

1.4 TRAINING

It is necessary that operators, inspection and supervisory personnel acquire the skills of electro fusion fitting fusion. The necessary training should be carried out by a qualified instructor with the objective of enabling participants to;

- Understand the principles of electro fusion fitting jointing.
- Identify pipe and appropriate fitting markings.
- Carry out pre-jointing machine and equipment checks.
- Make satisfactory electro fusion fitting joints from pipes and fittings of different sizes.
- Inspect for and identify joints of acceptable quality.

Note that some form of assessment and certification should be associated with the training. The certificate should detail the pipe and fitting size range. And the equipment used. A register of successful participants should be kept.

1.5 ELECTRO FUSION SADDLE JOINTING

- With electro fusion saddle jointing, an electrical resistance element is incorporated in the base of the saddle which, when connected to the appropriate power supply, melts and fuses the material of the fitting and the pipe together.
- The success of the technique depends on effective preparation of the jointing surfaces, in particular the removal of the oxidized surface of the pipe over the area equivalent to the area of the saddle base, and cleaning of the pipe surfaces.
- Methods of holding the tapping tee saddle during the fusion cycle are used namely, top loading and under clamping. The general parameters are similar. In some cases, if the manufacturer's procedure for holding the fitting is provided, then the same should be followed during the fusion cycle.

1.6 ELECTRO FUSION SADDLE JOINTING METHOD/ PROCEDURE

- Expose the pipe onto which the tapping tee is to be assembled, ensuring there is sufficient clear space around the pipe. In a trench, a minimum clearance of 150 mm is required.
- Clean the pipe over the general area on which the saddle is to be assembled using clean, disposable lint-free material.
- Without removing the fitting from its packaging, place it over the required position on the main. Mark the pipe surface all around and clear of the saddle base area using a felt tip pen or similar.

- Remove the surface of the pipe to a depth of 0.2 to 0.4 mm over the full area marked using a suitable tool. Remove the swarf.
- Connect the electro fusion control box input leads to the generator.

Check that the reset stop button, if fitted on the control box, is in the correct mode.

- Remove the two halves of fitting from its packing and clean the scraped area of the pipe surface and the bore of the fitting with a disposable wipe impregnated with Iso-propanol / Acetone. Ensure the prepared surfaces are completely dry before proceeding.

Note again that while Iso-propanol is a suitable cleaner, its use is subject to local Health and Safety Regulations.

- Position the fitting base onto the prepared pipe surface, and bring the lower saddle into position then gradually and evenly tighten the nuts until the upper saddle makes firm contact with the scraped pipe.
- Check that there is sufficient fuel for the generator to complete the joint. Start the generator and check that it is functioning correctly.
- Switch on the control box if applicable.
- Connect the control box output leads to the fitting terminals and check that they have been fully inserted.
- If required by the control box, enter the fusion jointing time into the control box timer. The jointing time is indicated on the fitting. Check the correct time is shown on the control box display.

Note 1: Automatic control boxes are available which obviate the need to enter the fusion time.

Note 2: Gloves and goggles should be worn during the jointing process.

- Press the start button on the control box and check that the heating cycle is proceeding as indicated on the display.
- On completion of the heating cycle, the melt indicators, where incorporated should have risen. If there is no apparent move in the melt indicators, a new saddle joint should be made. Cut the tee of the faulty joint from its base.
- If a satisfactory joint has been made, the joint is to be left in the clamps for the cooling time specified on the fitting label or by the automatic control box.

Note 3: If the fusion cycle terminates before completion of the countdown, check for

faults as indicated by the control box warning lights and check that there is adequate fuel in the generator. DO NOT attempt a second fusion cycle within one hour of the first attempt.

Note 4: The connection of the service pipe to the fitting outlet should be carried out in accordance with the procedure of the appropriate section of this Item.

Note 5: DO NOT attempt to tap the main with the integral cutter for at least 10 minutes after completion of the cooling cycle.

1.7 RECORDS

Records of appropriate servicing and calibration of Electro Fusion machines/ joints shall be kept.

1.8 TRAINING

AS PER 1.6

Note that some form of assessment and certification should be associated with the training. The certificate should detail the pipe and fitting size range and the equipment used. A register of successful participants should be kept.

1.9 STOPPING THE GAS FLOW

In the operation of a distribution system there is a periodic need to stop the gas flow for either routine or emergency maintenance. The flow may be stopped through the use of installed fittings such as valves. Where installed fittings are not available or the use of such would cause significant supply disruption, then one of the following methods may be employed.

1.10 SQUEEZE-OFF

- To control the gas flow a special tool may be used to squeeze the pipe walls together. Hydraulic jacks are used to supply the necessary force to compress the pipe walls for sizes 90 mm and above.
- It will be seen the squeeze-off equipment comprises two bars to apply pressure to the outside of the pipe. The bars are brought together, either manually or hydraulically, squeezing the pipe material together until a seal is formed where the upper and lower walls meet.
- The hydraulic machines should have a spring return for the jack and locking to prevent accidental release of pressure during operation. All squeeze-off machines should be fitted with check plate or stops to avoid over compression of the pipe.
- Where the pipe walls are compressed the polyethylene pipe will be severely deformed in the regions of maximum compression. The pipe will eventually regain its original shape after squeezing but there will be some reduction in the pressure bearing properties.

- A complete stop may not always be obtainable because of wrinkling of the inside of the pipe. If a complete stop is required then a second squeeze can be used, with an intermediate vent to remove the gas which passes the first squeeze from say the trench area. A second squeeze-off procedure should be a minimum of three pipe diameters and right angles to the initial squeeze.
- While not essential it would be good practice to fit a reinforcing stainless steel band do not squeeze again adhesive tape around the pipe upon the completion of a squeezing operation.

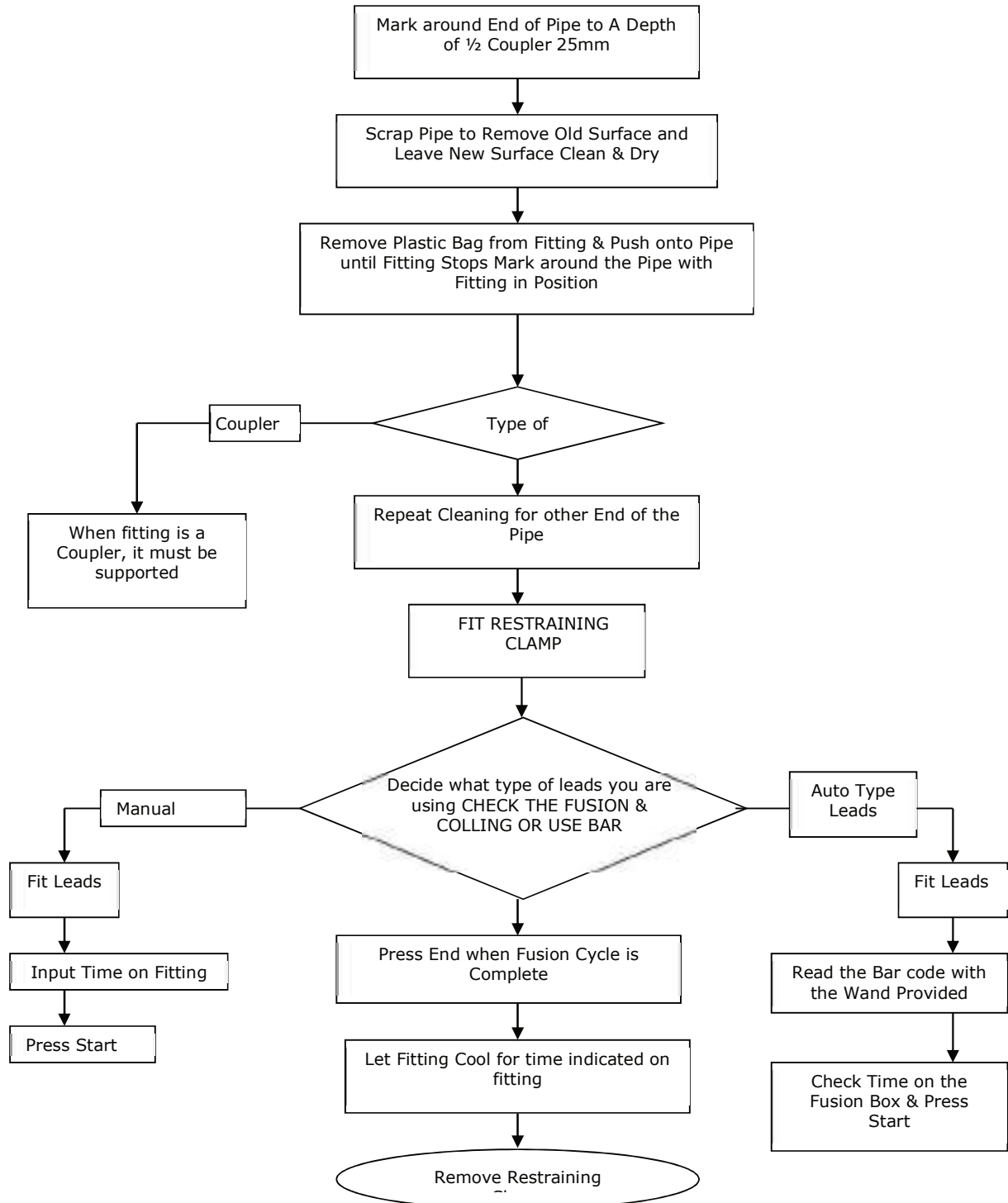
1.11 BENDING-BACK

Bending back of the pipe may be performed where the pipe has been severed damaged and stopping the gas flow is imperative. Its application is of a temporary nature, and will provide relief until a permanent repair can be affected. The section of pipe, which has been bent back, will have to be replaced because of the damage caused by the severe ness of the bend back operation. The need for any bend back operation is most likely to occur as a consequence of damage caused to a PE service pipe.

While it is not the prime function of a saddle tee, controlling the flow in a service may be achieved by opening up on an installed saddle tee and winding down the internal tapping tool to shut off the flow into the service pipe.

ANNEXURE # 1

FUSION COUPLERS FROM 20MM TO 180MM





ENERGISING QUALITY

VCS QUALITY SERVICES PVT. LTD.

STANDARD SPECIFICATION–FABRICATION, SUPPLY AND INSTALLATION OF WIRDED CAGES FOR MRS IN NCT OF DELHI & NCR

VCS – SS – PL - 0052

00	18.06.18	ISSUED AS STANDARD	BS	MVK	AD
REV	DATE	Purpose	Prepared By	Checked By	Approved By



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1.0 DEFINATIONS

Owner	Shall mean Indraprastha Gas Ltd. (IGL).
Manufacturer	Means the Manufacturer of the Steel Reinforced Rubber Hose.
SS	Means the present <<Standard Specification>> and its appendix, if any.
Third Party Inspection Agency	Means the Inspection Agency to be appointed by IGL.
PMC	Means the Project Management Consultant

2.0 SCOPE OF WORK

Installation of single entry key lock arrangement in MRS and wall mounting meter installation Including structure fabrication, supply and installation with material and hardware, single key lock etc.

- Material for MRS cages used shall be as follows:

Sr. No.	Item	Material	Dimensions/size (mm)
1	Angle	MS	65 X 65 X6
2	Flat	MS	50 X 6
3	Wire mesh	MS	75 X 30 X 4

- Material for wall Mounted cages used shall be as follows:

Sr. No.	Item	Material	Dimensions/size (mm)
1	Angle	MS	40 X 40 X 5
2	Flat	MS	25 X 4
3	Wire mesh	MS	75 X 30 X 4

- The MRS shall be enclosed by MS wire net fencing. The fencing shall be supported by adequate angle iron frame work and shall have iron bracings of the angle iron frames. Framework of gates of the MRS skid shall be made up of M.S. plate and angles. Angles are jointed with nuts and bolts. The corner of the fencing joints must be permanent (welded). The complete fencing work shall be painted with two coats of primer and two coats of suitable weatherproof paint.



- As per the requirement of fabrication & installation of fencing, the contractor will visit different sites for measurement /accessibility of the jobs. Once the measurement is done, fabrication and installation of fencing in proper size with reference to the skid, is the responsibility of the contractor.
At certain MRS skids where cages are already in place but require little modification shall also be in contractor's scope and payment shall be made accordingly.
- For fabrication of fencing (cage) structure, all the essential jobs viz. cutting, welding, grinding, finishing, painting including all materials like Angle, channel, wire net, support sheet, hardware ,electrode, grinding, wheel, gas cylinder, paint, primer, grouting, equipment, tools, generator for power welding machine, accessory etc.isunder contractor's scope.
- All activities related to offsite fabrication of structure will be carried out contractor's work shop. Only after complete fabrication and painting (red oxide primer plus two coat of Canary yellow paint on wire mesh and green bus colour paint on angle and flats). The structure will be installed to different sites of Delhi and NCR and is within the scope of contractor.
- Transportation and installation of fabricated structure/ fencing on different sites is under contractor's scope.
- All loading and unloading related jobs are to be carried out by the contractor.
- Contractor shall arrange own transport for movement of welding equipment, generator and man power.
- All necessary PPE's (personal protective equipment) required for carrying out jobs at sites as per the safety norms of IGL shall be provided by the contractor to their welder and helpers.
- The contractor shall inform well in advance after completion of cage fabrication at the workshop, the date of installation of cage to the IGL representative in order to arrange a shutdown of MRS at the customer's premises.
- The contractor has to complete all site jobs in one day at one site (Site jobs i.e. grouting of MRS cage /structure, fastening, installation, finishing, final painting, removal and disposal of waste items) after completion of jobs from customer's premises.
- The cage shall cover the MRS from all four sides and top also. Door is to be provided of the size 2400x1000 mm to approach the MRS. Wall mounted installation doors will be of size by 600x600 mm.
- In the MRS Cage ,following materials need to be used:
Welding of heavy duty handle with black color Teflon covers for opening and closing the door to the locking arrangement.



Installation of single entry key type lock (Harrison make 8 mm 5 lever lock with computerize key only).

Bolting of roof fame and side frame by 10 MM HT bolt and nut & washer and welded after fastening.

- Installation charges also includes providing 2 seats of welding machine, two welder teams And DG sets for site work.
- The complete cage should be well grouted and stable.

3.0 TECHNICAL SPECIFICATION

Civil, Structural & finishing works contents

- Civil & Structural Works
- Plain and reinforced cement concrete
- Structural steel works
- Synthetic enamel paint

Civil & Structural Works Material Specifications

Material Specifications

- **Brick**

Bricks for masonry work shall confirm to IS: 1077 specification for common burn clay building bricks and crushing strength not less than 75 kg/cm². Specific requirement like dimensions, tolerances and other common requirements shall confirm to IS: 1077. Bricks shall have smooth rectangular faces with sharp corners and shall be well burn, sound hard, tough and uniform in color. These shall be free from cracks, chips, flaws and Florence. All tests shall confirm as per the requirements of IS 5454 and IS 3495. Water absorption shall not more than 20% by its dry weight when soaked in cold water for 24 hours.

- **Cement**

Cement to be used for civil & structural work shall be of 43 grade/53 grade ordinary Portland Cement confirming to IS: 88112/IS: 12269 respectively.

- **Steel**

All steel bars, sections, plates and other miscellaneous steel materials shall be free from rust, oil, mud, paint or other coatings. Reinforcement bars to be used for civil & Structural work shall be of high strength deformed steel bars of grade FE 415 confirming to IS: 1786.

- **Aggregate**

Coarse & fine aggregates for civil & structural work shall confirm in all respects to IS: 383 latest.

- **Water**

Water used for Civil & structural work shall be cleaned and free from injurious amount of oil, acids Alkalis, organic matters or other harmful substances which