Steel Dynamics, Inc.
Engineered Bar Products Division

8000 N. County Road 225 East
Pittsboro, IN 46167
Phone: (317) 892-7000
Fax: (317) 892-7285

Certified Material Test Report

Cert # : 142986	Mill Order : 1212163	Heat # : A123749	Issued : 12/28/2015 13:50:30
Work Order : 138049	Sales Order : 157590-1		PO # : 122215-1-2
Load # : 241154	Reference # :	Reference Desc :	End Use :
Size : 2 x 2 x 3/8	Shape : Undefined	Grade : A36,572,992,529	Length : 20'
Grain Practice : Al Fine Grain (5-8) per ASTM A29		Reduction Ratio : 104.4 to 1	Disposition : Stock Prime

Ladle Chemistry Analysis (ASTM A29)

C	Mn	P	S	Si	Al	Cu	Ni	Cr	Mo	Sn	N	V	Cb	B	Ca	W	Ti	Di
0.16	0.70	0.012	0.009	0.19	0.029	0.34	0.12	0.15	0.04	0.013	0.0088	0.015	0.001	0.0001	0.0020	0.000	0.001	0.59

Pb	Co	As	Sb	Zr	Bi	H(ppm)	O(ppm)	Ceq	J-Factor
0.000	0.008	0.006	0.003	0.000	0.001	0.0		0.35	

Product Check Analysis (ASTM A29)

	C	Mn	P	S	Si	Al	Cu	Ni	Cr	Mo	Sn	N	V	Cb	Ti	B	Ca	O
Front																		
Back																		

Jominy (ASTM A255)

	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J12	J14	J16	J18	J20	J24	J28	J32
Calc'd Standard																		

	1.5	3	5	7	9	11	13	15	20	25	30	35	40	45	50
Calc'd Metric															

	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J12	J14	J16	J18	J20	J24	J28	J32
Front																		
Back																		

Microcleanliness (ASTM E45)

Method A								Method C		Method E	
AT	AH	BT	BH	CT	CH	DT	DH	S	O	SAM "B"	SAM "D"

Microcleanliness (DIN 50602)

K		M	
S	O	Tot	Tot

Decarb

Depth	% of Diameter

Grainsize

Austenitic	Ferritic

Macrostructure (ASTM E381)

S	R	C

Magnetic Particle Inspection

Frequency	Severity

Mechanical Properties (ASTM A370)

Tensile Properties								Hardness	
Tensile Strength		0.2% Yield Strength		% Elong (2")	% ROA	0.35% EUL Yield Strength		(MR)	(Surf)
75,500	psi	51,900	psi	35.0	59.9				

Steel Dynamics - Engineered Bar Products has a quality system in place which has been certified ISO 9001:2008 compliant, including PED certification.

Comments/Specs

ASTM A992-11 — ASTM A529-05 Gr 50 — ASTM A36-12

Condition : As-Rolled, Hot-Rolled

I hereby certify that the content of this report is correct and accurate, and that all tests and operations performed on this material were in compliance with applicable material specifications and purchaser designated requirements.

Jonathan Valloslo - Rolling Mill Metallurgist

Any alteration to this report voids Steel Dynamic's warranting of results. No weld repair has been performed on this material. This material is not radioactive and has not been exposed to radioactivity while under the control of Steel Dynamics. This material has not been exposed to mercury while under the control of Steel Dynamics. Unless otherwise noted, this material was melted, continually cast, and rolled in the USA; w/ all testing performed by Steel Dynamics.

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Certified Material Test Report

Cert # : 142897 | Mill Order : 1212162 | Heat # : A123748 | Issued : 12/23/2015 15:42:43
Work Order : 138049 | Sales Order : 157587-1 | | PO # : 122215-1-1
Load # : 241151 | Reference # : | Reference Desc : | End Use :
Size : 2 x 2 x 3/8 | Shape : Undefined | Grade : A36,572,992,529 | Length : 20'
Grain Practice : Al Fine Grain (5-8) per ASTM A29 | Reduction Ratio : 104.4 to 1 | Disposition : Stock Prime

Ladle Chemistry Analysis (ASTM A29)

C	Mn	P	S	Si	Al	Cu	Ni	Cr	Mo	Sn	N	V	Cb	B	Ca	W	Ti	Dl
0.15	0.60	0.011	0.019	0.20	0.028	0.35	0.13	0.12	0.05	0.014	0.0109	0.012	0.002	0.0002	0.0010	0.001	0.001	0.50

Pb	Co	As	Sb	Zr	Bi	H (ppm)	O (ppm)	Ceq	J-Factor
0.001	0.008	0.006	0.004	0.001	0.002	0.0		0.32	

Product Check Analysis (ASTM A29)

	C	Mn	P	S	Si	Al	Cu	Ni	Cr	Mo	Sn	N	V	Cb	Ti	B	Ca	O
Front																		
Back																		

Jominy (ASTM A255)

	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J12	J14	J16	J18	J20	J24	J28	J32
Calc'd Standard																		

	1.5	3	5	7	9	11	13	15	20	25	30	35	40	45	50
Calc'd Metric															

	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J12	J14	J16	J18	J20	J24	J28	J32
Front																		
Back																		

Microcleanliness (ASTM E45)

Method A								Method C		Method E	
AT	AH	BT	BH	CT	CH	DT	DH	S	O	SAM "B"	SAM "D"

Microcleanliness (DIN 50602)

K			M
S	O	Tot	Tot

Decarb		Grainsize		Macrostructure (ASTM E381)			Magnetic Particle Inspection	
Depth	% of Diameter	Austenitic	Ferritic	S	R	C	Frequency	Severity

Mechanical Properties (ASTM A370)

Tensile Properties							Hardness	
Tensile Strength		0.2% Yield Strength		% Elong (2")	% ROA	0.35% EUL Yield Strength	(MR)	(Surf)
72,000	psi	51,000	psi	35.5	33.6			

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Comments/Specs

ASTM A992-11 --- ASTM A529-05 Gr 50 --- ASTM A36-12

Condition : As-Rolled, Hot-Rolled

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