

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 - Adapting & 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 [Adaptalok](#) & [ATS](#), [Adaptaseal](#) and [Adapting](#) fittings

Fire performance	Test Standard	Performance Rating	
	IEC 61386	Pass	
	NFF16-101	-	Self Extinguishing & Halogen Free
	LUL	Pass	
	ASTM E662	-	
	UL94	HB	

Testing data Click or See pages [3](#) & [4](#)

Type of material Polyamide (Nylon) 6 - flame retardant - heat stabilised

Image



Non-Metallic Systems

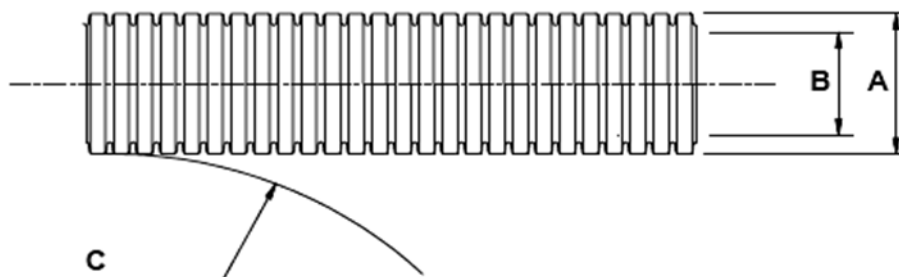
PAL Lightweight Conduit



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



Non-Metallic Systems

PAL Lightweight Conduit



BS EN 61386 Classification

	Fitting	Compression	Impact	Min temp	Max temp	bending	electrical	IP solids	IP water	Corrosion	Tensile	Non-flame Propogating	Suspended load
PAL	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:	Green	Yellow	Red	Black
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.

Non-Metallic Systems

PAL Lightweight Conduit



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
				
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 _s ≤ 0.03	0.0005 ± A _s ≤ 0.02	A _s ≤ 0.005	Hazard i.e
Zero Halogen	✓	✓	✓	Type , S, SS
Zero Phosphorus	✓	✓	✓	Metallic Conduit & Fit-
Zero Sulphur	✓	✓	✓	tings
NFF16-102	I3F2	I2F2	I2F1	
EN45545-2	HL2	HL3	HL3	

Pre Test Conditions

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