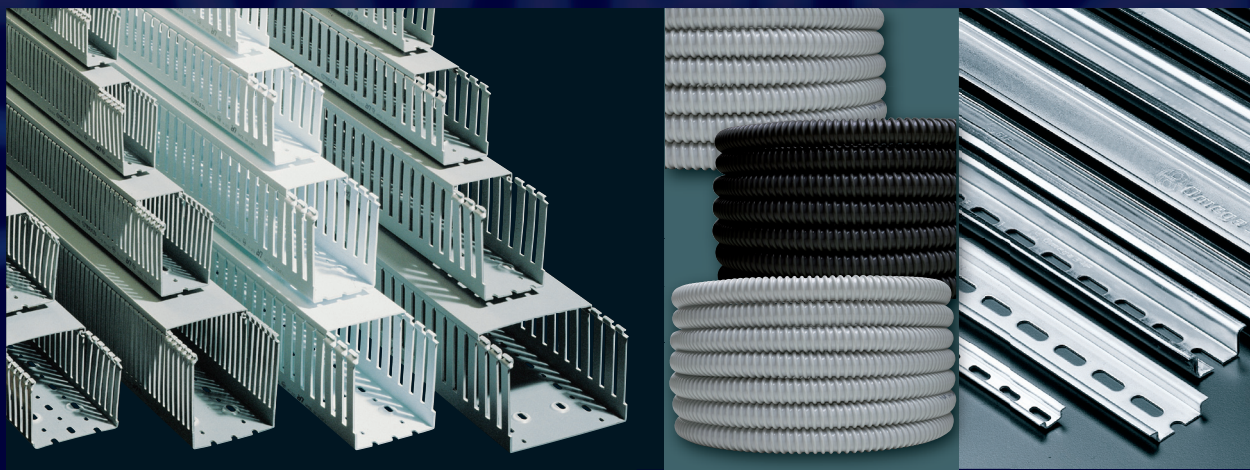# IBOCO®

The Most Extensive Line of Wiring Duct Component

Integrated Panel Management

The Most
Extensive Line
of Wiring
Duct and
Components

13

IBOCO CORPORATE PROFILE

Since 1986 the IBOCO Corporation has led Italy-based Bocchiotti Group's marketing operations in the United States. The Company, located in Edison, New Jersey is headed by Andrew Kwarciak, President, and Cesare Bocchiotti, Vice President.

BOCCHIOTTI CORPORATE PROFILE

Founded in 1965, IBOCO parent Company BOCCHIOTTI is widely recognized throughout the world as one of the major manufacturers of wire management products, raceways and conduits.

The Bocchiotti Group with more than 500 employees is headquartered in Genoa, Italy and has production plants and warehouses in 8 different locations throughout the Country.

The fully automated systems enable the Company to produce over 170 million feet of wiring duct and raceway per year in 25 different product lines in 37 Countries.
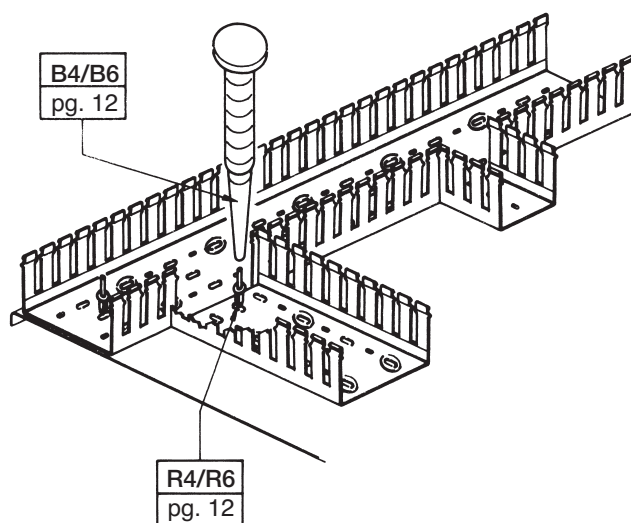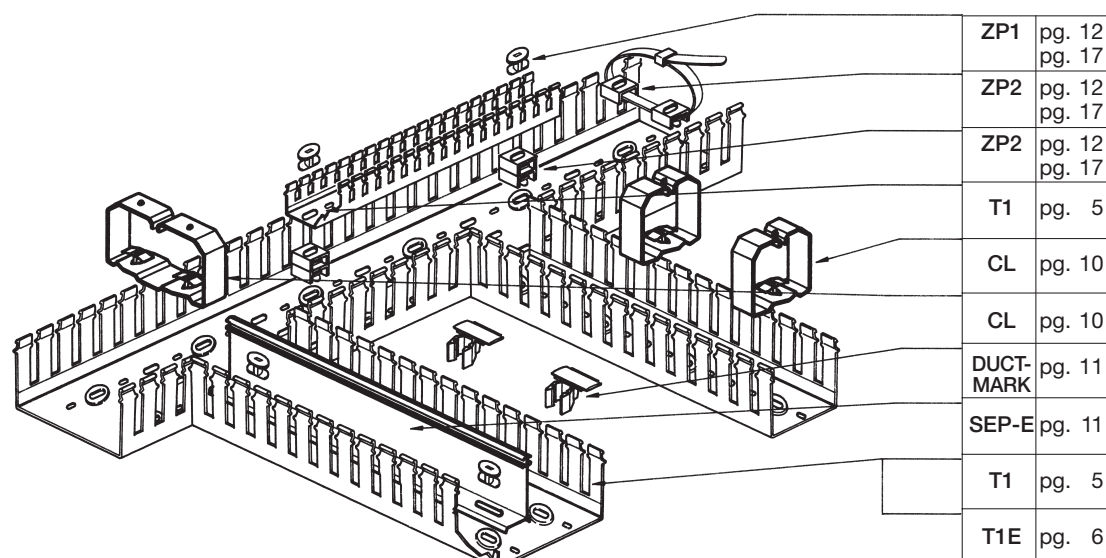
High Standard Products for Advanced and Time-Saving Panel Assembling

Every item in the rapidly expanding product line is designed and produced to meet the needs of original equipment manufacturers, installers, panel builders, and system integrators and complies with UL, CSA, CE and most international certifications. IBOCO's extensive catalog features several product lines: DIN rail, DIN rail accessories, T1 slotted duct, T1-E slotted duct, T1-K black slotted duct, T1-B blue slotted duct, TS/TSH solid duct, DINOSAUR flexible duct, cable ties and attachments, Spiralite, braided expandable sleevings, installation tools and over 40 accessories. The Company's integrated panel management systems continue to evolve and grow to meet the changing needs of panel builders. However, its overriding philosophy remains unchanged: to simplify and accelerate panel building operations including wire identification, retention and separation for panel builders, OEMs', and system integrators in a variety of industries.

![IBOCO logo]

A Very Extensive Line of Wiring Duct and Components

IBOCO offers an integrated system of specific solutions for panel builders' needs.

This duct system features 5 styles of duct with up to 35 duct sizes, a complete line of Din rails, and over 40 components and accessories. This combination allows for the simplification and acceleration of panel building operations such as wire retention, identification of equipment/circuits, circuit/wire separation, and the direct mounting of duct and equipment on Din rails.

ZP1	pg. 12 pg. 17
ZP2	pg. 12 pg. 17
ZP2	pg. 12 pg. 17
T1	pg. 5
CL	pg. 10
CL	pg. 10
DUCT-MARK	pg. 11
SEP-E	pg. 11
T1	pg. 5
T1E	pg. 6

B4/B6	pg. 12

R4/R6	pg. 12

The IBOCO duct system
simplifies and decreases the time required for the planning and construction of control panels by offering the ability to:
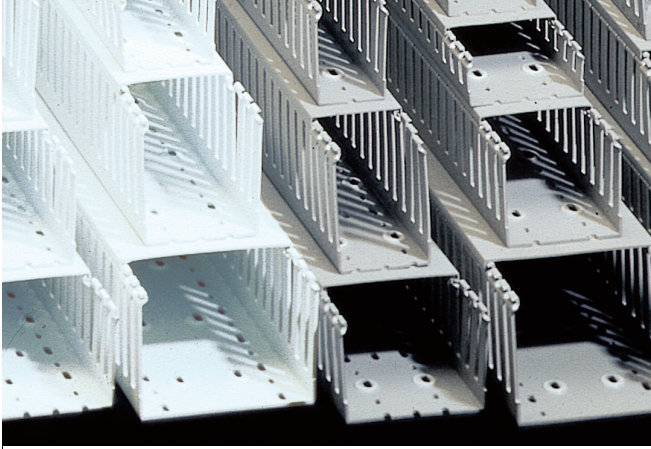- contain the wires
- identify the switchgear
- mount the wiring duct directly onto mounting rail or internal mounting plate
- build the frame of the panel board
- retain the wires
- achieve extremely compact wiring configurations
- separate circuits with different voltages and/or functions
- form wire bundles

Table of Contents

Alphabetical Index of Catalog Numbers

T1

DUCT SERIES

Material
Rigid PVC, self-extinguishing

Color
Light GREY RAL 7030
WHITE

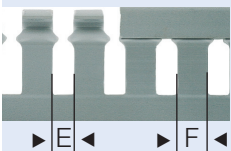### Standard Length
6 Feet 6 3/4 Inches

Standard Unit
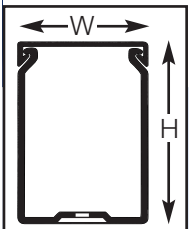Duct complete with cover

THE MOST COMPREHENSIVE RANGE

NOMINAL 1 ½"-2 ¼"-3"-4"
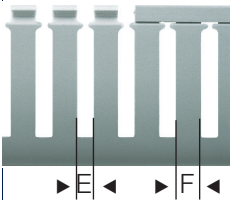
►E◄   ►F◄

NOMINAL ⅝"-1"

►E◄   ►F◄

All wiring ducts come complete with cover. Wiring duct covers can be sold separately: see page 8 and IBOCO Corp. Price List.

Catalog Number	Nominal Size (WxH)	Dimensions in inches (Actual)				Dimensions WxH (in millimeters)	Standard Carton (Qty)	
		W	H	E	F		Lengths (1)	Feet
T1-0506G	½ x ⅝	.60	.71	.20	.30	15 x 18	20	120
T1-0510G	½ x 1	.60	1.18	.20	.30	15 x 30	20	120
T1-0522G	½ x 2¼	.60	2.36	.20	.30	15 x 60	16	96
T1-1010*	1 x 1	1.00	1.18	.20	.30	25 x 30	18	108
T1-1015*	1 x 1½	1.00	1.57	.31	.47	25 x 40	18	108
T1-1022*	1 x 2¼	1.00	2.36	.31	.47	25 x 60	24	144
T1-1030*	1 x 3	1.00	3.15	.31	.47	25 x 80	24	144
T1-1040*	1 x 4	1.00	3.94	.31	.47	25 x 100	8	48
T1-1515*	1½ x 1½	1.57	1.57	.31	.47	40 x 40	20	120
T1-1522*	1½ x 2¼	1.57	2.36	.31	.47	40 x 60	18	108
T1-1530*	1½ x 3	1.57	3.15	.31	.47	40 x 80	16	96
T1-1540*	1½ x 4	1.57	3.94	.31	.47	40 x 100	8	48
T1-2215G	2¼ x 1½	2.36	1.57	.31	.47	60 x 40	12	72
T1-2222*	2¼ x 2¼	2.36	2.36	.31	.47	60 x 60	12	72
T1-2230*	2¼ x 3	2.36	3.15	.31	.47	60 x 80	12	72
T1-2240*	2¼ x 4	2.36	3.94	.31	.47	60 x 100	4	24
T1-3015*	3 x 1½	3.15	1.57	.31	.47	80 x 40	12	72
T1-3022*	3 x 2¼	3.15	2.36	.31	.47	80 x 60	12	72
T1-3030*	3 x 3	3.15	3.15	.31	.47	80 x 80	12	72
T1-3040*	3 x 4	3.15	3.94	.31	.47	80 x 100	4	24
T1-3050*	3 x 5	2.95	4.92	.31	.47	75 x 125	6	36
T1-4015G	4 x 1½	3.94	1.57	.31	.47	100 x 40	8	48
T1-4022G	4 x 2¼	3.94	2.36	.31	.47	100 x 60	8	48
T1-4030*	4 x 3	3.94	3.15	.31	.47	100 x 80	8	48
T1-4040*	4 x 4	3.94	3.94	.31	.47	100 x 100	4	24
T1-4050*	4 x 5	3.94	4.92	.31	.47	100 x 125	4	24
T1-6040*	6 x 4	5.91	3.94	.31	.47	150 x 100	4	24

Example: T1-0510 G = 1/2"x 1"light GREY duct with cover

(1) Each standard length is actually 6'6 3/4"
   but is counted as 6 feet for packaging and pricing

* Color - add suffix "G" for light GREY "W" for WHITE

ADHESIVE BACKING - add suffix "A" to catalog number - contact sales office for pricing (see page 23)

Available in 1 meter length contact sales office

Non- slip cover design of minimun encumbrance and maximum grip.
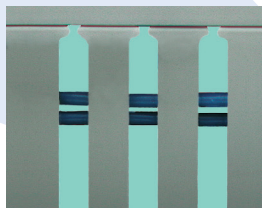
Restricted slot opening for wire retaining.
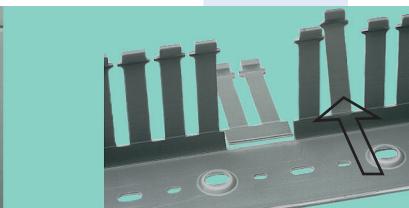
Two predetermined breaklines:
- for breaking off and removal of sidewall finger segments only.
- for removal of sidewall finger and base segments.

Burr-free edges.
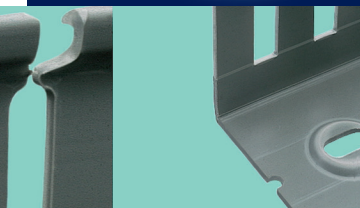
Recess boss for rapid mounting of components.

T1-E

DUCT SERIES

Material
Rigid PVC,
self-extinguishing

Color
Light GREY RAL 7030
WHITE

Standard Length
6 Feet 6 3/4 Inches

Standard Unit
Duct complete
with cover
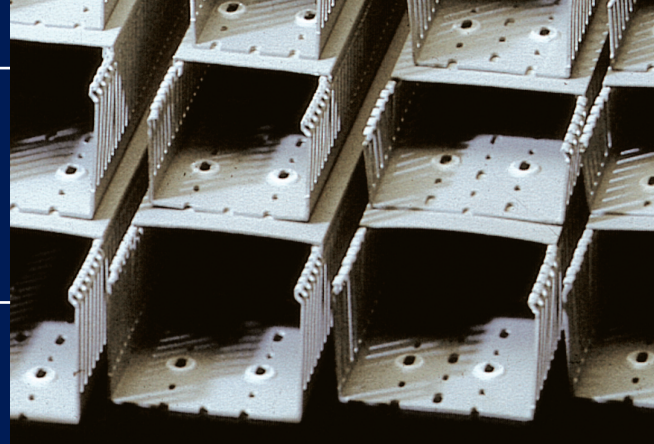
Catalog Number	Nominal Size (WxH)	Dimensions in inches (Actual)				Dimensions WxH (in millimeters)	Standard Carton (Qty)	
		W	H	E	F		Lengths (1)	Feet
T1E-1015*	1 x 1½	1.00	1.57	.16	.24	25 x 40	18	108
T1E-1022*	1 x 2¼	1.00	2.36	.16	.24	25 x 60	24	144
T1E-1030*	1 x 3	1.00	3.15	.16	.24	25 x 80	24	144
T1E-1040*	1 x 4	1.00	3.94	.16	.24	25 x 100	8	48
T1E-1515*	1½ x 1½	1.57	1.57	.16	.24	40 x 40	20	120
T1E-1522*	1½ x 2¼	1.57	2.36	.16	.24	40 x 60	18	108
T1E-1530*	1½ x 3	1.57	3.15	.16	.24	40 x 80	16	96
T1E-1540*	1½ x 4	1.57	3.94	.16	.24	40 x 100	8	48
T1E-2215G	2¼ x 1½	2.36	1.57	.16	.24	60 x 40	12	72
T1E-2222*	2¼ x 2¼	2.36	2.36	.16	.24	60 x 60	12	72
T1E-2230*	2¼ x 3	2.36	3.15	.16	.24	60 x 80	12	72
T1E-2240*	2¼ x 4	2.36	3.94	.16	.24	60 x 100	4	24
T1E-3015G	3 x 1½	3.15	1.57	.16	.24	80 x 40	12	72
T1E-3022*	3 x 2¼	3.15	2.36	.16	.24	80 x 60	12	72
T1E-3030*	3 x 3	3.15	3.15	.16	.24	80 x 80	12	72
T1E-3040*	3 x 4	3.15	3.94	.16	.24	80 x 100	4	24
T1E-4015G	4 x 1½	3.94	1.57	.16	.24	100 x 40	8	48
T1E-4022G	4 x 2¼	3.94	2.36	.16	.24	100 x 60	8	48
T1E-4030*	4 x 3	3.94	3.15	.16	.24	100 x 80	8	48
T1E-4040*	4 x 4	3.94	3.94	.16	.24	100 x 100	4	24

Example: T1E-1015 G = 1"x1½" light GREY duct with cover

Available in 1 meter length
contact sales office

(1) Each standard length is actually 6'6 3/4"
but is counted as 6 feet for packaging and pricing

* Color - add suffix "G" for light GREY "W" for WHITE

ADHESIVE BACKING - add suffix "A" to catalog number -
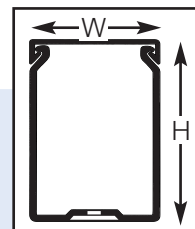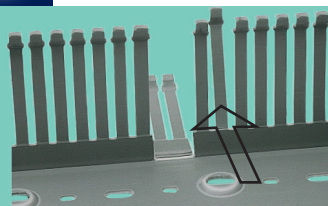contact sales office for pricing (see page 22)

All wiring ducts come complete with cover. Wiring duct covers can be sold separately: see page 8 and IBOCO Corp. Price List.

▶E◀   ▶F◀

←W→

H

Restricted slot opening for wire retaining.

Two predetermined breaklines:
- for breaking off and removal of sidewall finger segments only.
- for removal of sidewall finger and base segments.
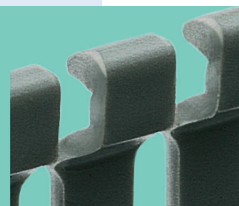
Burr-free edges.

Recess boss for rapid mounting of components.

Non- slip cover design of minimum encumbrance and maximum grip.

T1-K

DUCT SERIES

Material
Rigid PVC,
self-extinguishing

Color
BLACK

Standard Length
6 Feet 6 3/4 Inches
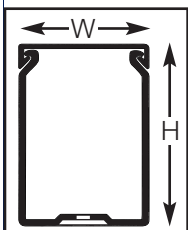
Standard Unit
Duct complete
with cover

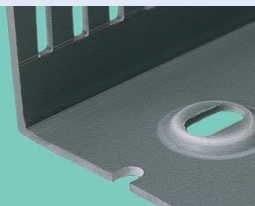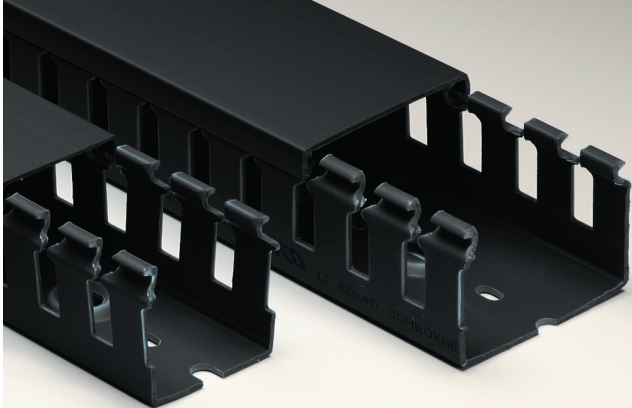| Catalog Number	Nominal Size (WxH)	Dimensions in inches (Actual)				Dimensions WxH (in millimeters)	Standard Carton (Qty)	
		W	H	E	F		Lengths (1)	Feet
T1-1040K	1 x 4	1.00	3.94	.31	.47	25 x 100	8	48
T1-1530K	1½ x 3	1.57	3.15	.31	.47	40 x 80	16	96
T1-2222K	2¼ x 2¼	2.36	2.36	.31	.47	60 x 60	12	72
T1-2240K	2¼ x 4	2.36	3.94	.31	.47	60 x 100	4	24
T1-3030K	3 x 3	3.15	3.15	.31	.47	80 x 80	12	72
T1-3040K	3 x 4	3.15	3.94	.31	.47	80 x 100	4	24
T1-3050K	3 x 5	2.95	4.92	.31	.47	75 x 125	6	36
T1-4040K	4 x 4	3.94	3.94	.31	.47	100 x 100	4	24
T1-4050K	4 x 5	3.94	4.92	.31	.47	100 x 125	4	24

For special sizes contact sales office

T1-B

Material
Rigid PVC,
self-extinguishing

Color
BLUE RAL 5015

Standard Length
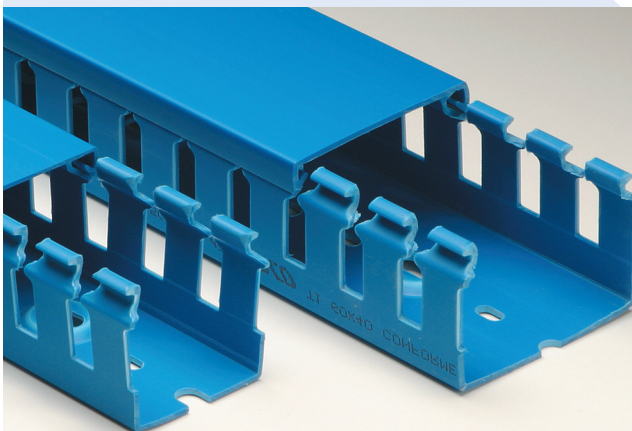6 Feet 6 3/4 Inches
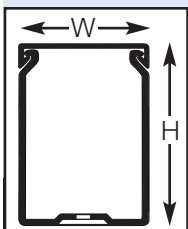
Standard Unit
Duct complete
with cover

Catalog Number	Nominal Size (WxH)	Dimensions in inches (Actual)				Dimensions WxH (in millimeters)	Standard Carton (Qty)	
		W	H	E	F		Lengths (1)	Feet
T1-1010B	1 x 1	1.00	1.18	.20	.30	25 x 30	18	108
T1-1022B	1 x 2¼	1.00	2.36	.31	.47	25 x 60	24	144
T1-1030B	1 x 3	1.00	3.15	.31	.47	25 x 80	24	144
T1-1515B	1½ x 1½	1.57	1.57	.31	.47	40 x 40	20	120
T1-1522B	1½ x 2¼	1.57	2.36	.31	.47	40 x 60	18	108
T1-1530B	1½ x 3	1.57	3.15	.31	.47	40 x 80	16	96
T1-2215B	2¼ x 1½	2.36	1.57	.31	.47	60 x 40	12	72
T1-2222B	2¼ x 2¼	2.36	2.36	.31	.47	60 x 60	12	72
T1-2230B	2¼ x 3	2.36	3.15	.31	.47	60 x 80	12	72
T1-3030B	3 x 3	3.15	3.15	.31	.47	80 x 80	12	72
T1-3050B	3 x 5	2.95	4.92	.31	.47	75 x 125	6	36
T1-4030B	4 x 3	3.94	3.15	.31	.47	100 x 80	8	48
T1-4040B	4 x 4	3.94	3.94	.31	.47	100 x 100	4	24

Blue color duct recognized for intrinsic safe circuits

NOTE : 1) Each standard length is 6' 6¾" but is considered as 6 feet for the purpose of pricing and packaging.

TS / TSH

DUCT SERIES

Material
Rigid PVC,
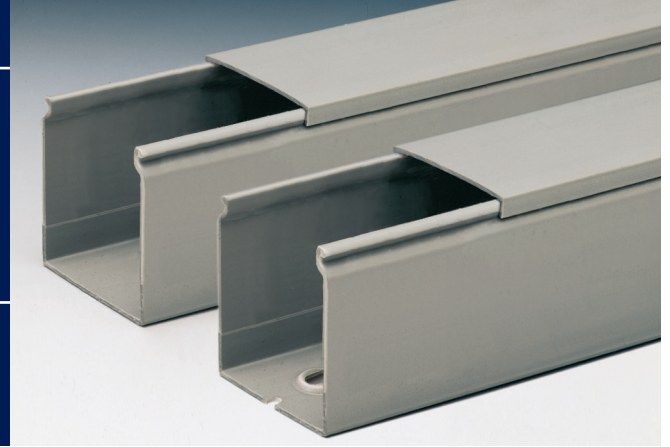self-extinguishing

Color
Light GREY RAL 7030

Standard Length
6 Feet 6 3/4 Inches

Standard Unit
Duct complete
with cover

Catalog Number	Nominal Size (WxH)	Dimensions in inches (Actual) W	H	Dimensions WxH (in millimeters)	Standard Carton (Qty) Lengths (1)	Feet
TS/TSH-0506G	½ x ⅝	.60	.71	15 x 18	20	120
TS/TSH-0510G	½ x 1	.60	1.18	15 x 30	20	120
TS/TSH-1010G	1 x 1	1.00	1.18	25 x 30	18	108
TS/TSH-1015G	1 x 1½	1.00	1.57	25 x 40	18	108
TS/TSH-1030G	1 x 3	1.00	3.15	25 x 80	24	144
TS/TSH-1515G	1½ x 1½	1.57	1.57	40 x 40	20	120
TS/TSH-1522G	1½ x 2¼	1.57	2.36	40 x 60	18	108
TS/TSH-1530G	1½ x 3	1.57	3.15	40 x 80	16	96
TS/TSH-2222G	2¼ x 2¼	2.36	2.36	60 x 60	12	72
TS/TSH-2230G	2¼ x 3	2.36	3.15	60 x 80	12	72
TS/TSH-3022G	3 x 2¼	3.15	2.36	80 x 60	12	72
TS/TSH-3030G	3 x 3	3.15	3.15	80 x 80	12	72
TS/TSH-3040G	3 x 4	3.15	3.94	80 x 100	4	24
TS/TSH-4030G	4 x 3	3.94	3.15	100 x 80	8	48
TS/TSH-4040G	4 x 4	3.94	3.94	100 x 100	4	24

TS - Solid duct less mtg. holes

TSH - Solid duct with mtg. holes

Optional adhesive backing available: add suffix "A" to catalog number.
Contact the IBOCO sales office for pricing (see page 23).

COV

COVER FOR T1 T1-E / TS / TSH

Material
Rigid PVC,
self-extinguishing

Color
Light GREY RAL 7030
WHITE

Catalog Number	Standard Carton (Qty.) Lengths (1)	Feet
COV-05*	25	150
COV-10*	25	150
COV-15*	25	150
COV-22*	25	150
COV-30*	25	150
COV-40*	20	120
COV-60*	20	120

* Color - add suffix "G" for light GREY RAL 7030
  "W" for WHITE
  For blue or black covers contact sales office

(1) Each standard length is actually 6' 6¾" but is
    counted as 6 feet for packaging and pricing
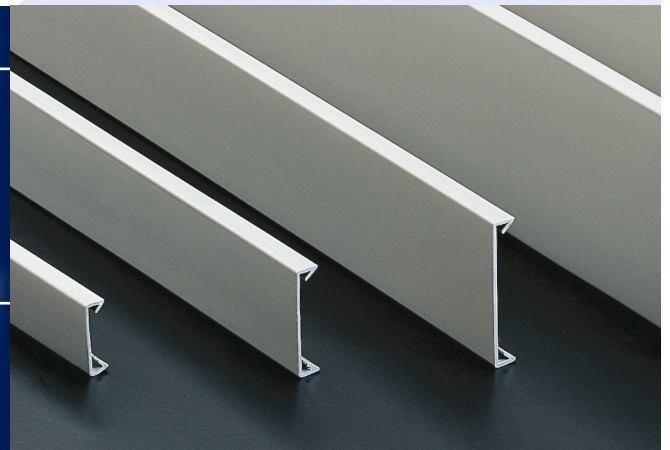
Nominal Duct Size	12 AWG	14 AWG		16 AWG	18 AWG	22 AWG
	INSULATION THICKNESS					
	1/32 OD-.158	3/64 OD-.165	1/32 OD-.139	1/32 OD-.125	1/32 OD-.113	1/64 OD-.065
½ x ⅝	7	6	9	11	14	43
½ x 1	12	11	16	20	24	74
½ x 2¼	25	23	33	40	50	150
1 x 1	22	21	29	36	44	134
1 x 1½	31	28	39	48	59	180
1 x 2¼	45	40	57	71	85	261
1 x 3	59	53	75	92	113	341
1 x 4	72	66	93	115	141	426
1½ x 1½	51	46	65	81	99	299
1½ x 2¼	77	70	98	121	148	449
1½ x 3	102	92	130	160	196	593
1½ x 4	125	113	159	197	241	729
2¼ x 1½	78	70	99	123	150	453
2¼ x 2¼	114	103	146	180	221	667
2¼ x 3	156	141	199	246	302	912
2¼ x 4	194	176	247	306	375	1132
3 x 1½	105	95	134	165	203	612
3 x 2¼	159	144	203	251	307	928
3 x 3	214	193	272	337	412	1246
3 x 4	267	242	341	421	515	1558
3 x 5	309	283	399	493	604	1826
4 x 1½	132	120	169	208	255	771
4 x 2¼	201	182	256	316	387	1171
4 x 3	270	244	344	425	520	1573
4 x 4	336	305	429	531	650	1963
4 x 5	415	381	536	663	812	2455
6 x 4	512	464	653	807	988	2987

Recommended Maximum Number of Wires To Be Used per Wiring Duct (MTW)
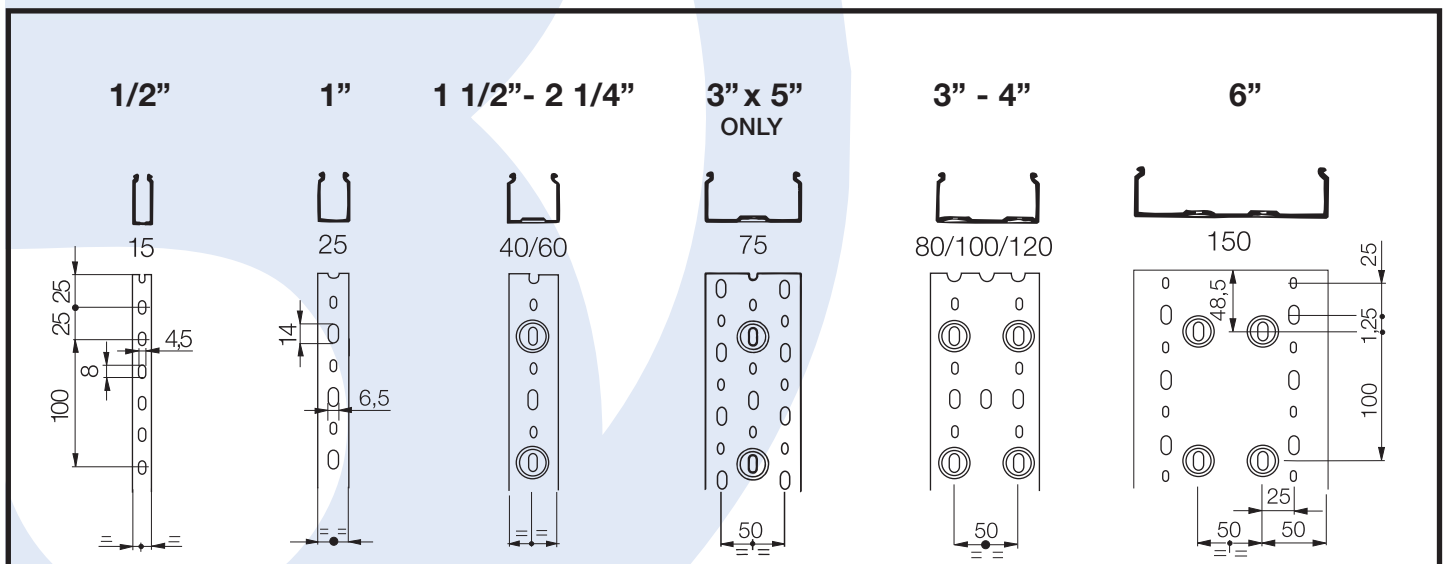BASED ON 60% FILL CAPACITY

Duct-System Base Perforation According to DIN 43659 and to DIN VDE 0660 TEIL 506

The base perforation of the wiring duct series T1 and T1E allows mounting on the panel with DUCTFIX R6 or R4 or on Din mounting rails.

The recess bosses in the base of duct series T1 and T1E permit rapid mounting of components CL, ZP2 and SEP-E inside the wiring duct.

All dimensions shown are in millimeters. For conversion to inches see below. (25.4 millimeters = 1 inch)

millimeters	= Inches	millimeters	= Inches
4.5	.177	50	1.969
6.5	.256	60	2.363
8	.315	80	3.150
14	.551	100	3.937
15	.591		
25	.984		
40	1.575		

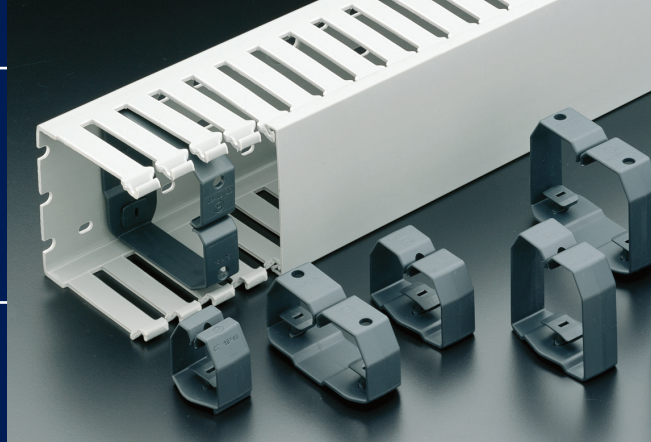| 1/2"	1"	1 1/2"- 2 1/4"	3" x 5" ONLY	3" - 4"	6"
15	25	40/60	75	80/100/120	150

CL

WIRE RETAINERS

Material
ABS/PC

Color
Dark GREY
RAL 7021

CL Wire Management Retainers

- Retains wires during installation
- Provides additional strain relief of fingers
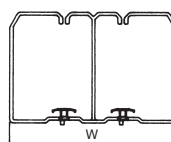- Eliminates bulging against sidewall

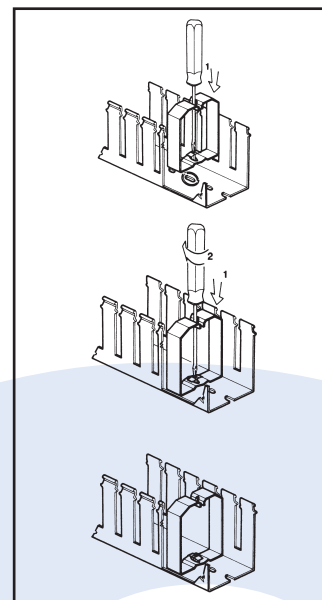| Catalog Number	Number Size (WxH)	Pieces per Carton
CL-1515	1½ x 1½	40
CL-1522	1½ x 2¼	40
CL-1530	1½ x 3	20
CL-2215	2¼ x 1½	40
CL-2222	2¼ x 2¼	20
CL-2230	2¼ x 3	20
CL-2240	2¼ x 4	20
CL-3022	3 x 2¼	10
CL-3030	3 x 3	10
CL-3040	3 x 4	10
CL-4015*	4 x 1½	10
CL-4022	4 x 2¼	10
CL-4030	4 x 3	10
CL-4040	4 x 4	5
CL-6040	6 x 4	5

W = 1½ - 2¼
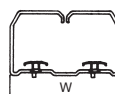
W = 3" - 4"

W = 6"

Catalog number indicates to which duct size (W x H) the CL will fit.
CL wire retainers come complete with mounting elements.

NEW DESIGN avoids fall out of wires especially in ceiling installations.
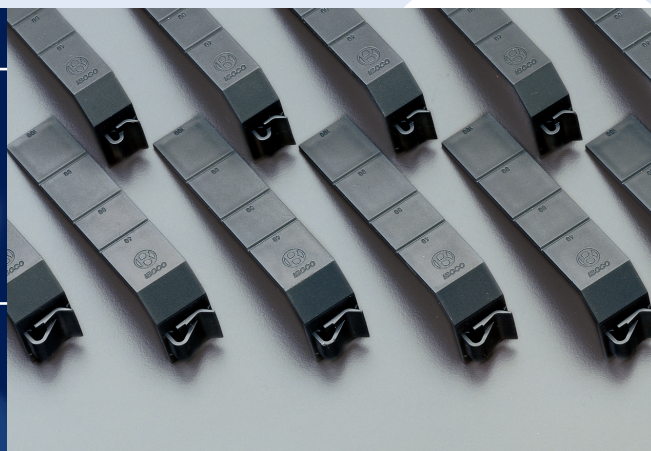
* Limited quantities available

TR1/TR1-E

## WIRE RETAINERS PREDETERMINED BREAKLINES

Material
ABS/PC

Color
BLACK

Catalog Number	Pieces per Carton
TR1*	50
TR1E**	50

* For T1
** For T1-E

A simple to use wire retainer that mounts on the duct fingers. Has predetermined scorelines so that "one size fits all". The TR1 and the TR1-E can be used on the 6", 4", 3",2¼" and 1½" T1 and T1-E duct. The quick solution for every panel builder during initial panel wiring and maintenance operation.
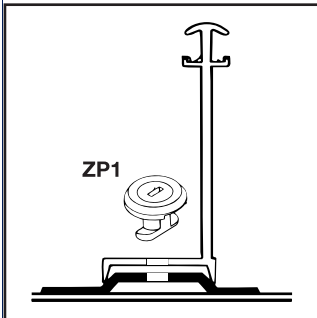
10
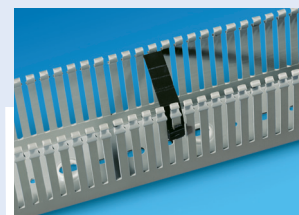
SEP-E

SEPARATORS

Material
Rigid PVC,
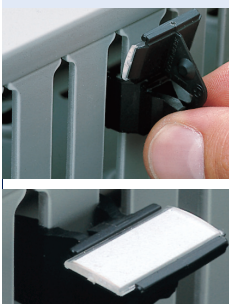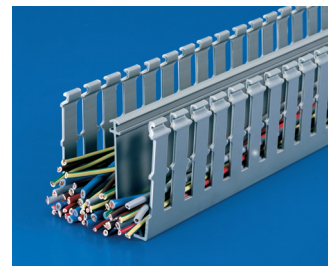self-extinguishing

Color
Light GREY RAL 7030

Standard Length
6 Feet 6 3/4 Inches

ZP1

SEP-E Mounting detail

Catalog Number	Use With Duct Nominal Height	Standard Carton	
		Feet (Meters)	Lengths
SEP-15E	1½	192 (64)	32
SEP-22E	2¼	120 (40)	20
SEP-30E	3	72 (24)	12

SEP-E allows the physical separation of circuits with different voltages and/or functions.

DUCTMARK

IDENTIFICATION TAG

Material Support and Insert
Polyamide 6

Color
BLACK

Slide
Transparent Polystyrene

Label
White cardboard

DM 1

Catalog Number	Pieces per Carton
DM 1	50

Cannot be used on T1-E Duct.

Resolves in a practical and functional manner the problem of circuit identification.

DUCTMARK
- need not be removed during maintenance or alteration work which involves the removal of the covers
- is always clearly visible

Ductmark is mounted by snapping it onto the sidewall finger segments taking care that it is placed above the wires coming out to the sidewall slots.

11

DUCTFIX

WIRING DUCT RIVETS

Material
Polyamide 6

Color
R4 - BLUE
R6N - NATURAL
R6O - ORANGE

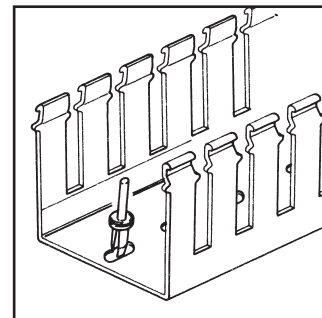| Catalog Number	Pieces per Carton
R4	250
R6N	250
R6O	250

MAIN FEATURES
- Elastic Vibration - dampening head
- Good temperature resistance
- Excellent mechanic properties
- Extremely short installation time
- Insulating - Functional - Easy To Apply

DUCTFIX
- Installs quick and easy using the B4 or B6 rivet tool.
- Can be used to install all types of wiring duct with standard mounting holes.
- Hole size R4 - 5/32" (4 mm) – R6 - 7/32" (5.5 mm)

- R4 - use B4 or RT4 tool
- R6N - use R6 tool
- R6O - use RT6 tool

B4-B6 RT4 - RT6

RIVET TOOLS

Color
B4 - RED   RT4 - BLUE
B6 - YELLOW   RT6 - ORANGE

Catalog Number	Pieces per Carton
B4*	1
B6*	1
RT4**	1
RT6**	1

* All plastic
** All metallic – note different rivets for RT6

Functional and sturdy

ZP1-ZP2

MOUNTING INSERTS CABLE ATTACHMENTS

Material
Polyamide 6

Color
WHITE

Catalog Number	Pieces per Carton
ZP1	100
ZP2	50

With a simple quarter turn ZP2 can be mounted inside duct. By stacking, mounting levels at different heights are achieved. For tightening a wire bundle inside duct, pass a cable tie through ZP2.

With a simple quarter turn, ZP1 is used to mount components and SEP-E separators inside duct. Also ZP1 can be used to mount smaller sizes of duct inside larger sizes, thus achieving separation of circuits with different voltages and/or functions.

DINOSAUR

Available after July NEW DESIGN

Material
Polypropylene
self-extinguishing

Color
GREY
RAL 7030

Catalog Number	Nominal Size	Lengths* per Carton
DN 25AG	.50 x .75	24
DN 35AG	1.00 x 1.38	24
DN 45AG	1.38 x 1.75	14

* Each length is 19.7 inches (500 mm)
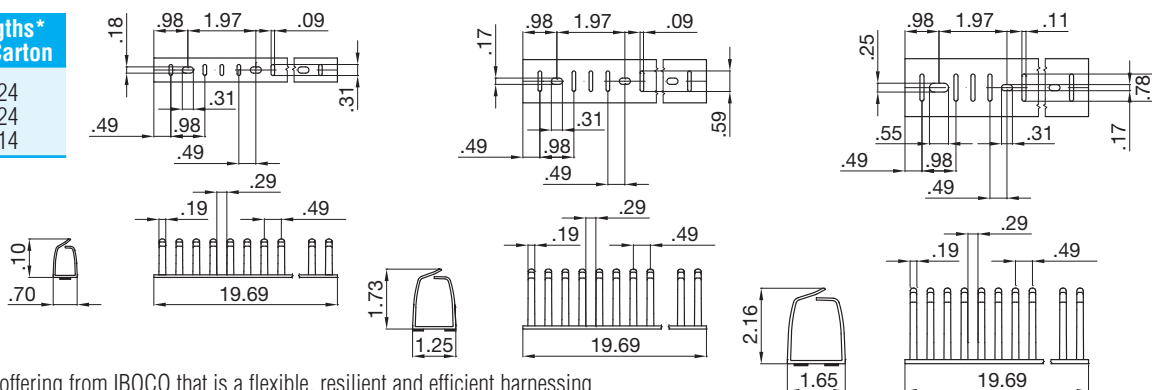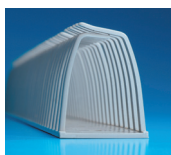
Dinosaur Duct is a unique product offering from IBOCO that is a flexible, resilient and efficient harnessing solution to your wiring needs. For wiring to cabinet doors, from control panels and for electronic equipment.
For that part of the cable run that leans against the side of the control cabinet.
- Due to the flexibility of the material individual wires can easily be added, or removed from total wires within the duct.
- Since Dinosaur has no cover it can accommodate cables in restricted space applications, and also effectively removes the need for cable ties.
- It can be used in extreme operating conditions (i.e. max. temp. up to 176°F) and has excellent resistance to radiation if exposed to a nuclear environment.
- Dinosaur withstands mechanical stress when installed (i.e. earthquake, falling equipment) while in the event of fire does not emit corrosive, nor toxic gases, and smoke development is minimal.
- The duct can be cut to desired length using scissors or knife.
When applying the Dinosaur with adhesive tape, it is necessary to make sure that the surface is perfectly clean and dry.

OLDER DESIGN

Applicable to white Dinosaur only

Material
Polypropylene
self-extinguishing

Color
GREY
RAL 7030
WHITE

Plus Efficiency
- Cut labor by up to 75%.
- Puts an end to cable ties and spiral wrap.
- Individual wires can be added or removed from a group as often as necessary-effortlessly.

Plus Versatility
Ideal for wiring to cabinet doors, from control panels, and for electronic equipment.

DN–10A

BOTTOM PERFORATIONS DN–10A
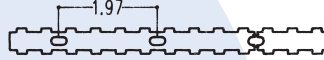
DN–20A

BOTTOM PERFORATIONS DN–20A / DN–30A
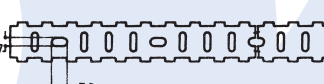
DN–30A

Catalog Number	Nominal Size	Lengths* per Carton
DN-10A**	½ x ½	42
DN-20A**	¾ x ¾	64
DN-30A**	1 x 1	36
DN-40A**	1½ x 1½	20

* Each length is 19.7 inches (500 mm)

** Color: add suffix "G" for GREY or "W" for WHITE

DN–40A
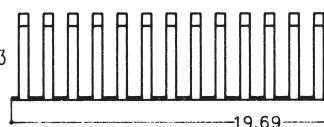
BOTTOM PERFORATIONS DN–40A

13
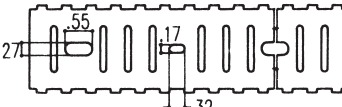
SPIRALITE

UNIVERSAL SPIRAL WRAPS

Material
Polyethylene
Natural (P)
Polyethylene
self-extinguishing (PA)
Polyethylene Black (PK)

According
to ASTM D 635

Catalog Number	Dimensions Inches			For Wire Bundles	Feet per Carton
	A	B	C		
P1 - PA1 - P1K	.06	.12	.20	1/16 to 1/2"	160
P2 - PA2 - P2K	.16	.24	.31	1/4" to 2"	80
P3 - PA3 - P3K	.31	.39	.47	3/8" to 3"	80
P4 - PA4 - P4K	.35	.47	.47	1/2" to 4"	65

Color black - 100 feet rolls only

Essential
- for fast and economical grouping of wire bundles.
- for joining groups of wires and/or tubing for fluidic/pneumatic machine control.
- for flexible connections between panel and door.

Robust, yet simple to install, it gives mechanical protection to the wire bundle which remains flexible although rigidly held. Easily removed, it can be re-used in the case of temporary wiring.
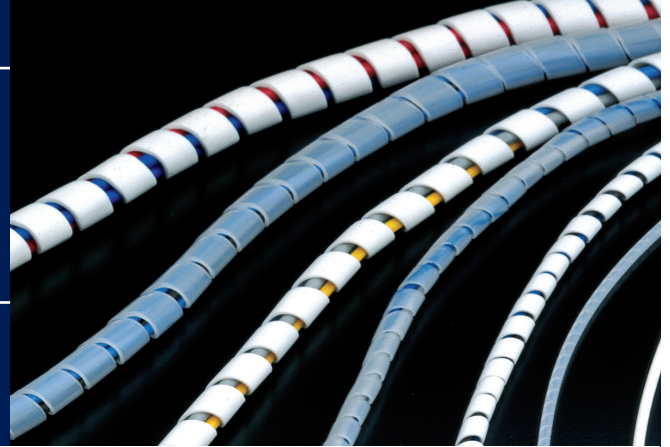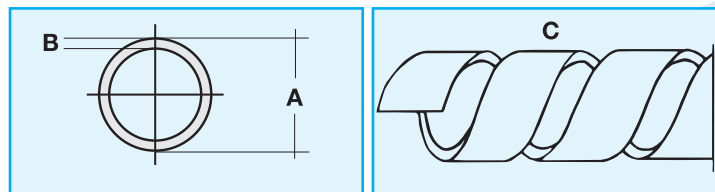
SLEEVING

BRAIDED EXPANDABLE SLEEVING

Material
Polyester

Color
BLACK - GREY
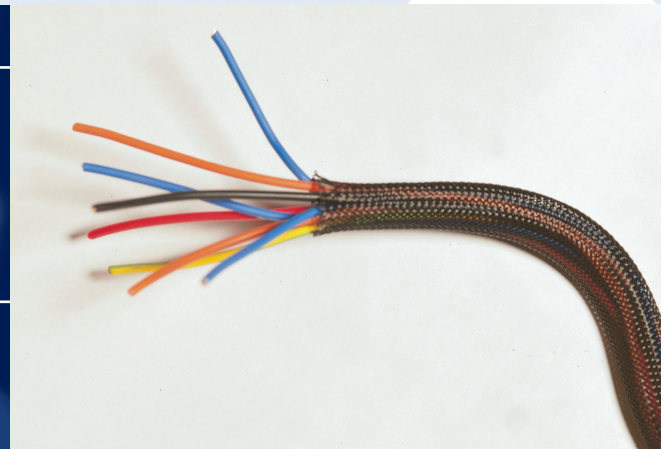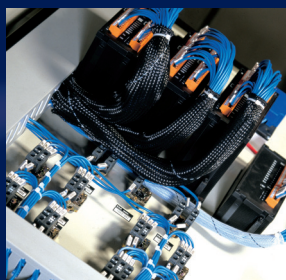
Catalog Number	Nominal I.D.		Nominal Diameter Range				QTY per Pack
	Inches	(mm)	Inches		to	(mm)	Feet
TY-5*	.197	(5)	.157	(4)	to	.472 (12)	325
TY-10*	.375	(10)	.315	(8)	to	.866 (22)	325
TY-20*	.750	(20)	.630	(16)	to	1.378 (35)	164
TY-30*	1.125	(30)	.984	(25)	to	1.890 (48)	164
TY-50*	2.000	(50)	1.575	(40)	to	2.835 (72)	164

Polyester - Halogen Free - Rated -58°F to +302°F (-50°C to +150°C)
* Color - add suffix "G" for GREY and "B" for BLACK

Product Characteristics

Operating temperature:	− 50°C to + 150°C
Physical properties:	Self-extinguishing for UL 94V2
Maximum elongation:	42%
Diameter expansion:	100%
Other:	Halogen - free

14

DIN RAILS

RoHS compliant

Treated with galvanic zinc plating and passivation (gal Zn 8c according to Din 50960) Minimum thickness 6 microns Standard length: 2 meters (6'6¾")

Bottom mtg. holes

The most comprehensive range of *Din metal mounting rails*

G1
EN 60715*
16.5 — 6 — 15 — 1.5 — 32

G1F
EN 60715*
16.5 — 6 — 6.3 — 15 — 1.5 — 32

Omega 3
EN 60715*
35 — 7.5 — 1 — 27

Omega 3F / 3FD
EN 60715*
35 — 7.5 — 6.3 — 1 — 27

Omega 3A
35 — 1.5 — 15 — 27

Omega 3AF / 3AFD
35 — 1.5 — 6.3 — 15 — 27

Omega 3B
35 — 1 — 2.3 — 15 — 24

Omega 2F
EN 60715*
15 — 4.2 — 5.5 — 10.5

Omega 75
75 mm x 25 mm
EN 60715*

CENTER LINE
The unperforated mounting rails (G1/OMEGA 3/OMEGA 3A/ OMEGA 3B) have a center line in order to expedite the drilling of the mounting holes.
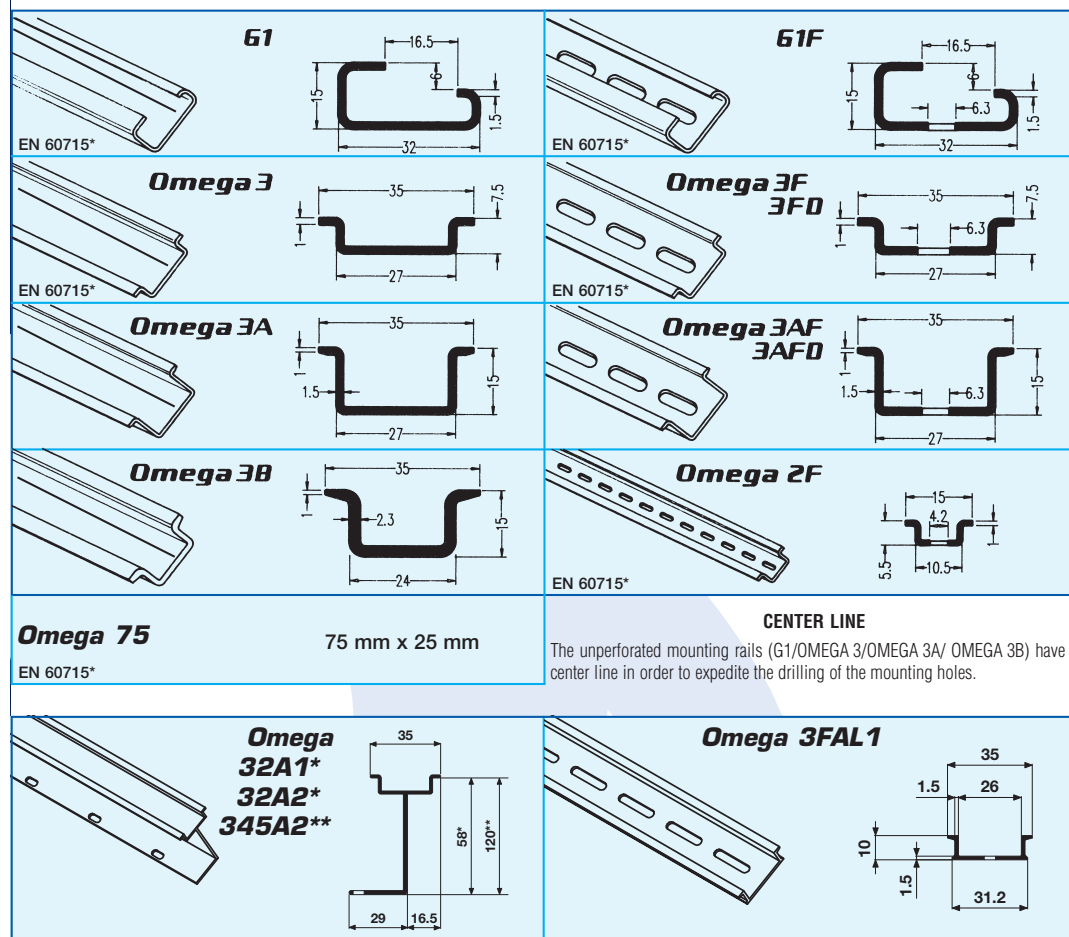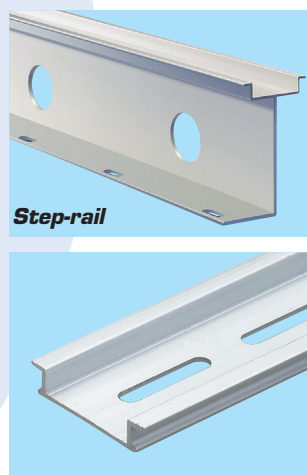
Omega 32A1* 32A2* 345A2**
35 — 58* — 120** — 29 — 16.5

Omega 3FAL1
35 — 1.5 — 26 — 10 — 1.5 — 31.2

G1F
18 — 25 — 6.3

Omega 3F - 3AF
18 — 25 — 6.3

Omega 3FD - 3AFD
25 — 36 — 36 — 5.2

Omega 2F
12.2 — 20 — 20 — 4.2

Omega 32A1 32A2
12.5 — 5.5 — 75

Omega 3FAL1
25 — 35.5 — 4.7

Catalog Number	Lengths per Pack
G1	12
G1F	12
G1F1	24
OMEGA 2F	20
OMEGA 2F1	40*
OMEGA 3	20
OMEGA 3F	20
OMEGA 3F1	40*
OMEGA 3FD	20
OMEGA 3A	10
OMEGA 3AF	10
OMEGA 3AF1	20*
OMEGA 3AFD	10
OMEGA 3B	10
OMEGA 3B1	10*
OMEGA 75	2

Catalog Number	Lengths per Pack
ALUMINUM	
OMEGA 32A1	6*
OMEGA 32A2	6
OMEGA 3FAL1	40*
OMEGA 345A2	2
GROMMET	
IG-11	10
COPPER	
OMEGA 3ACU	1
STAINLESS STEEL	
OMEGA 3SS	5
OMEGA 3SS1	10*

*One meter long

Step-rail

In compliance with EN 60715 (ex EN 50022 standards)

15
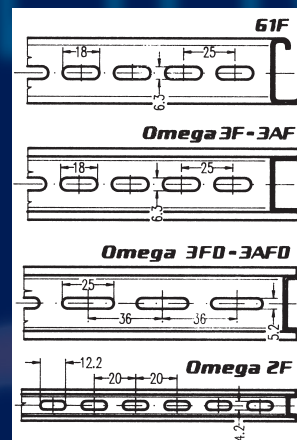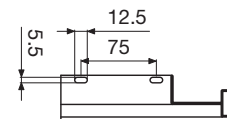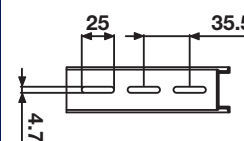
DINCLIC

MOUNTING CLIPS

Material
Zinc plated steel

With its help, one can snap onto all the mounting rails (except OMEGA 2F) those small switching devices which are not made for mounting on DIN rails.

Catalog Number	Pieces per Pack
DINCLIC DM4	40
DINCLIC FM4	40
DINCLIC FM5	40
DINCLIC FM8	20

Dinclic DM4 For mounting on rail G1, G1F
Dinclic FM4 - FM5 For mounting on OMEGA 3 - OMEGA 3A - OMEGA 3F OMEGA 3AF - OMEGA 3B - OMEGA 3FD

Screw size
FM4 and DM4 - 4 mm
FM5 - 5 mm (US 10-32 can be used)

DINCLIC FM8
IN ACETAL HOMOPOLYMER PLASTIC
(USE #8 SELF-TAPPING SCREW)
OTHER SCREW SIZES
AVAILABLE CONTACT IBOCO)

ST-STS

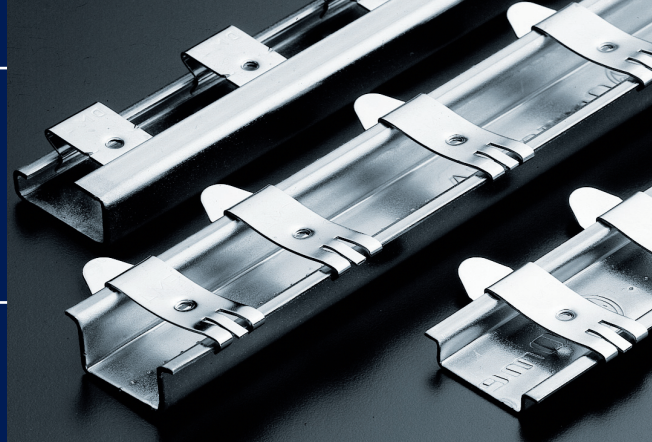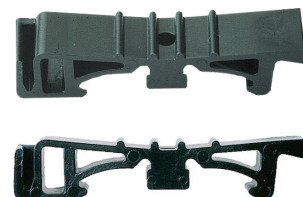| Catalog Number	Pieces per Pack
ST	10
STS 25	10
STS 50	10
STS 70	10
STS 90	10

DIN RAIL SUPPORT BRACKETS

Cold-rolled steel treated with galvanic zinc plating and passivation

ST
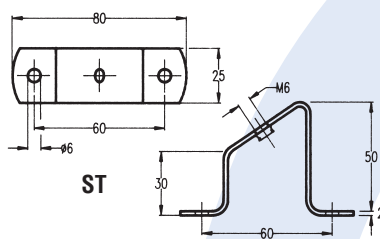
6 mm screws included

ST and STS screw size 6 mm
All dimensions shown are in mm

STS

H 25 mm = 1"
50 mm = 2"
70 mm = 2.75"
90 mm = 3.5"

DINFIX

Catalog Number	Pieces per Pack
DINFIX 64	50
DINFIX 53	50
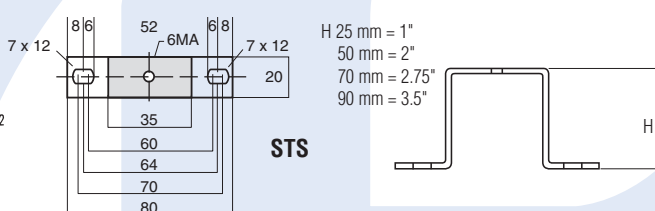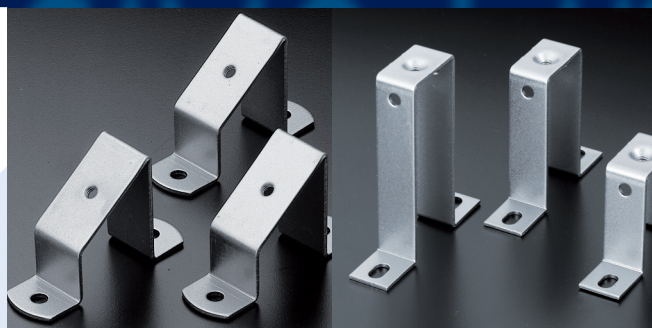
MOUNTING CLIPS

Material
Acetal resin (delrin) and galvanized steel

Dinfix permits the smooth mounting of metal rails on the mounting rail G1, thus allowing the construction of supporting frames for switchgear and wiring duct. DINFIX furthermore offers the possibility of installing onto the parallel rail G1, switchgear of a certain size and weight (e.g. transformers or contactors) that are not predisposed for snap-on assembly on Omega 3/3A/3B.

Service Temperature Limit (4°F to 212°F)

Once they are mounted, the Dinfix form a strong mounting plane at the level of the upper flange of the rail G1.

Dinfix 53 (BLACK)
Dinfix 64 (WHITE)
Ø M5   Ø M3   Ø M6   Ø M4
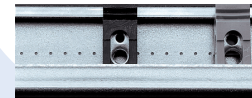
Panel Management

With IBOCO 's Space Saver Panel Management System
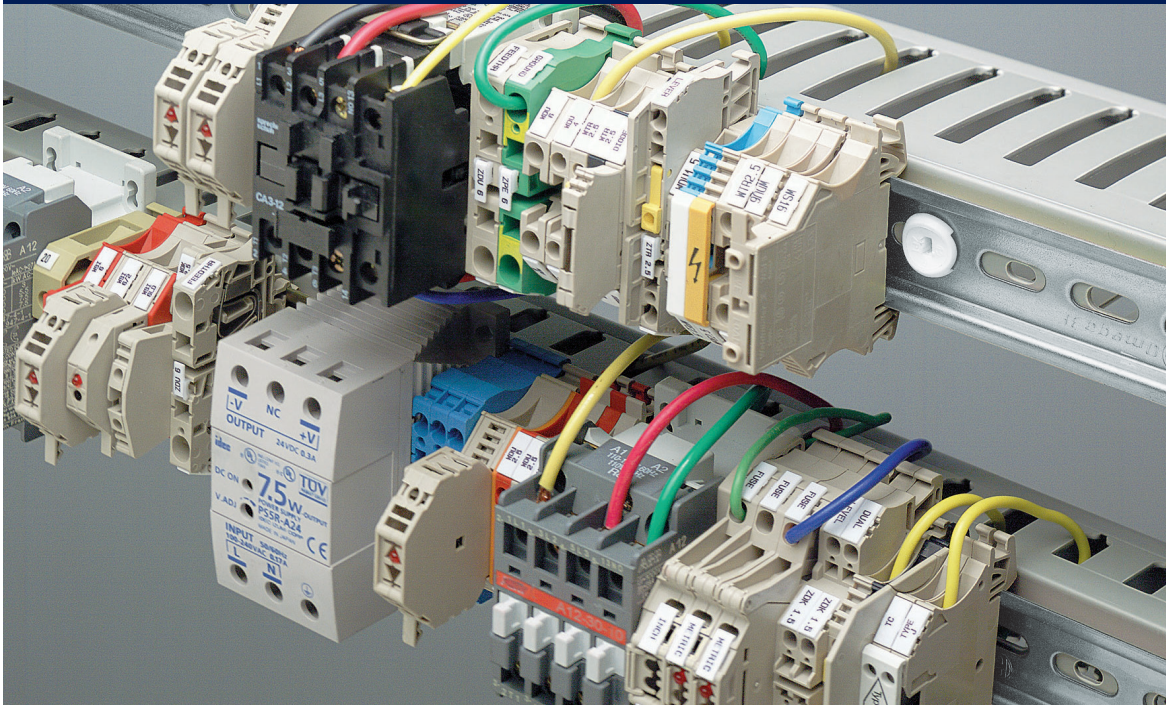
Save Space
Use up to 30% less panel space

Save Labor
Installations are clean and simple with ZP-1 mounting inserts

Save Money
Use smaller enclosures for your next project

In a dual entry or swing out panel application, this new and innovative panel management system provides a faster, effective and efficient installation.

ZP1-ZP2

MOUNTING INSERTS CABLE ATTACHMENTS

Material
Polyamide 6

Color
WHITE

Catalog Number	Pieces per Carton
ZP1	100
ZP2	50

With a simple quarter turn ZP2 can be mounted inside duct. By stacking, mounting levels at different heights are achieved. For tightening a wire bundle inside duct, pass a cable tie through ZP2.

With a simple quarter turn, ZP1 is used to mount components and SEP-E separators inside duct. Also ZP1 can be used to mount smaller sizes of duct inside larger sizes, thus achieving separation of circuits with different voltages and/or functions.

DINBLOK

MOUNTING BLOCKS

Material
Acetal Resin

Color
BLACK
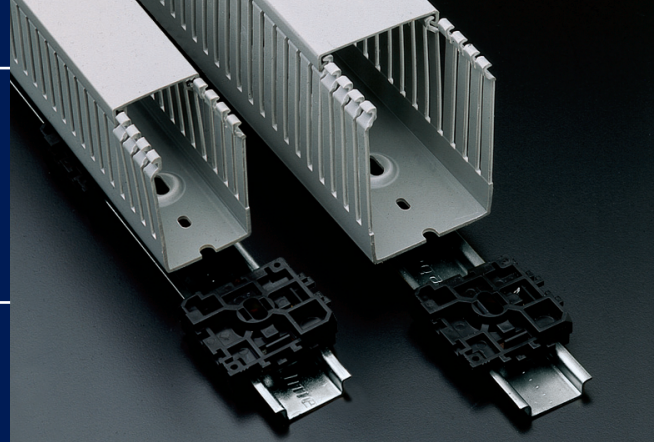
Dinblok 3

for mounting rails
Omega 3 type
Color: BLACK
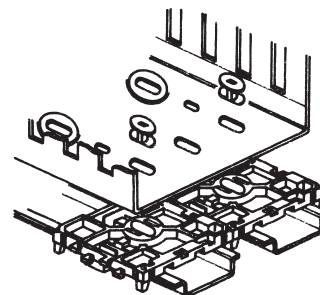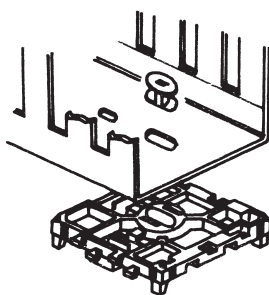
Catalog Number	Pieces per pack.
DINBLOK 3	25

DINBLOKS come complete with ZP1

MSM

DUCTS SUPPORT ARMS

Material
Steel

Color
CHROME
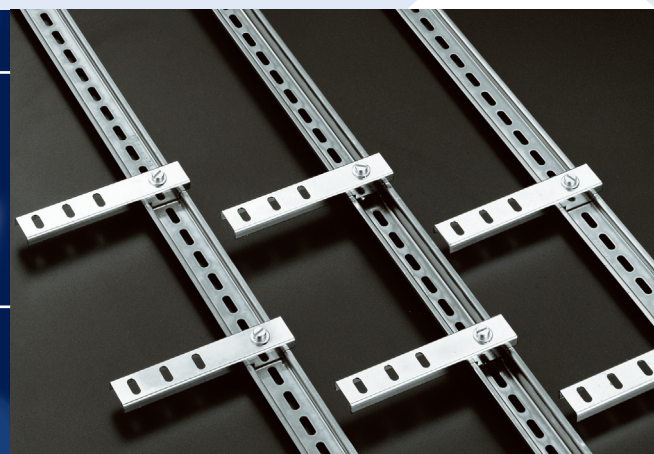
Catalog Number	Pieces per Pack
MSM	10

This provides added support and strength to your duct system and allows for mounting up to 4" wide duct to the side of our 35 mm Din rail.
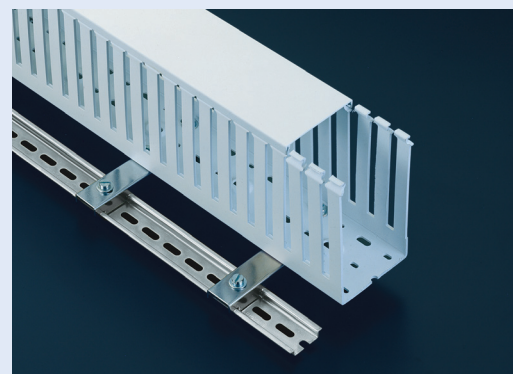
TOOLS

SX-15 Wiring Duct Cutter

WT-2 Duct and tubbing cutter

Features and Benefits

- Heavy-duty stainless steel blade
- Easy-grip handle
- Smooth, burr-free cuts on duct and cover
- Quick, easy cutting
- For use with all IBOCO wiring duct products, including DINOSAUR DUCT

Catalog Number		Pieces per Pack
SX-15	Hand duct cutter	1
SX-15B	Blade	1

Catalog Number		Pieces per Pack
WT-2	Duct and tubbing cutter	1
WT-2B	Blade	1

DC-510 Din Rail cutter

Features and Benefits

- Cuts Omega 3/2F/3F/3A/3AF/G1/G1F 6 mm (~ 1.4") steel rods, threaded or not
- Punches oblong hole 8.8 mm x 5 mm (0.35" x 0.20") in either direction on the axis of the rail
- Includes 1m ruler (imperial/metric) with End Stop

Catalog Number		Pieces per Pack
DC-510	Rail cutter	1

Cutter

Catalog Number		Pieces per Pack
BL-120	Wiring duct cutter	1
DCA-100	Aluminium rail cutter	1

Cable Tie Installation Tools
ITT-1   ITT-2A

Catalog Number	Pieces per Pack
ITT-1	1
ITT-2A	1

19

ICT

CABLE TIES

Material
6/6 Nylon
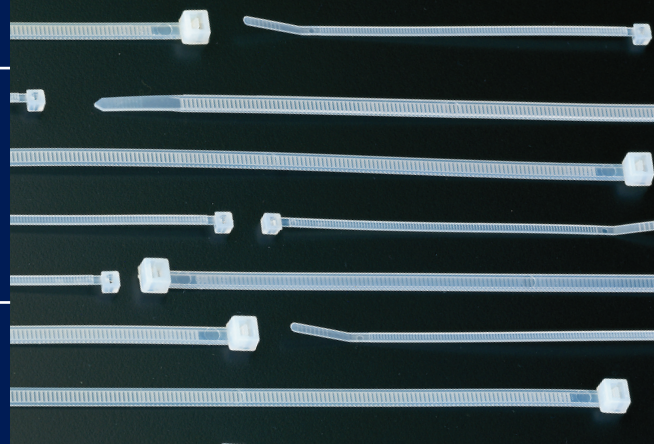
Color
NATURAL - BLACK

Catalog Number	Quantities Available	Length in.	(mm)	Min. Loop Tensile Strength	Maximum Bundle Dia. in.	(mm)
ICT-18R*	C-M	3.96	(100)		.875	(22)
ICT-18RB*	C-M	"			"	"
ICT-18L	C-M	6.15	(156)	18 LBS.	1.63	(41)
ICT-18LB	C-M	"			"	"
ICT-18V	C-M	8.00	(203)		2	(50)
ICT-18VB	C-M	"	"		"	"
ICT-40R*	C-M	5.78	(146)	40 LBS.	1.38	(35)
ICT-40RB*	C-M	"			"	"
ICT-40L	C-M	8.78	(223)		2.13	(54)
ICT-40LB	C-M	"	"		"	"
ICT-50R*	C-M	7.49	(190)		1.75	(44)
ICT-50RB*	C-M	"			"	"
ICT-50T*	C-D	11.3	(287)	50 LBS.	3	(76)
ICT-50TB*	C-D	"			"	"
ICT-50L*	C-D	14.5	(368)		4	(102)
ICT-50LB*	C-D	"			"	"
ICT-120R*	C	15	(381)		4	(103)
ICT-120RB*	C	"	"		"	"
ICT-120T	C	18	(457)	120 LBS.	5.25	(133)
ICT-120TB	C	"			"	"
ICT-120V	L	24	(610)		7	(178)
ICT-120VB	L	"			"	"
ICT-120X*	L	28	(711)		8	(203)
ICT-120XB*	L	"			"	"

Suffix B indicates BLACK
For other colors/sizes contact sales office

*MIL-SPEC Ties - Natural only

EXTRA HEAVY DUTY

Catalog Number	Quantities Available	Length in.	(mm)	Min. Loop Tensile Strength	Maximum Bundle Dia. in.	(mm)
ICT-175V*	L	24	(610)		7.2	(183)
ICT-175VB*	L	"	"		"	"
ICT-175R*	L	37	(940)		11	(279)
ICT-175RB*	L	"		175 LBS.	"	"
ICT-175T*	L	48	(1219)		14.5	(368)
ICT-175TB*	L	"			"	"
ICT-250R*	C	22.8	(579)	250 LBS.	6	(152)
ICT-250RB*	C	"			"	"

Suffix B indicates BLACK
For other colors/sizes contact sales office

*MIL-SPEC Ties - Natural only

RELEASABLE

Catalog Number	Quantities Available	Length in.	(mm)	Min. Loop Tensile Strength	Maximum Bundle Dia. in.	(mm)
ICT-50RLR	C	5.9	(149)		1.25	(32)
ICT-50RLRB	C	"			"	"
ICT-50RLS	C	7.8	(198)	50 LBS.	2	(51)
ICT-50RLSB	C	"			"	"
ICT-50RLL	C	11.75	(298)		3	(76)
ICT-50RLLB	C	"			"	"

Suffix B indicates BLACK

MOUNTING HOLES

Catalog Number	Quantities Available	Length in.	(mm)	Min. Loop Tensile Strength	Maximum Bundle Dia. in.	(mm)	Screw Hole
ICT-30MHR	C	6 "	(152) "	30 LBS.	1.25 "	(32) "	NO.8
ICT-30MHRB	C						
ICT-50MHS	C-M	8 "	(205) "		1.75 "	(44) "	
ICT-50MHSB	C-M						
ICT-50MHT	C	11.7 "	(298) "	50 LBS.	3 "	(76) "	NO.10
ICT-50MHTB	C						
ICT-50MHL	C	14 "	(368) "		4 "	(102) "	
ICT-50MHLB	C						
ICT-120MHL	C	15 "	(396) "	120 LBS.	4 "	(102) "	NO.10
ICT-120MHLB	C						

Suffix B indicates BLACK

Stainless Steel cable ties available, contact sales

IDENTIFICATION & FLAG TAGS

Catalog Number	Quantities Available	Length in.	(mm)	Min. Loop Tensile Strength	Maximum Bundle Dia. in.	(mm)	Pad Size
ICT-18IDR	C	4 "	(101) "	18 LBS.	.63 "	(16) "	5/16 x 1
ICT-18FLR	C						5/16 x 13/16
ICT-50IDS	C	7	(177)	50 LBS.	1.75	(44)	1/2 x 1/8
ICT-50IDL	C	14	(358)		4	(102)	1/2 x 2 1/4

Add following suffix to number to indicate quantity
M=1,000 pc package (ie..ICT-18R-M)
D= 500 pc package (ie..ICT-50R-D)
C= 100 pc package (ie..ICT-18R-C)
L= 50 pc package (ie..ICT-120R-L)

Color Natural
For additional colors/sizes contact factory

FLR

IDR

ICM

CABLE MOUNTS

Material
6/6 Nylon
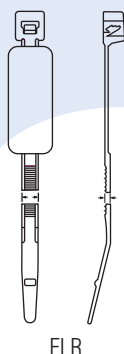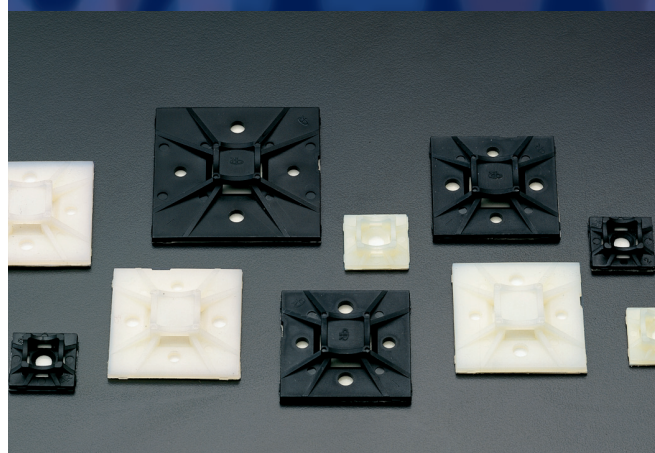
Color
NATURAL - BLACK
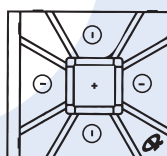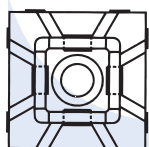
Catalog Number	Pieces per Pack
ICM-75	100
ICM-75B	100
ICM-100	100
ICM-100B	100
ICM-200	100
ICM-200B	100

Add suffix M to number when ordering
1000 pc package (ie.ICT-18R-M)
Color Standard Natural
Suffix B indicates BLACK

ICM-75 and 100   ICM-200

21

LIQUIDTIGHT CONDUIT

GUA - NON METALLIC

Material
Soft PVC
with rigid PVC
external spiral

Color
LIGHT GREY
BLACK

Catalog Number	Nominal ID	Actual ID	Coil length
GUA-12*	3/8	0.47	98' (30mtrs)
GUA-16*	1/2	0.63	98' (30mtrs)
GUA-20*	3/4	0.79	98' (30mtrs)
GUA-25*	1	0.98	98' (30mtrs)
GUA-32*	1-1/4	1.25	98' (30mtrs)
GUA-40*	1-1/2	1.57	98' (30mtrs)
GUA-50*	2	1.97	98' (30mtrs)

* Color - add suffix "G" for LIGHT GREY and "K" for BLACK

RA - STRAIGHT LIQUIDTIGHT FITTING

Material
Fire resistant
Polypropylene

Color
LIGHT GREY
BLACK

Catalog Number	Nominal ID	Actual ID	Pieces per pack
RA-12*	3/8	0.47	20
RA-16*	1/2	0.63	20
RA-20*	3/4	0.79	20
RA-25*	1	0.98	10
RA-32*	1-1/4	1.25	10
RA-40*	1-1/2	1.57	5
RA-50*	2	1.97	5

* Color - add suffix "G" for LIGHT GREY and "K" for BLACK

CUR - 90° LIQUIDTIGHT FITTING

Material
Fire resistant
Polypropylene

Color
LIGHT GREY
BLACK

Catalog Number	Nominal ID	Actual ID	Pieces per pack
CUR-12*	3/8	0.47	25
CUR-16*	1/2	0.63	25
CUR-20*	3/4	0.79	15
CUR-25*	1	0.98	5
CUR-32*	1-1/4	1.25	5

* Color - add suffix "G" for LIGHT GREY and "K" for BLACK
- For 11/2" and 2" contact sales office

GT - GASKETS

Catalog Number	Fits RA/CUR	Pieces per pack
GT-12	12	25
GT-16	16	25
GT-20	20	25
GT-25	25	20
GT-32	32	20
GT-40	40	10
GT-50	50	10
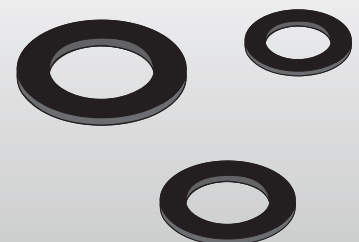
Adhesive Backed Duct

Adhesive tape can be applied to all sizes of our T1, T1E, TS and TSH Wiring Duct Series products.
Adhesive backing can be used for the following applications:

1) TEMPORARY MOUNTING (See Table Below):
   Gives installer ample time to secure duct (rivets or screws) with precision and accuracy.

2) PERMANENT MOUNTING:
   Significantly reduces labor costs and time by eliminating the need to drill or tap holes during installation. IBOCO recommends the entire width of the duct be covered with an Acrylic based adhesive tape. Contact factory for pricing;

   Note: IBOCO recommends that, when using acrylic tape, approximately 12 hours of curing time is allowed.

Factory Applied Tape (Temporary Mounting) Rubber Based Only

Duct Size W x H	Rows of Tape	Tape Size (in)	Tape Thickness
.5 x .5 Thru 1.5 x 2.25	1	.50	.0313
1.5 x 3 Thru 3 x 2	2	.50	.0313
3 x 3 Thru 3 x 5	2	.75	.0313
4 x 1.5 Thru 4 x 5	2	.75	.0313
6 x 4	3	.75	.0313

Tape Specifications:
* Double-sided rubber based polyolefin foam tape
* Application Temperature Range 65° F to 100° F
* General Service Temperature -20° F to 175° F

Please add an "A" to the part number when ordering (i.e. T1-2230GA).
Adhesive is applied as ordered.
For pricing please contact the factory.

Rolls of Adhesive to Purchase Separately

Part Number	Tape Size (in)	Roll Length (ft)
Acrylic		
MT-32A88	.875	216
MT-32A150	1.5	216
MT-32A212	2.125	216
Rubber		
MT-32A50	.50	216
MT-32A75	.75	216

Technical Characteristics of Materials

IBOCO wiring products respond to all installation needs, coping with different uses and environment applications. They are manufactured with high quality materials that undergo severe quality controls and performance tests under extreme operating and duration conditions with a constant control of quality standards.
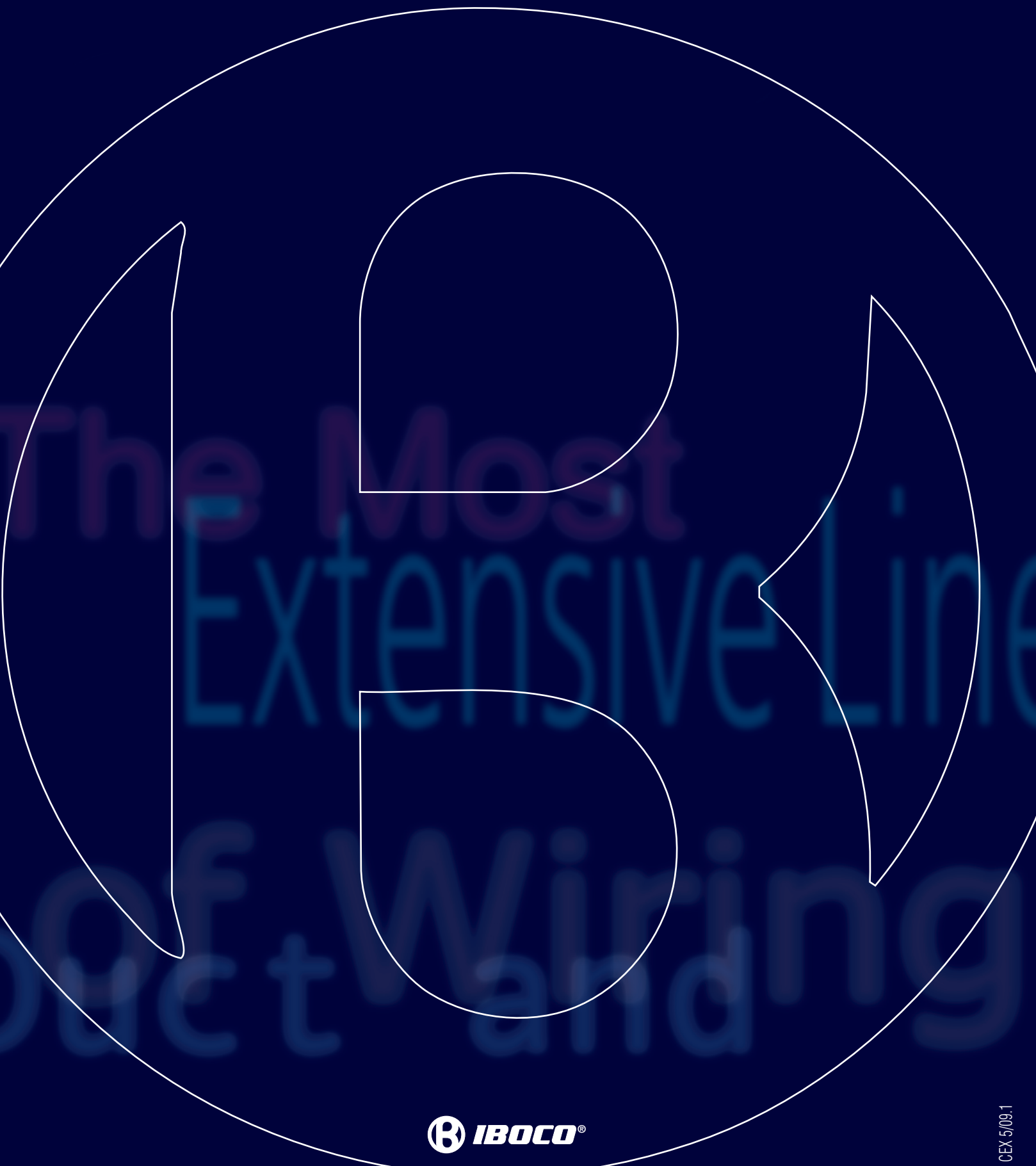
- WIRING DUCTS T1, T1-E, T1-K, T1-B, TS, TSH, SEP-E, CL, COV, TR1 and TR1-E are manufactured in rigid SELF-EXTINGUISHING PVC.

- Those components for which high bending resilience is required are in polyamide 6 and polypropylene.

- SPIRALITE is manufactured in natural polyethylene and self-extinguishing polyethylene.

MATERIALS / TECHNICAL CHARACTERISTICS	UNIT OF MEASURE	STANDARD	PVC DUCT	ABS/PC	POLYAMIDE 6	POLYETHYLENE	FLAME RETARDANT POLYETHYLENE	POLYPROPYLENE SELF EXTINGUISHING WHITE	POLYPROPYLENE SELF EXTINGUISHING GREY RAL 7030
CHEMICAL-PHYSICAL PROPERTIES			Value	Value	Value	Value	Value	Value	Value
Specific gravity	g/cm^3	ASTM D792	1.55	1.20	1.14	0.92	0.97	1,01	0,95
H$_2$O 73,4° F absorption	%	ISO 62	<0,1	0,4	2,5	<0,1	<0,1	<0,1	<0,1
Formaldehyde	ppm	–	absent	absent	absent	absent	absent	absent	absent
Cadmium	ppm	–	absent	absent	absent	absent	absent	absent	absent
MECHANICAL PROPERTIES									
Tensile stress at break	MPa	ASTM D638	39	–	45	17	15	24	24
Traction strength	MPa	ASTM D638	44	–	55	9,5	9	28	28
Elongation at break	%	ASTM D638	130	–	250	400	600	200	200
Modulus of elasticity at traction	MPa	ASTM D638	4400	–	950	–	240	–	–
Modulus of elasticity at flexion	MPa	ASTM D790	3200	–	1100	210	130	1700	1500
THERMAL PROPERTIES									
Temperature VICAT	°C	ASTM D1525	84	112	198	89	–	95	95
HDT	°C	ASTM D648	72	98	185	–	–	90	90
Coefficient of expansion	K^{-1}	ASTM D696	6 10^{-5}	–	8-10 10^{-5}	22 10^{-5}	10^{-5}	14 10^{-5}	14 10^{-5}
Specific heat	kJ/kgK	ASTM C351	0,94	–	1,7	–	–	–	–
Thermal conductivity	W/mK	ASTM C177	0,14	–	0,29	0,32	0,32	0,21	0,21
ELECTRICAL PROPERTIES									
Dielectric constant	–	ASTM D150	3,2 - 4,0	3,0	5,0	2,4	2,3	2,4	2,4
Dielectric strength	kV/mm	IEC 243	70	40	35	90	90	75	75
Surface resistance	Ohm	IEC 93	10^{13}	10^{14}	5 10^{11}	10^{13}	10^{13}	10^{13}	10^{13}
SELF-EXTINGUISHING									
Self-extinguishing 1,6 millimeters	–	UL 94	V0	HB	V2	HB	V2	V0	V2
Self-extinguishing 3,2 millimeters	–	UL 94	V0	HB	V2	HB	V2	V0	V2
Glow wire test (2 mm)	°C	IEC 60695-2-12	960	650	650	650	850	960	850
Oxygen number	%	ASTM D2863	43	–	25	–	25	30	25

Rigid PVC Resistance to Chemical Agents

Chemical	Concentration	Temp. °C	Resistance	Chemical	Concentration	Temp. °C	Resistance
Acetic acid, hydrous	25%	40	+	Hexane		20	+
Acetic acid	100%	20	0	Hydrochloric acid	30%	40	+
Acetone	traces	20	–	Hydrogen	100%	60	+
Acetone	100%	20	–	Lead acetate, hydr.	saturated	50	+
Acqua regia		20	0	Lead tetra-ethyl	100%	20	+
Aluminium chloride, hydrous	thinned	40	+	Linseed oil	100%	60	0
Aluminium sulphate, hydr.	thinned	40	+	Lubricating oils	100%	20	+
Ammonia, concentrate	saturated	40	+	Methanol	100%	40	+
Ammonia, dry gas	100%	60	+	Milk	normal	20	+
Ammonia, liquid	100%	20	0	Mineral oil	100%	20	+
Aniline, pure	100%	20	–	Molasses		20	+
Antifreeze	commercial	20	+	Naphtalene		20	–
Arsenic acid. hydr.	thinned	40	+	Nitrous acid, liquid	30%	50	+
Barium hydroxide, hydr.		60	+	Oils and fats	commercial	60	+
Barium salts, hydr.		60	+	Oil of turpentine	100%	60	0
Beer	commercial	20	+	Ozone	100%	20	+
Bee's wax	commercial	20	+	Paraffin wax		60	+
Benzene	100%	20	+	Petroleum		20	0
Benzoic acid		20	+	Photographic developer	commercial	40	+
Bleaching lye	usual conc.	40	+	Photographic emulsions	commercial	40	+
Borax, hydrous	thinned	40	+	Potash lye, hydrous	40%	40	+
Boric acid, hydr.	thinned	40	+	Patassium permanganate	6%	20	+
Brandy	commercial	20	+	Propane, liquid	100%	20	+
Bromine, liquid	100%	20	–	Prussic acid		60	+
Butane, gaseous		20	+	Salicylic acid		60	+
Butadiene	50%	60	+	Sea water		60	0
Butanol	10%	20	+	Sebacic acid	100%	60	+
Butyric acid, hydr.	20%	20	+	Silicone oil	100%	20	+
Calcium chloride		60	0	Soda, hydrous	thinned	40	+
Camphor oil	100%	20	+	Sodium chloride	thinned	40	+
Carbon tetrachloride	100%	20	0	Spirits, all types	commercial	20	+
Carbon dioxide, dry	100%	60	+	Succinic acid, hydrous		60	+
Chlorine, gaseous, dry	100%	20	+	Sulphur		60	0
Chlorine, gaseous, moist	0.5%	20	+	Sulphuric acid, hydrous	40%	40	+
Chlorine, liquid		20	–	Tannic acid	10%	60	0
Chlorine water	saturated	20	0	Tetrahydrofuran	100%	20	–
Chromic acid, hydr.	50%	40	+	Toluene	100%	20	–
Citric acid, hydr.	10%	40	+	Tincture of Iodine	commericial	20	–
Copper sulphate, hydr.	thinned	40	+	Urea, hydrous	10%	40	+
Diesel oil	100%	20	+	Urine		40	+
Ethyl-alcohol	96%	20	+	Vaseline oil	100%	20	–
Formaldehyde, hydr.	thinned	40	+	Vinegar	commercial	40	+
Formic acid	100%	20	+	Water	100%	40	+
Freon 12	100%	20	+	Water steam		40	0
Gasoline	100%	60	+	Wines, red and white	commercial	20	+
Gelatin, hydr.		40	+	Zinc salts	saturated	60	0
Glycerine, hydr.		60	+	Zinc sulphate, hydrous	thinned	40	+
Heating oil		20	0				

+ *Resistant*, 0 *Resistant in certain conditions*, – *Unsuitable*

IBOCO®