

GARLOCK SEALING TECHNOLOGIES

Overview of New Gasket Testing Procedures FEBRUARY 1999

The world of gasket testing as we know it is evolving into some new areas. The current ASTM tests are not addressing the needs of all of our customers. Customer demands for minimized emissions and improved operating efficiencies, has forced the gasket industry to look for more sophisticated means of evaluating gasketing materials. The MTI and PVRC have been working on establishing these tests for a number of years. The following is a quick overview of some of the more important new test procedures.

Fasten your acronym seatbelt! There are plenty to follow...

PVRC – Pressure Vessel Research Council
MTI – Materials Testing Institute
ASTM – American Society for Testing and Materials
TTRL – Tightness Testing Research Laboratory
ASME – American Society of Mechanical Engineers

Here are the tests:

ROTT – (**RO**om **T**emperature **T**ightness)

This procedure allows calculation of the new gasket constants G_b , a and G_s . These constants are used for the new ASME code flange design calculations, similar to those using existing 'm' and 'y' values. The test very accurately measures gasket leakage and deflection at progressively higher gasket loads, as well as during unloading (i.e. due to creep and internal pressure).

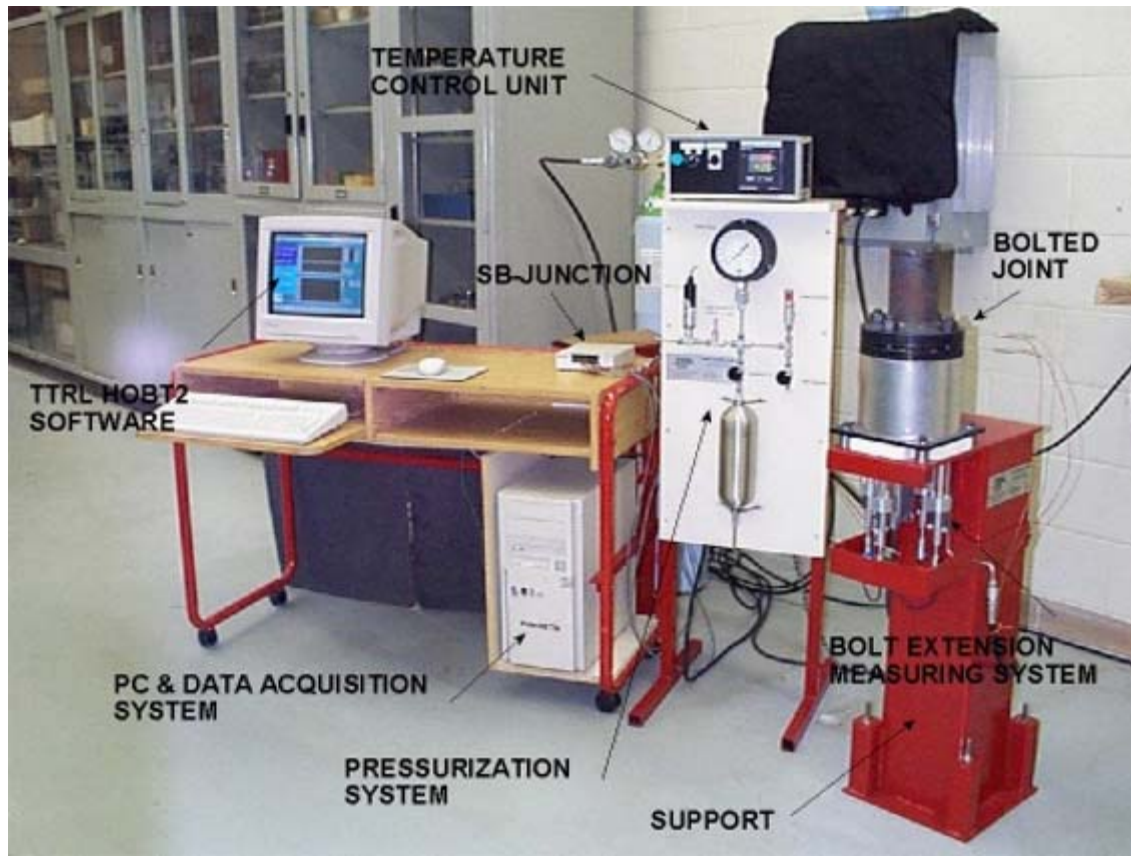


The difference between the 'm' and 'y' method and this new PVRC method is that flange and vessel designers can build flanges with the control of emissions in mind.

HOBT2 – (HOt Blow Out Test -Version 2)

Gasket is loaded, pressurized to a defined pressure and held while temperature is steadily increased until it blows out. The temperature is accurately controlled, while bolt load is monitored through out the test. Thus, differences from specimen to specimen are easily defined. The latest version of this test (as it exists in ASTM Task Groups), includes heat up and cool down cycles to determine the effect of gasket creep on blow out resistance.

Note: The blow out temperature does not necessarily relate to safe operating temperatures.



ARLA – (**A**ged **R**elaxation **L**eakage **A**dhesion Screen) Test –

A spring loaded bolt compresses the gasket about the same size as an ASTM F37 specimen. Temperatures up to 750°F are used in air or steam environment. The results give creep relaxation, adhesion, weight loss and leakage data. This test accounts for effects of time, temperature, and thermal cycles, on gasket creep and leakage. It also allows for weight loss data to be taken. This information can be correlated to long term performance better than loss of tensile strength. While adhesion may not effect joint performance, it is of interest to plant maintenance personnel.



Summary:

There are many other tests, which we will not discuss in this document. The PVRC / MTI / TTRL tests separate themselves into four basic categories:

- I. Ambient Temperature Tests – Includes: ROjTT, ROMT
- II. Elevated Temperature - Mechanical Screening – Includes: ARLA, ATRS, HATR, HOMT
- III. Elevated Temperature - Leakage – Includes: HOBT1, HOBT2, HOTT, AHOT, EHOT
- IV. Fire Resistance – Tests – Includes: FIRS, FITT

ROTT, HOBT2, and ARLA will probably be the tests that are the most requested. Most large manufacturers will discontinue the use of the current ASTM factors, and gradually phase in these new tests for gasket selection and flange design.