

Copper and Brass Sales Corporate Services Division P.O. Box 5116 SOUTHFIELD, MI 48086-5116 USA		Your order Made in Finland PO 5400087440-R05/W	
		Our reference 061053	Invoice / Date VA31602910 31.01.2011
		Marks 5400087440-R05	

Item 002	Product, Grade and Size COPPER SHEET OFE-OK® C101 0.5x36.5x96.5" HALF HARD 12,7x927,1x2451,1 mm ASTM F68-08 ASTM B152-08	3900.00 KG 8597.80 LBS	Lot number VA204675
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ThyssenKrupp Materials NA, Inc.
 Copper and Brass Sales Div sold to
 CUSTOMER: *Machining Tech*
 YOUR PO#: *PO11-1876*
 CBS ORDER#: *1400961636*
 QTY: *1pc*
 BY: *B* DATE: *10-12-11*

Due to the 100% micrographic inspection and other tests throughout our manufacturing process each piece of the following material is: OFE-OK® Certified Grade Copper acc. to ASTM F 68-08 and EN 13604

Mechanical properties									
Item	Tensile strength R _m N/mm ²	0.2 % proof strength R _{0.2} N/mm ²	Elongation %	Hardness	Grain size mm				
002	273	265	A5 22	HRF 86					

Chemical composition										Analytical methods:									
1) Specific value (ASTM B170-99) 2) Specified value (EN CW009A)										Optical emissiospectrometer Spark and gas analyzator									
% min	ppm max																		
Cu	Ag	As	Bi	Cd	Fe	Mn	Ni	O	P	Pb	S	Sb	Se	Sn	Te	Zn			
1) 99.99	25	5	1	1	10	0.5	10	5	3	5	15	4	3	2	2	1			
2) 99.99	25	5	2.0	1	10	0.5	10	-	3	5	15	4	2.0	2	2.0	1			
Measured value																			
99.998	8.7	<0.6	<0.9	<1	2.7	<0.2	<2	1.5	<0.5	<1	5.3	<1	<1	<1	<2	<1			

Electrical conductivity at 20 ° C % IACS (mass), annealed (>=101):	>101.5
Electrical conductivity at 20 ° C % IACS (vol), annealed (>=101):	>102.1

Metallographic examination (<= Class 2): Hydrogen embrittlement test Quench test for oxide adherence: Material is free of mercury contaminates	Class A = 1 B = 1 C = 1 pass good	These products have been produced under a certified Quality System ISO 9001:2000 / DNV Certificate No. 58901-2009-AQ-FIN-FINAS We hereby certify, that the material described above complies with the order. Minna Eerola
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A copy with original signature is available in our factory.