

## 5) Jain Multilayer Pipe

Above advanced material property pipes i.e. Jain Fire Retardant, Jain Rodent deterrent, Jain PE – RC pipes result in increase in the initial pipe cost as compared with normal HDPE pipe cost. But use of above pipes results in overall reduction in project cost which includes- pipe cost, laying and installation cost and cost of repair and replacement.

Further efforts in reducing the pipe initial cost resulted in development of Jain PE multilayer pipe. Jain PE multilayer pipe is made up of two or more layers of different PE materials to fulfill the requirements of end application and simultaneously reducing the pipe cost. Jain Multi-Layer Pipe (JMLP) solutions enable the installer and system designer to reduce the overall cost of the project for a modest increase in pipe cost, and bring additional safety to the installation. The thickness of individual layer of material depends on the requirement of end application.

Jain PE two / three layer pipes are available in sizes 90, 110, 125, 140, 160, 180, 200 and 225 mm in different pressure ratings as per company standard.

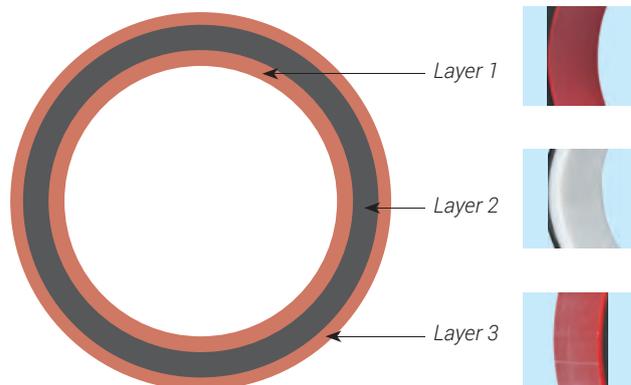
The different options available with Jain Multilayer PE pipe are –

- **HDPE pipe with outer layer of PE-RC material:**

This is an answer to need for resistance to point loading stresses by sharp stones in the field during installation, glass pieces or other material which put extra pressure on the pipe surface. Jain PE-RC pipes offers the right solution to these harsh environment and field condition and it is available as double layer pipe where the layers which provides protection is an integral part of the pipe. The inner layer of pipe is normal HDPE material whereas in the outer layer PE100 –RC material is used to improve its resistance to crack propagation.

**Application:**

- 1) Laying of shift-able PE pipes in mining
- 2) Laying of pipe by horizontal directional drilling (HDD) application
- 3) Laying of pipe by pipe slip lining method
- 4) Laying of pipes by pipe splitting method
- 5) Laying of pipe without proper bedding of the trench
- 6) Laying of pipe in stony soil
- 7) Slip lining of aged DI or concrete pipe



- **HDPE pipe with inner and outer layer of PE-RC material:**

This is a solution for extreme harsh conditions in the mining industries. The inner surface of pipe is continuously in contact with pumped slurry whereas outer surface is continuously exploited due to frequent pipe line shifting and installation of same without proper bedding. Because of this, the pipe inner and outer surface is constantly under harsh environment in terms of sharp stones etc. on outer surface and flowing slurry on inner surface. Jain PE RC-HDPE-PE RC pipes offers the right solution to these harsh environment and field condition and it is available as three layer pipe where all the layers which provides protection is an integral part of the pipe. The inner and outer layer of pipe is PE100 –RC material whereas in the core/ middle layer normal HDPE material is used. The use of PE-RC material for inner and outer layer improves the pipes Slow crack growth property. Apart from that the inner layer can be produced in natural white color which allows easier camera inspection

**Application:**

- 1) Laying of shift able PE pipes in mining
- 2) Laying of slurry conveying piping system
- 3) Laying of pipe by horizontal directional drilling (HDD) application
- 4) Laying of pipe by pipe slip lining method
- 5) Laying of pipes by pipe splitting method
- 6) Laying of pipe without proper bedding of the trench
- 7) Laying of pipe in stony soil
- 8) Slip lining of aged DI or concrete pipe

- **HDPE pipe with outer layer of PE-FR material:**

This is the solution to pipes fire retardant property requirement and to offset the cost increase due to the modified formulation for attaining the increased resistance to fire, innovative route has been worked wherein HDPE pipe is offered, to the customers, with two layers. The inner layer of pipe is normal HDPE material whereas in the outer layer, the recipe is modified to impart the fire retardant characteristics.

Jain HDPE pipe with outer layer of PE-FR material, when comes in contact with the flame source, has the ability to withstand the harsh fire environment and its Limiting oxygen index value is more than 21% and hence the flame extinguishes, when the source of the flame is removed. This is executed by its virtue of meeting the requirement of UL 94 flammability testing standard and as per UL 94, the material has V 0 / V 2 classification based on final thicknesses of different layers of pipe wall.

**Application:** Laying of underground fire hydrant piping network



- **HDPE pipe with outer layer of PE-RD material**

This is the solution to pipes rodent deterrent property requirement and to offset the cost increase due to the modified formulation for attaining the same, innovative route has been worked wherein HDPE pipe is offered, to the customers, with two layers. The inner layer of pipe is normal HDPE material whereas in the outer layer, the recipe is modified to impart the rodent deterrent property. The presence of rodent deterrent in outer layer of pipe has a bitter taste and irritation of sensory stimuli change in bitten prevent animal invasion. The rodent or bird hardly takes a bite for first time and there after it never comes back for re-bite. This combination in pipe wall thickness does not cause any change in the physical and mechanical properties of pipe.

**Application:** Laying of pipes in areas where pipe damages due to rodent bites is an issue.

- **HDPE-Glass fill PE- HDPE pipe for high pressure application**

Pressure withstanding capacity of the HDPE pipe depends upon the wall thickness as well as the design stress of the HDPE used. For increasing the operating pressure of the piping systems one has to increase the design stress as increasing the wall thickness may not be suitable option. This is due to increase in product cost and reduction in inner diameter of the pipe which would result in reduced volume available for the fluid to flow. JISL has come up with an innovative solution to run the piping system at a higher operating pressure by increasing the design stress of the basic piping material used. The increase in design stress is achieved by reinforcement of the basic HDPE polymer by using glass fiber and this approach is adopted in three layer pipe construction wherein the middle layer consists of glass fiber reinforcement. The use of glass fiber reinforcement does increase the price however the price increase is very marginal and increase in price is very well offset with exponential increase in the performance i.e., higher operating pressure of the piping system. This multilayered piping system is easy to install and all the installation & operating techniques involved are same as the conventional HDPE pipe.

- **HDPE- Mineral Filled PE – HDPE pipe for low noise application**

The flow through pipe creates the noise and the pipe starts to vibrate due to fluid current and noise. The intensity of pipe vibrations depends on the pipe material and its weight. Certain areas are very noise sensitive and such kind of noise disturbs a lot. The areas where noise generated through pipe and flowing fluid matters a lot includes –

- IT sector
- Premium Residential Building / Township
- Hospitals etc.

Mineral Filled HDPE pipe is the best suited option for the said application. This is a three layer pipe consists of –

- External layer made from black HDPE
- Middle layer made from mineral filled HDPE that provides the acoustic insulation
- Internal layer made from Natural HDPE material that provides the high performance in flow and contrast for visual monitoring.

The increase in weight of the pipe due to addition of mineral filler in the core of the pipe helps in reducing the vibrations and ultimately the noise generated during fluid flow. The pipe so produce can be jointed in the same way as that of normal HDPE pipe.

- **Ribbed, silicon coated PE -HDPE- PE RC pipe for HDD telecom duct application**

This is a typical solution for the application in which the telecom duct pipes are installed by using horizontal directional drilling method. in this application the pipe outer surface goes through the harsh condition of pipe dragging against the soil, sharp edges of stone etc. whereas the inner surface of pipe should provide minimum resistance to cable blown / pulled through it. This is achieved by producing three layer pipe having inner layer in the form of V ribs or plain made of silicon coated PE, middle layer is that of normal HDPE and outer layer is made up of PE RC material. this pipe provides excellent functioning under given conditions.

