

Municipal Advisory Board

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MAB Basic HDPE Repair Options

(MAB-4-2023)



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FOREWORD

The MAB-4 Basic HDPE Repair Options document was developed by the Municipal Advisory Board (MAB) and published with the help of the members of the Plastics Pipe Institute, Inc. (PPI).

The MAB-4 Basic HDPE Repair Options is intended as a guide for engineers, users, contractors, code officials, and other interested parties for use in the repair of high density polyethylene (HDPE) pressure water piping systems. The local utility or engineer may need to modify the document to adapt to local conditions, operations, and practices.

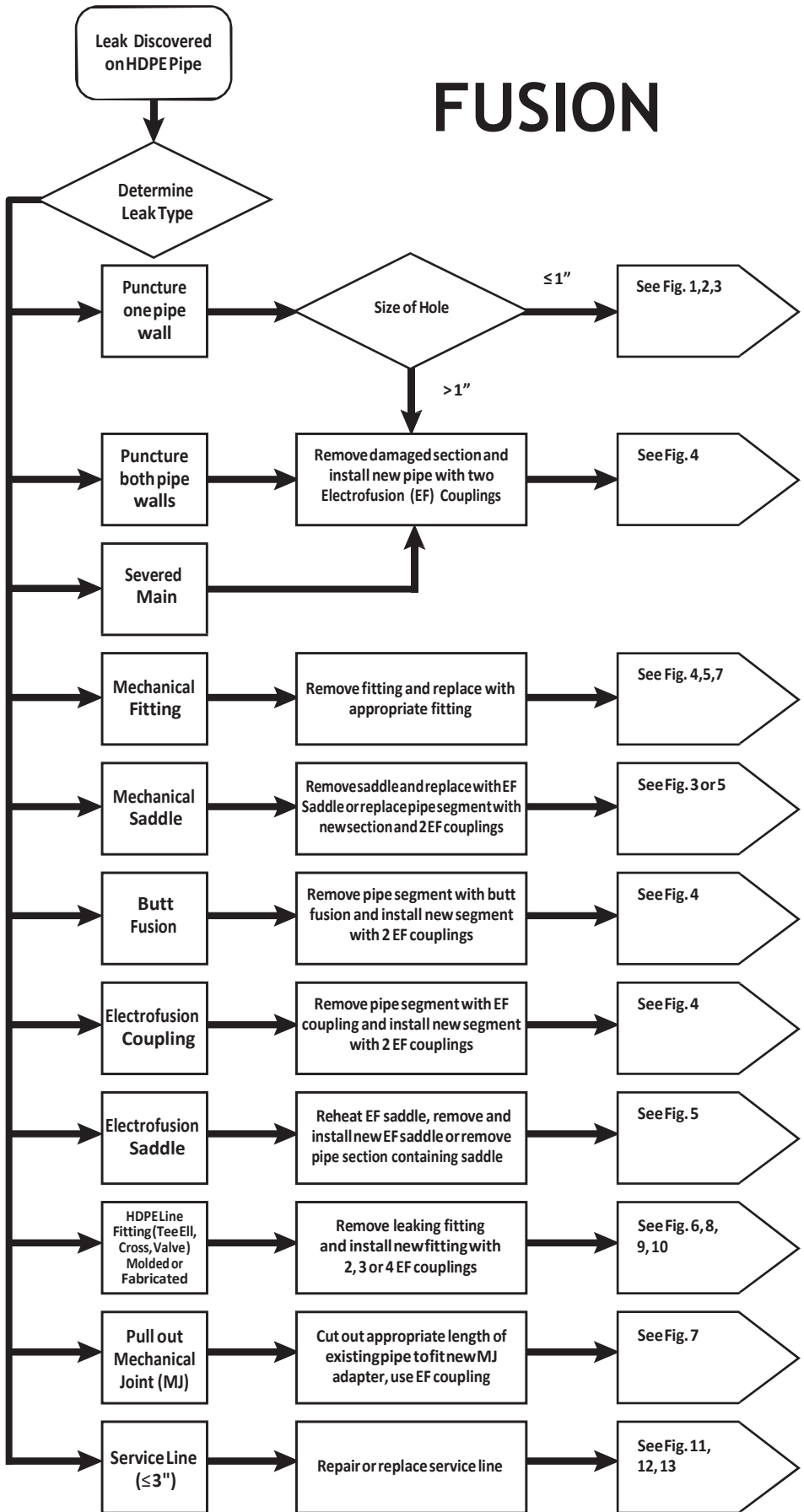
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The MAB serves as an independent, non-commercial adviser to the Municipal & Industrial (M & I) Division of the PPI. Once adopted, MAB will consider revising this document from time to time, in response to comments and suggestions from users. Please send suggestions of improvements to Camille George Rubeiz, PE, F.ASCE, at [*crubeiz@plasticpipe.org*](mailto:crubeiz@plasticpipe.org).

RECOMMENDATIONS

1. If you are able to eliminate water through the pipe, then fusion should be the first choice of repair.
2. Squeeze off tools can create dry conditions for fusion.
3. All mechanical couplings should include pull out resistance/restraint or be used with external restraint clamps when using non-restraint mechanical couplings.
4. Internal stiffeners should be used for all mechanical couplings.
5. Corrosion protection should be provided for all underground metallic fittings.
6. Fabricated fittings should always be at least one SDR thicker than pipe and have the same Pressure Rating as the pipeline.
7. Illustrations for repair with fabricated fittings are appropriate for molded fittings.
8. For mechanical connections, contact the fitting manufacturer to verify that these connections are designed to work specifically with HDPE.

FUSION



FUSION



Fig. 1 Repair Patch



Fig. 2 Branch Saddle w/cap

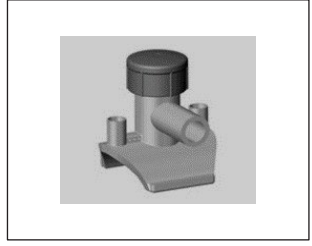


Fig. 3 Tapping Tee (requires outlet cap)

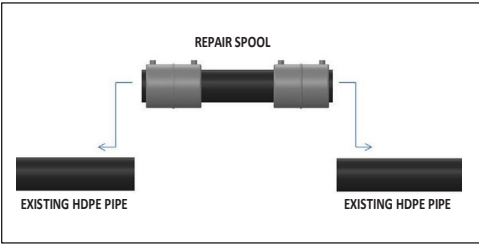


Fig. 4 Pipe Section Replacement with Two Electrofusion Couplings

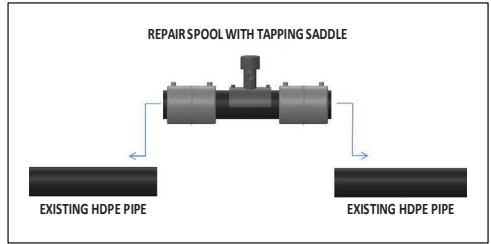


Fig. 5 Pipe Section Replacement with Tapping Tee

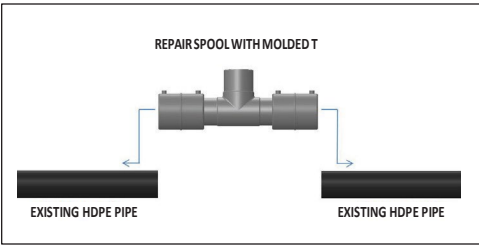


Fig. 6 Section Replacement with Molded Tee



Fig. 7 Mechanical Joint (MJ) Adapter w Install Kit



Fig. 8 Fabricated Elbow with Two EF Couplings



Fig. 9 Fabricated Tee with Three EF Couplings

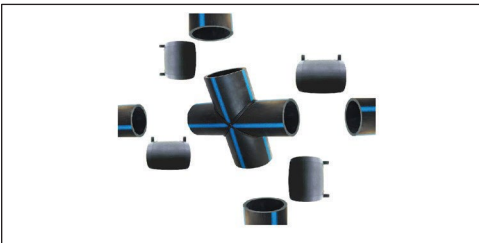


Fig. 10 Fabricated Cross with 4 EF Couplings



Fig. 11 Service line EF Coupling

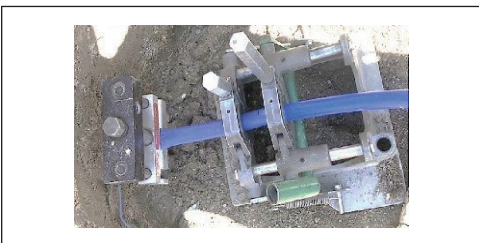


Fig. 12 Service Butt Fusion

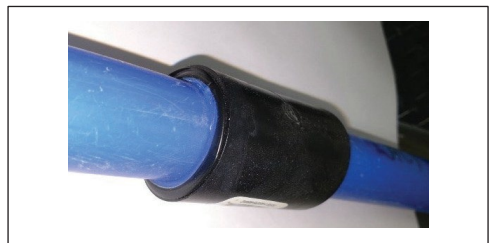


Fig. 13 Service Line Socket Fusion

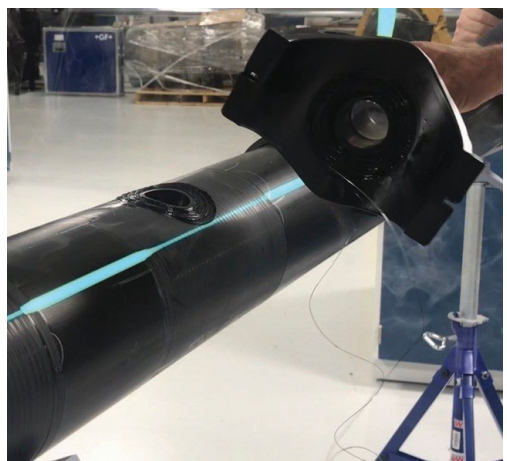
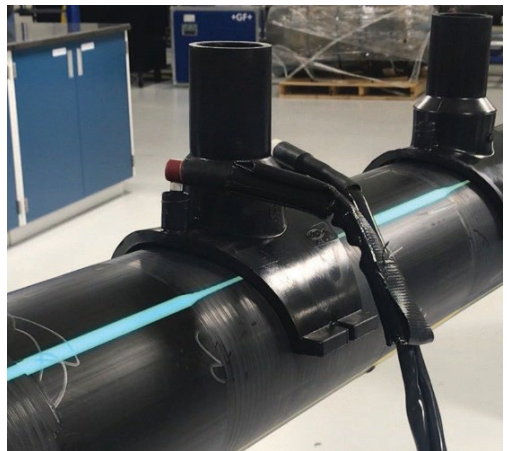
ELECTROFUSION REPAIR OF LEAKING SADDLE FUSIONS:

Leaks due to suspect electrofusion saddle joints can be repaired by removing the leaking connection and replacing the saddle. A weak or leaking fusion is likely due to contamination in the fusion zone or the lack of pipe preparation at the time of initial installation. In such cases, the saddle can be removed by re-energizing the heating coil to the point that the PE material becomes melted and softened. Once re-melted, the old saddle can be pulled from the pipe and a new saddle can be installed in the same location.

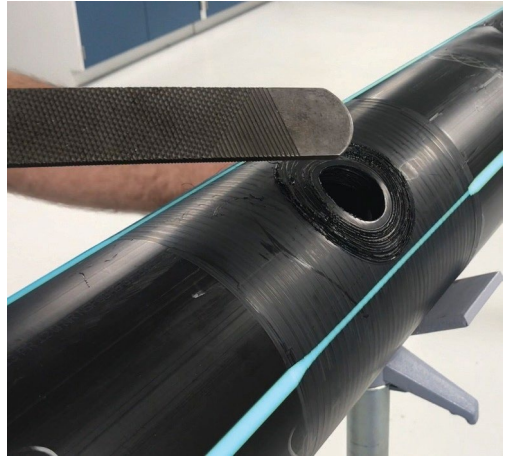
PROCEDURE:

Excavate to expose the suspect saddle and depressurize the system. Disconnect the service line and clean the pipe surfaces immediately surrounding the suspect saddle.

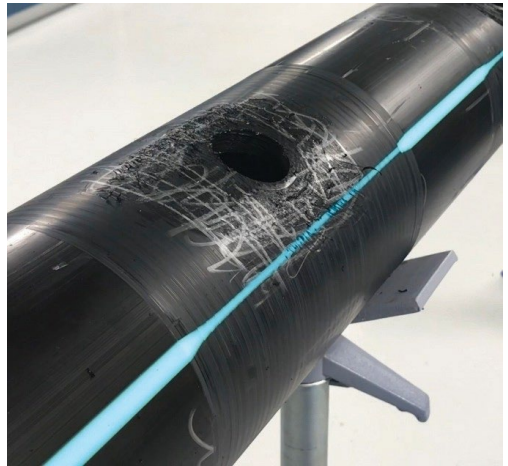
If the saddle has a “permanent” clamping device, such as a bolt-on strap or plastic underpart, the clamp must be removed. Connect the electrofusion control box to the suspect saddle and start the fusion cycle.



When the fusion cycle is complete, immediately pull the saddle from the pipe. Wear gloves and use caution to avoid burns from hot plastic or wires. Small tapping saddles can normally be removed by hand, but if necessary a suitable rubber mallet may be used to strike the fitting.



Inspect the pipe surface for damage. Remnants of PE material from the saddle will likely remain on the pipe surface and can be removed with a rasp to re-shape the pipe curvature. Once the remnants are removed, the pipe can be prepared for fusion by peeling/scraping using approved procedures. The tap hole may require that the peeler blade be manipulated to allow it to pass over the hole in the pipe as it revolves over that area.



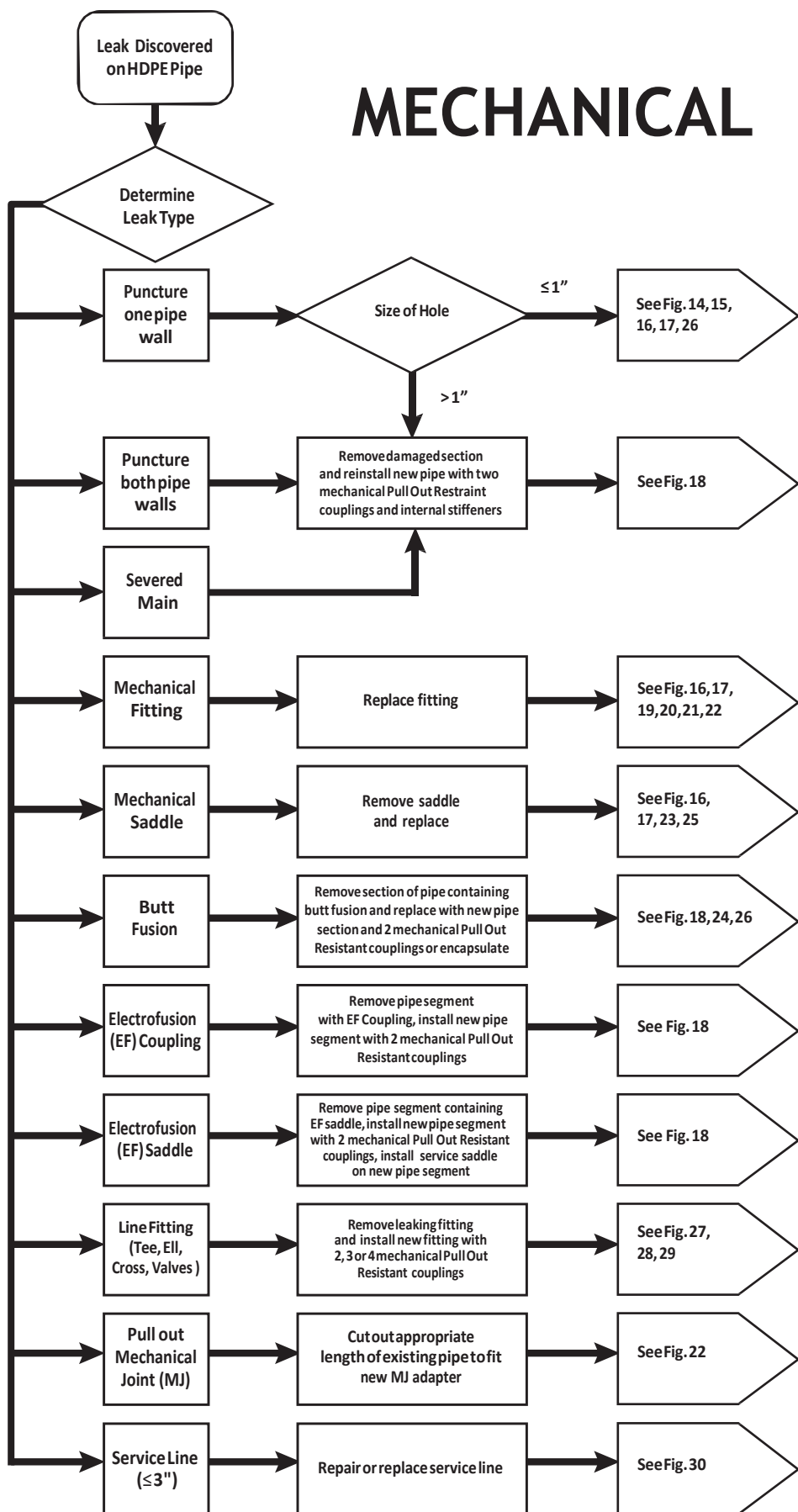
Place the new fitting over the tap hole carefully to ensure that the hole is inside of the fusion zone boundary. A mandrel or guide may be inserted into the tap hole to aid in aligning the replacement fitting over the hole. Clamp the fitting in place and fuse per normal procedures.



Allow the fitting to cool per normal procedures prior to removing the clamp, reconnecting the service line, and returning to service.



MECHANICAL



MECHANICAL



Fig. 14 Band Clamp



Fig. 15 Band Clamp w Pull Out Restraint

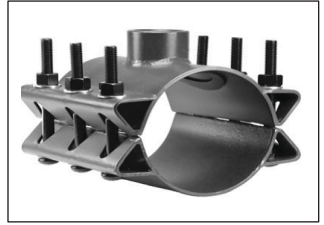


Fig. 16 Repair Sleeve requires outlet plug



Fig. 17 Repair Sleeve Flanged Outlet

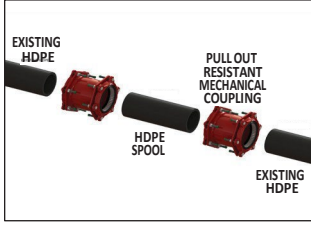


Fig. 18 HDPE Pipe Spool Replacement w Mechanical Couplings



Fig. 19 HDPE Flange



Fig. 20 Pull Out Resistant Coupling by Flange



Fig. 21 Fabricated Ell w Flanges



Fig. 22 Restrained Mechanical Joint



Fig. 23 "Mega-Lug" DIP Spool

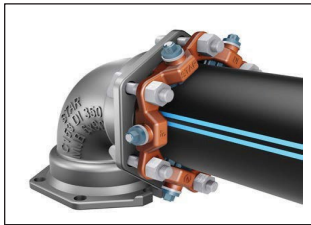


Fig. 24 "Mega-Lug" Connection to DIP Ell



Fig. 25 Service Saddle



Fig. 26 Band Clamp capable of Encapsulating Butt Fusion

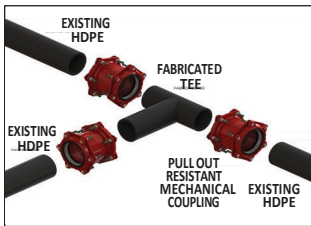


Fig. 27 Fabricated Tee

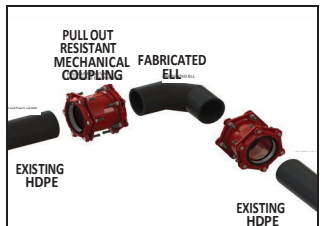


Fig. 28 Fabricated Ell



Fig. 29 Fabricated Cross



Fig. 30 Service Leak - Stab Type Coupling

FOR ADDITIONAL INFORMATION

- **ASTM F1041:** Standard Guide for Squeeze-Off of Polyolefin Gas Pressure Pipe and Tubing
- **ASTM F1055:** Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene and Crosslinked Polyethylene (PEX) Pipe and Tubing
- **ASTM F1563:** Standard Specification for Tools to Squeeze-off Polyethylene (PE) Gas Pipe or Tubing
- **ASTM F2620:** Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings
- **ASTM F3190:** Standard Practice for Heat Fusion Equipment (HFE) Operator Qualification on Polyethylene (PE) and Polyamide (PA) Pipe and Fittings

- **MAB-1:** MAB Generic Electrofusion Procedure for Field Joining of 12 Inch and Smaller Polyethylene (PE) Pipe
<https://plasticpipe.org/pdf/mab-generic-ef-110515.pdf>
- **MAB-2:** MAB Generic Electrofusion Procedure for Field Joining of 14 Inch to 30 Inch Polyethylene (PE) Pipe
<https://plasticpipe.org/pdf/mab-02-generic-electrofusiononn.pdf>
- **MAB-3:** MAB Model Specifications for PE 4710 Buried Potable Water Service, Distribution and Transmission Pipes and Fittings
<https://plasticpipe.org/pdf/mab3.pdf>
- **MAB-4:** MAB Basic HDPE Repair Options
https://plasticpipe.org/municipal_pipe/advisory/repairs/mab4.html

