| Item No. | Description/Specification | Qty. (Nos.) | Price Per Unit FOB | Price Per Unit C&F | Total Price C&F |
|---|---|---|---|---|---|
| 1 | PE Elbow 2" x 90 Deg Butt Fusion | 1900 | | | |
| 2 | PE Cap 1-1/4" Dia Socket Fusion | 20000 | | | |
| 3 | PE External Coupling, 1-1/4" Socket Fusion | 30000 | | | |
| 4 | PE Reducer 4"x 2" (Butt/Butt) | 1000 | | | |
| 5 | PE Tapping Tee Reducing 2"x1-1/4" Saddle/Socket | 15000 | | | |

## 1. Description:

Polyethylene Thermoplastic Fittings for installation on IPS medium density polyethylene Pipe of SDR 10/11 produced from P.E-80 resin. Fitting should be molded from PE-80 resin approved by the Company or resin having USA origin conforming to requirement of PE-80 and should be compatible for heat fusion with any pipe manufacturer from like or similar resin.

## 2. Design and Dimension:

The Polyethylene fusion fittings shall fully comply with the requirement of **ASTM D-2513 and API 15LE.**

The fusion fittings shall be manufactured in compliance with **ASTM D-2683** (Standard specification for socket type polyethylene fittings) &

**ASTM D-3261** (standard specifications for Butt Fusion polyethylene fittings).

The measurement shall be done in accordance with **ASTM D-2122.**

## 3. Specific Requirements:

The fitting should be molded form Yellow PE-80 resin for Natural Gas Applications and should be **bright yellow in colour** and stabilized against the effects of UV radiation, having following properties.

**Melt flow index** (190 deg. C/50 N)
0.2-1.3 gm/10 min to ISO-440).

**Density**: 0.94 to 0.944 gm/cm$^3$
(For MDPE / PE-80).

| Description | Type of Fusion | Size |
|---|---|---|
| Polyethylene Elbow | Socket | 3/4" x 90 deg. |
| Polyethylene Elbow | Socket | 1-1/4" x 90 deg. |
| Polyethylene Elbow | Butt | 2" x 90 deg. |
| Polyethylene Elbow | Butt | 4" x 90 deg. |
| Poly Cap | Socket | 1-1/4" |
| Poly Cap | Butt | 2" |
| Poly Cap | Butt | 4" |
| P.E. External Coupling | Socket | 3/4" |
| P.E. External Coupling | Socket | 1-1/4" |
| P.E. External Coupling | Socket | 2" |
| P.E. Red. Coupling | Socket / Socket | 2" x 1-1/4" |
| P.E. Red. Coupling | Butt / Socket | 4" x 1-1/4" |
| P.E. Red. Coupling | Butt / Butt | 4" x 2" |
| P.E. Equal Tee | Socket | 1-1/4" |
| P.E. Equal Tee | Butt | 2" |
| P.E. Equal Tee | Butt | 4" |
| Tapping Tees Reducing | Saddle/Socket | 1-1/4" x ¾" |
| Tapping Tees Reducing | Saddle/Socket | 2" x 3/4" |
| Tapping Tees Reducing | Saddle/Socket | 4" x 3/4" |
| Tapping Tees Reducing | Saddle/Socket | 2" x 1-1/4" |
| Tapping Tees Reducing | Saddle/Socket | 4" x 1-1/4" |
| Tapping Tees Reducing | Saddle/Butt | 4" x 2" |
| Transition Pieces | Steel Threaded End | 3/4" |
| Transition Pieces | Steel Weld End | 1-1/4" - 1" |
| Transition Pieces | Steel Weld End | 2" |
| Transition Pieces | Steel Weld End | 4" |

4. **Self Tapping Tee:**

Self tapping tee should be provided with suitable punch size . All tapping tees should have rectangular base. The inner side of the punch must have female threads to hold the main Pipe coupon after cutting. Suitable Sealing gasket / o rings etc should be provided in completion Cap or tapping tee body for leak tight connection between cap and body. Sealing material should be durable / high quality and shall not be affected by any constituents of natural gas and any additives normally used in the operation such as odorants. Completion cap should be hand tight only.

| Main / Saddle Size | Branch Size | Branch Fusion Type |
|---|---|---|
| 1-1/4" IPS | ¾" IPS | Socket |
| 2" IPS | ¾" IPS | Socket |
| 4" IPS | ¾" IPS | Socket |
| 2" IPS | 1.1/4" IPS | Socket |
| 4" IPS | 1.1/4" IPS | Socket |

**Rubber Gasket / O-Ring**

| | |
|---|---|
| **Base Polymer** | NBR |
| **Indentation Hardness** | Shore Hardness 60A,-5, +5 |
| **Specific Gravity** | $1.00 \pm 0.25$ g/cm$^3$ |
| **Tensile Strength Min.** | 1000 PSI |
| **Elongation @ Break Min.** | 300 % |
| **Compression Set @** | |
| **100 Degrees 22 Hrs** | 20% max. |

5. **Transition Fittings**

- The steel pipe of Transition Fittings shall be conforming to the requirements of API 5L Grade B Specifications (Schedule 40) and shall have external epoxy protective coating.

- "O"-Rings to be used for gas tight and tamper-proof should be either: Nitrile (Buna-N) oil-resistant copolymer of butadiene and acrylonitrile; OR Fluorocarbon (FKM) (VITON®) (FLUOREL®).

- At the transition portion the mechanical held arrangement through resistant to the action of Natural Gas under service conditions appropriate copper or steel compression sleeve liner should be madc to provide the maximum pull-out resistance as per CSA B137.4/05 or latest edition.

| Pipe Size | Length of Steel Pipe (Inches) | Length of PE Pipe (Inches) | Pull Out Resistance / Strength |
|---|---|---|---|
| ¾" | 18" | 18" | 3.5 KN |
| 1-1/4" - 1" | 12" (1" dia) | 12" (1-1/4" dia) | 4.15 KN |
| 2" | 12" | 12" | 8.45 KN |
| 4" | 12" | 12" | 30.375 KN |

6. **Printed Literature:**

Original printed literature must accompany the bid.