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Non-Metallic Systems

PKSS High Specification Braided Conduit

Technical Characteristics

Conforms to	BSI Kitemark KM-35161 CE mark to the Low voltage directive London Underground Category Extensive and Grouped NFF16-101 rating I2, F1 BS 6853 rating 1a
Approvals and Standards	
Degree of mechanical protection	High flexibility & fatigue life
Degree of protection	IP66 - Hi-Spec Type A & B IP67 - Hi-Spec Type A & B
UV protection	Very High
Finish	Stainless Steel Braiding
Application	Extreme temperature applications and underground stations and tunnels, trackside and exposed areas where high impact and abrasion resistance is required.

Normal operating temperature range

Application	Min Temp	Max Temp
Static	**- 60°C**	**+260°C**
Dynamic	**- 45°C**	**+260°C**

For use with - Fitting range	Hi-Spec Type A & B

Fire performance & EMI Screen

Test Standard	Performance Rating	
ISO 4589-2	40%	Self Extinguishing & halogen Free
NFF16-101	I2, F1	
BS 6853	Class 1a	
LUL	Extensive & Grouped	
UL94	V0	

Testing data	See pages 3 & 4
Type of material	Polyetheretherketone - Super low fire hazard , Stainless Steel 316 braiding
Image	

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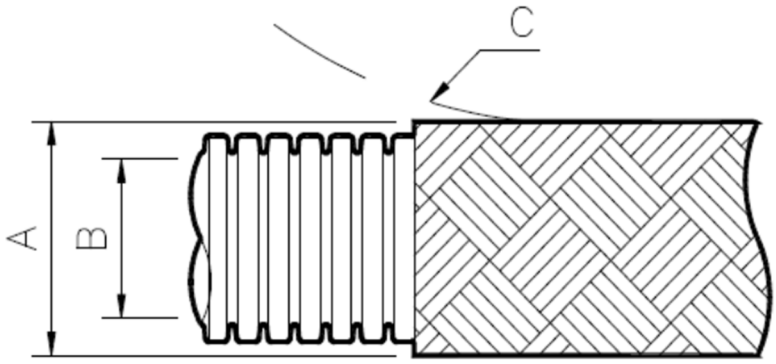
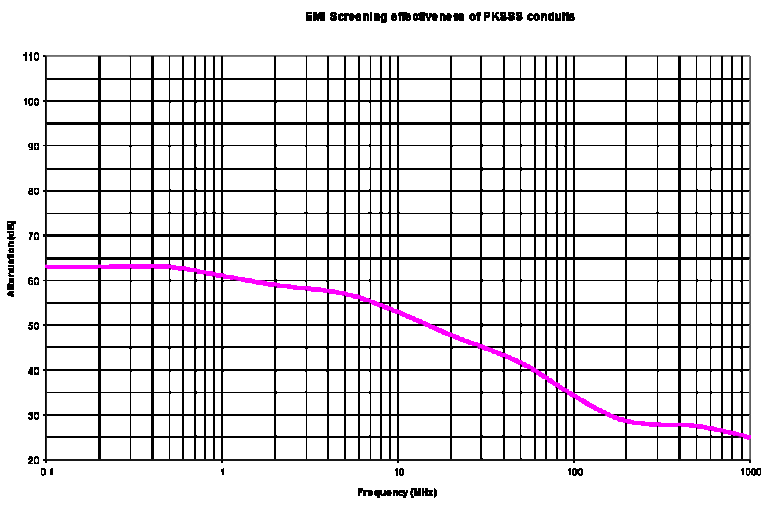
Technical & Dimensional Data

	Conduit Size			Dimensions				
Part No.	Nominal Conduit Size	NW Conduit Size	Conduit Pitch	(A) Outside Diameter	(B) Inside Diameter	(C) Min. Bend Radius	Reel Length (m)	Average Weight (Kg/100m)
TPKFSSS13	13mm	10	Fine	14.1mm	10.0mm	45mm	25, 50	2.5
TPKFSSS16	16mm	13	Fine	17.2mm	11.7mm	55mm	25, 50	2.9
TPKFSSS21	21mm	17	Fine	23.6mm	16.6mm	70mm	25, 50	4.4
TPKCSSS28	28mm	23	Coarse	30.0mm	21.7mm	85mm	25, 50	6.0
TPKCSSS34	34mm	29	Coarse	36.0mm	27.7mm	100mm	25, 50	12.0
To order quote part number, colour & reel length, e.g. TPKFSSS21/BL/50M								



EMI Screen System

The graph to the right shows the results of PKFSTC21 screened conduit, with its appropriate fittings, tested by ERA technology, to IEC60096/2:93 (radio frequency cables part 1).Tests measured attenuation in decibels (dB) over the frequency range covered by the EMC directive, 0.1 to 1000MHz.



For applications where electromagnetic interference is of particular concern, suitable conduit systems have been classified by means of symbols.

These are related in an ascending scale of performance as outlined in this explanation.

Symbol	Screen level	Explanation
STANDARD	40db @ 100MHz Standard EMI Screen	**Standard EMI Screen** (Products featuring a Stainless Steel overbraid)
ENHANCED	60db @ 100MHz Enhanced EMI Screen	**Enhanced EMI Screen** (Products featuring a Galvanised Steel overbraid)
HIGH	75db @ 100MHz High EMI Screen	**High EMI Screen** (Products featuring a tinned copper overbraid)

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BS EN 61386 Classification

	Fitting	Compression	Impact	Min temp	Max temp	bending	electrical	IP solids	IP water	Corrosion	Tensile	Non-flame Propagating	Suspended load
TPKFSSS	TPB	2	4	5	6	4	3	6	7	-	3	1	0

Mechanical Properties

Test Type	Methods / Standards	Requirements	Value
Crush Strength	IEC61386-1	<25% crush >90% recovery	>320N
Tensile Strength	IEC61386-1	Pull off of fitting minimum value	>500N
Impact Strength @-45 °C	IEC61386-1	No Cracks <20% deformation min value	>6.0J
Static Bend Radius		21mm size	70mm
Dynamic Bend radius @-45 °C	IEC61386-23	5000 cycles minimum	4xOD

Thermal Properties

Test Type	Methods / Standards	Requirements	Value
Minimum Temperature		Permanent Use (30,000 hours)	-60°C
Maximum Temperature		Permanent Use (30,000 hours)	-260°C
Maximum Short Term Temp		Peak (3000 hours)	300°C
Cold Bend @-40°C		Mandrel Diameter	3xOD
Heat Load Test @250°C	IEC61386-1	Weight @ crush classification 48hrs	Pass

Chemical Resistance Chart

Key:

Suitable :

Limited Suitability :

Unsuitable :

Not Tested :

Astm No.1	Diesel oil	Methyl Bromide	Sulphur Dioxide (Gas)
Astm No.2	Diethylamine	MEK	Sulphuric Acid (10%)
Astm No.3	Ethanol	Nitric Acid (10%)	Sulphuric Acid (70%)
Acetic Acid (10%)	Ether	Nitric Acid (70%)	Toluene
Acetone	Ethylamine	Oxalic Acid	Transformer Oil
Aluminium Chloride	Ethylene Glycol	Ozone (Gas)	1,1,1-Trichloroethane
Aniline	Ethyl Ethanoate	Paraffin oil	Trichloroethylene
Benzaldehyde	Freon 32	Petrol	Turpentine
Benzene	Hydrochloric Acid (10%)	Phenol	Vegetable Oil
Carbon tetrachloride	Hydrochloric Acid (36%)	Sea Water	Vinyl Acetate
Chlorine water	Hydrogen Peroxide (35%)	Silver Nitrate	Water
Chloroform	Hydrogen Peroxide (87%)	Skydrol	White Spirit
Citric Acid	Lactic Acid	Sodium Chloride	Zinc Chloride
Copper Sulphate	Lubricating oil	Sodium Hydroxide (10%)	
Cresol	Methanol	Sodium Hydroxide (60%)	

The information above is given as a guide only and is based on published technical data and experience. The chemical resistance of the above products is dependant on factors such as chemical exposure, concentration of the chemical and temperature. The above chemicals are valid for a temperature of 23°C. Use of the above table is at the users own discretion and risk. Those using it must satisfy themselves that their application presents no health and safety risks. The end user should assess compatibility with their application and contact TTS for further information.

ADHERENCE TO THE CURRENT WIRING REGULATIONS BS7671 OR NEC WIRING REGULATIONS (FOR USA) IS STRONGLY ADVISED.
MINIMUM BEND RADIUS FOR FLEXING IS DEPENDANT UPON MINIMUM TEMPERATURE, BENDING FREQUENCY AND CHEMICAL ENVIRONMENT.

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Flammability

Test Type	Method / Standard	Requirement	Result	Unit
Oxygen Index	ISO 4589-2	% Oxygen to support combustion ≥34%	40	%
Glow Wire Rating	IEC 60695	No Ignition to Extinguish within 2s	960	°C
Flammability	UL94	Vertical (V0) or Horizontal (HB)	V0	HB/V0
Flammability	IEC 61386-1	Self Extinguishing <30s	0s	Seconds
Flammability	NF F16-101	Glow Wire & oxygen index	I2	-
Flammability	ISO 4589-3	Flammability temperature index ≥300°C	360	°C

Smoke

Test Type	Method / Standard	Requirement	Result	Unit
Fume Rating	NF F16-101	Smoke & Toxicity	F1	-
Smoke Density	BS6853 Annex D	Ao <0.02	0.00148	Ao
Smoke Density	ASTM E-662	Ds <100 in both modes	10	Ds Max

Toxicity

Test Type	Method / Standard	Requirement	Result	Unit
Halogen Free	LUL	<0.5%	<0.1%	Yes/No
Phosphorous Free	LUL	<0.5%	<0.1%	Yes/No
Sulphur Free	LUL	<0.5%	<0.1%	Yes/No
Toxicity	NES713 Issue 3	<10.0	0.22	

Fire Performance Overview

Property	Low Fire Hazard	Enhanced Low Fire Hazard	Super Low Fire Hazard	Inherent Low Fire Hazard
				
Property	LFH	EFLH	SLFH	ILFH
Oxygen Index ISO4589	32% ≥ OI ≥ 28%	OI ≥ 32%	OI ≥ 32%	Inherent Low Fire
BS6853 Smoke Density 3m³	0.02 ≤ A_o ≤ 0.03	0.0005 ± A_o ≤ 0.02	A_o ≤ 0.005	Hazard i.e
Zero Halogen	✓	✓	✓	Type , S, SS
Zero Phosphorus	✓	✓	✓	Metallic Conduit &
Zero Sulpher	✓	✓	✓	Fittings
NFF16-101	I3F2	I2F2	I2F1	
EN45545-2	HL2	HL3	HL3	

Pre Test Conditions

Duration	Standard	Temperature	Relative Humidity
168 (Hours)	BS EN IEC 61386-1	23 (^{0}C)	50 (%)