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(54) Title: METAL REINFORCED HIGH DENSITY POLYETHYLENE PIPES

(57) Abstract: Metal reinforced HDPE pipes consisting of MS pipe of suitable diameter (1); wherein the inner layer (2); of HDPE of appropriate thickness is formed around a mandrill by extrusion machines which forms the inner HDPE layer on the MS Pipes; the outer HDPE layer (3); is extruded over the metal reinforced pipe so as to obtain metal reinforced pipe sandwiched between the inner & outer layer of HDPE which has required ring stiffness when used in the sewage system.



METAL REINFORCED HIGH DENSITY POLYETHYLENE PIPES

The invention relates to Metal Reinforced High Density Polyethylene Pipes. More particularly the invention relates to a Process of manufacturing Metal Reinforced High Density Polyethylene Pipes, wherein the pipes or the sections of pipe are corrosion resistance, high strength which is generally used for underground Sewage System.

The underground sewage system are laid for supplying liquid waste or water flows from place to place. They are supposed to withstand the load of the above ground level as well as they should work efficiently for flow of waste water / drinking water and the like.

The environmental pollutions often create hazardous conditions due to certain failures of the underground sewage piping system. The brittleness of the pipe used as well as associated problems of formation of deposits inside the pipes which not only hinders the flow of water but also blocks the water flowing through the system and reduces the diameter of pipes resulting in less flow.

The inventor with research has developed Metal Reinforced HDPE Pipes wherein they have sandwiched a Metal pipe with HDPE . By extrusion layering process where the properties of metal as well as non corrosive plastic has been combined together to achieve the target thereby the problem of strength and resistance to corrosion has been solved apart from hindrances due to the deposit is also eliminated . The continuity of the piping system has been solved by cutting profile opposing sections of the two separate pipes sealed by rubberised O - ring to make it leak proof from infiltration and ex-filtration.

The principle object of this invention is therefore, to provide Metal Reinforced HDPE pipe which have sufficient strength, resistance to corrosion and does not collect deposits. Another object of this invention is to provide Metal Reinforced HDPE Pipes which is easy to manufacture in less time and easy for maintenance.

Accordingly, there is provided a process of Manufacturing Metal Reinforced High Density Polyethylene Pipes comprising of:-

- 1) Reinforced inner Metal Shell Section;

- 2) Inner coating layer of High Density Polyethylene Material.
- 3) Outside coating layer of extruded High Density Polyethylene Material.
- 4) Finishing / Joining end connection as required .

The invention will now be described with reference to the figures 1,2,3 in the accompanying drawings :-

Fig1 is the elevation of "Metal Reinforced High Density Polyethylene Pipes".

Fig2 is the cross sectional view of "Metal Reinforced High Density Polyethylene Pipes".

Fig3 is the plan of "Metal Reinforced High Density Polyethylene Pipes".

1] COMPARISON OF NEW INVENTION WITH CONVENTIONAL ONE :

(The newly invented reinforced HDPE Pipes are meant for sewage / water pipe rehabilitations).

CONVENTIONAL

- a) Concrete pipes, RCC pipes, PSC pipes , Brick Lined section & GRP pipes which are generally used on sewage rehabilitation are brittle in nature and have less life spans owing to corrosion by sewer gas attacks.
- b) The " C " value which determines the flow rate in the pipes mentioned above decreases over the years, because of increase in resistance due to abrasion and formation of deposits on the walls of the pipes.
- c) All the above mentioned pipes are prone to the development of cracks and then cracks propagation

NEW INVENTION

MS reinforced HDPE Pipes & sections are by nature less brittle & have longer life span owing to higher resistant to corrosion.

MS reinforced HDPE Pipes are highly abrasion resistant & also the smooth HDPE pipe surface is less prone to the formation of deposits and hence the " C " value remains virtually the same as that of the new pipe over the years.

MS reinforced HDPE Pipes are resistant to crack their formation & therefore sudden pipe collapses & failures are

which lead to premature pipe failure & collapses.

d) All the above pipes are susceptible to the damages during land shift & earthquakes etc.

e) External corrosion occurs in all the above pipe which decreases the over all life span of the pipes.

virtually absent.

MS reinforced HDPE Pipes are resistant to land shift & earthquakes owing to its flexibility.

The external layer of HDPE coating prevents any external corrosion & there by the life span of the pipes are also increased.

2] BENEFITS OF INVENTION OVER CONVENTIONAL ONE

Conventionally, sewage lines are laid using concrete, RCC pipes, PSC pipes, Brick lined sections which have less life span, because they are less corrosion resistant and more prone to structural failures owing to the brittle nature.

To rehabilitate the above conventional sewage system, MS reinforced HDPE pipes which will have longer life span as they are more corrosion resistant and with less structural failures as Mild Steel & HDPE are less brittle.

For sewer and water pipe line applications, thicker HDPE pipes are required for higher ring stiffness and higher pressure ratings, (without reinforcement) which are more costly, & hence generally not used.

However, with the new process, by using thin walled HDPE layers over mild steel reducer reinforcement, the over all quantity of HDPE required is reduced, and hence the over all cost is brought down lower than the other pipes.

By virtue of the combined qualities of HDPE as well as mild steel reinforcement and the reinforced HDPE pipes are more suitable for earthquake prone region.

3] OPERATIONAL PARTICULARS / DESCRIPTION OF MANUFACTURING PROCESS:

Metal Reinforced High Density Polyethylene Pipes are manufactured according to the following process:

The required HDPE inner layer of appropriate thickness is formed around a mandrel, by an extrusion machine which produces the HDPE molten material (typically at 210* C) or the inner layer is directly extruded inside the MS pipe. The middle Mild Steel reinforcement pipe is then inserted over the inner layer of HDPE

pipe. The outer layer of HDPE is then formed over the mild steel reinforcement pipe, making sure that the either end of the HDPE inner and outer layer are welded together so that the mild steel ring is not exposed at either side. The reinforced pipe is then removed from the mandrel after allowing the HDPE outer layer to cool down and harden.

When ever necessary , the required profiles are introduced at either ends of the pipes so as to form the required locking & sealing arrangements , when two sections of reinforced HDPE pipes are joined together .

I CLAIM :-

1. Metal Reinforced High Density Polyethylene Pipes consisting of suitable diameter (1):
Wherein the inner layer (2) of HDPE of appropriate thickness is
5 formed around a mandrel by extrusion machine thus forming the inner layer. The outer HDPE layer (3) is extruded over the metal reinforced pipe so as to obtain metal reinforced pipe sandwiched between inner & outer layer of HDPE.
- 10 2. Metal Reinforced HDPE pipes as claimed in claim 1 wherein the length is ranging from 5 m to 7 m.
3. Metal Reinforced HDPE pipes as claimed in claim 2 wherein the diameter is preferably from 0.35 m to 3 m.
4. Metal Reinforced HDPE pipes as claimed in claim 1 wherein the inner layer with/without metal reinforcement elements .
- 15 5. Metal Reinforced HDPE pipes as claimed in claim 1 wherein profile cuttings between consecutive pipes for making continuity and sealing with rubberized 'O' ring to prevent infiltration and ex-filtration.
6. Metal Reinforced HDPE pipes as claimed in claim 1 reinforcement preferably from mild steel.
- 20 7. Metal Reinforced HDPE pipes as claimed in claim 1 and substantially held in described with reference to accompanying drawings 1,2 & 3.

1/2.

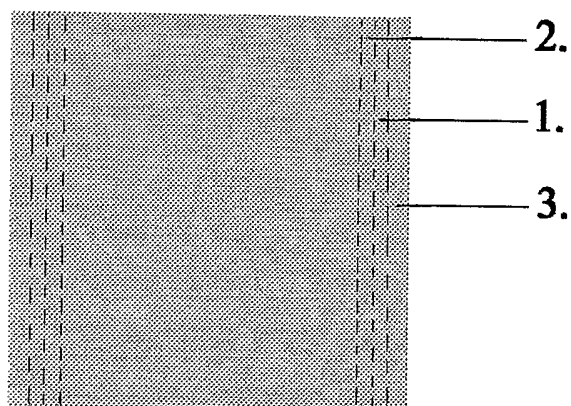


Fig. 1

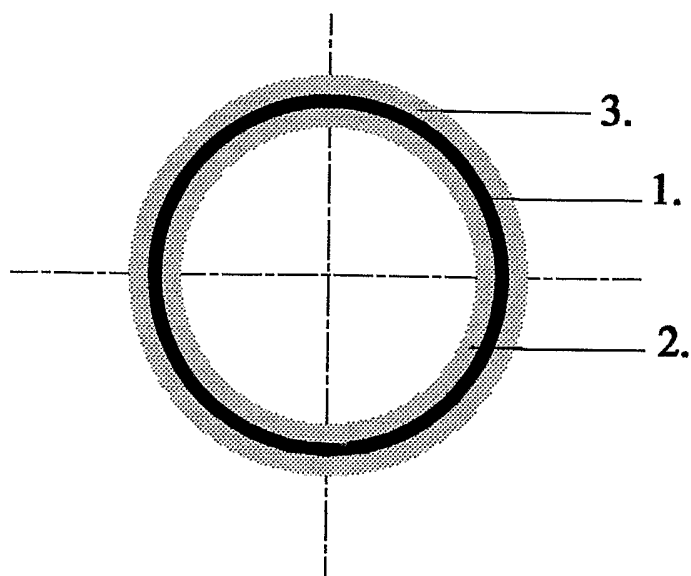


Fig. 2

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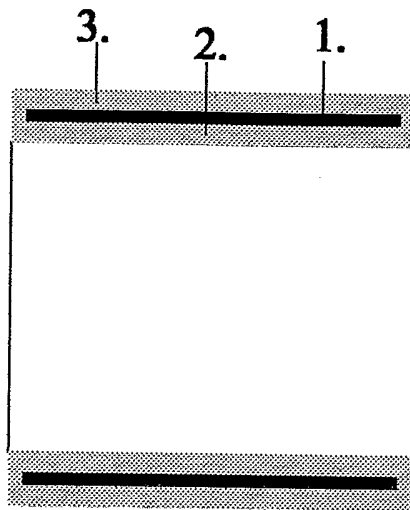


Fig. 2