GUJRAT ENERGY TRANSMISSION CORPORATION LTD.

STANDARD APPROVAL

STANDARD MANUFACTURING QUALITY PLAN

GETCO/CE(Engg)/III/D/O-006499
Date:06.04.2021

MATERIAL DESCRIPTION : STANDARD MQP GALVANIZED STEEL STRUCTURES FOR GETCO SUPPLY

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GETCO/MQP/20-21/TOWER&SS STRUCTURES	STANDARD MQP HDG TOWER & SS STRUCTURES UPTO 400KV	0	20.11.2020	7 of 13

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3. GALVANIZING

S.No	Component / Operation & Description of Test	Sampling Plan with basis	Ref. Doc & Acceptance norm	Record Format	Testing Agency			Remarks
					M	C	TPIA	
(a)	**DEGREASING** 1. Caustic solution / alkali based degreaser to be followed by Rinsing Water or 2. Acid based degreaser	One sample daily One sample daily	IS 2629 with Latest amendments. 10-15Kg of NaoH/100 Litres of H_2O. Temp of Solution : 85-90 °C As per Manufacturers recommendation.	Process Report/ Register	P	R	-	
(b)	**PICKLING** 1. Acid content 2. Iron Content	One sample daily One sample daily	HCL : @ Room Temp. Conc : 100-150g/l. H2SO4 : @ 60-80 °C. Conc : 100-150g/l. (Inhibitor to be used with Both types of Acid.) When iron content reaches 100-120g/l, the solution shall be discarded.	-Do-	P	R	-	
(c)	**RINSING** Only in absence of Auto Neutralization of Pre Flux solution	One sample daily	IS: 2629 with latest amendments (ph = 4 to 7)	-Do-	P	R	-	
(d)	**PREFLUXING** In Zinc chloride and Ammonium Chloride solution patent fluxing reagent	One sample daily	Iron Content : 50 Gms/Ltr Max. Sp. Gravity : 1.16 to 1.24 pH : 3 to 6	-Do-	P	R	-	

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S.No	Component / Operation & Description of Test	Sampling Plan with basis	Ref. Doc & Acceptance norm	Record Format	Testing Agency			Remarks
					M	C	TPIA	
(e)	**PREHEATING** On hot plate / dry air oven		70°C - 120 °C		P	R	-	
3.1	**DIPPING**						-	
(a)	Zinc Bath temperature recording is done by digital thermometer.	Hourly Check	440 °C to 460 °C	-Do-	P	R		Lab Report to be reviewed at the time of Final Inspection
(b)	Chemical composition of Zinc Bath	1 sample / Month	Mass of zinc in bath min 98.5%	Lab Report	R	R	P*	
(c)	**Immersion & Withdrawal time.**		Articles to be immersed till reaction takes place which is indicated by stoppage of bubbling, withdrawal to be controlled so that Zinc drains freely	-Do-	P	R	-	
(d)	**QUENCHING & RUNNING WATER**		After dipping the material is quenched in water temp < 60^0C		P	R	-	
(e)	**DICHROMATING**	One sample daily	Strength of Solution to be maintained 1% & temp <65°	-Do-	P	R	-	

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S.No	Component / Operation & Description of Test	Sampling Plan with basis	Ref. Doc & Acceptance norm	Record Format	Testing Agency			Remarks
					M	C	TPIA	
3.2	**GALVANIZING CHECKING**		IS 2629, 4759, 6745, 2633					
(a)	VISUAL CHECKING	100%	Free from harmful galvanizing defects	IR	P	R	-	
(b)	Thickness of Zinc Coating (a) Below 5mm thick (b) 5mm thick & above	8 samples / shift	IS 2629 (a) 65 micron Avg Min. (b) 87 micron Avg Min. (C) Refer Note, Page 11 of 13 of QAP	IR	P	R	-	
(c)	Mass of Zinc coating	3 samples / shift	(a) 460 g/m². (b) 610 g/m². (C) Refer Note Page 11 of 13 of QAP	IR	P	R	-	
(d)	Uniformity of Zinc coating	3 samples / shift	**IS 2633** (4 dips of 1 minutes without showing sign of copper deposits)	IR	P	R	-	
(e)	Adhesion Test of Zinc coating(Pivot Hammer test/knife test)	1 samples / shift	**IS 2629** (No peel out of Zinc coating in areas between hammer impressions)	IR	P	R	-	

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4. FINAL INSPECTION AND TESTING

S.No	Component / Operation & Description of Test	Sampling Plan with basis	Ref. Doc & Acceptance norm	Record Format	Testing Agency			Remarks
					M	C	TPIA	
(a)	**VISUAL & DIMENSIONAL INSPECTION** Refer CL.1.1.5-1.2.4 Page 01-02 of QAP	Sample as Per Table-II Page 13 of 13 of QAP	As per GETCO approved drawing & BOM	IR	P	W	-	Inspection Reports
(b)	**PHYSICAL / MECHANICAL PROPERTIES** (i) UTS Tests (ii) Yield Stress Test (iii) % Elongation Test (iv) Bend Test	1 Sample/ 40 MT for each type.	Refer CL.1.1.1 Page 01 of 13 of QAP for Physical/Mechanical Properties	Test Report	P	W	-	Test perform by Manufacturer in presence of GETCO representative
(c)	**GALVANIZING TESTS** (i) Thickness of Zinc Coating (ii) Mass of Zinc coating (iii) Uniformity of Zinc Coating (iv) Adhesion of Zinc coating	1 Sample/ 40 MT for each type.	Refer CL.3.2 Page 08 of 12 of QAP for Galvanizing Checking.	Test Report	P	W	-	Test perform by Manufacturer in presence of GETCO representative
(d)	**CHEMICAL TEST**	1 Sample/ 40 MT for each type.	IS 2062 : 2011 As per Annexure A & Table 3 Page 11 of 12 of QAP	Test Report	P	W	-	Test perform by Manufacturer in presence of GETCO representative
(e)	**TOWER ERECTION MARKING**	Sample as Per Table-II, Page 13 of 13 of QAP	Refer Project Specific GETCO approval Letter for Tower Erection Marking.	Visual	P	W	-	To be verified by GETCO Inspector during Inspection & shall be mentioned in MOM.
(f)	**Packing/Bundling** **Tower Wise/Section wise**	100 %	As per GETCO specification	BP, Packing List	P	W	-	Bundling Plan, Packing List shall be provide by Manufacturer.

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Code:	M= Manufacturer, C= GETCO/ any Third Party Inspection Agency deputed by GETCO., TPIA = Third Party Inspection Agency. IR= Inspection Report., MTC= Mill Test Certificate., P = Perform., P* = Perform by TPIA if non availability of testing facility at Works , R= Review., V= Verify., W=Witness, BP = Bundling Plan

Note:

1. Under marine environment, the fabricated structures shall have a minimum overall Zinc coating of 900 gm/sq.m of surface are except for plates and sections below 5mm which shall have a minimum overall Zinc coating 610gm/sq.m of surface area. The average Zinc coating for all sections and plates 5mm and above shall be maintained minimum 127 microns and that for plates and sections below 5mm shall be maintained minimum 87 microns as per GETCO specification.
2. Zinc coating for 11kv Outdoor structures shall be carried out as per Note 1, irrespective of location.
3. Zinc Coating shall be in accordance with GETCO Tender/EPC Project and or GETCO approval Letter.
4. The bolt nuts shall be procured from the GETCO approved vendor.
5. GETCO reserves right for inspection of any material during manufacturing process at any stage and also reserves right to carry out any other test(s) of responsible nature at supplier's works or site or in any other place in addition to the type & routine tests to satisfy that the material confirms with the specification of GETCO at our own cost.
6. However, you have to get separate vendor approval for re-rollers & bought out items from GETCO.

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Annexure - A

IS 2062 : 2011		Physical / Mechanical Properties			Bend Test		Chemical Properties					
Grade	Quality	Minimum Values			Min		Maximum Values in %					
		Yield Stress N/mm² (Min.)	UTS N/mm² (Min.)	% of Elongation (Min.)	≤25	>25	C	Mn	S	P	Si	CE
E 250	A	T<20 mm : 250	410	23%	2t	3t	0.23	1.50	0.045	0.045	0.40	0.42
	BR / BO	T >20-40 mm : 240					0.22	1.50	0.045	0.045	0.40	0.41
	C	T >40 : 230					0.20	1.50	0.040	0.040	0.40	0.39
E 350	A	T<20 mm : 350	490	22%	2t	---	0.20	1.55	0.045	0.045	0.45	0.47
	BR / BO	T >20-40 mm : 330										
	C	T >40 : 320					0.20	1.55	0.040	0.040	0.45	0.45
	IS 2062 : 2011 TABLE -3 Permissible Variation for product Analysis						C< 0.20 = 0.02 C> 0.20 = 0.03	0.05	0.005	0.005	0.03	--

Note for Bend Test: For bend test, the test piece at room temperature shall withstand bending through 180⁰ .to an internal diameter not greater than that given in Table 2 without cracking as per IS 2062-2011 with latest amendment.

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Sampling Plan

TABLE-1
Sampling plan for Visual & Dimensional Check of Raw Materials As Per IS-2500, Level II, AQL 1.5

S.No.	Lot Size	Sample Size	Acceptance No.	Rejection No
1	2 to 8	100%	0	0
2	9 to 15	8	0	1
3	16 to 25	8	0	1
4	26 to 50	8	0	1
5	51 to 90	8	0	1
6	91 to 150	20	1	2
7	151 to 280	32	1	2
8	281 to 500	50	2	3
9	501 to 1200	80	3	4
10	1201 to 3200	125	5	6
11	3201 to 10,000	200	7	8
12	10,001 to 35,000	315	10	11
13	35,001 to 1,50,000	500	14	15
14	1,50,001 & Above	800	21	22

TABLE-II
Sampling plan for Visual & Dimensional Characteristics of Structural Steel for Final Inspection (Dimension Check)
(Refer Para 4.4 Final Inspection & Testing)
As Per IS-2500, Level II, AQL 1.5
NUMBER OF PIECES

S.No.	Lot Size	Sample Size	Acceptance No.	Rejection No
1	2 to 8	100%	0	0
2	9 to 15	8	0	0
3	16 to 25	8	0	0
4	26 to 50	8	0	0
5	51 to 90	8	0	0
6	91 to 150	20	0	1
7	151 to 280	32	0	1
8	281 to 500	50	0	2
9	501 to 1200	80	0	3
10	1201 to 3200	125	0	5
11	3201 to 10,000	200	0	7
12	10,001 to 35,000	315	0	10
13	35,001 to 1,50,000	500	0	14
14	1,50,001 & Above	800	0	21

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