THE WORLD OF LAPP

Solutions for railway technology

LAPP GROUP

Legend for icons

PRODUCT CHARACTERISTICS


Suitable for outdoor use


Good chemical resistance


Flame-retardant

Wide clamping range


Halogen-free


Heat-resistant


Cold-resistant


Corrosion-resistant


Mechanical resistance


Assembly time


Low weight


Oil-resistant


Space requirement


Robust


Acid-resistant


Reliability


Voltage


Interference signals

Temperature-resistant

UV-resistant


Waterproof


Variety of approval certifications

Please note: the purpose of the icons is to provide you with a quick overview and a rough indication of the product features to which the corresponding information relates. You can find details of product characteristics in the “technical data” sections on the product pages.

Content

Success through values

Rock solid, high performance. Regional roots, global aspirations. Fast, reliable, high quality – and development that is always one step ahead. For products for the railway industry as well. This is Lapp.
The southwest region of Germany is considered one of the most innovative and powerful industrial sectors in the world, and for good reason. Lapp is a part of this region, helping to guide it and its success worldwide.
As a completely family run company, we know: Everything that we have achieved since our founding in 1957 is based on the daily commitment of our skilled staff and partnerships with our customers based on trust. Each of them has made a decisive contribution to our mutual success. Today, Lapp is one of the world's leading manufacturers of cables, leads, cable accessories and systems of the highest level of quality. We have approximately 3,200 employees worldwide. With 18 production sites on four continents, more than 40 sales companies and hundreds of dedicated consulting experts, we are always close by. And not just physically: customer proximity cannot be measured in mere kilometres. It is based on listening, making your challenges our own and developing solutions that help to further your business model. Candid closeness and a trusting, partnership-based cooperation are more than just words for Lapp, they are values upon which we have built our family company.

The result? Intelligent and reliable connectivity solutions precisely tailored to the needs of our globally active customers. For you as well.

Customer-oriented
Successful
Family based
Innovative. **Lapp.**

- Founded in 1957
- A leading manufacturer of cables, leads, accessories and complete system solutions for connection technology
- Approximately 3,200 employees worldwide
- 18 production facilities
- More than 40 sales companies
- Hundreds of dedicated consulting experts worldwide
- Years of experience in the rail industry

Andreas Lapp,
Matthias Lapp,
Ursula Ida Lapp,
Alexander Lapp,
Siegbert Lapp.

Reliably connecting the world

We want to help you become even more productive and successful. This is why we work tirelessly on optimising our processes. We do everything to make sure we always find the best solution for you and also provide you with quick, efficient and effective support.

No matter where you are – we are always by your side. Our plants, sales companies, partners and, above all, our competent teams of advisers ensure we offer you a comprehensive service on every continent. We do not simply distribute cable technology, we also manufacture our products ourselves – which represents another advantage for you. As a manufacturer with 18 of our own production facilities, you will benefit from our expertise in the development, design and manufacture of cables, system products and cable accessories. Thanks to this expertise, we can guarantee that Lapp will provide you with the quality that you require and that you demand.

You can always rely on quality from Lapp – wherever you are in the world. This is also embodied by our strong brands.

8 strong brands

100 sales partners

1 innovation after another

Employees from **152** countries

More than **40,000** standard products

41 proprietary sales companies

3,200 employees

Our global corporate network

Find other sales partners in your location:
www.lappgroup.com

America

Brazil	Cabos Lapp Brasil LTDA.
Canada	Lapp Canada Inc.
Mexico	Lapp Mexico S de RL de CV
Panama	Lapp Latinamerica Support Corporation
USA	Lapp USA Inc. Lapp Cable Works Inc. Lapp Tannehill Inc. Phoenix Wire & Cable Inc.

Europe

Austria	Lapp Austria GmbH
Benelux	Lapp Benelux B.V.
Czech Republic	Lapp Kabel s.r.o.
Denmark	Lapp Miltronic AB
Estonia	Lapp Miltronic SIA
France	Lapp France S.A.R.L. Câbleries Lapp S.A.R.L. Lapp Muller SAS
Germany	U.I. Lapp GmbH Lapp GmbH Kabelwerke Lapp Systems GmbH Contact GmbH Elektrische Bauelemente
Great Britain	Lapp Limited
Hungary	Lapp Hungària Kft.
Ireland	Lapp Limited Ireland
Italy	Lapp Italia s.r.l. Camuna Cavi s.r.l. Lapp Sistemi Italia s.r.l.
Latvia	Lapp Miltronic SIA
Lithuania	Lapp Miltronic UAB
Norway	Miltronic AS
Poland	Lapp Kabel SP. z.o.o.
Romania	Lapp Kabel Romania SRL
Slovenia	Lapp d.o.o.
Spain	Lapp Kabel España S.L.U.
Sweden	Miltronic AB Fleximark AB
Switzerland	Lapp Kabel AG
Turkey	Lapp Kablo San. ve. Tic.Ltd. Sti.
Ukraine	Lapp Ukraine LLC

Africa

South Africa	Lapp Southern Africa (PTY) Ltd.

Asia

China	Lapp Kabel Shanghai Co. Ltd.
India	Lapp India Pvt. Ltd.
Indonesia	JJ-Lapp Cable (I) SMI
Japan	Lapp Logistics Pte. Ltd.
Kazakhstan	Lapp Kazakhstan LLP
Malaysia	JJ-Lapp Cable (M) Sdn Bhd
Philippines	JJ-Lapp Cable (P) Inc.
Russia	Lapp Russia OOO
Singapore	JJ-Lapp Cable (S) Pte. Ltd. Lapp Logistics Pte. Ltd.
South Korea	Lapp Korea LLC.
Thailand	JJ-Lapp Cable (T) Ltd.
United Arab Emirates	Lapp Middle East FZE
Vietnam	JJ-Lapp Cable (V) Ltd.

Railway cables – quality makes the difference

The railway industry opens up to great opportunities: Numerous emerging markets around the world are developing with increasing momentum. And their demand for transport systems grows – in Asia and in the Middle East, Eastern Europe, Latin America and more recently in Africa as well. Even in Germany, with its dense transportation infrastructure, the market is growing at a disproportionate rate, in particular in the short-distance sector.

The modernisation of old system alone is a task of Herculean proportions – both for public budgets and for manufacturers and operators.

This is due to the fact that a significant innovation backlog has built up. At the same time, the demand for urban transport and fast short-distance systems grows. For larger distances, high-speed projects are gaining in importance, cities are growing and freight traffic is steadily increasing.

This is coupled with increasingly stringent safety regulations and quality standards that must be met. Fire protection standards are particularly demanding.
Based on decades of experience as a full-service provider for electrical cables, cable connections and accessories, Lapp has rounded out its portfolio with products for the railway industry and can offer its customers high-quality solutions in this sector as well.

Lapp now supplies a large number of customers in this market. One of our reference customers is the Korean manufacturer Hyundai-Rotem. They have placed their trust in use for a number of years and have equipped their high-speed trains for the new line of the Korea Train eXpress (KTX) from Seoul to Mokpo and Pusan with Lapp cables. Here, our quality and delivery service were the decisive factors to gain the edge over our competitors.

At the forefront of development. Also for the railway industry. **Lapp.**

- Almost 60 years of experience in the development and production of electrical cables, cable connections and accessories
- In-house production expertise
- Current reference project: High-speed trains for the Korea Train eXpress (KTX)
- IRIS certified

Your interests in mind – and passengers'

We are prepared and have systematically built up our know-how and expertise in the railway technology sector in order to provide convincing arguments to the railway industry regarding our global capabilities.

Because we have a great deal to offer. This starts with the ability to speak your language. Our employees come from 152 countries. With our sales companies and competent consulting teams, we are represented locally around the world, providing you with comprehensive services.
An effective customer focus is part of Lapp, as is our keen sense for trends, sectors and markets. Using this as a basis, we develop the components and solutions of tomorrow for your ideas and projects.

Even for complex requirements, we provide you with the perfect solution, from proven standard products to sophisticated custom solutions. We back up these promises with our actions. To make the procurement process as simple as possible, we can connect your inventory management system to our system. And in our e-shop, you can order any of our 40,000+ standard articles, including railway products, with a simple click – including individual price enquiries, availability and delivery time details, as well as shipment tracking.
Our full service, fast worldwide availability and small minimum order quantities reduce the overall cost to our customers.
In short: We are your partner, and we always keep your interests in mind, ensure uncomplicated cooperation and provide you with the highest quality from a single source paired with a clear added value for your business.

Clear added value for your company. Optimised total cost for rail equipment providers. **Lapp.**

- A local presence, worldwide
- More than 40,000 standard items, for order with the click of a mouse
- Excellent full service
- Fast worldwide availability
- Small minimum order quantities
- Total cost optimisation
- Highest quality
- Complete solutions for the railway industry from a single source = one-stop shop
- e-Service solutions

Technological lead, step-by-step

Our manufacturing facility for the ÖLFLEX® TRAIN is certified in accordance with the IRIS (International Rail Industry Standard), thus operating within the framework of the required processes of the railway industry.

We are a technology group in our sector. We live up to this expectation every day. This is a key success factor for us, something that is more important today in the railway business than ever. Lapp solutions set standards for safety, quality and functionality. And at a great value for money too.

ÖLFLEX® has long become synonymous in the market for power and control cables. Our flexible, oil-resistant cables satisfy the highest demands and can withstand even the very toughest conditions. We have now developed our ÖLFLEX® TRAIN product line, thus providing the railway industry with connectivity solutions of the highest quality that satisfy a wide range of national and international standards.

ÖLFLEX® TRAIN manufacturing technology:
Cable insulation products are usually made of thermoplastic materials, mainly consisting of macromolecules.

When warmed, the mobility of the molecule chains increases, making the plastic soft and malleable and eventually melting – an exclusion criterion for the use of such materials in railway equipment with its demanding safety and environmental conditions and high temperature requirements.

To counteract these factors, ÖLFLEX® TRAIN cables are physically cross-linked in our electron beam system using high-energy beams. This gives them significantly improved mechanical and chemical resistance, even at elevated temperatures.

However, durability and resistance is important not only at high temperatures. In some climatic zones, cables running along the outside of the railways vehicles must be able to withstand temperatures down to -40 °C. No problem for cross-linked products from Lapp.

This also applies to our other established brands:

- ÖLFLEX® CONNECT assembled cable solutions
- ETHERLINE® data communication systems for Ethernet technology
- UNITRONIC® data communication systems
- SKINTOP® cable glands
- EPIC® industrial connectors
- SILVYN® cable protection and guiding systems
- FLEXIMARK® marking systems
- HITRONIC® optical data communication systems


IRIS Certification

CERTIFICATE

awarded to

LAPP KOREA LLC
42, Jangan gongdan 8 gil
18579, Jangan-myeon, Hwasung-si
Korea, Republic of

TÜV Rheinland Italia S.r.l.

confirms, as an IRIS approved certification body, that the Management System of the above organization has been assessed and found to be in accordance with the

International Railway Industry Standard (IRIS)
Revision 02, June 2009

for the activities of Design and Development and Manufacturing
for the scope of certification: 12 (Cabling and cabinets)
for the products of Power Cables, Control Cables and Communication Cables.

Certificate valid from: 30/08/2015 Certificate valid until: 18/08/2018*

Current date: 31/08/2015
Certificate-Register-No: 39 10 003 1505

* Providing that the subsequent surveillance audits are successful before the validity date of the previous audit.
Certification body address: Via Mattei, 3 - 20010 Pogliano Milanese - Italy

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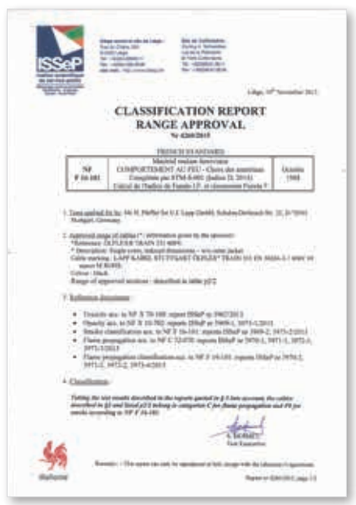
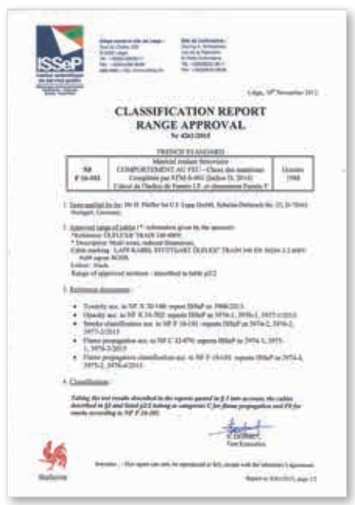
TÜVRheinland


CLASSIFICATION REPORT
RANGE APPROVAL


CLASSIFICATION REPORT
RANGE APPROVAL

Absolute safety on the tracks

The topic is well known: Railway lines must fulfil demanding national and international standards. In addition to these provisions, EU standards has achieved great importance. These include design standards such as EN 50264 and EN 50306. They define the required panel thickness and design and stipulate the mechanical, thermal, fire safety and chemical tests.

These testing standards are part of DIN EN 45545-2: Railway applications – Fire protection on railway vehicles – Part 2: Requirements for fire behaviour of materials and components. It defines the requirements for the fire behaviour.

Lapp has fulfilled the technological requirements for satisfying this standard for railway cables. The result: Cables and wires from Lapp fulfil the key requirements for railway equipment with flying colours. Reliable and safe – up to the highest level defined in EN 45545-2, Hazard Level 3 (HL3).

Testing standards that define the requirements for behaviour in case of fire are of particular importance. These include:

Flame propagation for a single cable
DIN EN 60332-1-2

Flame spread of bunched cables
DIN EN 60332-3-24/25

Smoke density
DIN EN 61034-2

Fluorine content
DIN EN 60684-2

Content of halogens
DIN EN 60754-1

Toxicity
EN 50305

Acidity/Corrosiveness
DIN EN 60754-2

- The highest level of technology
- Top priority: Safety and fire protection
- Test in accordance with EN 45545-2 at accredited and approved test laboratories passed successfully
- Important railway transport standards are satisfied and observed by Lapp


VDE Prüf- und Zertifizierungsinstitut

ZERTIFIKAT
CERTIFICATE

LAPP KABEL


VDE Prüf- und Zertifizierungsinstitut

ZERTIFIKAT
CERTIFICATE

LAPP KABEL

Arrival in the global railway market.
A sure thing.
Lapp.

Only the toughest tests guarantee the highest quality

Test centre at Lapp headquarters in Stuttgart
Our trial and test centre, with its extremely high standards for material testing and quality assurance, is a further guarantee of the decisive quality advancements of Lapp products. It is here that every Lapp Group design is subjected to tough performance and endurance tests. For example, our high-flexibility cables undergo millions of bending cycles at different speeds and extreme bending radii. Only products that survive the “folding chamber” are good enough to be included in our product range.

Comprehensive quality tests for cables
- Tensile and shearing strength test
- Resistance test
- Electrical test
- Torsion test
- Torsion-bending test
- Drag chain test
- Roll bending test
- Fire tests

Quality checks for cable glands
- Protection class testing - water (IP X3 to X8)
- Protection class testing - dust (IP 5X, IP 6X)
- Oil spray test according to UL 514 B
- Pulling protection testing

Strict materials testing
- Infra-red spectroscopy for material identification
- Thermogravimetry to determine material proportions
- Thermal analysis to test the thermal properties of materials
- Climate cabinets to test ageing and storability

Our test centre is also open for our customers
A customer-focused mentality and perfect service form part of the Lapp Group company values. We therefore offer our customers the chance to profit from our trial and test centre beyond the scope of quality assurance of our products.
We will test your products and carry out material tests in accordance with your wishes. For instance, you might bring us a length of cable whose material composition you wish to find out. We will test it for you using infrared spectroscopy and tell you what materials it contains. Using thermoanalysis we can give you information about the material properties. And we can test materials for aging and shelf-life.
In short: The entire know-how of our specialists is available to you for your analysis and quality assurance.

- ÖLFLEX® TRAIN solutions for the railway industry
- Perfect material properties thanks to electron beam cross-linking in our in-house production facility
- IRIS certified
- In-house test centre at our headquarters

With expertise in the railway sector. **Lapp.**

Railway equipment – available soon worldwide

You can forget about long delivery times and high minimum order quantities. We keep railway products in stock for you and deliver quickly. Regardless of where in the world you need them. Even in smaller quantities.
To make this possible, we have built up a close-knit network of logistics centres and professionally trained consulting experts. Our fast, smooth delivery service is based on sophisticated, completely digitised and reliable logistics processes.

Our logistics and service centre in Ludwigsburg is setting the benchmark in many ways: 30,000 m² total floor, fully automated high-rack facility, 120 logistics employees, 30 truck loading ramps, over 90,000 articles and nearly 500,000 km cables delivered every year represent the most important facts.

With our Track & Trace web service, you can always view the current status of your deliveries. Or you can give us your e-mail address and request our evening delivery update. It includes all the details on your current shipment, including the package or shipment number.

Incidentally, When the Lapp logistics centre was constructed, great importance was placed on sustainability and energy saving. The photovoltaic system on the roof, for instance, generates approximately 1,000 MWh of energy per year, thus reducing annual CO_2 emissions by around 650 tonnes.

- Delivery within a short time worldwide from the warehouse
- Track & Trace web service
- Daily delivery update with mail-push service
- Fully automatic high-rack facilities
- Sustainability and environmental awareness

Fast and reliable.
All over the world. **Lapp.**

65,000 m²

of storage space in Germany alone enables us to keep 40,000 km of ÖLFLEX® constantly in stock.

This is longer than the length of the equator

Products for the railway industry at a glance

Cables

ÖLFLEX® TRAIN 331 600V

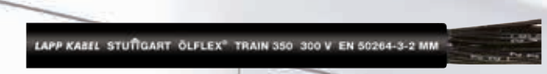
ÖLFLEX® TRAIN 355 C 300V

ÖLFLEX® TRAIN 340 600V

ÖLFLEX® TRAIN 361 1.8kV

ÖLFLEX® TRAIN 345 C 600V

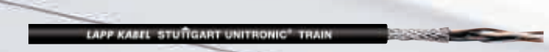
ÖLFLEX® TRAIN 371 1.8kV



ÖLFLEX® TRAIN 350 300V

ÖLFLEX® TRAIN 381 3.6kV

ETHERLINE® TRAIN



UNITRONIC® TRAIN

Connectors and cable glands

EPIC® H-BE 6 Screw termination

EPIC® H-BS 6

EPIC® H-BS 12

SKINTOP® ST-HF-M

SKINTOP® GMP-HF M

SKINTOP® BRUSH ADD ON

Cable conduit and marking systems

SILVYN® HFX

SILVYN® FCE

SILVYN® COMPACT M

SILVYN® FCE-M

SILVYN® HIPROJACKET

SILVYN® HIPROJACKET AMG

FLEXIMARK® Stainless steel FCC

FLEXIMARK®
Organized shrink tube

Cable lug KRFN

Shrinking tube
PROTECT-M/PROTECT-T

Basic Tie Cable tie

Overview ÖLFLEX® TRAIN

Single core cables

	ÖLFLEX® TRAIN 331 600V		ÖLFLEX® TRAIN 361 1.8 kV	ÖLFLEX® TRAIN 371 1.8 kV	ÖLFLEX® TRAIN 381 3.6 kV
Type standard	EN 50264-3-1		EN 50264-3-1	EN 50264-3-1	EN 50264-3-1
May substitute previous type	3GKW	3GKW		4GKW AXplus	9GKW-AXplus
With outer sheath				●	●
Type according to EN standard	M		M	MM	MM
Colour of insulation/outer sheath	BK	GN/YE	BK	BK	BK
Conductor cross-section/mm²	**Article number**	**Article number**	**Article number**	**Article number**	**Article number**
1	15331000	15331017			
1.5	15331001	15331018	15361000	15371000	
2.5	15331002	15331019	15361001	15371001	15381000
4	15331003	15331020	15361002	15371002	15381001
6	15331004	15331021	15361003	15371003	15381002
10	15331005	15331022	15361004	15371004	15381003
16	15331006	15331023	15361005	15371005	15381004
25	15331007	15331024	15361006	15371006	15381005
35	15331008	15331025	15361007	15371007	15381006
50	15331009	15331026	15361008	15371008	15381007
70	15331010	15331027	15361009	15371009	15381008
95	15331011	15331028	15361010	15371010	15381009
120	15331012		15361011	15371011	15381010
150	15331013		15361012	15371012	15381011
185	15331014		15361013	15371013	15381012
240	15331015		15361014	15371014	15381013
300	15331016		15361015	15371015	15381014

Overview ÖLFLEX® TRAIN

Multi core cables

	ÖLFLEX® TRAIN 340 600V	ÖLFLEX® TRAIN 345 C 600V	ÖLFLEX® TRAIN 350 300V	ÖLFLEX® TRAIN 355 C 300V
Type standard	EN 50264-3-2	EN 50264-3-2	EN 50264-3-2	EN 50264-3-2
May substitute previous type	3GKW-flex	3GKW C-flex		
With screen		●		●
Type according to EN standard	MM	MM	MM	MM
Number of cores and mm² per conductor	**Article number**	**Article number**	**Article number**	**Article number**
2 X 1			15350000	15355000
4 X 1			15350001	15355001
7 X 1			15350002	15355002
9 X 1			15350003	15355003
12 X 1			15350004	15355004
19 X 1			15350005	15355005
24 X 1			15350006	15355006
32 X 1			15350007	15355007
37 X 1			15350008	15355008
40 X 1			15350009	15355009
2 X 1.5	15340000	15345000		
3 X 1.5	15340001	15345001		
3 G 1.5	15340025	15345025		
4 X 1.5	15340002	15345002	15350010	15355010
4 G 1.5	15340026	15345026		
7 X 1.5			15350011	15355011
9 X 1.5			15350012	15355012
12 X 1.5			15350013	15355013
19 X 1.5			15350014	15355014
24 X 1.5			15350015	15355015
32 X 1.5			15350016	15355016
37 X 1.5			15350017	15355017
2 X 2.5	15340003	15345003		
3 X 2.5	15340004	15345004		
3 G 2.5	15340027	15345027		
4 X 2.5	15340005	15345005	15350018	15355018
4 G 2.5	15340028	15345028		
7 X 2.5			15350019	15355019
9 X 2.5			15350020	15355020
12 X 2.5			15350021	15355021
19 X 2.5			15350022	15355022
24 X 2.5			15350023	15355023
2 X 4	15340006	15345006		
3 X 4	15340007	15345007		
4 X 4	15340008	15345008		
2 X 6	15340009	15345009		
3 X 6	15340010	15345010		
4 X 6	15340011	15345011		
2 X 10	15340012	15345012		
3 X 10	15340013	15345013		
4 X 10	15340014	15345014		
2 X 16	15340015	15345015		
3 X 16	15340016	15345016		
4 X 16	15340017	15345017		
2 X 25	15340018	15345018		
3 X 25	15340019	15345019		
4 X 25	15340020	15345020		
2 X 35	15340021	15345021		
3 X 35	15340022	15345022		
2 X 50	15340023	15345023		
3 X 50	15340024	15345024		

ÖLFLEX® TRAIN 331 600V

Single-core cable according to EN 50264-3-1 type M for high requirements in railway applications

Info

- Meets EN 50264-3-1 type M and EN 45545-2
- High temperature resistance: -45°C up to 90°C
- Highly oil- and fuel-resistant

Benefits

- Good chemical resistance
- Resistant to mechanical influences in harsh environmental conditions
- Extended temperature range
- Reduced flame spreading increase the protection against damage to persons and property in the event of a fire

Application range

- For use in railway vehicles and buses, for fixed installations and applications where limited movement may occur
- Suitable for connecting lamps, heating equipment, switchgear, terminal boxes and power supply
- Also applicable within oily environments and areas with increased ambient temperature.

Product features

- Fire behaviour according to EN/IEC:
  - Halogen-free acc. to EN 60754-1
  - No corrosive gases acc. to EN 60754-2
  - No fluorine acc. to EN 60684-2
  - No toxic gases acc. to EN 50305
  - Low smoke density acc. to EN 61034-2
  - Flame-retardant acc. to EN 60332-1-2
  - No flame propagation acc. to EN 60332-3-24 / EN 60332-3-25
- Fire behaviour according to NF:
  - Toxicity of gases acc. to NF X 70-100
  - Low smoke density acc. to NF X 10-702
  - No flame propagation acc. to NF C 32-070, Cat. C1 and C2
- Chemical properties:
  - Oil resistant acc. to EN 50264-3-1
  - Fuel resistant acc. to EN 50264-3-1
  - Acid resistant acc. to EN 50264-3-1
  - Alkali resistant acc. to EN 50264-3-1
  - Ozone resistant acc. to EN 50264-3-1/ EN 50305)

Norm references / Approvals

- EN 50264-3-1 type M
- EN 45545-2 HL1, HL2, HL3
- NF F 16-101 - Classification: C / F0 (flame propagation / smoke)

Product Make-up

- Tinned-copper strand, fine-wire
- Insulation: Electron beam cross-linked Polymer compound EI 109
- Colour: Black or green-yellow

Technical data

Classification
ETIM 5.0 Class-ID: EC000993
ETIM 5.0 Class-Description: Single core cable

Conductor stranding
Fine-wired/ Finely stranded according to IEC 60228, conductor class 5

Minimum bending radius
Fixed installation:
≤ 12 mm: 3 x OD
> 12 mm: 4 x OD
Occasional flexing:
≤ 12 mm: 4 x OD
> 12 mm ≤ 20 mm: 5 x OD
> 20 mm: 6 x OD
(OD = outer diameter)

Nominal voltage
U_0/U AC 0.6/1 kV
U_m AC 1.2 kV
V_0 DC 0.9 kV

Test voltage
3,5 kV AC; 8,4 kV DC

Temperature range
Fixed installation:
-45°C to +90°C
Occasional flexing:
-35°C to +90°C
Short circuit: +200°C (5s)

Article number	Conductor cross-section (mm²)	Outer diameter (mm)	Copper index (kg/km)	Weight (kg/km)
ÖLFLEX® TRAIN 331 600V - BK				
15331000	1	2.5	9.6	14.8
15331001	1.5	3.0	14.4	21.7
15331002	2.5	3.4	24	32.8
15331003	4	4.1	38.4	48.9
15331004	6	4.6	57.6	69.9
15331005	10	5.6	96	111.6
15331006	16	6.6	153.6	174
15331007	25	8.3	240	272.6
15331008	35	9.5	336	374.1
15331009	50	11.7	480	531.4
15331010	70	13.6	672	738.5
15331011	95	15.6	912	988.1
15331012	120	17.4	1152	1242.9
15331013	150	19.8	1440	1558.2
15331014	185	21.7	1776	1926.9
15331015	240	25.4	2304	2487.2
15331016	300	26.8	2880	3085
ÖLFLEX® TRAIN 331 600V - GN/YE				
15331017	1	2.5	9.6	14.8
15331018	1.5	3.0	14.4	21.7
15331019	2.5	3.4	24	32.8
15331020	4	4.1	38.4	48.9
15331021	6	4.6	57.6	69.9
15331022	10	5.6	96	111.6
15331023	16	6.6	153.6	174
15331024	25	8.3	240	272.6
15331025	35	9.5	336	374.1
15331026	50	11.7	480	531.4
15331027	70	13.6	672	738.5
15331028	95	15.6	912	988.1

Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request.
Copper price basis: EUR 150/100 kg. Refer to catalogue appendix T17 for the definition and calculation of copper-related surcharges.
Packaging size: coil ≤ 30 kg or ≤ 250 m, otherwise drum
Please specify the preferred
Photographs are not to scale and do not represent detailed images of the respective products.

Similar products

- ÖLFLEX® TRAIN 361 1,8kV

ÖLFLEX® TRAIN 340 600V

Multi-core cable according to EN 50264-3-2 type MM for high requirements in railway applications

Info

- Meets EN 50264-3-2 type MM and EN 45545-2
- High temperature resistance: -45°C up to 90°C
- Highly oil- and fuel-resistant

Benefits

- Good chemical resistance
- Resistant to mechanical influences in harsh environmental conditions
- Extended temperature range
- Reduced flame spreading increase the protection against damage to persons and property in the event of a fire

Application range

- For use in railway vehicles and buses, for fixed installations and applications where limited movement may occur
- Suitable for connecting lamps, heating equipment, switchgear, terminal boxes and power supply
- Also applicable within oily environments and areas with increased ambient temperature.

Product features

- Fire behaviour according to EN/IEC:
  - Halogen-free acc. to EN 60754-1
  - No corrosive gases acc. to EN 60754-2
  - No fluorine acc. to EN 60684-2
  - No toxic gases acc. to EN 50305
  - Low smoke density acc. to EN 61034-2
  - Flame-retardant acc. to EN 60332-1-2
  - No flame propagation acc. to EN 60332-3-24 / EN 60332-3-25
- Fire behaviour according to NF:
  - Toxicity of gases acc. to NF X 70-100
  - Low smoke density acc. to NF X 10-702
  - No flame propagation acc. to NF C 32-070, Cat. C1 and C2
- Chemical properties:
  - Oil resistant acc. to EN 50264-3-1
  - Fuel resistant acc. to EN 50264-3-1
  - Acid resistant acc. to EN 50264-3-1
  - Alkali resistant acc. to EN 50264-3-1
  - Ozone resistant acc. to EN 50264-3-1/ EN 50305)

Norm references / Approvals

- EN 50264-3-2 type MM
- EN 45545-2 HL1, HL2, HL3
- NF F 16-101 - Classification: C / F0 (flame propagation / smoke)

Product Make-up

- Tinned-copper strand, fine-wire
- Insulation: Electron beam cross-linked Polymer compound EI 109
- Colour of insulation: Black with white numbers
- Outer sheath: electron beam cross-linked polymer-compound EM 104
- Outer sheath colour: Black

Technical data

Classification
ETIM 5.0 Class-ID: EC000104
ETIM 5.0 Class-Description: Control cable

Core identification code
Black with white numbers

Conductor stranding
Fine-wired/ Finely stranded according to IEC 60228, conductor class 5

Minimum bending radius
Fixed installation:
≤ 12 mm: 3 x OD
> 12 mm: 4 x OD
Occasional flexing:
≤ 12 mm: 4 x OD
> 12 mm ≤ 20 mm: 5 x OD
> 20 mm: 6 x OD
(OD = outer diameter)

Nominal voltage
U_0/U AC 0.6/1 kV
U_m AC 1.2 kV
V_0 DC 0.9 kV

Test voltage
3,5 kV AC; 8,4 kV DC

Protective conductor
G = with GN-YE protective conductor
X = without protective conductor

Temperature range
Fixed installation:
-45°C to +90°C
Occasional flexing:
-35°C to +90°C
Short circuit: +200°C (5s)

Article number	Number of cores and mm² per conductor	Outer diameter (mm)	Copper index (kg/km)	Weight (kg/km)
ÖLFLEX® TRAIN 340 600V				
15340000	2 X 1.5	7.4	28.8	94.1
15340001	3 X 1.5	7.9	43.2	113.5
15340025	3 G 1.5	7.9	43.2	113.5
15340002	4 X 1.5	8.6	57.6	139.6
15340026	4 G 1.5	8.6	57.6	139.6
15340003	2 X 2.5	8.2	48	127.4
15340004	3 X 2.5	8.7	72	156.9
15340027	3 G 2.5	8.7	72	156.9
15340005	4 X 2.5	9.6	96	195
15340028	4 G 2.5	9.6	96	195
15340006	2 X 4	9.6	76.8	178.5
15340007	3 X 4	10.2	115.2	222.9
15340008	4 X 4	11.4	153.6	284.5
15340009	2 X 6	10.8	115.2	244.2

Article number	Number of cores and mm² per conductor	Outer diameter (mm)	Copper index (kg/km)	Weight (kg/km)
15340010	3 X 6	11.5	172.8	308
15340011	4 X 6	13.0	230.4	393.4
15340012	2 X 10	13.2	192	377.3
15340013	3 X 10	14.0	288	479.6
15340014	4 X 10	15.4	384	604
15340015	2 X 16	15.2	307.2	551.9
15340016	3 X 16	16.2	460.8	708
15340017	4 X 16	18.2	614.4	916.2
15340018	2 X 25	19.0	480	857
15340019	3 X 25	20.2	720	1101.5
15340020	4 X 25	22.7	960	1420.9
15340021	2 X 35	21.4	672	1140.9
15340022	3 X 35	23.0	1008	1488.8
15340023	2 X 50	26.2	960	1626.5
15340024	3 X 50	28.0	1440	2101.1

Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request.
Copper price basis: EUR 150/100 kg. Refer to catalogue appendix T17 for the definition and calculation of copper-related surcharges.
Packaging size: coil ≤ 30 kg or ≤ 250 m, otherwise drum
Please specify the preferred type of packaging (e.g. 1 x 500 m drum or 5 x 100 m coils).
Photographs are not to scale and do not represent detailed images of the respective products.

Similar products

- ÖLFLEX® TRAIN 345 C 600V

Accessories

- SKINTOP® GMP-HF-M
- SKINTOP® ST-HF-M

ÖLFLEX® TRAIN 345 C 600V

Screened multi-core cable according to EN 50264-3-2 type MM for high requirements in railway applications

Info

- Meets EN 50264-3-2 type MM and EN 45545-2
- High temperature resistance: -45°C up to 90°C
- Highly oil- and fuel-resistant

Benefits

- Copper screening complies with EMC requirements and protects against electromagnetic interference
- Good chemical resistance
- Resistant to mechanical influences in harsh environmental conditions
- Extended temperature range
- Reduced flame spreading increase the protection against damage to persons and property in the event of a fire

Application range

- For use in railway vehicles and buses, for fixed installations and applications where limited movement may occur
- Suitable for connecting lamps, heating equipment, switchgear, terminal boxes and power supply
- Also applicable within oily environments and areas with increased ambient temperature.

Product features

- Fire behaviour according to EN/IEC:
  - Halogen-free acc. to EN 60754-1
  - No corrosive gases acc. to EN 60754-2
  - No fluorine acc. to EN 60684-2
  - No toxic gases acc. to EN 50305
  - Low smoke density acc. to EN 61034-2
  - Flame-retardant acc. to EN 60332-1-2
  - No flame propagation acc. to EN 60332-3-24 / EN 60332-3-25
- Fire behaviour according to NF:
  - Toxicity of gases acc. to NF X 70-100
  - Low smoke density acc. to NF X 10-702
  - No flame propagation acc. to NF C 32-070, Cat. C1 and C2
- Chemical properties:
  - Oil resistant acc. to EN 50264-3-1
  - Fuel resistant acc. to EN 50264-3-1
  - Acid resistant acc. to EN 50264-3-1
  - Alkali resistant acc. to EN 50264-3-1
  - Ozone resistant acc. to EN 50264-3-1/ EN 50305)

Norm references / Approvals

- EN 50264-3-2 type MM
- EN 45545-2 HL1, HL2, HL3
- NF F 16-101 - Classification: C / F0 (flame propagation / smoke)

Product Make-up

- Conductor: Fine-wire strands of tinned copper
- Insulation: Electron beam cross-linked Polymer compound EI 109
- Colour of insulation: Black with white numbers
- Wrapping: Halogen-free plastic foil
- Screen: Tinned-copper braiding
- Outer sheath: electron beam cross-linked polymer-compound EM 104
- Outer sheath colour: Black

Technical data

Classification
ETIM 5.0 Class-ID: EC000104
ETIM 5.0 Class-Description: Control cable

Core identification code
Black with white numbers

Conductor stranding
Fine-wired/ Finely stranded according to IEC 60228, conductor class 5

Minimum bending radius
Fixed installation:
≤ 12 mm: 3 x OD
> 12 mm: 4 x OD
Occasional flexing:
≤ 12 mm: 4 x OD
> 12 mm ≤ 20 mm: 5 x OD
> 20 mm: 6 x OD
(OD = outer diameter)

Nominal voltage
U_0/U AC 0.6/1 kV
U_m AC 1.2 kV
V_0 DC 0.9 kV

Test voltage
Core/core: 3,5 kV AC; 8,4 kV DC
Core/screen: 3,5 kV AC; 8,4 kV DC

Protective conductor
G = with GN-YE protective conductor
X = without protective conductor

Temperature range
Fixed installation:
-45°C to +90°C
Occasional flexing:
-35°C to +90°C
Short circuit: +200°C (5s)

Article number	Number of cores and mm² per conductor	Outer diameter (mm)	Copper index (kg/km)	Weight (kg/km)
ÖLFLEX® TRAIN 345 C 600V				
15345000	2 X 1.5	8.2	57.35	125.3
15345001	3 X 1.5	8.7	73.27	149.1
15345025	3 G 1.5	8.7	73.27	149.1
15345002	4 X 1.5	9.4	90.92	180.3
15345026	4 G 1.5	9.4	90.92	180.3
15345003	2 X 2.5	9.0	80.38	160
15345004	3 X 2.5	9.5	107.46	196.2
15345027	3 G 2.5	9.5	107.46	196.2
15345005	4 X 2.5	10.8	147.08	258.5
15345028	4 G 2.5	10.8	147.08	258.5
15345006	2 X 4	10.8	126.68	237.2
15345007	3 X 4	11.4	167.66	289.6
15345008	4 X 4	12.4	210.89	353.9
15345009	2 X 6	11.8	171.91	294.3

Article number	Number of cores and mm² per conductor	Outer diameter (mm)	Copper index (kg/km)	Weight (kg/km)
15345010	3 X 6	12.5	233.52	368.3
15345011	4 X 6	14.0	297.39	470.2
15345012	2 X 10	14.2	258.83	427.9
15345013	3 X 10	15.2	378.94	571.9
15345014	4 X 10	16.6	485.83	711.2
15345015	2 X 16	16.4	411.94	637.3
15345016	3 X 16	17.8	574.29	836.3
15345017	4 X 16	19.4	741.03	1040.4
15345018	2 X 25	20.2	608.98	939.8
15345019	3 X 25	21.4	861.67	1219.1
15345020	4 X 25	24.1	1147.27	1601.3
15345021	2 X 35	23.2	852.85	1286.7
15345022	3 X 35	24.6	1203.78	1668.2
15345023	2 X 50	27.6	1175.17	1732.8
15345024	3 X 50	29.8	1710.69	2336.3

Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request.
Copper price basis: EUR 150/100 kg. Refer to catalogue appendix T17 for the definition and calculation of copper-related surcharges.
Packaging size: coil ≤ 30 kg or ≤ 250 m, otherwise drum
Please specify the preferred type of packaging (e.g. 1 x 500 m drum or 5 x 100 m coils).
Photographs are not to scale and do not represent detailed images of the respective products.

Accessories

- SKINTOP® GMP-HF-M
- SKINTOP® ST-HF-M

ÖLFLEX® TRAIN 350 300V

Multi-core cable according to EN 50264-3-2 type MM for high requirements in railway applications

Info

- Meets EN 50264-3-2 type MM and EN 45545-2
- High temperature resistance: -45°C up to 90°C
- Highly oil- and fuel-resistant

Benefits

- Good chemical resistance
- Resistant to mechanical influences in harsh environmental conditions
- Extended temperature range
- Reduced flame spreading increase the protection against damage to persons and property in the event of a fire

Application range

- For use in railway vehicles and buses, for fixed installations and applications where limited movement may occur
- Suitable for connecting lamps, heating equipment, switchgear, terminal boxes and power supply
- Also applicable within oily environments and areas with increased ambient temperature.

Product features

- Fire behaviour according to EN/IEC:
  - Halogen-free acc. to EN 60754-1
  - No corrosive gases acc. to EN 60754-2
  - No fluorine acc. to EN 60684-2
  - No toxic gases acc. to EN 50305
  - Low smoke density acc. to EN 61034-2
  - Flame-retardant acc. to EN 60332-1-2
  - No flame propagation acc. to EN 60332-3-24 / EN 60332-3-25
- Fire behaviour according to NF:
  - Toxicity of gases acc. to NF X 70-100
  - Low smoke density acc. to NF X 10-702
  - No flame propagation acc. to NF C 32-070, Cat. C1 and C2
- Chemical properties:
  - Oil resistant acc. to EN 50264-3-1
  - Fuel resistant acc. to EN 50264-3-1
  - Acid resistant acc. to EN 50264-3-1
  - Alkali resistant acc. to EN 50264-3-1
  - Ozone resistant acc. to EN 50264-3-1/ EN 50305)

Norm references / Approvals

- EN 50264-3-2 type MM
- EN 45545-2 HL1, HL2, HL3
- NF F 16-101 - Classification: C / F0 (flame propagation / smoke)

Product Make-up

- Tinned-copper strand, fine-wire
- Insulation: Electron beam cross-linked Polymer compound EI 109
- Colour of insulation: Black with white numbers
- Outer sheath: electron beam cross-linked polymer-compound EM 104
- Outer sheath colour: Black

Technical data

Classification
ETIM 5.0 Class-ID: EC000104
ETIM 5.0 Class-Description: Control cable

Core identification code
Black with white numbers

Conductor stranding
Fine-wired/ Finely stranded according to IEC 60228, conductor class 5

Minimum bending radius
Fixed installation:
≤ 12 mm: 3 x OD
> 12 mm: 4 x OD
Occasional flexing:
≤ 12 mm: 4 x OD
> 12 mm ≤ 20 mm: 5 x OD
> 20 mm: 6 x OD
(OD = outer diameter)

Nominal voltage
U_0/U: 300/500 V
U_m AC 600 V
V_0 DC 450 V

Test voltage
2,0 kV AC; 4,8 kV DC

Protective conductor
G = with GN-YE protective conductor
X = without protective conductor

Temperature range
Fixed installation:
-45°C to +90°C
Occasional flexing:
-35°C to +90°C
Short circuit: +200°C (5s)

Article number	Number of cores and mm² per conductor	Outer diameter (mm)	Copper index (kg/km)	Weight (kg/km)
ÖLFLEX® TRAIN 350 300V				
15350000	2 X 1.0	5.4	19.2	54.4
15350001	4 X 1.0	6.2	38.4	81.4
15350002	7 X 1.0	7.7	67.2	128.1
15350003	9 X 1.0	9.6	86.4	179.4
15350004	12 X 1.0	10.1	115.2	203.8
15350005	19 X 1.0	12.1	182.4	309
15350006	24 X 1.0	14.4	230.4	396.4
15350007	32 X 1.0	15.9	307.2	520.1
15350008	37 X 1.0	16.7	355.2	580.1
15350009	40 X 1.0	17.8	384	643.9
15350010	4 X 1.5	7.6	57.6	116.2
15350011	7 X 1.5	9.2	100.8	184

Article number	Number of cores and mm² per conductor	Outer diameter (mm)	Copper index (kg/km)	Weight (kg/km)
15350012	9 X 1.5	11.7	129.6	272.6
15350013	12 X 1.5	12.4	172.8	301.8
15350014	19 X 1.5	15.0	273.6	472.9
15350015	24 X 1.5	17.3	345.6	576.5
15350016	32 X 1.5	19.6	460.8	777.6
15350017	37 X 1.5	20.6	532.8	879.4
15350018	4 X 2.5	8.6	96	168.5
15350019	7 X 2.5	10.6	168	269.8
15350020	9 X 2.5	13.7	216	401.7
15350021	12 X 2.5	14.5	288	460.2
15350022	19 X 2.5	17.0	456	679.6
15350023	24 X 2.5	20.1	576	879.2

Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request.
Packaging size: coil ≤ 30 kg or ≤ 250 m, otherwise drum
Please specify the preferred type of packaging (e.g. 1 x 500 m drum or 5 x 100 m coils).
Photographs are not to scale and do not represent detailed images of the respective products.

Similar products

- ÖLFLEX® TRAIN 340 600V
- ÖLFLEX® TRAIN 355 C 300V

Accessories

- SKINTOP® GMP-HF-M
- SKINTOP® ST-HF-M

ÖLFLEX® TRAIN 355 C 300V

Screened multi-core cable according to EN 50264-3-2 type MM for high requirements in railway applications

Info

- Meets EN 50264-3-2 type MM and EN 45545-2
- High temperature resistance: -45°C up to 90°C
- Highly oil- and fuel-resistant

Benefits

- Copper screening complies with EMC requirements and protects against electromagnetic interference
- Good chemical resistance
- Resistant to mechanical influences in harsh environmental conditions
- Extended temperature range
- Reduced flame spreading increase the protection against damage to persons and property in the event of a fire

Application range

- For use in railway vehicles and buses, for fixed installations and applications where limited movement may occur
- Suitable for connecting lamps, heating equipment, switchgear, terminal boxes and power supply
- Also applicable within oily environments and areas with increased ambient temperature.

Product features

- Fire behaviour according to EN/IEC:
  - Halogen-free acc. to EN 60754-1
  - No corrosive gases acc. to EN 60754-2
  - No fluorine acc. to EN 60684-2
  - No toxic gases acc. to EN 50305
  - Low smoke density acc. to EN 61034-2
  - Flame-retardant acc. to EN 60332-1-2
  - No flame propagation acc. to EN 60332-3-24 / EN 60332-3-25
- Fire behaviour according to NF:
  - Toxicity of gases acc. to NF X 70-100
  - Low smoke density acc. to NF X 10-702
  - No flame propagation acc. to NF C 32-070, Cat. C1 and C2
- Chemical properties:
  - Oil resistant acc. to EN 50264-3-1
  - Fuel resistant acc. to EN 50264-3-1
  - Acid resistant acc. to EN 50264-3-1
  - Alkali resistant acc. to EN 50264-3-1
  - Ozone resistant acc. to EN 50264-3-1/ EN 50305)

Norm references / Approvals

- EN 50264-3-2 type MM
- EN 45545-2 HL1, HL2, HL3
- NF F 16-101 - Classification: C / F0 (flame propagation / smoke)

Product Make-up

- Conductor: Fine-wire strands of tinned copper
- Insulation: Electron beam cross-linked Polymer compound EI 109
- Colour of insulation: Black with white numbers
- Wrapping: Halogen-free plastic foil
- Screen: Tinned-copper braiding
- Outer sheath: electron beam cross-linked polymer-compound EM 104
- Outer sheath colour: Black

Technical data

Classification
ETIM 5.0 Class-ID: EC000104
ETIM 5.0 Class-Description: Control cable

Core identification code
Black with white numbers

Conductor stranding
Fine-wired/ Finely stranded according to IEC 60228, conductor class 5

Minimum bending radius
Fixed installation:
≤ 12 mm: 3 x OD
> 12 mm: 4 x OD
Occasional flexing:
≤ 12 mm: 4 x OD
> 12 mm ≤ 20 mm: 5 x OD
> 20 mm: 6 x OD
(OD = outer diameter)

Nominal voltage
U_0/U: 300/500 V
U_m AC 600 V
V_0 DC 450 V

Test voltage
2,0 kV AC; 4,8 kV DC

Protective conductor
G = with GN-YE protective conductor
X = without protective conductor

Temperature range
Fixed installation:
-45°C to +90°C
Occasional flexing:
-35°C to +90°C
Short circuit: +200°C (5s)

Article number	Number of cores and mm² per conductor	Outer diameter (mm)	Copper index (kg/km)	Weight (kg/km)
ÖLFLEX® TRAIN 355 C 300V				
15355000	2 X 1.0	6.2	39.27	71.4
15355001	4 X 1.0	7.2	64.06	108.5
15355002	7 X 1.0	8.5	97.15	152
15355003	9 X 1.0	10.8	137.41	234.1
15355004	12 X 1.0	11.3	170.09	257.7
15355005	19 X 1.0	13.7	261.77	395
15355006	24 X 1.0	15.6	324.51	482.2
15355007	32 X 1.0	17.1	411.92	605.9
15355008	37 X 1.0	17.9	471.56	685.9
15355009	40 X 1.0	19.4	510.27	777.3
15355010	4 X 1.5	8.4	86.8	145.1
15355011	7 X 1.5	10.2	150.51	224

Article number	Number of cores and mm² per conductor	Outer diameter (mm)	Copper index (kg/km)	Weight (kg/km)
15355012	9 X 1.5	13.1	191.37	336
15355013	12 X 1.5	13.8	240	371.1
15355014	19 X 1.5	16.2	369.09	547.8
15355015	24 X 1.5	18.9	463.04	697.9
15355016	32 X 1.5	20.8	591.57	891.5
15355017	37 X 1.5	21.8	664.73	993.6
15355018	4 X 2.5	9.6	153.75	219.6
15355019	7 X 2.5	11.6	224.75	311.4
15355020	9 X 2.5	14.9	309.28	478.1
15355021	12 X 2.5	15.7	382.12	529.9
15355022	19 X 2.5	18.6	573.02	794.6
15355023	24 X 2.5	21.3	718.82	999.1

Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request.
Packaging size: coil ≤ 30 kg or ≤ 250 m, otherwise drum
Please specify the preferred type of packaging (e.g. 1 x 500 m drum or 5 x 100 m coils).
Photographs are not to scale and do not represent detailed images of the respective products.

Similar products

- ÖLFLEX® TRAIN 345 C 600V

Accessories

- SKINTOP® GMP-HF-M
- SKINTOP® ST-HF-M

ÖLFLEX® TRAIN 361 1,8kV

Single-core cable according to EN 50264-3-1 type M for high requirements in railway applications

Info

- Meets EN 50264-3-1 type M and EN 45545-2
- High temperature resistance: -45°C up to 90°C
- Highly oil- and fuel-resistant

Benefits

- Good chemical resistance
- Resistant to mechanical influences in harsh environmental conditions
- Extended temperature range
- Reduced flame spreading increase the protection against damage to persons and property in the event of a fire

Application range

- For use in railway vehicles and buses, for fixed installations and applications where limited movement may occur
- Suitable for connecting lamps, heating equipment, switchgear, terminal boxes and power supply
- Also applicable within oily environments and areas with increased ambient temperature.

Product features

- Fire behaviour according to EN/IEC:
  - Halogen-free acc. to EN 60754-1
  - No corrosive gases acc. to EN 60754-2
  - No fluorine acc. to EN 60684-2
  - No toxic gases acc. to EN 50305
  - Low smoke density acc. to EN 61034-2
  - Flame-retardant acc. to EN 60332-1-2
  - No flame propagation acc. to EN 60332-3-24 / EN 60332-3-25
- Fire behaviour according to NF:
  - Toxicity of gases acc. to NF X 70-100
  - Low smoke density acc. to NF X 10-702
  - No flame propagation acc. to NF C 32-070, Cat. C1 and C2
- Chemical properties:
  - Oil resistant acc. to EN 50264-3-1
  - Fuel resistant acc. to EN 50264-3-1
  - Acid resistant acc. to EN 50264-3-1
  - Alkali resistant acc. to EN 50264-3-1
  - Ozone resistant acc. to EN 50264-3-1/ EN 50305)

Norm references / Approvals

- EN 50264-3-1 type M
- EN 45545-2 HL1, HL2, HL3
- NF F 16-101 - Classification: C / F1 (flame propagation / smoke)

Product Make-up

- Tinned-copper strand, fine-wire
- Insulation: Electron beam cross-linked Polymer compound EI 109
- Colour: Black

Technical data

Classification
ETIM 5.0 Class-ID: EC000993
ETIM 5.0 Class-Description: Single core cable

Conductor stranding
Fine-wired/ Finely stranded according to IEC 60228, conductor class 5

Minimum bending radius
Fixed installation:
≤ 12 mm: 3 x OD
> 12 mm: 4 x OD
Occasional flexing:
≤ 12 mm: 4 x OD
> 12 mm ≤ 20 mm: 5 x OD
> 20 mm: 6 x OD
(OD = outer diameter)

Nominal voltage
U_0/U AC 1.8/3 kV
U_m AC 3,6 kV
V_0 DC 2,7 kV

Test voltage
6,5 kV AC; 15 kV DC

Temperature range
Fixed installation:
-45°C to +90°C
Occasional flexing:
-35°C to +90°C
Short circuit: +200°C (5s)

Article number	Conductor cross-section (mm²)	Outer diameter (mm)	Copper index (kg/km)	Weight (kg/km)
ÖLFLEX® TRAIN 361 1,8kV				
15361000	1.5	5.6	14.4	47.5
15361001	2.5	6.0	24	61.3
15361002	4	6.7	38.4	80.4
15361003	6	7.2	57.6	105
15361004	10	8.2	96	152.6
15361005	16	9.2	153.6	224
15361006	25	10.5	240	322.7
15361007	35	11.7	336	431
15361008	50	13.7	480	592.2
15361009	70	15.4	672	801.4
15361010	95	17.8	912	1075.5
15361011	120	19.4	1152	1328.9
15361012	150	21.4	1440	1634
15361013	185	23.3	1776	2011.4
15361014	240	26.8	2304	2570.5
15361015	300	28.0	2880	3175.6

Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request.
Packaging size: coil ≤ 30 kg or ≤ 250 m, otherwise drum
Please specify the preferred
Photographs are not to scale and do not represent detailed images of the respective products.

Similar products

- ÖLFLEX® TRAIN 371 1,8kV

ÖLFLEX® TRAIN 371 1,8kV

Single-core cable according to EN 50264-3-1 type MM for high requirements in railway applications

Info

- Meets EN 50264-3-1 type MM and EN 45545-2
- High temperature resistance: -45°C up to 90°C
- Highly oil- and fuel-resistant

Benefits

- High electrical strength and mechanical durability due to dual-layer cable construction
- Good chemical resistance
- Resistant to mechanical influences in harsh environmental conditions
- Extended temperature range
- Reduced flame spreading increase the protection against damage to persons and property in the event of a fire

Application range

- For use in railway vehicles and buses, for fixed installations and applications where limited movement may occur
- Suitable for wiring of control cabinets, distributors, converters, motors and batteries
- Also applicable within oily environments and areas with increased ambient temperature.

Product features

- Fire behaviour according to EN/IEC:
  - Halogen-free acc. to EN 60754-1
  - No corrosive gases acc. to EN 60754-2
  - No fluorine acc. to EN 60684-2
  - No toxic gases acc. to EN 50305
  - Low smoke density acc. to EN 61034-2
  - Flame-retardant acc. to EN 60332-1-2
  - No flame propagation acc. to EN 60332-3-24 / EN 60332-3-25
- Fire behaviour according to NF:
  - Toxicity of gases acc. to NF X 70-100
  - Low smoke density acc. to NF X 10-702
  - No flame propagation acc. to NF C 32-070, Cat. C1 and C2
- Chemical properties:
  - Oil resistant acc. to EN 50264-3-1
  - Fuel resistant acc. to EN 50264-3-1
  - Acid resistant acc. to EN 50264-3-1
  - Alkali resistant acc. to EN 50264-3-1
  - Ozone resistant acc. to EN 50264-3-1/ EN 50305)

Norm references / Approvals

- EN 50264-3-1 type MM
- EN 45545-2 HL1, HL2, HL3
- NF F 16-101 - Classification: C / F1 (flame propagation / smoke)

Product Make-up

- Tinned-copper strand, fine-wire
- Insulation: Electron beam cross-linked Polymer compound EI 109
- Outer sheath: electron beam cross-linked polymer-compound EM 104
- Outer sheath colour: Black

Technical data

Classification
ETIM 5.0 Class-ID: EC000057
ETIM 5.0 Class-Description:
Low voltage power cable

Conductor stranding
Fine-wired/ Finely stranded according to IEC 60228, conductor class 5

Minimum bending radius
Fixed installation:
≤ 12 mm: 3 x OD
> 12 mm: 4 x OD
Occasional flexing:
≤ 12 mm: 4 x OD
> 12 mm ≤ 20 mm: 5 x OD
> 20 mm: 6 x OD
(OD = outer diameter)

Nominal voltage
U_0/U AC 1.8/3 kV
U_m AC 3,6 kV
V_0 DC 2,7 kV

Test voltage
6,5 kV AC; 15 kV DC

Temperature range
Fixed installation:
-45°C to +90°C
Occasional flexing:
-35°C to +90°C
Short circuit: +200°C (5s)

Article number	Conductor cross-section (mm²)	Outer diameter (mm)	Copper index (kg/km)	Weight (kg/km)
ÖLFLEX® TRAIN 371 1,8kV				
15371000	1.5	5.8	14.4	56.3
15371001	2.5	6.2	24	66.7
15371002	4	6.9	38.4	89.7
15371003	6	7.4	57.6	115.6
15371004	10	8.8	96	173.3
15371005	16	9.8	153.6	243.6
15371006	25	12.1	240	374.3
15371007	35	13.3	336	487.7
15371008	50	15.3	480	659.4
15371009	70	17.0	672	875.3
15371010	95	19.8	912	1180.3
15371011	120	21.4	1152	1440.6
15371012	150	23.8	1440	1787.7
15371013	185	25.7	1776	2166.2
15371014	240	29.2	2304	2774.8
15371015	300	30.4	2880	3366.8

Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request.
Copper price basis: EUR 150/100 kg. Refer to catalogue appendix T17 for the definition and calculation of copper-related surcharges.
Packaging size: coil ≤ 30 kg or ≤ 250 m, otherwise drum
Please specify the preferred type of packaging (e.g. 1 x 500 m drum or 5 x 100 m coils).
Photographs are not to scale and do not represent detailed images of the respective products.

Similar products

- ÖLFLEX® TRAIN 381 3,6V

Accessories

- SKINTOP® GMP-HF-M
- SKINTOP® ST-HF-M

ÖLFLEX® TRAIN 381 3,6kV

Single-core cable according to EN 50264-3-1 type MM for high requirements in railway applications

Info

- Meets EN 50264-3-1 type MM and EN 45545-2
- High temperature resistance: -45°C up to 90°C
- Highly oil- and fuel-resistant

Benefits

- High electrical strength and mechanical durability due to dual-layer cable construction
- Good chemical resistance
- Resistant to mechanical influences in harsh environmental conditions
- Extended temperature range
- Reduced flame spreading increase the protection against damage to persons and property in the event of a fire

Application range

- For use in railway vehicles and buses, for fixed installations and applications where limited movement may occur
- Suitable for wiring of control cabinets, distributors, converters, motors and batteries
- Also applicable within oily environments and areas with increased ambient temperature.

Product features

- Fire behaviour according to EN/IEC:
  - Halogen-free acc. to EN 60754-1
  - No corrosive gases acc. to EN 60754-2
  - No fluorine acc. to EN 60684-2
  - No toxic gases acc. to EN 50305
  - Low smoke density acc. to EN 61034-2
  - Flame-retardant acc. to EN 60332-1-2
  - No flame propagation acc. to EN 60332-3-24 / EN 60332-3-25
- Fire behaviour according to NF:
  - Toxicity of gases acc. to NF X 70-100
  - Low smoke density acc. to NF X 10-702
  - No flame propagation acc. to NF C 32-070, Cat. C1 and C2
- Chemical properties:
  - Oil resistant acc. to EN 50264-3-1
  - Fuel resistant acc. to EN 50264-3-1
  - Acid resistant acc. to EN 50264-3-1
  - Alkali resistant acc. to EN 50264-3-1
  - Ozone resistant acc. to EN 50264-3-1/ EN 50305)

Norm references / Approvals

- EN 50264-3-1 type MM
- EN 45545-2 HL1, HL2, HL3
- NF F 16-101 - Classification: C / F1 (flame propagation / smoke)

Product Make-up

- Tinned-copper strand, fine-wire
- Insulation: Electron beam cross-linked Polymer compound EI 109
- Outer sheath: electron beam cross-linked polymer-compound EM 104
- Outer sheath colour: Black

Technical data

Classification
ETIM 5.0 Class-ID: EC000057
ETIM 5.0 Class-Description:
Low voltage power cable

Conductor stranding
Fine-wired/ Finely stranded according to IEC 60228, conductor class 5

Minimum bending radius
Fixed installation:
≤ 12 mm: 3 x OD
> 12 mm: 4 x OD
Occasional flexing:
≤ 12 mm: 4 x OD
> 12 mm ≤ 20 mm: 5 x OD
> 20 mm: 6 x OD
(OD = outer diameter)

Nominal voltage
U_0/U AC 3,6/6 kV
U_m AC 7,2 kV
V_0 DC 5,4 kV

Test voltage
11 kV AC; 26 kV DC

Temperature range
Fixed installation:
-45°C to +90°C
Occasional flexing:
-35°C to +90°C
Short circuit: +200°C (5s)

Article number	Conductor cross-section (mm²)	Outer diameter (mm)	Copper index (kg/km)	Weight (kg/km)
ÖLFLEX® TRAIN 381 3,6V				
15381000	2.5	9.0	24	118.1
15381001	4	9.7	38.4	145.8
15381002	6	10.2	57.6	175.7
15381003	10	11.2	96	231.7
15381004	16	12.2	153.6	302.7
15381005	25	14.5	240	445.4
15381006	35	15.7	336	565.6
15381007	50	17.7	480	747
15381008	70	19.4	672	972.1
15381009	95	21.4	912	1249.5
15381010	120	23.4	1152	1556.6
15381011	150	25.4	1440	1895
15381012	185	27.5	1776	2281.1
15381013	240	31.8	2304	2982.2
15381014	300	33.0	2880	3553.6

Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request.
Packaging size: coil ≤ 30 kg or ≤ 250 m, otherwise drum
Please specify the preferred type of packaging (e.g. 1 x 500 m drum or 5 x 100 m coils).
Photographs are not to scale and do not represent detailed images of the respective products.

Accessories

- SKINTOP® GMP-HF-M
- SKINTOP® ST-HF-M

UNITRONIC® TRAIN Cables MVB and WTB

Bus cables for use in railway applications

Application range

- The communication systems WTB (Wire Train Bus) and MVB (Multi Function Vehicle Bus) belong to the socalled TCN (Train Communicaton Network).
- The UNITRONIC® TRAIN Bus cables are designed for use in the TCN according to IEC 61375.
- The cables are electron beam cross linked and fulfill the high requirements of railways. These are espacially the requirements for fire protection according to EN 45545-2.

Product features

- Impedance: 120 ohms
- Tinned copper strands
- Flame retardant
- Low smoke
- High shielding effect
- High data rates
- Halogenfree

Products

Article Designation	Type	Construction
UNITRONIC® TRAIN MVB	MVB	1x2x0.50 mm²
UNITRONIC® TRAIN MVB	MVB	1x2x0.50 mm²+1x0.50 mm²
UNITRONIC® TRAIN MVB	MVB	2x2x0.50 mm²
UNITRONIC® TRAIN MVB	MVB	2x2x0.50 mm²+4x0.25 mm²
UNITRONIC® TRAIN WTB	WTB	1x2x0.75 mm²

ETHERLINE® TRAIN Cables for Ethernet

Ethernet Data cables for use in railway applications

Application range

- The ammount of data to be transmitted in trains is continously increasing. Ethernet provides the needed Data transmission performance for the modern railway technology.
- The ETHERLINE® TRAIN line includes Ethernet cables that are developped to fulfill the high requirements of the railway market.
- The Ethernet cables are available in performance classes from Cat.5e to Cat.7 and allow data transmission rates up to 10 Gbit/s. The cables are electron beam cross linked and provide flame protection according to EN 45545-2.

Product features

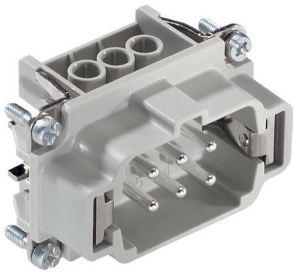
- Impedance: 100 ohms
- Tinned copper strands
- Flame retardant
- Low smoke
- High shielding effect
- High data rates
- Halogenfree

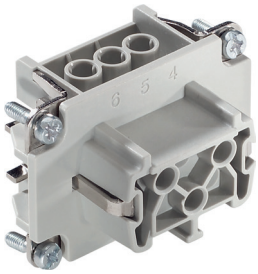
Products

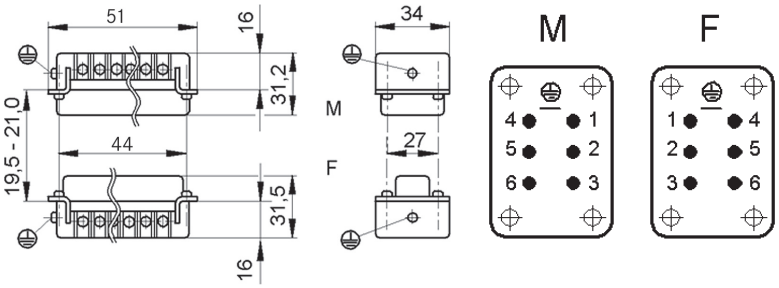
Article Designation	Category	Construction
ETHERLINE® TRAIN FLEX Cat.5e 1x4x22/7 AWG	Cat.5e	1x4x22/7 AWG
ETHERLINE® TRAIN FLEX Cat.5e 1x2x22/7 AWG	Cat.5e	1x2x22/7 AWG
ETHERLINE® TRAIN FLEX Cat.5e 1x4x0.5	Cat.5e	1x4x0.5
ETHERLINE® TRAIN FLEX Cat.6_A 4x2x24/7 AWG	Cat.6_A	4x2x24/7 AWG
ETHERLINE® TRAIN FLEX Cat.7 4x2x24/7 AWG	Cat.7	4x2x24/7 AWG

EPIC® H-BE 6 Screw termination

The proven standard inserts for easy assembly







Info

- Proven screw for easy installation
- Inserts for railway applications
  - Fire protection on railway vehicles
  Approval acc. to DIN EN 45545-2:2013
- Certified from April 2016
- Futher contact configurations and inserts see www.lappgroup.com

Benefits

- Standard inserts with screw, crimp cage clamp and Push-In termination
- The EPIC® H-BE series is suitable for applications that require a reliable connection when working with high voltages and currents

Application range

- Mechanical engineering
- Light & sound technology
- Plastics industry

Suitable housing

- EPIC® ULTRA H-B 6
- EPIC® H-B 6 Housings
- EPIC® QUICK & EASY Mounting system
- Refer to Selection Table A10 main catalogue 2016/17 page 1100 to select the required inserts and housings

Suitable tools

- PEW 8.186 crimping pliers refer to page 1015
- MULTICRIMP 6 crimping pliers
- Kraftform® adjustable torque screwdriver/ Kraftform Kompakt® Set refer to main catalogue 2016/17 page 1078
- Recommended crimping tool when conductor end-sleeves are used: MULTICRIMP 6

Technical data

ETIM 5.0 Class-ID: EC000438
ETIM 5.0 Class-Description: Contact insert for industrial connectors

Rated voltage (V)
IEC: 500 V
UL: 600 V
CSA: 600 V

Rated impulse voltage
6 kV

Rated current (A)
IEC: 16 A
UL: 16 A
CSA: 16 A

Degree of soiling
3

Contact resistance
< 2 mOhm

Contacts
Copper alloy, hard silver-plated

Number of contacts
6 + PE

Termination methods
Screw termination: 0.5 - 2.5 mm²

Stripping length (mm)
8

Cycle of mechanical operation
100

VDE-tested
Certified production control:
VDE-REG. no.: B437
UL-tested:
UL File Number: E75770

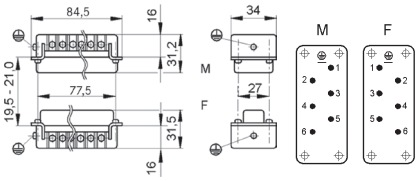
Temperature range
-40°C to +100°C,
short-term up to +125°C

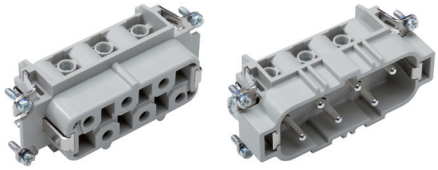
Article number	Article description	Contact type	Wire protection	Number of operating contacts	Pieces / PU
H-BE 6 screw termination					
10190000	EPIC® H-BE 6 SS	male	yes	1 - 6	10
10191000	EPIC® H-BE 6 BS	female	yes	1 - 6	10
10190100	EPIC® H-BE 6 SS	male		1 - 6	10
10191100	EPIC® H-BE 6 BS	female		1 - 6	10

Photographs are not to scale and do not represent detailed images of the respective products.

EPIC® H-BS 6

Inserts for high currents.



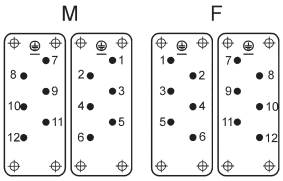


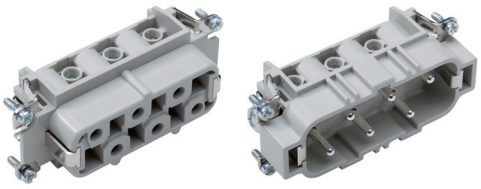
Info

- Standard insert for currents up to 35A
- Inserts for railway applications
  - Fire protection on railway vehicles
  Approval acc. to DIN EN 45545-2:2013
- Certified from April 2016
- Futher contact configurations and inserts see www.lappgroup.com

EPIC® H-BS 12

Inserts for high currents.





Benefits

EPIC® H-BS 6

- High rating for currents up to 35 A
- Screw termination up to a conductor cross section of 6 mm²

EPIC® H-BS 12

- High rating for currents up to 35 A
- Screw termination up to a conductor cross section of 6 mm²
- Two H-BS 6 inserts with different contact-numbering for one housing.

Application range

- Plant engineering
- Mechanical engineering
- Drive systems

Suitable housing

EPIC® H-BS 6

- EPIC® ULTRA H-B 16
- EPIC® H-B 16 Housings
- EPIC® QUICK & EASY Mounting system

EPIC® H-BS 12

- EPIC® ULTRA H-B 16
- Refer to Selection Table A10 main catalogue 2016/17 page 1100 to select the required inserts and housings

Suitable tools

- Kraftform® adjustable torque screwdriver/ Kraftform Kompakt® Set refer to main catalogue 2016/17 page 1078

Technical data

ETIM 5.0 Class-ID: EC000438
ETIM 5.0 Class-Description: Contact insert for industrial connectors

Rated voltage (V)
IEC: 500 V
UL: 600 V
CSA: 600 V
Conductor - conductor: 690 V

Rated impulse voltage
6 kV

Rated current (A)
IEC: 35 A
UL: 35 A
CSA: 35 A

Degree of soiling
3

Contact resistance
< 2 mOhm

Contacts
Copper alloy, hard silver-plated

Number of contacts
EPIC® H-BS 6
6 + PE
EPIC® H-BS 12
12 + PE

Termination methods
Screw termination: 0.5 - 6 mm²

Stripping length (mm)
8

Cycle of mechanical operation
100

VDE-tested
Certified production control:
VDE-REG. no.: B437
UL-tested:
UL File Number: E75770

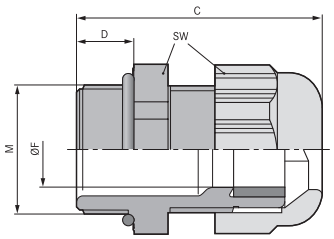
Temperature range
-40°C to +100°C,
short-term up to +125°C

Article number	Article description	Contact type	Wire protection	Number of operating contacts	Pieces / PU
H-BS 6 screw termination					
10170000	H-BS 6 SS	male	yes	1 - 6	5
10171000	H-BS 6 BS	female	yes	1 - 6	5
H-BS 12 screw termination					
10170600	H-BS 6 SS	male	yes	7 - 12	5
10171600	H-BS 6 BS	female	yes	7 - 12	5

Photographs are not to scale and do not represent detailed images of the respective products.

SKINTOP® ST-HF-M

SKINTOP® halogen-free



Info

- Cable gland for railway applications
  - Fire protection on railway vehicles
  Approval according to DIN EN 45545-2:2013

Benefits

- Maximum reliability
- Extremely flame-retardant according to UL 94 V0
- Completely halogen-free (including sealing material)
- Self-extinguishing, no dripping
- Permanent vibration protection

Application range

- When the protection of people and property is a priority
- Public buildings
- Ventilation systems
- Tunnel construction
- Underground railways and trains

Norm references / Approvals

- DIN EN 45545-2:2013

Product Make-up

- Metric connection thread acc. to DIN EN 60423
- Basis for technical information EN 50262

Technical data

Classification
ETIM 5.0 Class-ID: EC000441
ETIM 5.0 Class-Description:
Cable screw gland

Caution
Refer to Appendix T21 for the installation dimensions and torques

Colour delivered
Light grey (RAL 7035)

Material
Polyamide UL 94V-0 - halogen-free
Sealing ring: LSE 1 - halogen-free
O-ring: LSE 1 - halogen-free

Tests
Filament wire test
EN 60695-2-1/1 +960°C

Protection rating
IP 68 - 5 bar

Temperature range
-20°C to +100°C

Article number	Article designation / size	Clamping range ØF (mm)	SW wrench size mm	Overall length, C (mm)	Thread length, D (mm)	Pieces / PU
SKINTOP® ST-HF-M						
53111407	ST-HF-M 12 x 1,5	3,5-7	15	30.0	8	100
53111417	ST-HF-M 16 x 1,5	4,5-9	19	34.0	8	100
53111427	ST-HF-M 20 x 1,5	7-13	25	37.0	9	100
53111437	ST-HF-M 25 x 1,5	9-17	30	40.0	10	50
53111447	ST-HF-M 32 x 1,5	11-21	36	47.0	10	25
53111457	ST-HF-M 40 x 1,5	19-28	46	52.0	10	10
53111467	ST-HF-M 50 x 1,5	27-35	55	62.0	12	5
53111477	ST-HF-M 63 x 1,5	34-45	66	71.0	12	5

Photographs are not to scale and do not represent detailed images of the respective products.

Accessories

- SKINTOP® GMP-HF-M

SKINTOP® GMP-HF-M

Benefits

- Halogen-free
- Extremely flame-retardant according to UL 94 V0
- Self-extinguishing, no dripping

Application range

- For locking SKINTOP® cable glands in boreholes without thread.
- Airports
- Tunnel construction
- Underground railways
- Public buildings

Product Make-up

- Metric connection thread acc. to DIN EN 60423
- Basis for technical information EN 50262

Note

- Designed for use with SKINTOP® ST-HF-M

Info

- Cable gland for railway applications
  - Fire protection on railway vehicles
  Approval according to DIN EN 45545-2:2013

Technical data

Classification
ETIM 5.0 Class-ID: EC000441
ETIM 5.0 Class-Description:
Cable screw gland

Colour delivered
Light grey (RAL 7035)

Material
Polyamide UL 94V-0 - halogen-free

Temperature range
-20°C to +100°C

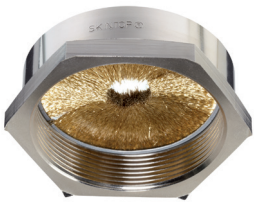
Article number	Article designation / size	SW wrench size mm	PU
SKINTOP® GMP-HF-M			
53119200	12 x 1,5	17	100
53119210	16 x 1,5	22	100
53119220	20 x 1,5	27	100
53119230	25 x 1,5	34	100
53119240	32 x 1,5	41	100
53119250	40 x 1,5	50	25
53119260	50 x 1,5	60	25
53119270	63 x 1,5	75	25

Photographs are not to scale and do not represent detailed images of the respective products.

Accessories

- SKINTOP® ST-HF-M

SKINTOP® BRUSH ADD-ON



Benefits

- Optimum, low-resistance 360° screen contact
- Cutting edges cut through the insulating layer of the housing or switch cabinets, thus guaranteeing an optimum EMC contact
- Easy disassembling
- Visible, large-scale screen contact
- Uncomplicated and reliable

Application range

- For EMC-compliant earthing of the copper braiding, or for cables with copper shaft sheath
- For EMC-contact at through bore-holes
- For use in railway vehicles and buses, for fixed installations and applications where limited movement may occur
- Suitable for connecting lamps, heating equipment, switchgear, terminal boxes and power supply
- Also applicable within oily environments and areas with increased ambient temperature.

Product Make-up

- Metric connection thread acc. to DIN EN 60423
- Basis for technical information EN 50262

Info

- Innovative EMC add-on for SKINTOP® ST(R)-M polyamide cable glands.
- Worlds first patented active EMC lock-nut!

Technical data

Classification
ETIM 5.0 Class-ID: EC000441
ETIM 5.0 Class-Description: Cable screw gland

Caution
Refer to Appendix T21 for the installation dimensions and torques
Apply SKINTOP® ST-M torques

Certifications
UL pending

Material
Body: nickel-plated brass
EMC brush: brass

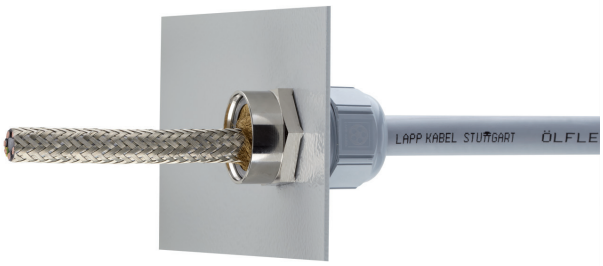
Temperature range
Dynamic: -20°C to +100°C
Depending on the combination of the used cable gland

Article number	Article designation / size	Minimum Ø above braiding (mm)	SW wrench size mm	Thread length, D (mm)	Pieces / PU
SKINTOP® BRUSH ADD-ON					
54110839	M 12 x 1,5	4	24	10	25
54110840	M 16 x 1,5	5	24	10	25
54110841	M 20 x 1,5	5	24	10	10
54110842	M 25 x 1,5	5	30	10	10
54110843	M 32 x 1,5	8	39	12	10
54110844	M 40 x 1,5	10	47	12	5
54110845	M 50 x 1,5	14	56	12	5
54110846	M 63 x 1,5	14	63	12	5

Photographs are not to scale and do not represent detailed images of the respective products.

Accessories

- SKINTOP® BS-M
- SKINTOP® ST-M
- SKINTOP® STR-M
- SKINTOP® ST-HF-M
- SKINTOP® COLD
- SKINTOP® COLD-R



SILVYN® HFX-V0

Benefits

- Impact-resistant
- Robust
- Abrasion protection
- High resistance to oil, petrol, acids and greases
- Liquidtight

Application range

- For use in railway vehicles and buses, for fixed installations and applications where limited movement may occur
- Also applicable within oily environments and areas with increased ambient temperature.

Product features

- UV-resistant
- Halogen-free and flame-retardant
- High mechanical and chemical resistance

Product Make-up

- Spirally-wound heavy metal protective conduit with interlocked profile
- PUR outer sheath

Technical data

ETIM 5.0 Class-ID: EC001179
ETIM 5.0 Class-Description:
Protective metallic hose

Certifications
EN 45545-2 HL1 + HL2
NF F 16-101 I3/F1
EN ISO 11925-2

Colour delivered
Black

Material
Metal with PUR sheath
Fire behaviour according to UL 94V-0

Temperature range
-50 °C to +105 °C
Short-term up to +125 °C

Article number	Nominal size	ID x OD mm	Bending radius (mm)	PU ring (m)
SILVYN® HFX-V0				
64400248	5/16”	10.1 x 14.4	65	30
64400241	3/8”	12.6 x 17.8	85	30
64400253	1/2”	16.0 x 21.1	110	30
64400242	3/4”	21.0 x 26.4	140	30
64400243	1”	26.5 x 33.1	170	30
64400244	1 1/4”	35.1 x 41.8	215	15
64400245	1 1/2”	40.3 x 47.8	250	15
64400246	2”	51.6 x 59.9	300	15

* Trade product, no Lapp product
Photographs are not to scale and do not represent detailed images of the respective products.

Accessories

- SILVYN® COMPACT M
- SILVYN® COMPACT PG
- SILVYN® COMPACT NPT
- SILVYN® LTP-E

SILVYN® COMPACT M



Info

- Space-saving due to compact dimensions

Benefits

- Space-saving application
- For high mechanical stress
- High tensile strength
- Corrosion-resistant

Application range

- In combination with protective conduit SILVYN® HFX

Product Make-up

- Metric connection thread
- Hexagonal collar
- Threaded sleeve
- Cap nut

Technical data

ETIM 5.0 Class-ID: EC001180
ETIM 5.0 Class-Description: Screw connection for protective metallic hose

On request
Available in stainless steel

Material
Body: nickel-plated brass
Sealing: polyamide
O-ring: NBR

Protection rating
IP 66
IP 67
NEMA 4X

Temperature range
-45 °C to +105 °C

Article number	Metric size	Clear opening	Suitable for SILVYN® HFX	Pieces / PU
SILVYN® COMPACT M				
61803846	16 x 1,5	8.5	5/16“	10
61803800	16 x 1,5	11.0	3/8“	10
61803847	20 x 1,5	8.5	5/16“	10
61803801	20 x 1,5	11.0	3/8“	10
61803802	20 x 1,5	14.5	1/2“	10
61803803	25 x 1,5	19.4	3/4“	5
61803804	32 x 1,5	24.7	1“	5
61803805	40 x 1,5	33.3	1 1/4“	5
61803806	50 x 1,5	38.0	1 1/2“	2
61803807	63 x 1,5	49.0	2“	2
SILVYN® COMPACT 45° M				
61803848	16 x 1,5	8.5	5/16“	10
61803850	16 x 1,5	11.0	3/8“	10
61803849	20 x 1,5	8.5	5/16“	10
61803851	20 x 1,5	11.0	3/8“	10
61803852	20 x 1,5	14.5	1/2“	10
61803853	25 x 1,5	19.4	3/4“	5
61803854	32 x 1,5	24.7	1“	5
SILVYN® COMPACT 90° M				
61803808	16 x 1,5	11.0	3/8“	10
61803809	20 x 1,5	11.0	3/8“	10
61803810	20 x 1,5	14.5	1/2“	10
61803811	25 x 1,5	19.4	3/4“	5
61803812	32 x 1,5	24.7	1“	5
61803813	40 x 1,5	33.3	1 1/4“	5
61803814	50 x 1,5	38.0	1 1/2“	2
61803815	63 x 1,5	49.0	2“	2

Photographs are not to scale and do not represent detailed images of the respective products.

Accessories

- SKINDICHT® SM-M

SILVYN® FCE -V0

Benefits

- The flexible conduit design enables small bending radii and is ideally suited for space-saving installations where space is limited in dry and damp interiors, as well as for outdoor applications
- High resistance to oil, petrol, acids and greases
- Liquidtight

Application range

- For use in railway vehicles and buses, for fixed installations and applications where limited movement may occur
- Also applicable within oily environments and areas with increased ambient temperature.

Product features

- UV-resistant
- Halogen-free and flame-retardant
- High mechanical and chemical resistance

Product Make-up

- Spirally-wound metal protective conduit with interlocked profile
- PUR outer sheath

Technical data

ETIM 5.0 Class-ID: EC001179
ETIM 5.0 Class-Description:
Protective metallic hose

Certifications
EN 45545-2 HL1 + HL2

Colour delivered
Black

Material
Metal with PUR sheath
Fire behaviour according to UL 94V-0

Temperature range
-50 °C to +105 °C
Short-term up to +125 °C

Article number	Nominal size	ID x OD mm	Bending radius (mm)	PU ring (m)
SILVYN® FCE-V0				
61814708	12	10.0 x 14.0	50	25
61814709	16	13.0 x 17.0	60	25
61814710	20	17.0 x 21.5	80	25
61814711	25	21.2 x 26.0	100	25
61814712	32	28.1 x 34.0	125	25
61814713	40	37.7 x 44.5	160	10
61814714	50	48.4 x 55.5	190	10

* Trade product, no Lapp product
Photographs are not to scale and do not represent detailed images of the respective products.

Accessories

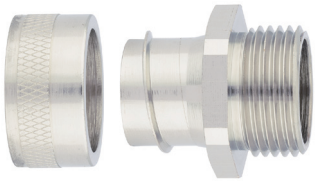
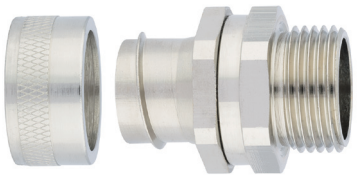
- SILVYN® FCE-M

SILVYN® FCE-M

Info

- Space-saving due to compact dimensions



Benefits

- High mechanical stability
- High tensile strength
- Space-saving application
- Corrosion-resistant

Application range

- In combination with protective conduit:
- Suitable for SILVYN® FCE

Product Make-up

- Metric connection thread
- Hexagonal collar
- Threaded sleeve
- Cap nut

Technical data

ETIM 5.0 Class-ID: EC001180
ETIM 5.0 Class-Description: Screw connection for protective metallic hose

Material
SILVYN® FCE COMPACT
Metal parts: nickel-plated brass
Sealings: NBR
SILVYN® FCE-F, FCE-S
Nickel-plated brass

Protection rating
SILVYN® FCE COMPACT: IP 68
SILVYN® FCE-F, FCE-S: IP 54

Temperature range
SILVYN® FCE COMPACT:
-45°C to +105°C
SILVYN® FCE-F, FCE-S:
-55°C to +260°C

Article number	Metric size	Clear opening	Suitable for SILVYN® FCE	Pieces / PU
SILVYN® FCE COMPACT M				
55503624	12 x 1,5	8.5	12	10
55503625	16 x 1,5	11.2	16	10
55503626	20 x 1,5	11.2	16	10
55503627	20 x 1,5	15.2	20	10
55503628	25 x 1,5	19.2	25	5
61803855	32 x 1,5	25.9	32	5
61803856	40 x 1,5	34.5	40	2
SILVYN® FCE COMPACT 90° M				
61803860	16 x 1,5	11.2	16	10
61803861	20 x 1,5	11.2	16	10
61803862	20 x 1,5	15.2	20	10
61803863	25 x 1,5	19.2	25	5
61803864	32 x 1,5	25.9	32	5
SILVYN® FCE-F M				
55503602	12 x 1,5	8.5	12	10
55503603	16 x 1,5	8.5	12	10
55503604	16 x 1,5	11.2	16	10
55503605	20 x 1,5	11.2	16	10
55503606	20 x 1,5	15.2	20	10
55503607	25 x 1,5	19.2	25	5
55503608	32 x 1,5	25.9	32	5
55503609	40 x 1,5	34.8	40	2
55503610	50 x 1,5	44.8	50	2
55503611	63 x 1,5	44.8	50	2
SILVYN® FCE-S M				
55503614	12 x 1,5	8.5	12	10
55503615	16 x 1,5	8.5	12	10
55503616	16 x 1,5	11.2	16	10
55503617	20 x 1,5	11.2	16	10
55503618	20 x 1,5	15.2	20	10
55503619	25 x 1,5	19.2	25	5
55503620	32 x 1,5	25.9	32	5
55503621	40 x 1,5	34.8	40	2
55503622	50 x 1,5	44.8	50	2
55503623	63 x 1,5	44.8	50	2

Photographs are not to scale and do not represent detailed images of the respective products.

SILVYN® HIPROJACKET / SILVYN® HIPROSILTAPE

Info

- Outstanding protection for extreme impact of heat

SILVYN® HIPROJACKET

SILVYN® HIPROSILTAPE

Benefits

- Heat-resistant
- Flexible
- Temporarily reduces the temperature in the conduit by up to 30 %
- The protection rating increases to IP67 if SILVYN® HIPROSILTAPE is also used

Application range

- For use in railway vehicles and buses, for fixed installations and applications where limited movement may occur
- Also applicable within oily environments and areas with increased ambient temperature.
- Used in areas where cables and wires are exposed to extreme heat

Product Make-up

SILVYN® HIPROJACKET

- Woven glass fibre conduit
- Iron oxide silicone coat

Technical data

Certifications
SILVYN® HIPROJACKET
EN 45545-2 HL1 / HL2 / HL3
NF F 16-101 I2/F1
NF EN ISO 11925-2
DIN 5510-2 S4/SR2/ST2
SAE AS 1072 Type 2

On request
SILVYN® HIPROJACKET
Other sizes, lengths and colours are available upon request

Colour delivered
Red

Material
SILVYN® HIPROJACKET
Glass fibre with iron oxide silicone coat
LOI 39,2
SILVYN® HIPROSILTAPE
Silicone-rubber compound, self-vulcanising, halogen-free

Protection rating
SILVYN® HIPROJACKET
IP 54 in combination with SILVYN® HIPROJACKET AMG fitting
IP 67 if SILVYN® HIPROSILTAPE is also used

Temperature range
SILVYN® HIPROJACKET
-55°C to +260 °C permanent temp.
+800°C for approx. 20 min (flame treatment)
+800°C for approx. 20 min (radiation heat)
+1640°C for approx. 15-30 sec (liquid-metal contact)
SILVYN® HIPROSILTAPE
-55°C to +260 °C permanent temp.

Article number	Nominal size	ID x OD mm	Suitable gland size	PU ring (m)
SILVYN® HIPROJACKET				
52021385	6	6.0 x 15.0		15
61713003	10	10.0 x 15.0	M16 + PG 9, PG 11, PG 13.5	15
61713005	13	13.0 x 18.0	M16, M20 + PG 9, PG 11, PG 13.5, PG 16	15
61713007	16	16.0 x 22.0	M20 + PG 16	15
61713010	19	19.0 x 25.0	M25 + PG 21	15
61713011	22	22.0 x 28.0	M25 + PG 21	15
61713000	25	25.0 x 31.0	M32 + PG 29	15
61713014	29	29.0 x 35.0		15
61713015	32	32.0 x 38.0	M40 + PG 36	15
61713016	35	35.0 x 41.0	M40 + PG 36	15
61713017	38	38.0 x 44.0	M50 + PG 42	15
61713018	41	41.0 x 47.0		15
61713021	44	44.0 x 50.0		15
61713019	51	51.0 x 57.0	M63 + PG 48	15
61713022	57	57.0 x 63.0		15
61713025	64	64.0 x 70.0		15
61713027	70	70.0 x 76.0		15
61713028	76	76.0 x 82.0		15
61713029	83	83.0 x 89.0		15
61713037	89	89.0 x 95.0		15
61713038	95	95.0 x 101.0		15
61713039	102	102.0 x 108.0		15
SILVYN® HIPROSILTAPE				
61713040	25	25.0 x 0.5		11

Photographs are not to scale and do not represent detailed images of the respective products.

SILVYN® HIPROJACKET AMG

Info

- Suitable fitting for use with SILVYN® HIPROJACKET

Benefits

- High tensile strength
- For high mechanical stress
- 45° and 90° elbow enables optimal assembly

Application range

- In combination with protective conduit SILVYN® HIPROJACKET

Product Make-up

- Connection thread metric/PG
- Hexagonal collar, straight/45° elbow/90° elbow
- Threaded sleeve
- Cap nut

Technical data

ETIM 5.0 Class-ID: EC001180
ETIM 5.0 Class-Description: Screw connection for protective metallic hose

Material
Body: nickel-plated brass
Clamping ring: nickel-plated brass
O-ring: NBR

Protection rating
IP 54
IP 67 if SILVYN® HIPROSILTAPE is also used

Temperature range
-45°C to +105°C

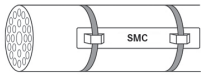
Article number	Metric size	PG size	Clear opening	Pieces / PU
SILVYN® HIPROJACKET AMG M				
55503516	16 x 1.5		10.2	50
55503517	20 x 1.5		13.9	50
55503518	25 x 1.5		18.5	25
55503519	32 x 1.5		23.8	10
55503520	40 x 1.5		31.8	5
55503521	50 x 1.5		36.8	5
55503522	63 x 1.5		47.8	4
SILVYN® HIPROJACKET AMG 45° M				
55503523	16 x 1.5		10.2	50
55503524	20 x 1.5		13.9	50
55503525	25 x 1.5		18.5	25
55503526	32 x 1.5		23.8	10
55503527	40 x 1.5		31.8	5
55503528	50 x 1.5		36.8	5
55503529	63 x 1.5		47.8	4
SILVYN® HIPROJACKET AMG 90° M				
55503530	16 x 1.5		10.2	50
55503531	20 x 1.5		13.9	50
55503532	25 x 1.5		18.5	25
55503533	32 x 1.5		23.8	10
55503534	40 x 1.5		31.8	5
55503535	50 x 1.5		36.8	5
55503536	63 x 1.5		47.8	4
SILVYN® HIPROJACKET AMG PG				
55503537		9	10.2	50
55503538		11	10.2	50
55503539		13.5	10.2	50
55503540		16	13.9	50
55503541		21	18.5	25
55503542		29	23.8	10
55503543		36	31.8	5
55503544		42	36.8	5
55503499		48	47.8	4
SILVYN® HIPROJACKET AMG 45° PG				
55503500		11	10.2	50
55503501		13.5	10.2	50
55503502		16	13.9	50
55503503		21	18.5	25
55503504		29	23.8	10
55503505		36	31.8	5
55503506		42	36.8	5
55503507		48	47.8	4
SILVYN® HIPROJACKET AMG 90° PG				
55503508		11	10.2	50
55503509		13.5	10.2	50
55503510		16	13.9	50
55503511		21	18.5	25
55503512		29	23.8	10
55503513		36	31.8	5
55503514		42	36.8	5
55503515		48	47.8	4

Photographs are not to scale and do not represent detailed images of the respective products.

FLEXIMARK® Stainless steel marking FCC

Info

- Contained in FLEXIMARK® sample bag (article number M3251010)



Benefits

- Customised stainless steel cable and component marking
- Markers are sorted prior to delivery
- No time-consuming preparation and installation
- Acid-resistant
- Diverse criteria as ageing resistance and chemical resistance are tested by the independent SP Technical Research Institute of Sweden according to SP 2171 Test Method (see selection table A15)

Application range

- Cable and component marking system
- Markers will be delivered with the desired text (printing service is included in the price)
- For use in railway vehicles and buses, for fixed installations and applications where limited movement may occur

Product features

- For fastening with cable ties (LS) up to a width of 7.9 mm
- Included cable ties in article no.83251406, 83251456, 83251426, 83251468: Stainless steel cable ties LS 4,6-200 (article no.61812950)

Norm references / Approvals

- Achilles JQS certified

Note

- **Ordering process:** Customised data will be emailed as an Excel file to the responsible Lapp employee when the order is made
  - Column A: Text for the first row
  - Column B: Text for the second row
  - Column B or C: Amount of each text
- Length of the markers is depending on the number of characters
- The column “number of characters” refers to the quanity in one line (the maximum amount of characters for a two-line embossing is 30-max.15 per line)
- All characters are printed in capital letters

Included

- 1 PU= 1 marker, there is no mimimum purchase quantity

Suitable tools

- STEEL GUN HT-338 cable tie pliers

Technical data

ETIM 5.0 Class-ID: EC001288
ETIM 5.0 Class-Description: Labelling material

Dimensions
Character size (height): 4.5 mm
Diameter borehole: 3,2 mm

On request
Blank version available upon request

Note
Gap between characters: approximately 1 mm

Info
Available characters: A-Ö, 0-9,+-/:;= -.
X Earthing sign

Material
Acid resistant stainless steel EN 1.4404 (SS2348, AISI 316L)

Temperature range
-80°C to +500°C

Article number	Article designation	Height (mm)	Product Make-up	Number of characters	Number of markers per PU
One line embossing/with cable tie brackets					
83251406	FLEXIMARK® Stainless SMC FCC LS200 0-15	9.9	with cable tie	0-15	1
83251456	FLEXIMARK® Stainless SMC FCC LS200 16-25	9.9	with cable tie	16-25	1
83251402	FLEXIMARK® Stainless SMC FCC 0-15	9.9	without cable tie	0-15	1
83251454	FLEXIMARK® Stainless SMC FCC 16-25	9.9	without cable tie	16-25	1
One line embossing/with screw hole					
83251450	FLEXIMARK® Stainless SM FCC 0-15	9.9	with screw hole	0-15	1
83251478	FLEXIMARK® Stainles SM FCC 16-25	9.9	with screw hole	16-25	1
Two-line embossing/with cable tie brackets*					
83251426	FLEXIMARK® Stainless SMC2R FCC LS200 0-15	13.9	with cable tie	0-15	1
83251468	FLEXIMARK® Stainless SMC2R FCC LS200 16-25	13.9	with cable tie	16-25	1
83251422	FLEXIMARK® Stainless SMC2R FCC 0-15	13.9	without cable tie	0-15	1
83251466	FLEXIMARK® Stainless SMC2R FCC 16-25	13.9	without cable tie	16-25	1
Two-line embossing/with screw hole					
83251451	FLEXIMARK® Stainless SM2R FCC 0-15	13.9	with screw hole	0-15	1
83251479	FLEXIMARK® Stainless SM2R FCC 16-25	13.9	with screw hole	16-25	1

Photographs are not to scale and do not represent detailed images of the respective products.
Blank markers could be found on the product page “SP Metalprint” (article no. 83251575 und 83251576).

Similar products

- FLEXIMARK® Stainless steel kit
- SP Metal print

Accessories

- STEEL GUN HT-338 cable tie pliers
- LS steel cable ties

FLEXIMARK® Organized shrink tube

Benefits

- Covers a wide range of cable diameters, even applicable for single core marking
- Already cut to the exact length
- Reduced working time
- UV-resistant, resistant against fluids (SAE-AMS-DTL-23053 tested)

Application range

- For single core and cable marking
- Can be printed with the FLEXIMARK® thermal transfer printer as CAB A4+M and EOS4
- Perfect for applications with a lack of space, such as rolling stock
- Printing with FLEXIMARK® Software (Download: http://www.lappkabel.com/service/downloadcenter/markingsystem/marking-software.html)

Product features

- Recommended ribbon: FLEXIMARK® Ribbon FTI-X 60-360 BK (article no, 83260206), but could be also printed with FTI-Y 60-360 BK (article no. 83260201)

Norm references / Approvals

- UL 224 approved- E file number: E 228117

Product Make-up

- Delivered as a roll of labels

Technical data

ETIM 5.0 Class-ID: EC001288
ETIM 5.0 Class-Description: Labelling material

On request
Also available as halogen-free und diesel-resistant (with SNCF-NF F00-608 approval) version

Colour delivered
Yellow
White and other colours available on request
Also available in white

Material
Polyolefin
Shrinking ratio: 3:1

Temperature range
-55 °C to +135 °C

Article number	Article designation	Colour	Shrinkage range (mm)	Length (mm)	Amount in width	Number of markers per PU	PU
FLEXIMARK® Organized shrink tube							
83260026	FLEXIMARK® Org.shr. 2.4/0.8-50(1) YE	yellow	0.8 - 2.4	50	1	1000	1
83260027	FLEXIMARK® Org.shr. 3.2/1.0-50(1) YE	yellow	1.0 - 3.2	50	1	1000	1
83260028	FLEXIMARK® Org.shr. 4.8/1.6-50(1) YE	yellow	1.6 - 4.8	50	1	1000	1
83260029	FLEXIMARK® Org.shr. 6.4/2.0-50(1) YE	yellow	2.0 - 6.4	50	1	1000	1
83260030	FLEXIMARK® Org.shr. 9.5/3.0-50(1) YE	yellow	3.0 - 9.5	50	1	500	1
83260031	FLEXIMARK® Org.shr.12.7/4.0-50(1)YE	yellow	4.0 - 12.7	50	1	500	1
83260032	FLEXIMARK® Org.shr.19.0/6.0-50(1)YE	yellow	6.0 - 19.0	50	1	500	1
83260033	FLEXIMARK® Org.shr. 25.4/8.0-50(1)YE	yellow	8.0 - 25.4	50	1	300	1
83260034	FLEXIMARK® Org.shr. 38.1/12.7-75(1)YE	yellow	12.7 - 38.1	75	1	100	1
83260035	FLEXIMARK® Org.shr. 2.4/0.8-38(1) YE	yellow	0.8 - 2.4	38	1	1000	1
83260036	FLEXIMARK® Org.shr. 3.2/1.0-38(1) YE	yellow	1.0 - 3.2	38	1	1000	1
83260037	FLEXIMARK® Org.shr. 4.8/1.6-38(1) YE	yellow	1.6 - 4.8	38	1	1000	1
83260038	FLEXIMARK® Org.shr. 6.4/2.0-38(1) YE	yellow	2.0 - 6.4	38	1	1000	1
83260039	FLEXIMARK® Org.shr. 9.5/3.0-38(1) YE	yellow	3.0 - 9.5	38	1	500	1
83260040	FLEXIMARK® Org.shr.12.7/4.0-38(1)YE	yellow	4.0 - 12.7	38	1	500	1
83260041	FLEXIMARK® Org.shr. 19.0/6.0-38(1)YE	yellow	6.0 - 9.0	38	1	500	1
83260042	FLEXIMARK® Org.shr.25.4/8.0-38(1)YE	yellow	8.0 - 25.4	38	1	300	1
83260043	FLEXIMARK® Org.shr. 38.1/12.7-38(1)YE	yellow	12.7 - 38.1	38	1	100	1
83260044	FLEXIMARK® Org.shr. 2.4/0.8-25(2) YE	yellow	0.8 - 2.4	25	2	2000	1
83260045	FLEXIMARK® Org.shr. 3.2/1.0-25(2) YE	yellow	1.0 - 3.2	25	2	2000	1
83260046	FLEXIMARK® Org.shr. 4.8/1.6-25(2) YE	yellow	1.6 - 4.8	25	2	2000	1
83260047	FLEXIMARK® Org.shr. 6.4/2.0-25(2) YE	yellow	2.0 - 6.4	25	2	2000	1
83260048	FLEXIMARK® Org.shr. 9.5/3.0-25(2) YE	yellow	3.0 - 9.5	25	2	1000	1
83260049	FLEXIMARK® Org.shr. 12.7/4.0-25(2)YE	yellow	4.0 - 12.7	25	2	1000	1
83260050	FLEXIMARK® Org. shr.19.0/6.0-25(2)YE	yellow	6.0 - 19.0	25	2	1000	1
83260051	FLEXIMARK® Org.shr. 5.4/8.0-25(2)YE	yellow	8.0 - 25.4	25	2	600	1

Photographs are not to scale and do not represent detailed images of the respective products.
FLEXIMARK® products are sold in packaging units. As example if you like to order 640 labels of LCK 32 you just need to order 1 PU instead of 640 single labels.

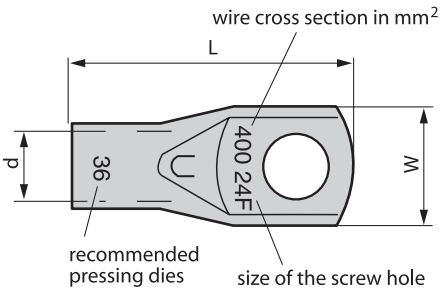
Similar products

- FLEXIMARK® Organized shrink tube FCC

Accessories

- HG 2320 hot-air pistol

Tube cable lugs KRFN



Benefits

- Can be installed via cable glands, allowing pre-assembly
- High-quality electrolytic copper ensures a good crimping quality
- With inspection hole

Application range

- Narrow tube cable lugs for stranded and flexible CU-conductors 50-240 mm², suitable for class 2 and class 5
- Perfect for applications with a lack of space, such as rolling stock

Norm references / Approvals

- In combination with recommended crimp tool fulfill requirments of SS-EN 61238-1, BS 4579:1, VDE 0220:1, EN-IEC 61238:1

Suitable tools

- V 1311-A pressing pliers, hydraulic

Technical data

ETIM 5.0 Class-ID: EC001051
ETIM 5.0 Class-Description:
Tube cable lug for copper conductors

Material
Tinned electrolyte copper

Temperature range
Temperature range up to +90°C
Working temperature: 110°C,
max. +140°C

Article number	Article designation	Screw hole Ø (mm)	UL certification	Length (mm)	Pressing dies	d mm	W mm	Pieces / PU
Tube cable lugs KRFN								
61797400	KRFN 50/6	6	no	51	B 14.5	11	18	100
61797401	KRFN 50/8	8	no	51	B 14.5	11	18	100
61797402	KRFN 50/10	10	no	51	B 14.5	11	18	100
61797403	KRFN 70/6	6	no	56	B 14.5	13	20	50
61797404	KRFN 70/8	8	no	56	B 17	13	20	50
61797405	KRFN 70/10	10	no	56	B 17	13	20	50
61797406	KRFN 95/8	8	no	61	B 20	15	24	50
61797407	KRFN 95/10	10	no	62	B 20	15	24	50
61797408	KRFN 95/12	12	no	64	B 20	15	24	50
61797409	KRFN 120/8	8	no	65	B 22	17	26	50
61797410	KRFN 120/10	10	no	66	B 22	17	26	50
61797411	KRFN 120/12	12	no	68	B 22	17	26	50
61797412	KRFN 150/10	10	no	73	B 25/13 B 25	19	30	50
61797413	KRFN 150/12	12	no	75	B 25/13 B 25	19	30	50
61797414	KRFN 185/10	10	no	80	13 B 27	21	32	25
61797415	KRFN 185/12	12	no	82	13 B 27	21	32	25
61797416	KRFN 185/16	16	no	86	13 B 27	21	32	25
61797417	KRFN 240/10	10	no	84	13 B 30	22.5	38	50
61797418	KRFN 240/12	12	no	84	13 B 30	22.5	38	50

Photographs are not to scale and do not represent detailed images of the respective products.

Similar products

- Tube cable lugs KR/ KRT/ KRF
- Solderless cable lugs KB

Accessories

- T 2288 pressing pliers
- V 1311-A pressing pliers, hydraulic
- DKB 0325 + DKB 0360 crimping pliers
- PVL 1300 pressing pliers battery-operated

Shrink tube PROTECT-M/PROTECT-T

Benefits

- For use in railway vehicles and buses, for fixed installations and applications where limited movement may occur
- High resistance to abrasion, corrosion and chemicals
- Good weather-resistance

Application range

- Thick and medium-wall shrink tubes for 600 V, 90°C low voltage applications in continuous use
- Ideal for the protection of cable joints and terminations in low voltage power applications

Product features

- UV-resistant
- Dielectric strength:
  PROTECT-M: 15 kV/mm
  PROTECT-T: 14 kV/mm

Design

- PROTECT-M = medium wall
- PROTECT-T = thick wall

Included

- Plastic bags with 1.0 m units

Suitable tools

- HG 2320 hot-air pistol

Technical data

ETIM 5.0 Class-ID: EC000217
ETIM 5.0 Class-Description:
Heat-shrink tubing

Note
Non flame-retardant
Double-walled

Info
Shrinking ratio: 3:1
Good UV-resistance

Material
Cross-linked modified polyolefin, with thermoplastic adhesive coating inside
Halogen-free

Temperature range
-40°C to +120°C
Shrinking temperature: +110°C

Article number	Article description	Shrinkage range (mm)	Panel thickness, shrunk +- 0.1 mm	Pieces / PU	PU
Medium wall					
61742460	PROTECT- M 12/3 BK	12.0 - 3.0	2.2	15	1
61742461	PROTECT- M 33/8 BK	33.0 - 8.0	2.6	10	1
61742462	PROTECT- M 40/12 BK	40.0 - 12.0	2.6	5	1
61742463	PROTECT- M 56/17 BK	56.0 - 17.0	3	3	1
61742464	PROTECT- M 92/26 BK	92.0 - 26.0	3.15	1	1
Thick wall					
61742455	PROTECT- T 13,0/4,0 BK	13.0 - 4.0	2.65	25	1
61742456	PROTECT-T 19/6 BK	19.0 - 6.0	2.65	15	1
61742457	PROTECT- T 45/12 BK	45.0 - 13.0	3.7	5	1
61742458	PROTECT- T 52/16 BK	52.0 - 16.0	4.1	3	1
61742459	PROTECT- T 130/45 BK	130.0 - 45.0	4.2	1	1

Shrink tubes from ABB (former Thomas & Betts) are available upon request
Photographs are not to scale and do not represent detailed images of the respective products.

Basic Tie cable tie

Benefits

- High resistance to bases, oils, greases, oil derivates, solvents containing chlorine
- Good UV-resistance of the black cable tie
- High tensile strengths
- For use in railway vehicles and buses, for fixed installations and applications where limited movement may occur

Application range

- Multipurpose cable tie for many applications

Product features

- Flame retardancy: UL 94 class V2
- Water absorption: 2.5 % (50 % relative humidity)
- Dielectric strength: 50,000 volts/mm

Norm references / Approvals

- E-File Numberr: E 86244 (M)

Info

- The standard cable ties for many applications

Technical data

ETIM 5.0 Class-ID: EC000046
ETIM 5.0 Class-Description: Cable tie

Material
Polyamide 6.6
Halogen-free

Temperature range
-40°C to +85°C
Max. temperature: +110°C (short-term)

Article number	Article description	UL certification	Length x width (mm)	Bundling Ø (mm)	Tensile strength (N)	PU
natural						
61831001	Basic Tie 100x2.5 TR	yes	100.0 x 2,5	2.0 - 24.0	110	1000
61831003	Basic Tie 160x2.5 TR	yes	160.0 x 2,5	2.0 - 42.0	110	1000
61831004	Basic Tie 200x2.5 TR	yes	200.0 x 2,5	2.0 - 55.0	110	1000
61831005	Basic Tie 140x3.5 TR	yes	140.0 x 3,5	3.0 - 36.0	200	1000
61831006	Basic Tie 200x3.5 TR	yes	200.0 x 3,5	3.0 - 55.0	200	1000
61831007	Basic Tie 280x3.5 TR	yes	280.0 x 3,5	3.0 - 80.0	200	100
61831013	Basic Tie 360x3.5 TR	yes	360.0 x 3,5	5.0 - 103.0	200	100
61831009	Basic Tie 160x4.5 nat.	yes	160.0 x 4.5	3.0 - 38.0	280	1000
61831011	Basic Tie 200x4.5 TR	yes	200.0 x 4,5	3.0 - 51.0	280	1000
61831014	Basic Tie 250x4.5 TR	yes	250.0 x 4,5	5.0 - 68.0	280	100
61831016	Basic Tie 360x4.5 TR	yes	360.0 x 4,5	5.0 - 101.0	280	100
61831020	Basic Tie 240x7.5 TR	yes	240.0 x 7,5	5.0 - 62.0	650	100
61831021	Basic Tie 320x7.5 TR	yes	320.0 x 7,5	5.0 - 88.0	650	100
61831022	Basic Tie 360x7.5 TR	yes	360.0 x 7,5	5.0 - 101.0	650	100
61831023	Basic Tie 450x7.5 TR	yes	450.0 x 7,5	20.0 - 130.0	650	100
61831024	Basic Tie 540x7.5 TR	yes	540.0 x 7,5	20.0 - 160.0	650	100
61831025	Basic Tie 750x7.5 TR	yes	750.0 x 7,5	32.0 - 222.0	650	100
61831026	Basic Tie 780x9.0 TR	yes	780.0 x 9.0	20.0 - 235.0	800	100
Black- UV-resistant						
61831041	Basic Tie 100x2.5 BK	yes	100.0 x 2,5	2.0 - 24.0	110	1000
61831043	Basic Tie 160x2.5 BK	yes	160.0 x 2,5	2.0 - 42.0	110	1000
61831044	Basic Tie 200x2.5 BK	yes	200.0 x 2,5	2.0 - 55.0	110	1000
61831045	Basic Tie 140x3.5 BK	yes	140.0 x 3,5	3.0 - 36.0	200	1000
61831046	Basic Tie 200x3.5 BK	yes	200.0 x 3,5	3.0 - 55.0	200	1000
61831047	Basic Tie 280x3.5 BK	yes	280.0 x 3,5	3.0 - 80.0	200	100
61831053	Basic Tie 360x3.5 BK	yes	360.0 x 3,5	5.0 - 103.0	200	100
61831049	Basic Tie 160x4.5 BK	yes	160.0 x 4.5	3.0 - 38.0	280	1000
61831051	Basic Tie 200x4.5 BK	yes	200.0 x 4,5	3.0 - 51.0	280	1000
61831054	Basic Tie 280x4.5 BK	yes	280.0 x 4,5	5.0 - 68.0	280	100
61831056	Basic Tie 360x4.5 BK	yes	360.0 x 4,5	5.0 - 101.0	280	100
61831060	Basic Tie 240x7.5 BK	yes	240.0 x 7,5	5.0 - 62.0	650	100
61831061	Basic Tie 320x7.5 BK	yes	320.0 x 7,5	4.0 - 80.0	650	100
61831062	Basic Tie 360x7,5 BK	yes	360.0 x 7,5	5.0 - 101.0	650	100
61831063	Basic Tie 450x7.5 BK	yes	450.0 x 7,5	20.0 - 130.0	650	100
61831064	Basic Tie 540x7.5 BK	yes	540.0 x 7,5	20.0 - 160.0	650	100
61831065	Basic Tie 750x7.5 BK	yes	750.0 x 7,5	32.0 - 222.0	650	100
61831066	Basic Tie 780x9.0 BK	yes	780.0 x 9.0	20.0 - 235.0	800	100

Photographs are not to scale and do not represent detailed images of the respective products.

Accessories

- BASIC cable tie pliers

The Lapp Group worldwide

Algeria
Cablemat Sarl
16 Cité Mimouni Lotissement 18
Villa N° 14
Bordj El Kiffan, ALGER
Tel.: +213 550024331, -661, -404, -331
Fax: +213 20388220, -212, -010, -39
www.cablemat.net

Argentina
NAKASE SRL
Calle 49 No. 5764
B1653AOX
Villa Ballester
1870 BUENOS AIRES
Tel.: +54 11 4768 4242
Fax: +54 11 4768 4242
ventas@nakase.com.ar
www.nakase.com.ar

Armenia
Integral design & engineering LLC
8 Tumanyan str.
International Business Center
0001 YEREVAN
Tel.: +374 10 520188
Fax: +374 10 519188
info@integral.am
www.integral.am

Australia
DKSH Australia Pty Ltd.
14-17 Dansu Court Hallam
3803 VICTORIA
Tel.: +61 3 95546666
Fax: +61 3 95546677
info@dksh.com.au

Austria
Lapp Austria GmbH
Bremenstraße 8
4030 LINZ
Tel.: +43 732 781272-444
Fax: +43 732 781272-34
sales@lappaustria.at
www.lappaustria.at

Belarus
PNS – Professional Network Systems
Temirjazeva str. 64b, office 308
220035 MINSK
Tel.: +375 17 2908372
Fax: +375 17 2547828
info@pns.by
www.pns.by

Belgium – Luxembourg
Lapp Benelux B.V.
Van Dijklaan 16, 5581 WG WAALRE
Postbus 74, 5580 AB WAALRE
The Netherlands
Tel.: +32 78 353060
Fax +32 78 353065
sales.lappbenelux@lappgroup.com
www.lappbenelux.com

Brazil
Cabos Lapp Brasil Ltda.
Av. Dr. Mauro Lindemberg
Monteiro, 628
Galpao 18, Osasco
CEP 06278-010 SAO PAULO
Tel.: +55 11 21664166
Fax: +55 11 21664165
vendas@lappgroup.com.br
www.lappgroup.com.br

Cabos Lapp Brasil Ltda.
Rodovia BA535 (via Parafuso)
km 13 e 14 – Sentido Salvador
Polo Industrial e Logístico Via
Parafuso – Lote 06
CEP 42810-200 CAMAÇARI-BA
Tel.: +55 71 35002400

Bulgaria
V&V Isomatic Ltd.
40a, Pirin Str.
1680 SOFIA
Tel.: +359 29 583111
Fax: +359 29 582270
office@viv-isomatic.com
www.viv-isomatic.com

Canada
Lapp Canada Inc.
3505 Laird Road, Unit 10
L5L 5Y7 MISSISSAUGA, Ontario
Tel.: +905 8 205492
Fax: +905 8 206516
sales@lappcanada.com
www.lappcanada.com

Chile
Desimat Chile
Av. Puerto Vespucio 9670
Parque Industrial Puerto Santiago
Pudahuel, SANTIAGO
Tel.: +56 2 25851200
Fax: +56 2 27470153
ventaschile@desimat.cl
www.desimat.cl

China
Lapp Kabel Shanghai Co., Ltd.
23A Zhaofeng Universe Building
1800 Zhongshan Road West
SHANGHAI 200235
Tel.: +86 21 64400833
Fax: +86 21 64400834
info@lappgroup.com.cn
www.lappgroup.com.cn

Lapp Cable Works Shanghai Co., Ltd.
No. 6 Standard Workshop Lingang
Industrial Area
1555 Cenglin Road, Pudong District
SHANGHAI 201306
Tel.: +86 21 20955833
Fax.:+86 21 20955834

Colombia
TRANSMISIONES LTDA
Cra 69B No. 21A – 24 Bodega UE 28 – 1
Parque Industrial Montevideo
BOGOTA, D.C
Tel.: +57 1 4126898
Fax: +57 1 2929736
info@transmisiones.de
www.transmisiones.de

Congo
Dezatech sarl
Av. Kasai no 12
KINSHASA/Gombe
Tel.: +243 8211 45963
dg@dezatech.com

Costa Rica
Elvatron, SA
De Repifreno en la Uruca
400 metros Nte.
SAN JOSÉ, Costa Rica
P.O. Box 8-3770 (1000)
Tel.: +506 2242-9955
Fax: +506 2520-0697
elvatron@elvatron.com
www.elvatron.com

Croatia
TIM KABEL
Savska cesta 103
10360 ZAGREB – Sesvete
Tel.: +385 1 5555900
Fax: +385 1 5555901
zagreb@tim-kabel.hr
www.tim-kabel.hr

Cyprus
3 BRO Ltd.
3 Limnou Str.
Office 301
3820 LIMASSOL
Tel.: +357 25255353
info@3bro.gr

Czech Republic
LAPP KABEL s.r.o.
Bartosova 315, Kvitkovice
765 02 OTROKOVICE
Tel.: +420 573 501011
Fax: +420 573 394650
info@lappgroup.cz
www.lappgroup.cz

Denmark
Lapp Danmark
Korskildeeng 6
2670 GREVE
Tel.: +45 43 950000
Fax: +45 43 950009
ordre@lappgroup.dk
www.lappgroup.dk

Dominican Republic
ING. Rudy Moreno & Asociados, S.R.L.
Prolongación 27 de Febrero Esq.
Cuidad Agraria, Edif. Yarudith
SANTO DOMINGO OESTE
Tel.: +809 334 4394
Fax: +809 334 4454
www.ingrudymorenoyasoc.com

Ecuador
Elsystec S.A.
Electricidad Sistemas y Tecnología
Vasco de Contreras N35-251 y
Mañosca
CÓDIGO POSTAL 170521
Tel.: +593 2 2456510
Fax: +593 2 2455698
elsystec@elsystec.com.ec
elsystec@uio.satnet.net
www.elsystec.com.ec

Egypt
see United Arab Emirates
LAPP CABLES MIDDLE EAST FZE

El Salvador
Intek El Salvador S.A. de C.V.
Calle Gabriela Mistral No. 373
Entre Blvd. Los Héroes y 33 Av. Nte.
SAN SALVADOR, El Salvador CA.
Tel.: +503 2260-8888
Fax: +503 2260-8855
inteksv@intek-ca.com
www.intek-ca-com

Estonia
Lapp Miltronic SIA Eesti Filiaal
Kastani pst 10
44307 RAKVERE
Tel.: +372 6 518970
Fax: +372 6 518971
orders@lappmiltronic.lv
www.lappmiltronic.ee

Finland
SKS Automaatio Oy
Martinkyläntie 50
P.O. Box 122
01721 VANTAA
Tel.: +358 2 076461
Fax: +358 2 07646820
automaatio@sks.fi
www.sks.fi

France
Lapp France s.a.r.l.
Technopôle Forbach-Sud BP 50084
57602 FORBACH CEDEX
Tel.: +33 387 841929
Fax: +33 387 841794
lappfrance@lappgroup.com
www.lappfrance.fr

LAPP MULLER SAS
Z.A. du Grand Pont
83310 GRIMAUD
Tel.: +33 494 566500
Fax: +33 494 43487
info@mullercables.com
www.mullercables.com

Câbleries Lapp Sarl
Technopôle Forbach Sud
Rue Avogadro
57600 Oeting
Tel.: +33 387 844343
Fax: +33 387 871641
accueil@lappgroup.com

Georgia
Insta LLC
Sergo Zakariadze str. 8
0177 TBILISI
Tel.: +995 32 2202020
Fax: +995 32 2202022
sales@insta.ge
www.insta.ge

Germany
U.I. Lapp GmbH
Schulze-Delitzsch-Straße 25
70565 STUTTGART
Tel.: +49 711 783801
Fax: +49 711 78382640
info@lappkabel.de
www.lappkabel.de

Lapp Systems GmbH
Oskar-Lapp-Str. 5
70565 STUTTGART
Tel.: +49 711 783804
Fax: +49 711 78383520
info@lappkabel.de
www.lappkabel.de

Ghana
PROCESS AND PLANT
AUTOMATION Ltd.
No. 3 Becca Villa, behind Cal Bank
Baatsona, Spintex Road.
P.O. Box Sr 95
ACCRA
Tel.: +233 3 02812680
ekua@automationghana.com
www.automationghana.com

Great Britain
Lapp Limited
Unit 3 Perivale Park
Horsenden Lane South
UB6 7RL GREENFORD MIDDLESEX
Tel.: +44 20 87587800
Fax: +44 20 87587880
sales@lapplimited.com
www.lappgroup.co.uk

Greece
Dimoulas Special Cables S.A.
100-102 Lenorman Str.
10444 ATHENS
Tel.: +30 21 05157610
Fax: +30 21 05157611
info@dimoulas.gr
www.dimoulas.gr

Guatemala
Intek Guatemala S.A.
4a. Ave. 10 – 31 Zona 9
GUATEMALA
Tel.: +502 2507-0500
Fax: +502 2507-0501
intekgt@intek-ca.com
www.intek-ca.com

Honduras
intek Honduras
Ofi-Bodegas Premier
100 mts. antes del Peaje a La Lima
Edificio PWC-14B
SAN PEDRO SULA
Tel.: +504 2559-4748, -50
Fax: +504 2559-4740
intekhn@intek-ca.com
www.intek-ca.com

Hong Kong
Worldtex & Co.
Unit 11, 11/F, Tins Enterprises
Centre
777 Lai Chi Kok Rd.
CHEUNG SHA WAN
KOWLOON
Tel.: +85 22 7811860
Fax: +85 22 7814733
info@worldtex-co.com.hk

Hungary
Lapp Hungária Kft.
Neumann János u.1
2040 BUDAÖRS
Tel.: +36 23 501-250
Fax: +36 23 501-259
sales@lapphungaria.hu
www.lapphungaria.hu

India
Lapp India Pvt. Ltd.
Plot No.98, J & K
Jigani Industrial Area, II Phase
BANGALORE SOUTH – 560 105
Tel.: +91 8110 304800
Fax: +91 80 27825479
info@lappindia.com
www.lappindia.com

Indonesia
PT. JJ-Lapp Cable SMI
Graha INTI FAUZI, 7th Floor
Jl. Buncit Raya No. 22
JAKARTA 12510
Tel.: +62 21 27537051
Fax: +62 21 27537052
sales_jjli@jjsea.com
www.jj-lappcable.com

Iran
see United Arab Emirates
LAPP CABLES MIDDLE EAST FZE

Island
Johan Rönning Ltd.
Klettagardar 25
104 REYKJAVIK
Tel.: +354 5 200800
Fax: +354 5 200888
ronning@ronning.is
www.ronning.is

Israel
Arrow Control Cables Ltd.
7, Zavitan street
49950 NEHALIM
Tel.: +972 3 9074887
Fax: +972 3 9074889
info@arrowcables.com
www.arrowcables.com

Italy
LAPP ITALIA S.R.L.
Via Lavoratori Autobianchi 1
Building 20
20832 DESIO (MB)
Tel.: +39 0362 4871
Fax: +39 0362 487330-340
lappitalia@lappitalia.it
www.lappitalia.it

Camuna Cavi s.r.l.
Via Generale Treboldi, 128
25048 EDOLO (BS)
Tel.: +39 0364 773411
Fax: +39 0364 770120
info@camunacavi.it
www.camunacavi.it
Sales Office
Via Lavoratori Autobianchi 1
Building 20
20832 DESIO (MB)

Japan
K.Mecs Co., Ltd.
Headquarters Yusen Iwamotocho
Bldg. 3F
2-3-3 Iwamotocho, Chiyodaku
101-0032 TOKYO
Tel.: +81 3 58255333
Fax: +81 3 58258550
info@kmecs.co.jp
www.kmecs.com

Jordan
see United Arab Emirates
LAPP CABLES MIDDLE EAST FZE

Kazakhstan
Lapp Kazakhstan LLP
Abaya ave. 13, office 703
010000 ASTANA c.
Tel.: +7 7172 273590
sales@lappgroup.kz
www.lappgroup.kz

Korea
Lapp Korea LLC.
42, Jangangongdan 8-gil
Jangan-myeon, HWASEONG-SI
Gyeonggi-do, 445-941 Korea
Tel.: +82 31 1688 1099
Fax: +82 31 697 4099
www.lappkorea.com

Kuwait
see United Arab Emirates
LAPP CABLES MIDDLE EAST FZE

Kyrgyzstan
MEG Solutions LLC
Chuj avenue 265A, office 204
720071 BISHKEK
Tel.: +996 312 641946
Fax: +996 312 641983
ofice@meg.kg
www.meg.kg

Latvia
LAPP MILTRONIC SIA
Ulbrokas 44a
RIGA, 1021
Tel.: +371 67 501900
Fax: +371 67 501909
pasutijumi@lappmiltronic.lv
www.lappmiltronic.lv

Lebanon
see United Arab Emirates
LAPP CABLES MIDDLE EAST FZE

Libya
Al Jouda Co.
Al Fath – Street
Al Buraq – Building 3rd floor
BENGHAZI
Tel.: +218 91 7433363
ilsharee@yahoo.co.uk

Lithuania
LAPP MILTRONIC filialas
Aukštaičių g. 6
11341 VILNIUS
Tel.: +370 5 2780390
info@lappmiltronic.lt
www.lappmiltronic.lt

Macedonia
Siskon Dooel
Taskenska 4A
1000 SKOPJE
Tel.: +389 2 3062423
Fax: +389 2 3061250
siskon@mt.net.mk
www.siskon.com.mk

Malaysia
JJ-LAPP Cable (M) sdn. Bhd.
16, Jalan 51A/225,
46100 PETALING JAYA SELANGOR
Tel.: +603 78 616288
Fax: +603 78 616299
sales_jjlm@jjsea.com
www.jj-lappcable.com

Malta
G & E Electronics Ltd.
Genics Bldgs.
Giov. Papaffy Str.
B'KARA BKR 4021
Tel.: +356 21 486816
Fax: +356 21 497103
info@gemalta.com
www.gemalta.com

Mexico
Lapp Mexico S de RL de CV
Avenida del bosque 1190 Int. 1
Parque Industrial del Bosque II
45619, TLAQUEPAQUE, Jalisco
Tel.: +52 33 36660250
Fax: +52 33 36660075
ventas@lappmexico.com
www.lappmexico.com

Republic of Moldova
Lapp Kabel Romania SRL
A1 Business Park
(Autostrada Bucuresti – Pitesti, Km 13.5)
Aleea Camilla nr. 11, Unitatea G2
Comuna Dragomiresti Vale
Sat Dragomiresti Deal
Judet ILFOV, 077096
Tel.: +40 213 1009-61
Fax: +40 213 1009-59
office@lappkabel.ro
www.lappkabel.ro

Mongolia
EUROCABLE G Co., Ltd.
Baruun Selbe 5/26
1st Khoroo, Chingeltei District
15160 ULAANBAATAR
Tel.: +976 70 117171
info@cable.mn
www.cable.mn

Morocco
Fiabel
16 Rue des Dahlias (Beausite)
Boulevard La Grande Ceinture
Ain Sebâa, CASABLANCA
Tel.: +212 522 403301, 522 404616
Fax: +212 522 403303
www.fiabel.ma

Netherlands
Lapp Benelux B.V.
Van Dijklaan 16,
5581 WG WAALRE
Postbus 74, 5580 AB WAALRE
Tel.: +31 40 2285000
Fax: +31 40 2285010
sales.lappbenelux@lappgroup.com
www.lappbenelux.com

New Zealand
Engineering Computer
Services Ltd.
Cnr Te-Rapa & Ruffell Rd
P.O. Box 20204
HAMILTON, 3288
Tel.: +64 7 8492211
Fax: +64 7 8492220
garry@lappgroup.co.nzw
www.lappgroup.co.nz

Nicaragua
Electronica Tecnica SA.
De la Óptica Nicaraguense
3C al este, 1/2C al Sur
Casa #38 Residendial Bolonia
MANAGUA
Tel.: +505 2254-4913
info@ni.elvatron.com
nicaragua.elvatron.com

Norway
Miltronic AS
Eikveien 11
3036 DRAMMEN
Tel.: +47 32 261300
Fax: +47 32 261398
info@miltronic.no
www.miltronic.no

Oman
see United Arab Emirates
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Pakistan
see United Arab Emirates
LAPP CABLES MIDDLE EAST FZE

Panama
Lapp Latinamerica
Support Corporation
Edif. Global Bank Calle 50, piso 38
Int. 3801-A, PANAMA
Tel.: +507 3938-565
soporte.latam@lappgroup.com

Peru
DIPROSOL PERU SAC
Av. Velasco Astete 2371
Surco LIMA 33
Tel.: +51 1 2752765
Fax: +51 1 2752776
ventas@diprosol.com.pe
www.diprosol.com.pe

Philippines
JJ-LAPP Cable (P) Inc
Unit 704, Philplans Corporate Center
1012 Triangle Drive
Bonifacio Global City
1634 TAGUIG CITY, MANILA
Tel.: +632 786 7566
Fax: +632 786 7544
sales_jjlp@jjsea.com
www.jj-lappcable.com

Poland
Lapp Kabel Sp. z o.o.
Ulica: Profesjonalna 1
Biskupice Podgórne
55-040 KOBIERZYCE
Tel.: +48 71 3306300
Fax: +48 71 3306306
info@lapppolska.pl
www.lapppolska.pl

Portugal
Policabos S.A.
Av. Pedro Álvares Cabral
Lugar da Capa Rota
2710-144 SINTRA
Tel.: +351 21 9178640
Fax: +351 21 9178649
policabos@policabos.pt
www.policabos.pt

Qatar
see United Arab Emirates
LAPP CABLES MIDDLE EAST FZE

Romania
Lapp Kabel Romania SRL
A1 Business Park
(Autostrada Bucuresti – Pitesti, Km 13.5)
Aleea Camilla nr. 11, Unitatea G2
Comuna Dragomiresti Vale
Sat Dragomiresti Deal
Judet ILFOV, 077096
Tel.: +40 213 1009-61
Fax: +40 213 1009-59
office@lappkabel.ro
www.lappkabel.ro

Russia
Lapp Russia OOO
Mira st., 7, Krutye Kluchi
443028 SAMARA
Tel.: +7 846 2310333
Fax: +7 846 2310028
info@lappgroup.ru
www.lappgroup.ru

Saudi Arabia
see United Arab Emirates
LAPP CABLES MIDDLE EAST FZE

Serbia
VESIMPEX d.o.o.
Patrijarha Dimitrija 24 (DMB)
11090 BEOGRAD-RAKOVICA
Tel.: +381 11 4049-070, -071, -072, -073
Magacin/warehouse: +381 11 4049-075
Fax: +381 11 4049-077
Mob: +381 63 693-373
info@vesimpex.rs
www.vesimpex.rs

Singapore
Lapp Logistics Pte. Ltd.
No.9 Tuas South St. 3
SINGAPORE 638017
Tel.: +65 6558-7176
Fax: +65 6558-7081
lappsea.lappgroup.com

JJ-LAPP Cable (S) Pte. Ltd.
No.9 Tuas South St 3
SINGAPORE 638017
Tel.: +65 6508-6200
Fax: +65 6863-1271
sales_jjls@jjsea.com
www.jj-lappcable.com

Slovakia
LAPP SLOVENSKO, s.r.o.
Piaristicka 2
949 24 NITRA
Tel.: +421 376 578095
Fax: +421 376 578095
info@lappgroup.sk
www.lappgroup.sk

Slovenia
Lapp, d. o. o.
Limbuška cesta 2
2341 LIMBUŠ
Tel.: +386 2 4213550
Fax: +386 2 4213571
info@lappslovenia.com
www.lappslovenia.com

South Africa
Lapp Group Southern Africa
51 Brunton Circle
Founders View South
Modderfontein
1645 GAUTENG
Tel.: +27 11 2013200
Fax: +27 11 6095850
info@lappkabel.co.za
www.lappcable.co.za

Spain
Lapp Group España
Avda. de les Garrigues, 34 – 36
Parque Empresarial Mas Blau II
08820 EL PRAT DE LLOBREGAT
(Barcelona)
Tel.: +34 902 108 669
Fax: +34 934 796 272
info@lappgroup.es
www.lappgroup.es

Sweden
Miltronic AB
Kungshagsvägen 7
Box 1022
611 29 NYKÖPING
Tel.: +46 155 77780
Fax: +46 155 77701
info@miltronic.se
www.miltronic.se

Sales office Denmark
Korskildeeng 6
2670 GREVE
Tel.: +45 43 950000
Fax: +45 43 950009
info@miltronic.dk
www.miltronic.dk

Switzerland
Volland AG
Ifangstrasse 103
8153 RÜMLANG
Tel.: +41 44 8179797
Fax: +41 44 8179700
info@volland.ch
www.volland.ch

EPIC®
Bachofen AG
Ackerstraße 42
8610 USTER
Tel.: +41 44 9441111
Fax: +41 44 9441233
info@bachofen.ch
www.bachofen.ch

Syria
see United Arab Emirates
LAPP CABLES MIDDLE EAST FZE

Taiwan
DKSH Taiwan Ltd.
10th Floor, No. 22, Lane 407
Tiding Blvd., Sec. 2
Neihu Technology Park
TAIPEI CITY 114-93
Tel.: +886 2 87527597
Fax: +886 2 87518688
edmund.foo@dksh.com

Thailand
JJ-LAPP Cable (T) Ltd.
23/110-117 Sorachai Building
25-29th FL
Soi Sukhumvit 63 (Ekamai),
Sukhumvit Road, Klongton Nua,
Wattana, BANGKOK 10110
Tel.: +66 27 878288
Fax: +66 27 878299
sales_jjlt@jjsea.com
www.jj-lappcable.com

Tunisia
ELECSA TN, Groupe TTI
Zone industrielle
8030 GROMBALIA
Tel.: +216 72 255954
Fax: +216 72 255980
commercial@elecsa-tn.com
www.elecsa-tn.com

Turkey
LAPP KABLO San. ve Tic.Ltd.Şti.
Atatürk Mah. Şeref Sok. No: 55/1
34758 ATAŞEHIR-İSTANBUL
Tel.: +90 216 4565699
Fax: +90 216 4565687-89
info@lapp.com.tr
www.lapp.com.tr

Ukraine
Lapp Ukraine LLC
201 – 203, Kharkivske shose
02121 KIEV
Tel.: +38 044 495-6000
Fax: +38 044 490-7630
sales@lappukraine.com
www.lappukraine.com

United Arab Emirates
LAPP CABLES MIDDLE EAST FZE
Wing A-502, P.O. Box 341223
Dubai Silicon Oasis
DUBAI
Tel.: +971 4 3712905
Fax: +971 4 3712918
lappme@lappgroup.com
www.lappgroup.com

Uruguay
Reprinter LTDA.
Avda. Italia 6481
MONTEVIDEO
Tel.: +598 2600-7343
Fax: +598 2600-8658
lapp@reprinter.com.uy
www.reprinter.com.uy

USA
Lapp USA, Inc.
29 Hanover Road
FLORHAM PARK, NJ 07932
Tel.: +1 973 6609700
Fax: +1 973 6609330
sales@lappusa.com
www.lappusa.com

Lapp Tannehill, Inc.
8675 Eagle Creek Parkway Suite 900
SAVAGE, MN 55378
Tel.: +1 952 8816700
Fax: +1 952 8810743
sales@lapptannehill.com
www.lapptannehill.com

Uzbekistan
Elektro Potential LLC
Y. Bodomzor str. 2 B, office 311
Yunusabad area
100084 TASHKENT
Tel.: +998 71 1501220
Fax: +998 71 1501220
mz1958@yandex.ru

Venezuela
Somerinca, C.A
Qta Corazón de Jesus
4ta Transversal de Montecristo c/
calle el Carmen, de los Dos Caminos
1070 CARACAS
Tel.: +212 235 1081/1696/2748,
237 3003
Fax: +212 239 9341
klocmoeller@cantv.net
www.somerinca.com

Vietnam
JJ-Lapp Cable Vietnam Co., Ltd
12th floor, Unit 1206, Sailing Tower
111A Pasteur Street, District 1
HO CHI MINH CITY
Tel.: +84 8 62887668
Fax: +84 8 38236776
sales_jjlv@jjsea.com
www.jj-lappcable.com

Yemen
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