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| Version | Date | Description of Revisions |
| 1 | August 30, 2006 | Approved final document. |
| 2 | August 12, 2014 | First draft review (AV) |
| 3 | June 8, 2015 | Second Draft for Review (AV) |
| **4** | **September 16, 2015** | **Updated, Finalized Specification – Reference eDOCS #5823668-v4 (AV)** |
| 5 | May 18, 2017 | Updated reference to standards ASTM D2996-15, ASTM A194/A194M-17, ASTM A216/A216M-16, ASTM A193/A193M-16, ASTM A563-15 (AAM) |
| 6 | August 16, 2017 | Removal of listed products (CPD, OMM) |

NOTE:

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| Item | Description | | |
| Pipe | Fibreglass reinforced plastic (FRP), helically-wound, conforming to ASTM D2310-06(2012) Type 1, vinyl ester resin.  Type C glass monofilament surfacing mat and/or organic fibre synthetic surfacing veil.  Constructed in conformance with ASTM D2996-15.  UV Protection: Add to the wax coat | | |
| Fabrication | Interior surfacing veil shall be 0.25 to 0.5 mm thick. Mat layers shall be resin-rich, fully wetted, 50 mils minimum thickness. | | |
| FRP-1 (pipe) | 1 layer C-Glass veil 2 mat layers bell-and-spigot or flanged | |
| FRP-2 (pipe) | 1 layer Dynel veil 2 mat layers bell-and-spigot or flanged | |
| FRP-3 (pipe) | 1 layer Dynel veil & 2 mat layers flanged  1 layer C-Glass veil only  Cut edges of laminates shall be fully wetted and cured with thinned resin, allowed to cure, then coated with surfacing resin to a DFT of 0.25 mm to 0.37 mm. | |
| Special Conditions | FRP-3 (pipe) | Interior layer and inner surfaces shall be free of fillers and thixotropic agents. Completed assemblies shall be post-cured for 2 hours at 93 degrees Celsius, 6 hours at 88 degrees Celsius or 16 hours at 71 degrees Celsius. Field welded joints shall be coated with resin paste before joining. | |
| Ratings | Fibreglass reinforced pipe, fittings and flanges shall be rated 700 kPa as specified in ASTM D2310-06(2012)  Minimum continuous strand glass filament (coated with resin) wall thickness for pipe are as follows: | | |
| 50 mm to 150 mm | | 1.5 mm |
| 200 mm | | 6 mm |
| 250 mm to 300 mm | | 8 mm |
| 350 mm | | 10 mm |
| 400 mm to 450 mm | | 12 mm |
| 500 mm | | 13 mm |
| 600 mm | | 14 mm |
| Fittings | Fittings: ASTM C582-09(2016) and D2996-15. Surface veil and mat layers same as specified above under Ratings.  Bends shall be long radius.  Structural body of fittings shall be filament wound or built-up with alternate layers of woven roving and chopped stand mat. Filament wound fittings shall be same thickness as specified above under Fabrication. | | |
| Flanges | Fibreglass reinforced plastic, faced and drilled 862 kPag, ASME B16.1-2010 standard.  Flanges mating with plastic lined steel pipe shall be Van Stone type, ductile iron ASTM A395/A395M-99(2014) or cast steel ASTM A216/A216M-16 Grace WCB, Class 150 standard in accordance with ASME B16.5-2013. | | |
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| Bolting | Raised Face Flanges: Carbon steel, ASTM A307-12 Grade B square head bolts and ASTM A563-15 Grade A heavy hex head nuts.  Flat Face Flanges in Corrosive Conditions: Stainless steel Type 316, ASTM A193/A193M-16, Grade B8M hex head bolts and ASTM A194/A194M-17 Grade 8M hex head nuts. | | |
| Gaskets | Flat Face Flanges: Ethylene propylene rubber (EPR), 3 mm thick, full faced.  Raised Face Mating Flange: Ring gasket same material as full face, with filler gasket between Outside Diameter (OD) of raised face and flange OD, thickness same as raised face lip.  Van Stone Mating Flange: Tetrafluoroethylene (TFE) envelope type, flat ring gasket. | | |
| Colour | Add pigment to the final layer only of exterior surfacing resin to lightly tint the surface, but not obliterate laminate quality. Colors are as follows:  FRP-1 Red  FRP-2 Green  FRP-3 Yellow | | |

**END OF SECTION**