Test Procedures

ASTM F37, Test Method for Sealability

Summary: This test provides a means of evaluating the sealing properties of sheet, composite and form-in-place gasket materials with two test methods. The typical mediums used to check leak rates are nitrogen and Fuel A, each tested at ambient (70 – 85°F) temperature and conditioned in accordance with ASTM F104.

Usage: This test method is designed to compare sealing characteristics of gasket materials under controlled conditions by providing a precise measure of leakage rate at different external flange loads.

Warnings: The actual gasket stress and internal pressures are not defined; many published values have slightly different conditions. Thermoseal's test parameters for Fuel A are: 1,000 psi (7 N/mm^2) external pressure and 14.7 psi (1 bar) internal pressure.

This test method is in the middle of a revision. For an update, please contact Thermoseal.

DIN 3535 Test Method for Gas Permeability

Summary: Test specimens are conditioned in a desecator for 24 hours. Possible leakage between the gasket and the platens is eliminated by using polyethylene foils. The gasket is placed between platens and is subjected to 4,640 psi (32 N/mm^2) external pressure and an internal pressure of 580 psi (40 bar) nitrogen. After two hours, the amount of gas escaping through the gasket in a period of 20 minutes is measured.

Usage: This test method is designed to compare gasket material under defined conditions and to provide a precise measure of the permeability of the gasket material.

Warnings: The mating surfaces of the platens are very smooth and do not represent the increase in tightness that is experienced with a serrated or rough finish.

The test should be carried out at the defined external stress and internal pressure of 4,640 psi (32 N/mm^2) and 580 psi (40 bar) nitrogen so comparisons can easily be made.

The test is carried out at ambient temperatures. Many gasket materials show an increase in tightness with elevated temperatures.

ASTM F38, Test Method for Creep Relaxation

Summary: This test method provides two test procedures. One measures the creep with the use of a calibrated strain gage, and the other measures the creep relaxation by means of calibrated bolt and dial indicator. Typical values are provided using 6000 lbf (27 kN) for the various types and classes of material.

These tests are run with conditioned test specimen per ASTM F104 and subject the gasket material to a compressive stress between two platens, with the stress applied by a nut and a bolt. The specimen unit is placed in a hot air circulating oven for 22 hours at 212°F ± 5°F (100 ±2°C). The test specimen unit is removed from the oven and measured once it has cooled to room temperature.

Usage: These procedures provide a means to compare related materials under controlled conditions and their ability to maintain a given compressive stress as a function of time.

Warnings: These procedures specify a defined nominal thickness as 0.03 in (0.8 mm) for all material except fluorocarbon polymer which shall not have a nominal thickness above 0.07 in (1.78 mm).

Tests such as ASTM F38 do not measure creep alone, both creep deformation and stress relaxation are measured simultaneously. Such tests are of relatively short duration in comparison with the anticipated service life of the gasket.

ASTM F146, Test Method for Fluid Resistance

Summary: Test specimens are subjected to complete immersion in test fluids. The test, based on time and temperature, measures the physical property of the material before and after immersion. Samples are cut in accordance with ASTM standards, and conditioning occurs according to ASTM F104.

The test specimen properties are measured before immersion into the specified liquid and then again after immersion into the test median.

Usage: This test method provides a standardized procedure to measure the effect of immersion in specified fluids under definite conditions of time and temperature.

Warnings: The result of this test is not intended to give any direct correlation with the service conditions in view of the wide variations in temperature and special uses encountered in gasket applications.

The free immersion testing is not comparable to the chemical resistance a gasket exhibits in a stressed