

1. PURPOSE:

The purpose of this document is to establish the acceptance criteria for the cosmetic aspect of Molex's components and assemblies. This document does not apply where there is a concern for mechanical or electrical functionality.

2. APPLICATION:

This specification applies to all products produced by the Commercial Products Division and Transportation Product Division. The examples included are intended to establish a baseline for customer acceptance and are not limited to the examples shown. Contact Molex product marketing for additional clarification.

In cases where product drawing notes conflict with this specification, the drawing notes take precedence.

3. REFERENCE DOCUMENTS:

3.1. None

4. DEFINITIONS:

- 4.1. Surface Classification: (To be identified on part drawing by responsible engineer)
 - 4.1.1 Class A (Highly decorative surface)
 - Any surface in constant view of the end customer, or
 - Any surface that directly affects a direct customer's ability to process Molex's connectors.
 - 4.1.2 Class B (Moderately decorative surface)

Any surface in occasional view of the end customer without moving or disassembling the unit, or

Any surface that has a minimal impact on a direct customer's ability to process Molex's connectors.

4.1.3 Class C (Non decorative surface)

Any surface not readily visible to the end customer except when unit is moved or disassembled, **or** Any surface that has no impact on a direct customer's ability to process Molex's connectors.

- 4.2. End Customer The end user of the Molex product (original equipment manufacturer, etc.)
- 4.3. Direct Customer The "ship to" customer (contract manufacturer, distributor, etc.)

4.4. Descriptions of Cosmetic Conditions:

- 4.4.1 Blisters: Areas of local air entrapment or non-adhesion.
- 4.4.2 Blush / Sheen Variation: Inconsistency in the gloss or luminance of a surface or fingerprints within the same part.
- 4.4.3 Color Variation: Variation of the surface color intensity or shade across parts. Intensity or shade is uniform within parts.
- 4.4.4 Contamination/Dirt/Smudge: Foreign substances inadvertently adhered/attached to a part surface that requires a special cleaning process.
- 4.4.5 Debris Lint/ Grit/ Speck: Any unintended non-metallic substance on a surface that is easily removed.

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- 4.4.6 Dents: Local material depressions.
- 4.4.7 Discoloration: Change from original color or inconsistent color within the same part.
- 4.4.8 Flash / Parting Line Mismatch: A visible line and/or raised surface formed at the intersection of two mating surfaces of the mold or part.
- 4.4.9 Flow Marks/ Šplay: Wavy or streaked appearance of a surface.
- 4.4.10 Gouge: Visible lines that can be felt with a thumbnail.
- 4.4.11 Heat Checking: Raise veins of material due to small cracks in the surface of molds and dies.
- 4.4.12 Internal Speck: Any unintended substance visible within a molded part.
- 4.4.13 Knit / Weld Lines: A visible line formed at the intersection of material flow.
- 4.4.14 Nick: a small notch or chip.
- 4.4.15 Orange Peel: Stress lines or crinkled appearance generally located near areas that are formed.
- 4.4.16 Oxidation: A natural chemical process that produces metal oxides on the surface of base metals.
- 4.4.17 Paint Runs: Caused by excessive paint in local area not drying uniformly.
- 4.4.18 Pits: Small craters on a surface.
- 4.4.19 Protrusion: A raised area on a surface (bump, ridge, or gate mark).
- 4.4.20 Scratches: Shallow grooves forming lines on the surface that cannot be felt with a thumbnail.
- 4.4.21 Short-fill: An area not completely formed during the molding process.
- 4.4.22 Sink: Depressions on the surface.
- 4.4.23 Texture Variation: Variation of the surface appearance due to surface roughness either within the part or across parts.
- 4.4.24 Tool Marks: A mark created by the manufacturing process typically consistent on all parts from that process.
- 4.4.25 Burn & Splay Marks: Surface defects created by Laser Spot Welding
- 4.4.26 Missing/Peeling Plating: Surface area that is no longer plated/coated due to poor adhesion.
- 4.4.27 Debris Flakes: Any unintended metallic substance on a surface that is easily removed.

5. RECORDS AND REPORTS

5.1 None

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6. PROCEDURE:

- 6.1 Viewing Magnification:
 - Class A view with the unaided eye (no magnification). Class B – view with the unaided eye (no magnification). Class C – view with the unaided eye (no magnification).
- 6.2 Viewing Distance:
 - Class A 450 mm / 18 inches
 - Class B 450 mm / 18 inches
 - Class C 600 mm / 24 inches
- 6.3 Viewing Time:
 - Class A 10 seconds
 - Class B 5 seconds
 - Class C 3 seconds
- 6.4 Viewing Angle:
 - Class A 45 degrees from the light source and with 80-100 foot candles of illumination.
 - Class B 45 degrees from the light source and with 80-100 foot candles of illumination.
 - Class C 45 degrees from the light source and with 80-100 foot candles of illumination.

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6.5 Evaluation Criteria per Unit – Non-Plated Plastic Parts

Condition	Illus	tration	Class A Su	rfaces	Class B Surfaces	Class C Su	
Blisters			Not Acceptable	2	Not Acceptable	Not Acceptable	3
Color Variation			Acceptable on defined range measurable m such as color o	using eans	Acceptable if color is recognizable	Acceptable	
Contamination/Dirt/ Smudge			Not Acceptable	2	Not Acceptable	Maximum .020 square – 4 loca surface	
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5 Evaluation Criteria per C Condition	Illust	· · · · · · · · · · · · · · · · · · ·	Class A Surfaces	Class B Surfaces	Class C Su	rfaces
Dents/Nicks			lot Acceptable	.060"/1.52mm wide x .015"/0.38mm deep 4 locations	Acceptable	
Discoloration			lot Acceptable	Maximum .100"/2.54mm square 4 locations	Acceptable	
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Condition	Illustration	Class A Surfaces	Class B Surfaces	Class C Surfaces
Flash / Parting Line Mismatch		Not Acceptable	Maximum protrusions or mismatch .010"/0.254 mm 2 locations	Maximum protrusions or mismatch .020"/0.508 mm 8 locations

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6.5 Evaluation Criteria per Unit – Non-Plated Plastics (continued)

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Co	ndition	Illustr	ation	Class A Surfa	aces	Class B Surfaces	Class C Su	rfaces
Flow Marks	s/ Splay			Not Acceptable		Acceptable	Acceptable	
Internal Sp	eck			Not Acceptable		Maximum .020"/0.51mm square 8 locations	Acceptable	
Knit / Weld	Lines			Not Acceptable		Maximum width .002"/0.051mm 2 locations	Acceptable	
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	ondition	Illustr	ation	Class A Surfaces	Class B Surfaces	Class C Sur	faces
Lint / Grit /	Speck			Not Acceptable	Maximum .060"/1.52mm x .015"/0.38mm thick 4 locations	Acceptable	
Pits				Not Acceptable	.060"/1.52mm wide x .015"/0.38mm deep 4 locations	Acceptable	
Protrusion				Not Acceptable	Maximum protrusions .010"/0.254 mm square area x .015"/0.38mm high 2 locations	Maximum protru .020"/0.508 mm area x .015"/0.38 8 locations	square
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5.5 Evaluation Criteria per Condition	Illustr		Class A Surface		Class C Su	rfaces
Scratches/Gouges			Not Acceptable	.250"/6.35mm long x .020"/0.508mm wide 4 locations	Acceptable	
Short Fill		J	Not Acceptable	Not Acceptable	Acceptable	
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Sink		Not Acceptable	Maximum depth	Acceptable
			.005"/0.127mm 2 locations	
Texture Variations		Not Acceptable	Acceptable	Acceptable
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	ndition Illust		ss A Surfaces	Class B Surfaces	Class C Surfaces
Tool Mark	s	Not Acc	eptable	Acceptable	Acceptable
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6.6 Evaluation Criteria per Unit – Plated Plastic Parts (See Non-Plated Plastics for Additional Criteria)

	dition	Illustra	ation	Class A Surfaces	Class B Surfaces	Class C Su	faces
Blisters				Not Acceptable	Not Acceptable	Not Acceptable	
Blush				Not Acceptable	Acceptable	Acceptable	
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Condition	Illustration	Class A Surfaces	Class B Surfaces	Class C Surfaces
Discoloration		Not Acceptable	Acceptable	Acceptable
Knit / Weld Lines	J.	Not Acceptable	Maximum width .002"/0.051mm 2 locations	Acceptable
Dents/Nicks		Not Acceptable	.060"/1.52mm wide x .015"/0.38mm deep 4 locations	Acceptable
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Condition	Illus	tration Class	A Surfaces C	lass B Surfaces	Class C Sur	faces
Dents/Nicks (continu	ued)	Not Acce		/1.52mm wide x /0.38mm deep 4 ions	Acceptable	
Missing Plating		Not Acce		mum diameter /3.81mm – around	Maximum diame .150"/3.81mm – gate	
			.050" featu	mum diameter /1.27mm on all res protruding from body 2 locations	Maximum diame .050"/1.27mm or features protrudi main body 4 lo	n all ng from
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Co	ondition	Illust	ration	Class A Surf	aces Cl	ass B Surfaces	Class C Su	rfaces
Pits				Not Acceptable		1.52mm wide x 0.38mm deep 4 ons	Acceptable	
Protrusion	1			Not Acceptable	.010"/ area x	num protrusions 0.254 mm square ‹ .015"/0.38mm high cations	Maximum protru .020"/0.508 mm area x .015"/0.3 high 8 location	n square 88mm
Scratches	/Gouges			Not Acceptable		6.35mm long x 0.508mm wide 4 ons	Acceptable	
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Condition	Illu	stration Class A Su		Class C Surfac	ces	
Blush		Not Acceptable	Acceptable	Acceptable		
Dents / Pits		Not Acceptable	.060"/1.52mm x .010"/0.25mm deep locations	4 Acceptable		
Discoloration		Not Acceptable	Maximum .060"/1.52m square 4 locations	Im Acceptable		
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Condition	Illustration	Class A Surfaces	Class B Surfaces	Class C Surfaces	
Gouge		Not Acceptable	The equivalent of 2 marks .100"/2.54mm long	The equivalent of 4 marks .200"/5.08mm long	
Lint / Grit / Speck		Not Acceptable	Maximum .020"/0.51mm x .005"/0.13mm thick 4 locations	Acceptable	
Orange Peel		Not Acceptable	Acceptable	Acceptable	
Oxidation		Not Acceptable	Acceptable	Acceptable	
Scratches		Not Acceptable	The equivalent of 2 marks .100"/2.54mm long	Acceptable	
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6.7 Evaluati	on Criteria per	Unit – Stamped, Rollec	l, and Screw Machined Metal	Parts (Fini	shed or Un-Fir	nished) (continued)		
Con	dition	Illu	stration	Class	A Surfaces	Class B Surface	es Class C S	Surfaces
Con Texture V			stration	Class A		Class B Surface Acceptable	Acceptable	
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Condition	IIIu	istration	Class	A Surfaces	Class B Surface	s Class C S	urfaces
Tool Marks			Not Acce	eptable	Acceptable	Acceptable	
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Cond	lition	Illu	stration	Clas	s A Surfaces	Class B Surfac	es Class C S	Surfaces
Tool Marks Continued				Not Ac	ceptable	Acceptable	Acceptable	
Sheen Vari	ation			Not Ac	ceptable	Acceptable	Acceptable	
Color Varia	ition	bright	E Shade	within using r	able only defined range neasurable such as color	Acceptable if colo recognizable and without variation within the same lo parts		
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Contamination/Dirt/				Class B Surfaces		urfaces
Smudge			Not Acceptable	Not Acceptable	Maximum .020"/0.51m – 4 locations surface	
Blisters			Not Acceptable	Not Acceptable	Maximum .020"/0.51m – 4 locations surface	m square s per
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Condit	tion	Illustration	Class A Surfaces	Class B Surfaces	s Class C	Surfaces
Missing / F Platin	Peeling g		Not Acceptable	Not Acceptable *Does not apply t tooling or "bando marks. See abov	o " toolin " "hando"	' marks.
Plating F	Flake	QD	Not Acceptable	Maximum length 0.5mm	n Maximui 0.5i	n length nm
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6.8 Evaluation Criteria per unit – Die Cast parts with or without coatings (not hermetically sealed)

Condition	Illustration	Class A Surfaces	Class B Surfaces	Class C Surfaces
Blisters		Not Acceptable	Not Acceptable	Not Acceptable
Dents / Pits		Not Acceptable	.060"/1.52mm x .015"/0.38mm deep 4 locations	Acceptable
Discoloration		Not Acceptable	Maximum .020"/0.51mm square 4 locations	Acceptable
Flash / Parting Line Mismatch		Not Acceptable	Maximum protrusions or mismatch .010"/0.254 mm - - 2 locations	Maximum protrusions or mismatch .020"/0.508 mm - 8 locations
Flow Marks		Not Acceptable	Acceptable	Acceptable
Gouge		Not Acceptable	The equivalent of 2 marks .100"/2.54mm long	The equivalent of 4 marks .200"/5.08mm long
Heat Checking		Not Acceptable	Not Acceptable	Maximum .030"/0.76mm deep 4 locations

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Cond	dition	Illustration	Class A Surfaces	Class B Surfaces	Class C Surfaces	
Knit / Weld Lir	nes		Not Acceptable	Maximum width .008"/0.20mm 4 locations	Acceptable	
Lint / Grit / Sp	eck		Not Acceptable	Maximum .050"/1.27mm x .015"/0.38mm thick 4 locations	Acceptable	
Oxid	lation		Not Acceptable	Not Acceptable	Acceptable	
Protr	usion		Not Acceptable	Maximum protrusions .010"/0.254 mm 2 locations	Maximum protrusions .020"/0.508 mm 8 locations	
Scra	tches		Not Acceptable	.250"/6.35mm x .020"/0.51mm wide 4 locations	Acceptable	
Sho	rt Fill		Not Acceptable	Not Acceptable	Acceptable	
Si	ink		Not Acceptable	Maximum depth .030"/0.76mm 4 locations	Acceptable	
Texture \	Variations		Not Acceptable	Acceptable	Acceptable	
Tool	Marks		Not Acceptable	Acceptable	Acceptable	
		tically sealed surfaces				
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Co	ondition	Illustration	Class A Surfaces	Class B Surfaces	Class C Sur	faces
Burn & Sp	lay		Not Acceptable	Not Acceptable	Acceptable	
Discolorati	ion	6	Not Acceptable	Acceptable	Acceptable	
Base Meta	al Exposure		Acceptable	Acceptable	Acceptable	
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8. REVISION HISTORY

Revision	Approval / Date	Description of Cha	ange		
А	Skip Fry 06 / 28 / 2006	Pending release.			
В	Skip Fry 08/23/2006	Add 7.3 Tool Marks			
С	Mibarra 09/12/2007	Modify Plated Pla	stic Criteria		
D	Mibarra 12/10/2007	Rearrange Tables			
Е	Mkipper 02/09/2011	Add Sheen Variat	ion to Definition 4.4.2, and Criteria 6.7.		
E1	MMSTROH 10/12/2011	Add tool mark and internal speck (se	t texture variation pictures (section 6.7) and added picture for ction 6.5)		
F	JKACHLIC 01/31/2012	Add section 4.4.2	Add section 4.4.25 for Burn and Splay Marks and section 6.10 for Laser Spot Welding of Stamped Metal Assemblies		
F1	MKIPPER 06/07/2012	Add picture to texture variation (section 6.7)			
F2	APROFFITT 12/21/12	Added additional cosmetic conditions to section 6.7 and descriptions to section 4.			
F3	MKIPPER 2/11/2013	Change Discoloration and Internal Speck requirements for Class B Surface (section 6.5), add picture.			
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