

SAE J1553 MAY86

**Cross Peel Test for
Automotive-Type
Adhesives for Fiber
Reinforced Plastic
[FRP] Bonding**

**SAE Recommended Practice
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RATIONALE:

Not applicable.

RELATIONSHIP OF SAE STANDARD TO ISO STANDARD:

Not applicable.

REFERENCE SECTION:

Not applicable.

APPLICATION:

This SAE Recommended Practice describes a cross peel test method for use in measuring the bonding characteristics of automotive-type adhesives for joining fiber reinforced plastics to themselves and to metals.

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**CROSS PEEL TEST FOR AUTOMOTIVE-TYPE ADHESIVES FOR
FIBER REINFORCED PLASTIC (FRP) BONDING**

SCOPE: This SAE Recommended Practice describes a cross peel test method for use in measuring the bonding characteristics of automotive-type adhesives for joining fiber reinforced plastics to themselves and to metals.

1. TEST SUBSTRATE:

- 1.1 Substrates:** Fiber reinforced plastic as specified. Metal composition and roughness as specified.
- 1.2 Dimensions:** Fiber reinforced plastic parts shall be cut into flat strips 25 x 76 mm (1.000 x 3.000 in) at a nominal thickness of 2.5 mm (0.100 in). In the case of FRP to metal bonding, metal thickness will be nominally 1.5 mm (0.060 in).
- 1.3 Surface Preparation:** Surface preparation of FRP will be in accordance with adhesive supplier or automotive engineer recommendation. Surface roughening, solvent cleaning and surface primers are acceptable provided they do not reduce FRP bulk properties. Any surface preparation must be adaptable to actual production situations. Metals will be machined to eliminate burrs or bevels. They will be clean and dry, or surface treated prior to bonding according to procedures prescribed by the adhesive supplier or automotive engineer.

2. PREPARATION OF TEST JOINTS:

- 2.1 Application of Adhesive:** Adhesive will be applied in accordance with adhesive supplier or automotive engineer recommendation. In the case of two-part adhesives, mixing will be in accordance with suppliers' suggested procedures.
- 2.2 Adhesive Cure:** Adhesive will be cured at room temperature or elevated temperature using prescribed conditions determined by adhesive supplier or automotive engineer.

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2.3 Joint Geometry: Joint Geometry will be as shown in Fig. 1.

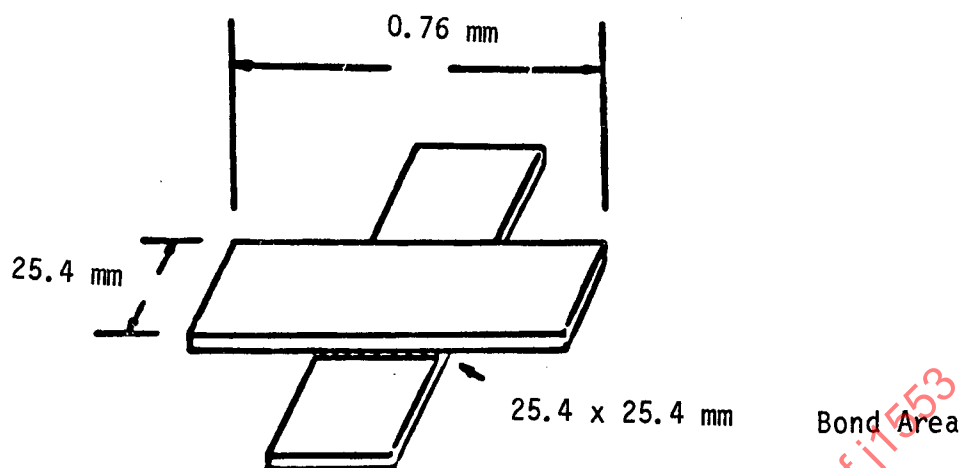


FIG. 1--JOINT GEOMETRY

Joint geometry will be controlled by appropriate fixturing using glass beads or other suitable means to control a 0.76 mm (0.03 in) adhesive glueline thickness. The amount of glass beads in the glueline will be the minimum number needed to hold glueline thickness. Fixturing pressure will be allowed.

- 2.4 Excess Adhesive: Excess adhesive (squeeze out) will be removed from bonded lap shear prior to curing.
- 2.5 Conditioning: Bonded parts will be allowed to return to ambient temperature for at least one hour if elevated temperature cures are employed. If adhesive is R.T. cured, full cure time plus 10% will be allowed prior to testing.

3. TESTING:

- 3.1 Apparatus: Testing machine capability shall conform to the requirements as prescribed in ASTM D1002.

The testing machine shall have a suitable pair of grips to hold test samples without allowing slip.

- 3.2 Test Rate: Fixture loading shall be conducted in a consistent manner with a rate of 13 mm (0.500 in)/min preferred.
- 3.3 Test Samples: Five cross peel samples will be prepared in each case and tested.
- 3.4 Specimen Holding Grips: Grips as shown in Figs. 2 and 3 shall be used to hold test specimens.

4. REPORT:

- 4.1 Complete identification of the adhesive tested, including type and manufacturer's code number.
- 4.2 Complete identification of the substrates used and method of surface preparation prior to bonding.
- 4.3 Cure schedule, time and temperature for bonding samples.
- 4.4 Individual peak load values (kPa or psi), averages, and failure modes with estimated percentages.

Failure mode will be reported as shown in Fig. 4. Visual estimation to be used to determine percent and type of failure mode.

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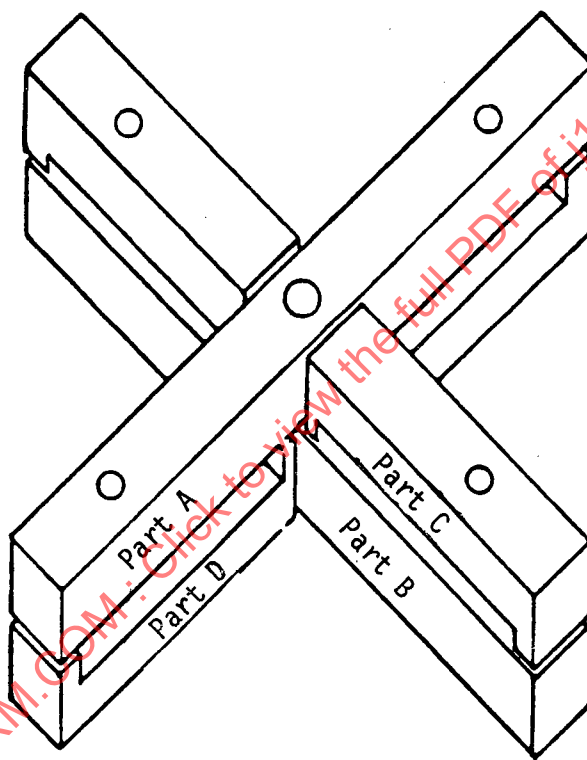


FIG. 2--ADHESION TEST FOR ADHESIVES AND SEALANTS
(DIMENSIONS DETAILED IN FIG. 3)