



BUILD SHEET: N-084 DATE 4-12-18  
MOULD LENGTH 2.584 COOLED  
ORDER DATE 04 APR 18 SHIP BY DATE: 18 APR 18  
FOR SLB-UAE PO NO NNMA00897E  
SIZE 2.5 TYPE MX  
THREAD 1" MT OTHER Crocodile Updrill  
MATRIX (H) 1785 WEIGHT \_\_\_\_\_  
MATRIX (S) 1786 WEIGHT \_\_\_\_\_  
BINDER 23679 WEIGHT \_\_\_\_\_  
BLANK NIF14100519 TJ 224296  
CUTTER \_\_\_\_\_  
BILLET \_\_\_\_\_ TUBE \_\_\_\_\_  
WELD BY ALLAN MPI BY V-L  
THREAD GAGE 48401 STAND OFF 0.380  
LENGTH TO WELD \_\_\_\_\_  
FINAL DIAMOND GRIND SIZE 2.500  
SHIPPED BY Allen DATE 4-17-18

SHORT BIT & TOOL CO  
225 GOLD STREET  
GARLAND TX 75042  
972-205-1011  
main@shortbits.com



# Certificate of Conformance

Serial Number	Size	Type	Steel or Matrix	Shank Diameter	Bore
N-084	2.50	MX	Matrix		
Component	Material	Vender	Lot or Heat Number		
Blank	8620 Steel	RHW	NF14100519		
Hard Powder	WC	HMP	1785		
Soft Capping Powder	W2	HWP	1786		
Tool Joint	4130 Steel	RHW	224296		
MIG Weld					
WP Tube					
Inspection					
Diamond Grinding To Size					
Weld MPI	Allan				
Thread Gaging	#48401 .380" stand-off		1"MT		
Signed By:		date:			

Document Number:	F-Q-018
Revision:	Orig.
Date of Origin:	8/12/2012
Manual:	P-Q-001
Page:	PAGE 1 OF 1
Title:	MATERIAL PROPERTIES CERTIFICATION



CUSTOMER:	Short Bits
CUSTOMER PO#:	VICKIE E MAIL 1-18-18
ITEM ID:	PWMP010
ITEM DESCRIPTION	MP MATRIX POWDER H
ITEM LOT #	MPW1785
DATE	1/22/2018
WEIGHT	100 lb.

CHEMICAL COMPOSITION (Weight Percent)			
Element	Minimum	Maximum	RESULT
Total Carbon (Tc)	5.4	5.90	5.63
Free Carbon (Fc)	-	0.04	0.03
Iron (Fe)	-	1.00	0.02
Nickel (Ni)	1.5	2.50	1.70
Tungsten (T)			Balance

PRODUCT SIZING (Weight Percent)			
Sieve	Minimum	Maximum	RESULT
(U.S. Standard Mesh per ASTM B214)			
+80	4.0	8.0	5.2
-80 + 120	13.0	17.0	16.0
-120 + 170	13.0	17.0	15.9
-170 + 230	13.0	17.0	15.4
-230 + 325	13.0	17.0	14.7
-325	29.00	37.00	32.7

PHYSICAL PROPERTIES			
Testing Procedure	Minimum	Maximum	RESULT
Apparent Density ASTM B212 (g/cc)	7.2	8.1	7.3
Tap Density ASTM B527 (g/cc)	9.2	10.4	10.2
Hall Flow Rate ASTM B213 (sec/50g)		Must Flow	13.2



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CUSTOMER:	Short Bits
CUSTOMER PO#:	VICKIE E MAIL 1-18-18
ITEM ID:	PWCTPM002
ITEM DESCRIPTION	CTPM CRYSTALLINE W 80 X 325 MESH
ITEM LOT #	MPW1786
DATE	1/22/2018
WEIGHT	100 lb.

CHEMICAL COMPOSITION (Weight Percent)			
Element	Minimum	Maximum	RESULT
Tungsten (W)	99.5	-	99.99
-	-	-	-

PRODUCT SIZING (Weight Percent)			
Sieve	Minimum	Maximum	RESULT
(U.S. Standard Mesh per ASTM B214)			
+80	-	5.0	0.3
-80 + 325	-	-	92.5
-325	-	10.00	7.2
-	-	-	-

PHYSICAL PROPERTIES			
Testing Procedure	Minimum	Maximum	RESULT
Apparent Density ASTM B212 (g/cc)	7.2	9.2	8.4
Tap Density ASTM B527 (g/cc)	9.0	10.5	9.8
Hall Flow Rate ASTM B213 (sec/50g)		Must Flow	9.2
-	-	-	-



330 Belmont Avenue, Brooklyn, NY 11207-4000 U.S.A  
tel:+1.718.342.4900 fax:+1.718.342.0175

## Certificate of Analysis

September 06, 2017

To: **Short Bits & Tool**  
225 Gold Street  
Garland, TX 750426648 USA

Customer Order No: **Verbal/Vicki**

Customer ID: **SHORTC**

Sales Order No: **28918**

Material: **4483D**

**BELMONT** *Virgin Grade Binder Alloy*

**Shape:** *1/2" x 1/2" x 3/4" Tumbled Sheared Pcs.*

**Packaging:** *250 Lb. Drums*

Lot: **23679**

Copper (Cu)	47.68
Manganese (Mn)	23.60
Nickel (Ni)	20.06
Zinc (Zn)	8.18
Boron (B)	0.19
Iron (Fe)	0.07
Silicon (Si)	0.17
Lead (Pb)	< 0.05
Tin (Sn)	< 0.05

BELMONT METALS, INC.

Nasir Naseer

QC Administraot

BELMONT



METALS

### NUCOR-LMP INC

Sold To: R H W METALS  
PO BOX 3489  
39 FRJ DR  
LONGVIEW, TX 75606-0000  
(903) 758-5450  
Fax: (903) 758-5677

Ship To: R H W METALS  
1551 LAREDO DR  
ODESSA, TX 79761

Customer P.O.	14768	Sales Order	530129.1
Product Group	Cold Finish Bar	Part Number	333285
Grade	1018 ASTM A108	Lot #	L1152012
Size	Round 2.5000 (.0030)	Heat #	NF14100519
Product	RD 2.5000" 1018 20-0 CD	B.L. Number	L1-418804
Description	CF Grade 1018	Load Number	L1-118973
Customer Spec		Customer Part #	

I hereby certify that the material described herein has been manufactured in accordance with the specifications and standards listed above and that it satisfies those requirements.

Qty Shipped LBS: 5,024 Qty Shipped Pcs: 15

Part Detail: RD 2.5000" 1018 20-0 Cold Drawn  
Process: Cold Drawn

C	Mn	P	S	Si	Cu	Cr	Ni	Mo	Sn	V	Cb
0.17%	0.82%	0.014%	0.031%	0.29%	0.26%	0.13%	0.12%	0.030%	0.010%	0.0040%	0.002%
Al 0.003%	Pb 0.000%										

Melting Mill: Nucor Bar NE

Country of Melting: USA

Reduction Ratio 8.0 : 1

Country of Rolling: USA

Rolling Mill: Nucor Bar NE

Yield Strength: 80757 PSI

Tensile Strength: 92747 PSI

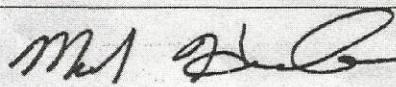
Elongation: 18.0 % in 2" (% in 50.8mm)

Reduction in Area: 53.7 %

Rockwell B Surface: 90.0 HRB


Specification Comments:

1. This material is free of mercury contamination.
2. No welding or weld repair was performed on this material.
3. ISO 9001:2008 certified. Certificate NO: 010424, Expires October 11, 2014.




Mark Herndon

DIVISION METALLURGIST

		<h2 style="margin: 0;">CERTIFICATO DI COLLAUDO</h2>				N. 99757 / 1 Data 30.05.2014 COLATA N. 224269 <small>Heat/Coate-Schmelz</small>						
ACCIAIERIE BERTOLI SAFAU SpA <small>Via Berton 78 - I-40138 Bologna - 33030 P.zza S. DEL FRATELLO                  Tel. 0521/617111 Fax 0521/617000</small>		Inspection Certificate 3.1/Certificat de reception 3.1/ Abnahmeprüfzeugnis 3.1				Pag. 1 / 2						
CLIENTE Customer-Client-Besteller <b>MAGELLAN CORPORATION</b>		ORDINE Order-Commande-Bestellung <b>209680</b>										
PROFILO Shape-Section-Profil <b>ROUND HOT ROLLED STEEL BARS                  50,8 MM - 2"</b>		STATO DI FORNITURA Delivery State-Etat de livraison <small>Lieferzustand</small> <b>HARDENED AND TEMPER.</b>										
ACCIAIO Steel-Acier-Stahl <b>AISI 4130</b>		Commessa/Pos <b>1024054/30</b>										
CAPITOLATO ABS: Technical Specification <b>ABS</b>												
CAPITOLATO DI ANALISI: Material Specification <b>MAGELLAN MIC 6016/2010 ADD.12 11-11-2010</b>												
CAPITOLATO DI FORNITURA: Technical Delivery Requirements <b>MAGELLAN MIC 6016-10 12.22.2010</b>												
<b>COMPOSIZIONE CHIMICA %</b> CHEMICAL ANALYSIS % - COMPOSITION CHIMIQUE % - CHEMISCHE ZUSAMMENSETZUNG %												
	C	Mn	Si	P	S	Cr	Ni	Mo	Al (T)	Cu	Sn	Ti
Min	0,280	0,40	0,20			0,80		0,15	0,015			
Max	0,330	0,60	0,30	0,025	0,025	1,10	0,25	0,25	0,045	0,35	0,050	0,0500
Colata/Heat	0,305	0,53	0,23	0,007	0,002	1,04	0,20	0,23	0,015	0,25	0,009	0,0084
	B (T)	V	Nb	As	Ca	Sb	Co	Pb	O2/ppm	H2/ppm	P+S	D.L INCH
Min												3,20
Max	0,0008	0,030	0,035	0,050	0,0500	0,060	0,100	0,4000	20,00	2,00	0,040	
Colata/Heat	0,0001	0,021	0,003	0,004	0,0011	0,001	0,010	0,0030	14,00	1,50	0,009	3,54
VACUUM DEGASSED ELECTRICAL FURNACE MELTED												
CARATT. MECCANICHE MECHANICAL PROPERTIES - CARACTERISTIQUES MECANIQUE - MECHANISCHE EIGENSCHAFTEN												
TENSILE/IMPACT TEST ON PRODUCT				TRATTAMENTO TERMICO HEAT TREATMENT								
TRAZIONE TENSILE TEST												
ATTACHED MECHANICAL PROPERTIES(99757/1-A) "ACC. TO ASTM E10"												
PROVA JOMINY JOMINY TEST - ESSAI JOMINY - STIRNABSCHRECKVERSUCH												
	J1/16" - HRC	J2/16" - HRC	J3/16" - HRC	J4/16" - HRC	J5/16" - HRC	J6/16" - HRC	J7/16" - HRC	J8/16" - HRC	J9/16" - HRC	J10/16" - HRC	J11/16" - HRC	J12/16" - HRC
Min	49	46	42	38	34	31	29	27	26	26	25	25
Max	56	55	53	51	49	47	44	42	40	38	36	35
Colata/Heat	51,4	50,1	48,3	45,2	42,3	40	38	36,2	34,7	33,1	32,2	31,2
	J13/16" - HRC	J14/16" - HRC	J15/16" - HRC	J16/16" - HRC	J18/16" - HRC	J20/16" - HRC	J22/16" - HRC	J24/16" - HRC	J26/16" - HRC	J28/16" - HRC	J30/16" - HRC	J32/16" - HRC
Min	24	24	23	23	22	21	20					
Max	34	34	33	33	32	32	32	31	31	30	30	29
Colata/Heat	30,4	29,6	29	28,4	27,4	26,8	26,3	25,9	25,6	25,2	24,7	24,3
HARDENABILITY INCH-HRC ACC. TO "ASTM A304"												
AUSTENITIZING TEMPERATURE 870°C												
INCLUSIONI NON METALLICHE NON METALLIC INCLUSION - INCLUSIONS NON METALLIQUES - PRUFUNG NICHTMETALLISCHE EINSCHLUSSE												
	Tipo A Type A	Tipo B Type B	Tipo C Type C	Tipo D Type D								
Fine Thin	1	0	0	1								
Grosso Heavy	0,5	0	0	0,5								
MICROINCLUSIONS : METHOD "A" MICROINCLUSIONS: STANDARD ASTM E45												
GRANO GRAIN - GRAIN - KORNGROSSE												
AUSTENITIC GRAIN : STANDARD ASTM E112/ASTM A29 AUSTENITIC GRAIN SIZE 7												
ALTRE PROVE OTHER TESTS - AUTRES ESSAIS - SONSTIGE PRUFUNGEN												

11/29/15  
 523657  
 224269  
 R561249  
 B

 <b>ACCIAIERIE BERTOLI SAFAU SpA</b> <small>Via Biondi, 26 - 10070 Cuneo (CN) - ITALIA  Tel. 0171/411211 Fax 0171/411212</small>	<p align="center"><b>CERTIFICATO DI COLLAUDO</b></p> <p align="center">Inspection Certificate 3.1/Certificat de reception 3.1/ Abnahmeprüfzeugnis 3.1</p>	N. 99757 / 1 Data 30.05.2014 COLATA N. 224269 <small>Mail-Controll-Schmelze</small> Pag. 2 / 2
MACROGROETCHING C 1 MACROGROETCHING R 1 MACROGROETCHING S 1 <b>MACRO TEST = "ACC. TO ASTM E381"</b>		
<p align="center">NOTE</p> <p>SURFACE DEFECTS: 100% SURFACE CONTROL  SURFACE DEFECTS: ACC. TO "ASTM E709"  INTERNAL DEFECT METHOD UT 100%  INTERNAL DEFECTS ACC. TO ASTM A388; API 6A/ISO-10423-PLS3  ANTIMIX 100 %  R/R = 28  TEST CERTIFICATE ISSUED ACCORDING TO: EN 10204 3.1  "NO REPAIR WELDING"  "NO CALCIUM ALUMINUM TREATMENT"  "ULTRASONIC INSPECTION SATISFACTORY"  STARTING PRODUCT : CONTINUOUS CASTING  "PRODUCED, TESTED &amp; CERTIFIED IN ACC. TO API16A 2010 20th; API16C 1993, API6A 2004  PRODUCT SPECIFICATION LEVELS PSL1 THROUGH 4 API MATERIAL DESIGNATION 75K"  "PRODUCED, TESTED &amp; CERTIFIED IN ACC. TO NACE MR-0175 2003"  "HEAT TREATED IN ACC. TO AMS-H-6875A 1998 REQUIREMENTS"  "VOLUMETRIC AND SURFACE NDE CAPABILITY STATEMENT"  ASTM A 29-12;A788-11;A576-12;A322-13;A751-11;E381-12;E112-12;E45-13;A265-10  A304-11;A370-12;A388-11;API6A/ISO 10423 PSL3 2009; API 6A 2010;16A-2004;16C-1993  AMS-H-6875A 1998; E709-2008;  - Material according to the " End-of-life Vehicles Directive 2000/53/EC" <b>STEEL IS FREE FROM MERCURY</b>  - Material conforming to the Legislative Decree n. 230/1995 (Council Directives 89/618/Euratom, 90/641/Euratom, 92/3/Euratom and 96/29/Euratom) on ionizing radiation</p>		
<p align="center">CONTROLLO QUALITA'  QUALITY CONTROL - CONTROLE DE QUALITE - QUALITÄTSTEILE</p>		
Company with a management system certified by IGQ to ISO 9001 and ISO/TS 16949 Verif.:Giovanna Rojatti <b>COUNTRY OF ORIGIN - ITALY</b> <i>Giovanna Rojatti</i>		



ACCIAIERIE BERTOLI SAFAU

INSPECTION CERTIFICATE N° 9975711-A-  
DATE 30/05/2014  
HEAT 224269  
STEEL GRADE AISI 4130

MECHANICAL PROPERTIES

POSITION TEST	YS 0.2% [PSI]	TS [PSI]	E% 2"	R.A.%	Kv-75°F [ft.lbs] long.			AVERAGE
								Kv-75°F [ft.lbs] long.
1/2 RADIUS	87.342	107.037	23,8	65	52	57	49	53
Exp. Lat. mm.					0,65	0,72	0,63	
Shear area %					77	72	77	

BHN = 231 ON SURFACE

BHN = 231 ON SURFACE

HRC = 21 ON SURFACE

HRC = 21 ON SURFACE

MECHANICAL PROPERTIES OBTAINED FROM PROLONGATION OF THE BAR ACC. TO ASTM A370.  
LONGITUDINAL TEST. TEST DRAWN AT CENTER BAR.  
LENGHT OF TEST SPECIMEN 130 mm. (ACC. TO ASTM A370 SPECIMEN N°4)  
NORMALIZED 1652°F X 440' AUSTENITIZE 1616°F WATER X 206' TEMPERED 1300°F AIR x 506'  
QUENCH WATER TEMPERATURE: BEFORE 86°F AFTER 86°F.  
ATMOSPHERIC THERMOCOUPLE TYPE K CLASS 1 IEC 60584-2/1998.  
TENSILE SPECIMEN SIZE 0,500"  
IMPACT SPECIMEN SIZE 10 mm. X 10 mm.

QUALITY CONTROL



ACCIAIERIE BERTOLI SAFAU S.p.A.  
Servizi Controllo Qualità

Customer: MERCER METALS INC  
Ord #: S535917 Part #: 523657 Cust PO#: 12226



**TEXAS HEAT TREATING, INC.**  
 6113 NORTH FREEWAY  
 FORT WORTH, TEXAS 76106  
 (972) 263-9755 Phone  
 (612) 238-0408 Fax

Order No.: 303094

Date: 04/04/2017

Page: 1 of 2

**CERTIFICATION**

**To:** SHORT BIT & TOOL CO.  
 225 GOLD STREET

GARLAND TX 75042

Purchase Order No.: THT-224296

Material: 4130

Customer Spec

HRC 32-35, Per P.O.

Quantity	Part Number / Part Name / Part Description	Container	Pounds
68	1 MT 2" dia, 4130 w/ machined end	Metal Pan 2 Skid 1	363

[1] Harden at 1,575°F for 2 hours. Oil quench.

[2] Temper at 1,000°F for 3 hours 2 minutes. Air cool.

Insp. Type	Scale	Minimum	Maximum	Insp. Type	Scale	Minimum	Maximum	Value
<b>Customer Requirements:</b>				<b>Results:</b>				
Surface	HRC	.0	.0	Surface	HRC	34.4	35.0	
Method: E18				5 Pieces Inspected, Date Tested: 04-02-2017				
Tensile Strength	KSI			Tensile Strength	KSI			159.8
Method: E8/8M				Date Tested: 04-03-2017				
Yield Strength	KSI			Yield Strength	KSI			147.9
Report Values				0.2% Offset				
% Elongation	%			% Elongation	%			18.3
Report Values				1" Initial Gauge				
% Reduction in	%			% Reduction in Area	%			62.09
Report Values				0.255" Initial Diameter				

**\*\*1 part scrapped for mechanical testing**

**IMPORTANT STATEMENT:**

All test specimens and testing conforms to applicable ASTM Standards, unless otherwise specified per written customer requirement. Reported values apply to the sample(s) tested and/or inspected and are not necessarily indicative of the quality of apparently identical or similar products and do not extend to the lot or batch from which the tested components were drawn. The information in this metallurgical report is intended for the use of Texas Heat Treating's client and may not be published or reproduced except in full without Texas Heat Treating's expressed consent. Texas Heat Treating accepts no responsibility or liability for results due to non-representative test items, improper sampling, insufficient testing or misinformation. Material submitted to metallurgical lab will be discarded after 30 days, except by prior written agreement.



TEXAS HEAT TREATING, INC.  
5113 NORTH FREEWAY  
FORT WORTH, TEXAS 76106  
(972) 263-9755 Phone  
(512) 238-0408 Fax

## CERTIFICATION

Order No.: 303094

Date: 04/04/2017

Page: 2 of 2

**To:** SHORT BIT & TOOL CO.  
225 GOLD STREET

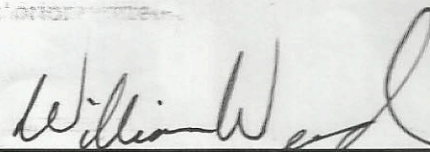
GARLAND TX 75042

Purchase Order No.: THT-224296

Material: 4130

Customer Spec

HRC 32-35, Per P.O.

  
\_\_\_\_\_