

STRESS CRACKING TEST FOR PLASTICS

Application

This procedure is used to determine the resistance of thermoplastic materials to stress cracking when they are used in direct contact with other materials, such as oil, grease, gasketing and elastomers.

Apparatus Required

Oven

As described in ASTM D 573

Test Fixtures

Stainless steel bars 4.76 x 19.1 x 83.8 mm with tapped holes 68.6 mm apart fitted with matching thread pan head screws (#6 or #8) 12.70 mm long. The bars shall be bent per Figure 1 to achieve the desired strain level. Refer to Figure 2 showing fixtures.

Stereo Microscope

20 to 60 magnification; Bausch and Lomb or equivalent.

Conditioning and Test Conditions

All test values indicated herein are based on material conditioned in a controlled atmosphere of 23 +/- 2 °C and 50 +/- 5 % relative humidity for not less than 24 h prior to testing and tested under the same conditions unless otherwise specified.

Procedure

1. Prepare "L" type tensile bars per ASTM D 1822. A minimum of four tensile bars shall be prepared for each strain level specified in the Engineering Material Specification. In the instance of material suspected of exhibiting anisotropy, specimens should be obtained parallel and perpendicular to the "grain flow."
2. Condition test bars for 24 h at 23 +/- 2 °C and 50 +/- 5 % relative humidity.
3. Assemble the tensile bars in the appropriate test fixtures to achieve the strain level required by the material specification. (Figure 1)
4. Examine the samples for cracks using the stereo microscope (after application of stress, but prior to application of the "contact" material).

Date	Action	Revisions
2001 03 28	Revised	Editorial – no technical change A. Cockman
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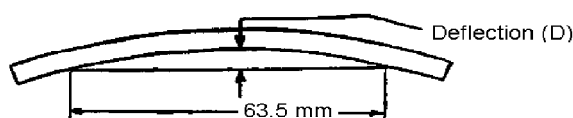
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5. Apply the contact material (within two h of assembling the test bar onto the fixture) to a minimum of three tensile bars of each strain level to assure intimate contact. (Do not apply the contact material to one bar at each strain level. This bar will serve as a "control" sample for the specific strain level.)
 - . Specimens of flexible material such as sheet vinyl, gasketing, or elastomers may be secured by using a soft wire to tie them to the straining fixture.
 - . Materials with high viscosity such as grease and paste should be applied by coating the tensile bar.
 - . In the instance of liquids, the test bar and fixture assembly should be totally immersed.
6. Expose the samples for the time period and temperature required by the Engineering Material Specification.
7. At the end of the test period, remove the contact material mechanically or by wiping with a soft cloth. Do not use a solvent.
8. Allow the strained sample to condition for 1.0 h at $23 \pm 2^\circ\text{C}$ and $50 \pm 5\%$ relative humidity.
9. Using a stereo microscope, examine the strained sample for cracking and crazing at 20 diameters magnification while the sample is still in the straining fixture.
10. Report presence of cracking or crazing.

Note: Other types of fixtures and test samples may be used provided that the strain levels and test procedure details are followed (refer to Chart 1). Care should be taken to assure that the test fixtures are carefully cleaned prior to each test to avoid possible contamination from previous tests. If other type fixtures are used, they shall be made from materials which will not influence the test results.

Chemicals, materials, parts, and equipment referenced in this document must be used and handled properly. Each party is responsible for determining proper use and handling in its facilities.

Figure1



Deflection (D) in 63.50 mm

% Strain

0.47 mm	0.1
0.95 mm	0.2
1.43 mm	0.4
1.62 mm	0.5
1.92 mm	0.6
2.42 mm	0.8
3.35 mm	1.0