

**PE extruded jacket
with standard U.I.P.[®] system for above grade piping**

1. GENERAL

The pipe shall be insulated using the unique U.I.P.[®] factory insulation process, as supplied by GF Urecon Ltd., complete with integral conduit(s) for electric heat trace cable (if required). The insulation of associated joints, fittings and accessories shall be as per GF Urecon's recommendations. The product shall be manufactured in accordance to ISO 9001 Standards, or approved equal.

2. PIPE PREPARATION

Pipe and casing jacket shall be cleaned of surface dust or dirt to ensure adhesion of the foam to the pipe surface.

3. HEAT TRACING CONDUIT(S)

Heat tracing conduit(s) shall consist of an extruded molding and shall be applied to the pipe prior to application of the insulation. The conduit(s) will be securely fastened to the pipe to prevent the ingress of foam therein during the insulation process. All conduit(s) shall be checked after insulating to ensure they are not blocked. The ends shall be sealed prior to shipping to prevent any foreign material from entering the conduit while in transit or during installation.

4. INSULATION

- a) Material: Rigid polyurethane foam, factory applied.
- b) Thickness: 50.8 mm (2 in) or as required.
- c) Density: (ASTM D1622) 35 to 48 kg/m³ (2.2 to 3.0 lbs/ft³).
- d) Closed cell content: (ASTM D6226) 90%, minimum.
- e) Water absorption: (ASTM D2842) 4.0% by volume.
- f) Thermal conductivity: (ASTM C518) 0.020 to 0.025 W/m °C (0.14 to 0.17 Btu • in/ft² • hr • °F).
- g) Temperature range: Cryogenic to 93.3 °C (200 °F).

5. SYSTEM PROPERTIES

- a) System compressive strength: (modified ASTM D1621 with extruded jacket) approximately 690 to 1379 kPa (100-200 lbs/in²), varies with pipe diameter;
- b) Service temperature range: the overall factory insulated system limitations are dependent on the core pipe type, insulation and application.
- c) Temperature limitations: minimum ambient installation temperature -34 °C (-29 °F).

6. PE EXTRUDED OUTER JACKET (only available from our manufacturing facility in Calmar, AB)

The outer protective layer shall be a high density polyethylene coating extruded evenly over the pipe immediately after primer & tape have been applied. Main characteristics of the extruded PE coating shall be:

- a) Material: Extruded black high density polyethylene copolymer, UV inhibited and factory applied;
- b) Minimum 2% carbon black, well dispersed;
- c) Density of PE base resin > 0.947 to 0.955 g/cm³ (>59.1 to 59.6 lbs/ft³) as per ASTM D1505;
- d) Melt index of compound < 0.4 to 0.15 g/10 minutes (<0.00088 to 0.00033 lb) as per ASTM D1238;
- e) Flexural modulus of compound < 1103 to 758 MPa (<160,000 to 110,000 psi) as per ASTM D790;
- f) Tensile strength at yield of compound < 28 to 24 MPa (<4,000 to 3,500 psi) as per ASTM D638.

Recommended PE Jacket thicknesses* for above grade applications-

Jacket OD ≤ 304.8 mm (12 in)	@ 3.17 mm (125 mils)
Jacket OD > 304.8 mm (12 in) to 609.6 mm (24 in)	@ 3.81 mm (150 mils)
Jacket OD ≥ 609.6 mm (24 in)	@ 4.44 mm (175 mils)

*other jacket thicknesses are available upon request

7. INSULATED PIPE JOINTS

a) Butt-fused and welded joints

Insulated pipe joints shall be completed with Slipjoint® kits consisting of preformed polyisocyanurate foam or polyurethane foam half shells supplied with PE cover sheet, stainless steel bands, gear clamps and self tapping screws. All PE overlaps at the joints and fittings shall be 50.8 mm (2 in) minimum and shall be field positioned in such a way as to shed water. The insulation shall be pre-grooved on the inside or slightly oversized to accommodate heat trace cable(s) if applicable.

Waterproofing: Where waterproofing is required, a heat shrink sleeve as supplied by GF Urecon shall be field applied to the insulation half shells as primary seal under the PE cover sheet. For more demanding waterproof application, GF Urecon Mec-Seal® joint kits should be considered in place of Slipjoint® kits with primary seal.

b) Bell x spigot joints

Insulated pipe joints with no mechanical restraints shall be completed - if the system is not electrically heat traced - with a 152.4 mm (6 in) wide PE cover sheet, stainless steel bands and gear clamps or 304.8 mm (12 in) to 609.6 mm (24 in) wide PE cover sheet if traced, depending on pipe size.

Waterproofing: Where waterproofing is required, a heat shrink sleeve as supplied by GF Urecon shall be field applied as primary seal under the PE cover sheet. For more demanding waterproof application, GF Urecon Mec-Seal® joint kits should be considered in place of Slipjoint® kits with primary seal.

8. INSULATION KITS FOR FITTINGS

Insulation kits for fittings shall consist of rigid polyisocyanurate or polyurethane foam half shells complete with a heavy polymer protective coating on the outside surfaces. All insulation kits shall be supplied complete with silicone caulking, stainless steel bands and gear clamps. If the insulation shells are form hugging to the fitting, 152.4 mm (6 in) wide PE cover sheets with stainless steel bands and gear clamps shall be supplied for each end of the kit.

a) Rigid polyisocyanurate or polyurethane foam

1. Density: (ASTM D1622) 32 kg/m³ (2.0 lbs/ft³).
2. Compressive strength: (ASTM D1621) 124 to 186 kPa (18 to 27 lbs/in²).
3. Closed cell content: (ASTM D2856) 90%, minimum.
4. Water absorption: (ASTM C272) 2.0% by volume.
5. K factor: (ASTM C518) 0.027 W/m °C (0.19 Btu • in/ft² • hr • °F).
6. Thickness: typically 50 mm (2 in), other thicknesses upon request, shall match pipe insulation thickness.

b) Polymer coating, GF Urecon BL-100-20EP

1. Two component high density polyurethane coating, black in color.
2. Density: 1170 kg/m³ (73 lbs/ft³).
3. Durometer D scale 60.
4. Tensile strength: 11.10 MPa (1610 lbs/in²).
5. Tear strength: 26.5 N/mm (151 lbs/in).
6. Thickness: 2.54 mm (100 mils) outside surfaces, 0.51 mm (20 mils) inside surfaces.

9. ELECTRIC TRACING SYSTEM

The electric tracing system and associated controls shall be as per the manufacturer's recommendations with particular attention being paid to the watt densities applied through conduits on plastic pipes. All tracing cables and related accessories to be CSA approved and comply with CSA heat tracing standard C22.2 No. 130-03. Standard of acceptance is GF Urecon's Thermocable or approved equal. Please contact your GF Urecon representative for further details and design assistance.

Note: Physical characteristics are nominal and may vary depending on pipe type and diameter.

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