



CORE LINEPIPE

**FREQUENTLY
ASKED
QUESTIONS
(FAQ)**



Table of Contents

Table of Contents	1
Bends & Risers	2
Burial Depth	2
Cathodic Protection	2
ClickWeld® Performance	3
Construction	3
CORE Liner®	4
CORE Service®	5
Cyclic Service	7
Electrofusion	8
Hydrotest, Leak Detection, Repair	10
Manufacturing	10
Performance & Design	11
Pressure Testing	14
Product Delivery/Inventory	14
Quality Control	15
Road Bores, HDD, Tensile	16
ROW	16
Temperature	16
Tie-ins, Futures, repairs, Pups	17
Torsional Forces	17
Venting	17
Versus Other Materials	18
Warranty	18

Bends & Risers



Can I bend CORE Linepipe® products?

Yes, CORE Linepipe® products can be bent to a minimum 20D bend radius. Our products must be cold bent to ensure that the internal liners are not compromised.

Can CORE Liner® be bent into a riser system?

Yes, CORE Liner® can be bent into 45 or 90-degree risers. Please see our bending and riser spec sheets and procedures for additional information.

Has the ClickWeld® mechanical joint been bend tested? Point loaded? Bend Cycled?

Yes, ClickWeld® exceeded all requirements for bend performance in the design & test program.

Burial Depth

How deep do I have to bury CORE Liner®?

CORE Liner® has no special requirements for burial depth. Consult your local regulatory bodies and use best practices when choosing depth of cover.

Cathodic Protection

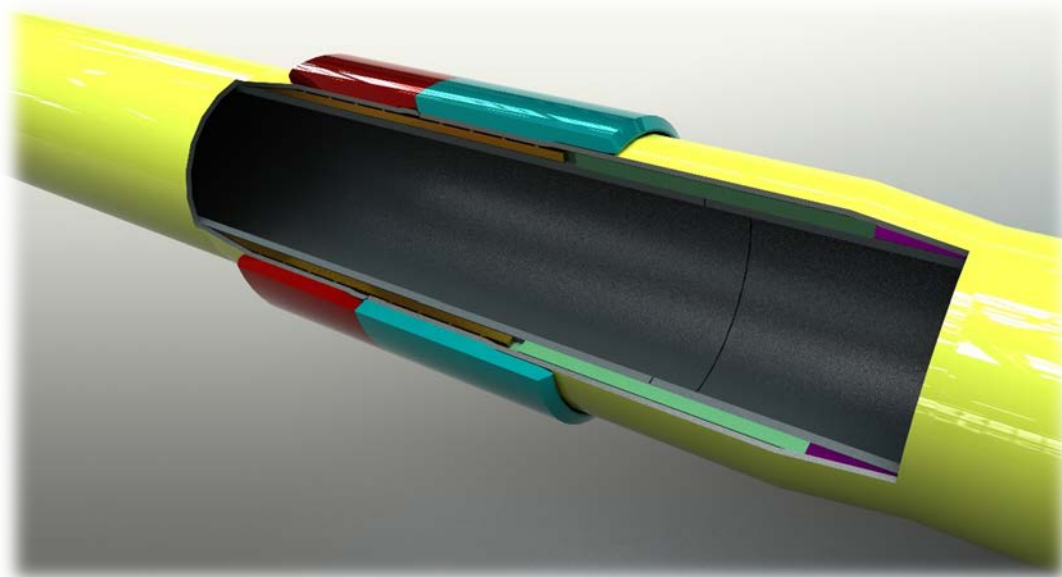
How do I design my cathodic protection system? Is there continuity across the joint? Is there additional resistivity?

There is full continuity across our joint, no electrical losses will be incurred.

ClickWeld® Performance

Is the mechanical joint (ClickWeld®) a weak point in the pipeline system?

ClickWeld® has proven to be the strongest point in our pipeline system, overperforming in all categories. The ClickWeld® connection has never failed a destructive test.



Construction

How much pipe can the CORE Service® team assemble in the field per day?

The cycle time of a ClickWeld® joint is consistently 6-11 minutes. When mainlining 600-1000m (depending on weather conditions) of completed pipe per day is very reasonable to expect. In our experience we can complete 4-6 tie-ins or crossings per day. Each tie-in or crossing takes roughly 1-2 hours depending on a variety of variables.

How many spreads do you currently have?

We have enough crews for 300+km of installations per year. We have strategically recruited CORE Service® team members with this in mind.

Where are your construction crews located?

Our operations teams (factory and field) are based out of Crossfield, Alberta. To cost effectively service markets across the WCSB we have strong relationships with contractors in all major oil patch service centers. This allows the CORE Service® team to deploy with only key personnel and critical equipment. Additional requirements for manpower and equipment will be sourced locally from our strategic partners.

CORE Liner®



What is the standard Wall Thickness of the Pipeline Liner material?

The standard liner thickness in a CORE Liner® product is .25" (6" NPS) .33" (8" NPS); however, this may vary depending on the engineering design requirements to ensure that CORE Liner® meets the demands of the intended service.

How long are the joints of steel?

18.9 to 19.7m. Any shipment of pipe received will maintain a length tolerance of +/- 0.25m from the average length.

What is the grade of steel?

359 Category II

CORE Service®

What does CORE Service® include?

CORE Service® completely removes welding and conventional liner installation crews. The CORE Service® team will deploy to site and integrate into a pipeline spread. Our team consists of 4 or 5 people, a track hoe, two trucks, Walter (custom field press), electrofusion machine, side by side, pipe, fittings etc.



What is the pipeline contractor responsible for?

ROW prep, strip, ditch, string, stabbing assistance, field bending, shrink sleeves, lowering, backfill, hydrotest etc. Basically, everything they typically would be responsible for with the

exception of welding or pulling a liner. Please review our detailed job execution package and tips for success sheet to see a detailed division of responsibilities.



Do I still need welders?

Not for the pipeline. The only welding work would be for riser pilings/sleepers or other surface piping requirements.

What do I do for risers?

CORE Liner® can easily be bent to a 45 or 90-degree configurations, joints are 9.4m long. Alternatively, a typical coated riser can be used, with a below grade flanged connections. Minimum 20D bends.

Who or what is Walter?

Walter is our custom field press that energizes our ClickWeld® joints.

How long does a joint take?

The cycle time of a ClickWeld® joint is consistently 6-11 minutes. When mainlining 800-1200m of completed pipe per day is achievable in good conditions.

How do you apply flanges?

Flanges are applied to the steel pipe using our ClickWeld® mechanical joining system. Please see our video and photo library for more information.

**What about flange stub ends?**

HDPE flange stub ends are specially injection-molded and then machined to CORE's strict tolerances in order to work in our system. The stub ends are electro-fused, as is the rest of the system. This is a significantly more reliable than conventional butt fusion methods that potentially leave the materials under strain.

Can you re-create the joining system in the field?

Yes, Walter (custom field press) is capable of recreating the ClickWeld® joint in the field. Walter recreates the cold worked bell and the CORE Service® team assembles the new ClickWeld® joint. Pipe can be cut to length; no pups are required. This is the same process for tie-ins, flanges and repairs.

How is the pipeline liner installed inside the steel in the CORE Liner® product?

The pipeline liner is installed inside the steel pipe in our factory. The liner sub-assembly (HDPE liner + EF Coupler) goes through a system of roller reduction wheels that simultaneously reduce the OD of the polyethylene and install it inside the steel conduit.

What do I do for shrink sleeves?

Currently we are using one pipe size larger, shrink sleeve rolls for CORE Liner® eg. 8" roll for our 6" product. Our CORE Service® team has worked with Shawcor – Pipeline Performance, to build a shrink sleeve spec and process for our products. Please review the

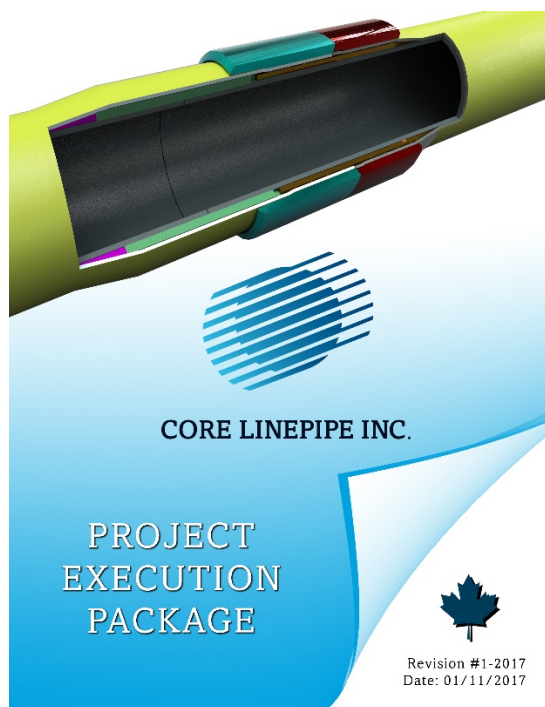
shrink sleeve spec as provided by Shawcor. Please refer to CORE's 'Project Execution Package' for additional details.

How do I handle CORE Liner® for stringing, lowering etc.

CORE Linepipe® handles like traditional steel pipe with very few variances. Some types of lifting equipment and methods may not be suitable (e.g. end hooks). Please see our detailed stringing procedure inside our Project Execution Package.

What support does CORE Service® require from the pipeline contractor?

The CORE Service® team requires dedicated support and access to one piece of equipment including an operator (side boom or hoe) and one labourer to assist with handling the pipe while we energize the ClickWeld® joints during mainline. For tie-ins, a minimum of 2 pieces of equipment are required to lift pipe.

**Where can I find specific details and the job/task descriptions for the workflow required to construct CORE Liner®?**

Please review our Project Execution package or contact CORE Sales to discuss contractor development training.

What about crossings?

Crossings are completed very similarly to steel pipelines. Often, we build a drag section and set it off to the side, this allows us to keep a high rate of mainline joint assembly.

Do the ClickWeld® electro-fusion access ports get sealed?

Yes, the access ports come with a gasket and threaded caps. They will be sealed before shrink sleeves are applied.

Cyclic Service

Will the product suffer from cyclic degradation?

CORE Linepipe® uses high grade steel and HDPE components to complete our pipeline liner system. As such, our products enjoy the strength of steel and corrosion resistant benefits of HDPE. There is no expected degradation of our system due to cyclic fatigue. Cyclic testing was performed in our design and test program by an independent laboratory.

Electrofusion

What are Electrofusion couplings?

Electrofusion couplings are an alternative HDPE joining system to that of butt fusion. The electrofusion joining system consists of a HDPE coupling that has embedded copper wiring connected to terminals. Two pieces of HDPE are then inserted inside the coupling. A current is passed through the terminals into the copper wiring inside the coupling. Once energized flow/melt of the coupling and HDPE pipe is achieved; this creates a permanent fusion. EF fittings require extremely tight material tolerances and have stringent preparation processes, they are extremely strong and reliable.

Is electrofusion a new technology?

No, EF couplings have been around for more than 50 years. EF's are commonplace in gas distribution and offer many advantages to the more common butt fusion.



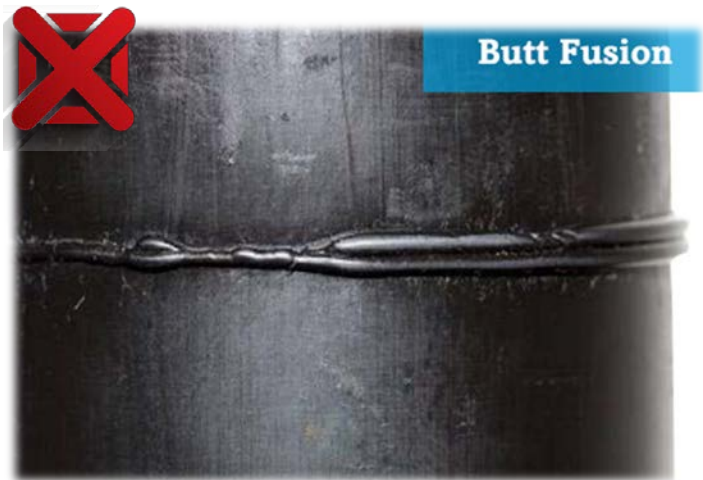
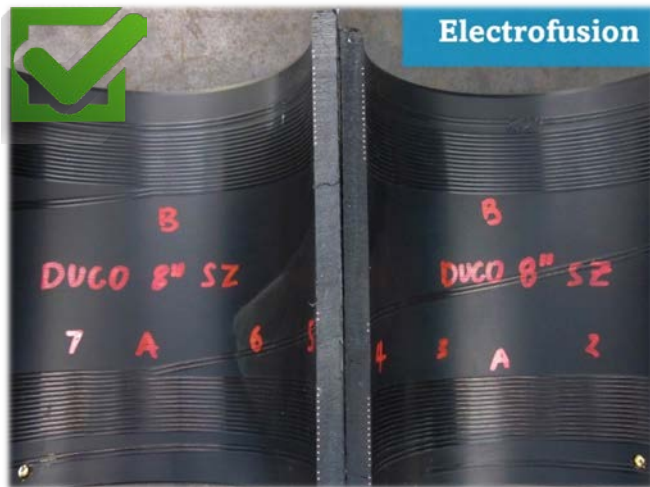
What are the advantages of electrofusion compared to butt fusions?

The EF fittings used in CORE Liner® are energized and monitored by a computer-driven electrofusion control unit (ECU). This machine automatically adjusts fusion/soak time to account for ambient temperature, it measures amps, volts, GPS location, time of day and temperature of fusion, as well as ensuring continuity of the wiring. If a permissive requirement is not met, the ECU machine will not allow the fusion to proceed. What this means is that there is a very comprehensive QC package available on all joints. Compared to butt fusions, this is a step change in QC. EF fittings also provide around 7 times more fusion area and associated strength compared to that of a butt fusion.



How does an EF fitting compare to a Butt Fusion?

In a pipeline liner application there are several very significant advantages in EF fittings when compared to butt fusions. The first is significantly enhanced QC, all aspects of the fusion are monitored and controlled by a computer processor, this is translated into a comprehensive QC package for EF fittings. In contrast a butt fusion is a relatively crude process that involves bringing two ends of pipe to their melt index and then pressing them together. Reliable butt fusions are particularly challenging to execute with a thin wall liner pipe compared to that of a butt fusion with a thick SDR pressure containing material; QC data and traceability is manual and unreliable for butt fusion. As such, the EF fitting in a liner application provides around 7 times more surface area and associated strength then that of a thin walled poly, butt fusion, in a liner. Another key difference is pigability. EF fittings produce an internal liner that is full-bore through the fusions and joining system, with no ID restrictions, which makes the system easily piggable. A conventional butt fusion produces fusion rings from the melted plastic on the inside of the pipe. This makes pigging a challenge.



Are there any NDT technologies to verify the integrity of the electro-fusion joint, while inside the steel carrier pipe?

Yes, there is a product offered by Russel NDE called a "Sea Snake" please visit their website for further information

How do you know that the joint has been completed successfully?

Extensive testing has been conducted on our electrofusion system to ensure that material tolerances and fusion calibrations are perfect every time. A stringent QC program ensures that incoming materials are of the highest quality and meet our specifications perfectly. In the field all materials are closely measured and the information is recorded. Through this rigorous system we can ensure that our fusions are perfect every time. The electrofusion processor logs all information about the actual fusion and it is compiled into a field QC package that provides complete traceability on all components.

How often is the EF machine calibrated?

EF is calibrated on a set schedule. The calibration is verified daily and at set intervals to ensure perfect fusions are being completed. These de-cohesion tests ensure that a ductile molecular fusion has occurred.

How do you QC incoming materials and joints in the factory?

All materials are inspected upon arrival. Our robust QC program for incoming materials ensures only the highest quality products are utilized for our product. For detailed information please contact your CORE Linerpipe® representative.

Hydrotest, Leak Detection, Repair

What is the repair and remediation process if the liner has been breached?

Cut out the failed section of liner, using our field press "Walter" we are able to recreate all activities done in the factory directly in the field. This allows fully customizable pup lengths for repairs, HDD, crossings, etc.

What is the Hydro-test procedure for CORE Liner®?

As per CSA Z662. (liner section 13.2, 13.2.2.10, 13.2.7, clause 8, clause 10)

*Please refer to our 'Project Execution Package' for additional information.



Manufacturing

Where do you manufacture CORE Liner®?

Our facility is in Crossfield, Alberta.



How is the pipeline liner installed inside the steel in the CORE Liner® product?

Our premium HDPE 4710 liner is inserted inside the steel pipe in our factory. The liner is temporarily compressed into the pipe through a system of reduction rollers that both reduce the OD of the polyethylened and push the material forward.

**How do you create the bell in the pipe?**

The steel pipe goes through a cold working process in our factory to create the bell in the pipe.

Performance & Design

I have experienced past liner failures, will CORE Liner® fail in the same way? Isn't this just another liner?

Failures of conventional liner systems and composite pipeline systems are a very broad topic. The CORE team has world leading experience in both composite pipeline systems and conventional field installed liners. Our intention is not to sell a product, rather we seek to partner with our clients, understand the demands of the intended service and deliver an engineered solution. CORE Liner® is not just another liner. We use premium materials and technology to deliver a product that can thrive in the most severe of service. Please contact your CORE sales representative to discuss this in further detail. Please review the critical design consideration matrix and engineering application review sections.

What causes Pipeline liner failure?

Typically, liner failures are due to a combination of factors. Temperature, material damage, material strain, incorrect material selection, cold fusions, dissimilar materials between stub end and liner, vacuum, crack propagation, chemical exposure, permeated pressure into interstitial space, conditioning period etc.

What kind of liner system is CORE Liner®? Is CORE a tight fit pipeline liner or an expanded poly pipeline liner?

CORE Liner® is a tight fit or interference fit pipeline liner system.

What is a Tight Fit pipeline Liner?

A tight fit pipeline liner system uses a plastic pipe that has a similar OD to the ID. of the steel conduit. As such, the liner's O.D. is temporarily reduced while it is installed inside the steel. After a brief period, the plastic rebounds to its natural size and shape and fits tightly inside the steel conduit.

What is the expected service life of CORE Liner®?

CORE Liner® has a minimum 25-year design life.

What are the most important factors to consider when designing a pipeline liner system to meet a 25-year service life?

Critical design considerations are very dependent on service. Temperature, pressure profile, chemical exposures, gas/fluid analysis etc. Please review our critical design considerations matrix.

Is the HDPE liner bonded to the steel?

No, the HDPE is tight fit but is not bonded.

Is there continuous interstitial or annular space between the HDPE liner and the steel pipe?

Yes, there is continuous interstitial or annular space between the HDPE and the steel. Permeated pressure is free to migrate to the nearest vents.

Is ClickWeld® gas and liquid tight?

Yes, all validation testing for the ClickWeld® joint has been conducted without a liner inside.

How do you apply flanges?

Flanges are ClickWeld®ed to the CORE Liner® system. Please see our tie-in procedure for additional information on the process.

What about flange stub ends?

Flange stub ends are machined to work in our system. The stub ends are electro-fused as is the rest of the system. This is a significantly more reliable than conventional butt fusion methods that potentially leave the materials under strain.

What about cold temperature installations?

CORE Liner® can be installed in temperatures as low as -20°C and we are presently testing for -30°C temperatures.

What about vacuum?

Vacuum is not recommended for any liner system and CORE Linepipe® recommends avoiding vacuum conditions or installing vacuum protection if vacuum is unavoidable. Please note that CORE Liner® is significantly more resistant to collapse than conventional liner systems. We have successfully completed vacuum testing and were not able to collapse our liner until the temperature rating of the liner had been drastically exceeded. Our EF fittings act as structural supports every 19m and our premium liner material is very robust. As per CSA Z662, pressure in the in the interstitial space between liner and steel is never to exceed the pressure inside the liner.

What about venting?

Venting is required at all flanges as per CSA. Although we do not require inline flanges (with the exception of flow joints), we do have the ability to install vents at every joint. Venting procedures are to be designed by the owner of the pipeline. Requirements will vary depending on the specific application. A routine venting program is always recommended.

What is the longest line that I should build without in-line vents?

This is a very application specific answer. Please contact your CORE sales representative to arrange a consultation with the CORE Engineering team.

**Is there a specific/unique calculation to determine the electrical resistance for CORE Linepipe®?**

Based on testing and discussions with CP professionals, we recommend the same electrical resistance calculations as a traditional welded steel pipe.

What type of testing has been completed pertaining to stress cracking? Specifically, on the belled section of pipe?

We test for SSC due to MR0175's limitation of 5% cold work or 15% cold work in grade 290 steel and below in fittings. It allows use of annex B of MR0175-2 to be used to justify other limits for cold work. CORE Liner®'s sour service rating was developed based on the results of the above-mentioned tests and associated results.

Pressure Testing

As it relates to CSA how can CORE Liner® only have one pressure test and not independently test both the steel and steel with liner?

CSA currently speaks to steel with an internal liner and mechanical joining systems independent of one another. There is no section of CSA that adequately addresses a system design such as CORE Liner®'s. With that in mind, CORE Liner® meets the relevant sections of CSA independently. However, there is no way to test the liner and steel independently. CORE does follow the hydrotest and leak test procedures as per CSA, which is more than adequate to validate both the structural integrity and seal of our system. All regulators in the WCSB have been contacted and are aware of our hydrotest package. We hope to have our system and procedure included in the next revision of CSA.

Product Delivery/Inventory

What are the lead times on an order?

In conjunction with our sales partners Gateway Tubulars, we carry an inventory of finished product. Virtually any order size could be delivered inside of two weeks from the date of order. We will always ensure that enough product is immediately available to service our valued clients.



Where does CORE Liner® ship from? Is freight included?

CORE Liner® ships from our facility in Crossfield, directly to your project site. CORE will arrange freight to location, with either your carrier or ours, and will provide a quote for approval.

What external coatings are available?

Currently CORE Liner® products are externally coated using Shawcor YJ or YJ2K products. Other coatings are available upon request to meet the demands of your application. For temperatures higher than 80C, Double Fusion Bond Epoxy or Napguard gold products are utilized.

**Do I need anything special to transport the product?**

Yes. CORE Liner® is shipped using custom carpeted bunks.

Materials handling – Is there any special method to load, unload or handle CORE Liner®?

Yes, special care is required to ensure that the ends of our

CORE Liner® products are not damaged, our mechanical joining system ClickWeld® is pre-installed. Please see the Handling and shipping procedure.

Quality Control

What about Quality Control (QC) in your electro-fusions? What data is available? What does my QC Package look like? What data is recorded in the field?

The EF fittings used in CORE Liner® are energized and controlled by a computer-driven electrofusion control unit (ECU). This machine automatically adjusts fusion/soak time to account for ambient temperature, it measures amps, volts, GPS location, time of day, temperature of fusion and ensure continuity of the wiring. If a permissive requirement is not met, the ECU will not allow the fusion to proceed. What this means is that there is a very comprehensive QC package available on all joints. Compared to conventional butt fusions, this is a step change in QC. EF fittings also provide around 7 times more fusion area and associated strength compared to that of butt fusions

How do you QC incoming materials?

All materials are inspected upon arrival. Our robust QC program for incoming materials ensures only the highest quality products are utilized for our product. For detailed information please reference the Technical Information Package.

What QC do I get on a ClickWeld® Joint?

The ClickWeld® QC package provides complete traceability of all materials, along with a 'weldmap' and a catalogue of all forces required to energize the mechanical joint.

**How do you know that a ClickWeld® has been completed successfully?**

The material tolerances are extremely tight on all components of a ClickWeld® joining system, mandrel O.D., pipe I.D., factory and field rings. Due to the precise nature of the component assembly, the forces that are required to complete a ClickWeld® joint are very consistent; there is a narrow window of acceptable forces that we closely measure during the swaging process.

Road Bores, HDD, Tensile

What about Road Bores / HDD? Will ClickWeld® pull apart? Is there a pull head? How hard can I pull on it?

CORE Liner® is an excellent fit for HDD applications, road bores etc. Our pull head is easily attached to the mandrel on factory end of the pipe. Our current guidance is to not exceed a 190,000lbs pull force. If higher pull forces are required, please contact the CORE sales team to evaluate the specific application.



ROW

How big of a ROW does a CORE installation require?

15m is adequate on most jobs.

A minimum of 6.4m (21ft) is required from the edge of the ditch to the edge of the ROW.

Temperature

Is ClickWeld® rated for low temperature and high temperature service?

Yes, ClickWeld® is rated for low temperature (-46C) and high temp service in continuous operations at 80C. Temporary temperature excursions in upset conditions may be acceptable up to 95C for brief periods, depending on the specific service and operating characteristics of the line. Please contact a CORE Sales representative for further information.

Tie-ins, Futures, repairs, Pups

How do I repair a line if there is an issue? Can we pull out the liner as we would in a conventional liner retrieval?

No, the liner system cannot be retrieved from the CORE Liner® product as it could in a conventional liner system. However, the CORE Service® team can easily repair a failed section by cutting out the necessary segment (both steel and liner), then recreating the bell and ClickWeld® system on the pipeline and installing a custom field pup. The process is fast and very efficient.

Do I require PUPS?

No, CORE Liner® products can be cut to length. The CORE Service® team can easily recreate our proprietary ClickWeld® joining system in the field. This is how we install flow joints, flanges etc.

Do I need to install future flow joints (Tee's and Y-Laterals)?

No, installing future flow joints that would be blinded off, is not a requirement. The CORE Service® tie-in team can quickly and efficiently perform flow joint installations in the future, as required.

How do I tie-in to CORE Liner®?

A flanged flow-joint is currently the most effective way to tie-in to CORE Liner®. In the future, CORE will offer custom ClickWeld®ed flow joints, check with your CORE Sales representative for additional information.

Torsional Forces

What about torsional loading?

Unlike spooled composites, CORE Liner® does not have a natural tendency to twist. ClickWeld® is the strongest component of our pipeline system, there is absolutely no expectation that torsional forces will present an issue. Torsional testing has been successfully completed.

Venting

Do you have to jumper vent every ClickWeld® joint?

CORE Liner® products maintain continuous interstitial space between the liner and steel carrier pipe throughout the length of the pipeline. Venting is still required at all flanges, both buried and above ground as per CSA. No venting is required at the ClickWeld® fitting.

Versus Other Materials

How does CORE Liner® compare to conventional field installed liner systems?

Based on our experience in the liner industry, the CORE Liner® system can save up to 20-30% on total project costs when compared to a conventional pulled system, utilizing comparable materials. If you require assistance in understanding the full benefit of our system, please contact the CORE Sales team for help.

Warranty

Does CORE Linepipe® provide a product warranty?

Yes, we provide a one-year warranty on all product and workmanship.