

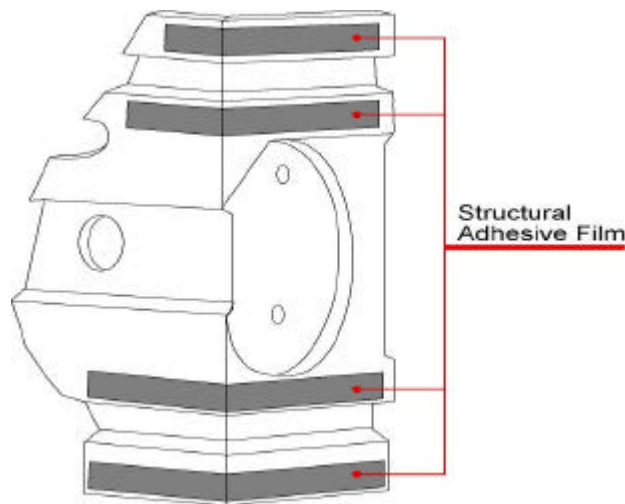
# SAF 6068

## 3M™ Automotive Structural Adhesive Film

### Technical Data Sheet

#### General Description:

3M™ Automotive Structural Adhesive Film SAF 6068 is for structural bonding or stiffening of metal to metal joints in BIW applications. The product is suitable for bonding to oily<sup>1</sup> surfaces. It can be used directly from rolls (like a tape) or die-cut to complex shapes to suit the application. Examples of applications include hinge-washer bonding for positive door hinge location after paint, hinge and pillar reinforcement brackets, roof bow brackets for vans and stiffening pads for hoods. The product exhibits some expansion during typical E-coat bake cycles to maximise joint fill and builds up final structural strength during paint bake cycles.



#### Reasons for Use:

- Higher performance structural adhesive
- Reduction of welding
- Used in areas where it is uneconomic to set up fully robotic paste adhesive application systems
- Used in problem areas to improve strength and stiffness, often combined with spot welds or rivets
- Purchase-In Assembly (adhesive applied by supplier of part) for high volume production.
- Low volume applications

## Automotive Structural Adhesive Film

### Application Character:

Because product has good dimensional stability, it can be handled without a release liner using thin slightly oily nitrile rubber gloves to smooth onto complex curved surfaces. Hand dispensing equipment is also available. Tack and initial adhesion to the first application surface builds up by oil absorption during storage. Alternatively, where higher tack is required to oily surfaces the product can be converted to a more aggressive tack format. On oil free or wiped surfaces the product can be used with a release liner if preferred, the liner is then removed before bonding.

### Handling and Process Properties:

Storage and shelf life is temperature dependent and the supply chain must be familiar with required conditions to avoid excessive temperature excursions of adhesive coated parts (see information below).

Where parts are stacked together without a release liner, care must be taken that the adhesive does not contact opposing surfaces. The product is currently being used successfully on parts shipped and stacked together in boxes.

### Product Features:

modified epoxy chemistry	high shear and peel strength	robust structural bonding performance
	E-coat and paint compatible in current applications	robust processing performance
	Good environmental durability to automotive specifications	dependable performance under extreme operating conditions
	99+% solids	low emissions, vapour, odour <sup>2</sup>

### Typical Physical Properties (uncured):

material thickness (mm)	0.2	single laminate
	0.4	double laminate
	0.6	triple laminate
colour	red or neutral	

### Typical Performance Properties (cured):

The product has been tested using minimum (170°C) and maximum(205°C) bake cycles used in normal paint bake ovens : The product also cures rapidly under induction cure conditions typically 4s@200°C. , full induction cure requires application of pressure. Typical results on 0.8mm steel under minimum and maximum bake conditions are as follows

	60G60GHD (oiled**)	60G60GEL (oiled**)
max. bake (shear) MPa	19.1	19.3
min. bake (shear) MPa	17.0	18.0
max. bake T-peel daN/cm	11.9	10.1
min. bake T-peel daN/cm	9.5	6.7

*\*\*oil used was a normal automotive stamping oil at normal coating weights*

samples used were 0.8mm thick using 25.4 x 12.7mm overlap joints for shear tests pulled at 10mm/minute; T peel tests were performed on 0.8mm substrates to ASTM D1876 and pulled at 254mm/minute.

## Automotive Structural Adhesive Film

### Environmental Ageing Performance properties in shear strength (MPa):

	<u>condition</u>	<u>A40 (Galvanealed oiled**)</u>	<u>G60 (hot dip galv. Oiled**)</u>
A	initial shear strength	15	17.2
B	A+250h @ 70°C	15	16.6
C	condensing humidity	15.2	14.8
D	250h salt spray	14.7	14.8
E	5 environmental cycles	13.8	15.9

	<u>condition</u>	<u>60G60GEL (oiled**) max. bake</u>	<u>60G60GEL (oiled**) min. bake</u>
F	14 days cataplastic test	12.5	12.3

\*\* oil used was a normal automotive stamping oil at normal coating weights

C 3 weeks at 38C, 98% RH

D 5% NaCl 35C

E 16h @ 70C, 24h@98%RH, 38C, 8h@-30C, cycling

F Renault D47 1165/H14)

### Torsional impact to GM 9751P (Nm):

	<b>A40 Galvanealed</b>	<b>G60 Hot Dip Galvanised</b>	
initial	6.8 (no failure)	6.8 (no failure)	
250h@70°C	4.5 (coating failure)	6.8 (no failure)	
condensing humidity	4.5 (coating failure)	6.8 (no failure)	
salt spray	4.5 (coating failure)	6.8 (no failure)	
5 environmental cycles	4.5 (coating failure)	6.8 (no failure)	

### Engineering information

shear modulus GPa (TAST***)	0.63 +/- 0.05
shear strength (MPa) (TAST)	43.5 +/- 2.3
Tensile modulus GPa	2.03
Tensile strength MPa	47
Poissons Ratio	0.42

\*\*\* ISO 11003-2

### Fatigue:

Tests using 3M AF126-2 on tapered strap joints (5251 aluminium) shows a fatigue limit of 40% P<sub>0</sub> at 10<sup>7</sup> cycles. At this stress level there was no detectable damage. (BS EN ISO9664).

1. While the product has broad spectrum oil compatibility it is recommended that new oil-metal combinations are tested to specification.
2. For applications involving weld-through or adjacent welding high local temperatures may result in generation of fume or smoke; under these conditions local extraction must be used.

# Automotive Structural Adhesive Film

## Storage and Transportation

### Pre-Application Adhesive Storage:

Adhesive shelf life:

freezer storage	-18°C	6 months
refrigerator	+4°C	30 days
typical room temperature	+24°C	14 days
max. transportation temp of adhesive coated components	+30°C	

### At the Adhesive Applicator / Converter

#### Storage and Handling at Converter

Rolls of adhesive should be stored at -18°C.  
24h Before use the adhesive should be exposed to room temperature (max 24°C) before converting or application to metal parts.

### Transportation and at the OEM

#### Storage of Adhesive Coated Metal Parts

Adhesive coated metal parts should be delivered to the OEM customer ensuring that they are used (baked) within 30 days from exposure to room temperature (max 24°C) until processed at the OEM.

Parts should be used in proper sequence after delivery to ensure minimum storage time for each part. The performance of the adhesive should be established for each application in relation to the maximum likely storage time/temperature of the part

Care should be taken that transportation conditions do not exceed 30°C as a guideline. The reason for these conditions is that the adhesive has a certain low cure rate even at room temperature and may reduce tack and performance on storage.

#### Labelling:

It is recommended that to ensure that no parts are assembled which are out of shelf life, a "USE BEFORE" label should be applied to parts shipped to the OEM plant

### **Important notice to purchaser**

All statements, technical information and recommendations herein are based on tests we believe to be reliable, but the accuracy or completeness thereof is not guaranteed. Please ensure before using our product that it is suitable for your intended use. All questions of liability relating to this product are governed by the Terms of Sale subject, where applicable, to the prevailing law.



3M Laboratories (Europe)  
Zweigniederlassung der 3M Deutschland GmbH

**Automotive Laboratory Europe**  
Carl-Schurz-Strasse 1  
D-41453 Neuss  
Tel. (49)-2131-142890  
Fax (49)-2131-143849

SAF 6068 STR\_01/ps  
Page 4 of 4  
Issue Date: 05.2002