

MATERIALS / PAINTS

FNHA-2-J-001.46

BEND TEST

1. SCOPE

1.1 The test method developed in this procedure is to determine the resistance to cracking through a elongation process of an organic coating attached to a steel substrate.

1.2 This specification may involve hazardous materials, procedures and apparatus. This specification does not address the health and safety problems associated with its application or use. It is the specification user's responsibility to follow appropriate health or safety practices and determine the application or regulatory limitation prior to use.

2. REFERENCE STANDARDS

ASTM D522 - Standard Test Method for Mandrel Bend Test of Attached Organic Coatings
86507636(FNHA-2-J-001.01) - Panel or Part Preparation.
86507641(FNHA-2-J-001.06) - Dry Film Thickness.

3. MATERIAL and EQUIPMENT

3.1 The bend test equipment consists of a set of mandrels, rods or cylindrical steel surfaces of the following diameters;

25 mm (1 in.)
19 mm (3/4 in)
12.7 mm (1/2 in)
9.5 mm (3/8 in)
6.4 mm (1/4 in)
3.2 mm (1/8 in)

3.2 Steel panel with the organic coating applied to one surface as described in standard 86507636 (FNHA-2-J-001.01). The thickness of the panel shall be 0.8 mm (0.032 in).

4. PROCEDURE

4.1 The organic coating thickness shall be read with a film thickness gage per standard 86507641 (FNHA-2-J-001.06).

4.2 The panel with the organic coating is places on a mandrel or rod with the non-coated surface in contact with this mandrel or rod. A minimum of at least 50 mm (2 in) shall overhanging the mandrel or rod. A uniform pressure is applied to bend the panel around the mandrel or rod to 180 ° or till both steel surfaces are parallel with each other.

4.2 This process is started with the 25 mm (1 in) rod. If the bend does not produce any cracking in the organic surface, then the test is repeated with the next smaller diameter mandrel or rod. This test is continued until cracking is produced or has achieved the required minimum reported elongation. These tests may be reduced by using smaller diameter mandrel or rod immediately when more experience with the particular product is obtained.

4.3 To determine the elongation of the organic coating the following process shall be followed.

4.3.1 The Elongation shall be taken from Table 1. This is the elongation for a 25µm (0.001 in) organic film on a 0.8mm (0.032 in) steel panel.

4.3.2 If the organic film thickness exceeds the 25µm (0.001 in), then the correction for organic film thickness shall be taken from Table 2. The thickness of the film shall be divided by 25µm (0.001 in) to obtain the thickness multiplying number (t). The thickness multiplying number (t) is multiplied by the correction number (c_i) and added to the elongation (e_i) to obtain percent elongation (E).

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					 NEW HOLLAND		ENGINEERING SPECIFICATION	
							FRAME 1	OF 2
							PART NUMBER	
							86571197	
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MATERIALS / PAINTS**FNHA-2-J-001.46**

4.3.3 The equation for the elongation is

$$E = e_1 + t(c_1)$$

Where:

E = total elongation %

e_1 = elongation from table 1

t = thickness of organic film divided by
25 μ m (0.001 in)

c_1 = Correction from Table 2

Table 1 - Elongation	
Mandrel Diameter, mm (in)	Elongation %
25 (1.0)	3.3
19 (3/4)	4.4
12.7 (1/2)	6.75
9.5 (3/8)	9.0
6.4 (1/4)	14.0
3.2 (1/8)	28.0

Table 2 - Correction for Film Thickness	
Mandrel Diameter, mm (in)	Correction Factor
25 (1.0)	0.21
19 (3/4)	0.26
12.7 (1/2)	0.38
9.5 (3/8)	0.50
6.4 (1/4)	0.71
3.2 (1/8)	1.40

5. REPORTING

Calculated and report elongation of the smallest diameter mandrel or rod test which has not cracked the surface of the organic film.

 NEW HOLLAND	NAME				PART NUMBER	
	BEND TEST				86571197	
ENGINEERING SPECIFICATION				REV. A	FRAME 2	OF 2