



# PPT3000™

**PACKAGING PRESSURE TESTER**

**NEXT GENERATION PRESSURE TESTER**



Test plastic bottles and similar products for pressure and expansion

Predict  $O_2$  or  $CO_2$  shelf-life of PET containers

Simulate filling process pressurization

Perform dome tests on aluminum bottles per industry protocol

Monitor temperature for volume expansion and burst tests

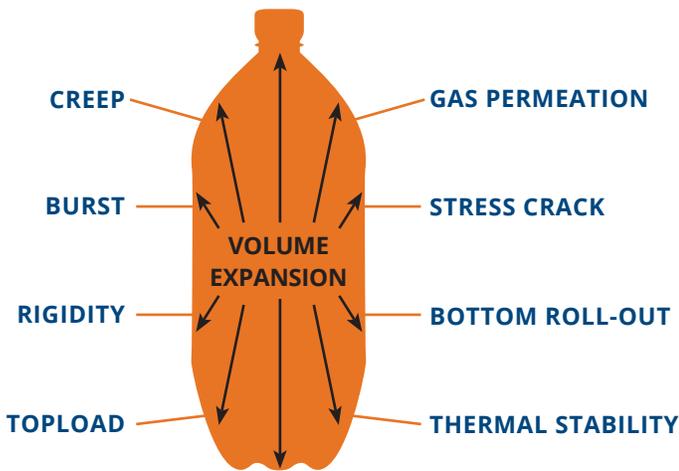
# PPT3000

The PPT3000™ Packaging Pressure Tester offers high-resolution, servo-controlled pressure and volume expansion testing for plastic and related containers, with the versatility to perform a number of industry standard and custom test profiles. Optional fixtures are available for aluminum bottle dome testing as well as other package applications. The PPT 3000™ test system can be used in the laboratory or alongside manufacturing lines to verify that containers meet packaging industry specifications.

## VALUABLE PROCESS TOOL FOR PET CONTAINER PRODUCTION

The PPT3000™ is a critical process tool for the management of PET container production, given the relationship of volume expansion to key container performance variables including creep, gas permeation, burst, stress cracks, rigidity, bottom roll-out, topload and thermal stability.

## KEY PET CONTAINER PERFORMANCE FACTORS AFFECTED BY VOLUME EXPANSION



## EASY-TO-USE OPERATOR INTERFACE

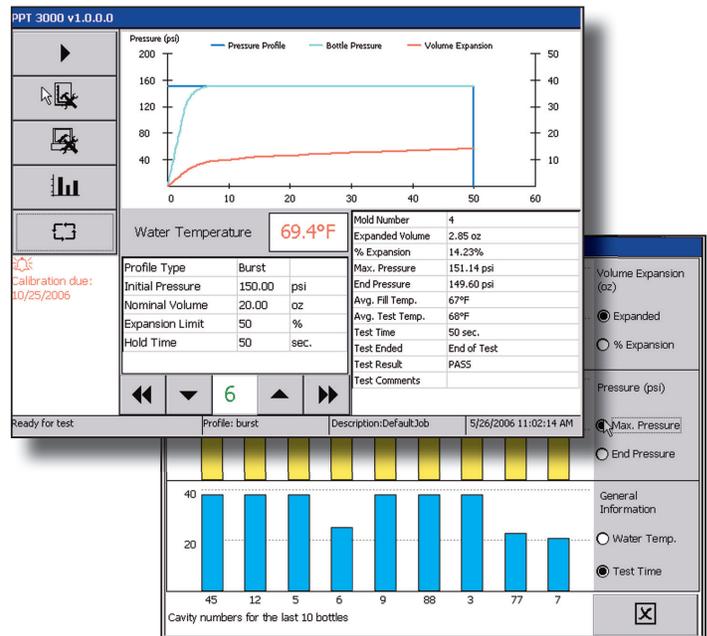
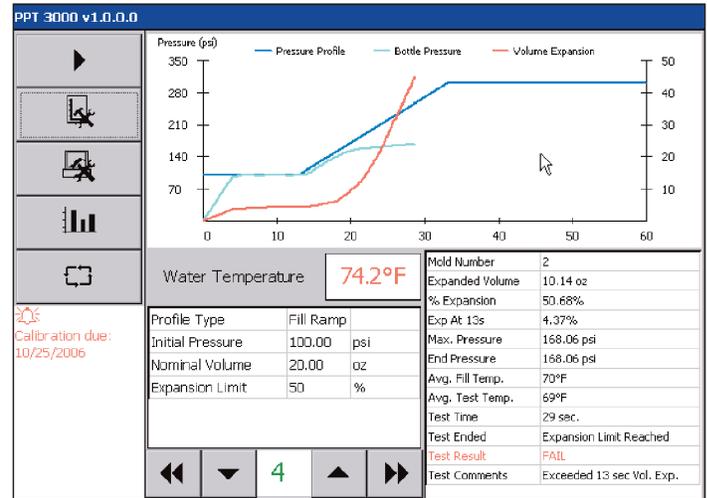
The PPT3000™ pressure tester features a large color, touch-screen display that is the center for operator interaction and presentation of on-going test data. All functions of the testing system are managed from this ergonomically designed user interface.

### OPERATOR INTERFACE FEATURES

- Touch-screen operation
- Easy navigation
- Graphic display of test curves
- Comprehensive post-test data
- Test parameters display
- Mold number input
- Alarm notification
- Ability to input post-test comments

## MANAGING THE EFFECT OF WATER TEMPERATURE

Water temperature has a direct influence on volume expansion and burst pressure test results of PET containers. Internal Agr studies indicate that water temperature affects container volume expansion and burst pressure within the temperature range of 40° to 110° F. Tests show that differences in volume expansion ranged from 5% to 30% of volume and burst pressure from 20 to 30 psi across the measured temperature range. The Agr PPT3000™ can help manage this variation by monitoring and providing a documented record of infeed and test temperatures for every test.



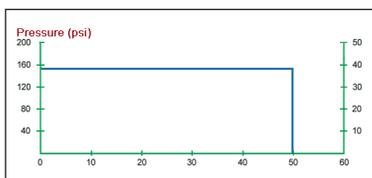
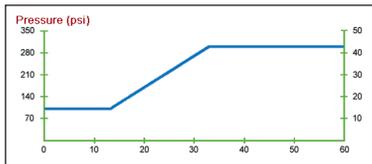
The PPT3000™ operates in accordance with all industry standards for pressure testing including ASTM, ISBT, etc.

## TESTING VERSATILITY

The PPT3000™ pressure tester offers testing modes that allow operators to perform a variety of industry standard tests as well as customized tests for unique applications.

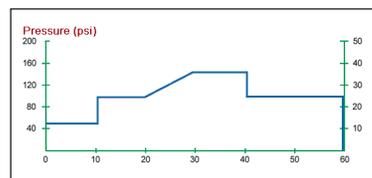
### Fill-Ramp Mode

This test mode is designed to simulate the conditions for PET container filling operations. In this mode of operation, the container is pressurized quickly to an operator-specified level and held for 13 seconds. The pressure is then ramped at a rate of 10 psi per second until container failure or the maximum level of pressure or volume is achieved. Input parameters include: initial pressure, nominal volume and expansion limit.



### Burst Pressure Mode

In this mode of operation, the container is pressurized quickly to a predefined pressure level and held for a specific time. Input parameters include: initial pressure, nominal volume, expansion limit and hold time.



### Custom Test Mode

The PPT3000™ custom test mode provides the capability of creating unique profiles to meet special testing requirements. The PPT3000™ custom profile editor lets operators build custom test profiles on a segment by segment basis. As each segment is developed, it is graphically displayed on the user interface.

## PROGRAMMABLE VOLUME EXPANSION

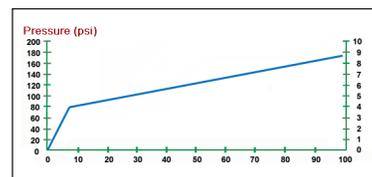
The PPT3000 is available with 13 second and optional user-defined volume expansion points that enable operators to configure the duration of time for capturing volume expansion during testing. This feature makes it possible to precisely simulate actual filling conditions and how the bottle will perform under those conditions.

### Metal Doming/Reversal Detection Mode (optional)

This test is designed specifically for aluminum beverage containers. This test mode applies internal pressure (up to 300 psi) to the container, at a controlled rate, to the point of base failure. The PPT3000™ system tracks the pressure value, elapsed time, and volume expansion as the dome reverses under pressure to the “buckling” point. The pressure/volume test curve is then displayed on the user interface for operator interpretation.

### M-RULE® Shelf-Life Mode (optional)

The M-RULE® shelf-life mode is designed to provide material utilization and predicted shelf-life data. In this mode, bottles are pressurized at a precise rate up to 60 psi. Pressure and expansion data is captured then analyzed by the embedded version of the M-RULE® Container Performance Model software to ascertain material utilization. Predicted O<sub>2</sub> or CO<sub>2</sub> shelf-life for the bottle is presented based upon test data and bottle attributes.



The M-RULE® Container Performance Model is a proven, software-based predictive tool that operates by integrating the fundamentals of permeation with critically evaluated, physical data for the component materials and other pertinent data affecting the permeability of a container. M-RULE® is a registered trademark of Container Science, Inc.

## FEATURES

- Integrated variable pressure programmability
- Water temperature monitored and included as part of the data packet
- Pressure and volume expansion curves displayed during the test
- Operator input for:
  - mold number
  - end of test details
- Capabilities for setting upper and lower control limits
- Integrated M-RULE® shelf-life prediction module (optional)



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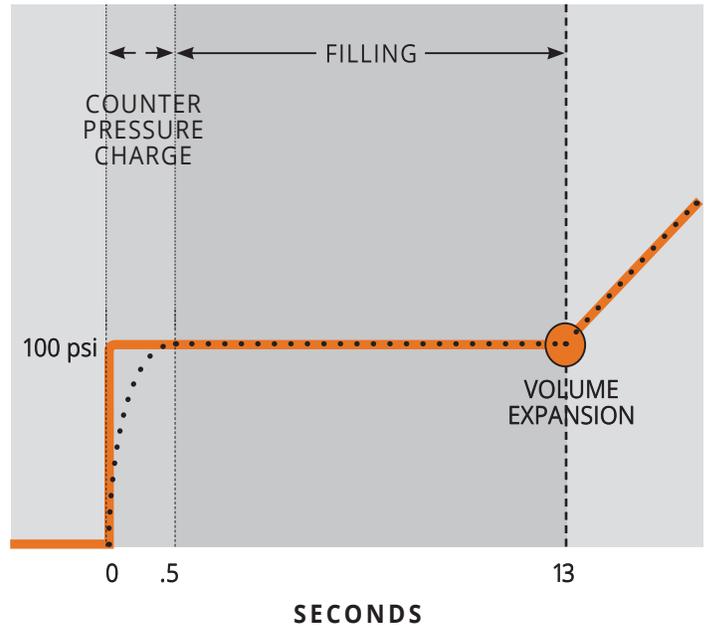
## SIMULATING THE FILLING PROCESS

During the filling process PET bottles experience a rapid, non-linear pressurization (counter-pressure) that can trigger failures, especially in the base. Many premature bottle failures occur well below the pressure level used in the counter-pressure filling process resulting in production delays and efficiency losses on the packaging line. In order to identify containers that are prone to failure during filling operations, pressure testing must closely simulate the pressures that are experienced during the filling process.

The PPT3000 is designed to help detect the potential for premature failures such as these by testing containers in a manner that accurately represents the counter-pressure filling process. The PPT3000 "Fill Ramp" test profile simulates a true filling environment by subjecting containers to an abrupt, approximately 500 millisecond non-linear pressurization, up to the test pressure hold level where it is held at that pressure for the defined time, and then subjected to a pressure ramp to identify the yield and burst pressure. Testing in this manner closely replicates the filling cycle, making it possible to accurately assess the performance of containers in the filling process and beyond.

### OTHER VALUABLE FEATURES

- Alarm and maintenance log
- Serial and Ethernet data output
- Composite housing with stainless steel inner workings
- Integrated diagnostics:
  - One-touch calibration verification
  - Friendly reminders for calibration and filter changes



### AVAILABLE OPTIONS

- Floor stand
- Water-saver recirculation system
- Water filtration system
- Additional inserts and fixtures for aluminum bottles
- Test gauge assembly for calibration verification
- Custom shelf-life test profiles
- Programmable volume expansion