Specifications For Manufactured Materials

Section: FENCING PRODUCTS

Subject: GALVANIZED STEEL REPAIR MATERIAL

1. SCOPE

1.1. This specification identifies all of the material requirements for the selection of materials used for repairs to galvanized steel surfaces, for Saskatchewan Highways & Transportation.

2. REFERENCES

2.1. This specification may refer to the following Standards; publications and tests. The latest issues, amendments and supplements shall apply, unless otherwise indicated in the purchasing documents.

2.1.1. American Society for Testing and Materials (ASTM)

Standard A-780	Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
Standard A-123	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
Standard D-2247	Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.
Standard D-968	Standard Practice for Testing Abrasive Resistance of Organic Coating by Falling Abrasive.
Standard B-117	Standard Test Method of Salt Spray (Fog) Testing.
Standard D-610	Relating Rating Numbers to Area Percentages of Red Rust.
Standard E-10	Brinell Hardness of Metallic Materials Test.

2.1.2. Additional Tests

Appendix I	V-Scribe Test for Adhesion.

3. QUALITY ASSURANCE

3.1. The supplier is responsible to ensure all materials conform to these specifications. A certificate of compliance with these specifications may be requested by Saskatchewan Highways and Transportation.

3.2. Samples may be requested and all materials must meet the specifications outlined herein.

3.3. All samples tested must meet the minimum requirements for material acceptance to be satisfied.

4. MATERIAL SPECIFICATIONS

4.1. Material Composition

4.1.1. Material shall contain no lead.

4.1.2. Material shall contain 47.5% to 50.5% tin by weight.

4.1.3. Material shall contain 0.8% to 1.3% copper by weight.

4.1.4. Material content not accounted for above shall consist solely of zinc.

4.2. The material shall possess all of the applicable minimum properties listed in ASTM Standard A780-92.

5. FINISHED REPAIR PROPERTIES

The finished repair, over both steel surface and galvanized surface shall meet the following minimum requirements:

5.1. Adhesion

5.1.1. Exhibit no tendency to flaking or chipping when tested using a pivoted hammer test according to ASTM Standard A123.

5.1.2. Exhibit no tendency to peeling when tested by V-Scribe method, as described in appendix.

5.2. Abrasion Resistance

5.2.1. Display a minimum abrasion resistance of 25 litres/mil when tested in accordance with ASTM Standard D-968, using G-40 steel grit.

5.3. Corrosion Resistance

5.3.1. Resist 500 hours of exposure to salt spray without displaying any red rust when tested in accordance with ASTM Standard B-117.

5.3.2. Resist 500 hours of exposure to 100% relative humidity without blistering and/or peeling when tested in accordance with ASTM Standard D-2247.

5.3.3. Resist atmospheric exposure to a 'light industrial atmosphere' for a minimum of 12 months with no red or white rust appearing.

5.4. Hardness

5.4.1. Exhibit a Brinell Hardness of BHN 25 or greater when tested in accordance with ASTM Standard E-10, using a 2 mm ball diameter, 20 kg load and a 30 s load duration.

6. APPEARANCE

6.1. Material must coat repaired surface evenly, without blistering or leaving flux deposits.

6.2. Repaired areas must approximate the same coloration and reflectivity as non-damaged areas.

7. APPLICATION

7.1. Application Temperature

7.1.1. Temperature required for best application of material must not exceed 300 degrees Celsius.

APPENDIX I

V-Scribe Test

A "V" scratch is made with two cuts, scribed at an angle of 20-30 degrees to each other, deep enough to go through the touch-up solder and into the steel substrate. The scribing tool used is a straight shank lathe cutting tool with a 0.4 mm radius tungsten carbide tip. A straight metal edge is used to guide the scribing tool. The adhesion is rated by the peeling of the segment of solder between the two sides of the "V", after lightly scratching the crossing with a thumb nail.

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APPROVAL SHEET

New __ Revision __ Date of Previous Document __-__-__

Effective Date: __-__-__

Description of Revision (Reason for Revision):

- Was developed in conjunction with revising the Chain Link Fencing SMM.

Review/Implementation Process:

- Reviewed by the Materials Section of the Technical Standards and Policies Branch.

Other Manuals/Policies Affected:

Nil

Follow Up/Training Required:

Forward to all District Design and Construction Engineers.

Comments/Concerns/Implications (Budget/Environment/Stakeholders):

Nil

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