

CERTIFICATE OF TESTS

ABNAHMEPRUEFZEUGNIS

CERTIFICAT DE CONTROLE

CERT SERIAL# 001179209



CARPENTER

Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 208-2000 (800) 338-4592

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
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10/16/19

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SELLER / VERKÄUFER / VENDEUR PAGE 1 OF 4

CORROSION MATERIALS
DIVISION CMI INC
LEA PAXTON
P O BOX 666
BAKER

LA 70714

HOU

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/POIDS
PO0051187-H	W97742	10/16/19	1752.000

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 585998 UNS NUMBER N08020

PRODUCT DESCRIPTION: 20CB-3 STAINLESS ANNEALED GROUND

SPECIFICATION: CORROSION MATERIAL #01 ALLOY 20 REV 29 (07/25/12) EXCPT LTR
(01/17/17) APPROVED
ASTM-B473-07
ASME-SB473 UNS N08020 SECT II, PART B 2017
EN 10204 3.1 (10/01/04) INSPECTION CERTIFICATE 3.1.B
DFARS 1998 EDITION

SIZE 1.625000 IN. (41.28 MM) RD BAR

HEAT CHEMISTRY (WT%) : (TEST METHOD IS SHOWN IN PARENTHESIS)

C (COM)	MN (XRF)	SI (XRF)	P (XRF)	S (COM)	CR (XRF)
0.02	0.31	0.32	0.020	LT .0005	19.41
NI (XRF)	MO (XRF)	CU (XRF)	CB+TA	FE (XRF)	
33.15	2.07	3.09	0.51	40.8	

INSPECTION CERTIFICATE 3.1 IN ACCORDANCE WITH EN 10204 AND DIN 50049

THIS HEAT MELTED BY THE ELECTRIC ARC/AOD PROCESSES

NO WELD REPAIR.

MATERIAL IS FREE FROM MERCURY CONTAMINATION

SOLUTION ANNEALED TO PROVIDE A MICROSTRUCTURE FREE FROM CONTINUOUS GRAIN BOUNDARY CARBIDE PRECIPITATION (NETWORK). (KALLINGS NO.2)

INTERGRANULAR CORROSION TESTED TO ASTM-A262, PRACTICE E - ACCEPTABLE.

MILL HEAT TREATMENT:

TYPE	SOLUTION ANNEAL
TEMP	1800F (982C)
TIME AT TEMP	CONTINUOUS FURNACE
QUENCH	WATER

HARDNESS AS SHIPPED, HRBW - 89 (MIDRADIUS)



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(T) TRANSVERSE	(L) LONGITUDINAL	L
YIELD STRENGTH, (0.20 %) KSI (MPA)	38.9 (268)	
TENSILE STRENGTH, KSI (MPA)	86.0 (593)	
ELONGATION IN 2.00", %	47.0	
REDUCTION OF AREA, %	73.0	

Heat # 585998

Tracer # T0835966

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MATERIAL HAS BEEN MELTED AND MANUFACTURED IN THE USA WHICH IS A QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872.1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.

UNLESS OTHERWISE NOTED, ALL TESTING WAS PERFORMED AT READING OR THE FOLLOWING SATELLITE LOCATIONS. TEST BY LOCATION CAN BE PROVIDED UPON REQUEST.

ADDRESS OF TESTING LOCATIONS:

READING - 101 WEST BERN ST, READING, PA 19601
SHALMET - 116 PINEDALE INDUSTRIAL RD, ORWIGSBURG, PA 17961
ATHENS - 22110 THOMAS L HAMMONDS RD, TANNER, AL 35671
HARTSVILLE - 205 TALLEY METALS LANE, MCBEE, SC 29101

UNLESS OTHERWISE STATED, THE TEST WERE PERFORMED TO THE LATEST REVISION OF THE STANDARDS LISTED BELOW: 1) BEND TEST - ASTM E290, 2) CHARPY IMPACT - ASTM E23, 3) COEFFICIENT OF LINEAR THERMAL EXPANSION - ASTM E228, 4) FRACTURE TOUGHNESS - ASTM E399, 5) BRINELL HARDNESS - ASTM E10, 6) ROCKWELL HARDNESS - ASTM E18, 7) MICRO VICKERS HARDNESS - ASTM E92, 8) KNOOP HARDNESS - ASTM E92, 9) MACRO VICKERS HARDNESS - ASTM E92, 10) STRESS RUPTURE / CREEP RUPTURE - ASTM E139, 11) STRESS RUPTURE (COMBINATION) - ASTM E292, 12) ROOM TEMPERATURE TENSILE - ASTM E8, 13) ELEVATED ROOM TEMPERATURE TENSILE - ASTM E21, 14) DECARBURIZATION - ASTM E1077, 15) DELTA FERRITE AMS 2315, 16) GRAIN SIZE - ASTM E112, 17) INCLUSION CONTENT / MICROCLEANLINESS - ASTM E45, 18) INTERGRANULAR ATTACH - ASTM A262, 19) INTERGRANULAR CORROSION - ASTM A262, 20) MACRO ETCH & TESTING - ASTM A604/E381, 21) PITTING CORROSION - ASTM A923, 22) CREVICE CORROSION - ASTM G48, 23) HARDNESS CONVERSIONS - ASTM E140, 24) XRF - ASTM E572/E1085/E2465, 25) OES - ASTM E415/E1086, 26) COM - ASTM E1019, 27) FUS - ASTM E1019, 28) MS - CARPENTER METHODS 206.8500/206.8530
THIS ORDER WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL, REVISION 37 DATED 07/31/2019.

CARPENTER'S QUALITY MANAGEMENT SYSTEM WAS REGISTERED TO ISO 9001, AS9100, AND AS9120. THIS CERTIFICATION OF TEST IS TYPE 3.1 PREPARED IN ACCORDANCE WITH EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS, AS DOCUMENTED IN THIS CERTIFICATE OF TESTS.

TEST METHODS ARE PER THE ASTM STANDARDS ON FILE AND IN EFFECT AT TIME OF ORDER ACCEPTANCE, STANDARD PRACTICES, OR AS AGREED UPON BETWEEN CARPENTER & CUSTOMER.

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DECISION RULE: UNLESS OTHERWISE SPECIFIED IN A CUSTOMER/INDUSTRY SPECIFICATION, CARPENTER TECHNOLOGY CORPORATION WILL DETERMINE ACCEPTABILITY OF ANY TEST RESULT BY COMPARISON OF THE RESULT WITH THE SPECIFICATION LIMITS, WITHOUT ANY ADDITIONAL CONSIDERATION OF THE MEASUREMENT UNCERTAINTY. WHEN REQUESTED, CARPENTER TECHNOLOGY CORPORATION WILL PROVIDE UNCERTAINTY BUDGETS FOR ANY TEST RESULT THAT IS NOT ADDRESSED BY THE INDUSTRY STANDARD.

TYLER SCHAPPELL
ADMINISTRATOR - QUALITY
CARPENTER TECHNOLOGY CORPORATION

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FOR REVIEW

Tyler A Schappell