



# Why use flexible conduit?

What would happen if your Cabling failed? In today's modern world there is an underlying trend towards more intelligent and automated systems driven by safety, efficiency and functionality. Flexible Conduit is the ideal solution to protect People and Personnel, Property and Processes.

## Understanding all the hazards?

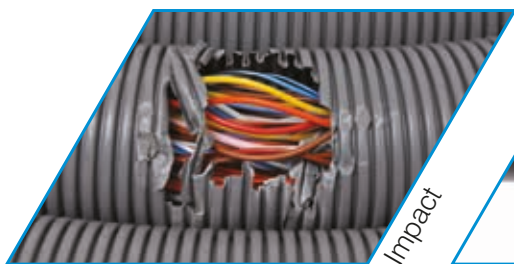
**Risks and hazards to cabling can vary significantly based on application, operating environments and conditions, hence one system does not necessarily suit all.**

We understand the performance properties of our products & solutions and can minimise your risk. We offer application guidance and expert advice whatever your challenges.

Incorrect Specification could lead to critical failures for your Cabling and Installation.



Don't take chances when it comes to your Cable Protection...



Impact



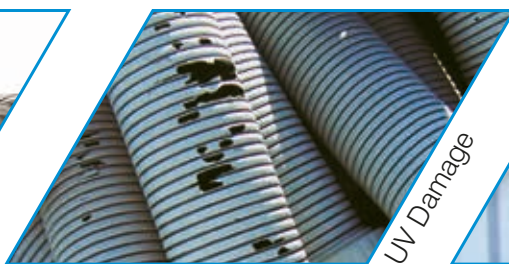
Impact



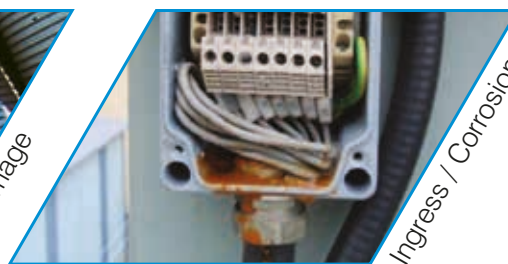
Tensile



Impact



UV Damage



Ingress / Corrosion

“whatever your application, we've got it covered...”

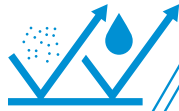
# Potential Hazards to consider

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



## Ingress Protection

- Penetration of solid objects, dust, liquid or steam



## Chemical resistance

- Reaction to different compounds or substances



## Impact

- Sharp or blunt forces which could cause damage



## Micro-organisms & Bacteria

- Danger from build up of bacteria, virus and fungus



## Crush / Compression

- Forces applied to cause deformation



## Static charge

- Build up on objects that cannot conduct a current



## Temperature

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



## Explosive Gases / Dust

- Substance that can be made to explode



## Fire

- Destructive burning



## Condensation

- Water which collects as droplets on a cold surface



## Corrosion

- Damage caused to materials based on chemical reaction



## Grazing animals / Vermin or pests

- Livestock
- Sharpening of teeth and searching for food



## Lightning Strike

- Damaged caused by natural electrical discharge



## Theft & Vandalism

- Stealing, unauthorised removal or deliberate damage



## EMC

- Electromagnetic Compatibility



## Fatigue Life

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



## Abrasion

- Process of scraping or wearing something away



## Vibration and Shock

- Shaking or sudden movement



## Tensile Strength

- Resistance to conduit being pulled from the fitting



## UV

- Resistance to Ultra Violet Radiation



# Benefits of using flexible conduit...

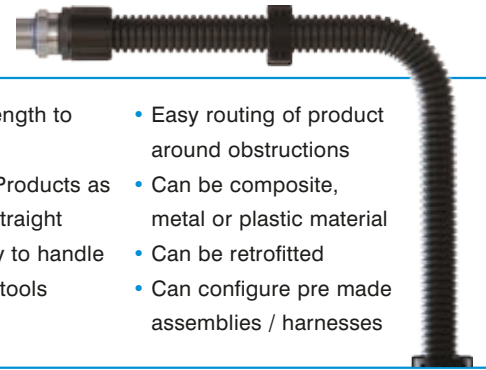
Providing an inherent mechanical barrier for cabling, Flexible Conduit offers more than just protection for Cables and Installations. It allows users and specifiers to do things differently, challenging traditional installation practices and offers unrivalled product performance.



## 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



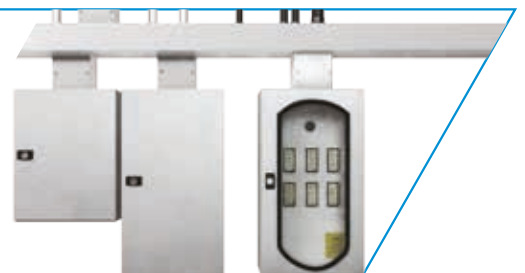
## Flexible Conduit vs Armoured Cables



- 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
- Higher IP ratings
- Can be retrofitted
- No requirement for corners
- 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

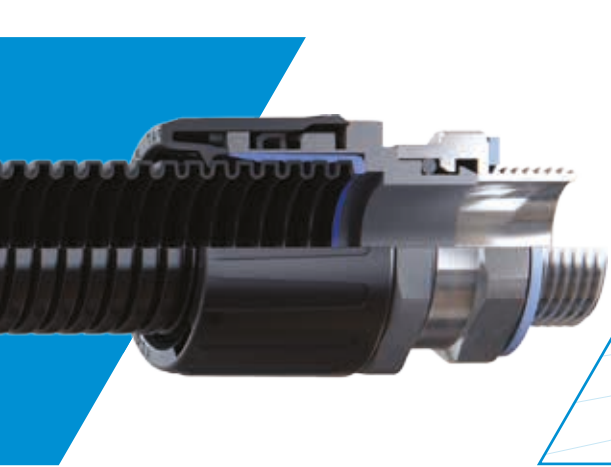
- Can easily add circuits throughout the life of the installation
- Easily accommodate changes as the installation needs change
- Off the shelf products



### System Integrity

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





# Cable Protection Specialists

We are focused on bringing customers the latest 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”



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. Our Technical Director is Chairman of both the IEC (worldwide) and CENELEC (European) committees that prepare conduit system standards.

We understand the importance of material properties and how they affect performance and application suitability. We have developed specialist conduits, using the latest material technologies, to ensure compliance with the latest international fire performance standards - EN 45545 and NFPA 130.

## Other product testing



• Vibration and Shock Testing to EN 61373 Cat 2



- UV testing to UL 1660, 1,000 hour xenon arc
- Extended UV testing, 13,000 hour xenon arc



• 1,000 hours salt spray testing for corrosion



• Fire performance testing including flammability, smoke, toxicity, halogen content and fire load - see Page 148



• Electrical insulation testing to EN 61386 and ASTM D 495 and 3638



• Direct lightning strike of conduit and fixed fittings



• Low temperature impact testing



• EMC screening performance



• Anti-static testing



• Food contact testing to EU 10 2011

# Quality Assurance, Testing & Manufacturing

We take testing seriously.  
Don't just take our word for it.

## Tested to extremes

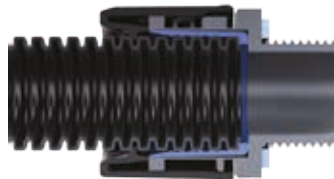
We have invested and committed to extensive independent testing for our Products combined with Quality Audits for our Manufacturing Processes, giving you the confidence that our solutions do what we say they do.

### Certifications and quality approvals we have:



We continuously test our products to ensure our Product quality is as you would expect from a leading British Manufacturer. We understand the importance and potential consequences of product failure therefore to ensure suitability we test our products to the extremes.

**Ultra** FLEXICON  
THE POWER OF ONE



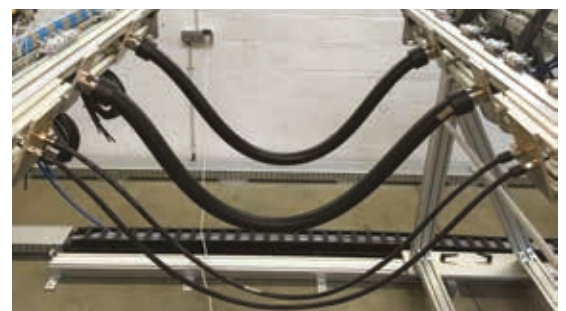
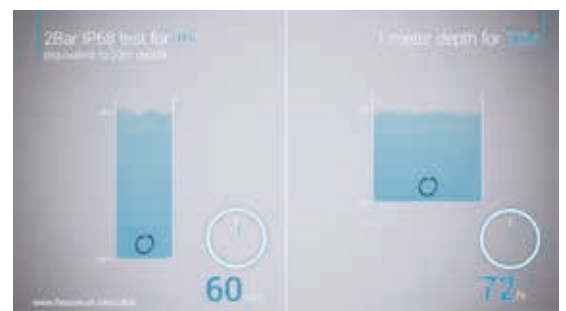
**MADE IN THE  
UK**

Flexicon Ultra™ underwent more than 1,000 individual Ingress Protection tests during its development to ensure & validate product performance with all of our range of Nylon Non-Metallic Conduits in both fine pitch and coarse pitch derivatives.

To demonstrate Ingress Protection Performance to IP68 we tested Flexicon Ultra™ products to a depth of 1m for a period of 72 hours (far beyond the requirement of BS EN IEC 60529) as well as to 2 Bar (equivalent to 20m depth) for a period of 1 hour.

We test our products to simulate the most extreme environmental application conditions giving assurance to our customers of the very best solutions.

We recently demonstrated a fatigue life test representing a service life of 35 years with a minimum 1 million cycles with no point of failure.





**NEW**

# Product Focus – Flexicon Ultra™

The Power of One – Designed for use with Flexicon’s Nylon Conduit range (either fine or coarse pitch), this true one piece Flexible Conduit Fitting features Integrated Sealing Technology to offer the ultimate in Strength, Integrity and Assurance for Cable Protection.



Integrated  
Sealing  
Technology

## The World’s Best Conduit Fitting - The Power of One

**Flexicon Ultra™ provides a true one piece solution, engineered to provide unrivalled performance with both fine and coarse pitch conduits.**

With all round teeth to secure the conduit, Flexicon Ultra™ offers superior dynamic performance providing Integrity, Strength & Assurance in one package.

**Integrity • Strength • Assurance**

### Features and Benefits

Offering Integrity, Strength and Assurance, Flexicon Ultra™ is the best solution for Performance & Safety Critical applications.

#### Integrity.

- One Piece - Integrated Sealing Technology
- IP68, IP69 performance
- Simple push and twist connection

#### Strength.

- 360° Strength- All round teeth
- 70kg Tensile Strength
- Anti-tamper, Dynamic & Vibration performance

#### Assurance.

- Lifetime sealing & reliability
- Independently tested to extremes
- UK Manufacturer



# What's New?

Innovation is at the centre of everything we do. This Product Guide features no less than 9 new Conduit Systems.

Highlighted below are a selection of new products featured in the 12th Edition.



## FPIHR - Non Metallic Conduit

EN 45545-2 NFPA 130

- This new range of corrugated conduits features enhanced fire performance properties combined with excellent dynamic performance for fatigue life and flexibility.



45

44



## FPASC - UL Listed Non Metallic Conduit

- This new range of Non Metallic Corrugated Flexible Conduits in sizes from 21mm to 67mm have UL Listing to UL 1660, and are suitable for use with FPAX and Flexicon Ultra™ Fittings which are UL Listed to UL 514B.

## FSS & FSSBRD

EN 45545-2 NFPA 130

- This new range of Stainless Steel conduits offer superior Ingress Protection and Corrosion resistance, combined with an Inherent Fire Performance.



120

84 & 112



## Hygienic Conduits

- This new range of Hygienic Flexible Conduits offers a smooth, easy to clean surface. Designed for use with our Hygienic range of Stainless Steel fittings this system is ideal for Food & Beverage, Machinery & OEM's Healthcare and Pharmaceutical applications.

## Connection Boxes - Round Boxes

- This new range of metallic Connection Boxes provide a reliable and flexible solution with High Ingress Protection levels, for the inter connection of circuits. Available in Brass and Stainless Steel derivatives these boxes have a removable lid for access and inspection.



126

76



## Clips and Channels

- A new range of fixing solutions for electrical and mechanical services. Our Clips and Channels solutions have been designed to accommodate a wide range of product derivatives including Flexible Conduit and Rigid Conduit.



# Construction

The Construction sector relies on safe and effective Cable Protection to ensure the safety of People and Property. Electrical faults or failures can have disastrous consequences and can jeopardise necessary critical services.

**Whether it is a Hospital, Financial Institution, Airport, Hotel, Warehouse or Datacentre the continuous and safe availability of services is paramount.**

The nature of construction and building sites often means that last minute changes are a necessity. No matter how detailed or comprehensive the plan, changes in response to unforeseen circumstances or environments is common.

Routing cables through flexible conduit can help to protect and reduce the mechanical stress on cables, ensuring that cable bend radius' are not exceeded.

Off site or modular construction is constantly developing due to the necessity to reduce build time and improve repeatability. Flexible Conduit can play an important role in the protection of wiring runs and pre-terminated connections to deliver a plug and play solution.

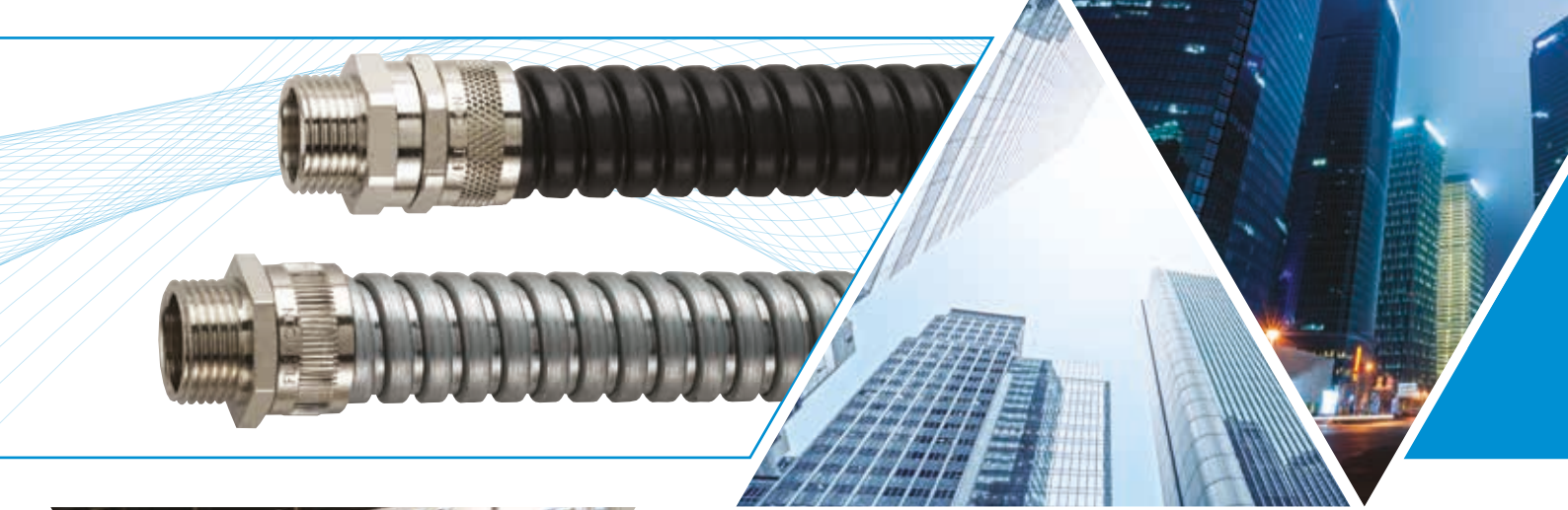
Flexible conduit can be either surface mounted or hidden within the fabric of the building. This can be under floors, above ceilings, down walls or inside concrete pours.

Sometimes conduits are part of the aesthetic design, with services visible as part of the look of the building.



BS EN IEC 61386





## Typical Hazards & Product Considerations

• Ingress Protection



• Impact



• Fire Performance



• Temperature



• Corrosion



• Aesthetics

## Example applications

- Lighting
- CCTV
- IT / Data
- HVAC
- Building Controls
- BEMS / BMS

- Emergency Lighting
- Alarm Systems
- Access Controls
- Fire Safety, detection and protection
- Plant Room Equipment

- Switch Gear
- Distribution Boards
- Temporary Site Power
- Lightning protection
- Escalators and Lifts
- Refrigeration

## Typical Products



- FU - Galvanised Steel



- FSU - PVC Coated Galvanised Steel



- LFHU - LFH Coated Galvanised Steel



- FPAS - PA6 Corrugated



- FPP - Polypropylene



- LTPUL - PVC Coated Liquid Tight UL

## Product installation examples:



- FU – Commercial Offices - Underfloor wiring to Distribution Boxes



- FSU – Plant rooms or connection of services - HVAC



- FU/LFHU – Public or municipal buildings – Emergency Lighting / CCTV where fire safety is paramount



- Nylon Systems – Pre fabricated Buildings – Wiring from Distribution Board



- Polypropylene – Acid resistant suitable to be buried in Concrete



# Automation & Manufacturing

Manufacturing and Automation is constantly evolving, with the rapid emergence of new technologies to achieve greater safety, efficiency and functionality.

Whether it is performing operations such as processing, assembly, inspection or materials handling, or in some cases a combination of all of these, Manufacturing Automation relies on effective Cable Protection.

Operating environments can vary significantly, however the fundamental requirement for continuous operation still exists. Engineers are constantly challenged to innovate, looking for improvements to deliver more for less.

“Manufacturing Automation relies on effective Cable Protection”



BS EN IEC 61386

## Typical hazards & product considerations

• Mechanical Strength



• Vibration & Shock Resistance



• Flexibility & Fatigue Life



• Temperature



• Ingress Protection



• Impact



• Abrasion Resistance

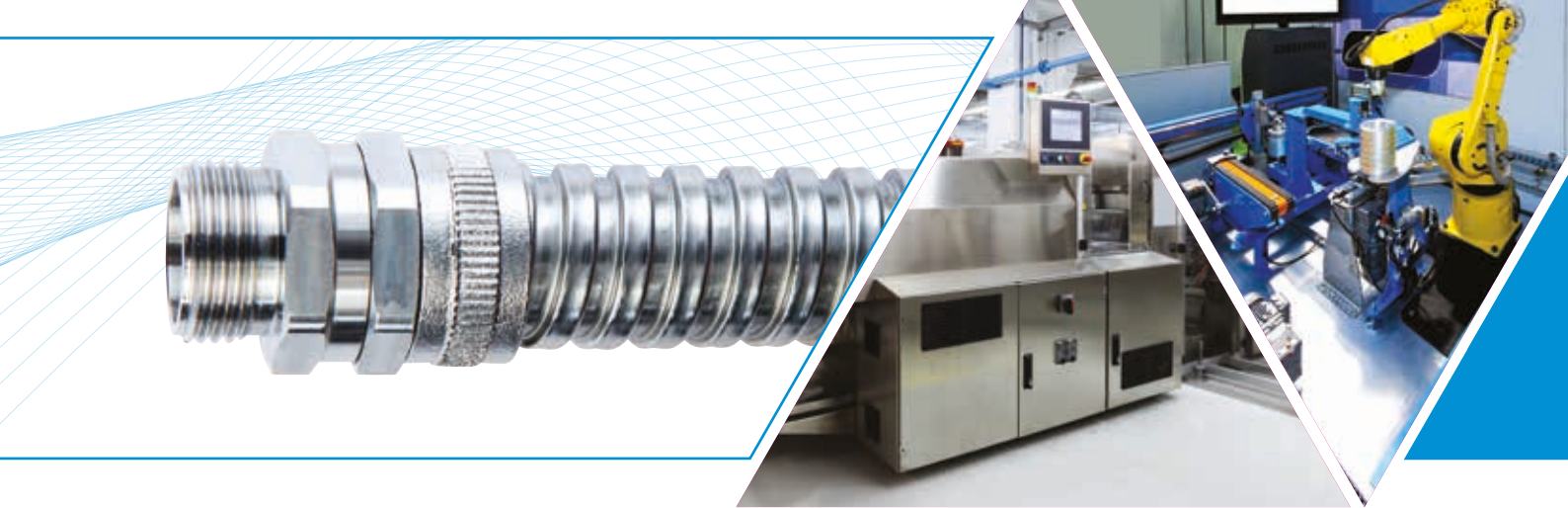


• Hazardous Gases / Dust



• Chemical resistance





## Example applications

- Control & Instrumentation Systems – Detection / Measurement
- Printing, Marking & Engraving
- Materials Handling Equipment – Palletizers / Conveyers / Mixing & Dosing
- Packaging – Accumulators / Baggers / Carton Machines
- Logistics – Handling / Lifting / Conveying
- Fabrication Equipment – Bending / Presses / Welding / Forming
- Metal Cutting Equipment – Drilling / Grinding / Lathes / Milling / Rotary Transfer
- Refrigeration - Storage / Temperature Controlled Environments
- Pumps / Drives / Motors
- Plant Room Equipment - Electrical and Mechanical Services
- Robotics
- Plastics Processing

42



NEW

- FPA / FPAX / FPAU - Range of Non-metallic fittings

102



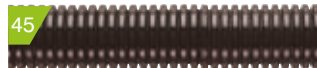
NEW

- F-Clamps and Fixing Accessories

## Typical Products



- FPI - PA12 Corrugated



- FPAS - PA6 Corrugated



- SSU - Stainless Steel



- FSU - PVC Coated Galvanised Steel



- FPASC - PA6 Corrugated UL



- LTP - PVC Coated Liquid Tight



- LTPPU - Polyurethane Coated Liquid Tight



- LTPUL - PVC Coated Liquid Tight UL

## Product installation examples:



- FPI – Production Line – Robotic arm



- SSU – Foundry – Lighting & ventilation



- FSU – Electrical Power – Distribution boards



- FPAS – Machines – Control Wiring



- LTPUL – Electrical Connection – Mains Power to machinery

# Utilities

Whether this is the Water Industry or the latest in Telecommunications technology, public service Utilities are essential for a nation's economy and wellbeing.

**Continuity of supply is critical for the Utilities sector. With considerable levels of investment, maximising asset lifetimes can help to achieve efficiencies and reliable operations.**

Projects need to offer safety and security. Whether it is a Water Treatment Plant or a Telecommunications mast, the loss of power or data can have a significant impact on the provision of services. With the risk of significant fines Operating Companies need to ensure provision of Utilities and Services which are typically 24 hours a day, 7 days a week processes.

“Whether state owned or privatised, the Utilities and Services offered need to be continuous and safe”



BS EN IEC 61386

## Typical hazards & product considerations

- |                       |  |                                |  |
|-----------------------|--|--------------------------------|--|
| • Ingress Protection  |  | • Corrosion Resistance         |  |
| • Mechanical Strength |  | • Vibration & Shock Resistance |  |
| • Fatigue Life        |  | • Temperature                  |  |
| • UV resistance       |  | • Impact                       |  |
| • Abrasion Resistance |  | • Hazardous Gases / Dust       |  |
| • Chemical resistance |  |                                |  |





## Example applications

- Control & Instrumentation Systems – Detection / Measurement
- MCC (Motor Control Centres)
- Pumps / Drives / Motors
- Plant Room Equipment
- Lighting
- Alarms
- CCTV and Security
- Access Control
- UPS systems
- Base stations & Masts
- Antenna



## Typical Products



- FSS - Stainless Steel Corrugated



- SSU - Stainless Steel



- FSU - PVC Coated Galvanised Steel



- FPAS - PA6 Corrugated



- LTP - PVC Coated Liquid Tight



- LTPUL - PVC Coated Liquid Tight UL

## Product installation examples:



- FSU – Water Treatment Plant - External lighting



- FPAS – Telecommunication Towers - Machines – Control Wiring



- LTP – Sewage Treatment Works – Pumping Equipment



- FPIH – Primary Treatment Tanks



- LTPUL – Electrical Connection – Mains Power to machinery

# Renewables – Wind / Solar / Hydro / Energy from Waste

Renewable Energy is a critical aspect of reducing global carbon emissions and offers an infinite source of power. This sector relies on new technologies to improve efficiency and maximise return on investment.

**In the global drive to reduce the impact of greenhouse gas emissions, renewable energy is playing an increasingly important role.**

Whether this is Onshore Wind, Offshore Wind, Solar PV or Biomass all categories rely on cabling and subsequently cable protection for efficient and safe operation. High cost of major mechanical repair, combined with long service life expectations and the remoteness of equipment pose significant challenges when specifying Cable Protection.

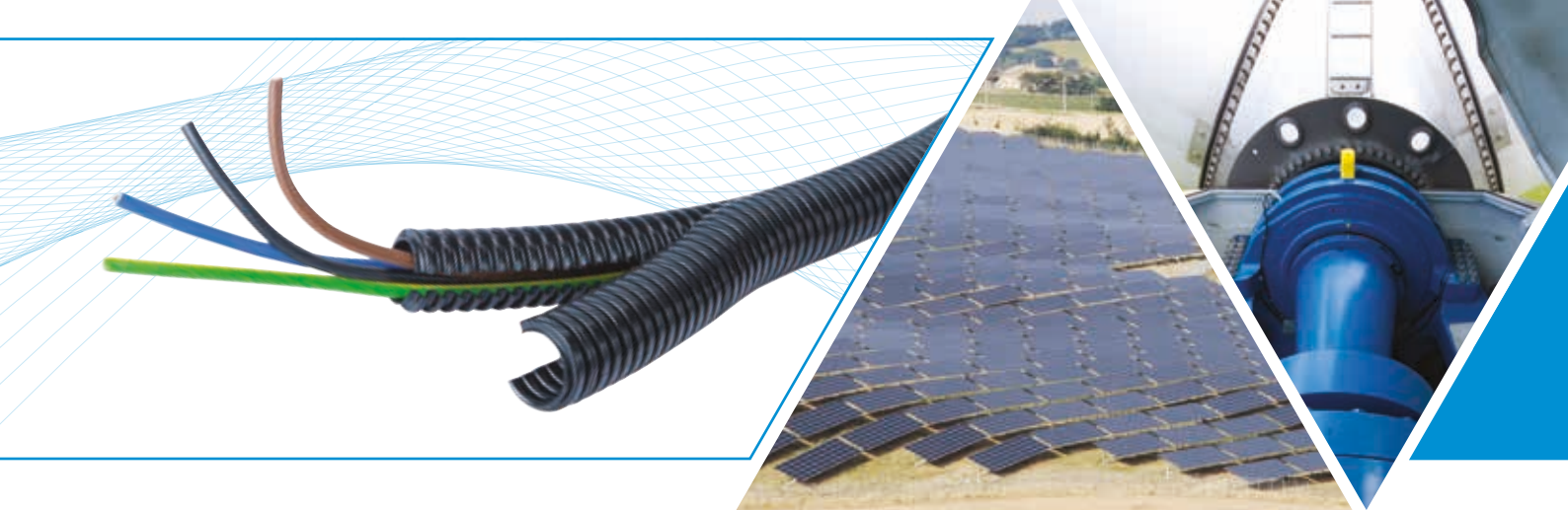


BS EN IEC 61386

## Typical hazards & product considerations

- |   |  |   |
|---|--|---|
| • Vibration        | • Abrasion            | • UV                 |
| • Temperature      | • Impact              | • EMC                |
| • Corrosion        | • Ingress Protection  | • Lightning Strikes  |
| • Explosive Gases  | • Animal attack       | • Sand Storms        |





## Example applications

- Biomass
- Wind Turbine:
  - Nacelle
  - Tower & Lighting
  - Electric Pitch System
  - Control System
  - Condition monitoring systems
  - Cooling and Heating
- Hydro Electric
- Solar PV Farms
  - Security and Perimeter Control
  - CCTV
  - DC Combiner boxes
  - Inverters
  - Substation
  - Weather Station



## Typical Products



- LTBRDP Conduit - Galvanised Steel Core with Braid Layer and PVC Coating



- LTPSS - PVC Coated Liquid Tight with Stainless Steel inner core



- EXD - Flameproof Barrier Gland



- FUSSB - Galvanised Steel Core with Stainless Steel Overbraid



- Polyamide systems and FPAU Ultra™ Fittings



- Lightning Swivel Fitting - High continuity fitting specifically developed for Wind Turbines



- FPADS - Dual slit conduit suitable for retrofit



- FPAS - PA6 Corrugated



- SSU - Stainless Steel

## Solar Range - UV Performance for 20 years:

Flexicon's Solar Offer is a premium range of products designed for use for Cable Protection for Solar PV installations.

Flexicon warrants that the Flexible Conduit will not suffer from significant mechanical deterioration from ultra violet exposure for a period of up to 20 years from the purchase date of the product\*.

\* Contact Flexicon for further details - Terms and Conditions apply.

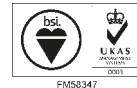






# Rail - Rolling Stock and Infrastructure

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



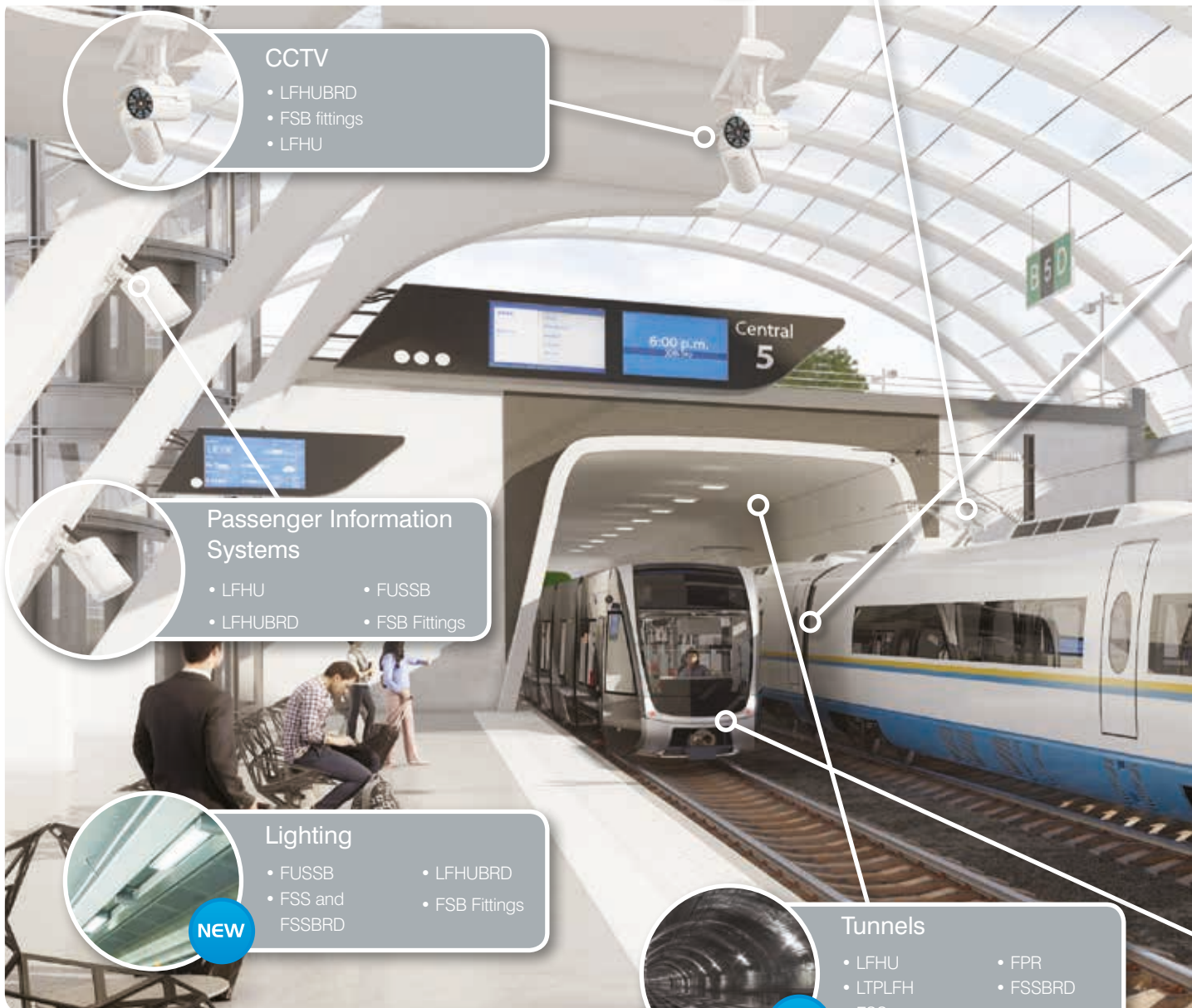
Flexicon offer a range of products for this technically demanding sector. IP ratings, tensile strength characteristics, weight, corrosion resistance, fire performance properties and operating temperature ranges are all factors to consider.



## Exterior Vehicle

- FPIHR
- FTCB
- Flexicon ULTRA™ Fittings

NEW



## CCTV

- LFHUBRD
- FSB fittings
- LFHU

## Passenger Information Systems

- LFHU
- LFHUBRD
- FUSSB
- FSB Fittings

## Lighting

- FUSSB
- FSS and FSSBRD
- LFHUBRD
- FSB Fittings

NEW

## Tunnels

- LFHU
- LTPLFH
- FSS
- FPR
- FSSBRD

NEW



### Inter Vehicle Jumper Applications

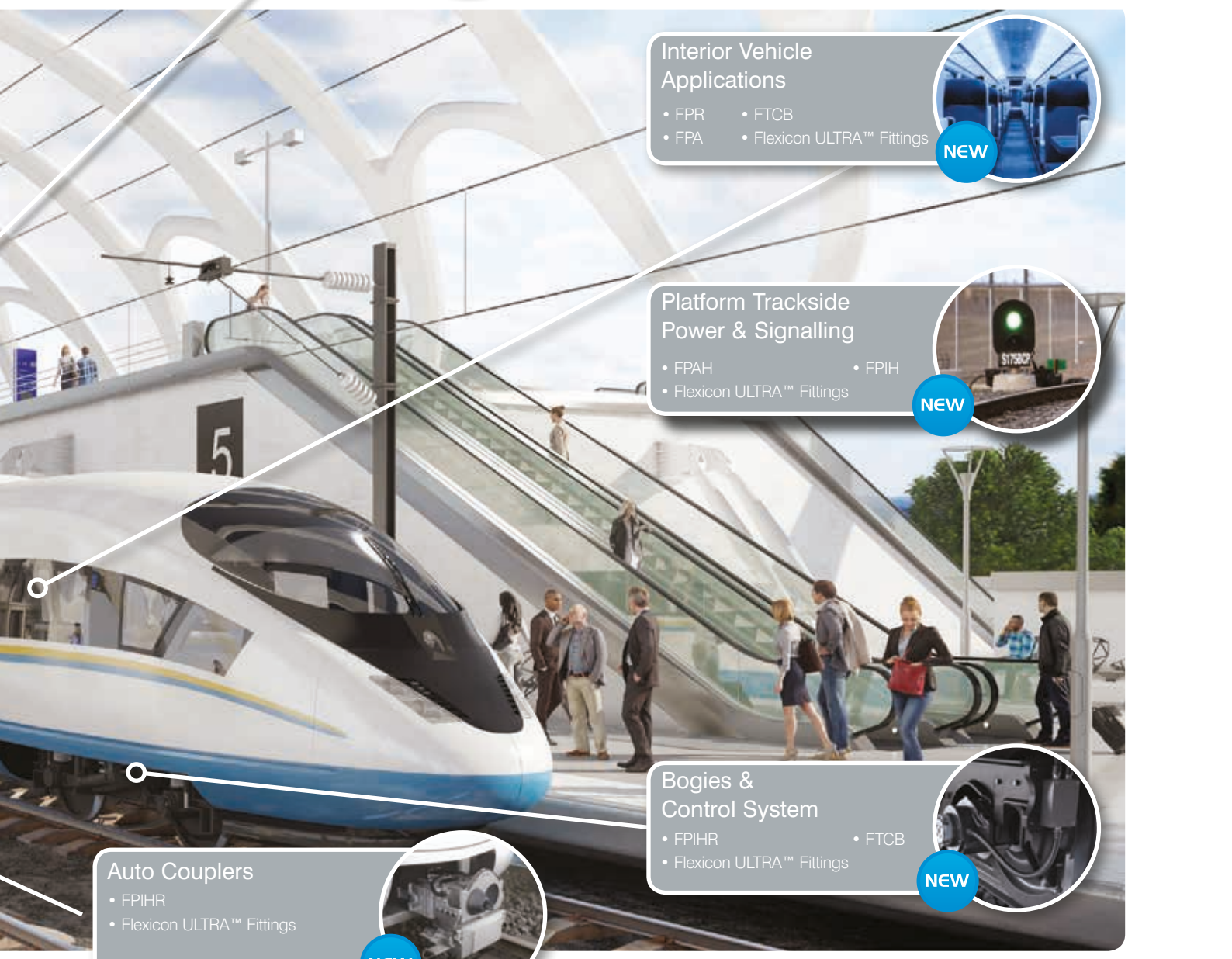
- FPIHR
- FTCEB
- Flexicon ULTRA™ Fittings

NEW



- High performance products offering superior tensile and impact / compression strength
- Designed to meet the strictest standards – EMC testing / vibration

- Wide product range to meet all applications
- Independently tested to the relevant standards
- Vibration proof
- Anti-tamper



### Interior Vehicle Applications

- FPR
- FTCEB
- FPA
- Flexicon ULTRA™ Fittings

NEW



### Platform Trackside Power & Signalling

- FPAH
- FPIH
- Flexicon ULTRA™ Fittings

NEW



### Bogies & Control System

- FPIHR
- FTCEB
- Flexicon ULTRA™ Fittings

NEW



### Auto Couplers

- FPIHR
- Flexicon ULTRA™ Fittings

NEW



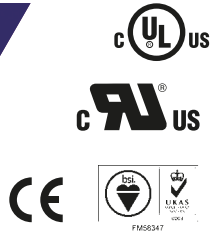


# Rail - Rolling Stock and Infrastructure

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.

“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

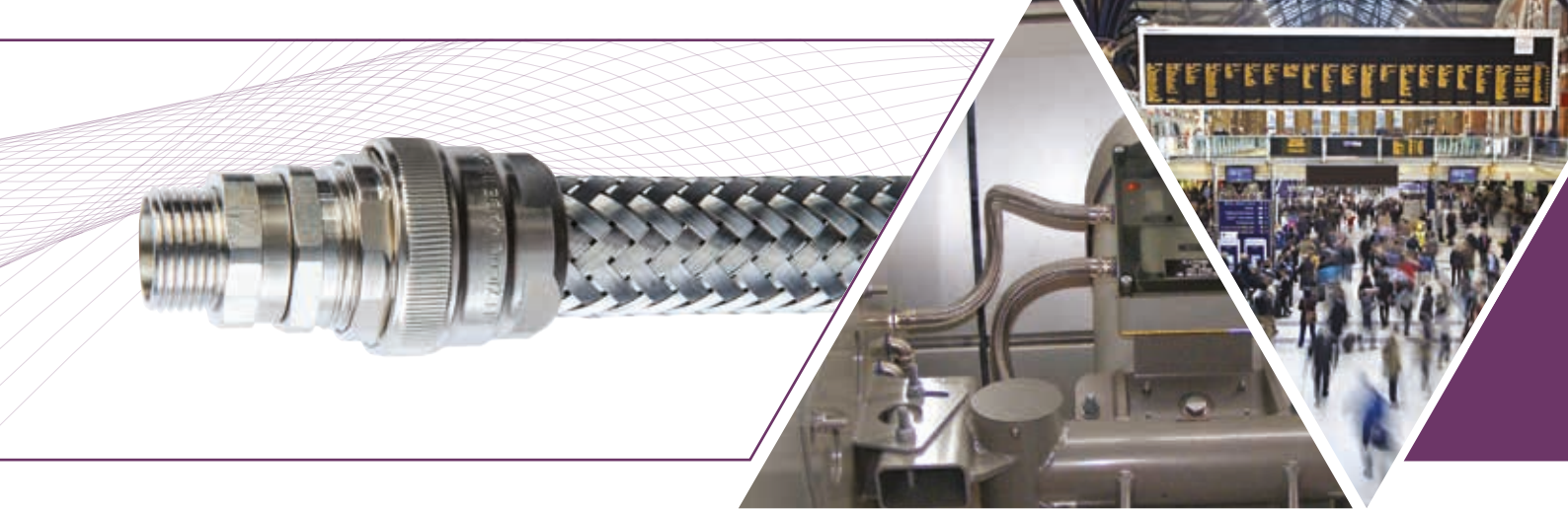


• UV Resistance



• EMC





## Example applications

### Infrastructure

- Ticketing and Passenger Access
- Station Car Parks
- CCTV / Passenger Information Systems
- Lifts & Escalators
- Lighting
- Platform Edge Screens
- Rail Crossings
- Trackside Points Machines
- Trackside Signalling
- Trackside Power
- Tunnels
- Depot (Berthing and Maintenance)

### Rolling Stock

- High Speed
- Intercity / Urban & Regional Trains
- Metro
- Trams & Trolleybuses
- Monorail
- Locomotives
- Propulsion & Control Systems
- Bogies
- HVAC
- Couplers
- Pantograph
- Brake Systems
- Door Modules
- ETCS

60



NEW

- FPAU - Range of Non-metallic fittings

76



NEW

- F-Clamps and Fixing Accessories

## Typical Products



- FPR - PA6 Corrugated



- FPIHR - PA12 Corrugated



- FPRSS - Stainless Steel Overbraided PA6 Corrugated



- LFHU - LFH Coated Galvanised Steel



- LFHUBRD - LFH Coated Galvanised Steel with SS Overbraid



- LTPLFH - LFH Coated Liquid Tight



- LTPPU - Polyurethane Coated Liquid Tight



- FSS - Stainless Steel Corrugated

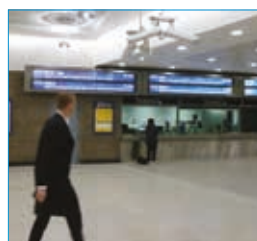
## Product installation examples:



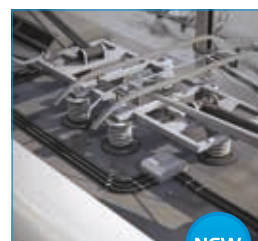
- LFHUBRD - Passenger Information System



- LFHU - Public Address Voice Alarms for staff safety - Rail Depot



- LFHU - CCTV & Security



- FPIHR - Control wiring on top of carriage










- FPIHR - Intercar Jumpers

# Hazardous Area Applications

System integrity and safety are critical for these technically demanding environments.

Using flexible conduit allows multiple cables to share the same space and hence reduce the number of entry points required into the control box and termination area.

-  Simplified Termination
-  Reduce installation times
-  Cable is mechanically protected
-  No need for specialist cables
-  Can provide EMC screening
-  Flameproof integrity
-  Future proofing – easier to upgrade



Combining our flexible conduit system with our Flameproof EXD glands, Contractors and Operators can ensure they mechanically protect their cabling installation without compromising on safety to protect people and assets.

Our standard products facilitate tailored solutions, off the shelf, thus minimising any lead times.

Flexible conduit from Flexicon can help to:

- Enhance Safety and System Integrity
- Extend service life
- Offer Corrosion Resistance (harsh environments)
- Minimise downtime
- Reduce installation time
- Reduce cost and weight





## Local Support & Guidance

- Product applications and suitability
- Experts on hand on how to protect vulnerable cables in safety and performance critical installations
- Hazardous Area expert sits on EXL/3/ (T/S UK Committee). Can offer guidance on applications and installations.
- Product support offered to;
  - End Users
  - EPC's
  - OEM's
  - Operators
  - Consultants



## Presence of Gases & Vapours

- Upstream, Midstream and Downstream
- Refineries
- Chemical plants
- Loading and unloading areas in terminals
- Storage areas for tanks

## Presence of Dust

- Mills
- Silos
- Combustion Plants
- Dust extraction
- Polymer Production
- Paint Shops

## Markets and Applications

- Skids
- Motors
- Control & Instrumentation
- Control Boxes
- Lighting
- Detection & Measurement
- MCC (Motor Control Centres)
- CCTV





# Hazardous Area Products

Flexicon have a wide range of cable protection solutions for use in Hazardous locations.

Routing of cables, both power and / or data, in hazardous areas, can be a complex task requiring detailed planning.

Our range offers a choice of eleven different conduits, depending on the operating environment and technical challenges faced, suitable for use with our Ex d, Ex e and Ex t fittings.

Manufactured in Birmingham, UK, our comprehensive range of Ex d (flameproof), Ex e (Increased safety) and Ex t (Dust Ignition Protection) fittings and accessories offer customers choice when it comes to specifying hazardous area approved equipment.

Our products are manufactured to the latest ATEX, IEC Ex, UL and CU-TR directives and standards.



## Typical hazards & considerations

• Ingress protection



• Hazardous Gases / Dust



• Mechanical strength



• Abrasion Resistance



• Chemical resistance



• Low Fire Hazard



• Corrosion resistance



• UV Resistance



• Temperature



• Static charge



• EMC





## UL Listed (file no. E247502)

NEW

104

UL Listed for use in USA and Canada (file No. E247502) Suitable for use in hazardous locations as per NEC Article 501 (B)(2) Class I Div 2, Article 502 (A)(2) & (B)(2) Class II Div 1&2, Article 503 (A)(3) & (B)(3) Class III Div 1&2.

### LTP-CUL Fittings



## EXE - Increased safety & Dust Ignition proof

108

Offering Ex e (Increased Safety) and Ex t (Dust Ignition Proof) protection. Suitable for use in Zone 1, Zone 2, Zone 21 and Zone 22 Hazardous Areas when used with Flexicon's Liquid Tight Conduit Range.

### LTP-EXE Fittings



## EXD - Flameproof Barrier Glands

106

Offering Ex d (Flameproof), Ex e (Increased Safety) and Ex t (Dust Ignition Proof) protection. Suitable for use in Zone 1, Zone 2, Zone 20, Zone 21 and Zone 22 Hazardous Areas. This gland can be used with any of Flexicon's Liquid Tight Conduit Range.

### LTP-EXD Fittings



AS  
ANTI-STATIC

ENHANCED  
EMC  
SCREEN  
\*\*

EXTRA  
LOW FIRE  
HAZARD  
\*\*

STANDARD  
EMC  
SCREEN  
\*

AS  
ANTI-STATIC



LTPPUAS

LTPSS

LTBRDP

LTBRDLFH

LTPBRD



**NEW**

# Hygienic Range

Production processes or environments which are subject to wash-down or hygienic requirements need to consider cable management carefully. Given the increase in automation, cable protection becomes even more important to protect power and data cabling.

**HG**  
HYGIENIC  
RANGE

Cleaning regimes are an important and essential process to ensure the safety and quality of a Company's Output and Goods. Whilst machinery or plant is being cleaned or maintained, production or service output is zero therefore this time should be as effective as possible, without compromising safety and quality.

“Flexicon can offer Hygienic Cable Protection solutions that save time and money”

Flexicon can offer Cable Protection products which enable efficient cleaning whilst providing system integrity for Hygienic Environments.

Our products protect against the build up of microbes and bacteria and also ensure that cleaning processes do not damage or compromise equipment operation.

Applications including Food & Beverage, Machinery & OEM's, Healthcare and Pharmaceutical Industries all rely on the benefits of effective Cable Protection.

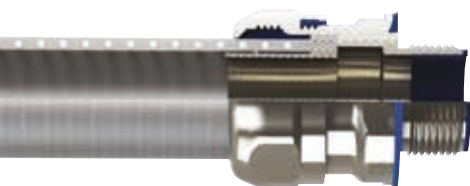
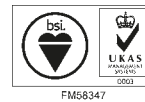
**EU Regulation 10/2011**

**EN ISO 14159**

**EN 1672-2**

**BS EN IEC 61386**

**EN IEC 61373 Cat 2**



NEW

Flexicon can offer connection solutions for your critical power and data cables in Hygienic environments.

Our new range of Stainless Steel Round Boxes have been designed using SS Grade 316L and feature a range of connection options.

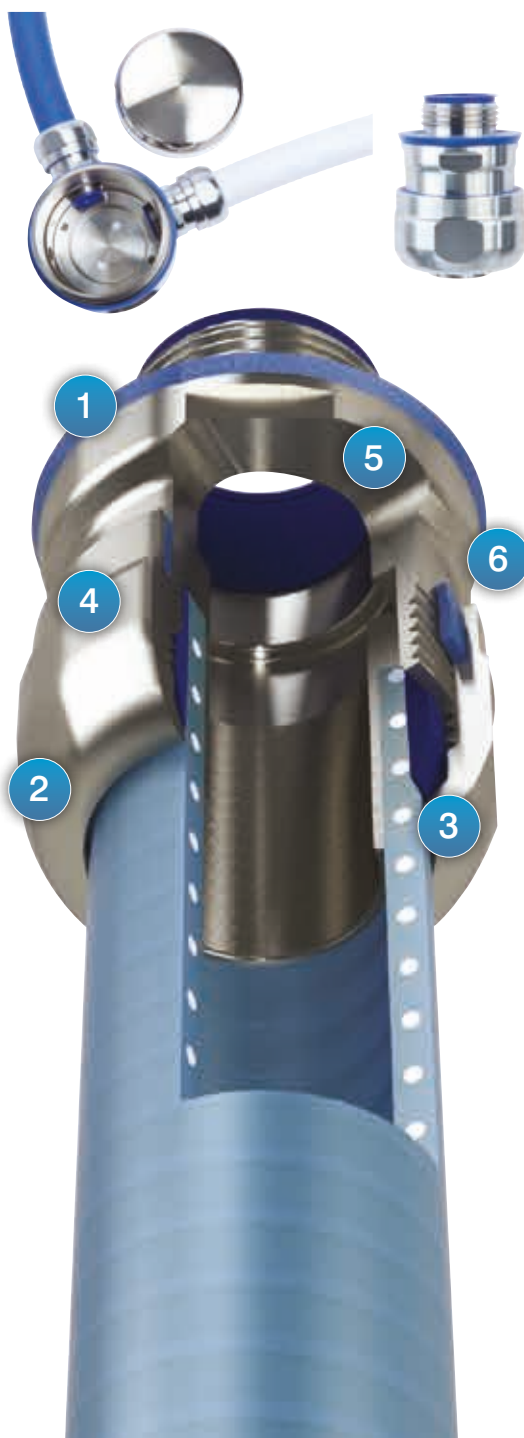
Our Hygienic Glands are available as a short thread version, to ensure a secure connection whilst maximising wiring space within the Box.

NEW

NEW

## Features & Benefits

- 1 Hygienic design**
  - In accordance with EN1672-2 & EN ISO 14159
- 2 Smooth finish**
  - Eliminate build up of bacteria & micro-organisms
- 3 High IP rating**
  - IP66, IP67, IP68 (2 Bar) & IP69
- 4 Corrosion resistance**
  - Material type (SS316L)
- 5 High chemical and thermal resistance**
  - Resistant to chemicals & cleaning agents
- 6 Fewer components**
  - Ease of assembly and integrated barrier seal to prevent contamination.



**NEW**

# Hygienic Cable Protection Solutions



**HG**  
HYGIENIC  
RANGE

**Flexicon are the leading solutions provider to protect your critical power and data cables in Hygienic environments from damage caused by mechanical, electrical or environmental influences.**

Flexible conduit is ideal for the Cable Protection, Management and routing of Power and / or data cables.

## **Simplicity**

No need for specialist cables. Standard and single core cables can be grouped and protected in one system. Mechanical protection is provided by the conduit system. Fewer components mean less product inventory throughout the supply chain.

## **Space Saving**

Grouping standard cables into one system means less glanding space / area required to terminate. Cost savings can be achieved by using smaller enclosures, less components and reducing installation time required to terminate.

## **Fixing**

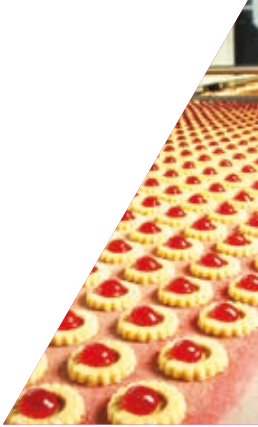
Multiple circuits can be fixed and secured in one system. This makes cleaning easy with one smooth outer cover. A range of fixing and mounting solutions are available to secure the Conduit in place throughout its lifetime.

## **Reduced Maintenance**

Existing circuits can be replaced or added with ease using a conduit system, throughout the life of the installation. Less cable entry points means less opportunity for Ingress Protection failure during washdown or cleaning schedules.

## **Speed of Installation**

Grouping cables using flexible conduit means fewer cable entry points to the enclosure /equipment therefore less installation time. Flexible Conduit offers the ability to route around equipment and plant without the need for specialist bending equipment.



# Cable Protection for Hygienic Applications

NEW



## Typical hazards & product considerations

- Chemicals
- Ingress Protection
- Corrosion – Chemicals and Wash down
- Steam jets
- Build up of Microbes and Bacteria



- Contamination
- Temperature
- Vibration
- Abrasion
- Continuous & Repeated Movement
- Explosive Gases



85



- LPC-C-FG Fitting

113



- LTP-C-FG Fitting

126



- Round Box (SS316L)

## Example applications

- Processes and production plants in the food & pharmaceutical industry
- Dairy Industry
- Breweries and Beverage Industry
- Bakery
- Meat & Poultry
- Seafood
- Confectionary
- Frozen
- Fresh and Chilled Foods
- Pharmaceutical Industry
- Cosmetic Industry
- Medical Technologies
- Clean Service applications

## Typical Products



- LPC-FG -



- LPC-FG -



- LPC-FG -



- LTP-FG -



- LTP-FG -



- LTBRDP-FG -



- LTBRDP-FG -



- LTPSS-FG -

## Product installation examples:



- In line detection



- LPC Blue conduit with SS FG fitting



- Mixing Machines



- Connection Box to extend or adapt circuits and wiring



- Automation and Processing Machinery



# North American Approvals –

UL Listed  and UL Recognised Products 

**Flexicon have developed a range of products and solutions for installations which require either UL “Listing” or “Recognition” approvals. In North America, and sometimes the rest of the World, compliance with UL (Underwriters Laboratories) is a fundamental requirement.**

UL standards are exacting and rigorous, with full transparency listed through the UL website. UL Representatives audit factories on a regular basis and any Manufacturers making claims regarding a product being “Listed” or “Recognised” can be verified by visiting the UL website.

Other standards include NFPA 70, also called the National Electrical Code, are the wiring rules for general wiring, and NFPA 79 is the Electrical Standard for Industrial Machinery.



## UL Recognised



UL Recognised approval is applicable to a component or raw material that is to be incorporated into a piece of finished equipment that will itself be UL Listed.

## UL Listed Products



UL Listed approval is applicable to a finished product that will be used in its own right.

Flexicon can offer both Non-metallic and metallic solutions where UL Listed is a requirement.

## UL 514B Listed Conduit Fittings



Flexicon have the following conduit fittings ranges UL Listed to UL514B.



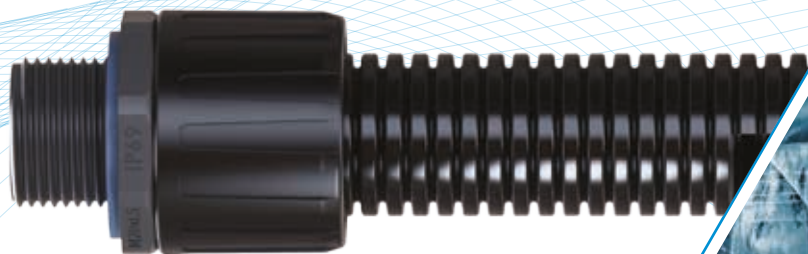
LTP-CUL



FPAX



Ultra™

NEW

## UL 1660 Liquid-Tight, Flexible Non-metallic Conduit

NEW

UL 1660 is the Non-metallic flexible conduit standard. Corrugated conduit (known as type C), is normally made from nylon (polyamide) and as the fittings for this type of conduit are not compression fittings, the conduit and fittings need to be supplied as a system.

Flexicon has FPAS21C to FPAS67C, PA6 corrugated conduits UL listed to UL1660.

For more details see File No.E246572 – UL Listing for Flexicon FPASC.

The UL mark is cULus, showing approval for use in both USA and Canada.

This Conduit is designed for use with UL Listed range of FPAX and FPAU Ultra™ IP68 fittings from 21mm to 67mm with NPT and Metric threads.

For more details see File No. E247502 - UL Listing for Flexicon Fittings.

The UL mark is cULus, showing approval for use in both USA and Canada.



# Ultra

NEW

## UL 360 Liquid-Tight, Flexible Steel Conduit

This is the standard for galvanised steel, PVC sheathed, flexible steel conduit. This standard specifies the conduit dimensions, with tolerances and for sizes up to 40mm it requires a copper bonding wire to be incorporated into the wall of the conduit.

Conduit fittings are specified under UL 514B, and are normally of a compression type that can cope with a wide tolerance range.



Flexicon's LTPUL conduit is UL listed to UL 360 for America and CSA approved for Canada.

Flexicon's LTP-CUL liquid tight fittings are UL listed to UL514B and are suitable for use in hazardous locations as per NEC Article 501 (B)(2) Class I Div 2, Article 502 (A)(2) & (B)(2) Class II Div 1&2, Article 503 (A)(3) & (B)(3) Class III Div 1&2.

NEW

## UL 1696 Non-metallic Protection Tubing

UL 1696 is the newest UL standard for conduit and is a system standard incorporating conduits and fittings.

Approval to UL 1696 gives a UL recognised system that may be incorporated into equipment that may itself end up being UL listed. Typically this standard covers corrugated polyamide and spirally reinforced PVC. This standard is harmonised between USA and Canada so

UL can also certify that products are suitable for use in Canada.

Flexicon has most of its nylon, PA6 and PA12 corrugated conduits, FPAS, FPAL, FPAH, FPR, FPI and FPIH, together with its FPA (IP66), FPAX (IP68) and FLK (IP66) fittings UL recognised to this standard, including use in Canada, UL file number E229161.

# Tailored Solutions

Flexicon can offer true engineering support when it comes to your Cable Protection requirements. When you talk to us, you know you are talking to the people that design, engineer and manufacture the products you are buying.

We are the experts when it comes to understanding product capabilities and can engineer solutions to help you save time and money when it comes to your protection requirements.

“one size does not necessarily fit all”

When it comes to Cable Protection, “one size does not necessarily fit all”. This is why we have over 60 different conduit systems, but occasionally even this is not enough. Given the diversity of applications for our products we are constantly developing bespoke solutions to meet our Customers needs.



# Whatever your application, we've got it covered...



Working closely with our customers, we understand their protection challenges and have provided numerous customised solutions. Some examples of specials and tailored solutions are listed below:

## Non standard lengths

- **Long lengths** – Typically when 50m is not long enough we have provided extended lengths such as in special containers and cages up to 1,700m.
- **Short lengths** – 10m is our smallest standard coil length but we can offer shorter lengths if necessary.
- **Pre cut lengths** – Pre-cut to defined dimensions we can offer conduit pre-cut to your requirements ready to use saving you time.



## Assemblies

- Ideal for use for wiring harnesses or for OEM's who are integrating products into their finished equipment. Consisting of pre-cut lengths of conduit, with fittings pre-terminated ready for assembly and wiring.



## Different Polymer formulations

- We offer a range of different Polymer formulations to change the performance characteristics and properties of our Flexible Conduits. This could be to modify any of the following:
  - Colours
  - UV resistance
  - Flame retardancy
  - Fire performance properties
  - Anti-static



## Bespoke thread sizes

- We can offer various thread sizes and types. Our Non metallic fittings utilise barb design allowing us to create a variety of thread sizes across our FPA, FPAX and FPAU conduit fittings with metallic threads. Our manufacturing capability enables us to create various thread types, lengths, size and form.



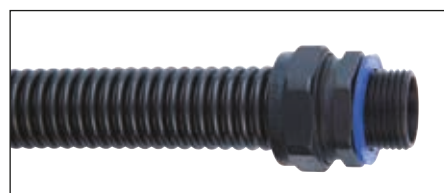
## Bespoke thread types

- We can offer various termination options to interface with our Conduits. We have developed time and labour saving solutions to interface with equipment such as:
  - Push Fit termination - no thread
  - Pulling eye - assist with product handling
  - Integrated Cable Strain Relief



## Metal finishes

- We can offer different material finishes for metal systems. Often the self colour of Galvanised Steel, Stainless Steel or Aluminium does not match the required aesthetics. We can chemically blacken Stainless Steel conduits and fittings so they are not visible. We can also offer anodising of aluminium components to suit required aesthetics.



All the above options are considered as specials and may be subject to agreed Minimum Order Quantities and Leadtimes.