



Jet-Weld™

TS-230 Thermoset Adhesive

Product Data Sheet

Updated : December 1993
Supersedes : April 1993

Product Description

Sprayable/extrudable grade with long set time ideal for bonding a wide variety of plastics including polystyrene and polyacrylic. Bonds aluminium and glass to plastic and wood.

Jet-Weld Thermoset Adhesives are a family of

one-component, moisture curing, urethane adhesives. These adhesives are applied warm and bond a wide variety of substrates such as wood, fibre reinforced plastic (FRP) and many other plastics to themselves, to metal and glass.

Features:

100% solids.
Rapid rate of strength build-up.
Broad substrate adhesion.
Highly plasticiser resistant.
High strength bonds.
One component.
Various set times.
Can be used to bond heat sensitive materials.

Physical Properties (Uncured)

Not for specification purposes

Application Temperature	250 °F 121°C	
Viscosity (at 250°F - 121°C)	9,000 cps (mPa.s)	
Colour (solid)	White/Off-White	
Open Time ²	4 minutes	
Set Time ³	2.5 minutes	
Density molten g/ml	1.09	
Shelf Life	6 months from date of despatch by 3M when stored in the original carton at 21°C (70°F) & 50 % Relative Humidity	
¹ Measured on Brookfield viscometer with Thermosel using spindle no. 27.		
² The bonding range of a 3.2mm/1/8" bead of molten adhesive on a non-metallic substrate.		
³ The minimum amount of time required between when the bond is made and when it will support a 5 psi / 35 kPa tensile load.		

Physical Properties (Cured)

Not for specification purposes

Shore D Hardness ¹	45	
Modulus ²	37.2 MPa	
100% Modulus ²	6.2 MPa	
Tensile Strength at Break ²	22.8 MPa	
Elongation at Break ²	700 %	
¹ Measured on .090" - .110" thick bars (2.3 - 2.8mm)		
² ASTM D 638, Die C, measured on .011" - .017" (280-430µm) thick films cured 7 days at 77°F (25°C)/50% Relative Humidity.		

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Performance Characteristics

Not for specification purposes

Overlap Shear Strength (MPa)

Tested at 73°F (23°C)

Substrate	
Maple	10.8
FRP	15.5
Polycarbonate	10.3
Polyacrylic	8.8
Polystyrene	4.1 ¹
ABS	6.4
PVC	12.3 ¹
¹ Substrate Failure	

Overlap Shear Strength (MPa)

Tested at 180°F (82°C)

Substrate	
Maple	2.8
FRP	5.0

180° Peel Strength (N/cm)

Tested at 73°F (23°C)

Substrate	
FRP	158 ¹
Polycarbonate	166 ¹
Polyacrylic	95
Polystyrene	88
ABS	96
PVC	133 ¹
Aluminium	89
Glass	109
¹ Cotton duck failed during test.	

Plasticised Vinyl, T-Peel (N/cm)

Tested at 73°F (23°C)

Condition	
Initial	28 ¹
Aged at 160°F (71°C) for 2 weeks	39 ¹
¹ Substrate Failure	

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Environmental Resistance

FRP, Overlap Shear Strength (MPa)

Tested at 73°F (23°C)

Condition	
15 days at 25°F/50% RH	15.5
Thermal Cycle ¹	15.7
¹ Thermal cycle = 10 cycles of 16 hours at 100°F (38°C) / 100% RH. 4 hours at -20°F(-29°C) with bonds aged for 24 hours at 77°F (25°C) /50% RH prior to testing.	

Typical Rate of Strength Build Up

FRP, Overlap Shear Strength (MPa)

Tested at 73°F (23°C) at various times after bonding.

The FRP was conditioned for 7 days at 77°F (25°C)/ 50% RH prior to bonding.

Time	
10 minutes	2.0
1 hour	3.7
24 hours	10.1
1 week	15.5
The cure rate will vary depending on air temperature, relative humidity, substrate and bond line thickness. Cure rate is more rapid on wood (moisture-rich substrate) than on plastic.	

Test Procedures

Overlap Shear Strength

Overlap shear (OLS) strengths were measured on 25.4mm wide 12.7mm overlap specimens. These bonds were made individually using 25.4 x 101.6 mm sample coupons. The thickness of the bond line was 75-150 µm (micrometer). The thickness of the substrates were : Plastics 3.2mm, Maple 9.5mm.

All strengths were measured at 23°C except where noted. The separation rate of test jaws was 50.8mm/minute.

180° Peel Strength

180° peel strengths were measured on 25.4 x 203.2mm pieces of flexible cotton duck (canvas) bonded to rigid 25.4 x 101.6mm substrates. The rigid substrates were approximately 3.2mm thick and the separation rate of the testing jaws was 50.8mm per minute. All strengths were measured at 73°F (23°C).

T-peel Strength

T-peel strengths were measured on 25.4mm wide pieces of plasticised vinyl at 73°F (23°C). The separation rate of the testing jaws was 50.8mm per minute.

Cure Cycle

With the exception of rate of strength build up, all bonds, unless otherwise noted, were cured for a minimum period of 7 days at 77°F (25°C)/50% RH before testing or subjecting to further conditioning or environmental ageing. Bonds were prepared using the suggested procedure for the particular substrate tested.

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Directions for Use

Apply to clean, dry surfaces. Remove oil, grease and other contaminants by wiping with isopropyl alcohol. For fibre reinforced plastics and other materials that are often contaminated with mold release agents. It is recommended that the surface be solvent wiped, abraded and solvent wiped. After heating to recommended application temperature, apply adequate amount of Jet-Weld Thermoset Adhesive to one of the substrates to be bonded. Join the substrates within the adhesives specified open time and hold/fixture the bonded part until the adhesive has adequately set. Do not use to bond metal or glass to itself or each other or cure will not occur due to low moisture vapour transmission of the substrate.

Important: Adhesive heated at application temperature for more than 16 hours should be discarded.

Note: When using solvents, extinguish all ignition sources and observe manufacturers' directions and precautions for handling such materials.

Dispensing Equipment

Jet-Weld Adhesive Cartridges can only be dispensed through the 3M Jet-Weld Adhesive Applicator. Other container sizes can be dispensed through bulk equipment specifically designed for use with hot melt polyurethane reactive adhesives (PUR). For more information on PUR application equipment, contact your local 3M sales representative. All equipment must be used in strict accordance with the recommendations of the manufacturer.

WARNING: Do not use Jet-Weld Adhesive above 275°F (135°C). Jet-Weld Adhesive should not be applied to substrates that exceed 275°F (135°C).

Caution: Wear heat resistant gloves and safety glasses when handling.

Container sizes available: 10 fl. oz cartridge, five gallon pail, 55 gallon drum.

Clean Up:

Allow product to solidify. Remove uncured waxy material (usually within the first 20 minutes after application) by scraping with a putty knife or similar tool. For cured material, remove by cutting or sanding. **Do not use heat or flame to remove adhesive.**

Surface Preparation

Plastic:

Wipe with isopropanol soaked cheesecloth. Allow solvent to evaporate before bonding. **Note:** Jet Weld Adhesives are not recommended for bonding untreated polyolefins.

Plastic contaminated with mold release:

Wipe with isopropyl soaked cheesecloth, abrade with fine grit abrasive, wipe with isopropyl alcohol soaked cheesecloth. Allow solvent to evaporate before bonding.

FRP, Rubber and Aluminium (uncoated):

Wipe with methyl ethyl ketone (MEK) soaked cheesecloth, abrade with fine grit abrasive, wipe with MEK soaked cheesecloth. Allow solvent to evaporate before bonding. Priming may be necessary on aluminium if part will be subjected to hot or humid conditions.

Glass:

Wipe with MEK soaked cheesecloth. Allow solvent to evaporate before bonding. Priming may be necessary on glass if part will be subjected to hot or humid conditions.

Note:

When using solvents, extinguish all ignition sources and observe manufacturers directions and precautions for handling such materials.

Storage Conditions

For maximum shelf life store product at 60°F (16°C) to 80°F (27°C), indoors and protect from exposure to moisture.

Products have a 6 month shelf life in unopened containers.

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**Health and Safety
Information**

Refer to the Product Label
and Material Safety Data
Sheet for Health and Safety
Information before using
this product.

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Values presented have been determined by standard test methods and are average values not to be used for specification purposes. Our recommendations on the use of our products are based on tests believed to be reliable but we would ask that you conduct your own tests to determine their suitability for your applications. This is because 3M cannot accept any responsibility or liability direct or consequential for loss or damage caused as a result of our recommendations.

**Specialty Tapes & Adhesives**

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