

BHUSHAN POWER & STEEL LTD

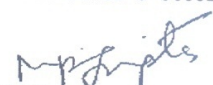


Works: RENGALI, DIST- SAMBALPUR (ORISSA) Bhushan Power & Steel Limited
Phone: (0)663-2535000, 2562024, (Fax) 2535277, 2562024 Plot No. 264, Sector-24
Faridabad (Haryana)

Test Certificate

Format No.: BPSL/QC/F - TC01, Rev-01, Rev. Date- 20.05.2015

Sadhu Forging

T.C. No. & Date		X9324D/08.03.2018				Heat No.		18A4403					
Customer ref.No./REV.No		-----				Grade of Steel		16/20MNCR5					
P.O. / Ref. No.		-----				Size		63 MM RCS					
Customer Name		BHUSHAN POWER & STEEL LTD T DIV III/FBD				No. of PCS. / Coils							
Supply Condition		As Rolled				Quantity (MT)		13.080					
Process Rout		BF-EAF-LRF-VD-CCM (EMS)- RM				Colour code		YELLOW+GREEN					
Billets Size mm		180X180		Reduction Ratio		8.16:1		Multiple length		6.00 MTR			
Chemistry %		%C	%Mn	%S	%P	%Si	%Cr	%Ni	%Mo	%Cu	%Al	%V	
Specification	Min.	0.17	1.10	--	--	--	1.00	--	--	--	--	--	
	Max.	0.19	1.30	0.030	0.025	0.400	1.10	--	--	--	--	--	
	Actual	0.18	1.20	0.014	0.011	0.250	1.08	0.011	0.004	0.005	0.025	0.004	
Gas Contents (ppm)		Hydrogen	Specified		Actual		Oxygen		Specified		Actual		
			--		1.5				--		18		
									Nitrogen		Specified		
											--		
											Actual		
											68		
Mechanical Properties													
	Test Condition	Hardness on TP	UTS (N/mm ²)	YS / 0.2 % PS	%E	%RA	Hardness (As Rolled) (BHN)	Imp.Value Joules	Cold/Hot Upset as per Cust Req.	Step Down test as per IS:4075/ Cust Req.	Size Tol AS Per IS 3739 Grade-1		
Specified	NA	NA	NA	NA	NA	NA	--	NA	--	--	--		
Actual	--	--	--	--	--	--	169	--	--	OK	OK		
Metallurgical Test													
	Macro-Etch (ASTM E-381)	Grain size 100x ASTM IS:4748	PARTIAL Decarb (mm)	DI Value	Inclusion Rating (As per IS:4163)								
				As per SAE J 406	A		B		C		D		
					T	H	T	H	T	H	T	H	
Specified	--	--		NA									
Actual	C2R2S2	7.00	0.25	--	1.5	--	1.0	--	1.0	--	1.5	--	
Micro Structure: Ferrite & pearlite													
Hardenability test (JOMINY TEST) IS:3848 / ASTM A255 / SAE J 406													
Dist.(INCH)		4/16"											
Required (HRC)		--											
Actual (HRC)		40.0											
Non Destructive Test													
Anti Mix Up Control(100%):				OK		Ultrasonic :		OK		MPI:		OK	
Remarks													
Prepared By: D N NAYAK								For Bhushan Power & Steel Ltd					
DECLARATION: Certified that the test findings are correct and based on actual result carried on samples drawn as per quality plan.								 Authorized Signatory (Quality Assurance)					