

Potable water distribution Small diameters – Innovating together

blutop



DN/OD	DI
75	68
90	82
110	102
125	117
140	133
160	152



Comprehensive pipe systems

PAm
SAINT-GOBAIN

INNOVATION AT YOUR SERVICE

WATER – A SCARCE AND PRECIOUS RESOURCE

As the final link in the water cycle before consumption in our homes, distribution pipes play a crucial role in ensuring a reliable supply of high-quality water. BLUTOP® is a dependable, proven solution for small-diameter pipes, eliminating the need to choose between flexibility and corrosion resistance, between competitiveness and durability, and between innovation and tradition.

blutop, Benchmark performance

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*Ease of use
Speed*

*Quality
Trust*

*Cost-
effectiveness
Service*



Innovating for you

BENEFITS OF blutop

***Durability
Made in Europe***



SUSTAINABLE DEVELOPMENT

The BLUTOP® solution was developed in keeping with the principles of sustainable development and delivers outstanding environmental performance.



EXTENDED SERVICE LIFE

As investment in renewing water supply infrastructure is declining in relative terms, water network managers are demanding longer service lives. Ductile iron components are not prone to ageing. Their mechanical properties remain constant over time.



LEAKTIGHTNESS

Reducing the amount of water lost in leaks from pipe systems is a major issue. BLUTOP® delivers a two-pronged solution, as ductile iron components (including pipes, fittings, valves and accessories) have an excellent reputation for both leaktightness and pressure resistance.



LESS ENERGY REQUIRED FOR PUMPING

Improving leaktightness reduces head losses, which in turn saves energy.



INSTALLATION

BLUTOP® revolutionises pipe installation and use. Pipe-laying operations are quicker because pipes and fittings can be transported by hand and inserted using a crowbar.



OPERATION

The BLUTOP® pipe range is compatible with existing plastic pipe networks and their related connection and maintenance accessories.



WATER QUALITY

In accordance with the major European regulatory requirements, drinking water Certificates have been obtained for all materials used in the BLUTOP® range (DUCTAN® coating, epoxy, elastomers, lubricating paste and repair products).



CHOOSING DESIGN AND PRODUCTION "MADE IN EUROPE"



Pont-à-Mousson factory - Blast furnace operator

PAM BENEFITS



Extended service life

Durable solutions thanks to our new ZINALIUM® and DUCTAN® coatings.



Eco-design

Energy requirements reduced by 30% over 15 years.



Responsible manufacturing

Significant investment in EHS (more than 20% in France) and ISO 14001 certification for all plants since 2001.



Green transportation

65% of raw materials used in the production process are carried by river, rail and/or sea.



PAM ECOPOSE

Fewer filler materials and less transport for enhanced economic and environmental performance!



Recycling

All iron is recyclable and 80% of our waste is recovered.



Corporate commitments

Safety, statutory compliance and commitment are core values for Saint-Gobain PAM.



Design and production in France

The company has a strong industrial base in France, backed by an engineering culture and high-quality solutions.

Saint-Gobain PAM in Europe:

- factories in France, Germany, United Kingdom, Spain, Italy and Czech Republic
- 4,500 employees
- 1 research centre
- 1,500 patents

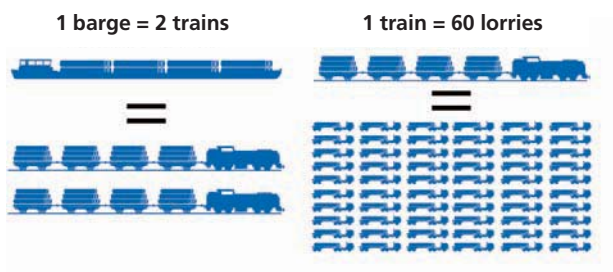
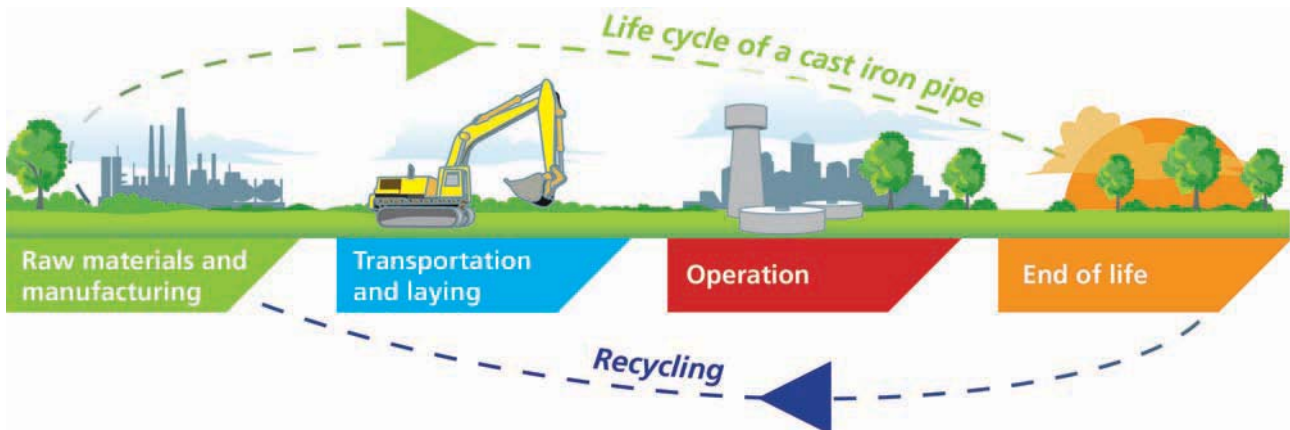


BLUTOP®
A EUROPEAN
TECHNOLOGICAL
BREAKTHROUGH!

BLUTOP® awards:

- 8 patents
- Société Industrielle de L'Est award
- Saint-Gobain Arches for Innovation award
- Innovation Award presented by Brazil's largest water company, SABESP

Sustainable development



Consumers, decision-makers and local authorities must all adopt an environmentally-responsible attitude

65% of raw materials used in the production process are carried by river, rail and/or sea.

Commitment

Innovation

Responsibility



A RANGE DESIGNED TO LAST MORE THAN 100 YEARS

TARGET - 100 YEARS!

Annual water network renewal rates are less than 1% (and only around 0.6% in France). Consequently, pipes laid today are required to last for more than 100 years, which is longer than the periods adopted in conventional depreciation calculations and longer than the service life specified in the applicable standards.

To achieve this durability target, BLUTOP® features:

- High mechanical strength
- Protection against soil aggression
- Protection against water aggression
- Flexible junctions



Thanks to Saint-Gobain PAM, I can ensure that the modernisation of my town's water network is done in the best possible economic, environmental and social conditions

**Designed and
manufactured
in Europe**

**Forward thinking
asset management**

**Sustainable
development**



Ductile iron

► HIGH MECHANICAL STRENGTH

BLUTOP® pipes are marketed as pressure class C25 (25 bar) products. Burst tests conducted on DN/OD 110 products yielded actual failure values in excess of 150 bar.

Each pipe is subjected to a factory pressure test at 40 bar followed by a gas-tightness test after the interior coating has been applied.

As the table below shows, BLUTOP® pipes have excellent diametrical rigidity, which helps to prevent ovalisation when buried.

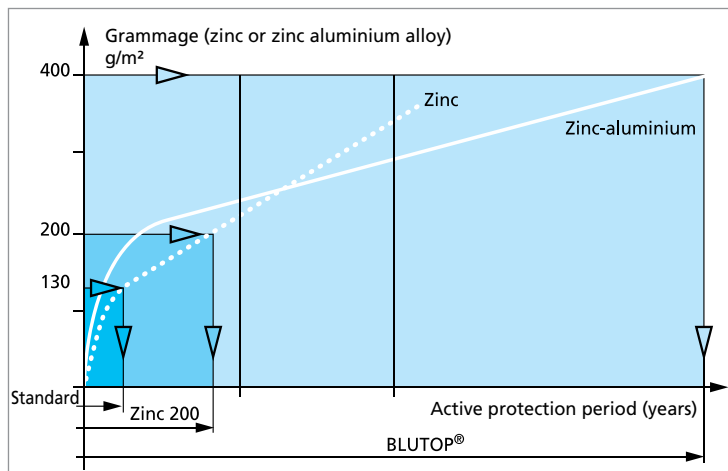
DN/OD	75	90	110	125	140	160
Diametrical rigidity	656 kN/m ²	373 kN/m ²	201 kN/m ²	136 kN/m ²	113 kN/m ²	103 kN/m ²

ZINALIUM®

► RESISTANCE TO CORROSIVE SOIL

Ductile iron pipes are well known for their resistance to corrosive soil. The new ZINALIUM® exterior coating (featuring an 85/15 zinc-aluminium alloy applied at 400 g/m²), finished with blue epoxy or acrylic paint, represents a genuine technological breakthrough:

- Service life extended by a factor of three compared with a conventional zinc (200 g/m²) and bitumen coating.
- Products now suitable for use in corrosive soil.



DUCTAN®

► RESISTANCE TO WATER AGGRESSION

Water can attack pipes, either as a result of its mineral composition or because it contains disinfectants or other chemical treatments.

Saint-Gobain PAM has opted to apply an ultramarine blue DUCTAN® thermoplastic interior coating rather than the cement lining traditionally used with cast iron pipes.

Key features:

- Outstanding adhesion, with a mean tear strength of 15 MPa (150 kg/cm²) and a minimum of 8 MPa (an important value for tapping under load and on-site cutting).
- Perfectly smooth for optimum flow
- Full and uninterrupted protection for the pipe shell, bell and spigot
- The lightweight but extremely tough DUCTAN® coating enables the weight of BLUTOP® pipes to be reduced by 25%.

Angular deviation

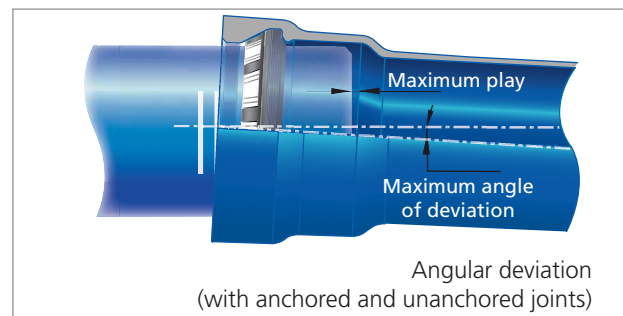
► ADAPTS TO GROUND MOVEMENTS

Both the anchored and unanchored versions of BLUTOP® joints are designed to withstand a particularly high angular deviation of 6°.

The enhanced jointing depth also decreases the risk of pipe dislocation.

As a result, BLUTOP® offers excellent performance in soil subject to ground movements.

DN/OD	75	90	110	125	140	160
Jointing depth in mm	93	95	97	103	106	108



TESTIMONIAL

"The aim of this renewal programme is to reduce the number of leaks and increase the efficiency of our network, which is currently around 70%. BLUTOP®, which has been awarded a certificate of sanitary conformity and is produced in keeping with the principles of sustainable development, was successfully introduced two years ago, in the Landes area."

LEAKTIGHTNESS

Guaranteed leaktightness

Joint performance determines the reliability of the pipelines during the following operations:

- Jointing
- Pressurising

And also during:

- The product's life cycle,
- All conditions of use

PAM has combined all its design skill and know-how, together with that of the very finest gasket manufacturers, in order to create the Blutop joint.

One of Blutop's major advantages is the pipeline anchor system, which eliminates the need for heavy concrete thrust blocks.

The technology developed and patented by Saint-Gobain PAM has greatly enhanced the competitiveness of its anchor systems.



CHANNELLING THE JOINTING FORCE

The Blutop joint has been specially designed in order to guarantee:

- Easy laying with a lower force requirement to allow for jointing using a crowbar
- Safe laying thanks to a mechanism to prevent the gasket from becoming loose during assembly
- Support points along the fittings make for easy jointing along the correct axis plane

This unique design, which has been perfected in close collaboration with several installers, allows for faster laying without causing additional tiredness and fatigue.



HIGH PERFORMANCE LEVELS

The full use of Saint Gobain PAM technologies has made it possible to create high performance Blutop joints.

Joint	PFA Allowable operating pressure	PMA Allowable maximum pressure	PEA Allowable Test Pressure
Non-anchored	25 bar	30 bar	35 bar
Anchored	16 bar	19 bar	20 bar

Joint reliability

CONTROLLED INSERTION FORCE



The BLUTOP® joint features a unique, optimised design and was developed in close cooperation with pipe-laying teams:

- The insertion force is adjusted by hand using just a crowbar, making pipe-laying much easier.
- Designed for reliable installation with a device to prevent the joint gasket from being ejected during assembly.
- Fittings feature load-bearing points enabling them to be easily pushed into position when aligned with the pipe.

PRESSURE TESTS PERFORMED IN EXTREME CONDITIONS

Buried pipe runs are subject to multiple pressure variations (due to day/night cycles, water hammer effects, pressure exerted by the water table, etc.).

BLUTOP® joints have been rigorously tested in accordance with the criteria defined in the EN545 standard, in extreme angular deviation and dimensional tolerance conditions. In particular, joint performance was tested in the following circumstances:

- Transient surge in operating pressure (at least 1.5 times the maximum allowable working pressure of the joint),
- Vacuum due to draining or cavitation
- Pressure pulses near pumps (24,000 cycles)
- External pressure exerted by a water table

Saint-Gobain PAM developed these tests with the aid of state-of-the-art finite-elements computer modelling techniques.

The BLUTOP® range ensures maximum reliability and is suitable for all types of water network



Leaktightness

Reliability

PFA: 25 bar

INCREASED EFFICIENCY



MANUAL INSTALLATION

Easier pipe-laying conditions are a key benefit with the BLUTOP® range: transport to hard-to-reach locations; lowering into trenches; assembly in confined spaces, etc.

BLUTOP® has proved its effectiveness in the field, significantly improving the operating efficiency and working conditions of pipe-laying teams.

BLUTOP® -
*Fast, efficient and
problem-free*

Assisted
pipe-laying
Safe
**Quick to
install**
Efficient



THREE DECISIVE BENEFITS

TRANSPORTABLE BY HAND

BLUTOP® pipes can be carried by two people without the need for mechanical handling equipment.

Pipes can be brought right to the edge of the trench, even in hard-to-reach locations. They can be lowered into the trench without using mechanical lifting equipment. Pipe fittings have ergonomically-designed handles for easy handling.



PIPES INSERTED USING A CROWBAR

Pipes and fittings can be inserted using just a crowbar. This achievement is attributable to:

- The design of the BLUTOP® junction, which has been optimised to reduce the required insertion force.
- The shape of the fittings, which feature load-bearing points against which the crowbar can be positioned in order to apply force in exactly the right direction, along the insertion plane.



FASTER PROGRESS AT WORKSITES

While the team is manually assembling pipes and fittings, the mechanical digger can continue digging the trench ahead of the pipe-laying front. This optimised use of machinery enables site work to progress more quickly. This in turn generates savings in terms of operating costs and fuel consumption.

Refer to our "Advice For Laying" leaflet for more detailed information on working with the BLUTOP® range.



BENEFITS

- **Easily-cleaned socket.** The flowing lines of the socket enable it to be easily cleaned if contaminated by earth from the trench.
- **Easily-fitted joint.** The joint slides easily into the lubricated socket without the need to compress it.
- **Quick to cut.** The thinner iron wall and the use of a DUCTAN® coating rather than a cement lining help to decrease cutting times and disk wear.
- **Easy hole cutting.** BLUTOP® hole-cutting tools cut the DUCTAN® coating cleanly and systematically recover the cut core.
- **Fewer fittings.** The exceptional angular deviation (up to 6°) at joints means that fewer fittings are required, thereby reducing the cost of works.

PROJECTS AROUND THE WORLD



Czech Republic



Hungary



Thonne La Long, France



Poitiers, France



Estonia



Spain



Paris, France



Bordeaux, France



Rocles, France



Brazil



Portugal



Venice, Italy

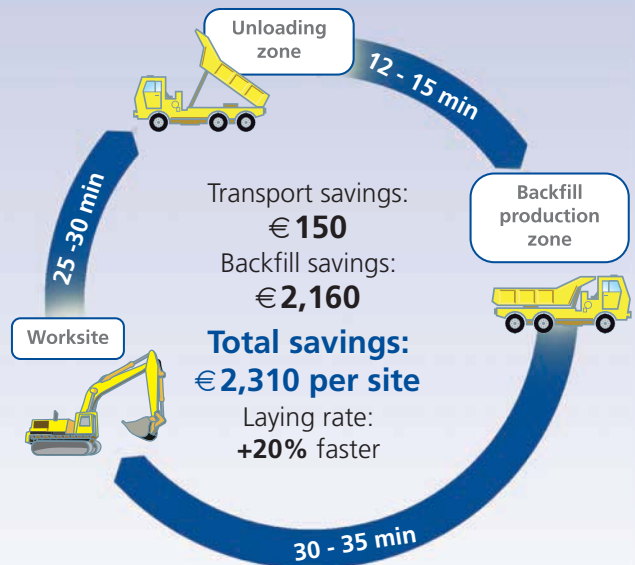
BENEFITS OF THE ECOPOSE INSTALLATION APPROACH



Compared with a conventional pipe-laying project, PAM ECOPOSE eliminates two stages - removing spoil and bringing in new material.

ECOPOSE SAVINGS

- Cover = **less filler material required**
- Fewer truck journeys = **lower carbon emissions**
- Ductile iron = **endlessly recyclable**
- Anchoring = no concrete stops = **lower carbon emissions**

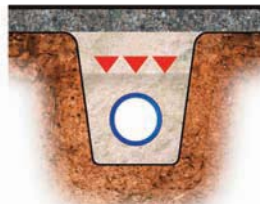


BLUTOP® pipes



**Re-use of
extracted materials**
85% compression (SPO*)

Conventional laying technique



**Use of
filler materials**
95 % compression (SPO*)

**500 m of pipes laid using the
ECOPOSE technique saves
1 tonne of carbon emissions!**

* SPO: Standard Proctor Optimum

● PAM ECOPOSE is cost-effective!

Using "native" soil for fill reduces the need to work sand quarries and reduces the amount of lorry journeys.

● PAM ECOPOSE is environmentally friendly!

As well as cutting carbon emissions, PAM ECOPOSE eliminates inconvenience for local residents and preserves natural soil resources.

TESTIMONIAL

"The pipes used in Valleroy-aux-Saules with a cross-section of 110 millimetres weigh 45 kg and have a maximum allowable working pressure of 25 bar. They can easily be laid by a team of three, using a manual insertion system. Now we only use the digger for trench digging and backfilling. Everything else, including inserting pipe sections and fitting joints, can be done by hand.

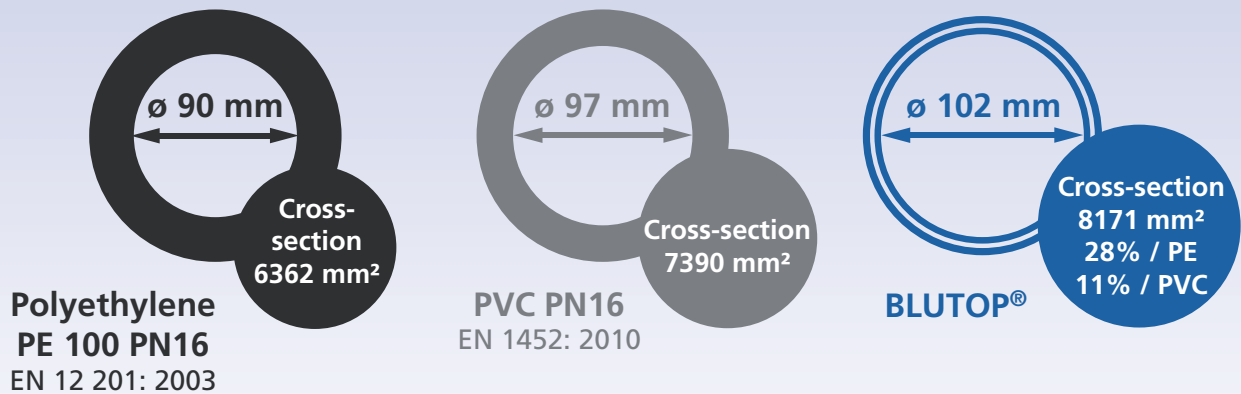
Also, everyone involved in this project agreed that using natural backfill offers significant gains by eliminating the need to bring in additional materials."

OPERATION-ORIENTED DESIGN

The BLUTOP® range has been designed with careful consideration for water network operators' requirements. The range's dimensional compatibility

with PE or PVC plastic pipes is a major advantage when extending the existing network or replacing old or prematurely aged pipe sections.

Example: DN/OD 110



A range designed to facilitate the extension or renewal of my water network

Reliability
Lower operating costs
Compatibility



Hydraulic diameters of PVC, HDPE and BLUTOP® pipes

	PVC	Polyethylene		BLUTOP®
PN/PFA	16	PE 80 16	PE 100 16	25
DN/OD 75	64	58	61	68
DN/OD 90	77	70	74	82
DN/OD 110	97	85	90	102
DN/OD 125	110	97	102	117
DN/OD 140	123	109	115	133
DN/OD 160	141	124	131	152

PVC pipe as per EN 1452 and PE pipe as per EN 12201

LOWER PUMPING COSTS

Head losses are reduced by a combination of a large hydraulic cross-section and the perfectly smooth DUCTAN® lining.

These characteristics help to cut pumping costs, and in some cases, enable sufficient water flow rates for fire protection purposes in remote locations (60 m³/h as specified in the French ministerial memo of 10/12/1951)

FULLY COMPATIBLE WITH PLASTIC PIPES

BLUTOP® pipes and fittings are designed to be compatible with plastic pipes and accessories.

PVC or HDPE pipe spigots that comply with applicable standards can be inserted into BLUTOP® pipes and fittings.



SATISFACTION AND TRUST

A KEY CONCERN

Recent international surveys have confirmed that a growing number of consumers are showing increased satisfaction with drinking tap water. This is positive for sustainable development as it helps to limit the impact on the environment caused by the preparation and transportation of bottled water.

The development of the BLUTOP® range has also contributed to this trend by offering pipes, fittings and joints that respect the water they transport.



Benchmark performance

CAREFULLY SELECTED MATERIALS

All materials used in BLUTOP® components that come into contact with water have drinking water certificates. They comply with European regulations, and are fully suitable for the distribution of potable water.

EUROPEAN APPROVAL

The BLUTOP® range is designed for use throughout Europe. It has already been approved at national level as follows:

- Certificate of conformity with the Belgian "Hydrocheck" approval procedure issued by Belgaqua
- Certificate of conformity with the German UBA-Guideline and DVGW-W270 approval procedures issued by the Hygiene-Institut des Ruhrgebiets in Gelsenkirchen

- Certificate of conformity with the BS 6920 standard issued by WRAS in the United Kingdom
- Certificate of conformity with "DWI Regulation 31 (4)(a)" in England, Wales and Scotland, issued by DWI on the basis of a report by WRc.

INERT IN CONTACT WITH WATER

DUCTAN® is an extremely pure lining material. It successfully passed all tests relating to the migration of organic compounds into water.

*The important thing for our family is
to be able to drink good quality water*



Quality
Trust



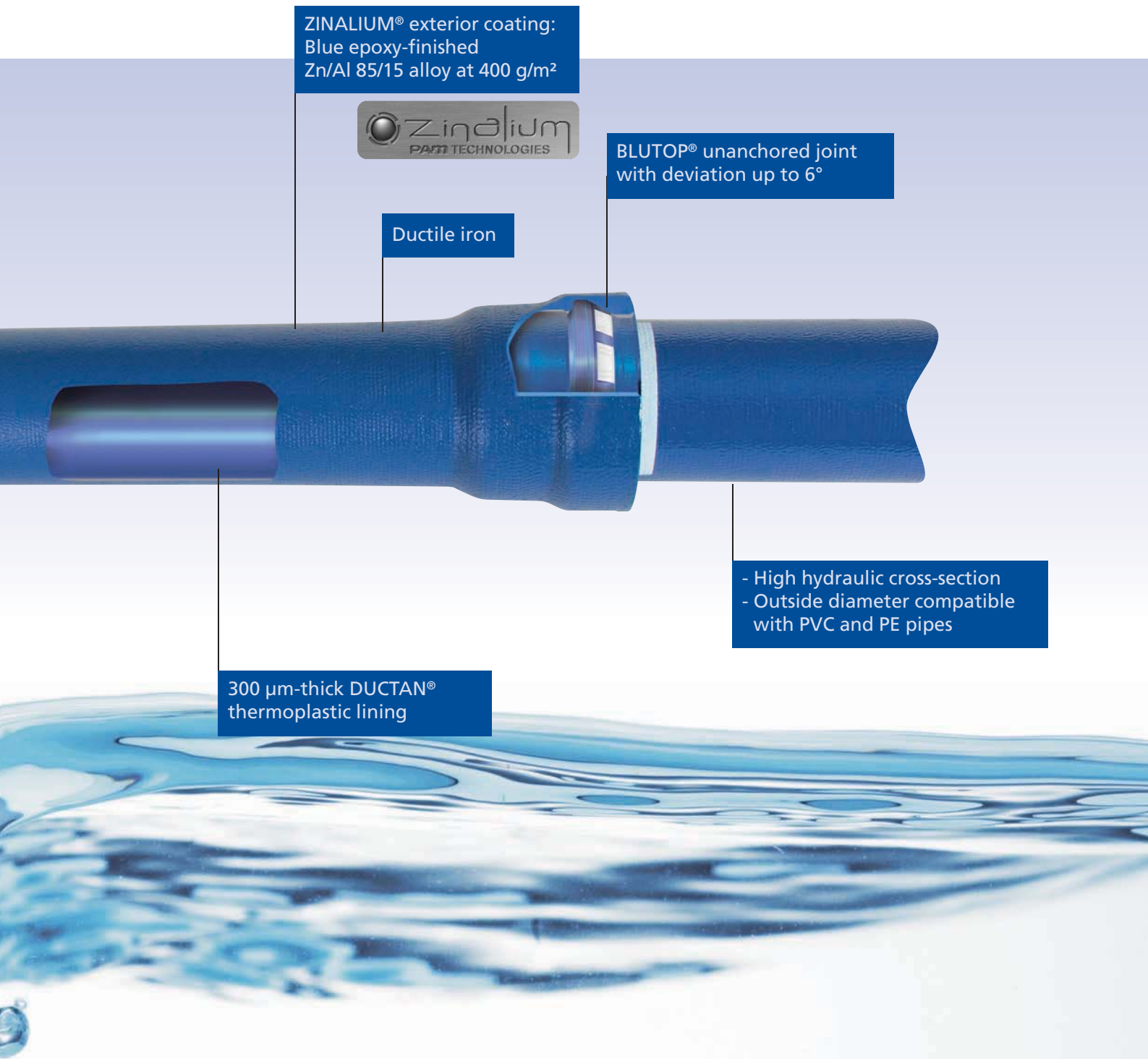
Handle

BLUTOP® anchored
joint with deviation
up to 6°

Bend fitting

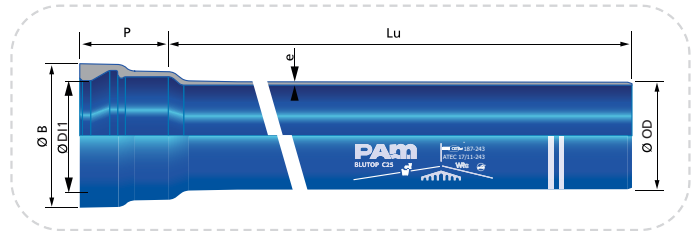
250 µm-thick
fusion bonded epoxy
exterior coating

Benchmark performance



***A SUCCESS STORY SHARED BY 17 COUNTRIES.
In Europe and Brazil, 1,000 water authorities
have chosen BLUTOP®***

PIPES



Pipe

DN/OD mm	DI** mm	Lu m	Class bar	Nominal th. mm	OD mm	DI mm	P mm	B mm	Weight kg/m	Reference
75	68	6	25	3.0	75.0	77.7	82.0	113.0	5.10	KXL75H60
90	82				90.0	92.7	84.0	130.2	6.10	KXL90H60
110	102				110.0	112.8	87.0	149.5	7.60	KXM11H60
125	117				125.0	128.0	92.0	164.0	8.60	KXM12H60
140*	133			3.2	140.0	143.1	94.5	185.0	10.00	KXM14H60
160	152			3.4	160.0	163.3	97.5	202.0	12.50	KXM16H60

** Hydraulic diameter

Unanchored joint

DN/OD mm	MAWP bar	Weight kg	Reference
75	25	0.059	JXL75BA
90		0.067	JXL90BA
110		0.081	JXM11BA
125		0.108	JXM12BA
140*		0.140	JXM14BA
160		0.169	JXM16BA



Anchored joint

DN/OD mm	MAWP bar	Weight kg	Reference
75	16	0.067	JXL75CA
90		0.076	JXL90CA
110		0.093	JXM11CA
125		0.118	JXM12CA
140*		0.190	JXM14CA
160		0.221	JXM16CA



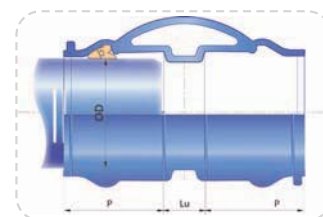
* Available in 2013



FITTINGS

Non-sliding collar

DN/OD mm	ØOD mm	P mm	Lu mm	Weight kg	Reference
75	75	87.0	40	3.00	KXL75MN
90	90	92.5		4.00	KXL90MN
110	110	99.0		4.90	KXM11MN
125	125	104.0		5.50	KXM12MN



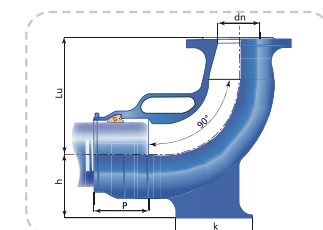
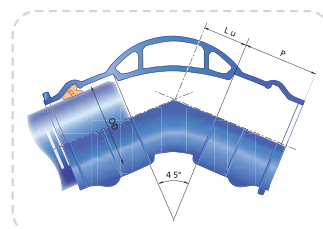
Semi-sliding collar with bulge for hole-cutting

DN/OD mm	ØOD mm	P mm	L mm	Weight kg	Reference
75	75	87.0	254	5.30	KXL75MM
90	90	92.5	265	6.30	KXL90MM
110	110	99.0	275	7.30	KXM11MM
125	125	104.0	295	8.80	KXM12MM
140*	140	108.0	305	9.60	KXM14MM
160	160	114.0	315	10.70	KXM16MM



Bend

Angle (degrees)	DN/OD mm	ØOD mm	P mm	Lu m	Weight kg	Reference
90° 1/4	75	75	87.0	70.0	4.40	KXL75CA
	90	90	92.5	75.0	5.50	KXL90CA
	110	110	99.0	85.0	7.10	KXM11CA
	125	125	104.0	110.0	8.80	KXM12CA
	140*	140	108.0	110.0	10.30	KXM14CA
	160	160	114.0	130.0	12.30	KXM16CA
45° 1/8	75	75	87.0	45.0	4.20	KXL75CB
	90	90	92.5	50.0	5.10	KXL90CB
	110	110	99.0	60.0	6.20	KXM11CB
	125	125	104.0	65.0	7.00	KXM12CB
	140*	140	108.0	70.0	8.40	KXM14CB
	160	160	114.0	70.0	10.30	KXM16CB
22°30' 1/16	75	75	87.0	25.0	3.40	KXL75CD
	90	90	92.5	30.0	4.40	KXL90CD
	110	110	99.0	30.0	5.50	KXM11CD
	125	125	104.0	30.0	6.60	KXM12CD
	140*	140	108.0	35.0	7.70	KXM14CD
	160	160	114.0	35.0	9.20	KXM16CD
11°15' 1/32	75	75	87.0	25.0	3.50	KXL75CE
	90	90	92.5	25.0	3.80	KXL90CE
	110	110	99.0	30.0	5.80	KXM11CE
	125	125	104.0	30.0	6.70	KXM12CE
	140*	140	108.0	30.0	7.70	KXM14CE
	160	160	114.0	35.0	9.10	KXM16CE



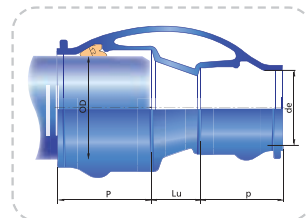
Duckfoot bend

Angle (degree)	DN/OD mm	ØOD mm	dn mm	P mm	Lu m	h mm	k mm	Weight kg	Reference
90° 1/4	75	75	80	87.0	165	110	107	7.60	KXL75DF0E
	90	90	80	92.5	165	110	107	8.00	KXL90DF0E
	110	110	80	99.0	180	125	126	11.40	KXM11DF0E
	125	125	80	104.0	220	120	146	13.60	KXM12DF0E
	140*	140	80	108.0	220	—	146	14.00	KXM14DF0E
	160	160	80	114.0	220	150	146	14.50	KXM16DF0E
	160	160	100	114.0	220	150	146	15.00	KXM16DF0F

* Available in 2013

Taper

DN/OD mm	ØOD mm	Øod mm	P mm	p mm	Lu mm	Weight kg	Reference
90	90	75	92.5	87.0	40.0	3.56	KXL90VE0C
110	110	75	99.0	87.0	50.0	4.21	KXM11VE0C
	110	90		92.5	50.5	5.00	KXM11VE0D
125	125	75*	104.0	87.0	55.0	5.00	KXM12VE0C
	125	90		92.5	50.0	5.20	KXM12VE0D
	125	110		99.0	45.0	5.50	KXM12VE0E
140*	140	90	108.0	92.5	50.0	5.40	KXM14VE0D
	140	110		99.0	45.0	5.80	KXM14VE0E
	140	125		104.0	45.0	6.10	KXM14VE0G
160	160	75	114.0	87.0	65.0	6.50	KXM16VE0C
	160	90		92.5	60.0	7.00	KXM16VE0D
	160	110		99.0	55.0	7.40	KXM16VE0E
	160	125		104.0	50.0	7.80	KXM16VE0G



Flanged spigot

DN/OD mm	ØOD mm	Flange DN mm	PN bar	Lu mm	L mm	B mm	Weight kg	Reference
75	75	60	10-16	98	158	175	3.85	KXL75BU1C
75	75	65		98	158	185	3.85	KXL75BU1D
90	90	80		102	167	200	4.70	KXL90BU1E
110	110	100		110	180	220	6.00	KXM11BU1F
125	125	125		114	188	250	7.90	KXM12BU1G
140*	140	125		119	190	250	9.56	KXM14BU1G
160	160	150		127	197	285	12.10	KXM16BU1J

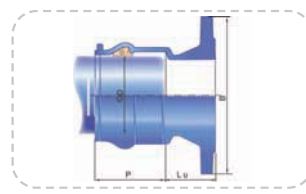
PN 25 flanges: for DN 60, 65, 100, 125 and 150. Available in 2013



Flanged socket

DN/OD mm	ØOD mm	Flange DN mm	PN bar	P mm	Lu mm	B mm	Weight kg	Reference
75	75	60	10-16	87.0	58	175	5.00	KXL75BE1C
75	75	65		87.0	58	185	5.00	KXL75BE1D
90	90	80		92.5	68	200	5.50	KXL90BE1E
110	110	100		99.0	68	220	6.70	KXM11BE1F
125	125	125		104.0	66	250	8.20	KXM12BE1G
140*	140	125		114.0	62	250	9.56	KXM14BE1G
160	160	150		114.0	68	285	11.00	KXM16BE1J

PN 25 flanges: for DN 60, 65, 100, 125 and 150. Available in 2013



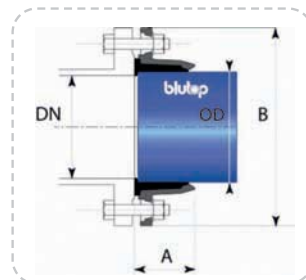
Anchored flange adapter

DN/OD mm	DN mm	A	B	Weight kg	Reference
75	60-65	58	185	2.50	226300
90	80	62	200	2.80	216901
110	100	68	220	3.40	216902
125	125	73	250	4.30	216906
140*	125	76	250	4.30	233658
160	150	82	285	5.70	226301



Unanchored flange adapter

DN/OD mm	DN mm	A	B	Weight kg	Reference
75	60-65	58	185	2.30	MAL75DACH
90	80	62	200	2.60	MAL90DACH
110	100	68	220	3.10	160754
125	125	73	250	4.10	160755
140*	125	76	250	4.10	160756
160	150	82	285	5.20	160757



* Available in 2013

The blutop range

Flanged tee with two sockets

DN/OD mm	ØOD mm	Flange DN	PN bar	P mm	Lu m	Hu mm	B mm	Weight kg	Reference
75	75x40	40	10-16	87.0	60.0	130.0	150.0	5.80	KXL75TD1A
	75x60	60			85.0	140.0	175.0	7.80	KXL75TD1C
	75x65	65			85.0	140.0	185.0	7.80	KXL75TD1D
90	90x40	40	10-16	92.5	65.0	135.0	150.0	6.80	KXL90TD1A
	90x60	60			90.0	155.0	175.0	8.60	KXL90TD1C
	90x65	65			90.0	160.0	185.0	8.20	KXL90TD1D
	90x80	80			105.0	160.0	200.0	9.40	KXL90TD1E
110	110x40	40	10-16	99.0	65.0	145.0	150.0	7.60	KXM11TD1A
	110x60	60			90.0	165.0	175.0	9.40	KXM11TD1C
	110x65	65			90.0	160.0	185.0	9.13	KXM11TD1D
	110x80	80			105.0	170.0	220.0	11.00	KXM11TD1E
	110x100	100			125.0	170.0	220.0	12.20	KXM11TD1F
125	125x40	40	10-16	104.0	65.0	160.0	150.0	9.20	KXM12TD1A
	125x60	60			90.0	160.0	175.0	10.80	KXM12TD1C
	125x65	65			90.0	160.0	185.0	10.00	KXM12TD1D
	125x80	80			105.0	170.0	200.0	11.50	KXM12TD1E
	125x100	100			125.0	180.0	220.0	12.20	KXM12TD1F
	125x125	125			150.0	180.0	250.0	15.00	KXM12TD1G
140*	140x40	40	10-16	108.0	65.0	160.0	150.0	9.30	KXM14TD1A
	140x60	60			90.0	160.0	175.0	11.10	KXM14TD1C
	140x65	65			90.0	160.0	175.0	11.25	KXM14TD1D
	140x80	80			105.0	170.0	200.0	12.40	KXM14TD1E
	140x100	100			125.0	180.0	220.0	14.10	KXM14TD1F
	140x125	125			150.0	180.0	250.0	16.40	KXM14TD1G
160	160x40	40	10-16	114.0	65.0	170.0	150.0	11.30	KXM16TD1A
	160x60	60			90.0	190.0	175.0	12.90	KXM16TD1C
	160x65	65*			90.0	190.0	185.0	12.90	KXM16TD1D
	160x80	80			105.0	200.0	200.0	14.30	KXM16TD1E
	160x100	100			125.0	205.0	220.0	16.40	KXM16TD1F
	160x125	125			150.0	210.0	250.0	18.00	KXM16TD1G
	160x150	150			175.0	220.0	285.0	20.30	KXM16TD1J

PN 25 flanges: for DN 60, 65, 100, 125 and 150. Available in 2013.

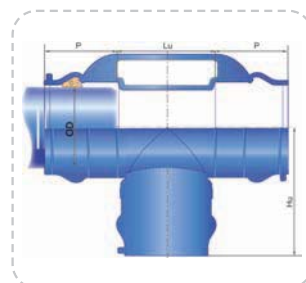
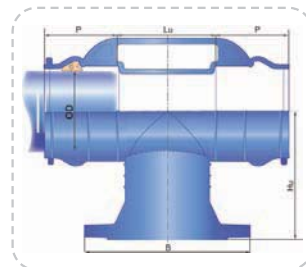
Tee with three sockets

DN/OD mm	ØOD mm	P mm	p mm	Lu m	Hu mm	Weight kg	Reference
75	75x75	87.0	87.0	85.0	52.0	6.00	KXL75TE0C
90	90x75	92.5	87.0	90.0	60.0	6.40	KXL90TE0C
	90x90	92.5	92.5	105.0	56.0	6.80	KXL90TE0D
110	110x75	99.0	87.0	90.0	70.0	7.50	KXM11TE0C
	110x90		92.5	105.0	67.0	7.80	KXM11TE0D
	110x110		99.0	134.0	67.0	8.70	KXM11TE0E
125	125x75	104.0	87.0	90.0	75.0	7.90	KXM12TE0C
	125x90		92.5	105.0	74.0	9.20	KXM12TE0D
	125x110		99.0	125.0	74.0	10.00	KXM12TE0E
	125x125		104.0	150.0	74.0	11.00	KXM12TE0G
140*	140x110	108.0	99.0	125.0	82.0	10.50	KXM14TE0E
	140x125		104.0	150.0	82.0	11.30	KXM14TE0G
	140x140		108.0	155.0	82.0	11.80	KXM14TE0H
160	160x110	114.0	99.0	125.0	92.0	13.00	KXM16TE0E
	160x125		104.0	140.0	92.0	13.60	KXM16TE0G
	160x160*		114.0	175.0	92.0	14.20	KXM16TE0J

Cap

DN/OD mm	ØOD mm	Lu mm	Reference	Weight kg
75	75	101.0	KXL75BH	1.88
90	90	107.0	KXL90BH	2.00
110	110	113.0	KXM11BH	2.20
125	125	118.0	KXM12BH	2.95
140*	140	122.0	KXM14BH	3.50
160	160	128.0	KXM16BH	3.40

* Available in 2013



VALVES

Euro 20® valve - PFA 16 bar

DN/OD	Anticlockwise-to-close, bonnet Reference	Clockwise-to-close, bare screw Reference
75	RDL75KDXH	RDL75KBXH
90	RDL90KDXH	RDL90KBXH
110	RDM11KDXH	RDM11KBXH
125	RDM12KDXH	RDM12KBXH
140*	RDM14KDXH	RDM14KBXH
160	RDM16KDXH	RDM16KBXH



Connection with BLUTOP® pipe - BLUTOP® anchored joint

DN/OD	Weight kg	Reference
75	0.067	JXL75CA
90	0.076	JXL90CA
110	0.093	JXM11CA
125	0.118	JXM12CA
140*	0.190	JXM14CA
160	0.221	JXM16CA



Connection with PVC / HDPE pipe - BLUTOP® joint + KLIKSO® locking gland (1)

DN/OD	BLUTOP® Joint Reference	Weight kg	KLIKSO® locking gland Reference	Weight kg
75	JXL75BA	0.059	JZL75VX	1.76
90	JXL90BA	0.067	JZL90VX	2.10
110	JXM11BA	0.081	JZM11VX	2.33
125	JXM12BA	0.108	JZM12VX	2.57
140*	JXM14BA	0.140	JZM14VX	2.80
160	JXM16BA	0.169	JZM16VX	3.10

(1) KLIKSO® locking gland for anchoring PVC and HDPE pipes only.



* Available in 2013



The blutop range

CONNECTIONS AND TOOLS

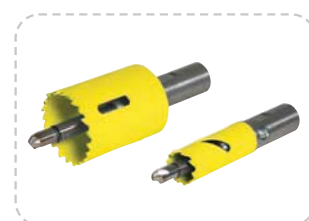
bludril for tapping BLUTOP® pipes

Reference	Weight kg
228099	4.30



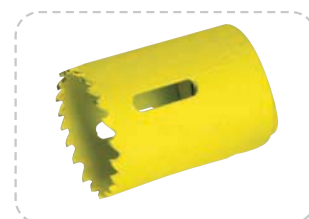
Complete tapping tool for BLUTOP® pipes

Diameter	Reference	Weight kg
19	214191	0.19
24	214193	0.20
30	214195	0.26
38	214196	0.27



Multi-tooth core cutting attachment only (for tapping BLUTOP® pipes)

Diameter	Reference	Weight kg
19	215444	0.10
24	215445	0.12
30	215446	0.17
38	215447	0.24



MPE multimaterial collars / PFA 16 bar

For main pipes		Small bulge M 40 x 3		Large bulge M 55 x 3	
Nominal DN	Min-max. OD	Reference	Weight	Reference	Weight
75	75 - 83	RSL75CPAB	1.80	-	-
90	88 - 100	RSL90CPAB	2.00	RSL90CQAB	2.20
110	110 - 122	RSM11CPAB	2.40	RSM11CQAB	2.30
125	125 - 137	RSM12CPAB	2.40	RSM12CQAB	2.30
140	139 - 150	RSM14CPAB	2.60	RSM14CQAB	2.70
160	160-172	RSM16CPAB	2.70	RSM16CQAB	2.80



Collars for PVC and PE pipes and BLUTOP® pipes / PFA 16 bar

For main pipes DN	Small bulge M 40 x 3		Large bulge M 55 x 3	
	Reference	Weight kg	Reference	Weight kg
75	173886	2.40	202176	2.50
90	173887	2.90	178312	2.90
110	173888	3.10	178313	3.30
125	178297	3.45	178314	3.45
140*	173889	3.50	178315	3.60
160	202177	3.70	202178	3.80



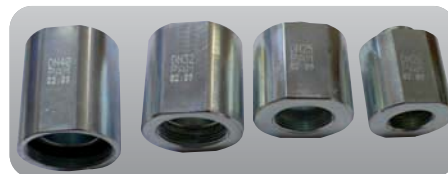
* Available in 2013

TOOLS

BLUTOP® PIPE TAPPING ACCESSORIES

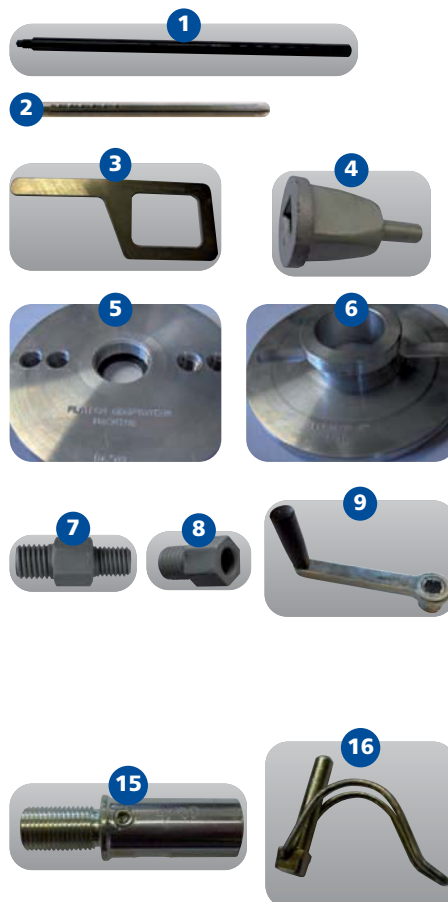
BLUTOP® tapping adapters for EIE machines

Description	Weight in kg	Reference
EIE/PAM machine adapter DN 20	0.98	220947
EIE/PAM machine adapter DN 25	1.32	220948
EIE/PAM machine adapter DN 32	1.20	220949
EIE/PAM machine adapter DN 40	1.34	220950



Tools and accessories for EIE/PAM tapping machines

Description	Weight in kg	Reference
1 EIE/PAM origin rod (D17 M14 L 402 mm)	0.68	220956
2 TOP rod M14 L 402 for electric screwdrivers	0.65	220899
3 CR66 kit disassembly wrench	0.38	220898
4 14 mm socket for electric screwdrivers	0.34	220951
5 1" flange female adapter disk	0.72	220900
6 2" flange male adapter disk	0.43	220922
7 M14-M12 male/male nipple	0.05	220911
8 M14-M12 male/female taper	0.02	221662
9 Windlass handle	0.45	220921
10 Electric screwdriver extension shaft D12/M14 L 150 mm	0.14	220923
11 Electric screwdriver extension shaft D12/M14 L 45 mm	0.04	220931
12 Bosch 14.4 V electric screwdriver	5.30	220979
13 Drill-bit locking screw	0.02	220952
14 Centring drill-bit DN 8	0.04	220954
15 Bare core-cutting attachment 20 25 32 (40)	0.05	220955
16 8x28 cotter pin (spline)	0.02	220953



ADAPTER KIT FOR OTHER TAPPING MACHINES

Description	Weight in kg	Reference
17 HUOT adapter kit - DN 20, 25, 32 and 40	2.70	220932
18 Saint-Germain and Staub + PAM adapter kit - DN 20,25, 32	1.47	220933
19 Pamco adapter kit - DN 20, 25, 40	1.62	220934
20 Iseo/Bayard adapter kit - DN 20, 25, 32, 40	2.11	220935
21 AVK adapter kit - DN 20, 25, 32 et 40	2.13	220946
22 HAWLE M/M adapter kit	2.70	225113
23 Adapter kit for VHM machines (2" F)	2.60	228109



The blutop range

TOOLS AND ACCESSORIES

SuperChanf Internal combustion-powered chamfering machine

Description	Weight kg	Reference
SuperChanf with accessories	35.50	228100
Box of carbide plates	1.00	229340



BLUTOP® pipe repair product

Description	Weight kg	Reference
Eurokote 438 RAL 5002	1.00	213686



BLUTOP® lubricating paste

Description	Weight kg	Reference
BLUTOP® lubricating paste	0.850	214611



Pack of 10 BLUTOP® flexible sleeves

DN/OD	Reference
75	224053
90	223164
110	223163
125	223165
140*	—
160	228021



* Available in 2013



MECHANICAL SPECIFICATIONS OF PIPES AND FITTINGS

The metallurgical properties of BLUTOP® pipes and fittings are as specified in the EN 545 standard.

Property	Unit	Pipes	Fittings
Minimum tensile strength, S _m	MPa	420	420
Minimum rupture strain, A	%	10	5
Maximum Brinell hardness	HB	230	250
Minimum Young's modulus	GPa	170	170

PIPE SPECIFICATIONS

CSTB has issued a draft Technical Opinion relating to the dimensional specifications of BLUTOP® pipes.

DN/OD	75		90		110		125		140		160	
Outside diameter and tolerances (mm)	75	+0.5 - 1.2	90	+0.6 - 1.0	110	+0.7 - 1.2	125	+0.8 - 1.2	140	+0.9 - 1.2	160	+1.0 - 1.2
Mean internal diameter (mm)	68		83		102		118		132		152	
Nominal iron thickness (mm)	3.0		3.0		3.0		3.0		3.2		3.4	
Design thickness (mm) (1)	2.2		2.2		2.2		2.2		2.4		2.7	
Nominal density (kg/m) (2)	5.1		6.1		7.5		8.6		10.3		12.5	
Nominal total weight (kg/pipe)	31		37		45		52		62		75	
Nominal mean hydraulic cross-section (mm ²)	3,632		5,411		8,332		10,936		13,809		18,194	

(1) The pipe wall must not be thinner than the design thickness at any point

(2) Guide iron weight, assuming a mean wall thickness of 3.0 mm

TECHNICAL SPECIFICATIONS OF THE DUCTAN® LINING

The table below shows the main properties of DUCTAN®.

Property	Value
Colour	Ultramarine blue (similar to RAL 5002)
Density (dry film)	0.96 g/cm ³
Adherence (ISO 4624)	≥ 10 MPa on shot-blasted steel plate
Shore D hardness	44
Rupture strain (ISO 527)	≥ 400%
Stress cracking (ASTM D1693)	> 1,000 h
Induction time before oxidisation at 200°C (EN 728) of DUCTAN® powder	> 10 min in oxygen

Technical specifications

The table below shows the main performance parameters for the DUCTAN® lining applied to the interior of BLUTOP® pipe cylinders.

Property	Criterion
Adherence	• 15 MPa mean value (8 MPa minimum value)
Non-porosity (holiday detector inspection)	• Holiday-free inner surface lining when measured at a voltage of 1,500 V
Reverse impact strength (opposite surface)	• No holiday detector jolts when subjected to a 10 J impact
Smoothness coefficient	< 0.01mm

The table below shows the main in-water ageing performance parameters for the DUCTAN® lining applied to the interior of BLUTOP® pipe cylinders.

Durability – Resistance to thermal ageing in water	Criterion in scratch	Criterion away from scratch
<p>The durability of the DUCTAN® interior corrosion protection is measured following an immersion test in water at a temperature of 50°C, conducted in accordance with EN ISO 2812-2:1995. The exposure time is 480 h.</p> <p>An inverted V (starting from the acute angle) measuring 1 mm in width and at least 50 mm in length is etched into each test specimen.</p> <p>Two areas are assessed.</p>	• Maximum blister width on each side of the scratch: <5 mm	Blistering: ID<2 mm and OD<2 mm as per EN ISO 4628-2
	• Maximum corrosion propagation width on each side of the scratch: <5 mm	Corrosion < Ri1 as per EN ISO 4628-3
	–	Mean adherence evaluated by tensile testing in accordance with EN ISO 4624-2003: Requirement ≥ 6 MPa.

TECHNICAL SPECIFICATIONS OF THE ZINALIUM® COATING

Material	Electrochemical potential
Iron	- 0.44 v
Zinc	- 0.76 v
Aluminium	- 1.66 v

TECHNICAL SPECIFICATIONS OF THE EPOXY COATING ON FITTINGS

The table below shows the main performance parameters of the epoxy coating applied to BLUTOP® fittings. This performance complies with the requirements of the standard **EN 14901**.

Performance tests	Criterion
Non-porosity	Holiday free detector jolts at 1,500 V
Impact resistance	Holiday free detector jolts at 1,500 V when the specimen is subjected to a 5 J impact
Durability – Resistance to thermal ageing in water	After applying the test procedure, the coating must have a mean adherence of at least 6 MPa.
Indentation resistance	The indentation depth measured after 48 h must not exceed 30% of the original measured coating thickness. Any increase in indentation depth measured between 24 h and 48 h must be less than that measured between 0 and 24 h and must not exceed 5% of the original measured coating thickness.
Durability – Resistance to thermal ageing in air	The coating must remain non-porous after applying the test procedure.

APPLICATION SCOPE DEPENDING ON SOIL CONDITIONS

The pipes and fittings in the BLUTOP® range are suitable for burying in most types of ground, as defined in the EN 545:2010 standard, Annex D.2.2 "Scope of Application", with the following exceptions:

- acidic peaty ground;
- ground containing waste, ash or slag, or polluted by solid or liquid industrial waste;
- ground below the marine water table with a resistivity of less than 500 Ω cm.

We recommend the PAM Standard TT product range for applications in the above types of ground, and also where stray currents may be encountered.

APPLICATION SCOPE DEPENDING ON WATER CONDITIONS

The products in the BLUTOP® range are suitable for use with all types of potable water in accordance with the European Directive 98/83/EC.

Water properties	Unit	BLUTOP® range
Minimum pH value	-	4
Maximum pH value	-	10
Minimum hardness	°	Not limited
Maximum aggressive CO2 content mg/l	mg/l	Not limited
Maximum sulphate content	mg/l	Not limited
Maximum magnesium content	mg/l	Not limited
Maximum ammonia content	mg/l	Not limited

MAXIMUM COVER DEPTHS FOR BLUTOP® PIPES

Cover depths vary according to the site conditions

Case	Laying bed	Cover	Compaction	Es	Min. 2 alpha
Case 1	Levelled trench floor	Group 4, 3, 2 or 1	Uncompacted	< 0.3 MPa	30°
Case 2	Selected materials	Group 3, 2 or 1	Compacted and inspected	1.0 MPa	60°
Case 3	Selected materials	Groupe 2 or 1	Compacted and inspected q5	1.2 MPa	90°
Case 4	Selected materials	Groupe 1	Compacted and inspected q4	2.0 MPa	90°

Maximum cover depths for BLUTOP® pipes **not subjected to rolling loads**

Unit	Case 1 m	Case 2 m	Case 3 m	Case 4 m
75	32.9	44.8	50.0	50.0
90	22.8	31.5	37.2	38.7
110	17.1	24.1	28.6	30.5
125	12.3	18.0	21.5	23.8
160	9.1	14.1	17.0	19.9

Maximum cover depths for BLUTOP® pipes **subjected to rolling loads**

DN/OD	Case 1 m	Case 2 m	Case 3 m	Case 4 m
75	32.9	44.8	50.0	50.0
90	22.8	31.5	37.2	38.7
110	17.0	24.1	28.6	30.4
125	12.2	18.0	21.5	23.8
160	9.0	14.0	17.0	19.8

In addition, although the minimum depth for laying pipes is **0.3 m**, due consideration should be given to potential freezing risks.

Technical specifications

QUALITY, STANDARDS AND ACCREDITATION

Quality management

The Saint-Gobain PAM quality management system complies with the ISO 9001 standard and covers the design, manufacture and sale of the BLUTOP® range. Compliance with this quality management system is certified by an independent organisation.

Environmental management

The plants that manufacture the pipes and fittings in the BLUTOP® range are ISO 14001-certified.

European standards

The following European standards apply to the BLUTOP® range:

- EN 805 – Overall design of the BLUTOP® range
- EN 681.1 – Joint gasket
- EN 12842 – Fittings in the BLUTOP® range
- EN 14901 – Epoxy coating on BLUTOP® fittings and accessories

In addition, the requirements of the standard EN 545 apply to the BLUTOP® range, except for:

- Standard DN/OD diameters
(in accordance with EN 805-2000)
- Standard pressure class: C25 (MAWP: 25 bar)
- Thermoplastic lining

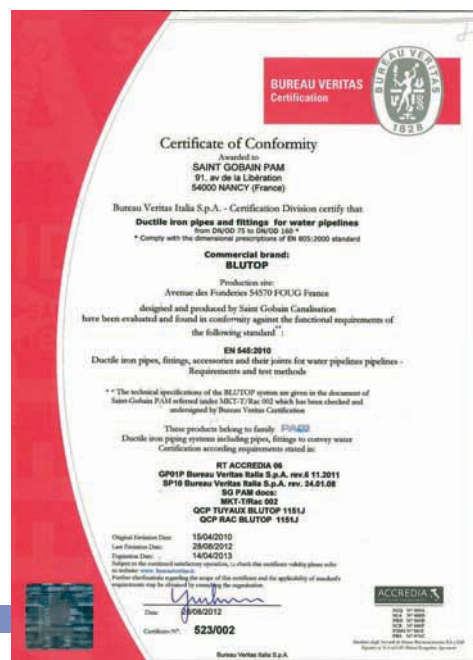
The performance tests to establish the characteristics of the products in the BLUTOP® range are conducted in accordance with the standard EN 545.

National certification

The BLUTOP® range has been assessed and certified by competent, independent organisations in several countries.

- France – CSTB Technical Opinion
- United Kingdom – WRc Opinion
- Germany – Experimental DIN standard (PAS)
- Belgium – Belgaqua approval
- Netherlands – KIWA approval

The relevant documents are available to view on our website: www.blutop.fr.



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