

LOCTITE® 5188™

August 2016

PRODUCT DESCRIPTION

LOCTITE® 5188™ provides the following product characteristics:

Technology	Acrylic
Chemical Type	Dimethacrylate ester
Appearance (uncured)	Red viscous product ^{LMS}
Fluorescence	Positive under UV light
Components	One component - requires no mixing
Viscosity	High
Cure	Anaerobic
Application	Sealing
Strength	Medium
Specific Benefit	Highly flexible, Maintains flexibility after exposure to high temperature

LOCTITE® 5188™ is a form-in-place gasketing product. It is designed for use on rigid metal flanged connections, such as gearboxes and engine casings, particularly where minor oil contamination of the flange surfaces can occur. It cures between close fitting metal surfaces in the absence of air and is particularly suitable for use on aluminum substrates where very good adhesion is achieved. It also provides resistance to low pressures immediately after assembly (instant seal). This product may be dispensed by hand or robotically with the appropriate LOCTITE® product conditioning and dispensing systems.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25 °C 1.1

Viscosity, Cone & Plate, 25 °C, mPa·s (cP):
 PK 100, PK 1, 2° Cone @ 20 s⁻¹ 11,000 to 32,000^{LMS}

Flash Point - See SDS

Instant Sealing Capability

Anaerobic sealants have the ability to resist low on-line test pressures while uncured. This test was performed with uncured product immediately after assembly of a glass plate and an annular zinc dichromate flange before cure occurred. The pressure was maintained for 1 minute.

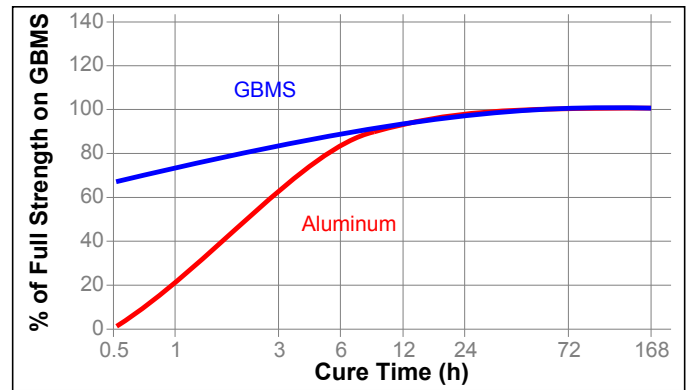
Pressure Resistance, MPa:

Induced Gap 0.0 mm	0.05
Induced Gap 0.125 mm	0.03
Induced Gap 0.25 mm	0.01

TYPICAL CURING PERFORMANCE

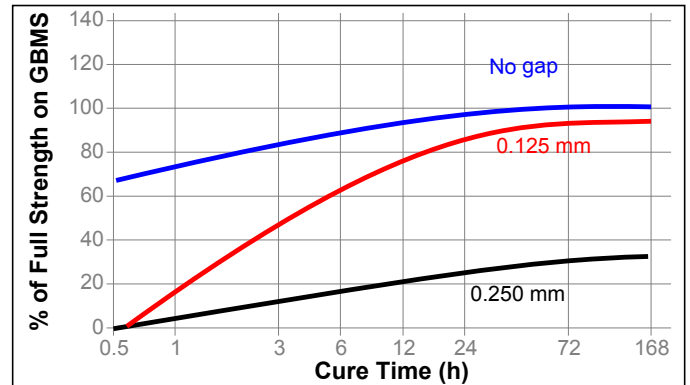
Cure Speed vs. Substrate

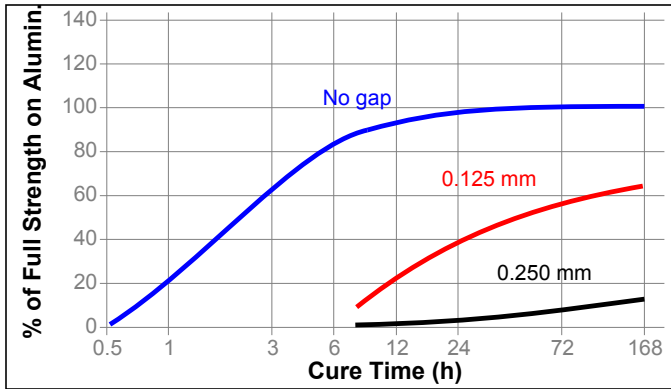
The rate of cure will depend on the substrate used. The graph below shows the shear strength developed with time on grit blasted mild steel lap shears compared to different materials and tested according to ISO 4587.



Cure Speed vs. Bond Gap

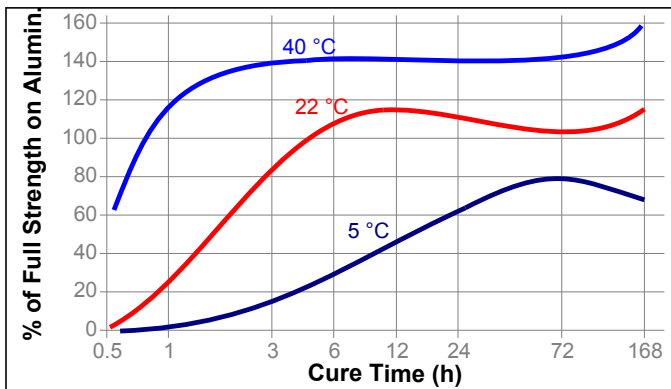
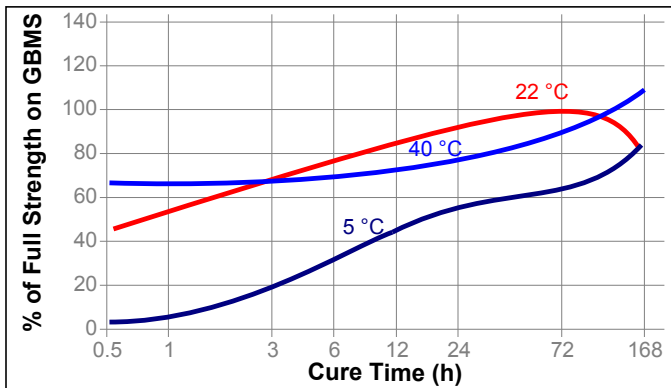
The rate of cure will depend on the bondline gap. The following graphs show the shear strength developed with time on grit blasted mild steel and aluminum lap shears at different controlled gaps and tested according to ISO 4587.





Cure Speed vs. Temperature

The rate of cure will depend on the ambient temperature. The graphs below show the shear strength developed with time at different temperatures on grit blasted mild steel and aluminum lap shears and tested according to ISO 4587.



TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties:

Coefficient of Thermal Expansion, K ⁻¹ :	
Pre Tg	145×10 ⁻⁶
Post Tg	160×10 ⁻⁶
Glass Transition Temperature, °C	
	105
Elongation, at break, %	
	186
Tensile Strength, at break	
	N/mm ² 4.24
	(psi) (610)
Tensile Modulus	
	N/mm ² 4.17
	(psi) (600)

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties

Cured for 24 hours @ 22 °C

Lap Shear Strength, ISO 4587:	
Grit Blasted Mild Steel (GBMS)	N/mm ² ≥2.0 ^{LMS}
	(psi) (≥290)
Aluminum	N/mm ² ≥3.0 ^{LMS}
	(psi) (≥435)

Cured for 72 hours @ 22 °C

Lap Shear Strength, ISO 4587:	
Grit Blasted Mild Steel (GBMS)	N/mm ² 9.2
	(psi) (1,330)
Aluminum	N/mm ² 7.0
	(psi) (1,010)

Cured for 168 hours @ 22 °C

Lap Shear Strength, ISO 4587:	
Grit Blasted Mild Steel (GBMS)	N/mm ² 7.8
	(psi) (1,130)
Aluminum	N/mm ² 8.0
	(psi) (1,160)

Sealing Capability

An annular shaped gasket with an inner diameter of 50 mm and an external diameter of 70 mm was tested up to 1.3 MPa for leakage (immersion in water for 1 minute).

Sealed to Maximum Induced Gap, mm:

Mild steel	0.25
------------	------

TYPICAL ENVIRONMENTAL RESISTANCE

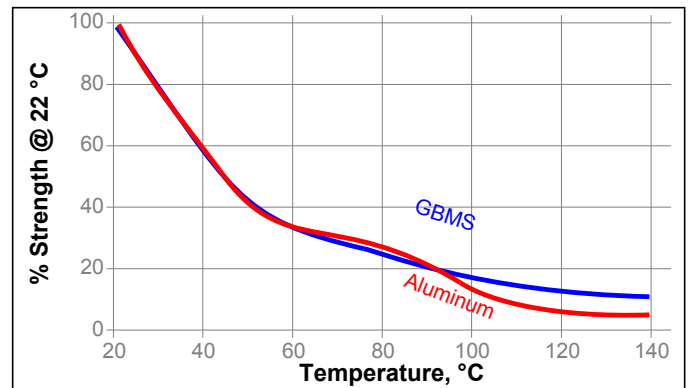
The following tests refer to the effect of environment on strength. This is not a measure of sealing performance.

Cured for 1 week @ 22 °C

Lap Shear Strength, ISO 4587

Hot Strength

Tested at temperature

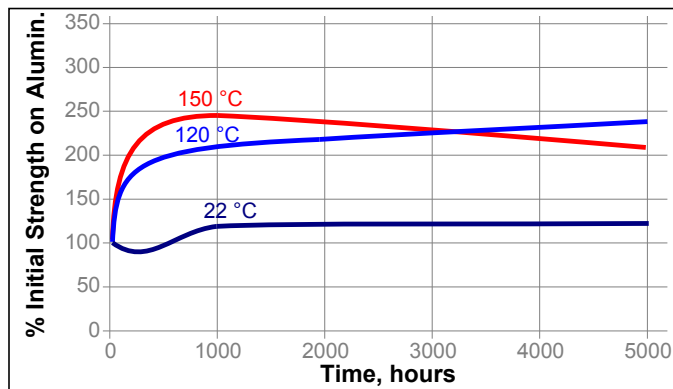
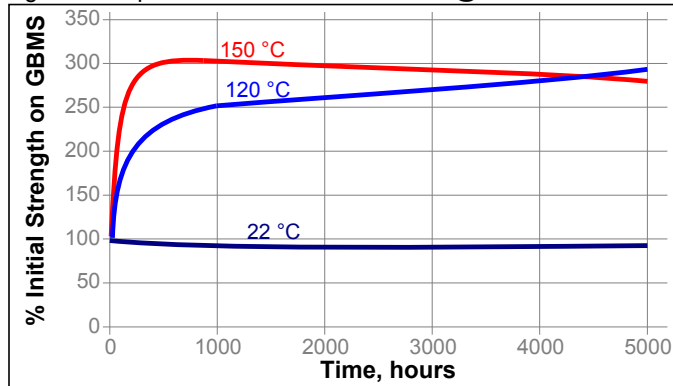


Cold Strength

This product has been tested to -75°C (-100 F). This product may work below this temperature, but has not been tested.

Heat Aging

Aged at temperature indicated and tested @ 22 °C

**Chemical/Solvent Resistance**

Aged under conditions indicated and tested @ 22 °C

Grit Blasted Mild Steel (GBMS)

Environment	°C	% of initial strength			
		100 h	500 h	1000 h	5000 h
Auto trans. fluid	120	140	190	215	260
Auto trans. fluid	150	165	270	250	270
Motor oil	120	170	210	250	185
Motor oil	150	190	245	270	185
Unleaded gasoline	22	80	50	65	30
Water/glycol	87	85	90	65	60
DEF (AdBlue®)	22		90	70	75

Aluminum

Environment	°C	% of initial strength			
		100 h	500 h	1000 h	5000 h
Auto trans. fluid	120	125	150	150	160
Auto trans. fluid	150	135	125	170	195
Motor oil	120	155	170	190	125
Motor oil	150	160	185	190	160
Unleaded gasoline	22	90	45	20	15
Water/glycol	87	35	25	35	30

GENERAL INFORMATION

This product is not recommended for use in pure oxygen and/or oxygen rich systems and should not be selected as a sealant for chlorine or other strong oxidizing materials.

For safe handling information on this product, consult the Safety Data Sheet (SDS).

Where aqueous washing systems are used to clean the surfaces before bonding, it is important to check for compatibility of the washing solution with the adhesive. In some cases these aqueous washes can affect the cure and performance of the adhesive.

This product is not normally recommended for use on plastics (particularly thermoplastic materials where stress cracking of the plastic could result). Users are recommended to confirm compatibility of the product with such substrates.

Directions for use:

1. For best performance bond surfaces should be clean and free from grease.
2. The product is designed for close fitting flanged parts.
3. LOCTITE® automatic dispensing equipment is recommended for best results. Application by screen printing, roller coating or bead dispense can also be achieved manually.
4. To obtain best results, each application should be evaluated under the specific conditions anticipated for dispensing, performance and durability of the parts.
5. Low pressures (<0.05 MPa, psi) may be used when testing to confirm a complete seal immediately after assembly and before curing.
6. Flanges should be tightened as soon as possible after assembly to avoid shimming.

Loctite Material Specification^{LMS}

LMS dated November 18, 2008. Test reports for each batch are available for the indicated properties. LMS test reports include selected QC test parameters considered appropriate to specifications for customer use. Additionally, comprehensive controls are in place to assure product quality and consistency. Special customer specification requirements may be coordinated through Henkel Quality.

Storage

Store product in the unopened container in a dry location. Storage information may be indicated on the product container labeling.

Optimal Storage: For pack sizes less than 850mL, the proper storage temperature is 8 °C to 21 °C. For pack sizes of 850mL or larger, storage should be between 2°C and 8°C. Storage outside these ranges can adversely affect product properties. Material removed from containers may be contaminated during use. Do not return product to the original container. Henkel Corporation cannot assume responsibility for product which has been contaminated or stored under conditions other than those previously indicated. If additional information is required, please contact your local Technical Service Center or Customer Service Representative.

Conversions

$(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$
 $\text{kV/mm} \times 25.4 = \text{V/mil}$
 $\text{mm} / 25.4 = \text{inches}$
 $\mu\text{m} / 25.4 = \text{mil}$
 $\text{N} \times 0.225 = \text{lb}$
 $\text{N/mm} \times 5.71 = \text{lb/in}$
 $\text{N/mm}^2 \times 145 = \text{psi}$
 $\text{MPa} \times 145 = \text{psi}$
 $\text{N}\cdot\text{m} \times 8.851 = \text{lb}\cdot\text{in}$
 $\text{N}\cdot\text{m} \times 0.738 = \text{lb}\cdot\text{ft}$
 $\text{N}\cdot\text{mm} \times 0.142 = \text{oz}\cdot\text{in}$
 $\text{mPa}\cdot\text{s} = \text{cP}$

Note:

The information provided in this Technical Data Sheet (TDS) including the recommendations for use and application of the product are based on our knowledge and experience of the product as at the date of this TDS. The product can have a variety of different applications as well as differing application and working conditions in your environment that are beyond our control. Henkel is, therefore, not liable for the suitability of our product for the production processes and conditions in respect of which you use them, as well as the intended applications and results. We strongly recommend that you carry out your own prior trials to confirm such suitability of our product.

Any liability in respect of the information in the Technical Data Sheet or any other written or oral recommendation(s) regarding the concerned product is excluded, except if otherwise explicitly agreed and except in relation to death or personal injury caused by our negligence and any liability under any applicable mandatory product liability law.

In case products are delivered by Henkel Belgium NV, Henkel Electronic Materials NV, Henkel Nederland BV, Henkel Technologies France SAS and Henkel France SA please additionally note the following:

In case Henkel would be nevertheless held liable, on whatever legal ground, Henkel's liability will in no event exceed the amount of the concerned delivery.

In case products are delivered by Henkel Colombiana, S.A.S. the following disclaimer is applicable:

The information provided in this Technical Data Sheet (TDS) including the recommendations for use and application of the product are based on our knowledge and experience of the product as at the date of this TDS. Henkel is, therefore, not liable for the suitability of our product for the production processes and conditions in respect of which you use them, as well as the intended applications and results. We strongly recommend that you carry out your own prior trials to confirm such suitability of our product.

Any liability in respect of the information in the Technical Data Sheet or any other written or oral recommendation(s) regarding the concerned product is excluded, except if otherwise explicitly agreed and except in relation to death or personal injury caused by our negligence and any liability under any applicable mandatory product liability law.

In case products are delivered by Henkel Corporation, Resin Technology Group, Inc., or Henkel Canada Corporation, the following disclaimer is applicable:

The data contained herein are furnished for information only and are believed to be reliable. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons against any hazards that may be involved in the handling and use thereof. In light of the foregoing, **Henkel Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Henkel Corporation's products. Henkel Corporation specifically disclaims any liability for consequential or incidental damages of any kind, including lost profits.** The discussion herein of various processes or compositions is not to be interpreted as representation that they are free from domination of patents owned by others or as a license under any Henkel Corporation patents that may cover such processes or compositions. We recommend that each prospective user test his proposed application before repetitive use, using this data as a guide. This product may be covered by one or more United States or foreign patents or patent applications.

Trademark usage

Except as otherwise noted, all trademarks in this document are trademarks of Henkel Corporation in the U.S. and elsewhere. ® denotes a trademark registered in the U.S. Patent and Trademark Office.

Reference 0.3