

CLIPSAL[®]
HALOGEN FREE
CONDUITS AND HOSE

Total flexibility
under fire



CLIPSAL HALOGEN FREE CONDUITS AND HOSE

When Clipsal first introduced halogen free conduits their fire resistant properties made them a major safety breakthrough in fire risk areas. Other features of these conduits have made them just as important a breakthrough in other areas where temperature stability and halogen free properties are desirable.

To increase the versatility of the range Clipsal have now released two new ranges of halogen free conduits and fittings. So now Clipsal can offer you three conduit systems with halogen free protection.

1. HFT RIGID CONDUIT
2. HFT CORRUGATED CONDUIT
3. FLEXIBLE ELECTRICAL HOSE

These new conduits make for easier and faster installation whilst maintaining the proven safety features of our rigid HFT conduits.

In addition, FLEXIBLE ELECTRICAL HOSE extends the use of halogen free conduits into petro-chemical areas, an avenue of use not previously suitable to these type of conduits.

So now the Clipsal halogen free range of conduits gives you total flexibility of installation in almost every fire sensitive installation.

WHAT HFT

The letters HFT come from an abbreviated description of the three most important properties of this remarkable range of conduits and fittings, which are:

H HALOGEN FREE

Unlike conventional PVC, the special plastic alloy used to manufacture our HFT conduits and fittings contains no halogens (chlorine, bromine, fluorine, iodine). Therefore no toxic or corrosive gases are released in the event of fire.



APPLIC

The unique properties of Clipsal halogen free conduits and fittings make them ideally suited for installation in a wide variety of situations. In many cases, the considerable mechanical strength of the rigid units makes them a viable and practical alternative to steel equivalents. And, throughout the range, their proven fire-resistance, and easy, low-cost handling, means they are perfect for use in, power plants, factories, hotels, public buildings, schools, multi-storey flats and many structures

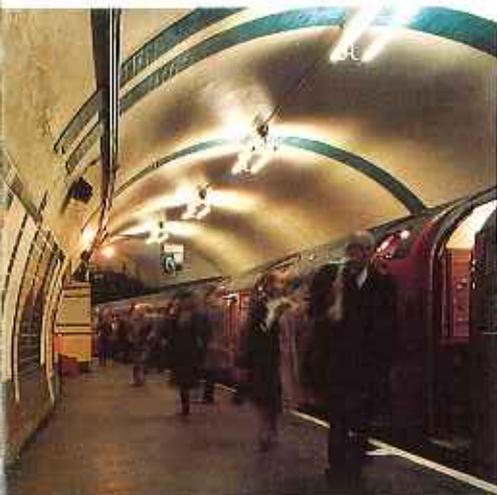
REPRESENTS

F FIRE RESISTANT

HFT conduits and fittings are fire-resistant, self-extinguishing within 10 seconds, and non-dripping.

T TEMPERATURE STABILITY

HFT conduit and fittings have an operational temperature range of between -40°C to $+140^{\circ}\text{C}$, which is greater than similar PVC units.



ATIONS

containing high concentrations of people and or sophisticated equipment.

Another application for halogen free conduits that shouldn't be overlooked is their ability to replace existing and outdated conduits and cable support systems when renovating or updating the electrical installation of an old building. To supply the benefits that halogen free conduits can give, in existing cable pits and old buildings; not only makes good sense for the electrical and safety aspects, but it is also an extremely cost efficient alternative.



INSTALLATION ADVANTAGES

HALOGEN FREE

Preventative fire-proofing and the reduction of damage following a fire, have gained increasing importance as large modern buildings house more and more people and high technology equipment. HFT conduits are HALOGEN FREE and in the event of fire, do not produce corrosive or toxic gases such as chlorine.

Halogens, when they come into contact with moisture or condensation (i.e. on the lungs, on substances, componentry or in the air) produce poisonous and or corrosive gases which can injure or kill people, cause irreversible damage to equipment (especially computer installations) and in extreme cases weaken the structures of buildings.

This makes halogen free materials a must for all installations such as hospitals, office blocks, nursing homes, computer centres, hi-tech laboratories, conference centres, entertainment complexes and anywhere protection for people or equipment is needed.

FIRE RESISTANCE

The conduits are also FIRE RESISTANT and comply with relevant sections of AS2420 'Fire Test Methods for Solid Insulating Materials and Non-metallic Enclosures used in Electrical Equipment'. They are difficult to ignite and halogen free conduits

self-extinguish immediately the flame is removed. Additionally, low smoke density is another major benefit. And whereas PVC conduits can actually feed fire when halogens are released through combustion, the opposite is true of HFT conduits and fittings. Another significant advantage.

TEMPERATURE STABILITY

HFT conduit's TEMPERATURE STABILITY range of -40°C to $+140^{\circ}\text{C}$ represents considerable thermal resistance.

Plastic conduits and fittings can now be used in many new areas. This non-flammability and higher temperature resistance markedly improves the operational reliability of electrical systems should fire eventuate.

Cables, connections and equipment remain in operation for longer, which is particularly important for stand-by plants, emergency lighting and communications systems. Owing to this wide temperature range, halogen free conduits are climatically stable. They are UV stabilised and resistant to all kinds of weather conditions, e.g. heat, cold, ice, sea water, radiation, etc.

LIMITATIONS

As with all materials, exposure to certain chemicals can adversely affect the physical properties of HFT plastics. Before installing HFT conduits, check the chemical compatibility chart in this brochure.

Chemical resistance properties of halogen free conduits

KEY: - **EXCELLENT** = Resistant. No or negligible change in mass or dimension at room or elevated temperatures. **GOOD** = Moderate Resistance. Product may fail at raised stress and / or temperature exposure. **FAIR** = Limited Resistance. Product may fail at low stress levels at room temperature. Brief contact may be possible under some circumstances.

POOR = Severe attack. Resultant considerable loss of properties.

Please note: The data presented here is meant to serve as a guide only. Many factors contribute to environmental resistance such as part stress, duration of contact, concentration of substances, ambient temperatures and installation loads to which the part is exposed. Each user should ideally conduct resistance tests on the given materials in the typical operating environment for the installation. It is the responsibility of the user to identify their specific environmental conditions.

Substance	Concentr.	Level of resistance			Substance	Concentr.	Level of resistance		
		HFT Rigid	HFT Corrugated	Flex. Elec. Hose			HFT Rigid	HFT Corrugated	Flex. Elec. Hose
INORGANIC ACIDS					HYDROCARBONS, AROMATIC				
Chromic Acid	5%	Excellent	Excellent	Poor	Benzene		Poor	Poor	Excellent
Hydrochloric Acid	20%	Good	Excellent	Poor	Toluene		Poor	Poor	Excellent
	10%	Excellent	Excellent	Poor	Xylene		Poor	Poor	Excellent
Hydrofluoric Acid	20%	Excellent	Excellent	Poor	HYDROCARBONS HALOGENATED				
	Concentrated	Excellent	Poor	Poor	Carbon				
Nitric Acid	5%	Excellent	Excellent	Poor	Tetrachloride				Excellent
Phosphoric Acid	10%	Excellent	Excellent	Poor	Chlorobenzene		Poor	Poor	Excellent
	20%	Excellent	Good/Fair	Poor	Chloroform		Poor	Poor	Poor
Sulphuric Acid	30%	Excellent	Poor	Poor	Methylene Chloride				Good/Fair
	60%	Good	Fair	Poor	Trichloroethylene		Poor	Poor	Good
	10%	Excellent	Excellent	Poor	Freon		Poor	Excellent	Excellent
	30%	Excellent	Good	Poor	KETONES AND ETHERS				
	60%	Excellent	Good	Poor	Acetone		Poor	Poor	Excellent
	90%	Fair	Poor	Poor	Cyclohexanone		Poor	Poor	Excellent
ORGANIC ACIDS					SALTS				
Acetic Acid	10%	Excellent	Excellent	Fair	Ammonium Nitrate	Saturated	Excellent	Excellent	Excellent
	100%	Excellent	Poor	Poor	Ammonium Sulphate	Saturated	Excellent	Excellent	Excellent
Oleic Acid	100%	Good	Excellent	Excellent	Calcium Chloride	Saturated	Excellent	Excellent	Excellent
Oxalic Acid	10%	Excellent	Good	Fair	Potassium Bicarbonate	Saturated	Excellent	Excellent	Excellent
Tartaric Acid	10%	Excellent	Excellent	Excellent	Sodium Bicarbonate	Saturated	Excellent	Excellent	Excellent
ALCOHOLS AND GLYCOLS					MISCELLANEOUS				
Diethyl Glycol		Excellent	Excellent	Excellent	Car Detergent (most types)		Excellent	Excellent	Excellent
Ethanol		Excellent	Excellent	Excellent	Car Wax (most types)		Excellent	Excellent	Excellent
Ethylene Glycol		Excellent	Excellent	Excellent	Cooking Oils and Fats		Fair	Fair	Excellent
Isopropyl Alcohol		Excellent	Good/Fair	Good	Food Spices and Essences		Poor	Fair	Excellent
Methanol		Excellent	Poor	Good	Hydraulic Oil		Good	Good	Excellent
ALDEHYDES					ESTERS				
Acetaldehyde		Poor	Poor	Good	Ethyl Acetate		Fair	Poor	Excellent
ALKALIES					HYDROCARBONS, ALIPHATIC				
Ammonium Hydroxide	10%	Excellent	Poor	Excellent	Butane		Excellent	Excellent	Excellent
	Concentrated	Fair	Poor	Good	Kerosene		Poor	Poor	Excellent
Potassium Hydroxide	10%	Excellent	Poor	Excellent	Petrol		Poor	Poor	Excellent
	30%	Excellent	Poor	Good	Propane Gas		Excellent	Excellent	Excellent
Sodium Hydroxide	10%	Excellent	Poor	Excellent					
	Concentrated	Excellent	Poor	Good					
AMINES					AMINES				
Aniline		Poor	Poor	Fair					

Dimensional Detail, Cross sectional area and space factors (all dimensions in millimetres except where otherwise stated)

Catalogue No.	HFT Rigid Conduit			HFT Corrugated Conduit						Flexible Electrical Hose						
	9020HF	9025HF	9032HF	9016CHF	9020CHF	9025CHF	9032CHF	9040CHF	9050CHF	9012EH	9016EH	9020EH	9025EH	9032EH	9040EH	9050EH
Nominal Size	20	25	32	16	20	25	32	40	50	12	16	20	25	32	40	50
Outside Dia.	20	25	32	16	20	25	32	40	50	12	16	20	25	32	40	50
	+0.0-0.3	+0.0-0.4	+0.0-0.4	+0.0-0.3	+0.0-0.3	+0.0-0.4	+0.0-0.4	+0.0-0.4	+0.0-0.4	+0.0-0.2	+0.0-0.3	+0.0-0.3	+0.0-0.4	+0.0-0.4	+0.0-0.4	+0.0-0.4
Wall Thickness	2.40	2.65	2.85	2.17	2.625	3.0	2.9	4.3	5.1	1.7	2.17	2.625	3.0	2.9	4.3	5.1
	+/-0.15	+/-0.15	+/-0.15	+/-0.15	+/-0.15	+/-0.15	+/-0.15	+/-0.15	+/-0.15	+/-0.15	+/-0.15	+/-0.15	+/-0.15	+/-0.15	+/-0.15	+/-0.15
Approx. Basic Bore Diameter	15.0	19.5	26.1	11.5	14.6	18.8	26.0	31.2	39.6	9.5	11.5	14.6	18.8	26.0	31.2	39.6
Approx. Bore Area (mm²)	177	297	535	104	168	278	531	765	1232	71	104	168	278	531	765	1232

Physical Properties (These indications refer to tested standardised samples)

	Unit	Conduit Types		Flex. Elec. Hose
		HFT Rigid	HFT Cor.	
Physical and Mechanical Properties				
Specific gravity	g/cm ³	1.06	1.21	1.16
Tensile modulus	N/mm ²	2400	2300	2000
Elongation at break	%	30	100	100
Water absorption (24hrs)	%	0.08	0.1	3
Electrical Properties				
Dielectric strength	kV/mm	25	17	35
Volume Resistivity	Ohm x cm	10 ¹⁵	10 ¹⁵	10 ¹²
Dielectric constant at 1 MHz		2.8	3.0	5.8
Thermal Properties				
Coefficient of linear thermal expansion	m/m°C	7 x 10 ⁻⁵	7 x 10 ⁻⁵	7 x 10 ⁻⁵
Flammability	—	self extinguishing		
Softening Temperature	°C	165	150	210
Thermal resistance in continual use	°C	-40 to +140	-40 to +140	-40 to +100
Oxygen Index	%	36	40	35

Recommended maximum number of thermoplastic insulated unsheathed cables in HFT Rigid Conduit, HFT Corrugated Conduit and Flexible Electrical Hose

Cables – AS3147				HFT Rigid Conduit			HFT Corrugated Conduit					Flexible Electrical Hose							
Nominal Size (mm ²)	Stranding	Overall Diameter	Area mm ²	20	25	32	16	20	25	32	40	50	12	16	20	25	32	40	50
1	1/1.13	2.9	6.6	10	17	31	8	9	16	31	49	80	7	8	9	16	32	49	80
1.5 solid	1/1.38	3.2	8.0	8	14	26	6	7	14	26	40	65	5	6	7	14	27	40	65
1.5 stranded	7/0.50	3.3	8.6	8	13	24	5	7	13	24	38	60	4	5	7	13	25	38	60
2.5 solid	1/1.78	3.6	10.2	6	11	20	5	6	11	20	32	51	3	5	6	11	21	32	51
2.5 stranded	7/0.67	3.8	11.3	6	10	18	4	5	10	18	28	46	3	4	5	10	19	28	46
4	7/0.85	4.8	18.1	7	6	11	2	3	6	11	17	28	2	2	3	6	12	17	28
6	7/1.04	5.3	22	3	5	9	2	2	4	9	13	22	1	2	2	4	9	13	22
10	7/1.35	6.3	31	2	4	7	1	1	3	7	9	16	1	1	2	3	7	9	16
16	7/1.70	7.3	42	1	3	5		1	2	5	7	11			1	2	5	7	11
25	19/1.35	9.4	69	1	1	3		1	1	3	5	7			1	1	3	5	7
35	19/1.53	10.4	85	1	1	2			1	2	4	5				1	2	4	5
50	19/1.78	12.0	113		1	1			1	1	3	5				1	1	3	5
70	19/2.14	13.8	150		1	1			1	1	2	4				1	1	2	4
95	37/1.78	16.0	201			1				1	1	3					1	1	3
120	37/2.03	17.7	246			1				1	1	2					1	1	2

HFT RIGID CONDUIT AND FITTINGS

(Please note, these fittings are suitable for use with HFT Corrugated Conduit)

Products Available	Cat. No.	Nom. Size
HFT Rigid Conduit 	9020HF 9025HF 9032HF	20 mm 25 mm 32 mm
Expansion Couplings 	251HF20 251HF25 251HF32	20 mm 25 mm 32 mm
Saddles 	261HF20 261HF25 261HF32	20 mm 25 mm 32 mm
Spacer Bar Saddles 	261HFS20 261HFS25	20 mm 25 mm
Saddle Spacer Extensions 	261HFE20 261HFE25	20 mm 25 mm

Products Available	Cat. No.	Nom. Size
Inspection Elbows 	244HF20 244HF25 244HF32	20 mm 25 mm 32 mm
Inspection Tees 	246HF20 246HF25 246HF32	20 mm 25 mm 32 mm
Couplings 	242HF20 242HF25 242HF32	20 mm 25 mm 32 mm
Reducers 	264HF2M 264HF3M	25-20 mm 32-25 mm
Conduit Clips 	280HF20 280HF25 280HF32	20 mm 25 mm 32 mm

Products Available	Cat. No.	Nom. Size
Conduit Clip Mounting Channel 	280HFMC	O/A Length 204 mm
90° Bends 	247HF20 247HF25 247HF32	20 mm 25 mm 32 mm
Plain to Screwed Adaptors 	263HF20 263HF25 263HF32	20 mm 25 mm 32 mm
Plain to Screwed Coupling 	258HF20 258HF25 258HF32	20 mm 25 mm 32 mm
Medium Gap Filling HFT Jointing Cement 	240HF240U	250 ml.

Manufactured to greatly exceed the minimum requirements as specified in AS2053 for Heavy Duty Conduits.

Products Available	Catalogue No.	Nominal Size	Entry Arrangement
Tangential Junction Boxes 	T240HF1L20 T240HF1R20 T240HF2/20 T240HF2A20 T240HF2U20 T240HF3T20 T240HF3Y20 T240HF4H20	20 mm 20 mm 20 mm 20 mm 20 mm 20 mm 20 mm 20 mm	1 Way Left Hand 1 Way Right Hand 2 Way Through 2 Way Angle 2 Way 'U' Type 3 Way 'T' Type 3 Way 'Y' Type 4 Way 'H' Type
	T240HF1L25 T240HF1R25 T240HF2/25 T240HF2A25 T240HF2U25 T240HF3T25 T240HF3Y25 T240HF4H25	25 mm 25 mm 25 mm 25 mm 25 mm 25 mm 25 mm 25 mm	1 Way Left Hand 1 Way Right Hand 2 Way Through 2 Way Angle 2 Way 'U' Type 3 Way 'T' Type 3 Way 'Y' Type 4 Way 'H' Type
Square Junction Boxes 	252HF32/1 252HF32/2 252HF32/2A 252HF32/3 252HF32/4	32 mm 32 mm 32 mm 32 mm 32 mm	1 Way 1 Way Through 2 Way Angle 3 Way 4 Way

HFT Corrugated Conduit and Fittings

Products Available	Cat. No.	Nom. Size
HFT Corrugated Conduit 	9016CHF	16mm
	9020CHF	20mm
	9025CHF	25mm
	9032CHF	32mm
	9040CHF	40mm
	9050CHF	50mm
Straight Glends with Locknut 	279C16HF	16mm
	279C20HF	20mm
	279C25HF	25mm
	279C32HF	32mm
	279C40HF	40mm
	279C50HF	50mm
Angled Glends with Locknut 	279AC16HF	16mm
	279AC20HF	20mm
	279AC25HF	25mm
	279AC32HF	32mm

Flexible Electrical Hose and Fittings

Products Available	Cat. No.	Nom. Size
Flexible Electrical Hose 	9012EH	12mm
	9016EH	16mm
	9020EH	20mm
	9025EH	25mm
	9032EH	32mm
	9040EH	40mm
Straight Glends with Locknut 	279C12EH	12mm
	279C16EH	16mm
	279C20EH	20mm
	279C25EH	25mm
	279C32EH	32mm
	279C40EH	40mm
Angled Glends with Locknut 	279AC12EH	12mm
	279AC16EH	16mm
	279AC20EH	20mm
	279AC25EH	25mm
	279AC32EH	32mm

CLIPSAL
ELECTRICAL
ACCESSORIES

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