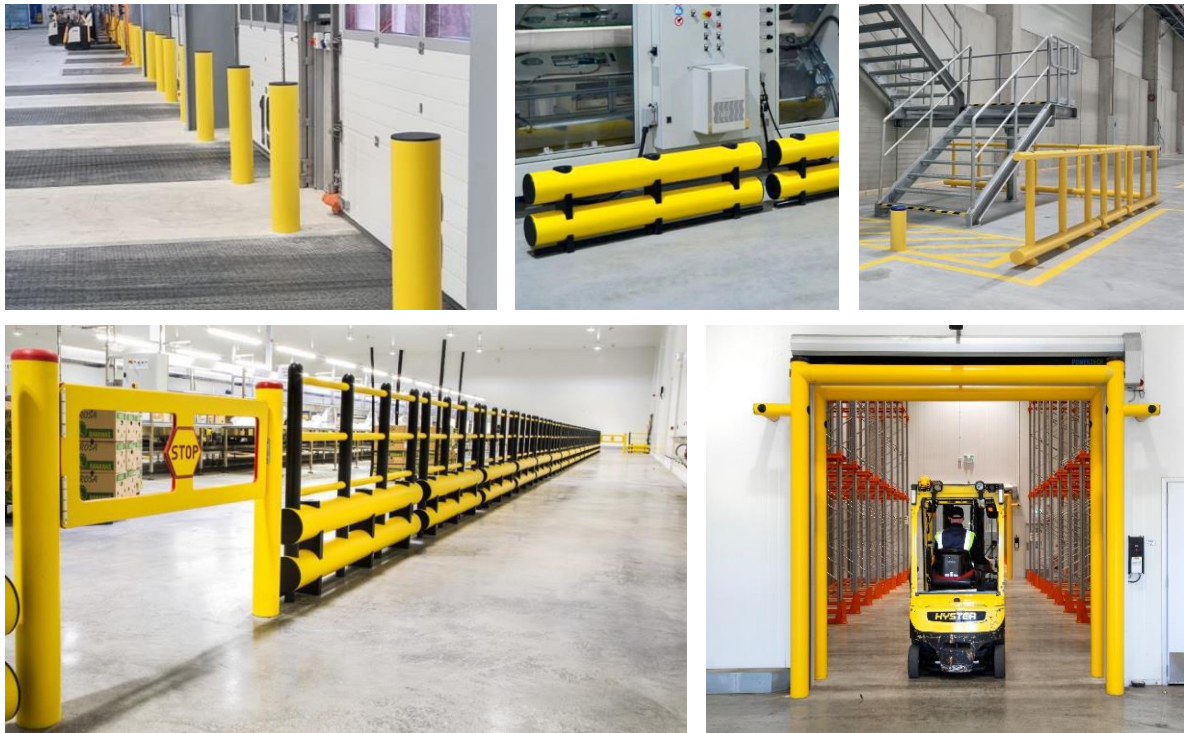


Polybar Group

High-Performance Impact Protection Systems



Polybar Impact Protection Systems

Polybar impact protection systems consist of a high-performance synthetic polymer technology designed to protect people, property and profits. They are internationally recognised for their superior performance across a wide spectrum of parameters.



Flexible, Durable & Impact Resistant



Built-in Reinforcement



Chemical & UV Resistant



Suitable For Temperatures Between -40°C to +80°C



Unique Single 'Hidden' Fix Anchoring System



Quick & Easy Repair



Minimum Maintenance, Zero Painting



Tailored Solutions



Foodsafe Certified



Hygienic & Easy To Clean With Smooth Surfaces



No Exposed Steel – Zero Exposure To Corrosion Risk

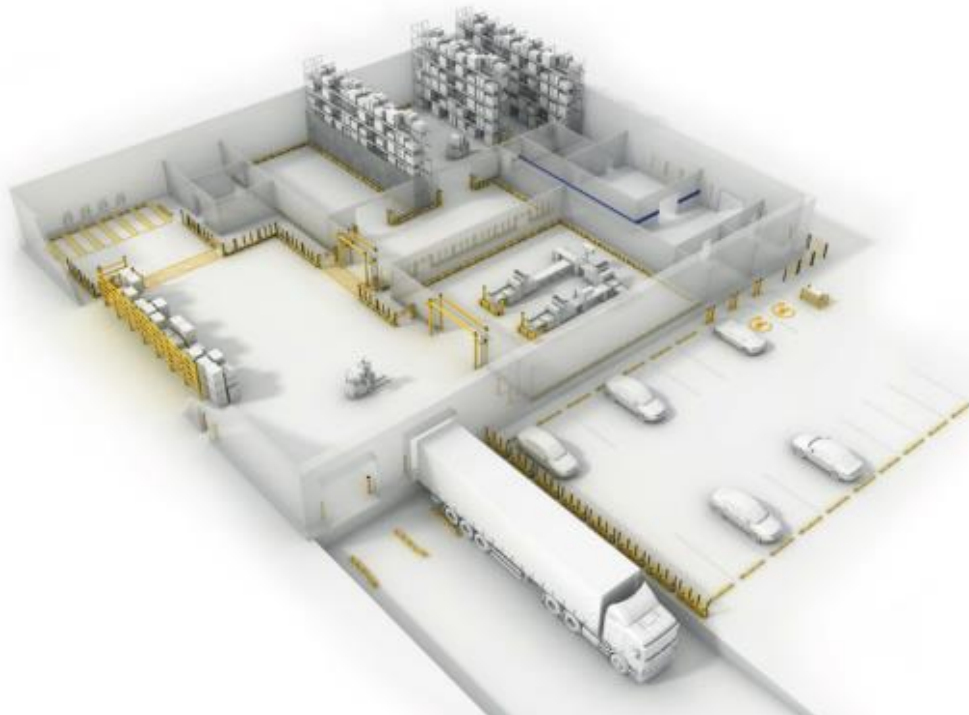


40% Recycled Content & 100% Recyclable



Contents

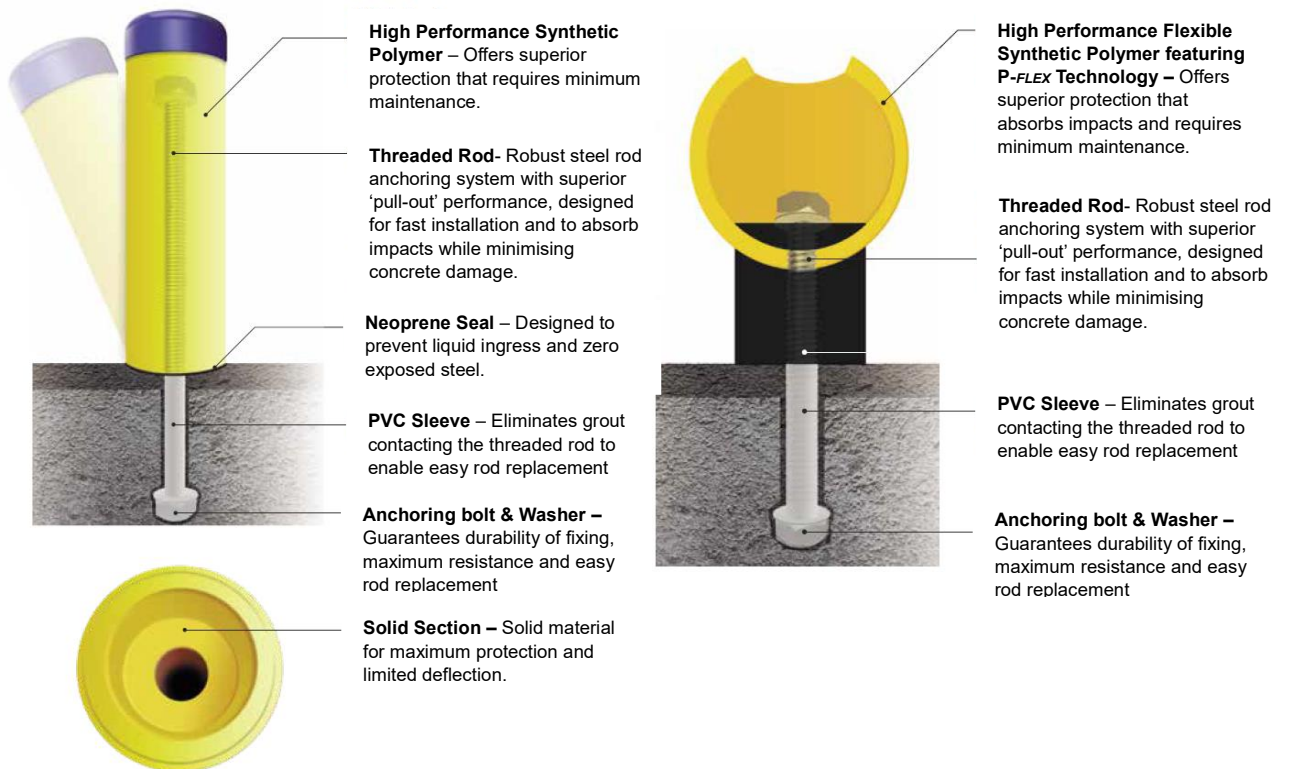
Installation	3	P-Range (Solid)	19
Testing	5	P-Bollard.....	20
P-FLEX Range (Hollow)	7	P-Barrier.....	21
P-FLEX Bollard.....	8	P-Double Barrier.....	22
P-FLEX Barrier.....	9	P-Pedestrian Rail.....	23
P-FLEX Double Barrier.....	10	P-Barrier Rail 200.....	24
P-FLEX Barrier Rail.....	11	P-Barrier Rail 300.....	25
P-FLEX Double Barrier Rail	12	P-Gate.....	26
P-FLEX Integrated Rail.....	13	P-Kerb.....	27
P-FLEX Goalpost.....	14	P-Plinth.....	28
P-FLEX Topple Barrier.....	15	Service & Support.....	29
P-FLEX Column Protection.	16		
P-FLEX Clatter Bar.....	17		



Installation

The unique single threaded-rod anchoring system provides exceptional impact resistance and strength while also allowing for fast installation, easy maintenance, and minimum concrete damage upon impact.

Polybar Impact Protection Systems can be installed up to twice as fast as comparable protection systems. The illustrations below show the installation procedure for the P-Bollard and the P-FLEX Barrier. However, please contact the Polybar Technical team for installation guidance on other products.



Installation



Drill concrete to a specified diameter using a diamond core drill.



Vacuum debris and dust to ensure a clean surface.



Mix & pour grout resin into hole.



Insert protection system, leave to set and tighten top bolt.



Fix cap.



Assembly complete.



Testing

Polybar Group seeks to underpin performance with third party independent testing. The majority of impact protection systems from Polybar are unique in that they have been subjected to robust dynamic and static testing.

TUV Nord have certified dynamic pendulum testing while the university of Engineering and Architecture of Zaragoza, Spain have carried out onerous static load testing. They have also carried out a study using finite element analysis to further understand mechanical performance.



Polybar impact protection systems are manufactured using a high-performance synthetic polymer. Protection systems that feature P-FLEX Technology benefit from increased elasticity that increases the protection systems' ability to safely absorb forces upon impact.

All sections with P-FLEX Technology are hollow whereas the standard range of protection products are solid. Besides impact and mechanical performance testing and analysis, the high-performance synthetic polymer that is used in Polybar Impact Protection Systems is robustly tested for:

- Food Contact – tested to BS EN 1186-2:2002
- BS EN 1186-3:2002 for materials and articles in contact with foodstuff
- UV Resistance – tested to BS EN ISO 4892-2:2014
- Chemical Resistance – high resistance to acids, alkali and solvents
- Recyclability – typically 40% recycled polymer material and 100% recyclable



Testing

Product	Diameter	Tested Impact Energy at 90° (Joules)	Equivalent Vehicle & Speed
P-Bollard	140mm	26,900	6.97 tonne forklift travelling 10 km/h
P-Bollard	120mm	17,405	4.51 tonne forklift travelling 10 km/h
P-Bollard	100mm	12,800	3.32 tonne forklift travelling 10 km/h
P-FLEX Bollard	110mm	15,051	3.90 tonne forklift travelling 10 km/h
P-FLEX Bollard*	170mm	26,900	6.97 tonne forklift travelling 10 km/h
P-Barrier	120mm	36,425	9.44 tonne forklift travelling 10 km/h
P-Barrier	100mm	19,850	5.15 tonne forklift travelling 10 km/h
P-Barrier	70mm	7,470	1.94 tonne forklift travelling 10 km/h
P-FLEX Barrier	110mm	6,200	1.61 tonne forklift travelling 10 km/h
P-FLEX Barrier	170mm	16,100	4.17 tonne forklift travelling 10 km/h
P-FLEX Double Barrier	170mm	21,360	5.54 tonne forklift travelling 10 km/h
P-FLEX Barrier Rail**	170mm	16,100	4.17 tonne forklift travelling 10 km/h
P-FLEX Double Barrier Rail***	170mm	21,360	5.54 tonne forklift travelling 10 km/h

Test	Results
Density (g/cm ³) - ISO 1183	0.95
Yield Stress (N/mm ²) - DIN EN ISO 527	28
Elongation Resistance (%) - DIN EN ISO 527	+8
Elongation at Break (%)	300
Tensile E Modulus (MPa) - DIN EN ISO 527	850
Impact Strength (kJ/m ²) - DIN EN ISO 179	Without break
Notched Impact Strength (kJ/m ²) - DIN EN ISO 179	50
Ball Indentation Hardness (N/mm ²) - DIN EN ISO 2039-1	45
Shore Hardness (N/mm ²) - D ISO 868	66
Average Thermal Coefficient of Elongation (K ⁻¹) - DIN 53752	1'8. 10 ⁻⁴
Thermal Conductivity (W/m.K) - DIN 52612	0.38
Dielectric Strength (kV/mm) - VDE 0303-21	44
Surface Resistance (Ohm) - DIN IEC 167	10 ¹⁴
Temperature Range (°C)	-100 to +80
Chemical Resistance (Acids, Alkalis and Solvents)	High
Physiologically Acceptable	Yes
Welding	Yes
Hot Forming	Possible

*Tested on the 140mm core of the 170mm P-FLEX Bollard II ** Tested on the P-FLEX Barrier 170mm II ***Tested on the P-FLEX Double Barrier

Polybar Impact protection systems are trusted by many international companies including...



P-*FLEX* Range (*Hollow*)



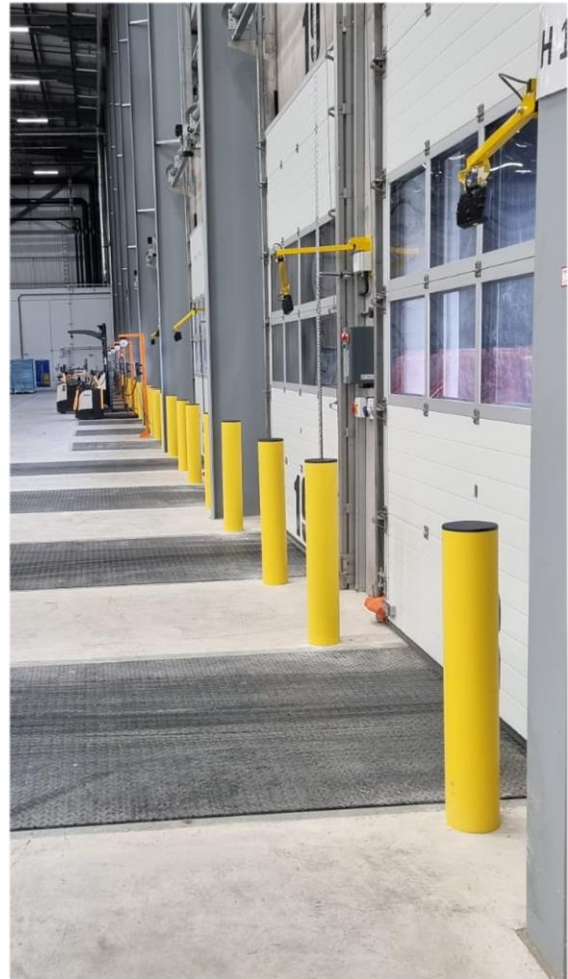
P-FLEX Bollard

Featuring P-FLEX Technology – a revolutionary high performance flexible synthetic polymer designed to safely absorb impacts. The P-FLEX Bollard is available in two diameters and various heights.

P-FLEX Bollard provides a superior durable protection solution that can be used in a range of applications from door protection to signposting on pedestrian walkways.

The core of the 170mm P-FLEX Bollard has tested impact energy of **26,900 Joules**

Dimensions (mm)			Drilling (mm)	
Diameter	Height	Rod ø	Hole ø	Depth
110	1000	30	68	150
110	1500	30	68	150
110	2000	30	68	150
110	2500	30	68	150
170	1000	30	68	150
170	1200	30	68	150
170	1500	30	68	150
170	2000	30	68	150
170	2500	30	68	150

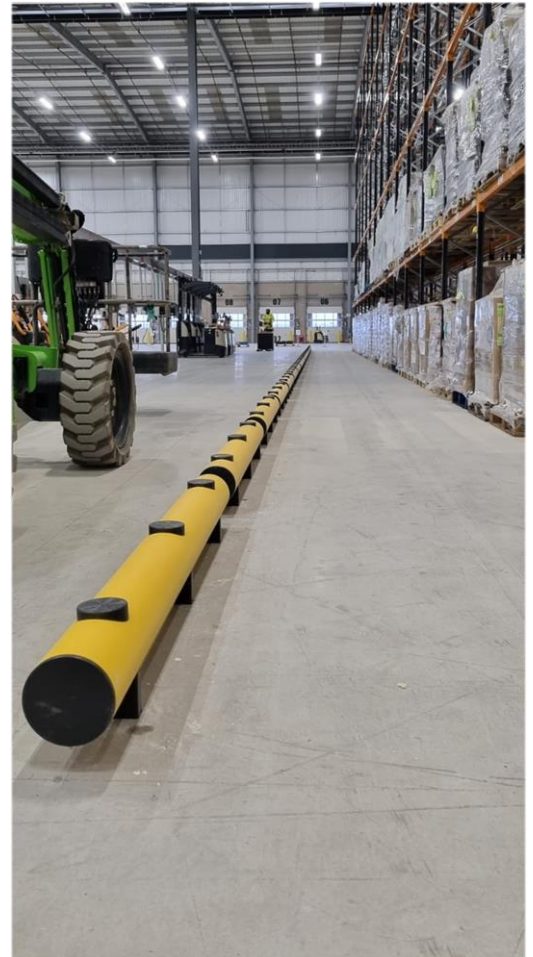


P-FLEX Barrier

The P-FLEX Barrier provides excellent impact resistance combined with high flexibility.

P-FLEX Barrier is available in diameters of 110mm and 170mm with a range of lengths as per the table below. The 170mm diameter product comes with a 40mm diameter reinforcement bar.

The 170mm P-FLEX Barrier has tested impact energy of **16,100 Joules** whereas the 110mm P-FLEX Barrier has tested impact energy of **6,200 Joules**.



Diameter (mm)	Dimensions			Drilling		
	Length (mm)	No. Bases	Height (mm)	Rod ø (mm)	Hole ø (mm)	Depth (mm)
110	500	2	175	14	36	150
110	1000	2	175	14	36	150
110	1500	3	175	14	36	150
110	2000	3	175	14	36	150
170	500	2	220	16	38	150
170	1000	2	220	16	38	150
170	1500	3	220	16	38	150
170	2000	3	220	16	38	150



P-FLEX Double Barrier

The P-FLEX Double Barrier is designed for a wide range of applications to offer protection where the impact zone is up to 450mm high.

The combination of P-FLEX technology and the unique threaded rod anchoring system with either two 110mm sections or two 170mm sections provides the basis for robust and safe protection.

P-FLEX Double Barrier with 170mm sections come with a 40mm reinforcement bar to provide additional protection and has tested impact energy of **21,360 Joules**.



Dimensions				Drilling		
Diameter (mm)	Length (mm)	No. Bases	Height (mm)	Rod \varnothing (mm)	Hole \varnothing (mm)	Depth (mm)
110	500	2	330	14	36	150
110	1000	2	330	14	36	150
110	1500	3	330	14	36	150
110	2000	3	330	14	36	150
170	500	2	450	16	38	150
170	1000	2	450	16	38	150
170	1500	3	450	16	38	150
170	2000	3	450	16	38	150



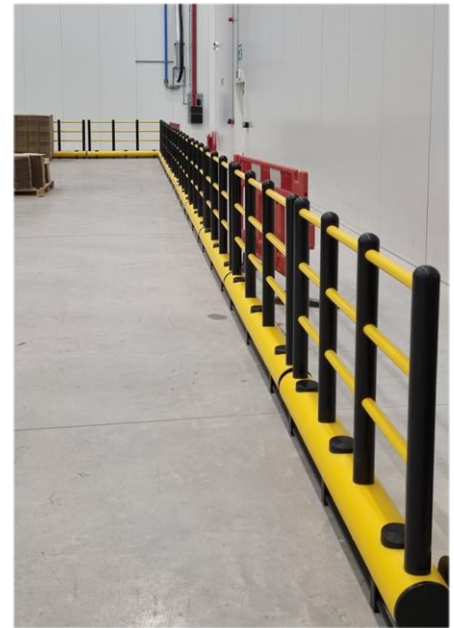
P-FLEX Barrier Rail

Featuring Polybar’s P-FLEX Technology, the P-FLEX Barrier Rail is a unique protection solution to segregate people from traffic.

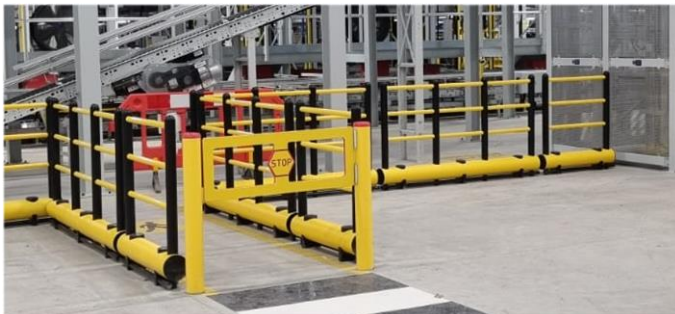
It is designed to offer optimum protection to people from moving traffic by safely deflecting upon impact and bringing forces gradually to a stop.

The P-FLEX Barrier Rail comes with a 40mm reinforcement bar to provide additional protection and has tested impact energy of **16,100 Joules***.

*Tested on the 170mm P-FLEX Barrier



Dimensions				Drilling		
Diameter (mm)	Length (mm)	No. Bases	Height (mm)	Rod ø (mm)	Hole ø (mm)	Depth (mm)
170 / 70 / 40	1000	2	1100	16	38	150
170 / 70 / 40	1500	3	1100	16	38	150
170 / 70 / 40	2000	3	1100	16	38	150



P-FLEX Double Barrier Rail

The P-FLEX Double Barrier Rail is robustly designed using P-FLEX technology to provide optimum protection to people from moving traffic.

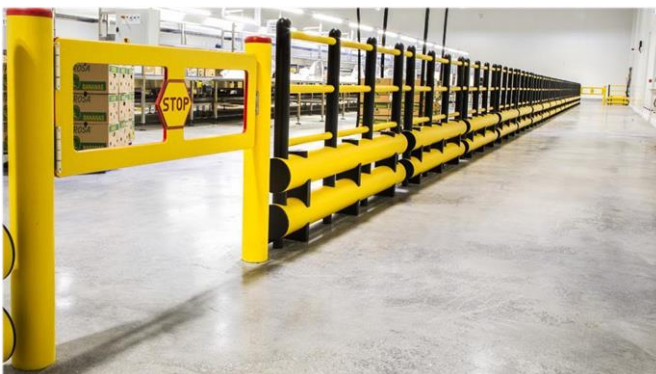
Upon impact the system deflects and brings forces safely to a stop. Its design, performance and appearance is exceptional.

P-FLEX Double Barrier Rail comes with a 40mm reinforcement bar to provide additional protection and has tested impact energy of **21,360 Joules***.

*Tested on the 170mm P-FLEX Double Barrier



Dimensions				Drilling		
Diameter (mm)	Length (mm)	No. Bases	Height (mm)	Rod ø (mm)	Hole ø (mm)	Depth (mm)
170 / 70 / 40	1000	2	1100	16	38	150
170 / 70 / 40	1500	3	1100	16	38	150
170 / 70 / 40	2000	3	1100	16	38	150

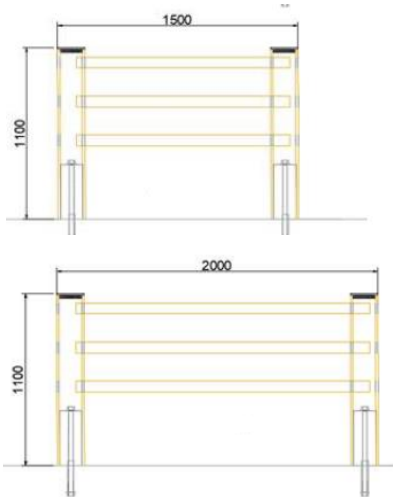


P-FLEX Integrated Rail

The P-FLEX Integrated Rail is an innovative railing system designed to segregate pedestrians from traffic areas / zones.

The P-FLEX Integrated Rail and the P-FLEX Barrier can be combined to offer enhanced protection in high traffic areas.

The core used to anchor the vertical sections has tested impact energy of **26,900 Joules** whereas the 170mm P-FLEX Barrier has tested impact energy of **16,100 Joules**.



Dimensions				Drilling		
Diameter (mm)	Length between posts (mm)	No. Bases	Height (mm)	Rod ø (mm)	Hole ø (mm)	Depth (mm)
170 / 70	1500	By Design	1100	30	68	150
170 / 70	2000	By Design	1100	30	68	150



P-FLEX Goalpost

The P-FLEX Goalpost is a proven door perimeter protection system that features P-FLEX Technology.

Its unique design, provides maximum protection for internal or external door systems. It is designed to safely deflect upon impact and ensure optimum resistance and can be manufactured to suit specific door sizes.

The P-FLEX Goalpost is made from 170mm diameter sections with arms made of 110mm diameter sections that can be mechanically fixed to a range of substrates including concrete walls or insulated panels. It can also be left free standing and used as a height restrictor with low level protection.

The core used to anchor the vertical sections has tested impact energy of **26,900 Joules**.



P-FLEX Topple Barrier

The P-FLEX Topple Barrier offers topple prevention for stacked / bulk goods.

Engineered to deflect when in contact with a force and available in various heights (up to 6m) and manufactured to suit specific requirements, the P-FLEX Topple Barrier stops goods from falling onto traffic routes or pedestrian walkways.

The P-FLEX Topple Barrier is an integrated system and engineered to suit specific requirements taking into consideration height and weight of stacked goods.

The P-FLEX Topple Barrier can be combined with the P-FLEX Barrier between the two vertical sections fixed to the ground to provide enhanced impact protection at low level.

The core used to anchor the vertical sections has tested impact energy of **26,900 Joules**. Impact resistance elsewhere on the P-FLEX Topple Barrier will depend on the design.



Dimensions				Drilling		
Diameter (mm)	Length (mm)	No. Bases	Height (mm)	Rod ø (mm)	Hole ø (mm)	Depth (mm)
170 / 110	2000	2	By Design	30	68	150



P-FLEX Column Protection

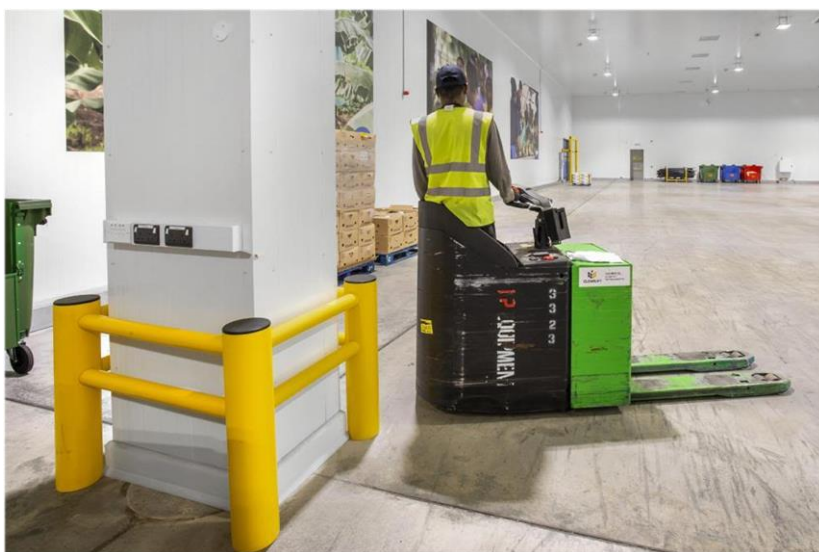
The P-FLEX Column Protection is an integrated system designed and manufactured to suit different types of columns or vertical structural elements.

It's typically 1100mm high and is not attached to the column therefore offering a deflection zone without applying any force to a column upon impact.

The core used to anchor the vertical sections has tested impact energy of **26,900 Joules**.



Dimensions				Drilling		
Diameter (mm)	Length (mm)	No. Bases	Height (mm)	Rod \varnothing (mm)	Hole \varnothing (mm)	Depth (mm)
170 / 70	By Design	4	1100	30	68	150



P-FLEX Clatter Bar

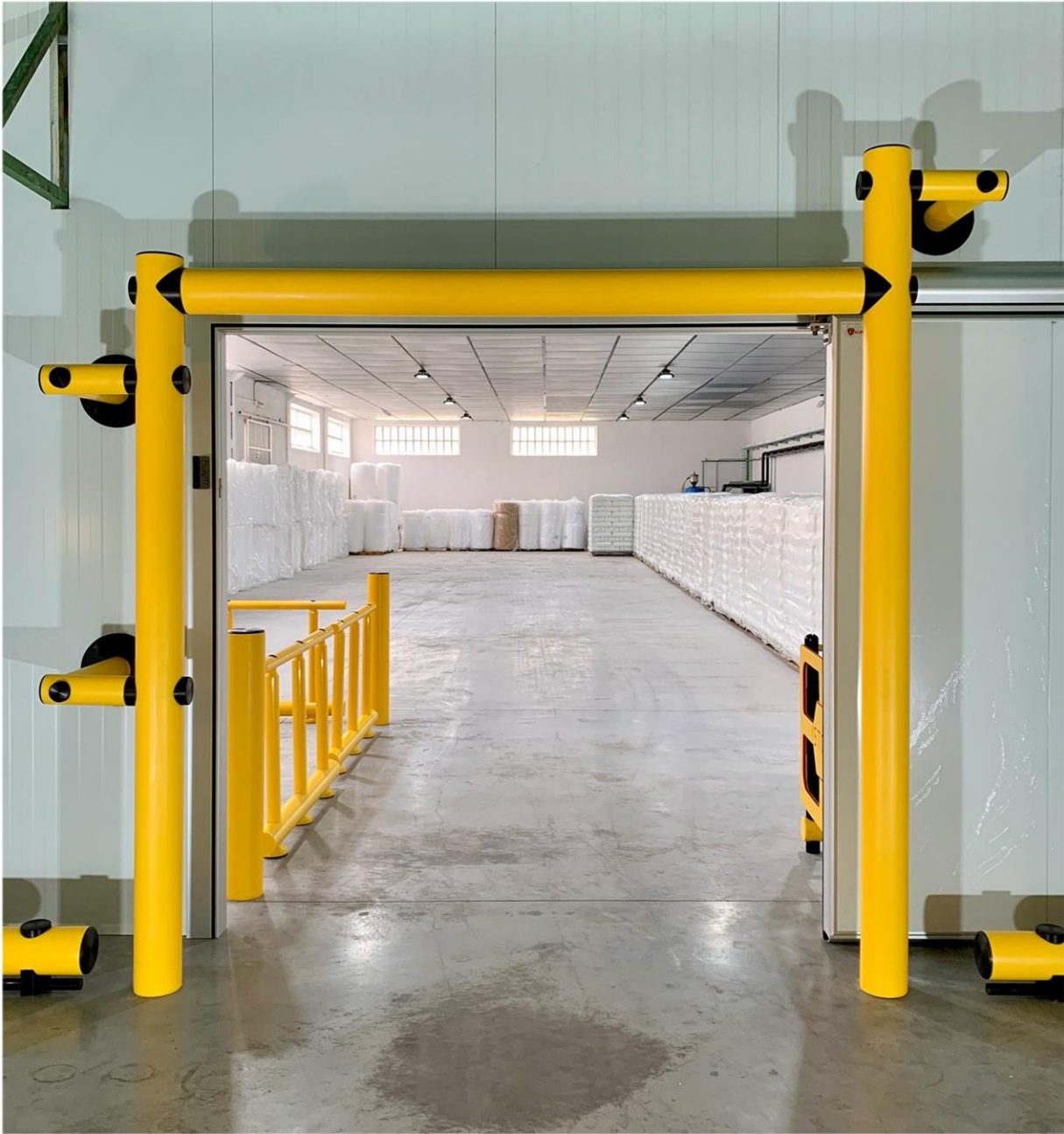
The P-FLEX Clatter Bar provides high visible height restriction typically used to protect mezzanine floors that could be impacted from traffic beneath.

The system is supplied in 110mm diameter sections that are 2000mm long with chains already installed for easy installation.



Dimensions			
Diameter (mm)	Length (mm)	No. of Chains	Chain Length (mm)
110	2000	2	1500





P-Range (*Solid*)

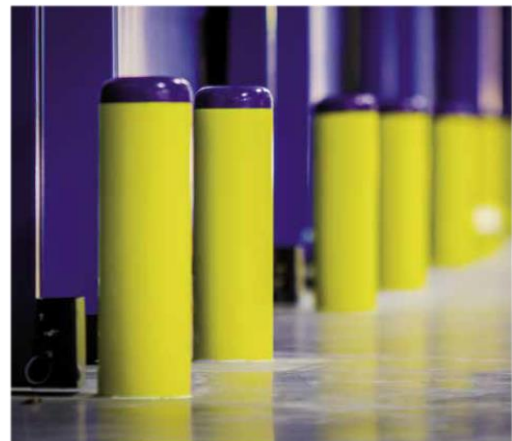
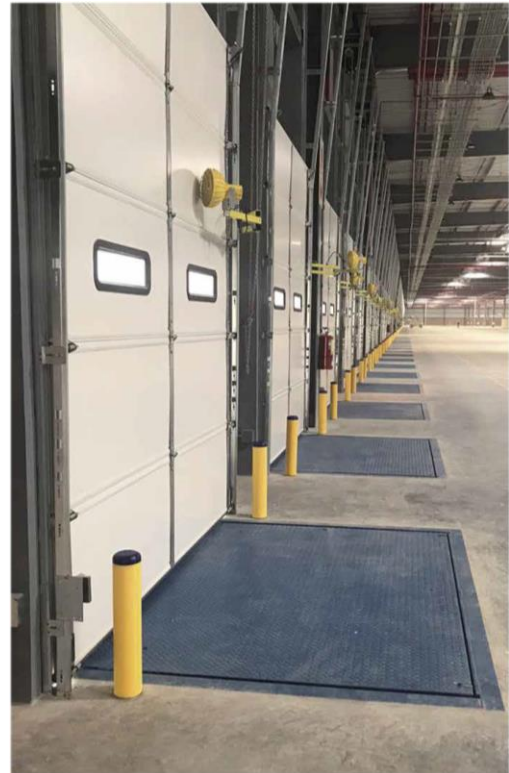


P-Bollard

The P-Bollard provides a high-performance protection solution for building corners, door areas and walls, as well as smaller surface areas.

It is manufactured using a high performance synthetic polymer to provide maximum impact resistance and, as it is self-coloured as opposed to painted, it is more scratch resistant and doesn't discolour when exposed to UV rays.

Engineered to provide superior protection, the 120mm diameter P-Bollard has tested impact energy of **17,405 joules** whereas the 100mm diameter P-Bollard has tested impact energy of **12,800 Joules**



Dimensions			Drilling	
Diameter (mm)	Height (mm)	Rod \varnothing (mm)	Hole \varnothing (mm)	Depth (mm)
70	266	20	48	150
100	430	30	68	150
100	530	30	68	150
100	1000	30	68	150
120	430	30	68	150
120	530	30	68	150
120	800	30	68	150
120	1000	30	68	150
140	430	30	68	150
180	430	30	68	150
180	800	30	68	150
180	1000	30	68	150



P-Barrier

The unique anchoring system of the P-Barrier offers ultimate protection for a wide range of applications while also allowing fast installation and minimum concrete damage upon impact.

The P-Barrier can be used to protect walls, machinery, columns & can also be used as a wheel guide to help guide drivers reversing articulated trailers to dock leveller doors for loading / offloading purposes.

The 120mm & 100mm diameter P-Barrier has tested impact energy of **36,425 & 19,850 Joules** respectively.



Dimensions				Drilling		
Diameter (mm)	Length (mm)	No. Bases	Height (mm)	Rod \varnothing (mm)	Hole \varnothing (mm)	Depth (mm)
70	500	2	125	16	38	150
70	1000	2	125	16	38	150
70	1500	3	125	16	38	150
70	2000	3	125	16	38	150
100	500	2	155	20	48	150
100	1000	2	155	20	48	150
100	1500	3	155	20	48	150
100	2000	3	155	20	48	150
100	2500	4	155	20	48	150
120	500	2	175	20	48	150
120	1000	2	175	20	48	150
120	1500	3	175	20	48	150
120	2000	3	175	20	48	150
120	2500	4	175	20	48	150



P-Double Barrier

The P-Double Barrier benefits from the extremely secure single point anchoring system that offers high impact resistance, offering a superior solution for the protection of walls and equipment.

P-Double Barrier consists of two solid sections that are available in various diameters & lengths, made from Polybar's high performance synthetic polymer protection technology.



Dimensions				Drilling		
Diameter (mm)	Length (mm)	No. Bases	Height (mm)	Rod \varnothing (mm)	Hole \varnothing (mm)	Depth (mm)
70	500	2	230	20	48	150
70	1000	2	230	20	48	150
70	1500	3	230	20	48	150
70	2000	3	230	20	48	150
100	500	2	300	20	48	150
100	1000	2	300	20	48	150
100	1500	3	300	20	48	150
100	2000	3	300	20	48	150
120	500	2	340	20	48	150
120	1000	2	340	20	48	150
120	1500	3	340	20	48	150
120	2000	3	340	20	48	150



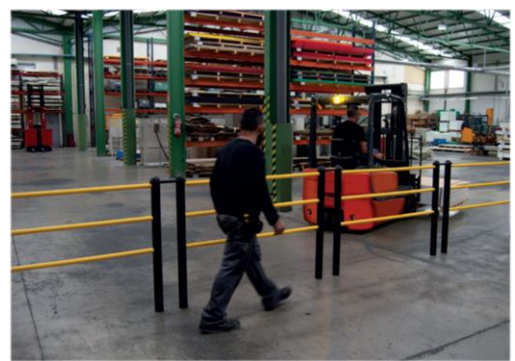
P-Pedestrian Rail

The P-Pedestrian Rail has been designed for low traffic environments. It benefits from a single threaded rod anchoring system however it's suitable only to segregate pedestrians from lightweight machinery.

It benefits from a single threaded rod anchoring system and is excellent for segregating people from lightweight machinery and demarcating pedestrian zones.



Dimensions				Drilling		
Diameter (mm)	Length (mm)	No. Bases	Height (mm)	Rod \varnothing (mm)	Hole \varnothing (mm)	Depth (mm)
70 / 40	1500	2	1100	14	36	150



P-Barrier Rail 200

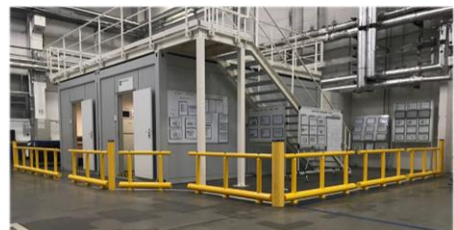
The P-Barrier Rail 200 is designed to offer superior protection for pedestrians in high traffic areas.

Engineered to cater for various heights, its robust design protects people and high value equipment & assets from impacts that may cause injury or damage.

The bottom 120mm & 100mm diameter sections of the P-Barrier Rail 200 has tested impact energy of **36,425 & 17,505 Joules** respectively.



Dimensions				Drilling		
Diameter (mm)	Length (mm)	No. Bases	Height (mm)	Rod \varnothing (mm)	Hole \varnothing (mm)	Depth (mm)
70 / 70	1500	3	1000	16	38	150
70 / 70	2000	3	1000	16	38	150
100 / 70	500	2	1000	20	48	150
100 / 70	1000	2	1000	20	48	150
100 / 70	1500	3	1000	20	48	150
100 / 70	2000	3	1000	20	48	150
120 / 70	500	2	500	20	48	150
120 / 70	1000	2	500	20	48	150
120 / 70	1500	3	500	20	48	150
120 / 70	2000	3	500	20	48	150
120 / 70	500	2	800	20	48	150
120 / 70	1000	2	800	20	48	150
120 / 70	1500	3	800	20	48	150
120 / 70	2000	3	800	20	48	150
120 / 70	500	2	1000	20	48	150
120 / 70	1000	2	1000	20	48	150
120 / 70	1500	3	1000	20	48	150
120 / 70	2000	3	1000	20	48	150



P-Barrier Rail 300

The P-Barrier Rail 300 is high performance impact protection system that features solid synthetic polymer technology that results in a robust impact protection system designed specifically for walkways.

The bottom 120mm diameter section of the P-Barrier Rail 300 has tested impact energy of **36,425 Joules**.



Dimensions				Drilling		
Diameter (mm)	Length (mm)	No. Bases	Height (mm)	Rod \varnothing (mm)	Hole \varnothing (mm)	Depth (mm)
120 / 70 / 40	1000	2	1100	20	48	150
121 / 70 / 40	1500	3	1100	20	48	150
122 / 70 / 40	2000	3	1100	20	48	150



P-Gate

Designed to provide a safe entry / exit point, the P-Gate can be supplied with a P-Bollard or two P-Bollards as a system to provide a fully enclosed walkway.

The gate hinge is designed to swing in both directions however, a stop-piece can be installed to enable opening in a single direction.

The 120mm diameter P-Bollard has tested impact energy of **17,405 joules**



P-Bollard Dimensions			P-Gate Dimensions			Drilling	
Diameter (mm)	Height (mm)	Rod \varnothing (mm)	Length (mm)	Height (mm)	Thickness (mm)	Hole \varnothing (mm)	Depth (mm)
120	1000	30	1100	400	20	48	150



P-Kerb

The P-Kerb protection system is a solid synthetic polymer kerb system that is flush with the ground, 150mm high and available in different lengths.

Easily installed using single fixing points, the P-Kerb is designed to provide optimum impact protection while also stopping the forks of forklifts from penetrating the protection system. It has a range of uses for both internal & external applications.



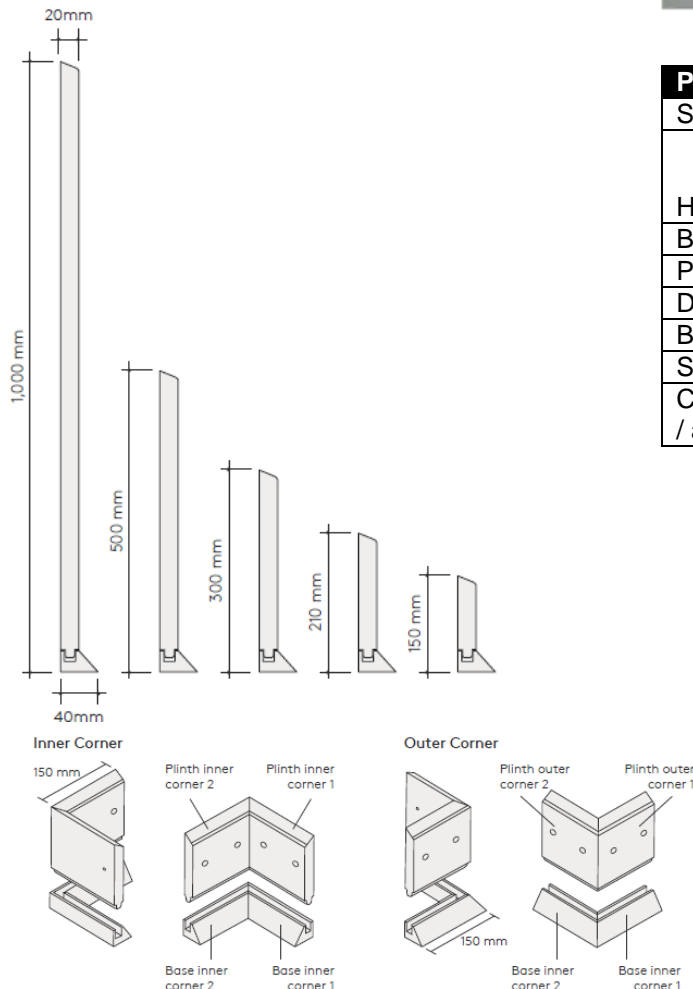
Dimensions				Drilling		
Width (mm)	Length (mm)	No. Bases	Height (mm)	Rod ø (mm)	Hole ø (mm)	Depth (mm)
80	500	2	150	16	38	150
80	1000	2	150	16	38	150
80	1500	3	150	16	38	150
80	2000	3	150	16	38	150



P-Plinth

Manufactured from robust synthetic polymer technology, the P-Plinth is a two piece protective plinth for protection at the base of building corners, columns and walls

Supplied in 2 meter lengths and available in various heights, the P-Plinth is easy to install. Its superior impact resistance makes it ideal for high traffic areas.



Parameter	Measurement
Standard Length	2000mm
Height	1000mm, 500mm, 300mm, 210mm and 150mm
Base thickness (+/- 1mm)	40mm
Plinth thickness (+/-1mm)	20mm
Density	0.91g/cm ³
Breaking elongation	70%
Shore Hardness	72
Chemical resistance - acids / alkalis	Excellent



Service & Support

The team at Polybar Group pride themselves in the service that accompany their products. The services provided are mapped to 5 key stages.

Stage 1. Consultation (free of charge)

A segregation consultation from a Safety Consultant is offered free of charge. This can be either virtually or face to face. The main objective is for the Safety Consultant to understand the customer's needs and for the customer to understand the suitability of Polybar various systems.



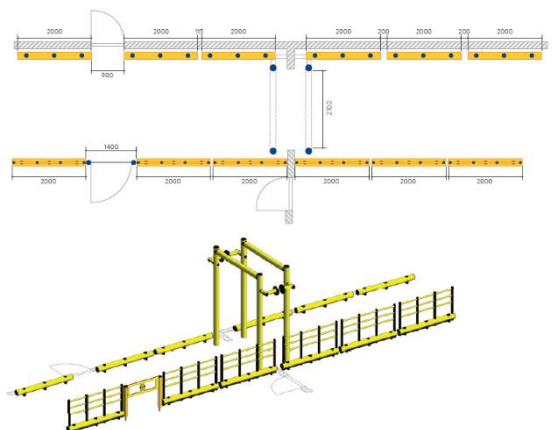
Stage 2. Onsite Survey (free of charge)

Following an initial consultation, a Safety Consultant will carry out an in-depth onsite survey. This will include identifying areas for protection, assessing potential impact forces, measuring and generating a site survey report.



Stage 3. Design & Layout (free of charge)

The Polybar in-house design engineering team will evaluate the site survey report and design an optimum impact protection solution tailored to the customer's needs. This will include a fully detailed layout proposal in 2D or 3D following industry standards (including PAS13 principles) as well as a take-off and quotation.



Service & Support

Stage 4: Installation Training (free of charge)

Prior to installation starting on site, Polybar's Field Service Engineering team provides installation training to the customer's preferred installation team.



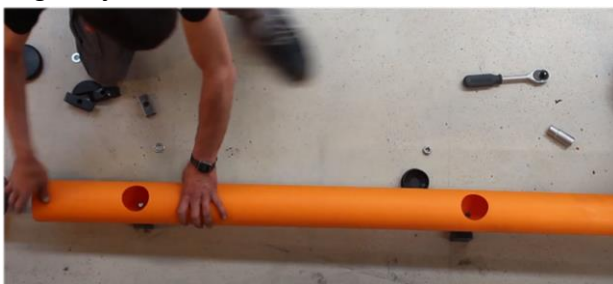
Samples (free of charge)

Small samples can be ordered upon request. The Polybar team can advise delivery time and availability.



Stage 5: Maintenance Packages (Bi-annual cost depending on scope)

Polybar Group offers various ongoing maintenance packages tailored to suit the customer's needs. The service includes inspecting, servicing, testing and cleaning Polybar's synthetic polymer protection systems to ensure they remain fit for purpose and highly visible. Should replacements be required, these will be quoted for separately. Polybar also offers a 'call-out' service should they be required urgently.



Customer Services (free of charge)

Our customer services team are dedicated to providing care and attention to customer needs. Various queries are quickly dealt with that range from order placement to delivery to site. We strive for a world class net promoter score of above 80.



Contact Details

Polybar Group is a trading name for Polybar International Limited.

Scan here for further information:



E: info@polybargroup.com

www.polybargroup.com

Care has been taken to ensure that the contents of this publication are accurate, but Polybar Group and its subsidiary companies do not accept responsibility for errors or for information that is found to be misleading. Suggestions for, or description of, the end use or application of products or methods of working are for information only and Polybar Group and its subsidiaries accept no liability in respect thereof.

