SUMAR S.L.

SUMINISTROS INDUSTRIALES Y NAVALES

INSTALLATION PRODUCTS
FOR THE RAILWAY INDUSTRY

Certified cable management

PRODUCT CERTIFICATIONS AND COMPLIANCE

EN 45545-2

EN 45545-2
Products are tested according to UNI EN 45545-2: Railway applications - Fire protection for railway rolling stock - Part 2: Requirements for the fire behavior of materials and components.

UL LISTED

UL RECOGNIZED

UL
Elematic cable ties are recognised and listed by UL (Underwriters Laboratories Inc.) according to UL 62275 standard - Cable Management Systems - Cable Ties for Electrical Installation.

DNV
DNV certification guarantees that Elematic cable ties comply to the "Det Norske Veritas" and "Ger-manischer Lloyd" standards for cable fixing in naval and offshore constructions, for both internal and external applications.

BUREAU VERITAS
This homologation, according to the IEC standard 60092-IEC 62275, ensures that Elematic cable ties comply to the "Bureau Veritas" standard for cables fixing in shipbuilding.

R.I.NA.
The Italian Naval Register homologation, according to the IEC EN 60092-101 "Electrical Installations in Ship" certifies that Elematic cable ties have been tested for flame propagation in shipbuilding.

CE MARKING

EUROPEAN STANDARD FOR SAFETY PERFORMANCE IN EUROPE IN CASE OF FIRE EN 45545-2

If you want your passenger train (conventional or high-speed) to travel in Europe, it has to be compliant with the European standard for safety performance in case of fire: **EN 45545-2.** Otherwise, if it is a light rail vehicle or a tram, this standard is not mandatory.

All the risks contained in EN 45545-2 are classified by the **design category** of railway vehicle.

Moreover, the European standard for safety behaviour in case of fire not only indicates the Hazard Level required for each design category but also includes the **operational environment** where the vehicle moves: tunnels, underground or elevated structures.

Only official laboratories are authorized to release these test certifications.

Design category	Standard Vehicles	Automatic vehicles with no emergency trained staff on board	Double-deck vehicles	Vehicles with sleeping quarters
Category 1: Vehicles not designed or equipped to run extensively underground in tunnels or elevated structures	**HL1**	**HL1**	**HL1**	**HL2**
Category 2: Vehicles designed for underground sections, tunnels and/or elevated structures (< 5Km) with side evacuation and where there are stations or rescue points reachable within 4 minutes	**HL2**	**HL2**	**HL2**	**HL2**
Category 3: Vehicles designed for underground sections, tunnels and/or elevated structures (> 5Km) with side evacuation and where there are stations or rescue points reachable within 15 minutes	**HL2**	**HL2**	**HL2**	**HL3**
Category 4: Vehicles designed for underground sections, tunnels and/or elevated structures, without side evacuation available	**HL3**	**HL3**	**HL3**	**HL3**

Source: TABLE 1- EN 45545-2:2020

RELIABILITY AND SAFETY ON ROLLING STOCK: EN 45545-2

The requirements for the fire behaviour of products used and installed in rolling stock are contained in the **EN 45545-2** standard.

Crucial factors such as oxygen index, smoke density and toxicity levels, for requirement sets **R22**, **R23** and **R24**, and related hazard levels are mentioned in the table 5 of EN 45545-2 standard.

There are three different **Hazard Levels**: **HL1** (lowest risk), **HL2** (medium risk), **HL3** (highest risk).

Among these, HL3 is therefore the most stringent classification level and, in case of fire, it allows for the most favorable conditions to safeguard the health of passengers.

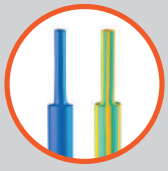
Categories	Test method	Parameter and unit	HL1	HL2	HL3
R22 (IN16; EL2; EL6A; EL7A; M2)	EN ISO 4589-2	Oxygen content%	28	28	32
	ISO 5659-2: 25 kW/m²	D_s max (smoke opacity)	600	300	150
	EN 17084 Method 2, 600° C or EN17084 Method 1, 25 kW/m²	CIT_{NLP} dimensionless (toxicity) or CIT_G dimensionless	1.2	0.9	0.75
R23 (EX12; EL2; EL5; EL6B; EL7B; M3)	EN ISO 4589-2	Oxygen content%	28	28	32
	ISO 5659-2: 25 kW/m²	D_s max (smoke opacity)	-	600	300
	EN 17084 Method 2, 600° C or EN17084 Method 1, 25 kW/m²	CIT_{NLP} dimensinless (toxicity) or CIT_G dimensionless	-	1.8	1.5
R24 (EL9)	EN ISO 4589-2	Oxygen content%	28	28	32

Source: TABLE 5- EN 45545-2:2020

SOLUTIONS FOR THE ROLLING STOCK

CABLE TIES

APPLICATION TOOLS



CABLE PROTECTION SYSTEM

2-LOCK CABLE TIES

Professional cable ties, in polyamide 6.6, having an innovative double locking system in stainless steel: maximum performance and reliability

Concerning the **BLACK 2-LOCK** cable ties, codes 1303÷1327, according to the standard EN 45545-2:2013 + A1:2015 (Railway applications - Fire protection on railway vehicles - Part 2: Requirements for fire behaviour of materials and components), **these cable ties comply with the standard in question for hazard levels HL1 - HL2 for set of requirements R22 and R23**.

FEATURES AND BENEFITS

- The special AISI 316 stainless steel locking system, directly incorporated into the head during the injection manufacturing process, allows the highest preformances and reliability
- The double tooth mechanism allows a double locking, on both side of ties, for an ultimate tightening of the bundles
- Perfect wiring: the smooth profile without racks offers infinite adjustment along the length of the tie and always a correct tensioning for any bundling diameters
- Resistance and reliability at low operating temperature up to -40 ° C
- 2-LOCK™ cable ties, in black color, are manufactured of special UV-resistant polyamide, for extreme outdoor applications
- 2-LOCK™ cable ties are packed in an innovative resealable bag: this avoids any dispersion after the first opening, maintaining the superior characteristics of the ties.

APPROVALS AND CERTIFICATIONS

CE EN 45545-2 UL RINA DNV HALOGEN FREE

TECHNICAL DATA

Body material	polyamide 6.6
Cage material	stainless steel INOX AISI 316
Halogen	absent
Humidity absorbition (50% relative humidity)	2,7%
Working temperature	-40°C ÷ +85°C
Installation temperature	-40°C ÷ 60°C
Flammability rating	UL94 class V2

Resistance external agents:
UV-resistant (2-Lock in black color). Excellent chemical resistance to aromatic solvents, oils, greases, oil-based products. Good chemical resistance to bases. Limited resistance to acids. Does not resist to phenol and chlorinated solvents. Corrosion Resistant (Overmoulded Locking System in A4-AISI 316 stainless Steel)

2-LOCK™
NATURAL

Description	Width (mm)	Length (mm)	Ø bundle max (mm)	Tensile Strength (kg)	Tensile Strength (N)	Pack (pcs.)	Code
2-LOCK 2,5x100	2,5	100	21	15,30	150	100	**1203**
2-LOCK 2,5x200	2,5	200	50	15,30	150	100	**1207**
2-LOCK 3,5x140	3,5	140	35	25,5	250	100	**1209**
2-LOCK 3,5x200	3,5	200	50	25,5	250	100	**1214**
2-LOCK 3,5x290	3,5	290	80	25,5	250	100	**1210**
2-LOCK 4,5x200	4,5	200	50	36,72	360	100	**1215**
2-LOCK 4,5x250	4,5	250	68	36,72	360	100	**1216**
2-LOCK 4,5x290	4,5	290	80	36,72	360	100	**1217**
2-LOCK 4,5x360	4,5	360	101	36,72	360	100	**1219**
2-LOCK 7,5x220	7,5	220	55	79,56	780	100	**1225***
2-LOCK 7,5x360	7,5	360	100	79,56	780	100	**1227**

*not DNV-GL certified

2-LOCK™
BLACK - UV-RESISTANT

Description	Width (mm)	Length (mm)	Ø bundle max (mm)	Tensile Strength (kg)	Tensile Strength (N)	Pack (pcs.)	Code
2-LOCK 2,5x100	2,5	100	21	15,3	150	100	**1303**
2-LOCK 2,5x200	2,5	200	50	15,3	150	100	**1307**
2-LOCK 3,5x140	3,5	140	35	25,5	250	100	**1309**
2-LOCK 3,5x200	3,5	200	50	25,5	250	100	**1314**
2-LOCK 3,5x290	3,5	290	80	25,5	250	100	**1310**
2-LOCK 4,5x200	4,5	200	50	36,72	360	100	**1315**
2-LOCK 4,5x250	4,5	250	68	36,72	360	100	**1316**
2-LOCK 4,5x290	4,5	290	80	36,72	360	100	**1317**
2-LOCK 4,5x360	4,5	360	101	36,72	360	100	**1319**
2-LOCK 7,5x220	7,5	220	55	79,56	780	100	**1325**
2-LOCK 7,5x360	7,5	360	100	79,56	780	100	**1327**

COMPARISON BETWEEN 2-LOCK WITH METALLIC DOUBLE TOOTH CABLE TIE AND COMPETITOR'S SINGLE TOOTH CABLE TIES

TENSILE STRENGTH
+ 53%

2-LOCK
DOUBLE TOOTH

COMPETITOR
SINGLE TOOTH

EASY TO APPLY
+ 47%

2-LOCK
DOUBLE TOOTH

COMPETITOR
SINGLE TOOTH

SELF-EXTINGUISHING CABLE TIES

Self-extinguishing cable ties, in polyamide V0, for higher fire protection. Halogen and phosphorus free

According to the standard **UNI EN 45545-2:2020** (Railway applications - Fire protection for railway rolling stock - Part 2: Requirements for the fire behaviour of materials and components) Self-extinguishing cable ties comply with the standard in question for hazard **levels HL1 - HL2 for set of requirements R22 and HL1 - HL2 – HL3 for set of requirements R23.**

FEATURES AND BENEFITS

- Manufactured in self-extinguish polyamide with extremely low toxic gas emission in fire situations
- Good flammability behaviour

APPROVALS AND CERTIFICATIONS

CE EN 45545-2 HALOGEN FREE

TECHNICAL DATA

Material	polyamide 6.6
Halogen	absent
Humidity absorbition (50% relative humidity)	2,7%
Working temperature	-40°C ÷ +85°C
Installation temperature	-10°C ÷ 60°C
Flammability rating	UL 94 class V0 - GW 960°C

Resistance external agents:
Excellent chemical resistance to aromatic solvents, oils, greases, oil-based products. Good chemical resistance to bases. Limited resistance to acids. Does not resist to phenol and chlorinated solvents.

SELF-EXTINGUISHING CABLE TIE
WHITE

Description	Width (mm)	Length (mm)	Ø bundle (mm)	Tensile Strength (kg)	Tensile Strength (N)	Pack (pcs.)	Code
Self-extinguishing cable tie 2,5x98	2,5	98	21	8,16	80	100	**5203/C V0E**
Self-extinguishing cable tie 3,5x140	3,5	140	32	18,36	180	100	**5209/C V0E**
Self-extinguishing cable tie 3,5x200	3,5	200	50	18,36	180	100	**5214/C V0E**
Self-extinguishing cable tie 4,8x200	4,5	200	50	22,44	220	100	**5215/C V0E**
Self-extinguishing cable tie 4,5x290	4,5	290	78	22,44	220	100	**5217 V0E**
Self-extinguishing cable tie 7,5x365	7,5	365	100	55,08	540	100	**5227 V0E**

STANDARD CABLE TIES

Technical cable ties, in polyamide 6.6, for professional application

Concerning the **BLACK STANDARD** ties, codes 53XX, according to the standard: **UNI EN 45545-2: 2020** (Railway applications - Fire protection for railway rolling stock - Part 2: Requirements for the fire behaviour of materials and components), **these cable ties comply with the standard in question for hazard levels HL1 - HL2 for set of requirements R22 and R23**.

FEATURES AND BENEFITS

- Guaranteed quality and performances by numerous approvals according to different international product standard
- Black cable ties, made of polyamide with special additives, have superior UV resistance than the natural colour ties
- Cost effective solution for vehicle wiring harness

APPROVALS AND CERTIFICATIONS

EN 45545-2

HALOGEN FREE

TECHNICAL DATA

Material	polyamide 6.6
Halogen	absent
Humidity absorbition (50% relative humidity)	2,7%
Working temperature	-40°C ÷ +85°C
Installation temperature	-10°C ÷ 60°C
Flammability rating	UL94 class V2

Resistance external agents:
Excellent chemical resistance to aromatic solvents, oils, greases, oil-based products. Good chemical resistance to bases. Limited resistance to acids. Does not resist to phenol and chlorinated solvents.

STANDARD CABLE TIE
NATURAL

Description	Width (mm)	Length (mm)	Ø bundle max (mm)	Tensile Strength (kg)	Tensile Strength (N)	Pack (pcs.)	Code
Standard cable tie 2,5x98	2,5	98	21	8,16	80	100	**5203/CE**
Standard cable tie 2,5x98	2,5	98	21	8,16	80	1.000	**5203E**
Standard cable tie 2,5x98	2,5	98	21	8,16	80	20.000	**5203/B2**
Standard cable tie 2,5x135	2,5	135	32	8,16	80	100	**5205/CE**
Standard cable tie 2,5x135	2,5	135	32	8,16	80	1.000	**5205E**
Standard cable tie 2,6x160	2,6	160	40	8,16	80	100	**5206/CE**
Standard cable tie 2,6x200	2,6	200	52	8,16	80	100	**5207/CE**
Standard cable tie 2,6x200	2,6	200	52	8,16	80	1.000	**5207E**
Standard cable tie 3,5x140	3,5	140	32	18,36	180	100	**5209/CE**
Standard cable tie 3,5x140	3,5	140	32	18,36	180	1.000	**5209E**
Standard cable tie 3,5x200	3,5	200	50	18,36	180	100	**5214/CE**
Standard cable tie 3,5x200	3,5	200	50	18,36	180	1.000	**5214E**
Standard cable tie 3,5x290	3,5	290	80	18,36	180	100	**5210/CE**
Standard cable tie 3,5x290	3,5	290	80	18,36	180	500	**5210E**
Standard cable tie 3,5x370	3,5	365	103	18,36	180	100	**5208E**
Standard cable tie 4,5x160	4,5	160	40	22,44	220	100	**5211/CE**
Standard cable tie 4,5x160	4,5	160	40	22,44	220	1.000	**5211E**
Standard cable tie 4,8x178	4,8	178	45	22,44	220	100	**5213/CE**
Standard cable tie 4,8x178	4,8	178	45	22,44	220	1.000	**5213E**
Standard cable tie 4,5x200	4,5	200	50	22,44	220	100	**5215/CE**
Standard cable tie 4,8x200	45	200	50	22,44	220	1.000	**5215E**
Standard cable tie 4,8x250	4,8	250	68	22,44	220	100	**5216/CE**
Standard cable tie 4,5x290	4,5	290	78	22,44	220	100	**5217E**
Standard cable tie 4,5x360	4,5	360	100	22,44	220	100	**5219E**
Standard cable tie 4,5x390	4,5	390	106	22,44	220	100	**5218E**
Standard cable tie 4,5x430	4,5	430	115	22,44	220	100	**5220E**
Standard cable tie 7,8x180	7,8	180	45	55,08	540	100	**5223E**
Standard cable tie 7,8x240	7,5	240	63	55,08	540	100	**5225E**
Standard cable tie 7,5x300	7,5	300	80	55,08	540	100	**5226E**
Standard cable tie 7,5x365	7,5	365	100	55,08	540	100	**5227E**
Standard cable tie 7,5x450	7,5	450	130	55,08	540	100	**5229E**
Standard cable tie 7,5x540	7,5	540	158	55,08	540	100	**5231E**
Standard cable tie 7,5x750	7,5	750	220	55,08	540	100	**5233E**
Standard cable tie 9,0x780	9	780	233	71,4	700	100	**5234E**
Standard cable tie 12,5x225	12,5	225	57	110	1.080	50	**5235E**
Standard cable tie 12,5x500	12,5	500	143	110	1.080	50	**5237E**
Standard cable tie 12,5x720	12,5	720	213	110	1.080	50	**5239E**
Standard cable tie 12,5x850	12,5	850	255	110	1.080	50	**5241E**
Standard cable tie 12,5x1.000	12,5	1.000	302	110	1.080	50	**5243E**

STANDARD CABLE TIE
BLACK

Description	Width (mm)	Length (mm)	Ø bundle max (mm)	Tensile Strength (kg)	Tensile Strength (N)	Pack (pcs.)	Code
Standard cable tie 2,5x98	2,5	98	21	8,16	80	100	**5303/CE**
Standard cable tie 2,5x98	2,5	98	21	8,16	80	1.000	**5303E**
Standard cable tie 2,5x98	2,5	98	21	8,16	80	20.000	**5303/B2**
Standard cable tie 2,5x135	2,5	135	32	8,16	80	100	**5305/CE**
Standard cable tie 2,5x135	2,5	135	32	8,16	80	1.000	**5305E**
Standard cable tie 2,6x160	2,6	160	40	8,16	80	100	**5306/CE**
Standard cable tie 2,6x200	2,6	200	52	8,16	80	100	**5307/CE**
Standard cable tie 2,6x200	2,6	200	52	8,16	80	1.000	**5307E**
Standard cable tie 3,5x140	3,5	140	32	18,36	180	100	**5309/CE**
Standard cable tie 3,5x140	3,5	140	32	18,36	180	1.000	**5309E**
Standard cable tie 3,5x200	3,5	200	50	18,36	180	100	**5314/CE**
Standard cable tie 3,5x200	3,5	200	50	18,36	180	1.000	**5314E**
Standard cable tie 3,5x290	3,5	290	80	18,36	180	100	**5310/CE**
Standard cable tie 3,5x290	3,5	290	80	18,36	180	500	**5310E**
Standard cable tie 3,5x370	3,5	365	103	18,36	180	100	**5308E**
Standard cable tie 4,5x160	4,5	160	40	22,44	220	100	**5311/CE**
Standard cable tie 4,5x160	4,5	160	40	22,44	220	1.000	**5311E**
Standard cable tie 4,8x178	4,8	178	45	22,44	220	100	**5313/CE**
Standard cable tie 4,8x178	4,8	178	45	22,44	220	1.000	**5313E**
Standard cable tie 4,5x200	4,5	200	50	22,44	220	100	**5315/CE**
Standard cable tie 4,8x200	4,5	200	50	22,44	220	1.000	**5315E**
Standard cable tie 4,8x250	4,8	250	68	22,44	220	100	**5316/CE**
Standard cable tie 4,5x290	4,5	290	78	22,44	220	100	**5317E**
Standard cable tie 4,5x360	4,5	360	100	22,44	220	100	**5319E**
Standard cable tie 4,5x390	4,5	390	106	22,44	220	100	**5318E**
Standard cable tie 4,5x430	4,5	430	115	22,44	220	100	**5320E**
Standard cable tie 7,8x180	7,8	180	45	55,08	540	100	**5323E**
Standard cable tie 7,8x240	7,5	240	63	55,08	540	100	**5325E**
Standard cable tie 7,5x300	7,5	300	80	55,08	540	100	**5326E**
Standard cable tie 7,5x365	7,5	365	100	55,08	540	100	**5327E**
Standard cable tie 7,5x450	7,5	450	130	55,08	540	100	**5329E**
Standard cable tie 7,5x540	7,5	540	158	55,08	540	100	**5331E**
Standard cable tie 7,5x750	7,5	750	220	55,08	540	100	**5333E**
Standard cable tie 9,0x780	9	780	233	71,40	700	100	**5334E**
Standard cable tie 12,5x225	12,5	225	57	110	1.080	50	**5335E**
Standard cable tie 12,5x500	12,5	500	143	110	1.080	50	**5337E**
Standard cable tie 12,5x720	12,5	720	213	110	1.080	50	**5339E**
Standard cable tie 12,5x850	12,5	850	255	110	1.080	50	**5341E**
Standard cable tie 12,5x1.000	12,5	1.000	302	110	1.080	50	**5343E**

2-LOCK, high performance cable ties for railway and industrial applications.

2-LOCK

Cable tie engineered with special built-in locking mechanism, made of A4 steel, to offer maximum tensile strength, as well as continuous exposure to sunlight, UV radiation, low temperature and vibrations. Reliability and maximum performance for demanding applications in the railway and shipbuilding industries.

COLSTEEL CABLE TIES

Completely stainless steel cable tie, with high mechanical strength, resistant to the fire and corrosion

FEATURES AND BENEFITS

- Quick installation, by manual tightening and tensioning with thespecific tool
- The ball locking mechanism and the smooth surface offer a very low insertion effort and a infinitely calibrated closing adjustment along all the length of the tie
- High mechanical strength: for safety and high performance applications, which can be guaranteed, only with a metal tie
- The total-smooth profiles and surfaces avoid any damage to the insulation of the electrical cables to be bundled
- Fire resistant, suitable for very high operating temperatures
- Available in 304 and also in 316 stainless steel grade for the highest corrosion and chemical resistance

APPROVALS AND CERTIFICATIONS

CE HALOGEN FREE

TECHNICAL DATA

Material	stainless steel INOX AISI 304 and 316
Working temperature	-60°C ÷ 530°C
	Not inflammable

Resistance external agents:
Excellent resistance to acids, oils, greases, oil-based products, chemical and oxidizing agents, solvents. High resistance in salt mist atmosphere. Corrosion resistant. UV-resistant

TENSIONING TOOL 5407

Automatic tensioning tool for stainless steel cable ties up to 7,9 mm maximum width

COLSTEEL
AISI 304

Description	Width (mm)	Length (mm)	Ø bundle max (mm)	Tensile Strength (kg)	Tensile Strength (N)	Pack (pcs.)	Code	Recommended tool
Colsteel 4,6x127 - AISI 304	4,6	127	25	45,4	445	100	**6701**	**5407**
Colsteel 4,6x201 - AISI 304	4,6	201	51	45,4	445	100	**6703**	**5407**
Colsteel 4,6x266 - AISI 304	4,6	266	69	45,4	445	100	**6706**	**5407**
Colsteel 4,6x362 - AISI 304	4,6	362	102	45,4	445	100	**6708**	**5407**
Colsteel 4,6x521 - AISI 304	4,6	521	152	45,4	445	50	**6710**	**5407**
Colsteel 4,6x838 - AISI 304	4,6	838	254	45,4	445	50	**6712**	**5407**
Colsteel 7,9x201 - AISI 304	7,9	201	51	113,4	1.112	100	**6719**	**5407**
Colsteel 7,9x266 - AISI 304	7,9	266	69	113,4	1.112	100	**6720**	**5407**
Colsteel 7,9x362 - AISI 304	7,9	362	102	113,4	1.112	100	**6722**	**5407**
Colsteel 7,9x521 - AISI 304	7,9	521	152	113,4	1.112	50	**6724**	**5407**
Colsteel 7,9x838 - AISI 304	7,9	838	254	113,4	1.112	50	**6726**	**5407**
Colsteel 7,9x1.067 - AISI 304	7,9	1.067	304	113,4	1.112	50	**6728**	**5407**

COLSTEEL
AISI 316

Description	Width (mm)	Length (mm)	Ø bundle max (mm)	Tensile Strength (kg)	Tensile Strength (N)	Pack (pcs.)	Code	Recommended tool
Colsteel 4,6x201 - AISI 316	4,6	201	51	91,8	445	100	**6753**	**5407**
Colsteel 4,6x266 - AISI 316	4,6	266	69	91,8	445	100	**6756**	**5407**
Colsteel 4,6x362 - AISI 316	4,6	362	102	91,8	445	100	**6758**	**5407**
Colsteel 4,6x521 - AISI 316	4,6	521	152	91,8	445	50	**6760**	**5407**
Colsteel 7,9x201 - AISI 316	7,9	201	51	204	1.112	100	**6769**	**5407**
Colsteel 7,9x266 - AISI 316	7,9	266	69	204	1.112	100	**6770**	**5407**
Colsteel 7,9x362 - AISI 316	7,9	362	102	204	1.112	100	**6772**	**5407**

TENSIONING TOOL
5407

Description	Length (mm)	Weight (gr)	Tensile Strength (N)	Pack (pcs.)	Code
Stainless steel tensioning tool for ties 7,9 max	178	560	445	1	**5407**

ER100

Thin wall heat-shrink tube 2:1, halogen free and low smoke

APPROVALS AND CERTIFICATIONS

Boeing BS 7239 toxic gas generation M7

Railway normative

BS6853 (1999) vehicle category Ia
EN 45545-2 class HL3
LUL 1-085: A3 compliant

FEATURES AND BENEFITS

- Halogen free and excellent flame retardant properties
- Thin flexible tubing in polyolefin
- Ideal for safety sensitive areas

TECHNICAL DATA

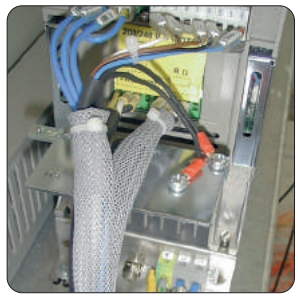
Shrinkage ratio	2:1
Available diameters	Ø 2,4 mm ÷ Ø 50,8mm
Available colours	Black
Halogen	Absent
Working temperature	-55°C to +105°C
Shrinkage temperature	> 90°C
Fire resistance	ASTM D 635-HB
Longitudinal withdrawal	-10% ÷ +5%
Dielectric strength	>20kV/mm

ER100

Description	Ø internal expanded (inch)	Ø internal expanded (mm)	Ø internal recovered (mm)	Wall recovered thickness (mm)	Pack (m)	Code
ER100 2,4/1,2	3/32"	2,4	1,2	0,51	200 m	-
ER100 3,2/1,6	1/8"	3,2	1,6	0,63	200 m	-
ER100 4,8/2,4	3/16"	4,8	2,4	0,63	200 m	-
ER100 6,4/3,2	1/4"	6,4	3,2	0,7	150 m	-
ER100 9,5/4,7	3/8"	9,5	4,8	0,7	150 m	-
ER100 12,7/6,4	1/2"	12,7	6,4	0,7	100 m	-
ER100 19,1/9,5	3/4"	19,1	9,5	0,77	50 m	-
ER100 25,4/12,7	1"	25,4	12,7	0,92	50 m	-
ER100 38,1/19,1	11/2 "	38,1	19,1	0,97	25 m	-
ER100 50,8/25,4	2"	50,8	25,4	0,97	25 m	-

BRAIDED SLEEVE

Braided sleeving for mechanical protection of cables and for cable bundling



APPROVALS AND CERTIFICATIONS

For polyester version:

EN 45545-2 class HL3

DIN 5510-2

FEATURES AND BENEFITS

- Easy insertion
- Resistant to abrasion

TECHNICAL DATA

POLYESTER VERSION

Material	Polyester
Thread diameters	0,22 mm
Working temperature	-40°C ÷ +150°C
Available diameters	from Ø 6 to Ø 40 mm
Fire resistance	UL 94 class V2
Halogen	Absent

BRAIDED SLEEVE
POLYESTER

Description	Color	Ø bundle Min/Max (mm)	Pack (m)	Code
Polyester braided sleeve 6 - grey	●	6 ÷ 12	100	**15501006**
Polyester braided sleeve 8 - grey	●	8 ÷ 15	100	**15501008**
Polyester braided sleeve 10 - grey	●	10 ÷ 18	100	**15501010**
Polyester braided sleeve 12 - grey	●	12 ÷ 22	50	**15501012**
Polyester braided sleeve 15 - grey	●	15 ÷ 25	50	**15501015**
Polyester braided sleeve 18 - grey	●	18 ÷ 28	50	**15501018**
Polyester braided sleeve 20 - grey	●	20 ÷ 30	50	**15501020**
Polyester braided sleeve 25 - grey	●	25 ÷ 38	50	**15501025**
Polyester braided sleeve 30 - grey	●	30 ÷ 49	50	**15501030**
Polyester braided sleeve 40 - grey	●	40 ÷ 60	50	**15501040**
Polyester braided sleeve 6 - black	●	6 ÷ 12	100	**15502006**
Polyester braided sleeve 8 - black	●	8 ÷ 15	100	**15502008**
Polyester braided sleeve 10 - black	●	10 ÷ 18	100	**15502010**
Polyester braided sleeve 12 - black	●	12 ÷ 22	50	**15502012**
Polyester braided sleeve 15 - black	●	15 ÷ 25	50	**15502015**
Polyester braided sleeve 18 - black	●	18 ÷ 28	50	**15502018**
Polyester braided sleeve 20 - black	●	20 ÷ 30	50	**15502020**
Polyester braided sleeve 25 - black	●	25 ÷ 38	50	**15502025**
Polyester braided sleeve 30 - black	●	30 ÷ 49	50	**15502030**
Polyester braided sleeve 40 - black	●	40 ÷ 60	50	**15502040**