

# NBS

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## NBS, Inc

### HDPE Lining

# Installation Steps

The HDPE liner is custom manufactured at an NBS qualified and approved extrusion facility that must also adhere to ISO 9001 standards. Because every HDPE liner project is customized with a liner OD larger than the ID of the host pipe, we work closely with our customers to determine their exact operating needs before recommending a final solution.

The logo for NBS, consisting of the letters 'N', 'B', and 'S' in a bold, blue, sans-serif font. The letters are slightly shadowed, giving them a three-dimensional appearance. They are centered horizontally within a dark rectangular area.

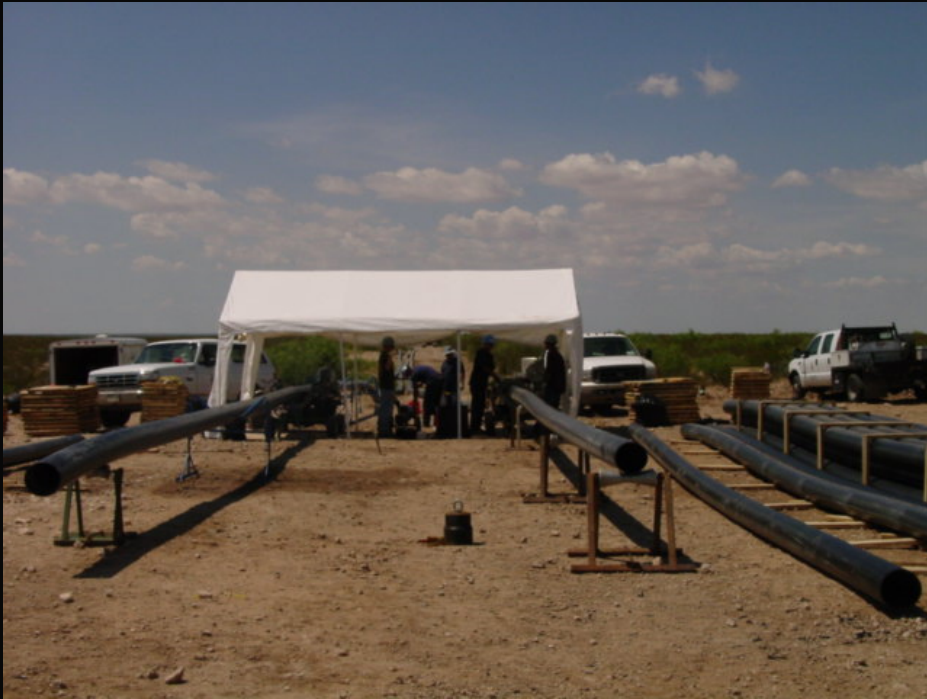
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Once the HDPE liner is extruded to the exacting standards of NBS, the polyethylene liner is delivered to the job site in individual lengths or “joints” up to 18 meters long.



On site, individual joints are thermally welded in a controlled environment using our specialized thermal fusion equipment. Our welds are tested to ASTM standards daily, individually monitored and logged, and then visually inspected to ensure quality in every joint. Our thermal fusions can be considered stronger than the extruded liner itself.



After de-beading, the result of this on site-fusion is to create individual and continuous lengths of HDPE liner that match the specific sections of carbon steel pipe to be lined.



Once the individual lengths are readied, the host pipe is also prepared to accept our HDPE liner. For this, a blow-down pig is fitted with a custom-sized metal gauge plate and connected to a steel cable or non-metallic rope. Compressed air is used to send the pig, plate and cable or rope from one end of the host pipe to the other. The metal plate acts as a Go/No-Go gauge such that if the pig and plate can get through the section of host pipe, the HDPE liner can be installed without obstruction.



With the cable now running through the host pipe, it is strung through the NBS specialized roller reduction machine and connected to the custom-made HDPE pull-head attached to the corresponding length of HDPE liner.



Once the NBS team is ready to install the section of liner, our specialized Liner Winch is used to carefully pull the liner through a series of custom-sized and custom-sequenced rollers. NBS offers both passive and active roller reduction machines depending on the complexity of our customer's project. Regardless, the roller reduction process takes advantage of the HDPE liner's thermoplastic qualities allowing the temporary reduction in diameter under radial and axial tension so that the normally larger OD of the HDPE liner will properly install inside of the smaller ID host pipe.





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After the Liner Winch tension and the clamps are released, the thermoplastic properties of the HDPE cause the liner to revert back toward its original diameter and length until it forms the tight fit against the steel host pipe. It is this tight radial fit that prevents lateral movement of the HDPE liner inside of the host pipe.



To ensure a proper bolt-up of the flanges and a leak free connection, NBS has a proprietary bolt up procedure and specifications, and we specially machine compression rings for each specific project. These rings fit between the steel flanges to make sure that the HDPE stub ends are properly compressed to form a leak-free seal above the pressure rating of the steel flanges.



Final bolt-up takes place and external monitoring vents are utilized in conjunction with a pressure test to confirm the absolute quality and integrity of the leak-free HDPE liner installation and product. Our engineering staff should be able to assist with recommendations of how best these monitoring vents can satisfy your manual, mechanical or automated needs to ensure and confirm leak free operation of your pipeline for years to come.

NBS rises far above the competition because we:

- Offer a technologically advanced HDPE lining solution
- Strive toward ISO 9001 qualification and certification
- Adhere to the highest safety standards
- All at the most cost effective price

Providing the highest level of customer loyalty and service, we never stop working for our customers.

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