

SUBJECT: ZINC ELECTROPLATING - GENERAL (ZINC & YELLOW)

1. **SCOPE & PURPOSE.** This Material & Process Specification establishes the standard electroplated finish (zinc and yellow) for parts used on products manufactured for and by AGCO's Hesston Operations. This specification does not apply to hardware applications.

2. **SOURCE REFERENCE.** The Engineering Standards Department is responsible for the content of this specification. ASTM Standards listed below were used as reference

ASTM B633-98
ASTM B183-79 (97)
ASTM B242-99
ASTM B320-60 (97)
ASTM B322-99
ASTM B201-80 (00)

Vendor supplied information

3. **HISTORY.** Hay & Forage Industries (HFI) now AGCO's (Hesston) Operations changed its standard zinc electroplating requirements in the fall of 2000. Zinc electroplated with, Type III, (clear chromate conversion coating) was the standard electroplating finish. Zinc electroplated with, Type II, (colored chromate conversion coating) became the default standard. Zinc electroplated with Type II chromate conversion coating will be known as (zinc & yellow) in this document.

4. **MATERIALS AND PROCESSES.** The coating shall be essentially pure zinc produced by electrodeposition. All materials, processes and workmanship shall conform to the best practice for high quality plating.

4.1 **Workmanship and Appearance Conforming to ASTM B633.**

4.2 **Cleaning of Basis Metal.** Conforming to the appropriate ASTM Standards listed:

B 183 Standard Practice for Preparation of Low-Carbon Steel for Electroplating.

B 242 Standard Practice for Preparation of High-Carbon Steel for Electroplating.

B 320 Standard Practice for Preparation of Iron Casting for Electroplating.

B 322 Standard Guide for Cleaning Metals Prior to Electroplating.

4.3 **HIGH TENSILE STRENGTH MATERIALS.** Unless otherwise specified the following guidelines should be followed concerning the plating of high strength steels per ASTM B633.

4.3.1 High tensile strength steel parts are defined as any steel part having tensile strength greater than 1700 Mpa / 245,000 psi. These parts should not be electroplated.

4.3.2 Hydrogen Embrittlement Relief. All parts made from steel having an ultimate tensile strength of 1200 Mpa / 174,000 psi or greater must be baked at a minimum of 190° C (374° F) for 3 hours or more within 4 hours after electroplating to provide hydrogen embrittlement relief.

4.3.3 Stress Relief. All electroplated parts made from steel having an ultimate tensile strength of 1000 Mpa / 145,000 psi or greater and have been machined, ground, cold formed or cold straightened must be heat treated at a minimum 190° C (374° F) for 3 hours or more for stress relief before cleaning or electroplating.

4.4 **COATING THICKNESS.** Zinc electroplating shall be .0002 minimum thickness on all significant surfaces. Zinc electroplating shall be followed with a passivation treatment Type II, yellow dichromate treatment. Finish must be capable of withstanding 96 hour salt spray test

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without signs of white rust involvement. Significant surfaces will not be identified on AGCO prints. However, significant surfaces may be defined as any surface that is normally visible, directly or by reflection and which is essential to the appearance or serviceability of the part when assembled in the normal position or which can be the source of corrosion infiltration that would deface the adjoining surfaces of the assembled parts. Surfaces that are not readily controlled, such as threads, small holes, deep recesses, inside bases of angles and other similar surfaces may be exempt from the minimum thickness requirements.

4.5 Reactivation treatment per ASTM B633-98.

4.6 Supplementary Treatments per ASTM B201.

5. PLATING NOTES ON PRINTS. AGCO Corporation has expanded by acquiring numerous product lines and entire farm equipment companies. With the acquisition of these products and companies and the consolidation of facilities there are a number of print formats and plating specifications called out on prints for parts being manufactured for Hesston Operations. There will be print formats from Massey Ferguson, Allis Chalmers, White / New Idea, Duetz Allis, AGCO Coldwater, AGCO Independence, PMI, Hesston Corporation, Hay & Forage Industries (HFI), AGCO Hesston Operations, etc. for some time in the future. Hesston Operations has been revising the plating specifications called out on the prints as they are identified. These plating specifications are being revised to reflect the current Hesston Operations plating requirements. However, this is going to take a period of time to accomplish. Hesston Operations default plating is (Zinc & Yellow) per this Material & Process Specification. If the plating note on the print says "Plated" or "Plated per M & PS 705 100 009", or "Plated (Zinc & Clear) or "Zinc Plate per CMS

M1047 Part 2" or "Plate per HFI M & PS 705 100 009 (Zinc & Clear)", the parts should be plated (Zinc & Yellow). Prints with erroneous plating callouts should be identified to Hesston Operations Purchasing or Engineering Departments so that the prints can be revised. The plating note on new or revised prints will read:

**PLATE PER AGCO (HESSTON)
M&PS 705 100 009**

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