KOUVIDIS®

Multilayer plastic conduit systems
for buried underground networks

A MORE SUSTAINABLE ENVIRONMENT IS OUR MAIN PRIORITY…

Marina Ayia Napa (under construction)

One of the most important investments in the Mediterranean area that trusted GEONFLEX N750 & GEOSUB N450 conduits.

Gold Award
AWARDS MADE IN GREECE 2022
Innovative Industrial product

MULTI LAYER PIPES
KOUVIDIS

we design innovative conduit systems that improve our quality of life

MAXIMUM PROTECTION OF POWER SUPPLY & TELECOMMUNICATION NETWORKS

double structured wall conduits

GEONFLEX® N750 GEOSUB® N450

at a glance...

GEONFLEX® N750 & GEOSUB® N450 double wall conduits are two of the most precious products in KOUVIDIS history because their arrival was a breakthrough that changed the protection of cables in buried underground installations.

2011 KOUVIDIS designed the first generation of GEONFLEX® N750 conduits.

2012 GEONFLEX® N750 gained electricians and engineers respect and KOUVIDIS became the first company in Greece investing in double structured wall conduits.

2014 KOUVIDIS expanded its product family with GEOSUB® N450 conduits, and with over 1 million meters of production, they were placed in hundreds of major construction projects, such as Stavros Niarchos Foundation Cultural Center.

2016 KOUVIDIS acquired the second production line for double structured wall conduits.

2017 KOUVIDIS launched the 2nd generation of GEONFLEX® N750 & GEOSUB® L450 conduits with color marking upgrading both product itself and Electrician's work.

2019 KOUVIDIS acquired the third production line for double wall conduits, and expanded its product range with **spacers** and **a new diameter of Ø 32** for GEONFLEX® & GEOSUB® conduits.

2022 Since 2012, GEONFLEX® and GEOSUB® fulfill a 10-year presence of phenomenal success with increasing usage both in Greece and abroad. Additionally, the conduits were recognized with the golden award at the Made in Greece awards in the "Branded Industrial Product" category.

2024 Double-wall structured conduit GEOSUB® has been upgraded and is now classified as Normal ('N') for impact resistance, compliant with EN 61386-24.

2026 Building on 14 years of manufacturing know-how on structured wall conduits, KOUVIDIS introduce the new Ø25 diameter, extending our comprehensive range from Ø25 to Ø250.

plastic conduit systems for buried underground networks

12 available diameters from Ø**25** to Ø**250**

2 product families, GEONFLEX® N750 & GEOSUB® N450

14 years of know-how in production of double wall conduits

MULTI LAYER PIPES
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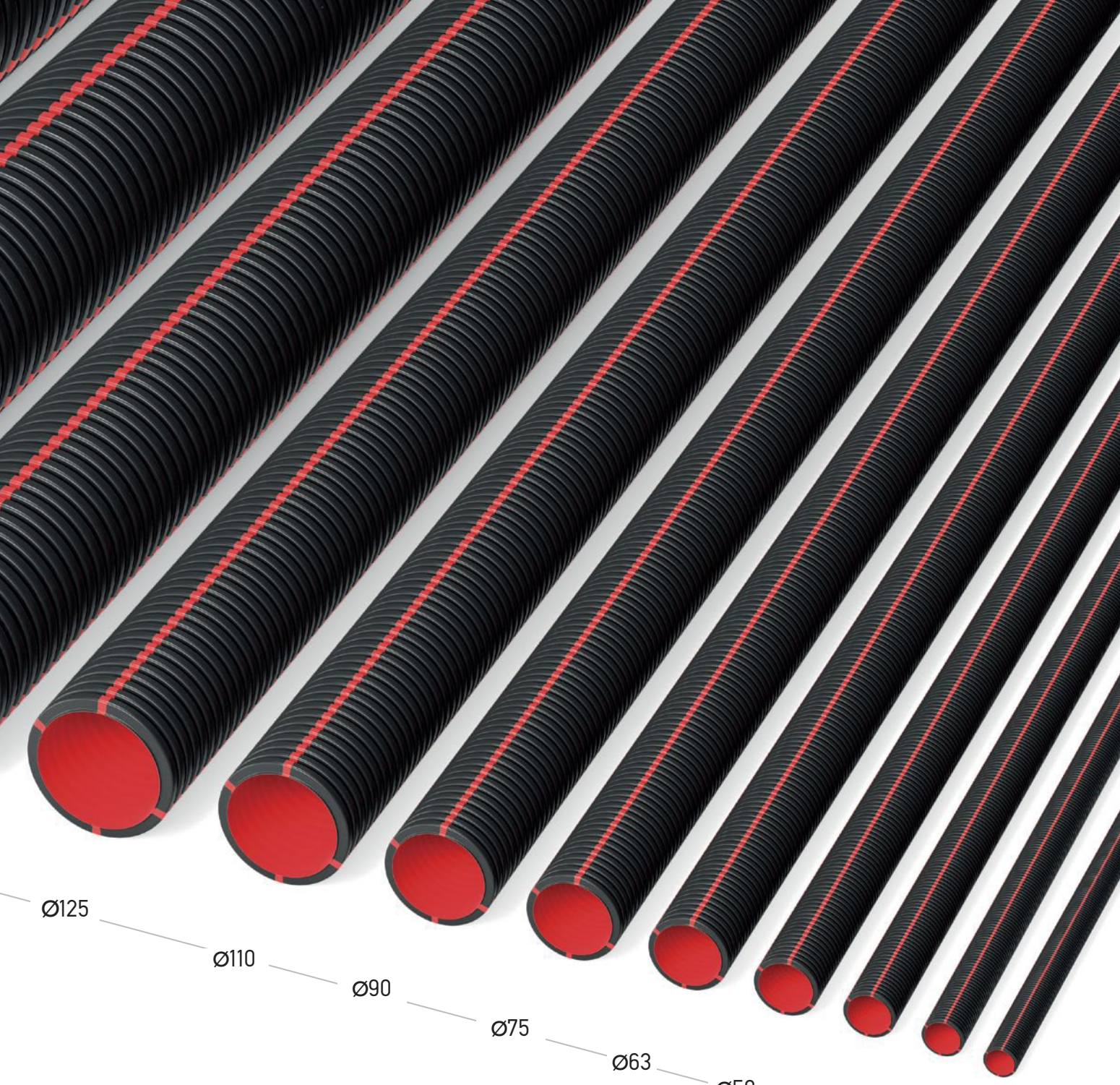

Ø125
Ø110
Ø90
Ø75
Ø63
Ø50
Ø40
Ø32
Ø25
NEW
Diameter
Coming soon

GEONFLEX® & GEOSUB® double wall conduits

Following the method of co-extrusion a third independent layer of longitudinal lines, of 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**

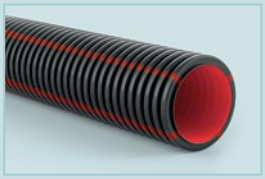
In this way, our new second-generation conduits, protect the personnel performing technical installation or maintenance tasks by warning them about the riskiness of the buried underground pipelines. At the same time, they facilitate engineer's work providing a better and safer way of networking.

Finally, our new second-generation conduits achieve increased resistance to solar radiation (UV), 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 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.

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

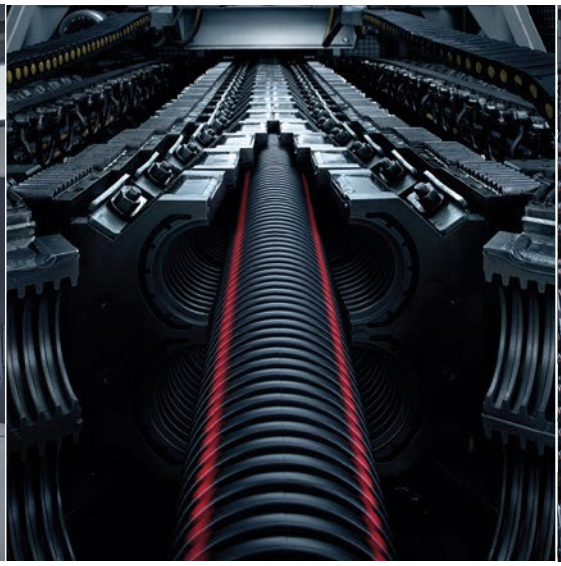
main properties of GEONFLEX® & GEOSUB® conduits



	GEONFLEX®	GEOSUB®
Type	N750	N450
Resistance to compression	≥750Nt (Type 750)	≥450Nt (Type 450)
Resistance to impact	Normal	Normal
IP ingress protection	IP44/IP68*	IP40/IP68*
Halogen free raw materials	•	•
Flame propagating	•	•
Warning marking	•	•
Ageing resistance	•	•
VDE marks approval	•	•
Rodent Repellent	•	–
Low friction (Special material Ultra-slip) speeds up the routing of cables)	•	–
Antistatic technology	•	•
Anti-scratch technology	•	•
Suitable for Concrete formwork	•	–
Label color (coils)	Green	Red
Safety strap color (coils)	White	Black
Packaging	Coils 25m: Ø40 to Ø200 Coils 50m: Ø25 to Ø125 Bars 6m: Ø75 to Ø250	Coils 25m: Ø160 and Ø200 Coils 50m: Ø25 to Ø125 Bars 6m: Ø75 to Ø250

VDE marks approval certificates for GEONFLEX® - GEOSUB® conduit systems are available in our website 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

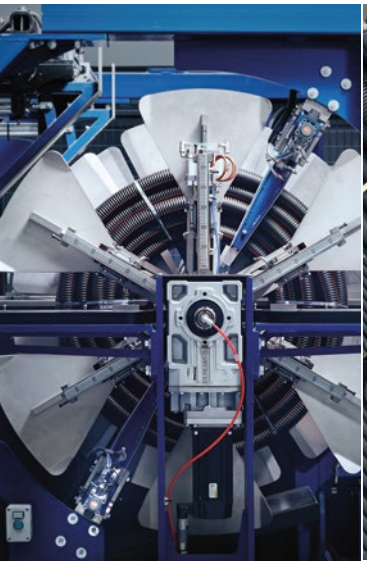
The design of a robust, easy to use and environmentally friendly product that will protect the cables from external factors and will facilitate the installation and accessibility to the network combining the properties of a pliable and a rigid pipe at the same time.

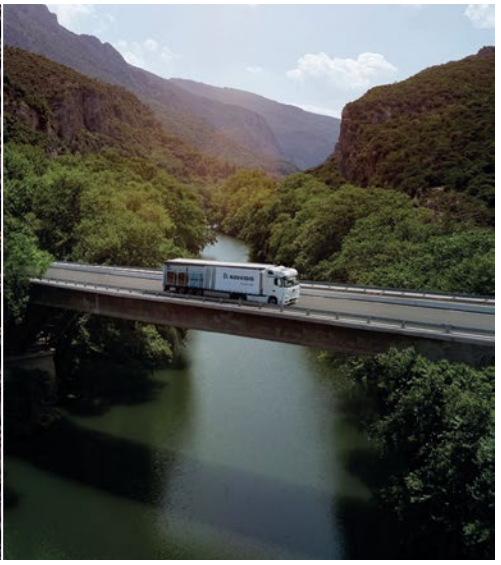
Manufacturing technology

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 Ø32 to Ø250, with the brand name GEONFLEX® and GEOSUB® with mechanical resistance N750 (the maximum resistance according to EN 61386-24) and N450 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 across Europe, served on a daily basis by our privately owned low emission fleet.

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.

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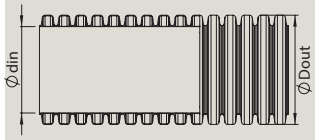
MULTI LAYER PIPES KOUVIDIS

Normal Type (N750)

GEONFLEX® ISR Pliable corrugated conduit / in coils

RAL 3020 INNER | RAL 9004 OUTER



Application Standard

EN 50626-1
(replaces EN 61386-24)

Reference Standard

NF P 98-332

Assembled with

Connection coupler with hooks
End cap with hooks

Patents protected

1009810, EP2698792, 1009158, 1010513

Red color coding protection of cables in **electrical installations**
Green color coding protection of cables in **communication sytems**

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. GEONFLEX conduits come with a cable guide and two protective caps at each conduit's end.

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
Low friction (internal layer)	Special material (Ultra 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 HIGH thickness and indelible color indicate the power of the protected cables
Antistatic Technology	Protection against static electricity
Antiscratch Technology	Protection against scratching from cable routing
Marking	Marked using embossed printing

Application fields

Exposed | Concealed (dry wall) | Concealed (underplaster) | Concealed floor / ceiling | **Underfloor in screed** | **Concrete** | Outdoor | **Buried underground** | Wood

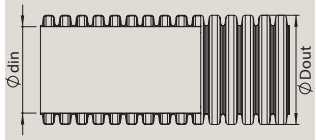
Type	Part number 25m / 50m	D out mm	min din mm	m	kg	13,6m m
Ø25	- / 2043025	25.0	18.0	- / 50m	-/6,00	-/55000
Ø32	- / 2043032	32.0	24.8	- / 50m	-/5,30	-/40000
Ø40	2042040/2043040	40.0	31.0	25m/50m	4,00/7,80	26250/31500
Ø50	2042050/2043050	50.0	40.0	25m/50m	5,20/10,20	16250/21000
Ø63	2042063/2043063	63.0	49.8	25m/50m	7,00/14,50	11500/14000
Ø75	2042075/2043075	75.0	60,6	25m/50m	9,50/18,80	6250/7750
Ø90	2042090/2043090	90.0	75.3	25m/50m	14,60/29,10	3750/5500
Ø110	2042110/2043110	110.0	92.7	25m/50m	17,00/34,50	3000/4000
Ø125	2042125/2043125	125.0	105.0	25m/50m	21,50/44,50	3125/3500
Ø160	2042160 /-	160.0	136.5	25m / -	37,00 / -	1900 /-
Ø200	2042200 /-	200.0	171.1	25m / -	40,00 / -	1225 /-

MULTI LAYER PIPES KOUVIDIS

Normal Type (N750)

GEONFLEX® ISR Rigid conduit / in bars

RAL 3020 INNER | RAL 9004 OUTER



Application Standard
EN 50626-1
(replaces EN 61386-24)

Reference Standard
NF P 98-332

Assembled with
Connection coupler with hooks
End caps with hooks

Patents protected
11009810, EP2698792, 1009158, 1010513

Red color coding protection of cables in **electrical installations**
Green color coding protection of cables in **communication sytems**

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
Low friction (internal layer)	Special material (Ultra 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 **HIGH** thickness and indelible color indicate the power of the protected cables
Antistatic Technology	Protection against static electricity
Antiscratch Technology	Protection against scratching from cable routing
Marking	Marked using embossed printing

Application fields

Exposed | Concealed (dry wall) | Concealed (underplaster) | Concealed floor / ceiling | **Underfloor in screed** | **Concrete** | Outdoor | **Buried underground** | Wood

Type	Part number	D out mm	min din mm	m	kg	13,6m m
Ø75	1024075	75.0	60.0	6	3,00	10080
Ø90	1024090	90.0	74.0	6	4,50	6912
Ø110	1024110	110.0	92.0	6	5,00	4800
Ø125	1024125	125.0	104.5	6	5,50	3072
Ø160	1024160	160.0	136.0	6	9,00	2520
Ø200	1024200	200.0	167.5	6	9,40	1800
Ø250	1024250	250.0	212.0	6	11,40	960

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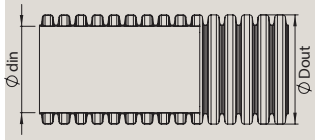
MULTI LAYER PIPES KOUVIDIS

Normal Type (N450)

GEOSUB® ISR Pliable corrugated conduit / in coils

RAL 3020 INNER | RAL 9004 OUTER



Application Standard
EN 50626-1
(replaces EN 61386-24)

Reference Standard
NF P98-332

Assembled with
Connection coupler with hooks
End cap with hooks

Patents protected
1009810, 1009158, 1010513

Red color coding protection of cables in **electrical installations**
Green color coding protection of cables in **communication sytems**

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. GEOSUB conduits come with a cable guide and two protective caps at each conduit's end.

Properties

Resistance to compression	450Nt (type 450)
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	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
Internal guide	Cable guide with minimum tensile strength 650Nt
Color marking	Longitudinal stripes of **LOW** thickness and indelible color indicate the power of the protected cables
Antistatic Technology	Protection against static electricity
Antiscratch Technology	Protection against scratching from cable routing
Marking	Marked using embossed printing

Application fields

Exposed | Concealed (dry wall) | Concealed (underplaster) | Concealed floor / ceiling | Underfloor in screed | Concrete | Outdoor | **Buried underground** | Wood

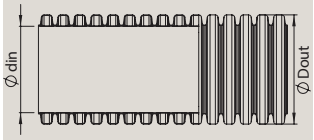
Type	Part number	D out mm	min din mm	m	kg	13.6m m
Ø25	2047025	25.0	18.0	50	6,00	55000
Ø32	2047032	32.0	24.8	50	5,30	40000
Ø40	2047040	40.0	31.4	50	7,30	31500
Ø50	2047050	50.0	40.5	50	8,20	21000
Ø63	2047063	63.0	50.5	50	14,50	14000
Ø75	2047075	75.0	61.5	50	15,50	10000
Ø90	2047090	90.0	76.0	50	20,25	7000
Ø110	2047110	110.0	92.7	50	29,00	4500
Ø125	2047125	125.0	106.1	50	35,50	3500
Ø160	2047160	160.0	138.4	25	25,50	1900
Ø200	2047200	200.0	171.1	25	33,00	1225

MULTI LAYER PIPES KOUVIDIS

Normal Type (N450)

GEOSUB® ISR Rigid conduit / in bars

RAL 3020 INNER | RAL 9004 OUTER



Application Standard
EN 50626-1
(replaces EN 61386-24)

Reference Standard
NF P98-332

Assembled with
Connection coupler with hooks
End cap with hooks

Patents protected
1009810, 1009158, 1010513

Red color coding protection of cables in **electrical installations**
Green color coding protection of cables in **communication sytems**

Properties

Resistance to compression	450Nt (type 450)
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	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
Color marking	Longitudinal stripes of **LOW** thickness and indelible color indicate the power of the protected cables
Antistatic Technology	Protection against static electricity
Antiscratch Technology	Protection against scratching from cable routing
Marking	Marked using embossed printing

Application fields

Exposed | Concealed (dry wall) | Concealed (underplaster) | Concealed floor / ceiling | Underfloor in screed | Concrete | Outdoor | **Buried underground** | Wood

Type	Part number	D out mm	min din mm	m	kg	13,6m m
Ø75	1022075	75.0	61.0	6	1,95	10080
Ø90	1022090	90.0	75.8	6	2,75	6912
Ø110	1022110	110.0	92.0	6	3,80	4800
Ø125	1022125	125.0	105.5	6	4,45	3072
Ø160	1022160	160.0	137.5	6	6,20	2520
Ø200	1022200	200.0	169.3	6	9,00	1800
Ø250	1022250	250.0	212.0	6	10,80	960

Fittings

RAL 9004

Application Standard
EN 50626-1
(replaces EN 61386-24)

Connection coupler 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)
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		pieces
Ø32	6101032	12	12096
Ø40	6101040	12	9216
Ø50	6101050	12	5376
Ø63	6101063	15	3105
Ø75	6101075	15	1800
Ø90	6101090	10	880
Ø110	6101110	5	600
Ø125	6101125	5	320
Ø160	6101160	2	176
Ø200	6101200	3	84

RAL 9004

End cap with hooks

Properties

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

Male end caps with perimetric double hooks for the proper protection of the internal side of conduits.

Type	Part number		pieces
Ø32	6118032	50	22400
Ø40	6118040	40	15360
Ø50	6118050	40	11200
Ø63	6118063	40	8280
Ø75	6118075	35	6300
Ø90	6118090	24	4320
Ø110	6118110	12	2160
Ø125	6118125	12	2160
Ø160	6118160	10	1200
Ø200	6118200	6	720

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

Part number		
6001004	6x310ml	-

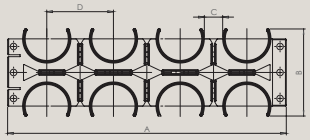
Lubricant for plastic pipes and fittings

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

Part number		
6001005	5kg	-

RAL 9004



Spacer / 8 folded

Properties

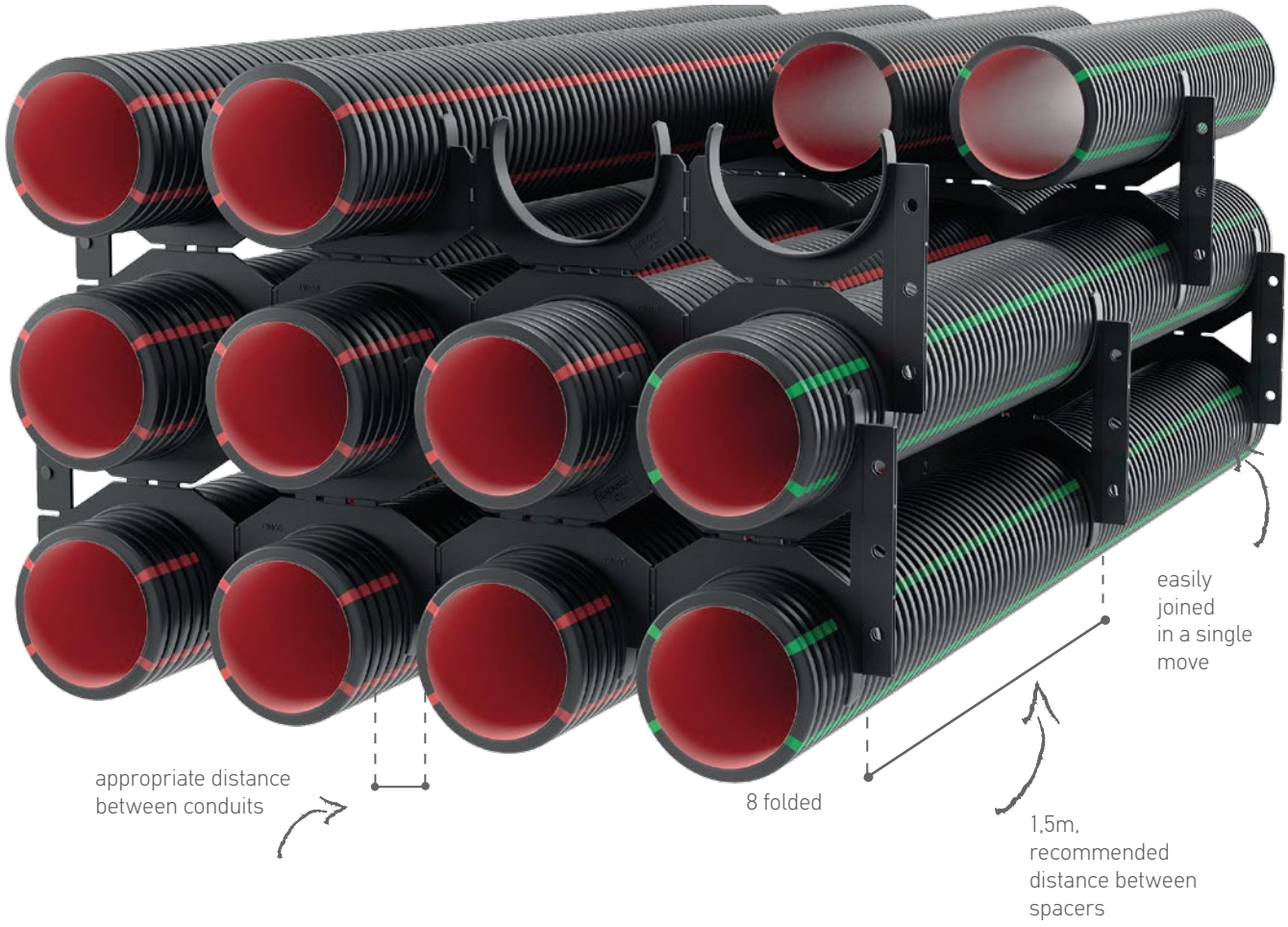
Raw material	Halogen free, heavy metals free (RoHS) and specially stabilized thermoplastic PP
Electrical characteristics	With electrical insulated characteristics
Resistance to flame propagating	Flame propagating
Compatibility (conduit nominal outer diameter)	Ø50 Ø63 Ø75 Ø90 Ø110 Ø125 Ø160 Ø200

Spacers have two rows of support points (four support points each). They can also be easily joined, thanks to their intelligent connection system. Moreover, their special construction allows them to be easily separated in a single move, in one row or in fewer positions, depending on the requirements of the specific installation. Finally, there is sufficient support width at each position to prevent the creation of point loads on the conduits.

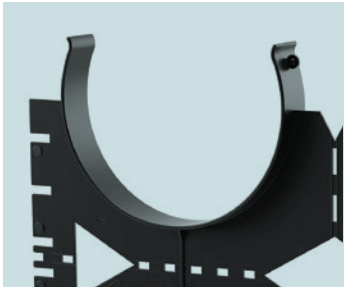
Type	Number of positions	Part number	A mm	B mm	C mm	D mm		
Ø50	8(4x2)	6121050	323	101	28	78	45	3960
Ø63	8(4x2)	6121063	376	116	28	91	25	2400
Ø75	8(4x2)	6121075	425	131	28	103	20	1920
Ø90	8(4x2)	6121090	484	147	28	118	72	2016
Ø110	8(4x2)	6121110	575	210	30	140	42	672
Ø125	8(4x2)	6121125	664	233	38	163	32	384
Ø160	4(2x2)	6121160	452	299	60	219	39	468
Ø200	4(2x2)	6121200	1118	344	67	279	22	264

Installation guidelines: It is recommended that spacers should be placed at 1.5 meters intervals, so that the appropriate distance between them can be maintained.

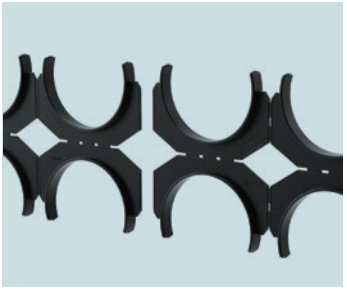
for the **proper installation** of GEONFLEX® N750, GEOSUB® N450 conduits in buried underground networks



Easy connection for additional positions



Optimal conduit support width

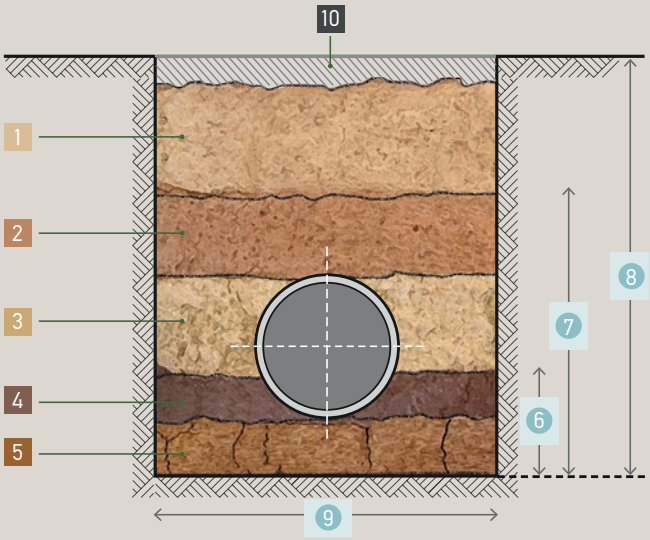


Easy separation in one movement

recent major projects

A few defining projects, that trusted GEONFLEX® & GEOSUB® .

Project	Product	Location	Type of project
Ptolemaida V	GEONFLEX N750	Greece (Ptolemaida)	Infrastructure
Marina Ayia Napa	GEONFLEX N750	Cyprus (Ayia Napa)	Infrastructure
Fraport Airports	GEONFLEX N750	14 airports in Greece	Infrastructure
Robinson Club Luxury Hotel operated by TUI	GEONFLEX N750	Greece (Crete)	Hotels
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	Greece & Cyprus	Commercial buildings
Public infrastructure project in Skopje - EVN (Public Electricity Company)	GEONFLEX N750	North Macedonia (Skopje)	Infrastructure
Parnassos Ski center	GEONFLEX N750	Greece (Fokida)	Infrastructure
Nana Princess luxury suites & villas	GEONFLEX N750	Greece (Crete)	Hotels
Power interconnection project between Crete & Mainland of Greece	GEONFLEX N750	Greece	Infrastructure
Kozani Photovoltaic Project	GEONFLEX N750 - GEOSUB N450	Greece (Kozani)	RES project
Falirikos Ormos	GEOSUB N450	Greece (Athens)	Infrastructure
Piraeus III Floating Dock	GEOSUB N450	Greece (Athens)	Infrastructure
Smart Park	GEOSUB N450	Greece (Athens)	Commercial buildings
National Gallery of Athens	GEOSUB N450	Greece (Athens)	Culture projects
Ionia Highway	GEOSUB N450	Greece	Infrastructure
Olympia Highway	GEOSUB N450	Greece	Infrastructure
AEK Larnaca football stadium	GEOSUB N450	Cyprus (Larnaca)	Infrastructure
National Observatory of Athens	GEOSUB N450	Greece (Athens)	Culture projects
Thessaloniki metro (subway)	GEOSUB N450	Greece (Thessaloniki)	Infrastructure
Park Lane Resort & Spa	GEOSUB N450	Cyprus (Limassol)	Hotels
Domes of Elounda	GEOSUB N450	Greece (Crete)	Hotels
Athens Underground Railway Extension	GEOSUB N450	Greece (Athens	Infrastructure
Lyttos Mare	GEOSUB N450	Greece (Crete)	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 particles, insects and rodents.

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.

The connection of double structured wall conduits GEONFLEX N750 and GEOSUB N450 with the coupler with hooks provide ingress protection IP44 and IP40 respectively. To secure ingress protection IP68, the use of KOUVIDIS adhesive sealant is recommended.

The below shows the minimum amount of adhesive (in grams) required for joining the pipes with the coupler, depending on the diameter, as well as the number of joints that can be made per diameter using one tube of adhesive.

Pipe Diameter	MInimux Sealant grams (gr)	Joints per tube
Ø32	4	108
Ø40	5	86
Ø50	8	54
Ø63	14	31
Ø75	18	24
Ø90	23	18
Ø110	60	7
Ø125	65	6
Ø160	112	3,5
Ø200	260	1,5

USAGE INSTRUCTIONS FOR ADHESIVE

For the application of the KOUVIDIS fixing and sealing adhesive, the use of a mechanical silicone gun is recommended. The adhesive should be applied to the inner ring of the coupling and to the first two grooves ("valleys") of the pipe rings.

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.

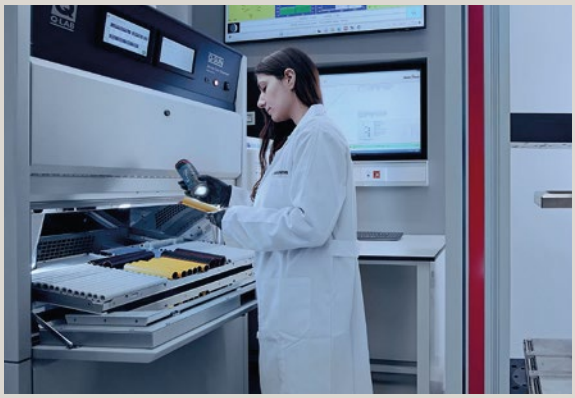
Classification code (acc. to European standard EN 50626-1 (replaces EN 61386-24))

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

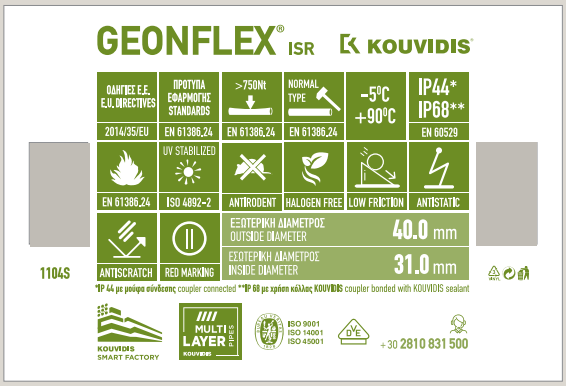
Resistance to compression

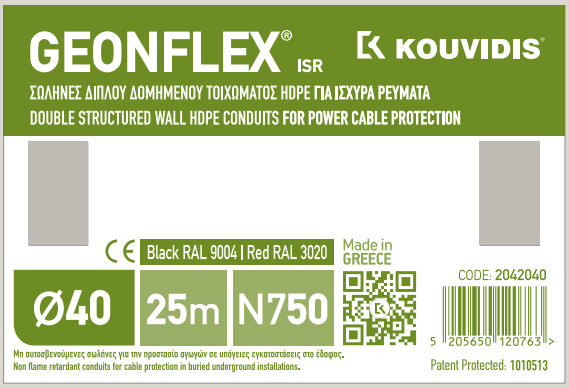
Resistance to compression	
Classification	Compression Strength (Nt)
Type 250	≥250
Type 450	≥450
Type 750	≥750



KOUVIDIS laboratory (quality control department).

Label explanation



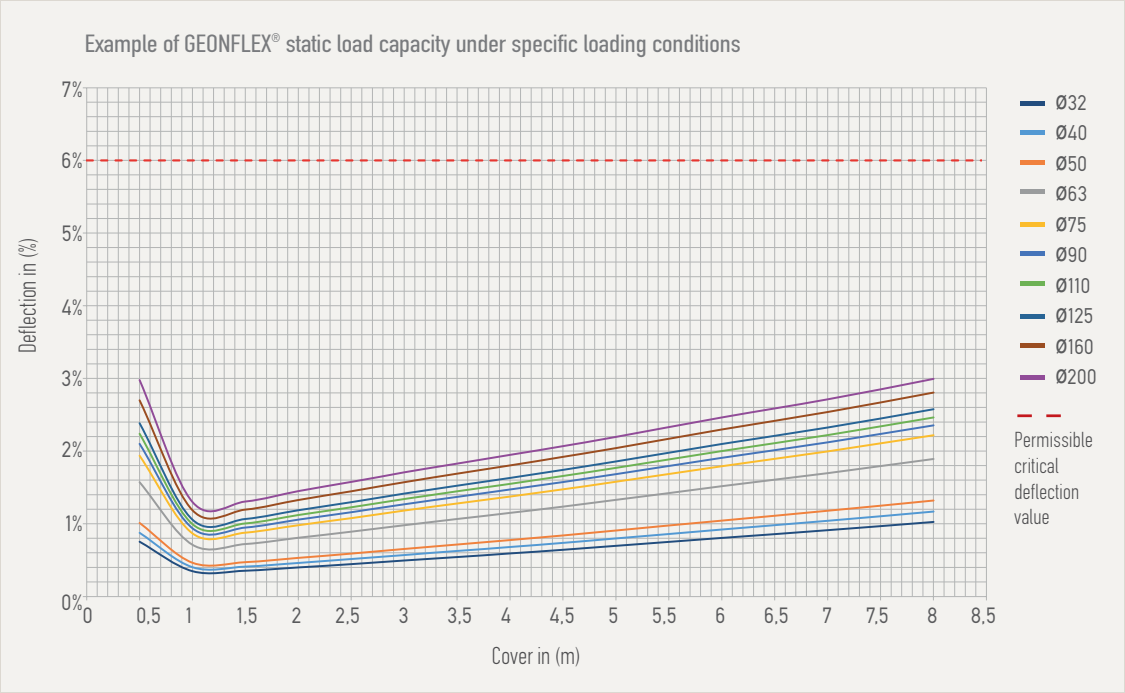


Deflection value

(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)

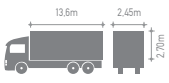
Bars (m)

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 production process are inspected and approved by VDE German institute

KOUVIDIS Multilayer Pipes Technology

Certification body of Quality Management System EN ISO 9001

Certification body of Environmental Management System EN ISO 14001

Certification body of Occupational Health and Safety Management System ISO 45001

N Normal (According to EN 61626-1, impact test)

L Light (According to EN 50626-1, impact test)

APPLICATION FIELDS

BEST CHOICE
acc. to the Manufacturer and the application needs

RECOMMENDED
acc. to the Manufacturer and the application needs

NOT RECOMMENDED
acc. to the Manufacturer and the application needs

6th version 02. 2026

With 47 years of successful presence, KOUVIDIS is one of the top manufacturers of multilayer plastic piping systems for cable protection, sewage, and drainage in Europe.

The trust that we have cultivated with our customers through all these years are the main source of inspiration for the development of new products and innovative solutions that secure high quality and safety to the installer.

We are delighted to have fulfilled a multi annual investment plan for the construction of our new Smart Factory and the installation of our state-of-the-art production lines adopting the values of the 4th industrial revolution. Thus, we now look into the future with confidence and we commit to keep creating value for our staff, our customers, and our partners, whilst to contribute to the development of our society.

KOUVIDIS
SMART FACTORY

KOUVIDIS

EMM. KOUVIDIS SA
MULTILAYER PLASTIC PIPING SYSTEMS MANUFACTURER

VIO.PA Tylissos 715 00 Heraklion, Crete, Greece
T: +30 2810 831500, F: +30 2810 831502
E: info@kouvidis.gr
www.kouvidis.com

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