



BUILD SHEET: N-023 DATE _____

ORDER DATE 26 Jan 18 SHIP BY DATE: 01 Feb 18
MOLD SIZE 5.819 x 4.777 CHECKED BY _____
FOR SIB - sugar land PO NO _____

SIZE 5.787 x 4.740 TYPE HDS special

THREAD 5 3/4 W P OTHER _____

MATRIX (H) 174³ WEIGHT _____

MATRIX (S) 1680 WEIGHT _____

BINDER 24679 WEIGHT _____

BLANK MM10450L TJ 6 1/2 416

CUTTER _____

BILLET _____ TUBE 585809

WELD BY JM MPI BY JM

THREAD GAGE 40466 STAND OFF 0.610

FINAL DIAMOND GRIND SIZE 5.787 x 4.780

LENGTH TO WELD 30 IN FROM END + 3 1/2 FROM FRONT

SHIPPED BY JM DATE 2-2-18

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

80 lbs
1234715

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 12-08-17
ITEM ID:	PWMP010
ITEM DESCRIPTION	MP MATRIX POWDER H
ITEM LOT #	MPW1743
DATE	12/11/2017
WEIGHT	100 lb.

CHEMICAL COMPOSITION (Weight Percent)			
Element	Minimum	Maximum	RESULT
Total Carbon (Tc)	5.4	5.90	5.65
Free Carbon (Fc)	-	0.04	0.03
Iron (Fe)	-	1.00	0.02
Nickel (Ni)	1.5	2.50	2.01
Tungsten (T)			Balance

PRODUCT SIZING (Weight Percent)			
Sieve	Minimum	Maximum	RESULT
(U.S. Standard Mesh per ASTM B214)			
+80	4.0	8.0	5.8
-80 + 120	13.0	17.0	15.5
-120+ 170	13.0	17.0	14.7
-170 + 230	13.0	17.0	15.1
-230 + 325	13.0	17.0	15.7
-325	29.00	37.00	33.2

PHYSICAL PROPERTIES			
Testing Procedure	Minimum	Maximum	RESULT
Apparent Density ASTM B212 (g/cc)	7.2	8.1	7.2
Tap Density ASTM B527 (g/cc)	9.2	10.4	10.3
Hall Flow Rate ASTM B213 (sec/50g)		Must Flow	12.8

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CUSTOMER:	Short Bits
CUSTOMER PO#:	VICKIE E MAIL 10-05-17
ITEM ID:	PWCTPM002
ITEM DESCRIPTION	CTPM CRYSTALLINE W 80 X 325 MESH
ITEM LOT #	MPW1680
DATE	10/9/2017
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	2.0
-80 + 325	-	-	94.7
-325	-	10.00	3.3
-	-	-	-

PHYSICAL PROPERTIES			
Testing Procedure	Minimum	Maximum	RESULT
Apparent Density ASTM B212 (g/cc)	7.2	9.2	7.5
Tap Density ASTM B527 (g/cc)	9.0	10.5	10.4
Hall Flow Rate ASTM B213 (sec/50g)		Must Flow	10.7
-	-	-	-



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

Certificate of Analysis

January 16, 2018

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

Customer Order No: **E Mail/Vicki**

Customer ID: **SHORTC**

Sales Order No: **30087**

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 Administrat

BELMONT



METALS

1-31-11

507038

Ht mm 10104506

R 3516 449

NUCOR
NUCOR STEEL MEMPHIS, INC.

Mill Certification
1/14/2011

3601 Paul R Lowry Rd
MEMPHIS, TN 38109
(901) 786-8900
Fax: (901) 786-5901

Sold To:

Ship To:

Customer P.O.	207261	Sales Order	107851.1
Product Group	Special Bar Quality	Part Number	3000500240MK80
Grade	ASTM A322 8620/8620H; A29, A304	Lot ID	MM1010450601
Size	6" (6.0000) Round	Heat ID	MM10104506
Product	5" Round 20' 8620-C1R5	B.L. Number	G1-214104
Description	8620-C1R5	Load Number	G1-105825
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.

C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Al	B
0.21%	0.85%	0.011%	0.023%	0.21%	0.23%	0.42%	0.46%	0.24%	0.004%	0.022%	0.0002%
Sn	Ti	Cb	Co	Ca	Pb	H					
0.008%	0.002%	0.002%	0.009%	0.0005%	0.000%	1.1 ppm					

DI value: 2.15

Fine Grain 5 or finer

Simulated Hardenability Band

J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J11	J12	J13	J14	J15	J16	J18	J20	J22	J24	J26	J28	J30	J32
45	45	42	36	31	27	25	24	23	22	21	20	20	19	19	18	18	17	17	16	16	15	15	15

Ball: 180.000bhn

Reduction Ratio 5.1:1

ASTM E45 Method A

Sulfides: T: 0.5 H: 0.5 Alumina: T: 0.0 H: 0.0 Silicates: T: 0.0 H: 0.0 Globular: T: 1.0 H: 1.0

Specification Comments: EAF, LMF, VTD, CONTINUOUS CAST FULLY KILLED CAPABLE OF MEETING E361 C252R2 CAPABLE OF MEETING E45: A-THIN 2.5, A-HEAVY 2.0 B-THIN 2.0, B-HEAVY 1.5 C-THIN 2.0, C-HEAVY 1.5 D-THIN 2.0, D-HEAVY 1.5

- All manufacturing processes, including melting have been performed in the U.S.A.
- No mercury, mercury compounds or mercury containing devices came into contact with this product.
- Welding or weld repair was not performed on this material.
- This material conforms to the specifications described on this document and may not be reproduced except in full, without written approval of Nucor Corporation.
- This product is NAFTA certified under Paragraph "B" of the NAFTA rule of origin.
- Material is free of Radioactive Contamination.
- This document is in compliance with EN 10204 "type 3.1"

Todd K. Evilsizer

Todd Evilsizer
Division Metallurgist

585809

Benteler Steel/Tube GmbH
Postfach 13 40
33043 Paderborn
Deutschland
Tel.: +49.5254.81-0 Fax: +49.5254.13666

BENTELER 
Steel/Tube

ABNAHMEPRÜFZEUGNIS EN 10204-3.1
INSPECTION CERTIFICATE EN 10204-3.1
CERTIFICAT DE RECEPTION EN 10204-3.1
EN 10204:2005-01

Benteler Steel/Tube GmbH - Postfach 1340 - 33043 Paderborn - Deutschland

Dokument-Nr.: 65-816835/001/P
Document No.:
No. du document:

Kunden-Bestell-Nr.: BST 46002104
Purchase Order No.:
No. de commande du client:

Benteler Auftrags-Nr.: 1598213
Benteler Order No.:
No. de commande Benteler:

Versandanzeigen-Nr.: 6543483
Dispatch Note No.:
No. d'avis d'expédition:

Produkt: NAHTLOSE STAHLROHRE
Product: SEAMLESS STEEL TUBES
Produit: TUBES D'ACIER SANS SOUDURE

Prüf-Nr.:
Inspection No.:
No. du certificat:

Hersteller: Warmrohrwerk Dinslaken
Manufacturer: (DIN EN ISO 9001, ISO/TS-16949 CERTIFIED BY TUEV NORD CERT)
Producteur: (PED 97/23/EC CERTIFIED BY TUEV NORD SYSTEMS)

Herstellerzeichen:
Manufacturer's brand:
Marque du producteur:



Stempel des Abnahmebeauftragten: WA
Stamp of the inspection representative:
Poinçon du contrôleur:

Stahlerschmelzungsverfahren: ELEKTROSTAHL
Steelmaking process: ELECTRIC FURNACE
Procédé d'élaboration de l'acier: FOUR ELECTRIQUE

Lieferbedingungen: API Spec. 5CT Ninth Edition, July 2011, Errata 09.2012
Terms of delivery:
Conditions de livraison:

Maße - Toleranzen: API Spec. 5CT Ninth Edition, July 2011, Errata 09.2012
Dimensions-tolerances:
Dimensions-tolérances:

Stahlsorte: **GRADE P110**
Steel grade:
Nuance d'acier:

Lieferzustand: Q
Delivery condition:
État de livraison:

Produktkennzeichnung: FK: Coloured rings: one white, at the same end as the marking
Product marking: FS: BENTELER SIGN API 5CT-0194 API SIGN YEAR/QUARTER RE DIMENSIONS LB/FT P S P TEST
Marquage du produit: PRESSURÉ D WA HEAT-NO.

AEZ = Ätztintenbeschriftung, Etching ink marking, Gravure à l'encre . FK = Farbkennzeichnung, colour marking, marquage par couleur . FS = Farbschablonierung, paint stencilling, marquage par peinture . FSD = Farbstrahldrucker, Colour jet printer, Imprimante à jet d'encre de couleur . LK = Laserkennzeichnung, Laser marking, Marquage laser . PKE = Etikettenkennzeichnung, tag marking, marquage sur étiquette . PS = Prägestempel, die stamp, marquage par poinçonnage . TS = Tintenstrahlkennzeichnung, Ink jet spray marking, imprimante à jet d'encre .

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Pos.	Stück	Maße	Länge	Gewicht	Schmelzen-Nr.	Prüfdruck	Rohr-Nr.-Gruppe	Vielfachlängen
Item	Number	Dimensions	Length	Weight	Heat No.	Test pressure	Tube number group	Multiple lengths
Poste	Nombre	Dimensions	Longueur	Poids	No. de coulée	Pression d'épreuve	Série de no. des tubes	Longueurs multiples
			feet	lbs		PSI		
						s		
0001	128	5.750" O.D. * 0.312" WT 34 FT - 36 FT	4396,33	80954	585809	9600	5	

Schmelzenanalyse [%] / Heat analysis [%] / Analyse sur coulée [%]

Pos.	Schmelzen-Nr.	C	SI	MN	P	S	CR	MO	NI	CU	AL
Item	Heat No.										
Poste	No. de coulée										
0001	585809	0,310	0,260	0,74	0,005	0,002	1,01	0,04	0,13	0,14	0,035

Produktanalyse [%] / Product analysis [%] / Analyse sur produit [%]

Pos.	Schmelzen-Nr.	C	SI	MN	P	S	CR	MO	NI	CU	AL
Item	Heat No.										
Poste	No. de coulée										
0001	585809	0,310	0,240	0,75	0,004	0,003	1,02	0,05	0,14	0,13	0,035
0001	585809	0,300	0,230	0,75	0,005	0,003	1,02	0,05	0,14	0,13	0,035

Prüfergebnisse / Test results / Résultats des essais

Die Rohre sind auf Dichtheit geprüft durch: The tubes have been submitted to a leak tightness test by: Les tubes ont passé un contrôle d'étanchéité par:	Hydrostatic test: acc. to API 5CT, holding time min 5 seconds, Test pressure/Time-record	PASSED
Drifttest: Drift test: Contrôle avec un mandrin:	acc. to API 5CT, mandrel diameter = ID - 3,18 mm, over the whole tube length; Drift mandrel diameter: 127,000 mm; Drift mandrel length: 152,0 mm; Drift mandrel diameter: 5.000 "; Drift mandrel length: 6 "	PASSED
Die Rohre wurden zerstörungsfrei geprüft: The tubes are non destructive tested: Les tubes ont passé un essai non destructif:	UT-longitudinal imperfections: acc. to API 5CT; Outside notch depth: 5,0 %; Inside notch depth: 5,0 %; Notch length: 50,0 mm; UT-transv. imperfections: acc. to API 5CT; Outside notch depth: 5,0 %; Inside notch depth: 5,0 %; Notch length: 50,00 mm; Geometric inspection: with ultrasonic; wall thickness	PASSED
Augensichtkontrolle: Visual inspection: Examen visuel:	PASSED Maßkontrolle: Dimensions examination: Vérification des dimensions:	PASSED

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Ergebnisse der mechanischen Prüfung / Results of mechanical testing / Résultats des essais mécaniques

Die Probennahme erfolgte an Vielfachlängen.
 The sampling was carried out on multiple lengths.
 L'échantillonnage était réalisé aux longueurs multiples.

Zugversuch längs Streifenprobe / Tensile test longitudinal Strip test specimen / Essai de traction longitudinale Bands decoupee sur tube

Pos. Item Poste	Proben-Nr. Specimen No. No. de l'éprouvette	Schmelzen-Nr. Heat No. No. de coulée	Probenabmessung Specimen dimensions Dimensions de l'éprouv.	Streckgrenze Yield strength Limite élastique	Zugfestigkeit Tensile strength Résistance à la traction	Dehnung Elongation Allongement	Einschnürung Area reduction Coefficient de striction
Anforderungen Requirements Exigences			mm	RT 0,6 % KSI 110-140	Rm KSI MIN 125	A2" %	1. Formel 1. Formule
0001	000001	585809	25,40 X 8,50	126	136	21,00	13,00
0001	000002	585809	25,40 X 8,10	124	135	20,00	12,87

Formeln zur Dehnung / Elongation formula / Formule de l'allongement

1. Formel METRIC FORMULA $E = 1942,57 * A^{0,2} / U^{0,9}$

Kerbschlagbiegeversuch Notched bar impact test / Essai de flexion par choc (résilience) [1 CHARPY_V]

Pos. Item Poste	Proben-Nr. Specimen No. No. de l'éprouv.	Schmelzen-Nr. Heat No. No. de coulée	Probenabmessung Specimen dimensions Dimensions de l'éprouvette			Probenlage Specimen position Position de l'éprouvette	Prüftemperatur Test temperature Température d'essai	Kerbschlagarbeit Absorbed energy Energie absorbée		Kerbschlagzähigkeit Impact strength Résistance au choc		Verf.-Bruchanteil Shear fracture Rupture ductile	
			Länge Length Longueur	Breite Width Largeur	Höhe Height Hauteur	längs (L) longitudinal (L) longitudinal (L)	quer (Q) transversal (Q) transversal (Q)	GRAD °C +0	einzel single individuelle	mittel average moyenne	einzel single individuelle	mittel average moyenne	einzel single individuelle
Anforderungen Requirements Exigences			mm	mm	mm			J	J	J/cm²	J/cm²	%	%
			55	5,00	10,00	Q	+0						
0001	000001	585809	55	5,00	10,00	Q	+0	50					
				5,00	10,00			51					
				5,00	10,00			53	51				
0001	000004	585809	55	5,00	10,00	Q	+0	58					
				5,00	10,00			59					
				5,00	10,00			61	59				

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Konservierung / Conservation / Conservation

outside surface varnished

Wärmebehandlung / Heat treatment / Traitement thermique

Hardening temperature: 870°C, Holding time: 1 min, Cooling: water / Tempering temperature: 620°C, Holding time: 4 min, Cooling:
air

Vermerk / Remark / Remarque

Certificate-Remark: The steel is produced in an electric arc furnace, ladle and continuous casting machine, argon purged. This process is commonly referred to as "clean steel process". The steel is fully killed.; Hardenability test: acc. to API 5CT, HRC min = 52 X %C + 21, equivalent to min 50% Martensite fraction, Hardenability test after hardening., 1 measurement point, measurement point: quadrant, 9 indentations

Grain size: acc. to ASTM-E 112; Grain size and finer: 5

Verkäufer(in) / Sales personnel / Personne chargée : Mr Storm, Tel.: 05254 81-204274, Fax: 204289

Dinslaken, 13.06.2014, TEL.: 02064.623-5360 FAX: 02064.623-5390

Abnahmebeauftragter
Inspection representative
Contrôleur

DR. BASEL KEITA / SEMIZ

Es wird bestätigt, daß die gelieferten Erzeugnisse den techn. Lieferbedingungen des Auftrages entsprechen. Dieses Dokument wurde mittels EDV erstellt und ist ohne Unterschrift rechtsgültig.
We certify that the supplied products comply with the order specification. This document was prepared by means of electronic data processing and is valid without signature.
Nous attestons que les produits livrés sont conformes aux stipulations de la commande. Ce document a été établi par traitement électronique de l'information et est valide sans signature.

Benteler Steel/Tube GmbH
 Postfach 1340 - D-33043 Paderborn
 Tel.: +49.5254.81-0 - Telex: 936866
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BENTELER 
 Steel/Tube

Abnahmeprüfzeugnis EN 10204-3.1 / Anhang
 Inspection Certificate EN 10204-3.1 / appendix
 Certificat de réception EN 10204-3.1 / appendice

Dokument-Nr.: 65-816835/001/P
 Document No.:
 No. du document:

Anlage: 1
 Attachment: 1

Abbeuguntersuchung: Stahlsorte P 110 / Semi finished product examination: Grade P 110 / Produit semi-fini: Nuance P 110

Schmelzen-Nr. Heat No. Coulée No.	Position Item Poste	Kohlenstoffanteil % Carbon % Carbone C (Gew.-%)	Härtbarkeit (min. Anforderungen) Hardenability (min. requirements) Trempeabilité (exigence min.) API Specification 5CT / ISO 11960	Härtbarkeit (IST-Werte) Hardenability (current value) Trempeabilité (valeur réelle)			
			HRC min = 52 x (%Carbon) +21				
585809	1	0,310	37	50,3			

Bemerkung / Remark / Remarqué

Der Stahl ist frei von Quecksilberverunreinigungen.
 The steel is free of mercury contamination.
 L'acier est libre des contaminations de mercure.

Dinslaken den 13.06.2014
 Tel. +49.2064.623-5360
 Fax. +49.2064.623-5390

Contrôleur
 Abnahmebeauftragter
 Inspection representative

DR. BASEL KEITA