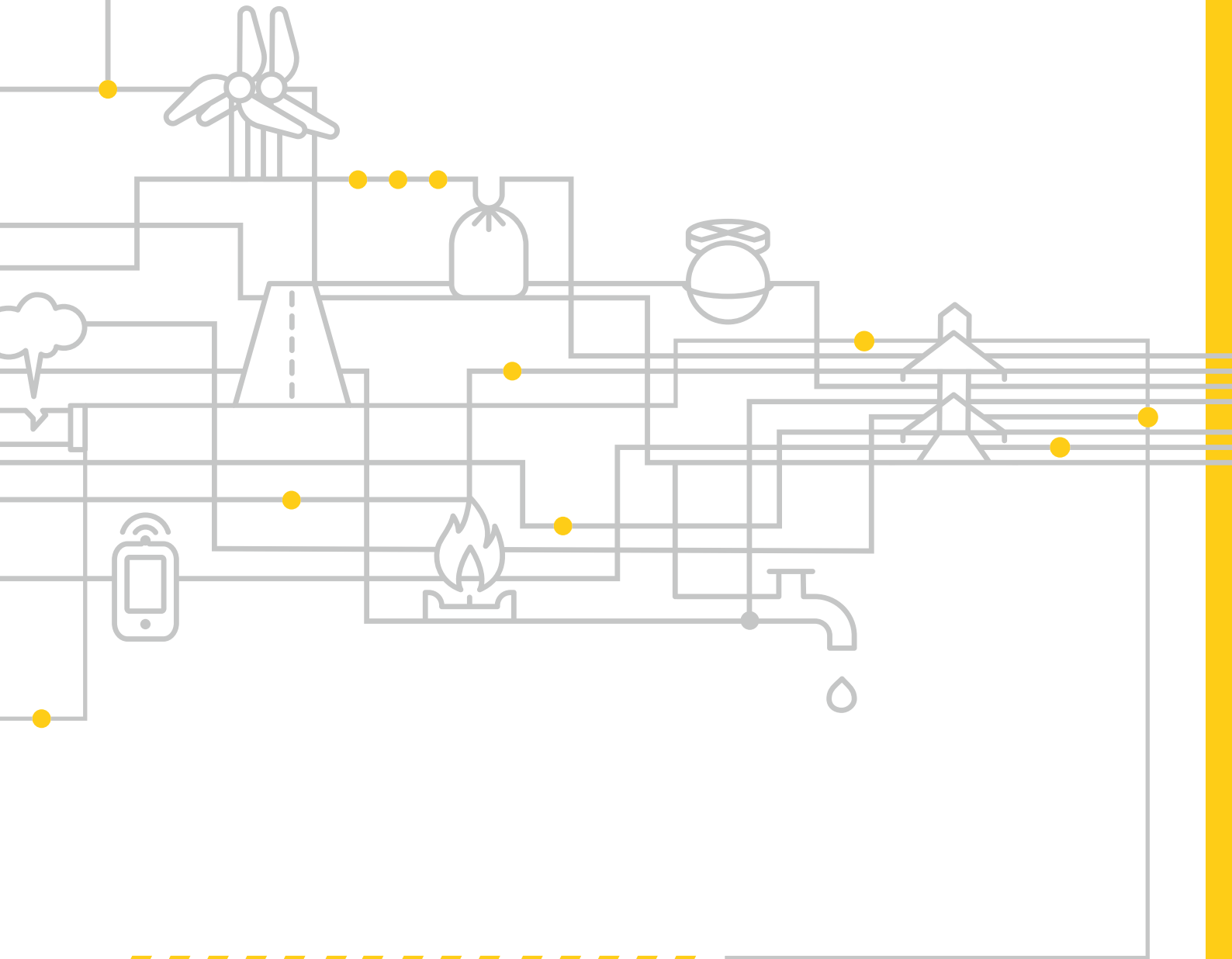




PTS
R A B K A



INFRASTRUCTURE MARKING, LOCATING AND SECURING SYSTEMS

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ABOUT US

Here at PTS Rabka we have been conducting business on the Polish market since 1991. From the very beginnings, we have been involved in the production of warning and location tapes. Over the past three decades, we have actively participated in the creation of marking, location and protection systems for underground infrastructure, gaining the experience essential to become an industry leader.

Today, after nearly 30 years active not just on the domestic market, but throughout Europe, we can offer our customers complete systems for marking, locating and securing underground infrastructure. Our broad product portfolio includes warning and location tapes, markers, marking and measurement posts, cable trays, duct access chambers, cable protection plates, road nets, as well as many other connection products and telecommunication, gas, water, and power network protection systems.

All our products are made of high quality and highly durable materials, each with all the legally required attestations and certificates.



Stanisław Sokołowski
President of the Board

“

Success in business is more than achieving goals, but also about maintaining trust and working with the right people.

”



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MARKING AND LOCATING SYSTEMS

The warning tapes, warning and location tapes, marking and measurement posts, markers, and locators form a comprehensive marking and location system for underground infrastructure.

Growing investments in the telecommunications, gas, water supply, power engineering and other industries leads to increasing densities of various network systems, especially those using plastics, installed in the ground. This translates to significant difficulties in locating the right cables and pipelines.

To ensure uninterrupted operation of such networks, it is necessary to know the types and locations of its keystone elements. This information can be ensured by applying warning and location tapes along the entire lengths of pipelines and cables, as well as installing additional markers in crucial sites (network crossing points, egress points from buildings, connections, cable boxes, water courses, roads, etc.). A selection of warning and location tape arrangements and a sample galvanic locating method are shown below.

The colour of the tape used with a particular network must comply with the standard (the colour must be consistent with the network type). An inscription may be printed on the tape, usually in black, and must also comply with current regulations (e.g. CAUTION! OPTICAL TELECOMMUNICATION CABLE, CAUTION! WATER LINE, GAS, etc.). A typical PTS Rabka system for network marking comprises: warning and warning/location tape, marking and measurement posts, markers and locators.

BENEFITS OF THE MARKING AND LOCATING SYSTEM:

- » Early warning of the risk of causing mechanical damage to networks,
- » Locating component – ability to precisely determine the routes and depths where pipelines (or other systems) are laid,
- » EMS markers – determines the locations of critical elements or crossing points with other networks.



TELECOMMUNICATIONS

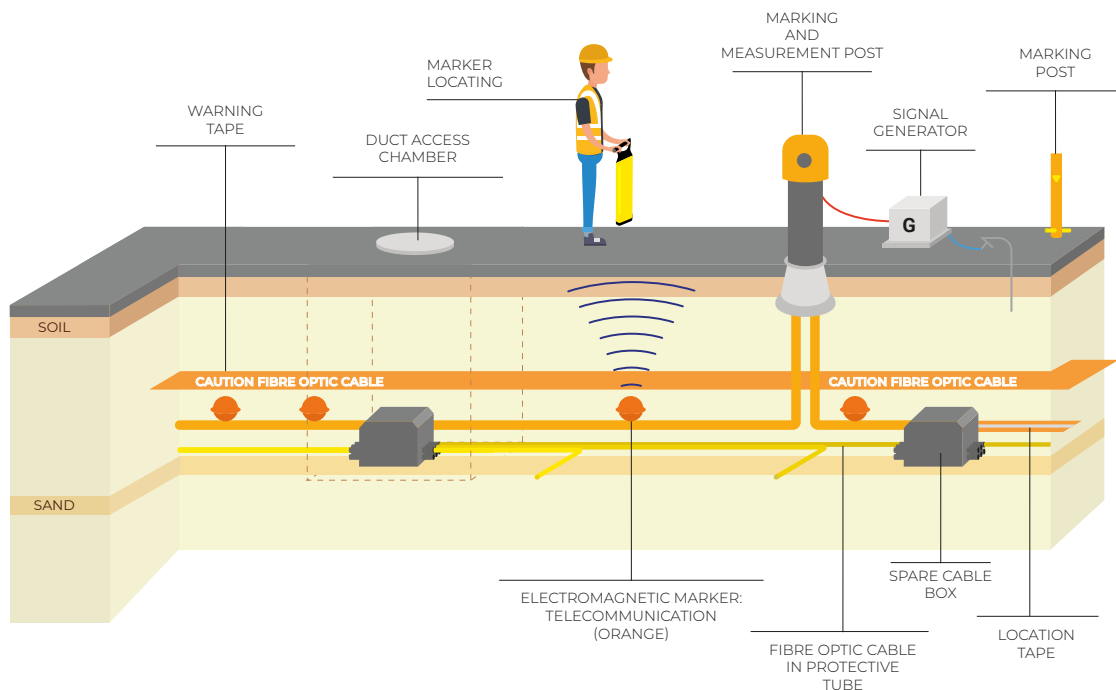
Warning tapes for telecommunication networks are available in orange and include one of the following standard inscriptions:

- » CAUTION OPTICAL TELECOMMUNICATION CABLE,
- » CAUTION TELECOMMUNICATION CABLE,
- » CAUTION FIBRE OPTIC CABLE.

Non-standard inscriptions, e.g. with a company logo (monochromatic), can also be ordered.

The warning tapes are manufactured using the highest quality materials, ensuring their strength and durability, as well as resistance to the effects of aggressive agents in the soil. All warning tapes have the necessary expert certificates and attestations required for materials used in telecommunication network construction.

OPTICAL TELECOMMUNICATION NETWORK MARKING SCHEME



TAPE DESCRIPTION	THICKNESS	WIDTH	INSCRIPTION
Orange	0,1 mm	10 cm	„CAUTION TELECOMMUNICATION CABLE”
	0,1 mm	15 cm	
	0,1 mm	20 cm	
	0,1 mm	25 cm	
For fibre optic cables, without steel insert	0,1 mm	10 cm	„CAUTION FIBRE OPTIC CABLE”
	0,1 mm	15 cm	
	0,1 mm	20 cm	
	0,1 mm	25 cm	
For fibre optic cables, with steel insert	0,1 mm	10 cm	„CAUTION FIBRE OPTIC CABLE”
	0,1 mm	20 cm	
	0,1 mm	25 cm	



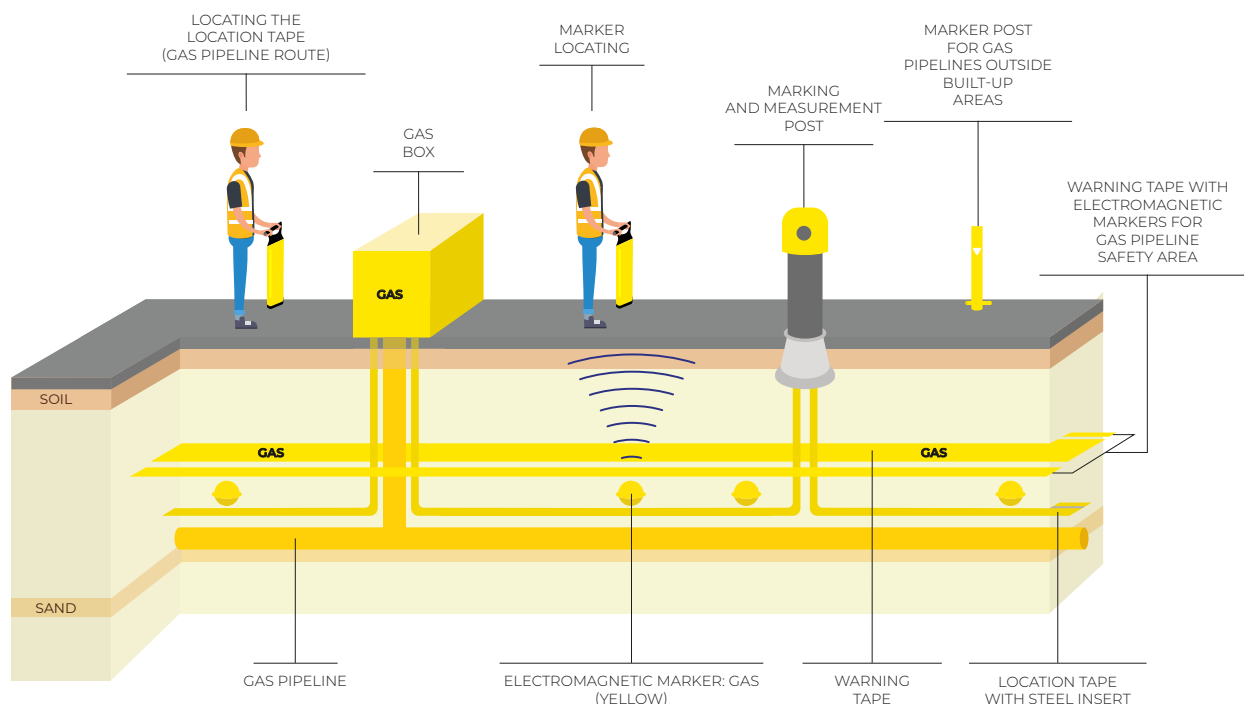
GAS SYSTEMS

Steel inserts for warning and location tapes used to mark gas distribution networks ensure easy and simple locating, similar to their telecommunication network counterparts. The highly-visible yellow tape colour guarantees that when uncovered by an excavator, it will be noticed and no damage to the gas pipeline will ensue. To further ensure protection, the tape can be perforated along its entire length to prevent the accumulation of gas and liquids. The tapes used for marking gas networks and telecommunication networks have inscriptions along their entire lengths, making it easier to quickly identify the type of network.

The ST-IGG 1001:-ST-IGG 1004:2015 compliant marking system allows use of the following tape types:

- » Warning tape without location component,
- » Location tape with steel insert,
- » Location tape with DY wire,
- » Marking tape for controlled zones.

PE GAS DISTRIBUTION NETWORK MARKING SCHEME, WITH SAFETY AREA





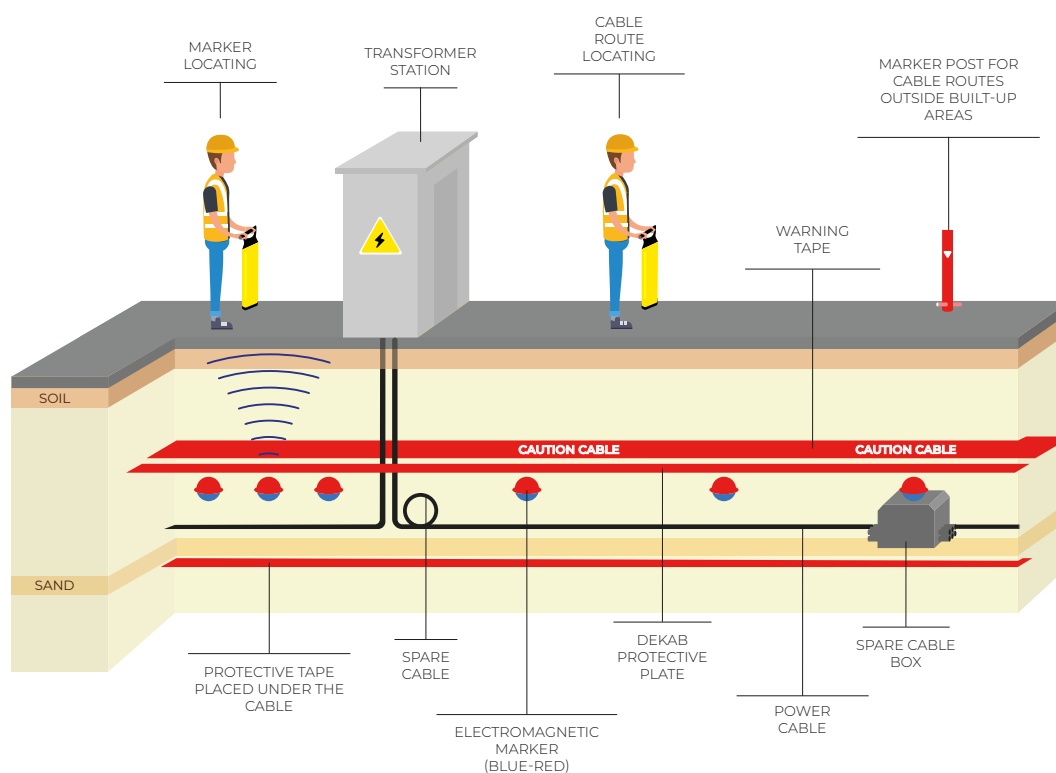
POWER ENGINEERING

Marking underground power distribution networks with warning tapes is particularly important due to the extreme life hazard in the event of cable damage. Tapes for marking underground power distribution networks are manufactured in two colours:

- » BLUE for cables rated below 1 kV,
- » RED for cables rated above 1 kV.

The colour and the thickness of the marking tapes comply with the standards applicable to different network rated voltages. The materials used to manufacture the tapes ensure their quality and strength. The tapes can be customised to order, including serration rolling, perforation, custom inscriptions, or stamping the lightning symbol. Stamping the lightning symbol is particularly important for blue tapes, as the same colour is used to mark water pipelines.

MV (ABOVE 1KV) POWER DISTRIBUTION NETWORK MARKING SCHEME, WITH SAFETY AREA



TAPE DESCRIPTION	INDEX	THICKNESS*	WIDTH*	INSCRIPTION (optional)
MARKING TAPE FOR POWER CABLES RATED 1 KV OR LESS**				
BLUE	TO-ENN/	0,08mm - 0,7 mm	20 cm - 60 cm	„CAUTION CABLE“
MARKING TAPE FOR POWER CABLES RATED ABOVE 1 KV**				
RED	TO-ENC/	0,08mm - 0,7 mm	20 cm - 60 cm	„CAUTION CABLE“
*NON-STANDARD WIDTHS AND THICKNESSES AVAILABLE ONLY TO SPECIAL ORDER			**NON-STANDARD INSCRIPTIONS AVAILABLE TO SPECIAL ORDER	



WATER SUPPLY, SEWERAGE AND HEAT DISTRIBUTION NETWORKS

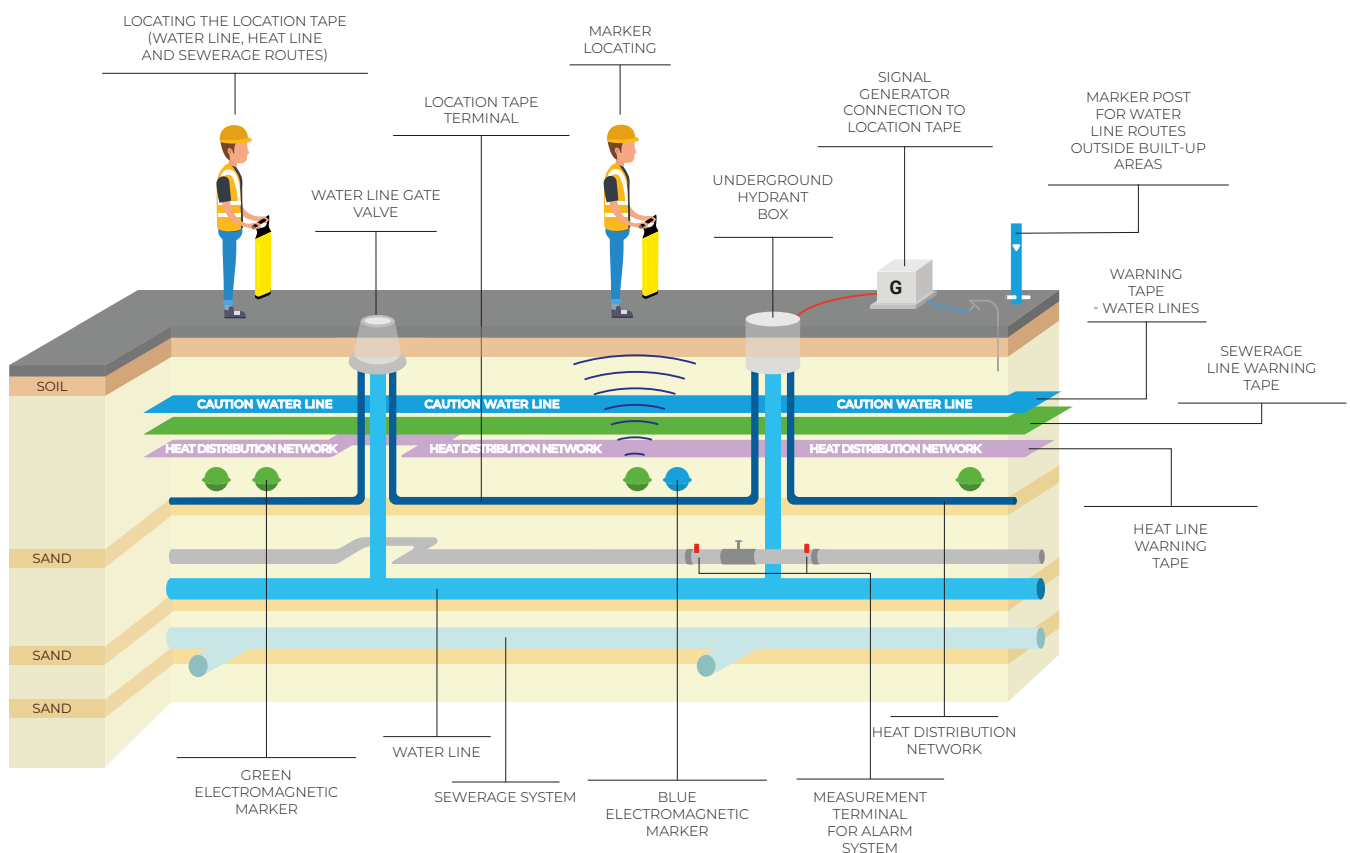
The high density of water supply lines, especially in urban areas, makes marking their routes particularly important. This can be achieved with warning and warning/location tapes, used to mark water line networks.

They provide the ability to warn about the presence of water lines, thus preventing their accidental damage. Acid-resistant steel inserts can be used, making it easier to locate the network. This is also used for se-

werage systems, as well as drainage and irrigation networks. As with water lines, heat distribution network marking has a special significance in urban areas.

To prevent accidental damage to the network, use white/green or purple warning and warning/location tapes to mark heat distribution networks. Network locating is achieved using tapes with steel inserts, ensuring easy network detection.

PE AND PVC WATER SUPPLY, SEWERAGE AND PRE-ISOLATED HEAT DISTRIBUTION NETWORKS MARKING SCHEME



TAPE DESCRIPTION	INDEX	WIDTH	TYPE	INSCRIPTION
BLUE	TO-W/20	20 CM		
	TO-WN/20	20 CM		„CAUTION WATER LINE“
	TOL-W/20	20 CM	WITH STEEL INSERT	
	TOL-WN/20	20 CM	WITH STEEL INSERT	„CAUTION WATER LINE“
PURPLE	TO-F/20	20 CM		
	TOL-F/20	20 CM	WITH STEEL INSERT	
WHITE/BLUE	TO-WBN/20	20 CM		
	TOL-WBN/20	20 CM	WITH STEEL INSERT	
GREEN	TO-Z/20	20 CM		
	TOL-Z/20	20 CM	WITH STEEL INSERT	
WHITE/GREEN	TO-EC/20	20 CM		
	TOL-EC/20	20 CM	WITH STEEL INSERT	



ROADS, RAILWAYS - SERVICE DUCTS

To meet the expectations of our clients, we have adjusted our product range to comply with the normative requirements that specify the service duct constructions used for road and railway systems. The technical requirements concerning the design, construction and reconstruction of service ducts are specified in the Regulation of the Minister of Administration and Digitisation of 21 April 2015 on technical conditions to be met by service ducts, and in the guidelines to the regulation, which introduce the following requirements for service duct marking and locating:

- » A warning tape of width 200 ± 10 mm and minimum thickness 0.3 mm, in an orange colour, with perforated holes of minimum diameter 10 mm and the permanent inscription "Caution Service Duct" shall be placed above service ducts at half the service duct laying depth.
- » A warning and location tape of width 200 ± 10 mm and minimum thickness 0.5 mm, in an orange colour, with a locating component in the form of an acid-resistant tape of minimum width 25 mm and minimum thickness 0.1 mm, with perforated holes of minimum diameter 10 mm and the permanent inscription "Caution Service Duct" shall be placed directly above the service ducts.
- » For marking and locating of cable ducts, electromagnetic markers shall be used at characteristic points of the service ducts.

FOR RAILWAYS, THE REQUIREMENTS ARE SPECIFIED IN TWO DOCUMENTS:

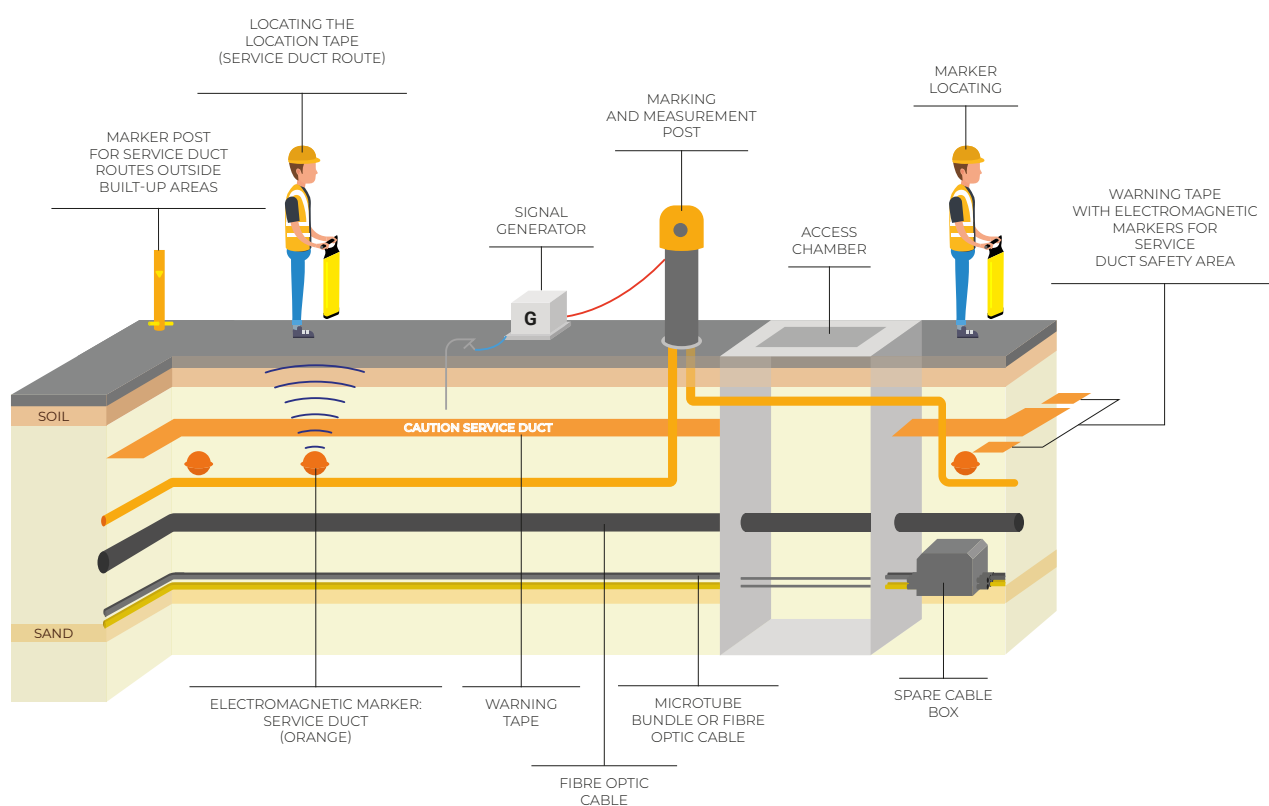
1. Polish State Railway Standard, Volume XV - Cables and Lines.
2. Polish State Railway Standard PLK Normative Document 01-10/ET/2018 - Cable line marking and protection principles, let-12

THE DOCUMENTS REQUIRE THAT THE FOLLOWING ARE USED:

- » Warning tape of minimum thickness 0.6 mm, bearing the manufacturer's details,
- » Location tape of minimum thickness 0.6 mm, with an acid-resistant steel insert of minimum width 2.5 cm, bearing the manufacturer's details,
- » Electromagnetic markers,
- » Protective plates of minimum thickness 2 mm, made of plastic,
- » Duct access chambers made of plastic,
- » Marker and marking/measurement posts made of plastic,
- » Cable ducts (cable trays).



SERVICE DUCT MARKING SCHEME



CABLE AND PIPELINE PROTECTION

DEKAB PROTECTIVE PLATES

Used for the mechanical protection of cables (power distribution and telecommunication), as well as pipelines laid in the ground.

The DEKAB protective plates are used to warn and inform about the type of infrastructure (colour and inscription). They replace cable protection systems of brick or concrete slabs. Compared to these

materials, the plate lifetime is substantially longer (at least 30 years) and is much less demanding in terms of transport, storage, and application (1 m of the widest PVC plate, at 300 mm, weighs only 0.75 kg). The plates are made of recycled PVC(PE), making them environmentally-friendly materials.

DEKAB PLATES



TYPE	MATERIAL	WEIGHT/ METRE	ON PALLET
DEKAB 120X2	PE / PVC	0,22 / 0,35 KG	1000 M
DEKAB 150X2	PE / PVC	0,28 / 0,44 KG	1000 M
DEKAB 170X2	PE / PVC	0,31 / 0,49 KG	1000 M
DEKAB 200X2	PE / PVC	0,38 / 0,58 KG	1000 M
DEKAB 250X2	PE / PVC	0,46 / 0,73 KG	1000 M
DEKAB 300X2	PE / PVC	0,55 / 0,87 KG	1000 M
DEKAB 125X4	PE	0,42 KG	500 M
DEKAB 170X4	PE	0,57 KG	500 M
DEKAB 250X4	PE	0,83 KG	500 M
DEKAB 300X4	PE	1,0 KG	500 M
DEKAB RH 40	PVC	0,23 KG	2000 M
DEKAB RH 50	PVC	0,29 KG	2000 M
DEKAB HA 110	PVC	0,31 KG	2000 M
DEKAB HA 120	PVC	0,35 KG	2000 M





ZEKAN CABLE TRAYS

ZEKAN underground cable trays have been developed to replace concrete trays, and are used for laying cables and cable shields in the ground, providing protection against mechanical damage at the same time. They are widely used in industry and civil engineering, especially in power engineering, telecommunications, and railway route construction.

Their ultimate appearance, shape and dimensions are the result of many years of development and

coordination with construction companies. Their advantages are low weight, easy installation, and easy modification. The cable trays are made of recycled PE material. Durability is at least the same as concrete trays, and their verified lifetime is at least 50 years.

When installed, the trays enable future access to the cables for repair or replacement.



ACCESS CHAMBERS

ZEKAN plastic access chambers are used as access points to cable ducts, to give better access during the installation of components, or to perform inspections, replacements or repairs. Compared to concrete and brick access chambers, these products are substantially lighter, and can be quickly and easily installed thanks to their modular design. Their mechanical load capacity is very high and meets the requirements of the EN 124 standard.

ACCESS CHAMBERS



SPARE CABLE BOX



EXAMPLE PROJECTS WHERE OUR PRODUCTS ARE USED:



MARKERS

ANALOG RADIO MARKERS

Analog radio markers are used for the permanent marking of underground infrastructures. They are ideal for the inexpensive and effective marking of crucial locations in underground infrastructure – an excellent method to resolve those situations where locating individual points is not necessary. We offer three types of analog marker in our range:

MAR 100-3D

This is a spherical analog marker, excellent for narrow excavations. The spherical shape of the electromagnetic field reduces the time needed to install the marker, as it can be placed in any orientation in the ground. The durable polyethylene casing of the MAR 100-3D marker provides excellent protection, even under extreme environmental conditions. The two side handles allow the MAR 100-3D to be attached to underground equipment using tapes.

MARKER 2500

Marker 2500 is positioned flat in the ground. It is intended for deep excavations, where detection to depths of up to 1.8 m is required.

LONG MARKER

This is a modernised version of the analog marker. Its properties and applications are similar to the Marker 2500, the primary difference being the readout range. With a new casing, the readout depth of Long MARKER has been increased to 2.5 m.



OPERATING FREQUENCY (KHZ)		MARKER COLOUR		LOCATOR
83,0 KHZ	GAS LINES	YELLOW		SML G
101,4 KHZ	FIBRE OPTIC CABLES	ORANGE		SML T
121,6 KHZ	SEWERAGE PIPELINES	GREEN		SML S
145,7 KHZ	WATER LINES	BLUE		SML W
134,0 KHZ, 169,8 KHZ	POWER LINES	RED		SML E

SMART RFID SYSTEM - SMART MARKERS

This is a smart system for marking and tracking underground objects and devices

It comprises the following elements:

- » SM1500 Smart Marker,
- » SML locator,
- » Marker database software.

Why choose a smart RFID marker system?

1. Data storage time in Smart Markers is at least 40 years.
2. Users can create and add text information about any Smart Marker.
3. Users can edit all data about the underground network, from the office or home.
4. GPS module integrated in the SML locator.
5. Sound-based GPS navigation.
6. Smart Marker location visualisation using Google maps
7. Accurate management and archiving of all data about underground networks using unique Marker Database software.

8. Cloud-based database archiving.
9. Secure data sharing with partners through the online Marker Database.

SM1500 Smart Markers are buried above key objects during their construction or during maintenance. Before they are deployed, each SM1500 is assigned a serial number, which ensures accurate and clear marking of every important point of the buried network (terminals, connections, flow direction change points, etc.). In this way, the SM1500 can be quickly, easily and accurately located using the SML locator. The GPS module integrated in the SML locator greatly reduces the time needed to find the SM1500 markers. All data about located SM1500 markers are automatically saved in the SML locator's internal memory. Each SM1500 marker transmits the following data:

- » GPS coordinates of its location,
- » marker text description added by the user,
- » marker identification number.



LOCATING EQUIPMENT

SML - SMART MARKER LOCATOR

An SML is a portable unit designed for quick and accurate location and detection of all analog markers and SM1500 Smart Markers. The GPS module integrated in the SML locator greatly reduces the time needed to locate markers. All data about every detected marker is automatically saved in the SML locator's internal memory. A virtual keyboard enables

the user to add text information about each marker. The SML can also measure the depth at which each marker is located. The SML locator can be conveniently connected to a PC with a USB cable to share all marker data using the unique Marker Database® software.

SML XXX LOCATOR TECHNICAL SPECIFICATION

OPERATING TEMPERATURE	-20 °C TO + 60 °C
STORAGE TEMPERATURE	-20 °C TO + 60 °C
MARKER DEPTH MEASUREMENT ACCURACY	+/-10% TO MARKER SPECIFICATION
GPS NAVIGATION	YES, INTEGRATED GPS MODULE
OPERATING FREQUENCY	"SML G1 - 83,0 KHZ SML T1 - 101,4 KHZ" "SML E1 - 121,6 KHZ SML E1 - 134 KHZ, 169,8 KHZ, SML W1 - 145,7 KHZ"
DIMENSIONS HEIGHT X WIDTH X DEPTH	225 X 240 X 210 MM
DEVICE WEIGHT WITH ANTENNA	UP TO 4 KG
MEMORY CAPACITY (READ/WRITE MEMORY)	8000 RECORDS MARKER (DIGITS)
DISPLAY TYPE	BACKLIT LCD SCREEN, 4 X 20
PC CONNECTIVITY	USB CABLE
BATTERY WORK TIME	45 HOURS
PRIMARY BATTERY CELLS, VOLTAGE 1.5 V SIZE WG IECR 14	10 PCS.



MARKING AND MARKING/MEASUREMENT POSTS

Marking and marking/measurement posts are used to indicate the routes of underground systems (water lines, gas lines, telecommunication networks, etc.). Marking/measurement posts are additionally equipped with a special rack inside, used to install equipment for monitoring the systems. The posts

comprise a 140 mm diameter main body, a 160 mm diameter lock-secured top, and a plastic base with cross rods. The use of plastic for the base enables easy insertion of cables or tapes, as well as simple and stable positioning of the posts in the ground.



PROTECTIVE NETS

OPB WARNING NET

Warning nets are an excellent solution for fencing and securing construction and landslide sites, marking cables and pipelines, building manholes, or for public road construction and repairs. They are

used wherever work conditions can be hazardous to the health, as they enable easy isolation of defined areas. This fencing type is extremely quick and easy to install and then later remove.

TRADE NAME	WIDTH	LINEAR DENSITY
OPB 100	100 CM	100 G/LM
OPB 120	120 CM	120 G/LM
		240 G/LM

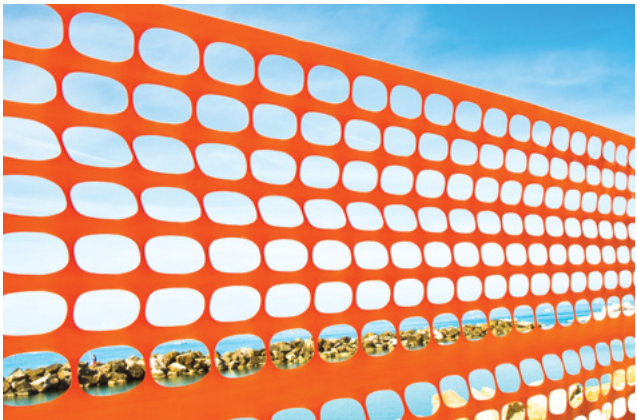
COLOUR	ORANGE		
MESH SHAPE	OVAL		
MESH SIZE	55X33 MM	45X30 MM	40X30 MM
TRADE FORM	REEL 100 LM	REEL 50 LM	

OPS WARNING NET

Owing to its orange colour, the OPS warning net is highly visible, making it easy to secure construction sites or other hazardous areas. The mesh has a regular oval shape, and it is both strong and durable

against weather conditions, such as humidity, low or high temperatures or strong winds. It is very easy to roll up once removed, facilitating storage. Available in multiple weight variants.

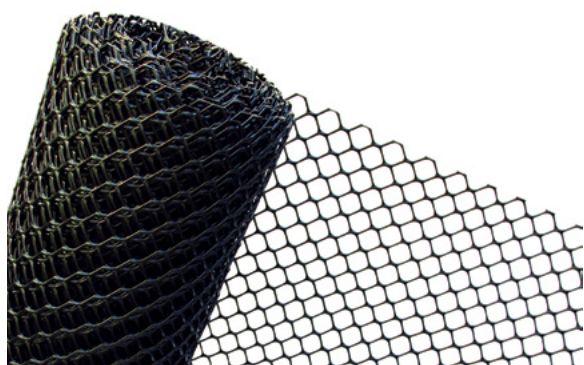
MESH SIZE	40X30 MM
TRADE FORM	REEL 50 LM



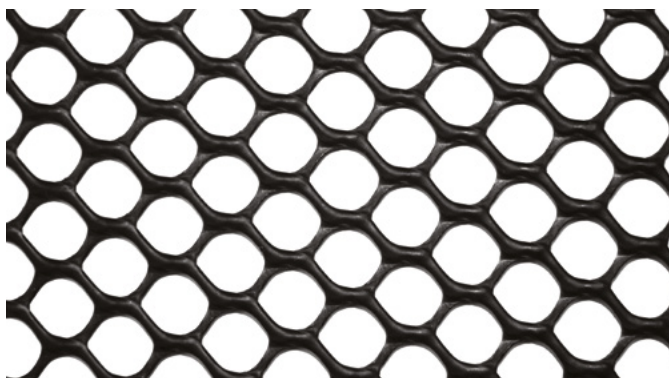
LANDSLIP AND ROAD PROTECTION NETS

PS NET

TRADE NAME	WIDTH	WEIGHT
PS 100	100 CM	650 G/LM
PS 120	120 CM	780 G/LM
PS 130	130 CM	850 G/LM

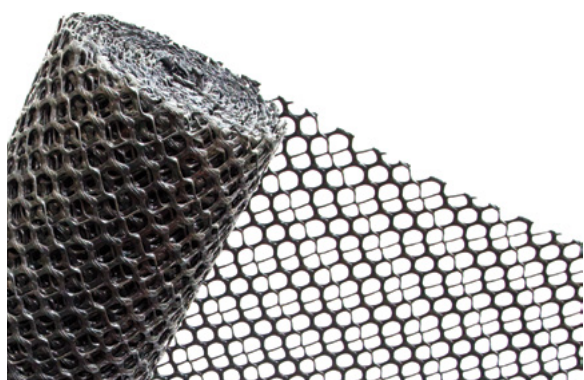


COLOUR	MESH SHAPE	TRADE FORM
BLACK ORANGE	120 CM	REEL 25 LM

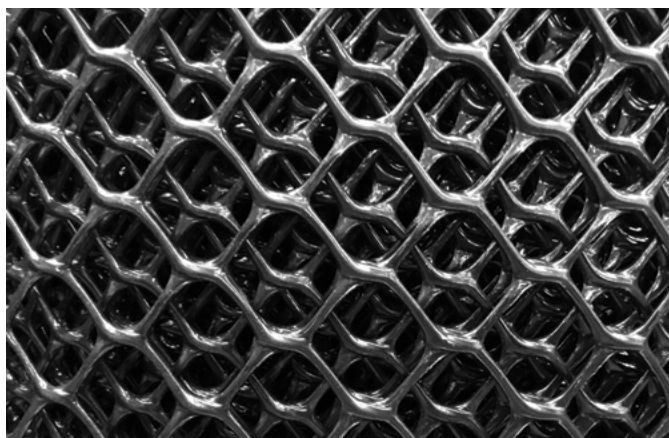


RS NET

TRADE NAME	HEIGHT	WEIGHT
PS 100	100 CM	650 G/LM
PS 120	120 CM	780 G/LM
PS 130	130 CM	850 G/LM



THICKNESS	COLOUR	MESH SHAPE	MESH DISTRIBUTION	TRADE FORM
4,5 MM	BLACK	HEXAGONAL	20X20 MM 30X20 MM	REEL 25 M

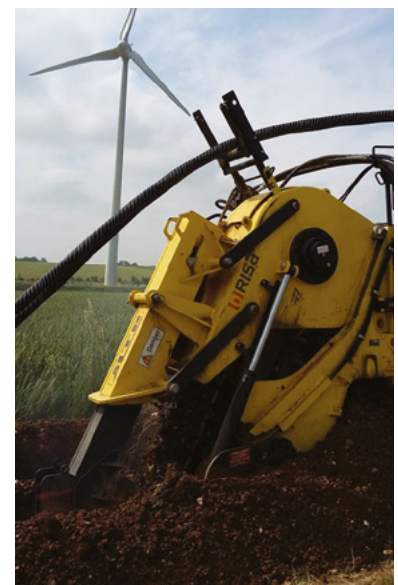
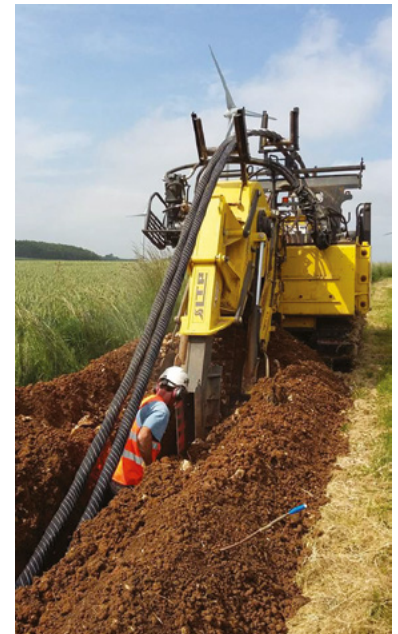
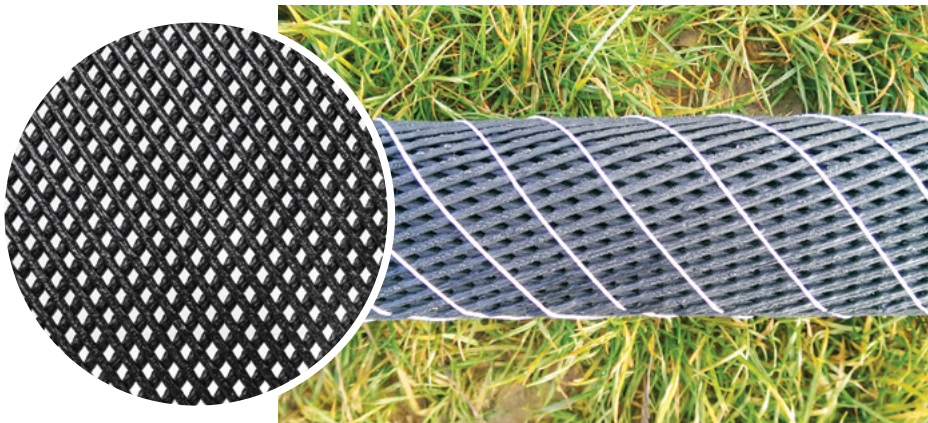


PIPE AND CABLE PROTECTION NETS - ROCKSHIELD

The GEO 3/1000 ROCKSHIELD net is an innovative solution used for the mechanical protection of power cables laid underground.

The special and at the same time flexible structure of the net enables it to be twisted and further rolled around the cables using a dedicated machine. This net design dissipates and absorbs the force of the mechanical impacts caused by rocks, gravel and other bulk materials.

The GEO 3/1000 ROCKSHIELD net is made of a special high-density polyethylene blend and blowing agents to increase its durability, while the black colour with UV stabilisers protects it against the effects of light when the cables are covered with the net and wound on the reel.



TECHNICAL PARAMETERS	VALUE	UNIT
POLYMER	HIGH-DENSITY POLYETHYLENE (HDPE)	
PORE-FORMING AGENTS	YES	
UV STABILISER	YES	G / M2
UNIT OF WEIGHT	1 000	
COLOUR	BLACK	

DIMENSIONS	VALUE	UNIT	TOLERANCE
NET SIZE: (MD X TD)	4 X 4	MM	(+/-) 5 %
NET THICKNESS	5,5	MM	(+/-) 1 MM
NET WIDTH	18 - 26 - 28 - 30 - 35	CM	—
REEL LENGTH	100	M	—

MECHANICAL PROPERTIES	VALUE	UNIT	STANDARD
LONGITUDINAL TENSILE STRENGTH	5,4	KN / M	EN ISO 12958:2010
LATERAL TENSILE STRENGTH	6,3	KN / M	EN ISO 12958:2010
LONGITUDINAL ELONGATION AT RUPTURE	80	%	EN ISO 12958:2010
LATERAL ELONGATION AT RUPTURE	60	%	EN ISO 12958:2010
DEFORMATION AT 1MPA	≤ 35	%	-

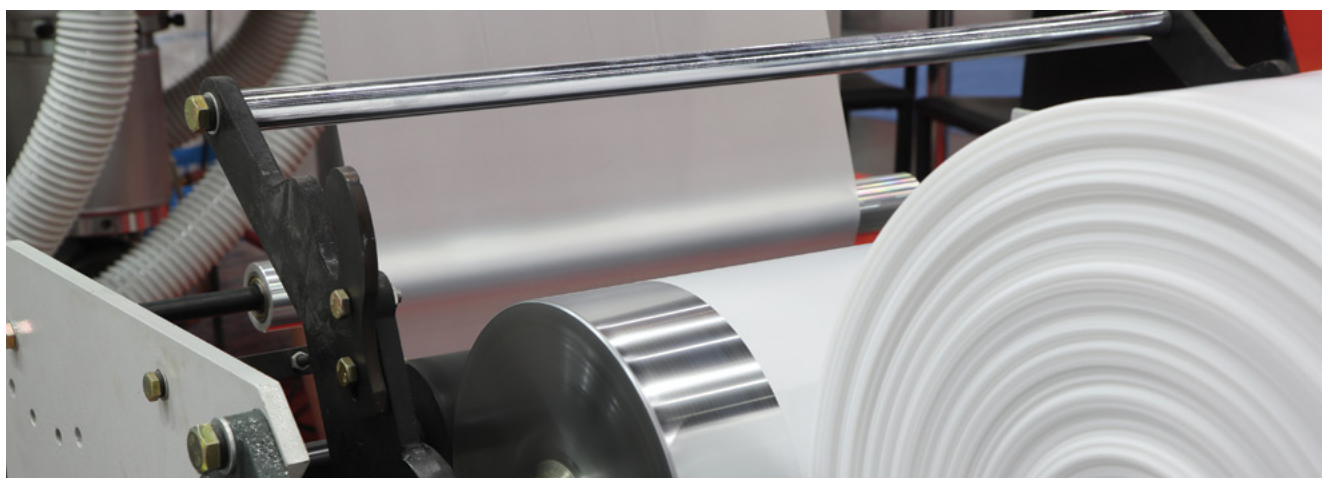
BENEFITS OF USING ROCKSHIELD NET:

- » Improves the durability and performance of power cables,
- » Improves cable electric throughput by dissipating cable heat into the ground,
- » Recyclable,
- » Enables the reuse of excavated soil without the need to use sand, generating significant economic savings.

SHEETS, SLEEVES, SEMI-SLEEVES AND BAGS FOR SELECTIVE WASTE COLLECTION

PTS Rabka specialises in the manufacture of LDPE sheets using raw materials and regranulates. The following plastic material types are available: tape, semi-sleeve (cut on one side), sleeve, and sleeve with one or two overlaps (folds). These plastics can

be made as heat shrinkable materials. The products can be made in any colour, to order. Flexographic inscriptions can be printed, up to 700 mm wide. The product range also includes a complete selection of waste collection and segregation bags.



PLASTIC SHEET PRODUCTS

PRODUCT TYPE	DIAGRAM	THICKNESS	WIDTH
TAPE		0,03 - 0,4 MM	10-105 CM
SEMI-SLEEVE		0,03 - 0,4 MM	10-105 CM
SLEEVE		0,03 - 0,4 MM	10-105 CM
2-OVERLAP (FOLD) SLEEVE		0,03 - 0,4 MM	50-180 CM

BAGS

COLOUR	INTENDED USE	DIMENSION CM	CAPACITY L	THICKNESS MM
YELLOW	PLASTICS AND CANS	70 X 110	120	0.05 / 0.07
BLUE	PAPER	70 X 110	120	0.05 / 0.03 - 1
GREEN	COLOUR GLASS	"70 X 110 60 X 80"	"120 60"	0.05 / 0.07
RED	METALS	"70 X 110 60 X 80"	"120 60"	0.05 / 0.07
BLACK	OTHER NON-SEGREGATED WASTE	70 X 110	120	0.05 / 0.07



Selective waste collection bags

ADVERTISEMENT TAPES AND SHEETS





