



BHUSHAN POWER & STEEL LTD

Works: RENGALI, DIST- SAMBALPUR (ORISSA)

Phone: (0)663-2535000, 2562024, (Fax) 2535277, 2562024

Bhushan Power & Steel Limited
Plot No. 264, Sector-24
Faridabad (Haryana)

Test Certificate

Format No.: BPSL/QC/F-TC01, Rev-02, Rev. Date-17.01.2017

T.C. No. & Date		X7243/22.01.2018						Heat No.		18E1142									
Customer Ref.No./REV.No		-----						Grade of Steel		16/20MNCr5									
P.O. / Ref. No.		-----						Size		60 MM DIA									
Customer Name		BHUSHAN POWER & STEEL LTD T DIV III/FBD						No. of PCS. / Coils											
Supply Condition		As Rolled						Quantity (MT)		6.426 8900									
Process Rout		BF-EAF-LRF-VD-CCM (EMS)-RM						Colour code		YELLOW+GREEN									
Billets Size mm		180X180		Reduction Ratio		11.45:1		Multiple length		6.00 MTR									
Chemistry %		%C	%Mn	%S	%P	%Si	%Cr	%Ni	%Mo	%Cu	%Al	%V							
Specification	Min.	0.170	1.10	0.020	--	0.15	1.00	--	--	--	0.020	--							
	Max.	0.190	1.30	0.035	0.025	0.35	1.10	--	--	--	0.040	--							
	Actual	0.180	1.25	0.013	0.013	0.23	1.06	0.011	0.0001	0.003	0.021	0.006							
Gas Contents (ppm)		Hydrogen		Specified		Actual		Oxygen		Specified		Actual		Nitrogen		Specified		Actual	
				--		1.7				--		14				--		72	
Mechanical Properties																			
	Test Condition	Hardness on TP	UTS (Kg/mm ²)	YS / 0.2 % PS	%E	%RA	Hardness (As Rolled) (BHN)	Impact Value Joules Izod/ Charpy	Cold/Hot Upset as per Cust Req.	Step Down test as per IS:4075/ Cust Req.	Size Tol.as per IS3739 Grade1								
	SPECIFIED	--	--	--	--	--	--	--	--	--	--								
	ACTUAL	--	--	--	--	--	171	--	--	OK	OK								
Metallurgical Test																			
	Macro-Etch (ASTM E-381)	Grain size 100x ASTM E112 / IS:4748	PARTIAL Decarb (mm)	DI Value As per SAE J 406	Inclusion Rating (As per ASTM E45A / IS:4163)														
					A		B		C		D								
					T	H	T	H	T	H	T	H							
	SPECIFIED	--	--	NA															
	ACTUAL	Better than C2R2S2	7.0	0.26	1.5	--	1.0	--	0.5	--	1.5	--							
Micro Structure: Ferrite + Pearlite																			
Hardenability test (JOMINY TEST) IS:3848 / ASTM A255 / SAE J 406																			
Dist. (INCHES)		J-4/16"																	
Required (HRC)		35-38																	
Actual (HRC)		37.0																	
Non Destructive Test																			
Anti Mix Up Control(100%):				OK				Ultrasonic :				OK		MPI:		OK			
Remarks																			
Prepared By: PRITAM										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)									