



TAPE, URETHANE, PRESSURE SENSITIVE, CHIP  
RESISTANT, EXTERIOR - 0.36 MM (14 MIL)  
NOMINAL THICKNESS

ESB-M99J291-A

TAPE, URETHANE, PRESSURE SENSITIVE, CHIP  
RESISTANT, EXTERIOR - 0.20 MM (8 MIL)  
NOMINAL THICKNESS

ESB-M99J291-A2

TAPE, URETHANE, PRESSURE SENSITIVE, CHIP  
RESISTANT, NON-VISIBLE APPLICATIONS -  
0.36 MM (14 MIL) NOMINAL THICKNESS

ESB-M99J291-A3

TAPE, URETHANE, PRESSURE SENSITIVE, CHIP  
RESISTANT, NON-VISIBLE APPLICATIONS -  
0.20 MM (8 MIL) NOMINAL THICKNESS

ESB-M99J291-A4

## 1. SCOPE

The materials defined by these specifications are clear, paper backed, urethane films with a water clear pressure sensitive adhesive. ESB-M99J291-A3 & A4 are not suitable for use on visible exterior areas.

## 2. APPLICATION

ESB-M99J291-A & A2 were released originally for material used for application to lower body sides to provide protection from stone abrasion. ESB-M99J291-A3 & A4 were released originally for material used to provide a galvanic barrier between steel and aluminum bumper components.

## 3. REQUIREMENTS

### 3.0 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

Material suppliers and part producers must conform to the Company's Standard Requirements For Production Materials (WSS-M99P1111-A).

### 3.2 PHYSICAL PROPERTIES

|         |                                                                                                                                                                            | <u>A, A2, A4</u> | <u>A3</u> |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----------|
| 3.2.1   | Tensile Strength, MPa min<br>(ASTM D 882, Method A, 25 x 150 mm<br>sample, 25 mm distance between bench<br>marks, jaw spaced at start 100 mm,<br>pulling speed 300 mm/min) | 55               | 48        |
| 3.2.1.1 | Elongation, min                                                                                                                                                            | 400%             | 400%      |

| Date       | Action   | Revisions                                   |
|------------|----------|---------------------------------------------|
| 2005 08 11 | Revised  | Inserted 3.0; deleted 3.1, 3.6 and 4        |
| 1985 01 10 |          | Released ESB-M99J291-A2/A2/A4 C9P1-RD527931 |
| 1977 05 12 | Released | AG1-6000-224                                |



## ENGINEERING MATERIAL SPECIFICATION

ESB-M99J291-A/A4

|         |                                                                                                                                                                                                                                                        | <u>A, A3,</u> | <u>A2</u> | <u>A4</u> |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------|-----------|
| 3.2.2   | Tear Strength, kg min<br>(ASTM D 1938)                                                                                                                                                                                                                 | 1.8           | 0.9       | 1.1       |
| 3.2.3   | Adhesion<br>(ASTM D 1000 Method A. Determine the<br>adhesion to ESB-M50J quality enamel. The<br>tape shall be 25 mm wide for this test.)                                                                                                               |               |           |           |
| 3.2.3.1 | As Received, min                                                                                                                                                                                                                                       |               |           | 438 N/m   |
| 3.2.3.2 | Aged, min                                                                                                                                                                                                                                              |               |           | 657 N/m   |
|         | Test Method: Expose duplicate samples to each of the following<br>conditions:                                                                                                                                                                          |               |           |           |
|         | . 72 h at 70 °C.                                                                                                                                                                                                                                       |               |           |           |
|         | . 400 h weatherometer, per FLTM BO 101-01.                                                                                                                                                                                                             |               |           |           |
|         | . 168 h at 38 °C and 95 - 100% relative humidity.                                                                                                                                                                                                      |               |           |           |
|         | . 10 cycles consisting of 4 h at 70 °C, 4 h at 38 °C and 95 - 100%<br>relative humidity, and 16 h at -30 °C.                                                                                                                                           |               |           |           |
|         | Samples shall be conditioned for 48 h at 23 +/- 2 °C prior to exposure.<br>Tests shall be completed within 1 h after removal from the conditioning<br>environment. The cycle test samples shall be allowed to recover to 23<br>+/- 2 °C prior to test. |               |           |           |

### 3.3 FILM PROPERTIES

|         |                                                                                   |              |  |               |
|---------|-----------------------------------------------------------------------------------|--------------|--|---------------|
| 3.3.1   | Appearance                                                                        |              |  |               |
|         | The film and adhesive shall be water clear and colorless.                         |              |  |               |
| 3.3.2   | Gloss (ESB-M99J291-A & A2)<br>(FLTM BI 110-01, using a 20°<br>Gardner Glossmeter) |              |  | 75 +/- 10     |
|         |                                                                                   | <u>A, A3</u> |  | <u>A2, A4</u> |
| 3.3.3   | Thickness<br>(ASTM D 1000)                                                        |              |  |               |
| 3.3.3.1 | Film, mm                                                                          | 0.27-0.34    |  | 0.13-0.18     |
| 3.3.3.2 | Film & Adhesive, mm                                                               | 0.32-0.39    |  | 0.18-0.23     |