Cosmetic Criteria of Heatsink

1. SCOPE

This specification describes the acceptable requirements and the not acceptable cosmetic quality criteria for heatsink product.

2. PURPOSE

2.1 The visual standards in this document apply to Heatsink parts used on I/O connector.
2.2 It can be referenced internally and used during discussions or agreements with both customers and suppliers.
2.3 If some special requirement in the drawing and conflict with this standard, please follow the drawing requirement.

3. DEFINITIONS

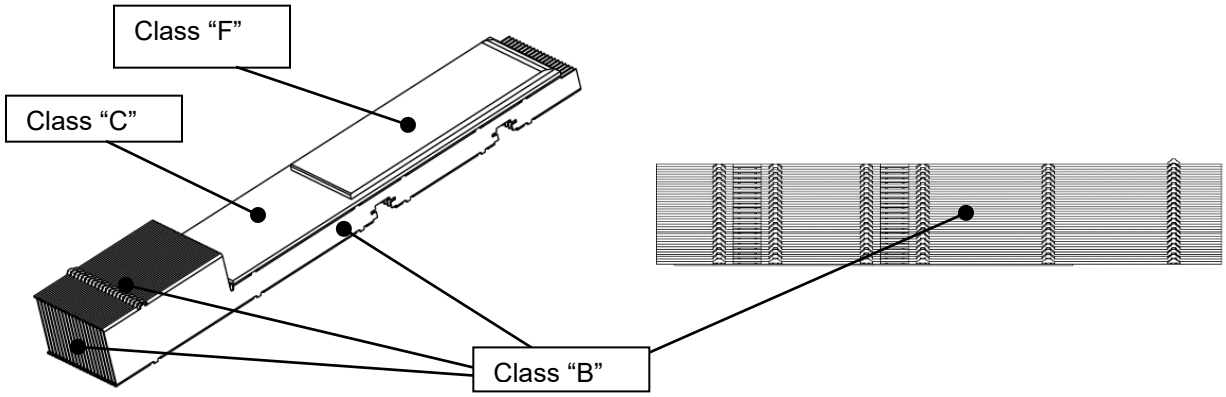
3.1 Surface Classification

A. Class “A”: Surface that will be in constant view of the customer.

B. Class “B”: There is a possibility the surface will be viewed by the customer before final assembly.

C. Class “C: This surface has a minimal chance of being viewed before final assembly and is not easily viewed after final assembly.

D. Class “F”: This surface will not be seen after assembly, but it’s functional surface, contact surface for the heat transmit.



3.2 Defect Definitions

Note:

Any mark, Dent, scratch should not penetrate the plating.

Item	Defective	Definition or Description of Defective
1	Scratches	Surface imperfection in the form of a line of any shape that Visible but cannot be felt with thumbnail.
2	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.

3	Deformation	The Shape out of original position.
4	Non-uniform gloss	Areas that have insufficient or excessive gloss. (Color difference)
5	Machining Mark	The marking cannot be avoided during the machining cutting process.
6	Sn ball, Excess Sn, Solder Mark	After soldering the base and find, some Sn ball or excess Sn will remain on the part. After removing the Sn ball or excess Sn, solder marking may remain on the surface.
7	Dent Mark	Small craters on the surface, cause by collision during the delivery or machining process.
8	Plating Marks and Runs	Visible inconsistencies in the surface due to the plating process, such as bleed outs, water runs, and hook marks.
9	Fingerprints	The surface discolors due to the touching by Finger without wear appropriate protective garments
10	Flux Mark	During the soldering process for fin+base type, the inside flux will remain on the heatsink surface.

4. GENERAL INSPECTION REQUIREMENTS

Cosmetic inspection for all suppliers shall use the time and distance method of inspection.

NOTE

The cosmetic standards as defined in this Workmanship Specification shall be used for training personnel, checking cosmetic surface quality produced by any process and used in making acceptable and not acceptable decisions.

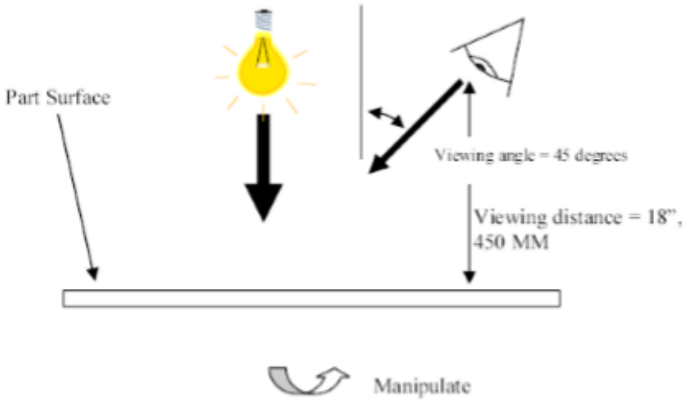
4.1 Viewing Conditions

Unless otherwise specified, light source shall be cool white fluorescent light at 80 to 100 foot-candles at inspection surface, unaided and viewed in a manner that duplicates the typical end use of the product. During a 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 approximately 45 degrees to the normal of the surface to be inspected. 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.

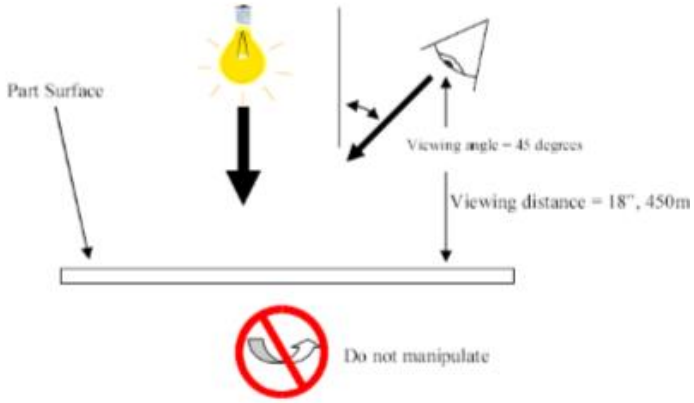
A. Time and Distance per Designated Area or Surface

Codes	**Class A**	Class **B**	**Class C**
Viewing Distance	450 mm[18 in]	450 mm[18 in]	450 mm[18 in]
Viewing Time	10 seconds	5 seconds	3 seconds
Light Source	80-100 foot-candles at inspection Surface	80-100 foot-candles at inspection Surface	80-100 foot-candles at inspection Surface
Viewing Method	Manipulate	Dot Not Manipulate	Dot Not Manipulate

Class “A”



Class “B” & “C”



5. ACCEPTABLE CRITERIA

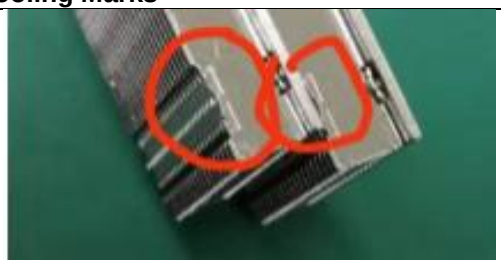
A. Class A, Class B, Class C or Class F acceptable defects should not affect fit or function. In such cases as affecting fit and or function the parts are automatic not acceptable.
B. For general inspection requirements and viewing conditions reference Paragraph 4.
C. Fingerprints: No fingerprints are allowed, whether they penetrate the plating or not in Class A, B, C or F. (Wear appropriate protective garments).

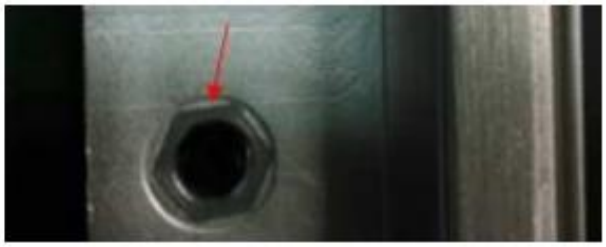
6. INSPECTION PROCEDURE

6.1 **Scratches**

Surface A	Surface B	Surface C	Surface F
Not Acceptable	1. **Cannot be felt with thumbnail** 2. 3 scratches within 25mm each 3. 5 scratches within 5mm each	No raised burr conflict with assembly process	Not Acceptable

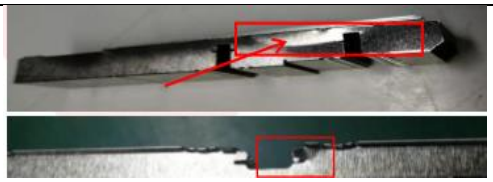
6.2 **Tooling Marks**





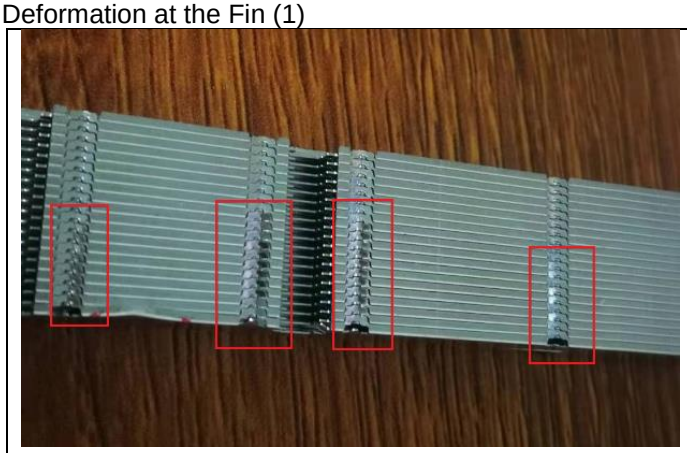
Surface A	Surface B	Surface C	Surface F
Not Acceptable	1. Uniform 2. Only allow at the bending, rivet or buckle area. 3. Two marks 4. within 10mm^2 S each, deep <=1/3 raw material thickness	1. If have bending, rivet or buckle area, the same as Surface B 2. No raised burr conflict with assembly process	Not Acceptable

6.3 **Deformation**



Surface A	Surface B	Surface C	Surface F
Not Acceptable	Not Acceptable, Except below Situation deformation of Fin	Not Acceptable	Not Acceptable

Deformation at the Fin (1)



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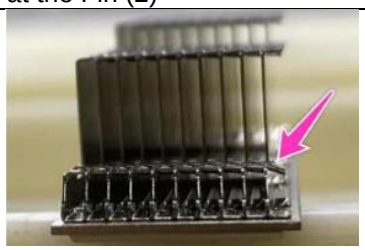
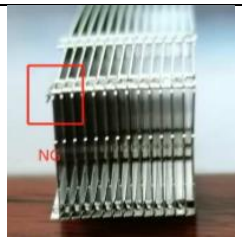
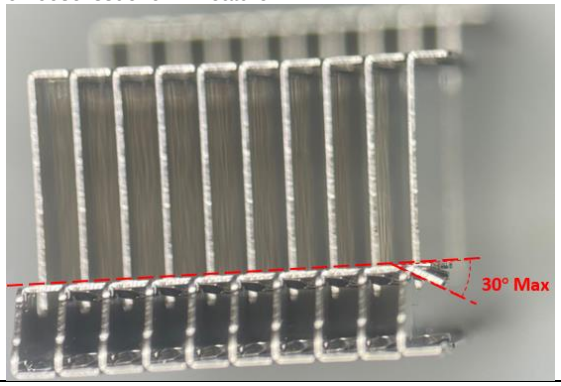
Surface A	Surface B
Not Acceptable	Acceptable condition: 1. Uniform for the same batch 2. Uniform for the all fins in same line 3. No locking problem for the fins 4. Not allow fin buckle broken and missing

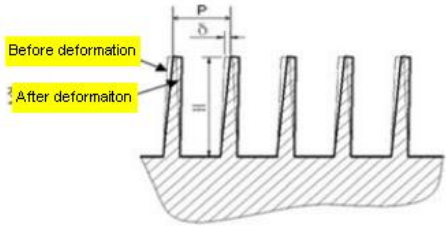
Deformation at the Fin (2)

 OK	 NG

Surface A	Surface B
Not Acceptable	**Acceptable condition:** Only for the fin at the open edge, slant<=30° and any fallen off or loose issue for fin feature. 

Deformation at the Fin (3)

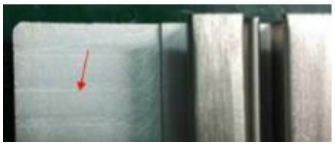
Surface B
Acceptable condition: 1. Meet the drawing requirement in note: Max Pin Lean of x° in any direction. 2. If no requirement, can follow below:  For Extrusion Heatsink, a) P>10mm and H>=20mm, δ <=1/3*P b) 10>=P>=5mm,H>=20mm, δ <=1/10*P c) P<5mm or H<20mm, not allow obvious deformation For Fin+Base Heatsink

Fin Height(H)	H<=20mm	20<H<=50mm	H>50mm
δ	<=1/4*P	<=1/3*P	<=1/2*P

6.4 Non-uniform Gloss

Surface A	Surface B	Surface C	Surface F
Not Acceptable	***NOTE*** Not allowed to have two different kinds of glosses in one batch of delivery.		

6.5 **Machining Mark**



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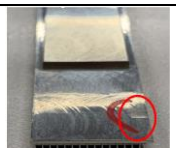

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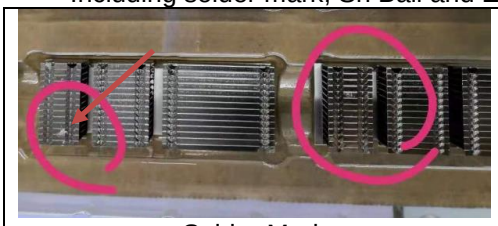
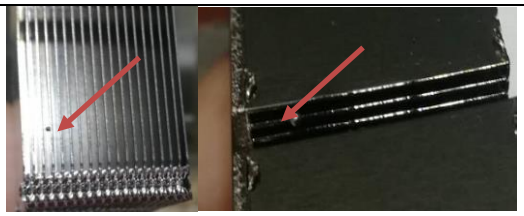
Surface A	Surface B	Surface C	Surface F
Not Acceptable,	1.Uniform paten 2.Not obvious	1.0.13mm max step, thickness shall be met TE Spec 2. No Significant difference by different batches 3.Roughness meet specification	1.Roughness and surface flatness meet specification. 2.Not obvious

6.6 Solder Mark

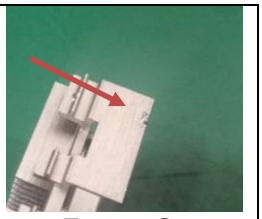
Including solder mark, Sn Ball and Excess Sn on surface.



Solder Mark



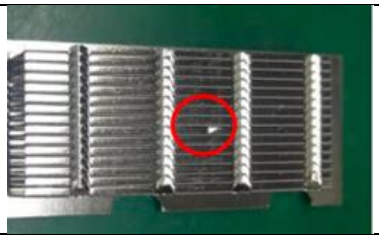
Sn Ball



Excess Sn

Surface A	Surface B	Surface C	Surface F
Not Acceptable,	1. Solder ball and Excess Sn on the outside surface is not acceptable. Inside the slot of the Fin, the Solder ball or Excess Sn have no risk of fall off can be acceptable. Judgement method: a) Use air gun to blow the solder ball, no moving phenomenon. b) After drop-off test, no fallen off phenomenon 2. After removing the solder ball or excess Sn, the solder mark acceptable condition as below: a) Only allow 1 location in each direction surface b) Area Size <=2mm^2 c) It cannot be felt with a thumbnail	The Solder ball and Excess Sn need to be removed, no raised burr to conflict with assembly process	Not Acceptable.

6.7 Dent Mark



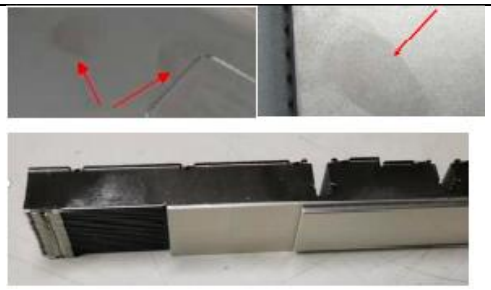
Surface A	Surface B	Surface C	Surface F
Not Acceptable,	1. Only allow 1 location in each direction surface 2. Area Size <=1mm^2, Deep Size<=0.5mm	1. No raised burr conflict with assembly process 2. Allow not over 3location in each direction surface 3. Area Size <=1mm^2, Deep Size<=0.5mm	Not Acceptable

6.8 Plating Marks and Runs


Water Mark

Surface A/B	Surface C/F
Not Acceptable	1. Cannot be removed 2. For white color: Acceptable, and no rust/oxidation after 48H salt spray test. For yellow/black color: NOT acceptable.

6.9 Fingerprints


Fingerprints

All Surface
Not Acceptable Cleaning the fingerprint is not recommended. if supplier need to clean it. Supplier should take effective testing to prove that the cleaning method can make sure the marking will not reappearance after long storage.

6.10 Flux Mark

Surface A	Surface B	Surface C	Surface F
Not Acceptable	1. On outside surface: NOT Acceptable 2. Inside the slot of the Fin: Acceptable	Not Acceptable	Not Acceptable