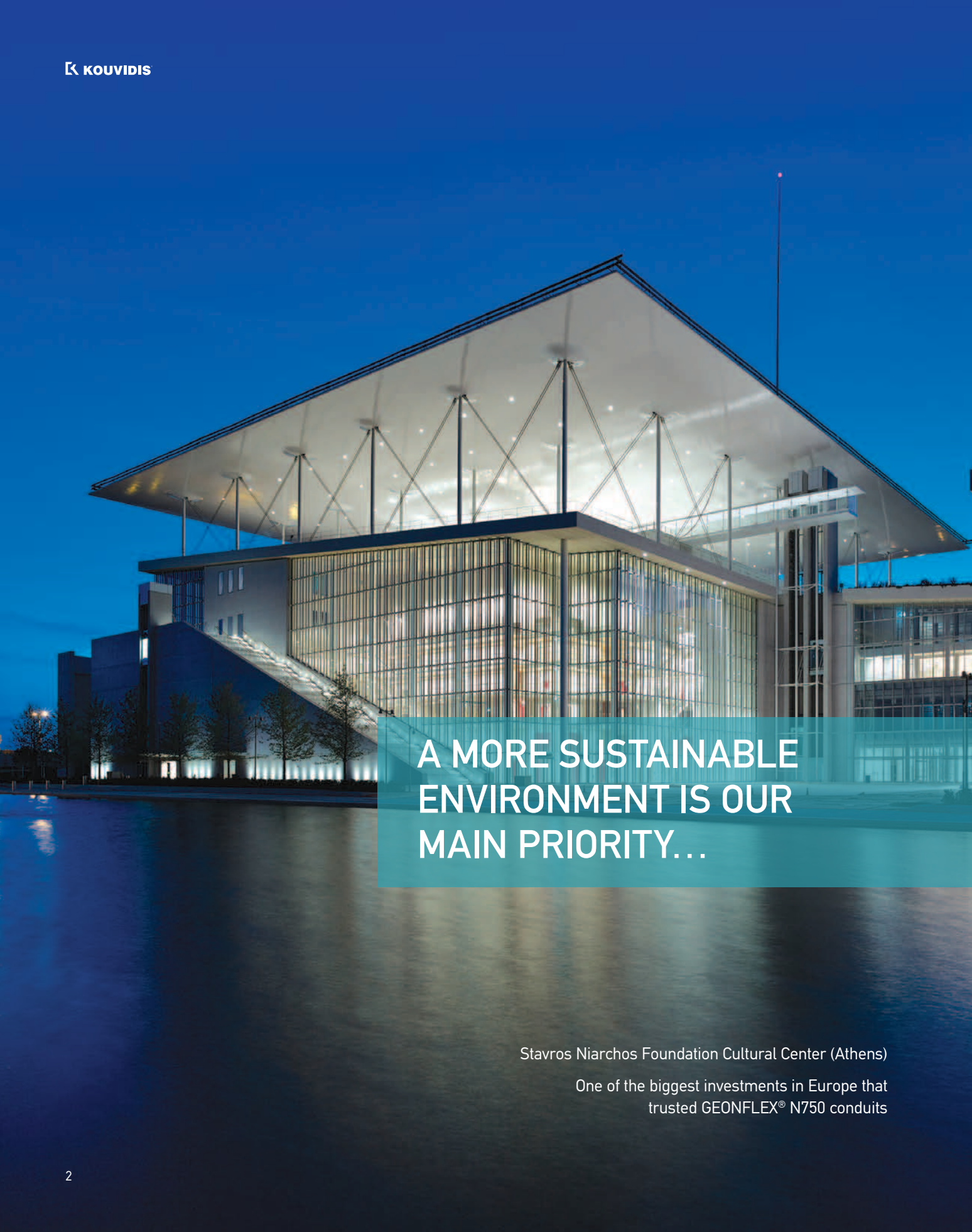
KOUVIDIS

Plastic conduit systems
for buried underground networks

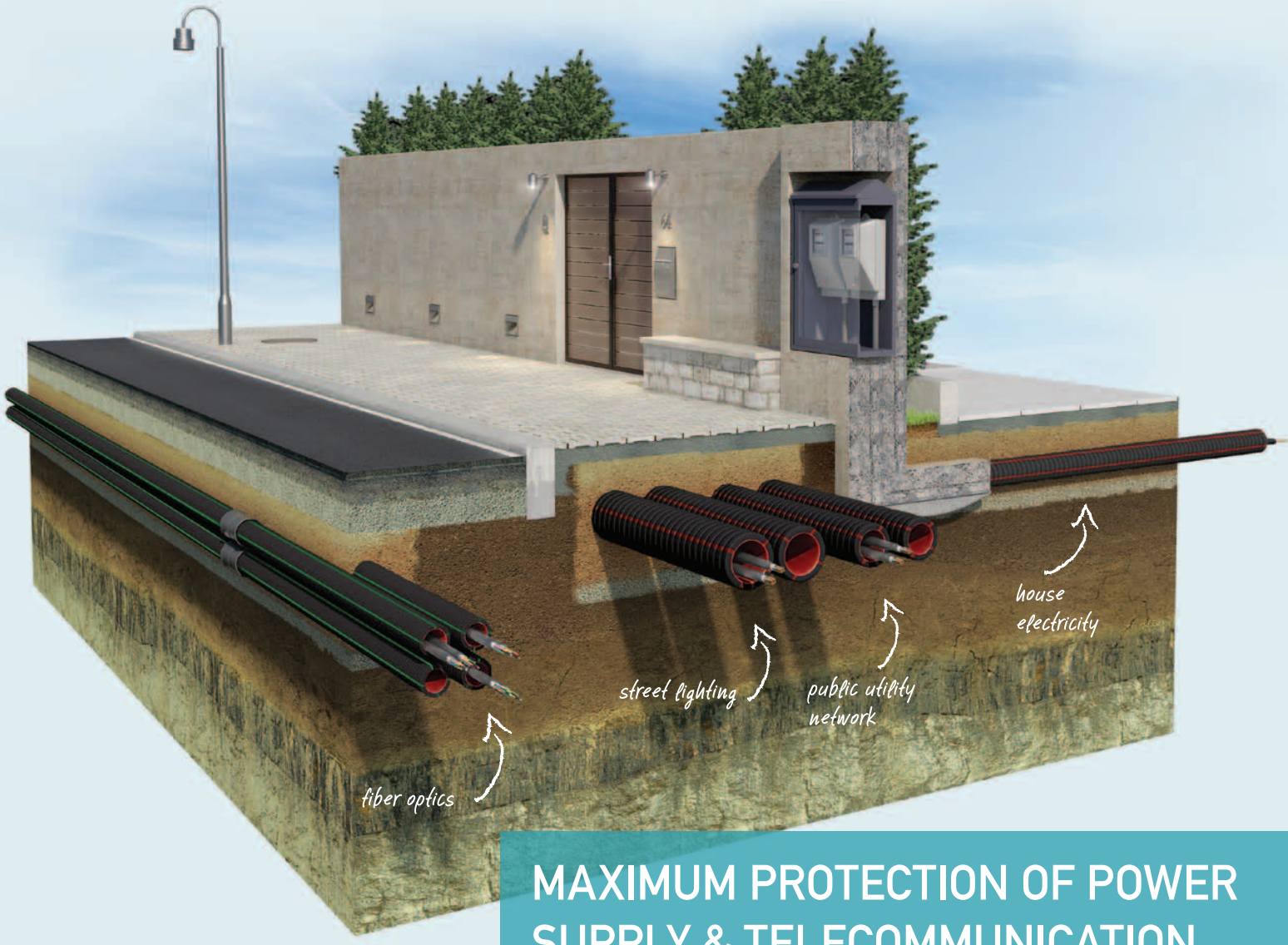


A MORE SUSTAINABLE ENVIRONMENT IS OUR MAIN PRIORITY…

Stavros Niarchos Foundation Cultural Center (Athens)

One of the biggest investments in Europe that trusted GEONFLEX® N750 conduits

we design innovative conduit systems that improve our quality of life



MAXIMUM PROTECTION OF POWER SUPPLY & TELECOMMUNICATION NETWORKS

double structured wall conduits

N GEONFLEX® N750 L GEOSUB® L450

at a glance...

GEONFLEX® N750 & GEOSUB® L450 double wall conduits are two of the most precious products in KOUVIDIS history because they have changed the protection of cables in buried underground installations. After 7 years in the market with almost 10 million meters of production, they have been placed in hundreds of major construction projects, such as Stavros Niarchos Foundation Cultural Center, with great success gaining electricians and engineers respect due to their high quality and their distinctive advantages.

In 2016 KOUVIDIS acquired a second production line of latest technology for the production of double wall structured conduits. In 2017, the company launched the 2nd generation of **GEONFLEX®** N750 & **GEOSUB®** L450 with color marking, upgrading both product itself and Electrician's work.

KOUVIDIS

new 2nd generation double wall conduits

Following the method of co-extrusion a third independent layer of longitudinal lines, in indelible color, is incorporated, during the production process, on the outer conduit's corrugated wall creating a long lasting color marking between electrical installations and communication systems.

RAL 3020

Red color coding protection of cables in **electrical installations**

RAL 6037

Green color coding protection of cables in **communication systems**

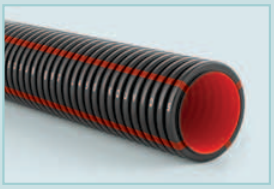
In this way, our new second-generation conduits, protect the personnel performing technical installation or maintenance tasks by warning them about the riskiness of the buried underground pipelines. At the same time, they facilitate engineer's work providing a better and safer way of networking.

Finally, our new second-generation conduits achieve increased resistance to solar radiation (UV), longer than 5 years, which is necessary in order to ensure their mechanical properties after a long period of storage in the warehouse or in the construction site.

The color identification of the new second generation GEONFLEX® & GEOSUB® conduits follows the rules set by the Standard NF P 98-332 which specifies the pipeline coloring according to the application field and the minimum distances buried pipes should have between each other. The new warning marking, of our new conduits, follows the specifications of products intended to protect and warn of buried underground installations according to the European Standards EN 12613 & EN 50520.

GEONFLEX® and GEOSUB® conduits can be produced with different color coding upon request.

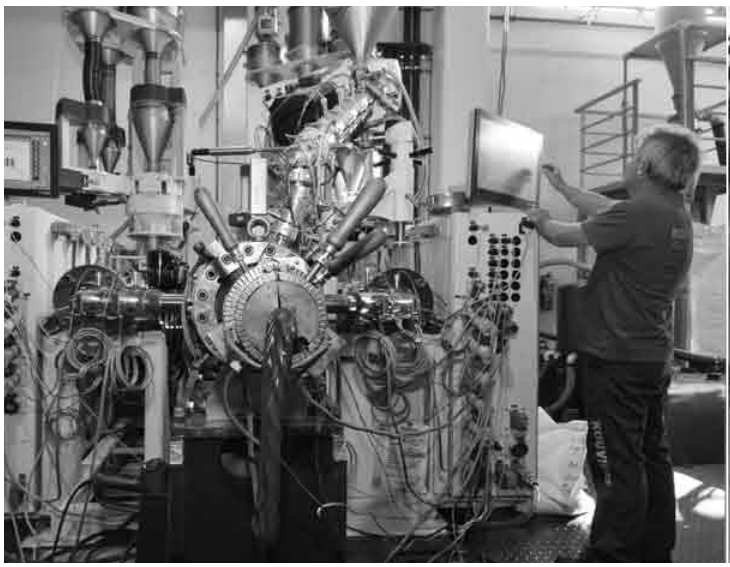
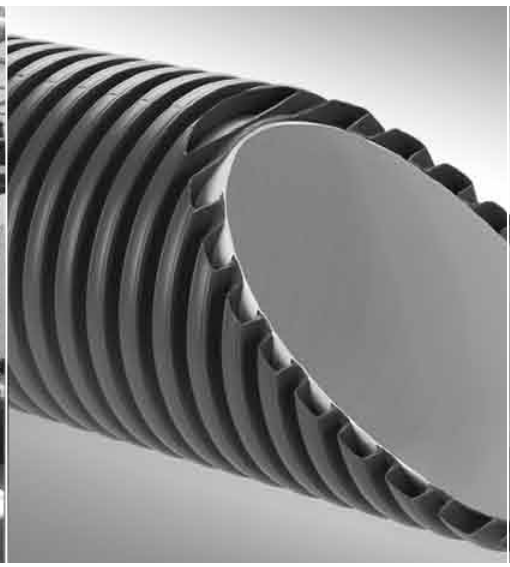
main properties of GEONFLEX® & GEOSUB® conduits



	GEONFLEX®	GEOSUB®
Type	N750	L450
Resistance to compression	≥750Nt (Type 750)	≥450Nt (Type 750)
Resistance to impact	Normal	Light
IP ingress protection	IP44/IP68*	IP40/IP68*
Virgin raw materials	•	–
Halogen free raw materials	•	•
Flame propagating	•	•
Warning marking	•	•
Ageing resistance > 5 years	•	•
VDE marks approval	•	•
Rodent Repellent (internal layer)	•	–
Low friction (Special material (slip) speeds up the routing of cables)	•	–
Label color (coils)	Green	Red
Safety strap color (coils)	White	Black
Packaging	Coils 25m: Ø40 to Ø200 Coils 50m: Ø40 to Ø125 6m bars	Coils 25m: Ø160 to Ø200 Coils 50m: Ø40 to Ø125 6m bars
Color	Outer wall: Black RAL 9004 Inner wall: Red RAL 3020	Outer wall: Black RAL 9004 Inner wall: Red RAL 3020 also available in red (outer wall) & black (inner wall) without stripes

VDE marks approval certificates for GEONFLEX® - GEOSUB® conduit systems are available in our certification issue (www.kouvidis.com)

* Coupler bonded with KOUVIDIS sealant and adhesive.


the design

Need

The underground routing of the public utility networks for safety reasons (avoid exposure to extreme natural phenomena and transmission of electromagnetic radiation) and the upgrading of the urban environment (better aesthetics since they are not an eyesore).

Research

The design of a robust, easy to use and environmentally friendly product that will protect the cables from external factors and will facilitate the installation and accessibility to the network combining the properties of a pliable and a rigid pipe at the same time.

Manufacturing technology

Welding of three different walls during the production process through co-extrusion. The corrugated external wall of the conduit provides the necessary flexibility and the required mechanical strength with the use of less raw materials. The internal smooth wall ensures the smooth insertion of the cables during the installation/ replacement.

Generation

Acquisition of two fully automated production lines, from top European companies, that produce double structured wall HDPE conduits, in nominal outer diameters from Ø40 to Ø250, with the brand name GEONFLEX® and GEOSUB® with mechanical resistance N750 (the maximum resistance according to EN 61386-24) and L450 respectively.

Application field

Protection and management of buried underground power and telecommunication networks (motorways, road networks, tunnels etc.), urban development projects (pedestrianization, shaping of public spaces, rehabilitation of historic centers, etc.), RES urban development projects (photovoltaic and wind parks), construction projects such as industrial buildings, shopping centers, housing, etc.

Distribution Network

A distribution network with authorized wholesalers of electrical materials, with more than 500 sales points all over the Greek and Cypriot territory, served on a daily basis by our 20 privately owned low emission trucks.

Environmental footprint

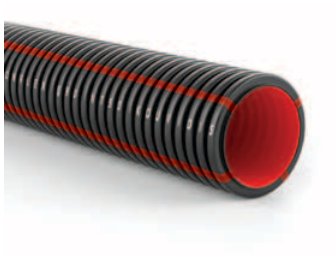
Made from 100% eco-friendly materials that comply with the requirements of the European RoHS and REACH regulations, regarding the use of chemicals and hazardous substances, respectively, and can be recycled at the end of their product life cycle, without burdening the environment.

Normal Type (N750)

RAL 3020
red / inner layer

RAL 9004
black / outer layer

RAL 3020
Indelible red / Longitudinal lines



Standards: EN 61386-24

Reference Standards: NF P 98-332, EN 12613 & EN 50520

More Feauters for GEONFLEX bars and coils

Assembled with
Connection coupler with hooks
End caps

Red color coding protection of cables in **electrical installations**

Green color coding protection of cables in **communication systems**

Patent Protected: EP2698792
Patent No.: 1009158
Hellenic Industrial Property Organization

All product's certificates are available at www.kouvidis.com

GEONFLEX® IAR 2nd generation (in bars)

Properties

Resistance to compression	750Nt (type 750)
Resistance to impact	Normal
Lower temperature range	-5°C
Upper temperature range	+90°C
Resistance to bending	Rigid
Electrical characteristics	With electrical insulated characteristics
IP ingress protection	IP44 (coupler connected) IP 68 (Coupler bonded with KOUVIDIS sealant)
Resistance to flame propagating	Flame propagating

Additional properties

Raw material	Halogen free, heavy metals free (RoHS) and specially stabilized thermoplastic HDPE
Ageing resistance	UV stabilized (≥ 5 years)
Low friction (internal layer)	Special material (slip) speeds up the routing of cables
Rodent Repellent	Not attractive to rodents (the internal layer incorporates rodent repellent)
Color marking	Longitudinal stripes of indelible color indicate the power of the protected cables

+ Double structured wall conduits, corrugated outside and smooth inside, printed with indelible color with their basic properties and affixed with an informative waterproof indelible green label. Ideal for buried underground power and telecommunication networks, urban development projects, RES urban development projects and construction projects.

Their special design ensures higher mechanical resistance, over 750Nt in compression.

Type	Part number	D out	min din	m	kg	m 13.6m
Ø75	16230750	75	56.0	6	2,90	10080
Ø90	16230900	90	67.0	6	3,60	6912
Ø110	16231100	110	82.0	6	5,00	4800
Ø125	16231250	125	94.0	6	5,30	3072
Ø160	16231600	160	120.0	6	8,30	2520
Ø200	16232000	200	150.0	6	9,70	1800
Ø250	16232500	250	188.0	6	16,70	960

Note: Product with minimum order quantity requirement (also with green stripes)

Normal Type (N750)

RAL 3020
red / inner layer

RAL 9004
black / outer layer

RAL 3020
Indelible red / Longitudinal lines

GEONFLEX® IAR 2nd generation (in coils)

Properties

Resistance to compression	750Nt (type 750)
Resistance to impact	Normal
Lower temperature range	-5°C
Upper temperature range	+90°C
Resistance to bending	Pliable
Electrical characteristics	With electrical insulated characteristics
IP ingress protection	IP44 (coupler connected) IP 68 (Coupler bonded with KOUVIDIS sealant)
Resistance to flame propagating	Flame propagating

Additional properties

Raw material	Halogen free, heavy metals free (RoHS) and specially stabilized thermoplastic HDPE
Ageing resistance	UV stabilized (≥ 5 years)
Low friction (internal layer)	Special material (slip) speeds up the routing of cables
Rodent Repellent	Not attractive to rodents (the internal layer incorporates animal repellent)
Internal guide	Cable guide with minimum tensile strength 650Nt
Color marking	Longitudinal stripes of indelible color indicate the power of the protected cables

Standards: EN 61386-24

Reference Standards: NF P 98-332, EN 12613 & EN 50520

\+ Double structured wall conduits, corrugated outside and smooth inside, printed with indelible color with their basic properties, packed with **WHITE** safety straps and affixed with an informative waterproof indelible green label. Ideal for buried underground power and telecommunication networks, urban development projects, RES urban development projects and construction projects.

Type	Part number 25m / 50m	D out	min din		kg 25/50m	m 25/50m 13.6m
Ø40	26250400/26260400	40	30.0	25m/50m	3,80/7,68	26250/31500
Ø50	26250500/26260500	50	37.0	25m/50m	4,50/8,84	16250/21000
Ø63	26250630/26260630	63	47.0	25m/50m	6,70/14,00	11500/14000
Ø75	26250750/26260750	75	56.0	25m/50m	9,10/18,00	6250/7750
Ø90	26250900/26260900	90	67.0	25m/50m	14,70/29,30	3750/5500
Ø110	26251100/26261100	110	82.0	25m/50m	17,50/34,00	3000/4000
Ø125	26251250/26261250	125	94.0	25m/50m	20,70/41,60	3125/3500
Ø160	26251600/-	160	120.0	25m	32,80	1900/-
Ø200	26252000/-	200	150.0	25m	38,96	1225/-

NOTE: GEONFLEX conduits come with a cable guide. 50 m packaging has a protection cap at the one edge and connection coupler at the other while 25m packaging has protective caps at each conduit 's edge.

In 50m coil packaging and internal safety strap is placed on the 25th meter to keep the initial shape of the coil unchanged when its external straps are snipped off.

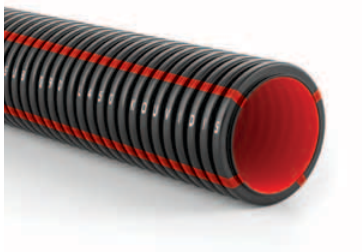
GREEN PRODUCT KOUVIDIS

Light Type (L450)

RAL 3020
red / inner layer

RAL 9004
black / outer layer

RAL 3020
Indelible red / Longitudinal lines



Standards: EN 61386-24

Reference Standards: NF P 98-332, EN 12613 & EN 50520

More Feauters for GEOSUB bars and coils

Assembled with
Connection coupler with hooks
End caps

Red color coding protection of cables in **electrical installations**

Green color coding protection of cables in **communication systems**

Patent Protected: EP2698792
Patent No.: 1009158
Hellenic Industrial Property Organization

CE

GREEN PRODUCT KOUVIDIS

All product's certificates are available at www.kouvidis.com

L GEOSUB® IAR 2nd generation (in bars)

Properties

Resistance to compression	450Nt (type 450)
Resistance to impact	Light
Lower temperature range	-5°C
Upper temperature range	+90°C
Resistance to bending	Rigid
Electrical characteristics	With electrical insulated characteristics
IP ingress protection	IP40 (coupler connected) IP 68 (coupler bonded with KOUVIDIS sealant)
Resistance to flame propagating	Flame propagating

Additional properties

Raw material	Halogen free, heavy metals free (RoHS) and specially stabilized thermoplastic HDPE
Ageing resistance	UV stabilized (≥ 5 years)
Color marking	Longitudinal stripes of indelible color indicate the power of the protected cables

+ Double structured wall conduits, corrugated outside and smooth inside, printed with their basic properties and affixed with an informative waterproof indelible mauve label.

Ideal for buried underground power and telecommunication networks, urban development projects, urban development and construction projects.

Type	Part number	D out	min din	m	kg	m 13,6m
Ø75	16330750	75	56.0	6	1,95	10080
Ø90	16330900	90	67.0	6	2,75	6912
Ø110	16331100	110	82.0	6	3,45	4800
Ø125	16331250	125	94.0	6	4,45	3072
Ø160	16331600	160	120.0	6	6,30	2520
Ø200	16332000	200	150.0	6	7,65	1800
Ø250	16332500	250	188.0	6	10,80	960

Note: Product with minimum order quantity requirement (also with green stripes)

Light Type (L450)

RAL 3020
red / inner layer

RAL 9004
black / outer layer

RAL 3020
Indelible red / Longitudinal lines

L GEOSUB® IAR 2nd generation (in coils)

Properties

Resistance to compression	450Nt (type 450)
Resistance to impact	Light
Lower temperature range	-5ºC
Upper temperature range	+90ºC
Resistance to bending	Pliable
Electrical characteristics	With electrical insulated characteristics
IP ingress protection	IP40 (coupler connected) IP 68 (coupler bonded with KOUVIDIS sealant)
Resistance to flame propagating	Flame propagating

Additional properties

Raw material	Halogen free, heavy metals free (RoHS) and specially stabilized thermoplastic HDPE
Ageing resistance	UV stabilized (≥ 5years)
Internal guide	Cable guide with minimum tensile strength 650Nt
Color marking	Longitudinal stripes of indelible color indicate the power of the protected cables

Standards: EN 61386-24

Reference Standards: NF P 98-332, EN 12613 & EN 50520

NOTE: GEOSUB conduits come with a cable guide, a protection cap at the one edge and connection coupler at the other.

In 50m coil packaging an internal safety strap is placed on the 25th meter to keep the initial shape of the coil unchanged when its external straps are snipped off.

RED color (outer wall) without stripes, upon request.

+ Double structured wall conduits, corrugated outside and smooth inside, printed with their basic properties, packed with special **BLACK** safety straps and affixed with an informative waterproof indelible mauve label.

Ideal for buried underground power and telecommunication networks, urban development projects, urban development and construction projects.

Type	Part number BLACK | RED	D out	min din		kg	m 13,6m
Ø40	26180400/26970400	40	30.0	50	5,35	31500
Ø50	26180500/26970500	50	37.0	50	6,99	21000
Ø63	26180630/26970630	63	47.0	50	10,60	14000
Ø75	26180750/26970750	75	56.0	50	13,10	10000
Ø90	26180900/26970900	90	67.0	50	20,05	7000
Ø110	26181100/26971100	110	82.0	50	26,09	4500
Ø125	26181250/26971250	125	94.0	50	30,57	3500
Ø160	26081600/26871600	160	120.0	25	25,20	1900
Ø200	26082000/26872000	200	150.0	25	32,40	1225

Fittings

RAL 9004
black

Standards: EN 61386-24

CE DVE

Connection couplers with hooks

Properties

Raw material	Halogen free, heavy metals free (RoHS) and specially stabilized thermoplastic HDPE
Temperature range	-5 °C to +90 °C
IP ingress protection	IP 40 (coupler connected to GEOSUB conduit) IP 44 (coupler connected to GEONFLEX conduit) IP 68 (coupler bonded with KOUVIDIS sealant)
Ageing resistance	UV stabilized

+ They carry three perimetric internal double hooks on each side and an inner lip for the proper conduits fixing and assembling.

Type	Part number		
Ø40	6101040	12	504
Ø50	6101050	12	180
Ø63	6101063	15	135
Ø75	6101075	15	15
Ø90	6101090	10	10
Ø110	6101110	5	5
Ø125	6101125	5	5
Ø160	6101160	2	2
Ø200	6101200	3	3

Packaging parts

RAL 9004
black

All product's certificates
are available at www.kouvidis.com

End caps

Properties

Raw material	Halogen free, heavy metals free (RoHS) and specially stabilized thermoplastic HDPE
Ageing resistance	UV stabilized

+ Ideal for the protection of the internal side of conduits. Caps offered with a ventilation hole.

Type	Part number		
Ø40	6100040	30	1620
Ø50	6100050	30	720
Ø63	6100063	30	510
Ø75	6100075	15	210
Ø90	6100090	15	120
Ø110	6100110	8	80
Ø125	6100125	8	64
Ø160	6100160	6	6
Ø200	6100200	6	6

Required materials

Adhesive & Sealant

Properties

Consistency	Paste
Cured 2mm after	18 hours
Toxic	No
Solubility in water	Insoluble
Skin over time	Approx. 10 minutes
Expansion	No
Color	White
Working temperature	+5^{0}C to +40^{0}C
Shelf conditions	12-18 months

+ Capable to provide IP68 ingress protection. Free of silicone, isocyanides, solvents and halogens.

Part number		
6001004	6x310ml	-

Required materials

Lubricant for plastic pipes and fittings

Properties

Consistency	Paste
Solubility in water	Insoluble
Color	White
Working temperature	+15^{0}C to +40^{0}C
Ph Value	8.5 - 9.5
Shelf conditions	+5^{0}C to +25^{0}C

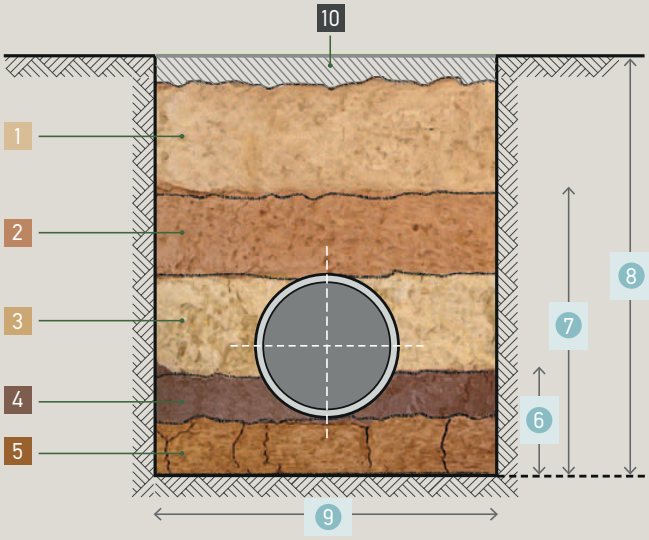
+ Based on synthetic raw materials, is water miscible and fulfills the current requirements of the German DVGW institute after the basis of type examination VP641.

Part number		
6001005	5kg	-

recent major projects

A few defining projects, during 2016-2017 period, that trusted GEONFLEX® & GEOSUB®.

Project	Product	Location	Type of project
Stavros Niarchos Foundation Cultural Center	GEONFLEX N750	Greece (Athens)	Culture projects
Halcor Industry	GEONFLEX N750	Greece (Athens)	Industrial properties
Anemos Luxury Grand Resort	GEONFLEX N750	Greece (Crete)	Hotels
Miramare Beach and Spa Hotel	GEONFLEX N750	Greece (Corfu)	Hotels
Nigeria AFAM III (Power Plant 180MW)	GEONFLEX N750	Nigeria	RES projects
Photovoltaic park 14MW	GEONFLEX N750	Mauritania	RES projects
Jumbo & AB Vasilopoulos Department Stores	GEONFLEX N750	Greece (Kefalonia)	Commercial buildings
LIDL Grocery stores	GEONFLEX N750	Cyprus (Larnaca)	Commercial buildings
Public infrastructure project in Skopje - EVN (Public Electricity Company)	GEONFLEX N750	Skopje	Infrastructure
Parnassos Ski center	GEONFLEX N750	Greece (Fokida)	Infrastructure
Nana Princess luxury suites & villas	GEONFLEX N750	Greece (Crete)	Hotels
National Gallery of Athens	GEOSUB L450	Greece (Athens)	Culture projects
Ionia Highway	GEOSUB L450	Greece	Infrastructure
Olympia Highway	GEOSUB L450	Greece	Infrastructure
AEK Larnaca football stadium	GEOSUB L450	Cyprus (Larnaca)	Infrastructure
National Observatory of Athens	GEOSUB L450	Greece (Athens)	Culture projects
Thessaloniki metro (subway)	GEOSUB L450	Greece (Thessaloniki)	Infrastructure
Park Lane Resort & Spa	GEOSUB L450	Cyprus (Limassol)	Hotels



Description of filling trench zones

1. Main backfill
2. Initial backfill
3. Sidefill
4. Upper bedding
5. Lower bedding
6. Depth of bedding
7. Depth of embedment
8. Trench depth
9. Trench width
10. Bottom of road construction, if any

installation guide

Installation of conduits in underground networks requires a series of works that need to be carried out as specified in the design so as to ensure the safety of the works and the installation itself. Some details on best practice for safe installation in accordance with the specification of Standard EN 1610 are given below.

Basic information on trenches

When digging a trench for conduit installation care must be taken in order to ensure a smooth, even underlying surface. It is best that trenching is performed as late as possible before the laying of the conduits and for backfilling to take place as soon as possible after their laying. Some basic accuracy checking criteria for the trench works are:

- Slope and level of the bottom of the trench in accordance with the differences in height provided for.
- Dimensions of the excavated sections.
- Evenness of the trench surfaces, bottom and walls.
- Removal of surface and ground water.
- Selection, reuse and temporary storage of the excavated materials and removal of those which are unsuitable.

Trench dimensions

The trenches should have the width and depth specified in the design. This should be the minimum required for a workmanlike installation of the underground network and compaction of the backfilling materials in accordance with the diameter of the conduit and its depth of installation. It is recommended that the minimum width of the trench be the greater than the values shown in the 2 tables below:

Minimum recommended width of trench
in relation to outside diameter of conduit

Nominal Diameter (DN)	Minimum trench width (OD + Xm)
≤ 225	OD + 0,4

OD: outside diameter

Minimum recommended width of trench
in relation to trench depth

Trench depth (m)	Minimum trench width (m)
< 1	No minimum width required
≥ 1 ≤ 1,75	0,80
> 1,75 ≤ 4,00	0,90
> 4,00	1,00

conduits with outside diameter OD up to 200 mm

Differences may occur in the above minimum recommended widths in the case of works which do not require a person to be inside the trench or in other special circumstances. A very important factor that needs to be taken into account at the time of selecting from the above sizes is the installation of more than one conduit in the trench.

Trench materials

The suitability of the ground materials for backfilling the trenches for underground networks depends on their geotechnical properties and their capacity for compaction. The backfill materials can be taken from the excavated materials. When these materials do not meet the requirements, are non existent or unavailable then suitable materials must be chosen as specified in the design. It is best to preclude the presence of backfill materials that are larger than 22 mm in diameter. It is also necessary that the backfill materials are free from organic substances (such as leaves, roots, grass etc.), snow and ice since their water content affects compaction. The trenches must be protected from surface water. It would be good to use pumps to remove and drain off any water towards nearby natural receptacles or other suitable receptacles.

Installation

Reception and transportation to the installation point

The conduits and their fittings must be inspected upon delivery, to see that they bear the correct labels and markings and meet all the necessary specifications laid down in the design. Prior to installation they must be carefully checked for any signs of damage.

Storage

The conduits must be stored in such a way as to ensure that they remain incorruptible. They must not be placed next to open trenches and their

storage area must be clean and free from any foreign bodies such as sharp stones that could cause damage.

Laying

In the case of interruption of the installation process, or due to a temporary break in the works, or in view of connection at a later date, the ends of the conduits must be sealed with protective caps. The caps must not be removed before the connection process. The area of the conduit that will come into contact with the connection fitting (coupler) must be clean and show no signs of damage.

BEST PRACTICE: It is recommended that external caps be used to protect the inside of the conduits from wet and dry particles.

Connection

During the connection process (coupler, trench, etc.) it must be ensured that no foreign bodies can get inside the conduits. In order to achieve this, particular care must be taken when cutting and assembling the conduit.

Trenching

After completion of the works for digging, shaping and inspecting the bottom of the trench, the next step is the laying of the conduit and backfilling with the material provided for in the design. It is recommended that the conduit be laid over a substrate (underlying layer) of 100 mm in the case of soil and 150 mm for stony or hard ground, and covered respectively to a height of 300 mm above the highest point of the outside diameter of the conduit (see diagram).

It is recommended that the filling and compaction of the trench be carried out simultaneously on both sides of the conduit. It is suggested that the compaction, the degree of which must be provided

for in the design, be carried out from the wall of the trench towards the conduit in uniform layers using manual equipment. Compaction using mechanical means must not be performed in an area above the zone of the pipe that is less than 300 mm deep. When choosing the mechanical means of compaction, the number of drillings and the thickness of the layers of compaction, it is necessary to take into account the type of compaction material and the type of conduit that will be laid in the trench. Compliance of the above with the specifications provided for in the design must be a priority.

Inspection

During the installation, in addition to visual checks, the following checks must also be performed: checks for any deformation of the conduits, change in degree of compaction and the adequacy and effectiveness of the laying. Checks on degree of compaction must be carried out throughout the works. The surface on which the conduits are laid must be thoroughly inspected and meet the requirements of the design regarding its degree of slope and evenness.

ATTENTION: The above information comprises an informative guide for the safe digging of trenches and installation of conduits for cable protection as defined by European standard EN 1610. In NO way must be used as a specification or be confused with the specifications laid down in each individual design.

Classification code (acc. to European standard EN 61386-24)

Resistance to impact

Nominal conduit dimension (mm)	Light (L)			Normal (N)		
	Hammer mass (kg) +1% - 0%	Height of fall (mm) 1%	Force of mass (Joule)	Hammer mass (kg) +1% - 0%	Height of fall (mm) 1%	Force of mass (Joule)
≤60	3	100	3	5	300	15
61 to 90	3	200	6	5	400	20
91 to 140	3	400	12	5	570	28
>140	3	500	15	5	800	40

Resistance to compression

Resistance to compression	
Classification	Compression Strength (Nt)
Type 250	≥250
Type 450	≥450
Type 750	≥750

KOUVIDIS laboratory (quality control department).

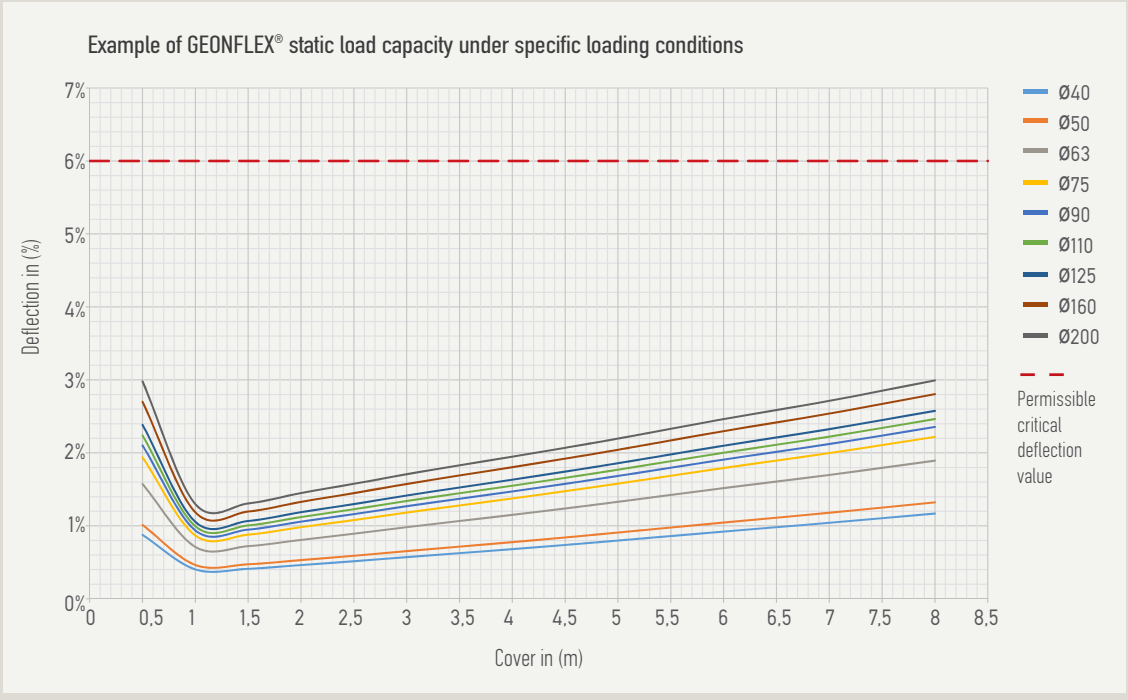
Label explanation

Deflection value

(example with deflection degree of GEONFLEX® pliable conduits under certain conditions)

Basic parameters:

- CEN / TR 1295-3: 2007 " Structural design of buried pipelines under various conditions of loading - Part 3: Common method"
- Underground installation with embankment
- Moderate traffic load conditions
- Single pipe & cable installation only
- Without affecting the aquifer
- Pipe zone: Soil of Gs2 - SP3
- Degree of bedding: 180 degrees
- Soil: Gs4 - SN2
- Soil and backfill concentration: 90% - 92% Dpr



The above diagram is an example of GEONFLEX® pipes strength in specific static load under certain load conditions. It is a guide in order to be understood the degree of deflection. In NO way must be used as a specification or be confused with the specifications laid down in each individual study.

5 things to remember...

1 **Safety**

The longitudinal lines, in indelible color that are incorporated on the outer conduit's corrugated wall, protect the personnel performing technical installation or maintenance tasks by warning them about the riskiness of the buried underground pipelines. At the same time, they facilitate engineer's work providing a better and safer way of networking.

2 **Weight**

Due to the specific geometry of their external wall they achieve high mechanical strength with a significantly lower weight than the single wall conduits. Thus they are less weight, a fact that facilitates their storage, transportation and installation.

3 **Resistance**

GEONFLEX® conduits achieve the maximum mechanical strength that the Standard for buried underground networks EN 61386-24 defines, a fact that makes them suitable to be installed in smaller trench depths, when engineer approves so, reducing significantly the installation cost while maintaining the safety at the maximum level.

4 **Low cost**

Their reduced weight, their easiness in loading and installation and their easy cutting using only basic professional cutting tools ensure great installation cost and time savings.

5 **100% environmentally friendly**

They are made from high density polyethylene (HDPE), halogen free and fully recyclable with the lowest possible environmental footprint.

... one more thing about GEONFLEX® conduits

Their inner wall incorporates two innovations:

1 They are not an attractive food to rodents due to the particular ecological additive they contain in their internal layer.

2 They incorporate a special material (slip) on their internal smooth surface to facilitate easier introduction and guiding of cables thanks to the significant (up to 50%) reduction in friction.

LEGEND

Nominal outer diameter (mm)

Nominal minimum inner diameter (mm)

Packing (m/coil)

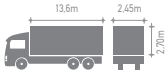
Bars (m)

Bar's Weight (kg)

Coil's Weight (Kg)

Packing (pieces/box)

Bigger Packing for fittings (pieces)



Double wall conduits loaded on a truck (m)

Product Conformity to all requirements of relative European Directives

The product and its productionprocess are inspected and approved by VDE German institute

The product does not contain hazardous substances acc. to 2011/65/EE RoHS Directive. Certification body VDE

Distinction among the best workplaces in Greece (2017)

Certification body of Quality-Management SystemEN ISO 9001:2008

Certification body of Environmental Management System EN ISO 14001:2004

Certification body of Occupational Health and Safety Management System OHSAS 18001:2007

Halogen free product

Normal (According to EN 61386-24, impact test)

Light (According to EN 61386-24, impact test)

Patent protected product

Environmentally friendly product. Halogen free, heavy metals free (RoHS), low smoke, SVHC-free (REACH) with 100% eco-friendly packaging

3rd veriom 02. 2018

KOUVIDIS is a purely Greek second - generation family company, specialized in the development and production of plastic conduit systems for cable protection, sewage and drainage since 1979.

The three distribution centers (Athens, Thessaloniki, Crete) and the two subsidiaries companies in Cyprus and Germany ensure the necessary capacity to serve daily more than 500 sales points both in Greece and abroad. Holding a leading position in the Greek market, and having a clearly customer-oriented philosophy, KOUVIDIS mission is to ensure Electrician's safety and to constantly improve his work through the design and the production of innovative and value - added products.

DVE VDE RoHS compliant TÜV AUSTRIA ISO 9001 TÜV AUSTRIA ISO 14001 TÜV AUSTRIA OHSAS 18001 GREAT PLACE TO WORK® Best Workplaces 2017 Greece

KOUVIDIS®

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