

**HOLDEN**

Holden Limited
Engineering Department

MATERIAL SPECIFICATION

NUMBER : HN 2152
SHEET : 1 of 8
RELEASE : August, 1994
REVISION : August, 2002

NAME: ADHESIVE, MOISTURE CURE, POLYURETHANE, GLASS

1. SCOPE

The specification details the requirements of a fast curing 1 component material that cures by absorbing moisture from the air to form a rubbery, adherent, black sealant adhesive suitable for retaining stationary glass in the body opening, and is resistant to extended outdoor weathering without losing its adhesion and physical characteristics.

- 1.1 This material must be used in conjunction with the appropriate stationary glass primers. Refer to the appropriate material specification for the requirements of the primers.

2. REQUIREMENTS

Specific material requirements and appropriate test methods are listed under properties.

2.1 Physical Properties.

- | | |
|---|---|
| 2.1.1 Specific Gravity (ASTM D147) | 1.14 ±0.02. |
| 2.1.2 Solids Content (GM9010P) | 98% min. |
| 2.1.3 Viscosity (GM9021P): | |
| Orifice | 2.64 mm. |
| Pressure | 410 kPa. |
| Sample Weight | 20 g. |
| Seconds | The viscosity shall be 25 to 55 s after the following conditions: |
| | Initial, as received |
| | 72 h @ 55 ± 2°C |
| | 60 days @ 23 ± 2°C. |
| 2.1.4 Colour | Black. |
| 2.1.5 Odour (GM9832P). The material must not have a toxic or noxious odour. After curing, the material must be relatively nonodorous. | |

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2. REQUIREMENTS (continued)

2.1 Physical Properties. (continued)

2.1.6 Toxicity. The material must not adversely affect those personnel handling it.

2.2 Performance Requirement

2.2.1 Cure Rate.

2.2.1.1 Tensile Test (GM9775P). Prepare sample coupons according to the procedure outlined in GM9775P using the appropriate primers and paint substrates. The samples shall cure @ $23 \pm 2^\circ\text{C}$ and 30% RH and have the following minimum tensile strengths at the following cure times:

3 h, 240 N min
48h, 1100 N min

2.2.1.2 Overlap Shear Test (GM9521P). The material must have the following minimum shear strengths when cured @ $23 \pm 2^\circ\text{C}$ and 30% RH for the time indicated (see Table 1).

TABLE 1

Cure Time (h)	Overlap Shear Strength (kPa, min)
3	250
72	3500
168	3500

2.2.2 Tear Strength (ASTM D624). A minimum tear strength of 800 N on a die C sample after curing @ $23 \pm 2^\circ\text{C}$ and 30% RH for 168 h and pulled at a rate of 500 mm/minute.

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2. REQUIREMENTS (continued)

2.2 Performance Requirement (continued)

2.2.3 Hardness, Shore A

TABLE 2

Environment	Hardness (Shore A)
168 h @ 23 ± 2°C and 30% RH	55 ± 5
4 h @ - 30°C plus (test at temperature)	15 point max over 168 h value above
336 h @ 70 ± 2°C (test @ 23 ± 2°C)	15 point max over 168 h value above

2.2.4 Environmental Shear Testing. All shears are prepared as outlined in GM9521P and cured for 72 h @ 23 ± 2°C and 50% RH. The samples are exposed to the appropriate environment as detailed below. The samples are allowed to recover to 23 ± 2°C and 50% RH before pulling unless otherwise stated. All samples should produce cohesive failure within the glass bonding material with a min bond strength of 1300 kPa.

2.2.4.1 Humidity (GM4465P). Samples are exposed for 168 h to an environment of 35 ± 2°C and 100% RH.

2.2.4.2 Environmental Cycle (GM9050P, Cycle I)...5 cycles.

2.2.4.3 Heat Age. Samples are exposed for 336 h to a temperature of 70 ± 3°C.

2.2.4.4 Water Immersion Plus Heat Age. Samples are immersed for 72 h in water @ 55 ± 2°C. The samples are then exposed for 96 h to a temperature of 70 ± 2°C.

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