IMS CONNECTOR SYSTEMS	guideline **definition of surfaces for suppliers** File: RL-CS-06ab-definition surfaces suppliers.doc	**RL-CS-06b** **updated: 2018-04-25** **Revision: 13**

plating definition

--> the definition of the layer thickness is valid for the defined position.
(see XXX marking in the piece part drawing)
--> all existing surface definitions are hereby replaced.
--> the ordering text (Catuno) is binding for the specification of the layer thickness and the procedure.
--> the drawing must contain measuring points and the size of the surface (mm2).
--> if there are needed "min."-values, this must be stated explicitly.

requirements

type of surface	operation code	layer construction		IMS digit numbers	ability of flanging / ductile	solderable	adhesion	non magnetic	salt spray test			additional explanations !
gold	2.1	**Cu flash + 2ym Ni (duktil) + Au**			X	X	X					2.1 is valid alternative for old instruction 2.2
			0,2 ym	1								
		tolerances see attachment	0,8 ym	1								**(able to flange)**
			1,3 ym	2								
			2,0 ym	2								
	2.3	**Cu flash + 4ym Ni + Au**				X	X					2.3 is valid alternative for old instruction 2.4
			0,2 ym	1								
		toleranzces see attachment	0,8 ym	1								**(not able to flange)**
			1,3 ym	2								
			2,0 ym	2								
	2.6	**0.3ym Cu + 3ym chem. Ni + 0.2ym Au**		1	X	X	X					
	2.7 a	**Cu flash + 2ym Ni(ductile) + Au + pa**			X	X	X					
		tolerances see attachment										
		pa = passivated: specification --> ROHS conform --> Improvement of the sliding properties --> solderability is retained --> contact resistance is not changed	0,2 ym	1								**(able to flange)**
			0,8 ym	1								**(good gliding performance)**
			1,3 ym	2								
			2,0 ym	2								

Ni (ductile) = flexible / ductile

pa = passivated / good glide characteristic but soldering and also the electronical characteristics should not be affected

P = Phosphor

	2.7 b	**2ym Ni(ductile) + Au + pa**			X	X	X					2.7b is valid alternative for old instruction 2.5a und 2.5b
		tolerances see attachment										
		pa = passivated: specification --> ROHS conform --> Improvement of the sliding properties --> solderability is retained --> contact resistance is not changed	0,2 ym	1								**(CuBe-parts)**
			0,8 ym	1								**(good gliding performance)**
			1,3 ym	2								
			2,0 ym	2								
	2.7 c	**2ym Ni + Au**				X	X					**Components mechanically loaded (Static or dynamic)**
		without glossy pickling	0,2 ym	1								
			0,8 ym	1								
			1,3 ym	2								
			2,0 ym	2								
	2.8 a	**Cu flash + 2ym chem. Ni + Au**			X	X	X					**regular layer thickness**
		tolerances see attachment	0,2 ym	1								
			0,8 ym	1								
			1,3 ym	2								
			2,0 ym	2								
	2.8 b	**Cu flash + 2ym chem. Ni-P (min.10% P) + Au**			X	X	X	X				**regular layer thickness no magnetism**
		non-magnetic	0,2 ym	1								
		tolerances see attachment	0,8 ym	1								
			1,3 ym	2								
			2,0 ym	2								
Ni-P +Au	**3.1***	**galvanic Ni + Au**										**(good gliding performance)**
		2-4ym Ni + 2ym Ni-P +	0,15 ym	3	X	X	X					**(able to flange / magnetic)**
		Ni-P (6 - 12 % P)										*** not to be used for new parts**
	3.2	2ym Ni-P (min.12% P) +	0,15 ym	3		X	X	X				3.2 is valid alternative for old instruction 4ym Tribor
		non-magnetic										**(non-magnetic)**
												(not able to flange)
	3.3	**Cu + chem. Ni-P + Au**										**(non-magnetic) (not able to flange)**
		min.0,5ym + min.2,0ym + min.0,2 ym		3		X	X	X				
		(10%<P<14%)										

silver	**4.1**	**Cu flash + Ag + pa** flash + 5 - 8 ym	4		X	X	X				**(abrasion on the contact)**
	4.3	**Cu + Ag + pa** flash + 3 - 5 ym pa = passivieren: Änderungsgrund: Kundenforderung Vorgabe: ab 01.06.2006 muss die **Passivierung AG 110** von Fa. Schlötter, 73312 Geislingen eingesetzt werden.	4	X	X	X	X				**(conditional able to flange)**
	4.5	**Cu + Ag (schwarz)** flash + 3 - 5 ym	4			X	X				**decorative surface**
	4.6	**Cu + chem. Ni-P (min. 10%)+ Ag + pa** flash + 2 - 4 ym + 3 - 5 ym **nichtmagnetisch**	4	X	X	X	X	**48 h**			
	4.7	**Cu + Ag + pa** min. 3 ym + 3 - 6 ym	4	X	X	X	X				
	4.8	**Cu + Ag + pa** min. 5 ym + min. 5 ym	4	X	X	X	X				**note thread deviation**
passivated	**6.1**	**passivieren**	**6**	Der Markt fordert die Passivierung und muss deshalb wieder eingeführt werden !							**stainless steel parts**
tin	**7.5**	**Cu + Ni + Sn** 2 ym + 2 ym + 3 - 5 ym tolerances see	7	X	X	X					**Solder parts, tinned completely**
nickel	**9.1**	**Cu + Ni** Flash 3 - 5 ym **shiny nickel (= refractory nickel)**	9			X					**not able to flange**
	9.2	**Cu + Ni (duktil)** Flash 3 - 5 ym **matt nickel (= ductile nickel)**	9	X		X					**able to flange**
	9.3	**Cu + Ni** 8 - 12 ym 3 - 5 ym	9			X					**diecasted housings**
	9.4	**Cu + chem. Ni** flash 2 ym	9	X		X					**regular layer thickness**

white-bronze	**10.1**	**Cu*** + **CuZnSn**	5	X	(X)	X	X					
		Flash 2 - 4 ym										
		Bei Fleckenbildung oder Haftproblemen ist nach Freigabe durch IMS 2-4 ym Ag als Zwischenschicht erlaubt										* Cu, if requested by plater
	10.2	**Cu + CuZnSn + Au**	5		X	X	X					**diecasted housings**
		8-12 ym 2 - 4 ym min. 0.2 ym										
	10.3	**Cu* + CuZnSn + Au**	5	X	X	X	X					
		flash 2 - 4 ym min. 0.2 ym										* Cu, if requested by plater
	10.4	**Cu + CuZnSn**		X	(X)	X	X					
		min.0,5 ym + min.2,0 ym										
	10.5	**Cu + CuZnSn**		X	(X)	X	X					
		min. 2 ym + 2 -4 ym										
white-bronze +Palladium	**11.1**	**Cu + CuZnSn + Palladium**	8	X	X	X	X					
		flash 2 - 4 ym flash										
silver + white-bronze	**12.1**	**Ag + CuZnSn**	5	X	(X)	X	X					
		3 - 5 ym flash										
	12.2	**Cu + Ag + CuZnSn**		X	(X)	X	X					
		min.0,5 ym + min.2 ym + min. 0,5 ym										
silver + white-bronze +Palladium	**13.1**	**Ag + CuZnSn + Palladium**	8	X	X	X	X					
		3 - 5 ym flash flash										
chrome	**14.1**	**black chrome**				X						
		Cu + Ni + Cr (black)										
		0,5 ym 10 - 12 ym 1 - 1,5 ym										
	14.2	**Cu + Ni + Cr**				X						
		0,5 ym 4 - 6 ym 0,2 - 0,4 ym										
selective + special	**15**	**see drawing: definition of layer and possible selective area**										**generally for special surfaces and selective surfaces**

tolerances

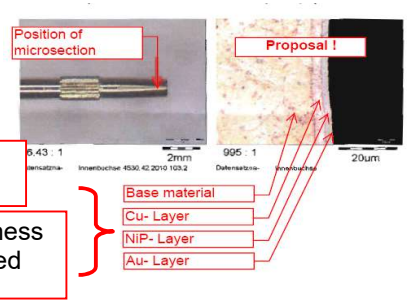
nominal values:	layer thickness	tolerances	
gold	nominal specification	min. max.	
	flash	0,05 0,2	
	0,15 ym	0,13 0,35	
	0,2 ym	0,18 0,40	
	0,4 ym	0,30 0,80	
	0,8 ym	0,70 1,20	
	1,3 ym	1,15 1,80	
nickel			
	2 ym	1,60 5,00	
	4 ym	3,20 7,20	

min. values:	layer thickness	tolerances	
gold	min. specification	min. max.	
	min. 0,2 ym	0,20 0,45	"min. values" have to be mentioned explicit on the drawing and in Catuno (text according to the order). No details or statements automatically stand for "nominal values".
	min. 0,4 ym	0,40 0,85	
	min. 0,8 ym	0,80 1,30	
	min. 1,3 ym	1,30 2,00	
Ni / Ni-P CuZnSn Ag			
	min. 2 ym	2,00 5,00	
	min. 4 ym	4,00 8,00	
	min. 5 ym	5,00 8,00	for barrel plating
	min. 5 ym	5,00 10,00	for rack plating (threads, etc. have to be acc. gauges)
Cu	min. 0,5 ym	0,50 2,00	
	min. 3,0 ym	3,00 6,00	

Inspection methods

Standards for inspection (defined on the drawings and/or mentioned in our order)

inspection	Level:	"standard"	"high"
Thickness of layers (Method: X-Ray or polished section)		X	X
Thickness of Cu- Layer (Method: polished section)			X
Content of Phosphorous in case of NiP is requested			X
Providing test-report for each production lot		X	X



Applies for inspection-level "high":

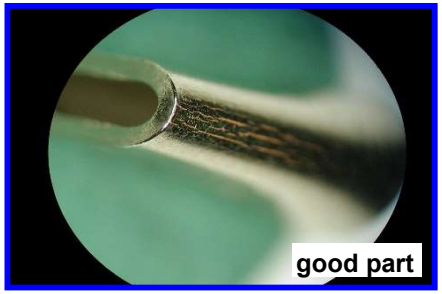
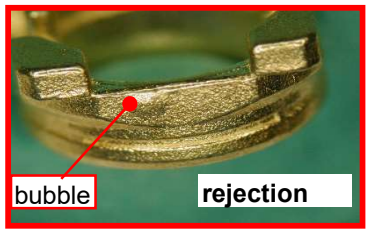
- in the First Article Inspection report (FAI, EMPB, etc.), the respective layer-thicknesses, have to be verified via polished section.
- for serial deliveries, a X-Ray protocol is sufficient. IMSCS reserves the right to initiate random checks on the parts.
  Non-compliant batches will be rejected.

Deviations to this guideline have to be agreed with IMS and fixed in an additional written QS-agreement

Chemical composition / hardness

plating	properties	remark
Au	Hard gold (alloyed with Co or Ni) microhardness HV 160 -230	acc. ASTM B-488-01
Ni	Ni 99,9% microhardness HV 300-400	
Ni-P	Ni-P min.12 % Phosphor microhardness HV 600-1000	
Cu	Cu 99,9% microhardness HV 180-200	
silver	Ag 99.9% microhardness ca. HV 130	
tin	Sn 99,9 % or SnPb 90 10	

Test Procedures

standard	test methods / brief description	picture	decision criteria
ability to flange	deformation of the part using a "flat nose plier"		surface may not be busted
adhesion	1) 90° bending acc. ISO 4524/5 2) or heat-shock acc. ISO 4524/5 3) or 180° bending		surface may not be busted
	4) at zinc diecasted parts test for aging: 10h bei 120°C	 	no bubbles on the surface bubble = surface is being lifted
solderability	acc. IEC 600 68-2-20 (dipping method)		

Advices for manufacturing

recommendation: thread deviation

	surfaces	kind of thread				note
		US-thread		metric thread		
		outside	inside	outside	inside	
	all of them with the exception of 4.8 zinc diecasting housings 9.3 / 10.2	-0.04	+0.04	6e	7G	before plating
		0	0	6g	6H	after plating
	zinc diecasting housings 9.3 / 10.2	-0.08	+0.08			before plating
		0	0			after plating
	4.8	tbd	tbd	7e	tbd	before plating
		0	0	6g	6H	after plating
	example	1/4"-36UNS -0.04		M29 * 1.5	6e	before plating
		1/4"-36 UNS		M29 * 1.5	6g	after plating
	additional explanation	The dimensions before the surface treatment should compensate for the layer application by the electroplating, so that the threads after the treatment correspond to the standardized nominal size and the function is guaranteed.				

History of changes

description of change:					
Rev.	**description**		**operated**	**Responsible**	**Note**
Rev. 07	New specification of the passivation because		12.04.2006	RBg	
	description of change is added				
Rev. 08	surface 6.1 will be released again		08.05.2006	RBg	
Rev. 09	2.8 b	plating 2.8 b Ni-P released	01.04.2007	RBg	
	3.2	Note: "non magnetic" attached			
	4.6	New surface			
	10.1	Note: "Ag as sublayer released" attached			
Rev. 10	3.3	new platings defined	20.01.2010	RBg	
	4.7				
	10.4				
	12.2				
		Inspection Standards defined			
Rev. 11	High level	QS-Agreement allowed	11.06.2010	RBg	
	nom.Tol.	2ym Ni: 3.6ym changed to 5.0 ym			
	min.Tol.	add min. Tolerances for Cu			
Rev. 12	min.Tol.	min. Toleranzen für Cu hinzugefügt	20.03.2017	PS	
	4.8	new platings defined			
	10.5				
Rev. 13	"high"	Inspection standard updated	25.04.2018	PS	
		Updated acc. Supplier request			