



SERIAL NUMBER: N-207  
208 COOK DATE: -

MOLD SIZE - BY -

ORDER DATE 01 AUG 18 SHIP DATE: - PO NKI W12962Z

SIZE 4.5" TYPE SK FOR SLB

THREAD 2 3/8 DAC OTHER UPDRILL

MATRIX (H) - WEIGHT -

MATRIX (S) - WEIGHT -

BINDER - WEIGHT -

BLANK - TJ -

BILLET D1810574 TUBE -

WELD - MPI - MPI PIC - BRAZE -

THREAD GAGE 48466 STAND OFF .625

FINAL DIAMOND GRIND SIZE - 4.500

LENGTH TO WELD 1

FINISHED PIC TAKEN BY AH SHIPPED BY AH DATE: 8-10-18

DIMS L - X W - X H - WEIGHT -

IF MULTIPLES IN ONE BOX ONLY NEED DIMS ON ONE SHEET

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



# Certificate of Conformance

Serial Number	Size	Type	Steel or Matrix	Shank Diameter	Bore
N-207, N-208	4.5"	SK	Steel		
Component	Material	Vender	Lot or Heat Number		
Blank/Billet	4140 Steel	RHW	D1810574		
Hard Powder					
Soft Capping Powder					
Tool Joint					
MIG Weld					
WP Tube					
Inspection					
Diamond Grinding To Size					
Weld MPI					
Thread Gaging			2 3/8 PAC		
Signed By: <i>P Beegh</i>		date: <i>8-20-2018</i>			



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# KALİTE BELGESİ

## QUALITY CERTIFICATE / MILL TEST CERTIFICATE



Customer	MULTIMETALS RESOURCES LTD	Date	29.03.2018
Heat no	D1810574	Grade	SAE 4140 P110
Dimension	RD 4,75 inch	Weight	92.903 LB / 42.140 KG
Your Order No	17-732/8	Number of bars	75
Our Order No	1209005018 / 000010	Doc. Norm / Number	EN 10204/3.1 - 1803778
Casting type	Ingot Cast.	Reduction Ratio	24,9 /1

**Product**  
PRIME NEWLY PRODUCED HOT ROLLED STEEL ROUND BARS  
HOT ROLLED, QUENCHED & TEMPERED AND STRESS RELIEVED STEEL BARS  
ACC. TO TD-PUR-411 (01/09/17), YPX-17/055 AND LATEST EDITIONS OF ASTM A29, A434 BD, A370, A388, A322, AMS 2301, E112, E350, E381, API 6A PSL3, API 16A & PED  
WE CERTIFY THAT THE MATERIAL IS AN ALLOY STEEL

**Steelmaking Process:**  
Electric Arc Furnace/EAF, Ladle Furnace/LF, Vacuum Degassing/VD  
**Ladle Chemical Composition (%)**

	C	Si	Mn	P	S	Cr	Mo	Ni	Al	Cu	Sn	V	Nb	H	Ca
Min	0,40	0,15	0,75		0,005	0,90	0,18		0,010						
Max	0,43	0,35	1,00	0,025	0,025	1,10	0,25	0,25	0,040	0,35	0,035	0,050	0,035	0,00025	
Sample	0,42	0,30	0,95	0,005	0,011	1,06	0,24	0,21	0,025	0,12	0,007	0,037	0,025	0,00010	0,0018

Customer Req.		Asil Çelik Result		
Min	Max	Hardness	Unit	Test Loc.
285	341	331	HB	SURFACE
285	341	331	HB	1"
285		302	HB	MIDRADIUS

### Mechanical Properties (Required)

Test	Min	Max	Unit	Test Loc.	Temp.	Direction	Notch Type	Result-1
Yield strength (%0,2)	110000	140000	Psi	MIDRADIUS				134609
Yield strength (EUL %0,6)			Psi	MIDRADIUS				134754
Tensile Strength	140000		Psi	MIDRADIUS				148244
Elongation	15		%	MIDRADIUS				21,60
Reduction	45		%	MIDRADIUS				48,20
Shear (%)			%	MIDRADIUS	70 °F	Longitudinal		60
Shear (%)			%	MIDRADIUS	-20 °F	Longitudinal		40
Shear (%)			%	MIDRADIUS	14 °F	Longitudinal		50
Lateral Expansion (mm)			mm	MIDRADIUS	70 °F	Longitudinal		0,81
Lateral Expansion (mm)			mm	MIDRADIUS	-20 °F	Longitudinal		0,59
Lateral Expansion (mm)			mm	MIDRADIUS	14 °F	Longitudinal		0,77
Impact Strength-1	30		ft-lbs	MIDRADIUS	70 °F	Longitudinal	ISO-V	67,86
Impact Strength-2	30		ft-lbs	MIDRADIUS	70 °F	Longitudinal	ISO-V	64,91
Impact Strength-3	30		ft-lbs	MIDRADIUS	70 °F	Longitudinal	ISO-V	66,38
Impact Strength-Average	40		ft-lbs	MIDRADIUS	70 °F	Longitudinal	ISO-V	66,38
Impact Strength-1	15		ft-lbs	MIDRADIUS	-20 °F	Longitudinal	ISO-V	44,25
Impact Strength-2	15		ft-lbs	MIDRADIUS	-20 °F	Longitudinal	ISO-V	42,78
Impact Strength-3	15		ft-lbs	MIDRADIUS	-20 °F	Longitudinal	ISO-V	44,25
Impact Strength-Average	20		ft-lbs	MIDRADIUS	-20 °F	Longitudinal	ISO-V	43,52
Impact Strength-1	15		ft-lbs	MIDRADIUS	14 °F	Longitudinal	ISO-V	63,43
Impact Strength-2	15		ft-lbs	MIDRADIUS	14 °F	Longitudinal	ISO-V	61,96
Impact Strength-3	15		ft-lbs	MIDRADIUS	14 °F	Longitudinal	ISO-V	60,48
Impact Strength-Average	22		ft-lbs	MIDRADIUS	14 °F	Longitudinal	ISO-V	61,96

### Metallography Tests (Required)

Test	Min	Max	Unit	Standard	Result-1
A Thin		2,5		ASTM E45A	1,5
A Heavy		2		ASTM E45A	0,75
B Thin		2,5		ASTM E45A	0,66
B Heavy		1,5		ASTM E45A	0,5
C Thin		2		ASTM E45A	0
C Heavy		1,5		ASTM E45A	0
D Thin		2		ASTM E45A	1
D Heavy		1,5		ASTM E45A	0,5
Austenite Grain Size		5		ASTM E112	8

### Heat Treatment Parameters

QUENCH TEMPERATURES AT START & FINISH: <100 °F & <120 °F

COOLING MEDIA: AIR / QUENCH MEDIA: POLYMER

AUSTENITIZING TEMP. / TIME:	1590 °F	3,56	HOURS
TEMPERING TEMP. / TIME:	1166 °F	4,8	HOURS
STRESS RELIEVE TEMP. / TIME:	952 °F	3,56	HOURS

### Microstructure Tests (Required)

Test	Min	Max	Unit	Result-1
Macroetching-S		2		1
Macroetching-R		2		1
Macroetching-C		3		1

### Special Chemical Analysis Requests

Formula	Min	Max	Unit	Value
DI (ASTM A255-10)		5		7,44
P-S	0	0,04		0,017

### MECHANICAL PROPERTIES TAKEN FROM PROLONGATION.

LENGTH OF PROLONGATION : 20 cm / TENSILE SPECIMEN : RND, 12,5 mm  
GAGE LENGTH (%) : 2 inch / FBH SIZE MAX, 3,2 mm & RESULTS WERE OK  
CHARPY SPECIMEN : 10x10x55 mm / TEMP. OF TENSILE SPECIMEN : AMBIANT TEMP.  
METHOD OF MONITORING TEMPERATURE : FURNACE TYPE THERMOCOUPLE  
FURNACE CALIBRATION : AMS 2750 / COUNTRY OF ORIGIN (MELT/MANUFACTURE) : TURKEY  
ULTRASONIC TESTING 100 % ASTM A-388/SA 388-07, AFTER O&T 5R-ACCEPTANCE CRITERIA  
API 6A/ISO 10423 PSL 3 & 100 % MIX-UP CONTROLLED & SURFACE CRACK TESTED & RESULTS WERE OK  
\*FREE FROM RADIOACTIVITY & FREE FROM MERCURY. NO WELD REPAIR PERFORMED\*  
\*WE HEREBY CERTIFY, MATERIAL DESCRIBED ABOVE HAS BEEN TESTED AND COMPLIES WITH THE TERMS OF ORDER CONTRACT\*

Approved by

Mehmet Erdal TÜRKAN

33.23.169.A4 (1)

gökyüz mübarraklı

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