

## ERECTION AND COMMISSIONING TEST FORMATS

### 21.20.21 ERECTION & COMMISSIONING TEST: - TOWER CONSTRUCTION

Record No: 21.20  
Format No: 21.20.21

#### Erection & Commissioning Test Record

OHSAS Requirement	Ensure all PPES as safety shoes, safety helmet, safety belt, Hand gloves & Mask are appropriately used before starting of work as per PPE matrix ( M1 Manual- Annexure A)
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SR. NO.	DESCRIPTION	CHECKED		REMARKS	REFERENCE/ INSTRUCTION
		YES	NO		
<b>A</b>	<b>STORAGE AND HANDLING OF MATERIAL AT SITE</b>				
1	Ensure proper storage of all tower members, hardware, conductor, Insulator, Earth wire, OPGW at site.				Visual inspection
2	Ensure proper handling of material to prevent any damages.				
<b>B</b>	<b>STUB SETTING</b>				
1	Ensure correct pits are excavated for the foundation based on the specific foundation/ pit marking drawing & make of the tower for that particular location				Foundation/pit marking drawing
2	Carry out stub setting as per set procedure & RFC drawing				RFC drawing
3	Measure the lengths, sides & diagonals of the template & compare the same with the given drawing and correct if required.				
4	Enter all measurements/level readings of template in stub setting register.				Format no. 21.56.01
<b>C</b>	<b>FOUNDATION</b>				
1	Ensure all activities as per civil check list are completed				
2	Ensure stub setting is completed in all respect .				Format no. 21.56.01
3	Ensure setting period of foundation is allowed for 14 days as per specification				Refer date of casting
4	Ensure benching/revetment (if any) is completed in all respect.				
5	Ensure complete back filling is done after casting of foundation.				

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<b>D1</b>	<b>EARTHING (PIPE/MS ROD TYPE)</b>				
1	Ensure pipe earthing provided on Leg `A`				
2	Ensure G.I. Pipe / MS Rod & flat properly tightened with correct size Nut & Bolt and placed as per drawing				Refer RFC drawing
3	Ensure broken coke (max. size 25mm) and salt in Ratio 10:1 or bentonite slurry is filled in bore holes				Refer RFC drawing
4	Ensure backfilling done properly after earthing.				
<b>D2</b>	<b>EARTHING (COUNTER POISE TYPE)</b>				
1	Ensure excavation is done up to required depth (min. 1m) and length (min. 15m) in four radial Direction.				Refer RFC drawing
2	Ensure G.I. Wire is placed in Excavated trench and lugs are firmly tightened with Nut and Bolt .				Refer RFC drawing
3	Ensure backfilling is done properly after placing of GI wire .				
<b>E</b>	<b>TOWER ERECTION</b>				
1	Ensure setting period of foundation is allowed for atleast 14 days as per specification				
2	Ensure back filling is done & compacted properly				
3	Ensure all erection tools, plants and safety equipments are tested & in good working condition.				Test certificates
4	Ensure all tower members & required hardware are available at site without any damage or rusting.				Refer BOM & RFC drawing
5	Ensure shutdown of power lines, if required, is arranged				
6	Ensure first section is completely braced and all plane diagonals are placed in proper position as per approved drawing				RFC drawing
7	Ensure proper guying of tower is provided as per approved drawings and norms. Guying to be terminated on firm ground				RFC drawing

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8	Ensure all Nuts/Bolts, flat/spring washers are available at site as per BOM & approved drawings.				Refer BOM & RFC drawing
9	Ensure all horizontal Bolt heads are facing inside and vertical Bolt head facing upwards				By visual inspection
10	Ensure subsequent sections are erected only after complete erection and bracing of previous section				Refer RFC drawing
11	Any undue stress, bending or damage of member during erection is noticed				By visual inspection
12	Any drilling of holes or cutting of members during erection observed				By visual inspection
13	Any heavy hammering of bolt causing damage of threads noticed				By visual inspection
14	Any substitute of tower member is erected. If yes, member nos.				
15	Ensure tightening is done progressively from top to bottom using torch wrench				
16	Ensure all bolts at the same level are tightened simultaneously				
17	Ensure slipping/running over nut/bolts are replaced by new ones				
18	Ensure correct size of nut & bolts are used				Refer RFC drawing
19	Ensure threaded portion of bolts projected outside of nut is not less than 3mm				
20	Ensure punching of threads projected outside is done at three positions on dia				
21	Ensure all dummy holes are filled with correct size of bolt/nut				
22	Ensure proper fixing of all Tower Accessories such as number plate, phase plate, danger plate, anti climbing devise/barbed wire, aviation signals/paints as per specification & approved. Drawings.				Refer RFC drawing
23	Ensure hanger, U-Bolt and bird guard are fixed on the suspension tower				
24	Ensure tack welding is done as per standard quality of welding rods.				
25	Ensure rich cold galvanising paint applied over tack welding				
26	In case of dismantling of towers ensure all members are dismantled without any damage				

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<b>F</b>	<b>STRINGING</b>				
1	Check for cleanliness of insulators and mechanical breakage / damage of insulators.				
2	Check IR value of insulator string using 5kV Megger before hoisting is within permissible limits.				
3	Ensure all stringing tools, plants and safety equipments are tested & in good working condition.				Test certificates
4	Ensure that the sequence of paying out shall be from top onwards . Ground wire shall be payed out first.				
5	Ensure that all angle/dead end towers shall be provided with stays/anchors to balance the one sided load on them while stringing is done initially on one side only.				
6	Ensure that standing tress or any other object or tower legs should not be used for providing stays.				
7	Ensure that stay pits are excavated to a minimum depth of 2 meters.				
8	Ensure all compression joints should be carefully made and record of initial and final lengths of the joints is to be maintained.				
9	Ensure that not more than one joint in a conductor is provided in one span				
10	Ensure that no mid span joint is provided in major crossings for main roads, railway crossing, power line crossing and major rivers.				
11	Ensure that all mid span joints on conductors/earthwire and repair sleeves of compression type are free from sharp edges, rust and dust				
12	Check for any damage to hardware of insulators, conductor, earth wire/OPGW				
13	Ensure continuous check of conductor and ground wire for loose/broken strands or any other damage while installation.				
14	Check for any damage to insulators, conductor, earth wire/OPGW				
15	Ensure proper tightening of copper bond connection.				
16	Check Final tension and sag length are as per sag tension chart.				Refer Sag Tension chart
17	Ensure correct ground clearance is maintained as specified in IE rules				Refer IE rule for ground clearances
18	Ensure Jumpers in the tension tower are properly intact with conductor and form a				

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	parabolic shape in order to achieve adequate clearance from tower steel structure.				
19	Check Jumper bolts are properly tightened.				
<b>G</b>	<b>PRE- COMMISSIONING</b>				
1	Ensure verticality of tower is checked with help of Total Station for both longitudinal & transverse direction This is within specified Limits.				
2	Check IR value of each phase of line with respect to ground and phase to phase are within limits.				
3	Check conductor continuity test with help of 10kV Megger.				
4	Ensure placement and no. of dampers on each phase are verified as per damper placement chart / drawing.				Refer damper placement chart / RFC drawing
4	Ensure that all foreign materials viz dead bird, Fallen tree branches, bird nests etc. on conductors, earth wires, Jumper, insulator string, cross arms are re-moved.				By visual inspection
5	Check value of tower footing resistance after earthing in dry season with the help of 10kV megger (permissible limit less than 10 ohm).				Refer Format No. 21.57.01
<b>H</b>	<b>COMMISSIONING</b>				
1	Ensure checking of Line continuity by using off line fault locator.				
2	Ensure all statutory approvals are received for charging of the Line.				
<b>I</b>	<b>POST COMMISSIONING</b>				
1	Ensure Phase Sequence after charging of line				Refer RFC drawing
2	Check the line voltages of all the three phases and between the three phases are read in the voltmeter on the control panel of the line.				
3	Check leakage current values are within permissible limits indicated on leakage current meters of lightning Arresters Surge counter of the line.				
4	Check for excessive hissing noise & corona				Line patrolling
5	Check for any Hot Spots with the help of Thermo Vision Camera				Thermo Vision scanning

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	Supplier Representative			Erection Representative			R-Infra Representative		
Stage	A	.....	Z	A	.....	Z	A	.....	Z
Name									
Signature									
Date									

Note : Following checklists will be shared during pre bid meeting and during execution works.

1. Civil checklist for tower.
2. Stub setting format.
3. Earth resistance measurement format.