

Sl No.	Components/Operations & Description of Test	Type of check	Quantum of check/ Sampling with basis	Reference document for testing	Acceptance norms	Form of record	Applicable Codes						Remarks
3	FINAL INSPECTION AND TESTING (Inspection Engineer to ensure/check compliance of Notes/general requirements mentioned in this MQP)												
3.1	Visual and Dimensional Inspection: For Fabrication (as per approved Drawing) & Galvanizing	Visual & Measurement	a. For Angles/Plates etc. which have been procured with CIP (in line with MQP): Total nos. of samples shall be calculated (A) based on One sample/50	Please refer Sr. No 2.1.1 to 2.1.9 /POWERGRID approved drawing	Please refer Sr. No 2.1.1 to 2.1.9 /POWERGRID approved drawing	Test Report	A	J	U	Z		Y	CIP
3.2	Mechanical Properties		MT/Section/Source (Re-roller/Manufacturer). Only 25% of "A" shall be randomly selected for testing.										
3.2.1	Yield Stress Test	Mechanical	b. For Angles/Plates etc. which have been procured without CIP (in line with MQP) Total nos. of samples shall be calculated (B1) & (B2) based on One sample/50 MT/ Section / Source (Re-roller/ Manufacturer) for MS (B1) and HT (B2) items respectively and following sampling plan for inspection shall be adhered:	Please Refer (for test values) Sr. No. 1.2.1 to 1.2.5	Please Refer (for test values) Sr. No. 1.2.1 to 1.2.5	Test Report	A	J	U	Z		Y	
3.2.2	Ultimate Tensile Strength	Mechanical					A	J	U	Z		Y	
3.2.3	Percentage Elongation at 5,65√Area	Mechanical	MS Items: 25% of B1 HT Items: 50% of B2				A	J	U	Z		Y	
3.2.4	Bend Test	Mechanical	c. Sampling plan for testing for new vendors (initially for a period of one year and subsequently as indicated in their MQP approval extension letter) and in cases, where material has been procured from traders (after approval from POWERGRID):				A	J	U	Z		Y	
3.2.5	Impact Test (if applicable)	Mechanical	One sample for Every 50 MT/ section/Lot or part thereof for each source (re-roller/manufacturer)				A/D	J/L	U/V	Z		Y	
3.3	Chemical Properties	Chemical	100% samples selected for testing as per above sampling plan	IS: 2062/Grade as mentioned in POWERGRID TS	IS: 2062/Grade as mentioned in POWERGRID TS	Test Report/ Third party Lab report	A/D	J/L	U/S	Z		Y	CIP

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3.4	Galvanizing Tests												
3.4.1	Thickness of Zinc Coating (Galvanizing coating check by Elcometer)	Chemical	100% samples selected for testing as per above sampling plan	IS 2629/IS 4759/IS 6745/IS 2633/	Please refer Sl. No. 2.3	Test Report	A	J	U	Z		Y	CIP
3.4.2	Weight of Zinc Coating	Chemical											
3.4.3	Uniformity of Zinc Coating	Chemical											
3.4.4	Adhesion Test of Zinc Coating	Chemical											
3.5	For Foundation Bolt												
3.5.1	Dimensional test	Measurement	Sampling as per IS 1367/2500	POWERGRID Drawing	POWERGRID Drawing	Test Report	A	J	U	Z		Y	CIP
3.5.2	Mechanical Test UTS, Yield & Elongation	Mechanical	2 samples lot	As per IS 2062/SAE 1018	As per IS 2062/SAE 1018	Test Report	A	J	U	Z		Y	
3.5.3	Chemical Test	Spectro Analysis	2 samples lot	As per IS 2062/SAE 1018	Chemistry needs to be comparable with raw material supplier TC	Test Report	A	J	U	Z		Y	
3.5.4	Impact Test (if applicable)	Mechanical	One sample per section per lot for each source	IS 2062 Grade E250, POWERGRID Tech. Specn.	IS 2062 Grade E250, POWERGRID Tech. Specn.	Test Report	AD	J/L	U/V	Z		Y	
3.6	Packing, Storing, Bundling and Handling		100%		IS802/POWERGRID specn./Packing list to be submitted along with dispatch documents	Manufacturer's Log Book/Format No							Tower wise bundling shall be carried out. Pieces of lighter sections shall be wire bundled and heavy sections shall be supplied loose. Stacking shall have proper ventilation and be kept inclined. Damage to galvanization coating shall be avoided while handling. Sequential supplies and other details as per POWERGRID technical specification shall be ensured.

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ANNEXURE-4								
Agreed Chemical Composition of Billets / Blooms for POWERGRID Projects								
	Rashtriya Ispat Nigam Ltd (RINL):			SAIL (ISCO)		SAIL (BSP)		
Grade	C18HMn-For HT (E350) with V	C18HMn-For HT (E350) with Ti	C20 MMn-For MS (E250)	SAIL Tower Grade VI For HT (E350)	C20 MMn-For MS (E250)	SAIL Tower Grade VI For HT (E350)	C20 MMn-For MS (E250)	
C	0.15-0.20	0.15-0.20	0.17-0.23	0.15-0.22	0.16-0.25	0.15-0.22	0.16-0.25	
Mn	1.1-1.4	1.1-1.4	0.6-0.1	1.15-1.6	0.6-1.05	1.25-1.6 /	0.6-1.05	
Si	0.1-0.35	0.1-0.35	0.1-0.35	0.10-0.35	0.15-0.30	0.15-0.30	0.1 (Max)	
P (Max)	0.04	0.04	0.04	0.045	0.047	0.047	0.047	
S (Max)	0.04	0.04	0.04	0.045	0.047	0.047	0.047	
Cr (Max)	0.08	0.08	0.08	0.1	0.2	0.2	0.2	
Ni (Max)	0.03	0.03	0.03	0.05	0.05	0.05	0.05	
Cu (Max)	0.03	0.03	0.03	0.07	0.1	0.1	0.1	
Mo (Max)	0.005	0.005	0.005	0.05	0.05	0.05	0.05	
V (Min)	0.03			0.025	As per test certificate	0.025 / 0.03*	As per test certificate	
V (Max)	0.08	0.01	0.01					
Nb (Min)				0.015		0.015		
Nb (Max)								
Ti (Min)		0.028						
Ti (Max)	0.01	0.05	0.01					
Al (min)	0.015 for SMS-1 Heats			0.015				
Al (max)	0.04 for SMS-2 Heats							
CE (Min)			0.28		0.28	0.36	0.28	
CE (Max)	0.45	0.45	0.42	0.45	0.42	0.45	0.42	
S+P (Max)				0.09	0.09	0.09	0.09	
N (Max)								
B (Max)	0.004	0.004	0.004	0.005	0.005	0.005	0.005	
Sn (Max)								
Remarks	Variation in Min/Max Limit: C=0.02, Mn=0.03, P=0.005, S=0.005			Si - Traces - 0.35 for Al Killed Steel, V=0.025 Min or Nb=0.015 (if added alone), V+Nb+Ti = 0.25 Max, Al=0.015 for Al Killed heats.		Mn 1.25-1.50 for blooms size 350x150mm; V=0.025 Min for Billets and Blooms up to 150 mm and 0.03 for Blooms of 160 mm and above; Nb=0.015 (if added alone), Al=0.015 for Al Killed heats.		

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	SAIL (DSP)		Electrosteel Steels Ltd		Jindal Steel & Power Ltd (Raigarh & Angul)			
Grade	SAIL Tower Grade VI For HT (E350)	C20 MMn-For MS (E250)	C18+Mn-For HT (E350)	C20 MMn-For MS (E250)	C18 HMn+HT (E350)	C20 MMn-For MS (E250)	C18 MMn-For MS (E250)	
C	0.15-0.22	0.16-0.25	0.15-0.22	0.17-0.25	0.15-0.20	0.17-0.23	0.15-0.21	
Mn	1.25-1.6 /	0.8-1.05	1.20-1.50	0.8-1.00	1.20-1.50	0.80-1.00	0.80-1.00	
Si	0.15-0.30	0.15-0.30	0.10-0.35	0.10-0.35	0.15-0.30	0.10-0.40	0.10-0.40	
P (Max)	0.047	0.047	0.045	0.045	0.03	0.04	0.04	
S (Max)	0.047	0.047	0.045	0.045	0.03	0.04	0.04	
Cr (Max)	0.2	0.2	0.08	0.08	0.07	0.07	0.07	
Ni (Max)	0.05	0.05	0.03	0.03	0.07	0.07	0.07	
Cu (Max)	0.1	0.1	0.03	0.03	0.1	0.1	0.1	
Mo (Max)	0.05	0.05	0.005	0.005	0.07	0.07	0.07	
V (Min)	0.025 / 0.03*	As per test certificate	0.03		0.03			
V (Max)			0.06	0.005				
Nb (Min)	0.015				0.015			
Nb (Max)								
Ti (Min)								
Ti (Max)								
Al (min)					0.015	0.01	0.01	
Al (max)								
CE (Min)	0.35/0.38	0.28	0.36	0.28				
CE (Max)	0.45	0.42	0.45	0.42	0.45	0.42	0.42	
S+P (Max)	0.09	0.09						
N (Max)								
B (Max)	0.005	0.005	0.004	0.004				
Sn (Max)								
Remarks	* 0.36 for 125x125 mm Billets Mn 1.25 -1.60 for blooms size 350x150mm; V=0.025 Min for Billets and Blooms up to 150 mm and 0.03 for Blooms of 160 mm and above; Nb=0.015 (if added alone); Al=0.015 for Al Killed heats.				Variation in Min Limit: C=0.02, Mn=0.03, P=0.005, S=0.005, Nb when added alone V+Nb+Ti<=0.25			

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	JSW Steel Ltd			Jayaswal Neco Industries Ltd				
Grade	C18 HMn-HT (E350)	C20 MMn-For MS (E250)	C18 MMn-For MS (E250)	C18 JC20 HMn- HT (E350)	C18 MMn MS (E250)	C20 MMn- MS (E250)		
C	0.15-0.21	0.17-0.23	0.15-0.21	0.15-0.20	0.15-0.20	0.17-0.23		
Mn	1.20-1.50	0.60-1.00	0.60-1.00	1.2-1.50	0.6-1.00	0.6-1.00		
Si	0.10-0.35	0.10-0.35	0.10-0.35	0.15-0.35	0.15-0.35	0.15-0.35		
P (Max)	0.04	0.04	0.04	0.035	0.035	0.035		
S (Max)	0.03	0.04	0.04	0.035	0.035	0.035		
Cr (Max)	0.07	0.07	0.07	0.05	0.05	0.05		
Ni (Max)	0.07	0.07	0.07	0.05	0.05	0.05		
Cu (Max)	0.1	0.1	0.1	0.1	0.1	0.1		
Mo (Max)	0.07	0.07	0.07	0.05	0.05	0.05		
V (Min)	0.025			0.03				
V (Max)								
Nb (Min)	0.015*							
Nb (Max)								
Ti (Min)								
Ti (Max)								
Al (min)	0.015	0.01	0.01	0.015	0.01	0.01		
Al (max)	0.05			0.035	0.035	0.035		
CE (Min)				0.38				
CE (Max)	0.45	0.42	0.42	0.42	0.41	0.41		
S+P (Max)								
N (Max)								
B (Max)								
Sn (Max)				0.1	0.1	0.1		
Remarks	Total Microalloying (Ti+Nb+V) <= 0.20 * Nb<0.015 (Min) if added alone			Variation in Min/Max Limit: C=0.02, Mn=0.05				

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	Tata Steel, Kalinganagar (For Plates)			Electrotherm India Pvt Ltd				
Grade	C18 HMn- HT (E350)		C18MMn-For MS (E250)	C18 HMn-HT (E350)	C20 MMn-For MS (E250)	C18 MMn-For MS (E250)		
C	0.12-0.18		0.15-0.20	0.15-0.21	0.17-0.23	0.15-0.21		
Mn	1.05-1.45		0.8-1.0	1.20-1.50	0.60-1.00	0.60-1.00		
Si	0.14-0.25		0.15-0.30	0.10-0.35	0.10-0.35	0.10-0.35		
P (Max)	0.030		0.035	0.04	0.04	0.04		
S (Max)	0.020		0.035	0.04	0.04	0.04		
Cr (Max)	0.1		0.05	0.1	0.1	0.1		
Ni (Max)	0.1		0.05	0.07	0.07	0.07		
Cu (Max)	0.1		0.05	0.1	0.07	0.07		
Mo (Max)	0.1		0.05					
V (Min)				0.07				
V (Max)				0.025				
Nb (Min)				0.05				
Nb (Max)	0.15			0.015				
Ti (Min)								
Ti (Max)	0.1		0.01					
Al (min)	0.02			0.015	0.02	0.02		
Al (max)			0.025					
CE (Min)								
CE (Max)	0.45		0.39	0.47	0.42	0.42		
S+P (Max)								
N (Max)	0.012							
B (Max)	0.0005							
Sn (Max)								
Remarks	Total Microalloying (Ti+Nb+V) = 0.025 (Min) and 0.25 (Max)			Nb = 0.015 Min if added alone Ti+Nb+V <= 0.20				

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Bhushan Steel Ltd								
Grade	C18 HMM+HT (E350)	C20 MMn-For MS (E250)						
C	0.15-0.21	0.17-0.23						
Mn	1.20-1.60	0.60-1.00						
Si	0.35	0.35						
P (Max)	0.04	0.04						
S (Max)	0.04	0.04						
Cr (Max)	0.12	0.12						
Ni (Max)								
Cu (Max)								
Mo (Max)	0.07							
V (Min)	0.03							
V (Max)								
Nb (Min)								
Nb (Max)								
Ti (Min)								
Ti (Max)								
Al (min)	0.01	0.01						
Al (max)								
CE (Min)								
CE (Max)	0.45	0.42						
S+P (Max)								
N (Max)								
B (Max)								
Sn (Max)								
Remarks	Ti+Nb+V <= 0.20							

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Request Letter

On Official Letter Head

To

RIO Incharge, -----

POWERGRID

Sir,

We (Name of the Manufacturer)..... are offering material for inspection vide following Inspection Call nos:

1.,
2.
3.
4.
5.

As the material is of the same design and specification, We want to offer this material for inspection in single lot. We understand that in case of failure of any section(s) , the material corresponding to the failed section(s) in all the above-mentioned inspection calls shall be rejected.

Thanking you.

Yours sincerely,

(Seal & Signature of the Quality In-charge)

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Guidelines for welder/brazer Qualification by POWERGRID

Revised guidelines for welder/ brazer qualification /certification are as follows:

1. The welder/brazer shall be qualified as per provision in ASME Section-IX/ AWS D1.1.
2. The manufacturer shall engage a certified third-party agency for WPS and witness the welding process in line with the approved WPS (Welding Procedure Specification) for qualification of welder.
3. The third-party agency must be a Type-A inspection body accredited as per ISO/IEC 17020:2012 from an IAF member body which is signatory to their Multilateral Recognition Arrangement (MLA) for the certification bodies as a requirement and having scope of accreditation-IAF scope 17 (i.e. as per ASME section IX & AWS D1.1).
4. As per Clause QW-322 of ASME Sec-IX:2019, the performance qualification of the welder shall remain valid, provided that not more than 6 months have passed since the qualified welding process was last used. Hence, the manufacturer shall re-validate their qualification at every two years interval, as per the existing practice followed by POWERGRID.
5. The validity of the welders approved by POWERGRID shall remain valid and existing POWERGRID certified welders will continue to be considered approved. After expiry of their approval or for new welder qualification, the certification shall be done by certified third party agency as per above mentioned procedure.
6. POWERGRID QA&I dept shall review the welder certification during product and process inspection.
7. POWERGRID reserves the right to carry out welder qualification as per earlier practice as and when required (i.e. *Welding brazing procedure is approved by POWERGRID and Welders/ Brazers are qualified based on witnessing of welding/ brazing work by POWERGRID representative*)

The above guidelines shall be implemented with immediate effect.

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