



Work Instructions

Title: **COSMETIC ACCEPTANCE CRITERIA**

Department: **QUALITY ASSURANCE**

Revision History				
Change Notice / Dev. Number	Description	Date	Old Rev.	New Rev.
100-229	Initial Release	1/16/09	-	I/R
100-277	Revised Para 5.0.2	06/29/10	I/R	A
	Reviewed and no changes required	06/02/11	-	A
Title		Authorized Signatures		Date
Originator	Robert Davies			1/16/09
Department Head	Kirit Patel			06/29/10
Revised By	George Sheldon			06/29/10
Documentation Coordinator	George Sheldon/Kirit Patel			06/29/10

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1.0 1.0 Purpose PURPOSE AND SCOPE

- 1.0 The purpose of this document is to establish cosmetic acceptability and non-acceptability criteria for customer shippable parts, assemblies and final products that are purchased or consigned to EPE Corporation for value added assembly.

2.0 RESPONSIBILITIES

- 2.0 Quality is responsible for maintaining this document and the content. Quality applies the information contained here in or as it is modified and agreed to between EPE and the customer to determine material compliance with this document.
- 2.1 Program Manager is responsible for providing Cosmetic Specifications to EPE Customers prior to value added assembly.
- 2.2 Purchasing/Buyer is responsible for communicating cosmetic criteria/requirements to all Suppliers of EPE Corporation.
- 2.3 Manufacturing Operators are responsible for assessing questionable material conformance with this specification

3.0 SURFACE COSMETICS

3.0 General Inspection Requirements:

- 3.0.1 Cosmetic inspection at EPE Corporation or its suppliers shall use the **TIME** and **DISTANCE** method of inspection as described in different sections of this document.
- 3.0.2 The Cosmetic standards defined in this Workmanship Standard shall be used for training personnel, checking surface quality produced by any process and used in making "Accept/Reject" decision.

3.1 Viewing Conditions:

- 3.1.1 All inspection will be made under normal artificial lighting, unaided and viewed in a manner that duplicates the typical end use of the product. During cosmetic inspection, only visual qualities (appearance) of the part surface shall be considered. Surfaces shall be viewed without the aid of magnification, at an angle approx. 45° to normal of the surface to be inspected.

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3.1.2 The following are Inspection criteria:

- 3.1.2.1 Inspection shall be conducted using the unaided eye.
- 3.1.2.2 Viewing distance shall be 18" or 24" as specified by surface class.
- 3.1.2.3 Viewing angle shall be 45° to the surface.
- 3.1.2.4 Light source shall be by cool white fluorescent light; the light source shall be positioned and distanced to provide optimal viewing and minimized glare and shadowing of the sample.
- 3.1.2.5 In the case where black light or other special lighting is required to detect or accent defects, the specifics specified in this procedure shall prevail, except where exempted in writing by the customer
- 3.1.2.6 Where subjectiveness intervenes in the assessment form/fit/function shall take precedent or where available 3rd party decision (including) but not limited to the customer/end user shall prevail.

3.1.3 General Guidelines

- 3.1.3.1 Viewing duration shall be based on part size as well as complexity.

Codes	Class A	Class B	Class C
Viewing Distance	450mm (18 in.)	450mm (18 in.)	600mm (24 in.)
Viewing Time	10 seconds	5 seconds	3 seconds
Viewing Area	322.6 cm ² (50 in. ²)	322.6 cm ² (50 in. ²)	322.6 cm ² (50 in. ²)

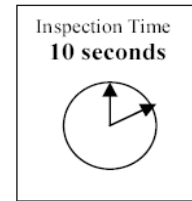
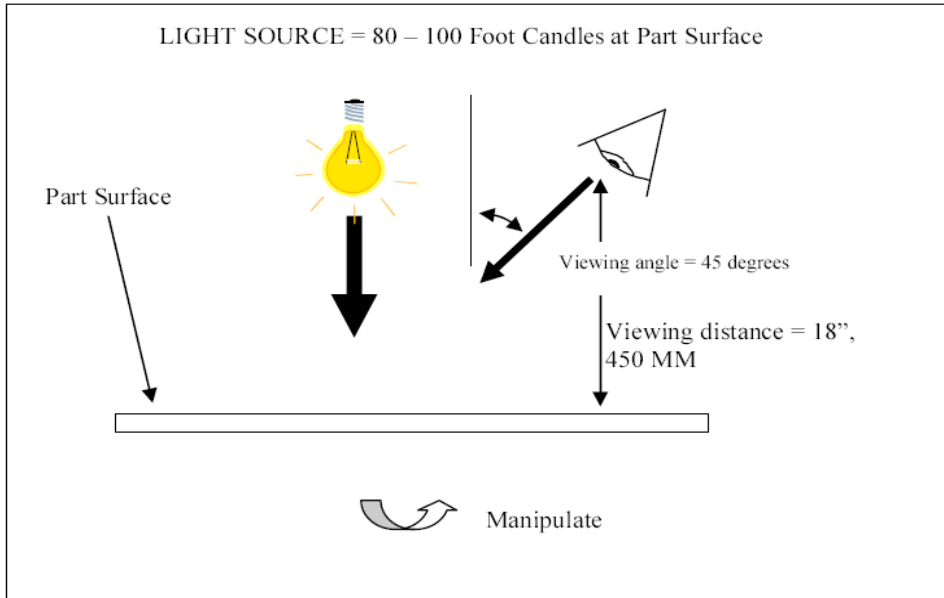
- 3.1.3.2 Discernable variation from the guidelines specified within this document shall be grounds for rejection.
- 3.1.3.3 Class "A" surfaces shall be manipulated during inspection to achieve maximum reflection of a light source. Class "B" and Class "C" surfaces shall NOT be manipulated during inspection. Refer to Class A, Class B, and Class C viewing condition figures below.

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Class A (Viewing Conditions – cool white light):

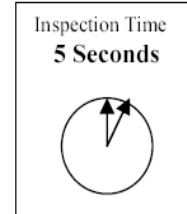
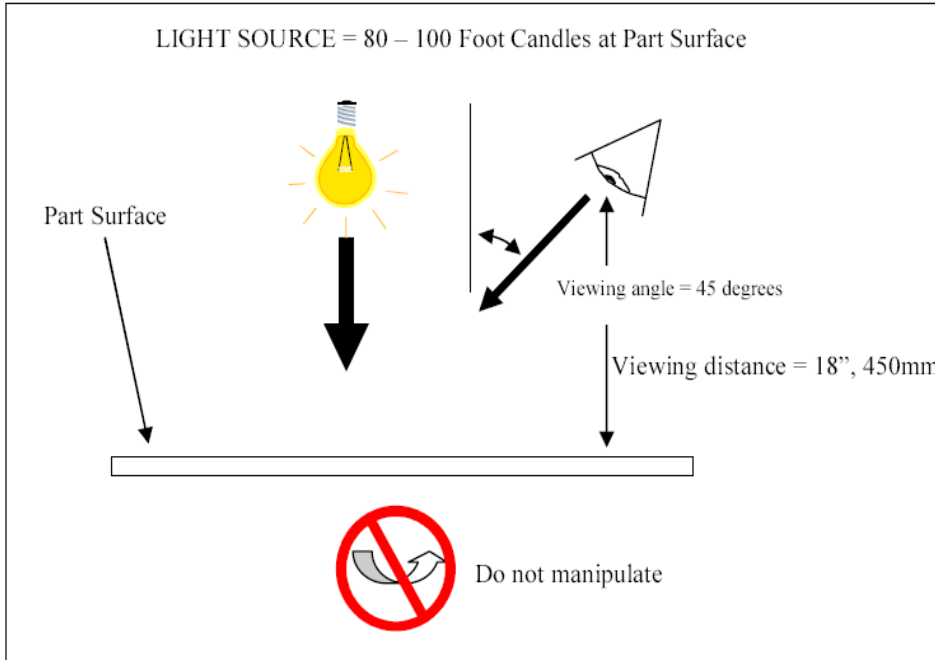


Class B (Viewing Conditions – cool white light):

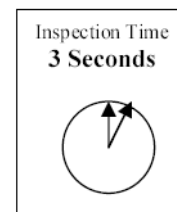
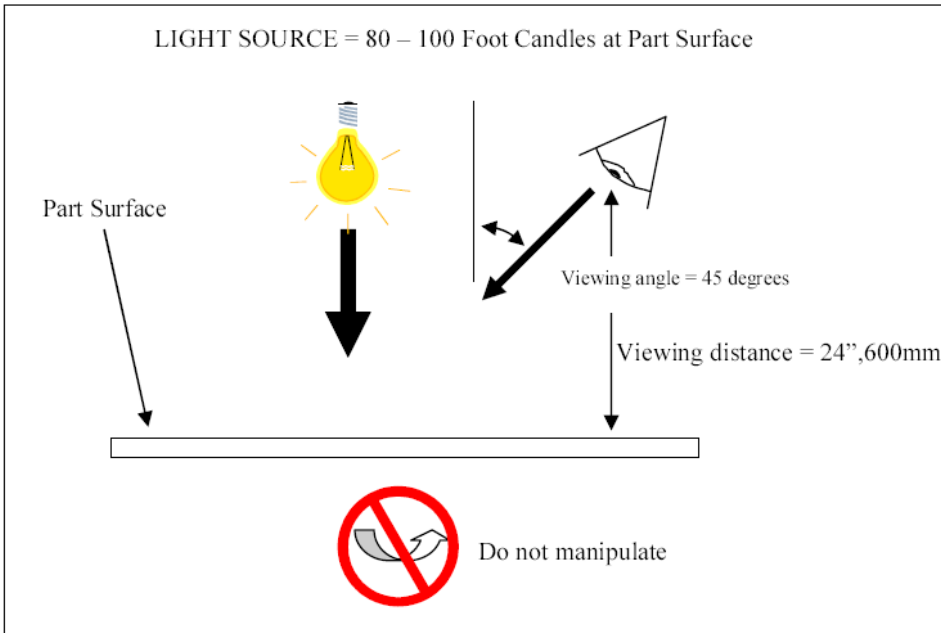
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Class C (Viewing Conditions – cool white light):



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4.0 SURFACE CLASSES

- 4.0 The following assumes the item being viewed is an assembled unit as it would appear in an operational environment. Assemblies utilizing unlike materials on the same viewing surface (e.g. plastic handles and fasteners on a sheet-metal panel) will have the same cosmetic class standard applied from the applicable material tables. When viewing separate components it must be understood which surfaces correspond to the classification below.
- 4.0.1 **CLASS A** - Highly decorative surface in constant view of the customer.
 - 4.0.2 **CLASS B** – Moderately decorative surface in occasional view of the customer without the unit being removed. Examples include but are not limited to the top and sides of rack-mounted chassis, rear faceplates.
 - 4.0.3 **CLASS C** – Non decorative surface not readily visible to the customer except when the unit is moved.

5.0 PLASTIC PARTS

5.0 Acceptable Criteria:

- 5.0.1 Acceptable Class A, Class B or Class C defects should not affect FIT or FUNCTION. In such cases affecting fit or function, the parts are automatic rejects.
- 5.0.2 For General inspection requirements and viewing conditions – reference beginning with **Section 5.3** (Various materials- Surface Cosmetics)
- 5.0.3 This spec. applies to parts with inserts and parts resulting from post molding operations.
- 5.0.4 50 sq. inch area in the Tolerance Table is the limit for the number of defects found acceptable within the surface area. For larger surfaces the number of defects allowed increases proportionally. Clustering of more than two defects is not acceptable.

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5.1 Texture:

5.1.1 Molded texture specs are the default plastic textures adopted by EPE Corporation.

5.2 Defect Definitions:

5.2.1 Protrusion – A raised area on a surface (blister, bump, ridge or gate mark)

5.2.2 Discoloration – Change from original color or inconsistent color within the same part

5.2.3 Burns – Black specs in the surface of the part due to overheating

5.2.4 Splays – Marks from gases or voids in the surface of a part.

5.2.5 Flow Marks – Wavy or streaked appearance of a surface.

5.2.6 Haze – Cloudiness on an otherwise transparent part.

5.2.7 Pits – Small craters on a surface.

5.2.8 Specks – Small pieces of material stuck to the surface.

5.2.9 Scratches – Shallow grooves forming lines on the surface.

5.2.10 Phantom Scratches – Light surface marring, visible through manipulation, but not from all angles or sides.

5.2.11 Sink – Depression on the surface.

5.2.12 Knit/Weld Line – A visible line formed at the intersection of material flow.

5.2.13 Blush – Inconsistency in surface gloss.

5.2.14 Parting Line/Flash – A visible line and or raised surface on the part formed at the intersection of (2) mating surfaces of the mold.

5.2.15 Texture Variation – Visible variation of texture from within the same part.

5.2.16 Mold Release – Spray lubricant used for ease of part release from the mold.

5.2.17 Color Variations – Color of part appears different from color sample chips.

5.3 Tolerance Table: (Plastic parts – Surface Cosmetics)

5.3.1 The total number of defects per surface shall not exceed the acceptable limit. Use the Table below for training inspection personnel and making “Accept/Reject” decisions.

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Defect Type	Class A	Class B	Class C
Protrusions	Not Acceptable	Qty 2 (Max) per 50 Sq." Area. Max Dim: .010 Sq" A x .015" H	Qty 8 (Max) per 50 sq." Area. Max Dim: .020 Sq." A x .030" H
Discoloration, Flow marks, Haze, Burns and Splay	Not Acceptable	Qty 4 (Max) per 50 Sq." Area. Max Dim: .010 Sq." Area.	Acceptable
Pits and Specks	Not Acceptable	Qty 4 (Max) per 50 Sq." Area. Max Dim: 0.06" Dia. x 0.15" Dp (Pits) Max Dim: 0.06 Dia. X .015" H (Specks)	Acceptable
Scratches	Not Acceptable	Qty 4 (Max) per 50 Sq." Area Max Dim: 0.25" L x .020" W	Acceptable
Phantom Scratches	Not Acceptable	Qty 4 (Max) per 50 Sq." Area Max Dim: 0.25" L x .020" W	Acceptable
Sink Marks	Not Acceptable	Qty 2 (Max) per 50 Sq." Area Max Depth: 0.005"	Acceptable
Knit/Weld Lines	Not Acceptable	Qty 2 (Max). Max Dim: 0.002" Wide	Acceptable
Blush	Not Acceptable	Acceptable	Acceptable
Parting Lines/ Flash	Not Acceptable	Flash: Max Dim: .005" protrusion from base surface. Mismatch/Step: Max Dim: .005". Diff from one surface level to another	.010 Max
Texture variation: Visible variation on the surface	Not Acceptable	Acceptable	Acceptable
Mold release on surface	Not Acceptable	Not Acceptable	Not Acceptable
Color Variation	Not Acceptable	Not Acceptable	Acceptable

6.0 SHEETMETAL PARTS

6.0 Acceptable Criteria:

- 6.0.1 Acceptable Class A, Class B or Class C defects should not affect FIT or FUNCTION. Any cosmetic defects that negatively affect fit or function of the part or assembly shall be rejected.
- 6.0.2 For general inspection requirements and viewing conditions reference **Section 6** (Surface Cosmetics).
- 6.0.3 This spec applies to both **Pre-Plated and Post Plated parts.**
- 6.0.4 **50 Sq. inch area** in the Tolerance Table is the limit for the number of defects found acceptable proportionally. Clustering of more than two defects is not acceptable.

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6.0.5 Fingerprints: No fingerprints, whether they penetrate the plating or not, are allowed in Class A, B or C. (Wear appropriate protective garments)

6.1 Defect Definitions:

- 6.1.1 Rainbow effect – Zinc plating may have discoloration or the “rainbow” effect.
- 6.1.2 Rust/ Oxidation – Chemical reaction of exposed metal with oxygen (air).
- 6.1.3 Discoloration – Any change from original color, intended color or inconsistent color.
- 6.1.4 Scratches – Visible but cannot be felt with thumbnail. Please consult your Quality Engineer or Process Engineer if you have product specific questions regarding Acceptability.
- 6.1.5 Gouge – Surface imperfection, deeper than a scratch, penetrates into plating, often with raised edges.
- 6.1.6 Plating Marks and Runs – Visible inconsistencies in the surface due to the plating process. Such as bleed outs, water runs and hook marks. Any mark, pit, scratch or gouge, should not penetrate the plating.
- 6.1.7 Marks – Pits, sanding or other marks on base material that remain visible after coating.
- 6.1.8 Non-uniform gloss – Areas that have insufficient or excessive gloss.
- 6.1.9 Grease or Oil – Used in the process and left on the surface (not cleaned).
- 6.1.10 Lint/Grit/Speck/Dust – Any unintended substance in the coating or on the surface
- 6.1.11 Pits – Small craters on the surface.
- 6.1.12 Tooling Marks – Normal process marks created by forming dies. These marks are consistent on all parts and located at the formed area. All other marks are not defined as standard tooling marks. Depth of tooling mark can be visible but cannot be felt with thumbnail.
- 6.1.13 Surface Finish (Texture) – A pattern (texture) produced by abrasive media. Such as a belt-sander that produces a grained finish and an oscillatory sander that produces an oscillated finish. GRIT size must be specified on individual part drawing.

6.2 Tolerance Table: (Post-Plated Sheet metal parts) (Surface Cosmetics)

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6.2.1 The total number of defects per surface shall not exceed the acceptable limit. Use Table below for training inspection personnel in making "Accept/Reject" decisions.

Defect Type	Class A	Class B	Class C		
Rainbow effect (seen on Zinc Plating)	Not Acceptable	Acceptable	Acceptable		
Rust/ Oxidation	Not Acceptable	Not Acceptable	Acceptable on sheared edges. Touch up allowed for rust spots on surfaces up to 0.25" Dia.		
Discoloration	Not Acceptable	Acceptable	Acceptable		
Gouge	Not Acceptable	Not Acceptable	Not Acceptable		
Scratch	For scratches which are within 0.25" L x .015" W		Not to Exceed Standard Manufacturing Practices* * Please check with specific NPI team member if there are questions re: Acceptability.		
	Surface Area	# of Scratches Allowed		Surface Area	# of Scratches Allowed
	10 - 20 sq in.	0		10 - 20 sq in.	3
	21 - 50 sq in.	0		21 - 50 sq in.	6
	51 - 200 sq.in.	0		51 - 200 sq.in.	10
	201+ sq. in	4		201+ sq. in	20
For Scratches which are within 0.50" L x 0.005" W		For Scratches which are within 1.00" L x 0.005" W			
Surface Area	# of Scratches Allowed	Surface Area	# of Scratches Allowed		
10 - 20 sq in.	0	10 - 20 sq in.	1		
21 - 50 sq in.	0	21 - 50 sq in.	2		
51 - 200 sq.in.	0	51 - 200 sq.in.	3		
201+ sq. in	1	201+ sq. in	7		
Accumulation of scratches not to exceed 2.5" in length/200+ sq. in.					
Surface Area	# of Scratches Allowed	Surface Area	# of Scratches Allowed		
10 - 20 sq in.	1	10 - 20 sq in.	1		
21 - 50 sq in.	2	21 - 50 sq in.	2		
51 - 200 sq.in.	3	51 - 200 sq.in.	3		
201+ sq. in	7	201+ sq. in	7		
Phantom Scratches	Not Acceptable	Acceptable	Acceptable		
Plating Marks and	Not Acceptable	Qty (2) Max per 50 Sq" Area	Acceptable		

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Runs		Max Dim: .06" W x .5" L	
Non-uniform Gloss	Not Acceptable	Acceptable	Acceptable
Grease or Oil	Not Acceptable	Not Acceptable	Not Acceptable
Grit/Dust/Lint/Speck	Not Acceptable	Acceptable	Acceptable
Protusions	Not Acceptable		Acceptable
Marks/Pits	Not Acceptable		Acceptable
Tooling Marks	Not Acceptable	Acceptable	Acceptable
Fingerprints	Not Acceptable	Not Acceptable	Not Acceptable
Surface Finish: Visible variation in texture from the approved sample.	Not Acceptable	Not Acceptable	Acceptable

6.3 Tolerance Table: (Pre-Plated Sheet metal parts) (Surface Cosmetics)

6.3.1 The total number of defects per surface shall not exceed the acceptable limit. Use the Table below for training inspection personnel in making "Accept / Reject" decisions.

Defect Type	Class A	Class B	Class C												
Rainbow effect (seen on Zinc plating)	N/A	Acceptable	Acceptable												
Rust/ Oxidation	N/A	Not Acceptable	Acceptable on sheared edges. Touch-up allowed for rust spots on surfaces up to 0.25" Dia.												
Discoloration	N/A	Acceptable	Acceptable												
Gouge	N/A	Not Acceptable	Not Acceptable												
Scratch	N/A	<p>For scratches which are within 0.25" L x .015" W</p> <table border="1" style="width: 100%;"> <tr> <td>Surface Area</td> <td># of Scratches Allowed</td> </tr> <tr> <td>10 - 20 sq in.</td> <td style="text-align: center;">3</td> </tr> <tr> <td>21 - 50 sq in.</td> <td style="text-align: center;">6</td> </tr> <tr> <td>51 - 200 sq.in.</td> <td style="text-align: center;">10</td> </tr> <tr> <td>201+ sq. in</td> <td style="text-align: center;">20</td> </tr> </table> <p>For Scratches which are within 1.00" L x 0.005" W</p> <table border="1" style="width: 100%;"> <tr> <td>Surface Area</td> <td># of Scratches Allowed</td> </tr> </table>	Surface Area	# of Scratches Allowed	10 - 20 sq in.	3	21 - 50 sq in.	6	51 - 200 sq.in.	10	201+ sq. in	20	Surface Area	# of Scratches Allowed	<p>Not to Exceed Standard Manufacturing Practices*</p> <p>* Please check with specific NPI team member if there are questions re: Acceptability.</p>
Surface Area	# of Scratches Allowed														
10 - 20 sq in.	3														
21 - 50 sq in.	6														
51 - 200 sq.in.	10														
201+ sq. in	20														
Surface Area	# of Scratches Allowed														

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		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">10 - 20 sq in.</td> <td style="width: 50%; text-align: center;">1</td> </tr> <tr> <td>21 - 50 sq in.</td> <td style="text-align: center;">2</td> </tr> <tr> <td>51 - 200 sq.in.</td> <td style="text-align: center;">3</td> </tr> <tr> <td>201+ sq. in</td> <td style="text-align: center;">7</td> </tr> </table>	10 - 20 sq in.	1	21 - 50 sq in.	2	51 - 200 sq.in.	3	201+ sq. in	7	
10 - 20 sq in.	1										
21 - 50 sq in.	2										
51 - 200 sq.in.	3										
201+ sq. in	7										
		<p>Accumulation of scratches not to exceed 2.5" in length/200+ sq. in.</p>									
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Surface Area</th> <th style="width: 50%;"># of Scratches Allowed</th> </tr> </thead> <tbody> <tr> <td>10 - 20 sq in.</td> <td style="text-align: center;">0</td> </tr> <tr> <td>21 - 50 sq in.</td> <td style="text-align: center;">0</td> </tr> <tr> <td>51 - 200+ sq.in.</td> <td style="text-align: center;">1</td> </tr> </tbody> </table>	Surface Area	# of Scratches Allowed	10 - 20 sq in.	0	21 - 50 sq in.	0	51 - 200+ sq.in.	1	
Surface Area	# of Scratches Allowed										
10 - 20 sq in.	0										
21 - 50 sq in.	0										
51 - 200+ sq.in.	1										
Phantom Scratches	N/A	Acceptable	Acceptable								
Plating Marks and Runs	N/A	Qty (2) Max per 50 Sq" Area Max Dim: .06" W x .5" L	Acceptable								
Non-uniform Gloss	N/A	Acceptable	Acceptable								
Grease or Oil	N/A	Not Acceptable	Not Acceptable								
Grit/Dust/Lint/Speck	N/A	Acceptable	Acceptable								
Protrusions	N/A	Qty 4 (Max) per 50 Sq." Area Max Dim: 0.06" Dia. x .010" H	Acceptable								
Mark/Pits	N/A	Qty 4 (Max) per 50 Sq." Area Max Dim: 0.06" Dia. x .010" DP	Acceptable								
Tooling Marks	N/A	Acceptable	Acceptable								
Fingerprints	N/A	Not Acceptable	Not Acceptable								
Surface Finish: Visible variation in texture from the approved sample.	N/A	Not Acceptable	Acceptable								

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7.0 DIE CAST PARTS

7.0 Acceptable Criteria:

- 7.0.1 Acceptable Class A, Class B or Class C defects should not affect FIT or FUNCTION. In such cases as affecting fit or function the parts are automatic rejects.
- 7.0.2 For General Inspection requirements and viewing conditions- reference **Section 3** (Surface Cosmetics).
- 7.0.3 This specification applies to all RAW and PLATED die cast parts and to parts resulting from post casting operations.
- 7.0.4 **50 Sq. inch area** in the Tolerance Table is the limit for the number of defects found acceptable within that surface area. For larger surfaces the number of defects allowed increases proportionally. Clustering of more than two defects is not acceptable.

7.1 Defect Definitions:

- 7.1.1 Growth – Expansion of casting from aging
- 7.1.2 Heat Checking – Fine cracks, veins or fins of any length
- 7.1.3 Sink – Depression on the surface
- 7.1.4 Porosity – Holes or voids (blow holes, pits, underfills)
- 7.1.5 Protrusions – A raised area on a surface (blisters, bumps, ridge and gate).
- 7.1.6 Specks – Small particles stuck on the surface.
- 7.1.7 Scratches – Shallow grooves forming lines on the surface.
- 7.1.8 Weld Line – A visible line or mark on a surface of any length.

7.2 Tolerance Table: (Die Cast parts) (Surface Cosmetics)

Defect Type	Class A	Class B	Class C
Growth	Not Acceptable	Qty (2) Max Dim: .10" Dia. x .015" H	Acceptable
Heat Checking and Sink	Not Acceptable	Qty (4) Max Depth: .03" (sinks/cracks) Max Height: .015" (fins)	Acceptable
Porosity, Protrusions and Specks	Not Acceptable	Qty (4) Max Dim: .05" Dia. x .15" H	Acceptable
Scratches	Not Acceptable	Qty (4) Max Dim: .02" W x .25" L	Acceptable

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Weld Lines	Not Acceptable	Qty (4) Max Depth: .008	Acceptable
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8.0 WET PAINT & POWDER COAT COSMETIC SURFACE FINISHES

8.0 Acceptable Criteria:

- 8.0.1 All classes must exhibit good workmanship and meet requirements (as specified per customer product drawings and/ or specifications) for color, gloss, texture, and film thickness and adhesion.
- 8.0.2 Wet paint touch up is acceptable as long as it meets the Class B and Class C defect criteria in the Tolerance Table.
- 8.0.3 For general inspection requirements and viewing conditions – reference **Section 3** (Surface Cosmetics).
- 8.0.4 **50 Sq. inch area** in the Tolerance Table is the limit for the number of defects found acceptable within that surface area. For larger surfaces the number of defects allowed increases proportionally. Clustering of more than two defects is not acceptable.

8.1 Defect Definitions:

- 8.1.1 Debris – Foreign material and objects
- 8.1.2 Dents – Local material impressions
- 8.1.3 Gouges – Material removed or displacement in a local area resulting in the removal of paint and/or base material.
- 8.1.4 Scratches – Shallow grooves forming lines on the surface.
- 8.1.5 Phantom Scratches – Light surface marring, visible through manipulation, but not from all angles or sides.
- 8.1.6 Orange Peel – Surface condition caused by an irregular waviness of a paint finish, resembling an orange peel texture.
- 8.1.7 Paint Runs – Caused by excessive paint in a local area not drying uniformly.
- 8.1.8 Discoloration – Non-uniform color.
- 8.1.9 Light Coverage – Inadequate paint coverage.
- 8.1.10 Texture Variation – Visible variation in texture on the part surface.
- 8.1.11 Blisters – Areas of local air entrapment or non-adhesion

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8.1.12 Stains – Spots or uneven color on the surface due to defects in material or due to poor cleaning.

8.2 Tolerance Table: (Wet Paint & Powder Coat finishes) (Surface Cosmetics)

Defect Type	Class A	Class B	Class C
Debris including Fibers	Not Acceptable	Qty (3) Max. particles of less than .040" Dia. X .015" H per 50 sq. inch area	Acceptable
Dents	Not Acceptable	Qty (3) Max. dents of less than 0.040" Dia. Per 50 sq. inch.	Acceptable
Gouges	Not Acceptable	Not Acceptable	Acceptable. Must not penetrate base metal.
Scratches	Not Acceptable	Max. of 4 - .025" L x .015" W per 50 sq. inch area * Wet paint touch up may be required.	Acceptable. Must not penetrate base metal. Touch up NOT required.
Phantom Scratches	Not Acceptable	Max. of 4 - .025" L x .015" W per 50 sq. inch area	Acceptable. Must not penetrate base metal. Touch up NOT required.
Orange Peel	Not Acceptable	Not Acceptable	Acceptable
Paint Runs	Not Acceptable	Not Acceptable	Acceptable
Light Coverage	Not Acceptable	Not Acceptable	Acceptable
Discoloration	Not Acceptable	Not Acceptable	Acceptable
Texture variation: Visible variation on the surface	Not Acceptable	Acceptable	Acceptable
Blisters	Not Acceptable	Not Acceptable	Not Acceptable
Stains	Not Acceptable	Not Acceptable	Acceptable

*** For items denoted by “**” contact Process Engineer to determine if touch up of this defect will be allowed. For touch up to be performed on a Class A or Class B surface it must be approved by the Customer.**

9.0 PRODUCT MARKING:

9.0 Acceptable Criteria:

- 9.0.1 Acceptable Class A, Class B or Class C defects should not affect FIT or FUNCTION. In such cases as affecting fit or function the parts are automatic rejects.
- 9.0.2 For General Inspection requirements and viewing conditions- reference **Section 3** (Surface Cosmetics).
- 9.0.3 This spec applies to all Product Marking processes such as Product ID labels, Silk Screening, Rubber Stamp, Laser and Chemical etching etc. However, this

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spec does not provide criteria for Class C surfaces. The markings on a Class C surface such as barcode labels (i.e. serial number, deviation number or CLEI code labels) and the compliance labels are intended to provide information and shall be inspected against EPE Workmanship Standards.

9.1 Defect Definitions:

- 9.1.1 Label is loose and falling off – Label not properly adhered to surface or does not stay in designated location.
- 9.1.2 Label Edges / Corners dog-eared or not fully adhered to surface. Example: Label edge peeled up.
- 9.1.3 Misapplied Label on the product. Example: Label is not parallel or perpendicular to the product edge.
- 9.1.4 Mis- registered text or graphics. Example: Text or graphics is off or not parallel to the label edge.
- 9.1.5 Mis-registered silkscreen text or graphics on product. Example: Silkscreen text is off edge or not parallel to the edge of product or to the label edge.
- 9.1.6 Scratched Label – Shallow grooves forming lines on the surface.
- 9.1.7 Phantom Scratches (Abraded label) – Light surface marring, visible through manipulation, but from all angles or sides.
- 9.1.8 Scratched or Abraded Silk Screening – Shallow grooves forming lines on the surface.
- 9.1.9 Stray Spots and Print Voids – Typically the spots are round or oval in shape. Several small spots clustered together can appear as a single spot and should be considered a single spot.
- 9.1.10 Variable Line width of text or graphics – Print imperfections appearing with line width variation.
- 9.1.11 Illegible Text / Smudged Ink/ Non-Permanent Ink – Can be problem with ink or post-print handling resulting in smears.
- 9.1.12 Ragged Printed Edges – Print imperfections with ragged profile
- 9.1.13 Filled Text – Example: Ink-filled txt (i.e. the letter “O” may appear as a dot).
- 9.1.14 Ink Non-Opacity – Example: Ink is translucent (i.e. you can see through the ink).
- 9.1.15 Incomplete Characters – Example: The letter “R” appears as a “P”.

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9.1.16 Pin Holes – (Blistering in Silkscreening) Blistering resulting in pinholes in the silkscreening.

9.1.17 Inconsistent Ink Color – Color of ink appears different with a part when compared to other parts in the same production lot.

9.2 Tolerance Table: (Product Marking) (Surface Cosmetics)

Defect Type	Class A	Class B	Class C
Label loose or falling off	Not Acceptable	Not Acceptable	Refer to 9.1.3
Label edges/ corners dog-eared or not fully adhered.	Not Acceptable	Not Acceptable	Refer to 9.1.3
Scratched Label	Not Acceptable	Not Acceptable	Refer to 9.1.3
Phantom Scratches	Not Acceptable	Qty (1) Max Abrasion of less than .25" L x .020" W per 5 sq. inch area	Refer to 9.1.3
Scratched or Abraded Silk screening	Not Acceptable	Not Acceptable	Refer to 9.1.3
Misapplied Label on the product. Example: Label is not parallel or perpendicular to the product edge.	Acceptable within 1 degree	Acceptable within 2 degree	Refer to 9.1.3
Mis- registered text or graphics. Example: Text or graphics is off or not parallel to the label edge.	Acceptable within 1 degree	Acceptable within 2 degree	Refer to 9.1.3
Mis-registered silkscreen text or graphics on product. Example: Silkscreen text is off edge or not parallel to the edge of product or to the label edge.	Acceptable within ½ degree	Acceptable within 1 degree	Refer to 9.1.3
Variable line width of text or graphics.	Line width within 5% Acceptable	Line width within 10% Acceptable	Refer to 9.1.3
Stray Spots and Print Voids	Not Acceptable	Qty (4) Max. spots or less than .008" Dia. Per 5 sq. inch area	Refer to 9.1.3
Illegible text/ Smudged Ink/ non-permanent ink	Not Acceptable	Not Acceptable	Refer to 9.1.3
Filled Text	Not Acceptable	Not Acceptable	Refer to 9.1.3
Ink non-capacity	Not Acceptable	Not Acceptable	Refer to 9.1.3
Incomplete Characters	Not Acceptable	Not Acceptable	Refer to 9.1.3

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Pin Holes	Not Acceptable	Qty (4) Max. spots or less than .008" Dia. Per 5 sq. inch area	Refer to 9.1.3
Inconsistent Inc color	Not Acceptable	Not Acceptable	Refer to 9.1.3

10.0 QUALITY RECORDS

10.0 N/A

11.0 ASSOCIATED/RELATED DOCUMENTS

11.0 N/A