and test fixture. Reserve an area on the table for the selected test fixture. Connect the power cord to the receptacle at the rear of the tester. Plug the male end into a grounded receptacle no more than 6 feet away from the console. Refer to Figure 1.0 for unit placement.

d. Plug the female end of the AC power cord into the power entry module on the side panel of the console. Connect the other end to an appropriate 3-wire power receptacle, capable of supplying 100–240 VAC at 50/60 cycles per second (Hz).

---

**Figure 1.0: Unit Placement and Table Dimensions**

- **Wall**
- **Outlet**
- **Table**
- **Test Fixture**
- **Test Console**
- **Width of Table**: 24 in (0.61 m)
- **Length of Table**: 50 in (1.27 m)
- **Height of Table**: between 36 - 42 in (0.91 - 1.06 m)
- **Distance from wall to allow for service**: **distance from wall to allow for service**
- **Center test console and chamber on table**: **center test console and chamber on table**

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Other Test Fixtures

If a test fixture was ordered with the system, unpack the test fixture and inspect it for damage. If parts are missing, contact Test-A-Pack Systems. Save the packing materials for future use.
SETTING UP YOUR NEW SYSTEM

The F100-2800-2 Multifunction Package Tester is a fully operational personal computer (PC) with a 15" touch screen. The operating system is Windows 7. Two universal serial bus (USB) ports in the console’s side panel enable the use of customer-supplied keyboard and mouse. A CAT6 network connection is also located in the side panel of the console.

Pneumatic System Setup (Rear Panel)

The rear panel of the console is the point of interconnection for all system components (ref. Figure 2.0).

![Figure 2.0: Console Rear Panel]

**NOTE**

The compression fittings at the rear panel have been sealed to prevent leakage. Do not attempt to remove these fittings. The compression nuts for the compression fittings are not interchangeable with parts from other manufacturers. Use only Test-A-Pack replacement parts.

a. Insert one end of the 1/4” diameter pressure Sensing Line tube into the SENSING LINE fitting (ref. Figure 2.0). Tighten the compression nut hand tight. Then, using an appropriate wrench, tighten the nut an additional 1/2 turn only. This tube connects to the sensing port of an appropriate test fixture.
Pneumatic System Setup (Rear Panel) (continued)

c. Insert one end of the 3/8” diameter Air to Fixture tube into the AIR TO FIXTURE fitting (ref. Figure 2.0). Tighten the compression nut hand tight. Then, using an appropriate wrench, tighten the nut an additional 1/2 turn only. This connection delivers air from the console to the air delivery port of an appropriate test fixture.

d. Attach an air inlet fitting (not supplied) to the ¼ NPT bulkhead fitting marked AIR SUPPLY. Use Teflon™ tape to ensure ease of removal at a later date. If you wish to use the full capability of the tester, the inside diameter of the fitting should be no smaller than ¼ inch. Use a tube with an inside diameter greater than ¼ inch for optimum performance.

! CAUTION

The model F100-2800-2 console requires a clean, dry, oil-free air supply. The use of a contaminated air source may damage internal components and void the warranty.

e. Apply 70 to 100 PSI of clean, dry, oil-free air to the AIR SUPPLY fitting. Use of a 5-micron coalescing filter is recommended to remove water, oil, and particulate from the air supply.

Electrical System Setup (Side Panel)

85–264 Volts AC is applied to the unit through the switched power entry module. The module requires two 5 x 20 mm, 250-volt, 1-amp, time-delay fuses (included and preinstalled) for proper operation.

Connecting Other Testing Fixtures

Test-A-Pack test fixtures are designed to mate with the F100-2800-2 console via the console’s SENSING LINE and AIR TO FIXTURE line. The fittings on F100-1600 series open package testers and F100-1320 series closed package testers will need to be removed and replaced with compression-type fittings to make proper connections with the console. See the manual supplied with the test fixture for detailed installation instructions.

Installing a Local Printer

A “local printer” is a printer connected directly to the console. If your printer is a USB model, Windows should automatically detect it and begin installation when it is plugged in.

1. Click the Start button, and then, on the Start menu, click Devices and Printers.
2. Click Add a printer.
3. In the Add Printer wizard, click Add a local printer.
4. On the Choose a printer port page, click on the Use an existing port button, then click Next.
5. Select the printer manufacturer for your printer and then click Next.
Installing a Local Printer (continued)

6. Select the specific printer model for your printer and then click **Next**.
7. On the Install the printer driver page, select the printer manufacturer and model, and then click Next.
   - If your printer isn't listed, go to Windows **Update**, and then wait while Windows checks for additional drivers.
   - If none are available and you have the installation CD, click **Have Disk**, and then browse to the folder where the printer driver is located. (For additional help, consult the printer manual.)
8. Complete the additional steps in the wizard, and then click Finish.

If you are unsuccessful in adding your printer, contact your printer manufacturer for the proper printer drivers required for operation in a **Windows 7** environment.

**Test-A-Pack Systems does not offer support for printers other than the generic information supplied above.**

If you need assistance installing a printer, you may wish to access the Microsoft website: http://windows.microsoft.com/en-us/windows/install-printer#install-printer=windows-7

**Network Capability**

The Intel-based PC within the console is equipped to provide networking capability. Carleton Technologies does not offer networking service or application assistance regarding networking the F100-2800-2 system within the user’s systems.
SECTION 2: TEST DESCRIPTIONS

TEST MODE OVERVIEW

The F100-2800-2 console performs the following eight tests:

- Burst Test
- Creep Test
- Creep-to-Burst Test (dual test)
- Stepped Creep Test (two types)
- Mass Flow Test
- Mass Flow-to-Burst Test
- Pressure Decay Test
- Pressure Decay-to-Burst Test

**Burst Test**

The Burst Test pressurizes a package until it experiences a failure. The control console monitors internal package pressure, as well as stores and displays the peak pressure at the instant of burst.
Creep Test

The Creep Test measures the ability of a package to withstand constant pressure without experiencing a failure. The test is usually performed at a suggested starting pressure equal to 80% of the average Burst Test pressure, with a time duration set by the operator. If the package fails during the test, the control unit displays the pressure, time to failure, and a REJECT message.

Creep-to-Burst Test

The Creep-to-Burst test performs a Creep Test and upon completion of the Creep portion, immediately continues to perform a Burst Test.
Stepped Creep Test

The Stepped Creep Test allows the operator to observe the effects of pressurization of a package in equally measured steps with a defined hold time at each pressure. This test is also effective in measuring the performance of package seals as they are exposed to varying pressures until the seals fail.

Choose one of two test methods:

1. Select a pressure step size, a maximum pressure, and a Hold Time.

   Use the chart above for this example. If you set the step size at 10 in. H$_2$O, the maximum pressure at 30 in. H$_2$O, and the Hold Time to 20 seconds, the package would: Inflate from ambient to 10 in. H$_2$O, hold for 20 seconds, inflate to 20 in. H$_2$O, hold for 20 seconds, inflate to 30 in. H$_2$O, hold for 20 seconds, and then the test would end.

2. Select a number of steps, a maximum pressure and a Hold Time.

   Use the chart above for this example. If you set the number of steps to three, the maximum pressure at 36 in. H$_2$O, and the Hold Time to 10 seconds, the package would: Inflate from ambient to 12 in. H$_2$O, hold for 10 seconds, inflate to 24 in. H$_2$O, hold for 10 seconds, inflate to 36 in. H$_2$O, hold for 10 seconds, and then the test would end.
Mass Flow Test

A Mass Flow Test measures the amount of gas leaking out of a package when a constant pressure is maintained within the package. The operator sets a threshold flow value, which is the maximum leak allowable. The package inflates to the set pressure. The internal pressure is allowed to stabilize. If the mass flow out of the package is greater than the Mass Flow leak threshold set by the operator, the test stops and the data are saved.

Mass Flow-to-Burst Test

In a Mass Flow-to-Burst Test, if the flow does not exceed the Mass Flow Leak Threshold by the time the Hold timer times out, the package will begin to inflate until its seals fail.
A Pressure Decay Test measures the drop in pressure in a sealed package after it has been filled to a specific pressure. The operator sets a threshold pressure value, which is the maximum allowable drop in package pressure in a specified time. The package inflates to the set pressure. The internal pressure is allowed to stabilize and the package is monitored for a drop in internal pressure. If the pressure drop in the package is greater than the Pressure Decay Leak Threshold set by the operator, the test stops and the test result is saved.

In a Pressure Decay-to-Burst Test, if the pressure does not exceed the Pressure Decay Leak Threshold by the time the Hold timer times out, the package will begin to inflate until its seals fail.
SECTION 3: OPERATING INSTRUCTIONS

BURST TEST, INCLUDING GENERAL OPERATING INSTRUCTIONS

We will first set up a Burst Test, step by step, to become familiarized with the overall operation of the system.

Accessing the Test Screens

You can use the touch screen operator interface with on-screen keyboard for all of your setup and testing. You may wish to use a USB keyboard and mouse (not supplied), connected to the side panel of the console, to make setup and initialization quicker and easier.

- Turn on the AC power by pressing the rocker switch on the rear panel of the console.

- After the Windows operating system initializes, the main screen (above) appears.

- You can select any window or function by touching the screen or by using a mouse, whichever is more convenient.

**NOTE:** In this manual, “click” or “double-click” also means “touch” or “double-touch” when using the touch screen.
Entering a Password

To choose a test and set parameters for that test, you must enter a password.

- Click **Password** in the upper left corner of the screen, then click **Enter**.
- The ENTER PASSWORD pop-up box will appear. If you attached a USB keyboard (not supplied), type in the password.

**NOTE**: The factory-supplied password is TAP (all caps).

On-Screen Keypad

- If you do not have a USB keyboard, you can access an on-screen keyboard by clicking on the Keyboard icon in the lower right corner of the screen (see below).

- After you have entered the password, you are admitted to the test screens.
Changing the Password

You may change the password at any time to one of your choosing. First, enter your current password, then click Change. The following box appears:

Burst Test Setup Panel

Click Create New/Edit Test. The following Test Setup Panel appears:

- First, under Select Test to Run, click the white circle next to Burst.
- Next, under Test Setup Data, type in a test filename or use a barcode scanner to scan in a barcode string.
- Select the desired engineering units by clicking on the Pressure Units box. A list of available units will appear. Click the desired unit of measurement.
- Choose an appropriate Sensitivity. 1 is the most sensitive and 9 is the least sensitive. 1 is preferred in most cases. See Appendix A for more information about Sensitivity.
- Set your burst high and low control limits if desired. The High Limit is the highest acceptable burst pressure for the package under test. The Low Limit is the lowest acceptable burst pressure for the package under test.
Setting Optional Data Column Headers

The five Optional Data Column Headers are provided to more accurately identify test results. They become helpful when viewing test results data later. You may use any, all, or none.

- Click the CLR column to clear the names and values entered in the header after each test.

This feature is useful if multiple operators test the same product or if a bar code scanner is used to identify products to be tested.

Auto Start

If any Column Header CLR box is checked, the Auto Start function is enabled. By clicking on the Auto Start button, testing will automatically begin as soon as the information is manually entered or scanned into the last open header field.

Saving the Test Setup

After all of your test parameters and selections are entered, click Save and the following window appears:

- Click OK to generate a data file for this test and to save the setup information.
- If you click New, you will access a fresh screen, which will allow you to set up a new test.

The Load Button

- If you click Load, a window will appear, giving you access to all previously saved tests.

**NOTE:** You can save time in setting up a new test by selecting a previously saved test that uses the same parameters, and just renaming the test.
NOTE: After you run a test, that test name is reserved. The test and its parameters are no longer alterable, and the test name cannot be used again.

- From the Test Setup Panel, click the Home button to return to the menu screen.
- Click Password then click Clear to prevent unauthorized access to the test setup menu.

Selecting a Test to Run

- Click Run Test.

The File Select window appears. All saved tests are in this folder and are accessible through this window. As an alternative to setting up a new test, you can easily copy an existing test, rename it, and change the parameters.

- To select a test, scroll to and then highlight the desired test and then click OK or just double-click the test name.
Test Panel

The Test Panel for the selected test will appear.

The Test Panel shows all of the data you will save in the test data file. For this test example, the following will be saved in the test data file:

1. **Test Number**
2. Highest **Pressure** seen by the package under test
3. The **Test Time** - duration of the test
4. The **Operator** identifier header
5. The **Lot Number** of the package under test header
6. The **Box Number** header

**Filling In the Optional Data Column Header Fields**

The three Optional Data Column Headers that appear below were identified earlier during the test setup. The corresponding fields must be filled in before beginning a test. If you ignore filling in one or more of the Optional Data Column Header fields and attempt to run a test, the following box will appear:
Filling In the Optional Data Column Header Fields (continued)

The headers can be filled in by typing information into the left-side Header boxes in the Test Panel. After you have entered this information, it will shift into the right-side Header list.

The right side Header list is a drop-down menu that can contain the last 50 entries into the individual header boxes. Instead of typing in the information before each test, the operator can select often-used information just by selecting it from the drop-down menu. A barcode scanner can also be used to populate these fields.

Selecting a Previously Performed Test

The Previous Test drop-down menu on the Test Panel contains the last 10 tests performed. If an operator routinely switches between different tests, using this drop-down menu saves time by allowing the operator to quickly load any one of the 10 most recently saved tests without leaving the Test Panel.

Initiating a Test

- After all test information is entered, and a package is attached to an appropriate test fixture, click Run Test to initiate testing.

Burst Test Panel
Status Bar

The Status bar, located just below the graph on the Test Panel, indicates operation of the test as follows:

**Taring Sensor** – The ambient pressure sensor voltage is read immediately prior to applying pressure. This voltage is automatically subtracted from each reading for accuracy.

**Prefill** – During Prefill, the package will slowly fill to approximately 1 inch of water. If the package is large and the factory preset pressurization rate fails to fill the package in a reasonable time, the console will automatically increase flow to speed up the filling process. See Appendix A for more information about Prefill.

**Bleeding Down** – When the package is prefilled to one inch of water column, it is allowed to bleed down slightly before pressurizing the package.

**Pressurizing** – Air pressure is delivered to the package under test.

**Testing** – The package will fill automatically until the tester senses a drop in pressure. If a drop from the peak measured pressure exceeds the programmed **Sensitivity** pressure value (see Appendix A for more information about Sensitivity), the test will end and the TEST COMPLETE message appears:

![TEST COMPLETE]

When a test is complete, the test result and all of its associated test panel information is permanently stored in a database under the filename chosen during the test setup.
Anomaly Flag

If for some reason a test result includes some type of error, click the **Set Anomaly Flag** button. An asterisk will be placed in memory, at the end of the data line, to signal some type of test error.

Viewing Test Results

To view the test results for a specific filename, click **Home** then click **ReView Test Data**. A **File Select** window will open, showing all test result files currently in the database. Select the file you wish to view and click **OK**, or double-click your choice.

The **View Data** screen will appear.
Viewing Test Results (continued)

The test data file is displayed, along with the statistics for the test results.

Statistics are available only for tests that include upper and lower test limits.

The column headers are active buttons that will sort the column data numerically or alphabetically, depending on the type of data in the column.

Filtering Saved Data

If you click the Filter button on the View Data screen, the SET FILTER CRITERIA box will appear:

You can select specific data for display using this filtering tool. In the example shown, you can specify a range of dates and a range of times, for a test or a series of tests, for a specific operator, testing a specific lot. Only those tests that meet the filtering request will be displayed.

Click the Print button to send test results to your local printer.

Click Filter Off to restore the entire test file to the View Data window.

Click Show Graph(s) to generate two graphs (see below) based on the data file.
Viewing Graphs

Graph 1 shows a scatter chart of the Burst Pressure vs. Time-to-Burst for the selected data.

Graph 2 shows the Burst Pressures in the order of testing.

Generating a CSV File

If you click the Save as CSV File button on the View Data screen, you will generate a Comma Separated Value file. The default location for all CSV files is:

C:\Test A Pack\Test Data\CSV Data

These files can be directly imported into Microsoft Excel as shown in the example below.

![Image of a CSV file example]

Click Select File to view another data file.

Click Home to return to the main menu.
CREEP TEST

The Creep Test checks the seal strength of a package by filling a package to a specified pressure and holding that pressure constant for some appropriate length of time. This test shows the package seal’s ability to withstand constant stress over time. The usable range of the Creep Test is from 5 to 1383 inches of water column (0.18 to 50 PSI).

Creep Test Setup

- Click Create New/Edit Test.
- First, under Select Test to Run, click the white circle next to Creep.
- Next, under Test Setup Data, type in a test name or use a barcode scanner to scan in a barcode string.
- Select the desired engineering units by clicking on the Pressure Units box. A list of available units will appear. Click the desired unit of measurement.
- In the Set Pressure box, type the desired Creep Test Pressure.
- Choose an appropriate Sensitivity. 1 is the most sensitive and 9 is the least sensitive. 1 is preferred in most cases. See Appendix A for more information about Sensitivity.
- In the Hold Time box, type the desired time to allow any overshoot to subside.
- In the Test Time box, type the desired length of time that the package must remain at the stable set pressure.

The Optional Data Column Headers function as described in the Burst Test section.

Test Setup Panel
CREEP TEST (continued)

- After all of your test parameters and selections are entered, click **Save**.
- Click **OK** to generate a data file for this test and to save the setup information.
- Click **Home** to return to the menu screen.
- Click **Password** then click **Clear** to prevent unauthorized access to the test setup menu.

Click **Run Test**.

The **File Select** window appears.

- To select a test, scroll to and then highlight the desired test and then click **OK** or just double-click the test name.

The **Test Panel** for the Creep Test appears.

- Click **Run Test**.

**Test Panel**
CREEP TEST (continued)

The test begins immediately. The status bar indicates the progression of the test. When the package reaches the set pressure, **Hold Time** allows the package pressure time to stabilize. The programmed **Test Time** immediately follows the **Hold Time**. If the package remains intact throughout the entire Test Time, the **TEST COMPLETE** message appears:

![TEST COMPLETE](image)

The **TEST COMPLETE** message indicates that the package passed the test.

The **TEST LIMIT EXCEEDED** message indicates that either (A) seal creep caused a drop in package pressure below the **Sensitivity** value, or (B) the package burst.

![TEST LIMIT EXCEED](image)

The **TEST LIMIT EXCEEDED** message indicates a package failure.

When the test is complete, the test result and all of its associated test panel information is permanently stored in a database under the filename chosen during the test setup.

- If for some reason a test result includes some type of error, click the **Set Anomaly Flag** button. An asterisk will be placed in memory, at the end of the data line, to signal some type of test error.

If you wish to save a copy of the test screen when the test is complete, press or click the **PRINT PANEL** button.
STEPPED CREEP TEST

The Stepped Creep Test checks the seal strength of a package by filling a package to multiple discrete pressures, holding each pressure constant for some appropriate length of time. This test shows the package seal’s ability to withstand constant stress over time at increasing pressures. The operator can choose a pressure step size and a maximum pressure, or a maximum pressure and a number of steps.

Stepped Creep Test Setup

- Click Create New/Edit Test.
- First, under Select Test to Run, click the white circle next to Creep.
- Next, under Test Setup Data, type in a test name or use a barcode scanner to scan in a barcode string.
- Select the desired engineering units by clicking on the Pressure Units box. A list of available units will appear. Click the desired unit of measurement.
- Click the Stepped Creep Test box.

Test Setup Panel

If you wish to creep to specific pressure values, Select SPECIFY STEP PRESSURE.
- Enter the desired Step Pressure.
- Enter the Max. Pressure you wish to reach.

If you wish to creep a specific number of steps, Select SPECIFY NUMBER OF STEPS.
- Enter the desired No. of Steps.
- Enter the Max. Pressure you wish to reach.

- Choose an appropriate Sensitivity. 1 is the most sensitive and 9 is the least sensitive. 1 is preferred in most cases. See Appendix A for more information about Sensitivity.
STEPPED CREEP TEST (continued)

- In the Hold Time box, type the desired time to allow any overshoot to subside.
- In the Test Time box, type the desired length of time that the package must remain at the stable set pressure.

The Optional Data Column Headers function as described in the Burst Test section.

- After all of your test parameters and selections are entered, click Save.
- Click OK to generate a data file for this test and to save the setup information.
- Click Home to return to the menu screen.
- Click Password then click Clear to prevent unauthorized access to the test setup menu.
- Click Run Test.

The File Select window appears.

- To select a test, scroll to and then highlight the desired test and then click OK or just double-click the test name.

The Test Panel for the Stepped Creep Test appears.

- Click Run Test.

Test Panel

The test begins immediately. The status bar indicates the progression of the test. When the package reaches the set pressure, the Hold Time allows the package pressure time to stabilize. The programmed Test Time immediately follows the Hold Time.
STEPPED CREEP TEST (continued)

If the package remains intact during the entire Test Time, the TEST COMPLETE message appears:

![TEST COMPLETE](image)

The TEST COMPLETE message indicates that the package passed the test.

The TEST LIMIT EXCEEDED message indicates that either (A) seal creep caused a drop in package pressure below the *Sensitivity* value, or (B) the package burst.

![TEST LIMIT EXCEEDED](image)

The TEST LIMIT EXCEEDED message indicates a package failure.

When the test is complete, the test result and all of its associated test panel information is permanently stored in a database under the filename chosen during the test setup.

- If for some reason a test result includes some type of error, click the **Set Anomaly Flag** button. An asterisk will be placed in memory, at the end of the data line, to signal some type of test error.

If you wish to save a copy of the test screen when the test is complete, press or click the **PRINT PANEL** button.
CREEP-TO-BURST TEST

The Creep-to-Burst Test checks the seal strength of a package by filling a package to a specified pressure and holding that pressure constant for some appropriate length of time, immediately followed by pressurizing the package to burst. This test shows the package seal’s ability to withstand constant stress over time, as well as the overall seal strength after having undergone stress due to pressure. The usable range of the Creep-to-Burst Test is from 5 to 1383 inches of water column (0.18 to 50 PSI).

Creep-to-Burst Test Setup

- Click Create New/Edit Test.
- First, under Select Test to Run, click the white circle next to Creep To Burst.
- Next, under Test Setup Data, type in a test name or use a barcode scanner to scan in a barcode string.
- Select the desired engineering units by clicking on the Pressure Units box. A list of available units will appear. Click the desired unit of measurement.
- In the Set Pressure box, type the desired Creep Test Pressure.
- Choose an appropriate Sensitivity. 1 is the most sensitive and 9 is the least sensitive. 1 is preferred in most cases. See Appendix A for more information about Sensitivity.
- In the Hold Time box, type the desired time to allow any overshoot to subside.
- In the Test Time box, type the desired length of time that the package must remain at the stable set pressure.
- Set the upper and lower control limits if desired. The lower limit is the lowest acceptable burst pressure for the package under test. The high limit is the highest acceptable burst pressure for the package under test.

Test Setup Panel
CREEP-TO-BURST TEST (continued)

The Optional Data Column Headers function as described in the Burst Test section.

- After all of your test parameters and selections are entered, click **Save**.
- Click **OK** to generate a data file for this test and to save the setup information.
- Click **Home** to return to the menu screen.
- Click **Password** then click Clear to prevent unauthorized access to the test setup menu.
- Click **Run Test**.

The **File Select** window appears.

- To select a test, scroll to and then highlight the desired test and then click **OK** or just double-click the test name.

The **Test Panel** for the **Creep-to-Burst Test** appears.

- Click **Run Test**.

**Test Panel**

The test begins immediately. The status bar indicates the progression of the test. When the package reaches the set pressure, the **Hold Time** allows the package pressure time to stabilize. The programmed **Test Time** immediately follows the Hold Time. If the package remains intact during the entire Test Time, the package will inflate until the seal or material fails.
CREEP-TO-BURST TEST (continued)

If the package remained intact during the entire Creep portion of the test and continued into a Burst test, the TEST COMPLETE message appears:

![TEST COMPLETE]

The TEST COMPLETE message indicates that the package passed the Creep portion of the test and the pressure displayed on the test screen is the burst pressure of the package under test.

The TEST LIMIT EXCEEDED message indicates that either (A) seal creep caused a drop in package pressure below the Sensitivity value, or (B) the package burst before or during the creep portion of the test.

![TEST LIMIT EXCEED]

The TEST LIMIT EXCEEDED message indicates that the package failed during the Creep portion of the test.

When the test is complete, the test result and all of its associated test panel information is permanently stored in a database under the filename chosen during the test setup.

- If for some reason a test result includes some type of error, click the Set Anomaly Flag button. An asterisk will be placed in memory, at the end of the data line, to signal some type of test error.

If you wish to save a copy of the test screen when the test is complete, press or click the PRINT PANEL button.
MASS FLOW TEST

The Mass Flow Test combines a Creep Test and a Mass Flow Leak Test in one test. The test begins by filling a package to a specified pressure and holding that pressure constant for some appropriate length of time while checking for leaks in the package. The test pressure should be high enough to cause the package to become rigid with a constant volume. The pressure should not be so great as to cause the package material to stretch. The 200 cc mass flow sensor has a .05 cc resolution.

Mass Flow Test Setup

- Click Create New/Edit Test.
- First, under Select Test to Run, click the white circle next to Mass Flow.
- Next, under Test Setup Data, type in a test name or use a barcode scanner to scan in a barcode string.
- Select the desired engineering units by clicking on the Pressure Units box. A list of available units will appear. Click the desired unit of measurement.
- In the Set Pressure box, type the desired Creep Test Pressure.
- Choose an appropriate Sensitivity. 1 is the most sensitive and 9 is the least sensitive. 1 is preferred in most cases. See Appendix A for more information about Sensitivity.
- In the Hold Time box, type the desired time to allow any overshoot to subside.
- In the Stable Time box, type the desired time to allow any oscillation due to the closing of the isolation valves to subside.
- In the Test Time box, type the desired length of time that the package must remain at the stable set pressure.
- In the Flow Limit box, type the maximum allowable leak rate for the package under test.

Test Setup Panel
MASS FLOW TEST (continued)

The Optional Data Column Headers function as described in the Burst Test section.

- After all of your test parameters and selections are entered, click Save.
- Click OK to generate a data file for this test and to save the setup information.
- Click Home to return to the menu screen.
- Click Password then click Clear to prevent unauthorized access to the test setup menu.
- Click Run Test.

The File Select window appears.

- To select a test, scroll to and then highlight the desired test and then click OK or just double-click the test name.

The Test Panel for the Mass Flow Test appears.

- Click Run Test.

Test Panel

The test begins immediately. The status bar indicates the progression of the test. When the package reaches the set pressure, the Hold Time allows the package pressure time to eliminate overshoot. At this point, the fill circuit switches to send the air flow through the mass flow sensor. Next, the Stabilize Time is a delay that allows the mass flow sensor time to reach a stable temperature. The programmed Test Time immediately follows.
MASS FLOW TEST (continued)

If the package remains intact during the entire Test Time and the measured Mass Flow is less than the Flow Limit, the TEST COMPLETE message appears:

![TEST COMPLETE](image)

The TEST COMPLETE message indicates that the package passed the test.

The TEST LIMIT EXCEEDED message indicates that either (A) seal creep caused a drop in package pressure below the Sensitivity value, (B) mass flow measurement exceeded the entered Flow Limit value, or (C) the package burst.

![TEST LIMIT EXCEED](image)

The TEST LIMIT EXCEEDED message indicates a package failure.

When the test is complete, the test result and all of its associated test panel information is permanently stored in a database under the filename chosen during the test setup.

- If for some reason a test result includes some type of error, click the Set Anomaly Flag button. An asterisk will be placed in memory, at the end of the data line, to signal some type of test error.

If you wish to save a copy of the test screen when the test is complete, press or click the PRINT PANEL button.
MASS FLOW-TO-BURST TEST

The Mass Flow-to-Burst Test combines a Burst Test, Creep Test, and Mass Flow Leak Test in one test. The test begins by filling a package to a specified pressure and holding that pressure constant for some appropriate length of time while checking for leaks in the package. The test pressure should be high enough to cause the package to become rigid with a constant volume. The pressure should not be so great as to cause the package material to stretch. The 200 cc mass flow sensor has a .05 cc resolution. After if the package passes the Mass Flow Test, the tester automatically inflates the package until the seals burst.

Mass Flow-to-Burst Test Setup

- Click Create New/Edit Test.
- First, under Select Test to Run, click the white circle next to Mass Flow-to-Burst.
- Next, under Test Setup Data, type in a test name or use a barcode scanner to scan in a barcode string.
- Select the desired engineering units by clicking on the Pressure Units box. A list of available units will appear. Click the desired unit of measurement.
- In the Set Pressure box, type the desired Creep Test Pressure.
- Choose an appropriate Sensitivity. 1 is the most sensitive and 9 is the least sensitive. 1 is preferred in most cases. See Appendix A for more information about Sensitivity.
- In the Hold Time box, type the desired time to allow any overshoot to subside.
- In the Stable Time box, type the desired time to allow any oscillation due to the closing of the isolation valves to subside.

Test Setup Panel
MASS FLOW-TO-BURST TEST (continued)

- In the Test Time box, type the desired length of time that the package must remain at the stable set pressure.
- In the Flow Limit box, type the maximum allowable leak rate for the package under test.
- Set your burst high and low control limits if desired. The Burst High Limit is the highest acceptable burst pressure for the package under test. The Burst Low Limit is the lowest acceptable burst pressure for the package under test.
- If the Continue to Run Burst Test on Failure box is checked, the burst portion of the test will run, even if the package fails the leak test.

The Optional Data Column Headers function as described in the Burst Test section.

- After all of your test parameters and selections are entered, click Save.
- Click OK to generate a data file for this test and to save the setup information.
- Click Home to return to the menu screen.
- Click Password then click Clear to prevent unauthorized access to the test setup menu.
- Click Run Test.

The File Select window appears.

- To select a test, scroll to and then highlight the desired test and then click OK or just double-click the test name.

The Test Panel for the Mass Flow Test appears.

- Click Run Test.
MASS FLOW-TO-BURST TEST (continued)

The test begins immediately. The status bar indicates the progression of the test. When the package reaches the set pressure, **Hold Time** allows the package pressure time to reduce overshoot. At this point, the fill circuit switches to send the air flow through the Mass Flow sensor.

Next, the **Stabilize Time** is a delay which allows the mass flow sensor time to reach a stable temperature. The programmed **Test Time** immediately follows.

If the package remained intact during the entire Mass Flow portion of the test and continued into a Burst test, the TEST COMPLETE message appears:

![TEST COMPLETE](image)

The TEST COMPLETE message indicates that the package passed the Mass Flow portion of the test and the pressure displayed on the test screen is the burst pressure of the package under test.

The TEST LIMIT EXCEEDED message indicates that either (A) seal creep caused a drop in package pressure below the **Sensitivity** value, (B) mass flow measurement exceeded the entered **Flow Limit** value, or (C) the package burst before or during the mass flow portion of the test.

![TEST LIMIT EXCEED](image)

The TEST LIMIT EXCEEDED message indicates that the package failed before or during the Mass Flow portion of the test.

When the test is complete, the test result and all of its associated test panel information is permanently stored in a database under the filename chosen during the test setup.

- If for some reason a test result includes some type of error, click the **Set Anomaly Flag** button. An asterisk will be placed in memory, at the end of the data line, to signal some type of test error.

If you wish to save a copy of the test screen when the test is complete, press or click the **PRINT PANEL** button.
PRESSURE DECAY TEST

The Pressure Decay Test combines a Creep Test and a Pressure Decay Test in one continuous test. The test begins by filling a package to a specified pressure and holding that pressure constant for some appropriate length of time while checking for leaks in the package. The test pressure should be high enough to cause the package to become rigid with a constant volume. The pressure should not be so great as to cause the package material to stretch. The leak detection sensor has a .04 in.H2O resolution.

Pressure Decay Test Setup

- Click Create New/ Edit Test.
- First, under Select Test to Run, click the white circle next to Pressure Decay.
- Next, under Test Setup Data, type in a test name or use a barcode scanner to scan in a barcode string.
- Select the desired engineering units by clicking on the Pressure Units box. A list of available units will appear. Click the desired unit of measurement.
- In the Set Pressure box, type the desired Creep Test Pressure.
- Choose an appropriate Sensitivity. 1 is the most sensitive and 9 is the least sensitive. 1 is preferred in most cases. See Appendix A for more information about Sensitivity.
- In the Hold Time box, type the desired time to allow any overshoot to subside.
- In the Stable Time box, type the desired time to allow any oscillation due to the closing of the isolation valves to subside.
- In the Test Time box, type the desired length of time that the package must remain at the stable set pressure.
- In the Decay Limit box, type the maximum allowable pressure drop for the package under test.

Test Setup Panel
PRESSURE DECAY TEST (continued)

The Optional Data Column Headers function as described in the Burst Test section.

- After all of your test parameters and selections are entered, click Save.
- Click OK to generate a data file for this test and to save the setup information.
- Click Home to return to the menu screen.
- Click Password then click Clear to prevent unauthorized access to the test setup menu.
- Click Run Test.

The File Select window appears.

- To select a test, scroll to and then highlight the desired test and then click OK or just double-click the test name.

The Test Panel for the Pressure Decay Test appears.

- Click Run Test.

The test begins immediately. The status bar indicates the progression of the test. When the package reaches the set pressure, the Hold Time allows the package pressure time eliminate overshoot. At this point, the fill circuit switches to send the air flow through the mass flow sensor. Next, the Stabilize Time is a delay which allows the mass flow sensor time to reach a stable temperature. The programmed Test Time immediately follows.
PRESSURE DECAY TEST (continued)

If the package remains intact during the entire Test Time and the measured pressure decay is less than the Decay Limit, the TEST COMPLETE message appears:

![TEST COMPLETE](image1)

The TEST COMPLETE message indicates that the package passed the test.

The TEST LIMIT EXCEEDED message indicates that either (A) seal creep caused a drop in package pressure below the Sensitivity value, (B) Pressure Decay exceeded the entered Decay Limit, or (C) the package burst.

![TEST LIMIT EXCEEDED](image2)

The TEST LIMIT EXCEEDED message indicates a package failure.

When the test is complete, the test result and all of its associated test panel information is permanently stored in a database under the filename chosen during the test setup.

- If for some reason a test result includes some type of error, click the Set Anomaly Flag button. An asterisk will be placed in memory, at the end of the data line, to signal some type of test error.

If you wish to save a copy of the test screen when the test is complete, press or click the PRINT PANEL button.
PRESSURE DECAY-TO-BURST TEST

The Pressure Decay-to-Burst Test combines a Burst test, Creep Test and a Pressure Decay Leak Test in one test. The test begins by filling a package to a specified pressure and holding that pressure constant for some appropriate length of time while checking for leaks in the package. The test pressure should be high enough to cause the package to become rigid with a constant volume. The pressure should not be so great as to cause the package material to stretch. The 5 PSI Pressure Decay sensor has a .001 PSI resolution. After if the package completes the Pressure Decay portion of the test, the tester automatically inflates the package until the seal or the material fails.

Pressure Decay-to-Burst Test Setup

- Click Create New/Edit Test
- First, under Select Test to Run, click the white circle next to Pressure Decay-to-Burst.
- Next, under Test Setup Data, type in a test name or use a barcode scanner to scan in a barcode string.
- Select the desired engineering units by clicking on the Pressure Units box. A list of available units will appear. Click the desired unit of measurement.
- In the Set Pressure box, type the desired Set Pressure.
- Choose an appropriate Sensitivity. 1 is the most sensitive and 9 is the least sensitive. 1 is preferred in most cases. See Appendix A for more information about Sensitivity.

Test Setup Panel
PRESSURE DECAY-TO-BURST TEST (continued)

- In the Hold Time box, type the desired time to allow any overshoot to subside.
- In the Stable Time box, type the desired time to allow any oscillation due to the closing of the isolation valves to subside.
- In the Test Time box, type the desired length of time that the package must remain at the stable set pressure.
- In the Decay Limit box, type the maximum allowable leak rate for the package under test.
- Set your burst high and low control limits if desired. The Burst High Limit is the highest acceptable burst pressure for the package under test. The Burst Low Limit is the lowest acceptable burst pressure for the package under test.

The Optional Data Column Headers function as described in the Burst Test section.

- After all of your test parameters and selections are entered, click Save.
- Click OK to generate a data file for this test and to save the setup information.
- Click Home to return to the menu screen.
- Click Password then click Clear to prevent unauthorized access to the test setup menu.
- Click Run Test.

The File Select window appears.

- To select a test, scroll to and then highlight the desired test and then click OK or just double-click the test name.

The Test Panel for the Pressure Decay-to-Burst Test appears.

- Click Run Test.
PRESSURE DECAY-TO-BURST TEST (continued)

The test begins immediately. The status bar indicates the progression of the test. When the package reaches the set pressure, the Hold Time allows the package pressure time to eliminate overshoot. At this point, the fill circuit switches to send the air flow through the mass flow sensor.

Stabilize Time is a delay which allows the pressure decay sensor time to reach a stable pressure. After isolation valves are closed. The programmed Test Time immediately follows.

If the package remains intact during the entire pressure decay portion of the test and continued to pressurize the package until its seals failed in the Burst portion of the test, the TEST COMPLETE message appears:

![TEST COMPLETE](image1)

The TEST COMPLETE message indicates that the package passed the Pressure Decay portion of the test and the pressure displayed on the test screen is the burst pressure of the package under test.

The TEST LIMIT EXCEEDED message indicates that either (A) seal creep caused a drop in package pressure below the Sensitivity value, (B) Pressure Decay exceeded the entered Decay Limit, or (C) the package burst before or during the pressure decay portion of the test.

![TEST LIMIT EXCEEDED](image2)

The TEST LIMIT EXCEEDED message indicates a package failure before or during the Pressure Decay portion of the test.

When the test is complete, the test result and all of its associated test panel information is permanently stored in a database under the filename chosen during the test setup.

- If for some reason a test result includes some type of error, click the Set Anomaly Flag button. An asterisk will be placed in memory, at the end of the data line, to signal some type of test error.

If you wish to save a copy of the test screen when the test is complete, press or click the PRINT PANEL button.
APPENDIX A: SPECIAL TERMS

PREFILL

As the package fills with air, there is virtually no internal pressure until the package volume increases to maximum. A rigid package is always at its maximum volume. Adding air to a rigid package will immediately cause pressure to build up.

A flexible-membrane pouch, however, will increase in volume as air is introduced; at first, it is flat, with no internal volume. As air enters, the volume increases. Internal pressure is negligible until the package balloons to its rigid size. After the package becomes rigid, pressure rises quickly. The Prefill function of the F100-2800-2 system slowly fills the package with air until the system senses that the package is rigid (approximately 1 in.H_2O [0.04 PSI] of pressure). When the package becomes rigid, the system stops the Prefill function, resets the fill regulator by shutting it off, and begins to pressurize the package for testing.

SENSITIVITY

The F100-2800-2 system cannot tell if a package physically bursts; it can only measure pressure. If package pressure is rising, the system assumes that the package is intact. Conversely, if package pressure begins to fall as the system continually delivers more air, the system assumes that this drop in pressure is caused by air escaping through a failed seal. The system needs some indication of how far the pressure must fall to stop the test. To set this criterion for a package failure, the operator selects a Sensitivity value. The operator-selectable Sensitivity values range from 1 to 9. Each Sensitivity value is a multiple of 4 in.H_2O. A Sensitivity value of 1 = 4 in. H_2O; 2 = 8 in. H_2O; 3 = 9 in.H_2O; and so forth.

Only when the package pressure exceeds the pressure equal to the Sensitivity setting, can a test begin. As an example, assume that Sensitivity is set to 1, which equals 4 in.H_2O. The package must first reach at least 4 in.H_2O before it can fall 4 in.H_2O. A Sensitivity setting of 9 would require that the package pressure must reach at least 36 in.H_2O to fall 36 in.H_2O. If a pressure drop exceeds the Sensitivity value programmed during the test setup, the test will end. In most cases, pressure drop occurs when the package seal fails. As an example, if Sensitivity was set to 1, the package pressure peaked at 100 in.H_2O, and then the package’s seal began to fail, the test would end as soon as the package pressure fell below 96 in.H_2O (100 in.H_2O minus 4 in.H_2O).

Some packages will experience a “creep effect” along the seal. “Creep” occurs when the seal begins to fail along the inner seal perimeter, without fully breaking the seal. When “creep” occurs, the internal volume of the package increases slightly. This slight increase in volume can—and often will—cause the internal package pressure to drop enough to terminate the test without a seal burst. To overcome such a scenario, increase the Sensitivity to accommodate seal creep.
APPENDIX B: SELF-TEST FUNCTION

The F100-2800-2 system includes a self-test function that checks for internal leaks. The self-test function also sets the starting voltage for all tests, so it can detect if voltage settings drift over time.

The self-test function verifies the system’s ability to perform tests, as shown in the box below.

To start the self-test:

- Click Run Self Test on the Self Test screen (above).
- Make sure that the AIR TO FIXTURE port is open to the atmosphere (ambient air).
- Click the Continue button.

The self-test will automatically step through all system tests.

If any of the self-test steps fail, make sure that the AIR TO FIXTURE port (3/8 inch poly tube) is open to ambient and try the self-test again.

CAUTION

If the system fails again, contact Test-a-Pack Systems. Do not attempt to repair anything internally. Internal components are not user-serviceable. All pneumatic components are sealed with a thread-locking adhesive to prevent leaks. Improper installation of pneumatic or electronic components may cause unreliable test results and significant damage to the system.
APPENDIX C: ADVANCED PID PROGRAMMING

CAUTION

The information in this Appendix should be used only by persons with knowledge of, and experience with, PID pressure controllers. Improper use of PID programming may cause system malfunction.

The F100-2800-2 system is operated by a Proportional-Integral-Derivative (PID) controller, which adjusts the delivery of pressure to the package under test.

The system has been designed to provide the optimum PID variables for different pressure ranges for each type of test offered. A pre-determined set of variables is used for dual tests such as the Creep-to-Burst Test.

However, Carleton has enabled adjustable PID variables to facilitate the satisfaction of unique customer requirements.

To adjust the PID variables:

- Enter Password to access a Test Setup Panel.
- Set up or load a test.

From the Test Panel, click the View PID Values button (see below):
APPENDIX C: ADVANCED PID PROGRAMMING (continued)

The following window will appear:

Adjust each of the three variables by using the scroll buttons or by directly entering data. The variables do not need to be saved until you find a combination that works for your application. After you save the new variables, they will be available each time you open that individual test file. The new variables will not affect any other test type or any other saved test files.

If, after you have saved a set of PID variables, you decide to fine tune one of the variables to further fine tune the PID loop, but then some time later you find you wish to go back to the previous set of variables, click **Restore** to reinstall the last saved set of variables.

If your new PID control loop simply does not work and inflation performance has deteriorated, click **Set To Factory Values** to reset all PID variables to the original factory settings.

For dual tests, like the Creep-to-Burst test below, there are two sets of PID values: One for the Creep portion of the test, and the other for the Burst portion of the test.
APPENDIX D: BASIC TROUBLESHOOTING

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>There are no user serviceable components or systems within the console.</strong> Breaking the calibration seal and opening the console voids the calibration and will also void any written or implied warranty.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All fittings, valves, and pneumatic components within the console have been assembled using a permanent sealing material to prevent internal leaks. If loosened or removed, leakage will result. Do not disassemble the pneumatics within the console or the two compression fittings on the back of the console.</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The system cannot be calibrated by the customer.</strong></td>
</tr>
</tbody>
</table>

The four sensors within the F100-2800-2 console are electronically calibrated. The system’s calibration program is embedded inside the console and only “talks” to a dedicated Carleton test stand, which controls the pressures and flows measured during calibration.

The F100-2800-2 system must be returned to Carleton Technologies Test-A-Pack Systems (ref. Appendix I) whenever calibration or service is needed.

**Problem Situations**

**The unit will not turn on**

- Verify that the switch on the power entry module is in the **ON** position.
- Check that voltage is available at the wall socket.
- Verify that the power cord is firmly connected to both the wall socket and the console’s power entry module.
- Try using a different power cord.
- Check that fan at the rear of the console is operating.

**The fan is not operating**

- Unplug the power cord from the console.
- Using a small-blade screwdriver, insert the blade behind the small tab in the fuse drawer on the power entry module and gently pry open the fuse drawer.
APPENDIX D: BASIC TROUBLESHOOTING (continued)

The fan is not operating (continued)

- Using an Ohmmeter, make sure that both fuses have continuity through them.
- If either or both fuses show no continuity, replace them with 1-amp, 250-volt, time-delay fuses.
- Reconnect the power cord and check the fan and console screen for proper operation.
- If the unit does not operate, contact Carleton Technologies, Test-A-Pack Systems (ref. Appendix I).

The console is operational but will not perform a simple Burst Test

- Verify that the AIR SUPPLY tube is delivering between 70 and 100 PSI (6.7 to 9.6 MPa) to the console.
- Check that the sensing tube and air delivery tubes are securely fastened to the system and the test fixture.
- Verify that the system is not in the Power Save Sleep Mode by turning off the system, waiting 10 seconds, then turning the system back on.
- Try running a simple Burst Test. If the system works, contact your company’s information technology (IT) department to check that the computer’s Power Save Plan is set to Balanced and the “Put the computer to sleep” option is set to Never, as shown below.

![Change settings for the plan: Balanced](image)

If the system still will not perform a proper Burst Test:

- Run the Self-Test function from the console’s main screen.

If the Self-Test function fails, the system requires service. Contact Carleton Technologies, Test-A-Pack Systems (ref. Appendix I).

If the system passes the Self-Test, try running a Burst Test.

If the Burst Test does not work, the system requires service. Contact Carleton Technologies, Test-A-Pack Systems (ref. Appendix I).
APPENDIX D: BASIC TROUBLESHOOTING (continued)

Air is not filling the test package

- Check that the factory air supply is turned on.
- Check that the factory air supply is connected to the AIR SUPPLY port at the back of the console.
- Check that the sensing tube and air delivery tubes are properly attached to the console and the test fixture.
- Run the Self-Test function from the console’s main screen.

During a Burst Test, the burst pressure values begin to lower and may eventually go to zero, even though the package fills and bursts

This is a common problem associated with using the F100-1320 series of Closed Package Test Fixtures. The problem is caused by material that plugs the sensing needle on the double-needle manifold or the sensing port on the large needle.

- Use a small, stiff wire to clean out the interior of the small needle on the double-needle manifold.
- Clean the needles by filling the sensing tube with water and using an air gun to force the water through the needles until a steady stream of water comes out of the needle.
- Follow the same procedure if using the large single-needle probe. Do not use a wire to clean this sensing port.
APPENDIX E: MAINTENANCE AND SERVICE

Cleaning

Do not use any harsh chemicals to clean the F100-2800-2 system or its fixtures. Use only a soft cloth or sponge dampened with water and a mild detergent. Use of any other chemicals or solvents could damage the exterior of the unit.

Service

The electrical fuses in the power module are the only user-serviceable parts within the F100-2800-2 control console. In the unlikely event that these 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 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 Carleton service technician. Any work performed by a non–factory authorized service technician will void the warranty and our certificate of calibration, and can place the operator of the unit in physical danger due to the potential of electric shock.

Calibration

The F100-2800-2 system must be returned to the factory annually for calibration/service. The calibration of the system is performed electronically by a computer-controlled automated test stand whose functionality cannot be duplicated in the field. The calibration windows for the four internal sensors are “read only” for the operator’s information. The clock used for measuring the test duration cannot be calibrated; it is the internal PC’s clock.

CAUTION

Never apply direct pressure to the sensing line fitting.
Applying direct pressure to the sensing line fitting will damage the flow sensor and the differential sensors within.

There are no user serviceable components within the console.
Breaking the calibration seal and opening the console voids the calibration and will also void any written or implied warranty.
APPENDIX F: WARRANTIES

A) Carleton Technologies Inc. (Carleton, CTI) warrants that each item of its manufacture is free from defects in material and workmanship at the date of shipment. This warranty shall not apply to any parts or parts supplied to but not manufactured by Carleton. As to such parts, Carleton agrees to purchase the same from a reputable supplier and to assign to its customer whatever right Carleton may have under warranties.

B) CTI's obligation under this warranty is limited to replacing or repairing a control console which within (12) twelve months from either the date of shipment or the date of assignment to storage at Buyer's request, whichever first occurs, is proven by Carleton Inspection to have been defective at the time of shipment. Warranty for any Test-A-Pack fixture is 90 days. A defect in a component of any unit shall not, when that component is capable of repair or replacement, operate to require replacement of the entire unit. As a condition of this warranty, Buyer shall notify Carleton in writing of any claimed defect immediately upon discovery and shall return the item, transportation prepaid, to Carleton for inspection. However, the Buyer is responsible for damages during shipment to and from Carleton and is also responsible for transportation charges of return shipment. Carleton shall not provide uncompensated field service under this warranty and no allowance will be made for repairs or alterations. Carleton shall not be responsible for work or repairs performed which are not performed either by Carleton employees or by personnel expressly authorized by Carleton to perform the particular work or repair. This assembly by anyone other than personnel authorized by Carleton shall, at the option of Carleton, void the terms of this warranty.

C) Unless Carleton is contractually obligated to provide installation assistance, proper installation and checkout shall be the sole responsibility of the Buyer.

D) The warranties provided under this agreement shall be void as to any equipment or accessories which, in the opinion of Carleton, have been abused or subjected to abnormal use or for which Carleton factory representatives are denied free and safe access.

E) CTI shall not be liable for improper use, installation, operation, or maintenance of items manufactured by Carleton, nor for any damage resulting from improper use, installation, operation or maintenance, or from the failure of Buyer to fulfill the instructions or recommendations contained in the Carleton installation, maintenance and/or operations manuals. In addition, Carleton shall not be responsible for any damages or loss of production or profits, damage to product or economy of operation, damage to tools or work pieces, or any other consequential or incidental damages occasioned by defects in or failure of any goods supplied by Carleton, or by defects in or failure of any product in which a component manufactured by Carleton is incorporated.

F) Carleton shall not be responsible for the performance of any product which incorporates component parts manufactured by Carleton unless such performance is expressly designated as Carleton's responsibility under the terms of the written agreement between Carleton and the Buyer.

G) Carleton shall not be responsible for any defect arising from or related to any specification, design, or design change requested by the Buyer.

H) THE WARRANTIES CONTAINED HEREIN ARE EXCLUSIVE AND ARE GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.
APPENDIX G: F100-2800-2 SPECIFICATIONS

- **Length**: 18.0 inches (457 mm)
- **Width**: 16 inches (406 mm)
- **Height**: 12.5 inches (318 mm)
- **Weight**: 44 lb (20 kg)

- **Communication Ports**: 2 – USB 2.0
- **Networking Port**: 1 – CAT-6
- **Operating System**: Windows 7
- **Optical Drive**: DVD R/W

- **Air Source**: 70 psi (483 kPa) (min.)
  100 psi (689 kPa) (max.)

- **Air Quality**: Instrument Quality, Dry, Uncontaminated (no vapor, water, solids)

- **AC Line Power**: 85 to 264 volts
  47 to 63 Hz

- **Fuses**: Two: 5 x 20mm, 250 volt, 1 amp, time-delay

- **Operating Temperature**: 60° to 110° F (5° to 43° C)
- **Storage Temperature**: 0° to 125° F (-17° to 51° C)
- **Relative Humidity**: 90% (max.)

- **Units of Measure**: Inches of water (in.H₂O)
  Pounds per square inch (PSI)
  Centimeters of water (cm.H₂O)
  Kilo Pascal (kPa) (metric pressure)

- **Timer Range**: 0 to 999999.9 seconds

- **Pressure Reading Resolution**: Within ± .2% full scale

- **Pressure Testing Range**: 5 in.H₂O to 50.0 PSI

- **Creep Test Stabilization**: Target Pressure ± 1.0 in.H₂O

<table>
<thead>
<tr>
<th>Burst Sensitivity Levels (max. to min.)</th>
<th>Package Pressure Decrease (in.H₂O)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>7</td>
<td>28</td>
</tr>
<tr>
<td>8</td>
<td>32</td>
</tr>
<tr>
<td>9</td>
<td>36</td>
</tr>
</tbody>
</table>
## APPENDIX G: F100-2800-2 SPECIFICATIONS (continued)

Minimum and maximum Burst and Creep values:

<table>
<thead>
<tr>
<th>Units</th>
<th>Minimum Value</th>
<th>Maximum Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSI</td>
<td>0.2</td>
<td>50</td>
</tr>
<tr>
<td>ATM</td>
<td>0.02</td>
<td>3.4</td>
</tr>
<tr>
<td>BAR</td>
<td>0.02</td>
<td>3.45</td>
</tr>
<tr>
<td>Mbar</td>
<td>13</td>
<td>3447</td>
</tr>
<tr>
<td>kPa</td>
<td>1.25</td>
<td>344</td>
</tr>
<tr>
<td>mmHg</td>
<td>10</td>
<td>2585</td>
</tr>
<tr>
<td>Torr</td>
<td>10</td>
<td>2585</td>
</tr>
<tr>
<td>in. H2O</td>
<td>5</td>
<td>1384</td>
</tr>
</tbody>
</table>

Minimum and maximum Pressure Decay values:

<table>
<thead>
<tr>
<th>Units</th>
<th>Minimum Value</th>
<th>Maximum Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSI</td>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td>ATM</td>
<td>0</td>
<td>.340</td>
</tr>
<tr>
<td>BAR</td>
<td>0</td>
<td>.340</td>
</tr>
<tr>
<td>Mbar</td>
<td>0</td>
<td>344</td>
</tr>
<tr>
<td>kPa</td>
<td>0</td>
<td>34.4</td>
</tr>
<tr>
<td>mmHg</td>
<td>0</td>
<td>258.5</td>
</tr>
<tr>
<td>Torr</td>
<td>0</td>
<td>258.5</td>
</tr>
<tr>
<td>in. H2O</td>
<td>0</td>
<td>138</td>
</tr>
</tbody>
</table>
APPENDIX H: COMPATIBLE CARLETON TEST FIXTURES

The following items may be used with the F100-2800-2 Multifunction Package Tester. Pricing and availability are available from:

CARLETON TECHNOLOGIES, INC.
10 Cobham Drive
Orchard Park, NY 14127-4195
www.cobham.com/orchardpark/test-a-pack.aspx

Open Package Test Fixtures:
F100-1800-1  12” Open package test fixture for leak testing
F100-1600-2  24” Open package test fixture
F100-1600-3  12” Open package test fixture
F100-1600-4  40” Custom open package test fixture

Closed Package Test Fixtures:
F100-1320-4  6 ½” Maximum height- 3/16” needle probe
F100-1320-5  14” Maximum height- 3/16” needle probe
F100-1320-6  6 ½” Maximum height- double-needle probe (for small packages)

Restraining Plates: For packages up to 14” wide x 20” long
F100-1750-1  For closed packages with a 0.25–2 inch variable gap
F100-1750-2  For open packages with a 0.25–2 inch variable gap
F100-1750-3  For closed packages with a 1–3 inch variable gap

PRODUCT DESCRIPTIONS

F100-1600 Open Package Test Fixture

The F100-1600 Open Package Test Fixtures can be used with the F100-2600-3 Test-A-Pack Automatic Control Console or with the Test-A-Pack F100-2800-2 Multifunction Package Tester when leak testing is not an issue. The F100-1600 Open Package Test Fixtures provide a quick and convenient method to retain and test open-ended porous or non-porous pouches. Model F100-1600-3 is used to test pouches up to 12 inches wide. Model F100-1600-2 will accommodate pouches up to 24 inches wide.
F100-1800 Open Package Test Fixture

The F100-1800-1 Pneumatic Open Package Test Fixture is a leak-proof test fixture designed for use with the Test-A-Pack F100-2800 Multifunction Package Tester or with the Test-A-Pack F100-2600-3 Seal Strength Tester. The F100-1800 provides a quick and convenient method to clamp and hold open-ended pouches up to twelve inches wide without the possibility of having the package pull out of the fixture. This easy to-use fixture ensures worry-free Burst, Creep, and Creep-to-Burst testing of porous or non-porous packages. It has a patented feature that forms a leak-proof clamp seal for leak testing open, non-porous, flexible pouches, when used with the F100-2800 Multifunction Package Tester.

F100-1320 Closed Package Test Fixture

The Closed Package Test Fixture provides a quick and convenient method to retain and test sealed porous or non-porous pouches, lidded trays, and containers. Two standard needle assemblies are available. The 3/16 inch diameter single-needle assembly is used to test medium-to-large packages. The double-needle assembly is used to test smaller packages.

F100-1750 Package Restraining Plate Test Fixture

The F100-1750-1 Closed Package Restraining Plate Fixture design minimizes deformation of a package under test. This Carleton product affords the operator less variation in test results by virtually eliminating gross package deformation as a variable.
APPENDIX I: CONTACT INFORMATION

Test-A-Pack Systems
Carleton Technologies Inc.
10 Cobham Drive
Orchard Park, NY 14127

Phone: 1-888-TAP-PACK (1-888-827-7225)
Or
716-662-0006

Fax: 716-662-0747