

Specification #FPG00002

Chrome Plating on Metallic and Plastic Components Specification Velvac Chrome Plating Visual Inspection Criteria

1. Specification is Built Around this Basic Premise:

A defect must be able to be seen from 20-28 inches or more away in the proper lighting. If not identified in this manner an anomaly is not considered objectionable.

2. Surfaces Defined:

2.1 Surface A: The front face; the side(s) the customer sees the most.

2.2 Surface B: The face on both sides of the part.

2.3 Surface C: The back side of the mirror.

2.4 Surface D: The bottom view of the part and the internal surface of a mirror shell.

2.5 Surface E: Internal surfaces of plated parts.

3. Inspection Requirements:

3.1 Distance: 20 - 28 inches

3.2 Time: 5 – 10 seconds per surface, 30 seconds total time

3.3 Part Viewed: “In Use” position as assembled onto a vehicle

3.4 Lighting Requirement: 100 foot candles = 110 watts

3.5 Initially Suspected Defective: Part Re-inspected by a second inspector

| Rev. Level | Rev. Date | Revision | Rev. By: |
|------------|-----------|--|--------------|
| 09 | 01-16-09 | E08297 – see 'red' changes in 'DRAFT' copy in ECN folder | D. Behling |
| 10 | 01-27-11 | E11016 re-written | D. Wittlieff |
| 11 | 02-20-12 | Added mounting surface requirement “E” | D. Wittlieff |

4. Critical Qualification:

4.1 The parts will be inspected for the following criteria:

Criteria for Surfaces:

- No un-plated pinholes or pits are allowed anywhere on Class A - C surfaces
- No peeling chrome or moveable bubbles or blisters are allowed on any Class A – C surfaces
- Color and gloss must be uniform across the part on Class A - C surfaces
- No yellow or golden hue is allowed on Class A - C surfaces except in the seam between elbow and arm.
- Appearance of copper is only allowed in the chamfer and threads of a bolt hole
- Excess plating build up is not allowed that will interfere with proper functioning of a part.
- In the case of a defect that appears on the edge of a part (border between visible and non-visible surfaces), the inspection criteria will apply only to amount of the defect that occurs in the visible area.

4.2 If non-conforming defects are detected the parts will be rejected.

5. Visual Qualification:

The parts will be visually inspected per Section 3 Inspection Requirements for non-conforming issues.

If non-conforming issues are detected the parts will be checked using the criteria in the Section titled Inspection Criteria.

Parts will then be rejected or accepted and dispositioned accordingly.

6. Required Inspection Techniques:

- All defective parts must be returned to their original packaging
- Defects are only marked on the part after re-inspection confirms the defect

Inspection Criteria:

| Surface Type | Soft Bubble | Hard Bubble | In Seam | Plated over | Scratch | | Plated over | Dents |
|--------------|-----------------------------------|---|-------------|--------------|--|--|---|-----------------------------------|
| | | | Hard Bubble | Grit or Bump | Smooth Surface | *Surface distorting | Pit/Pin Hole | |
| A | 0.03" max. | 0.06" max. | .125" max. | 0.06" max. | 1" long each, or total of 2" long combined in a group | .5" single, or total of 1" combined in a group | .020" dia or smaller up to 6 in 1" dia., or 3 up to .030" dia in 1" dia. or 1 pin hole (size > .030" & < .060") is allowed within a 1" diameter | up to .0625" wide and .1875" long |
| B | 0.03" max. | 0.06" max. | .125" max. | .090" max. | 1.5" long each, or total of 3" long combined in a group | 1" single, or total of 2" combined in a group | .020" dia or smaller up to 8 in 1" dia., or 6 up to .030" dia in 1" dia. or 1 pin hole (size > .030" & < .060") is allowed within a 1" diameter | up to .0625" wide and .375" long |
| C | 0.03" max. | .090" max. | .125" max. | .090" max. | 4" long each, or total of 8" long combined in a group | 2" single, or total of 4" combined in a group | .020" dia or smaller up to 10 in 1" dia., or 8 up to .030" dia in 1" dia., or 3 up to .060" dia. In 1" dia. | up to .125" wide and .50" long |
| D | Overall Plating coverage required | Plating quality must be to "C" standard within 1" of edge of visible, exposed chrome surface. | | | | | | |
| E | Internal areas of plated parts | Coverage required within ¼" of external edge For parts intended to mount to another surface (bases, etc) Type C level criteria applies within 1/16" of external edge | | | Note: For "E" surfaces, any scratches, dents, missing plating, soft & hard bubbles, or pits are farther than the applicable minimum distance requirement, the parts are deemed acceptable. | | | |