PLASTON-P

PRODUCT CATALOGUE

PLASTIC PIPELINES

FOR:

- COAL MINING INDUSTRY
- PROCESSING PLANTS
- OIL AND GAS INDUSTRY
- METAL ORE MINES
- POWER INDUSTRY

2022

www.plaston-p.com.pl

ISO 9001:2008

PLASTON-P is a manufacturer of plastic pipes and fittings for the mining, processing as well as refining and gas industries, in particular for underground hard coal mines with methane hazards. During the company's 25-year history, several hundred pipelines have been delivered and installed in mines in Poland, the Czech Republic, Ukraine and Kazakhstan.

PLASTON-P's pipes are extremely durable and designed for several decades of use without losing their mechanical and physical properties. They are manufactured from laminate-glass composites, combined with a wide range of inner layers, depending on the intended use: from antistatic gas liners, through liners for transporting water and slurries, to wear-resistant layers designed for the most demanding transport of hydraulic fills, metal ores and other solid suspensions.

Our reference list includes virtually all coal mines in Poland as well as numerous international companies and coal groups, among others:

Jastrzębska Spółka Węglowa S.A.

Polska Grupa Górnicza S.A.

Przedsiębiorstwo Górnicze SILESIA Sp. z o.o.

Spółka Restrukturyzacji Kopalń S.A.

TAURON WYDOBYCIE S.A.

WIELICZKA Salt Mine

OKD Group - mines in the Czech Republic

Zasyadko - a mine in Donetsk, Ukraine

Donetksteel - a Ukrainian group of coal mines and metallurgical plants

Arcelor Mittal Temirtau - mines in Kazakhstan

Plaston-P's products have all the necessary certificates and approvals for use in underground mine excavations issued by accredited certification bodies.

The structural layer of the pipes is a laminate made of a special mixture of polyester – vinyl resins reinforced with glass fibre. This layer is supplemented with a wide range of inner linings whose mechanical characteristics and chemical composition depend on the planned use of the pipeline. Inner linings protect the tightness of the products by increasing their abrasion and impact resistance. All products manufactured by **PLASTON-P** can be made of V-0 class flame retardant materials, with the self-extinguishing time of < 5 seconds, and are completely antistatic, with a surface resistivity of 106Ω/m. These products have safety certificates for use in underground mining with methane explosion hazard 'a', 'b' and 'c' and coal dust explosion hazard 'A' and 'B'.

The temperature range of standard pipes is up to +60°C without losing mechanical properties, and storage temperature ranges from -40°C do +60°C, without any roofing necessary.

For the version for heating mains, when using heat-resistant resins, the upper limit of safe operation can be increased up to +125°C.

The product range includes complete pipeline systems for:

HARD COAL MINING INDUSTRY

Ventilation
Degassing (methane extraction)
Transport of water and water slurries
Fire protection pipes
Ice water transport in air-conditioning systems
Process water supply
Hydraulic fill transport
Transport of excavated materials in processing plants

METAL AND MINERAL ORE MINING INDUSTRY

Ventilation
Drainage
Transport of excavated hard materials in aqueous and acid solutions
Disposal of waste raw materials and solutions
Hydraulic fill transport

REFINING AND GAS INDUSTRY

Transport of liquids and solutions produced from petroleum, including high-octane gasoline types
Transport of suspensions and emulsions as well as acid solutions, including sulphuric, phosphoric and saline solutions
Transport of flammable gases
Transport of oils and greases and disposal of waste substances

OTHER APPLICATIONS

Transport of water in district heating pipes
Transport of other liquids with aggressive chemical composition at an elevated temperature
Transport of plaster stone, cement, salt, grain and artificial fertilizers
Transport of excavated materials with high abrasive and corrosion parameters in mineral raw material mines

PLASTON-P'S PRODUCTS INCLUDE:

- standard and polyurethane foam pre-insulated line pipes up to 6 metres long with flanged and flangeless connections in the diameter range 80 mm - 600 mm and with working pressure up to 10 MPa for selected diameters,
- fittings such as T-connections, elbows, reducers, blind flanges, etc. made at any angle and capable of connecting any available diameters,
- cover pipes for running pipelines through walls and other openings,
- laminate support structure for pipes and elbows fixed in shafts,
- at the customer's request, pipeline installation accessories such as hangers, supports, gaskets, bolts, chains and valves can be supplied and experienced and qualified personnel may be provided to install the pipelines.

ADVANTAGES OF LAMINATE PIPES

- **No corrosion or fouling**, which allows the use of pipes with a smaller diameter than steel pipes without changing the flow parameters, while ensuring trouble-free use for decades.
- **High pipe resistance**, confirmed in practice by the reliable operation of Plaston-P's products for more than 25 years.
- **The best durability of flanged connections** - constant, regardless of pressure jumps and differences between internal and external temperatures of the pipeline, no bending or increases in the flexibility of pipes or flanged connections, which is characteristic of polyethylene pipes.
- **Ability to use various inner layers** depending on the client's needs in order to achieve parameters required for the specific applications of the pipeline.
- **Quick and simple damage repair**, possible also underground at the location where the pipeline is installed and used, as opposed to steel and polyethylene pipes.
- **Low costs of transport, installation and removal** compared to steel and polyethylene pipes due to the fact that the product is several times lighter.
- **Small pressure drop over length** owing to very smooth inner surfaces, which reduces power consumption of pumps and makes it possible to transport more liquid or gas over the same time (by up to 15%).
- **Very good thermal insulation properties of pre-insulated pipes** - approximately 30% better than of traditional pre-insulated steel pipelines.
- **High resistance to abrasive wear**, especially in versions with abrasion-resistant polyurethane inner linings and ceramic gelcoats. An important feature is the ability to select an abrasion-resistant lining for a specific application, thus creating a pipe with individual characteristics dedicated to a specific application, achieving many times better results than with pipes made of steel or thermoplastics (PE, PVC).
- **High circumferential stiffness of pipes in a broad temperature range**, which makes it easier to transport and suspend a pipeline in various conditions and ensures smooth operation for many years; stiffness comparable to steel pipes and several times higher than in polyethylene pipes, which significantly reduces the cost of fixing a pipeline.
- **The best internal diameter to flanged connection size ratio among plastic pipes** - wall thickness comparable to steel pipes and approximately 15-20% better than in comparable polyethylene pipes, which increases flow by about 40%.
- **Weatherproof** - operation parameters remain constant in the temperature range from -40°C to +60°C, which allows the pipes to be stored in stacking yards for long periods of time.
- **High resistance to aggressive substances and solutions**, including sulphuric, phosphoric and saline acids as well as plaster stone and other highly corrosive substances.

PLASTON-P'S PIPELINES ENSURE THE LOWEST TOTAL COST OF PURCHASE, TRANSPORT, ASSEMBLY AND OPERATION THROUGHOUT THE ENTIRE SERVICE LIFE.

PIPES FOR TRANSPORTING WATER, SUSPENSIONS AND AGGRESSIVE LIQUIDS

Designed for the construction of horizontal and shaft pressure pipes for:

-dewatering,
-process piping,
-fire protection,
-non-flammable liquids and water slurry,
-other chemically aggressive aqueous solutions,
-air-conditioning,
-fill.

Diameter and pressure range of the manufactured GRP/W pipes

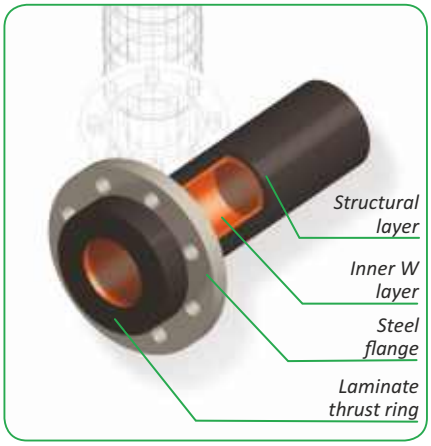
Nominal diameter of flanged connection D_N [mm]	Inner diameter of the GRP/W pipe D_w [mm]	Internal pressure [bar]							
		2,5; 6,3(6); 10	16	20	25	30	40	64	100
		Production scope							
80	82	●	●	●	●	●	●	●	●
100	103	●	●	●	●	●	●	●	●
125	119	●	●	●	●	●	●	●	●
150	152	●	●	●	●	●	●	●	●
200	190	●	●	●	●	●	●	●	●
250	240	●	●	●	●	●	●	●	●*
300	302	●	●	●	●	●	●	●	●*
400	385	●	●	●	–	–	–	–	–
450	430	●	●	●	–	–	–	–	–
500	480	●	●	●	–	–	–	–	–
600	580	●	●	●	–	–	–	–	–

* Applies to laminate pipes with a metal insert and an inner plastic lining.

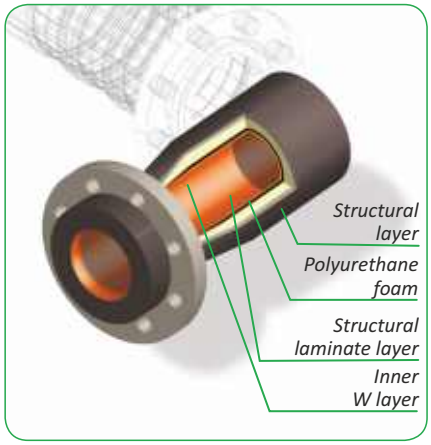
All types of fittings such as T-connections, elbows, bends, reducers and covers are also available. Depending on the diameter and pressure range, the structure of the fittings is the same as that of pipes or they are made with an additional inner steel layer. In addition to the above-mentioned standard diameters, the manufacturer can produce other diameter and wall thickness ranges upon agreement with the customer.

At the customer's request, the pipes can be made in a multipurpose version suitable for transporting both liquids and gases.

PIPE DIAGRAM
- STANDARD VERSION



PIPE DIAGRAM
- PRE-INSULATED VERSION



The insulation layer is polyurethane foam covered by a thin protective laminate layer. Very high insulation parameters of the foam coupled with natural insulation properties of plastics ensure exceptionally stable temperature of the transported water - in the range of 0.2 to 0.3°C per one kilometre of the pipeline. The self-extinguishing time of the applied insulation layer is < 30 seconds.
The protective laminate layer has the same flame-retardant parameters as basic PLASTON-P's pipes. Polyurethane foam is 35- 50-mm thick, depending on the pipe diameter and intended use of the given system. Research conducted by the Department of Mining Aerology at the Central Mining Institute in Katowice has shown that the heat-transfer coefficient of PLASTON-P's pre-insulated pipes is lower by 14% at diameters up to 150 mm, and by 29% at diameters above 200 mm, compared to the traditional steel pipeline insulation method.

PIPES FOR TRANSPORTING METHANE, AIR AND OTHER GASES

Designed for constructing pipelines for:

-methane extraction,

-transporting air and other flammable gases,

-and for compressed air process piping.

The pipes are made completely of V-0 class flame retardant and antistatic materials, with resistance of all layers as well as volume resistance below $10^6\Omega$/m. They can be used for transporting methane and other gases in underground mine excavations with methane explosion hazard 'a', 'b' and 'c' and coal dust explosion hazard 'A' and 'B'.

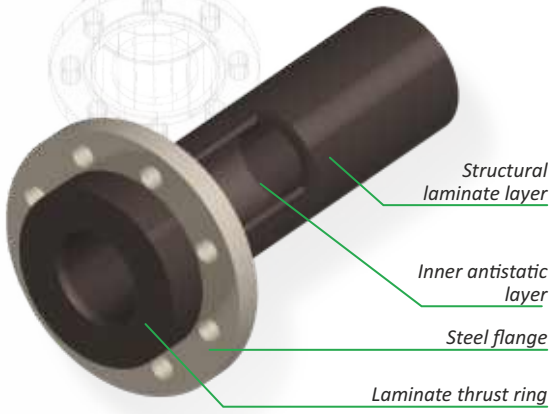
Diameter and pressure range of the manufactured GRP pipes

Nominal diameter of flanged connection D_N [mm]	Inner diameter of the GRP/W pipe D_w [mm]	Internal pressure [bar]					
		2,5; 6,3 (6); 10	16	20	25	30	40
		Vacuum up to - 0.5					
80	90	•	•	•	•	•	•
100	110	•	•	•	•	•	•
125	125	•	•	•	•	•	•
150	160	•	•	•	•	•	•
200	200	•	•	•	•	•	–
250	250	•	•	•	•	•	–
300	315	•	•	•	•	•	–
400	400	•	•	•	–	–	–
450	450	•	•	•	–	–	–
500	500	•	•	•	–	–	–
600	600	•	•	•	–	–	–

All types of fittings such as T-connections, elbows, bends, reducers and covers are also available. The fittings are built in the same way as pipes for the range of diameters and pressures highlighted grey in the table. For the other values fittings are made with an inner reinforcing layer.

These pipes can also be made in multipurpose version designed additionally for water transport.

PIPE DIAGRAM



The multipurpose version of the pipe without the inner PVC liner.

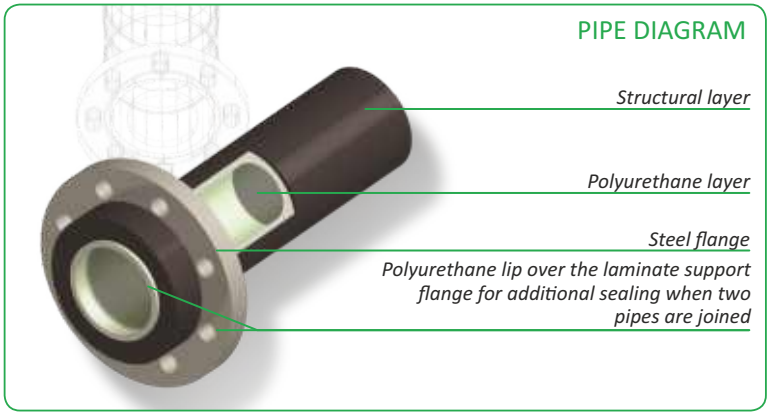
It is made completely of a flame-retardant and anti-static material. As a result, the pipe does not lose its explosion safety properties even as the inner layer gradually wears out during many years of use.

This is supplemented by a broad range of fittings such as bends made at any angle, elbows, T-connections, reducers, blind flanges and other products, according to the customer's needs.

ABRASION-RESISTANT PIPES WITH INNER POLYURETHANE LAYER

Polyurethane is one of the best currently available abrasion-resistant plastics.
It also has very good chemical resistance parameters at elevated temperatures against the majority of aggressive chemicals, including petroleum products such as high-octane gasoline.
Combining polyurethane and the structural laminate layer manufactured by PLASTON-P allows us to obtain a product with unique properties and a very broad range of applications:

- hydraulic fill in the mining industry, including the use of hard power plant slag,
- the entire pipe has the highest non-combustibility and antistatic protection class,
- transporting metal ores in aqueous and acid mixtures,
- transporting plaster stone and nitrogen solutions as well as grain products,
- sand and gravel extraction,
- cement industry,
- transporting refinery products, including phosphoric and saline acid solutions.

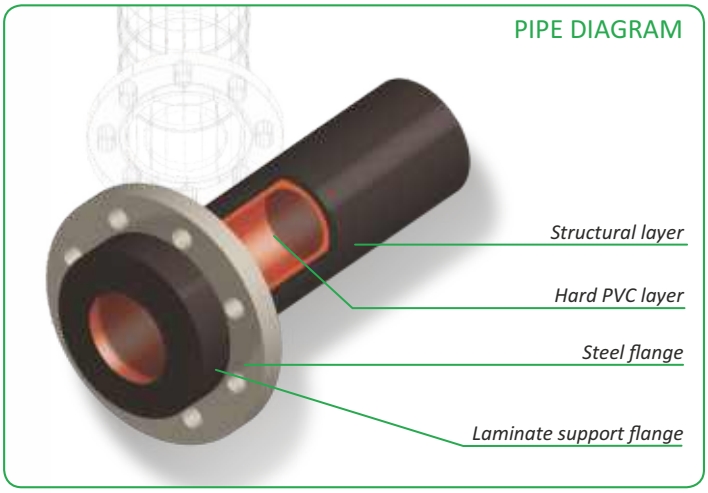


The best abrasion-resistant pipes for hydraulic fill based on aqueous mixtures of sand, power plant dust, slag and waste rock mixtures.

The abrasive wear of the polyurethane used is approximately 4 to 5 times less than for steel pipes (depending on the operating conditions and the characteristics of the material being transported).
The pipe weighs approximately 4 times less than steel pipes.
Elbows and polyurethane-lined tees complete the offer.

Full corrosion resistance to weather conditions as well as mine and surface saline, acidic and basic environments.
Exceptionally smooth inner surface increases transport of suspensions, solutions and gas mixtures by approximately 15% compared to steel pipes used with the same transport devices.
Resistant to the transport of high-temperature media.
Approximately 4 times lighter than comparable steel pipes, which significantly reduces costs of transport and installation.

CONNECTION TYPES



The inner layer consists of liners made of a special abrasion-resistant grade of PVC. For the transport of hydraulic fill based on a water-dust mixture and for the transport of water pulps with low granularity (e.g. gypsum).

CONNECTION TYPES

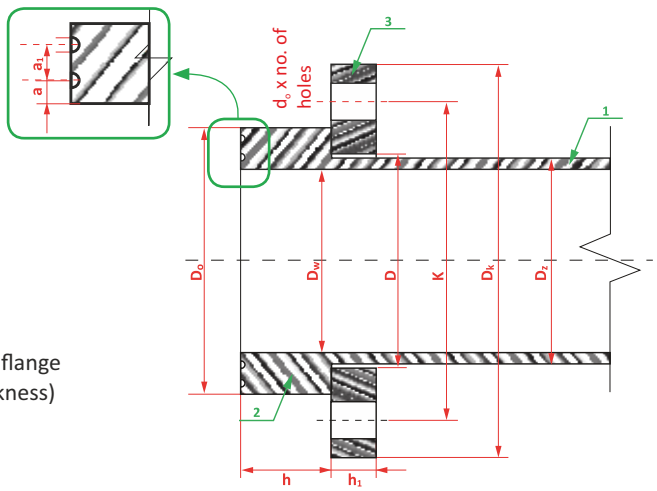
PLASTON-P's pipeline systems can have different connections depending on the needs and requirements of the customer:

FLANGED CONNECTIONS - detachable reusable connections with loose steel flanges and laminate thrust rings. The pipe ends, in the form of laminate thrust rings, form an integral part with the pipe jacket and withstand test pressures of up to 350 atmospheres. Dimensions of galvanised steel flanges, with respect to the bolt circle diameter, comply with PN EN 1092-1 to enable easy connection of PLASTON-P's pipes to existing steel pipelines and fittings.

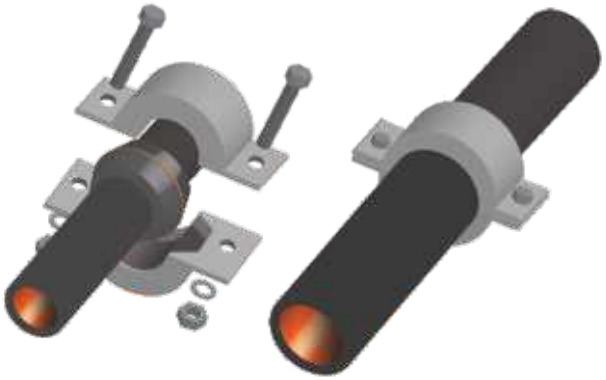
LAYOUT OF FLANGED CONNECTION WITH LOOSE STEEL RINGS OF LAMINATE PIPES OR FITTINGS

1 - PIPE
2 - SUPPORT FLANGE
3 - LOOSE RING

D_w - inner diameter of the pipe
D_z - outer diameter of the pipe
D_k - diameter of the loose ring
K - loose ring bolt circle diameter
d_o - hole diameter
D_o - pipe support flange diameter
h - pipe support flange thickness
h_1 - loose ring thickness
a - distance between the circumferential groove on the flange and the inner diameter of the pipe(a=1.2 x wall thickness)
a_1 - distance between grooves (5÷15 mm)
D - inner diameter of the loose ring ($D=D_z+5÷8$ mm)



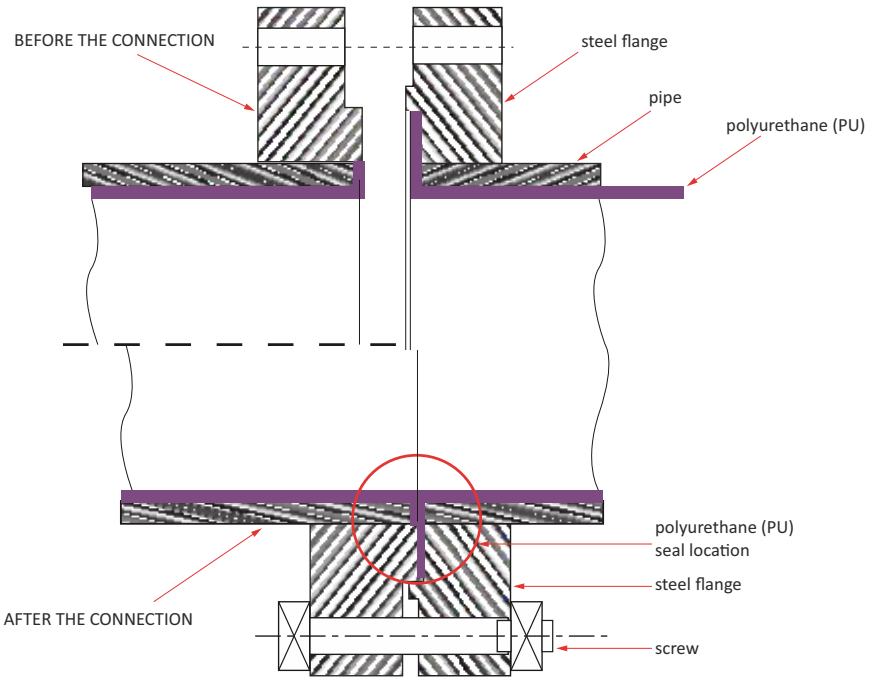
CONNECTION WITH PLASTON-P'S QUICK RELEASE COUPLING - reusable quick release sleeve couplings for operating pressures up to 30 atmospheres. It can be used for both water and gas pipes. This connection uses one small o-ring seal and two halves of a sleeve made of galvanised cast iron. The sleeve is bolted with only two small screws.



Ideal connection for low-pressure water pipelines and all ventilation and methane pipelines. The pipes supplied have no steel components, making them even lighter and easier to install. Compared to a traditional flanged connection, Plaston-P's quick release coupling replaces two steel flanges and long mounting bolts, making the whole connection three times lighter and twice as cheap. An additional advantage is the short assembly and disassembly time and the reusability of the quick release coupling and o-ring seal.

SEALLESS CONNECTION - available for abrasion-resistant pipes with an inner polyurethane layer. The seal between the pipes is obtained by pressing a layer of polyurethane turned up over the face of the pipe. The connection is available in two variants:

- **directional connection** - for easier axial alignment of the pipes during assembly, the pipes must be aligned with the correct ends to each other
- **two-sided connection** - both ends of the pipes are terminated in the same way, there is no need to rotate the pipes, which can be difficult in narrow mine galleries.

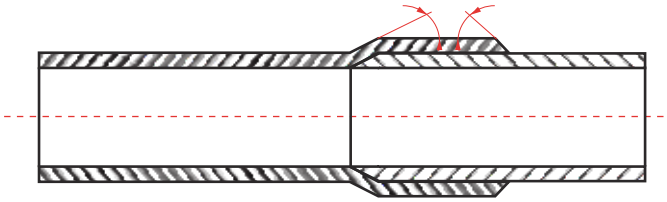


FLANGED PIPE CONNECTION WITH AN INNER PU (POLYURETHANE) LINING WITH A SELF-SEALING SURFACE WITHOUT ADDITIONAL GASKETS

CONNECTION TYPES

GLUED SOCKET CONNECTIONS - connections in non-pressure and low-pressure pipelines with a maximum operating pressure of up to 1.6 MPa. They are capable of creating a permanent bonded connection without the use of any steel components.

CONSTRUCTION DIAGRAM OF A GLUED SOCKET CONNECTION



FLANGED CONNECTION DIMENSION TABLE

Nominal diameter of flanged connection D_N [mm]	Outer pipe diameter D_z [mm]	Inner diameter of GRP/W pipe D_w [mm]	Inner diameter of GRP pipe D_w [mm]	Connection dimensions			h [mm]	min h_1 [mm]	max h_1 [mm]
				K [mm]	D_k [mm]	d_o / n [mm]			
For operating pressure: PN 2,5; 6,3 (6)									
80	100 ± 3	84 ± 2	90 + 1,5	150	190	18/4	$30^{(\pm5)}$	18	18
100	120 ± 3	104 ± 2	110 + 1,5	170	210	18/4	$40^{(\pm5)}$	18	18
125	135 ± 2	120 ± 2	125 + 1,5	200	240	18/8	$40^{(\pm5)}$	18	20
150	170 ± 2	153 ± 2	160 + 1,5	225	265	18/8	$50^{(\pm5)}$	18	20
212	212 ± 2	192 ± 2	200 + 1,5	280	320	18/8	$55^{(\pm5)}$	18	22
250	262 ± 3	241 ± 2	250 + 1,5	335	375	18/12	$55^{(\pm5)}$	20	24
300	329 ± 3	304 ± 2	315 + 1,5	395	440	22/12	$55^{(\pm5)}$	20	24
415	415 ± 3	385 ± 3	400 + 1,5	495	540	22/16	$60^{(\pm5)}$	22	28
450	462 ± 3	431 ± 3	450 + 1,5	550	595	22/16	$60^{(\pm5)}$	22	30
500	517 ± 3	482 ± 3	500 + 1,5	600	645	22/20	$65^{(\pm5)}$	25	32
600	616 ± 4	580 ± 4	600 + 3	705	755	26/20	$65^{(\pm5)}$	25	32
For operating pressure: PN 10 (16*)									
80	103 ± 2	84 ± 2	90 + 1,5	160	200	18/8	$35^{(\pm5)}$	18	20
100	123 ± 2	104 ± 2	110 + 1,5	180	220	18/8	$45^{(\pm5)}$	18	22
125	135 ± 2	120 ± 2	125 + 1,5	210	250	18/8	$45^{(\pm5)}$	18	22
150	172 ± 2	153 ± 2	160 + 1,5	240	285	22/8	$50^{(\pm5)}$	18	24
200	212 ± 2	192 ± 2	200 + 1,5	295	340	22/8	$55^{(\pm5)}$	18	24
250	265 ± 2	241 ± 2	250 + 1,5	350	395	22/12	$55^{(\pm5)}$	20	26
300	330 ± 3	304 ± 3	315 + 1,5	400	445	22/12	$60^{(\pm5)}$	22	26
400	415 ± 3	385 ± 3	400 + 1,5	515	565	26/16	$60^{(\pm5)}$	22	32
450	465 ± 3	431 ± 3	450 + 1,5	565	615	26/20	$65^{(\pm5)}$	24	36
500	518 ± 3	482 ± 4	500 + 1,5	620	670	26/20	$70^{(\pm5)}$	27	38
600	618 ± 3	580 ± 4	600 + 3	725	780	30/20	$70^{(\pm5)}$	30	42

Note: **PN 16*** applies only to gas transporting pipes with DN 600 diameters.

FLANGED CONNECTION DIMENSION TABLE

Nominal diameter of flanged connection D_N [mm]	Outer pipe diameter D_z [mm]	Inner pipe diameter GRP/W D_w [mm]	Inner diameter of GRP pipe D_w [mm]	Connection dimensions			h [mm]	min h_1 [mm]	max h_1 [mm]
				K [mm]	D_k [mm]	d_0 / n [mm]			
For operating pressure: PN 16 i PN 20									
80	105 ± 2	84 ± 2	90 + 1,5	160	200	18/8	$40^{(\pm5)}$	18	20
100	123 ± 2	104 ± 2	110 + 1,5	180	220	18/8	$50^{(\pm5)}$	18	22
125	137 ± 2	120 ± 2	125 + 1,5	210	250	18/8	$50^{(\pm5)}$	20	22
150	174 ± 2	153 ± 2	160 + 1,5	240	285	22/8	$55^{(\pm5)}$	20	24
200	214 ± 2	192 ± 2	200 + 1,5	295	340	22/12	$55^{(\pm5)}$	20	26
250	268 ± 2	241 ± 2	250 + 1,5	355	405	26/12	$55^{(\pm5)}$	20	29
300	332 ± 2	304 ± 2	315 + 1,5	410	460	26/12	$60^{(\pm5)}$	22	32
400	417 ± 3	385 ± 3	400 + 1,5	525	580	30/16	$65^{(\pm5)}$	25	38
450	467 ± 3	431 ± 3	450 + 1,5	585	640	30/20	$70^{(\pm5)}$	27	42
500	518 ± 3	482 ± 3	500 + 1,5	650	715	33/20	$75^{(\pm5)}$	30	46
600	620 ± 3	580 ± 3	600 + 3	770	840	36/20	80	40	55
For operating pressure: PN 25 i PN 30									
80	105 ± 2	84 ± 2	90 + 1,5	160	200	18/8	$40^{(\pm5)}$	18	24
100	124 ± 2	104 ± 2	110 + 1,5	190	235	22/8	$55^{(\pm5)}$	18	26
125	137 ± 2	120 ± 2	125 + 1,5	220	270	26/8	$55^{(\pm5)}$	20	28
150	173 ± 2	153 ± 2	160 + 1,5	250	300	26/8	$60^{(\pm5)}$	20	30
200	216 ± 2	192 ± 2	200 + 1,5	310	360	26/12	$60^{(\pm5)}$	20	32
250	269 ± 2	241 ± 2	250 + 1,5	370	425	30/12	$60^{(\pm5)}$	22	35
300	334 ± 2	304 ± 3	315 + 1,5	430	485	30/16	$70^{(\pm5)}$	25	38
For operating pressure: PN 40									
80	106 ± 3	84 ± 2	90 + 1,5	160	200	18/8	$45^{(\pm5)}$	18	24
100	126 ± 3	104 ± 2	110 + 1,5	190	235	22/8	$55^{(\pm5)}$	20	26
125	137 ± 2	120 ± 2	125 + 1,5	220	270	26/8	$55^{(\pm5)}$	20	28
150	177 ± 2	153 ± 2	160 + 1,5	250	300	26/8	$60^{(\pm5)}$	20	30
200	217 ± 2	192 ± 2	-	320	375	30/12	$60^{(\pm5)}$	25	36
250	270 ± 2	241 ± 2	-	385	450	33/12	$65^{(\pm5)}$	27	42
300	335 ± 2	304 ± 3	-	450	515	33/16	$80^{(\pm5)}$	30	52
For operating pressure: PN 64									
80	107 ± 2	84 ± 2	-	170	215	22/8	$55^{(\pm5)}$	20	30
100	127 ± 2	104 ± 2	-	200	250	26/8	$60^{(\pm5)}$	26	32
125	137 ± 2	120 ± 2	-	240	295	30/8	$60^{(\pm5)}$	26	34
150	178 ± 2	153 ± 2	-	280	345	33/8	$60^{(\pm5)}$	30	36
200	218 ± 2	192 ± 2	-	345	415	36/12	$65^{(\pm5)}$	38	48
250	275 ± 2	241 ± 2	-	400	470	36/12	$80^{(\pm5)}$	40	55
300	350 ± 2	304 ± 2	-	460	530	36/16	$90^{(\pm5)}$	42	65
For operating pressure: PN 100									
80	108 ± 3	84 ± 2	-	180	230	26/8	$65^{(\pm5)}$	26	34
100	128 ± 3	104 ± 2	-	210	265	30/8	$70^{(\pm5)}$	26	36
125	138 ± 2	120 ± 2	-	250	315	33/8	$75^{(\pm5)}$	30	42
150	179 ± 2	153 ± 2	-	290	355	33/12	$80^{(\pm5)}$	36	48
200	221 ± 4	192 ± 2	-	360	430	36/12	$85^{(\pm5)}$	40	60
For PN 100 pressure with a metal insert and inner lining									
300	306 ± 2	290 ± 2	-	500	585	42/16	$90^{(\pm5)}$	60	84

NOTES:
1. The dimensions of the outer diameters of the pipes and thus the wall thickness of the GRP pipes may change in the directions of increase to suit the customer's requirements, which does not alter the terms of the Certification.
2. The inner diameters of the pipes can also be changed to (+) or (-) to suit the customer's requirements, which does not alter the terms of the Certificate and does not reduce the strength of the product, provided the wall thickness is maintained.
3. Observe the following standards when selecting steel pipes for inserts: PN-EN 10216-1,2 or 10217-1,2.
4. Steel inserts should be certified by the manufacturer.

FITTINGS AND HANGERS

PLASTON-P offers a full range of plastic pipe fittings. All shapes are available, such as tees, elbows, bends, reducers, shells and multi hole pipes for methane extraction, with any angle and sizes matching the diameters of the pipes manufactured. The fittings are made of the same composite materials as the main line pipes. All fittings have flanged connections at their ends in accordance with PN EN 1092-1.

FITTINGS WITH AN INNER LAYER MADE OF CERAMIC GELCOAT OR ABRASION-RESISTANT POLYURETHANE

Fittings with inner abrasion-resistant linings complement abrasion-resistant pipes and are used for the construction of fill pipelines in the mining industry and for the transport of all highly abrasive materials in the mining of metal ores and mineral resources. High-pressure fittings have an additional inner reinforcing steel layer. An additional advantage of ceramic gelcoat fittings is that they can be regenerated by applying a new abrasion-resistant layer in the abraded spot, without the need to buy a new elbow or tee.

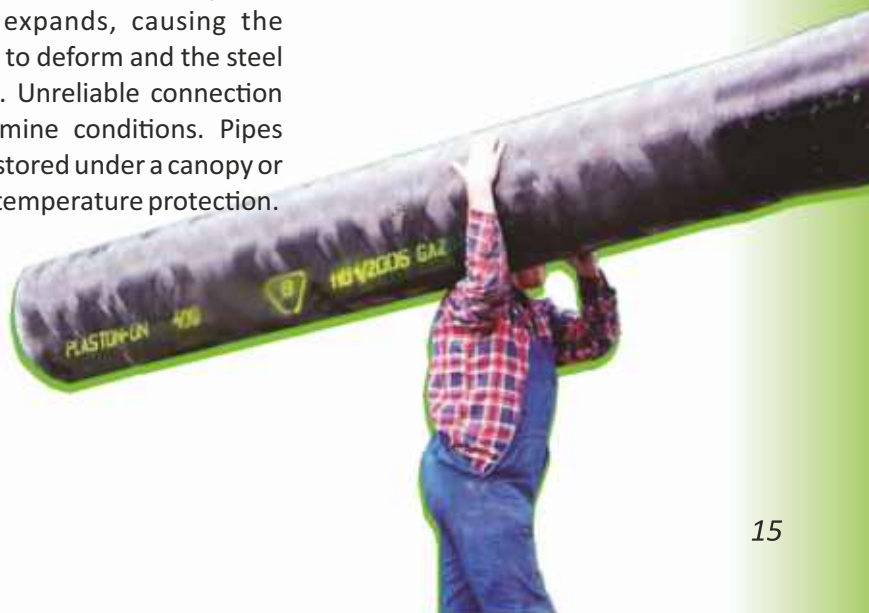
GENERAL PHYSICAL AND MECHANICAL PROPERTIES

PROPERTY	DECLARED VALUE	TEST ACCORDING TO STANDARD
Reinforcement content	min. 50% of weight	PN-EN 637 PN-EN ISO 1172
Long-term resistance of the pipe jacket to internal pressure σ_{obw} (MRS)	100 N/mm² for t = 1000 h 50 N/mm² for t = 50 lat	PN-EN 705 PN-EN 1447
Apparent tensile strength - circumferential - axial (longitudinal)	 min. 160 N/mm² min. 80 N/mm²	PN-EN 1394 PN-EN 1393
Modulus of elasticity in tension (on a test piece)	min. 10 Gpa	PN-EN 1393
Modulus of circumferential elasticity of pipes from internal pressure tests	min. 30 Gpa	PN-EN 1393
Shear strength between layers	10 N/mm²	PN-EN 2377 ASTM D 2290
Initial specific circumferential stiffness	min. 10 kN/m²	PN-EN 1228
Impact resistance	TIR ≤ 10	PN-EN-ISO 3127 (PN-EN 744)
Heat deflection temperature - Vicat HDT	min. 70°C	PN-EN ISO 75
Barcol curing degree	min. 30°	PN-EN 59
Long-term specific circumferential stiffness	min. 7 kN/m²	PN-EN 1225
Creep factor	≤ 3	PN-EN 761
Surface resistance of laminate	on the level of 10^6 Ω	PN-EN ISO 8031
Pipe jacket material flammability	V-0	PN-EN ISO 60695
Fire resistance of the pipe jacket - flame test	≤ 15 seconds	PN-EN ISO 340
Oxygen index of the pipe jacket	≥ 27	PN-EN ISO 4589-2
Flammability of the PU foam and internal linings	V-1	PN-EN ISO 60695
Oxygen index of the PU foam and elastomer	> 21	PN-EN ISO 4589-2
Resistance of the pipe to internal pressure (joint tightness)	min. 2 x PN	PN-EN 1229
Roughness of the laminate surface Roughness of the PVC-U and PU lining surface	0,05 mm 0,01 mm	Mean value
Linear flow loss factor (an example) for PVC linings in laminate pipes	0,016 (for V=1,8 m/s at D=150 mm)	PN 76/M-34034
Thermal conductivity coefficient of the composite Thermal conductivity coefficient of the PU foam	0,1 W/mK <0,03 W/mK	PN-EN 12667
PU foam density	≥ 38 kg/m³	PN-EN 12667
Heat penetration coefficient	0,1-0,2 W/mK with DN 100-300	proprietary method of GIG Katowice
Laminate density	1,8 g/cm³	PN-EN 1183
Thermal expansion	max 0,05 mm/m^{oC}	proprietary method

MATERIAL COMPARISON

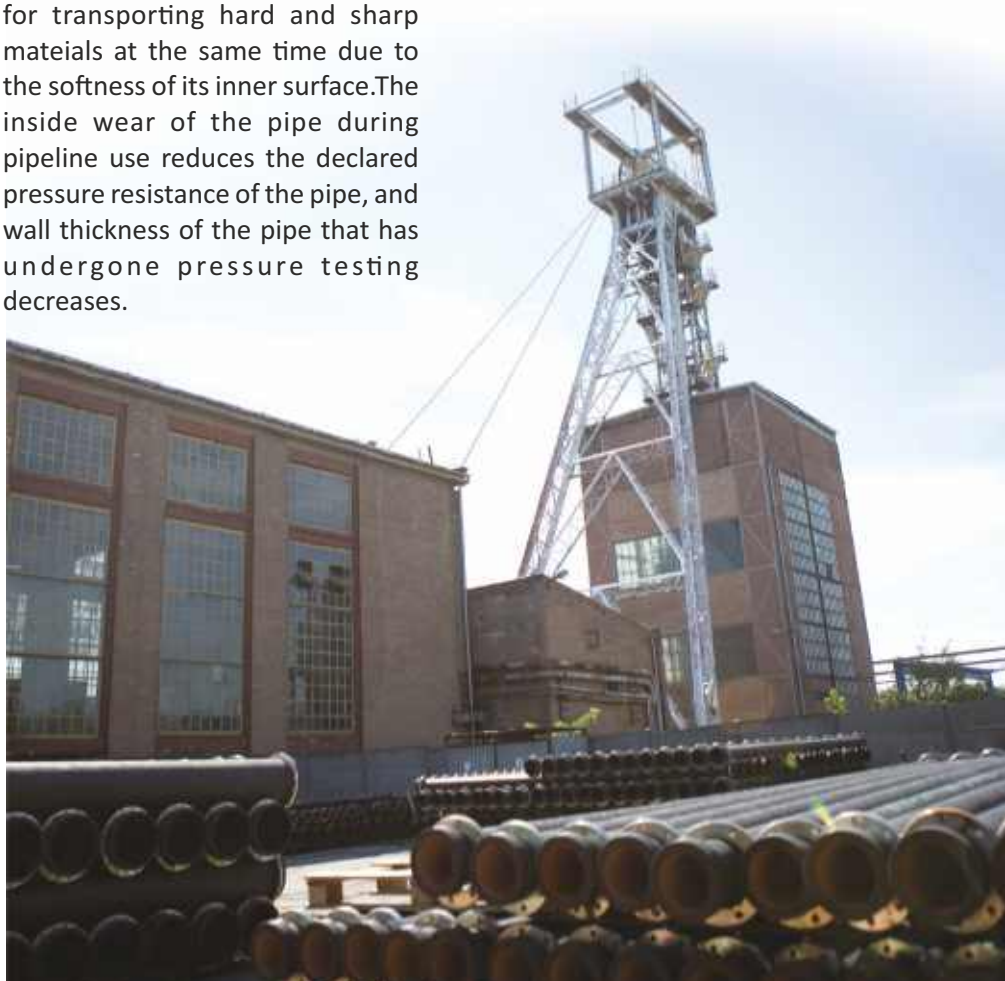
PIPES PLASTON-P	PE POLYETHYLENE PIPES	STEEL TUBES
STRENGTH		
Good over the entire temperature range. Maintains physiochemical and mechanical properties over the range from -40°C to +60°C.	Good in narrow temperatures range, drops to 40% above 35°C and in negative temperatures.	Good over the entire temperature range.
CORROSION / FOULING		
No corrosion and fouling, resistance to aggressive fluids and gases, long pipe life.	No corrosion and fouling, resistance to aggressive fluids and gases.	Fast corrosion in mine conditions, fouling, flow resistance and short pipe life.
FIRE RESISTANCE AND ANTI-STATIC PROPERTIES		
Easy to make flame retardant and anti-static by a small addition of a few percent of flame retardants and anti-static agents, flame-retardant class V-0, self-extinguishing in < 5 seconds, additives do not change the laminate properties and do not increase manufacturing costs.	Flammable material, difficult to make flame retardant and anti-static, very high quantity of flame retardants and anti-static agents required, up to 50% of the weight of polyethylene, additives worsen the properties of the plastic, both mechanical and abrasion resistance.	Flame retardant and anti-static material.
MINE FIRE		
Pipes safe during fire, not burning, only resins are charred enabling miners to escape safely, the material extinguishes itself instantly once the source of fire is contained and no fire is spread.	Pipes hazardous during fire, the plastic drips while burning posing additional risk of injury to miners, the pipes break in heat hindering evacuation. Fire is spread, even when the external source of fire is contained.	Pipes safe while in fire.
FLOW RATE - PIPELINE OPERATING PARAMETERS		
With the same flanged connection diameter, the pipe's inner cross sectional area is up to 50% greater than that of polyethylene pipes and comparable to steel pipes, readily compatible with existing steel pipelines. With the same flow parameters, smaller flanged connection diameter can be applied, compared to polyethylene and steel pipes, which reduces the cost of the pipeline by approximately 20-25%, and the flow conditions do not change in prolonged use.	With the same flanged connection the cross sectional area is up to 50% smaller than that of laminate pipes so, to achieve the same flow rate, a larger flanged connection has to be used, resulting in instant increase of the pipeline cost.	The pipes corrode and fouling reduces their inner diameter quickly, and, on average, after 2 years of use, it is about 30% smaller than on the day of installation. Very expensive pipeline operation - requires monitoring for fouling, breaking of blockages and the use of larger pumps, causing higher energy consumption and the need to periodically replace corroded pipes.

PIPES PLASTON-P	PE POLYETHYLENE PIPES	STEEL PIPES
DAMAGE REPAIR		
Very easy to repair damage even when operated in underground mines, without the need to remove the pipe. The initial pipe quality is restored at the damaged point following a less than one-hour repair procedure.	Damaged pipe cannot be repaired, both underground and on the surface, it can only be replaced with a new one.	Difficult repair, possible on the surface only.
WEIGHT OF PIPES		
About half of that of PE pipes, and about 4-5 times less compared to steel piping.	A comparable pipe is about twice as heavy as the laminate one.	Very heavy, about 4-5 times heavier than the laminate ones.
PIPE FITTINGS		
Fittings of the same material as that of pipe can be manufactured. Fully plastic pipeline is thus created, with available shapes at any angle.	Fittings cannot be made of pipe material (polyethylene reinforced with steel wire). For that reason the fittings offered are of non-reinforced material with low strength.	All shapes available, but considering the corrosion, fouling and low wear resistance, it is virtually pointless to use them underground.
EXTERNAL SURFACE DAMAGE / SCRATCH RESISTANCE		
Hard, scratch-resistant material.	Soft, thermoplastic material with low scratch resistance.	Hard, scratch-resistant material.
DURABILITY OF FLANGED CONNECTIONS		
Pipe ending with a laminate thrust ring that forms an integral part of its structure, grooves on the face of the thrust ring help the gasket to tighten better. Standard support flanges and steel rings certified for pressures up to 64 atm, reinforced flanges for pressures up to 100 atm for fill pipelines. The rings do not change their mechanical properties in temperatures from -40°C to +60°C, and those made of special thermal resin up to 125°C. Can be stored outdoors in summer and winter conditions without the need for roofing or temperature protection.	Pipe made of a soft thermoplastic material. In the area of the flanged connection it needs to be reinforced with a corrosive steel ring, sunk partly in a turned-up pipe band. At low temperatures, the polyethylene material shrinks and at high temperatures (35-40°C) it plasticises and expands, causing the connection to deform and the steel ring to slip. Unreliable connection quality in mine conditions. Pipes need to be stored under a canopy or cover with temperature protection.	Pipe ended with a steel support flange that forms an integral part of its structure, thus providing a permanent flanged connection.



MATERIAL COMPARISON

PIPES PLASTON-P	PE POLYETHYLENE PIPES	STEEL PIPES
PIPE STIFFNESS		
Pipes with very high circumferential and longitudinal stiffness. Long spacing of hanging points significantly reduces pipeline installation costs. The pipes do not change their mechanical properties up to +40°C; no pipe sagging between fixing points occurs.	Soft, thermoplastic pipes, with low circumferential and longitudinal stiffness, additionally soften when exposed to high temperatures, as low as 35-40°C. Very short distance between hanging points is required, even every 2 metres, thus significantly increasing the installation cost.	Pipes with very high circumferential stiffness, resistant to temperature variations.
ABRASION RESISTANCE		
The inner layers of the pipe made of a special grade of PVC, polyurethane or ceramic gelcoat have better abrasion resistance properties than polyethylene and steel pipes. The pipes have a homogeneous structure across the entire cross-section, thanks to which the pipeline reacts uniformly to changing operating conditions. Fittings with an inner layer of abrasion-resistant gelcoat can be regenerated and therefore restored. Wear of the internal coating during pipeline use does not compromise the declared pressure resistance of the pipe, because the laminate layer that has been pressure tested remains intact.	Pure PE100 polyethylene has good abrasion resistance properties, but it is still about 2 times worse than the liners used in PLASTON-P's pipes. However, pure PE100 offers low pressure resistance and is a highly flammable material - the use of various additives to increase its strength and make it fire retardant and resistant to static electricity (to meet mining requirements) causes a significant deterioration of abrasion resistance. Not suitable for transporting hard and sharp mateials at the same time due to the softness of its inner surface.The inside wear of the pipe during pipeline use reduces the declared pressure resistance of the pipe, and wall thickness of the pipe that has undergone pressure testing decreases.	Ordinary steel pipes offer average wear resistance, pipes used for backfilling are expensive and very heavy and are prone to corrosion over time. Steel pipes with inner PE lining have better characteristics. However, the lining is not bound with the pipe and it breaks along with wear, often blocking the pipeline. Both layers react to temperature changes differently and have different deformation patterns.



PIPES PLASTON-P	PE POLYETHYLENE PIPES	STEEL PIPES

COST OF INSTALLATION AND OPERATION

Low cost of installation and operation:

- low weight of pipes - low transport and installation cost;
- suitable for outdoor storage, both at low and high temperatures;
- low number of hangers thanks to high circumferential stiffness;
- very low flow resistance of the inner surface - low cost of pump energy;
- the largest flow cross-section at a given flanged connection diameter, which remains constant throughout the service life;
- long life of pipes designed for over 30 years of stability of mechanical properties, the oldest PLASTON-P's pipelines have already been in service for 20 years. Pipe parameters can be adapted to individual requirements by using different inner linings, which have very good adhesion with the laminate structural layer of the pipe.

Medium cost of installation and operation:

- higher weight than that of laminate pipes;
- outdoor storage at low and high temperatures reduces mechanical performance of the material and causes the pipes to deform;
- a very large number of hangers required due to low pipe stiffness,
- very low flow resistance of the inner surface - low cost of pump energy;
- much smaller flow cross-section than that of laminate pipes (even up to 50%);
- pipes designed for long service life but not proven in practice, the oldest pipes have been in service for about 5-6 years.

High cost of installation and operation:

- pipes approximately 4-5 times as heavy as laminate pipes, and 6-7 times as heavy in the case of fill pipes;
- outdoor storage causes corrosion of inner and outer surfaces;
- robust pipe fixings needed due to weight, especially in shafts;
- pipe corrosion and fouling - very high pump energy cost;
- constantly decreasing internal diameter and thus flow cross-section;
- as a rule, installed only for several years of service, periodic pipe replacement required.

SELECTED CERTIFICATES

Ośrodek Badan, Atestacji i Certyfikacji Sp. z o.o.
44-121 Gliwice, ul. Łabędzka 21

CERTIFICATE

conferring the right to mark a product with a safety sign

No. OBAC/0128/CB/22

(renewal of certificate no. OBAC/0158/CB/19)

Name and address of the certificate's holder: „PLASTON-P" Sp. z o.o. ul. Wiejska 15 41-503 Chorzów

Name and address of the manufacturer: „PLASTON-P" Sp. z o.o. ul. Wiejska 15 41-503 Chorzów

Product name: Pipes and fittings made of polyester-glass composites (laminate pipes and fittings), including those with outer linings and pre-insulated ones

Type (variants): As described in the document: DTR (maintenance and technical documentation) 1/2022 + Instructions for use. Pipes and fittings made of polyester-glass composites (laminate pipes and fittings), including those with inner linings and pre-insulated ones. Chorzów, March 2022. Drawn up by: „PLASTON-P" Sp. z o.o.

Technical parameters: As described in the document: DTR (maintenance and technical documentation) 1/2022 + Instructions for use. Pipes and fittings made of polyester-glass composites (laminate pipes and fittings), including those with inner linings and pre-insulated ones. Chorzów, March 2022. Drawn up by: „PLASTON-P" Sp. z o.o.

Basic safety requirements were met through compliance with:

– Product Assessment Procedure **PB-OBAC/87. Pipes for mining pipelines**, taking into account among others the provisions of the Act of 9 June 2011 "Geological and mining law" (uniform text, Dz.U. – the Journal of Laws – of 2021, item 1420) and requirements included in the executive acts issued based on the delegation of this act, in particular the Regulation of the Minister of Energy of 23 November 2016 on detailed requirements for the operation of underground mines (Dz.U. of 2017, item 1118, as amended by Dz. U. of 2019, item 1080).

Confidential report on product evaluation: OBAC/0128/EM/22

In accordance with the documentation: according to the list on page 2/2

The certificate is valid from 08/04/2022 to 07/04/2025 and it applies exclusively to product(s) whose properties (parameters) are identical to the sample (samples) presented for the evaluation and which conform to the requirements specified above. When issuing this Certificate, the Institute for Research, Attestation and Certification OBAC in Gliwice assumes no responsibility for a potential infringement of exclusive and related rights.

Gliwice, 04 April 2022

Head of the Certification Body

Piotr Tarnawski, MA

Ośrodek Badan, Atestacji i Certyfikacji Sp. z o.o.
44-121 Gliwice, ul. Łabędzka 21

CERTIFICATE

conferring the right to mark a product with a safety sign

No. OBAC/0128/CB/22

(renewal of certificate no. OBAC/0158/CB/19)

1. **In accordance with test report:**
   – Number III.-6/22-16 of 28/01/2022
   – Number 11/106/2022/A of 25/03/2022
   – Number 11/107/2022/A of 17/03/2022
   – Number III.-6/22-16 of 16/03/2022
   – The Medical University of Silesia, Environmental Epidemiology and Medicine Department and Unit Assessment of toxicity and harmfulness of polyester-glass composite pipe materials, including those with inner linings and pre-insulated ones, based on submitted documents and laboratory test results. Zabrze, April 2022.

2. **Documentation**
   2.1. DTR (maintenance and technical documentation) 1/2022 – Instructions for use. Pipes and fittings made of polyester-glass composites (laminate pipes and fittings), including those with inner linings and pre-insulated ones. Chorzów, March 2022. Drawn up by: „PLASTON" Sp. z o.o.

3. **Product application conditions:**
   3.1. Pipes and fittings made of polyester-glass composites (laminate pipes and fittings), including those with inner linings and pre-insulated ones, which on the subject of DTR 1/2022, are designed for use in rooms "a", "b" or "c" exposed to the methane explosion hazard and rooms "A" or "B" exposed to the coal dust explosion hazard. They can be installed on the floor or suspended and fixed in chocks, in processing plants and on the surface, to transport non-flammable liquids, highly mineralised waters and slurries, including hydraulic fill, and to transport gases, including methane and compressed air. The pipes should be used in accordance with the provisions of DTR 1/2022 drawn up by their manufacturer.
   3.2. During storage, transport and installation in excavations of mines of pipes and fittings, including those with inner GRP/W linings and pre-insulated ones, for transporting water, slurries and hydraulic fill, in which the resistance on the inner surface is greater than 10^7 Ω/m, they should be protected against unhindered air flow through the inner surfaces of the pipes and fittings.

Ośrodek Badan, Atestacji i Certyfikacji Sp. z o.o.
44-121 Gliwice, ul. Łabędzka 21

CERTIFICATE

conferring the right to mark a product with a safety sign

No. OBAC/0158/CB/19

Name and address of the certificate's holder: „PLASTON-P" Sp. z o.o. ul. Wiejska 15 41-503 Chorzów

Name and address of the manufacturer: „PLASTON-P" Sp. z o.o. ul. Wiejska 15 41-503 Chorzów

Product name: Pipes and fittings made of polyester-glass composites (laminate pipes and fittings), including those with outer linings and pre-insulated ones

Type (variants):
- GRP
- GRP/W

Pre-insulated:
- GRP/W/PUR/GRP
- GRP/PUR/GRP

Technical parameters: As described in the document: DTR (maintenance and technical documentation) 1/2019 + Instructions for use. Pipes and fittings made of polyester-glass composites (laminate pipes and fittings), including those with inner linings and pre-insulated ones. Chorzów, March 2022. Drawn up by: „PLASTON-P" Sp. z o.o.

Basic safety requirements were met through compliance with:

– Product Assessment Procedure **PB-OBAC/87. Pipes for mining pipelines**, taking into account among others the provisions of the Act of 9 June 2011 "Geological and mining law" (uniform text, Dz.U. of 2017, item 2126) and requirements included in the executive acts issued based on the delegation of this act, in particular the Regulation of the Minister of Energy of 23 November 2016 on detailed requirements for the operation of underground mines (Dz.U. of 2017, item 1118).

Confidential report on product evaluation: OBAC/0158/EM/19

In accordance with the documentation: according to the list on page 3/4

The certificate is valid from 08/04/2019 to 07/04/2022 and it applies exclusively to product(s) whose properties (parameters) are identical to the sample (samples) presented for the evaluation and which conform to the requirements specified above. When issuing this Certificate, the Institute for Research, Attestation and Certification OBAC in Gliwice assumes no responsibility for a potential infringement of exclusive and related rights.

Gliwice, 09 April 2019

Head of the Certification Body

Piotr Tarnawski, MA

Ośrodek Badan, Atestacji i Certyfikacji Sp. z o.o.
44-121 Gliwice, ul. Łabędzka 21

CERTIFICATE

conferring the right to mark a product with a safety sign

No. OBAC/0158/CB/19

3. **Product application conditions:**
   3.1. Pipes and fittings made of polyester-glass laminates (laminate pipes and fittings), including those with inner linings and pre-insulated ones.
   Variant type:
   - GRP
   - GRP/W

   Pre-insulated:
   - GRP/W/PUR/GRP
   - GRP/PUR/GRP

   they are designed for use in rooms "a", "b" or "c" exposed to the methane explosion hazard and rooms "A" or "B" exposed to the coal dust explosion hazard. They can be installed on the floor or suspended and fixed in chocks, in processing plants and on the surface, to transport non-flammable liquids, highly mineralised waters and slurries, including hydraulic fill, and to transport gases, including methane and compressed air.
   3.2. The pipes should be used in accordance with the provisions of DTR 1/2019 drawn up by their manufacturer.
   3.3. During storage, transport and installation in excavations of mines of pipes and fittings, including pre-insulated ones, with inner GRP/W linings, for transporting water, slurries and hydraulic fill, in which the resistance on the inner surface is greater than 10^7 Ω/m, they should be protected against unhindered air flow through the inner surfaces of the pipes and fittings.

PG SILESIA

Czechowice-Dziedzice, 17 June 2020

PLASTON-P Sp. z o.o.
Wiejska 15 Street
41-500 Chorzów, Poland
Tel./Fax: (32) 245-97-99

letter ref. no.: PGS/TM/025/2020

re: references, information on the completion of deliveries.

We hereby confirm that in 2019 the company PLASTON-P Sp. z o.o. with its registered office in Chorzów, code: 41-500, ul. Wiejska 15, was a supplier of polyester-glass laminate pipes and fittings (gaskets, elbows and couplings) to PG SILESIA.

During the execution of the task, PLASTON-P Sp. z o.o. proved itself to be a reliable company with appropriate technical facilities. The task was completed on time and in accordance with the material scope set out in the concluded contract.

Yours faithfully,

Przedsiębiorstwo Górnicze „SILESIA" Sp. z o.o.
"Silesia" coal mine
Head of Mine Operations

MSc. Eng. Roman Kolatek

Z.U.G. SZYB-MONT

Zakład Usług Górniczych „SZYB- MONT" sp. z o.o
43-190 Mikołów, ul. Przelotowa 7

Phone no.: 32 723 11 80
Fax: 32 723 11 81
email: szybmont@gni.pl

Our ref. no. 43/02/2020 — Mikołów, 21/02/2020

PLASTON-P Sp. z o.o.
Wiejska 15 Street
41-500 Chorzów, Poland

REFERENCE LETTER

In 2019, PLASTON-P Sp. z o.o., with its registered office in 41-500 Chorzów, ul. Wiejska 15, supplied polyester-glass laminate pipes and fittings for the following tasks we were carrying out:

1. Installation of a DN200 brine pipeline on level VIII in the Biliński drift in Kopalnia Soli "Wieliczka" S.A.(Wieliczka Salt Mine) - value: PLN 110,000.00.
2. Construction of a compressed air network in the underground excavations of Kopalnia Soli "Wieliczka" S.A. - Construction of a DN160 pipeline in the Kinga shaft – value: PLN 116,745.00.

The deliveries were made on time, as ordered.
The components supplied had the relevant approvals and certificates.
On the basis of our cooperation to date, we can attest that PLASTON-P ensures the high quality of the materials supplied and that deliveries are made reliably and on time.

Yours faithfully,

Zakład Usług Górniczych
"SZYB-MONT" Sp. z o.o.
PRESIDENT
Andrzej Mansfeld

Z.U.G. SZYB-MONT

Zakład Usług Górniczych „SZYB- MONT" sp. z o.o
43-190 Mikołów, ul. Przelotowa 7

Phone no.: 32 723 11 80
Fax: 32 723 11 81
email: szybmont@gni.pl

Our ref. no.: 119/08/2020 — Mikołów 07/08/2020

REFERENCE LETTER

We hereby declare that PLASTON- P sp. z o.o. has completed for Zakład Usług Górniczych "SZYB-MONT" sp. z o.o. the delivery of polyester-glass laminate shaft pipes in the period: September 2019.
The deliveries were made to the Wieliczka Salt Mine and included the supply of DN ISO PN 16 pipes together with fittings and support pipes for a total quantity of: 200 m (for the amount of PLN 143 thousand gross).
The deliveries were made on time, with due diligence and to the highest technical and quality standards. The deliveries were accompanied by the relevant documents and certificates. No complaint procedures have been implemented against the company.
We recommend PLASTON- P with full confidence as a reliable and professional supplier.

Yours faithfully,

Zakład Usług Górniczych
"SZYB-MONT" Sp. z o.o.
PRESIDENT
Andrzej Mansfeld

SRK S.A.

Spółka Restrukturyzacji Kopalń
Spółka Akcyjna in Bytom, Czeladź Branch
Central Mine Dewatering Facility

41-253 Czeladź, ul. Kościuszki 9, tel. +48 32 265-15-35, fax +48 32 265-25-47,
e-mail: czok@srk.com.pl KRS 0000027497, Regional Court in Katowice, Regon 276902504-00075,
NIP 62626-19-005 Share capital: PLN 188,837,000,

Ref. No. SRK/CZOK/TMPS/...../20/IR — Czeladź.....2020

PLASTON-P Sp. z o.o.
Wiejska 15 Street
41-500 Chorzów, Poland

REFERENCE LETTER

We hereby confirm that in 2020 Plaston-P Sp. z o.o., with its registered office in Chorzów (41-500) at ul. Wiejska 15, **carried out a task for Spółka Restrukturyzacji Kopalń S.A. in Bytom, Czeladź Branch, Central Mine Dewatering Facility, under contract**:

- no. eRU: 062000135
Under the name: "Supply of pipes for filling and decommissioning of excavations".

The value of the delivery under the aforementioned contract was: **138 211,36 net.**

The task was carried out in a timely and diligent manner.

SPÓŁKA RESTRUKTURYZACJI KOPALŃ S.A.
in Bytom, Czeladź Branch
CENTRAL MINE DEWATERING FACILITY
REPRESENTATIVE OF THE MANAGEMENT BOARD
GENERAL MANAGER
Deputy Head of Mine Operations
Andrzej GAWENDA

SPÓŁKA RESTRUKTURYZACJI KOPALŃ S.A.
in Bytom, Czeladź Branch
CENTRAL MINE DEWATERING FACILITY
REPRESENTATIVE OF THE MANAGEMENT BOARD
BRANCH DIRECTOR
Head of Mine Operations
Witold KASPERKIEWICZ

SELECTED CERTIFICATES

POLSKA GRUPA GÓRNICZA

MATERIAL LOGISTICS CENTRE
70/NLL2/ EB / _____ /2020/REF
25128

Ruda Śl., 26/02/2020

PLASTON-P Sp. z o.o.
Wiejska 15 Street
41-500 Chorzów, Poland

INFORMATION ON THE COMPLETION OF DELIVERIES

The contractor PLASTON-P Sp. z o.o. with its registered office in 41-500 Chorzów, ul. Wiejska 15, in the period from 01/01/2019 to 31/12/2019, as a supplier of plastic pipes for mine systems (material group 252-12), carried out orders initiated on the basis of concluded contracts.

The value of deliveries duly made during the period covered by this information was:

Year of delivery	Beginning of the period	End of the period	Net value of deliveries
2019	22/01/2019	30/12/2019	PLN 9,812,258.21
Total for the period covered by the information:			PLN 9,812,258.21

Polska Grupa Górnicza S.A.
Material Logistics Centre
Purchasing Team, District 2
Piotr Słomiński
Representative of the Management Board

SRK S.A.

Spółka Restrukturyzacji Kopalń
Spółka Akcyjna in Bytom, Czeladź Branch
Central Mine Dewatering Facility

41-253 Czeladź, ul. Kościuszki 9, tel. +48 32 265-15-35, fax +48 32 265-25-47,
e-mail: czok@srk.com.pl KRS 0000027497, Regional Court in Katowice, Regon 276902504-00075,
NIP 62626-19-005 Share capital: PLN 188,837,000,

Ref. No. SRK/CZOK/TMPS/...../20/IR

Czeladź..... 02.03.2020

PLASTON-P Sp. z o.o.
Wiejska 15 Street
41-500 Chorzów, Poland

REFERENCE LETTER

We hereby confirm that in 2020 Plaston-P Sp. z o.o., with its registered office in Chorzów (41-500) at ul. Wiejska 15, **carried out a task for Spółka Restrukturyzacji Kopalń S.A. in Bytom, Czeladź Branch, Central Mine Dewatering Facility, under contract**:

- no. eRU: 062000135
Under the name: "Supply of pipes for filling and decommissioning of excavations".

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The task was carried out in a timely and diligent manner.

SPÓŁKA RESTRUKTURYZACJI KOPALŃ S.A.
in Bytom, Czeladź Branch
CENTRAL MINE DEWATERING FACILITY
REPRESENTATIVE OF THE MANAGEMENT BOARD
Chief Engineer
Deputy Head of Plant Operations
Witold KASPERKIEWICZ

SPÓŁKA RESTRUKTURYZACJI KOPALŃ SA
in Bytom, Czeladź Branch
CENTRAL MINE DEWATERING FACILITY
REPRESENTATIVE OF THE MANAGEMENT BOARD
BRANCH DIRECTOR
Head of Plant Operations
Czesław DEREGOWSKI

KG CONSTRUCTION Sp. z o.o.
41-800 Zabrze, ul. Pawliczka 25
tel. +48 32 83019 20
tel./fax 32 630 19 21
e-mail: biuro@kgconstruction.pl

Łaziska Górne, 19/08/2021

PLASTON-P Sp. z o.o.
Wiejska 15 Street
41-500 Chorzów, Poland

REFERENCE LETTER

In 2020/2021, PLASTON-P Sp. z o.o. with its registered office in 41-500 Chorzów, ul. Wiejska 15 was a supplier to KG CONSTRUCTION Sp. z o.o. of polyester-glass laminate pipes for water transport, including pre-insulated pipes used in the construction of the central air-conditioning system at KWK (coal mine) Ruda Ruch Halemba. Net value of the deliveries: PLN 6,105,711.80.

During the execution of the task, PLASTON-P Sp. z o.o. proved itself to be a reliable company with appropriate technical facilities. The task was completed on time, in accordance with the material scope set out in the concluded contract.

MSc. Eng. Krzysztof Gregorek
President of the Management Board

KG CONSTRUCTION Sp. z o.o.
Member of the Management Board
Mateusz Gregorek

PBSz

DRS/AN/81/2021

Tarnowskie Góry, 02/02/2021

REFERENCE LETTER

We hereby certify that in 2020 PLASTON-P Sp. z o.o. with its registered office at ul. Wiejska 15, 41-500 Chorzów, carried out a task for Przedsiębiorstwo Budowy Szybów SA:

"Manufacture and supply of plastic DN315 pipeline components according to Project no. MR-023/2020".

The scope of the task included:

1. Manufacture of DN 315 pipeline components from the Contractor's materials in accordance with the documentation supplied to the Contractor.
2. Provision of approvals, certificates, declarations of conformity, material approvals and other documents required by law.

Task completion date: November 2020.

The task was completed on time, in compliance with our quality and technical requirements. No complaint procedures have been applied against the company. In accordance with the foregoing, we recommend PLASTON-P Sp. z o.o. as a trustworthy partner.

Yours faithfully,

Przedsiębiorstwa Budowy Szybów S.A
Vice Chairman of the Board
for Strategy and Development
Andrzej Pałarczyk

Przedsiębiorstwo Budowy Szybów S.A.
VICE PRESIDENT OF THE MANAGEMENT BOARD
Chief Technical Officer
Marcin Mieszczak

SRK S.A.

Spółka Restrukturyzacji Kopalń SA
Czeladź Branch
Central Mine Dewatering Facility with its registered office in Czeladź

Reference No.: SRK/CZOK/TMPS/2602/2021/AM

Czeladź, 15/08/2021

PLASTON-P Sp. z o.o.
Wiejska 15 Street
41-500 Chorzów, Poland

REFERENCE LETTER

This is to certify that Plaston-P Sp. z o.o., with its registered office in Chorzów, ul. Wiejska 15, on the basis of contract:

- 062100104 dated 20/04/2021, carried out for SRK S.A., Czeladź Branch, Central Mine Dewatering Facility a task under the name:

Supply of fittings for the pp10 bis field intermediate pumping station - "Pstrowski" Pumping Station, for the branch Central Mine Dewatering Facility.

Task period: 20/04/2021 to 08/07/2021.
Task value: PLN 89,430.00 net

The contract was performed in an appropriate manner, on time, to the highest technical and quality standards and in accordance with occupational health and safety rules in force in the mine. During the execution of the task, PLASTON-P Sp. z o.o. proved itself to be a reliable company with appropriate technical facilities and qualified staff needed to perform this task and that is why we believe Plaston-P Sp. z o.o. to be a dependable contractor worthy of recommendation.

SPÓŁKA RESTRUKTURYZACJI KOPALŃ S.A.
in Bytom, Czeladź Branch
CENTRAL MINE DEWATERING FACILITY
REPRESENTATIVE OF THE MANAGEMENT BOARD
GENERAL MANAGER
Deputy Head of Mine Operations
Andrzej GAWENDA

SPÓŁKA RESTRUKTURYZACJI KOPALŃ S.A.
in Bytom, Czeladź Branch
CENTRAL MINE DEWATERING FACILITY
REPRESENTATIVE OF THE MANAGEMENT BOARD BRANCH DIRECTOR
Head of Mine Operations
Witold KASPERKIEWICZ

Spółka Restrukturyzacji Kopalń S.A.
ul. Strzelców Bytomskich 207
41-914 Bytom
Branch: Central Mine Dewatering Facility
ul. Kościuszki 9
41-253 Czeladź

tel.: +48 32 265 15 35
fax: +48 32 265 25 47
e-mail: czok@srk.com.pl;
www.srk.com.pl

Regional Court Katowice - Wschód
in Katowice, VIII Economic Department
of the National Court Register (KRS)
KRS 0000027497.

NIP 626-26-19-005
Regon 276902504
Share capital: PLN 292,287,600

Elektrometal SA

ul. Stawowa 71,43-400 CIESZYN
telephone: +48 33 85 75 200
fax: +48 33 85 75 205

Cieszyn, 27/01/2021

PLASTON-P Sp. z o.o.
Wiejska 15 Street
41-500 Chorzów, Poland

REFERENCE LETTER

We declare that in 2020 PLASTON-P sp. z o.o. ul. Wiejska 15, 41-500 Chorzów was, in accordance with our order no. FL/4923.LK.2020, a supplier of plastic DN150 pipes together with fittings and installation accessories.
The net value of the delivery was:

- PLN 269,650.00 net

No complaint procedures were implemented against the company during this period as regards the above-mentioned materials. The materials were delivered with due diligence.

Yours faithfully,

PROXY
ELEKTROMETAL SA
Marketing and Development Director
Bogdan Pagret

ELEKTROMETAL SA
Mining Market Director
MSc. Eng. Wojciech Korzec

*** ISO 9001 * ISO/IEC 80079-34 * ISO/IEC 17025 * EN 62061 * ISO 14001 * PN-N 18001 ***

www.elektrometal.eu
em@elektrometal.com.pl

Elektrometal Spółka Akcyjna has been entered into the register of entrepreneurs kept by the Regional Court in Bielsko Biała, VIII Commercial Department, under KRS number: 0000081102. NIP: 548-007-53-18. Share capital of PLN 4,415,172.84 paid up in full.
BDO registry no.: 000008571

Fundusze Europejskie | Rzeczpospolita Polska | Unia Europejska

POLSKA GRUPA GÓRNICZA

MATERIAL LOGISTICS CENTRE
70/NLL2/ EB / 24464 /2020/REF

Ruda Śl., 26/01/2021

PLASTON-P Sp. z o.o.
Wiejska 15 Street
41-500 Chorzów, Poland

INFORMATION ON THE COMPLETION OF DELIVERIES

The contractor PLASTON-P Sp. z o.o. with its registered office in 41-500 Chorzów, ul. Wiejska 15, in the period from 01/01/2020 to 31/12/2020, as a supplier of plastic pipes for mine systems (material group 252-12), carried out orders initiated on the basis of concluded contracts.

The value of deliveries duly made during the period covered by this information was:

Year of delivery	Beginning of the period	End of the period	Net value of deliveries
2020	09/01/2020	04/03/2020	PLN 1,687,761.22
Total for the period covered by the information:			PLN 1,687,761.22

Polska Grupa Górnicza S.A.
Material Logistics Centre
Purchasing Team, District 2
Dariusz Bielawska
Representative of the Management Board

Jastrzębskie Zakłady Remontowe Spółka z o.o.

44-268 Jastrzębie-Zdrój, ul. Węglowa 4
Phone no. 32 7215100, 32 7561726; fax 32 7215104; www.jzr.pl; e-mail: jzr@jzr.pl

SERVICE CENTRE: phone no. +48 604 865 000; e-mail: serwis@jzr.pl

JZR SP. Z O.O. GRUPA JSW

JZR/SZZ/Ko/2922/2021

Jastrzębie-Zdrój, 10/12/2021

PLASTON-P Sp. z o.o.
Wiejska 15 Street
41-500 Chorzów, Poland

re: reference list

In 2021, PLASTON-P Sp. z o.o., with its registered office in 41-500 Chorzów, ul. Wiejska 15, was a supplier to Jastrzębskie Zakłady Remontowe Sp. z o.o. of GRP/W[PVC-U] DN 150 PN25 polyester-glass laminate pipes for water transport. Net value of the delivery: PLN 223,595.00.
During the execution of the task, PLASTON-P Sp. z o.o. proved itself to be a reliable company with appropriate technical facilities. The task was completed on time and in accordance with the material scope set out in the order.

Jastrzębskie Zakłady Remontowe Sp. z o.o.
in Jastrzębie Zdrój
DEPUTY PRESIDENT OF THE MANAGEMENT BOARD
Dariusz Biernacki

Jastrzębskie Zakłady Remontowe Sp. z o.o.
in Jastrzębie Zdrój
PRESIDENT OF THE MANAGEMENT BOARD
Rafał Rychter

KRS 0000088012 Regional Court. X Economic Department of KRS, Gliwice, ul. Powstańców Warszawy 23
NIP 633-19-71-048, REGON 276057813 Share capital: PLN 712,304,000.00
BDO no.: 000000985

Rafał Rychter – President of the Management Board, Director of the Company
Dariusz Bernacki – Deputy President, Economics and Finance Director
Adam Bosowski – Deputy President, Chief Technical Officer

SELECTED CERTIFICATES

POLSKA GRUPA GÓRNICZA

MATERIAL LOGISTICS CENTRE
70/NLL/BS/...../2022

Katowice, 11/01/2022

PLASTON-P Spółka z ograniczoną odpowiedzialnością
Wiejska 15 Street
41-500 Chorzów, Poland

INFORMATION ON THE COMPLETION OF DELIVERIES

The contractor **PLASTON-P Sp. z o.o.** with its registered office in 41-500 Chorzów, ul. Wiejska 15, in the period from 18/06/2021 to 07/12/2021, as a supplier of plastic pipes for mine systems, carried out orders on the basis of concluded contracts. The value of deliveries duly made during the period covered by this information was:

Year of delivery	First delivery	Last delivery	Value of revenue
2021	18/06/2021	07/12/2021	PLN 1,817,681.10
		Total value of deliveries:	PLN 1,817,681.10

Polska Grupa Górnicza S.A.
Material Logistics Centre
Purchasing Team
REPRESENTATIVE OF THE MANAGEMENT BOARD
Roman Jędrzejak

.....
(Signature of the Representative)

Jastrzębska Spółka Węglowa S.A.
Production Support Unit
44-330 Jastrzębie-Zdrój, ul. Towarowa 1
phone no.: 32 756 4002
e-mail: info@zwp.jsw.pl, www.jsw.pl

JSW SA
ZWP
Wydobywamy to, co najlepsze

Grażyna Pytel, Director
Augustyn Holeksa, Tender Director
Sebastian Meisner, Material and Asset Security Director

ZWP/MIB/15830

Jastrzębie-Zdrój, 11/01/2022.

Reference No.: ZWP-MIB.230-03MN.01/22

PLASTON-P Sp. z o.o.

Wiejska 15 Street
41-500 Chorzów, Poland
contr. no.: 39490

Reference letter - information on business relations between Production Support Unit of JSW S.A and its business partner

We declare that your company has been a supplier of plastic flange pipes to JSW S.A. mines.
To the knowledge of JSW S.A.'s Production Support Unit, on the date of issuing the reference letter the total value of deliveries duly completed between 03/01/2019 and 03/01/2022 amounted to PLN 13,928,689.62 net.

The Testing and Complaints Department, Senior Inspector Mr Mariusz Nowak, tel. 32 756 4098., is in charge of the substantive aspects of this case.

Yours faithfully,

Jastrzębska Spółka Węglowa S.A.
Production Support Unit
Material and Asset Security
Director
Proxy
Sebastian Meisner

Jastrzębska Spółka Węglowa S.A.
Production Support Unit
Tender Director
Proxy
Augustyn Holeksa

Cc:
1) Addressee:
2) copy for files

TAURON

Brzeszcze, 05/05/2022

PLASTON-P Sp. z o.o.
Wiejska 15 Street
41-500 Chorzów, Poland

Ref. no.: TT-3/TI/...../...../2022

Re: reference letter.

From 09/12/2021 to 11/03/2022, PLASTON-P Sp. z o.o., with its registered office in Chorzów, ul. Wiejska 15, was a supplier to TAURON Wydobycie S.A. of polyester-glass pipes for methane transport. The deliveries were carried out properly and in accordance with the contract.

TAURON Wydobycie S.A.
Proxy
Marek Maruszczyk

TAURON Wydobycie S.A.
Vice-President of the Management Board
Roman Gąska

From 09/12/2021 to 11/03/2022, PLASTON-P Sp. z o.o., with its registered office in Chorzów, ul. Wiejska 15, was a supplier to TAURON Wydobycie S.A. of polyester-glass pipes for methane transport. The deliveries were carried out properly and in accordance with the contract.

TAURON WYDOBYCIE

Jaworzno, 24/02/2020

Ref. no.: PZ/PZL/37/.....2020

PLASTON-P Sp. z o.o.
Wiejska 15 Street
41-500 Chorzów, Poland

Re: reference letter.

In 2019, PLASTON-P spółka z o.o., with its registered office in 41-500 Chorzów, ul. Wiejska 15, was a supplier of plastic pipes and fittings/seals, elbows, couplings/ to TAURON Wydobycie. The deliveries were carried out properly and in accordance with the contract.

TAURON Wydobycie S.A.
acting Director
of Purchasing and Materials Logistics
Joanna Wąs

NOTES

PLASTON-P Sp. z o.o.
Wiejska 15 Street
41-503 CHORZÓW, POLAND
Tel./fax +48 32 245 97 99
biuro@plaston.com.pl
www.plaston-p.com.pl