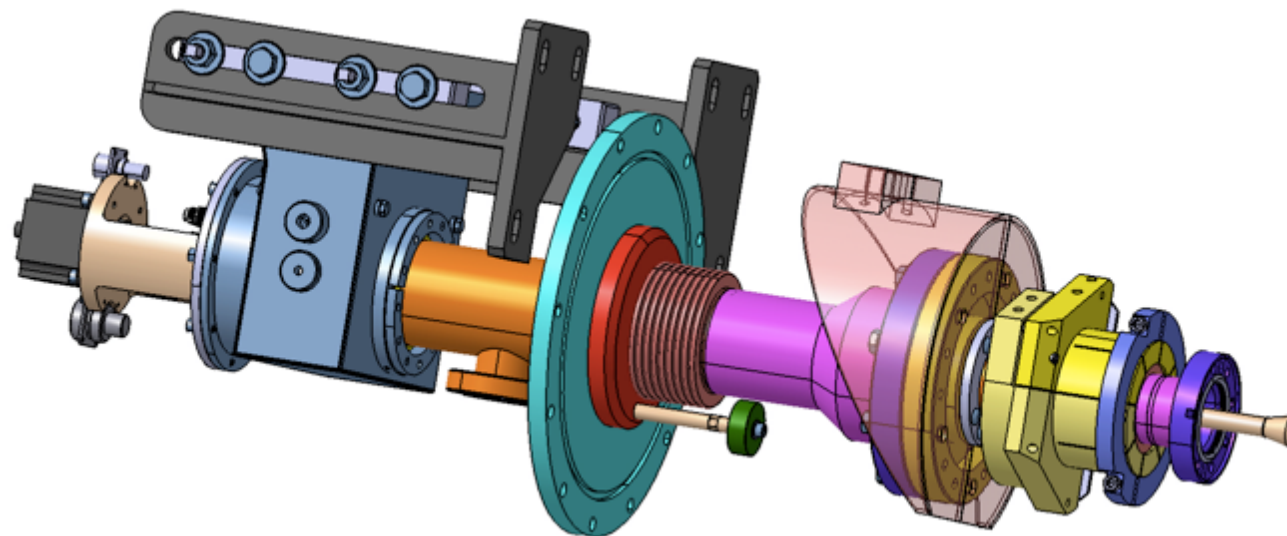


## Copper plating on XFEL couplers

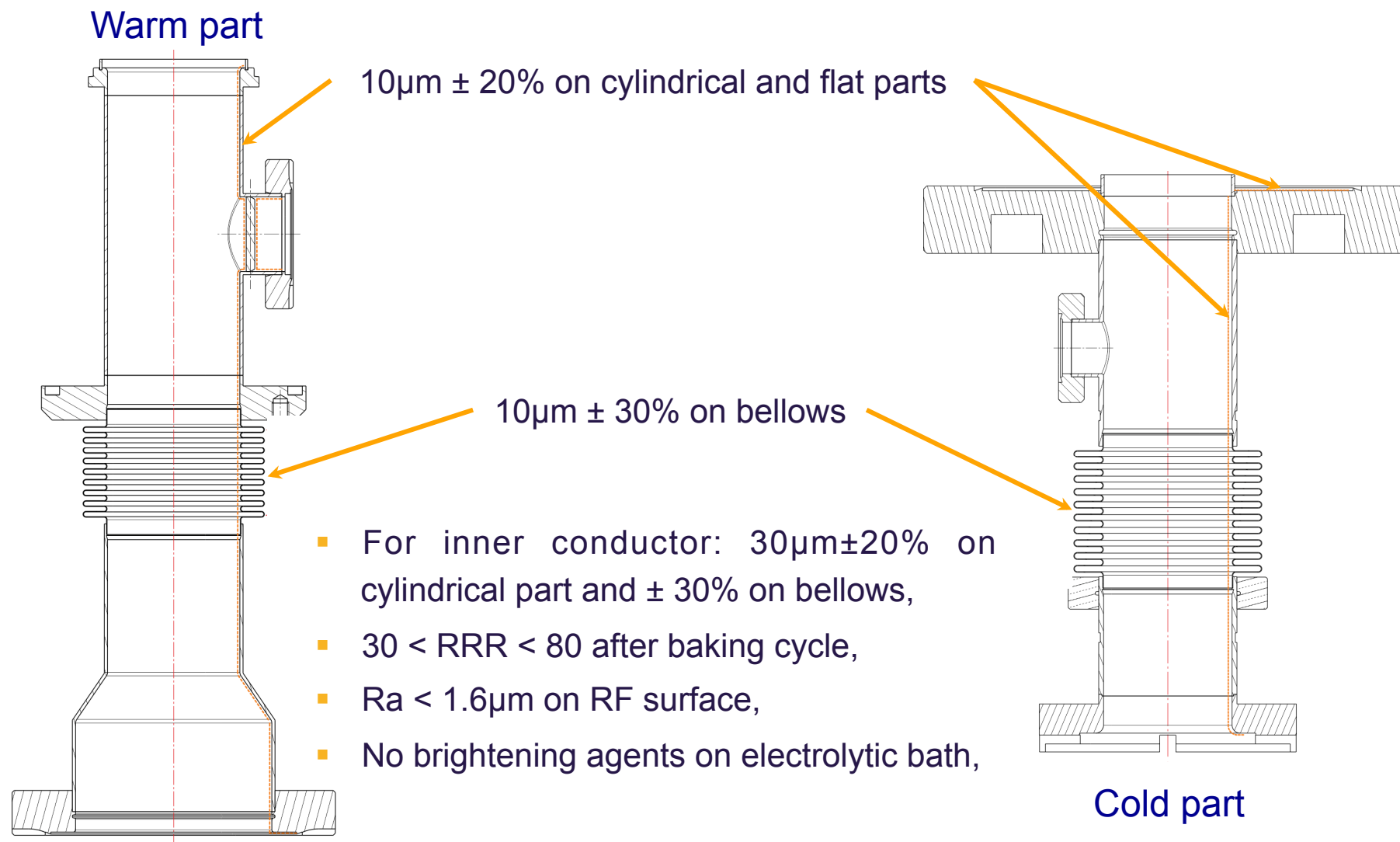
### Real defects, examples and classification

DESY-Hamburg, March 25<sup>th</sup> 2014



Walid KAABI- LAL/Orsay

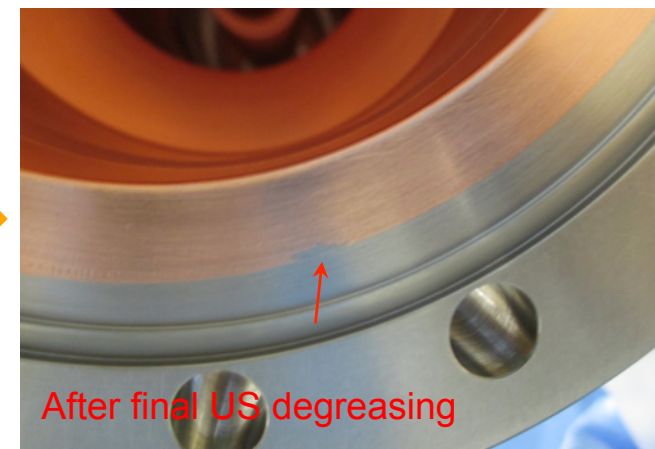
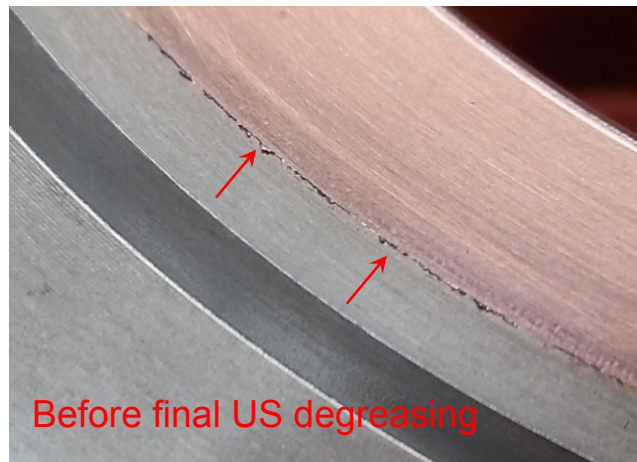
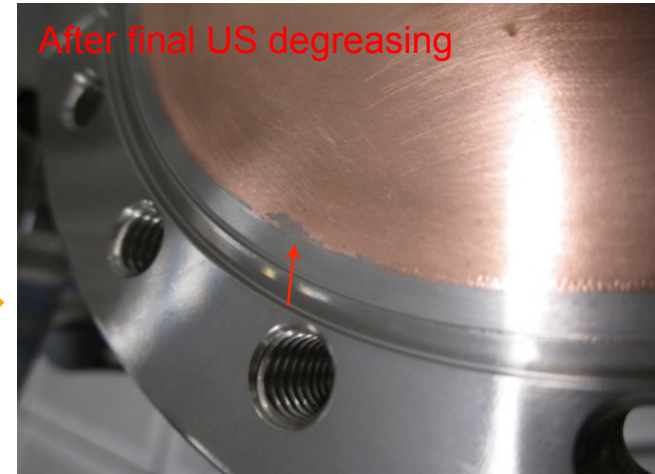
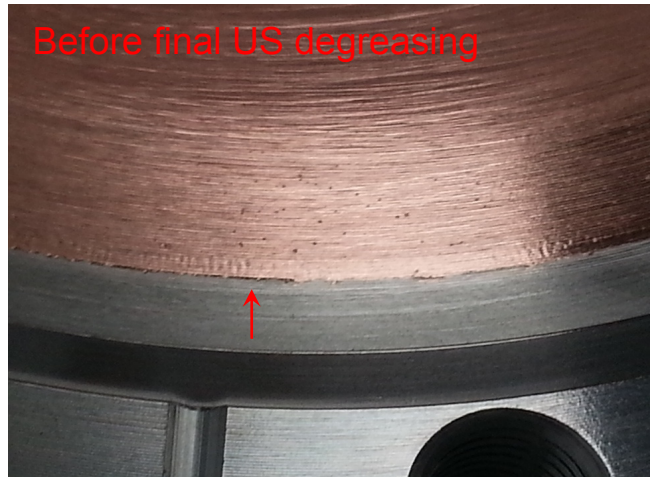
## Copper coating specifications:



## Defects observed during visual inspection:



Copper coating edge peeling on CF100 flange:

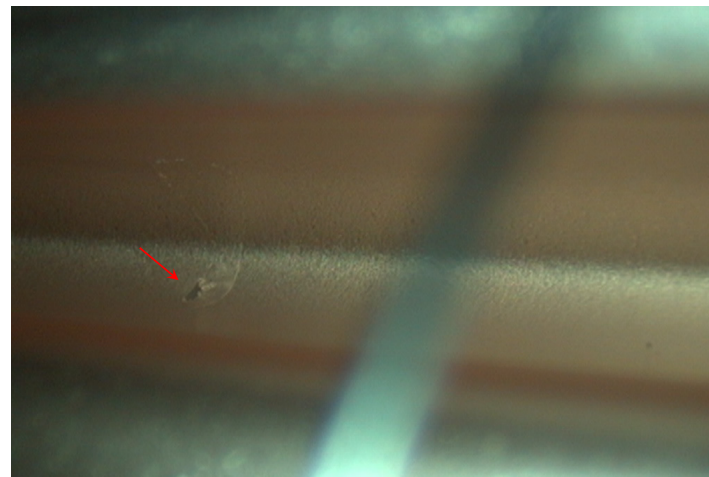
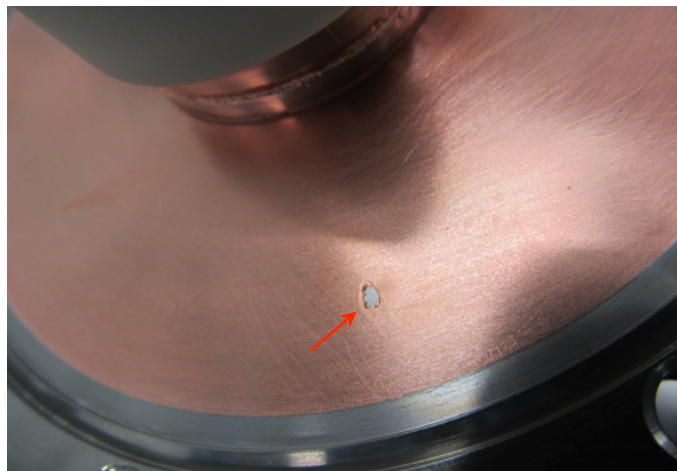
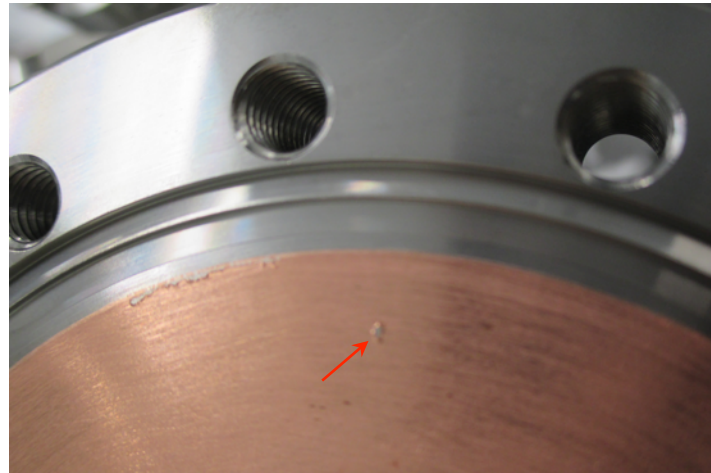
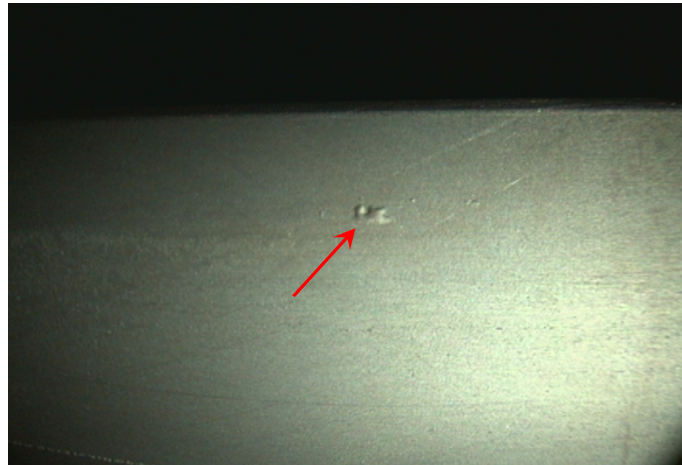




## Defects observed during visual inspection:

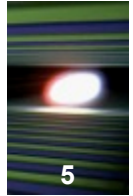


Blisters, bubbles and lack of copper in the coated surface:

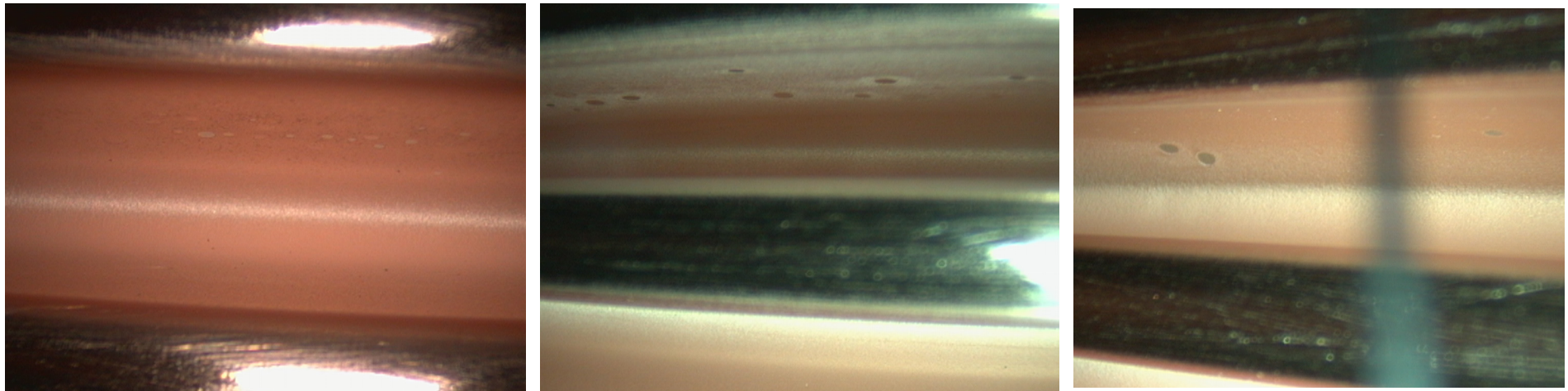




## Defects observed during visual inspection:



Circular spots in bellow valley upper surface:



- Diameter of the circular spots varies from 0,1 to more than 0,5 mm,
- The colour of the spots varies from copper like to light grey,
- The number of spots varies from 1 to some tenth per wave,

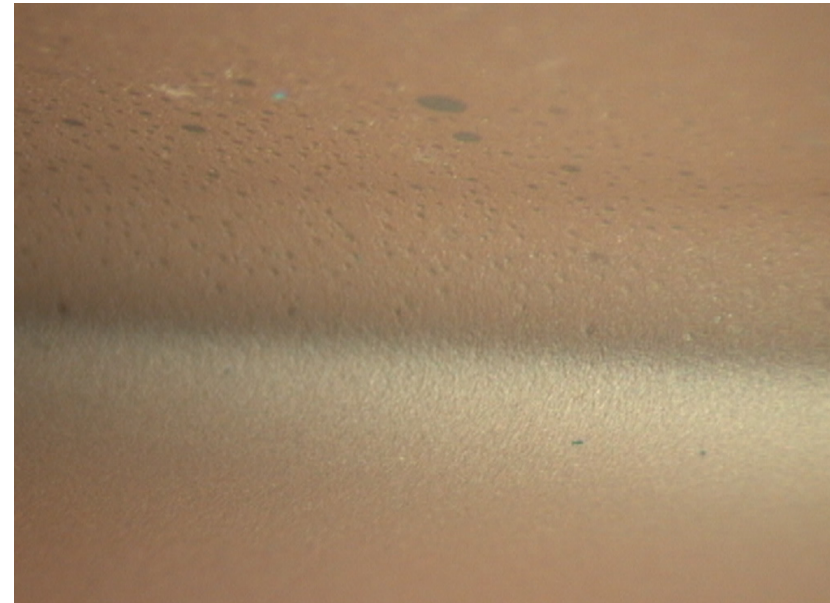
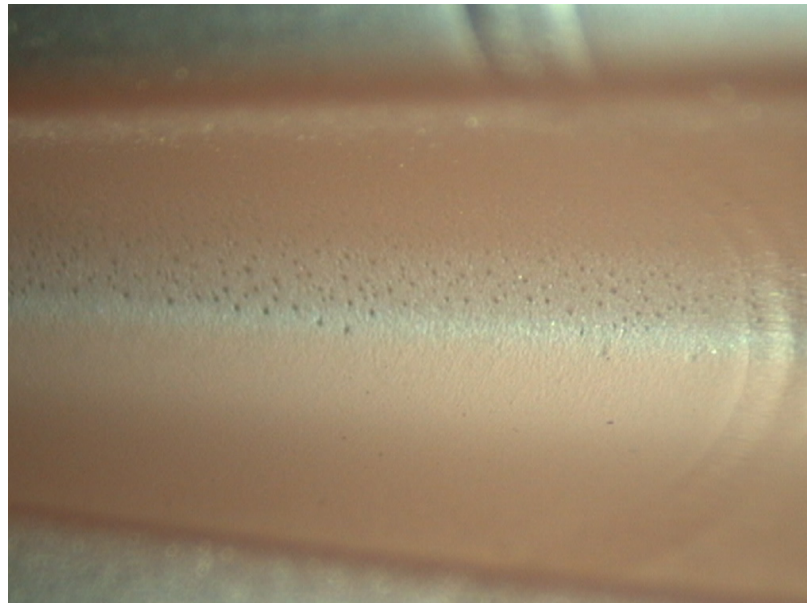
### Acceptance criteria (with NCR):

- Spots diameters must be  $<0,2\text{mm}$ ,
- The number of spots per wave must be  $<10$ ,
- Only the valley spots valley are concerned by this deviation, spots in the bellow hill are not accepted,
- The copper like spots are not concerned by this acceptance criteria,

## Defects observed during visual inspection:



Pitting in the bellow valley: Many very small spots in the bellow valleys:

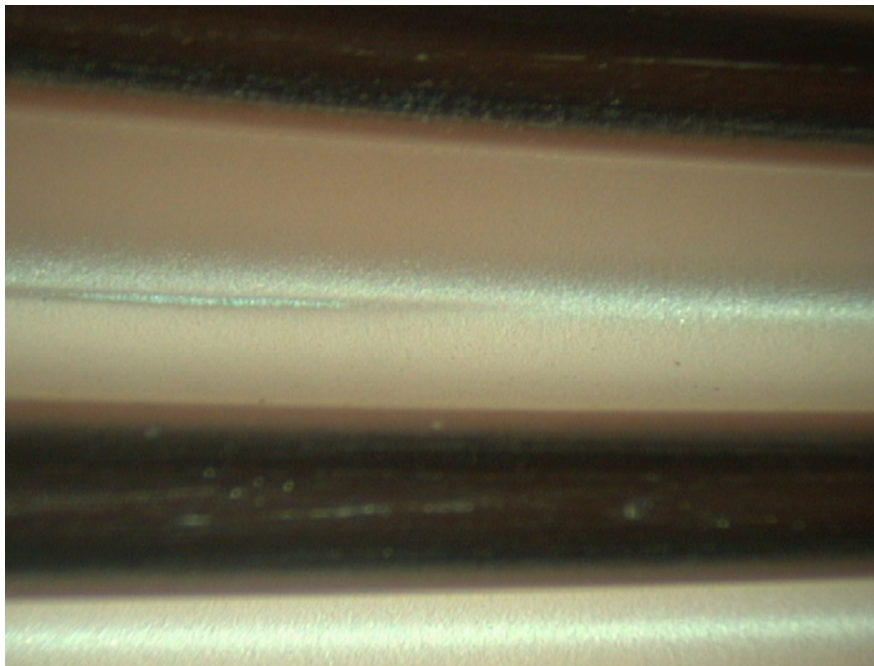


Accepted with NCR after a case per case discussion.

## Defects observed during visual inspection:



Long thin barely in the bellow valley (1,5 x 0,1mm):



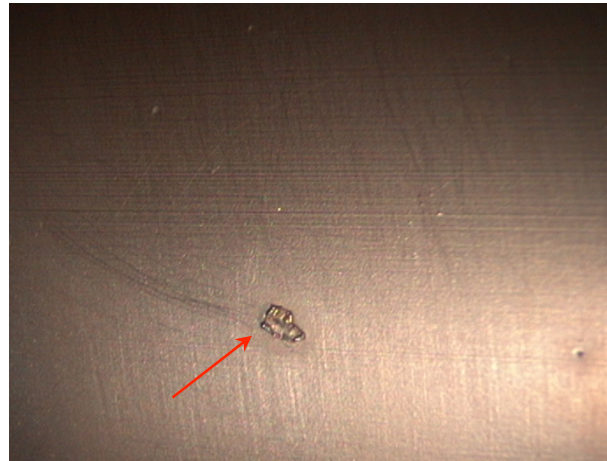
Accepted only for warm part with NCR after a case per case discussion.



## Defects observed during visual inspection:



Copper particles in the coated surface:



- Must be removed from the surface with a copper tool,
- Surface must not show sharp tips after particle removal,





Thank you for your attention