

SURFACE TREATMENTS

Electro-galvanized after manufacturing, EG

Electro-galvanizing refers to covering the product with a layer of zinc, using electricity. These products are also referred to as zinc electroplated products. The average thickness of this layer is 8-12 µm. Electroplating is made in an electrolyte bath, after several cleaning and treatment stages.

The products can be used in premises belonging to corrosivity categories C1 and C2. Typical environments include dry premises, such as offices and commercial buildings, shopping centres, markets, schools, hospitals, industrial halls, warehouses, sports halls, etc.

Electro-galvanized products are galvanized in accordance with the standard EN ISO 2081.

Pre-galvanized sheet metal, PG

Pre-galvanized sheet metal products are made of zinc-coated steel bands. These products are also referred to as sendzimir galvanized products. The average thickness of the zinc coating on these products is 20 µm.

The products can be used in premises belonging to corrosivity categories C1 and C2. Typical environments include dry premises, such as offices and commercial buildings, shopping centres, supermarkets, schools, hospitals, industrial premises, warehouses, sports halls, etc.

The pre-galvanized steel sheet metal products are galvanized in accordance with the standard EN 10346.

Hot-dip galvanized after manufacturing, HDG

Hot-dip galvanized products are made of sheet metal and finished product, such as a whole cable ladder or a part of it, is pre-treated and dipped in molten zinc. These are also referred to as hot-dip zinc coated products. The zinc coating covers the entire product, including cutting edges and weld seams. The average thickness of the zinc coating on these products is 45 µm or 55 µm depending on product.

The products can be used in premises belonging to corrosivity categories C1, C2, C3, and C4. Typical environments include outdoor facilities, as well as production and industrial facilities with high amounts of moisture and impurities. Hot-dip galvanized products are galvanized in accordance with the standard EN ISO 1461.

Acid-proof stainless steel, AISI 316L HST

Products made of acid-proof stainless steel are used in highly corrosive environments, where hot-dip galvanizing does not provide sufficient corrosion protection. HST products are suitable for indoor and outdoor use.

The products can be used in premises belonging to corrosivity categories C3, C4, C5-I and C5-M. Typical environments include chemical and wood-processing industry applications, as well as premises with special hygiene requirements, such as dairies, food industry facilities, and the pharmaceutical industry.

Whether stainless or acid-proof material is used, depends on several different factors. The factor that affects the choice of material the most is the chemistry of the environment, i.e. what compounds appear in what concentration levels in the surrounding environment. On the whole, it can be said that acid-proof material has better atmospheric corrosion resistance, and it is thereby well-suited for an industrial or a marine environment. High chloride content also requires the use of acid-proof materials.

Painted sheet metal, M

Paint-coated sheet metal products are made of pre-galvanized, painted steel band. The surface is covered with polyester paint, which has high resistance against weather, corrosion, and wear.

The products can be used in premises belonging to corrosivity categories C1 and C2. Typical environments include dry premises, such as offices and commercial buildings, shopping centres, supermarkets, schools, hospitals, and sports halls.

The standard colour of these products is white, RAL 9010. White KRA M cable trays have an additional, removable plastic film, to protect the product during transportation and installation.

CORROSION RATING

Selection of the required surface treatment on the basis of the prevailing ambient conditions, according to the EN ISO 12944-2.

Corrosivity level	Ambient conditions		Required surface treatment	Galvanization wear
	Outdoors	Indoors		
 C1 Very low	Not for outdoor use.	Heated buildings with a clean atmosphere, such as offices, schools and hotels.	Pre-galvanized sheet metal or paint-coated sheet metal.	0,0 µm - 0,1 µm in a year
 C2 Low	Atmospheres with low contamination levels. Mostly rural areas.	Unheated buildings with possible condensation, such as warehouses and sports halls.	Pre-galvanized sheet metal or paint-coated sheet metal.	0,1 µm - 0,7 µm in a year
 C3 Medium	Urban and industrial atmosphere with medium sulphur dioxide levels. Coastal areas with low salinity levels.	Production premises with high humidity levels and some impurities in the air, such as food industry facilities.	Hot-dip galvanized after manufacture.	0,7 µm - 2,1 µm in a year
 C4 High	Industrial areas and coastal areas with medium salinity levels.	Chemical industry production plants, coastal shipyards and boatyards.	Hot-dip galvanized after manufacture.	2,1 µm - 4,2 µm in a year
 C5-I Very high (Industrial)	Industrial areas with high humidity levels and a corrosive atmosphere.	Buildings or areas with almost constant condensation and high contamination levels.	Hot-dip galvanizing and PEX coating (powder coating) after manufacture. Acid-proof steel. Case-specific selection of surface treatment.	4,2 µm - 8,4 µm in a year
 C5-M Very high (Marine)	Coastal and other areas with high salinity levels.	Buildings or areas with almost constant condensation and high contamination levels.	Hot-dip galvanizing and PEX coating (powder coating) after manufacture. Acid-proof steel. Case-specific selection of surface treatment.	4,2 µm - 8,4 µm in a year

Recommended products		
C1 - C2	C3 - C4	C5I - C5M
<p>Hot-dip galvanized sheet metal products with a coating thickness of 20 µm. Electro-galvanized products with a coating thickness of 12 µm.</p> <ul style="list-style-type: none"> -Cable ladder KS20 with accessories. -MEK lighting tracks with accessories. -Cable trays KRA, KRB and KRC with accessories. -WMT cable trays with accessories. <p>Aluminium products</p> <ul style="list-style-type: none"> -Instal cable trunkings. -Instal cable trunking fasteners. -unipro® lighting tracks. 	<p>Products hot-dip galvanized after manufacturing, with a coating thickness of 55 µm.</p> <ul style="list-style-type: none"> -Cable ladders KS80, KSR80 and KSF80, with accessories. -MEK HDG lighting tracks with accessories. -KRL Pural covers. 	<p>Acid-proof products (AISI 316L)</p> <ul style="list-style-type: none"> -Products whose names include the letters "HST".

FIRE RESISTANCE

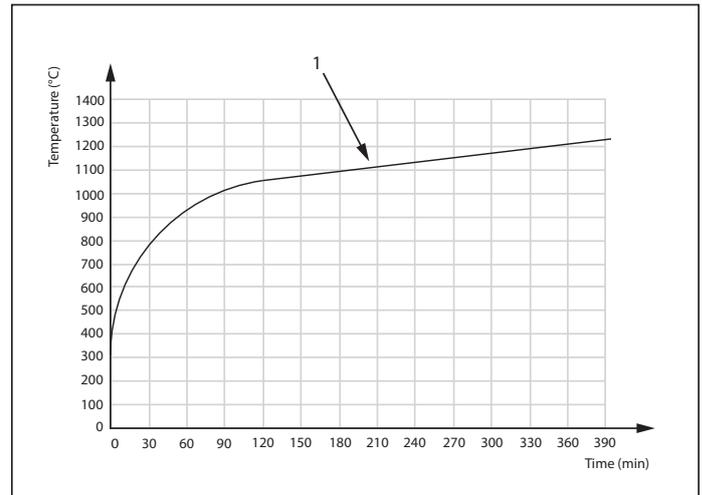
The fire resistance of **Meka Pro Oy's** cable ladders KS80, KS20 and KRA, and the lighting track MEK has been tested at VTT in Finland, in 2013 – 2014; and at the PozStandard testing facility in Moscow in 2011.

In the fire tests, the testing environment and - methods are in accordance with the standards EN 1363-1, DIN 4102-12, GOST-R 30247.1, as well the new document currently being prepared in the IEC committee, "Technical Report (TR): Cable management systems (CMS) for fire resistant installations".

Currently in preparation, the "Technical report" will clarify and harmonise the fire resistance testing processes for cable trunkings in Europe. These guidelines will probably become a pan-European EN standard, displacing national standards.

Testing environment and conditions

During the fire tests carried out in spring 2014, the following document was also adhered to (currently in preparation by the IEC committee): "Technical Report' (TR): Cable management systems (CMS) for fire resistant installations", which is better suited to the fire resistance testing for cable ladders and trays, for example, than the previous standards.



The temperature curve in accordance with the standard EN 1363-1.



Meka's products in the fire testing chamber before the incineration.



60 min after the start of the fire test: the temperature in the furnace is approx. 950 °C. The cable ladder on the bottom left of the image has been fastened with an interval of 2 m, and above that, the fastening interval is 1.2 m (a sample of deflection).



KS80-400 cable ladder after a 60-min fire test.



KRA cable ladder after a 90-min fire test.

INSTALLATION INSTRUCTIONS

Cable trays and lighting tracks

Technical requirements

Before using cable trays, please study the following standards and regulations, as well as the installation instructions in the product folder.

1. Standard series SFS 6000 Low-voltage electrical installation works
2. ST 51.06 Fire-resistant cable management system, and systems intended to be functional during a fire
3. ST-card ST 51.13 "Cable trays, ladders and lighting tracks"
4. ST 51.15 Cable management systems. Structure, design and installation.
5. ST-card ST 51.17 "Electric cables and fire safety"
6. ST-card ST 51.18.01 "Sound insulation in electric lead-through installations"
7. ST-card ST 51.18.02 and ST 841.10 "Fire insulation in electric lead-through installations"
8. ST-card ST 53.21 "Earthing and equipotential bonding in building distribution systems"

General installation instructions

Ladder installations must be carried out such that the deflection of visible cable ladders and lighting tracks does not exceed 1/200. For industrial premises and non-visible cable ladders and lighting tracks, the maximum permitted deflection is 1/100. In practice, a deflection of 1/200 means that the maximum deflection for a 3 m span is 15 mm. In calculating the deflection, about 50% of the existing load must be added as a reserve. Sufficient space must be allowed for thermal expansion at the ends and joints of cable ladders and lighting tracks. The thermal expansion coefficient of steel is 0.000012 m/°C. Thermal expansion can be calculated with the following formula: change in temperature x 0.000012 x length. For example, if the cable tray is 100 m long, and the temperature changes by 40 °C, the change in length is 40 x 0,000012 x 100 = 0.048 m, i.e. 48 mm. When installing cable ladders and lighting tracks, attention must be paid to the loading capacity of brackets, and the sufficient strength of fastening and surface materials. In places where vertical ladders are exposed to a risk of mechanical damage, the trays must be protected with covers up to a height of 1.5 m.

Lead-throughs

For lead-throughs in fire walls, cable ladders must be cut at the wall. At boundaries between fire sections, the lead-throughs must comply with the fire resistance of the surrounding structure. Different types of fire-resistant cable lead-throughs are presented in ST card 51.18.02. Sound insulation principles for lead-through installations of cable ladders, lighting tracks and cable trunkings are presented in ST card 51.18.01.

Equipment

Equipment placed on cable ladder or lighting tracks, such as junction boxes, are to be fastened firmly and kept out of the actual cable space. Installation frames are to be used as necessary.

Using high-voltage cable systems

High-voltage cables can be installed on the KS80 and KSF80 cable ladders using cable fasteners made for this purpose.

Product liability

When installing cable ladders, the following must be taken into account:

1. Cable ladders are intended for cable support only.
2. When installing cable ladders and other cable support products, attention must be paid to the loading capacity of brackets, and the sufficient strength of fastening and surface materials.
3. Cable ladders must not be used as ladders or walking platforms.
4. The manufacturer is not liable for any direct or indirect damage resulting from the incorrect use of the products.

EARTHING AND EQUIPOTENTIAL BONDING

Main equipotential bonding must be carried out in each building. The purpose of main equipotential bonding is to prevent the occurrence of dangerous voltage differences between conductive parts that may be touched at the same time. In equipotential bonding, exposed conductive parts and other conductive parts are connected to the same potential, to eliminate potential differences between them. Parts connected to the main equipotential bonding usually include the building's metal pipelines (HVAC), metal constructions, and, where applicable, the main reinforcing steels used in concrete constructions. Metal cable support systems can also be regarded as structures to be included in the equipotential bonding.

Protective earthing/equipotential bonding of cable trunkings

Cable trunking systems do not usually require protective earthing or connection to an equipotential bonding conductor. If the cables used in the trunking are shielded (MMJ type). Exceptions to this include hospital premises and potentially explosive (ATEX) premises. Also, some customer cases may require protective earthing or equipotential bonding of aluminium cable trunkings to prevent electrical interference, for example.

Protective earthing/equipotential bonding of cable trays

Cable ladders, cable trays and lighting tracks can be regarded as exposed conductive parts, which means that they must be connected to the building's main equipotential bonding rail at least at one point. In industrial installations in particular, special attention must be paid to the earthing and reliability of the entire cable ladder system. In industrial applications, it is recommended that the cable ladder be connected to earth at an interval of 40 m, for example, unless it is reliably connected to a conductive structure (e.g. an earthed steel column). Extension piece SSR, which is used with cable ladder types KS20 and KS80, provides sufficient electrical connection, so a separate grounding conductor need not be installed across the ladder extension.

Electrical conductivity

Information about the conductivity of cable ladders, cable trays and lighting tracks is provided below.

Product	Resistivity (mΩ/m)
KS20	0,60
KS80	0,44
KSF80	0,44
KRA-300M	0,30
MEK 70M	2,88
MEK 110M	0,58
Product + extension	Resistivity (mΩ)
<i>Measured at 50 mm from the extension.</i>	
KS20-300 + NL/KS20	0,24
KS20-300 + SSR/KS20	0,13
KS20-300 + SSC/KS20	0,24
KS80-300 + NL	0,39
KS80-300 + SSR	0,17
KS80-300 + SSU	0,14
KSF80-300 + M10 pultit	0,16
KSF80-300 + KSF-NL	0,30
KRA-200 + RSS	0,36
KRA 200M + RSS	0,23
MEK 70M + J-70	0,42
MEK 110M + J-110	0,42

APPROVALS AND TESTS

CE mark

The CE mark is the manufacturer's guarantee that the product meets the requirements outlined in relevant directives. MEKA's steel and aluminium products, as well as the components of the unipro lighting track system must have the CE mark, through the harmonised product standards under the Low Voltage Directive (2006/95/EY).

The purpose of the Low Voltage Directive 2006/95/EY is to ensure that when used, installed and maintained correctly, the electrical devices available on the European Union's market are not a risk to the safety of people, domestic animals, or property. This directive is applicable to all hazards caused by the use of electrical devices. This directive presents the essential safety objectives that electrical devices must adhere to in order to be suitable for the EU market. In accordance with the EU's harmonisation regulations, this directive also ensures the free movement of electrical devices that adhere to the relevant requirements.

The FI mark

Testing at a competent testing laboratory is a prerequisite for achieving the FI mark. The FI mark is only granted to those products that have passed precise tests and inspections. A FI-certified product always meets the directive's safety requirements for the product. FI-marked products are also monitored at the manufacturing and sales locations.

The FI safety mark is recognised in all countries of the EEA. It indicates that the product adheres to safety standards. Furthermore, it provides a basis for the certification of several other countries. Thereby, in an increasingly competitive market, the FI mark has become a strong selling point for products in Finland and elsewhere in Europe.

EAC certification

The Eurasian Customs Union is comprised of Russia, Belarus and Kazakhstan. This certification follows the instructions of the certification of the EACU and/or Russia, Belarus, or Kazakhstan. The mark of the EACU certificate is the EAC Eurasian Conformity. The new EAC certificates of the EACU have replaced the GOST-R certificates that were used previously.

STUL guarantee

The Electrical Contractors' Association of Finland (STUL) has created the STUL guarantee system, wherein the risks of a warranty period are divided fairly between the manufacturer/importer and contractor, ensuring that the products on the market meet the warranty terms and conditions of YSE 1998 (General Conditions for Building Contracts).

This guarantee does not apply to special products manufactured in accordance with the contractor's drawings. The guarantee is only applicable to pre-installed products manufactured by Meka Pro Oy.

Standards

The standard EN 61537, "Cable tray systems and cable ladder systems for cable management", determines the mechanical testing specifications for cable trays, fasteners, and other parts. This standard also determines the tests for electrical conductivity. The IEC 61537 is a product standard for cable tray systems, harmonised on the EU level.

The standard EN 50085-1, "Cable trunking systems and cable ducting systems for electrical installations". The standard includes the structural requirements and tests for cable trunking systems. A harmonised product standard.

The standard EN 60570, "Electrical supply track systems for luminaires", includes the IEC requirements for lighting tracks and system parts. Harmonised under the LVD directive.

The standard EN 60598-1, "Luminaires. Section 1: General requirements and tests", outlines the general regulations regarding the classification and marking of luminaires, as well as their mechanical and electrical structure, with the relevant tests. The EN 60598-1 is a harmonised product standard.

The standard EN 60529, "Degrees of protection provided by enclosures (IP Code)". This standard determines the enclosure categories and codes, as well as outlining the requirements and the necessary tests. A harmonised product standard.

Recycling

Meka's products are mainly manufactured from recyclable materials, and are 100% recyclable after the end of their lifespan.

