

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

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	4	X	X	X	X				(conditional able to flange)
	<div style="border: 2px solid red; padding: 5px;"> pa = passivieren: Änderungsgrund: Kundenforderung Vorgabe: ab 01.06.2006 muss die Passivierung AG 110 von Fa. Schlötter, 73312 Geislingen eingesetzt werden. </div>										
	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	<div style="border: 2px solid red; padding: 5px;"> Der Markt fordert die Passivierung und muss deshalb wieder eingeführt werden ! </div>							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

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. 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
	min. 5 ym	5,00	10,00
Cu	min. 0,5 ym	0,50	2,00
	min. 3,0 ym	3,00	6,00

"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".

for barrel plating

for rack plating (threads, etc. have to be acc. gauges)

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"**:


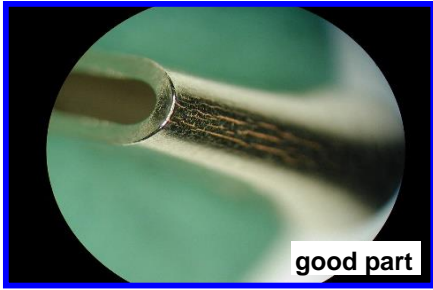
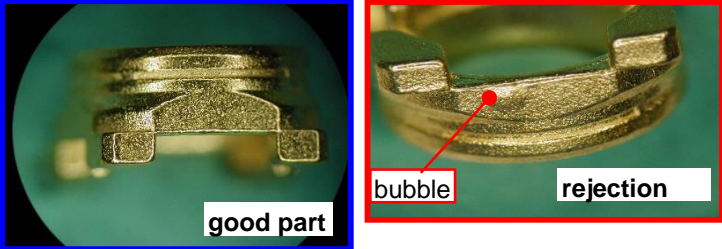
- in the First Article Inspection report (FAI, EMPB, etc.), the respective layer-thicknesses, have to be verified via polished section.
 - for serial deliveries, a X-Ray protocol is sufficient. IMSCS reserves the right to initiate random checks on the parts.
- Non-compliant batches will be rejected.

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		
	all of them with the exception of 4.8 zinc diecasting housings 9.3 / 10.2	outside	inside	outside	inside	
		-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.				

Duty to inform

If changes are made to this document, Quality Management must be informed and approval must be obtained from the Design Manager & Quality Manager (4-eyes principle).

The obligation to inform the customer/ supplier must be checked and implemented by the Quality Management.

History of changes

description of change:					
Rev.	description		operated	Responsible	Note
Rev. 07	New specification of the passivation because description of change is added		12.04.2006	RBg	
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				
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			
Rev. 14	Added point "duty to inform"		11.07.2023	MS	