Pipe Welding Procedure

Project No:

REVISION HISTORY	ISSUE DATE	DESCRIPTION	REVIEW / STATUS
00			

PREPARED BY:	**REVIEWED & APPROVED BY:**
QA QC ENGINEER	PROJECT ENGINEER

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1. Purpose

The purpose of this method statement/pipe welding procedure is to define and outline proposals for carrying out the welding & installation of the **MS piping System**.
The method applies to all ERW, Black Steel, Schedule 40, Grade 'B', and fittings, following mechanical specifications for pipe sizes 65mm dia. and above.

2. Documentations

The work will be done following approved Shop Drawings and approved material submittal for pipes, fittings, valves, supports, pumps, and accessories.
Other reference documents include but are not limited to:

3. Contract Specifications

- Project Quality Plan
- Consultant and contractor project Health and Safety plan.

4. Definitions & Abbreviations

HSE: Health Safety and Environment
ITP: Inspection and Testing Plan
ITR: Inspection and Testing Request
MAR: Material Approved Request
MIR: Material Inspection Request

5. Roles and Responsibilities

5.1. Project Manager

MP shall be responsible for the overall project start execution and completion.
The project Manager will be based on-site and will be responsible for the management of the project, both on and off-site, through delegation of duties following the organization chart and for the effective implementation of the project management system.
He shall ensure that the proper tools and tackles are available for the timely completion of this job in a quality manner.

5.2. MEP Coordinator

MEPC is responsible for the coordination of all MEP services to ensure that they do not clash with one another during installation.

He is also responsible to check and ensure that MEP services are coordinated with Structural / Architectural finishes including false ceilings.
The MEP coordinator is also responsible to check and ensure that MEP services provisions are provided in the shop drawings to all other trades as per the scope & requirements of the project.
He is responsible for liaising with Consultant and Main Contractors to properly coordinate MEP services and ensure all Coordination Drawings are submitted & approved to meet the approved construction and submission program.

5.3. HSE Officer

HSEO will monitor and implement all HSE-related issues.
He shall ensure that all requirements regarding health, safety, and environmental concerns are met and adhered to.
The HSE officer will coordinate with HSE officers to ensure that all permits and authorizations are on hand before starting any site operation.

5.4. QA/QC Manager

QAQCM shall ensure that the MS pipe welding work is carried out ensuring that the requirement for quality control is followed.
He shall ensure that all ITP requirements are met.

5.5. QAQC Engineer

The QA/QC engineer shall ensure that all necessary requests for inspection and testing are processed and put forward to the consultant for notification.
He shall ensure all inspections are conducted as per contract specifications, QCP (Quality control procedures) & and ensure all inspections proper tools & tackles, and manpower are used at all stages of work to ensure all current issues of procedures, approved materials, and shop drawings and standards are available at the point of use.
QA/QC shall be responsible for the total quality of work for the installation work.
He will inspect for any damage during shipping, handling, and storage. Monitor the quality of works and ensure that fulfillment of specified requirements and that all quality records related to work are completed. Ensure the work is completed as per quality requirements.
Main contractor QA/QC shall inspect the same work before initiating ITR for consultant approval.

5.6. QA/QC inspector

QA/QC Shall maintain comprehensive inspection and test records for documentation.

5.7. Project Mechanical Engineer

PMECH.E shall ensure that all the pipe welding works are carried out according to the approved shop drawings.
Direct and supervise all personnel including site engineers and supervisors, taking into consideration all relevant documents.

He shall review the method statement before starting the work, explain the same to the subordinates, and prepares the program for the daily job.
He shall be aware of all codes of practices, standards, specifications, and HSE plans and appreciate the workforce to perform a time-bound and quality job.
Originate ITR for complete installation works and accompanies QA/QC engineer/inspector during inspections from consultant/client.

5.8. Site Engineer

SE shall ensure that all works are carried out according to approved shop drawings, approved material submittal, and approved method statement.
Ensure all safety equipment proper tools, tackles, and PPE are available at the point of use.
Aware of all procedures, work methods, instructions, and quality requirements for the timely completion of the job and explains the task to workers for the execution of the job with applicable code of practice.

6. Tools & Equipment for Welding Work

Below is a list of necessary tools and equipment performing the welding and pipe installation activities.

- Fork Lift or Crane with suitable capacity
- Hydraulic Trolley
- Portable Drilling Machine/Grinding Machine & Angle Cutter
- Pipe Fitters Tools Boxes
- Spirit Level & Level threads
- Step Ladder as per site requirement
- Scaffolding with the platform as per site requirement
- Welding machine, Oxy – Acetylene Gas cutting set,
- Chain Block pulley and Shackles
- Pulley and rope
- Grooving Machine
- Pipe cutter, Grinder, Angle cutting machine, and webbing sling

7. Pipe Welding Procedure

- Before the commencement of any welding, the following works are required to be carried out:
- Check materials to be used have approved material submittals.
- Check work areas are clean and safe ensuring that the area is free of all flammable or volatile material.
- All welding work shall be carried out in open or ventilated areas.
- Welder’s qualification will be verified as per requirement.

7.1. Welding Procedure

- Measure the length of pipe required, making due all allowance for any pipe fittings to be used.
- Cut the pipe to the measured length and ensure that the ends are cut square.
- Prepare the end of the pipe to be welded to the right angle of level and the size of the root face following procedure specification.
- The surfaces to be welded shall be smooth, uniform, and free from tears, scale, slag, grease, paint, and other materials that might affect the quality of welding.
- Power tools or hand tools will be used for cleaning, grinding, or both.
- The two prepared ends to be welded, pipe to pipe or pipe to fitting, shall be aligned as accurately as is practical and ensure that the spacing between the abutting ends is following the procedure specification used.
- Alignment of the abutting ends shall minimize any offset between the surfaces caused by dimensional variations and will equally distribute around the circumference of the pipe any such offset.
- Hammering of the pipe to obtain the proper lineup will be kept to a minimum.
- The two prepared ends shall be tack welded together in four positions at ninety degrees.
- After tacking, the alignment shall be checked to confirm the integrity of the alignment has been preserved.
- During the welding process, the tacks shall be removed by grinding.
- The welding process will commence, ensuring that the correct filler metal, electrical current, polarity, voltage, amperage, and number of passes is following the welding procedure.
- All slag or foreign matter shall be removed from each pass of welding, including the repair of any visible defects, such as cracks, cavities, etc., before commencing the succeeding passes.
- Any such impurities shall be removed using a grinder.
- On completion of the welding process, the welder's designated identification mark will be placed adjacent to the weld.
- This weld will also be given a unique joint number as indicated on the welding drawings.
- The Weld joint shall be visually inspected to check for inadequate penetration, excessive undercutting, and burn-through, and to ensure the weld is free from cracks.
- The weld shall not be cooled by water.

7.2. Weld Inspection & Testing

- 100% visual inspection will be carried out for all welded joints.

- All weld joints will be subject to hydrostatic testing to a minimum of 1.5 times the operating pressure.
- Inspection requests will be raised for Consultants' visual inspection and witness testing.
- Sample welding tests will be organized for all welders.

7.3. HSE Requirements for Welding Process

- Proper toolbox talk shall be given to the personnel involved in carrying out the welding process.
- The method statement shall be communicated to the crew during the toolbox talk.
- Mandatory PPE i.e. safety shoes, helmet, hand gloves, overalls, goggles, and other appropriate PPE for the task shall be used.
- Safety items to be provided shall include fire extinguishers and welding screens.
- Welding cables are to be checked regularly for visual signs of damage, and any joints are to be sheathed and taped.
- Before commencement of work check the welding machine i.e. current, voltage, earthling, etc., for safety.
- A standard welding Safety kit of shields, gloves, etc. will be provided for each welder.
- Glasses to be checked for cracks/weld spatter
- Permit to Hot work (PTW) should be obtained before the commencement of welding work.
- The Project Engineer / Safety officer shall ensure that all safety precautions are taken as per the project ***HSE plan***.
- Ensure that chain block, shackles & webbing slings are calibrated with valid certificates and in a good working condition

8. Attachments:

- Inspection Test Plan for welding procedures.
- Risk Assessment for MS Pipe Welding.
- Inspection checklist