

FATIGUE RESISTANCE OF DIRECT GLAZING ADHESIVES**Application**

This procedure is used to determine the normal and aged fatigue resistance of both curing and non-curing pumpable or preformed adhesives, including thermo-electric, for the bonding of windshields and backlights to painted steel.

Apparatus and Materials Required**Test Panels**

Steel body skin panels.
Dimensions 75 x 225 mm.
Surface finish 1.35 +/- 0.45 micrometre C.L.A.
Prepared in accordance with FLTMEU BI 3-2, Method C.

Glass Plate

125 x 175 x 6.0 mm.

Clamping Device

Capable of compressing non-curing tape adhesives to the required thickness.

Cold Box

Capable of maintaining a temperature of - 40 +/- 2 °C. The box must be capable of accommodating the flexing apparatus.

Mechanical Convection Oven

Capable of maintaining a temperature of 90 +/- 2 °C.

Humidity Cabinet

The humidity cabinet must be maintained at 38 +/- 1 °C and a relative humidity of 98 +/- 2 %. The moist air must be circulated in the cabinet by a fan or other suitable means. Test assemblies must be suitably supported and arranged in the test cabinet so that no water can drip from one specimen onto another.

Clean Cloth**Naphtha**

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2000 11 13	Revised	Editorial – no technical change A. Cockman
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Flexing Apparatus

This apparatus is used to flex the test assembly (drawing 2) a total of 1.5 mm (0.75 mm either side of the normal position) at a rate of 1400 cycles/minute.

The metal panel 'A' is clamped in a fixed position in the fixture 'B' and the Glass Plate 'C' is moved relative to the metal panel by the action of the eccentric drive 'D' and the connecting rod 'E'.

Tank

Of suitable size to immerse a test assembly under a 100 mm head of water.

Dial Gauge

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

Procedure 'A' - Normal Fatigue - 2 Test Assemblies Required

1. The metal and glass bonding surfaces must be clean and free from grease or other contaminants. When cleaning is necessary, wipe the affected surface with a clean cloth dampened with naphtha.
2. Apply adhesive primer, when specified, along the edge of the glass and metal panels (drawing 1). The width of the primer must be approximately 15 mm on each panel. The film thickness must be in accordance with the requirements of the relevant Engineering Specification.
3. Allow the primer to flash dry for a minimum of 10 minutes and a maximum of 60 minutes at 23 +/- 2 °C.
4. Apply the adhesive to the primed area of the glass plate. Preformed tape adhesives must be positioned 2 mm inboard from the edge of the glass. Pumpable mastic adhesives must be applied from a gun as a bead 6 mm in diameter in the centre of the primed area. The length of the adhesive bead should be 150 mm.
5. Place the prepared glass plate over the metal panel, so that the preformed adhesive contacts the primed area 2 mm inboard from the edge of the metal panel. For mastic adhesives, the contact position must be in the centre of the primed area of the metal panel.
6. Compress the assembly to the total adhesive thickness required by the relevant Engineering Specification. The sample may be shimmed, if necessary, to maintain the required adhesive thickness. The use of clamps is generally necessary for preformed adhesives while hand pressure is usually sufficient for mastic adhesives.
7. For materials that cure at room temperature, the assembly must be removed from the clamps after 1 minute and conditioned for 168 hours at 23 +/- 2 °C. During the period of conditioning, the glass and metal panels must remain parallel - if necessary shims may be used. Materials that require curing must be cured in accordance with the requirements of the relevant Engineering Specification, whilst the assembly is clamped. Remove the clamps 1 hour after the completion of curing and condition the assembly for 24 hours at 23 +/- 2 °C.