

installation of PE pipelines for water and gas

The polyethylene differs from traditional materials used for pipelines carrying fuel gas and fluids under pressure for its particular physical and mechanical characteristics of high flexibility. If in the past these characteristics were considered a performance limit the same are now an advantage allowing the laid pipelines to support the ground stress.

If the laying and covering conditions are controlled, especially for the **ground compressing**, the use of PE pipes allow a greater network safety in case of ground settlements, landslides or earthquakes. Furthermore the PE pipelines flexibility allow the use of innovative laying technologies with important reduction in times and laying network costs. The PE lightweight and the easy weldability give advantages in terms of speed of the laying operations.

laying bed

The bottom of excavation must be flat in order to give regular holding to the pipeline, made of uniform materials and without sharp elements which can damage the pipe. The **height of the laying bed** must be of **100 – 150 mm**.

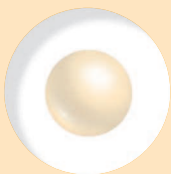
installation

Installation procedures must be performed by expert Operators.

For pipe installation follow the exact position according to the project drawings (altimetrical and planimetrical) unless otherwise suggested by the Works Supervisor.

To put inside the trench the single pipelines made outside the excavation use hemp/synthetic ropes avoiding possible scraping on the ground or on the excavation edge. Pipe section with surface cuts exceeding 10% of their thickness must be cutted off.

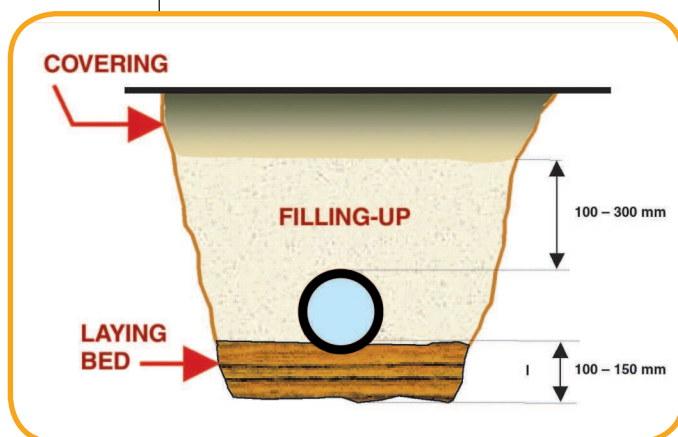
Control devices such as valves and gate valves which can stress the pipes due to their weight must be hold by independent supports avoiding any stress on the pipeline and joints.



filling up

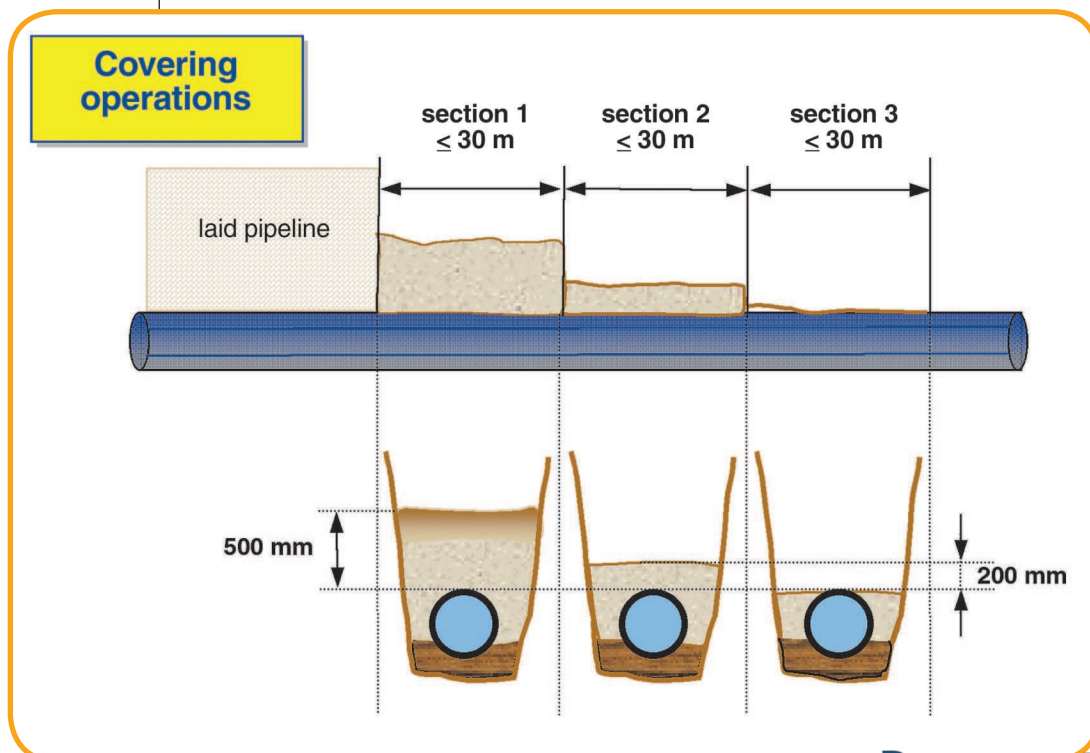
Once pipes laid in the excavation, they must be covered by a sand layer having height within **100 and 300 mm** measured from the upper pipe generatrix. Special care must be used when compacting the layer up to about $\frac{2}{3}$ rds of the pipe height. Compacting must be manually done avoiding any pipe movement.

Compacted sand must be of good consistency and uniformity covering both sides of the pipe.



covering

If the pipe is tightened at its ends before the filling-up of excavation, it is forced by remarkable stress due to its thermic expansion, so it is necessary to proceed as follows:



- the covering must be carried out on the whole network with the same ambient temperature conditions and if possible during the cool hours of the day;
- always proceed with sections of 20 – 30 meters and in one direction, possibly uphill;
- it is recommended to work at the same time on three pipeline sections for a total length of 90 meters;
- the covering on the three sections is done up to the top of the pipe (the pipe is covered with a sand layer of 100 mm at least);
- the first two sections are covered with further 15 – 20 cm of materials without stones;
- the first section is completely filled-up and covered up to 500 mm over the pipe;
- afterwards the covering of the second section is done and subsequently up to the complete covering of the network.

signals

A continuous yellow colored strip must be installed during the covering works with the message “Attention Gas Pipe” or blue colored with “Attention Water Pipe”. This strip is laid at **300 mm** over the upper generatrix of the pipeline indicating the pipe presence for future excavation works. Whenever other services are being installed, the new excavation must never show the sand which covers the pipeline.

If pipeline detection systems are used such as Ball Markers, these must be fixed on the pipeline by plastic clamps in order to keep them axially aligned.

