



CORE LINEPIPE

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CORE Liner[®] Qualification Testing Summary

| SR# | Test Description | Reference Standard | 6" | | | 8" | | |
|-----|--|---------------------------|--|-----------------------------|----------------------------------|--|---------------------|----------------------------------|
| | | | Requirement | Result | Report | Requirement | Result | Report |
| 1 | Tensile Strength of ClickWeld [®] | CSA Z662-15 Sec. 4.5.4.4 | Resist 102,000 lbf | Pass, 262,000 lbf | C-FER File No. F098 | Resist 155,000 lbf | Pass, 278,000 lbf | C-FER File No. F175 |
| 2 | Compressive Strength of ClickWeld [®] | CSA Z662-15 Sec. 4.5.4.4 | Resist 166,000 lbf | Pass, 256,000 lbf | C-FER File No. F098 | - | - | - |
| 3 | Bending Strength of ClickWeld [®] | CSA Z662-15 Sec. 4.5.4.4 | Resist 10,294 lbf | Pass, 21,720 lbf | C-FER File No. F098 | Resist 20,664 lbf | Pass, 36,902 lbf | C-FER File No. F175 |
| 4 | Torsional Strength of ClickWeld [®] | CSA Z662-15 Sec. 4.5.4.4 | - | - | - | - | 42,000 lbf-ft | C-FER File No. F175 |
| 5 | Electrofusion Evaluation | CSA Z662-15 Sec. 12.7.9.1 | Min 85% ductility | Pass, 95% ductility | Electrofusion Validation Reports | Min 85% ductility | Pass, 95% ductility | Electrofusion Validation Reports |
| 6 | Gas Tightness | CORE Linepipe | No failure at 1800 psig for 4 hours | Pass | C-FER File No. F098 | No failure at 1800 psig for 4 hours | Pass | C-FER File No. F175 |
| 7 | Hydrostatic Pressure | CSA Z662-15 Sec. 4.5.3.2 | No failure at 1800 psig for 12 hours | Pass | 6" Qualification Report | No failure at 1800 psig for 12 hours | Pass | 8" Qualification Report |
| 8 | Hydrostatic Burst Pressure | CSA Z662-15 Sec. 4.5.3.2 | No failure below 2969 psig. | Average burst at ~4779 psig | C-FER File No. F098 | No failure below 2661 psig | Pass | - |
| 9 | Cyclic Pressure | CSA Z662-15 Sec. 4.5.3.2 | No failure at 100,000 cycles from 500 to 1800 psig | Pass | C-FER File No. F098 | No failure at 100,000 cycles from 500 to 1800 psig | Pass | C-FER File No. F175 |



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| 10 | High Frequency Pressure Pulsations | CSA Z662-15 Sec. 4.5.3.2 | No failure at 1,000,000 cycles from 1300 to 1480 psig | Pass | C-FER File No. F098 | No failure at 1,000,000 cycles from 1300 to 1480 psig | Pass | C-FER File No. F175 |
| 11 | Thermal Cycling | CSA Z662-15 Sec. 4.5.3.2 | No Failure at 0-1800 psig & 0-80°C for 10 cycles | Pass | 6" Qualification Report | - | - | - |
| 12 | Vacuum | CORE Linepipe | <0.5 psia, 5 min at 80°C | Pass for 30 min | 6" Qualification Report | <0.5 psia, 5 min at 80°C | Pass | 8" Qualification Report |
| 13 | Field Trials | CORE Linepipe | Field construction of a 200 m pipeline | Pass | 6" Qualification Report | Field construction of a pipeline | Pass | Several projects executed |
| 14 | Hydrogen Induced Cracking | CSA Z662-15 Sec. 16.4.2.2 / NACE MR0175 / NACE TM0284 | No cracks | No cracks on welded steel, expanded steel or base steel in a solution A saturated with H2S. | HIC Report 3-Feb-2015 | - | - | - |
| 15 | Sulfide Stress Cracking | CSA Z662-15 Sec. 16.4.2.2 / NACE MR0175 / NACE TM0177 Method C | No cracks | No cracks on welded & expanded steel in a solution A saturated with H2S at a stress of 40% x AYS. | Corrmat report 1504-9459 | - | - | - |
| 16 | Sulfide Stress Cracking | CSA Z662-15 Sec. 16.4.2.2 / NACE MR0175 / NACE TM0177 Four Point Bend Test | No cracks | No cracks on welded & expanded steel in a solution A saturated with H2S at a stress of 40% x AYS. | Corrmat report 1504-9460 | - | - | - |



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| 17 | Sulfide Stress Cracking | CSA Z662-15 Sec. 16.4.2.2 / NACE MR0175 / NACE TM0177 Method C | - | - | - | No cracks | No cracks on welded & expanded steel in a solution with a pH=5.5 and an H2S partial pressure of 100 kPa(a) at a stress of 100% x SMYS. | Element report dated 28-June-2017 |
| 18 | Sulfide Stress Cracking | CSA Z662-15 Sec. 16.4.2.2 / NACE MR0175 / NACE TM0177 Method C | - | - | - | No cracks | No cracks on welded & expanded steel in a solution with a pH=4.5 and an H2S partial pressure of 10 kPa(a) at a stress of 100% x SMYS. | Element report dated 28-June-2017 |