

Technical Section

THREAD DATA, EMI SCREEN SYSTEM & FIRE PERFORMANCE

Thread Data

METRIC

Standard thread conforming to EN60423 & BS3643

THREAD SIZE mm	EXT THREAD OUTSIDE DIAMETER	INT THREAD INSIDE DIAMETER	PITCH
M8	8.0	6.9	1.0
M10	10.0	8.9	1.0
M12	12.0	10.9	1.0
M12	12.0	10.4	1.5
M16	16.0	14.4	1.5
M18	18.0	16.9	1.0
M20	20.0	18.4	1.5
M25	25.0	23.4	1.5
M30	30.0	28.4	1.5
M32	32.0	30.4	1.5
M40	40.0	38.4	1.5
M50	50.0	48.4	1.5
M63	63.0	61.4	1.5
M75	75.0	73.4	1.5
-	-	-	-

PG

German Standard thread conforming to DIN40430

THREAD SIZE mm	EXT THREAD OUTSIDE DIAMETER	INT THREAD INSIDE DIAMETER	PITCH
PG7	12.5	11.3	1.27
PG9	15.2	13.9	1.41
PG11	18.6	17.3	1.41
PG13.5	20.4	19.1	1.41
PG16	22.5	21.2	1.41
PG21	28.3	26.8	1.59
PG29	37.0	35.5	1.59
PG36	47.0	45.5	1.59
PG42	54.0	52.5	1.59
PG48	59.3	57.8	1.59
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

PF

Japanese conduit thread conforming to JIS B 0202

THREAD SIZE (inches)	EXT THREAD OUTSIDE DIAMETER	INT THREAD INSIDE DIAMETER	PITCH
1/4	13.0	-	1.34
3/8	16.7	15.0	1.34
1/2	21.0	18.6	1.81
3/4	26.4	24.1	1.81
1	33.3	30.3	2.31
1 1/4	41.9	39.0	2.31
1 1/2	47.8	44.8	2.31
2	59.6	56.7	2.31
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

NPT

US taper seal pipe thread conforming to ANSI/ASME B1.20.1 – 1983

THREAD SIZE (inches)	EXT THREAD OUTSIDE DIAMETER	PITCH
-	-	-
3/8	16.7	1.14
1/2	21.0	1.81
3/4	26.4	1.81
1	33.3	2.21
1 1/4	41.9	2.21
1 1/2	47.8	2.21
2	59.6	2.21
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-




UNEF

American Unified Thread conforming to BS1580

THREAD SIZE (inches)	EXT THREAD OUTSIDE DIAMETER	INT THREAD INSIDE DIAMETER	PITCH
5/8	15.9	14.7	1.06
3/4	19.1	17.7	1.27
7/8	20.6	19.3	1.27
1	22.2	20.9	1.27
1 1/8	23.8	22.4	1.27
1 1/4	25.4	24.0	1.27
1 3/8	28.6	27.0	1.41
1 1/2	30.2	28.6	1.41
1 3/4	31.8	30.2	1.41
2	33.3	31.8	1.41
2 1/8	34.9	33.4	1.41
2 1/4	36.5	35.0	1.41
2 3/8	44.5	42.9	1.41
2 1/2	50.8	49.3	1.41
2 3/4	57.2	55.4	1.41

NOTE: Dimensions are nominal & in mm unless otherwise stated.

EMI Screen System

<p>40db @ 100MHz</p>  <p>STANDARD EMI SCREEN</p>	<p>SCREENING LEVEL 60db @ 100MHz</p>  <p>ENHANCED EMI SCREEN</p>	<p>75db @ 100MHz</p>  <p>HIGH EMI SCREEN</p>
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For applications where electromagnetic interference is of particular concern we have classified suitable conduit systems by means of symbols. These are related in an ascending scale of performance from Standard EMI Screen (products featuring a stainless steel overbraid) through to High EMI Screen (products featuring a tinned copper overbraid).

Contact us for full details.

Fire Performance

 <p>LOW FIRE HAZARD</p>	 <p>ENHANCED LOW FIRE HAZARD</p>	 <p>SUPER LOW FIRE HAZARD</p>	 <p>INHERENT LOW FIRE HAZARD</p>
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PROPERTY	LFH	ELFH	SLFH	ILFH
OXYGEN INDEX ISO4589	31% OI 28%	OI 35%	OI 35%	Inherent Low Fire Hazard
BS6853 SMOKE DENSITY 3m ²	0.02 A ₀ 0.03	0.005 A ₀ 0.02	A ₀ 0.005	i.e. Type S, SS, SPB STC, SSB & SSBGS Metallic Conduit & Fittings
ZERO HALOGEN	✓	✓	✓	
ZERO PHOSPHORUS	✓	✓	✓	
ZERO SULPHUR	✓	✓	✓	
LONDON UNDERGROUND CONCESSION	CONCESSION	APPROVED	APPROVED	
TOXICITY INDEX NES713 ISSUE 3	5.0 TI 6.0	0.5 TI 5.0	TI 0.5	
NFF16-102	I3F2	I2F2	I2F1	

Adaptaflex has introduced a set of symbols to help the user specify conduit systems for installations where fire performance is of particular concern. Each symbol encompasses a range of properties relevant to the high specification materials used in the construction of the conduit. They are in an ascending scale of performance from Low Fire Hazard (LFH) featuring zero halogen through to Super Low Fire Hazard (SLFH) featuring zero nitrogen. In addition, Inherent Low Fire Hazard systems (ILFH) are classified as being all metal systems.

Ingress Protection (IP) Rating according to EN 60529/DIN 40050

IP suitability ratings are a system for classifying the degree of protection provided by enclosures of electrical equipment. The higher the number, the greater the degree of protection; they apply **ONLY** to properly installed equipment. The numerals stand for the following:

IP **6** **8**

The first digit stands for:
Protection against Dust



IP **6** **8**

The second digit stands for:
Protection against Water



Protection against Solid Bodies

Degree of protection for persons against access to hazardous parts inside the enclosure and/or against the ingress of solid foreign objects.

- 0** No protection
- 1** Objects greater than 50 mm, accidental touch by hands
- 2** Objects greater than 12 mm, accidental touch by fingers
- 3** Objects greater than 2.5 mm, e.g. tools/wires
- 4** Objects greater than 1 mm, e.g. tools/wires/small wires
- 5** Protected against dust - limited ingress (no harmful deposits)
- 6** Totally protected against dust (Dust-tight)

Protection against Water

Degree of protection of equipment inside enclosures against damage from the ingress of water.

- 0** No protection
- 1** Protected against vertically falling drops of water
- 2** Protected against direct sprays of water up to 15° from vertical
- 3** Protected against sprays of water to 60° from vertical
- 4** Protected against water sprayed from all directions - limited ingress permitted
- 5** Protected against low pressure jets of water from all directions - limited ingress permitted
- 6** Protected against strong pressure jets of water, heavy seas - limited ingress permitted
- 7** Protection against the Effects of immersion between 15cm - 1 m
- 8** Protection against long periods of immersion under a quoted pressure. E.g. 2 bar at 24 hours
- 9k** IP69k Automotive standard DIN40050 and signifies resistance to high pressure jets of water (up to 80bar) from any angle.

Fitting Characteristics



Fitting or thread swivels independently of conduit during installation but is not suitable as a rotating joint in constantly moving applications



Fitting rotates independently of the conduit to act as a rotating joint within constantly moving applications

Chemical resistance comparison table

Products	PA, PR, PADL, SN	PI	CP	KF, RF, SP	PP	PK	Fittings PA66	ATS Elastomer Seal	S (incl braid)	SS (incl braid)	LFH-SP	SPL, SPUL	SPLHC	TC braid	Fittings nickel plated brass
Chemical															
Astm no.1	●	●	●	■	●	●	●	●	●	●	■	●	●	●	●
Astm no.2	●	●	●	■	●	●	●	●	●	●	■	●	●	●	●
Astm no.3	●	●	●	■	▲	●	●	●	●	●	▲	●	▲	●	●
Acetic Acid (10%)	▲	▲	●	▲	●	●	▲	▲	■	●	●	●	●	▲	●
Acetone	●	●	▲	■	●	●	▲	▲	●	●	■	■	●	●	●
Aluminium Chloride	▲	●	■	▲	●	●	▲	▲	■	▲	●	■	●	▲	NT
Aniline	▲	■	■	■	●	▲	▲	■	●	●	●	■	●	●	●
Benzaldehyde	▲	▲	▲	■	▲	●	▲	▲	●	●	■	■	▲	●	●
Benzene	●	●	▲	■	▲	●	●	▲	●	●	■	■	■	●	●
Carbon tetrachloride	●	●	■	■	▲	●	●	▲	●	●	■	■	▲	●	●
Chlorine Water	■	■	▲	▲	▲	■	■	■	■	■	▲	▲	▲	■	●
Chloroform	■	■	■	■	▲	●	■	▲	●	●	■	■	▲	●	●
Citric acid	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Copper sulphate	▲	●	●	●	●	●	▲	●	●	●	●	●	●	●	●
Cresol	■	■	NT	▲	●	▲	■	●	●	●	■	▲	●	▲	●
Diesel oil	●	●	●	▲	●	●	●	●	●	●	▲	●	●	●	●
Diethylamine	●	▲	▲	▲	●	●	●	■	●	●	▲	▲	●	●	●
Ethanol	●	▲	●	■	●	●	●	▲	●	●	▲	■	●	●	●
Ether	●	●	NT	▲	●	●	●	●	●	●	■	▲	●	●	●
Ethylamine	●	▲	NT	▲	●	●	●	■	●	●	▲	▲	▲	●	●
Ethylene Glycol	●	●	●	▲	●	●	●	■	■	■	■	■	●	●	●
Ethyl ethanoate	▲	●	●	■	●	●	▲	■	■	■	■	■	●	●	●
Freon 32	●	●	●	▲	●	●	▲	■	■	■	■	▲	■	●	●
Hydrchloric acid (10%)	■	▲	▲	●	●	●	■	▲	■	■	■	●	●	■	●
Hydrchloric acid (36%)	■	■	■	▲	●	●	■	■	■	■	■	●	●	■	●
Hydrogen peroxide (35%)	▲	▲	▲	●	▲	●	▲	■	■	■	■	■	▲	●	●
Hydrogen peroxide (87%)	■	■	■	●	▲	●	■	■	■	■	■	■	■	▲	●
Lactic acid	▲	●	■	▲	●	●	▲	●	■	■	■	▲	▲	●	●
Lubricating oil	●	●	●	▲	●	●	●	●	●	●	▲	■	▲	●	●
Methanol	▲	▲	●	■	●	●	▲	▲	●	●	■	■	▲	●	●
Methyl bromide	■	■	NT	■	▲	●	■	■	●	●	■	■	▲	●	●
MEK	●	●	▲	■	●	●	●	▲	●	●	■	■	●	●	●
Nitric acid (10%)	■	■	▲	●	●	●	■	■	■	■	■	■	●	■	●
Nitric acid (70%)	■	■	■	▲	●	■	■	■	■	■	■	■	●	■	●
Oxalic acid	▲	●	▲	▲	●	●	▲	▲	■	■	■	■	●	▲	●
Ozone (gas)	■	■	NT	▲	▲	●	■	●	■	■	■	▲	▲	●	●
Paraffin oil	●	●	●	▲	●	●	●	●	●	●	▲	●	●	●	●
Petrol	●	●	●	■	●	●	●	●	●	●	●	●	●	●	●
Phenol	■	■	■	▲	●	▲	■	▲	●	●	■	▲	●	▲	●
Sea water	●	●	●	●	●	●	●	●	■	■	■	■	●	●	▲
Silver nitrate	●	●	NT	●	●	●	●	●	■	■	■	■	●	●	●
Skydrol	●	●	●	■	●	●	▲	●	●	●	■	■	●	●	●
Sodium chloride	●	●	●	●	●	●	●	●	■	■	■	■	●	●	▲
Sodium hydroxide (10%)	●	●	●	●	●	●	●	●	■	■	■	■	●	●	●
Sodium hydroxide (60%)	●	▲	■	▲	●	●	■	■	■	■	■	■	●	●	●
Sulphur dioxide (gas)	■	■	▲	●	●	●	■	■	■	■	■	■	●	▲	■
Sulphuric acid (10%)	■	▲	●	●	●	●	■	■	■	■	■	■	●	■	■
Sulphuric acid (70%)	■	■	■	●	●	■	■	■	■	■	■	■	●	■	■
Toluene	●	●	▲	■	●	●	■	■	●	●	▲	■	■	●	●
Transformer oil	●	●	●	▲	●	●	●	●	●	●	▲	■	▲	●	●
1,1,1-Trichloroethane	●	●	▲	■	▲	●	▲	■	■	■	■	■	▲	●	●
Trichloroethylene	▲	■	■	■	▲	●	▲	■	■	■	■	■	■	●	●
Turpentine	●	●	●	▲	■	●	▲	■	■	■	■	■	■	●	●
Vegetable oil	●	●	●	▲	●	●	●	●	●	●	▲	■	●	●	●
Vinyl acetate	▲	●	NT	■	●	●	▲	■	■	■	■	■	●	●	●
Water	●	●	●	●	●	●	●	●	■	■	■	■	●	●	●
White spirit	●	●	NT	▲	●	●	●	■	■	■	■	■	▲	●	●
Zinc chloride	■	●	▲	●	●	●	■	▲	■	■	■	■	▲	●	●

Key
 SUITABLE ●
 LIMITED SUITABILITY ▲
 UNSUITABLE ■
 NOT TESTED NT

Note

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 Adaptaflex for further information.

Technical Section

CABLE CARRYING CAPACITY (WIRE FILL)

Introduction

UK Wiring regulations BS7671 recommend that the total cross sectional area of the sum of individual cables shall not exceed 40% of the cross sectional area of the conduit based on using 3 or more cables. The tables below enable you to calculate the number of conductors that can be run within a piece of flexible conduit.

Instructions

- STEP 1 Establish the number and size of each wire to be run in the conduit
- STEP 2 Look on the Cross Sectional Area (CSA) chart (table 1), look up the CSA taken up by each of the wires from STEP 1
- STEP 3 Add all the CSA values together (Total CSA)
- STEP 4 Look on the conduit fill value chart (table 2). Choose a conduit with a 40% fill value higher than the total CSA from STEP 3

Table 1. Cross Sectional Area (CSA) chart.

NOMINAL CONDUCTOR SIZE	NUMBER OF WIRES							
	1	2	3	4	5	10	15	20
1mm	6.6	13.2	19.8	26.4	33	66	99	132
1.5mm	7.6	15.2	22.8	30.4	38	76	114	152
2.5mm	9.6	19.2	28.8	38.4	48	96	144	192
4mm	14.5	29	43.5	58	72.5	145	217.5	290
6mm	18.8	37.6	56.4	75.2	94	188	282	376
10mm	29.3	58.6	87.9	117.2	146.5	293	439.5	586
16mm	40.2	80.4	120.6	160.8	201	402	603	804
25mm	63.8	127.6	191.4	255.2	319	638	957	1276
35mm	83.5	167	250.5	334	417.5	835	1252	1670
50mm	113	226	339	452	565	1130	1695	2260
70mm	149	298	447	596	745	1490	2235	-
95mm	204	408	612	816	1020	2040	-	-

Table 2. Wire Fill of Plastic & Metallic Conduit.

NOMINAL DIAMETER	PLASTIC Conduit		METALLIC Conduit		
	100% FILL	40% FILL	100% FILL	40% FILL	
10mm	33.2	13	10mm	25.5	10.2
13mm	72.4	29	12mm	58.1	23.2
16mm	109.4	44	16mm	83.3	33.3
18mm	158.4	63	20mm	160.6	64.2
21mm	213.8	86	25mm	243.3	97.3
28mm	369.8	148	32mm	452.4	181
34mm	602.6	241	40mm	855.3	342.1
42mm	973.1	390	50mm	1164.2	465.7
54mm	1698.2	680	63mm	1963.5	785.4
80mm	3520	1410	75mm	3473.2	1389.3
106mm	6500	2600			

Example - What size of conduit to use?

- STEP 1. 4 x 2.5mm conductors, 2 x 10mm conductors and 3 x 50mm conductors
- STEP 2. The CSA of Four 2.5mm conductors is 38.4, Two 10mm conductors is 58.6, Three 50mm conductors is 339
- STEP 3. Total of these groups is $38.4 + 58.6 + 339 = 436$
- STEP 4. Using Table 2 the conduit is either 54mm (680) Plastic or 50mm (465.7) Metallic
Note. 42mm Plastic is 390 which is smaller than 436 therefore not recommended

The information given above relates to PA - Standard weight conduit and Adaptalok fittings or SPL with M- Type fittings. It is given in good faith and should be used only as a guide in conjunction with the relevant wiring regulations.

Technical Section

IEC61386 CLASSIFICATIONS

IEC61386 Classifications table

Non-metallic	WITH FITTING	COMPRESSION STRENGTH	IMPACT STRENGTH**	MINIMUM TEMP.	MAXIMUM TEMP.	BENDING PROPERTIES	ELECTRICAL PROPERTIES	IP RATING SOLIDS	IP RATING WATER	CORROSION RESISTANCE	TENSILE STRENGTH	NON-FLAME PROPAGATING	SUSPENDED LOAD CAPACITY
PA LIGHT	AL	2	4	2	4	4	0	6	6	-	1	1	0
PA STANDARD	AL	2	4	2	4	4	0	6	6	-	1	1	0
PA HEAVY	AL	2	4	2	4	4	0	6	6	-	2	1	0
PADL	AL	2	4	4	4	4	0	6	6	-	2	1	0
PI LIGHT	AL	1	4	2	3	4	0	6	6	-	1	1	0
PI STANDARD	AL	1	3	5	4	4	0	6	6	-	1	1	0
PI HEAVY	AL	2	4	5	4	4	0	6	6	-	1	1	0
PR	AL	2	4	2	4	4	0	6	6	-	1	1	0
CP	AL	1	4	4	5	4	0	6	6	-	1	1	0
KF LIGHT	KC	2	2	2	1	2	2	4	0	-	1	1	0
KF STANDARD	KC	2	3	2	1	2	2	4	0	-	2	1	0
KF MEDIUM	KC	3	3	2	1	2	2	4	0	-	1	1	0
PK	PK	2	4	5	6	4	2	6	7	-	1	1	0
PKTC	PB	2	4	5	6	4	3	6	7	-	3	1	0
PKSS	PB	2	4	5	6	4	3	6	7	-	3	1	0
PRTC	PB	2	4	2	4	4	1	6	7	-	3	1	0
PRSS	PB	2	4	2	4	4	1	6	7	-	3	1	0

Metallic													
S	S	4	4	5	6	4	0	4	0	1	4	1	5
SS	S	4	4	5	6	4	0	4	0	4	4	1	5
SP	SP(M)	4	4	2	2	4	2	6	5	-	4	1	5
SN	SP(M)	4	4	4	5	4	0	6	5	-	4	1	5
LFH-SP	SP(M)	4	4	2	3	4	0	6	5	-	4	1	5
SPL	SPL(M)	4	4	2	3	4	2	6	7	-	4	1	5
SPLHC	SPL(M)	4	4	5	5	4	0	6	7	-	4	1	5
SB	SB	4	5	5	6	4	1	4	0	1	4	1	5
STC	SB	4	4	5	6	4	1	4	0	1	4	1	5
SSB	SB	4	4	5	6	4	1	4	0	4	4	1	5
SSBGS	SB	4	4	5	6	4	1	4	0	1	4	1	5
SPB	SPB	4	4	2	2	4	3	5	4	-	4	1	5
SPTC	SPB	4	4	2	2	4	3	5	4	-	4	1	5
SPLHCB	SPLB	4	4	5	5	4	1	6	7	-	5	1	5

Performance Classification Key

Classification Level	Units	(N)	(J)	(°C)	(°C)	-	-	-	-	-	(N)	-	(N)
0	-	-	-	-	-	-	Not declared	-	0	N/A	Not declared	-	Not declared
1	125	0.5	5	60	Rigid	Conductor	-	1	Low	100	✓	20	
2	320	1	-5	90	Pliable	Insulator	-	2	Medium	250	✗	30	
3	750	2	-15	105	1/2 Semi Rigid	Con/Ins	3	3	Med-Hi	500	-	150	
4	1250	6	-25	120	Flexible	-	4	4	High	1000	-	450	
5	4000	20	-45	150	-	-	5	5	-	2500	-	850	
6	-	-	-	250	-	-	6	6	-	-	-	-	
7	-	-	-	-	-	-	-	7	-	-	-	-	