

DETERMINATION OF CHEMICAL STRESS CRACK RESISTANCE OF
PLASTIC PARTS UNDER MECHANICAL STRESS

Application

This procedure is used to determine the chemical stress crack resistance of plastic parts under specified mechanical stress.

Apparatus Required

Tensile Test Machine

With a constant rate of jaw separation of 50 mm/minute and a recording device.

Bending Template

With known curvature of radius, made of stainless steel (see Sketch 1).

Glass Container

Readily sealable (i.e. desiccator) for test reagent.

Hose Clamps (minimum 2 pieces)

For fixing the test specimen on the bending template.

Sliding Caliper

Water Absorbing Tissue

Various Test Agents

As specified by the Relevant Materials Specification.

Micrometer

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.

Date	Action	Revisions
2001 04 02	Revised	Editorial – no technical change A. Cockman
1992 04 30		

Printed copies are uncontrolled

Page 1 of 3

Copyright © 2001, Ford Global Technologies, Inc.

Procedure

1. Determine the thickness of the test specimen with a micrometer accurately to within 0.01 mm (test slab according to ISO R 527, Type B, Figure 2, but 3.2 +/- 0.05 mm thick).
2. Calculate the bending radius (r) of the template by entering the thickness (d) into the attached formula to achieve the surface strain (E_b) of the test beam according to specification requirement.

Calculation of the surface strain (E_b):

$$E_b = \frac{d}{(2 \times r + d)} \times 100$$

d = thickness of the test beam
r = radius of the template

Calculation Example:

Thickness of test beam d: 3.20 mm

Required E_b : 0.70 %

Calculate the radius of the template as follows:

$$r = \frac{(100 \times d) - (E_b \times d)}{2 \times E_b} = \frac{(100 \times 3.2) - (0.7 \times 3.2)}{2 \times 0.70} = 227 \text{ mm}$$

3. Tighten the test slab onto a template of suitable radius of curvature (as calculated in para 2) with two hose clamps (see Sketch below).

Sketch 1: **Metal Template with Tightened Test Slab**

