CONSTRUCTION SUPERVISION AND MANAGEMENT

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1.0 GENERAL

1.1 The CONTRACTOR shall construct Plant/Facilities in accordance with the requirements of the Technical Standards/ Specifications, with proven/good engineering practices and procedures. Such Facilities shall be safe, reliable and suitable for their intended purpose.

1.2 The CONTRACTOR shall provide all supervision, labour, construction equipments, tools & tackles, materials and consumables, temporary facilities, Construction utilities, Drinking Water, Restroom, washroom Facilities etc. and render all support services necessary for the construction. Provision of drinking water, construction power and water shall be as per Special Conditions of Contract (SCC)/ General Conditions of Contract (GCC).

1.3 The CONTRACTOR shall plan, execute, manage and control all the construction activities for the facilities forming a part of this contract.

1.4 The CONTRACTOR shall arrange insurance coverage for all the personnel engaged by him for the work as per statutory rules, regulations and local laws.

1.5 The CONTRACTOR shall insure all the materials and equipments against fire, flood, earthquake, theft, etc. as per SCC/ GCC brought for the job till the Plant/Facilities are commissioned and handed over to the OWNER.

1.6 The CONTRACTOR to ensure mechanizing the construction activities to a great extent.

1.7 The CONTRACTOR is deemed to have full knowledge of the applicable laws and regulations, conditions of labour, local conditions, the site conditions, environmental aspects and shall comply with the requirements thereof.

1.8 The CONTRACTOR is required to organize and mobilize Construction Management Services in a systematic and sequential manner to ensure that the Plant installation is carried out in accordance with the approved engineering drawings, specifications, standards, QA/QC procedures etc. and its mechanical completion is achieved within targeted time schedule. Construction Management and Supervision is to be carried out by the CONTRACTOR himself by deploying persons on his rolls and this activity is not to be sub-contracted in any case.

For this purpose, the Contractor shall deploy a Construction Management Team headed by a qualified & experienced person at site. The Construction Management team shall include engineers/ specialists in QA/QC, Project Control (Planning, scheduling, monitoring), contracts, construction supervision, progress measurement/billing, safety, warehousing, purchasing etc. Key personnel including the Head should have sufficient qualification/experience and should not be changed without concurrence from Owner/PMC.

Curriculum vitae of all key Construction Personnel shall be submitted to Owner/PMC at least 3 months before deployment. Owner/PMC reserves the right to interview these personnel before their mobilization.

1.9 The CONTRACTOR shall ensure delegation of adequate and sufficient powers (including financial) to the Head of his Construction Team for effective and smooth functioning of the construction management. HO support shall be provided to the Head of Construction Team at site during construction on all matters of project execution including the following:

- Field engineering.
- Vendor specialists required during construction.
- Rectification/replacement of defective supplies, if any, noticed during construction.
- Expediting replacement of imported items found short/damaged.
- Required documentation for the material management & material inspection at site
- Compilation and submission of Field Inspection documents in requisite copies as per contract
- Documentation to meet Statutory requirements.

1.10 The construction supervision, co-ordination and management activities shall be carried out by the CONTRACTOR in accordance with the construction procedures developed and submitted by the CONTRACTOR and approved by Owner/PMC. CONTRACTOR shall prepare construction schedules within the framework of overall contract schedule and submit to Owner/PMC for approval. CONTRACTOR shall plan, execute, monitor and control construction activities as per the approved construction schedule. The schedule so prepared shall be reviewed periodically and backlog if any related to availability of work front/ materials shall be brought to the notice of Engineer-in- Charge and corrective actions to be taken to meet the monthly/ overall Construction targets.

CONTRACTOR shall depute a project team at site during construction phase under a project coordinator for providing above-mentioned support to the Head of Construction Team.

1.11 The CONTRACTOR shall procure material like cement, reinforcement bars and structural steel from approved vendors only. The CONTRACTOR shall establish and maintain a material testing laboratory for carrying on field tests during execution of contracts under different disciplines by sub-contractor's, at no extra cost to Owner. The entire test equipments deployed shall have valid test/calibration certificates traceable to relevant national/ international standards. Such material tests, for which testing facility at site is not established, shall be carried out by CONTRACTOR at testing laboratories approved by Owner/PMC at no extra cost. CONTRACTOR shall maintain the test records and the same shall be made available for review/ inspection of Owner/PMC. Further, Owner/PMC reserve the right to witness/ inspect testing at the laboratory at no extra cost to Owner/PMC.

1.12 Construction supervision and management functions to be performed by the CONTRACTOR shall include the following as key functions for effective execution, monitoring and control:

- Planning, scheduling, monitoring & reporting.
- Construction supervision, discipline wise.

- Quality assurance and quality control, discipline wise.
- Shipping, custom clearances, inland transportation
- Warehouse management and material control.
- Field engineering/Purchase.
- Health, Safety and Environment (HSE) Management
- Enforcement of statutory rules/ regulations and Labour Laws
- Personnel/administration/Industrial Relations
- Billing and invoicing
- Finance and Accounts
- Security

1.13 Whenever the hookup, if any is to be done with the facilities under operation, efforts shall be made by the CONTRACTOR to complete the work and restore the system expeditiously. If required the work shall be continued round the clock.

2.0 EXECUTION OF WORKS

The CONTRACTOR'S work during construction shall include but not be limited to the following:

i. Prepare and submit all the Plans, Procedures and documents to Owner/PMC as specified in the contract.

ii. Establish requisite site organization staffed by competent and experienced specialists, supervisors and inspectors.

iii. Supervise, Coordinate and manage the activities performed at site by him and by his sub- contractors for execution of work and render all technical/specialist services.

iv. Plan and schedule the construction work, monitor and take timely corrective action when required to adhere to approved execution schedule.

v. Plan, allocate and mobilize required resources, manpower, and construction equipment/materials, commensurate with construction plan/schedule.

vi. Provide all temporary facilities required for Construction including drinking water, lighting, office space, electronic transmission of drawings & documents, printing facilities, rest rooms, crèches, first-aid, fire protection system, toilets, canteen facilities, labour hutments, transport facilities for the workers and staff.

vii. Prepare & implement Quality Control and Quality Assurance plan.

viii. Prepare & implement Health, Safety & Environment (HSE) plan.

ix. Report beforehand and take approval from Owner/PMC regarding use of any equipment and/or material not conforming to the contract, drawings and specifications.

x. Execute and supervise all additional works and modification works as required or suggested by Owner/PMC as a part of approved change orders.

xi. Erect and install the equipments and materials according to the approved

specifications and procedures.

xii. Establish required Field Inspection and Testing Laboratories at site to carryout tests as specified in the standards/specifications of the contract.

xiii. To organize and obtain all applicable clearances/approvals from statutory bodies/authorities, as required by the laws of land for the work executed at site shall be the responsibility of the Contractor under the contract.

xiv. Obtain approval of Owner/ PMC for Welding Procedure Specifications (WPS)/ Procedure Qualification Records (PQR) as required. Carry out inspection, non- destructive tests and analyze and certify acceptability of all welds and materials in accordance with specified Technical Standards. Carry out inspection and testing of incoming materials as per agreed procedures.

xv. Organize and conduct Weekly Project Review meeting related to site construction activities.

xvi. Provide daily work progress reports and detailed weekly and monthly progress reports summarizing percentage completion of the work including status of drawings, materials and effects on approved schedule, areas of concern and corrective actions required thereof. Contractor shall also identify any foreseeable delays in any aspect of the WORK and take corrective actions to eliminate/minimize the effect on Overall Completion Schedule. All progress shall be quantified.

xvii. Take photographs and video recording of Project Construction Progress on regular basis and submit the same to Owner/PMC on monthly basis along with the Monthly Progress Report.

xviii. Prepare and submit safety and labour relation procedures in line with all applicable codes, regulations and OWNER'S requirements.

xix. Supervise and monitor all safety and labour relation functions as per agreed procedures and applicable laws of the land and report to Owner immediately for any violations and injuries.

xx. If any part of the facilities is completed and is under operation, while other parts of the facilities are under construction, or work is to be carried in running Plant, it is essential that rigid safety rules be prepared and maintained for all works in accordance with the requirements of Owner/PMC.

xxi. Maintaining all the records generated during project execution up-to-date and made available to Owner/PMC whenever requested. These records shall be handed over to Owner on completion of the work at no extra cost to Owner.

xxii. Carryout warehouse management and material control in accordance with approved procedure.

xxiii. Take all necessary precautions and required actions to protect construction work and materials from damage by local weather conditions and ongoing construction activities in the vicinity, theft and pilferage etc. till handing over of the plant to Owner.

xxiv. Damages, if any, occurred to the existing facilities at the site during execution of the job shall be intimated to Owner / PMC immediately and the damages shall be rectified promptly without any extra cost to Owner.

xxv. Take insurance policies for materials in transit and storage-cum-erection risk and other insurance covers required for men and materials at site as per SCC/ GCC in consultation with Owner.

xxvi. Undertake housekeeping including sweeping, clean up to maintain cleanliness, sanitation, removing excess materials, temporary facilities, scaffolding, etc. on Daily basis till handed over to Owner.

xxvii. Prepare and submit to Owner/PMC the following daily reports for construction activities covering the following:

a. Weather

b. Manpower deployment category wise

c. Construction Equipments

d. Work Progress

xxviii. Ensure the control of all works with regard to its impact on the surrounding environment.

xxix. Ensure all hot works are performed outside hazardous areas and in compliance with OWNER'S Safety Permit System requirements wherever applicable.

xxx. Arrange and coordinate the visits of suppliers representatives/specialists at site as per instruction of Engineer In-Charge.

xxxi. All material handling equipment, tools, tackles, hoisting and lifting equipments/ machineries should be subjected to required load test initially and then periodically, to ensure safe/stable operation.

xxxii. Organize field engineering work, wherever required and ensure timely resolution of interface problems / site constraints in consultation with Owner/PMC.

xxxiii. Prepare and certify material reconciliation statement on completion of work to enable Owner to take over the surplus materials, as applicable.

xxxiv. Organize the codification and handing over of surplus materials (as applicable) and spares/ tools and tackles to the Owner on completion of work.

xxxv. Provide weekly/daily activity plan for site inspection.

xxxvi. Develop a phased mechanical completion program to facilitate sequential Pre- commissioning/Commissioning activities in a logical manner to meet the Overall Project Schedule.

xxxvii. Remove / demolish all temporary structures/ establishments/ facilities created by the Contractor / his sub-contractors during the execution of the work and restore the site to its original condition.

xxxviii. Carry out tightening of flange joints by using hydraulic tensioner/ torque wrench as per specifications. Contractor shall ensure that stud bolts are

ordered extra-long to facilitate tensioning.

xxxix. Organize safety induction programme for their manpower before deployment on work and at regular intervals thereafter.

3.0 EXECUTION PLANS

CONTRACTOR shall submit Construction Execution Plan to Owner/PMC for review/approval during kick-off meeting. The Plan shall detail the execution methodology of the CONTRACTOR during construction phase of the PROJECT covering following aspects as minimum –

3.1 Construction Management Plan

CONTRACTOR shall submit Construction Management Plan to Owner/PMC for approval during kick-off meeting. The Plan shall detail the management methodology to be applied during the construction phase of the PROJECT, along with a list of procedures to be utilized in undertaking the work.

All reference procedures and detail work plans referred to in this document must be submitted for review and approval by Owner/PMC at least (4) four weeks in advance of actual commencement of the activity concerned.

3.2 Construction Execution Plan:

It shall include the following as minimum:

3.2.1 Contractor's manpower and man-hour histogram by major section and discipline and their manpower deployment schedule on monthly basis.

3.2.2 Major equipment mobilization plan on monthly basis with short description. CONTRACTOR to develop this plan with due consideration to maximize the mechanization of construction activities.

Other plans of Contractor and procedures to be submitted at least four (4) weeks/as stipulated in tender prior to start of respective activity at site, include the following as a minimum:

i. Develop/ prepare construction/erection plan/procedures and submit to Owner/ PMC for approval.
ii. Temporary facilities, etc.
iii. Piling plan
iv. Barricading Plan
v. Scaffolding plan
vi. Excavation and underground work plan

vii. Heavy transport and heavy lifting plan (Rigging Plan), if applicable

viii. Pre-fabrication / Modularization plan

ix. Other activity plans e.g. piping, equipment and steel structure erection plan etc.

x. Monsoon counter measures and preparation

xi. Emergency Evacuation Procedure

xii. Storm Management Plan

xiii. Schemes to carry out works in inclement weather

Contractor shall ensure that lay down area (as applicable) given to him shall be utilized optimally.

3.3 Sub-Contracting Plan

A minimum of the following activities shall be performed by the CONTRACTOR directly and shall not be subcontracted:

a) Project Management

b) Planning

c) Procurement

d) Construction Management

e) Commissioning

If CONTRACTOR proposes to engage sub-contractor(s) for the execution of some of the activities at site, a preliminary sub-contracting plan along with the identified scope of work for each sub-contract shall be furnished by the CONTRACTOR to the Owner/PMC at the time of bid submission. However, the credentials of proposed Sub-contractor(s)'s shall be submitted by the CONTRACTOR on award of work, which shall be evaluated by Owner/PMC at SITE for acceptance. CONTRACTOR shall not be permitted to change the sub-contractor under any circumstances without prior approval of Owner/PMC. Non-compliance of the above shall be strictly dealt within relevant provision(s) of the contract.

The sub-contracting plan shall cover

i) Sub-contracting philosophy and plan

ii) List and scope of work of each subcontract

iii) Subcontract administration plan

iv) Organization chart of each sub-contractor.

The list and major scope of each subcontract shall not be changed from those of the CONTRACTOR'S plan unless specially approved by OWNER.

4.0 TEMPORARY FACILITIES

The CONTRACTOR shall arrange the following temporary facilities as the minimum (including for his sub-contractors also):

i) Exact location of temporary work area, access and general layout inside the area.

ii) Planning and description of the temporary facilities such as:

a. Identification of borrow earth area (if required)/excess earth dumping yards
b. Site office and Fabrication yards, Open storage area and Warehouse
c. Miscellaneous workshops including maintenance area for construction equipments.
d. Temporary roads including access road to Plant, fencing and gates
e. Security, watch & ward, security gates, etc.
f. Utility supply systems viz. Construction power with DG Sets, construction water, drinking water etc.
g. Area lighting
h. Firefighting equipments
i. Drainage and Sanitation
j. Camp Accommodation/ Rest Rooms/ Dining rooms.
k. Mobile toilets and necessary arrangement Field Testing Laboratory
l. Radiography Source Pit as per BARC Guidelines, if required.
m. Film processing and viewing labs, if required
n. Communication facilities viz. Telephone, Fax, E-mail, electronic transmission of drawings./ documents, etc.
o. Hutments, transport, Pantry and Canteen for staff and workers. Hutments/ labour colony shall not be allowed inside the station/plant complex.
p. Vehicle parking area including construction equipments.
q. First aid arrangement/ medical and health care facilities
r. Gate pass for workmen/officials/ vehicles as per OWNER security system.
s. Work Permits as per Owner's prevailing system.

CONTRACTOR shall develop the temporary facilities layout for approval of Owner/PMC.

5.0 CONSTRUCTION PLANNING, SCHEDULING, MONITORING & REPORTING

The CONTRACTOR shall be responsible for construction Planning, Scheduling, Monitoring and Reporting activities at site in line with the overall master schedule and details stipulated elsewhere in the document.

The CONTRACTOR shall submit constructability report to Engineer In charge/ Owner within 60 days from the date of award of contract after detailed study for execution to meet the time schedule.

6.0 QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

The CONTRACTOR shall be responsible for ensuring quality of construction (including materials) carried out by him/his approved sub-contractors in accordance with the requirements given in Appendix-A for Quality Assurance / Quality Control (QA/QC) during construction including all documents referred therein.

7.0 WAREHOUSE MANAGEMENT & MATERIAL CONTROL

The CONTRACTOR shall construct/ build warehousing facilities (both covered and open) appropriate for storing materials required for the job. The facilities shall include proper lighting, fire protection system, office/rest rooms/toilets for warehouse personnel.

The CONTRACTOR shall obtain all statutory approvals from concerned authorities for all warehouse equipment, instruments etc. The CONTRACTOR shall comply with statutory regulations for storage of any material covered under Explosives rules.

The CONTRACTOR shall be responsible for carrying out the Warehouse Management and Material Control in accordance with the approved warehousing procedure and material control procedure, which is to be submitted by the CONTRACTOR during kick-off meeting. The activities shall include but not limited to:

- Transport Liaison, both for imported materials as well as materials procured indigenously, from the time of dispatch up to receipt at site.
- Transportation Plan (i) from source to site (ii) site to erection location.
- Receipt, Handling, Identification, Inspection (including confirmation by an Alloy Analyzer for Alloy Steel, Stainless Steel and other Exotic Materials) and Acceptance, Storage and Preservation of Materials,

Codification of all materials including free issue materials to be supplied by OWNER.
- Filing of insurance Claims and follow up.
- Documentation for control and accounting of materials.
- Generation and upkeep of Traceability Records for materials.
- Materials Control & Issue.
- Inventory Checks.
- Field Requisition and Purchase.
- Spare & Non-Sparking Tools including handing over of mandatory Spares/Tools to the OWNER as per the terms of the contract.
- Material Appropriation and Handing Over of all items to OWNER with Owner's codification system as per terms of contract.
- Security.
- Taking up with suppliers on short supplied items and placing replacement orders for lost/damaged items.
- Intimating to their HO regarding short/lost/damaged items received at site and further replacement action, as applicable.

CONTRACTOR shall generate and issue following reports:

- Fortnightly statement of consignments in transit.
- Daily report of material received.
- Material receipt status and inventory status w.r.t. material delivery schedule
- Material Inspection Report with respect to materials received at site
- Report on Over/Short/Reject/Damage (OSRD) receipts against each consignment on receipt at warehouse.
- Weekly status of consignments, Material Receipt Report (MRRs)
- Monthly status of field purchase.
- Monthly status of over, short, reject & damage (OSRD) settlement.
- Monthly status of piping material MTO V/s Actual receipt.
- Log Register of Rotating Equipments maintenance
- Daily Stock Position of Cement
- Any other report as desired by Owner/PMC.

8.0 FIELD ENGINEERING

CONTRACTOR shall be responsible for controlling and issue of technical drawings and documents, preparation of field sketches, field modifications, checking/preparation of as- built drawings, etc. CONTRACTOR should have adequate facilities for incorporating field changes, preparation of As-built drawings, printing machines and Drawing & Document Control System.

9.0 FIELD TENDERING

CONTRACTOR shall be responsible for carrying out field tendering activities, as required from the site itself.

10.0 FIELD PURCHASE

CONTRACTOR shall be responsible for carrying out field purchase activities, as required.

Field Purchase items are restricted to those required for running and

maintenance of the field offices, items required to expedite construction work and items found short, missing or damaged against the main order when received at the site. Any material purchased from field for usage in the plant should have proper inspection certificate and should be purchased from Owner/PMC approved suppliers. If required by OWNER/ PMC, check testing of the material samples selected by Owner/PMC shall be carried out by CONTRACTOR without any extra commercial implication.

11.0 HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT

The CONTRACTOR shall be responsible for Health, Safety and Environment (HSE) Management at construction site for the construction activities to be carried out by the him/his approved sub-contractors in accordance with the requirements mentioned in Appendix-B for Health, Safety and Environment Management during construction.

All measures required for safe construction are to be ensured for Process safety Management and safe work practices. Besides all personnel employed in the job to follow safety requirements of Owner/PMC, the movement of CONTRACTOR's personnel will be restricted to their workplace only.

12.0 HOUSE KEEPING

It is the responsibility of the CONTRACTOR to maintain general cleanliness and proper housekeeping at work site. CONTRACTOR shall organize disposal of excavated earth /garbage/ rubbish/scrap, etc. on day-to-day basis to identified disposal areas/safe areas and forward daily report for the same indicating the details of men and machinery deployed for the purpose; if asked by Owner/PMC.

Wastage and serviceable/ unserviceable scrap generated during dismantling and regular works shall be segregated and dumped in designated locations in consultation with Owner/PMC. Earth and landfill materials shall be dumped at locations identified by Owner/PMC, otherwise outside the Project Site and the required fees charged by the local authorities shall be borne by the CONTRACTOR without any extra cost to OWNER.

13.0 INDUSTRIAL LABOUR RELATIONS

CONTRACTOR shall be responsible for industrial relation functions and implementation of labour laws at site. CONTRACTOR'S staff shall be suitably trained and experienced in Labour Relation functions so as to ensure a good relationship with labour and to prevent the occurrence of industrial disputes

resulting in subsequent delays or work stoppages. In particular, CONTRACTOR shall maintain close liaison with Owner/PMC.

CONTRACTOR shall maintain proper liaison with Statutory Authorities and local bodies and shall be responsible to implement and observe all statutory laws at site. CONTRACTOR must have in his staff; a well experienced Labour Relation Officer, preferably from local area.

CONTRACTOR shall maintain the records of wages paid in a wage register, PF, etc. as per statutory regulations.

CONTRACTOR shall report immediately to Owner/PMC any problems including labour disputes, fight, and work stoppages. A written report shall be submitted to Owner/PMC within 24 hours of the incident.

CONTRACTOR must submit a Labour Relation Plan including their sub-contractor(s) prior to the start of the work/within one month of award of the contract, whichever is earlier, mentioning as a minimum:

- A detailed estimate of the number of labour, both indirect and direct, sorted by craft.
- Outline recruiting plans for all manpower requirements.
- Identify personnel involved with labour relations and outline procedures to mitigate labour disputes & problems.
- Labour welfare plan

CONTRACTOR shall hold labour relations meeting twice a month with their work force as well as a separate meeting with the Owner.

14.0 CONSTRUCTION EQUIPMENTS

The Contractor is required to organize and mobilize the construction equipments and other tools/tackles in a sequential manner and ensure that plant installation is carried out in a mechanized manner to the extent possible and its mechanical completion is achieved within targeted time schedule.

Contractor shall ensure deployment of the following construction equipment as a minimum as per requirement to the maximum extent –

i. Cranes of different capacities required for erection/ handling of materials.
ii. Cranes for heavy lift
iii. Pipe Trailers
iv. Hydraulic Excavator/ Back hoe
v. Grader/ Dozer
vi. Dumper
vii. X-ray and Gamma ray Radiography sources

viii. UT Machine
ix. Bar Bending/Cutting Machine
x. RMC through supplier
xi. Concrete Mixture M/c
xii. Welding machines
xiii. Automatic welding machines, if applicable
xiv. DG sets
xv. Electrical and Instrumentation equipments/measuring devices etc.
xvi. Bevel Cutting Machines
xvii. Pressurization Pumps
xviii. Dozing Pump
xix. Dead Weight Tester
xx. Dewatering Pump
xxi. Compressors
xxii. Gas and Mechanical cutting devices
xxiii. Various inspection / measuring devices

The Contractor shall, without prejudice to his responsibility to execute and complete the work strictly as per the specifications and other laid down procedures, execute all the work by mechanizing the construction activities to the maximum extent by deploying all necessary construction equipments/machinery of adequate capacities and numbers.

Contractor shall replace any defective/damaged equipments promptly to complete the work without time & cost implication to the Owner/EIL.

For the purpose of Pipeline laying, the Contractor shall deploy a Pipeline team comprising of civil/mechanical and electrical engineers and foreman's for ROW clearing and Grading, Stringing, welding, trenching, lowering, tie-in and backfilling etc., reporting to Spread in-charge. Spread in charge should be well conversant with methods and techniques of pipeline laying works.

Contractor shall prepare erection schedule in line with the overall project schedule of the Plant in phased manner with erection schemes of various equipments, vessels and submit to Owner/PMC for approval, Monitoring and control of erection schedule and erection activities shall be carried out by the contractor as per the approved construction procedures.

For efficient working and maintenance of construction aids, Contractor shall establish and maintain crane yard / workshop equipped with regular maintenance facilities for various construction aids for carrying out routine field maintenance during performance of the contract. Temporary approach road and hard stands, wherever required for the movement of the Cranes and other vehicles for equipment erection and transportation of material shall be properly

planned and made by the Contractor. Weekly/fortnightly maintenance shall be planned in such a way that the same does not hamper the erection schedule.

During performances of the work, Contractor must ensure that structures, materials and equipments are adequately braced with Guys, Struts or any other means as deemed fit & approved by Owner/PMC. Such means shall be supplied and installed by the Contractor as required till the erection works is satisfactorily completed. Such guys, shoring, bracing, strutting, planking supports etc. shall not interfere with the work of other agencies and shall not damage or cause distortion to works executed by other agencies. All lifting tools, tackles and cranes shall be tested periodically by statutory/ competent authorities for their load carrying capacity. Such relevant valid/test certificates shall be submitted to Owner/PMC for review before actual use of the tools, tackles and cranes.

Contractor shall submit the construction equipment deployment schedule at the time of kick off meeting. Daily construction equipment deployment report will also be submitted by the Contractor to Owner/PMC along with DPR in the performa approved by Engineer In charge.

Contractor shall ensure the timely augmentation of the men, equipments and machinery depending upon the exigencies of the work to meet the overall project schedule and as per instructions of Owner/PMC.

15.0 CONSTRUCTION MANPOWER

The Contractor is required to organize and mobilize construction staff/ manpower in a sequential manner to ensure that the work is carried out in accordance with the construction schedule. Mobilization of construction staff should be such that the progress achieved in phased manner should match with the overall Project Schedule. Key Personnel i.e. Resident Construction Manager, Site In-charge (Spread In-Charge), Lead QA/QC Engineer, Lead Planning Engineer, Safety officer, Discipline Engineer for execution of job shall be deployed meeting the qualification and experience requirement of Document No. 7-82-0003.

For this purpose, the Contractor shall clearly indicate in his construction methodology whether work shall be done departmentally or by engaging sub-contractor or the combination of both. Contractor shall prepare detailed methodology for the work to be carried out departmentally as well as through

sub-contractors clearly, defining the scope and responsibility of Contractor and his sub-contractors.

The works of all sub-contractors shall be managed by the construction staff of the main Contractor who shall perform the duties of construction management and shall administer, coordinate, and inspect the works of the sub-contractor(s) and be responsible for the Quality and timely completion of respective works. The Contractor shall establish the pre-requisites for successful completion of sub-contractor (s) work. However, by deploying the sub-contractor (s), as approved by Owner/PMC for any discipline, does not absolve the Contractor of his total responsibility under the subject contract.

The Contractor must note that in case of any sub-contractors' failure to execute the works as per standards/specifications/drawings and/or negligence & disobedience in carrying out any order or instruction of Owner/PMC, the same shall be viewed very seriously and any action as deemed fit in accordance with provision(s) of the contract shall be taken by Owner/PMC.

Contractor shall submit the construction manpower deployment schedule at the time of kick off meeting. Daily construction manpower deployment report shall also be submitted by the Contractor to Owner/PMC on approved format. Any additional manpower of any category required to be deployed during the actual execution of the work to meet the Project time schedule and as instructed by Owner/PMC, shall be mobilized by the Contractor within a reasonable time. Mobilization of such additional manpower by the Contractor shall not entitle him for any additional compensation at all.

All construction supervision, coordination and management activities shall be carried out by the Contractor in accordance with the construction procedures approved by Owner/PMC. Contractor shall prepare construction schedules based on the Overall Project Schedule and submit the same to Owner/PMC for approval. Monitoring and control of the construction activities shall be carried out as per the approved construction schedule & procedures.

During the execution of works at site, if the Contractor engages sub-contractor (s) for execution of works at site as per approval obtained from Owner/PMC in line with contract provision(s) and in the event sub-contractor complains in writing to the Owner with regard to the non-payment of their dues from the

Contractor for the works executed by them (excluding final payments and payments due after termination of sub-contractors' services by the main Contractor), Owner/PMC reserves the right to make such payment to the sub-contractors directly based on approved measurements with due notice to the Contractor. Owner/PMC shall release such payments to sub- contractor at the cost and risk of the Contractor in order to ensure smooth execution of work at site. All such payments made by Owner/PMC to the sub-contractor(s) shall be deducted from the running account bills or any other payments due to the Contractor.

The above provisions shall also be applicable in case of construction materials procured at site by the Contractor from the suppliers.

16.0 INTERFACES WITH OTHER CONTRACTORS

CONTRACTOR shall ensure that his interface with other CONTRACTORS is smooth and cordial. In case of any dispute, Owner/PMC decision shall be binding.

Owner/PMC may arrange weekly/fortnightly/monthly interface meetings. The CONTRACTOR shall depute concerned personnel to attend these meetings.

Generally, the following interfaces may be present:

- CONTRACTOR shall allow movement of persons/ material/ equipment/ vehicles belonging to other CONTRACTORS or Owner/PMC through the roads constructed by him.
- CONTRACTOR shall coordinate with 'neighboring' contractors for maintaining elevations/levels of various interconnecting services.
- CONTRACTOR shall not dump his earth, scrap or any material in other Contractors' area. He shall cooperate with Owner/PMC in maintaining good housekeeping throughout the complex.
- CONTRACTOR shall ensure proper drainage and no water logging in his area/other areas.
- If requested by the Owner/PMC, CONTRACTOR shall allow testing of materials of other Contractors in his laboratory, in case of emergency.
- CONTRACTOR shall clearly define in the interface meeting with other contractors their erection / construction interface at their Battery limits.

17.0 ODC CRITERIA

The Maximum Transportable dimensions (inclusive of all projections & saddle height)/ weight shall be finalized based on detailed route survey to be carried out by the EPC contractor. The responsibility of contractor shall include route

survey from fabrication shop to refinery gate, from refinery gate to erection / assembly site inside the refinery, arranging and providing loading/ unloading facilities, obtaining clearances from statutory organizations like PWD, state electricity boards etc.

The Contractor shall minimize site works and prepare schemes for carrying out maximum works at vendor works and transport the equipments in sections. Transportation of all completed sections, segments and equipment from shop to site and unloading the same at designated storage yard shall be in the scope of the contractor. All ODC equipments are to be transported by Hydraulic axles only. Contractor shall submit the detail report and Transportation Procedure after award of the job.

EPC Contractor shall implement following measures in view of constraints w.r.t limited space availability at project site-

a) Maximize the pre-fabrication work for equipments at vendor works.

b) Maximize simultaneous / parallel working on multiple fronts.

c) Maximize work at ground to ensure good progress, quality, and safety.

d) Erection of structures is to be planned in modular form.

e) Erection of all columns, Vessels, Reactors etc. in dressed up conditions i.e. erection along with circular platforms, insulation (if applicable) and down comers.

Bidder shall visit the site at bid stage to acquaint himself with the site conditions at project site and furnish detail execution schedule and resource mobilization plan along with the offer to meet the Project schedule.

18.0 CHECKLIST FOR INSPECTION OF FLANGED JOINTS

Requirements specified in standard specification for application of torque and hydraulic bolt tension for flange joints No. 6-76-0002 shall be followed by the CONTRACTOR.

APPENDIX - A

QUALITY ASSURANCE

AND

QUALITY CONTROL

DURING CONSTRUCTION PHASE

TABLE OF CONTENTS

1.0 SCOPE

This document shall be applicable to all construction works to be executed by CONTRACTOR.

2.0 RESPONSIBILITY

It is Contractor's prime responsibility to arrange/produce the product conforming to contract specifications and inspect all equipment, materials and works at various stages of execution as per the approved QA Plans. In addition, they have to coordinate all efforts in this regard directly with the Owner/PMC and other involved agencies to give adequate confidence that the activities are performed as per agreed ITPs and necessary documentation is available. Contractor shall deploy an exclusive team of Quality control Engineers and Supervisors for ensuring the quality of works executed at site on day to day basis. Verification by Owner/PMC or his representative at any stage shall not relieve CONTRACTOR of his responsibility towards quality of the product.

The CONTRACTOR shall comply with all statutory rules & regulations in force during execution of work and interface with such authorities as required.

3.0 METHODOLOGY

The management of construction quality control is divided into the following categories:-

(1) Procurement of materials required for the construction work.

(2) Execution of work

(3) QA/QC Audits

3.1 PROCUREMENT OF MATERIALS REQUIRED FOR THE CONSTRUCTION WORK

The CONTRACTOR shall develop list(s) defining the items to be procured along with proposed Vendors for approval of the Owner/PMC. The list shall comprise of all items except vessels, equipments, pumps, electrical/ instrumentation panels etc. which may be available directly ready for installation or requiring small fabrication as per requirement. The vendor list shall be in line with the contract document. In case, no vendor list exists in the contract for a particular item, the CONTRACTOR shall propose a list of Vendors to Owner/PMC. CONTRACTOR has to satisfy himself with the capability of the vendor to deliver the product in time with quality before proposing him as a prospective vendor. CONTRACTOR shall submit the QA/QC plans for all major items and carry out their procurement in line with the approved plans. The categorization plan shall be submitted by contractor in line with the contract requirement/ bid package. The CONTRACTOR can either provide his own adequate qualified staff for inspection or employ a separate third- party inspection agency with prior approval to carry out these functions. Involvement of Owner/PMC in the quality control plan, if required, shall be defined during approval of the same.

3.2 EXECUTION OF WORK

(i) The QA plans for execution shall be developed by the CONTRACTOR. OWNER/ PMC's approval for the same shall be taken well before start of the work. The final Inspection & Test Plans (ITPs) and formats, based on the indicative ITPs (enclosed elsewhere in package), shall be developed by the CONTRACTOR as per contract specifications for approval by Owner/PMC. For the activities which are identified as Witness or Hold Point, specific inspection

call shall be raised by the CONTRACTOR with Owner/PMC in the requisite format well in advance.

The indicative ITPs enclosed in the bid package are for guidance to the CONTRACTOR and may not cover some of the activities to be performed during execution of works under the scope of this contract. The CONTRACTOR shall develop Inspection & Test Plans and Formats for all such activities also and submit the same to Owner/PMC for approval, before actually undertaking such activities

CONTRACTOR shall be completely responsible for management of approved quality plans and Owner/PMC involvement will be only of Surveillance in nature to randomly check the works at selective/critical junctures. Their role shall be to monitor that the CONTRACTOR is executing the quality plans as per the approved drawings, employing adequately qualified staff and other resources for various items of works. Any deviation to the specifications shall be brought to the notice of Owner/PMC in prescribed formats by CONTRACTOR for approval.

(ii) It is likely that the CONTRACTOR may engage sub-contractor(s)/vendors for performance of the work. CONTRACTOR shall be responsible for ensuring the implementation of approved QA plan, contract specifications and contract conditions through their sub-contractors to achieve the quality during all stages of construction. It shall be the responsibility of the CONTRACTOR to ensure proper coordination between his sub- contractor(s) and other agencies working at site.

The sub-contractor(s)/vendors selection shall be done after evaluation by the CONTRACTOR in line with contract requirements and shall be got approved by Owner/PMC before engaging them for the works.

(iii) Storage

All the materials procured shall be stored/stacked as per the standard norms and as recommended in various clauses of relevant codes and contract document. The storage of material shall be such as to avoid damage to life/properties (physical and chemical) of the materials. The storage shall not cause deterioration, rusting, mix-up etc. and hamper the other related works in any way. CONTRACTOR shall submit his detailed warehouse plan for Owner/PMC approval to manage the above in open/covered areas.

The materials susceptible to fire shall be kept away in a separate protected place.

In general, the materials shall be kept systematically in order of their class, batch number and identification number, so that they are accessible for the inspection by Owner/PMC whenever required and to avoid the mix up in those materials.

(iv) Use

The materials shall be stacked in such a way that the lot, which is procured first, will be consumed first. For materials which are having specific expiry date/ shelf life shall not be used beyond that date and shall be removed from site. Wherever there is any doubt about the change in properties of the materials, such materials shall be sent to reputed approved laboratory for testing and acceptance.

(v) Inspection

The CONTRACTOR shall be responsible for carrying out inspection of the materials brought at site and conducting tests/ checks (at site or in approved laboratories) at predefined frequencies as per contract. It is the responsibility of the CONTRACTOR to ensure that the materials used at site shall conform to relevant codes/ standards and Manufacturer Test Certificates are available for correlation as and when required. The CONTRACTOR shall maintain the records of all materials brought at site and tests conducted on them.

(vi) In process and final Inspection

CONTRACTOR shall be responsible to arrange verification of products during in-process and final inspection. Relevant checks and tests shall be arranged for the works performed and records maintained. Tolerances achieved with respect to contract specification and execution drawings for various activities/processes shall be ascertained and submitted to Owner/PMC for approval. Efforts shall be made to keep checks and controls in such a way that a non-conforming product is avoided. However, if in an isolated case, the tolerances are beyond the acceptable values given in the contract/execution drawings/codes, non-conformance resolution/Deviation permit need to be raised by the CONTRACTOR and got approved/resolved from Owner/PMC.

The CONTRACTOR shall arrange verification of ingredients used and validation of the software used at the batching plant(s). Owner/PMC reserve the right to inspect the working of batching plant including validation of the software used and calibration of measuring & monitoring devices any time. The CONTRACTOR shall ensure the quality of the concrete delivered by the transit mixers, as applicable and maintain verifiable records.

CONTRACTOR will carryout Inspection, Non-destructive Tests and analyze and certify acceptability of all welds, materials and works in accordance with specified technical standards/International standards and carryout inspection and testing of incoming materials as per agreed procedures.

v) Any Observation on quality aspects , Owner/PMC shall raise observation in attached OQA format which has to be acknowledged & compliance to be done by the contractor within the agreed time period.

vi) The CONTRACTOR shall follow the requirements given for control of monitoring and measuring devices (Refer Document no. 7-82-0002).

3.3 QA/QC AUDITS

During the execution of the works, CONTRACTOR shall carry out periodical Quality Audits at least quarterly in all areas of work. These audits will be conducted by a team of specialists in the respective areas. The auditors shall not be directly involved in the jobs being audited.

The CONTRACTOR shall prepare an Audit Plan and Procedure and submit the same to Owner/PMC for approval.

A copy of the Audit Report containing the findings of the Audit team will be submitted to Owner/PMC. After completion of rectification/modifications/corrective actions on the issues indicated in Audit Report, Compliance Report shall be submitted by the CONTRACTOR to Owner/PMC for review.

Over and above the Contractor's Internal QA/QC Audits outlined above, Owner/PMC shall also reserve the right to conduct QA/QC audits at the frequency decided by them. CONTRACTOR shall participate and provide full support to the Audit Team and furnish all documents/reports/records as desired by the Audit Team. The CONTRACTOR shall take all actions required to comply with the findings of the Audit Report and issue regular Compliance Reports for the same to Owner/PMC till all the findings of the Audit Report are fully complied.

In case major Non conformities are observed during execution of the works Owner/PMC reserve the right to appoint an independent person/Third Party Agency to conduct QA/QC Systems Audit for full/part of the facilities being executed by the CONTRACTOR. This audit will be in addition to the audits described above and may be carried out intermittently/continuously for all or part of the facilities being executed by the CONTRACTOR. CONTRACTOR shall bear the total cost of such audits and shall participate & provide full support to the Audit Team and ensure compliance of the audit observations.

4.0 DOCUMENTATION AND RECORDS

All the necessary documentation & records shall be maintained by CONTRACTOR till completion of project and handed over to Owner/PMC in requisite copies as a part of completion documents. Wherever Owner/PMC personnel were directly involved particularly in witness and hold point, the copies of the records shall also be provided to personnel on completing inspection of those activities. The documentation & records shall include the following as a minimum but not limited to:

i) Approved Quality Assurance Plan
ii) Approved Inspection and Test Plans
iii) Inspection and test documents covering
   a) Manufacturer Test Certificate
   b) Material Receipt Report including Inspection Release Note, if applicable and Site Inspection and acceptance Report on quality and quantity of material
   c) Site test/laboratory test Report reviewed by CONTRACTOR for acceptance vis-à-vis to contract/code requirements for materials/including PMI report at warehouse.
   d) In process Verification reports of CONTRACTOR representative and OWNER/ PMC as applicable
   e) Final verification report including any test checks done for compliance
   f) As-built vis-à-vis to contract/drawings including tolerances
   g) As-built for erection
   h) Non conformance resolution raised by CONTRACTOR/OWNER/ PMC
   i) Concession/Deviation approval by Owner/PMC
   j) Change order approval by Owner/PMC incase there is variation from contract
   k) QA/QC Audit Reports and compliance Reports thereof
   l) Mechanical Completion formats

APPENDIX-B

HEALTH, SAFETY AND

ENVIRONMENT (HSE) MANAGEMENT

DURING CONSTRUCTION

GENERAL REQUIREMENTS

1.0 Standard specification for Health, Safety and Environment (HSE) Management (Spec. No. 6-82-0001), is required to be followed by Contractor during Construction Phase at site.

2.0 Contractor shall have a documented HSE policy to cover commitment of the organization to ensure Health, Safety and Environment aspects in the line of operation.

3.0 It is the responsibility of the Contractor to ensure that safe construction procedures are complied with. Contractor will also ensure that adequate First Aid medical facilities are available for emergency purpose and that safety practices as per the approved safety procedure are followed by his sub-contractors also.

Contractor to ensure safety measures at the minimum like:

a) The use of safety gadgets, viz. safety goggles, helmets, safety shoes, full body harness, provision of safety net for construction at higher elevations and provision of toe boards in scaffolding platforms, etc.
b) All hot works must be performed by ensuring compliance to the requirements as specified by the Owner from time to time.
c) Barricading of crane movement areas / Radiography areas
d) Proper earthing of equipments.
e) Proper shoring / strutting of Excavated Areas, as applicable.
f) Cylinders of inflammable gases to be stacked upright.

To assist in the development of an effective safety program, a safety checklist for various jobs shall be developed by the Contractor and the same shall be adhered to by the Contractor's Site-In-charge.

The responsibilities of the Contractor will include but not limited to:

- Coordination and supervision of the details of the job safety programme.
- Initiation of accident reporting, investigation and follow-up actions.
- Preparation of periodic accident summaries.
- Periodic Accident Analysis Reports
- Tallying safety inspection of the job and submission of summary inspection report to Owner/PMC.
- Obtaining work permits from the OWNER, wherever applicable.
- Check the fitness of cranes and other hoisting equipments on periodic basis/before all major lifts and submit to Owner/PMC valid/latest test certificates of tackles used for lifting.
- Submission of any other report required by Owner/ PMC.
- Conduct HSE Audit at predefined frequencies and assist Owner/PMC /TPI during conductance of their HSE Audits.
- Ensure closure of NCs observed during the above audits.

4.0 Guidelines on Safety Practices during Construction and Contractor Safety prepared by Oil Industry Safety Directorate (OISD) Nos. OISD-GDN-192 & OISD-GDN-207 shall

be followed by the contractor at site. Safety Recommended Practices for Electrical System (OISD-RP-147) shall be followed by the contractor at site. These are supplementary requirements in addition to specification for Health, Safety and Environment (HSE) Management (Spec. No. 6-82-0001) to be followed by the CONTRACTOR at site.

5.0 Any Observation on Safety aspects, Owner/PMC shall raise observation in attached OSA format, which has to be acknowledged & compliance to be done by the contractor within the agreed time period.

ATTACHMENT -I

INSPECTION & TEST PLAN (ITP)

FOR

CONSTRUCTION WORKS

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INSPECTION & TEST PLAN (ITP) FOR MECHANICAL WORKS (EPCC/LSTK CONTRACTS)

Rev. No	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	15.06.2022	REVISED AND REISSUED	DK	DG	JPV	SM
3	23.07.2018	REVISED AND REISSUED	SKG	AP	AKK	RKT
2	09.11.2015	REVISED AND REISSUED	DJ	MKG	TKS	SC
1	04.07.2011	REVISED AND REISSUED	SM	SM	MKG	DM
0	31.03.2006	ISSUED AS STANDARD SPECIFICATION	AS	MPJ	RSG	VJN

Format No. 8-00-0001-F1 Rev. 0

Abbreviations:

A/G	:	Above Ground
AFC	:	Approved For Construction
AS	:	Alloy Steel i.e. Cr-Mo steels like A335 Gr P11, P5, P9, P22, etc.
CFB	:	Ceramic Fibre Blankets
CS	:	Carbon Steel
CSO	:	Car Seal Open
FD	:	Free Draught
GAD	:	General Arrangement Drawings
HIC	:	Hydrogen Induced Cracking
I/S	:	Inner Side
IBR	:	Indian Boiler Regulations
IMIR	:	Incoming Material Inspection Report
ID	:	Induced Draught
LO/ LC	:	Lock Open / Lock Close
LTCS	:	Low Temperature Carbon Steel
MT	:	Magnetic Particle Testing
NACE	:	National Association of Corrosion Engineers
NDT	:	Non Destructive Testing
NRV	:	Non Return Valve
O/S	:	Outer Side
ODC	:	Over Dimension Consignment
PMI	:	Positive Material Identification
PQR	:	Procedure Qualification Record
PT	:	Penetrant Testing
PWHT	:	Post Weld Heat Treatment
RF	:	Reinforcement
RT	:	Radiographic Testing
SS	:	Stainless Steel like A312 TP 304, 316, 321, 304L, 316L, 316Mo, etc.
SSCC	:	Sulphide Stress Corrosion Cracking
TSR	:	Tray Support Ring
UDFC	:	Under Down Flow Clearance
WPS	:	Welding Procedure Specification
WSC	:	Welding Specification Chart

Construction Standards Committee

Convenor: Sh. John Paul V, ED (Construction)

Members:
Sh. Janak Kishore, ED (Projects)
Sh. Chinmoy Kapuria, Sr. GM (SCM)
Sh. Udayan Chakravarty, Sr. GM (Piping)
Sh. Ravindra Kumar, Sr. GM (Construction)
Sh. Debasish Ghosal, GM (Construction)
Sh. Pankaj Kumar Rai, DGM (Construction)

CONTENTS

GENERAL NOTE

1. The enclosed ITPs shall be followed for the works to be performed by the contractor. The provisions indicated for stage wise inspection by EIL/Owner (For specific activities), which may be modified in line with EIL scope of services as per the contract between EIL and Owner. Activities for which ITPs are not provided in this specification, contractor to develop and get the same approved by EIL/Owner before start of the work. In general role of EIL has been specified in the document. The role of owner to be specified during preparation of site specific ITPs.

2. Contractor to submit job procedures for the jobs for which ITP's are attached & job specific reporting formats with the aid of enclosed sample reporting formats to EIL/Owner for approval, before commencement of the activity. If the contractor has to deviate from the given ITP for a valid reason, he shall obtain prior written approval of EIL/Owner. Contractor to carry out 100% examination of all activities.

LEGEND

HP : **Hold Point ;**

An activity which requires witnessing/inspection/verification and acceptance by Owner/EIL before any further processing is permitted.
The Contractor shall not process the activity/item beyond a Hold Point without written approval by Owner/EIL except where prior written permission for further processing is available.

W : **Witness Point ;**

An activity which requires witnessing/inspection/verification by Owner/EIL when the activity is performed.
After proper notification has been provided (notification modalities and period shall be finalized before hand), the Contractor is not obliged to hold further processing if Owner/EIL is not available to witness the activity or does not provide comments before the date notified. Basis of acceptance shall be on review of Contractor generated report/document as per relevant technical specification.

Rw : **Review** of Contractor's documentation.

S : **Surveillance** Inspection by Owner/ EIL.
Monitoring or making observations to verify whether or not material/items or services conform to specified requirements. Surveillance activities may include audit, inspections, witness of testing, Review of quality documentation & records, personnel qualifications, etc.

WC : **100%**Supervision and Examination by Contractor.

Responsibility for execution of the inspection/testing is with the Contractor; Owner/EIL only verifies examination or testing done by the Contractor at important stages.

ITP NO: 2110

ABOVE GROUND PIPING

SL. NO	ACTIVITY	CONTRACTOR	EIL		
			CAT A	CAT B	CATC
A.	**PRIOR TO FABRICATION**				
1.	Incoming Material	WC	Note -1		
2.	Welding Filler Material Approval/Qualification a) Review of Manufacturer's Test Certificates/Documents & Sampling.	WC*	HP*	Rw*	Rw*
	b) Laboratory Testing, if any	WC	Rw	Rw	Rw
3.	WPS/PQR				
	a) Review of proposed procedure	WC	HP	Rw	Rw
	b) Welding of Test Coupons and subsequent testing, if applicable	WC	W	W	W
	c) Approval of final WPS/PQR	WC	HP	HP	HP
4.	Welder performance Qualification	WC	Rw	Rw	Rw
5.	Certification & approval of welders.	WC	HP	W	W
6.	NDT Procedure Qualification				
	i) Review of proposed procedure	WC	Rw	Rw	Rw
	ii) Witnessing of Proposed Procedure Testing	WC	W	W	W
	iii) Approval of Qualified Procedure	WC	HP	HP	HP
7.	Review of Joint numbering in Isometrics (Big & Small bore)/Sketches	WC	W	Rw	--
8.	Material traceability & Transfer of Heat Nos.	WC	HP	S	--

* **a)** *Notwithstanding any other tests/documentation required for qualification/approval of filler metals:*

i) For Alloy Steel & Stainless Steel welding filler metals, chemical analysis to be carried out for every batch.

ii) For Low Temperature Services piping, and for material class wherever impact requirement is specified in WSC, Impact testing to be carried out for every batch of the filler metal, to be witnessed by PMC/owner

b) *For NACE filler metals, corrosion tests like HIC, SSCC, etc. to be carried out for every batch. However, HIC/SSCC tests done earlier & duly witnessed by a reputed third party, will be acceptable.*

ITP NO: 2110
ABOVE GROUND PIPING

SL. NO.	ACTIVITY	CONTRACTOR	EIL		
			CAT A	CAT B	CATC
B.	**FABRICATION /ERECTION**				
1.	Material as per piping class (check w.r.t. approved colour coding procedure), Fit-up check and Traceability check.	WC	W	S	--
2.	Pre-heat (if any)	WC	S	--	--
3.	Certificate of purity of purging/shielding Gas (if any)	WC	Rw	--	--
4.	Purging rate (if any) and arrangement	WC	S	--	--
5.	Shielding rate (if any)	WC	S	--	--
6.	Baking of Electrodes	WC	S	--	--
7.	Inter-pass cleaning & Temperature check.	WC	S	--	--
8.	Visual Examination of completed welds	WC	W	S	S
9.	a) Monitoring of PWHT Cycle	WC	S	--	--
	b) Review of Time – Temperature graph	WC	Rw	Rw	--
10.	Hardness Check	WC	S	--	--
11.	a) PT/MT (Branch Joints)	WC	W	W	--
	b) PT /MT (Others)	WC	W	S	--
12.	a) Identification of Joints for Radiography (for Random radiography only)	WC	S	--	--
	b) Check shot for radiography	WC	HP	HP	HP
13.	Review of Radiographs interpreted by the Contractor	WC	HP	W	Rw
14.	Lifting arrangement (for critical piping only)	WC	Rw	Rw	Rw
15.	Test certificates for lifting tackles	WC	Rw	Rw	Rw
16.	Location and orientation of Branch connections	WC	Rw	Rw	-
17.	MUT activities at Site	WC	W	W	S
18.	PAUT/TOFD activity at Site	WC	S	S	S
19.	Interpretation of PAUT/TOFD	WC	HP	W	Rw
20.	Provision of Inst. Tappings	WC	W	W	-
21.	Provision of vents and drains	WC	Rw	Rw	-
22.	Correctness of type of supports, Anchors, Guides	WC	W	W	S
23.	Correctness of gaskets/ fasteners	WC	W	S	S
24.	Correctness of valves (NRV, Gate, Globe, control Valves etc.), steam traps and their direction of flow.	WC	HP	W	S
25.	Provision of cold pull, if any.	WC	W	W	-

ITP NO: 2110
ABOVE GROUND PIPING

SL. NO.	ACTIVITY	CONTRACTOR	EIL		
C	PROOF TESTING		CAT A	CATB	CATC
1.	Procedure Review	WC	Rw	Rw	Rw
2.	Scrutiny of test packs for Mechanical & NDT Clearance (Refer Format M-01)	WC	S	S	--
3.	Correctness of Testing arrangements. (Refer Format M-01)	WC	W	W	Rw
4.	Positive Material Identification as per specification after completion of installation.	WC	Rw	--	--
5.	Preparation of Punch list (Refer Format M-02)	WC	W	W	--
6.	Review of Punch List prepared by Contractor	WC	Rw	Rw	--
7.	Liquidation of check list, if applicable	WC	HP	HP	--
8.	a) Review of Calibration certificates of pressure Gauges (Refer Format M-03)	WC	Rw	Rw	--
	b) Field Calibration, if any	WC	S	--	--
9.	Air/Water Flushing (preliminary)	WC	S	S	--
10.	Visual inspection of all weld joints for leak during Pneumatic/ Hydro testing	WC	W	W	--
11.	Draining of Water & Air Drying (Refer Format M-04)	WC	S	S	--
12.	Removal of temporary blinds/supports(Refer Format M-04)	WC	W	S	--
13.	Boxing up including reinstallation of flappers of check valves	WC	S	--	--
14.	Review of Records of fasteners & gaskets	WC	Rw	Rw	Rw
15.	Torque tightening/ tensioning of flange joints, wherever applicable	WC	W	S	--
16.	Modification of Tested lines (Refer Format M-05)	WC	Rw	Rw	Rw
	INSPECTION & TEST DOCUMENTS				
	Review Test and Inspection Documents	WC	Rw	Rw	Rw

NOTE :
1) For Incoming Material Inspection, please refer ITP no: 6-82-1010
2) Pre-commissioning activities such as chemical cleaning, card board blasting, system testing are not covered by these ITP's. The contractor shall develop ITP's for such activities and obtain Owner/ PMC/ Licensor's approval.

CAT A: All services involving hydrogen and hydrogen bearing fluid., all piping above and including 600# rating, all SS, AS,NACE,LTCS, clad Inconel, piping, SHP/HP Steam piping.

CAT B: All CS piping for process lines up to 600 # (excluding), all Steam lines under purview of IBR other than category A, Jacketed piping.

CAT C: Piping for "D" class fluid, Non IBR portion of condensate & steam lines.

ITP NO: 2120
COLUMN INTERNALS

SL. NO.	ACTIVITY	CONTRACTOR	EIL
			CAT A
	INSTALLATION OF COLUMN INTERNALS		
A.	Before Installation		
1.	Internal Installation Procedure including identification of confined space hazards & mitigation thereof	WC	Rw
2.	Material inspection	WC	Note-1
3.	Level check on TSRs	WC	S
4.	Check for down comer clearance and Tray clearance	WC	S
5.	Distance between TSRs	WC	S
B.	**After Installation - *Check for***		
1.	Exit weir height	WC	S
2.	UDFC	WC	S
3.	Tightness of bolts	WC	S
4.	Orientation and tightness of clamps	WC	S
5.	Provision of lock nuts/seal plates	WC	HP

ITP NO: 2120
COLUMN INTERNALS

SL. NO.	ACTIVITY	CONTRACTOR	EIL
			CAT A
6.	Correctness of installation of shimming/bolting for top down comer	WC	HP**
7.	Correctness of gasket (if any)	WC	S
8.	Tray to tray distance and level of trays	WC	S
9.	Leak testing of seal pans as applicable	WC	S
10.	Damaged, missing valves and valve movements for valve trays	WC	S
11.	Fitting of proper valve combination	WC	S
12.	Damage to deck components	WC	S
13.	Level and alignment of inlet weir and exit weir	WC	S
14.	Check for proper location of slots on tray components	WC	S
15	Check for Gaps at down comer ends	WC	S
16	Removal of temporary plugs after testing	WC	S
17	Cleaning of all trays & inside of equipment	WC*	W
18	Certification of installation by Vendor's representative Final boxing up, if any.	WC*	HP**
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Documents		

*Vendor Representative to Check 100%
** By Owner/Process Licensor
NOTE : 1) For Incoming Material Inspection please refer ITP no: 6-82-1010

CAT A: All works

ITP NO: 2130
FIRED HEATERS

SL. NO.	ACTIVITY	CONTRACTOR	EIL
			CAT A
A.	**PRIOR TO FABRICATION**		
1.	Incoming Material:	WC	Note - 1
2.	Welding Filler Material Approval/Qualification		
	a) Review of Manufacturer's Test Certificate/Documents	WC	HP*
	b) Laboratory testing, if any		
	i) Carbon Steel	WC	Rw
	ii) Alloy Steel/Stainless Steel	WC	W
3.	WPS/PQR		
	a) Review of proposed Procedure	WC	Rw
	b) Welding of Test Coupons and subsequent testing		
	i) Carbon Steel	WC	W
	ii) Alloy Steel/Stainless Steel	WC	W
	iii) All other materials including NACE CS, CS for H_2 Service	WC	W
	c) Approval of final WPS/PQR	WC	HP
4.	Welder performance Qualification Test	WC	S
5.	Certification & Approval of welders before deployment on job	WC	W
6.	i) NDT Procedure Qualification		
	a) Review of proposed Procedure	WC	Rw
	b) Witnessing of Proposed Procedure Testing	WC	W
	c) Approval of Qualified Procedure	WC	W
7.	Joint Numbering for coils/ pressure parts	WC	S
B.	**FABRICATION**		
	STEEL WORK		
1.	Materials as per AFC drawing	WC	S
2.	Dimensional check	WC	S
3.	Fit-up check	WC	S

* *Notwithstanding any other tests/documentation required for qualification/approval of filler metals:*

i) For Alloy Steel & Stainless Steel welding filler metals, chemical analysis to be carried out for very batch.

ii) *For NACE filler metals, corrosion tests like HIC, SSCC, etc. to be carried out for every batch. However, HIC/SSCC tests done earlier & duly witnessed by a reputed third party, will be acceptable.*

ITP NO: 2130
FIRED HEATERS

SL. NO.	ACTIVITY	CONTRACTOR	EIL
			CAT A
4.	Radiography, as applicable		
	a) RT Marking (for random/spot radiography only)	WC	S
	b) RT Interpretation / Review	WC	W
5.	Completion of structures as per AFC drawings	WC	W
C	**COIL WORK**		
1.	a) Material as per specification (check w.r.t. approved colour coding procedure)	WC	W
	b) Dimensional checks	WC	S
	c) Fit-up check for butt joints and socket joints	WC	S
	d) Fit-up checks for branch joints	WC	S
	e) Cold Pull Check	WC	S
	f) Supports and anchor location	WC	S
2.	Pre-heat (if any)	WC	S
3.	Certificate of purity of purging/shielding Gas (if any)	WC	S
4.	Purging rate (if any) and arrangement	WC	S
5.	Shielding rate (if any)	WC	S
6.	Baking of Electrodes	WC	S
7.	Inter-pass cleaning & Temperature check	WC	S
8.	Visual check of completed welds	WC	S
9.	a)Monitoring of PWHT Cycle	WC	S
	b)Review of Time – Temperature graph	WC	W
10	Hardness Check		
	(i) For C.S. Coils	WC	S
	(ii) For A.S. Coils	WC	W
11.	PT/MT	WC	W
12.	Radiography marking (for Random Radiography only)	WC	W
13.	Radiography Interpretation/ Review	WC	W
14.	Check Shot for Radiography, if applicable	WC	W
15.	Clearance for Hydrostatic testing	WC	HP
16.	Positive Material Identification for base material and welds, as applicable	WC	W
17.	Hydrostatic Testing	WC	W

ITP NO: 2130
FIRED HEATERS

SL. NO	ACTIVITY	CONTRACTOR	EIL
D.	**ERECTION**		**CAT A**
1.	Review of foundation check as per AFC drawing	WC	HP
2.	Lifting of radiant section columns and their alignment	WC	S
3.	Bottom plate fit-up & welding	WC	S
4.	Radiant shell courses fit-up & welding	WC	S
5.	Weld visual inspection	WC	S
6.	Review of radiographs interpreted by the contractors	WC	W
7.	Cutout		
	a) Marking for burners, sight doors, soot blowers	WC	S
	b) Marking for balance cut outs	WC	S
	c) Cutting	WC	S
8.	Coil erection in Radiant section		
	a) Fixing of coil support castings	WC	S
	b) Clearance for erection of coil	WC	S
	c) Alignment of completed coil work	WC	W
9.	Assembly and erection of convection box		
	a) Erection procedure Review	WC	S
	b) Structural including plate work	WC	S
	c) End tube sheets and intermediate tube sheets with support brackets	WC	S
	d) Clearance of coil erection	WC	W
	e) Erection of box (If applicable)	WC	W
10.	Check Shot for radiography for coil field joints, if applicable	WC	W
11.	Clearance for Hydrostatic test	WC	HP
12.	Hydrostatic test	WC	W

ITP NO: 2130
FIRED HEATERS

SL. NO	ACTIVITY	CONTRACTOR	EIL
			CAT A
13.	Erection, fit-up & welding of stack		Rw
	a) Erection procedure	WC	Rw
	b) Erection	WC	S
	c) Alignment	WC	S
14.	Erection Fit-up, welding of ducts and its support structural	WC	S
15.	Radiography, as required on steel work		
	a) RT Marking	WC	S
	b) RT Interpretation	WC	W
16.	FD & ID Fan	WC	Note 4
17.	Installation of auxiliary equipment		
	a) Burner along with ignition system and transformer	WC	W
	b) Soot blower along with sequential control panel and electrical wirings	WC	W
	c) Damper and shut-off blades with control panel and winch	WC	W
	d) Air pre-heater (cast, glass, plate) and steam air heater	WC	W
	e) Skin thermocouples	WC	W
	f) Spring Supports	WC	S
18.	Erection of all platforms. Ladders, Hand rails & miscellaneous structures	WC	S
19.	Insulation/ refractory lining	WC	Note 3
20.	Final Painting	WC	Note 2
21.	Liquidation of checklist	WC	HP
22	Smoke testing of Heater	WC	W
23.	Final inspection and acceptance	WC	HP
	INSPECTION & TEST DOCUMENTS		
	Review of Test and Inspection documents	WC	Rw

NOTE :
1) For Incoming material Inspection please refer ITP no: 6-82-1010
2) For Painting works, please refer ITP No. 2190
3) For Insulation, please refer ITP No. 2100
4) For Rotary Equipment, please refer ITP No. 2160

CAT A: All works

ITP NO: **2140**

REFRACTORY & INSULATION WORKS- FIRED HEATER

SL. NO.	ACTIVITY	CONTRACTOR	EIL
			CAT B
A.	**RADIANT SECTION**		
1.	**Radiant shell**		
	Fixing of Ceramic fibre blanket		
	i) Material inspection		
	Manufacturing test certificates	WC	Rw
	Testing, if any	WC	W
	ii) Clearance for hot work	WC	HP
	iii) Marking of studs	WC	S
	iv) Welding of studs with approved WPS&PQR	WC	S
	v) Surface cleaning	WC	**S**
	vi) Check for individual layers of ceramic fibre blankets and SS foils	WC	W
	vii) Check for overlap of ceramic blanket	WC	S
	viii) Fixing of speed fix washer and cup lock	WC	S
	ix) Cleaning and final inspection	WC	W
2.	**ARCH PLATE**		
	i) Material inspection		
	- Manufacturing test certificates	WC	Rw
	- Testing, if any	WC	W
	ii) Clearance for hot work	WC	HP
	iii) Marking of studs/anchors	WC	S
	iv) Welding of studs/anchors with approved WPS & PQR	WC	S
	v) Surface cleaning	WC	**S**
	vi) Check for individual layers of ceramic Fibre blankets (CFB) modules and SS foils	WC	S
	vii) Check for overlap of CFB and modules	WC	S
	viii) Cleaning and final inspection	WC	W

ITP NO: **2140**

REFRACTORY & INSULATION WORKS- FIRED HEATER

SL. NO.	ACTIVITY	CONTRACTOR	EIL
			CAT B
3.	**FLOOR PLATE**		
	Laying of castable / fire bricks		
	i) Material inspection		
	- Manufacturing test certificates	WC	Rw
	- Testing, if any	WC	W
	ii) Clearance for hot work	WC	HP
	ii) Surface cleaning	WC	S
	iv) Check Shelf life prior to application	WC	W
	v) Check for undulations on floor	WC	S
	vi) Check for castable mix	WC	W
	vii) Check for proper compaction	WC	S
	viii) Check for thickness of castable	WC	S
	ix) Curing	WC	S
	x) Cleaning after laying of castable	WC	S
	xi) Check for cracks and repair	WC	W
	xii) Fixing of tar paper, if applicable	WC	S
	xiii) Cleaning and final inspection	WC	W
B.	**CONVECTION SECTION**		
	1) CONVECTION WALLS		
	Laying of castable		
	i) Material inspection		
	- Manufacturing test certificates	WC	Rw
	- Testing, if any - Manufacturing test certificates	WC	W

ITP NO: **2140**

REFRACTORY & INSULATION WORKS- FIRED HEATER

SL. NO.	ACTIVITY	CONTRACTOR	EIL
			CAT B
	ii) Clearance for hot work	WC	HP
	iii) Marking of studs/anchors	WC	S
	iv) Welding of studs/anchors with approved WPS & PQR	WC	S
	v) Surface cleaning	WC	W
	vi) Check for undulations on wall	WC	S
	vii) Check for castable mixing	WC	W
	viii) Check for proper compaction	WC	S
	ix) Check for thickness of castable	WC	S
	x) Curing	WC	S
	xi) Cleaning after laying of castable	WC	S
	xii) Check for cracks and repair	WC	W
	xiii) Cleaning and final inspection	WC	W
	2) END TUBESHEETS		
	Laying of castable		
	i) Material inspection		
	- Manufacturing test certificate	WC	Rw
	- Testing, if any	WC	W
	ii) Clearance for hot work	WC	HP
	iii) Marking of studs/anchors	WC	S
	iv) Welding of studs/anchors with approved WPR & PQR	WC	S
	v) Surface cleaning	WC	S
	vi) Check for castable mixing	WC	W
	vii) Check for proper compaction	WC	S
	viii) Check for thickness of castable	WC	S
	ix) Curing	WC	S
	x) Cleaning after laying of castable	WC	S
	xi) Check for cracks and repair	WC	W
	xii) Cleaning and final inspection	WC	W

ITP NO: **2140**

REFRACTORY & INSULATION WORKS- FIRED HEATER

SL.	ACTIVITY	CONTRACTOR	EIL
			CAT B
	3) BREECHING PLATE		
	Laying of castable		
	i) Material inspection		
	- Manufacturing test certificates	WC	Rw
	- Testing, if any	WC	W
	ii) Clearance for hot work	WC	HP
	iii) Marking of studs/anchors	WC	S
	iv) Welding of studs/anchors with approved WPR & PQR	WC	S
	v) Surface cleaning	WC	S
	vi) Check for undulations on plate	WC	S
	vii) Check for castable mixing	WC	W
	viii) Check for proper compaction	WC	S
	ix) Check for thickness of castable	WC	S
	x) Curing	WC	S
	xi) Cleaning after laying of castable	WC	S
	xii) Check for cracks and repair	WC	W
	xiii) Cleaning and final inspection	WC	W
	4) HEADER BOX		
	Laying of castable		
	i) Material inspection		
	- Manufacturing test certificates	WC	Rw
	- Testing, if any	WC	W
	ii) Clearance for hot work	WC	HP
	iii) Marking of studs/anchors	WC	S
	iv) Welding of studs/anchors with approved WPR & PQR	WC	S
	v) Surface cleaning	WC	S
	vi) Check for undulations on box	WC	S
	vii) Check for castable mixing	WC	W
	viii) Check for proper compaction	WC	S
	ix) Check for thickness of castable	WC	S
	x) Curing	WC	S
	xi) Cleaning after laying of castable	WC	S
	xii) Check for cracks and repair	WC	W
	xiii) Cleaning and final inspection	WC	W

ITP NO: **2140**

REFRACTORY & INSULATION WORKS- FIRED HEATER

SL. NO.	ACTIVITY	CONTRACTOR	EIL
			CAT B
	xiv) Surface cleaning	WC	S
	xv) Check for undulations on box	WC	S
	xvi) Check for castable mixing	WC	W
	xvii) Check for proper compaction	WC	S
	xviii) Check for thickness of castable	WC	S
	xix) Curing	WC	S
	xx) Cleaning after laying of castable	WC	S
	xxi) Check for cracks and repair	WC	W
	xxii) Cleaning and final inspection	WC	W
C	**STACK**		
	Laying of castable		
	i) Material inspection		
	- Manufacturing test certificates	WC	Rw
	- Testing, if any	WC	W
	ii) Clearance for hot work	WC	HP
	iii) Marking of studs/anchors	WC	S
	iv) Welding of studs/anchors with approved WPS & PQR	WC	S
	v) Surface cleaning	WC	S
	vi) Check for undulations on stack shell	WC	S
	vii) Check for castable mixing	WC	W
	viii) Check for proper compaction	WC	S
	ix) Check for thickness of castable	WC	S
	x) Curing	WC	S
	xi) Cleaning after laying of castable	WC	S
	xii) Check for cracks and repair	WC	W
	xiii) Cleaning and final inspection	WC	W

ITP NO: **2140**

REFRACTORY & INSULATION WORKS- FIRED HEATER

SL. NO.	ACTIVITY	CONTRACTOR	EIL
			CAT B
D	**HOT AIR DUCT**		
	i) Material inspection		
	- Manufacturing test certificates	WC	Rw
	- Testing, if any	WC	W
	ii) Clearance for insulation	WC	HP
	iv) External Surface cleaning	WC	S
	iv) Provide spacer rings/anchors	WC	S
	v) Check for thickness of the mineral wool insulation	WC	S
	vi) Check for staggering of joints in insulation	WC	S
	vii) Check for providing expansion joints	WC	W
	viii) Overlapping of metal sheet as per specification	WC	S
	ix) Overlap on joints for Aluminium sheeting as per specification	WC	W
	x) Sealing Aluminium sheeting	WC	S
	Final inspection & acceptance	WC	W
E	**INSPECTION & TEST DOCUMENTS**		
	Review Test and Inspection Documents	WC	Rw

CAT B: All works.

ITP NO: 2150

EQUIPMENT ERECTION (STATIC)

SL. NO.	ACTIVITY	CONTR ACTOR	EIL		
			CAT A	CAT B	CAT C
	EQUIPMENT ERECTION (STATIC)				
1.	**BEFORE ERECTION**				
a.	Review of foundation acceptance report	WC	HP	Rw	Rw
b.	Incoming material	WC	Note-1	Note-1	Note-1
c.	Readiness for erection				
	i) Centre line marking on equipment and foundation	WC	S	--	--
	ii) Level of foundation (shims/ packing with marking to be prepared & kept ready)	WC	S	--	--
	iii) Correctness of no. & size of Foundation bolts	WC	S	--	--
	iv) Hole dia and no. of holes in base/ structure of equipment columns	WC	S	--	--
	v) Matching equipment base bolt holes with actual foundation bolt layout	WC	S	--	--
	vi) Marking orientation	WC	S	--	--
	vii) Checking the threads of bolts & nuts	WC	S	--	--
	viii) Chipping & roughening of foundation	WC	S	--	--
d.	Outside cleaning, coating/wrapping, painting (for underground equipment only)	WC	HP	W	--

ITP NO: 2150

EQUIPMENT ERECTION (STATIC)

SL. NO	ACTIVITY	CONTRACTOR	EIL		
			CAT A	CAT B	CAT C
2.	**ERECTION SCHEMES FOR CRITICAL EQUIPMENTS**				
	a. Review of rigging procedures	WC	HP		--
3.	**SAFETY TEST**				
	a .Load test of cranes, lifting beams, slings and shackles, length and dia. of sling & condition of wire rope by competent authority	WC	Rw	Rw	Rw
4.	**DURING ERECTION**				
	a. Orientation to be checked	WC	S	--	--
	b. Placement of packing as per AFC drawing	WC	S	--	--
	c. Placement of Main & trailing crane as per approved rigging procedure	WC	S	--	--
	d. Orientation of equipment as per AFC drawing	WC	S	--	--
5.	**AFTER ERECTION**				
	a. Tightening of Bolts and Providing washers	WC	S	--	--
	b. Leveling and Alignment of equipments	WC	W	W	--
	c. Corresponding requirement elevation & distance between nozzles in special cases	WC	S	--	--
	d. Cleaning of Sleeves before grouting	WC	S	--	--
	e. Grouting	WC	S	--	--
	i) Acceptance of Specified grouting materials	WC	HP	Rw	Rw
	ii) Placement of grouting	WC	S	--	--
	iii) Curing of grout	WC	S	--	--
	f. Final tightening of bolts	WC	S	--	--

ITP NO: 2150

EQUIPMENT ERECTION (STATIC)

SL. NO	ACTIVITY	CONTRACTOR	EIL		
			CAT A	CAT B	CAT C
6.	**PACKED EQUIPMENTS**				
	1. Before Installation				
	a. Identify the material, check thickness, dimensions, no. and angle of fingers of packing rings	WC	S	--	--
	2. During Installation				
	a. Degreasing and cleaning of packing material	WC	S	--	--
	b. Check packing support plate	WC	S	--	--
	c. Check for stacked or dumped packing as per specifications	WC	S	--	--
	d. Check for nesting	WC	S	--	--
	e. Check that packing's are touching bed limiter	WC	S	--	--
	INSPECTION & TEST DOCUMENTS				
	Review Test and Inspection Documents	WC	Rw	Rw	Rw

NOTE **:** 1) For Incoming material Inspection please refer ITP no: 6-82-1010

CAT A: Process columns & Reactors (including internals), Mounded Bullets, ODC's or any special type of equipment (Project specific)

CAT B: Vessels & exchangers above 5 T, Hoppers /bins, Incinerators, combustion chamber, Boilers and all other equipments not covered in "Cat A" and "Cat C"

CAT C Filters, Demister, Seal pots, All vessels/exchangers Up to 5T

ITP NO: 2160

EQUIPMENT ERECTION ROTARY

SL. NO.	ACTIVITY	CONTRACTOR*	EIL		
			CAT A	CAT B	CAT C
1.	**PRE – ERECTION ACTIVITIES**				
	a. Review of foundation acceptance report	WC	HP	Rw	Rw
	b. Material Supply				
	- Owner's supply including templates, if any	WC	Rw	Rw	--
	- Contractor's supply & check testing, if any	WC	Note-1	Note-1	Note-1
	c. Readiness for erection				
	i. Level of foundation (shims/packing with markings to be prepared & kept ready)	WC	W	--	--
	ii. Marking/Centre line of foundation & equipment	WC	W	--	--
	iii. No./dia./length of anchor bolts, depth of pockets, verticality of pockets	WC	W	--	--
	iv. Chipping, roughing & cleaning of pockets/top of foundation	WC	HP	W	Rw
	v. Acceptance of grouting materials as per specifications/ Manufacturer's recommendations	WC	HP	Rw	Rw
2.	**LIFTING TACKLES**				
	a. Certificate from competent authority	WC	Rw	--	--
	b. Load test of Cranes/Lifting beams/slings/ shackles/ Wire ropes, etc. for weight of equipments to be handled	WC	Rw	--	--
3.	**VISUAL INSPECTION OF EQPT. TAG/IDENTIFICATION NO.**				
	a. For any damage	WC	S	--	--
	b. Free shaft rotation	WC	S	--	--
4.	Drilling & Tapping, holes in the base plate of eqpt. (if reqd.)	WC	S	--	--
5.	Approval of Rigging procedure	WC	HP	Rw	Rw

* Inspection by Vendor/Manufacturer for all critical equipments

ITP NO: 2160

EQUIPMENT ERECTION ROTARY

SL. NO.	ACTIVITY	CONTRACTOR*	EIL		
			CAT A	CAT B	CAT C
6.	**DURING ERECTION**				
	a. Level/elevation of base frame	WC	S	--	--
	b. Checking of foundation bolts (for location, threading, greasing, etc.)	WC	S	--	--
	c. Checking orientation of equipment	WC	S	--	--
	d. Placement of Crane(s), if applicable	WC	S	--	--
	e. Elevation/level of equipment and placement of shims/packings as per AFC drawings	WC	S	--	--
	f. Distance between couplings	WC	S	--	--
	g. Rough alignment of equipment	WC	S	--	--
	h. Availability of Vendor's engineer at site (For critical equipments)	WC	S	--	--
	i. Cleaning of pockets/ grouting of foundation bolts' pockets/base frame	WC	W	--	--
	j. Erection of auxiliary equipment/ Accessories	WC	S	--	--
	k. Final alignment of equipment	WC	S	--	--
	- Without piping	WC	W	W	--
	- With piping (After tightening the flange bolts)	WC	HP	W	--
	1. All protection & safety guards installation	WC	S	--	--

ITP NO: 2160

EQUIPMENT ERECTION ROTARY

SL. NO.	ACTIVITY	CONTRACTOR*	EIL		
			CAT A	CAT B	CAT C
7.	**POST ERECTION ACTIVITIES**				
	a. Curing of grout	WC	S	--	--
	b. Auxiliary connections to be mounted on equipments as per drawing	WC	S	--	--
	c. Final tightening of bolts	WC	S	--	--
	d. Chemical cleaning of equipment parts/ connected piping	WC	S	--	--
	e. Boxing up of equipment & connected piping	WC	S	--	--
	f. Log book maintenance (For rotating of shaft and any other activity to be performed as per vendor's recommendations)	WC	S	--	--
	g. No load run of motors	WC	W	W	Rw
	h. Re-coupling of motor & reconfirmation of alignment	WC	HP	W	Rw
	INSPECTION & TEST DOCUMENTS				
	Review Test and Inspection Documents	WC	S	--	--

* Inspection by Vendor/Manufacturer for all critical equipments

NOTE : 1) For Incoming material Inspection please refer ITP no: 6-82-1010

CAT A: Compressors, Pumps (ratings>15 KW), Turbines & Diesel Engines, Rotary Driers or Any special type of equipment (Project specific)

CAT B: All types of pumps excluding category A & C, Fans & Blowers Conveyors & Material handling Equipment

CAT C: Metering & Dosing Pumps, etc.

ITP NO: 2170

INSTALLATION/ERECTION & TESTING OF CRANES (EOT/HOT)

SL.	ACTIVITY		EIL		
			CAT A	CAT B	CAT C
1.	BEFORE ERECTION				
	a. Execution scheme of equipment foundation	WC	Rw		
	b. Materials supply	WC	Note-1	Note-1	Note-1
	c. Readiness for erection	WC	W	--	--
	i. Structural steel girder span centre to centre & elevation difference	WC	W	--	--
	ii. Check centre to centre distance of rails, gaps, elevations, crab wheels distances	WC	W	--	--
	iii. Check buffer stops	WC	W	--	--
2	a. Erection and assembly of components like LT, Crane Girders, Crab, Platforms, etc.	WC	S	--	--
	b. Review of hoist ropes and assembly of hook blocks	WC	S	--	--
3.	a. Electrical installation, testing & no load test of motors	WC	S	--	--
	b. Coupling of motors to drivers	WC	S	--	--
4	NO LOAD TEST				
	a. Winding & unwinding test	WC	W	--	--
	b. Traversing test	WC	W	--	--
	c. Traveling test	WC	W	--	--
5.	LOAD TEST				
	a. Winding & unwinding test	WC	HP	W	Rw
	b. Traversing test	WC	HP	W	Rw
	c. Traveling test	WC	HP	W	Rw
	d. Load & over load testing	WC	HP	W	Rw
	e. Deflection of girder	WC	HP	W	Rw
	INSPECTION & TEST DOCUMENTS				
	Review Test and Inspection Documents	WC	Rw	Rw	Rw

NOTE : 1) For Incoming material Inspection please refer ITP no: 6-82-1010

CAT A: Special purpose M/C viz. Pot tending M/c
CAT B: All EOT cranes with capacity 10T and above
CATC : All EOT /HOT cranes with capacity below 10T

ITP NO: 2180
STORAGE TANKS

SL. NO.	ACTIVITY	CONTRACTOR	EIL	
			CAT A	CAT B
A.	**PRIOR TO FABRICATION**			
1.	Review Acceptance Report of the tanks foundation	WC	HP	Rw
2.	Incoming Material	WC	Note-1	Note-1
3.	Welding Filler Material Approval / Qualification	WC*	Rw	Rw
	a) Review of Manufacturer's Test Certificate/Documents			
	b) Laboratory testing, if any			
	i) Carbon Steel	WC	W	--
	ii) Alloy Steel/Stainless Steel	WC	W	--
	iii) Low Temperature Services	WC	W	--
4.	WPS/PQR			
	a) Review of proposed procedure	WC	Rw	Rw
	b) Testing			
	i) Carbon Steel	WC	Rw	Rw
	ii) Alloy Steel/Stainless Steel	WC	W	W
	c) Approval of Final WPS/PQR	WC	W	W
5.	a) Welder performance Qualification Test	WC	W	W
	b) Certification & approval of welders	WC	W	W
6.	NDT Procedure Qualification			
	i) Review of proposed procedure	WC	Rw	Rw
	ii) Witnessing of the proposed procedure testing	WC	W	W
	iii) Approval of Qualified Procedure	WC	HP	HP
7.	Review of Joint numbering in drawings	WC	Rw	Rw
8.	Review fabrication, erection, testing Procedures for job	WC	Rw	Rw
B.	**FABRICATION/ERECTION BOTTOM**			
1.	Blast cleaning & painting of underside of bottom plates	WC	HP	S

* *Notwithstanding any other tests/documentation required for qualification/approval of filler metals :*

iii) For Alloy Steel & Stainless Steel welding filler metals, chemical analysis to be carried out for every batch.

iv) For Low Temperature application, and for material class wherever impact requirement is specified in WSC, Impact testing to be carried out for every batch of the filler metal, to be witnessed by PMC/Owner.

v) *For NACE filler metals, corrosion tests like HIC, SSCC, etc. to be carried out for every batch. However, HIC/SSCC tests done earlier & duly witnessed by a reputed third party, will be acceptable.*

ITP NO: 2180
STORAGE TANKS

SL. NO	ACTIVITY	CONTRACTOR	EIL	
			CAT A	CATB
2.	Plate lay out, overlap and fit up	WC	S	--
3.	Sequence of welding	WC	S	--
4.	Size and positioning of backing plate for annular plates	WC	S	--
5.	Baking of electrodes	WC	S	--
6.	Inter-pass cleaning	WC	S	--
7.	Visual check of welding	WC	W	S
8.	PT/MT/NDT of annular plate butt welds and bottom plate butt welds (As applicable)	WC	W	S
9.	Vacuum box test for bottom plate welding	WC	W	S
	SHELL			
1.	Shell course alignments and fit-up of vertical and circumferential joints before welding	WC	W	S
2.	a) Check Shell diameter, circularity, perpendicularity, straight edge before welding.	WC	W	S
	b) Check Shell diameter, circularity, perpendicularity straight edge after welding,	WC	W	S
3	Visual check of welding and Back chipping	WC	S	-
4.	Inner side welding visual check	WC	S	-
5.	Location, size, alignment and fit-up of nozzles & other openings	WC	W	S
6.	R.F. Pads fit-up/welding	WC	S	-
7	PWHT of shell, RF pads, Nozzles, manholes, etc. (As applicable)	WC	S	S
8.	Radiography marking (for Random radiography only)	WC	W	W
9.	Curb angle and Wind girders fit-up/welding	WC	S	Rw

ITP NO: 2180
STORAGE TANKS

SL. NO	ACTIVITY	CONTRACTOR	EIL	
			CAT A	CATB
10.	PT/MT of nozzles, wind girders and other attachments (as applicable).	WC	W	S
11.	RF pads pneumatic test	WC	W	W
12.	Shell to bottom fit up	WC	W	S
13.	Shell to bottom I/S welding root run visual/Oil chalk test	WC	W	S
14.	Shell to bottom O/S welding visual and PT	WC	W	S
15.	Fabrication and erection of stair ways	WC	S	--
16.	Cleats welding for insulation	WC	S	--
17.	Review of radiographs interpreted by the contractors	WC	HP	Rw
	FIXED ROOF			
1.	Blast cleaning and painting Roof Structure, underside of Roof plates	WC	W	S
2.	Location and Welding of Roof supports	WC	S	--
3.	Alignment and welding of Roof structures	WC	S	--
4.	Plate layout, overlap and fit-up	WC	S	--
5.	Visual check of roof welds	WC	S	--
6.	Location, size and alignment of roof nozzles, man-holes vents, etc.	WC	W	S
7.	PWHT (as applicable)			
	i) Procedure Review	WC	Rw	Rw
	ii) PWHT cycle monitoring	WC	W	--
	iii) Time-Temp Chart Review	WC	W	Rw
8.	RF pads fit-up & Welding	WC	S	--
9.	RF pad pneumatic testing	WC	W	S
10.	PT/MT of Nozzles, vents & other attachments	WC	W	S
11.	Welding of Roof plate with shell/ curb angle	WC	S	--

ITP NO: 2180
STORAGE TANKS

SL. NO	ACTIVITY	CONTRACTOR	EIL	
			CAT A	CATB
	FLOATING ROOF			
1.	Temporary staging spacing and levels	WC	S	--
2.	Plate layout, overlap, fit-up/welding	WC	S	--
3.	Availability of approved calculations for design of buoys	WC	Rw	--
4.	Buoys fabrications	WC	S	--
5.	Vacuum testing of roof-plate welds	WC	W	--
6.	Location of sleeve supports	WC	S	--
7.	Pad plate welding with roof and sleeve support	WC	S	--
8.	Fixing and welding of Buoys	WC	S	--
9.	Initial – lift	WC	S	--
10.	Supports fixing through sleeves	WC	S	--
11.	Seal welding of support sleeves from beneath after dewatering	WC	S	--
12.	Air test of Buoys Pontoon welding	WC	S	--
13.	Location, fixing and welding of man holes, drains etc.	WC	W	--
14.	Shell to pontoon clearance	WC	HP	--
15.	Seal fixing	WC	HP	--
16.	Floating Roof Testing, as required e.g. flooding etc.	WC	HP	--

ITP NO: 2180

STORAGE TANKS

SL. NO	ACTIVITY	CONTRACTOR	EIL	
			CAT A	CATB
C.	**TESTING**			
1.	Correctness of testing arrangements especially size of blind flanges/vents/drains/ temporary piping	WC	S	--
2.	Mechanical / Inspection clearances	WC	HP	HP
3.	Earthing of ladder & shell	WC	W	W
4.	Settlement readings during water filling	WC	W	Rw
5.	Hammer test	WC	W	W
6.	Air pressure test	WC	W	W
7.	Vacuum test	WC	W	W
8.	Roof collapsibility test in case of floating roof tanks	WC	W	W
9.	Calibration of tanks from Statutory authorities	WC	Rw	Rw
	INSPECTION & TEST DOCUMENTS			
	Review Test and Inspection Documents	WC	Rw	Rw

NOTE:
1) For Incoming material Inspection please refer ITP No: 6-82-1010
2) For Painting works, please refer ITP No. 2190
3) For Insulation, please refer ITP No. 2200

CAT A: All Site fabricated steel storage tanks for process fluid /Hydrocarbon, floating roof, tanks having capacity600cum or 10m dia and 8 m height.

CAT B: Site fabricated steel storage tanks for Raw water, Fire water, waste water, DM water, etc. and all tanks not covered under "CAT A"

ITP NO: 2190
PAINTING WORKS

SL. NO.	ACTIVITY	CONTRACTOR	EIL
			CAT B
A.	BEFORE FABRICATION		
1.	a) Approved supplier, product and supplier's materials test certificate	WC	Note 1
	b) Check manufacturing date, expiry period and shelf life	WC	Note 1
2.	a) Physical condition of materials; original manufacturers packing/ containers	WC	Note 1
	b) Confirm identification/ Transfer of identification of materials before painting	WC	Note 1
3.	a) Adequacy of blasting machine capacity for blast cleaning	WC	--
	b) Type and quality of abrasive being used for blast cleaning	WC	--
	c) Adequacy of Airless spray equipment, air spray equipment and paint brushes	WC	--
4.	Performance test of paint applicator and blast cleaning operator	WC	S
5.	Check quality of dry air for blast cleaning and spray application	WC	--
6.	Inspection of blast cleaning operation		
	- Inspect for surface cleanliness by visual stds. of ISO 8501	WC	--
	- Measurement of surface profile by Micrometer/Elkometer/Stylus instrument	WC	--
7.	Wet film thickness and over coating interval for each coat of paint during application	WC	--
8.	Dry film thickness after final coat	WC	S
9.	Inspection of final curing/ drying, adhesion, hardness, surface finish, sagging, hiding and pinhole detection	WC	--
10.	Painting identification band/ code, etc.	WC	--
11.	Acceptance prior to shifting to fabrication shop, if applicable	WC	Rw

CAT B: All works
Note: 1) For Incoming material Inspection please refer ITP no: 6-82-1010

ITP NO: **2190**
PAINTING WORKS

SL. NO.	ACTIVITY	CONTRACTOR	EIL
			CAT B
B.	AFTER INSTALLATION		
1.	a) Approved supplier product : Suppliers materials test certificate	WC	Note 1
	b) Manufacturing date, expiry period and shelf life	WC	Note 1
2.	Physical condition of materials: original manufacturers packing/ containers	WC	Note 1
3.	Confirm completion of		
	c) Hydrostatic testing of piping	WC	--
	d) Mechanical clearance of structure & equipment's	WC	--
4.	a) Adequacy of surface preparation tools and tackles	WC	--
	b) Check the quality of surface preparation	WC	--
5.	a) Performance test for paint applicator for spray application	WC	Rw
	b) Adequacy of airless spray equipment and air spray equipment and paint brushes and quality of dry air for paint application	WC	--
6.	Wet film thickness and over coating interval for each coat of application	WC	--
7.	Dry film thickness after final coat	WC	S
8.	Identification of colour bands, direction marking	WC	--
9.	Identification of colour bands, direction marking	WC	--
10.	Final Acceptance	WC	W
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Documents	WC	Rw

CAT B: All works
Note :1) For Incoming material Inspection please refer ITP no: 6-82-1010

ITP NO: **2200**
INSULATION WORKS

SL.	ACTIVITY	CONTRACTOR	EIL
			CATB
1.	**PRIOR TO APPLICATION OF INSULATION**		
	a. Material Test certificates from supplier of insulation material and acceptance thereof	WC	Note 1
	b. Check testing, if required	WC	Note 1
2.	**DURING APPLICATION OF INSULATION**		
	a. Surface preparation	WC	--
	b. Fixing of spacer rings and checking their spacing	WC	--
	c. Fixing of support rings and checking their spacing in case of vertical piping	WC	--
	d. Fixing of insulation lugs and angle rings in case of vessels, tanks, etc	WC	--
	e. Thickness of insulation	WC	--
	f. Aluminum foil for S.S. Piping/Vessels	WC	--
	g. Overlap of cladding at vertical and horizontal joints	WC	--
	h. Expansion joints, if any	WC	--
	i. Inspection windows	WC	--
	j. S.S. foil for S.S. piping	WC	--
	k. Final finish	WC	W
3.	**ADDITIONAL CHECKS FOR COLD INSULATION**		
	a. Wooden supports	WC	--
	b. Vapour barrier	WC	--
	c. Vapour sealant	WC	--
	d. Insulation coat	WC	--
	Review Test and Inspection Documents	WC	Rw

Note 1) For Incoming material Inspection please refer ITP no: 6-82-1010

CAT B: All works

FORMAT NO: M-01
(Sheet 1 of 4)

CHECKLIST FOR MECHANICAL CLEARANCE – A/G PIPING

Project : _____	Report No : _____
Plant/Unit : _____	Date : _____
Contractor : _____	Area : _____
Loop No : _____	INCH MTR : _____

Line No (Isometric No.)	Rev.	GAD No.	Rev.	P&ID No.	Rev.

	Items to be checked		Compliance Status	Accepted by	
			OK/NA/PL (Note-1)	Contractor	EIL
1.	**Installation checked as per Isometric w.r.t.** CONFIGURATION : Route, plumb, elevation, Clearance for thermal expansion/ insulation BRANCH : Location, angle, orientation, type, RF pad, etc. STEAM TRAP : Direction				
2.	**Installation checked as per GAD w.r.t.** CONFIGURATION : Route, clearance for thermal expansion/insulation				
3.	Installation checked as per P&ID				
4.	Isometrics completed for **(enclosed)**:				
	a. Joint Numbering (Shop & Field Welds)				
	b. Spool Numbering				
	c. As-built routing & dimensions				
5.	**Valves**(Check Rating, Gaskets, Flow Direction, Sheet No., Tag No., Spindle direction, CSO LO/LC, Damage, etc)	Nos			
	Gate Valves				
	Globe Valves				
	Check Valves				
	Control Valves Tag Nos.:				
	Safety Valves Tag Nos.:				
	Any other valves :				
6.	**Strainers** : Check for clearance, flow direction, elements				

Note-1: OK – Accepted, NA-Not applicable, PL – Punch listed

FORMAT NO: M-01
(Sheet 2 of 4)
CHECKLIST FOR MECHANICAL CLEARANCE – A/G PIPING

	Item to check	Compliance Status	Accepted by	
		OK/NA/PL (Note-1)	Contractor	EIL
7.	**Flanged Joints**			
	Total Nos.			
	Check for type of flange			
	Check for Rating			
	Identification of Flange joints not subjected to hydro test in the Test Pack			
	Check for Alignment, (proper gap & parallelity)			
	Check for Correct Studs & nuts – dia., length, Material, uniform protrusion of studs, anti seize compound			
	Check for correct gasket (type, size, spec., thickness, etc.)			
	Torque values used for tightening			
8.	Seal Welding of Screwed Connections (if Required)			
9.	Vents/Drains as per Dwg and Provision of additional high point Vents and/or low point Drains, if reqd.			
10.	Reinforcement pads as per piping class			
11.	**Orifice Flanges :**			
	Check for Tag No., tapping orientation, tap valve, jack screw, straight run length of upstream & downstream			
12.	**Local Gauges :** Check for accessibility			
13.	Slope (When Applicable)			
14.	**Supports**			
	a) Guides, Cross Guides, Trunnion, etc.			
	i) Check for correct type, material & dimension			
	ii) Check welding			
	iii) Check for vent hole on pads (if applicable)			
	iv) Check offset for thermal expansion			
	v) Check clearance of guide			
	vi) Check U bolt for slide support			
	b) Spring Support			
	i) Verify tag no. and check details as per data sheet/spring set			
	ii) Check for locking arrangement and any damage during transit, etc.			
	vi) Check for completeness of installation as per drg. including welding of mounting cleat/ bracket			
	iv) Check for locking during installation and pressure test			
	c) Bracket Support & Inserts with Anchor Fasteners :			
	i) Check for members dimensions and materials			
	ii) Check for welding			
	iii) Check for bolting			
	iv) Check for appearance/ damage			

Note-1: OK – Accepted, NA-Not applicable, PL – Punch listed

FORMAT NO: M-01
(Sheet 3 of 4)
CHECKLIST FOR MECHANICAL CLEARANCE – A/G PIPING

	Item to check	Compliance Status	Accepted by	
		OK/NA/PL (Note-1)	Contractor	EIL
15.	**Vents/ Drains :**			
	- As per drg.			
	- Orientation of valve handles			
	- Clearance for hose			
	- Requirement of additional vents/ drains (highest/lowest pt.)			
16.	**Earthings :**			
	a) Check for location			
	b) Check for dimension of lug welding			
17.	**Joists History sheets enclosed for :**			
17.1	Material Traceability as per Procedure No:_____ (refer enclosed suggested Format)			
17.2	Fit ups checked			
17.3	NDT Complete (Radiography, MT, PT, UT, PAUT)			
17.4	Stress Relieving & Hardness check complete			
17.5	Positive Material Identification **(PMI)**			
	Checked for Removal/Blinding-off of:			
	a. Control, Safety and Check Valves			
	b. In-Line Instruments			
	c. Rupture Discs			
	d. Equipment Nozzles			
	e. Others			
18.	Supports and Weld/Flanged/Screwed connections free from			
	insulation or other coverage`			
19.	Checked Installation of (Indicate Location in Drawings)			
	a. Temporary Blinds/Spades			
	b. Temporary Strainers			
	c. Temporary Dummy-Spools			
	d. Temporary Gaskets			
	e. Others			
20.	**Expansion Bellows -**			
	a) Checks prior to installations			
	- Physical damages			
	- Transit locks are intact			
	- Dimensions as per drgs.			
	b) Check during installation			
	- Parallelity of mating flanges			
	- Face to face dimension of mating flanges			
	- Concentricity of mating flanges			
	- No stress on expansion bellows			
	- Record			

Note-1: OK – Accepted, NA-Not applicable, PL – Punch listed

FORMAT NO: M-01

(Sheet 4 of 4)

CHECKLIST FOR MECHANICAL CLEARANCE – A/G PIPING

	Item to check	Compliance Status	Accepted by	
		OK/NA/PL (Note-1)	Contractor	EIL
	c) Isolation during pressure tests			
	- Bellow mfg. recommendations on isolation of bellow during pr. Test to be followed			
	- If recommended expn. Bellow to be dropped during pr. Test.			
21.	Cleanliness Internally and Externally			
22.	Rotating Equipment Final Alignment Checked with piping			
23.	Removal of unwanted construction supports			
24.	Instrument tapings provided as per Drawing			
25.	**Physical-Walk-Through – The – Line,** checked for gross irregularities including physical damages, unwanted tacks, arc strikes, spatters and space for thermal expansion.			
Other :				
Remarks				
Reviewed by Contractor (minimum one level higher than checker)				
Contractor				
Sign :				
Name :	Designation :			
Date :				
EIL				
Sign :				
Date :				
Name :	Designation :			

Note-1: OK – Accepted, NA-Not applicable, PL – Punch listed

FORMAT NO: M-02

HYDROTEST PACK PUNCH LIST

Project : _____	Report No : _____
Plan : _____	Date : _____
Contractor : _____	Area : _____
Loop No : _____	REF P & ID No. : _____

Description : _____

Ref Document : _____

Punch Item No.	Priority	Description of Punch Items	Location	Prepared By	Action By	Due date	Completion Acceptance

Priority: 1. Needed for pressure test, 2. Needed for Pre-Commissioning, 3. Needed for Commissioning 4. Needed for startup, 5. Needed for plant acceptance

Contractor :	**EIL** :
Sign :	Sign :
Date :	Date :
Name : Designation :	Name : Designation :

FORMAT NO: M-03

RELEASE FOR HYDRO TEST– A/G PIPING

Project : _____	Report No : _____
Plan : _____	Date : _____
Contractor : _____	Area : _____
Loop No : _____	REF P & ID No. : _____
	INCH MTR : _____
	From _____ To _____

	Line No. (s)		Isometric No. (s)	P&ID No. (s)	

Test Medium :		Test Duration :	Design/Test Pressure :
Test Pressure Gauge No.	Range	Calibration Certificate No.:	Gauge Calibration Date:

Items to check		Accept	Witness	
		Contractor	EIL	
	Field Installation Checklist Prior to Hydrotest Signed			
	Punch list Prepared	☐	☐	
	Pre – Hydrotest Punch items Cleared			
	Accessibility to Inspection/Witness Locations			
	Capacity of pressurizing pump checked			
	Cordon off area for high pressure testing, as required			
	Pre-Hydrotest flushing carried out			
	IBR/Others test Witnessing Required Yes No			
System Released for Pressure Testing :				

Contractor :	**EIL:**
Sign : Name :	Sign : Name :
Date :	Date :
Designation :	Designation:

FORMAT NO: M-04

PIPING HYDROTEST RECORD – A/G PIPING

ACTIVITY	Date	Time
Water Filling and Venting started at		
Water Filling Completed		
Vents Closed		
Isolation of Pressurizing pump		
Test completed at :		
- Water drained		
- Air drying done		
- Temp Blinds Removed		
- Checked for reinstallation of a. Control & Safety vales b. On line Instruments c. Rupture disks d. Others		
- Cold setting of spring supports carried out		
- **Test Result**	Acceptable	Not Acceptable

Contractor :	**EIL** :
Sign :	Sign:
Date :	Date:
Name : Designation	Name: Designation:

FORMAT NO: M-05

AUTHORISATION FOR MODIFICATION OF PIPING JOINTS

Indicative format for Authorizing/Recording of Modification of Piping Joints after Mechanical clearance /NDT Clearance/ Hydro Testing /Pneumatic Testing of pressure Test Packages/Loops in piping jobs.			
Job No. :	Unit No.:	Report No:	Date:
Owner/Client : PMC : Contractor :		Pressure Test Package No.: System Name/No. : Previous Hydrotest Date :	
Drawing No	:		
Line No.	:		
Joint Nos. to be modified (attach sketch)	:		
Size & type of joint	:		
New Joint Nos.	:		
Deleted Joint Nos.	:		
Modification Joint Nos.	:		
Reason for Modification	:		

A) Proposed checks/NDT / Testing after Modification

1. Fit up and Traceability.:	☐				
2. PMI Checks :	☐	Mark '√' in box as necessary			
3. MPI Test :	☐	PT (root/final) :	☐	RT :	☐
4. PWHT/Hardness : Required. :	☐	Not Required. :	☐		
5. Hydrotesting:	☐	Pneumatic Test :	☐		

Authorized Signatory (note-1)

Name	
Signature	
Date	

B) Proposal Accepted by EIL (note-2)

	Area Co-ordinator	Welding/ NDT Incharge
Name		
Signature		
Date		

Clearance/Acceptance after modifications (All Supporting Documents enclosed)

Mechanical clearance: Contractor Mech.	☐	Signature.	EIL Mech.	☐ Signature.
NDT Clearance : Contractor QA/QC.	☐	Signature.	EIL Welding/NDT	☐ Signature.
Testing Acceptance : Contractor Mech.	☐	Signature.	EIL Mech.	☐ Signature.

Final acceptance after Modification

	Contractor	EIL
Name		
Signature		
Date		

Note: 1. Authorized signatory (*): RCM/ Site In charge of execution agency

2. RCM/SIC of EIL may seek opinion of Engineering, prior to acceptance of proposal from LSTK Contractor as necessary.

FORMAT NO: M-06

Checklist for Erection of Static Equipment

(4 pages)

S. No.	Description	Status (OK / Not OK)	Contractor / TPI	EIL / Client	Remarks
1	**Shifting of Equipment (within site)**				
1.1	Equipment inspected at stores for damages (if any), Arrange for rectification at site/stores, including initiation of insurance claim process (if required).				
1.2	Detailed packing list checked & all loose items identified at stores/site.				
1.3	Special lifting tools & tackles (Spreader bar, lifting beams, shackles etc) if any supplied by Manufacturer/Licensor/Package vendor are identified and shifted to site.				
1.4	Manoeuvring plan identified and Checked by the TPI/Erection contractor for shifting the equipment from the store/ owner point to the designated erection area, including removal of site hindrances for safe movement of the equipment.				
1.5	ODC permits taken from all concerned (if applicable).				
1.6	Adequate height in saddle arrangement provided to carry out installation of Brackets/Insulation etc., at site (If applicable).				
2	**Safety/Training**				
2.1	Tool box talk (TBT) done.				
2.2	TBT conducted for shifting of equipment from one place to designated location.				
2.3	TBT conducted to the rigging team before erection of the equipment.				
2.4	Adequate ventilation are provided in the confined space (If applicable)				
2.5	Lower Explosive Limit (LEL) checked in the confined space before erection of the equipment (If applicable)				
2.6	High Tension (HT) line passing nearby erection area are within the safe distance limit (If applicable)				
2.7	Safe Access for removal of the sling after erection of the equipment checked.				
2.8	Health check of Man basket done before the erection of the equipment.				
2.9	Fitness Certificate availability for Rigging Team & Crane operator checked.				
2.10	Clear demarcation of risk prone area by HSE personnel & job engineer for barricading & ensuring the presence of only designated persons in the barricaded area during erection				
3	**Crain Detail Checking**				
3.1	Configuration of the crane				

S. No.	Description	Status (OK / Not OK)	Contractor / TPI	EIL / Client	Remarks
3.2	Age of the crane				
3.3	Boom length and additional arrangements if any shall be indicated				
3.4	Operating radius				
3.5	Cumulative Lifting capacity within SWL				
3.6	Clearance between the equipment and boom				
3.7	Jacks of the crane are positioned in level and safe				
3.8	Barrication done in erection area				
3.9	Adequacy of Counter weight checked and weight of counter weight is embossed/marked				
3.10	Hindrance due existing facilities like drains, Culverts, trenches, any neighbouring foundation, structures, equipments etc., are identified and hindrance are removed before erection and same shall be marked in the scheme.				
3.11	Swing of Boom & counter weight doesn't foul with existing facilities				
3.12	The load chart of the cranes				
3.13	Capacity of the lifting tackles along with all the test certificates are found in order				
3.14	Availability of valid Load Test Certificate issued from Competent Authority/TPI for Main Crane				
3.15	Availability of valid Load Test Certificate issued from Competent Authority/TPI for Trailing Crane				
3.16	Availability of valid Test Certificate from Competent Authority/TPI for Rigging tools & tackles checked				
3.17	Crane safety indications checked				
3.18	Safe Load Indicator (SLI) checked				
3.19	Wind anemometer working indications checked				
3.2	Swing warning alarm/lights working checked				
3.21	Road block permits (if any) taken				
3.22	Intimated to other contractors nearby				

S. No.	Description	Status (OK / Not OK)	Contractor / TPI	EIL / Client	Remarks
4	**Pre-Erection Activities at site**				
4.1	Ensure latest revision of Equipment drawing is available				
4.2	Ground compaction of crane & equipment placement area (Hard Stand), if applicable.				
4.3	Testing of Hard Stand, if required				
4.4	Work Permit availability before commencement of the job checked.				
4.5	Damages (if any) checked in equipment nozzle, instrument connection, saddles, structural clips etc. (after shifting to site).				
4.6	Damages (if any) checked on foundation bolt and greasing done.				
4.7	Centre line marking on equipment and foundation for checking verticality. If marking is under Insulation transfer marking outside insulation on equipment				
4.8	Ground compaction of crane & equipment placement area. Hard Stand, if applicable.				
4.9	Level/Elevation, Orientation of the foundation checked				
4.10	Correctness of no. & size of foundation bolts checked				
4.11	Check the size of opening is sufficient enough taking into account all projection of nozzles if equipment to be inserted through opening				
4.12	Hole dia. and no. of holes in case / structure of equipment columns checked				
4.13	Equipment base bolt holes matching with actual foundation bolt layout checked				
4.14	Thread of bolts & nuts checked				
4.15	Check any damages observed in the pre fixed internals like grid, Internal distributor, distributors etc.,				
4.16	Cleaning of Sleeves before erection checked				
4.17	Chipping & roughening of foundation checked				
4.18	Shims, levelling plates, wedges, sliding base plates installation checked				
4.19	Platform brackets installation checked				

S. No.	Description	Status (OK / Not OK)	Contractor / TPI	EIL / Client	Remarks
4.20	Insulation done before the erection of the equipment				
4.21	Before erection of the equipment, equipment spring support installation at prescribed elevation checked as per the applicable drawings				
4.22	Touch up paint done as per the applicable painting spec and job specification				
5	**Erection Scheme**				
5.1	All details required in the rigging Scheme & procedure provided by agency/contractor				
5.2	Erection Scheme & Rigging procedure submitted by agency/contractor are approved				
5.3	Wire rope slings checked				
5.4	Spreader beam checked				
5.5	D Shackles checked				
5.6	Hook Blocks checked				
5.7	Orientation, length and size of lifting trunions checked for fouling of slings with any nozzle while lifting				
5.8	Equipment orientation w.r.t equipment GAD and piping GAD are matched				
6	**After Erection**				
a	Post erection the Temporary saddles used for equipment shifting and templates are shifted to designated location as per instruction of engineer in charge				
b	Tightening of bolts and providing washers checked				
c	Levelling and alignment of equipments checked				
d	Final tightening of bolts checked				
e	Sub assemblies and Commissioning spares etc., received along with equipment (if any) returned to store/owner				
f	Insulation rings checked and found in order				
g	Sub assemblies are installed & Commissioning spares returned to store/owner				
h	Erection of Davit, Checking welding of Sliding Link (if applicable)				
i	Welding of washers checked (if applicable)				
j	Check removal of temporary support of equipment both internal & external				

सामान्य कार्यों
(ईपीसीसी/एलएसटीके संविदाओं)
के लिए
निरीक्षण एवं परीक्षण योजना (आईटीपी)

INSPECTION & TEST PLAN (ITP) FOR GENERAL WORKS (EPCC/LSTK CONTRACTS)

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	29.03.2024	REVISED AND REISSUED	DK	AC	RKS	MN
3	14.01.2019	REVISED AND REISSUED	SKG	AP	AKK	RKT
2	19.02.2016	REVISED AND REISSUED	DJ	AKM	TKS	SC
1	04.07.2011	REVISED AND REISSUED	SM	SM	MKG	DM
0	14.07.2006	ISSUED AS STANDARD SPECIFICATION	AS	MPJ	VNP	VJN

Abbreviations:

AFC	:	Approved For Construction
CF	:	Ceramic Fibre
PMC	:	Project Management Consultant
SS	:	Stainless Steel like A312 TP 304, 316, 321, 304L, 316L, 316Mo, etc.

Construction Standards Committee

Convenor: Sh. R K Singh, ED (Construction)

Members:
Sh. D S N Murthy, GGM (Projects)
Sh. Chinmoy Kapuria, CGM (SCM)
Sh. Udayan Chakravarty, CGM (Piping)
Sh. Abhijit Chakraborty, GM (Construction)
Sh. Pankaj Kumar Rai, DGM (Construction)
Sh. Dhananjay, AGM (Construction)

CONTENTS

GENERAL NOTE

The enclosed ITPs shall be followed for the works to be performed by the contractor. The provisions indicated for stage wise inspection by EIL/Owner (For specific activities), may be modified in line with EIL scope of services as per the contract between EIL and Owner. Activities for which ITP's are not provided in this specification, contractor to develop and get the same approved by EIL/Owner before start of the work. In general, role of EIL has been specified in the document. The role of owner to be specified during preparation of site specific ITPs.

Contractor to submit job procedures for the jobs for which ITP's are attached & job specific reporting formats with the aid of enclosed sample reporting formats to EIL/Owner for approval, before commencement of the activity. If the contractor has to deviate from the given ITP for a valid reason, he shall obtain prior written approval of EIL/Owner. Contractor to carry out 100% examination of all activities.

LEGEND

HP : **Hold Point ;**

A point which requires witnessing/inspection/verification and acceptance by Owner/EIL before any further processing is permitted.
The Contractor shall not process the activity/item beyond a Hold Point without written approval by Owner/EIL except where prior written permission for further processing is available.

W : **Witness Point ;**

An activity which requires witnessing/inspection/verification by Owner/EIL when the activity is performed.
After proper notification has been provided (notification modalities and period shall be finalized before hand), the Contractor is not obliged to hold further processing if Owner/EIL is not available to witness the activity or does not provide comments before the date notified. In such cases, basis of acceptance shall be review of Contractor generated report/document as per relevant technical specification.

Rw : **Review** of Contractor's documentation.

S : **Surveillance** Inspection by Owner/ EIL.
Monitoring or making observations to verify whether or not material/items or services conform to specified requirements. Surveillance activities may include audit, inspections, witness of testing, Review of quality documentation & records, personnel qualifications, etc.

WC : **100%** Supervision and Examination by Contractor.

Responsibility for execution of the inspection/testing is with the Contractor; Owner/EIL only verifies examination or testing done by the Contractor at important stages

ITP NO: 2501

PAINTING WORKS

SL. NO.	ACTIVITY	CONTRACTOR	EIL
A.	**BEFORE FABRICATION**		
1.	Availability of Valid calibration certificates of instruments/ testing equipment's	WC	RW
2.	a) Approved supplier, product and supplier's materials test certificate	WC	Note 1
	b) Check manufacturing date, expiry period and shelf life	WC	Note 1
3.	a) Physical condition of materials; original manufacturers packing/ containers	WC	Note 1
	b) Confirm identification/ Transfer of identification of materials before painting	WC	Note 1
4.	a) Adequacy of blasting machine capacity for blast cleaning	WC	--
	b) Type and quality of abrasive being used for blast cleaning	WC	--
	c) Adequacy of Airless spray equipment, air spray equipment and paint brushes	WC	--
	d) Performance test for paint applicator for spray application and blast cleaning operator	WC	--
5.	Check quality of dry air for blast cleaning and spray application	WC	--
6.	Inspection of blast cleaning operation		
	- Inspect for surface cleanliness by visual stds. of ISO 8501	WC	--
	- Measurement of surface profile by Micrometer/Elkometer/Stylus instrument	WC	--
7.	Wet film thickness (including primer) and over coating interval for each coat of paint during application	WC	--
8.	Dry film thickness after final coat (wherever applicable)	WC	S
9.	Inspection of final curing/ drying, adhesion, hardness, surface finish, sagging, hiding and pinhole detection	WC	--
10.	Painting identification band/ code, etc.	WC	--
11.	Acceptance prior to shifting to fabrication shop, if applicable	WC	Rw

Note: 1) For incoming material inspection please refer ITP no: 6-82-1010.

ITP NO: 2501

PAINTING WORKS

SL. NO.	ACTIVITY	CONTRACTOR	EIL
B.	**AFTER INSTALLATION**		
1.	a) Approved supplier product : Suppliers materials test certificate	WC	Note 1
	b) Manufacturing date, expiry period and shelf life	WC	Note 1
2.	Physical condition of materials; original manufacturers packing/ containers	WC	Note 1
3.	Confirm completion of		
	a) Hydrostatic testing of piping	WC	--
	b) Mechanical clearance of structure &equipment's	WC	--
4.	a) Adequacy of surface preparation tools and tackles	WC	--
	b) Check the quality of surface preparation	WC	S
5.	a) Performance test for paint applicator for spray application	WC	--
	b) Adequacy of airless spray equipment and air spray equipment and paint brushes and quality of dry air for paint application	WC	--
6.	Repairing / Touchup of shop applied paint, if required	WC	--
6.	Wet film thickness and over coating interval for each coat of application	WC	--
7.	Dry film thickness after final coat	WC	S
8.	Identification of color bands, direction marking	WC	--
9.	Review Test and Inspection Documents	WC	Rw
10.	Final Acceptance	WC	HP

Note: 1) For incoming material inspection please refer ITP no: 6-82-1010.

ITP NO: 2505

INSULATION WORKS

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	**PRIOR TO APPLICATION OF INSULATION**		
	a. Material Test certificates from supplier of insulation material and acceptance thereof	WC	Note 1
	b. Check testing, if required	WC	Note 1
2.	**DURING APPLICATION OF INSULATION**		
	a. Surface preparation (Dryness, paint etc.)	WC	S
	b. Fixing of spacer rings and checking their spacing	WC	--
	c. Fixing of support rings and checking their spacing in case of vertical piping	WC	--
	d. Fixing of insulation lugs and angle rings in case of vessels, tanks, etc.	WC	--
	e. Thickness of insulation	WC	--
	f. Aluminum foil for S.S. Piping/Vessels	WC	--
	g. Overlap of cladding at vertical and horizontal joints	WC	--
	h. Expansion joints, if any	WC	--
	i. Inspection windows	WC	--
	j. S.S. foil for S.S. piping	WC	--
	k. Final finish	WC	W
3.	**ADDITIONAL CHECKS FOR COLD INSULATION**		
	a. Wooden supports	WC	--
	b. Vapour barrier	WC	--
	c. Vapour sealant	WC	--
	d. Insulation coat	WC	--
	Review Test and Inspection Documents	WC	Rw
4.	Final Acceptance	WC	HP

Note: 1) For incoming material inspection please refer ITP no: 6-82-1010.

ITP NO: 2510

REFRACTORY LINING

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1	**PRIOR TO START OF LINING**		
	i) Material Test certificates from suppliers	WC	Note 1
	ii) Field tests and tests from approved laboratories, if applicable	WC	Note 1
	iii) Availability of Refractory specialist at site (Contactor's/ Vendor's)	WC	HP
	iv) Mockup applicable for castable lining	WC	S
2	**DURING LINING**		
	A) INSULATING FIRE BRICKS		
	i. Clearance for completion of structural works including cleats/ lugs/ anchors/ hooks, etc.	WC	--
	ii. Cleanliness of the surfaces to be lined	WC	--
	iii. Insulating layer application, wherever applicable	WC	--
	iv. Metal foil application, wherever applicable	WC	--
	v. Checking of bricks for their soundness (squareness, cracks and for any other damages)	WC	--
	vi. Mix proportion	WC	S
	vii. Laying of bricks as per specifications	WC	S
	viii. Line and verticality	WC	S
	ix. Identifying location of expansion joints	WC	S
	x. Filling expansion joints, wherever applicable	WC	S
	xi. Finishing works	WC	S

ITP NO: 2510

REFRACTORY LINING

SL. NO	ACTIVITY	CONTRACTOR	EIL
	B) INSULATING CASTABLE CONCRETE		
	i. Clearance for completion of structural steel work including cleats/ support lugs/ anchors/hooks, etc.	WC	S
	ii. Cleanliness of the surface to be lined	WC	S
	iii. Insulating layer application, wherever applicable	WC	--
	iv. Metal foil application, wherever applicable	WC	--
	v. Fixing of wire mesh	WC	--
	vi. Fixing of shuttering/ scaffolding and providing pockets for pouring mortar	WC	--
	vii. Mix proportion	WC	
	viii. Identifying location of expansion joints	WC	--
	ix. Ramming of mortar for achieving uniform density	WC	--
	x. Filling expansion joints, wherever applicable	WC	--
	xi. Wetting of previous layer prior to casting the Construction joints	WC	--
	xii. Pointing	WC	--
	xiii. Curing	WC	--
3	Review Test and Inspection Documents	WC	Rw
4	Final Acceptance	WC	HP

Note: 1) For incoming material inspection please refer ITP no: 6-82-1010.
2) Surveillance/witness may be increased in case of boilers, heaters, etc.as per specific requirements given in the specifications.

ITP NO: 2515

CERAMIC FIBRE LINING

SL. NO	ACTIVITY	CONTRACTOR	EIL
1	**PRIOR TO START OF LINING**		
	i. Material Test certificates from suppliers	WC	Note 1
	ii. Field tests and tests from approved laboratories, if applicable	WC	Note 1
	iii. Availability of Refractory specialist at site (Contactor's/ Vendor's/PMCs)	WC	HP
2	**DURING LINING**		
	i. Clearance for completion of structural works including welding of cleats/ lugs/ anchors/hooks, etc.	WC	S
	ii. Cleanliness of surfaces to be lined	WC	--
	iii. Laying of Ceramic fibre blanket layer wise (As per AFC drawings)	WC	--
	iv. Provision of cups locks/ arrangement for CF lining holding	WC	--
	v. Identifying location of expansion joints	WC	S
	vi. Filling expansion joints as per specifications/ AFC drawings	WC	--
	vii. Finishing works	WC	S
3	Review Test and Inspection Documents	WC	Rw
4	Final Acceptance	WC	HP

Note: 1) For incoming material inspection please refer ITP no: 6-82-1010.

Format No.: G-01
FIELDPAINITNG PRIMER/FINISH PAINT FOR STRUCUTRAL STEEL

PROJECT :				FORMAT NO :
Name of Work :				REPORT NO :
FOA No :				
Drawing :				DATE :
Surface Preparation Method :-	Type of Primer/Finish Paint/Shade :-	Application Method :		Humidity :
Surface Preparation Standard :-		Paint Manufacturer :	Temperature :	
Blasting Type:-	Batch No:	BT Certificate No :	Dew point :	
(Shot & Grit/Copper Slag/Sand)	Base :	Shelf Life :	Weather Condition	
B.T Certificate No of Shot & Grit:-	Hardness :			
	Calib. Certificate No: 1) Profile :-			
DRAWING NO :		GRID NO :		ELEVATION :

Sl. No.	Particulars/Item/Mark No	DESCRIPTION	MEASUREMENT				Coating Layer	Actual D.F.T. (In Micron)		Acceptance			Remarks
			L (mm)	B (mm)	THK (mm)	NOS		Required	Actual	Acc/Rej	Contractor	EIL	
1													
2													
3													
4													
5													

CONTRACTOR	EIL
Signature :	
Name :	
Date :	

Format no: G-02
FIELD PAINTING PRIMER/FINISH PAINT OF EQUIPMENT

PROJECT :								FORMAT NO :	
Name of Work :								REPORT NO :	
FOA No :									
Drawing :	JOB No :							DATE :	
Surface Preparation Method :-		Type of Primer/Finish Paint/Shade :-						Application Method :	
Surface Preparation Standard :-								Paint Manufacturer :	
Blasting Type:-		Batch No:						BT Certificate No :	
(Shot & Grit/Copper Slag/Sand)		Base :						Shelf Life :	
B.T Certificate No of Shot & Grit:-		Hard :							
Calib. Certificate No: 1) Profile :-					2) DFT Meter :-				
EQUIPMENT NO:								DESIGN TEMP :	
Primer :-1st Coat				Finish Paint: 1st Coat				Finish Paint: 2nd Coat	
Humidity :				Humidity :				Humidity :	
Temperature :				Temperature :				Temperature :	
Dew point :				Dew point :				Dew point :	
Weather Condition :				Weather Condition :				Weather Condition :	
Type of Paint	DFT	Acceptance		Type of Paint	DFT	Acceptance		Type of Paint	DFT
		Contractor	EIL			Contractor	EIL		
Contractor								EIL	
Signature :								Signature :	
Name :								Name :	
Date :								Date :	

Format no: G -03, FIELD PAINITNG PRIMER/FINISH PAINT (PIPING)

Drawing No.		Location	
Specification No.		Report No.	
Procedure		Dated	

Job Description :

Daily weather record :

Time	Relative Humidity	Ambient temperature	Surface temperature	Dew point temperature	Weather condition

Surface preparation

a) Method

	Blasting		Power tool		Hand clean		Solvent		Emery cloth		Other	

b) Blasting details

	Abrasive		Sand		Grit		Shot		Certificate No.

c) Surface standard

	ISO 8501-1/SIS-05 5900/SSPC-SP		Others		Profile Micron		Result : Accepted /Rejected

Painting material and application method : Painting System - Temp. Range -

	Material brand	Manufacturer	Certificate No.	Batch No.	Shelf life upto	Shade/ Colour	Application
Base							
Hardener							
Primer (1st coat)							
(2nd coat)							
Paint (1st coat)							
(2nd coat)							

Painting Inspection Record :

Item	Area/Joint		Coating Layer	Wet Film Thickness		Dry Film Thickness		Completion of hydrostatic testing	Visual Inspection	Acceptance
	From	To		Measurements 1,2,3...	Minimum Reqd.	Measurements 1,2,3...	Minimum Reqd.			
			Primer							
			1st coat (intr)							
			2nd coat (intr)							
			Finish							
			1st coat							
			2nd coat							

Identification colour band & direction marker : Accepted/ Not Accepted

NOTE: All blasting and coating materials shall be approved by EIL/Owner. All measuring and testing equipment's shall have valid calibration certificate and shall adhere to relevant specifications.

Format no: G -04, INSPECTION REPORT FOR INSULATION WORK – EQUIPMENT

PROJECT :		FORMAT NO :	
Name of Work :		REPORT NO :	
FOA No :			
Drawing :		DATE :	
DRAWING NO :		REV.	
GRID NO :	ZONE	ELEVATION	
SURFACE PREPARATION (Dryness, paint etc.):-	Accepted /Not accepted	VISUAL INSPECTION :-	Accepted /Not accepted

SL NO	ACTIVITY & ITEM NO	Visual Inspection	SURFACE AREA INSULATED			REMARK
			FROM	TO	SURFACE AREA (SQM)	
1	Lagging of Insulation Materials					
	Thickness of Insulation					
	Moisture barrier, if applicable					
	Heat Tracer Putty application, if applicable					
2	Sheeting / Cladding work					
3	Miscellaneous					
	a) Inspection window					
	b) Valve boxes					
	c) Flange covers					
	d) Expansion joints					
	e) SS Foil for SS Piping					
4	For COLD INSULATION					
	a) Wooden support	ACCEPTED / NOT ACCEPTED				
	b) Vapour barrier	ACCEPTED / NOT ACCEPTED				
	c) Vapoursealant	ACCEPTED / NOT ACCEPTED				
	d) Insul. Coat	ACCEPTED / NOT ACCEPTED				

HOT INSULATION (Visual & position of seam to prevent water penetration)	ACCEPTED / NOT ACCEPTED
COLD INSULATION (Visual & Sealing)	ACCEPTED / NOT ACCEPTED
FINAL FINISH	ACCEPTED / NOT ACCEPTED

	Contractor	EIL
Signature :		
Name :		
Date :		

Format no: G - 05

INSPECTION REPORT FOR INSULATION WORK - PIPING

PROJECT :		FORMAT NO :	
Name of Work :		REPORT NO :	
FOA No :			
Drawing :		DATE :	
SURFACE PREPARATION (Dryness, paint etc.):- Accepted /Not accepted		VISUAL INSPECTION :- Accepted /Not accepted	

SR. NO.	LINE NO.	DIA	R.Mtr.	OP. TEMP	INSULATION		SPACER RING			MOISTURE BARRIER		HEAT TRACER PUTTY APPLICATION			FIXING OF ALUMINIUM SHEET			REMARKS
					TYP	THK	QTY	Cont.	EIL	CONT.	EIL	QTY	CONT.	EIL	QTY	CONT.	EIL	

REMARKS:

	CONTRACTOR	EIL
Signature		
Name		
Date		

फील्ड इंस्ट्रूमेंटेशन कार्यों (ईपीसीसी/एकमुश्त टर्नकी संविदाओं) के लिए निरीक्षण एवं परीक्षण योजना (आईटीपी)

INSPECTION & TEST PLAN (ITP) FOR FIELD INSTRUMENTATION WORKS (EPCC/LSTK CONTRACTS)

Rev. No	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	18.09.2023	REVISED AND REISSUED	DJ	DS	RKS	SM
3	27.07.2018	REVISED AND REISSUED	SKG	AP	AKK	RKT
2	19.02.2016	REVISED AND REISSUED	DJ	AKM	TKS	SC
1	04.07.2011	REVISED AND REISSUED	SM	SM	MKG	DM
0	24.08.2006	ISSUED AS STANDARD SPECIFICATION	AS	MPJ	VNP	VJN

Abbreviations:

A/G	:	Above Ground
AS	:	Alloy Steel i.e. Cr-Mo steels like A335 Gr P11, P5, P9, P22, etc.
CS	:	Carbon Steel
CSO	:	Car Seal Open
DCS	:	Distributed Control System
DPT	:	Dye Penetration Testing
FTB	:	Field Terminal Block
GAD	:	General Arrangement Drawings
HIC	:	Hydrogen Induced Cracking
ITP	:	Inspection & Test Plan
JB	:	Junction Box
LCP	:	Local Control Panel
LO/ LC	:	Lock Open/ Lock Close
MPI	:	Magnetic Particle Inspection
MT	:	Magnetic Particle Testing
NACE	:	National Association of Corrosion Engineers
NDT	:	Non Destructive Testing
NRV	:	Non Return Valve
P&ID	:	Piping & Instrumentation Diagrams
PLC	:	Programmable Logic Controller
PMI	:	Positive Material Identification
PMS	:	Piping Material Specification
PQR	:	Procedure Qualification Record
PT	:	Penetrant Testing
PVC	:	Poly Vinyl Chloride
PWHT	:	Post Weld Heat Treatment
QA/QC	:	Quality Assurance/ Quality Control
RF	:	Reinforcement
SS	:	Stainless Steel like A312 TP 304, 316, 321, 304L, 316L, 316Mo, etc.
SSCC	:	Sulphide Stress Corrosion Cracking
WPS	:	Welding Procedure Specification

Construction Standards Committee

Convenor: Sh. Rupesh Kumar Singh , ED (Construction)

Members:
Sh. Janak Kishore, ED (Projects),
Sh. Chinmoy Kapuria, CGM (SCM),
Sh. Udayan Chakravarty, Sr. GM (Piping),
Sh. Debasish Ghosal, GM (Construction),
Sh. Pankaj Kumar Rai, DGM (Construction),

CONTENTS

GENERAL NOTE

The enclosed ITPs shall be followed for the works to be performed by the contractor. The provisions indicated for stage wise inspection by EIL/Owner (For specific activities), may be modified in line with EIL scope of services as per the contract between EIL and Owner. Activities for which ITP's are not provided in this specification, contractor to develop and get the same approved by EIL/Owner before start of the work. In general, role of EIL has been specified in the document. The role of owner to be specified during preparation of site specific ITPs.

Contractor to submit job procedures for the jobs for which ITP's are attached & job specific reporting formats with the aid of enclosed sample reporting formats to EIL/Owner for approval, before commencement of the activity. If the contractor has to deviate from the given ITP for a valid reason, he shall obtain prior written approval of EIL/Owner. Contractor to carry out 100% examination of all activities.

LEGEND

HP : **Hold Point ;**

A point which requires witnessing/inspection/verification and acceptance by Owner/EIL before any further processing is permitted.
The Contractor shall not process the activity/item beyond a Hold Point without written approval by Owner/EIL except where prior written permission for further processing is available.

W : **Witness Point;**

An activity which requires witnessing/inspection/verification by Owner/EIL when the activity is performed.
After proper notification has been provided (notification modalities and period shall be finalized before hand), the Contractor is not obliged to hold further processing if Owner/EIL is not available to witness the activity or does not provide comments before the date notified. In such cases, basis of acceptance shall be review of Contractor generated report/document as per relevant technical specification.

Rw : **Review** of Contractor's documentation.

S : **Surveillance** Inspection by Owner/ EIL.
Monitoring or making observations to verify whether or not material/items or services conform to specified requirements. Surveillance activities may include audit, inspections, witness of testing. Review of quality documentation & records.

WC : **100%** Supervision and Examination by Contractor.

Responsibility for execution of the inspection/testing is with the Contractor; Owner/EIL only verifies examination or testing done by the Contractor at important stages

ITP NO: 2603

CALIBRATION OF INSTRUMENTS

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	Availability of approved standard calibrated testing equipment having test certificates from approved lab and validity of calibration.	WC	HP
2.	Dust free environment	WC	S
3.	Availability of approved data sheets, calibration procedures, standards, vendor's manuals	WC	Rw
4.	Usage of appropriate tools and tackles	WC	S
5.	Mounting of instruments, instrument tag & model	WC	S
6.	Checking of instrument ranges, supply & output for proper connections	WC	S
7.	Calibration of local gauges	WC	Rw
8.	Calibration of electronic instruments	WC	S
9.	Calibration/ stroke checking of Control Valves	WC	S
10.	Calibration of safety valves, shut down valves and trip switches or transmitters	WC	S
11.	Calibration of special level instruments i.e. Radar type/ float type instruments	WC	S
12.	Calibration of Gas Detector/ Hydrogen Detector/ Flame Detector etc. with valid calibration gas	WC	S
13.	Ensuring procedure & record	WC	Rw
14.	Plugging of spare entries	WC	S
15.	Stamping of calibration date on instruments	WC	S
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection documents	WC	Rw

ITP NO: 2604

ERECTION OF DUCT SUPPORT AND CABLE DUCTS

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	Incoming material Inspection	WC	Note 1
2.	Use of approved consumables	WC	S
3.	Correctness of dimensions and thickness of duct	WC	S
4.	Welding as per standards/ specifications	WC	S
5.	Installation & alignment of support as per structural drawings and documents	WC	S
6.	Painting of cable duct and support	WC	S, Note 2
7.	Grinding of sharp edges before erection	WC	–
8.	Alignment of cable duct	WC	S
9.	Covering of duct after completion of cable laying/ dressing	WC	S
10.	Fire Proofing of cable duct (as applicable)	WC	S
11.	Usage of appropriate clamp & fasteners	WC	S
12.	Installation of guide supports	WC	S
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Document	WC	Rw

Note : 1) For incoming material inspection please refer ITP no: 6-82-1010.
2) For cleaning & painting, please refer ITP No. 2501 (Standard no 6-82-2500)

ITP NO: 2605

FABRICATION, ERECTION OF CABLE TRAYS, ANGLE TRAYS FOR CABLE AND TUBE LAYING.

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	Incoming material Inspection	WC	Note 1
2.	Correct size and routing of tray/ angle	WC	S
3.	Ensure separation of cable trays for power & signal/ Thermocouple cables	WC	S
4.	Supports as per standards/ specifications	WC	S
5.	Removal of sharp edges and sharp bends	WC	--
6.	Fastening/ welding of trays/ angles	WC	S
7.	Fire Proofing of cable duct (as applicable)	WC	S
8.	Check for fouling with piping & structures	WC	S
9.	Check for any obstruction/ free access for maintenance	WC	S
10.	Painting of trays/angle and support	WC	S, Note 2
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Document	WC	Rw

Note :1) For incoming material inspection please refer ITP no: 6-82-1010.
2) For cleaning & painting, please refer ITP No. 2501 (Standard no 6-82-2500)

ITP NO: 2606

FABRICATION, INSTALLATION OF INSTRUMENT SUPPORT/ STANCHIONS, PANEL SUPPORTS, CANOPIES, JB SUPPORTS

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	Incoming material Inspection	WC	Note 1
2.	Availability of approved junction box layout and Instrument location plan	WC	Rw
3.	Location of Junction Box & Instrument Stanchions (As per installation standards)	WC	S
4.	Correctness of dimensions, height, etc.	WC	S
5.	Approved welder, consumables, standards	WC	Rw
6.	Check for installation of support as per standard	WC	S
7.	Removal of sharp edges	WC	--
8.	Painting	WC	S, Note 2
9.	Easy access from O&M point of view	WC	S
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Document	WC	Rw

Note : 1) For incoming material inspection please refer ITP no: 6-82-1010.
2) For cleaning & painting, please refer ITP No. 2501(Standard no 6-82-2500)

ITP NO: 2607

INSTALLATION OF FIELD INSTRUMENTS

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	Availability of approved location plans, piping GADs, P&ID, vendor's manual, etc.	WC	Rw
2.	Installation of proper support/ instrument stanchion, canopy	WC	S
3.	Instrument tag as per P&ID and model & make as per instrument data sheet	WC	S
4.	Alignment of the instruments	WC	S
5.	Mounting of accessories as per instrument data sheet	WC	S
6.	Visibility & maintenance clearance	WC	S
7.	Installation of canopy	WC	S
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Document	WC	Rw

ITP NO: 2608

INSTALLATION OF IMPULSE TUBING

SL. NO.	ACTIVITY	CONTRACTOR	EIL		
			CAT A	CAT B	CAT C
1.	Availability of approved Installation Standards, BOM, PMS & Procedure	WC	-	Rw	Rw
2.	Direction of flow, tapping orientation, standard , piping/tubing materials	WC	W	S	S
3.	Upstream & downstream straight runs	WC	S	S	S
4.	Removal of burrs & sharp edges on tube bends	WC	-	-	-
5.	Smooth bends/ free draining	WC	S	-	-
6.	Ferrule punching	WC	S	S	S
7.	Supports as per standards/ specifications	WC	S	S	S
8.	Direction of valves/ valve manifolds	WC	S	S	S
9.	Usage of approved sealant, etc	WC	Rw	Rw	-
10.	Hydrostatic/ pneumatic testing	WC	W	S	Rw
	INSPECTION & TEST DOCUMENTS				
	Review Test and Inspection Document	WC	Rw		

CAT A: All services involving hydrogen and hydrogen containing fluids, All impulse piping for 600# rating & above All SS, AS, NACE, LTCS impulse piping

CAT B: All CS impulse piping for process lines below 600 # rating

CAT C: Piping for "D" class fluid (Utility lines other than steam lines), Non IBR portion of condensate & steam lines

ITP NO: 2609

CABLE LAYING, GLANDING AND TERMINATION

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	Incoming Material Inspection for Cables, Glands etc.	WC	Note 1
2.	Correctness of cable type as per schedule	WC	S
3.	Measurement & routing	WC	--
4.	Check cable for continuity, insulation resistance, megger values	WC	Rw
5.	Identification tags/ tag plates and proper dressing & clamping	WC	S
6.	Separation of signal/ thermocouple and power cables	WC	S
7.	Proper glands as per area classification, size of cable, JB entry, etc.	WC	S
8.	Identification/ ferrule and dressing inside junction boxes and instrument	WC	S
9.	Crimpable type lugs and proper crimping	WC	--
10.	Telephone wire connection inside JB	WC	--
11.	Shield wire dressing/ sleeving and termination	WC	--
12.	Insulation of shield wire on instrument end	WC	--
13.	Preparation of drum cutting plan	WC	--
14.	Ensure bending radius of cable is maintained	WC	S
15.	Ensure spare cores are terminated with identification	WC	S
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Document	WC	Rw

Note: 1) For incoming material inspection please refer ITP no: 6-82-1010.

ITP NO: **2610**

INSTALLATION OF JUNCTION BOXES, LOCAL CONTROL PANEL

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	Incoming Material Inspection	WC	Note 1
2.	Check suitability as per specified hazardous area classification	WC	Rw
3.	Check Correctness of cable entries	WC	--
4.	Alignment	WC	--
5.	Tightening of fasteners	WC	--
6.	Tightening & numbering of terminal blocks	WC	Rw
7.	Availability of telephone sockets (for JB's) & earthing point	WC	--
8.	Earthing of JB/ LCP	WC	S
9.	Plugging of spare entries with correct plugs	WC	S
10.	Wiring of various hardware in LCP as per approved wiring drawings	WC	S
11.	Protection of JB and LCP (Canopy, weather shed)	WC	S
12	Easy access from O&M point of view	WC	S
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Document	WC	Rw

Note : 1) For incoming material inspection please refer ITP no: 6-82-1010.

ITP NO: 2611

FABRICATION & ERECTION OF AIR LINES AND TUBING OF PNEUMATIC LINES

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	Incoming Material Inspection	WC	Note 1
2.	Availability of AFC drawings for air / pneumatic distribution line	WC	Rw
3.	Proper packing material/ sealant used at threaded joints	WC	--
4.	Providing three piece union at each loop for easy maintenance	WC	--
5.	Slope of Air Lines, provision of drain valves at lowest point on main header / Drain & Vent assemblies, isolation valves (Ball valves)	WC	S
6.	Tightening of joints	WC	--
7.	Ensure separate cable tray for erection of pneumatic tubing	WC	S
8.	Supporting and clamping	WC	S
9.	Test air lines as per standards/ specifications and record	WC	S
10.	Check for inlet, outlet, signal, test and drain connection on the instrument	WC	S
11.	Correct supply as per data sheets	WC	--
12.	Flush Air lines before pneumatic tubing connection to instruments	WC	S
13.	Punching of ferrules	WC	--
14.	Tagging at both ends of tubes	WC	S
15.	Test pneumatic tubing as per standards/ specifications and record	WC	S
16.	Tubing as per vendor hook up drawing	WC	S
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Document	WC	Rw

Note : 1) For incoming material inspection please refer ITP no: 6-82-1010.

ITP NO: 2612

INSTALLATION OF FLOAT TYPE LEVEL SWITCHES LEVEL GAUGES AND TANK LEVEL INDICATORS

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	Incoming Material Inspection	WC	Note 1
2.	Check Tapings provided at vessels/stand pipes are matching with centre to centre distance on respective instruments & connection size ratings are matching with instruments.	WC	--
3.	Check tapings provided at vessels/stand pipes are matching with process requirements/P&IDs	WC	--
4.	Deployment of approved welders, usage of approved consumables & procedures, pipes & pipe fittings as per PMS	WC	--
5.	Alignment of flanges, visibility of gauges and orientation of instrument	WC	S
6.	Verticality of the instrument	WC	S
7.	Installation of float, displacer, instrument accessories as per data sheet/vendor's instruction manuals	WC	S
8.	QA/QC clearance for welding & testing	WC	W
9.	Tightness of guide wires (as applicable) for Tank Level indicators	WC	-
10.	Usage of correct size, rating & type of gasket and stud/ nuts as per PMS	WC	S
11.	Tightness of studs/ nuts	WC	S
12.	Check for requirements of Steam Tracing/ Insulation as per Process requirements	WC	Rw
13.	Check for type of Illuminators for Transparent Type Level Gauges suitable to area Classification, Cable Glanding, Termination, plugging of spare entries	WC	S
14.	Final inspection	WC	W
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Documents	WC	Rw

Note :1) For incoming material inspection please refer ITP no: 6-82-1010.

ITP NO: 2613

INSTALLATION OF TEST THERMOWELLS, TEMPERATURE GAUGES AND TEMPERATURE ELEMENTS

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	Incoming Material Inspection	WC	Note-1
2.	Correctness of range, rating, immersion length (U length), Instrument tags as per P&ID/ Instrument data sheets	WC	Note-1
3.	Check for flange size, orientation, location as per P&ID	WC	S
4.	Usage of correct size, rating & type of gasket and stud/ nuts as per PMS	WC	S
5.	Installation of temperature element head & assemblies	WC	S
6.	Tightness of studs/ nuts	WC	-
7.	Visibility & orientation of gauges	WC	--
8.	Plugging of spare entries with correct size plugs	WC	S
9.	Check for tapping height from top of pipe as per U-length	WC	S
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Documents	WC	Rw

Note : 1) For incoming material inspection please refer ITP no: 6-82-1010.

ITP NO: 2614

LOOP CHECKING

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	Completeness of installation as per standards & specifications, completeness of FAT punch points (if any)	WC	Rw
2.	Liquidation of punch list as per ITP	WC	Rw
3.	Availability of standard calibrated equipment	WC	Rw
4.	Coordination with DCS vendor	WC	S
5.	Loop checking		
	a) From instrument to junction box	WC	--
	b) From Instrument to control room	WC	S
6.	Recalibrate/ fine tune instruments for accurate response if required	WC	--
7.	Check for inter locks and response of final control elements	WC	S
8.	Ensure proper response and record	WC	Rw
9.	Loop acceptance	WC	W
10.	Usage of proper communication equipment	WC	S
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Documents	WC	Rw

ITP NO: 2615

INSTALLATION OF IMPULSE PIPING

SL. NO	ACTIVITY	CONTR-ACTOR	EIL		
			CAT A	CAT B	CAT C
A.	**PRIOR TO FABRICATION**				
1.	Incoming Material				
	a) Documents (MRIR etc.): Review & acceptance	WC	NOTE 1	NOTE 1	NOTE 1
	b) Physical verification	WC	NOTE 1	NOTE 1	NOTE 1
2.	Welding Filler Material Approval/Qualification				
	a) Review of Manufacturer's Test Certificates/Documents & Sampling	WC*	HP*	Rw*	Rw*
	b) Laboratory Testing, if any	WC	W	Rw	Rw
3.	WPS/PQR				
	a) Review of proposed procedure	WC	HP	Rw	Rw
	b) Welding of Test Coupon and subsequent testing	WC	W	Rw	Rw
	c) Approval of final WPS/PQR	WC	HP	Rw	Rw
4.	a) Welder performance Qualification	WC	W	Rw	--
	b) Certification & approval of welders	WC	HP	Rw	--
5.	NDT Procedure Qualification				
	i) Review of proposed procedure	WC	HP	Rw	--
	ii) Witnessing of Proposed Procedure Testing	WC	W	Rw	--
	iii) Approval of Qualified Procedure	WC	HP	Rw	--
6.	Review of Joint numbering Procedure, numbering in Isometrics (Big & Small bore)/ Sketches	WC	W	Rw	--
7.	Material traceability & Transfer of Heat Nos. (Material Traceability not required for utility services)	WC	W	S	--

* Notwithstanding any other tests/documentation required for qualification/approval of filler metals :

i) For Alloy Steel & Stainless Steel welding filler metals, chemical analysis to be carried out for every batch.

ii) For low temp. services piping and for material class wherever impact requirement is specified in WSC, Impact testing to be carried out for every batch of the filler metal, to be witnessed by Owner/ EIL.

For NACE filler metals, corrosion tests like HIC, SSCC, etc. to be carried out for every batch. However, HIC/SSCC tests done earlier & duly witnessed by a reputed third party, will be acceptable.

ITP NO: 2615

INSTALLATION OF IMPULSE PIPING

SL. NO.	ACTIVITY	CONTR-ACTOR	EIL		
			CAT A	CATB	CATC
B.	**FABRICATION (SHOP & FIELD)**				
1.	Material as per piping class (check w.r.t. approved colour coding procedure), Fit-up check and Traceability check	WC	S	--	--
2.	Pre-heat (if any)	WC	S	--	--
3.	Certificate of purity of purging/shielding Gas (if any)	WC	Rw	--	--
4.	Purging rate (if any) and arrangement	WC	Rw	--	--
5.	Shielding rate (if any)	WC	Rw	--	--
6.	Baking of Electrodes	WC	S	--	--
7.	Inter-pass cleaning & Temperature check	WC	S	--	--
8.	Visual Examination of completed welds	WC	W	S	--
9.	a) Monitoring of PWHT Cycle	WC	S	--	--
	b) Review of Time – Temperature graph	WC	Rw	Rw	Rw
	c) Hardness Check	WC	S	--	--
10.	PT/MT	WC	W	S	--
11.	Identification of Joints for Radiography (for Random Radiography only)	WC	Rw	--	--
12.	Review of Radiographs interpreted by the Contractor	WC	HP	W	Rw

ITP NO: 2615

INSTALLATION OF IMPULSE PIPING

SL. NO.	ACTIVITY	CONTRA-CTOR	EIL		
			CATA	CAT B	CATC
C.	**Installation**				
1	Check for tapping size, orientation, location as per P&ID	WC	**S**	**S**	S
2	Check for Meter below / above installation as per Process / P&ID requirement	WC	**S**	**S**	S
3	Check for high-low connections of DP type Instruments as per P&ID	WC	RW	RW	--
4	Check for Fit-up & flow direction of Globe Valve in line with respective Installation Standard	WC	RW	RW	--
5	Ensure NDT clearance & availability of complete LHS	WC	HP	HP	Rw
6	Ensure Impulse Piping Steam Tracing/ Electrical Tracing (as applicable)	WC	S	S	Rw
7	Hydro-testing of Impulse piping as per standards / specifications and record	WC	W	W	Rw
D.	**PROOF TESTING (See enclosed checklist as per format I-01)**				
1.	Availability of approved installation standards	WC	Rw	Rw	Rw
2.	Procedure Review	WC	HP	Rw	Rw
3.	Preparation of Punch list	WC	S	S	--
4.	Liquidation of check list, if applicable	WC	HP	W	--
5.	Correctness of Testing arrangements	WC	S	--	--
6.	Scrutiny of History Sheets for Mechanical & NDT Clearance	WC	HP	W	Rw
7.	Positive Material Identification as per specification after completion of installation	WC	S	Rw	--
8.	a) Availability of Valid Calibration certificates of pressure Gauges	WC	Rw	Rw	Rw
	b) Field Calibration, if any	WC	S	--	--
9.	Air/Water Flushing (preliminary)	WC	-	--	--
10.	Pressure Testing (Pneumatic/ Hydrostatic testing),Visual inspection of all weld joints for leak during Pneumatic/ Hydrostatic testing **(See Format I – 02)**	WC	HP	W	--
11.	Draining of Water & Air Drying	WC	S	--	--

ITP NO: 2615

INSTALLATION OF IMPULSE PIPING

SL. NO.	ACTIVITY	CONTRA-CTOR	EIL		
			CAT A	CATB	CATC
13.	Boxing up including reinstallation of flappers of check valves	WC	S	--	--
14.	Review of Records of fasteners & gaskets	WC	Rw	Rw	Rw
15.	Torque tightening/ tensioning of flange joints, wherever applicable	WC	S	--	--
	INSPECTION & TEST DOCUMENTS				
	Review Test and Inspection Documents	WC	Rw	Rw	Rw

Note : 1) For incoming material inspection please refer ITP no: 6-82-1010.
2) Pre-commissioning activities such as chemical cleaning, card board blasting, system testing are not covered by these ITP's. The Contractor shall develop ITP's for such activities and obtain Owner/ EIL/ Licensor's approval.

CAT A : All services involving hydrogen and hydrogen containing fluids, All piping of 600# rating & above ,All SS, AS, NACE, LTCS impulse piping

CAT B : All CS impulse piping for process lines up to 600 #

CAT C : Piping for "D" class fluid (Utility lines), Non IBR portion of condensate & steam lines.

ITP NO: 2631

INSPECTION & PANEL ERECTION - CONTROL ROOM

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	Receipt of materials/ panels as per purchase requisition, inspection release note, bill of materials, etc.	WC	Note 1
2.	Storage of materials at site	WC	S
3.	Shifting of panels into the control room without damage	WC	--
4.	Check for Hole to hole dimensions of the base frames with the as built drawings of the panels	WC	--
5.	Check alignment, fastening, welding & painting of the base frame.	WC	S
6.	Erection of panels as per approved layout drawing, after completion of all welding works	WC	S
7.	Tagging/identification of panels	WC	S
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Documents	WC	Rw

Note: 1) For incoming material inspection please refer ITP no: 6-82-1010.

ITP NO: 2632

FABRICATION & ERECTIONOF CABLE TRAYS - CONTROL ROOM

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	Availability of latest revision of approved tray layout drawings	WC	Rw
2.	Welding & painting of supports before erection of panels	WC	--
3.	Fastening and joining of cable trays	WC	--
4.	Removal of sharp edges	WC	--
5.	Covering of cable trays for unarmored and system cable trays	WC	S
6.	Separate cable trays for power and signal cables with sufficient distance apart	WC	S
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Documents	WC	Rw

ITP NO: 2633

LAYING, GLANDING & TERMINATION OF INTERCONNECTION CABLES, PREFABRICATED CABLES, SYSTEM CABLES, POWER CABLES AND FIELD CABLES – CONTROL ROOM

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	Correct size & type of cables as per cable schedule	WC	Note 1
2.	Testing of cable before laying as per specification (continuity, megger, etc.), as applicable	WC	--
3.	Check for exact distance and cables cutting accordingly	WC	--
4.	Tag on cables as per specification	WC	S
5.	Availability of proper cable gland size, type of specified thread	WC	--
6.	Tightening of check nut (after termination)	WC	--
7.	Cable continuity & insulation resistance, as applicable	WC	Rw
8.	Dressing of cables inside PVC Duct and covering of PVC Duct after complete cabling.	WC	S
9.	Termination of shield wire with green sleev into earth bus bar	WC	S
10.	Ferruling of cables	WC	S
11.	Usage of sleeved crimpable type lugs	WC	--
12.	Crimping of lugs	WC	--
13.	Tightness of cables in the terminal block	WC	--
14.	Numbering of terminal blocks	WC	--
15.	Continuity of fuses in terminal blocks	WC	--
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Documents	WC	Rw

Note : 1) For incoming material inspection please refer ITP no: 6-82-1010.

ITP NO: 2634

POWER 'ON' OF PANELS AND PRE-COMMISSIONING OF THE SYSTEM - CONTROL ROOM

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	Check for earth pit resistance	WC	Rw
2.	Earth connection to system earth, panel earth etc.	WC	S
3.	Ensure proper interconnectivity of panel earth bus	WC	S
4.	Incoming power supply and termination of the power cables	WC	S
5.	Check for compliance of FAT Punch Points (if any)	WC	Rw
6.	Power 'ON' the system and observe system booting and self diagnostic check.	WC	W
7.	Reload the software's, if necessary	WC	S
8.	Check for alarms by switching 'ON'/'OFF' the sub systems	WC	S
9.	Start simulation of individual loops from respective 'Field Terminal Blocks' (FTBs)	WC	S
10.	Observe the response and tune the controllers	WC	S
11.	Interlocks as per P&ID	WC	S
12.	Record the input & outputs	WC	Rw
13.	Trend reports, logging reports/shift reports & alarm, sequence and functioning of all peripheral units.	WC	Rw
14.	Back-up operation of PLC cards, system memory & power supply switch over	WC	W
15.	Lighting and ventilation fan operation	WC	S
16.	Functioning of complex loops	WC	W
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Documents	WC	Rw

ITP NO: 2635

FOR FIELD LOOP CHECKING AND 'SYSTEM ACCEPTANCE TEST' - CONTROL ROOM

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	Coordination with field contractor for loop checking.	WC	S
2.	Operation of sub systems and peripheral systems	WC	S
3.	'Back-up' system operations	WC	S
4.	Ensure feedback/commands from/to electrical system	WC	S
5.	System acceptance	WC	HP
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Documents	WC	Rw

FORMAT NO: I -01
(Sheet 1 of 4)

CHECKLIST FOR MECHANICAL CLEARANCE - IMPULSE PIPING

Project : _____	Report No : _____
Plant/Unit : _____	Date : _____
Contractor : _____	Area : _____
Instrument Tag No.: _____	Installation Standard No. : _____

Line No (Isometric No.)	Rev.	GAD No.	Rev.	P&ID No.	Rev.

	Items to be checked		Accept Contractor	Remarks
1.	**Installation checked as per Installation Standard**			
2.	Installation checked as per P&ID			
3.	Installation completed for **(enclosed)**			
	a. Joint Numbering (Shop & Field Welds)			
4.	**Valves** (Check Rating, Gaskets, Flow Direction, Sheet No., Tag No., Damage, etc.)	Nos.		

FORMAT NO: I -01
(Sheet 2 of 4)

CHECKLIST FOR MECHANICAL CLEARANCE - IMPULSE PIPING

	Items to be checked	**Accept**	**Remarks**
		Contractor	
5.	**Flanged Joints :**		
	Total Nos.		
	Check for type of flange		
	Check for Rating		
	Check for Alignment, (proper gap & parallelity)		
	Check for Correct Studs & nuts – dia., length, Material, uniform protrusion of studs, anti seize compound		
	Check for correct gasket (type, size, spec., thickness, etc.)		
	Torque values used for tightening		
6.	Seal Welding of Screwed Connections (if Required)		
7.	Vents/Drains as per Standard		
8.	**Orifice Flanges :**		
	Check for Tag No., tapping orientation, tap valve, jack screw, straight run length of upstream & downstream		
9.	**Local Gauges :** Check for accessibility		
10.	Supports as per drg. and specifications		

FORMAT NO: I -01
(Sheet 3 of 4)

CHECKLIST FOR MECHANICAL CLEARANCE - IMPULSE PIPING

	Items to be checked	**Accept**	**Remarks**
		Contractor	
11.	**Vents/ Drains :**		
	- As per drg.		
	- Orientation of valve handles		
12.	**Joists History sheets enclosed for :**		
12.1	Material Traceability as per Procedure No:_____ (refer enclosed suggested Format)		
12.2	Fit ups checked		
12.3	NDT Complete (Radiography, MT, PT)		
12.4	Stress Relieving & Hardness check complete		
12.5	Positive Material Identification **(PMI)**		
13.	Supports and Weld/ Flanged/ Screwed connections free from insulation or other coverage		

FORMAT NO: I -01
(Sheet 4 of 4)

CHECKLIST FOR MECHANICAL CLEARANCE - IMPULSE PIPING

	Items to be checked	Accept	Remarks
		Contractor	
14.	**Physical-Walk-Through-The-Line,** checked for gross irregularities including physical damages, unwanted tacks, arc strikes, spatters		
Other :			
Remarks			
Reviewed by Contractor (one level higher than checker)			
Name :	Designation :		
Date :			
EIL			
Sign :			
Date :			
Name :	Designation :		

FORMAT NO: I -02

RECORD FOR HYDRO TEST– IMPULSE PIPING

Project : _____	Report No : _____
Plan : _____	Date : _____
Contractor : _____	Area : _____
Instrument Tag No. : _____	REF P & ID No. : _____
	Installation Standard No. : _____

Test Medium :		Test Duration :	Design/Test Pressure :
Test Pressure Gauge No.	Range	Calibration Certificate No.:	Gauge Calibration Date:

Items to check		Accept	Witness	
		Contractor	EIL	
	Field Installation Checklist Prior to Hydrotest Signed			
	Punch list Prepared	Yes ☐	No ☐	
	Pre-hydrotest punch items cleared			
	Accessibility to Inspection/Witness Locations			
	Capacity of pressurizing pump checked			
	Cordon off area for high pressure testing, as required			
	Pre-hydrotest flushing carried out			
	Statutory Authorities/Others test Witnessing Required	Yes	No	

Released for Pressure Testing :

Contractor :	**EIL:**
Sign : Name :	Sign : Name :
Date :	Date :
Designation :	Designation:

FORMAT NO: I -03

RECORD FOR HYDRO TEST– IMPULSE PIPING
INSTRUMENT TAG NO.

ACTIVITY	Date	Time
Water Filling and Venting Done		
Water Filling Completed		
Vents Closed		
Isolation of Pressurizing pump		
Test completed at :		
- Water drained		
- Test Result	☐ Acceptable ☐ Not Acceptable	

Contractor :	**EIL:**
Sign :	Sign:
Date :	Date:
Name : Designation	Name: Designation:

सिविल, सरंचना एवं वास्तुकला कार्यों (ईपीसीसी/ एकमुश्त टर्नकी संविदाओं) के लिए निरीक्षण एवं परीक्षण योजना (आईटीपी)

INSPECTION & TEST PLAN (ITP) CIVIL, STRUCTURAL & ARCHITECTURAL WORKS (EPCC/LSTK CONTRACTS)

Rev. No	Date	Purpose	Prepared by	Checked by	StandardsCommitteeConvenor	Standards Bureau Chairman
					Approved by	
4	29.08.2023	REVISED AND REISSUED	DJ	DG	RKS	SM
3	27.07.2018	REVISED AND REISSUED	SKG	AP	AKK	RKT
2	19.02.2016	REVISED AND REISSUED	DJ	AKM	TKS	SC
1	04.07.2011	REVISED AND REISSUED	SM	SM	MKG	DM
0	17.10.2005	ISSUED AS STANDARD SPECIFICATION	MPJ	SPS	VNP	VJN

Abbreviations:

AFC	:	Approved For Construction
BM	:	Bench Mark
CI	:	Cast Iron
CPT	:	Cone Penetration Test
GI	:	Galvanized Iron
IRC	:	Indian Road Congress
JB	:	Junction Box
MS	:	Mild Steel
MT	:	Magnetic Particle Testing
NDT	:	Non Destructive Testing
PCC	:	Plain Cement Concrete
PQR	:	Procedure Qualification Record
PT	:	Penetration Testing
PVC	:	Poly Vinyl Chloride
PWHT	:	Post Weld Heat Treatment
RCC	:	Reinforced Cement Concrete
RF	:	Reinforcement
SPT	:	Standard Penetration Test
U/G	:	Under Ground
WBM	:	Water Bound Macadam
WMM	:	Water Mix Macadam
WPS	:	Welding Procedure Specification

Construction Standards Committee

Convenor: Sh. Rupesh Kumar Singh , ED (Construction)

Members: Sh. Janak Kishore, ED (Projects),
Sh. Chinmoy Kapuria, CGM (SCM),
Sh. Udayan Chakravarty, Sr. GM (Piping),
Sh. Debasish Ghosal, GM (Construction),
Sh. Pankaj Kumar Rai, DGM (Construction),

CONTENTS

GENERAL NOTE

The enclosed ITPs shall be followed for the works to be performed by the contractor. The provisions indicated for stage wise inspection by EIL/Owner (For specific activities), may be modified in line with EIL scope of services as per the contract between EIL and Owner. Activities for which ITP's are not provided in this specification, contractor to develop and get the same approved by EIL/Owner before start of the work. In general, role of EIL has been specified in the document. The role of owner to be specified during preparation of site specific ITPs.

Contractor to submit job procedures for the jobs for which ITP's are attached & job specific reporting formats with the aid of enclosed sample reporting formats to EIL/Owner for approval, before commencement of the activity. If the contractor has to deviate from the given ITP for a valid reason, he shall obtain prior written approval of EIL/Owner. Contractor to carry out 100% examination of all activities.

LEGEND

HP : **Hold Point;**

A point which requires witnessing/inspection/verification and acceptance by Owner/EIL before any further processing is permitted.
The Contractor shall not process the activity/item beyond a Hold Point without written approval by Owner/EIL except where prior written permission for further processing is available.

W : **Witness Point;**

An activity which requires witnessing/inspection/verification by Owner/EIL when the activity is performed.
After proper notification has been provided (notification modalities and period shall be finalized before hand), the Contractor is not obliged to hold further processing if Owner/EIL is not available to witness the activity or does not provide comments before the date notified. In such cases, basis of acceptance shall be review of Contractor generated report/document as per relevant technical specification.

Rw : **Review** of Contractor's documentation.

S : **Surveillance** Inspection by Owner/ EIL.
Monitoring or making observations to verify whether or not material/items or services conform to specified requirements. Surveillance activities may include audit, inspections, witness of testing, Review of quality documentation & records.

WC : **100%** Supervision and Examination by Contractor.

Responsibility for execution of the inspection/testing is with the Contractor; Owner/EIL only verifies examination or testing done by the Contractor at important stages

ITP NO. : 2701

LAND & TOPOGRAPHICAL SURVEY

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	Boundary markings and submission of drgs./sketches	WC	Rw
2.	a) Availability of valid calibration certificates of instruments/ testing equipments	WC	Rw
	b) Field calibration, if any	WC	S
3.	Establishing permanent bench marks, temporary bench marks with ref. to Survey of India B.Ms. by check levels	WC	HP
4.	Block levels, contour plans and submission of relevant drgs. & records.	WC	S
5.	Protection of control points, permanent bench marks and regular rechecking	WC	S
6.	Submission of Master plan showing monuments, structures exposed rocks, weirs, water works, ponds, underground services if crossing that area, etc.	WC	Rw
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Documents	WC	Rw

ITP NO. : 2702

SOIL INVESTIGATION

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	Positioning of test location	WC	S
2.	a) Availability of valid calibration certificates of instruments/ testing equipments	WC	Rw
	b) Field calibration, if any	WC	S
3.	Boring & sampling	WC	S
4.	In-situ testing (SPT, CPT, Plate load test, Soil Resistivity, Block vibration test, etc.)	WC	S
5.	Lab testing (as applicable)	WC	S/Rw
6.	Monitoring of water level	WC	S
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Documents	WC	Rw

ITP NO. : 2703

SITE GRADING

SL. NO.	ACTIVITY	CONTRACTOR	EIL	
			CAT B	CAT C
1.	Clearing and stripping of soil including disposal of unsuitable material	WC	S	-
2.	a) Availability of valid calibration certificates of instruments/ testing equipments	WC	Rw	Rw
	b) Field calibration, if any	WC	S	-
3.	Taking and plotting of initial levels at specified intervals for cutting as well as filling areas	WC	S*	S*
4.	Classification (Levels of strata) and testing of filling soil for suitability including preparation of Lead Charts to filling/disposal areas.	WC	S	-
5.	Proper warning of explosions, misfires and storage of explosive materials (As applicable).	WC	-	--
6.	Breaking up of clods, lumps, etc. at the time of filling and compaction.	WC	S	-
7.	Identification and suitability of borrow areas for filling soil/murrum including verification of payments for royalty, etc.	WC	Rw	-
8.	Compaction test for earth filling in specified layers including finished areas.	WC	Rw	-
9.	Verification of final finished grade levels.	WC	S*	S*
10.	Computation of Earth works.	WC	Rw*	Rw*
11.	Record of tree cuttings, stacking of blasted rocks and other quarry materials including handing over to Owner	WC	S	S
12.	Preparation of "As built drawings	WC	Rw	Rw
13.	Removal of Unserviceable Surplus earth/excavated material and leveling in disposal areas.	WC	S	-
	INSPECTION & TEST DOCUMENTS			
	Review Test and Inspection Documents	WC	Rw	Rw

CAT B: All fillings
CAT C: All cuttings.

* In case quantum of earthwork is required to be certified by EIL then W.

ITP NO. : 2704

EXCAVATION

SL. NO.	ACTIVITY	CONTRACTOR	EIL		
			CAT A	CAT B	CAT C
1.	a) Availability of valid calibration certificates of instruments/ testing equipments	WC	Rw	Rw	Rw
	b) Field calibration, if any	WC	S	S	-
2.	Layout checking	WC	S	-	-
3.	Taking initial levels	WC	S	-	-
4.	Slopes of excavation, benching, overburden, shoring & strutting (in case of deep excavation)	WC	S	--	-
5.	Check for sub-soil water, dewatering requirements as per specifications.	WC	S	--	--
6.	Bottom level of excavation and compaction	WC	S	--	--
7.	Stacking of different type of soils separately	WC	S	-	-
8.	Making trial pits manually to check UG utilities before carrying out Mechanical excavation (if applicable).	WC	S	S	S
9.	List of obstacles encountered (cables, pipes, conduits, etc)	WC	S	S	-
10.	Barricading of excavated pits for safety & protection from rain	WC	S	S	S
	FOR HARD ROCK				
1	Obtaining license from district authorities for undertaking blasting operations	WC	Rw	Rw	Rw
2	Storing of explosive materials as per explosive rules	WC	--	--	--
3	Prominent display of red flags around the area to be blasted	WC	S	S	S
4	Check the dimensions of bore holes	WC	--	--	--
5	Stacking of hard rock for useable/non useable including handing over to owner	WC	S	S	S
	INSPECTION & TEST DOCUMENTS				
	Review Test and Inspection Documents	WC	Rw	Rw	Rw

CAT A : Equipment foundations, Plant buildings, Technological structure, etc.
CAT B : Non Plant buildings, pipe racks, pipe culverts, bridges, etc.
CAT C : Boundary walls, wing walls, manholes, drains, isolated non-critical foundations etc.

ITP NO. : 2705

BACK FILLING

SL. NO.	ACTIVITY	CONTRACTOR	EIL		
			CAT A	CAT B	CAT C
1.	Selection of materials/selected earth	WC	S	S	S
2.	Check for treatment of soil, if any	WC	S	S	-
3.	a) Availability of valid calibration certificates of instruments/ testing equipments	WC	Rw	Rw	Rw
	b) Field calibration, if any	WC	S	S	-
4.	Filling in specified layers, consolidating, watering.	WC	S	-	-
5.	Compaction tests for layers	WC	Rw	Rw	Rw
6.	Filling to required levels	WC	S	-	-
	INSPECTION & TEST DOCUMENTS				
	Review Test and Inspection Documents	WC	Rw	Rw	Rw

CAT A: Equipment foundations, Plant buildings, Technological structure, etc.
CAT B: Non Plant buildings, pipe racks, pipe culverts, bridges, etc.
CAT C: Boundary walls, wing walls, manholes, drains, etc

ITP NO. : 2706

UNDERGROUND PIPING (RCC/ CI/HDPE/UPVC/CPVC)

SL. NO.	ACTIVITY	CONTRACTOR	EIL	
			CAT B	CAT C
1.	Checking of material	WC	NOTE 1	NOTE 1
2.	Adequate slope, benching in excavation for safety purposes (if required)	WC	S	
3.	Layout, line & level	WC	S	-
4.	Laying & jointing, grouting at manholes/chambers	WC	S	-
5.	Check for supports/ firm bed/ sub soil water level	WC	S	-
6.	Testing for leakages by blocking pipe ends	WC	W	W
7.	Hydro-testing and other tests, Removal of blockages, Cleaning & flushing of system	WC	W	W
8.	Backfilling in layers	WC	Rw	Rw
9.	Check for MS rungs in proper position, inlet/outlet pipe levels in manholes	WC	S	--
10.	Preparation of "As-built drawings"	WC	Rw	Rw
	INSPECTION & TEST DOCUMENTS			
	Review Test and Inspection Documents	WC	Rw	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

CAT B: Main Plant Buildings, Utilities, Offsites etc.
CAT C: Non Plant Buildings, Technological Buildings, Admn. Buildings, Gate House, Security Rooms, etc.

ITP NO. : 2707 A

WBM ROADS

SL. NO.	ACTIVITY	CONTRACTOR	EIL	
			CAT B	CAT C
1.	a) Availability of valid calibration certificates of instruments/ testing equipments	WC	Rw	Rw
	b) Field calibration, if any	WC	S	-
2.	Layout checking including Road crossings and taking initial levels	WC	S	S
3.	Approval of source & checking/testing of materials (wherever required)	WC	NOTE 1	NOTE 1
4.	Filling (if any), compaction, providing cambers in sub-base including levels	WC	S	S
5.	Spreading metal to required thickness, line & levels, dry rolling including spreading of screening material	WC	-	-
6.	Check for camber, superelevation and levels over metalling	WC	S	S
7.	Spreading murrum/ sand, watering and rolling	WC	S	-
8.	Checking thickness after each layer and rectification thereof (if any)	WC	S	S
9.	Checking quantity of aggregate by excavation of trial pits as per IRC Code	WC	S	S
	INSPECTION & TEST DOCUMENTS			
	Review Test and Inspection Documents	WC	Rw	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

CAT B: Roads subjected to heavy loading, connected to main highway, main plant roads
CAT C: Balance Roads

ITP no: **2707 B**

WMM for Roads

SL. NO.	ACTIVITY	CONTRACTOR	EIL	
			CAT B	CAT C
1.	a.) Review of calibration certificates of instruments/testing equipment's.	WC	Rw	Rw
	b)Field calibration, if any.	WC	S	-
2.	Design Mix to fix the proportion of ingredients	WC	Rw/HP	Rw/HP
3.	Layout Checking including Road Crossing & taking initial levels.	WC	S	S
4.	Approval of source & checking /testing of materials (wherever required)	WC	Rw	Rw
5.	Filling (if any), compaction, providing chambers in sub-base including levels.	WC	S	-
6	Spreading metal to required thickness, line & levels, dry rolling including spreading of screening material.	WC	S	-
7	Check for camber, superelevation & levels.	WC	S	S
8	Spreading, watering & rolling.	WC	S	-
9	Checking thickness after each layer and rectification thereof (if any).	WC	S	S
	INSPECTION & TEST DOCUMENTS			
	Review Test and Inspection Documents	WC	Rw	Rw

CAT- A –Roads subjected to heavy loading connected to main High way, main plant roads etc.

CAT B- Balance roads

ITP NO. : 2708

BLACK TOPPING- PREMIX CARPETING - PC, BITUMINOUS CONCRETE (BC) & BITUMINOUS MACADAM (BM)/ DENSE BITUMINOUS MACADAM (DBM)

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	Approval of source of materials	WC	Note 1
2.	a) Availability of valid calibration certificates of instruments/ testing equipments	WC	Rw
	b) Field calibration, if any	WC	S
3.	Surface preparation & check for camber/level	WC	S
4.	Checking/ testing of material wherever required	WC	S
5.	Tack coat application	WC	-
6.	Laying of Premix carpeting/ BC/BM/DBM including rolling	WC	S
7.	Application of Seal coat	WC	-
8.	Check for camber, superelevation and levels	WC	S
9.	Check for bitumen temperature and consumption	WC	S
10.	Thickness check of Premix carpet/ BC/BM/DBM	WC	S
11.	Removal of surplus earth	WC	-
12.	Berm preparation	WC	-
13.	Final Inspection	WC	S
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Documents	WC	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

ITP NO. : 2709

TANK PADS

SL. NO.	ACTIVITY	CONTRACTOR	EIL	
			CAT A	CAT B
1.	Approval of source of materials	WC	NOTE 1	NOTE 1
2.	Stripping the area	WC	-	-
3.	a) Availability of valid calibration certificates of instruments/ testing equipments	WC	Rw	RW
	b) Field calibration, if any	WC	S	S
4.	Layout and marking of ground level	WC	S	-
5.	Excavation to required level, compaction of sub-base	WC	S	S
6.	Checking/ testing of materials	WC	S	S
7.	Filling selected materials in specified layers, rolling, watering	WC	S	-
8.	Compaction tests	WC	Rw	Rw
9.	Gravel filling under annular ring with compaction and adding graded filler material (As applicable)	WC	S	S
10.	Anti-corrosive layer, consolidation	WC	S	-
11.	Premix carpeting on side slopes	WC	S	S
12.	Preparation of "As-built drawing" for erection	WC	Rw	Rw
13.	Check for settlement of pads during hydro testing of tanks	WC	W	S
	INSPECTION & TEST DOCUMENTS			
	Review Test and Inspection Documents	WC	Rw	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

CAT A: All Site fabricated steel storage tanks for process fluid/ Hydrocarbon, floating roof, tanks having capacity 600cum or 10m dia. and 8 m height.

CAT B: Site fabricated steel storage tanks for Raw water, Fire water, waste water, DM water, etc. and all tanks not covered under "CAT A".

ITP NO. : 2710

MICRO GRADING

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	a) Availability of valid calibration certificates of instruments/ testing equipments	WC	RW
	b) Field calibration, if any	WC	-
2.	Taking initial levels	WC	S/Rw
3.	Clearing/ Removal of extra soil, debris, etc. from site by transportation	WC	-
4.	Taking final levels	WC	S
5.	Verification of gradient of ground	WC	S
6.	Finishing of ground surface by hand compactor/ Roller (As applicable)	WC	S
7.	Final inspection	WC	S
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Documents	WC	Rw

ITP NO. : 2740

FOR UNDERGROUND PIPING (CARBON STEEL)

SL. NO	ACTIVITY	CONTRACTOR	EIL	
			CAT B	CAT C
A.	**PRIOR TO FABRICATION**			
1	Incoming materials	WC	NOTE 1	NOTE 1
2.	Welding Filler Material Approval/Qualification			
	i) Review of Manufacturer's Test Certificates/ other documents	WC	RW	RW
	ii) Testing, if any	WC	Rw	Rw
3.	WPS/PQR			
	i) Review of proposed Procedure	WC	Rw	Rw
	ii) Welding of test coupon and subsequent Testing, if applicable	WC	W	W
	iii) Approval of Final WPS/PQR	WC	HP	HP
4	Certification & approval of welders	WC	Rw	Rw
5.	NDT Procedure Qualification			
	i) Review of proposed Procedure	WC	Rw	Rw
	ii) Testing	WC	Rw	Rw
	iii) Approval of NDT procedure	WC	HP	HP
6.	Preparation of sketches from General Arrangement drawings	WC	Rw	-
7.	Joint numbering	WC	Rw	-
8.	Approval of colour coding scheme	WC	Rw	-
9.	Monitoring of colour coding on pipes & fittings	WC	S	-
B.	**FABRICATION (SHOP & FIELD)**			
1.	Material as per piping class (check w.r.t. approved colour coding procedure)	WC	S	
	i) Fit-up check ii) Dimensional check	WC WC	S S	Rw Rw

NOTE : 1) For incoming material inspection please refer ITP no: -6-82-1010.

CAT B : All pressure lines, Fire Water line, Cooling Water line, etc.
CAT C : Balance Works

ITP NO. : 2740

FOR UNDERGROUND PIPING (CARBON STEEL)

SL. NO	ACTIVITY	CONTRACTOR	EIL	
			CAT B	CAT C
2.	Pre-heat (if any)	WC	S	-
3.	Check for purity of purging/shielding Gas (if any)	WC	S	-
4.	Purging (if any)	WC	S	-
5.	Shielding rate (if any)	WC	S	-
6.	Baking of Electrodes	WC	S	-
7.	Inter-pass cleaning & Temperature check.	WC	S	-
8.	Visual check of completed welds	WC	S	-
9.	PT/MT	WC	S	-
10.	Radiography marking (for Random Radiography)	WC	S	S
11.	Radiography Interpretation	WC	Rw	Rw
C.	**HYDROSTATIC/ PNEUMATIC TESTING**			
1.	Procedure Review	WC	Rw	Rw
2.	Correctness of Testing arrangements	WC	S	-
3.	Calibration of Pressure Gauges	WC	-	-
4.	R.F. Pad testing, if any	WC	S	-
5.	Scrutiny of test packs for Mechanical & NDT Clearance (Refer UG-01)	WC	HP	HP
6.	Air/Water Flushing (preliminary)	WC	S	S
6a.	Addition of corrosion inhibitors, if required – Approval of make & quality	WC	S	S

CAT B : All pressure lines, Fire Water line, Cooling Water line, etc.
CAT C : Balance Works

ITP NO. : 2740

FOR UNDERGROUND PIPING (CARBON STEEL)

SL. NO	ACTIVITY	CONTRACTOR	EIL	
			CAT B	CAT C
7.	Pneumatic/ Hydrostatic testing	WC	S	S
8.	Draining of water & Air drying	WC	S	S
D.	**LAYING**			
1.	Trench excavation and levels	WC	S	-
2.	Cleaning of pipe surface	WC	S	-
3	Approval of wrapping/coating material manufacturers	WC	Note 1	Note 1
4.	Approval of agency for wrapping & coating	WC	Rw	Rw
5.	Sample test of coating materials in approved laboratory	WC	Rw	Rw
6.	Application of primer	WC	S	S
7.	Coal tar temperature	WC	S	-
8.	Coating & wrapping	WC	S	S
9.	Approval of agency for epoxy coating/ cold tape joint/ hot jointing method	WC	Rw	Rw
10.	Check Thickness of coating (if applicable)	WC	S	-
11.	Calibration of Holiday tester	WC	Rw	Rw
12.	Holiday testing	WC	W	S
13.	Peel test	WC	S	S

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

CAT B : All pressure lines, Fire Water line, Cooling Water line, etc.
CAT C : Balance Works

ITP NO. : 2740

FOR UNDERGROUND PIPING (CARBON STEEL)

SL. NO	ACTIVITY	CONTRACTOR	EIL	
			CAT B	CAT C
14.	Lifting arrangement	WC	S	-
15.	Lowering (levels & orientation of branches)	WC	S	-
16.	Checking of wrapping & coating for damages during lowering, their repair, Holiday Testing, etc.	WC	S	S
17.	Back filling & compaction	WC	S	-
18.	Location, Brickwork, plaster of valve pit	WC	-	-
19.	Top cover & Finish of valve pit	WC	S	S
E.	**SYSTEM COMPLETION**			
1.	Tie in joints	WC	Refer 2740A	Refer 2740A
2.	Scrutiny of test packs for system testing	WC	Refer 2740B	Refer 2740B
3.	System testing	WC	W	Rw
	INSPECTION & TEST DOCUMENTS			
	Review Test and Inspection Documents	WC	Rw	Rw

CAT B : All pressure lines, Fire Water line, Cooling Water line, etc.
CAT C : Balance Works

ITP NO. : 2740A

TIE IN JOINTS FOR UNDERGROUND PIPING (CARBON STEEL)

SL. NO.	ACTIVITY	CONTRACTOR	EIL
A.	Fit up	WC	S
B.	Root Run DP	WC	S
C.	Final Run DP	WC	S
D.	Radiograph Review	WC	Rw
E.	PWHT Hardness	WC	Rw
F.	RF Pad Testing	WC	W
G.	Cleaning & Priming	WC	S
H.	Coating, Wrapping	WC	S
I.	Peel Test	WC	S
J.	Holiday Testing	WC	W
K.	Checking For Any Damage In Wrapping & Coating After Lowering, Their Repair Holiday Testing, Etc.	WC	S
L	Back Filling	WC	S

ITP NO. : 2740B

MECHANICAL COMPLETION RECORD FOR UNDERGROUND PIPING (CARBON STEEL)

SL. NO.	ACTIVITY	CONTRACTOR	EIL	
			CAT B	CAT C
1.	Clearance for flushing & testing	WC	Rw	Rw
1a.	Mechanical clearance			
	- Conformity with drawing	WC	Rw	Rw
	- Material as per Specification	WC	Rw	Rw
1b.	Welding & NDT clearance			
	- Material as per Specification	WC	Rw	Rw
	- Fit-up check record	WC	Rw	Rw
	- Visual check of completed welds	WC	Rw	-
	- PT/MT	WC	Rw	Rw
	- Radiography	WC	Rw	Rw
	- PWHT & hardness	WC	Rw	Rw
	- RF pad testing	WC	Rw	Rw
2.	Flushing & Pressure testing	WC	W	W
3.	Coating & wrapping			
	- Surface preparation	WC	Rw	-
	- Primer application	WC	Rw	Rw
	- Coating, wrapping & peel test	WC	Rw	-
	- Holiday check	WC	Rw	Rw
4.	Laying			
	- Trench leveling	WC	Rw	Rw
	- Lowering & checking for damages in wrapping & coating, their repair, Holiday testing, etc.	WC	Rw	Rw
	- Backfilling	WC	Rw	Rw

CAT B : All pressure lines, Fire Water line, Cooling Water line, etc.
CAT C : Balance works

ITP NO : 2741

PLAIN CEMENT CONCRETE

SL. NO.	ACTIVITY	CONTRACTOR	EIL	
			CAT B	CAT C
1.	a) Availability of valid calibration certificates of instruments/ testing equipments	WC	RW	RW
	b) Field calibration, if any	WC	S	Rw
2.	Checking of layout and materials, compaction of sub –grade	WC	S	-
3.	Mix proportion	WC	S	-
4.	Check for shuttering, dewatering if any.	WC	-	-
5.	Concreting with proper compaction	WC	-	-
6.	Checking of top level of PCC	WC	Rw	-
7.	Curing	WC	-	-
	INSPECTION & TEST DOCUMENTS			
	Review Test and Inspection Documents	WC	Rw	Rw

CAT B : for filled-up area
CAT C : for cutting area

ITP NO : 2742

REINFORCED CEMENT CONCRETE (SUBSTRUCTURE)

SL. NO.	ACTIVITY	CONTRACTOR	EIL		
			CAT A	CAT B	CAT C
1	Approval of source of materials	WC	HP	HP	Rw
2.	a) Availability of valid calibration certificates of instruments/ testing equipments	WC	Rw	Rw	Rw
	b) Field calibration, if any	WC	S	S	S
3.	Checking of layout & condition of PCC/ leveling course	WC	S	S	-
4.	Incoming material checking	WC	NOTE 1	NOTE 1	NOTE 1
5.	Design of mix &establishment of strength at site by trial mix	WC	HP	HP	HP
6.	Check for line & level of shuttering including its condition, quality and rigidity.	WC	S	--	-
7.	Check for sub-soil water & dewatering arrangement, if any	WC	S	--	-
8.	Reinforcement & covers to reinforcement	WC	S	S	--
9.	Inserts, Anchor bolts and pipe sleeves, pockets, dowels, etc.	WC	S	S	--
10.	Pour Card	WC	W	S	Rw
11.	Check for obstacles encountered (Electrical conduits, pipe lines, etc.)	WC	S	--	-
12.	Concreting, testing, compaction & finishing	WC	S	S	-
13.	Casting of cubes	WC	S	S	--
14.	Curing	WC	S	S	-
15.	Testing of cubes – 7 days	WC	S/Rw	S/Rw	S/Rw
16	Testing of cubes – 28 days	WC	W	S/Rw	S/Rw
17.	Removal of shuttering	WC	S	-	-
18.	Check for water tightness, rendering, if any	WC	S	S	S
19.	Preparation of As-built drawings	WC	Rw	Rw	Rw
	INSPECTION & TEST DOCUMENTS				
	Review Test and Inspection Documents	WC	Rw	Rw	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

CAT A: Critical foundations of equipments i.e. compressors, reactors, columns, stacks, foundations subjected to dynamic loading and any other foundation with RCC Quantity > 250 Cum in single pour ,etc.

CAT B: Unit Pipe racks, plant buildings and other equipment foundations not covered in category A, etc

CAT C: Non critical pipe racks (branch pipe, offsite pipe rack, etc.) non-plant buildings, pipe sleepers, manhole, catch pit and balance works.

ITP NO : 2743

REINFORCED CEMENT CONCRETE (SUPER STRUCTURE)

SL. NO.	ACTIVITY	CONTRACTOR	EIL		
			CATA	CATB	CAT C
1	Approval of source of materials	WC	HP	HP	Rw
2.	a) Availability of valid calibration certificates of instruments/ testing equipment	WC	Rw	Rw	Rw
	b) Field calibration, if any	WC	S	S	S
3.	Checking of layout	WC	S	--	-
4.	Incoming material inspection	WC	Note 1	Note 1	Note 1
5.	Design of mix &establishment of strength at site by trial mix	WC	HP	HP	HP
6.	Check for line & level of shuttering and scaffolding/ vertical bracing including hoisting arrangements.	WC	S	S	-
7.	Reinforcement & covers to reinforcement	WC	S	S	--
8.	Inserts, bolts, pipe sleeves, MS rungs, concealed electrical conduits, fan hooks, dowels, etc. including welding if any	WC	S	S	-
9.	Pockets/ openings	WC	S	S	-
10.	Expansion joints, if any	WC	S	S	-
11.	Check for water stops, slopes, stoppers, if any	WC	S	S	-
12.	Pour Card	WC	W	S	Rw
13.	Concreting, testing, compaction & finishing	WC	S	S	S
14.	Casting of cubes	WC	S	S	S
15.	Curing	WC	S	S	-
16.	Testing of cubes – 7 days	WC	S/Rw	S/Rw	S/Rw
17	Testing of Cubes – 28 days	WC	W	Rw	S/Rw
18.	Removal of formwork/ staging	WC	S	-	-
19.	Verification of dimensions viz. AFC drawings and tolerances	WC	S	S	S
20.	Check for water tightness, rendering, if any	WC	S	S	-
21.	Preparation of As built drawings.	WC	Rw	Rw	Rw
	INSPECTION & TEST DOCUMENTS				
	Review Test and Inspection Documents	WC	Rw	Rw	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

CAT A: Super structure of foundations for Critical equipment's i.e. compressors, reactors, columns, stacks, foundations subjected to dynamic loading and super structure of any other foundation with RCC Quantity > 250 Cum. in single pour, Slabs of plant and non-plant buildings, etc.

CAT B: Unit Pipe racks, plant buildings and super structure of other equipment not covered in category A, etc

CAT C: Non critical pipe racks (branch pipe, offsite pipe rack, etc.) non-plant buildings, pipe sleepers, manhole, catch pit and balance works.

ITP NO : 2745

RCC PAVEMENT/FLOORING

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	Approval of source of materials	WC	Rw
2.	a) Availability of valid calibration certificates of instruments/ testing equipments	WC	Rw
	b) Field calibration, if any	WC	S
3.	Layout checking/ excavation of all new foundations	WC	-
4.	Incoming material inspection	WC	NOTE 1
5.	Design of mix &establishment of strength at site by trial mix	WC	HP
6.	Check for proper back filling/compaction/ completion of sub - Structure works	WC	S
7.	Check for edges of shuttering, alternate panels	WC	-
8.	Check for slopes, thickness of flooring	WC	S
9.	Shuttering, reinforcement (as applicable)	WC	-
10.	Check for expansion joints/ Construction joints	WC	S
11.	Check for concealed pipe embedment, earthing, if any	WC	-
12.	Check for dividing strips, as applicable	WC	S
13.	Concreting, finishing, etc	WC	S
14.	Checking for line, levels, slopes, joints, thickness of flooring viz. AFC drawings	WC	S
15.	Curing	WC	S
16.	Grinding & polishing, as applicable	WC	S
17.	Testing of concrete cubes -7 days (as applicable)	WC	S/Rw
18	Testing of concrete cubes -28 days (as applicable)	WC	W
19.	Preparation of "As Built Drawings"	WC	Rw
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Documents	WC	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

ITP NO : 2746

BRICK MASONARY

SL. NO.	ACTIVITY	CONTRACTOR	EIL	
			CAT B	CAT C
1.	a) Availability of valid calibration certificates of instruments/ testing equipments	WC	RW	RW
	b) Field calibration, if any	WC	Rw	Rw
2.	Incoming material inspection	WC	Note 1	Note 1
3.	Cleaning of surface	WC	-	-
4.	Wetting/soaking of bricks	WC	S	S
5.	Cement mortar proportion	WC	S	S
6.	Staging & scaffolding	WC	-	-
7.	Hacking of adjacent concrete surface	WC	S	S
8.	Check for bond/closers, thickness of joints	WC	S	-
9.	Line, level & plumb	WC	S	S
10.	Raking out joints, keys in brick work, if any	WC	S	S
11.	Check for placement of Reinforcement bars in case of partition brick work	WC	S	S
12.	Embedment of fixtures	WC	S	S
13.	Curing	WC	-	-
14.	Preparation of 'As Built' Drawings	WC	Rw	Rw
	INSPECTION & TEST DOCUMENTS			
	Review Test and Inspection Documents	WC	Rw	

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

CAT B : Load bearing walls
CAT C : Balance works

ITP NO : 2747

STRUCTURAL STEEL WORKS

S. NO	ACTIVITY	CONTRA-CTOR	EIL		
			CAT A	CAT B	CAT C
A	**PRE – FABRICATION ACTIVITIES**				
1.	a) Availability of valid calibration certificates of instruments/ testing equipments	WC	Rw	Rw	Rw
	b) Field calibration, if any	WC	S	S	
2.	Incoming material inspection	WC	Note 1	Note 1	Note 1
3.	Welding Filler material approval/ qualification				
	a) Manufacturing test certificates/ documents	WC	Rw	Rw	Rw
	b) Testing, if any	WC	S	S	S
4.	Approval of WPS/ PQR	WC	HP	HP	HP
5.	Welders performance qualification	WC	Rw	Rw	Rw
6.	Layout checking	WC	S	-	-
7.	Welding equipment and accessories	WC	S	-	-
8.	Preparation and approval of Fabrication drawings	WC	Rw	Rw	-
B	**FABRICATION ACTIVITIES**				
1.	Materials as per design drawing	WC	Rw	Rw	Rw
2.	Check straightness and non-warping of members	WC	S	S	-
3.	Dimensional and fit-up checks including provision of slopes for deflection wherever required	WC	S	S	-
4.	Visual check for welding	WC	S	S	-
5.	Grinding including surface preparation for painting and application of primer	WC	S	S	-
6.	Checking paint as per specs, shelf-life, etc.	WC	S	S	-
7.	Application of specified paint, painting thickness, etc.	WC	S	S	-
C	**FIELD ERECTION ACTIVITIES**				
1.	Lifting arrangements including test certificates of lifting tackles	WC	S	S	Rw
2.	Correctness of location	WC	S	-	-
3.	Orientation of bracing, lugs, Anchor bolts	WC	S	-	-
4.	Alignment & levels	WC	S	-	-
5.	Field welding (if any)	WC	S	S	-
6.	Grouting	WC	S	S	-
7.	Finishing coat of paint, thickness of paint etc.	WC	S	S	S
8.	Preparation of As-built drawings	WC	Rw	Rw	Rw
	INSPECTION & TEST DOCUMENTS				
	Review Test and Inspection Documents	WC	Rw	Rw	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

CAT A: Steel structures pertaining to equipments i.e. compressors, reactors, columns, stacks, Technological structures.

CAT B: Steel structures pertaining to Unit Pipe racks, and other equipments not covered in category A, etc.

CAT C: Steel structures of Non critical pipe racks (branch pipe, offsite pipe rack, etc) plant buildings and non-plant buildings, pipe sleepers, manhole, catch pit, walkways, platforms at grade levels, etc.

ITP NO : 2748

PILING WORKS

SL. NO.	ACTIVITY	CONTRACTOR	EIL		
			CAT A	CAT B	CAT C
1.	Approval of source of materials	WC	HP	HP	Rw
2.	Layout and ground level	WC	S	S	-
3.	Incoming material inspection	WC	Note 1	Note 1	Note 1
4.	Design of mix &establishment of strength at site by trial mix	WC	HP	HP	HP
5.	Driving of piles & check for set point	WC	S	S	-
6.	Check for depth of bore and lowering of cage measuring	WC	S	-	-
7.	Pour Card	WC	HP	S/Rw	Rw
8.	Concreting,	WC	W	S	S
9.	Casting of cubes/Testing – 7 days	WC	S/Rw	S/Rw	S/Rw
10.	Casting of cubes/Testing – 28 days	WC	W	S/Rw	S
11.	Check for cut off level of concreting & quantity of concrete poured	WC	S	-	-
12.	Lifting of casing pipe	WC	S	--	-
13.	Pile load tests (lateral/vertical/cyclic/pull out)	WC	W	Rw	Rw
14.	Submission of pile load test report	WC	Rw	Rw	Rw
	INSPECTION & TEST DOCUMENTS				
	Review Test and Inspection Documents	WC	Rw	Rw	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

CAT A: Critical foundations of equipments i.e. compressors, reactors, columns, stacks, foundations subjected to dynamic loading and any other foundation with RCC Quantity > 250 Cum in single pour ,Technological structures, etc.

CAT B: Unit Pipe racks, plant buildings and other equipment foundations not covered in category A, etc.

CAT C: Non critical pipe racks(branch pipe, offsite pipe rack, etc.) non-plant buildings ,pipe sleepers, manhole, catch pit, etc.

ITP NO : 2771

ANTI-TERMITE TREATMENT

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	Approval of applicator agency	WC	HP
2.	Incoming material inspection & spraying devices including personal protective equipments like facemask, gloves, shoes, etc.	WC	Note 1
3.	Preparation of surface for taking dosage of emulsion by ramming of each layer of soil by roding the earth at specified intervals	WC	-
4.	Backfilling and compaction in specified layers along with application of emulsifier along the sides of masonry & RCC structures	WC	S
5.	Compaction of top surface for taking dosage of emulsifier by roding the earth at specified intervals for the entire floor area before concreting	WC	-
6.	Check for consumption of emulsifier utilized	WC	S
7.	Shelf life of anti-termite chemical	WC	S
8.	Guarantee Certificate for performance	WC	Rw
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Documents	WC	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

ITP NO : 2772

PLASTERING

SL. NO.	ACTIVITY	CONTRACTOR	EIL	
			CAT B	CAT C
1.	Check for completeness of all hidden jobs like piping, conduiting, etc.	WC	-	-
2..	Check for grading of sand, Mix proportion	WC	S	S
3.	Mortar Cube casting & its testing	WC	S	S
4.	Use of Chicken mesh of given gauge at junction of concrete & masonry.	WC	S	S
5.	Sample preparation for finish and its approval	WC	W	S
6.	Neeru application on plaster (as applicable)	WC	S	-
7.	Hacking and cleaning the surface, removing loose particles, wetting the surface	WC	S	S
8.	Leaving plaster rough where tiles are to be fixed	WC	-	-
9.	Checking of plaster thickness, plumb & even surface	WC	S	-
10.	Check for grooves, openings, rounding off the corners, hollowness in plaster	WC	S	S
11.	Checking for use of waterproofing compound , Mix proportion(as applicable)	WC	S	S
12.	Curing	WC	S	-
	INSPECTION & TEST DOCUMENTS			
	Review Test and Inspection Documents	WC	Rw	-

CAT B: Area requiring special finish (e.g. pebble dash finish etc.)
CAT C: Balance works.

ITP NO. : **2773**

DOORS, ROLLING SHUTTERS, WINDOWS AND VENTILATORS

SL. NO.	ACTIVITY	CONTRACTOR	EIL	
			CAT B	CAT C
1.	Incoming material inspection	WC	Note 1	Note 1
2.	Check for sections & dimensions	WC	S	-
3.	Line, level & plumb	WC	-	-
4.	Section joinery details	WC	Rw	-
5.	Check for orientation/ opening direction	WC	S	S
6.	Grouting with lugs/ dash fasteners	WC	-	
7.	Check for fixtures & fittings	WC	S	S
8	Check for thickness & type of glazing	WC	-	-
9.	Check for rubber gasket, anodizing (as applicable)	WC	-	-
10	Brand/ shade of paints, no. of coats including surface preparation (as applicable)	WC	S	Rw
11.	Check for fire rated certificate for fire doors/ windows/ partitions	WC	Rw	Rw
	INSPECTION & TEST DOCUMENTS			
	Review Test and Inspection Documents	WC	Rw	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

CAT B: Main plant buildings
CAT C: Balance works

ITP NO. : 2774

PAINTING (BUILDING WORKS)

SL. NO.	ACTIVITY	CONTRACTOR	EIL	
			CAT B	CAT C
1.	Completion of surface preparation	WC	S	S
2.	Incoming material inspection	WC	Note 1	Note 1
3.	Confirmation of colour, shade & brand	WC	S	S
4.	Check for base surface preparation (Putty/ POP, Primer, rendering etc.)	WC	S	-
5.	Check for number of coats and thickness	WC	S	S
6.	Final check for touch up, repairs etc.	WC	S	-
7.	Curing, if any	WC	S	S
	INSPECTION & TEST DOCUMENTS			
	Review Test and Inspection Documents	WC	Rw	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

CAT B: Main plant buildings
CAT C: Balance works

ITP NO. : 2775

SANITARY FITTINGS

SL. NO.	ACTIVITY	CONTRACTOR	EIL	
			CAT B	CAT C
1.	Incoming material inspection	WC	Note 1	Note 1
2.	Checking of sample (as applicable)	WC	S	-
3.	Check completeness of finishing works w.r.t. line, level & position	WC	S	-
4.	Check proper fixing of the sanitary fittings to give aesthetic appeal	WC	S	-
5.	Check for leakage/ testing at given pressure	WC	S	S
	INSPECTION & TEST DOCUMENTS			
	Review Test and Inspection Documents	WC	Rw	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

CAT B: Main plant buildings
CAT C: Balance works

ITP NO. : 2776

WATER PROOFING (ROOF)

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	Surface preparation for screeding/ water proof plastering	WC	S
2.	Mix proportion, thickness of screeding/ plastering & slope towards rain water pipes	WC	S
3.	Formation of groove at specified height on parapet wall/ pedestal/ columns etc.	WC	S
4.	Incoming material inspection, no. of coats, application procedure and consumption.	WC	S/Note 1
5.	Lapping (along the length & in transverse direction) of waterproofing membrane.	WC	S
6.	Termination of material in groove on vertical plane	WC	S
7.	Check for hollowness, bubbles in water proofing, if any	WC	S
8.	Conducting a sample of water proofing test by flooding the area for specified interval (as applicable)	WC	S
9.	Check for protective layer of PCC over waterproofing with chicken wire mesh, groove cutting, sealant filling.	WC	S
10.	Cleaning of surface	WC	-
11.	Submission of Guarantee in the requisite Performa	WC	Rw
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Documents	WC	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

ITP NO : 2777

FALSE FLOORING AND FALSE CEILING

SL. NO.	ACTIVITY	CONTRACTOR	EIL
	FALSE FLOORING		
1.	Manufacturers Test Certificate	WC	Rw
2.	Incoming material inspection	WC	Note 1
3.	Cleaning base floor	WC	S
4.	Painting base floor with Polyurethane based paint (as specified)	WC	S
5.	Check for cutouts in floor, anchor fasteners in floor, studs spacing etc.	WC	S
6.	Proper line, level & layout	WC	S
	FALSE CEILING		
1.	Manufacturers Test Certificate	WC	Rw
2.	Incoming material inspection	WC	Note 1
3.	Surface preparation of panel boards	WC	-
4.	Proper line, level & cut-outs	WC	S
5.	Finishing of panel boards	WC	S
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Documents	WC	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

ITP NO. : 2778

UNDER DECK INSULATION

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	Incoming material checking including density	WC	Note 1
2.	Checking of adhesive, fasteners for anchorage	WC	S
3.	Fixing of scaffolding, ladders, platforms	WC	S
4.	Fixing of under-deck insulation with adhesive	WC	S
5.	Use of chicken wire mesh while fixing the insulation sheet.	WC	S
6.	Fixing of dash fasteners at defined spacing	WC	-
7.	Finishing	WC	S
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Documents	WC	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

ITP NO. : 2779

ROOFING ACCESSORIES

SL. NO.	ACTIVITY	CONTRACTOR	EIL	
			CAT B	CAT C
1.	Incoming material inspection	WC	HP/Note 1	HP/Note 1
2.	Check for mitring, overhang, laps, etc.	WC	S	-
3.	Slopes line, level of sheets, barge boards, ridges & gutters, overhang of sheets	WC	S	-
4.	Checking for profile, coating, shade of sheet.	WC	S	-
4.	Bolting by drilling only, length of bolts, nos., anodizing and type of washers	WC	S	-
5.	Check for slopes of rain gutters, down take pipes, north lighting curves/ supports for gutters	WC	S	-
6.	Check for wind ties installation of required dimensions	WC	S	-
7.	Check for leakage/ passing of light	WC	S	-
	INSPECTION & TEST DOCUMENTS			
	Review Test and Inspection Documents	WC	Rw	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

2) Fixing arrangement need to be reviewed with respect to contract specifications.

CAT B: Important structures (e.g. Compressor House, Warehouse and Pump House etc.)
CAT C: Balance works.

ITP NO. : 2799

LIGHTING WORKS (NON PLANT BUILDINGS)

SL. NO.	ACTIVITY	CONTRACTOR	EIL
1.	Prepare detailed conduit layout diagram as per the approved electrical drawing	WC	Rw
2.	Provide /PVC/GI sleeves in columns/beams at identified locations to facilitate laying of conduit on later date.	WC	S
3.	Ensure conduit & accessories material is inspected at site before using	WC	Note-1
4.	Ensure that the conduit is laid in line with execution drawings & provide pull-wires as per requirement.	WC	S
5.	Check correctness of drop/JB locations	WC	S
6.	Check threaded joints are proper	WC	S
7.	Ensure all JB/Fan box are properly stuffed with jute	WC	S
8.	Ensure conduits are properly tied to reinforcement bars to prevent floating during concrete	WC	S
9.	Ensure proper supporting of conduit lengths wherever required	WC	S
10.	Ensure adequate chasing depth for conduit portion coming inside brick walls	WC	S
11.	Check workmanship towards joints and presence of any foreign material inside the conduits	WC	S
12.	Ensure wiring material is inspected at site before use & colour code is checked.	WC	Note-1
13.	Ensure correctness of lighting wire size and no. of wires as per the drawing in each conduit portion	WC	S
14.	Preparation of "As Built" drgs.	WC	Rw
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Documents	WC	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

विद्युत कार्यों (ईपीसीसी/ एकमुश्त टर्नकी संविदाओं) के लिए निरीक्षण एवं परीक्षण योजना (आईटीपी)

INSPECTION & TEST PLAN (ITP) FOR ELECTRICAL WORKS (EPCC/LSTK CONTRACTS)

Rev. No	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	29.08.2023	Revised and Updated	PK	DG	RKS	SM
3	23.07.2018	Revised and Updated	SKG	AP	AKK	RKT
2	19.02.2016	REVISED AND REISSUED	DJ	AKM	TKS	SC
1	04.07.2011	REVISED AND REISSUED	SM	SM	MKG	DM
0	12.09.2006	ISSUED AS STANDARD SPECIFICATION	AS	MPJ	VNP	VC

Abbreviations:

AC	:	Alternating Current
AFC	:	Approved For Construction
AVR	:	Automatic Voltage Regulator
BB	:	Blue Blue
BDV	:	Break Down Voltage
CB	:	Circuit Breaker
CT	:	Current Transformer
DC	:	Direct Current
EHT	:	Extra High Tension
EIL	:	Engineers India Limited
EMCC	:	Emergency Motor Control Centre
GI	:	Galvanised Iron
HV	:	High Voltage
IR	:	Insulation Resistance
JB	:	Junction Box
LT	:	Low Tension
LV	:	Low Voltage
MCC	:	Motor Control Centre
MV	:	Medium Voltage
NGR	:	Neutral Grounding Resistance
OLTC	:	On Load Tap Changer
OTI	:	Oil Temperature Indicator
PCC	:	Power Control Centre
PI	:	Polarization Index
PMG	:	Permanent Magnet Generator
PT	:	Potential Transformer
R_{CT}	:	Resistance of Current Transformer
RR	:	Red Red
SWGR	:	Switch Gear
WTI	:	Winding Temperature Indicator
YY	:	Yellow Yellow

Construction Standards Committee

Convenor: Sh. R K Singh, ED (Construction)

Members:
Sh. Janak Kishore, ED (Projects)
Sh. Chinmoy Kapuria, CGM (SCM)
Sh. Udayan Chakravarty, Sr. GM (Piping)
Sh. Debasish Ghosal, GM (Construction)
Sh. Pankaj Kumar Rai, DGM (Construction)

CONTENTS

GENERAL NOTE

The enclosed ITPs shall be followed for the works to be performed by the contractor. The provisions indicated for stage wise inspection by EIL/Owner (For specific activities), may be modified in line with EIL scope of services as per the contract between EIL and Owner. Activities for which ITP's are not provided in this specification, contractor to develop and get the same approved by EIL/Owner before start of the work. In general role of EIL has been specified in the document. The role of owner, to be specified during preparation of site specific ITPs

Contractor to submit job procedures for the jobs for which ITP's are attached & job specific reporting formats with the aid of enclosed sample reporting formats to EIL/Owner for approval, before commencement of the activity. If the contractor has to deviate from the given ITP for a valid reason, he shall obtain prior written approval of EIL/Owner. Contractor to carry out 100% examination of all activities.

LEGEND

HP : **Hold Point ;**

A point which requires witnessing/inspection/verification and acceptance by Owner/EIL before any further processing is permitted.
The Contractor shall not process the activity/item beyond a Hold Point without written approval by Owner/EIL except where prior written permission for further processing is available.

W : **Witness Point ;**

An activity which requires witnessing/inspection/verification by Owner/EIL when the activity is performed.
After proper notification has been provided (notification modalities and period shall be finalized beforehand), the Contractor is not obliged to hold further processing if Owner/EIL is not available to witness the activity or does not provide comments before the date notified. In such cases, basis of acceptance shall be review of Contractor generated report/document as per relevant technical specification.

Rw : **Review** of Contractor's documentation.

S : **Surveillance** Inspection by Owner/ EIL.
Monitoring or making observations to verify whether or not material/items or services conform to specified requirements. Surveillance activities may include audit, inspections, witness of testing, Review of quality documentation & records, etc.

WC : **100%** Supervision and Examination by Contractor.

Responsibility for execution of the inspection/testing is with the Contractor; Owner/EIL only verifies examination or testing done by the Contractor at important stages

ITP NO.: 2801

INSTALLATION/ ERECTION & TESTING OF TRANSFORMER

Sl. No.	Activity	Contractor	EIL		
			CAT A	CAT B	CAT C
1.	Incoming Material inspection at site	WC	Note-1	Note-1	Note-1
2.	Check foundation, its cleanliness, level and center lines, Anchor bolts/insert plates, their position & straightness, flatness of contacting surface for transformer skid. In case of Rail mounted type, check center line and levels of rails.	WC	S	S	S
3.	Check the Transformer no. and rating as per drawings and purged gas/ air pressure & oil leakage, physical damage etc.	WC	S	--	--
4.	Check sequence of installation e.g. main tank first + radiators + accessories + internal check as per installation flow chart.	WC	S	--	--
5.	Ensure the cleanliness of connecting part e.g. flange parts and maintenance of duly tight blank flanges until commencement of assembly	WC	S	--	--
6.	Check bushing cracks, chips or presence of paint or dirt. Bushing should be cleaned as per vendor's instruction. Check explosion vent assembly & healthiness of diaphragm	WC	S	--	--
7.	After completing assembly of all parts, filling of tank and OLTC with transformer oil, operation of OLTC (prior to filling the Transformer oil, each drum must be tested against di-electric strength for minimum as per specifications)	WC	S	--	--

ITP NO.: 2801

INSTALLATION/ ERECTION & TESTING OF TRANSFORMER (contd.)

Sl. No.	Activity	Contractor	EIL		
			CAT A	CAT B	CAT C
8.	Check & ensure bus duct connection at both ends.	WC	S	S	S
9.	Ensure cable connection at the cable & box, their colour coding & tightness. Use of spring and flat washers on the appropriate faces to be confirmed) and cleanliness of lapping surfaces. For multiple cable connection, check for correctness of RR, YY, BB grouping	WC	S	--	--
10.	If specified, fill the cable end box with tested transformer oil and ensure oil levels	WC	S	--	--
11.	Check the use of proper size conductors/ cables for HV/LV, neutral connection and their connection to NGR or earth grid/ earth point	WC	S	--	--
12.	Check equipment earthing, connections, tightness and earth resistance value on each earth pit	WC	S	S	--
13.	Ensure earthing of tertiary winding if applicable	WC	S	--	--
14.	Check leakage and oil level	WC	S	--	--
15.	Check oil filtration before energization & check BDV of oil(as applicable)	WC	S	--	--
16.	Check proper installation of Dessicants (reactivate the silica gel to blue; oil traps to be filled up)	WC	S	--	--
17.	Measure winding resistance at each tap	WC	S	--	--
18.	a) Test insulation resistance & PI	WC	S	--	--
	b) Ensure heat run/ dehydration of transformer	WC	W	S	--
	c) Check final IR value after dehydration and temp. Vs IR curve to ensure drying	WC	S	S	--
19.	Test vector group polarity, magnetizing current, magnetic balancing	WC	W	S	--

ITP NO.: 2801

INSTALLATION/ ERECTION & TESTING OF TRANSFORMER (contd.)

Sl. No.	Activity	Contractor	EIL		
			CAT A	CAT B	CAT C
20.	Test transformation ratio at each tap points (injecting 3 phase, 415 V at primary)	WC	W	S	--
21.	Ensure laying, termination & connection of all control &Signal cables as per cable schedule	WC	S	S	--
22.	Check Bucholtz's relay operation by air injection for both transformer & OLTC, MOG for alarm and trip contacts' function	WC	W	--	--
23.	Check setting of Fan control (auto & manual), OTI, WTI - alarm and trip	WC	S	S	--
24.	Check tap changer control/ operation- both auto & manual – without energizing the transformer. Ensure master/ followers' correct functioning	WC	S	--	--
25.	Final residual check to confirm removal of all temporary supports/ spacers, tags, accumulation of air in Buchhelz relay, oil, if any, etc., which might have been used as protection/ and identification during transportation and erection	WC	S	--	--
26.	Stability check, (Restricted (64R)/ standby Earth fault (51G)/ Transformer differential(87T), (as applicable)	WC	W	--	--
27.	Check CT Ratio & Polarity	WC	W	--	--
28.	Check Transformer protection relay settings as per Relay Setting chart	WC	W	S	--
29.	Mechanical Acceptance Test/ Energisation protocol of transformer	WC	HP	HP	Rw
	INSPECTION & TEST DOCUMENTS				
	Review Test and Inspection Documents	WC	Rw	Rw	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010

CAT A: Power & Distribution Transformers,
CAT B: Lighting transformers
CAT C : Miscellaneous transformers like isolation transformers, etc.

ITP NO.: 2805

INSTALLATION/ ERECTION & TESTING OF MOTOR

Sl. No.	Activity	Contractor	EIL		
			CAT A	CAT B	CAT C
1.	Incoming material inspection	WC	Note-1	Note-1	Note-1
2.	Check for foundation, it's level & center line markings, ensure the depth of anchor grouting pockets and straightness of anchor bolts. Foundation should be thoroughly cleaned before placement of motor	WC	Rw	Rw	Rw
3.	Check motor name plate, identify the equipment referring to vendor's shop floor test certificate and construction drawing	WC	S	S	--
4.	Check type of motor as per area classification drgs duly approved by the Competent Authority	WC	S	S	S
5.	Check and ensure physically the suitability of the supplied/available Cable glands with Cables and Motor side cable entry	WC	S	S	--
6.	Check lubrication of bearings, their suitability and level. For lubricants, vendor instructions and specifications to be followed	WC	W	S	--
7.	Ensure sealing of all exposed outlets during erection/ assembly	WC	--	--	--
8.	Ensure air-gap as per vendor instruction (for big machines assembled at site)	WC	Rw	--	--
9.	Check proper earthing of the motor and earth connection	WC	S	S	S

ITP NO.: 2805

INSTALLATION/ ERECTION & TESTING OF MOTOR

Sl. No.	Activity	Contractor	EIL		
			CAT A	CAT B	CAT C
9.	a. Check IR and PI for the motor and IR for auxiliary circuits like heaters and Thermal detectors, excitor (for synchronous motor), etc.	WC	W	S	--
	b. In case of low IR/ PI, Improve IR value as per spec/ suitable method as per vendors' recommendation.	WC	W	S	--
10.	Measure winding Resistance (if specified in spec)	WC	S	S	--
11.	Inspect space heater and control cable connections. Ensure the tightness of connection, proper glanding & earthing of armour, correct phase sequence of supply cable as per mark and closing the covers of terminal boxes.	WC	S	--	--
12.	Check for de-coupling of motor for no-load run and ensure re-coupling of the motor after verification of original alignment.	WC	S	S	--
13.	Set the temperature indicators (alarm/ trip) and vibration monitors (if any)	WC	S	--	--
14.	Check motor protection relay settings as per Relay Setting diagram	WC	W	W	--
15.	Check provision of CTs in power/ neutrals as per requirement of specifications. Visually check name plates of CT's and ensure their ratio, accuracy class and proper grounding as per approved drawings. Test their polarity ratio and stability. Do the cable termination at CT terminal boxes.	WC	W	S	--
16.	Check operation of synchronizing panel for synchronous motor.	WC	S	--	--
17.	Perform no load run of motor - record vibration, Temp rise, current, speed, Starting current/No load current etc.	WC	W	W	--
18.	Mechanical Acceptance Test/Energisation Protocol	WC	HP	HP	Rw
	INSPECTION & TEST DOCUMENTS				
	Review Test and Inspection Documents	WC	Rw	Rw	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010

CAT A : HV& MV motors above 132 KW, all MV motors in hazardous area
CAT B : MV motors up to 132 KW in non-hazardous area
CAT C : Others .

ITP NO.: 2810

INSTALLATION/ ERECTION & TESTING OF GENERATOR

Sl. No.	Activity	Contractor	EIL	
			CAT A	CAT B
1.	Incoming material inspection	WC	Note-1	Note-1
2.	Check for foundation, its level & center line markings, ensure the depth of anchor grouting pockets and straightness of anchor bolts. Foundation should be thoroughly cleaned before placement of equipment	WC	Rw	Rw
3.	Check equipment's as per approved area classification drawings	WC	S	S
4.	Ensure sealing of all exposed outlets during erection/ assembly	WC	S	S
5.	Check for installation of equipment, its leveling, alignment and coupling with driven equipment (before coupling magnetic centering must be ensured)	-	-	-
	a. Level/elevation of base frame	WC	S	-
	b. Checking of foundation bolts (for location, threading, greasing, etc.)	WC	S	-
	c. Checking orientation of generator	WC	S	-
	d. Placement of Crane(s), if applicable	WC	S	-
	e. Elevation/level of generator and placement of shims/packings as per AFC drawings	WC	S	-
	f. Distance between couplings	WC	S	-
	g. Rough alignment of generator	WC	S	-
	h. Availability of Vendor's engineer at site (if applicable)	WC	S	-
	i. Cleaning of pockets/ grouting of foundation bolts' pockets/base frame	WC	S	-
	j. Final Alignment	WC	S	-
	k. All protection & safety guards installation	WC	S	-
6.	Ensure pedestal insulation	WC	S	-
7.	Check lubrication of bearings, their suitability and level. For lubricants, vendor instructions and specifications to be followed	WC	S	-
8.	a. Ensure air-gap as per vendor instruction (for big machines assembled at site)	WC	S	-
	b. Check & Ensure magnetic centering before coupling	WC	S	-
	c. Check proper coupling with driven equipment	WC	S	-
9.	Check earthing of the equipment and earth connection including NGR. Ensure earth resistance as per the requirement			
	a) Check IR and PI for the equipment and IR for auxiliary circuits like heaters and Thermal detectors, excitor PMG, etc.	WC	W	S
	b) In case of low IR/PI, Improve IR value by suitable method as per vendors' recommendation	WC	W	W
10.	Measure winding Resistance	WC	W	S

ITP NO.: 2810

INSTALLATION/ ERECTION & TESTING OF GENERATOR

Sl No	Activity	Contractor	EIL	
			CAT A	CAT B
11.	Inspect exciter control panel/ space heater and control cable connections. Ensure the tightness of connection, proper glanding and earthing of armour correct phase sequence of supply cable as per mark and closing the covers of terminal boxes.	WC	S	S
12.	Set the temperature indicators (alarm/ trip) and vibration monitors	WC	S	-
13.	Check the provision of generator CT/PT and its inter connection with others as per approved drgs. Do the cable termination at CT/PT terminal boxes. Visually check nameplates of PT/CT's and ensure their ratio accuracy, class and proper grounding against approved drgs. Test their polarity ratio.	WC	W	S
14.	Check generator control panel, its wiring as per drg. Relay & their calibration & setting, functional checks, etc.	WC	W	S
15.	Check performance/operation of following protection relays with Primary/Secondary injection	WC	W	S
	a) Differential protection			
	b) Negative phase sequence test			
	c) Earth Fault (E/F)			
	d) Open circuit/Rotor earth fault			
	e) Over Voltage/Residual over voltage & Reverse power			
	f) Time over current and short circuit			
	g) Loss of excitation			
	h) Current Unbalance			
	i) Under & Over frequency and frequency rate change			
	j) Loss of excitation			
16.	Check for synchronizing & manual excitation control function	WC	W	S
17.	Check AVR operation & settings	WC	W	S
18.	Mechanical acceptance test/ Energization protocol	WC	HP	HP
	INSPECTION & TEST DOCUMENTS			
	Review Test and Inspection Documents	WC	Rw	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

CAT A : Generators above 1000KW
CAT B : Generators upto 1000KW

ITP NO.: 2815

INSTALLATION/ ERECTION & TESTING OF SWITCH GEARS/ PCC/ MCC/ EMCC/ VFD's/ ASB/ LIGHTING PANELS

Sl. No.	Activity	Contractor	EIL	
			CAT A	CAT B
1.	Incoming material Inspection	WC	Note-1	Note-1
2.	Check the layout of base channels/frames and ensure the correct provisions for grouting/welding and cable entry openings.	WC	S	S
3.	Ensure proper grouting/welding of the base channels/frames	WC	S	-
4.	Check sequence wise (starting from center or Bus-duct panel) installation, final leveling and bolting up	WC	S	-
5.	Check main bus bar connection at all shipping sections and shrouding at all tap-off points	WC	S	-
6.	Check inter panel wiring after fixing of loose accessories and wiring	WC	S	-
7.	Ensure the level of flooring for smooth opening of panel doors and drawing out & in operation of Breaker Trolleys	WC	S	-
8.	Check equipment earthing & continuity of earth bus	WC	S	S
9.	Ensure thorough cleaning, removal of temporary spacers, supports, any foreign materials and dusting the panels	WC	S	S
10.	Verify the correctness, in accordance with the drawings, of all type of relays, test blocks, control switches, meters & instruments, motor starters, fuses, space heaters, etc.	WC	Rw	Rw
11.	Check name plate for each breaker, inspect & test the operating mechanics (Mechanically), interlocks, contacts, arc chutes, auxiliary devices and adjustments as required	WC	S	S
12.	Visually check all relays and meters for removal of shipping blocks and for mechanical damage. Ensure their range against approved drawings, inspect calibration, testing and setting for each relay and meter.	WC	S	S
13.	Visually check name plates of CT's and PT's and ensure their ratio, accuracy class and proper grounding against approved drawings. Test their polarity, knee point voltage, R_{CT} and ratio. Primary injection tests at three points on the characteristics curve as per manufacturer recommendation.	WC	W	S

ITP NO.: 2815

INSTALLATION/ ERECTION & TESTING OF SWITCH GEARS/ PCC/ MCC/ EMCC/ VFD's/ ASB/ LIGHTING PANELS

Sl. No.	Activity	Contractor	EIL	
			CAT A	CAT B
14.	Test and witness IR value of the power and control bus	WC	W	W
15.	Test and witness high pot tests, as specified	WC	HP	HP
16.	Check phasing & phase sequence between bus section and incomer.	WC	W	W
17.	Inspect secondary injection test and ensure tripping of C.B. through protection relays	WC	W	S
18.	Inspect primary injection & check the breaker tripping through protective relays, check ammeter, voltmeter, power factor indications etc. for proper functioning	WC	W	S
19.	Switch on AC & DC control supply. Check the sequence of operation of breakers electrically, local and remote interlock; ensure proper alarm and annunciation and indications in SW/ GR/ MCC/ Control Panel. Auto/ Independent/ manual mode of operation of incomer & bus coupler shall be checked as per schematics. Under voltage tripping of breakers shall be verified.	WC	W	W
20.	Measure contact resistance and ensure simultaneous closing & making of breaker contacts.	WC	W	S
21.	Check for relay parameters and settings	WC	W	S
22.	Differential stability (as applicable) shall be verified.	WC	S	-
23.	Checking of Man machine communication and verification of graphics	WC	S	S
24.	Mechanical Acceptance Test/Energisation protocol	WC	HP	HP
	INSPECTION & TEST DOCUMENTS			
	Review Test and Inspection Documents	WC	Rw	Rw

NOTE: 1) For incoming material inspection please refer ITP no: 6-82-1010.

CAT A: HT Switch Gears / PCC Control Panels/ VFD's
CAT B: MCC / EMCC/ASB/ lighting panels.

ITP NO.: 2820

INSTALLATION/ ERECTION & TESTING OF EHT/ HT MAIN BUS AND ALLIED EQUIPMENTS

Sl. No.	Activity	Contractor	EIL
		CAT A	CAT B
1.	Incoming Material Inspections	WC	Note-1
2.	Check the insulators wall bushing for any damage like chips or cracks. Ensure proper installation of the insulators & bushing	WC	S
3.	Check the clearance between conductor to ground & conductor to floor level. Ensure minimum clearance between two conductor Bus	WC	S
4.	Check the anchoring of the conductor bus and terminal/Tap Off connections	WC	S
5.	Ensure correctness of phase sequence	WC	W
6.	Check earth connections and measure earth resistance of the supporting structures of insulators	WC	S
7.	Check IR value of the conductor bus phase to phase and each phase to earth.	WC	W
8.	Check operation of isolators, CB, earth switch and interlocks, check ratio & polarity of CTs, PTs	WC	S
9.	Check high voltage tests keeping all the CB's and isolators closed but PT's should be disconnected	WC	W
10.	Check hot line insulator washing equipment and system-Nozzle position & resistivity of water	WC	S
11.	Check type & class of lighting arrestor, its earth connection and earth resistance	WC	S
12.	Mechanical Acceptance Test/ Energisation protocol	WC	HP
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Documents	WC	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

ITP NO.: 2825

CABLE LAYING

Sl. No.	Activity	Contractor	EIL	
			CAT A	CAT B
1.	Incoming material Inspection	WC	Note-1	Note-1
2.	Survey the cable route as per AFC drawings, identify any possible obstruction like road/pipe rack crossing, heat sources etc. and finalize the cable route	WC	S	S
3.	Prepare cable drum schedule to avoid wastage and minimize cable joints	WC	Rw	Rw
4.	Ensure entire route is available for cable trench	WC	S	S
5.	Ensure availability of cables of required size and length	WC	--	--
6.	Verify the dimensions of buried trench as per AFC drawings (in case of buried cables)	WC	S	S
7.	Ensure readiness of cable trays and installation of GI pipes (for cable protection) wherever required	WC	-	-
8.	Ensure the initial bed of sand is provided as per standard and of required thickness	WC	S	S
9.	Check IR Lay cables as per the cable schedule to avoid criss-crossing of cables within the trench (1st layer). Check IR Values in drum before laying.	WC	S	S
10.	Provide cable tags at specified locations	WC	Rw	Rw
11.	Record IR value of cables of first layer after sand filling	WC	Rw	Rw
12.	Provide second layer of sand, and ensure proper clearance between HT/LT cables (wherever applicable)	WC	S	S
13.	Complete layer wise laying of cables and sand filling	WC	S	S
14.	Record IR value of cables of each layer after sand filling	WC	Rw	S
15.	Provide final layer of sand	WC	S	S

ITP NO.: **2825**

CABLE LAYING

Sl. No.	Activity	Contractor	EIL	
			CAT A	CAT B
16.	Provide bricks/slabs for cable protection in buried trenches	WC	S	S
17.	Back fill the trenches with earth and compact properly after ensuring the completion of earthing works, if any as per earthing layout drawings.	WC	S	S
18.	Install cover slabs and seal the trenches in plant/offsite areas after ensuring the completion of earthing works, if any.	WC	S	S
19.	Remove surplus earth generated as per provisions in the contract.	WC	S	S
20.	Hi pot test of cables as required.(as applicable)	WC	W	W
21.	Provide cable markers as per the specifications at identified locations	WC	S	S
	INSPECTION & TEST DOCUMENTS			
	Review Test and Inspection Documents	WC	Rw	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

CAT A : All HT/HV cable works.
CAT B: All LT/MV cable works and control cable laying works.

ITP NO.: 2830

LIGHTING SYSTEM

Sl. No.	Activity	Contractor	EIL	
			CAT A	CAT B
1.	Incoming material inspection	WC	Note-1	Note-1
2.	Mounting of receptacles/mast/poles as per drawings & standards.	WC	S	S
3.	On walkways, platforms & outdoor areas, lighting fixtures are located nearer to landing of stairs/ ladders, gauges, flow meters etc.	WC	-	-
4.	Provision of plugs for spare entry/ sockets. Erection of lighting poles/ fixtures manually on concrete foundations as per drawings.	WC	S	S
5.	Check earth continuity for individual sockets/ outlets as well as for the complete lighting system	WC	S	S
6.	Ensure lighting circuit are marked as per AS Built drawing.	WC	S	S
7.	Ensure luminaries for emergency purpose carry identification marks.	WC	S	S
8.	Illumination level checking after completion of all indoor & outdoor lighting activities.	WC	W	S
9.	Load balancing of LDB	WC	Rw	Rw
10.	Welding/ bolting of poles to base/ foundation. Check for verticality of poles alignment adjustments as required,	WC	S	S
11.	Ensure cable termination, earth continuity , etc. and sealing of spare entries of JBs	WC	S	S
12.	Ensure touch-up painting or galvoseal application done at affected areas to arrest corrosion.	WC	S	S
	INSPECTION & TEST DOCUMENTS			
	Review Test and Inspection Documents	WC	Rw	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

CAT A : All lighting works in Hazardous area, escape routes.
CAT B : All lighting works in Non-hazardous areas and general office areas.

ITP NO: 2835

EARTHING SYSTEM

Sl. No.	Activity	Contractor	EIL	
			CAT A	CAT B
1.	Incoming material Inspection	WC	Note1	Note1
2.	Ensure the electrodes have a clean surface, free from non-conducting materials like paint, grease etc.	WC	S	S
3.	Check the earth pit is backfilled by using alternate layers of charcoal & common salt and individually numbered for identification.	WC	S	S
4.	Measure earth resistance of each earth pit/electrode installed.	WC	S /Rw	S /Rw
5.	Check top level of the earth pit is matched with FFL in paved area and 100 mm above FGL in unpaved area	WC	S	S
6.	Ensure earthing grids are installed as per the pre-determined layout & earthing conductors are at a depth specified in the specifications from the grade level.	WC	S	S
7.	Ensure weld joints are made by overlapping the strip equivalent to double the width of the strip and four sides (three on Top and one on the bottom) shall be continuously welded	WC	S	S
8.	Check all joints of the conductors below the grade level are welded & suitably protected by application of two coats of bitumen & wrapping with the Jute/Hessian Tape. Earthing strips laid above ground are welded and protected by applying two coats of bitumen.	WC	S	S
9.	Ensure the joints are inspected before the coat application & backfilling.	WC	S	S

ITP NO: **2835**

EARTHING SYSTEM

Sl. No.	Activity	Contractor	EIL	
			CAT A	CAT B
10.	Ensure all the risers are clamped to the walls, columns, etc.	WC	S	S
11.	Ensure all the MV & HV electrical equipment's are doubly earthed by connecting two points on the equipment to the earth grid. Rest of the structural, mechanical, piping is connected to the earth grid as per the contract specifications & drawings.	WC	S	--
12.	Ensure all process pipelines are bonded & earthed at entry & exit points of battery limit of hazardous area.	WC	S	--
13.	Ensure lightening protection grid is connected to the individual electrode and bonded to the main earth grid at two or more points as per the drawings.	WC	S	S
14.	Ensure each lighting fixture & receptacle is earthed through extra core provided in the lighting cable (normally, the third core of a 3 core cable)	WC	S/Rw	Rw
15.	Removal of surplus earth generated as per provisions of the contract.	WC	S	S
	INSPECTION & TEST DOCUMENTS			
	Review Test and Inspection Documents	WC	Rw	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

CAT A : All earthing in hazardous areas/ communication/ control systems.
CAT B : Earthing in non-hazardous area.

ITP NO.: 2840

INSTALLATION OF BUS DUCT

Sl. No.	Activity	Contractor	EIL
1.	Incoming Material inspection at site	WC	Note 1
2.	Ensure that the switch board terminal box & the transformer terminal boxes are inspected & cleared before proceeding to the bus duct installation.	WC	S
3.	Check the equipment no. and rating as per drawings, no physical damage, etc.	WC	S
4.	Check availability of all accessories	WC	S
5.	Inspect the bus duct insulators for any physical damage occurred during the transit.	WC	S
6.	Check bushing cracks, chips or presence of paint or dirt. Bushing cleaned as per vendor's instruction.	WC	S
7.	Ensure various sections of the bus duct enclosures are coupled together by using proper gaskets & bellows as specified.	WC	S
8.	Ensure the bus bars are properly fixed & coupled on the insulator and correct phases are connected at both ends.	WC	S
9.	Ensure bus bar bolts are tightened to the required torque values) using calibrated torque wrench.	WC	S
10.	Ensure bus bar joints are insulated using manufacturers recommended materials, wherever required.	WC	S
11.	Prior to closing of the bus duct cover, ensure that the bus duct enclosures are cleared of tools/ loose materials and debris.	WC	W
12.	Ensure enclosure of bus duct earthed (to the earthing grid) as per drawing.	WC	S
13.	Ensure wall sealing is done & sun shields provided as per drawings.	WC	S
14.	Ensure bus bar joints are cleaned/ polished & not oxidized before bolt-up connection.	WC	W
15.	Ensure provisions of breathers/silica gel and Drain plugs	WC	S
16.	Ensure provision of heaters and recording of its IR value	WC	S
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Documents	WC	Rw

NOTE : 1) For incoming material inspection please refer ITP no: 6-82-1010.

ITP NO.: 2845

CABLE TERMINATION

Sl. No.	Activity	Contractor	EIL
1.	Ensure proper tagging of the cable at both ends.	WC	S
2.	Ensure cables are properly dressed, clamped & glanded using suitable sizes/ class of cable glands.	WC	S
3.	Ensure sufficient cable length is kept on both ends for future re-termination, if need arises.	WC	S
4.	Ensure proper bending radius while laying to avoid twisting.	WC	--
5.	Ensure cable segregation, spacing & depths maintained as per specifications	WC	S
6.	Ensure usage of correct sizes of lugs for termination	WC	S
7.	Ensure all cores are firmly terminated to terminals provided in individual feeders.	WC	S
8.	Ensure proper earthing of armour.	WC	S
9.	Ensure continuity & IR value checks are done on the cable from panels to equipment's.	WC	S/Rw
10.	Ensure unused entries are plugged tightly in panels, motor terminal boxes, JB's, etc	WC	S
11.	Ensure on completion of cable termination, the cable trenches are backfilled & trench covers put back in position.	WC	S
12.	Ensure all cable openings & conduit entries are properly sealed.	WC	S
	INSPECTION & TEST DOCUMENTS		
	Review Test and Inspection Documents	WC	Rw

ठेकेदार द्वारा सप्लाई की गई सामग्रियों के लिए निरीक्षण एवं परीक्षण योजना (आईटीपी) अथवा आवक सामग्री की जांच

INSPECTION & TEST PLAN (ITP) FOR INCOMING MATERIAL CHECKING FOR CONTRACTOR'S SUPPLIED MATERIALS

Rev. No	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
3	29.08.2023	REVISED AND REISSUED	DJ	DG	RKS	SM
2	27.07.2018	REVISED AND REISSUED	SKG	AP	AKK	RKT
1	14.10.2015	REVISED AND REISSUED	DJ	MKG	TKS	SC
0	04.07.2011	ISSUED FOR IMPLEMENTATION	SM	SM	MKG	

Abbreviations:

ATT	:	Anti Termite Treatment
CGI	:	Corrugated Galvanized Iron
CS	:	Carbon Steel
EOT	:	Electric Operated Traction
FLM	:	Flood Light Mast
HOT	:	Heat Operated Traction
HT	:	High Tension
HV	:	High voltage
IMIR	:	Incoming Material Inspection Report.
IRN	:	Inspection Release Note
ITP	:	Inspection Test Plan
KW	:	Kilo Watt
LR	:	Lorry Receipt
LT	:	Low Tension
LV	:	Low Voltage
LEL	:	Low Explosive Limit
MOC	:	Material of Construction
MTC	:	Manufacture Test Certificate
NACE	:	National Association of Corrosion Engineers
PLC	:	Programmable Logic Control
PRDS	:	Pressure Reducing and De-superheating Stations
QAP	:	Quality Assurance Plan
RCC	:	Reinforced Cement Concrete
SS	:	Stainless Steel
SOR	:	Schedule Of Rates
TC	:	Test Certificate
TPIA	:	Third Party Inspection Agency

Construction Standards Committee

Convenor: Sh. Rupesh Kumar Singh , ED (Construction)

Members: Sh. Janak Kishore, ED (Projects),
Sh. Chinmoy Kapuria, CGM (SCM),
Sh. Udayan Chakravarty, Sr. GM (Piping),
Sh. Debasish Ghosal, GM (Construction),
Sh. Pankaj Kumar Rai, DGM (Construction),

CONTENTS

GENERAL NOTE

The enclosed ITPs shall be followed for the works to be performed by the contractor. The provisions indicated for stage wise inspection by EIL/Owner (For specific activities), may be modified in line with EIL scope of services as per the contract between EIL and Owner. Activities for which ITP's are not provided in this specification, contractor to develop and get the same approved by EIL/Owner before start of the work. In general, role of EIL has been specified in the document. The role of owner to be specified during preparation of site specific ITPs.

Contractor to submit job procedures for the jobs for which ITP's are attached & job specific reporting formats with the aid of enclosed sample reporting formats to EIL/Owner for approval, before commencement of the activity. If the contractor has to deviate from the given ITP for a valid reason, he shall obtain prior written approval of EIL/Owner. Contractor to carry out 100% examination of all activities.

LEGEND

HP **: Hold Point**

A point which requires inspection/verification and acceptance by Owner/EIL before any further processing is permitted.
The Contractor shall not process the activity/item beyond a Hold Point without written approval by Owner/EIL except where prior written permission for further processing is available.

W **: Witness Point**

An activity which requires witnessing by Owner/EIL when the activity is performed.
After proper notification has been provided (notification modalities and period shall be finalized before hand), the Contractor is not obliged to hold further processing if Owner/EIL is not available to witness the activity or does not provide comments before the date notified. In such cases basis of acceptance shall be review of Contractor generated report/document as per relevant technical specification.

Rw **: Review** of Contractor's documentation.

S **: Surveillance** Inspection by Owner/ EIL.

Monitoring or making observations to verify whether or not material/items or services conform to specified requirements. Surveillance activities may include audit, inspections, witness of testing, review of quality documentation & records.

WC **: 100%** Supervision and Examination by Contractor.

Responsibility for execution of the inspection/testing is with the Contractor; Owner/EIL only verifies examination or testing done by the Contractor at important stages.

SL NO	ACTIVITY	CONTRACTOR	EIL/OWNER(S)			Records to be submitted/ Format No:
			CAT 1	CAT2	CAT 3	
A	**Document Checking**					
1	Check whether vendor/source is approved.	WC	HP	Rw	Rw	G-01
2	Availability of QAP/ITP duly approved by TPIA.	WC	Rw	Rw	Rw	G-01
3	Availability of MTC / IRN (Availability of stage wise Inspection Reports/certificates in case of inspection by TPIA, Inspection reports of Contractor).	WC	Rw	Rw	Rw	G-01
4	Availability of certificates from statutory bodies, if applicable	WC	Rw	Rw	Rw	
5	Delivery challan /LR/ E-way Bill/ Tax Invoice	WC	Rw	Rw	-	G-01
6	For Foreign Items: Bill of landing, Country of origin, Packing List, phytosanitary certificate, bill of entry, customs invoice (as applicable)	WC	Rw	Rw	-	
B	**Physical Verification**					
1	Checking for Inspection stamp/Identification mark	WC	W*	S	S	G-01
2	Correlation of MTC w.r.t. Heat nos/ Batch no /lot no.	WC	HP	Rw*	Rw*	G-01
3	Physical assessment of Quantity.	WC	S	S	-	G-01
4	Certification of condition of material.	WC	S	S	S	G-01
C	Sampling for Field tests / tests from approved laboratories, if applicable.	WC	W	W	W	G-01
D	Review of Field Test reports/Test reports if applicable.	WC	Rw	Rw	Rw	G-01
E	Review MTC/IRN/TC etc.	WC	Rw	Rw	Rw	G-01
F	Endorsement on IMIR	WC	HP	HP	Rw	G-01

NOTE:

- **(S)**A generic categorization plan could be firmed based on following guideline and as per Table A:-
- (*)Sampling plan for checking of bulk items shall be as per discretion of EIL
- General :

1) EIL/OWNER and contractor shall jointly finalize the list of incoming materials and categorize in line with inspection categorization plan for bought out items. The items not covered in Table A shall be finalized by Engineer In charge /Owner.
2) In general Sl no of the ITP: A (1, 3, 4 & 5) B, E and F shall be applicable to both (#) and (@) i.e. Items with and without TPI/EIL inspection
3) In general Sl no of the ITP: A (2), shall be applicable to (@) ie. Items with TPI/EIL inspection
4) In general Sl no. of ITP: C and D shall be applicable to (#) ie. Items without TPI/EIL inspection.

5) All items to be procured from approved vendors / source as per list enclosed in the contract / approved vendor list. Prior approval for the source / vendor to be taken for items not listed in the contract / approved vendor list.

6) Anodisation / galvanization shall be ensured in shops having proven track record and samples are to be tested to check galvanizing / anodizing prior to dispatch to sites.

CAT 1 CRITICAL: The materials requiring long time impact to meet the stipulation of end user. Completely engineered and inspected as per the contract.

CAT 2 MAJOR: The materials requiring lesser time impact on end user. Specified to Industry standards, lower design category (not fully reviewed of detailed Engg but all interfaces checked) and with complete compliance with code, however requiring limited inspection.

CAT 3 MINOR: Standard items, fit for the purpose with minimal Engg review.

TABLE: A

SL NO	CAT 1 (CRITICAL)	CAT 2 (MAJOR)	CAT 3 (MINOR)
		Items without TPI/EIL inspection (#)	
1	Refractory materials	• Cement • Reinforcement • Structural steel • Brick and tile brick • Asphalt(bitumen) • Paint • Sanitary wares • sanitary fittings(pipes & fittings) • Chemicals for ATT • Acid resistant tiles and mortar • Marble/ Granite/ Ceramic Tiles • Chemical hardener for flooring • Grouting compound • Wood for doors and windows • Ventilator • Flush door • Paneled door • Roof treatment materials • False ceiling & flooring materials • RCC Hume pipes • Anchor fasteners • Foundation bolts • Waterproofing Materials • Underdeck insulation materials • Water stopper/ HDPE/ LDPE Sheet • Vermiculite based cementious fireproofing materials	• AC sheets/CGI sheets • Particle board • Glazing glass • All galvanized • anodized items like GI pipes • door/window frames • Pre-coated sheets • Steel doors • Rolling shutters • Cable ducts/trays • lightning arrestors • street light poles • Earthing items • Conduits/wire/Metsec Channels • Safe area Lightning fixtures • SS Handrails • UPVC/CPVC Pipe • HDPE Pipes • PPR Pipes

SL NO	CAT 1 (CRITICAL)	CAT 2 (MAJOR)	CAT 3 (MINOR)
		Items with TPI/EIL inspection (@)	
1	• All process Compressor, pumps (with drive above 110 KW). • Diesel Generators Vessels (thickness more than 50 mm) and all Vessels with MOC NACE, alloy steel, clad steels, Inconel. • All Columns, Reactors, Heat Exchangers,	• All types of pumps, compressors excluding category 1 • Fans, blowers, Conveyors and material handling equipment's.Vessels (thickness less than 50 mm) and other vessels excluding category 1 • Trays and tower Internals • Burners for fired heaters • EOT/HOT crane • De super heaters & PRDS Air pre heaters, Damper, Soot blowers • Expansion joint ,Gas and Liquid Filters • Pipes /Piping material (flanges, fittings etc. AS, SS, clad steel, Inconel, NACE) • All types of valves All Fire Fighting equipment's, including Deluge valves LRM, Sprinklers. • FLM with fittings • HT/LT switch gear, Bus ducts • Fire alarm system • HV / LV Motors • DC System including consoles • PLC ,Batteries & battery Chargers, Capacitor banks • Plant communication system, UPS & Transformer • Variable speed drives • Tank level indicator/Instruments • All Control valves, pressure relief valves, breather valves • Meter-flow-annubar, Solenoid valve, Annunciators with panels, Self-actuating pressure control valves. • Temperature sensing Element RTD's • Thermowell and thermocouple • Mass flow meters , Pressure switches, Flow switches , Level switches (explosion Proof) • Flow sensing Element Orifice Plate & Flanges, Pitot Tube Analyzers - LEL Detectors, Level Instruments • Transmitters • Flame arrestors • Panel Control and accessories • All HV/HT and LV/LT cables and control cables. All types of flameproof fittings & fixtures.	• Hoists • Pipes & Piping materials (carbon steel & other) excluding category2 • Gauges Glass • Pressure gauges, Temperature Gauges, Draft Gauges. • Tape coat materials • Gratings • Insulation materials All fasteners, gaskets. • Hand railings

Note: For any material not covered above, the inspection requirement shall be decided by EIC based on the criticality.

Format No: G: 0 1 REV 0

INCOMING MATERIAL INSPECTION REPORT

Report No. :
Date :

Project :
Contractor :
Work order No. :
:

Unit :
Consultant :
P.O. No. & Date :

Name of Work :
Job No. :
LR No. :

Sl. No.	SOR Item No.	Material description/Tag no	Date of Receipt	Qty. Received	Qty. Accepted	Manufacturer/ Vendor	MTC No./ IRN No. with Date/ Field, Lab test, etc.	Heat/ Batch No.	Ref. Invoice, Challan No., E-Way Bill (as applicable)	Observation/Remarks/ Storage Instruction

Notes :

INSPECTION ACTIVITY AT SITE (Tick as applicable)

1. Quantity verified and found in order ☐
2. Material condition appears to be good ☐
3. Heat/Batch/Tag No. mentioned on the material ☐
4. Color coding done as applicable ☐
5. Site identification mark on material ☐
6. Correlation w.r.t. IRN/MTC/Lab Tests report ☐
7. TC verification w.r.t. IRN/Spec/QAP, etc. ☐
8. Check for Vendor/Source approval ☐
9. Special Requirement if any. ☐

Based on above, materials are accepted.

Contractor Field Engineer
Name:

Contractor RCM/Site In charge
Name:

EIL Field Engineer

Name:

EIL Lead Engineer/Area coordinator/Spread In charge

Name: