Plastics Industry Pipe Association of Australia Limited ACN 086 511 686

ELECTROFUSION JOINTING OF POLYETHYLENE (PE) PIPE AND FITTINGS FOR PRESSURE APPLICATIONS

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This article has been prepared for pipes and fittings complying with AS/NZS 4130 and AS/NZS 4129 respectively.

WHAT IS ELECTROFUSION JOINTING?

With electrofusion jointing, an electrical resistance element is incorporated in the socket of the fitting which, when connected to an appropriate power supply, melts and fuses the materials of the pipe and fitting together. The effectiveness of this technique depends on attention to preparation of the jointing surfaces and ensuring the surfaces to be welded have satisfactory contact during the welding and cooling cycles.

Pipe clamps or other approved methods of restraining, aligning and rerounding the pipes during the fusion cycle should be used.

PROCEDURE

- Ensure there is sufficient space to permit access to the jointing area.
- Cover the pipe ends remote from the fitting joint, to ensure airflow through the pipeline cannot occur during the heating and cooling cycles.
- Check that the pipe ends to be jointed are cut square to the axis and any burrs removed.
- Wipe pipe ends using clean, disposable, lint free material to remove traces of dirt mud, etc. Pipe ends may be washed with clean water if necessary and dried with the lint free material. Ensure pipe end is completely dry before proceeding.
- Measure the depth of penetration of the fitting by placing the socket of the bagged fitting alongside the pipe end and put a witness mark on the pipe at half the fitting length to indicate the area to be scraped. Do not remove the fitting from its packaging at this stage.
- Check that the pipe clamps are of the correct size for the pipes to be jointed.
- Using an appropriate pipe scraper, as recommended by the pipe or fitting manufacturer, remove the entire surface of the pipe over the area indicated, to a depth of approximately 0.3mm. Metal files, rasps, emery paper etc are not suitable end preparation tools.
- Wipe the scraped surface with an authorised Ispropanol impregnated pipewipe, as recommended by the pipe or fitting manufacturer, to remove any dust residue. Methylated spirits, acetone, methyl ethyl ketone (MEK) or other solvents are not recommended for wiping the scraped surface. Ensure the prepared surfaces are completely dry before proceeding.

- Remove the fitting from its packaging and check the bore of the fitting is clean. The bore of the fitting may be wiped with an approved pipewipe if necessary. Ensure the bore is completely dry before proceeding.
- Insert the pipe end(s) into the fitting so that they are in contact with the centre stops.
- Using pipe clamps, or other suitable means, secure the pipe(s) so that they cannot move during the fusion cycle. Check that the pipe end(s) and the fitting are correctly aligned.
- Ensure the generator is switched on and running satisfactorily before connecting the electrofusion control box to the power source.
- Identify the required jointing time, which should be indicated on the fitting.
- Check that the correct time is shown on the control box display.
- 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, one or both melt indicators should have risen. If there is no apparent movement of either indicator the joint could be unsatisfactory and should be investigated.
- If a satisfactory joint has been made, the joint should be left in the clamps for the cooling period specified on the fitting.

ADDITIONAL NOTES

- Electrofusion fittings for pressure applications are usually recommended for use with PE pipes SDR17 or thicker. Some manufacturers supply electrofusion fittings for thinner pipes, down to SDR33 whereas others limit the use of some saddle type fittings to SDR11 or thicker.

  These limitations are usually detailed on the fitting body or on the packaging.

  If in doubt, check with the supplier or manufacturer as unsatisfactory joints are likely to occur if the fitting/pipe combination is incorrect.

  Pipes of different grades of PE and/or SDR can be jointed successfully using electrofusion sockets, provided that all components have adequate nominal pressure rating for the operating conditions and the PE materials comply with AS/NZS4131.
- Contamination of the jointing surfaces by dust and/or moisture are likely to result in unsatisfactory joints. A shelter should be used to provide adequate protection for the pipe, fittings and equipment against adverse weather conditions and contamination.
- When saddle type fittings are used, the offtake hole in the pipe must not be cut until the fitting has completed the required cooling time.
- It is good practice to open only one end of the fitting package if both ends are not to be connected immediately to a pipe. The package can then be fixed in place to enclose the exposed end of the fitting to keep the fitting bore free from contamination.
- When a melt indicator rises, it indicates that heat has been applied to the fitting. Movement of a melt indicator does not in any way indicate correct welding procedures have necessarily occurred or that a good quality joint has been completed.

- Only electrofusion fittings that comply with AS/NZS 4129 should be used for pressure applications.

- Users are reminded that fusion jointing is a skilled operation and operators should be trained to an appropriate standard. Refer to PIPA or your supplier for details of suitable training courses available in your area.
- These procedures may be injurious to health if adequate precautions are not taken. They refer only to technical suitability and do not absolve the user from legal obligations relating to health and safety at any stage.
- Further detailed information on electrofusion jointing is available in Industry Guideline POP001 which can be downloaded free of charge from this web site.

For Further information please contact :
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