

Flexicon Capabilities

We are focused on bringing customers the best solutions and technologies to solve their Cable Protection requirements.



Our knowledge, skills and expertise allows us to offer the ultimate solutions for technically demanding applications. We have been protecting performance and safety critical power and data cabling installations for many years across the world.

“We specialise in protecting your Cables from hazards for now and for the future”



Quality Assurance, Testing & Manufacturing

We take testing seriously. Don't just take our word for it. With a dedicated design team, we work at the forefront of material technologies and industrial design to deliver solutions that work not only for today but also for the long term. Our Engineers use their extensive knowledge to drive innovation and develop the future today.

Flexicon have invested in and committed to extensive independent testing for our Products combined with Quality Audits for our Manufacturing Processes including the International Railway Industry Standard (IRIS), giving you the confidence that our systems do what we say they do.



We extensively test our products to ensure that our product performance is as you would expect from a leading British Manufacturer. We understand the importance and potential consequences of product failure therefore we test our products far beyond the performance requirements of the certifications and approvals we have.



Global Presence

With a Global reach, we work closely with customers to become part of their supply chain. We know how important it is to work with suppliers who offer support, expertise and guidance.



Our products have been installed in all 7 continents, and we currently distribute through approved partners to over 55 different Countries.

Our Flexicon PTY subsidiary is a dedicated Sales and Distribution operation in Australia and New Zealand, well placed to serve the ANZ Markets.

Our sister company AFC Cable Systems provide stock and local support in the North American markets.

FLEXICON
FLEXIBLE CONDUIT SOLUTIONS



International & National Conduit Standards

- BS EN IEC 61386-1 Conduit Systems, generally accepted worldwide other than North America
- BS EN IEC 61386-23 Flexible Conduit Systems
- BS EN IEC 61386-22 Pliable Conduit Systems
- AS/NZS 2053, Australia and New Zealand but based on IEC 61386
- UL 1660, Non-metallic UL listed conduit for North America
- UL 360, Metallic UL listed conduit for North America
- UL 514B, UL listed conduit fittings for North America
- UL 1669, Non-metallic UL recognised conduit systems for North America





Tested to extremes

Rail - Ingress Protection

High levels of Ingress Protection is a critical requirement of installations in the Rail Industry. Whether this is from the weather in the form of rain or flooding, or from brake dust in Underground applications.

“Flooding is one of the most extreme forms of hazards for electrical systems. If product is submerged Ingress Protection becomes critical”

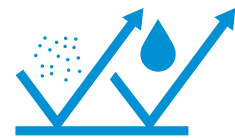
Applications demand “over and above” standard IP tests

Ingress protection is normally tested using EN IEC 60529, with the levels of protection given by a 2 digit code.

IP68 1st digit – protection against solid objects and dust

IP68 2nd digit – protection against water

IP tests to EN IEC 60529, give an indication of system performance but they are very short tests on samples that have been assembled under ideal laboratory conditions, at room temperatures and in straight lengths.



Durations and application of these tests are;

- IPx4, 5 minutes light spray similar to a shower head
- IPx5, 3 minutes medium spray similar to a garden hose
- IPx6, 3 minutes high pressure jet similar to a fire hose
- IPx7, 30 minutes 1 metre immersion under water
- IPx8, immersion at a pressure and time decided by the manufacturer
- IPx9, 2 minutes high pressure hot water similar to a steam cleaner

Other potential Hazards to consider

When it comes to protecting Safety and Performance Critical Cabling, we have listed some of the potential hazards to consider in Rail applications.

Abrasion

- Process of scraping or wearing something away



Chemical resistance

- Reaction to different compounds or substances



Crush / Compression

- Forces applied to cause deformation



Fire

- Destructive burning



Lightning Strike

- Damaged caused by natural electrical discharge



Impact

- Sharp or blunt forces which could cause damage



Tensile Strength

- Resistance to conduit being pulled from the fitting



EMC

- Electromagnetic Compatibility



Integrity • Strength • Assurance

“Flexicon Ultra™ has been tested to IP68, submerged at a depth of 1 metre for a period of 3 days at min bend radius”



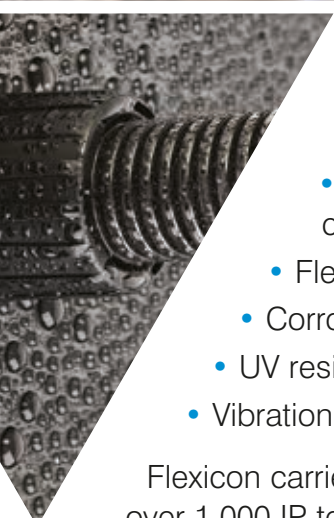
Tested beyond the Standard

Water may be present as rain, condensation, immersion including flooding, spray, jet wash cleaning, ice formation and melting. Suction can be created by rise and fall of temperature although conduit systems are normally vented to atmosphere through at least one end. A vented conduit system has advantages over a sealed enclosure with cable glands as the conduit allows the air inside the enclosure to expand and contract with temperature changes.

In conjunction with some of our major rail customers we have completed more onerous testing than the standard tests required to give the customer confidence that true performance adequately represented real life installations.

- IPx8 carried out at 2 bar for 1 hour at minimum bend radius
- IPx8 carried out at 1 metre under water for 72 hours at minimum bend radius
- IPx8 carried out under water and ice at minimum bend radius for 5 cycles of; 10 hours at -15°C followed by 5 hours at +40°C
- Flexing conduit under water for 5 days (exhibition display)
- Corrosion resistance - 1,000 hour salt spray testing to EN ISO 9227 NSS @ 35°C
- UV resistance - up to 21,000 hours testing using xenon arc
- Vibration and shock-testing to EN 61373 category 2, bogie mounted

Flexicon carries out extensive water ingress testing in house. For the Ultra system, over 1,000 IP tests were conducted to ensure that every conduit in every size, weight and material were checked with every type of fitting to ensure the integrity of the system. External test reports were then commissioned to confirm our in-house test results.



UV

- Resistance to Ultra Violet Radiation



Corrosion

- Damage caused to materials based on chemical reaction



Grazing animals / Vermin or pests

- Livestock
- Sharpening of teeth and searching for food



Vibration & Shock

- Shaking or sudden movement



Theft & Vandalism

- Stealing, unauthorised removal or deliberate damage



Fatigue Life

- Weakness caused by repeated variations of stress or continuous and repeated movement



Temperature

- Intensity of heat present - high or low. Rapid changes of temperature



Salt Water

- Prolonged exposure can cause dezincification (Corrosion)





Rail - Fire Performance

The reaction of products in the event of a fire is critical when it comes to effective product specification. There are recognised national and international standards related to products performance and reaction to fire. Flexicon can offer a wide range of conduit systems which have been independently tested.

At Flexicon we define a Low Fire Hazard product as having all of the following properties:

Highly Flame Retardant

to prevent a fire starting or limit its development if one does start.

Low Smoke

emission in the event of a fire to enable people to see their way to escape.

Low Toxicity

in the event of a fire to ensure people are not overcome during their escape.

Halogen Free

gives an indication of low smoke and low toxicity. It also rules out halogen acid gas emission - a fact that is of interest to insurers as acid smoke can destroy computer equipment and damage the structure of a building. Halogens are Fluorine, Chlorine, Bromine and Iodine.

Rail Industry Standards

Our product development programme involves extensive testing to the latest Rail Industry standards to ensure the safety of our products, thus providing confidence for specifiers and consultants when it comes to their reaction to fire.

- EN 45545-2 - European Fire Safety
- NFPA 130 - North American Standard
- AS/NZS 1530.3 - Australian Standard
- Russian Fire Safety Certificate - 1374363
- TFL S1085 - UK Underground Standard

EN 45545-2 European Fire Safety Standard

This new European standard is rapidly replacing national standards in Europe and consists of 7 parts.

- **Part 1: General**
- **Part 2: Requirements for fire behaviour of materials and components**

For Part 2, product groups are required to meet a set of performance requirement levels (R1 to R26), conduit performance **R22 is for interior parts** and **R23 is for exterior parts**. There are also three defined levels of performance related to the reaction of fire, HL1, HL2 and HL3.

HL3 is the highest level of performance when it comes to the reaction to fire and will be specified for higher risk applications.

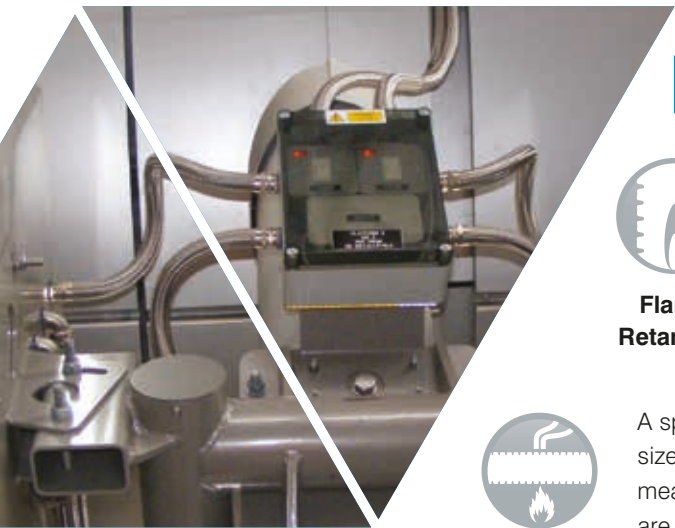
The required HL level is given from a matrix of Operational Category of the track and Design Category of the train.

Flexicon EN 45545-2 conduits meet HL3 for both internal and external use.



				HL1	HL2	HL3
R22 Internal use	T01 EN ISO 4589-2: OI	Oxygen Content %	Minimum	28	28	32
	T10.03 EN ISO 5659-2: 25 kWm-2	Ds max. dimensionless	Maximum	600	300	150
	T12 NF X70-100-1 and -2, 600° C	C/TNLP dimensionless	Maximum	1.2	0.9	0.75
R23 External use	T01 EN ISO 4589-2: OI	Oxygen Content %	Minimum	28	28	32
	T10.03 EN ISO 5659-2: 25 kWm-2	Ds max. dimensionless	Maximum	-	600	300
	T12 NF X70-100-1 and -2, 600° C	C/TNLP dimensionless	Maximum	-	1.8	1.5

Low Fire Hazard systems are required to protect the public, personnel and property in the event of a fire and are demanded by Specifiers, Industry Bodies, Train and Network Operators, Fire Services and even Insurers.



Assessing Fire Performance



Flame Retardant

To assess how flame retardant a material is, the defined test method is to measure the Limiting Oxygen Index (LOI) according to BS EN ISO 4589-2 which determines the percentage of oxygen that needs to be present to support combustion. The higher the LOI percentage, the greater the flame retardancy of the material. Oxygen present in normal air is approx. 21%.



Smoke

A specified sample of material is burnt under controlled conditions in a given size smoke chamber and the smoke obscuration of a defined beam of light is measured. Although the different tests are similar, the results and the requirements are different. The lower the smoke density, the more efficient evacuation and safety for fire fighting becomes.



Toxicity

A specified sample of material is burnt under controlled conditions in a given size smoke chamber and the fumes are analysed for various gases, the concentration of each gas is then multiplied by its toxic potency to give a toxicity index. If halogens, sulphur or phosphorus are present in a material, it is unlikely to pass the low toxicity tests.



Halogen Free

Halogen based materials give off highly toxic fumes and often thick smoke. A material cannot be considered as Low Fire Hazard if it contains halogen. However a halogen free material is not necessarily Low Fire hazard as it may not be low toxicity, low smoke and highly flame retardant. Halogen content is assessed by various chemical tests and analytical techniques.

Simple classifications of performance from Flexicon...



Inherently Low Fire Hazard

These products are made entirely from metals so there is no non-metallic material to burn or create smoke or toxic fumes. Inherently Low Fire Hazard products include; FU, SSU, FB, FUSBS, FTCS, FSS, FSSBRD and metal fittings.



Extra Low Fire Hazard

These products have a Limiting Oxygen Index of greater than 32% as well as being low smoke and low toxicity.

Extra Low Fire Hazard products include; LFHU, LFHUBRD, LTPLFH, LTBRDLFH, LFHP, FPR, FPRSS, FPIHR, FPIHRSS and FPRTC.

LOI	Conduits	
35.9%	FPIHR & FPIHRSS	
37.0%	FPR, FPRSS & FPRTC	
48.3%	LFHU, LFHUBRD, LTPLFH, LTBRDLFH & LFHP	



Standard Low Fire Hazard

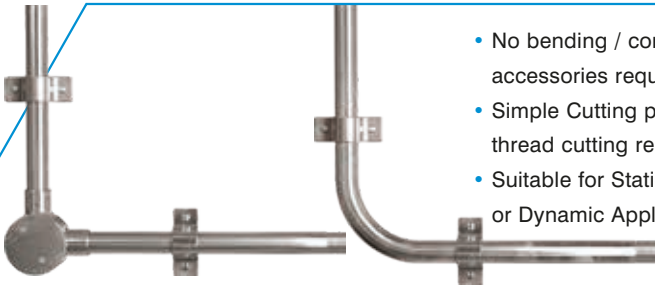
These products have a Limiting Oxygen Index of greater than 26% as well as being low smoke and low toxicity. Standard Low Fire Hazard products include; FPAS, FPAH, FPI, FPISS, FPIH, FPIHSS and PA66 fittings.

Benefits of using flexible conduit...

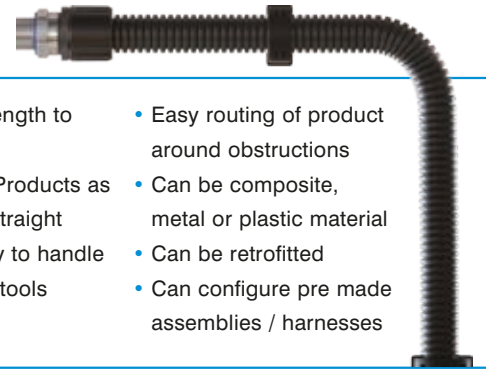
Providing an inherent mechanical barrier for cabling, Flexible Conduit offers more than just protection for Cables and Installations. It allows users and specifiers to do things differently, challenging traditional installation practices and offers unrivalled product performance.



Flexible Conduit vs Rigid Conduit



- No bending / corner accessories required
- Simple Cutting plus no thread cutting required
- Suitable for Static and / or Dynamic Applications
- Improved strength to weight ratio
- Long Coiled Products as opposed to Straight lengths - easy to handle
- No specialist tools required
- Easy routing of product around obstructions
- Can be composite, metal or plastic material
- Can be retrofitted
- Can configure pre made assemblies / harnesses



Flexible Conduit vs Cable Glands

- Can group multiple cables in one system meaning less terminations
- Reduced physical glanding space required for termination of cables
- Reduced risk of system failure due to fewer points of entry
- Can replace faulty cables without replacing entire System
- Can upgrade and add circuits with ease
- Fitting does not have to compress the cable to ensure sealing
- Can be retrofitted with ease
- Suitable for use with multiple cable types
- Quicker to install
- Conduit fittings offering strain relief available
- No need for specialist cables



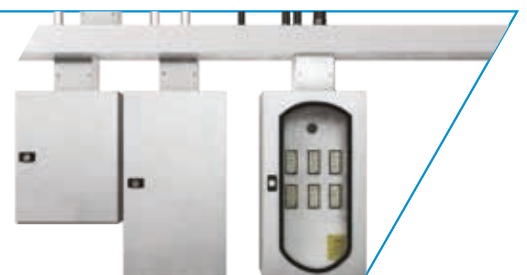
Flexible Conduit vs Armoured Cables



- Simple Cutting - easier assembly
- Can combine multiple cable types in one system using off the shelf products
- Can make quick changes / upgrades to circuits within existing system
- Easy routing of cables with different bend radius
- Can replace faulty cables without replacing entire system
- Suitable for Static and / or Dynamic Applications
- Can be retrofitted
- Swivel thread fittings available to ease Installation
- Mechanical protection provided by the Conduit - no need for specialist cables
- Easier termination of glands

Flexible Conduit vs Trunking

- Coiled Products as opposed to lengths
- Easy routing of product
- Can be retrofitted
- Quicker to install
- No requirement for additional fittings to create a bend
- Simple Cutting
- Simple termination
- Suitable for Static and / or Dynamic Applications



- Simplicity
- Speed of Installation
- Lifetime Solution
- System Integrity

Realise the Benefits of using Flexible Conduit...

Simplicity

- No need for Specialist Cables
- Standard & Single Core Cables can be grouped and protected in one system
- Less Product Inventory in the Supply Chain



Speed of Installation

- Combining cables mean less cable entry points / terminations
- Ease of fixing with various securing options
- No special tools required



Lifetime Solution

- Can easily add circuits throughout the life of the installation
- Easily accommodate changes as the installation needs change
- Off the shelf products



System Integrity

- Properties of the conduit can be matched to the potential hazards of the installation
- Reliable solution for protection of critical cabling
- Light weight product



Applications in Rail

Flexicon offer a range of products for this technically demanding sector. IP ratings, tensile strength characteristics, weight, corrosion resistance, fire performance properties and operating temperature ranges are all factors to consider.



Exterior Vehicle

- FPIHR
- FTCEB
- Flexicon ULTRA™ Fittings

CCTV

- LFHUBRD
- FSS
- FSB fittings
- FSSBRD
- LFHU

Passenger Information Systems

- LFHU
- FUSSEB
- LFHUBRD
- FSB Fittings

Lighting

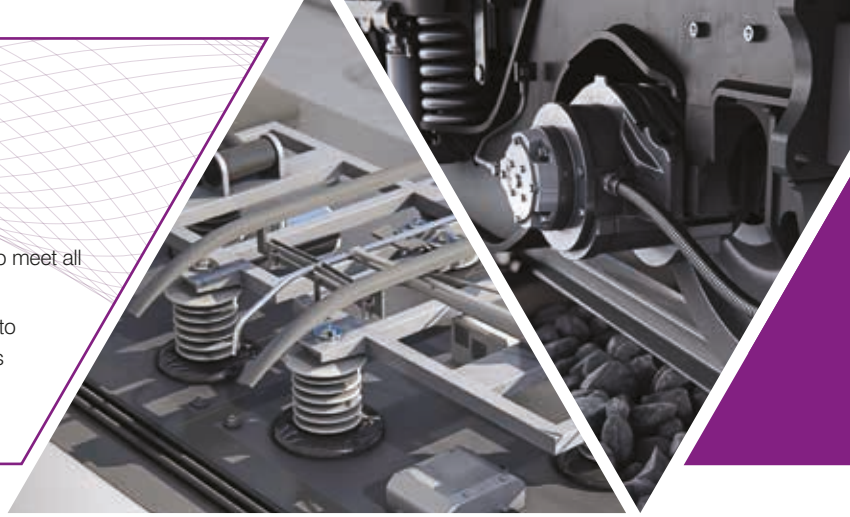
- FUSSEB
- LFHUBRD
- FSS and FSSBRD
- FSB Fittings

Tunnels

- LFHU
- FPR
- LTPLFH
- FSSBRD
- FSS

Rolling Stock and Infrastructure

- High performance products offering superior tensile and impact / compression strength
- Designed to meet the strictest standards – EMC testing /vibration
- Vibration proof
- Wide product range to meet all applications
- Independently tested to the relevant standards
- Anti-tamper



Inter Vehicle Jumper Applications

- FPIHR
- Flexicon ULTRA™ Fittings



Interior Vehicle Applications

- FPR
- FPA
- FTCB
- Flexicon ULTRA™ Fittings



Platform Trackside Power & Signalling

- FPAH
- Flexicon ULTRA™ Fittings
- FPIH



Bogies & Control System

- FPIHR
- Flexicon ULTRA™ Fittings
- FTCB



Auto Couplers

- FPIHR
- Flexicon ULTRA™ Fittings





Rolling Stock Product Testing & Approvals

“This technically demanding sector presents numerous challenges when it comes to product performance and compliance to the relevant standards.”

Alstom Worldwide Approval

Flexicon has earned worldwide approval under Alstom global component parts listing. This includes Flexicon's true one piece Ultra™ gland range that gives the quickest and most reliable interconnection when terminating on to Flexicon's non-metallic Flexible Conduits.

Alstom first carried out mechanical tests on our samples to satisfy themselves of the mechanical performance. Alstom then stated that they were not satisfied that the standard IP testing to EN60529 as the tests did not adequately represent their applications. IP67 1m under water for 30 minutes was far too short a time and IP68 (2bar pressure for 1 hour, equivalent to 20m under water) was of little interest - if the train was 20m under water there would be bigger problems than water ingress into the conduit system. Alstom required 1m under water for 72 hours for straight conduit and then again at minimum bend radius, Alstom also insisted on making up the samples and carrying out the tests themselves.



A 1 million reversed cycling test was conducted to confirm the fatigue life of the conduit and the fittings, fully loaded with cables, to represent 35 years service life for inter-carriage jumpers on the most onerous track, line 11 of the Paris Metro. After the test the conduit was taken apart to check for any wear of the conduit or fittings on the cable and cable on the conduit and Flexicon's product showed no signs of failure.



Rolling Stock Reference Projects



Russia - Rail Car Refurbishment

Metal braided conduits with fittings, along with Nylon FPR Conduit with FPAX fittings systems were used on the refurbishment of rail cars.

Dubai - Metro

Nylon FPIHR Conduit and Ultra brass threaded fittings were used on the roof of the carriages for the systems high IP rating and fire performance properties.

China - High Altitude Rail Link

Plastic coated steel conduits was used on vehicles under-frame harness applications that required properties for low temperature and high impact resistance.

United Kingdom - Train Renovations

Stainless Steel braided Nylon 6 FPRSS conduit and fittings were used for the installation of under vehicle harness assemblies requiring EMC screening and high IP ratings.

Indonesia - EMC on Passenger Coaches

LTBRDP liquid tight conduit and LTP fittings were used under the trains for the EMC screening performance. Nylon FPAS Conduits and FPAX fittings were also used where high IP ratings were required.

Australia - New Vehicle Builds

Liquid tight, high temperature, Halogen free conduit systems were used on new rail vehicle builds.

United Kingdom - Refurbishment & Maintenance

Nylon 6 & 12 conduits FPR and FPI with FPA fittings were used within an out of warranty repair and overhaul project.

Czech Republic - Carriage Installations

Nylon 6 & 12 conduit systems for carriage installation both interior and exterior use.





Rolling Stock

Whether it is high speed travel over long distances, regional transit with repeated short journeys or true power solutions such as locomotives to move large masses of material & freight, we have the most reliable Cable Protection solutions to ensure safety and reliability for all types of Rolling Stock.



High Speed



Intercity



Urban & Regional Trains



Metro



Trams & Trolleybuses



Monorail



Locomotives















Key considerations

- Reliability
- Service life
- Ease of maintenance
- Standards & compliance
- Operating environment

“Flexicon have a proven track record in protecting Safety & Performance Critical Cabling”



Typical hazards & product considerations



- | | | | |
|--------------------------------|---|----------------------------|---|
| • Fire Performance |  | • Strength to Weight ratio |  |
| • Ingress Protection |  | • Flexibility |  |
| • Vibration & Shock Resistance |  | • Fatigue Life |  |
| • Temperature |  | • Abrasion Resistance |  |
| • Impact |  | • Chemical resistance |  |
| • UV Resistance |  | • EMC |  |



Standards



Typical Products

- | | | | |
|--|---|---|--|
| <p>30</p>  <ul style="list-style-type: none"> • FPR - PA6 Corrugated | <p>31 NEW</p>  <ul style="list-style-type: none"> • FPIHR - PA12 Corrugated | <p>52</p>  <ul style="list-style-type: none"> • FPRSS - Stainless Steel Overbraided PA6 Corrugated | <p>70</p>  <ul style="list-style-type: none"> • LFHU - LFH Coated Galvanised Steel |
| <p>73</p>  <ul style="list-style-type: none"> • LTBRDP - Galvanised Steel with Galvanised Steel braid, PVC cover | <p>44 NEW</p>  <ul style="list-style-type: none"> • FPAU - Range of fittings with or without metal threads | <p>61 NEW</p>  <ul style="list-style-type: none"> • F-Clamps and Fixing Accessories | |



Rail - Rolling Stock Applications

Passenger safety and operational integrity are vital characteristics of a modern rail network.

We know and appreciate the various challenges involved in achieving compliance to the latest industry legislation, managing and controlling risk, making procurement more efficient whilst striving for continuous improvement across the entire railway system.

Inside Carriages / Passenger Zones



FPR Conduits

- Modified PA6 conduit offering excellent Fire Performance
- Light weight
- High Tensile strength
- Vibration resistant



- Flexicon ULTRA™ - nylon thread
- Flexicon FPA - nylon thread



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Carriage Lighting



FPR Conduits

- Modified PA6 conduit offering excellent Fire Performance
- Light weight
- High Tensile strength
- Vibration resistant



- Flexicon ULTRA™ - nylon thread
- Flexicon FPA - nylon thread



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Carriage TV Screens



FPR Conduits

- Modified PA6 conduit offering excellent Fire Performance
- Light weight
- High Tensile strength
- Vibration resistant



- Flexicon ULTRA™ - nylon thread
- Flexicon FPA - nylon thread



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Under Carriages / Bogies



FPIHR Conduits

- Modified Heavy Duty PA12 conduit offering excellent dynamic performance with flexibility & fatigue life combined with Fire Performance.
- Excellent UV resistant & high impact strength even at low temperatures
- Excellent Ingress Protection integrity when used with Flexicon ULTRA™
- High Tensile strength & Vibration resistant



- Flexicon ULTRA™ - metallic thread
- Flexicon ULTRA™ - metallic thread with strain relief



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Above Carriages



FPIHR Conduits

- Modified Heavy Duty PA12 conduit offering excellent dynamic performance with flexibility & fatigue life combined with Fire Performance.
- Excellent UV resistant & high impact strength
- Excellent Ingress Protection integrity when used with Flexicon ULTRA™
- High Tensile strength & Vibration resistant



- Flexicon ULTRA™ - metallic thread
- Flexicon ULTRA™ - metallic thread with strain relief



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Intercar Jumpers



FPIHR Conduits

- Modified Heavy Duty PA12 conduit offering excellent dynamic performance with flexibility & fatigue life combined with Fire Performance.
- Excellent UV resistant & high impact strength even at low temperatures
- Excellent Ingress Protection integrity when used with Flexicon ULTRA™
- High Tensile strength & Vibration resistant



- Flexicon ULTRA™ - metallic thread
- Flexicon ULTRA™ - metallic thread with strain relief



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Couplings



FPIHR Conduits

- Modified Heavy Duty PA12 conduit offering excellent dynamic performance with flexibility & fatigue life combined with Fire Performance.
- Excellent UV resistant & high impact strength even at low temperatures
- Excellent Ingress Protection integrity when used with Flexicon ULTRA™
- High Tensile strength & Vibration resistant



- Flexicon ULTRA™ - metallic thread
- Flexicon ULTRA™ - metallic thread with strain relief



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Infrastructure Installation Track Record



TRANSPORT
FOR LONDON
EVERY JOURNEY MATTERS



“Flexicon have the most LUL approved products of any Flexible Conduit Manufacturer”

Redevelopment of London's Blackfriars Tube Station

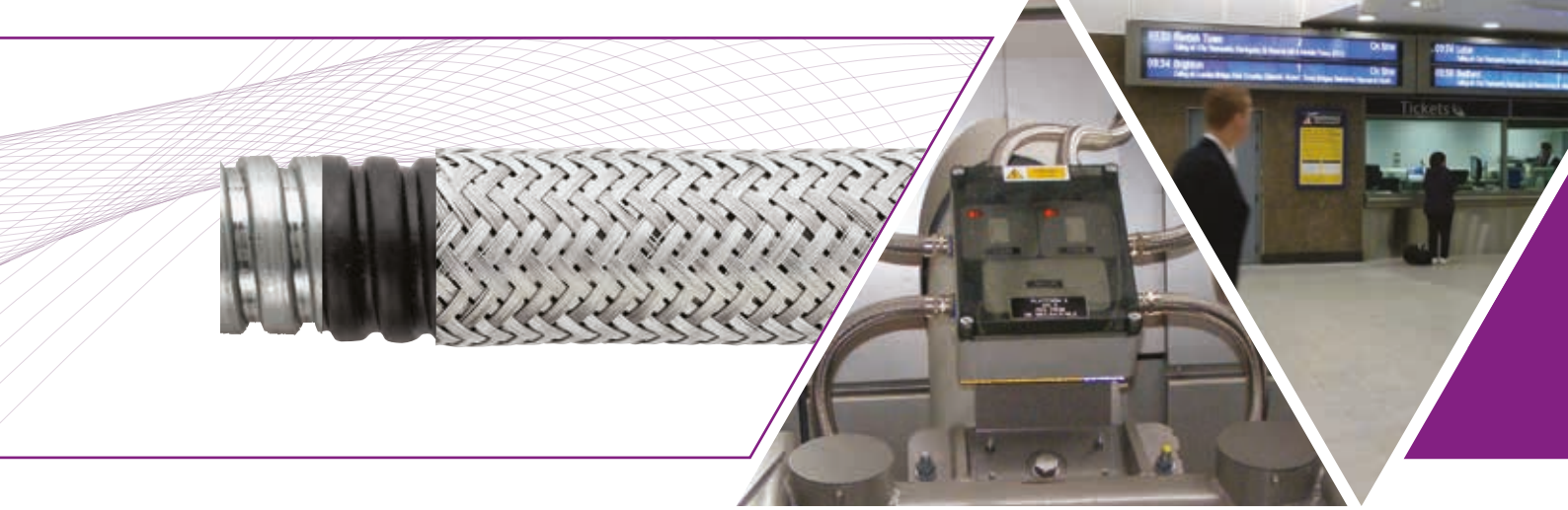
Balfour Beatty used Flexicon's flexible conduit to protect all of the cabling for lighting, power, signalling and communications for the major redevelopment of Blackfriars station.

The project included the creation of a common entrance at the north end of the rail bridge spanning the River Thames, increasing the length of the platforms to accommodate 50 percent longer trains, the refurbishment of the underground station and the construction of a new station on the South Bank of the Thames. The station was the first one to span the entire width of the River Thames and features 4,400 of photovoltaic panels producing over 1MW of electricity.

All of the services had been left visible as part of the design, so Flexicon's LFHUBRD flexible conduit had been specified since its grade 316 stainless steel overbraid provides both protection and aesthetic appeal. The system has high abrasion resistance and high mechanical strength, is highly flexible and has an ingress protection rating of up to IP65.

In addition, the flexible conduit meets all of Transport for London's fire requirements, with details listed on LUL product registration certificate no. 297. As a low fire hazard product, it is highly flame retardant, has low smoke emissions, low toxicity and is halogen free. It also provides EMC screening, which is vital for communications and signaling.





Thameslink - Infrastructure Improvements

Linbrooke Services had specified and installed a flexible conduit system from Flexicon to protect power and data cabling for a passenger signage system as part of the Thameslink high capacity infrastructure improvements. The aim of the new system was to facilitate swift movement of passengers off and onto trains to minimise dwell time. It is vital in ensuring that people are on the right platform, at the right time and are standing in the right position.

There is signage in every area of the station to direct passengers to the correct platform and then screens right along the length of the platform to help spread passengers out for a 12 carriage train. It is part of a real time prediction system that uses data from a number of sources to accurately predict the arrival of trains, which is used to analyse what this means to the overall train service at a station and then communicate this to passengers so that they can plan their journey.

The company selected Flexicon's LFHUBRD metallic conduit, which has a galvanised steel core, extra low fire hazard coating and a stainless steel overbraid. It provides EMC screening for data cabling and with its high tensile strength, crush and abrasion resistance will resist any potential vandalism. Its stainless steel overbraid also makes the conduit visually attractive to the viewing public.

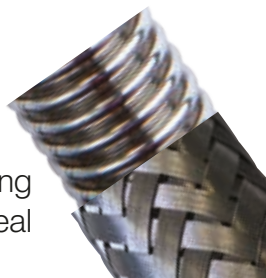
Europe's Largest Infrastructure Project - Crossrail

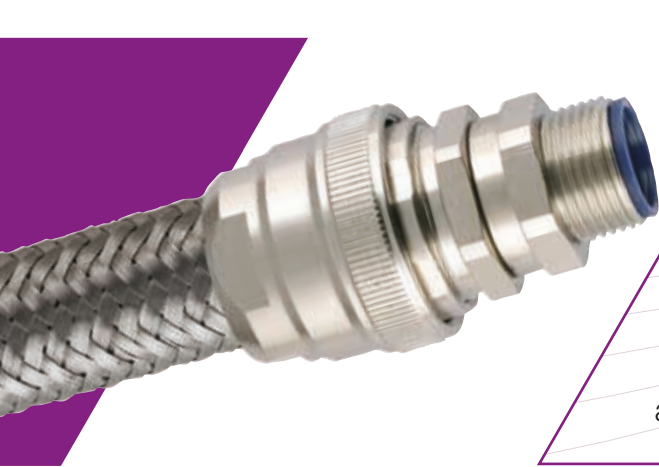
The £14.8 billion Crossrail project is Europe's largest infrastructure project and brings an extra 1.5 million people to within 45 minutes of central London. Power and data is vital for operational efficiency and critical safety systems. With so many people using the new Elizabeth line, it is vital that the cabling is protected not just from day one but for the lifetime of the installation.

Cable protection from Flexicon is used for all lighting, small power, CCTV and audio systems in both the general public and back office areas and for the Platform Edge Screen (PES) that separates the station from the track area.

The main requirements for the cable protection system were to protect cabling from vandalism, provide ingress protection of up to IP68 and meet the stringent fire safety standards for sub-surface rail installations. For public facing areas the conduit had to also meet the aesthetic requirements of the installation.

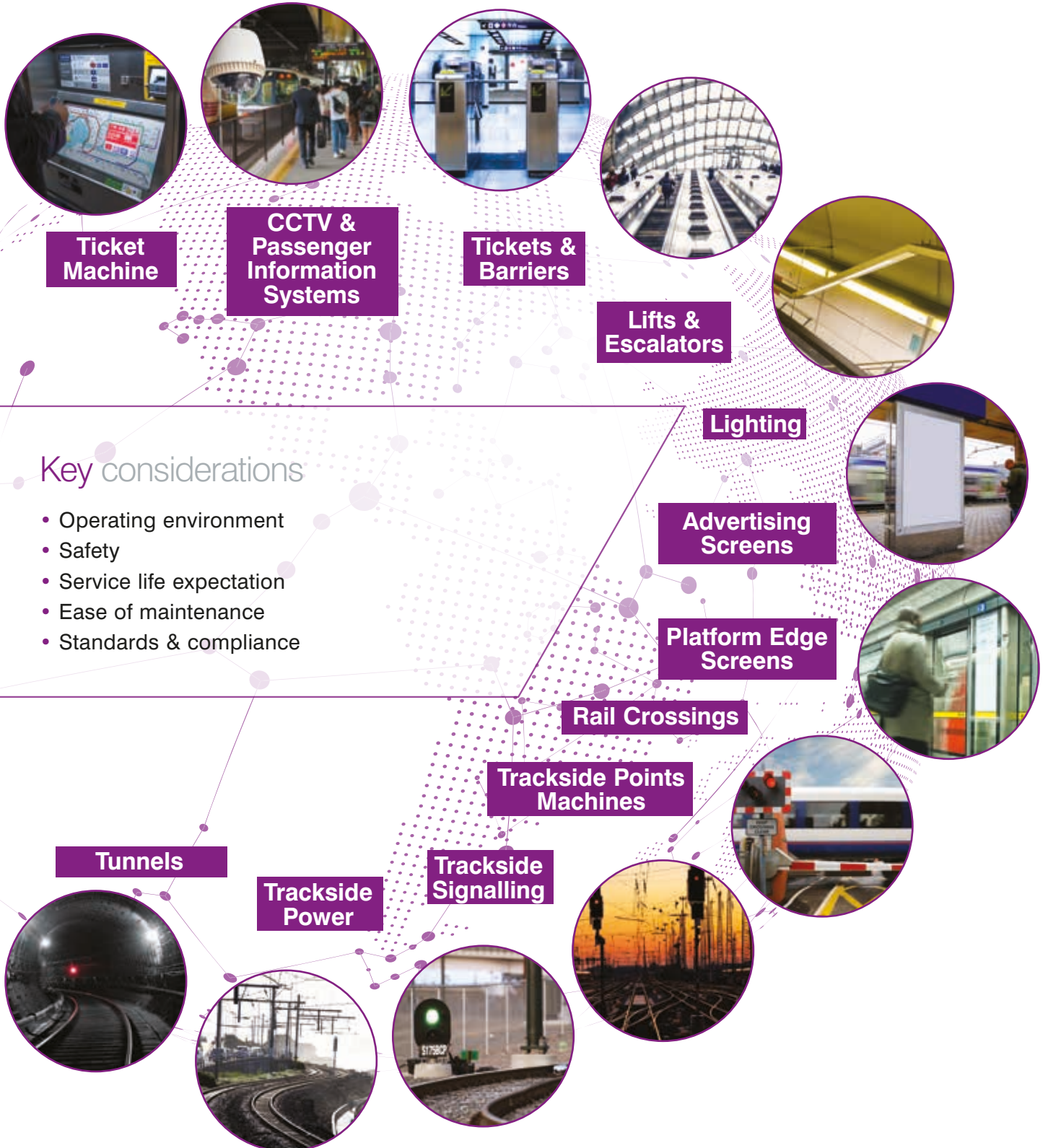
Back office areas used Flexicon's new FSS stainless steel corrugated conduit. Public facing areas use either FSSBRD, which has a stainless steel over braid for added aesthetic appeal or the specially developed all metallic black stainless-steel conduit called FSS black.





Infrastructure

Whether it is Passenger Information systems, Station Lighting, CCTV and Passenger Safety, Trackside power & signalling, train monitoring & information systems or tunnels, our products provide ideal Cable Protection for infrastructure and track related installations to ensure safety and reliability.



Key considerations

- Operating environment
- Safety
- Service life expectation
- Ease of maintenance
- Standards & compliance

Typical hazards & product considerations

• Fire Performance



• Strength to Weight ratio



• Ingress Protection



• Flexibility



• Vibration & Shock Resistance



• Fatigue Life



• Temperature



• Abrasion Resistance



• Impact



• Chemical resistance



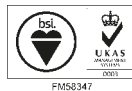
• UV Resistance



• EMC



Standards



Typical Products



• LTPLFH - LFH Coated Liquid Tight



• LFHU - LFH Coated Galvanised Steel



• FSS - Stainless Steel Corrugated



• FSSBRD - SS Corrugated with SS overbraid



• LFHUBRD - LFH Coated Galvanised Steel with SS Overbraid



• FPRSS - Stainless Steel Overbraid PA6 Corrugated



• LTPPU - Polyurethane Coated Liquid Tight



• FPR - PA6 Corrugated



Infrastructure Applications

Passenger safety and operational integrity are vital characteristics of a modern rail network.

We know and appreciate the various challenges involved in achieving compliance to the latest industry legislation, managing and controlling risk, making procurement more efficient whilst striving for continuous improvement across the entire railway system.

Security Systems (CCTV) & Lighting



LFHUBRD Conduits

- Galvanised Steel Conduit with Low Fire Hazard coating and a Stainless Steel overbraid offering excellent mechanical strength, EMC screening, Aesthetic appearance and good Ingress Protection.



Lifts and People Movers (escalators)



LFHU Conduits

- Galvanised Steel Conduit with Low Fire Hazard coating offering excellent mechanical strength and good Ingress Protection.



Passenger Information Systems



LFHU Conduits

- Galvanised Steel Conduit with Low Fire Hazard coating offering excellent mechanical strength and good Ingress Protection.





Passenger Information



FSS & FSSBRD Conduits

- Stainless Steel Conduit offering inherent Fire Performance, high Ingress Protection and corrosion. Braided option also available for enhanced EMC screening.



Trackside Signalling



FPIH Conduits

- Heavy duty PA12 conduit offering excellent UV resistance and high impact strength. Suitable for outdoor areas offering superior Ingress Protection, corrosion resistance and anti-vibration performance. Can be combined with FTCB to achieve EMC performance.
- For Network Rail approved Conduits and Fittings, see page 56

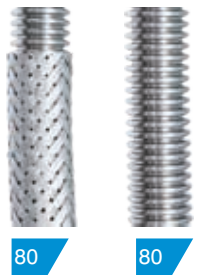


Tunnels



FSS & FSSBRD Conduits

- Stainless Steel Conduit offering inherent Fire Performance, high Ingress Protection and corrosion. Braided option also available for enhanced EMC screening.



Ticketing



LFHU Conduits

- Galvanised Steel Conduit with Low Fire Hazard coating offering excellent mechanical strength and good Ingress Protection.



Rail Infrastructure - Signalling Power Distribution Systems



“Use in new and upgraded Signalling Power Distribution Systems in accordance with NR/L2/SIGELP/27410”

Benefits of Flexicon's unique offering for SIN 119

Safety and reliability of the Rail Infrastructure network is paramount. Network Rail's ongoing challenge to achieve SIN 119 compliance has created the need for new solutions and techniques to remove potential dangers for the maintenance and management of 650V Signalling Power Distribution Systems in accordance with NR/L2/SIGELP/27410.

Flexible Conduit provides an ideal solution for new and existing equipment identified for upgrade and is fully compliant to NR/L2/SIGELP/27421 and NR/L2/SIGELP/27422 for use in Class II Based Signalling Power Distribution Systems.

NetworkRail

PA05/06589

Flexible Conduit Systems

- Flexible Insulating Conduits with a dielectric withstand of 3.5kV in accordance with NR/L2/SIGELP/27421

Conduit Glands

- Conduit Glands in accordance with NR/L2/SIGELP/27422
- Universal End of Line Gland
- True one piece

Accessories

- Range of fixing accessories and mounting equipment for Flexible Conduits



UK

NetworkRail

PA05/06589



Compliant Conduit

56



• NRFPAS

56



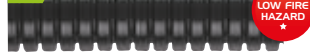
• NRFPAH

56



• NRFPFR

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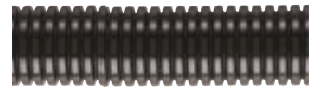


• NRFPPIH

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• NRFPPIHR



• NRFPADS

Compliant Fittings and Accessories

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• NRFPAU

58



• NRFP4U45

58



• NRFP4U

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• NRFPAX-FPAX

60



• NRFP4U EOL

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• NRFCCL

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• NRDLMP

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• NRDLMP90

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• NRFCCLAMP

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• NR FCCLAMP KIT

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• NRREC

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• NRCC01

Flexicon warrant resistance to UV degradation

Our range of Network Rail PADS approved products have been extensively tested to warrant that the product performance will not suffer from significant mechanical deterioration from ultra violet exposure for a period of 35 years in the UK from the purchase date of the product.

