

**HOLDEN**

GM Holden Limited
Engineering Department

MATERIAL SPECIFICATION

NUMBER : HN 2189
SHEET : 1 of 8
RELEASE : December, 1995
REVISION : May, 2009

NAME: ADHESIVE – PREFORMED - EXPANDING

1. SCOPE

This specification describes a rubber based material that expands, bonds, and cures during paint oven heats, thereby effecting a bond between roof bows and roof outer panel. It may also be used as a gasket material that would provide a water and dust proof seal after expansion.

1.1 This material is provided in an extruded or die cut form. If an antiblocking coating is used, this coating must in no way affect the adhesive characteristics of the material under production conditions.

1.2 The 2 material types described are:

Type I - Material that does not require stiffness measurement.

Type II - Material that does require stiffness measurement (See 3.15)

2. REFERENCES

GM4298P	GM9037P	GM9763P	GM4465P
GM9505P	GM9832P	GM9011P	GM9753P
HN 1000	GMW3059		

3. REQUIREMENTS

3.1 Material must part cleanly from paper on which it is furnished without sticking or stretching.

3.2 Odour (GM9832) and Toxicity

3.2.1 The material must not have a toxic noxious odour and shall not have any adverse effects on personnel handling it. It also must not have an odour which is perceptible after curing.

3.2.2 The toxicity shall be disclosed in kind and magnitude as required by the GM Material Safety Data Sheet. In addition, the material must have full approval of the appropriate medical departments before production use.

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3. REQUIREMENTS (continued)

3.3. Expansion (GM9037P)

The material must expand between 200-300% when baked per the following cycle:

Bake	30 minutes @	195°C
Cool	20 minutes @	25°C

3.3.1 The material, after heat expansion and cure, shall be flexible and have good adhesion to oily galvanized or cold rolled steel surfaces.

3.4 Modulus

Samples shall be prepared per GM9753P and baked per bake cycle shown in 3.

3.4.1 The Youngs modulus of the cured sample should be determined at 18.6% elongation by either the secant or chord method, whichever is applicable. The modulus at a 3mm stretch of a 15 mm gage length shall be between 35 and 86 kPa, using a pull rate of 50 mm/minute.

NOTE: Measure cooled sample gap as described in GM9753P. Maximum gap of 0.7 mm permitted.

3.5 Tensile Strength (GM9753P)

The material shall conform to the following tensile strength range requirements: Pull rate 50 mm/minute.

3.5.1 Pretest

Cured 30 minutes at 195°C and conditioned at room temperature for 24 h: 190 kPa max, 56 kPa min.

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3. REQUIREMENTS (continued)

3.5 Tensile Strength (GM9753P) (continued)

3.5.2 Durability

The tensile strength shall not drop below 50% of the original value when tested after environmental exposure per 3.6, 3.7, 3.8, 3.10 and 3.12.

3.6 Neutral Salt Spray Exposure (GM4298P)

After 1 week neutral salt spray, there shall be no evidence of corrosion beneath the material. Tensile strength shall maintain the minimum value set forth in this specification per 3.5.2.

3.7 Thermal/Stress Cycle (GM9505P)

After 6 weeks GM9505P Cycle C, there shall be no evidence of corrosion beneath the material. Tensile strength shall maintain the minimum value set forth in this specification per 3.5.2.

3.8 Humidity Exposure (GM4465P)

After 3 weeks 38°C/100%RH, there shall be no evidence of corrosion beneath the material. The tensile strength shall maintain the minimum value set forth in this specification per 3.5.2.

3.9 High Heat Exposure

Bake 1 h at 205°C. After bake, place panel for 1 week @ 38°C/100% RH. There shall not be any corrosion underneath material.

3.10 Aging Characteristic

After 2 weeks aging at 70°C, the material shall not show signs of brittleness, cracking or reversion to a tacky, gummy condition and the tensile strength shall maintain the minimum value set forth in this specification per 3.5.2.

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