

EK 24. HDPE BORU MONTAJ UYGULAMA PLANI (HDPE PİPES METHOD STATEMENT) ÖRNEĞİ

METHOD STATEMENT

for

FABRICATION & INSTALLATION of HDPE PIPES

INDEX

- 1.0 SCOPE
- 2.0 STORAGE OF PIPES and FITTINGS
- 3.0 TRENCH PREPARATION and BACKFILLING
- 4.0 ROLL OUT of COILED PIPES
- 5.0 BUTT WELDING TECHNIQUE
- 6.0 ELECTROFUSION WELDING TECHNIQUE
- 7.0 SAFE OPERATION of BUTT WELDING UNITS
- 8.0 MAINTENANCE and REPAIR of WELDING UNITS
- 9.0 WELDING UNITS
- ATTACHMENT - BUTT WELDING PARAMETERS for HDPE PIPES

1. SCOPE

This Method Statement defines the requirements for fabrication and installation of HDPE pipework at SITE.

2. STORAGE of PIPES and FITTINGS

Pipes and fittings shall be stored in a way to protect the material from direct sunlight, heavy wind, mud and flammable products such as paint, benzene etc. HDPE fittings and materials should be kept under sheltered or tented area. The manufacturer recommends that pipes should not be stored under direct sunlight.

Pipes should be stored together one above the other but the height of the stored pipe must be identified according to the span of the pipes and the total height of pipe stock. Pipes' storage should be limited to avoid a permanent span deflection to happen on the pipe.

3. TRENCH PREPARATION and BACKFILLING

The width of the trench should be 60 cm for the pipe sizes below 200 mm and if the pipe size is between 200 to 600 mm, the width of the trench shall be the size of the pipe plus 20 cm.

Slope of the pipework shall be as shown on drawings.

Trench shall be excavated vertical without slope up to 1.5 m of laying depth. If a deeper trench is required, the slope of the trench should be identified by Safety Engineers according to the type of the excavated soil.

Trench shall be excavated to 15 cm below from the Bottom of Pipe Elevation and this section shall be filled with granular sand bedding material for prevention of pipes from the sharp edges of the rocks. The bedding shall be hand compacted.

After laying of the pipework, sand bedding shall be raised up to the 120 degrees section of the pipe from both sides.

Then, the pipework shall be backfilled with the approved material to 30 cm above of the pipe. Later, the excavated material shall be layer by layer backfilled to close the trench. Layer by layer compaction shall be carried out in compliance with specifications.

4. ROLL OUT of COILED PIPES

Some pipes delivered to site as rolled. When unrolling coiled pipes, care shall be taken not to twist or damage the pipe. If it necessary, twisted or damage sections of pipe shall be cut and removed.

To prevent a potential incident risk during unrolling, all strips over the coil, which holds the coil in shape, shall not be cut at the same time.

5. BUTT WELDING TECHNIQUE

Pipe size 4"(DN 100) and above sizes shall be butt welded. Pipe shall be welded only by special welding machines produced specially for HDPE welds.

Welding sections shall be free of debris, dust, oil etc. in order to have a qualified penetration in the bonding beads.

Welding machines shall be energized from the existing power system or generators. The power of the machine shall be minimum 4 kW. Welding units are generally 220/240 Volts-50 Hz.

- To make the welding, pipes shall be installed on the welding units by clamps specially designed for holding the pipe in position.
- By the skid mounted shaving units (trimmer), the bevels of the pipe shall be shaved (trimmed) to make the surface smooth and clean.
- Heating mirror (iron) shall be energized to the required welding temperature. (See attached butt welding parameters data sheet.
- Shaving units shall be removed between the pipes and eccentricity shall be controlled to make sure that the pipes are in the same axis.
- Teflon (or silverstone) coated heating iron shall be placed between the pipes and pipes shall be heated until they reach the welding temperature. (See attached butt welding parameters data sheet).
- Remove the heating iron and push the pipes to each other, under a pressure of 0,18 Mpa to 0,22 Mpa by a special lever operator which is placed on the welding unit. Pulling apparatus to push the pipes are operated manually or by hydraulic power and the type depends on the pipe size.
- Pressure shall be applied until having the correct size of the weld seam thickness according to project requirements. Weld bead thickness and width shall be controlled by special thickness and width gauge.
- Pipes shall be kept under that pressure until the cooling period of the weld is finished according to the requirements. (See attached butt welding parameters data sheet).
- Under rainy and windy conditions, welds shall be protected from the affect of the bad weather conditions. A sheltered or tented area is recommended under heavy weather conditions. If the required protective conditions are not supplied, the welding work will not be done.

Please refer to Attachment 1 for butt welding parameters.

6. ELECTROFUSION WELDING TECHNIQUE

Electrofusion welding technique shall be applied to the pipe sizes below 4" (DN 100).

All fittings have electrofusion nipples on them, to observe the welding process.

- Pipes shall be cut with hand saw with thin cutting edges so the surface will be smooth enough to proceed with.
- Pipes shall be welded with special electrofusion type of couplings.

- First of all, pipe section which will be inserted into the coupling shall be marked. This section shall be cleaned from debris and oxidized surface shall be removed by scrapers and flap disks. The surface then to be cleaned with alcohol.
- Barcode labels of the fittings will indicate the weld duration related with the weather temperature.
- Power supply to welding units should be stagnant during process time. Alignment of the pipes shall be checked before energizing the welding unit.
- Pipes shall be not be moved and shall not be in contact with water until weld bead gets cooled.
- Fusion nipples of the fittings and couplings shall be kept away free from oil and water.
- For the connection points, steel flanges shall be inserted to the HDPE pipe and pipe ends shall be welded by electrofusion type of couplings.

7. SAFE OPERATION of BUTT WELDING UNITS

- Welding unit shall not be used for any other purpose.
- Only trained personnel shall use the welding machine.
- Cables for the welding units shall not be laid down through the roads.
- After completing the welding, welding machine should not be moved before the heating iron cooled down. If transportation is required and mandatory, operator must make sure that cables of the machine is not touching with the heating iron.
- Operator shall not touch to the iron, when it is hot.
- Cable insulation shall be checked before the welding unit is started.
- Welding process shall not be performed in an explosive atmosphere such as near the units producing explosive or toxic gases.
- Since breathing of the melted plastic could cause problems in lungs and respiration system, welding area to be ventilated.
- Operator shall never touch to the shaving blades.

8. MAINTENANCE and REPAIR of WELDING UNITS

Surface of the heating iron shall be cleaned as per manufacturer recommendation prior to use of the equipment.

Lubrication of the equipment shall be done according to the maintenance manual of the Vendor.

All repair works shall be made by qualified personnel only.

9. WELDING UNITS

9.1 Butt Welding Units:

Type and Model : or similar

Range : 63 mm – 250 mm

Heating Iron : Removable PTFE or Silverstone coated, (220 V, 50 Hz, W)

Shaving Tool : Removable electric facing tool with double blades.

Compression Unit: Double acting electro hydraulic unit with pressure gauge and flexible hoses

with quick coupling. Maximum working pressure is 60 barg. 0.8 kW, 220 V, 50 Hz.

Type and Model : or similar

Range : 200 mm – 500 mm

Heating Mirror : Removable PTFE or Silverstone coated, (220 V, 50 Hz, W)

Shaving Tool : Removable electric facing tool with double blades.

Compression Unit: Double acting electro hydraulic unit with pressure gauge and flexible hoses
with quick coupling. Maximum working pressure is 60 barg. 0.8 kW, 220 V, 50 Hz.

9.2 Electro fusion Welding Units:

Type and Model : or similar Electrofusion Control Unit
Range : 20 mm – 630 mm
Working Temperature : Minus 10 deg to Plus 45 deg Celsius
Nominal Input Voltage : 230 V - 50/60 Hz
Output Voltage : 8 - 44 V
Max Input Power : VA
Protection Degree : IP 54

ATTACHMENT 1.

BUTT WELDING PARAMETERS for HDPE PIPES

Nominal Pipe Size	Wall Thickness (mm)	Pressure Class (bar)	Weld Thickness under Pressure (mm)	Free Heating Duration (sec)	Removal Time for heating mirror (sec)	Welding Pressure Arrival Duration (sec)	Cooling Period Under Pressure (min)
110	10	16	1,5	150	3	3	15
125	11,4	16	1,64	171	3	3	16
140	12,7	16	1,77	191	3	3	17
160	14,6	16	1,96	219	3	3	18
180	16,4	16	2,14	246	3	3	19
200	18,2	16	2,32	273	3	3	20
225	20,5	16	2,55	308	3	3	21
250	22,7	16	2,77	341	3	3	22
280	25,4	16	3,04	381	3	3	23
315	18,6	16	3,36	429	3	3	25
355	32,2	16	3,72	483	3	3	27
400	36,3	16	4,13	545	3	3	29
450	40,9	16	4,59	614	3	3	31
500	45,4	16	5,04	681	3	3	33