


SUB-SECTION–E-02

ELECTROSTATIC PRECIPITATOR

CLAUSE NO.	QUALITY ASSURANCE			
	ELECTROSTATIC PRECIPITATORS			
1.00.00	DISCHARGE AND COLLECTING ELECTRODES			
1.01.01	<p>1) Work tests for Discharge electrodes include the following (for the wire type electrodes)</p> <ul style="list-style-type: none"> (a.) Chemical and tensile tests. (b.) Metallographic examination-longitudinal and transverse (250X) (c.) Surface finish and surface purity from chloride ions. (d.) Spring back and surface finish after coiling (applicable to helical discharge electrodes) <p>For all other type of electrodes, testing to be carried out as per the applicable standards.</p> <p>(2) Work tests for collecting electrodes and rigid discharges electrode include the Following:</p> <ul style="list-style-type: none"> (a) Chemical and mechanical properties. (b) Check for profile and straightness. (c) Check for surface finish and dimensional accuracy. (d) Cupping test for deep drawn sheets as per IS 513. 			
1.02.00	<p>Thermal insulation shall be subjected to all tests as per IS: 8183.</p> <p>LRB mattresses/sections of Rockwool / Glass wool confirming to & tested as per relevant clauses of Indian Standards and shall meet the requirements of NTPC data sheet. Type tests except Thermal Conductivity shall be regularly carried out once in three months, Thermal Conductivity Type Test shall be carried out minimum once in twelve months by the manufacturer. Wire mesh of diameter 0.71mm (min.) or as per approved data sheet shall only be used. Requirements of various components like Binding wires, Lacing wires, Wire mesh, etc. shall be as per NTPC approved data sheet / as given in (Technical Requirements of Electrostatic precipitator).</p>			
1.03.00	<p>ESP Structure</p> <ul style="list-style-type: none"> (a) Only material which has been identified against mill sheet or test certificates shall be used for construction. All plates above 40mm thickness shall be 100% ultrasonically tested. (b) Visual inspection of all welds shall be performed in accordance with AWS D.1.1. (c) NDT requirements of structural steel welds shall be as under:- <ul style="list-style-type: none"> (i) 100% RT/UT on butt-welds of plate thickness ≥ 32 mm. (ii) For plates of $25\text{mm} \leq \text{thickness} < 32\text{mm}$ - 10% RT/UT and 100% MPI. (iii) For plates of thickness $< 25\text{mm}$ - 10% MPI/LPI. (iv) All fillet welds of structural members shall be inspected 100% by MPI. (d) Edge for shop & field weld shall be examined by MPI for plate thickness $\geq 32\text{mm}$. 			
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SUB-SECTION–E-04

FGD SYSTEM

CLAUSE NO.	QUALITY ASSURANCE			<div>एनटीपीसी NTPC</div>
	FLUE GAS DESULPHURISATION SYSTEM			
1.00.0	FLUE GAS DESULPHURISATION SYSTEM			
1.01.0	Mills:			
1.01.01	Raw material for shaft, coupling, gears and pinions, top and bottom races and other rotating components shall be subjected to UT. MPI/LPI shall be carried out to check surface soundness.			
1.01.02	Wear-resistant metallic parts, if applicable shall be UT/RT tested to check soundness after suitable heat treatment. Check for chemical composition, hardness and microstructure shall be carried out.			
1.01.03	Butt welds in the tube/body/shell casing of the mill shall be tested by RT and MPI. All other welds in main tube/ body casing shall be tested by MPI/LPI for acceptance.			
1.01.04	All gearboxes shall be run tested for adequate duration to check rise in oil temperature, noise level and vibration. Check for leak tightness of gear case also shall be performed.			
1.01.05	No load run test of the assembly shall be demonstrated at shop/site depending upon its design/feasibility.			
1.02.0	Feeders:			
1.02.01	Any welds in the casing/pulley fabrication shall be checked with MPI.			
1.02.02	Routine tests shall be done as per relevant Indian Standards or equivalent International Standards.			
1.02.03	All major items like plates for casing, head pulley, tail pulley, pulley shaft and major castings shall be procured with respective material test certificates.			
1.02.04	Calibration check shall be carried out on all feeders.			
1.03.0	Dampers:			
1.03.01	All the dampers shall be subjected to operational test/checks with the job actuator.			
1.03.02	Gas tight Dampers shall be subjected to shop leakage test to demonstrate the guaranteed tightness as per NTPC Tech Specification.			
1.04.0	PIPING, VALVE AND SPECIALITIES:			
1.04.01	All pipes and fittings shall be tested as per applicable code.			
1.04.02	All valves shall be hydraulically/Air tested for body, seat and back-seat (if applicable) as per relevant standard.			
1.04.03	NDT on valves shall be as per relevant standard.			
1.04.04	Valves shall be offered for hydro test in unpainted conditions.			
1.04.05	Functional checks of the valves for smooth opening and closing shall also be done.			
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CLAUSE NO.	QUALITY ASSURANCE			<div>एनटीपीसी NTPC</div>
1.05.00	TANKS / VESSELS:			
1.05.01	Atmospheric tanks:			
	<div><div>i)</div><div>All welds joints shall be DP tested and tanks shall be water fill tested up to liquid level as per construction Code.</div></div> <div><div>ii)</div><div>All atmospheric storage tanks fabricated and erected at site shall be subjected to tests (NDT and Vacuum) according to design code/standard as applicable.</div></div> <div><div>iii)</div><div>Lining of the tanks/vessels shall be tested for hardness and spark test etc, as per applicable standard.</div></div>			
1.05.02	Pressure vessels:			
	<div><div>1)</div><div>NDT on weld joint shall be as per respective code requirements or the minimum as specified as below:</div><div><div>i)</div><div>100% DPT on root run of butt weld, nozzle welds and finished fillet welds.</div></div><div><div>ii)</div><div>10% DPT on all finished butt welds.</div></div><div><div>iii)</div><div>10% RT (covering all 'T'/cross joints) of butt welds.</div></div></div> <div><div>2)</div><div>Butt welds of dished ends shall be stress relieved and subjected to 100% RT.</div></div> <div><div>3)</div><div>Each finished vessels shall be hydraulically tested to 150% of the design pressure for a duration of 30 minutes.</div></div>			
1.06.00	HEAT EXCHANGER/HEATER:			
1.06.01	All material shall be tested for chemical and mechanical properties and NDT as per relevant standard.			
1.06.02	NDT on welds and other checks shall be as per relevant code.			
1.06.03	Air heaters shall be subjected to dimensional and clearance checks as per standard practice			
1.06.04	Lube. oil system, drive system, soot blowing system etc. of Air heaters shall be checked suitably as per standard practice			
1.07.00	PUMPS:			
1.07.01	UT on shaft forgings (greater or equal to 40mm) and MPI/DPT shall be done on shafts and impeller to ensure freedom from defects.			
1.07.02	The pump casing shall be hydraulically tested at 200% of pump rated head or at 150% of shut off head, whichever is higher. The test pressure shall be maintained for at least half an hour.			
1.07.03	The pump rotating parts shall be subjected to static and dynamic balancing.			
1.07.04	All pumps shall be tested at shop for capacity, head efficiency and brake horse power as per relevant/applicable standard.			
1.07.05	Noise and vibration shall be measured during the performance testing at shop.			
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CLAUSE NO.	QUALITY ASSURANCE			<div>एनटीपीसी NTPC</div>
1.08.00	STRUCTURES , DUCTS, HOPPERS:			
1.08.01	All materials shall be tested for chemical and mechanical properties as per relevant standard. All plates above 40mm shall be 100% ultrasonically tested.			
1.08.02	Visual inspection of all welds shall be performed in accordance with AWS D1.1.			
1.08.03	NDT requirements of structural steel welds shall be as under:			
	i) 100% RT/UT on butt-welds of plate thickness \geq 32mm.			
	ii) For plates of 25mm \leq thickness $<$ 32mm-10% RT/UT and 100% MPI.			
	iii) For plates of thickness $<$ 25mm-10% MPI/LPI.			
1.08.04	Edge for shop and field weld shall be examined by MPI for plate thickness \geq 32mm.			
1.08.05	Cladding material and its application on the ducts shall be tested as per applicable standard.			
1.09.00	VACUUM BELT FILTER SYSTEM:			
1.09.01	Impeller, casing and shaft of vacuum pumps shall be tested for chemical and mechanical properties as per relevant standard. All plates above 40mm shall be 100% ultrasonically tested.			
1.09.02	UT on shaft (if greater or equal to 40mm) and impeller shall be carried out.			
1.09.03	All vacuum pumps shall be tested at shop for capacity, power, pressure, efficiency, noise and vibration etc.			
1.09.04	Filter cloths and belts shall be tested for physical properties as per relevant standard			
1.09.05	Hydro cyclones shall be checked by visual, dimensional etc.			
1.10.00	SPRAY NOZZLES:			
1.10.01	Spray nozzles shall be tested for physical properties			
1.10.02	Spray nozzles also shall be subjected to performance test.			
1.11.00	AGITATORS:			
1.11.01	Lining of the agitator shall be tested for hardness and spark test etc. as per applicable standard.			
1.11.02	Impellers shall be tested for dimensional and balancing check. All impeller welds shall be tested by PT / MT.			
1.11.03	Gear Boxes shall be tested for run test as per standard practice			
1.12.00	FANS:			
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1.12.01	Impeller, casing, blades and shafts of fans shall be tested for chemical and mechanical properties as per relevant standard. All plates above 40mm shall be 100% ultrasonically tested.			
1.12.02	Rotor components shall be subjected to ultrasonic test at mill and magnetic particle inspection / liquid penetrant examination after rough machining.			
1.12.03	Butt welds in rotor components shall be subjected to 100% RT and all welds shall be magnetic particle/dye penetrant tested after stress relieving. Due to design of the rotor in case RT is not feasible then in lieu of RT, UT shall be performed.			
1.12.04	All rotating components and assemblies of fan shall be balanced dynamically			
1.12.05	Performance test shall be carried out on fans as per Technical specification/ Relevant standard			
1.12.06	Test for Natural Frequency and hardness of Fans blades shall be carried out as per Technical specification/ relevant standard.			
1.13.0	OXIDATION BLOWER			
1.13.01	Impeller, casing, gears and shafts of oxidation blowers shall be tested for chemical and mechanical properties as per relevant standard. All plates above 40mm shall be 100% ultrasonically tested.			
1.13.02	Butt welds in rotor components shall be subjected to 100% RT and all welds shall be magnetic particle/dye penetrant tested after stress relieving (if applicable).			
1.13.03	All rotating components and assemblies of blower shall be balanced dynamically.			
1.13.04	Performance test shall be carried out on blowers as per Technical specification/ relevant standard.			
1.14.00	ABSORBER			
1.14.01	All weld joints shall be tested to suitable NDT techniques as applicable to the materials being welded, joint design , weld profile and corrosion protection requirement etc. according to design code/ standard as applicable.			
	Tanks shall be water fill tested up to liquid level as per construction Code.			
	Vacuum test according to design code/standard as applicable.			
1.14.02	Cladding / Bonding material and its application shall be tested as per applicable standard. Corrosion test on Corrosion Resistant Alloy shall be performed as per ASTM G48/applicable relevant standard for C276 Gr material.			
	For Ti Cladding Material shall meet the NTPC Datasheet and shall be tested as per relevant applicable Indian/International standard as applicable.			
1.14.03	Absorber fabricated and erected at site shall be subjected to all tests according to design code/ standard as applicable.			
1.15.00	Thermal Insulation, Lagging & Cladding:			
	(a) Lightly resin bonded mineral wool:			
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	<p>LRB mattresses/sections of Rockwool/ Glass wool shall conform to & tested as per relevant clauses of Indian Standards and shall meet the requirements of NTPC data sheet. Type tests except Thermal Conductivity shall be regularly carried out once in three months, Thermal Conductivity Type Test shall be carried out minimum once in twelve months by the manufacturer. Requirements of various components like Binding wires, Lacing wires, Wire mesh, etc. shall be as per NTPC approved data sheet / as given in respective Sub-Section of Technical Requirements of Steam Generator & Auxiliaries.</p> <p>(b) Lagging & Cladding:</p> <p>All insulation shall be protected by means of an outer covering of Aluminum sheeting confirming to ASTM B-209-1060 temper H14 from reputed manufacturer meeting the requirements of NTPC data sheet.</p> <p>1.16.00 OTHER CRITICAL EQUIPMENTS:</p> <p>1.16.01 Checks/ NDTs shall be done as per relevant Indian Standards or equivalent International Standards.</p> <p>1.17.00 BOROSILICATE LINING:</p> <p>Borosilicate block shall conforms to NTPC data sheet and to be tested as per Relevant applicable standard .</p>		
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