

## 2.313 PX PLUG HOUSING 9-CHROME



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### INSPECTION CERTIFICATE TYPE 3.1 to BS EN10204

TATA STEEL INT (AMERICAS) INC.  
475 NORTH MARTINGALE DRIVE  
SUITE 400 SCHAUMBURG  
ILLINOIS 60173 - 2222  
USA



Cast No. A0011Y

Works Order No. CB880865

Customer Order No. PO3614-001

Date of Issue 16-MAR-2015

Certificate No. 00552017/1

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**SPECIFICATIONS ASSOCIATED WITH THIS ORDER -**  
9CR TO BMS S501 REV D + WS801 REV M + (2) ADD SPEC  
SCHLUMBERGER CMS-ZZA10.0 AS  
HALLIBURTON ES-MA-2-7 REV J

#### PRODUCT INFORMATION -

SIZE - 2.75"

QUANTITY/WEIGHT - 20 BARS 4.030 TONNES APPROX

CONDITION OF MATERIAL - H&T, SM TURN, STR REL

STEELMAKING PROCESS/PROCESS OF MANUFACTURE - Electric VDG Ingot

#### HEAT TREATMENT OF MATERIAL - W52856

Harden at 850° C; for 02:00; time to 02:04; total time 04:04; Oil Quenched from 44° C.

Temper at 655° C; for 03:00; time to 05:44; total time 08:44; Air Cooled.

Stress Relieve at 625° C; for 01:00; time to 01:52; total time 02:52; Air Cooled.

#### ANALYSIS -

Cast No	C	Si	Mn	P	S	Cr	Mo	Ni	Cu
Cast Analysis									
A0011Y	.126	.32	.52	.011	.0027	8.28	.84	.09	.05

**Mechanical Test -** Tested to ASTM A370 - 13  
**Material Specification** ES-MA-2-7

Test No.	Ingot Id	Ingot Pos.	Sample Pos.	Orient	Temp.	0.2% PS	UTS	Elong	R of A	Hardness	Hardness	Tensile Dia
Units					C	kPSI	kPSI	%	%	HBW10/3000	HBW10/3000	Inches
Result	2631727	M	Mid-Radial	Lo	23	86.3	112.0	25.0	73.0	235	235	0.50

Test No.	Ingot Id	Ingot Pos.	Sample Pos.	Orient	Temp.	Tensile G.L.	Frac Pos.
Units					C	Inches	
Result	2631727	M	Mid-Radial	Lo	23	2.00	A

**Impact Test -** Tested to ASTM E23 - 12c  
**Material Specification** ES-MA-2-7

Test No.	Ingot Id	Ingot Pos.	Sample Pos.	Geometry	Orient	Temp.	Imp Mean	Impact	Impact	Impact	% Ratio
Units						C	FILbs	FILbs	FILbs	FILbs	%
Result	2631728	M	Mid-Radial	CH2MMV(8)	Lo	-10	118	122	109	122	89.0



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**Mechanical Test - Tested to ASTM A370 - 13**  
**Material Specification BAKER BMS S501**

Test No.	Ingot Id	Ingot Pos.	Sample Pos.	Orient	Temp.	0.2% PS	U.T.S	Elong	R of A	Hardness	Hardness	Frac Pos.
					C	kPSI	kPSI	%	%	HBW10/3000	HBW10/3000	
Result	2831730	M	Mid-Radial	Lo	23	86.3	112.0	26.0	73.0	235	235	A

**Mechanical Test - Tested to ASTM A370 - 13**  
**CMS-Z2A10.0**

Test No.	Ingot Id	Ingot Pos.	Sample Pos.	Orient	Temp.	0.2% PS	U.T.S	Elong	R of A	Hardness	Frac Pos.
					C	PSI	PSI	%	%	HRc	
Result	2831731	M	Mid-Radial	Lo	23	85500	112000	24.0	71.0	19.3	A

**Mechanical Test - Tested to ASTM A370 - 13**  
**WS801**

Test No.	Ingot Id	Ingot Pos.	Sample Pos.	Orient	Temp.	0.2% PS	U.T.S	Elong	R of A	Hardness	Hardness	Frac Pos.
					C	kPSI	kPSI	%	%	HRc	HRc	
Result	2831732	M	Mid-Radial	Lo	23	85.3	112.0	24.0	71.0	17.8	19.3	A

**Impact Test - Tested to ASTM E23 - 12c**  
**WS801**

Test No.	Ingot Id	Ingot Pos.	Sample Pos.	Geometry	Orient	Temp.	Imp Mean	Impact	Impact	Impact
						C	FILbs	FILbs	FILbs	FILbs
Result	2831733	M	Mid-Radial	CH2MMV(8)	Lo	0	129	131	131	127

**Grain Size Test - Tested to ASTM E112 - 13 (Comparison Method)**  
**MacQuaid Ehn Grain Size - Cerburised at 925 Deg C 8 Hours Furnace Cooled.**

Tested at a magnification of X100

Test No.	Ingot Id	Ingot Pos.	G.Size	G.Size	Elicant
Result	2831728	M	7	8	Villelae

**Surface Hardness -**

Test No.	Ingot Id	Ingot Pos.	Hardness	Hardness
			HBW10/3000	HBW10/3000
Result	2831734		223	223



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Ultrasonic Test - Tested to ASTM A388/A388M - 11  
Satisfactory to 3.0mm FBH ASTM A388/M95  
MEETS API 6A CLAUSE 7.4.2.3.15 PSL 3 & 7.4.2.4.11(PSL 4)  
US SATISFACTORY TO API 6A PSL 3+ 4

Ultrasonic Test - Tested to UT ANGLE BEAM PROCEDURE  
Angle beam inspection satisfactory to 1/16" side drilled holes.


**MISCELLANEOUS INFORMATION -**

NACE MR-01-75/ISO 15156  
ULTRASONIC TEST MEETS SCHLUMBERGER NDE 31  
ULTRASONIC TEST METHOD ASTM A388.  
REDUCTION RATIO: 52.91:1  
VAC DEGASSED AND SECONDARY REFINED STEEL  
Material type tested satisfactorily  
Method of Analysis  
- Elemental Analysis (combustion/fusion) tested at our Rotherham laboratory C S  
- Atomic Emission Spectroscopy (OES) tested at our Rotherham laboratory Si Mn P Cr Mo Ni Cu  
Radioactivity < 0.1Bq/g on ladle sample.  
This product is mercury free.  
No weld repair carried out on this product.  
Our quality management system is accredited to the following standards : ISO9001 and AS/EN9100.  
Our environmental management system is accredited to ISO14001.  
Material is melted and manufactured in the United Kingdom.

**AUTHORISED SIGNATURE -**

Certified by our Stockbridge Works that, unless otherwise stated above, the whole of the above mentioned materials have been manufactured, tested & inspected in accordance with the terms of the acknowledged contract/order applicable thereto and conform fully to the standards/specifications quoted herein.

Approved Signatory - Lee Ibbittson - Certification and Accreditation Manager

  
Signed.....

For Tata Steel UK Limited

This inspection certificate shall not be reproduced except in full, without the written approval of Tata Steel UK Limited  
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