




# Non-Metallic Systems

## PAL Lightweight Conduit



### Technical Characteristics

Conforms to	BSI Kitemark KM-35161 Low voltage directive Deutsche Bahn S4, SR2, ST2		
Approvals and Standards	  		
Degree of mechanical protection	High flexibility & fatigue life		
Degree of protection	IP40 - Adaptaring & Jumbo IP65 - N/A IP66 - Adaptalok, ATS or Adaptaseal IP67 - Adaptalok + ALS Seal or ATS, Adaptaseal IP68 - Adaptalok + ALS Seal or ATS, Adaptaseal IP69k - N/A		
UV protection	Very High		
Finish	Black (BL), Grey (GR)		
Application	Indoors / Outdoors - light industrial, buildings & machinery		
Normal operating temperature range	Application	Min Temp	Max Temp
	Static	- 40°C	+120°C
	Dynamic	- 5°C	+120 °C
For use with - Fitting range	<a href="#">Adaptalok</a> & <a href="#">ATS</a> , <a href="#">Adaptaseal</a> and <a href="#">Adaptaring</a> fittings		
Fire performance	<b>Test Standard</b>		<b>Performance Rating</b>
	IEC 61386		Pass
	NFF16-101		-
	LUL		Pass
	ASTM E662		-
	UL94		HB
Testing data	Click or See pages <a href="#">3</a> & <a href="#">4</a>		
Type of material	Polyamide (Nylon) 6 - flame retardant - heat stabilised		

Image



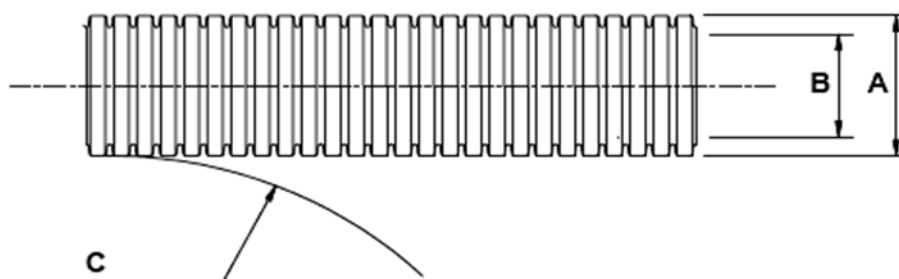
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### Technical & Dimensional Data

Part No.	Conduit Size			Dimensions				Average Weight (KG/100m)
	Nominal Conduit Size	NW Conduit Size	Conduit Pitch	(A) Outside Diameter	(B) Inside Diameter	(C) Min. Bend Radius	Reel Length (M)	
PAFL10	8mm	10	Fine	10.0mm	6.9mm	20	50/100	1.9
PAFL13	13mm	10	Fine	13.0mm	10.0mm	25	50/100	2.4
PAFL16	16mm	13	Fine	15.8mm	11.9mm	35	50/100	3.5
PAFL21	21mm	17	Fine	21.2mm	16.8mm	45	50/100	5.6
PACL28	28mm	23	Coarse	28.5mm	22.2mm	50	50m	9.5
PACL34	34mm	29	Coarse	34.5mm	27.9mm	60	50m	12.0
PACL42	42mm	36	Coarse	42.5mm	35.2mm	65	25/50	12.0
PACL54	54mm	48	Coarse	54.5mm	46.9mm	75	25m	20.0
To order quote part number, colour & reel length, e.g PAFL21/BL/50M								



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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
<b>PAL</b>	AT	2	4	2	4	4	0	6	7	-	1	1	0

### Mechanical Properties

Test Type	Methods / Standards	Requirements	Value
Crush Strength	IEC61386	<25% crush >90% recovery	>320N
Impact Strength @ 23 °C	IEC61386-1	No Cracks <20% deformation min value	>20J
Impact Strength @-5 °C	IEC61386-1	No Cracks. <20% deformation min value	>6.0J
Tensile Strength	IEC61386-1	Pull off of fitting minimum value	>100N
Dynamic Bend radius @-5 °C	IEC61386-23	5000 cycles minimum	4xOD

### Thermal Properties

Test Type	Methods / Standards	Requirements	Value
Minimum Temp	Dynamic IEC61386	Dynamic 5000 cycles	-5°C
Maximum Short Term Temp	IEC61386	Static & Dynamic 3000 hours, 5000 cycles	150°C
Minimum Static Temp		Permanent Use (30,000) Hours	-40°C
Maximum Static Temp		Permanent Use (30,000) Hours	120°C
Cold Bend @ - 40°C	NFR13-903	2xOD	-

### 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 Thomas & Betts 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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# Thomas & Betts

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### Flammability

Test Type	Method / Standard	Requirement	Result	Unit
Oxygen Index	ISO 4589-2	% Oxygen to support combustion	22	%
Glow Wire Rating	IEC 60695	No Ignition to Extinguish with 30s	-	°C
Flammability	UL94	Vertical (V0) or Horizontal (HB)	HB	
Flammability	IEC 61386-1	1Kw Burner @ 45° Vertical burn	Pass	Pass/Fail
Ignition Rating	NF F16-101	Glow Wire & oxygen index	-	-





### Smoke

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

### Toxicity

Test Type	Method / Standard	Requirement	Result	Unit
Halogen Free	LUL	<0.5%	Pass	Pass/Fail
Phosphorous Free	LUL	<0.5%	Pass	Pass/Fail
Sulphur Free	LUL	<0.5%	Pass	Pass/Fail
Toxicity	NES713 Issue 3	<10.0	-	-

### Fire Performance Overview

Property	Low Fire Hazard	Enhanced Low Fire Hazard	Super Low Fire Hazard	Inherent Low Fire Hazard
<b>Property</b> Oxygen Index ISO4589 BS6853 Smoke Density 3m³ Zero Halogen Zero Phosphorus Zero Sulphur NFF16-102 EN45545-2	 LFH 32% ≥ OI ≥ 28% 0.02 ≤ A <sub>s</sub> ≤ 0.03 ✓ ✓ ✓ I3F2 HL2	 ELFH OI ≥ 32% 0.0005 ± A <sub>s</sub> ≤ 0.02 ✓ ✓ ✓ I2F2 HL3	 SLFH OI ≥ 32% A <sub>s</sub> ≤ 0.005 ✓ ✓ ✓ I2F1 HL3	 ILFH Inherent Low Fire Hazard i.e Type , S, SS Metallic Conduit & Fit- tings

### Pre Test Conditions

Duration	Standard	Temperature	Relative Humidity
168 (Hours)	EN50086/IEC61386	23 (°C)	50 (%)

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