

Sample Result Name	Type	Measure Date Time	Recalculation Date Time	Origin
9917 (DIA-70 MM) HNO-166583	Unknown	Thursday, September 11, 2014	12:38:19 PM	Measured
Method Name	Method Version	Operator Name	Check Type	Check Status
Fe-30-MO		SARA SAE	None	Not Used
Grade Verification Name	Grade Verification Similarity	Correction Type	Type Corr Sample Name	Grade Search Name
	0	None		
Grade Search Similarity	Type	Status	Outlier Removal	
0	None	Not Used		

Sample Name	Grade
9917 (DIA-70 MM) HNO-166583	

	C Conc %	Si Conc %	Mn Conc %	P Conc %	S Conc %	Cr Conc %	Mo Conc %	Ni Conc %	Al Conc %	Co Conc %	Cu Conc %	Nb Conc %	Ti Conc %	V Conc %	W Conc %	Pb Conc %	Sn Conc %	As Conc %	Zr Conc %
1	0.046	0.30	0.67	0.017	0.017	21.51	2.65	39.65	0.090	0.061	1.59	0.056	0.62	0.049	0.047	0.012	0.013	<0.005	<0.003
2	0.045	0.32	0.68	0.018	0.015	21.67	2.57	39.54	0.085	0.061	1.59	0.060	0.61	0.047	0.046	0.011	0.010	<0.005	<0.003
3	0.043	0.33	0.67	0.017	0.016	21.78	2.59	39.33	0.094	0.064	1.61	0.060	0.62	0.046	0.052	0.013	0.013	<0.005	<0.003
Rep	0.045	0.32	0.67	0.017	0.016	21.65	2.60	39.51	0.090	0.062	1.60	0.059	0.62	0.047	0.048	0.012	0.012	<0.005	0.003
Min Cal	0.006	0.005	0.004	0.003	0.002	0.005	0.003	0.005	0.003	0.005	0.002	0.005	0.0010	0.002	0.040	0.010	0.002	0.005	0.003
Mean	0.045	0.32	0.67	0.017	0.016	21.65	2.60	39.51	0.090	0.062	1.60	0.059	0.62	0.047	0.048	0.012	0.012	<0.002	<0.002
Max Cal	3.00	5.04	18.12	0.18	0.30	36.00	10.20	55.2	6.24	21.60	7.44	3.60	3.60	12.00	7.32	0.13	0.27	0.13	0.19

	Ca Conc %	B Conc %	Fe Conc %
1	0.002	0.002	32.60
2	0.002	0.002	32.61
3	0.002	0.002	32.65
Rep	0.002	0.002	32.62
Min Cal	0.0005	0.0005	
Mean	0.002	0.002	32.62
Max Cal	0.016	0.025	

Qualify in JN-825 as per
SIS 26-724A

① Analy

certificate 124455/0
DIN EN 10204/01.05 3.1

Order No. Delivery No. Purchase Order No.
440426 41485 OK/092/12

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VDM
Elements

Sara Sae Private Limited
7/1, Pritam Road
IND - 248001 (Uttarakhand) India

Trademark
VDM® Alloy 825
NICROFER 4221
2.4858

EN ISO 9001, AS 9100
LRQA Approval
KLN 4000941/E
ASME QSC-671, expiration date:
March 16, 2015

Product
Bar, round, hot rolled, annealed, machined

Specification

FMC M40116 Rev. C

Mechanical properties from prolongation of the bar; Hardness max. 210 HB

Material

UNS N08825

Item Pcs Wht [kg] Dimension [mm] Cast Lot

1	9	417	40,00 Ø x 3000-6000	166583	104080005	
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Analysis (weight %)

LE=combustion analysis

RF=XRF

FMC M40116 Rev. C

Cast	Melting Pr.	C	S	Cr	Ni	Mn	Si	Mo	Ti	Cu	Fe	Al
166583	EF/VD	0,01 LE	<0,002 LE	22,7 RF	39,3 RF	0,8 RF	0,3 RF	3,1 RF	0,7 RF	2,0 RF	R30,6	0,1 RF

Sample Condition annealed		Tensile Test 1 ASTM E8/E8M - 13a / longitudinal specimen						Hardness Test 1 ASTM E10 - 12			
Lot	Sample No.	Temp [°C]	Yield [MPa]	Temp [MPa]	Yield [MPa]	Tensile A [%]	Elongation A [%]	Elongation A [%]	RoA	HBW 10/3000	
104080005	1-A1	1	RT	278		674	4D	48		1190 surface	

Heat Treatment	Lot
950°C/01:05h/Water	104080005

Spectrographic analytical mixup test/PMI check: without objection

Dimensional and visual inspection performed: without objection

No mercury contamination; no Radium, Luminous or Alpha source materials were used in the manufacture or testing of the items furnished.

'o weld repairs performed.

Since March 01, 2014, Outokumpu VDM GmbH is again a part of ThyssenKrupp enterprise. Due to this change in ownership, we are trading under VDM Metals GmbH instead of Outokumpu VDM GmbH.

The change in ownership does not lead to further changes in organization and production location. In Inspection Certificates of VDM Metals GmbH attachments, ThyssenKrupp VDM GmbH or Outokumpu VDM GmbH attachments shall be deemed to be equivalent.

We herewith certify, that the material is in conformance with the above mentioned specifications

Mark of the
Inspector

E

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Thomas Gymnich, authorized inspection representative

Date of release: 13.05.2014

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