

ALWASAIL



الوسائل

Alwasail Industrial Co. شركة الوسائل الصناعية

Corrugated Pipes



Cable Protection



WRAS
Water Regulations Advisory Scheme



TUV NORD
Management system as per
EN ISO 9001 : 2008
Certificate Registration No. 44 100 100801

HDPE Corrugated Pipe

Twin-layer Cable Conduit

Corrugated externally and plain internally - 450N series -N-

ALWASAIL twin-layer conduit is a high density polyethylene pipe for the protection of electric and telephone underground cables.

It is made of two coextruded layers: the outer wall is corrugated to assure a greater resistance to deflection and flexibility; the inner wall is plain to ease cable insertion and slipping.

Thanks to the coextrusion technique, there is no possibility of layers split.

The twin-layer conduit is available from diameter 63 mm to diameter 110 mm in coils and bars.



Bars and Coils Ø mm	Coils 50 m	Coils 25 m	Bars 6 m
63	X		X
75	X		X
90	X		X
110	X		X

HDPE Corrugated Pipe

Characteristics

Resistance to impact down to -25°C
Resistance to temperature changes from -10°C to $+40^{\circ}\text{C}$ without compromise the original

characteristics.

Electrical insulating resistance higher than 100 Mohm.
Dielectric strength higher than 800 kV/cm
Resistance to chemical agents.

Thanks to its flexibility the pipe can be installed in any ground and slope. The flexibility helps to avoid all kind of obstacles with no need for bends.

Elasticity helps to absorb all stresses caused by the ground settlements. It can be installed in any ground, in underground shafts, as well as in moist, wet and aggressive environments.

Its lightness makes storing, transport and installation very easy.

Connection between two pipe lengths is made through an easy-to-use jointing coupler for which no adhesive is required. For a quick connection between pipe and coupler we suggest using a lubricant and/or slipping product onto the coupler inside surface with insertion of elastomeric seals.

Cables available in different colours for easier identification. Multiple die saddles for the construction of multi-pipe systems

It is supplied in 50 m coils (25 meters for DN 200 mm), or in 6 m bars, all provided with 1 coupler

Physical, Chemical Properties

The high density polyethylene is a thermoplastic resin. At room temperature the density is between $0,94$ and $0,96$ g/cm^3 , about 60 % is crystalline the remaining is amorphous. Between 125° - 135° C , polyethylene melts and the viscosity is molecular weight dependent. The melt density drops to $0,80$ g/cm^3 .

The polyethylene resists to the most chemical products and solvents. Only some substances, such as the decahydronaphthalene or some aromatic or halogenated hydrocarbons, dissolve the polyethylene at high temperatures.

The chemical destruction of polyethylene can occur only under the action of strong oxidizing agents such as fuming nitric acid or fuming sulphuric acid.

Mechanical Properties

The most important mechanical characteristics of a conduit are:

- resistance to deflection;
- resistance to impact.

The first characteristic is the most important as the pipe is buried and subjected to the static and dynamic load. Any load caused by stress (described later in this chapter) on the ground that covers the cable ducts must also be added.

The second characteristics regards the accidental stress caused by the stones in the ground falling onto the cable duct surface during pipe-laying. For this reason, the ground layer around the cable duct must be free from stones bigger than 80-100mm.

No more low-temperature tests are required with polyethylene as it can resist to low temperatures (-50°C) without going fragile; nevertheless, tests are carried out just to comply with the standards required when cable ducts were only made of polyvinyl chloride (PVC).

- Resistance to deflection.

The stiffness test, is based on the CEI EN 50086-2-4 variant A1. According to this standard, the 200 mm long conduit test piece is deflected between two $100 \times 200 \times 15$ mm plates to reduce

the outer diameter by 5%; the force required must exceed the settled value (450 N or 750 N).

At the end of the test, the cable duct test piece is not classified but simply declared compliant or non-compliant.

- Resistance to impact.

The classification is made according to the impact test. While the resistance to deflection characterises the conduit during its whole "underground" life, the resistance to impact concerns only its installation. The test is carried out only for safety purposes. The test consists in a weight falling on the test piece according to the CEI EN 50086-1 and CEI EN 50086-2-4 variant A1. The test piece is cooled at -5°C for 2 hours.

The test consists in letting a 5 Kg fixed weight beam fall down on the test piece from a height which varies depending on the pipe nominal diameter (see table "Impact test").

At the end of the test, no cracks that could make water pass from inside to outside must be detected. This result must be detected at least on 9 over the 12 test pieces

HDPE Corrugated Pipe Laying Technique

Trench Classification

One of the most important matter when installing a conduit line is the type of trench you must use. This fact is strictly linked to the kind of ground and to the stresses to which the conduits is subjected to.

The trench classification can be made according to geometrical dimensions, such as depth, H, and width, B, of the trench in connection with the diameter of the conduit to be installed (see table).

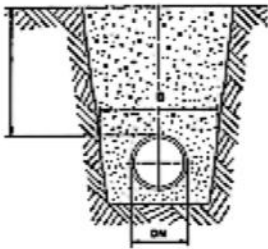
By these two methods you can determine the type of trenches usually made for conduit installation, such as narrow trenches, wide trenches, and embankment.
The following table shows the width of the excavation, B, according to the diameter, D, of the conduit or the depth, H, for any type of trench.

Table "Trench classification"

Trench type	B	
Narrow trench	= 3 ND	< H/2
Wide trench	> 3 ND	< H/2
	< 10 ND	< H/2
Embankment	= 10 ND	= H/2

Legend:

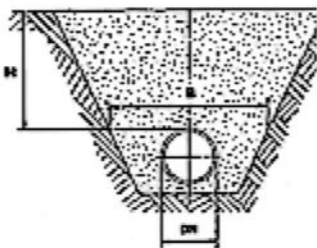
ND = nominal diameter of the pipe
B = width of the trench measured at the level of the pipe crown.
H = height of the backfilling from the pipe crown.



Narrow Trench

This is the best situation for laying a conduit since part of the load is discharged on the trench walls.

This type of trench must be used as often as possible, according to the ground condition.



Wide Trench

The wide trench is adopted when the ground is mainly gravel and sand. The load to which the conduit is subjected is higher than the load of a narrow trench as the load is not discharged on the trench walls.

For this reason, during the design, we suggest, for safety reasons, to take this fact into consideration.

Trench Width

It is characterised by the bedding depth and the conduit diameter; in fact, the trench width must be such as to allow to settle the bottom, to connect the conduit, and be enough place for the operators to operate.

In any case, the trench is more effective when the width decreases. If more than one pipe must be installed in the trench, the trench width must also consider this situation.

Trench Bottom

It is composed of the filling, usually sand, that offers the cable duct a constant and flat support.

Due to its resistance to mechanical stresses, the Polieco cable duct does not need a trench bottom made of casting or similar. Instead, we suggest preparing special niches on pre-arranged distances to make bar or coil jointing easier for cable installation.

HDPE Corrugated Pipe Laying Technique

Trench Bottom and Sidefill

When necessary, bedding must be prepared before the trench settlement. The material suitable for bedding must be, if possible, of sand mixed with gravel or gravel mixed with 10 to 15 mm crushed stones. Due to resistance to mechanical stresses, the Alwasail conduits does not need to have concrete bottom. Bedding must be carefully compacted so that the loads can be regularly distributed along the duct.

The conduit sidefill must be carried out using easy to compact materials, such as sand, while all organic, peat, muddy, clay must be avoided due to their high water content which hinders compaction.

The trench backfilling, and in general the backfilling of all types of excavation, is the most important operation for cable duct installation. In fact, this operation must be properly carried out to ensure a perfect interaction between the cable duct and the ground and allow the cable duct to react to the ground deflections caused by the ground settlement as well as the loads which the excavation is subjected to.

The interaction between the cable duct and the ground can be assured by a layer backfilling of the trench

Trench Backfilling

The trench backfilling, and in general the backfilling of all types of excavation, is the most important operation for cable duct installation. In fact, this operation must be properly carried out to ensure a perfect interaction between the cable duct and the ground and allow the cable duct to react to the ground deflections caused by the ground settlement as well as the loads which the excavation is subjected to.

The interaction between the cable duct and the ground can be assured by a layer backfilling of the trench (see picture).

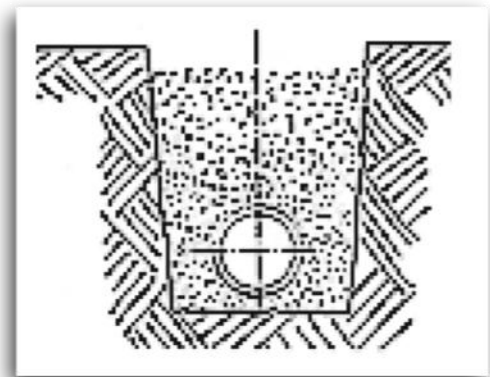
The first layer is the conduit sidefill which reaches the pipe crown; here, the material used is generally the same as for bedding. Compaction is carried out on the conduit sides only.

In the second layer, 15-20 cm approximately, which is prepared using the same material of the bedding, compaction must be carried out only at the cable duct sides and not vertically to avoid useless dynamical stresses.

For the following 30 cm thick layers, the same material of the excavation is used free from all stones with a diameter greater than 10 cm and from all vegetal fragments.

Compaction must always be very careful and all material which cannot be compacted must be eliminated.

Remember to leave room for the last layer of loam soil.



فروع المبيعات (العربية السعودية)

فاكس	جوال	هاتف	ص.ب	الموقع
٠٦٣٨١ ١٢٠٣		٠٦٣٨٢ ١٧٨٥/١٩٠١	١٢٤	بريدة (المكتب الرئيسي)
٠٦٣٨١ ١٣٠٦	٠٥٠ ٦٣٩ ٥٨٣٣/٠٥٠ ٦٣٧ ٥٦٨٥	٠٦٣٨١ ٦٦٥٨/٣٩١٤	١٢٤	بريدة (فرع الرئيسي)
٠٦٣٢٥ ٧٠٦٧	٠٥٠ ٦٣٩ ٠٢٩٧	٠٦٣٢٤ ٩٤١٩	١٢٤	بريدة (الموظء)
٠٣٨١٧ ٦٣٤٧	٠٥٠ ٦٤٣ ٧٣١٧	٠٣٨١٧ ١٣٧٥	٨٨٩٣	الدمام
٠٦٥٣٢ ٢١٣٨	٠٥٠ ٦١٣ ٧٢٥٦	٠٦٥٤٣ ٥٢١٩	٢٣٩٣	حائل
٠٣٥٨٢ ٥٦٣٤	٠٥٠ ٦٣١ ٤٠٢١	٠٣٥٨٢ ٥٥٣٤		الهضوف
٠٢٦٦٥ ٧٤٧٣	٠٥٠ ٦٤٢ ٣٥٩٨	٠٢٦٦٥ ٧٤٧٣/٤٥٣٦	٦٩٦٣	جدة (واحد)
٠٢٢٢٧ ٤٦٥٩	٠٥٠ ٦٤٢ ٠٩١٤/٠٥٠ ٦٤٣ ٧٩٠٧	٠٢٢٢٧ ٥٧٣٤/٥٧٣٥	٦٩٦٣	جدة (اثنين)
٠٧٣٢٧ ٤٨٨٣	٠٥٠ ٦٣٤ ٦٤٥٦	٠٧٣٢٧ ٤٨٨٠	١١٢	جيزان
٠٤٦٢٤ ٦٨٤٠	٠٥٠ ٦٣٦ ٧٩٢٥	٠٤٦٢٤ ٤٠٧٦	١٠٨٣	الجوف
٠١٥٥١ ٠٤٥٨	٠٥٠ ٦٤٠ ٤٣١٧	٠١٥٥٠ ١٦١٦	١٦٠٦	الخرج
٠٤٨٤٥ ٧٢٧٧	٠٥٠ ٦٤١ ٥٦١٠	(٠٤) ٨٤٦ ١٤٩٣	٢٥٠	المدينة
٠٧٥٤٤ ١٩٨٦	٠٥٠ ٦٣٤ ٨٩٤٧	٠٧٥٤٤ ١٩٨٦	١٣١٧	نجران
٠٦٣٦١ ٠١٢٨	٠٥٠ ٦٤١ ٨٧٦٣	٠٦٣٦١ ٠١٢٨	١٥٠٩	عنيزة
٠١٤٥٠ ٨٤٣٥/٨٤٢٢/٨١٦٦	٠٥٠ ٦٣٥ ٤٨١٥/٠٥٠ ٦٣٥ ٩١٤٥	٠١٤٥٠ ٨٤٣١/٣٢/٣٣/٣٤	٢١٥٩٩	الرياض (فرع الرئيسي)
٠١٤١١ ١٩١٤	٠٥٠ ٦٤٠ ٢٤٩١	٠١٤١١ ٤٦٧٩	٢١٥٩٩	الرياض (شارع سلام)
٠٤٤٢٨ ٨٣٧٤	٠٥٠ ٦٣٥ ٨٧٥٣	٠٤٤٢٨ ٨٣٧٤	٢٠٠٨	تبوك
٠٢٧٤٠ ٢١٧٩	٠٥٠ ٦٤٠ ٣٩٦٧	٠٢٧٤٠ ٢١٧٩	٧٠٤٢	الطائف
٠١٧٨٦ ٢٠٨١	٠٥٠ ٦٤١ ٩٦٤٣	٠١٧٨٦ ٢٠٨١	٥٢٥	وادي الدواسر
٠٦٤٢٣ ٢٤٢١	٠٥٠ ٦٣٥ ١٩٠٣	٠٦٤٢٣ ٤٩٢٧	٧٢٥	الزلفى
٠٣٣٨٦ ١٩٦٠	٠٥٠ ٦٤٤ ٢٣٣٨	٠٣٣٨٦ ١٢٢٥		القرية العليا

SALES BRANCHES (SAUDI ARABIA)

Location	P.O.Box	Tel.No.	Mobile No.	Fax No.
Buraidah (Head Office)	124	(06) 3821785/1901		(06) 381-1203
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Buraidah (Al-Muwatha)	124	06 324 9419	050 639 0297	06 325 7067
Dammam	8893	03 817 1375	050 643 7317	03 817 6347
Hail	2393	06 543 5219	050 613 7256	06 532 2138
Hofuf		03 582 5534	050 6314021	03 582 5634
Jeddah (One)	6963	02 665 7473/4536	050 642 3598	02 665 7473
Jeddah (Two)	6963	02 227 5734/5735	050 642 0914/050 643 7907	02 227 4659
Jizan (Sabia)	112	07 327 4880	050 634 6456	07 327 4883
Jouf	1083	04 624 4076	050 636 7925	04 624 6840
Kharj	1606	01 550 1616	050 640 4317	01 551 0458
Madina	250	04 846 1493	050 641 5610	04 845 7277
Najran	1317	07 544 1986	050 634 8947	07 544 1986
Onaizah	1509	06 361 0128	050 641 8763	06 361 0128
Riyadh-Main Br.	21599	01 450 84 31/32//33/34	050 635 4815/050 635 9145	01 450 8435/8422/8166
Riyadh-Salam Street	21599	01 411 4679	050 640 2491	01 411 1914
Tabuk	2008	04 428 8374	050 635 8753	04 428 8374
Taif	7042	02 740 2179	050 640 3967	02 740 2179
Wadi Al-Dwasir	525	01 786 2081	050 641 9643	01 786 2081
Zulfi	725	06 422 4927	050 635 1903	06 423 2421
Olaya Village		03 386 1225	050 644 2338	03 386 1960

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The Company engages in a policy of continuous development and improvement of its products. Therefore, the company reserves the right to modify the design and / or specifications of any products or equipment without notice and without incurring liability.

MADE IN SAUDI ARABIA

صنع بالسعودية