GM WORLDWIDE ENGINEERING STANDARDS	Test Procedure	GMW15284

Spot Test for Etch Susceptibility of Stainless Steel

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. This standard describes a test procedure to be followed when conducting spot test on cold rolled stainless steel. The object of the test is to determine etch susceptibility on the stainless steel.

1.2 Applicability. Not applicable.

1.3 Remarks. Not applicable.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

ASTM D1193

2.2 GM Standards/Specifications.

None

3 Resources

3.1 Facilities.

3.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.2 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition.

3.2 Equipment.

3.2.1 Test Solution. The following reagent grade chemicals are dissolved in 200 ml of deionized water:

- 10 g ferric chloride (hydrated) ($Fe_3CI\ 6H_20$)
- 5 g sodium chloride
- 2.5 mL hydrochloric acid (concentrated)
- Deionized water (per ASTM D1193 Type IV)

Note: This test solution shall be stored in a stoppered glass container and used within 1 month of initial mixing.

3.2.2 Solvent. Suitable organic solvents or detergents for cleaning specimens.

3.2.3 Drying. A sufficient amount of soft clean cloth or paper towels for drying specimens.

3.2.4 Dropper. A clean glass dropper.

3.2.5 Container. A clean glass container (for immersion testing when required).

3.3 Test Vehicle/Test Piece. Coupons of incoming material or parts manufactured from stainless steel are satisfactory for the test. For Production Part Approval Process, actual production parts are to be used.

3.4 Test Time. Not applicable.

3.5 Test Required Information Not applicable.

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3.6 Personnel/Skills. Not applicable.

4 Procedure

4.1 Preparation. The stainless steel surface shall be cleaned of oil, wax, dirt or buffing compound by means of organic solvents or detergents, followed by a tap water rinse and drying with a paper towel.

4.1.1 Wash samples in Alconox or comparable detergent solution to achieve as near a water break-free surface as possible, i.e., scrub samples with nylon brush; soak samples (20 to 30) minutes; re-scrub samples; re-soak samples 5 additional minutes using an Alconox solution 8 g/l, at (+43 ± 2) °C. Rinse cleaned samples, each with fresh room temperature (+25 ± 5) °C water.

4.1.2 Immediately examine samples visually for any pits, scratches, roughness or other defects and record. Then begin test again within 1 minute of cleaning.

4.2 Conditions.

4.2.1 Environmental Conditions. The sample and test temperature solution should be maintained between (+25 ± 5) °C during testing.

4.2.2 Test Conditions. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

4.3 Instructions.

4.3.1 Application of Solution. Test solution shall be applied in the following way: Apply a drop with a clean glass dropper in a (6 to 8) mm diameter wax ring made with a china pencil or comparable wax marking device.

4.3.2 Duration of Test. The solution shall be left in contact with the surface of the sample for 5 minutes. The solution shall be removed by rinsing with flowing tap water, and the surface dried with forced air or by light rubbing with a clean soft cloth or paper towel. The wax ring shall be removed with an organic solvent. Test-to-failure should be done in additional 5 minutes increments.

5 Data

5.1 Calculations. Not applicable.

5.2 Interpretation of Results.

5.2.1 Etch susceptibility is determined by visual comparison of the test spot with untested surface areas. Etch susceptibility is indicated by various degrees of dulling, frosting, pitting, graying, or any other type of visible permanent change in luster of the test area. Samples should be viewed under daylight as well as fluorescent lighting.

5.2.2 Acceptance criteria shall be specified within engineering documentation which includes: Material Specifications, Subsystem Technical Specifications, Component Technical Specification, and Part Drawings.

5.3 Test Documentation. Document the etch susceptibility as described in 5.2.1.

6 Safety

This Engineering Standard may involve safety requirements for hazardous materials, the method of operations and equipment. This standard does not propose to address all the safety issues associated with its use. It is the responsibility of the user of this standard to ensure compliance with all appropriate safety and health practices. This would include any specific training that may be required. The safety and health standards include site specific rules and procedures, company rules and procedures, and Government Standards. Contact shall be made with the appropriate site Safety and Health personnel for further direction and guidance in these matters.

7 Notes

7.1 Glossary. Not applicable.

7.2 Acronyms, Abbreviations, and Symbols. Not applicable.

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