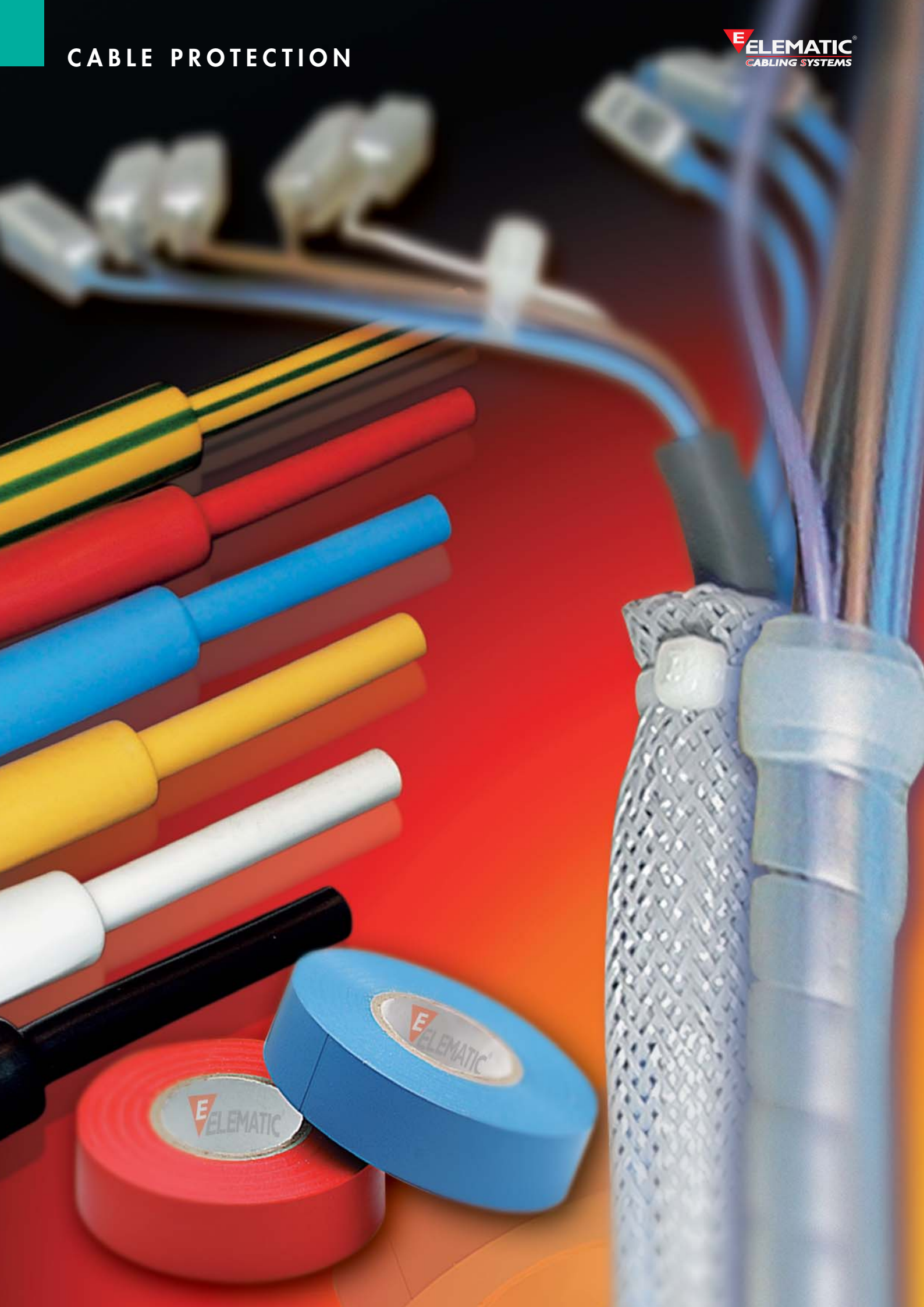


# CABLE PROTECTION

**E**ELEMATIC<sup>®</sup>  
CABLING SYSTEMS



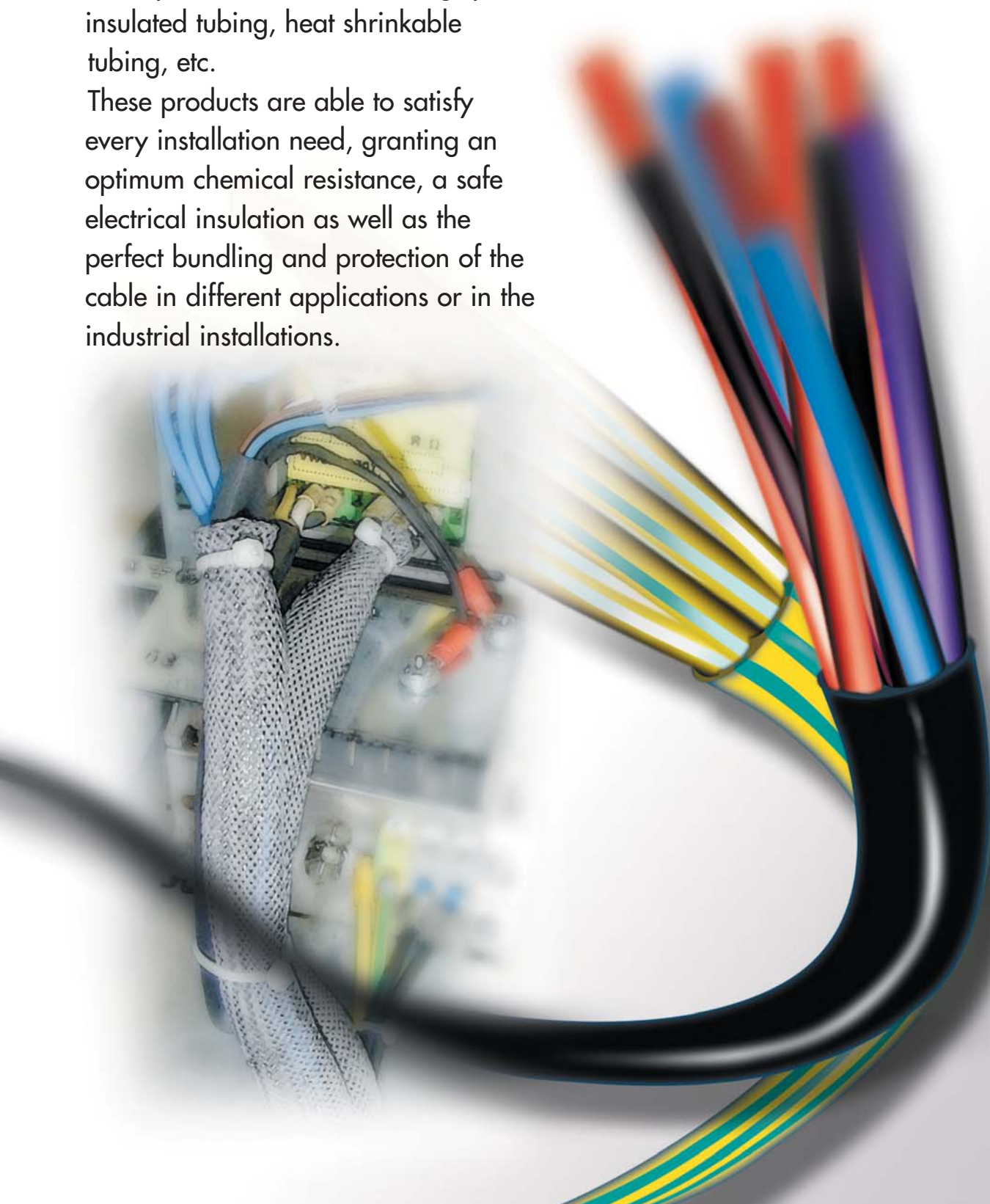
# Safe cable protection!

Elematic Cabling Systems produces in own plants a wide range of products for the cable protection, such as wiring spirals, insulated tubing, heat shrinkable tubing, etc.

These products are able to satisfy every installation need, granting an optimum chemical resistance, a safe electrical insulation as well as the perfect bundling and protection of the cable in different applications or in the industrial installations.



CABLE PROTECTION



# ELEGEL TWO COMPONENTS GEL

**ELEGEL is a transparent insulating two components gel with excellent dielectric and sealing properties, ideal to insulate and waterproof Low Voltage electrical connections. Its low viscosity gives an initial excellent filling that can completely envelop every electrical connection; its low mechanical strength after hardening allows instead the accessibility to the electrical joint, simply removing the gel without any special tools. ELEGEL is easy to use, non toxic, chemically inert and without expire date.**

Once mixed in equal parts (1:1), ELEGEL can be cast within closed containers; in case of an electrical connection inside, this will be completely covered and sealed by the gel.

After a convenient hardening period (10 to 20 minutes depending on the temperature) the product solidifies making the connection perfectly sealed, protected from dust, moisture and water, with a protection IP 68.

## Applications

- Insulation and sealing of electrical connection in
- aerial laying
  - underground laying
  - submersed laying

## Characteristics

- Operating voltage: 0.6 ÷ 1 kV
- Working temperature: -20°C ÷ 90°C
- Dielectric strength > 23 kV/mm
- Volume resistivity > 10<sup>16</sup> Ω x cm
- Protection class IP68
- Non toxic and chemically inert
- Halogen free

## Advantages

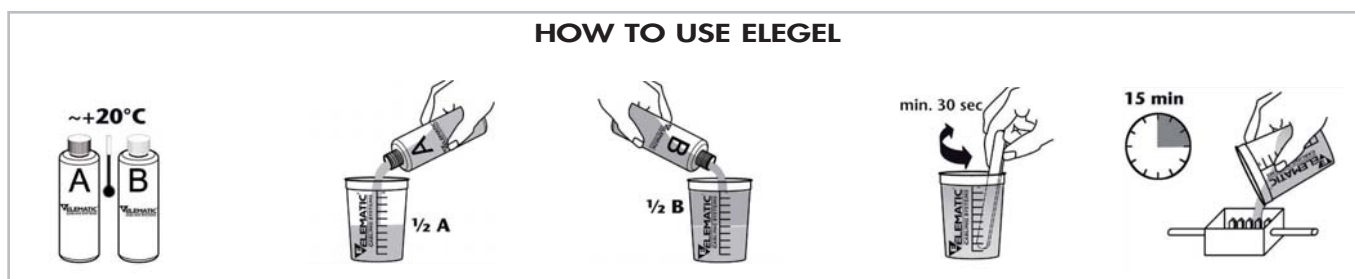
- No toxic or heat emission during hardening process;
- Fast hardening
- Easy accessibility to the electrical connection
- No expire date



ELEGEL is available in two packages, 400ml and 1000 ml. In each of them there is a measuring container to mix the two components and a shovel to conveniently mix them.

### Two components ELEGEL

Code	Quantity	Pcs
ECS-261372	400 ml	1
ECS-261373	1000 ml	1



# WIRING POLYETHYLENE SPIRALS



**Halogen free**

## Characteristics:

Type of material: Polyethylene (low density).  
 Colours available: natural, black, white (only self-extinguishing).  
 Colours on request: yellow, orange, red, pink, purple, violet, green, beige, brown, grey.  
 Available diameters: from 2,3 to 22,2 mm.  
 Humidity absorption: null.

- Working temperature: -50°C ÷ 90°C
- Tightening temperature: -20°C ÷ 60°C
- Max admissible point: 100°C for short time
- Melting point: 113°C
- Density: 0,922 g/cm<sup>3</sup>

Flammability rating: UL 94, class HB (natural, black colours).  
 UL 94, class V2 and V0 (self-extinguishing white).

Resistance to external agents: Good resistance to bases, weak acids, organic solvents.  
 Limited resistance to chloride solvents.  
 Good resistance to UV rays (black version).  
 Recyclable, not biodegradable, halogen-free.

**For availability, MOQ and LT of products on request, please ask to our sales offices.**

## Applications

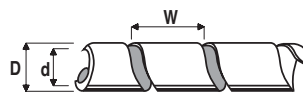
- Bundling and protection of electrical cables and wires (general purpose).
- Suitable for the automotive applications, control panels, cabinets and electrical installations.

## Characteristics

- The polyethylene spiral is obtained by a tube of extruded and cut polyethylene.
- The polyethylene spiral is extremely flexible.
- For the characteristics of the material see page 19.
- The spiral is available in a wide range of diameters and colours.

## Benefits

- Easy installation.
- Halogen-free.
- Due to the spiral structure, cables can branch out at any point and in any direction.

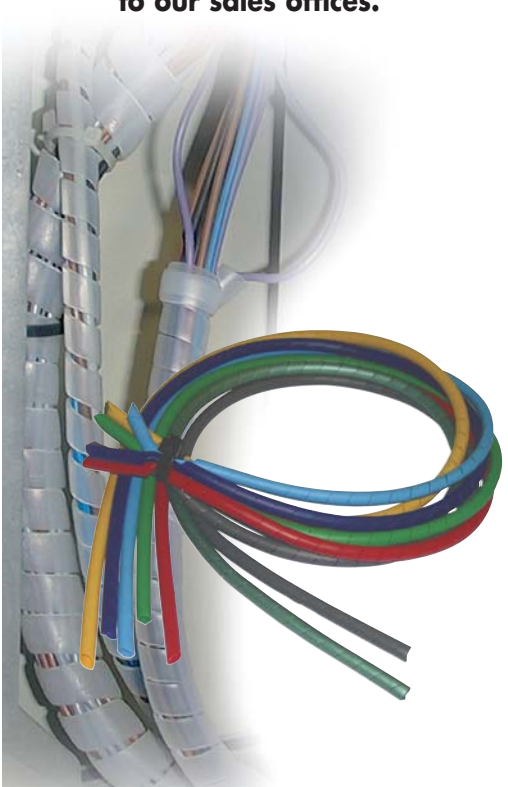


## POLYETHYLENE spirals

Code	Code	Code	Code	Thickness	Dimensions (mm)			Wiring (mm)		Lenght (m)	
Natural	Black	self-ext. V2	self-ext. V0	(mm)	d	D	W	Ø min.	Ø max	Bag	Carton
SP 2	SP 2N	SPA 2	SPVO 2*	0,60	2,3	3,5	5	2	15	50	2000
SP 4	SP 4N	SPA 4	SPVO 4*	0,65	3,7	5,0	7	4	20	25	1000
SP 6	SP 6N	SPA 6	SPVO 6*	0,75	6,5	8,0	10	7	40	25	500
SP 9	SP 9N	SPA 9	SPVO 9*	0,90	8,2	10,0	12	12	50	25	350
SP 12	SP 12N	SPA 12	SPVO 12*	1,00	10,0	12,0	14	13	70	25	250
SP 15	SP 15N	SPA 15	SPVO 15*	1,00	12,0	14,0	16	15	80	20	200
SP 20	SP 20N	SPA 20	SPVO 20*	1,20	17,6	20,0	22	20	120	25	100
SP 25	SP 25N	SPA 25	SPVO 25*	1,40	22,2	25,0	27	25	150	20	80

\* Available on request only.

**Other measures available on request.**



# BRAIDED SLEEVES



**Halogen free**

## BRAIDED SLEEVE IN POLYESTER Characteristics of raw material:

Properties	Test Method	Benefits
Type of material: Yarn diameter: Working temperature range: Temperature peak max: Flammability rating: Melting point: Humidity absorption (H <sub>2</sub> O) (-50% relative humidity): Ultimate elongation max: Density: Specifications:	polyester 0,22 mm -50°C ÷150°C 180°C UL 94-V2 255°C  0,3% 20% 1,34 g/cm <sup>3</sup> DIN 5510 part 2 class S4/SR2/ST2	The braided sleeve in polyester is suitable where a good flame, mechanical and thermal resistance is required.

## Applications

- Flexible cable protection in the electrical or electronic installations, in the telecommunications.

## Characteristics

- Braided sleeves are available in a wide range of diameters (from 3 to 50 mm), of colours (grey and black) and materials (polyester, polyamide and PBT V0).
- The product is packaged in reel and protected with an external film.
- The braided sleeve can be cut with a hot-knife, to prevent fraying at the end of the yarn.

## BRAIDED SLEEVE IN POLYAMIDE Characteristics of raw material:

Properties	Test Method	Benefits
Type of material: Yarn diameter: Working temperature range: Temperature peak max: Flammability rating: Melting point: Humidity absorption (H <sub>2</sub> O) (-50% relative humidity): Ultimate elongation max: Density: Specifications:	polyamide 6.6 0,25 mm -55°C ÷125°C 200°C UL 94-V2 260°C  2,5% 20,5% 1,14 g/cm <sup>3</sup> DIN 5510 part 2 class S4/SR2/ST2	The braided sleeve in polyamide 6.6 is suitable wherever a mechanical resistance is required. The major density and thickness of the yarn, enable the hardest applications.

## Benefit

- Extreme easy insertion and slip of a cables bundle.

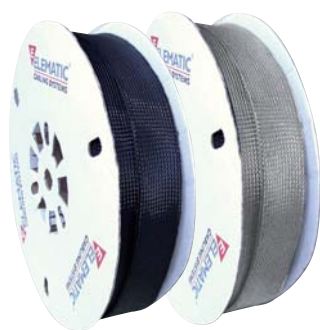


## BRAIDED SLEEVE IN POLYESTER PBT V0\* Characteristics of raw material:

Properties	Test Method	Benefits
Type of material: Yarn diameter: Working temperature range: Temperature peak max: Flammability rating: Melting point: Humidity absorption (H <sub>2</sub> O) (-50% relative humidity): Ultimate elongation max: Density:	polyester PBT 0,25 mm -50°C ÷130°C 150°C UL 94-V0 225°C  0,2% 27% 1,3 g/cm <sup>3</sup>	The braided sleeve in polyester PBT V0 is self-extinguishing according to UL94-V0. This kind of sleeve offers a superior cable protection and should be used wherever fire protection is important. It is particularly suitable for the car and railway vehicle production as well as for the automatic equipments.

\*Available on request only.

**For availability, MOQ and LT of products on request, please ask to our sales offices.**



### braided sleeves IN POLYESTER

Code Grey	Code Black	Ø Nominal (mm)	Ø Max. (mm)	Reel length (m)
15501003	15502003	3	6	100
15501004	15502004	4	8	100
15501005	15502005	5	10	100
15501006	15502006	6	12	100
15501008	15502008	8	15	100
15501010	15502010	10	18	100
15501012	15502012	12	22	50
15501015	15502015	15	25	50
15501018	15502018	18	28	50
15501020	15502020	20	30	50
15501025	15502025	25	38	50
15501030	15502030	30	49	50
15501040	15502040	40	60	50
15501050*	15502050*	50	72	50



### braided sleeves IN POLYAMIDE 6.6

Code Grey	Code Black	Ø Nominal (mm)	Ø Max. (mm)	Reel length (m)
15510003	15520003	3	5	100
15510004	15520004	4	7	100
15510005	15520005	5	8	100
15510006	15520006	6	9	100
15510008	15520008	8	13	100
15510010	15520010	10	15	100
15510012	15520012	12	18	50
15510014	15520014	14	20	50
15510016	15520016	16	21	50
15510018	15520018	18	22	50
15510020	15520020	20	25	50
15510025	15520025	25	28	50
15510030	15520030	30	37	50
15510035	15520035	35	45	50
15510040	15520040	40	48	50
15510050*	15520050*	50	59	50



### braided sleeves IN POLYESTER PBT VO\*

Code Grey	Code Black	Ø Nominal (mm)	Ø Max. (mm)	Reel length (m)
15570003	15580003	3	5	100
15570004	15580004	4	7	100
15570005	15580005	5	8	100
15570006	15580006	6	9	100
15570008	15580008	8	13	100
15570010	15580010	10	15	100
15570012	15580012	12	18	50
15570015	15580015	15	22	50
15570020	15580020	20	25	50
15570025	15580025	25	28	50
15570030	15580030	30	37	50
15570040	15580040	40	48	50
15570050	15580050	50	59	50



Heat guns and related accessories, see page 133.

\*Available on request.

# PVC TUBING SLEEVES



**Tubing sleeve in PVC, suitable for insulating wires in the electrical applications or where the bundling and protection of cables and wires are necessary.**

## Technical data

Diameters:	from 1 to 50 mm.
Colours available:	black.
Colours on request:	white, red, blue, yellow, grey, brown, violet, orange.
Working temperature:	from -30°C to 70°C (105°C on request).
Temperature (short period):	+200°C.
Wall resistance:	±0,1 mm.
Wall thickness:	0,3 - 1,3 mm.
Tensile strength:	14,5 MPa.
Elongation at tear:	195%.
Specific gravity:	1,36gr/cm <sup>3</sup> .
Hardness Shore A:	70 ÷ 78°C.
Dielectric strength to 25°C:	25 kV/mm.
Water absorption:	0,2%.
Flammability rating:	self-extinguishing UL 94 class V0.

**For availability, MOQ and LT of products on request, please ask to our sales offices.**

## Applications

Cable protection in:

- Panel buildings.
- Industrial wirings.
- Automotive.

## Characteristics

- Material: PVC.
- Available in reel from 25 to 500 mt, thickness from 0,3 to 1,3 mm according to the diameter.
- Available on request in PVC 105°C.

## Benefits

- Pre-inflated sleeves ( $\varnothing \leq 20$  mm) for easiest insertion and sliding of the cables.
- According to the norms: CEI (20-34/1-3/3-2/1-1) (20-37) (20-11).



**PVC tubing sleeve**

Code	Ø Internal (mm)	Ø External (mm)	Wall thickness (mm)	Reel length (m)
12370100	1,0	1,6	0,3	500
12370150	1,5	2,1	0,3	500
12370200	2,0	2,6	0,3	500
12370250	2,5	3,1	0,3	500
12370300	3,0	3,6	0,3	200
12370350	3,5	4,1	0,3	200
12370400	4,0	4,6	0,3	200
12370450	4,5	5,3	0,4	200
12370500	5,0	5,8	0,4	200
12370600	6,0	6,8	0,4	200
12370700	7,0	7,8	0,4	200
12370800	8,0	8,8	0,4	200
12370900	9,0	9,8	0,4	200
12370101	10,0	11,0	0,5	200
12370111	11,0	12,0	0,5	100
12370121	12,0	13,0	0,5	100
12370131	13,0	14,2	0,6	100
12370141	14,0	15,2	0,6	100
12370151	15,0	16,2	0,6	100
12370161	16,0	17,2	0,6	100
12370181	18,0	19,4	0,7	100
12370202	20,0	21,6	0,8	100
12370222	22,0	23,8	0,9	100
12370242	24,0	25,8	0,9	50
12370262	26,0	27,8	0,9	50
12370282	28,0	30,0	1,0	50
12370303	30,0	32,0	1,0	50
12370343	34,0	36,0	1,0	25
12370363	36,0	38,0	1,0	25
12370383	38,0	40,2	1,1	25
12370404 *	40,0	42,5	1,2	25
12370454 *	45,0	47,6	1,3	25
12370505 *	50,0	52,6	1,3	25

\* Available on request.

**Other sizes available on request.**



# HOW TO CHOOSE THE RIGHT

## Thin wall tubing

Product name	Shrinking ratio	Operating temperature	Shrinking temperature	Flame rating	Halogen free	Cadmium free
EZ 100*	2:1	-30°C ÷ 105°C	>90°C	not self-extinguishing	yes	yes
EV 100	2:1	-55°C ÷ 125°C	>90°C	not self-extinguishing	yes	yes
ET 100	2:1	-55°C ÷ 135°C	>90°C	self-extinguishing UL 224 125°C	no	yes
EP 100*	2:1	-30°C ÷ 105°C	>90°C	flame retardant	yes	yes
EL 100	2:1	-55°C ÷ 135°C	>90°C	self-extinguishing UL 224 125°C VW1	no	yes
ET 301	3:1	-55°C ÷ 135°C	>90°C	self-extinguishing UL 224 125°C	no	yes

## Dual wall adhesive-lined tubing

EL 301A	3:1	-55°C ÷ 110°C	>110°C	self-extinguishing (outer wall)	no	yes
EL 401A*	4:1	-55°C ÷ 110°C	>110°C	self-extinguishing (outer wall)	no	yes

## Medium wall tubing

EM 100*	3:1	-40°C ÷ 120°C	>110°C	not self-extinguishing	yes	yes
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## Medium wall adhesive-lined tubing

EM 100A	3:1	-40°C ÷ 120°C	>110°C	not self-extinguishing	yes	yes
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## Thick wall tubing

EH 100*	4:1	-40°C ÷ 120°C	>110°C	not self-extinguishing	yes	yes
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## Thick wall adhesive-lined tubing

EH 100A*	4:1	-40°C ÷ 120°C	>110°C	not self-extinguishing	yes	yes
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\*Available on request only.

## HOW TO CHOOSE THE RIGHT HEAT SHRINKABLE TUBE

In order to choose the right heat shrinkable tubing size, it is necessary that the diameter of the shrunked tubing allows the perfect adhesion between the tubing and the cable diameter that has to be covered.

This result is achieved when the tubing shrinks between 20% and 80% of its complete shrinkage capacity.

### Example 1:

Imagine to have a cable of 10 mm diameter to be wrapped with a heat shrinkable tubing with a shrinking ratio of 3:1; in theory both sizes 12/4 and 24/8 would be suitable, since the required diameter of 10 mm lies within the shrinking range of both tubing sizes.

Type	Max expanded nominal diameter (mm)	Min recovered diameter (mm)	Shrinkage capacity (mm)	Shrinkage min. (20%) (mm)	Shrinkage max (80%) (mm)
12/4	12	4	8	10,4	5,6
24/8	24	8	16	20,8	11,2

The right heat shrinkable tubing is 12/14.

### Example 2:

Imagine to have a cable of 5 mm diameter to be wrapped with a heat shrinkable tubing with a shrinking ratio of 2:1; in theory both sizes 6,4/3,2 and 9,5/4,7 would be suitable, since the required diameter of 5 mm lies within the shrinking range of both tubing sizes.

Type	Max expanded nominal diameter (mm)	Min recovered diameter (mm)	Shrinkage capacity (mm)	Shrinkage min. (20%) (mm)	Shrinkage max (80%) (mm)
6,4/3,2	6,4	3,2	3,2	5,76	3,84
9,5/4,7	9,5	4,7	4,7	8,56	5,74

The right heat shrinkable tubing is 6,4/3,2.

# HEAT SHRINKABLE TUBING

Available diameters (mm)	Characteristics	Packaging	Page
1,2 ÷ 50,8	General purpose, economic, semi rigid.	1 mtr length.	88
1,6 ÷ 50,8	General purpose, black colour.	reel, dispenser box, 1 mtr length.	90
1,2 ÷ 101,6	General purpose, flame retardant, black and coloured.	reel, dispenser box, 1 mtr length.	92
1,2 ÷ 50,8	Excellent printability, low smoked emission.	reel.	94
1,6 ÷ 101,6	Professional purpose, self-extinguishing, black and coloured.	reel, dispenser box, 1 mtr length.	96
1,5 ÷ 39,0	General purpose, high shrinking ratio, black and green/yellow, self-extinguishing	reel, dispenser box, 1 mtr length.	98
3 ÷ 24	Professional purpose, adhesive-lined, high shrinking ratio, self-extinguishing.	dispenser box, 1 mtr length.	100
4 ÷ 52	Professional purpose, adhesive-lined, very high shrinking ratio, self-extinguishing.	1 mtr length.	102
12 ÷ 235	Heavy applications, high shrinking ratio, black.	bag 1 mtr length.	104
12 ÷ 180	Heavy applications, high shrinking ratio, adhesive-lined, black.	bag 1 mtr length.	106
12 ÷ 200	Heavy applications, very high shrinking ratio, black.	bag 1 mtr length.	108
12 ÷ 200	Heavy applications, very high shrinking ratio, adhesive-lined, black.	bag 1 mtr length.	110

## EXAMPLE (thin wall tubing):

Type	Shrinking ratio	Expanded diameter (mm)	Recovered diameter (mm)	Shrinking 100% (mm)	Shrinking 80% (mm)	Shrinking 20% (mm)
<b>RANGE OF APPLICATION</b>						
1,2/0,6	2:1	1,2	0,6	0,6	0,72	1,08
2,4/1,2	2:1	2,4	1,2	1,2	1,44	2,16
3,2/1,6	2:1	3,2	1,6	1,6	1,92	2,88
4,8/2,4	2:1	4,8	2,4	2,4	2,88	4,32
6,4/3,2	2:1	6,4	3,2	3,2	3,84	5,76
9,5/4,7	2:1	9,5	4,7	4,8	5,66	8,54
12,7/6,4	2:1	12,7	6,4	6,3	7,66	11,44
19,1/9,5	2:1	19,1	9,5	9,6	11,42	17,18
25,4/12,7	2:1	25,4	12,7	12,7	15,24	22,86
38,1/19,1	2:1	38,1	19,1	19,0	22,90	34,30
50,8/25,4	2:1	50,8	25,4	25,4	30,48	45,72
76,2/38,1	2:1	76,2	38,1	38,1	45,72	68,58
101,6/50,8	2:1	101,6	50,8	50,8	60,96	91,44
1,5/0,5	3:1	1,5	0,5	1	0,70	1,30
3/1	3:1	3,0	1,0	2	1,40	2,60
6/2	3:1	6,0	2,0	4	2,80	5,20
12/4	3:1	12,0	4,0	8	5,60	10,40
24/8	3:1	24,0	8,0	16	11,20	20,80
39/13	3:1	39,0	13,0	26	18,20	33,80

# Heat shrinkable tubing EZ 100

(on request only)



**EZ 100 is a general purpose tubing designed for commercial uses for the Eastern European markets where cost is an important factor. This semi-rigid tube with a nice round shape has also good mechanical features. Common use includes wire bundling, insulation and mechanical protection.**

Shrinking ratio: 2 : 1.  
 Diameters: from 1,2 mm to 50,8 mm.  
 Colours on request: black, white, red, blue, yellow, grey, pink, violet, green, brown, orange, yellow/green.  
 Working Temperature: -30°C ÷ 105°C.  
 Shrinking Temperature: >90°C.  
 Flammability rating: not self-extinguishing - halogen and cadmium free.  
 Packaging: 1 mtr. length; reel and dispenser box on request.

**Halogen free**

**Cadmium free**

**For availability, MOQ and LT of products on request, please ask to our sales offices.**

## TECHNICAL DATA

Properties	Test method	Results
<b>Physical</b>		
Tensile strength	ASTM D 638	10 N/mm <sup>2</sup>
Elongation	ASTM D 638	200%
Longitudinal change after shrinkage	ASTM D 2671	+5%, -10% max
Water absorption	ASTM D 570	0,5% max
Specific gravity	ASTM D 792	1,20 gr/cm <sup>3</sup>
<b>Thermal</b>		
Heat shock (4 hrs at 175 °C)	ASTM D 2671	No cracking or flowing
Flexibility at low temperatures -40°C	ASTM D 2671C	Does not break
Elongation at tear (168 hrs at 150 °C)	ASTM D 638	Elongation 100%
Flammability	ASTM 635, UL94 HB	Passed
<b>Electrical</b>		
Dielectric strength	ASTM D 2671	> 20 kV/mm
Volume resistivity	ASTM D 257	10 <sup>14</sup> ohm cm
<b>Chemical</b>		
Resistance to fungus	AMS-DTL-7444	No growth
Resistance to chemical agents	AMS-DTL-23053/5	Good
Copper corrosion	ASTM D 2671B	Good
Resistance to petrol and diesel		Low



Heat guns and related accessories, see pages 133-135.



**EZ 100 heat shrinkable tubing in 1 MTR LENGTH**

Code	Ø Internal expanded (inch)	Ø Internal expanded (mm)	Ø Internal recovered (mm)	Wall thickness (mm)	Box (m)
12272012	3/64"	1,2	0,6	0,41	30
12272016	1/16"	1,6	0,8	0,43	30
12272024	3/32"	2,4	1,2	0,51	30
12272032	1/8"	3,2	1,6	0,51	30
12272048	3/16"	4,8	2,4	0,51	24
12272064	1/4"	6,4	3,2	0,65	24
12272095	3/8"	9,5	4,7	0,65	20
12272127	1/2"	12,7	6,4	0,65	16
12272190	3/4"	19,1	9,5	0,77	10
12272254	1"	25,4	12,7	0,89	6
12272381	1 1/2"	38,1	19,1	1	10*
12272508	2"	50,8	25,4	1,1	10*

\* Packaged in plastic bag.

# Heat shrinkable tubing EV 100



**EV 100 is a thin wall heat shrinkable tubing in polyolefin, economic with a low shrinking temperature, suitable for insulating conductors or for general applications.**

- Shrinking ratio: 2 : 1.
- Diameters: from 1,6 mm to 50,8 mm (other dimensions available on request).
- Colours available: black.
- Working Temperature:  $-55^{\circ}\text{C} \div 125^{\circ}\text{C}$ .
- Shrinking Temperature:  $>90^{\circ}\text{C}$ .
- Flammability rating: not self-extinguishing - halogen and cadmium free.
- Packaging: reel, dispenser box 1 mtr. length.
- Specifications: FMVSS 302.

**Halogen free**

**Cadmium free**

**For availability, MOQ and LT of products on request, please ask to our sales offices.**

## TECHNICAL DATA

Properties	Test method	Results
<b>Physical</b>		
Tensile strength	ASTM D 638	10 N/mm <sup>2</sup>
Elongation	ASTM D 638	200%
Longitudinal change after shrinkage	ASTM D 2671	+5%, -10% max
Water absorption	ASTM D 570	0,15% max
Specific gravity	ASTM D 792	1,40 gr/cm <sup>3</sup>
<b>Thermal</b>		
Heat shock (4 hrs at 175 °C)	ASTM D 2671	No cracking or flowing
Flexibility at low temperatures -40 °C	ASTM D 2671C	Does not break
Elongation at tear (168 hrs at 150 °C)	ASTM D 638	Elongation 100%
<b>Electrical</b>		
Dielectric strength	ASTM D 2671	> 20 kV/mm
Volume resistivity	ASTM D 257	10 <sup>14</sup> ohm cm
<b>Chemical</b>		
Resistance to fungus	AMS-DTL-7444	No growth
Resistance to chemical agents	AMS-DTL-23053/5	Good
Copper corrosion	ASTM D 2671B	Good
Resistance to petrol and diesel		Low



Heat guns and related accessories, see pages 133-135.

## EV100 heat shrinkable tubing in REEL



Code	Ø Internal expanded (inch)	Ø Internal expanded (mm)	Ø Internal recovered (mm)	Wall thickness (mm)	Reel length (m)
12201016	1/16"	1,6	0,8	0,43	200
12201024	3/32"	2,4	1,2	0,51	200
12201032	1/8"	3,2	1,6	0,51	200
12201048	3/16"	4,8	2,4	0,51	200
12201064	1/4"	6,4	3,2	0,65	150
12201095	3/8"	9,5	4,7	0,65	150
12201127	1/2"	12,7	6,4	0,65	100
12201190	3/4"	19,1	9,5	0,77	50
12201254	1"	25,4	12,7	0,89	50
12201381	1 1/2"	38,1	19,1	1,00	25
12201508	2"	50,8	25,4	1,10	25

## EV100 heat shrinkable tubing in DISPENSER BOX



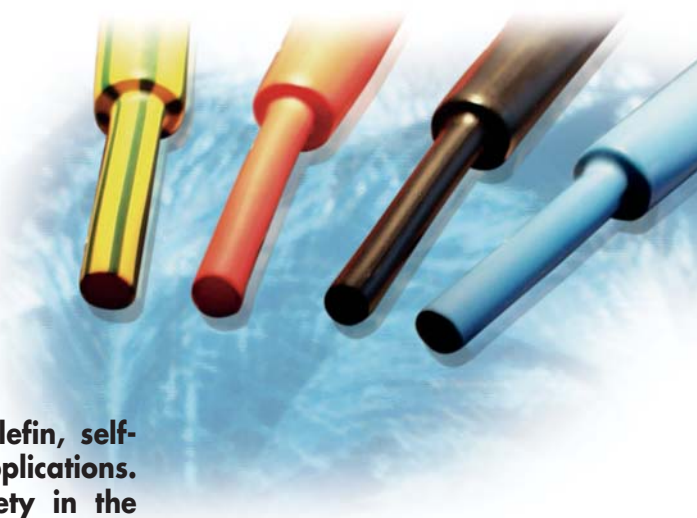
Code	Ø Internal expanded (inch)	Ø Internal expanded (mm)	Ø Internal recovered (mm)	Wall thickness (mm)	Box (m)
12251016	1/16"	1,6	0,8	0,43	15
12251024	3/32"	2,4	1,2	0,51	15
12251032	1/8"	3,2	1,6	0,51	15
12251048	3/16"	4,8	2,4	0,51	12
12251064	1/4"	6,4	3,2	0,65	12
12251095	3/8"	9,5	4,7	0,65	10
12251127	1/2"	12,7	6,4	0,65	8
12251190	3/4"	19,1	9,5	0,77	5
12251254	1"	25,4	12,7	0,89	3

## EV100 heat shrinkable tubing in 1 MTR LENGTH



Code	Ø Internal expanded (inch)	Ø Internal expanded (mm)	Ø Internal recovered (mm)	Wall thickness (mm)	Box (m)
12271016	1/16"	1,6	0,8	0,43	30
12271024	3/32"	2,4	1,2	0,51	30
12271032	1/8"	3,2	1,6	0,51	30
12271048	3/16"	4,8	2,4	0,51	24
12271064	1/4"	6,4	3,2	0,65	24
12271095	3/8"	9,5	4,7	0,65	20
12271127	1/2"	12,7	6,4	0,65	16
12271190	3/4"	19,1	9,5	0,77	10
12271254	1"	25,4	12,7	0,89	6

# Heat shrinkable tubing ET 100



**ET 100 is a thin wall heat shrinkable tubing in polyolefin, self-extinguishing, flexible and strong, suitable for general applications. It grants the maximum chemical resistance and safety in the electrical insulation.**

Shrinking ratio:	2 : 1.
Diameters:	from 1,2 mm to 101,6 mm (other dimensions available on request).
Colours available:	black - white - red - blue - transparent - yellow/green
Colours on request:	pink, green, orange, violet, yellow, brown, grey.
Working Temperature:	-55°C ÷ 135°C.
Shrinking Temperature:	>90°C.
Flammability rating:	self-extinguishing UL 224, 125°C (except transparent) Cadmium free (except transparent).
Packaging:	reel, dispenser box, 1 mtr. length.
Specifications:	SAE-AMS-DTL-23053/5 ( $\varnothing \leq 50,8$ ) class 1 (coloured) - class 2 (transparent) UL224 125°C - UL cert. E 228117* CSA C22.22 N.198.1-98 OFT* * Except transparent.



**Cadmium free**

**For availability, MOQ and LT of products on request, please ask to our sales offices.**

## TECHNICAL DATA

Properties	Test method	Results
<b>Physical</b>		
Tensile strength	ASTM D 638	13 N/mm <sup>2</sup>
Elongation	ASTM D 638	350%
Longitudinal change after shrinkage	ASTM D 2671	±5% max
Water absorption	ASTM D 570	0,2% max
Specific gravity	ASTM D 792	1,47 gr/cm <sup>3</sup>
<b>Thermal</b>		
Heat shock (4 hrs at + 250 °C)	ASTM D 2671	No cracking or flowing
Flexibility at low temperatures -40°C	ASTM D 2671C	Does not break
Elongation at tear (168 ore a 175°C)	ASTM D 638	Elongation 250%
Flammability	UL 224	Only colours
<b>Electrical</b>		
Dielectric strength	ASTM D 2671	> 20 kV/mm
Volume resistivity	ASTM D 257	10 <sup>14</sup> ohm cm
<b>Chemical</b>		
Resistance to fungus	AMS-DTL-7444	No growth
Resistance to chemical agents	AMS-DTL-23053/5	Good
Copper corrosion	ASTM D 2671B	Good
Resistance to petrol and diesel		Low



Heat guns and related accessories, see pages 133-135.



### ET 100 heat shrinkable tubing in REEL - DISPENSER BOX - 1 MTR LENGTH

Code Reel	Reel length (m)	Code Dispenser Box	Box (m)	Code 1 mt length	Box (m)	Ø Internal expanded (inch)	Ø Internal expanded (mm)	Ø Internal recovered (mm)	Wall thickness (mm)
12203012	200	12253012	15	12273012	30	3/64"	1,2	0,6	0,41
12203016	200	12253016	15	12273016	30	1/16"	1,6	0,8	0,43
12203024	200	12253024	15	12273024	30	3/32"	2,4	1,2	0,51
12203032	200	12253032	15	12273032	30	1/8"	3,2	1,6	0,51
12203048	200	12253048	12	12273048	24	3/16"	4,8	2,4	0,51
12203064	150	12253064	12	12273064	24	1/4"	6,4	3,2	0,64
12203095	150	12253095	10	12273095	20	3/8"	9,5	4,7	0,64
12203127	100	12253127	8	12273127	16	1/2"	12,7	6,4	0,64
12203190	50	12253190	5	12273190	10	3/4"	19,1	9,5	0,77
12203254	50	12253254	3	12273254	6	1"	25,4	12,7	0,89
12203381	25			12273381	4*	1 1/2"	38,1	19,1	1,02
12203508	25			12273508	3*	2"	50,8	25,4	1,14
12203762	15			12273762	3*	3"	76,2	38,1	1,27
12203994	15			12273994	3*	4"	101,6	50,8	1,40

\* Packaged in plastic bag.

For ordering, kindly add after the code: MAR for brown, BL for white, BL for Blue, GI for yellow, R for red, TR for transparent, GR for grey.

### ET 100 YELLOW/GREEN heat shrinkable tubing in REEL - DISPENSER BOX - 1 MTR LENGTH

Code Reel	Reel length (m)	Code Dispenser Box	Box (m)	Code 1 mt length	Box (m)	Ø Internal expanded (inch)	Ø Internal expanded (mm)	Ø Internal recovered (mm)	Wall thickness (mm)
12203024 G/V	200	12253024 G/V	15	12273024 G/V	30	3/32"	2,4	1,2	0,51
12203032 G/V	200	12253032 G/V	15	12273032 G/V	30	1/8"	3,2	1,6	0,51
12203048 G/V	200	12253048 G/V	12	12273048 G/V	24	3/16"	4,8	2,4	0,51
12203064 G/V	150	12253064 G/V	12	12273064 G/V	24	1/4"	6,4	3,2	0,64
12203095 G/V	150	12253095 G/V	10	12273095 G/V	20	3/8"	9,5	4,7	0,64
12203127 G/V	100	12253127 G/V	8	12273127 G/V	16	1/2"	12,7	6,4	0,64
12203190 G/V	50	12253190 G/V	5	12273190 G/V	10	3/4"	19,1	9,5	0,77
12203254 G/V	50	12253254 G/V	3	12273254 G/V	6	1"	25,4	12,7	0,89

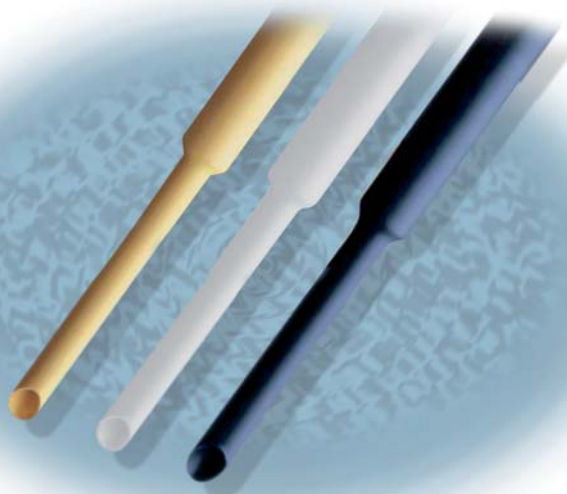


Display code: 8221705 GB



# Heat shrinkable tubing EP 100

(on request only)



**EP 100 is a flexible, thin wall heat shrinkable polyolefin tubing with ideal printability properties for identification purposes. The tubing contains no added halogens and offers excellent fire safety characteristics combined with minimal smoke emission.**

Shrinking ratio:	2 : 1.
Diameters:	from 1,2 mm to 50,8 mm (other dimensions available on request).
Colours on request:	black, white, yellow.
Working Temperature:	-30°C ÷ 105°C.
Shrinking Temperature:	>90°C.
Flammability rating:	flame retardant - halogen and cadmium free.
Packaging:	reel; dispenser box and 1 mtr. length on request.
Specifications:	ASTM D 635, BS6853 - smoke class 2 - oxygen and toxic class 1A.

**Halogen free**

**Cadmium free**

**For availability, MOQ and LT of products on request, please ask to our sales offices.**

## TECHNICAL DATA

Properties	Test method	Results
<b>Physical</b>		
Tensile strength	ASTM D 638	10 N/mm <sup>2</sup>
Elongation	ASTM D 638	200%
Longitudinal change after shrinkage	ASTM D 2671	+5%, -10% max
Water absorption	ASTM D 570	0,15% max
Specific gravity	ASTM D 792	1,40 gr/cm <sup>3</sup>
<b>Thermal</b>		
Heat shock (4 hrs at 175 °C)	ASTM D 2671	No cracking or flowing
Flexibility at low temperatures -40°C	ASTM D 2671C	Does not break
Elongation at tear (168 hrs at 150 °C)	ASTM D 638	Elongation 100%
Flammability	ASTM D 635-HB	Passed
<b>Electrical</b>		
Dielectric strength	ASTM D 2671	> 20 kV/mm
Volume resistivity	ASTM D 257	10 <sup>14</sup> ohm cm
<b>Chemical</b>		
Resistance to fungus	AMS-DTL-7444	No growth
Resistance to chemical agents	AMS-DTL-23053/5	Good
Copper corrosion	ASTM D 2671B	Good
Resistance to petrol and diesel		Low



Heat guns and related accessories, see pages 133-135.



**EP 100 heat shrinkable tubing in REEL**

Code	Ø Internal expanded (inch)	Ø Internal expanded (mm)	Ø Internal recovered (mm)	Wall thickness (mm)	Reel length (m)
12207012	3/64"	1,2	0,6	0,41	200
12207016	1/16"	1,6	0,8	0,43	200
12207024	3/32"	2,4	1,2	0,51	200
12207032	1/8"	3,2	1,6	0,51	200
12207048	3/16"	4,8	2,4	0,51	200
12207064	1/4"	6,4	3,2	0,65	150
12207095	3/8"	9,5	4,7	0,65	150
12207127	1/2"	12,7	6,4	0,65	100
12207190	3/4"	19,1	9,5	0,77	50
12207254	1"	25,4	12,7	0,89	50
12207381	1 1/2"	38,1	19,1	1	25
12207508	2"	50,8	25,4	1,1	25

# Heat shrinkable tubing EL 100



**EL 100 is a flexible, self-extinguishing, thin wall heat shrinkable tubing in polyolefin, suitable for a wide range of professional applications in electronics and electrotechnics, ideal for insulating, marking, for the mechanical protection and identification. EL 100 ensures an excellent mechanical and electrical protection.**

- Shrinking ratio: 2 : 1.
- Diameters: from 1,6 mm to 101,6 mm.
- Colours available: black, yellow/green.
- Colours on request: white, red, blue, yellow, brown, grey, pink, orange, violet.
- Working Temperature:  $-55^{\circ}\text{C} \div 135^{\circ}\text{C}$ .
- Shrinking Temperature:  $>90^{\circ}\text{C}$ .
- Flammability rating: self-extinguishing UL 224, 125°C-VW1. Cadmium free.
  
- Packaging: reel, dispenser box, 1 mtr. length.
- Specifications: SAE-AMS-DTL-23053/5 class 1 ( $\varnothing \leq 50,8$ )  
UL224 125°C VW1 - UL cert. E 228117  
CSA C22.22 N.198.1-98 OFT.



**Cadmium free**

**For availability, MOQ and LT of products on request, please ask to our sales offices.**

## TECHNICAL DATA

Properties	Test method	Results
<b>Physical</b>		
Tensile strength	ASTM D 638	13 N/mm <sup>2</sup>
Elongation	ASTM D 638	300%
Longitudinal change after shrinkage	ASTM D 2671	±5% max
Water absorption	ASTM D 570	0,15% max
Specific gravity	ASTM D 792	1,45 gr/cm <sup>3</sup>
<b>Thermal</b>		
Heat shock (4 hrs at + 250 °C)	ASTM D 2671	No cracking or flowing
Flexibility at low temperatures -55°C	ASTM D 2671C	Does not break
Elongation at tear (168 hrs at 150°C)	ASTM D 638	Elongation 250%
Flammability	UL 224 VW1	Passed
<b>Electrical</b>		
Dielectric strength	ASTM D 2671	> 20 kV/mm
Volume resistivity	ASTM D 257	10 <sup>14</sup> ohm cm
<b>Chemical</b>		
Resistance to fungus	AMS-DTL-7444	No growth
Resistance to chemical agents	AMS-DTL-23053/5	Good
Copper corrosion	ASTM D 2671B	Good
Resistance to petrol and diesel		Low



Heat guns and related accessories, see pages 133-135.



## EL 100 heat shrinkable tubing in REEL - DISPENSER BOX - 1 MTR LENGTH

Code Reel	Reel length (m)	Code Dispenser Box	Box (m)	Code 1 mt length	Box (m)	Ø Internal expanded (inch)	Ø Internal expanded (mm)	Ø Internal recovered (mm)	Wall thickness (mm)
12204016	200	12254016	15	12274016	30	1/16"	1,6	0,8	0,43
12204024	200	12254024	15	12274024	30	3/32"	2,4	1,2	0,51
12204032	200	12254032	15	12274032	30	1/8"	3,2	1,6	0,51
12204048	200	12254048	12	12274048	24	3/16"	4,8	2,4	0,51
12204064	150	12254064	12	12274064	24	1/4"	6,4	3,2	0,64
12204095	150	12254095	10	12274095	20	3/8"	9,5	4,7	0,64
12204127	100	12254127	8	12274127	16	1/2"	12,7	6,4	0,64
12204190	50	12254190	5	12274190	10	3/4"	19,1	9,5	0,77
12204254	50	12254254	3	12274254	6	1"	25,4	12,7	0,89
12204381	25					1 1/2"	38,1	19,1	1,02
12204508	25					2"	50,8	25,4	1,14
12204762	15					3"	76,2	38,1	1,27
12204994	15					4"	101,6	50,8	1,40



## EL 100 YELLOW/GREEN heat shrinkable tubing in REEL - DISPENSER BOX\*

Code Reel	Reel length (m)	Code Dispenser Box	Box (m)	Ø Internal expanded (inch)	Ø Internal expanded (mm)	Ø Internal recovered (mm)	Wall thickness (mm)
12204024 G/V	200			3/32"	2,4	1,2	0,51
12204032 G/V	200	12254032 G/V	15	1/8"	3,2	1,6	0,51
12204048 G/V	200	12254048 G/V	12	3/16"	4,8	2,4	0,51
12204064 G/V	150	12254064 G/V	12	1/4"	6,4	3,2	0,64
12204095 G/V	150	12254095 G/V	10	3/8"	9,5	4,7	0,64
12204127 G/V	100	12254127 G/V	8	1/2"	12,7	6,4	0,64
12204190 G/V	50	12254190 G/V	5	3/4"	19,1	9,5	0,77
12204254 G/V	50	12254254 G/V	3	1"	25,4	12,7	0,89

\*Available on request.

# Heat shrinkable tubing ET 301



**ET 301 is a thin wall heat shrinkable tubing in polyolefin, self-extinguishing, flexible and strong, with chemical resistance and good capacity of electrical insulation, suitable for general applications.**

**Thanks to its high shrinking ratio, more applications can be covered with the same diameter. Its high expansion ratio is designed for use when wide ranging substrate diameters need to be covered.**

Shrinking ratio:	3 : 1.
Diameters:	from 1,5 mm to 39 mm.
Colours available:	black - white - red - blue - transparent - yellow/green.
Colours on request:	pink, green, orange, violet, yellow, brown, grey.
Working Temperature:	-55°C ÷ 135°C.
Shrinking Temperature:	>90°C.
Flammability rating:	self-extinguishing UL 224, 125°C (except transparent) Cadmium free (except transparent).
Packaging:	reel, dispenser box, 1 mtr. length.
Specifications:	SAE-AMS-DTL-23053/5 class 1 (coloured) - class 2 (transparent) UL224 125°C - UL cert. E 228117* CSA C22.22 N.198.1-98 OFT* * Except transparent



**Cadmium free**

**For availability, MOQ and LT of products on request, please ask to our sales offices.**

TECHNICAL DATA		
Properties	Test method	Results
<b>Physical</b>		
Tensile strength	ASTM D 638	13 N/mm <sup>2</sup>
Elongation	ASTM D 638	300%
Longitudinal change after shrinkage	ASTM D 2671	+1% ; -10% max
Water absorption	ASTM D 570	≤0,20%
Specific gravity	ASTM D 792	1,45 gr/cm <sup>3</sup>
<b>Thermal</b>		
Heat shock (4 hrs at + 250 °C)	ASTM D 2671	No cracking or flowing
Flexibility at low temperatures -40°C	ASTM D 2671C	Does not break
Elongation at tear (168 hrs at 175°C)	ASTM D 638	Elongation 200%
Flammability	UL 224	Only for coloured
<b>Electrical</b>		
Dielectric strength	ASTM D 2671	> 20 kV/mm
Volume resistivity	ASTM D 257	10 <sup>14</sup> ohm cm
<b>Chemical</b>		
Resistance to fungus	AMS-DTL-7444	No growth
Resistance to chemical agents	AMS-DTL-23053/5	Good
Copper corrosion	ASTM D 2671B	Good
Resistance to petrol and diesel		Low



Heat guns and related accessories, see pages 133-135.



## ET 301 heat shrinkable tubing in REEL - DISPENSER BOX - 1 MTR LENGTH

Code Reel	Reel length (m)	Code Dispenser Box	Box (m)	Code 1 mt length	Box (m)	Ø Internal expanded (mm)	Ø Internal recovered (mm)	Wall thickness (mm)
12205015	200	12255015	15	12275015	30	1,5	0,5	0,45
12205030	200	12255030	15	12275030	30	3,0	1,0	0,55
12205045	150	-	-	-	-	4,8	1,6	0,60
12205060	150	12255060	10	12275060	24	6,0	2,0	0,70
12205090	150	12255090	8	12275090	20	9,0	3,0	0,70
12205120	100	12255120	7	12275120	16	12,0	4,0	0,70
12205180	50	12255180	4	12275180	10	18,0	6,0	0,80
12205240	50	12255240	3	12275240	6	24,0	8,0	1,00
12205390	30			12275390	4*	39,0	13,0	1,15

\*Packaged in plastic bag.

Other coloured tubes are available on request, from diam. 3 mm. For ordering, kindly add after the code: BL for white, BL for Blue, GI for yellow, R for red, MAR for brown, TR for transparent.

## ET 301 GREEN/YELLOW heat shrinkable tubing in REEL - DISPENSER BOX - 1 MTR LENGTH

Code Reel	Reel length (m)	Code Dispenser Box	Box (m)	Code 1 mt length	Box (m)	Ø Internal expanded (mm)	Ø Internal recovered (mm)	Wall thickness (mm)
12205015 G/V	200	12255015 G/V	15	12275015 G/V	30	1,5	0,5	0,45
12205030 G/V	200	12255030 G/V	15	12275030 G/V	30	3,0	1,0	0,55
12205045 G/V	150	-	-	-	-	4,8	1,6	0,60
12205060 G/V	150	12255060 G/V	10	12275060 G/V	24	6,0	2,0	0,70
12205090 G/V	150	12255090 G/V	8	12275090 G/V	20	9,0	3,0	0,70
12205120 G/V	100	12255120 G/V	7	12275120 G/V	16	12,0	4,0	0,70
12205180 G/V	50	12255180 G/V	4	12275180 G/V	10	18,0	6,0	0,80
12205240 G/V	50	12255240 G/V	3	12275240 G/V	6	24,0	8,0	1,00
12205390 G/V	30			12275390 G/V	4*	39,0	13,0	1,15

\*Packaged in plastic bag.

# Heat shrinkable tubing EL 301A



**EL 301A is a flexible, heat shrinkable polyolefin tubing, with thermoplastic adhesive inside suitable for professional applications, such as insulation, identification and protection of wire and cable constructions, in electric and electronic components. Its high shrinking ratio and its inner liner allow to seal and encapsulate the inner components, offering environmental protection.**

- Shrinking ratio: 3 : 1
- Diameters: from 3 mm to 24 mm (other dimensions available on request).
- Colours available: black
- Colours on request: transparent
- Working Temperature: -55°C ÷ 110°C
- Shrinking Temperature: >110°C
- Flammability rating: self-extinguishing (outer wall) - cadmium free.
- Packaging: box, 1 mtr. length; reel on request.
- Specifications: SAE-AMS-DTL-23053/4 class 3 (except transparent)

**Cadmium free**

**For availability, MOQ and LT of products on request, please ask to our sales offices.**

**TECHNICAL DATA**

Properties	Test method	Results
<b>Physical</b>		
Tensile strength	ASTM D 638	11 N/mm <sup>2</sup>
Elongation	ASTM D 638	300%
Longitudinal change after shrinkage	ASTM D 2671	+1%; -15% max
Water absorption	ASTM D 570	0,5% max
Specific gravity	ASTM D 792	1,45 gr/cm <sup>3</sup>
<b>Thermal</b>		
Heat shock (4 hrs at + 250 °C)	ASTM D 2671	No cracking or flowing
Flexibility at low temperatures -55 °C	ASTM D 2671 C	Does not break
Elongation at tear (168 hrs at 175 °C)	ASTM D 638	Elongation 250%
Flammability	ASTM D 2671 B	Passed
<b>Electrical</b>		
Dielectric strength	ASTM D 2671	> 15 kV/mm
Volume resistivity	ASTM D 257	10 <sup>14</sup> ohm cm
<b>Chemical</b>		
Resistance to fungus	AMS-DTL-7444	No growth
Resistance to chemical agents	AMS-DTL-23053/4	Good
Copper corrosion	ASTM D 2671 B	Good
Resistance to petrol and diesel		Low
<b>Adhesive</b>		
Softening point	ASTM E 28	123°C
Adhesive strength	- PVC	- 3,4 N/mm <sup>2</sup>
	- steel	- 1,76 N/mm <sup>2</sup>
	- copper	- 1,4 N/mm <sup>2</sup>



Heat guns and related accessories, see pages 133-135.



**EL 301A heat shrinkable tubing in DISPENSER BOX - 1 MTR LENGTH**

Code	Box	Code	Box	Ø Internal expanded (mm)	Ø Internal recovered (mm)	Wall thickness (mm)
<b>Dispenser Box</b>	(m)	<b>1 mt length</b>	(m)			
12256030	15	12276030	30	3,0	1,0	1,00
12256060	12	12276060	24	6,0	2,0	1,10
12256090	10	12276090	20	9,0	3,0	1,30
12256120	8	12276120	16	12,0	4,0	1,70
12256180	5	12276180	10	18,0	6,0	2,00
12256240	3	12276240	6	24,0	8,0	2,50



# Heat shrinkable tubing EL 401A

(on request only)

**EL 401A is a general purpose, flexible, high grade heat shrinkable polyolefin tubing with a thermoplastic adhesive inner liner. The inner liner will melt and flow to seal and encapsulate the inner components, offering an environmental protection.**

Shrinking ratio:	4 : 1.
Diameters:	from 4 mm to 52 mm.
Colours on request:	black, transparent.
Working Temperature:	-55°C ÷ 110°C.
Shrinking Temperature:	>110°C.
Flammability rating:	self-extinguishing (outer wall) - cadmium free.
Packaging:	1 mtr. length.
Specifications:	SAE-AMS-DTL-23053/4 class 3 (except transparent and Ø = 52 mm).

**Cadmium free**

**For availability, MOQ and LT of products on request, please ask to our sales offices.**

## TECHNICAL DATA

Properties	Test method	Results
<b>Physical</b>		
Tensile strength	ASTM D 638	11 N/mm <sup>2</sup>
Elongation	ASTM D 638	300%
Longitudinal change after shrinkage	ASTM D 2671	+1%; -15% max
Water absorption	ASTM D 570	0,5% max
Specific gravity	ASTM D 792	1,45 gr/cm <sup>3</sup>
<b>Thermal</b>		
Heat shock (4 hrs at + 250 °C)	ASTM D 2671	No cracking or flowing
Flexibility at low temperatures -55 °C	ASTM D 2671C	Does not break
Elongation at tear (168 hrs at 175 °C)	ASTM D 638	Elongation 250%
Flammability	ASTM D 2671 B	Passed
<b>Electrical</b>		
Dielectric strength	ASTM D 2671	> 15 kV/mm
Volume resistivity	ASTM D 257	10 <sup>14</sup> ohm cm
<b>Chemical</b>		
Resistance to fungus	AMS-DTL-7444	No growth
Resistance to chemical agents	AMS-DTL-23053/4	Good
Copper corrosion	ASTM D 2671B	Good
Resistance to petrol and diesel		Low
<b>Adhesive</b>		
Softening point	ASTM E 28	123°C
Adhesive strength	- PVC	- 3,4 N/mm <sup>2</sup>
	- steel	- 1,76 N/mm <sup>2</sup>
	- copper	- 1,4 N/mm <sup>2</sup>



Heat guns and related accessories, see pages 133-135.



**EL 401A heat shrinkable tubing in 1 MTR LENGTH**

Code	Box (m)	Ø Internal expanded (mm)	Ø Internal recovered (mm)	Wall thickness (mm)
12278040	30	4,0	1,0	1,02
12278080	24	8,0	2,0	1,02
12278120	20	12,0	3,0	1,30
12278160	12	16,0	4,0	1,78
12278240	6	24,0	6,0	2,10
12278320	10*	32,0	8,0	2,50
12278520	10*	52,0	13,0	2,50

\*Packaged in plastic bag.

# Heat shrinkable tubing EM 100

(on request only)



**EM 100 is a medium wall polyolefin tubing suitable for a wide range of telecom and power applications like joints and cable repair. It provides an excellent strain and abrasion resistance and is ideally for aerial, underground and direct burial installation.**

Shrinking ratio:	3 : 1
Diameters:	from 12 mm to 235 mm
Colours available:	black
Working Temperature:	-40°C ÷ 120°C.
Shrinking Temperature:	>110°C
Flammability rating:	not self-extinguishing - halogen and cadmium free.
Packaging:	1 mtr. length in plastic bag.

**Halogen free**

**Cadmium free**

**For availability, MOQ and LT of products on request, please ask to our sales offices.**

## TECHNICAL DATA

Properties	Test method	Results
<b>Physical</b>		
Tensile strength	ASTM D 638	14,0 N/mm <sup>2</sup>
Elongation	ASTM D 638	400%
Longitudinal change after shrinkage	ASTM D 2671	-10% max
Water absorption	ASTM D 570	0,12% max
Specific gravity	ASTM D 752	1,08 gr/cm <sup>3</sup>
<b>Thermal</b>		
Shock termico (4 hrs at + 200 °C)	ASTM D 2671	No cracking or flowing
Flexibility at low temperatures -55°C	ASTM D 2671C	Does not break
Elongation at tear (168 hrs at 150°C)	ASTM D 638	300%
<b>Electrical</b>		
Dielectric strength	ASTM D 2671	> 17 kV/mm
Volume resistivity	ASTM D 257	>10 <sup>14</sup> ohm cm
<b>Chemical</b>		
Resistance to chemical agents		Good
Copper corrosion	ASTM D 2671 B	Pass



Heat guns and related accessories, see pages 133-135.



**EM 100 heat shrinkable tubing in 1 MTR LENGTH**

Code	Ø Internal		Wall thickness (mm)	Bag (m)
	expanded (mm)	recovered (mm)		
12248012	12	3	1,9	25
12248019	22	6	2,2	15
12248030	33	8	2,5	10
12248040	40	12	2,5	5
12248050	55	17	2,7	3
12248070	72	22	3,0	2
12248095	92	35	3,0	1
12248115	115	35	3,1	1
12248140	140	45	3,15	1
12248160	160	55	3,15	1
12248175	175	58	3,25	1
12248200	200	65	3,25	1
12248235	235	65	3,25	1

# Heat shrinkable tubing adhesive-lined EM 100A



**EM 100A a is a medium-wall shrinkable polyolefin tubing, with internal thermoplastic adhesive, suitable for a wide range of applications, such as insulating and protecting cable joints and terminations. The inner liner provides good moisture sealing and weathering protection.**

**Good environmental protection.**

Shrinking ratio:	3 : 1
Diameters:	from 12 mm to 180 mm (other dimensions available on request).
Colours available:	black
Working Temperature:	-40°C ÷ 120°C.
Shrinking Temperature:	>110°C
Flammability rating:	not self-extinguishing - halogen and cadmium free.
Packaging:	1 mtr. length in plastic bag.

**Halogen free**

**Cadmium free**

**For availability, MOQ and LT of products on request, please ask to our sales offices.**

TECHNICAL DATA	Test method	Results
<b>Properties</b>		
<b>Physical</b>		
Tensile strength	ASTM D 638	14,0 N/mm <sup>2</sup>
Elongation	ASTM D 638	400%
Longitudinal change after shrinkage	ASTM D 2671	-10% max
Water absorption	ASTM D 570	0,12% max
Specific gravity	ASTM D 752	1,08 gr/cm <sup>3</sup>
<b>Thermal</b>		
Shock termico (4 hrs at + 200 °C)	ASTM D 2671	No cracking or flowing
Flexibility at low temperatures -55°C	ASTM D 2671C	Does not break
Elongation at tear (168 hrs at 150°C)	ASTM D 638	300%
<b>Electrical</b>		
Dielectric strength	ASTM D 2671	> 17 kV/mm
Volume resistivity	ASTM D 257	>10 <sup>14</sup> ohm cm
<b>Chemical</b>		
Resistance to chemical agents	ASTM D 2671 B	Good
Copper corrosion		Pass
<b>Adhesive</b>		
Softening point	ASTM E 28	90°C
Adhesive strength	- PVC, PE	- 40 N/mm <sup>2</sup>
	- steel, lead	- 30 N/mm <sup>2</sup>



Heat guns and related accessories, see pages 133-135.



**EM 100A heat shrinkable tubing in 1 MTR LENGTH**

Code	Ø Internal		Wall thickness (mm)	Bag (m)
	expanded (mm)	recovered (mm)		
12247012	12	3	2,2	25
12247019	22	6	2,3	15
12247030	33	7	2,6	10
12247040	40	12	2,6	5
12247050	55	17	2,9	3
12247063	65	19	3,15	3
12247070	72	22	3,15	2
12247095	92	35	3,35	1
12247115	115	35	3,35	1
12247140	180	60	3,35	1

# Heat shrinkable tubing EH 100

(on request only)



**EH 100 is a thick wall polyolefin tubing designed to insulate and protect electrical splices and terminations where maximum flame retardancy and exceptional mechanical protection are required.**

- Shrinking ratio: 4 :1
- Diameters: from 13 mm to 200 mm
- Colours available: black
- Working Temperature: -40°C ÷ 120°C.
- Shrinking Temperature: >110°C
- Flammability rating: not self-extinguishing - halogen and cadmium free.
- Packaging: 1 mtr. length in plastic bag.

**Halogen free**

**Cadmium free**

**For availability, MOQ and LT of products on request, please ask to our sales offices.**

## TECHNICAL DATA

Properties	Test method	Results
<b>Physical</b>		
Tensile strength	ASTM D 638	14,0 N/mm <sup>2</sup>
Elongation	ASTM D 638	400%
Longitudinal change after shrinkage	ASTM D 2671	-10% max
Water absorption	ASTM D 570	0,12% max
Specific gravity	ASTM D 752	1,08 gr/cm <sup>3</sup>
<b>Thermal</b>		
Shock termico (4 hrs at + 200 °C)	ASTM D 2671	No cracking or flowing
Flexibility at low temperatures -55°C	ASTM D 2671C	Does not break
Elongation at tear (168 hrs at 150°C)	ASTM D 638	300%
<b>Electrical</b>		
Dielectric strength	ASTM D 2671	> 17 kV/mm
Volume resistivity	ASTM D 257	>10 <sup>14</sup> ohm cm
<b>Chemical</b>		
Resistance to chemical agents		Good
Copper corrosion	ASTM D 2671 B	Pass



Heat guns and related accessories, see pages 133-135.



**EH 100 heat shrinkable tubing in 1 MTR LENGTH**

Code	Ø Internal		Wall thickness (mm)	Bag (m)
	expanded (mm)	recovered (mm)		
12242013	13	4	2,2	25
12242019	19	6	2,4	15
12242030	30	8	3,0	10
12242045	45	13	3,0	5
12242052	52	16	3,6	3
12242072	72	22	3,8	2
12242092	92	29	3,8	1
12242115	115	35	4,0	1
12242130	130	45	4,0	1
12242160	160	55	4,0	1
12242180	180	55	4,0	1
12242200	200	60	4,0	1



# Heat shrinkable tubing adhesive-lined EH 100A

(on request only)



**This thick wall Polyolefin tubing (with glue) is designed to insulate and protect electrical splices and terminations where maximum flame retardancy and exceptional mechanical protection are required.**

- Shrinking ratio: 4 :1
- Diameters: from 13 mm to 200 mm.
- Colours available: black
- Working Temperature: -40°C ÷ 120°C.
- Shrinking Temperature: >110°C
- Flammability rating: not self-extinguishing - halogen and cadmium free.
- Packaging: 1 mtr. length in plastic bag.

**Halogen free**

**Cadmium free**

**For availability, MOQ and LT of products on request, please ask to our sales offices.**

TECHNICAL DATA	Test method	Results
<b>Properties</b>		
<b>Physical</b>		
Tensile strength	ASTM D 638	14,0 N/mm <sup>2</sup>
Elongation	ASTM D 638	400%
Longitudinal change after shrinkage	ASTM D 2671	-10% max
Water absorption	ASTM D 570	0,12% max
Specific gravity	ASTM D 752	1,08 gr/cm <sup>3</sup>
<b>Thermal</b>		
Shock termico (4 hrs at + 200 °C)	ASTM D 2671	No cracking or flowing
Flexibility at low temperatures -55°C	ASTM D 2671C	Does not break
Elongation at tear (168 hrs at 150°C)	ASTM D 638	300%
<b>Electrical</b>		
Dielectric strength	ASTM D 2671	> 17 kV/mm
Volume resistivity	ASTM D 257	>10 <sup>14</sup> ohm cm
<b>Chemical</b>		
Resistance to chemical agents		Good
Copper corrosion	ASTM D 2671 B	Pass
<b>Adhesive</b>		
Softening point	ASTM E 28	90°C
Adhesive strength	- PVC, PE - steel, lead	- 40 N/mm <sup>2</sup> - 30 N/mm <sup>2</sup>



Heat guns and related accessories, see pages 133-135.



**EH 100A heat shrinkable tubing in 1 MTR LENGTH**

Code	Ø Internal		Wall thickness (mm)	Bag (m)
	expanded (mm)	recovered (mm)		
12243013	13	4	2,65	25
12243019	19	6	2,65	15
12243030	30	8	3,3	10
12243045	45	13	3,7	5
12243052	52	16	4,1	3
12243072	72	22	4,1	2
12243092	92	29	4,1	1
12243115	115	35	4,2	1
12243130	130	45	4,2	1
12243160	160	55	4,2	1
12243180	180	55	4,2	1
12243200	200	60	4,2	1

# Heat shrinkable tubing ASSORTIBOX



### Assortibox ET100 - shrinking ratio 2 : 1

Shrinking ratio: 2:1  
 Box: transparent  
 Ø int.: from 1,2/0,6 mm to 19,1/9,5 mm  
 Lengths: 50/100/200 mm  
 Colours: Black, Transparent, Blue, Red, White, Green/Yellow  
 Total: 406 pcs/21.700 mm



### Assortibox ET301 - shrinking ratio 3 : 1

Shrinking ratio: 3:1  
 Box: transparent  
 Ø int.: from 1,5/0,5 mm to 24/8 mm  
 Lengths: 40/80/120/170 mm  
 Colours: Black, Blue, Red, Green/Yellow, Brown  
 Total: 170 pcs/10.640 mm

### Assortibox ET100

Code	Description	Shrinking ratio	Quantity pcs	Total length (mm)
12233000	Assortibox ET100	2:1	406	21.700

Composition code 12233000			
Ø (mm)	Length (mm)	Colours	Pcs x box
1,2/0,6	50	Black	25
1,2/0,6	50	Transparent	25
1,2/0,6	50	Blue	25
1,6/0,8	50	Black	25
1,6/0,8	50	Transparent	25
1,6/0,8	50	Red	25
2,4/1,2	50	Black	20
2,4/1,2	50	Transparent	20
2,4/1,2	50	White	20
3,2/1,6	50	Black	50
4,8/2,4	50	Black	40
6,4/3,2	50	Black	15
6,4/3,2	50	Transparent	15
9,5/4,7	50	Black	15
9,5/4,7	50	Red	15
9,5/4,7	50	Green/Yellow	15
9,5/4,7	50	Blue	15
12,7/6,4	100	Black	10
19,1/9,5	200	Black	6

### Assortibox ET301

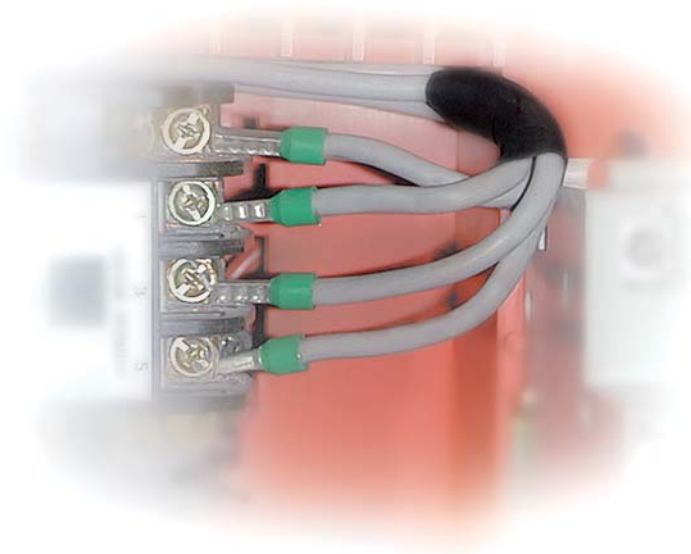
Code	Description	Shrinking ratio	Quantity pcs	Total length (mm)
12235000	Assortibox ET301	3:1	170	10.640

Composition code 12235000			
Ø (mm)	Length (mm)	Colours	Pcs x box
1,5/0,5	40	Black	10
1,5/0,5	40	Red	5
1,5/0,5	40	Blue	5
1,5/0,5	40	Green/Yellow	5
1,5/0,5	40	Brown	5
3/1	40	Black	20
3/1	40	Red	5
3/1	40	Blue	5
3/1	40	Green/Yellow	5
3/1	40	Brown	5
6/2	40	Black	20
6/2	40	Red	5
6/2	40	Blue	5
6/2	40	Green/Yellow	5
6/2	40	Brown	5
9/3	80	Black	5
9/3	80	Red	2
9/3	80	Blue	2
9/3	80	Green/Yellow	2
9/3	80	Brown	2
12/4	80	Black	5
12/4	80	Red	2
12/4	80	Blue	2
12/4	80	Green/Yellow	2
12/4	80	Brown	2
18/6	120	Black	10
18/6	80	Red	2
18/6	80	Blue	2
18/6	80	Green/Yellow	2
18/6	80	Brown	2
24/8	170	Black	8
24/8	120	Red	2
24/8	120	Blue	2
24/8	120	Green/Yellow	2
24/8	120	Brown	2



Heat guns and related accessories, see pages 133-135.

# NEOPRENE SLEEVES



**THE SLEEVES** in neoprene are suitable for protecting and insulating electrical panels and industrial wirings.

#### Characteristics of raw material:

Type of material: lubricated neoprene.  
 Colours available: black.  
 Other colours available on request.  
 Diameters: from 1,25 mm to 17 mm.  
 Working Temperature: from -30° to 90°C.  
 Dielectric strength: 13 kV/mm.  
 Flammability rating: self-extinguishing UL 94 class V0.

**For availability, MOQ and LT of products on request, please ask to our sales offices.**

Code	Signature	Ø Min (mm)	Ø Max (mm)	Length (mm)	Thickness (mm)	Bag (pcs)
5380	A 0	1,25	2	20	0,5	1.000
5381	A 1	1,75	3,5	20	0,5	1.000
5381 BIS	A 1 BIS	2,4	4,5	20	0,6	1.000
5382	A 1 K	2,5	5,5	25	0,9	1.000
5383	A 2	3,0	6	25	0,6	1.000
5384	A 2 K	4,0	8	30	1,2	1.000
5385	A 3	5,0	9	25	0,7	1.000
5386	A 4	7,5	12	30	0,8	1.000
5387	A 5	10,0	15	35	0,9	500
5388*	A 8	12,0	20	50	1,2	500
5389*	A 9	14,0	23	50	1,3	500
5390*	A 10	17,0	28	50	1,3	500

\* Available on request.

#### Applications

- Protecting and insulating electrical panels.
- Industrial wiring.

#### Characteristics

- Resistance to oils and petrols.
- Good behaviour to humidity and aging.
- Resistant to low temperatures.

#### Benefits

Their internal lubrication makes their application in electric conductors, through tools, very easy.



Tools for neoprene sleeves, see page 128.

# ELECTRICAL INSULATION TAPES



## TECHNICAL CHARACTERISTICS

	Adhesive tape thickness 0,13 mm	Adhesive tape thickness 0,15 mm	Self-amalgamating thickness 0,75 mm
Type of support	PVC	PVC	EPR
Thickness	0,13 mm	0,15 mm	Ethylene-propylene rubber
Adhesive strength (steel)	1,8 N/cm	1,8 N/cm	0,75 mm
Tensile strength	25 N/cm	30 N/cm	400 g/cm
Elongation at break	180%	170%	3 MPa
Dielectric strength	40 kV/mm	40 kV/mm	>900%
Working temperature	0 ÷ 90°C	0 ÷ 90°C	42 kV/mm
Flame resistance	Self-extinguishing	Self-extinguishing	-40 ÷ 100°C
			Self-extinguishing

## Applications

- Electrical insulation.
- General insulation.
- Bundling cables and lines.
- Marking and colour coding.
- Sealing.
- Identification.

## Characteristics

- PVC film with adhesive, with thickness 0,13 mm - 0,15 mm.
- All tapes for electrical insulation are approved according to EN 60454-2 CEI EN 60454-3-1; BS 3924.
- IMQ Omologation.

## Benefits

- Easy and safe application.
- Good electrical insulation.
- Good adhesive force.
- High flexibility.
- Good temperature resistance.
- Suitable for identification.

### \*SELF-AMALGAMATING TAPE APPLICATION

Remove the protective film and stretching the tape to reduce its width by one third. Wrap the section to be covered by overlapping each subsequent layer of 50%. End the application by pulling the tape and join the end part of the tape to the section covered. It is recommended to cover the connection with PVC adhesive tape.

## adhesive insulation tapes **THICKNESS 0,13 mm**

Code	Colour	Dimensions		Rolls for bar	Rolls for carton
		Width (mm)	Length (m)	pcs	pcs
NI 20N	Black	15	10	10	200
NI 20BI	White	15	10	10	200
NI 20BL	Bluee	15	10	10	200
NI 20GI	Yellow	15	10	10	200
NI 20GR	Grey	15	10	10	200
NI 20R	Red	15	10	10	200
NI 20T	Green/Yellow	15	10	10	200
NI 20V	Green	15	10	10	200
NI 20M	Brown	15	10	10	200
NI 22N	Black	19	25	10	120
NI 22BI	White	19	25	10	120
NI 22BL	Bluee	19	25	10	120
NI 22GI	Yellow	19	25	10	120
NI 22GR	Grey	19	25	10	120
NI 22R	Red	19	25	10	120
NI 22T	Green/Yellow	19	25	10	120
NI 22V	Green	19	25	10	120
NI 21N	Black	15	25	12	144
NI 24N	Black	25	25	8	96
NI 26N	Black	38	25	5	60
NI 27N	Black	50	10	4	60
NI 28N	Black	50	25	4	48

## adhesive insulation tapes **THICKNESS 0,15 mm**

Code	Colour	Dimensions		Rolls for bar	Rolls for carton
		Width (mm)	Length (m)	pcs	pcs
NI 14N	Black	15	10	10	200
NI 14BI	White	15	10	10	200
NI 14BL	Bluee	15	10	10	200
NI 14GI	Yellow	15	10	10	200
NI 14GR	Grey	15	10	10	200
NI 14R	Red	15	10	10	200
NI 14T	Green/Yellow	15	10	10	200
NI 14V	Green	15	10	10	200
NI 14M	Brown	15	10	10	200
NI 16N	Black	19	25	10	120
NI 16BI	White	19	25	10	120
NI 16BL	Bluee	19	25	10	120
NI 16GR	Grey	19	25	10	120
NI 16R	Red	19	25	10	120
NI 16T	Green/Yellow	19	25	10	120
NI 16M	Brown	19	25	10	120
NI 18N	Black	25	25	8	96

## adhesive insulation tapes **THICKNESS 0,75 mm - SELF-AMALGAMATING**

Code	Colour	Dimensions		Rolls for bar	Rolls for carton
		Width (mm)	Length (m)	pcs	pcs
NI 69A	Black	19	10	1	48