

**HOLDEN**

GM Holden Limited
Engineering Department

MATERIAL SPECIFICATION

NUMBER : HN 2014
SHEET : 1 of 12
RELEASE : April, 1989
REVISION : August, 2005

NAME: ADHESIVE - HOT MELT - HIGH SOFTENING POINT

1. SCOPE

The material described in this specification is a high softening point hot melt adhesive/sealer suitable for foaming to produce a closed cell thermoplastic product to be used as a seal against air, dust and water.

- 1.1 The material may also be used for certain applications as a silencer or flexible material for covering gaps, openings and other non-sealing type applications. The material can be used for non-foaming applications as well.
- 1.2 The material must not stain, attack, or have any other objectionable effect on adjacent surfaces.
- 1.3 This material is foamed through the introduction of an inert gas, such as nitrogen or carbon dioxide to a specific density reduction. The material is allowed to cool with the gas bubbles intact and a closed cell foam product is formed. Density reduction denotes the percentage of inert gas content.
- 1.4 For Heating, Ventilation and Air-conditioning (HVAC) applications, this specification should be used in conjunction with the Chemical Specification that pertains to the subject material.
- 1.5 Materials covered by this specification shall be classified as follows:-

Type 1	High viscosity
Type 2	Low viscosity

2. PHYSICAL PROPERTIES

- | | | |
|-----|-----------------|--|
| 2.1 | Viscosity | Type 1; 8000 - 12,000 CPS
Type 2; 5000 - 6000 CPS |
| | Method: | Brookfield Thermocel Viscometer No. 27
Spindle/20RPM/180° C.
Reading to be taken after 30 min. |
| 2.2 | Softening Point | 120° C - 130° C.
Ring and Ball as per ASTM D36-64T. |

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2. PHYSICAL PROPERTIES (continued)

2.3 Tensile Strength 0.7 MPa min.
Test Method HN 0230.1

2.4 Heat Resistance - Creep Test

Test Method HN 0230.2

LOAD	TEMP. OF FAILURE
160 gm	102° C min.
300 gm	90° C min.
500 gm	80° C min.

2.5 Open Time. Up to 20 sec. at 25° C.

Test

Apply a 6mm diam. bead of sealer/adhesive to plastic test panel. After 20 seconds adhere a second plastic piece to the adhesive. Test shear adhesion as in HN 0230.1. Requirement is a minimum of 0.7 MPa.

3. REQUIREMENTS

Unless otherwise specified, all tests shall be performed at $23 \pm 2^\circ \text{C}$ and $50 \pm 5\% \text{ RH}$.

3.1 Compression Load Deflection

By varying the per cent density reduction, the material shall be capable of achieving the compression load deflection value in kilo Pascals, indicated on the Engineering drawing.

3.1.1 Values shall be determined at 50% compression (no preflex) after 1 minute at a compression rate of 50 mm/minute. Samples shall be 50 x 50 mm with a minimum thickness of 3.2 mm. Samples shall be dusted with talc to prevent adhesion to the compression plates.

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3. REQUIREMENTS (continued)

3.2 Staining - (HN 0096 Method B)

There shall be no indication of migratory staining when the material is foamed onto the representative substrate and exposed 7 days.

3.3 Sealability

Glass plates shall be used for material evaluation. Representative substrates shall be used to evaluate the material performance in specific applications. There shall be no objectionable shrinkage of the material or general deterioration of the material or adjacent substrates causing loss of seal or other function after exposure to the appropriate environment. There shall be no corrosion of the adjacent substrates due to the material.

3.3.1 Test procedure

The material when foamed to the required density reduction for the application, must provide a complete barrier to the passage of water when compressed 30%. Samples are compressed in the form of a parabola or trough between two plates. Compression shall be controlled at 30% through the use of spacers and clamps. The assembly shall be exposed to the appropriate environment as specified in section 3.3.6.1 thru 3.3.6.3. After environmental exposure, distilled water shall be added between the plates until the depth above the lowest point of the parabola is 50 mm.

3.3.2 As-Received Sealability

Prepare samples as described in section 3.3.1 and condition samples 24h at $23 \pm 2^{\circ}\text{C}$ prior to addition of distilled water. The material must provide a complete water seal for a minimum of 1 h.

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3. REQUIREMENTS (continued)

3.3 Sealability (continued)

3.3.3 Heat Aged Sealability

Samples prepared as described in section 3.3.1 shall be exposed for 3 weeks at $93 \pm 2^\circ \text{C}$ for exterior and interior applications (including passenger compartment HVAC applications) and at $121 \pm 2^\circ \text{C}$ for all underhood applications. The sample assemblies shall be conditioned a minimum of 16 h at $23 \pm 2^\circ \text{C}$ after heat ageing and prior to addition of distilled water. The material must provide a complete water seal for a minimum of 1 h.

3.3.4 High Temperature Sealability

This test is to simulate exposure in a paint repair oven and to ensure the seal-ability of the foamed material through elevated temperatures.

3.3.4.1 Samples prepared as described in section 3.3.1 shall be exposed for 20 minutes at $149 \pm 2^\circ \text{C}$. The sample assemblies shall be conditioned to a minimum of 16 h at $23 \pm 2^\circ \text{C}$ after heat ageing and prior to addition of distilled water. The material must provide a complete water seal for a minimum of 1 h.

3.3.5 Low Temperature Sealability

Samples prepared as described in 3.3.1 shall be exposed for 50 h at $-10 \pm 2^\circ \text{C}$ prior to addition of distilled water. There shall be no deterioration or breakage of the material. There shall be no room temperature conditioning of the assembly prior to addition of the distilled water. Distilled water a minimum of temperature of $23 \pm 2^\circ \text{C}$ shall be added to the cold assembly to a depth of 50 mm above the lowest point of the parabola. The material must provide a complete water seal for a minimum of 1 h.

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