



# Technical Data Sheet

## 3M™ Scotch-Weld™ UV Dual Cure Adhesive 3581



Regulatory  
Info/SDS

### Product Description

3M™ Scotch-Weld™ 3581 is a high-performance UV and thermal dual cure adhesive that offers high bonding strength and heat and humidity resistance. It features low shrinkage, low CTE, high Tg and effective UV cure depth.

### Product Features

- Dual cure technology - UV + thermal
- Low shrinkage
- High Tg and low CTE
- Non-sag formulation

### Technical Information Note

The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

### Typical Uncured Physical Properties

| Attribute Name | Temperature   | Value                                 |
|----------------|---------------|---------------------------------------|
| Color          |               | Off-White <sup>1</sup>                |
| Density        |               | 1.6 g/mL (13.4 lb/gal)                |
| Pot Life       | 23 °C (73 °F) | 3 d <sup>2</sup>                      |
| Viscosity      | 25 °C (77 °F) | 10,000 cP (10,000 mPa.s) <sup>3</sup> |

<sup>1</sup> Colors may vary from nearly white to yellow/amber. Adhesive performance is not affected by color variation.

<sup>2</sup> Time to double viscosity measure by cone and plate rheometer.

<sup>3</sup> Shear rate 10s-1

### Typical Cure Profiles

| Attribute Name    | Temperature     | Value  |
|-------------------|-----------------|--|
| UV Curing         |                 | 3,000-10,000 mJ/cm <sup>2</sup> <sup>1</sup> |
| Time to Full Cure | 121 °C (250 °F) | 40 min                                       |

<sup>1</sup> UV Cure at 365nm to achieve green strength

### Typical Cured Characteristics

| Attribute Name   | Test Method | Temperature   | Value             |
|------------------|-------------|---------------|-------------------|
| Modulus          |             | 25 °C (77 °F) | 6,600 MPa         |
| Shore D Hardness | ASTM D2240  | 25 °C (77 °F) | 87                |
| Volume Shrinkage | ISO3521     | 23 °C (73 °F) | 0.9% <sup>1</sup> |

<sup>1</sup> Measured by Helium gas pycnometer

## Typical Performance Characteristics

| Attribute Name         | Test Method          | Dwell Time | Temperature     | Test Condition                    | Substrate      | Surface Prep | Value   |
|------------------------|----------------------|------------|-----------------|-----------------------------------|----------------|--------------|---|
| Green Strength         |                      |            |                 | 365nm, 30s, 400mw/cm <sup>2</sup> | Glass to An Al |              | 1.8 MPa (261 lb/in <sup>2</sup> )               |
| Overlap Shear Strength | ASTM D1002, ISO 4587 | 30 min     | 100 °C (212 °F) | 23 °C                             | AnAl to AnAl   | IPA Wipe     | 8.7 MPa (1260 lb/in <sup>2</sup> ) <sup>1</sup> |

<sup>1</sup> 25 mm (1) wide, 12.7 mm (1/2) overlap samples, 25 mm (1) x 102 mm (4) substrates, bondline thickness: 0.13-0.20 mm (5-8 mil) Separation rate 2.5 mm/min (0.1 in/min) metal, 51 mm/min (2 in/min) plastic, 510 mm/min (20 in/min) rubber. Substrate thickness: steel 1.5 mm (60 mil), other metal 1.3-1.6 mm (50-64 mil), rubber and plastic 3.2 mm (125 mil)

Temperature: 23 °C (73 °F)

| Attribute Name   | Test Method | Value             |
|------------------|-------------|-------------------|
| Water Absorption | ISO 62      | 0.1% <sup>1</sup> |

<sup>1</sup> Duration: 24 hours

## Electrical and Thermal Properties

| Attribute Name                                 | Value                          |
|--|--------------------------------|
| Glass Transition Temperature (T <sub>g</sub> ) | 139 °C (282.2 °F) <sup>1</sup> |
| Coefficient of Thermal Expansion               | 40 x 10 <sup>-6</sup> m/m/°C   |

<sup>1</sup> Measured at one week via DMA

## Handling/Application Information

### Directions for Use

1. Storage at -18 °C (-0.4 °F) or below.
2. Warm products to room temperature before opening containers to restore proper application consistency and to prevent moisture condensation on adhesive surface. Containers may be stored at room temperature for 1-2 days to thaw. Do not warm at temperatures above 27 °C (80.6 °F).
3. Use glove to avoid contacting container directly.
4. Avoid freezing products again after warming.

## **Surface Preparation**

The following cleaning methods are suggested for common surfaces:

### Steel

1. Wipe surface free of dust and dirt with oil-free solvent such as methyl ethyl ketone.\*
2. Sandblast or lightly abrade using clean fine grit abrasives.
3. Wipe again with solvent to remove loose particles.\*

### Aluminum

1. Vapor degrease - Perchloroethylene\* condensing vapors for 5-10 minutes.
2. Alkaline degrease - Oakite 164 solution (9-11 oz./gallon water) at 87 °C ± 5 °C (190 °F±10 °F) for 10-20 minutes. Rinse immediately in large quantities of cold running water.
3. Acid (FPL) etch - Place panels in their following solution for 10 minutes at 66 °C ± 2 °C (150 °F± 5 °F).

Sodium Dichromate 4.1-4.9 oz./gallon

Sulfuric Acid, 66°3e 38.5-41.5 oz./gallon

2024-T3 aluminum (dissolved) 0.2 oz./gallon minimum

Tap water as needed to balance

4. Rinse - Rinse panels in clear running tap water.
5. Dry - Air dry 15 minutes; force dry 10 minutes at 66 °C ± 5 °C (150 °F ± 10 °F).
6. If primer is to be used, it should be applied within 4 hours after surface preparation.

### Plastics

1. Solvent wipe with Isopropyl Alcohol.\*
2. Abrade using clean fine grit abrasives.
3. Solvent wipe with Isopropyl Alcohol.\*

### Glass

1. Solvent wipe with acetone or methyl ethyl ketone.\*

\*Note: Prior to use of these solvents, extinguish or eliminate any ignition sources and read and follow supplier's environmental, health, and safety recommendations listed on the MSDS and product label.

## **Storage and Shelf Life**

Store products at -18 °C (-0.4 °F) or below for maximum storage life. Higher temperatures reduce normal storage life. Rotate stock on a "first-in-first-out" basis.

This product has a shelf life of 9 months when stored in their unopened containers at -18 °C (-0.4 °F) or below.

## **Precautionary Information**

Refer to Product Label and Material Safety Data Sheet for health and safety information before using this product. For additional health and safety information, call 1-800-364-3577.

## **Automotive Disclaimer**

### **Select Automotive Applications:**

This product is an industrial product and has not been designed or tested for use in certain automotive applications, such as automotive electric powertrain battery or high voltage applications, which may require the product to be manufactured in a IATF certified facility, meet a Ppk of 1.33 for all properties, undergo an automotive production part approval process (PPAP), or fully adhere to automotive design or quality system requirements (e.g., IATF 16949 or VDA 6.3). Customer assumes all responsibility and risk if customer chooses to use this product in these applications.

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## **ISO Statement**

This product was manufactured under a 3M quality system registered to ISO 9001 standards.

3M™ Industrial Adhesives and Tapes Division  
3M Center, St. Paul, MN 55144-1000  
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