

# CABLE LADDERS KSE 80



 **MEKA**

[www.meka.net](http://www.meka.net)

# MEKA

Meka is a Finnish company whose business idea is to produce high-quality and competitive cable support systems for the various construction projects of our customers.

Meka cable support systems are manufactured from high quality raw materials. We operate on all levels based on the principles of sustainable development of the environment. All Meka products are technically tested and meet the given technical specifications.

The design of Meka products is focused on easy installation facilitated by versatile installation components. This ensures the high quality and applicability of products even in the most demanding environments.

Using of Meka's cable support systems is a modern way of electrifying different buildings and spaces easily and economically.

Meka has ISO 9001 Quality System Certificate which is valid for product development, manufacturing and marketing.

## PRODUCT RANGE

### Cable ladders

**KS20, KS30 and KS35** cable ladders - made of hot galvanised metal sheet, coating thickness approx. 20 µm of zinc. Can be used in offices, shops, schools, hospitals, warehouses and industrial spaces (environment classifications C1 and C2).

**KS80, KSE80 and KSF80** – tube type cable ladders. Hot dip galvanised after manufacture, coating thickness approx. 60 µm of zinc. Can be used for industrial applications where high and concentrated load carrying capacity, lateral rigidity and a durable surface finishing are required. These include: industrial buildings, power plants, food, pharmaceutical and animal feed industry, tunnels and other similar industrial areas (environment classifications C1, C2, C3 and C4).

**RST and HST** - stainless steel and acid-proof cable ladders can be used in chemical and wood processing industry as well as in other highly corrosive environments. Other places of use are places where hygiene is a vital factor, such as in dairies, slaughter-houses, other areas of food industry and pharmaceutical plants, tunnels etc.

**PEX** – tube type cable ladders. Hot dip galvanised after manufacture (coating thickness approx. 60 µm of zinc) and finally powder coated. Can be used in industrial areas with high humidity and harsh atmosphere, coastal or offshore areas (environment classifications C5-I and C5-M).

### Cable trays and lighting tracks

**KRA, KRB, KRC and KRV** - smooth and perforated cable trays with different side heights: 12, 40, 60, 80 and 110 mm.

**MEK 70 and MEK 110** - lighting tracks with special groove for sliding nuts.

Cable trays and lighting tracks are made of hot galvanised sheet metal or hot galvanised and coil coated sheet metal. The standard colour in coil coated products is white (RAL 9010, NCS 0502-Y), other colours are available on request.

Cable trays KR and lighting tracks MEK are used in office buildings, business locations, shopping centres, schools and other public buildings in which the cable trays are an integral part of the interior (environment classifications C1 and C2).

(Environment classifications according to SFS-EN ISO 12944-2 standard.)

### Cable trunkings and socket poles

**INSTAL** cable trunkings and **INSTAL SP** socket poles are used in electrical installations where the design and appearance are an integral and important part of the interior.

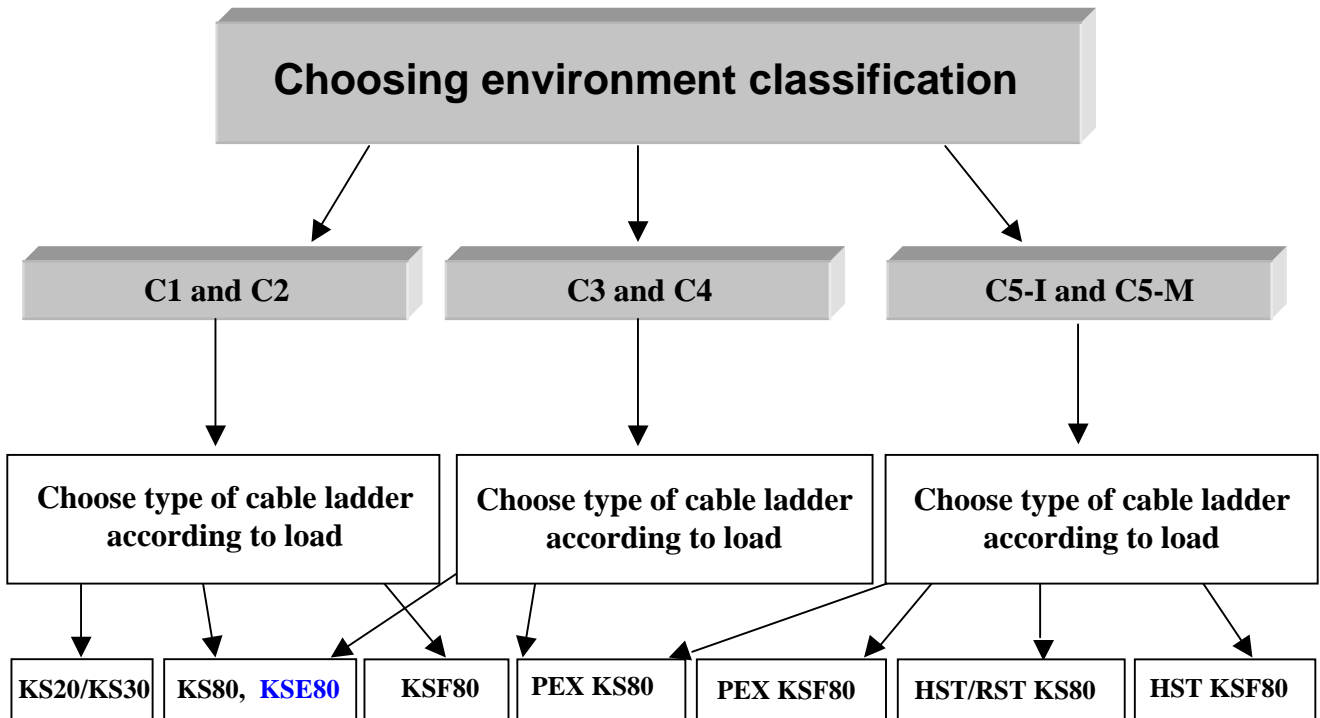
Main applications are offices, public buildings, business locations, schools and hospitals.

INSTAL products are made of aluminium and painted white (RAL 9010) or grey (RAL 9006), or anodised in which case they retain their natural metal tone. Products painted in other colours are available on request.

Almost all possible mounting boxes can be used in the INSTAL trunkings and socket poles, which means that the socket outlets and other electrical fittings suitable for any given environment can be chosen freely.



# CHOOSING THE CABLE LADDER TYPE



The choice of surface treatment are made according to factors effecting the product in the surrounding environment, as set out in the SFS-EN ISO 12944-2 standard

# CORROSION CLASSIFICATION

The choice of surface treatment are made according to factors effecting the product in the surrounding environment, as specified in the SFS-EN ISO 12944-2 standard.

Corrosivity category	Examples of typical environments in a temperate climate (informative only)		Surface treatment required
	Exterior	Interior	
C1 very low		Heated buildings with clean atmospheres, e.g. offices, shops, schools, hotels.	Hot galvanised sheet metal, or plastic coated sheet metal.
C2 low	Atmospheres with low level of pollution. Mostly rural areas.	Unheated buildings where condensation may occur, e.g. warehouses, sport halls.	Hot galvanised sheet metal, or plastic coated sheet metal.
C3 medium	Urban and industrial atmospheres, moderate sulphur dioxide pollution. Coastal areas with low salinity.	Production rooms with high humidity and some air pollution, e.g. food-processing plants, laundries, breweries, dairies.	Hot galvanisation after assembly.
C4 high	Industrial areas and coastal areas with moderate salinity.	Chemical plants, swimming pools, coastal ship- and boatyards.	Hot galvanisation after assembly.
C5-I very high (industrial)	Industrial areas with high humidity and harsh atmosphere.	Buildings or areas with almost permanent condensation and with high pollution.	Hot galvanisation and epoxy painting after assembly. Acid-proof steel. Surface treatment chosen case-by-case.
C5-M very high (marine)	Coastal and offshore areas with high salinity.	Buildings or areas with almost permanent condensation and with high pollution.	Hot galvanisation and epoxy painting after assembly. Acid-proof steel. Surface treatment chosen case-by-case.

**Notes:**

1. The loss values used for the corrosivity categories are identical to those given in ISO 9223.
2. In coastal areas in hot, humid zones, the mass or thickness losses can exceed the limits of category C5-M. Special precautions must therefore be taken when selecting protective paint systems for structures in such areas.

# SURFACE TREATMENTS

## Hot galvanised steel sheet

Sheet metal is hot galvanised on continuously moving production lines. The basic material is cold-rolled steel sheeting. After degreasing, the sheet is pickled and oxidised, after which surface oxides are removed by a reduction in 950°C temperature, which also simultaneously softens the steel. The surface of the sheet is now purified metal and is transferred directly into a zinc bath. The sheet is then vertically driven out from the bath between air jets, which remove excess zinc from the surface of the sheet while the zinc goes back into the bath, leaving the desired coating. Computerised measurement systems are used to measure the thickness of the coating, while the operation of the air jets is also computerised. After cooling, straightening and white rust prevention treatment, the sheet is either delivered to the cutting press, rolled, or transferred to the plastic coating line.

Mekajohtotiet Oy produces KS20 and KS30 cable ladders, MEK lighting tracks, and KRA, KRB, KRC cable trays from hot galvanised sheet metal. These products include a coating thickness of approximately 20 µm of zinc. They are suitable for installation in dry environments, such as offices, shops, hospitals, factories etc.

The hot galvanised steel sheet used by Mekajohtotiet Oy is galvanised according to the SFS-EN 10142 standard, which is equal to the ASTM A 653 standard, and the old SS 141151 and DIN 17162 standards.

## Hot galvanising by immersion

Grease, oil, and soot are usually removed by using an alkaline degreasing solution. After flushing with water rust and rolling scale are removed from the surfaces by pickling the steel in diluted hydrochloric acid or sulphuric acid. Prior to the sheet being immersed in molten zinc, it has to be treated with a fluidiser, to remove oxides from the surfaces of both the steel sheet and the bath in order to allow the steel and zinc to form a metallic bond between each other. After the fluidised bath treatment, the substrates are dried. A thin layer of fluidiser salt is left on the surfaces of the objects. After this, the object is immersed in the zinc, after which it is ready for final cleaning, inspection and loading. Mekajohtotiet Oy hot dip galvanises all cable ladders KS80, KSE80, KSF80 and their installation accessories using this method, according to the SFS-EN 1461 standard, which corresponds to the old SFS 2765 and DIN 50976 standards.

These products include a coating thickness of approximately 60 µm of zinc.

## Duplex treatment

Hot galvanisation usually provides more than adequate protection against corrosion. In some cases however, additional protection may be needed if the environment is exceptionally corrosive. Duplex treatment gives the customer lasting protection against corrosion and in addition, the opportunity to choose a colour to go with the rest of the interior.

The zinc surface must be thoroughly cleaned before painting in order to ensure good adhesion, and an appropriate paint type must be used. After careful preparation, cable ladders and accessories are powder painted and finally hardened in an oven. MekaJohtotiet Oy's cable ladder system PEX is Duplex treated.



# INSTALLATION INSTRUCTIONS

## TECHNICAL REQUIREMENTS

Before using the cable trays, please read the following standards and regulations and the installation instructions in the product folder:

1. Standard SFS 3209 "Switchboard and telecommunications spaces, cable conduits" contains instructions for measuring the area needed for cable trays.
2. ST card ST 51.13 "Cable trays and ladders, lighting tracks".
3. ST card ST 841.05 "Layouts for cable trays"
4. ST cards ST 51.91 and ST 841.10 present the ways in which ducts are made.
5. ST card ST 13.51 presents the CAD graphic symbols for cable trays.

## GENERAL INSTALLATION INSTRUCTIONS

Installation is performed in a way that deflection does not exceed 1/200 in visible cable trays and lighting tracks. In industrial and hidden cable trays and lighting tracks deflection must not exceed 1/100. An additional allowance of approx. 50% of the existing load must be included when calculating deflection.

Sufficient space for heat expansion must be left at the ends and between cable trays and lighting tracks. The heat expansion coefficient of steel is 0.000012 m/°C.

Cable trays and lighting tracks are fixed in a manner which does not allow them to slant or twist laterally.

The load bearing capacity of brackets and the strength of fixing and surface materials must be taken into consideration as cable trays and lighting tracks are installed.

In places where vertical trays are subject to physical damage, they should be protected up to a height of 1.5 m with a protective cover.

### Ducts

When cable trays pass a fire-wall they must be cut. At borders of fire areas, the ducts must correspond to the fire endurance of the material being cut through. Different fire-proof cable ducts are presented in ST card 51.18.

The principles of sound insulation in connection with cable trays and lighting tracks passing through walls are presented in ST card 51.19.

### Cables

Insulated cables are the most common cables used. External factors such as heat must be considered as cables are installed. Similarly, the effect of the strongest continuous current on the temperature of the cable must be taken into consideration. On a horizontal tray, cables are usually placed neatly straightened without fastening. On vertical and slanting trays, cables are fastened to the tray at appropriate distances with suitable fasteners.

### Accessories

Accessories, such as branch boxes, which are installed on cable trays or lighting tracks are to be fastened firmly and in such a manner that they do not obstruct the actual cable space. Mountings, supports and other accessories are used when needed.

### Electrical conductivity of cable ladders

All of Mekajotiet Oy cable ladders, cable trays and lighting tracks have been tested for electrical conductivity in Sweden at SP (Swedish National Testing and Research Institute). If you would like to obtain the test results, contact Mekajotiet Oy's technical support staff.



## USAGE OF CABLE LADDERS

KS20/KS30 cable ladders system can be used within environmental stress classifications C1 and C2 common applications include offices, shops, schools, hospitals, warehouses and industrial spaces.

KS80 cable ladder system can be used for industrial applications where high and concentrated load carrying capacity, lateral rigidity and a durable surface finishing are required. These include industrial building sites, power plants, food, pharmaceutical and animal feed industries, humid areas and tunnels.

KSF80 cable ladder system can be used for industrial applications where high and concentrated load carrying capacity, lateral rigidity and durable surface finishing are required.

KSE80 cable ladders are manufactured to be used mainly in food processing industry.

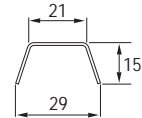
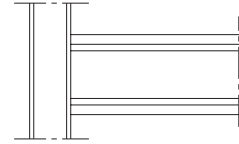
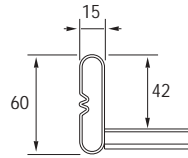
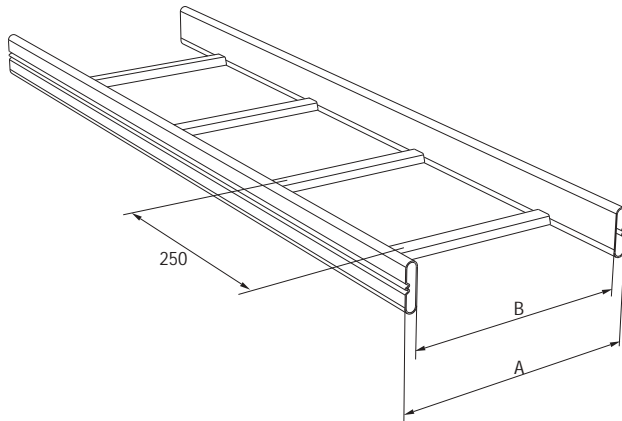
## TO BE TAKEN INTO CONSIDERATION

1. Cable ladders and cable trays are intended only for supporting cables.
2. When cable ladders and other conduit products are installed, the load carrying capacity of brackets has to be observed, and care should be taken in order to see that there is sufficient strength in the fixtures and surface materials.
3. Cable trays must not be used as ladders or walk-ways.
4. The manufacturer is not responsible for direct or indirect damages caused by inappropriate use of any of our products.



## CABLE LADDERS

# Cable ladders KSE80



Product	SSTL number	Package m	Weight kg /100 m	A mm	B mm	Lenght m
<b>Hot dip galvanised after manufacture</b>						
KSE80-150	14 498 91	60	270	150	120	6
KSE80-200	14 498 92	60	280	200	170	6
KSE80-300	14 498 93	60	300	300	270	6
KSE80-400	14 498 94	60	320	400	370	6
KSE80-500	14 498 95	60	340	500	470	6
KSE80-600	14 498 96	60	360	600	570	6

**KSE80 cable ladders are manufactured to be used mainly in food processing industry.**

# CABLE LADDERS

## Usage and surface treatment

KSE80 cable ladders can be used in food processing industry and in places where cleaning of the ladder system should be easy. KSE80 cable ladders, bends, T and X pieces are made of high quality steel. The products are zinc coated by immersion after manufacture. The thickness of the zinc coating is at least 55  $\mu\text{m}$ .

A difference between cable ladders KSE80 and KS80 is the design of rungs. KSE ladders' rungs do not have any holes and the rungs' profile have only two bendings.

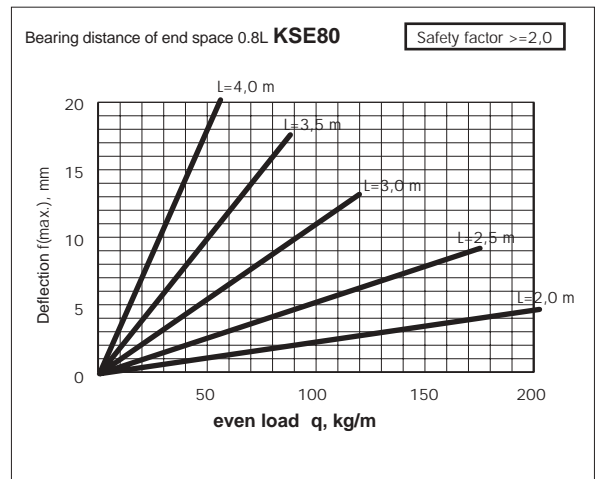
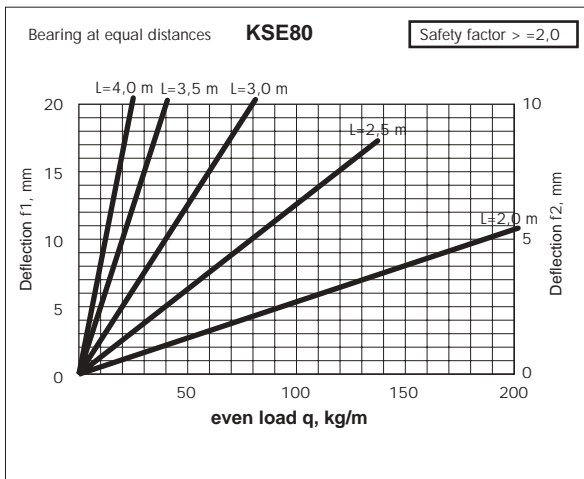
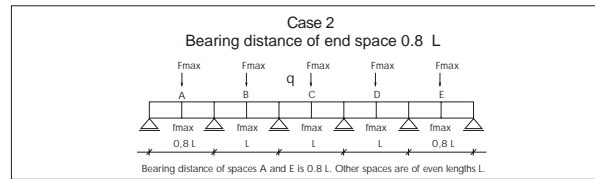
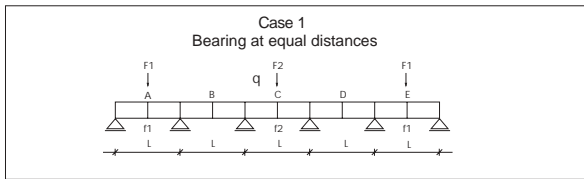
KSE80 cable ladders are suitable to be used in environmental stress classifications C1, C2, C3 and C4 (see "Choosing the cable ladder type").

KSE80 cable ladders are delivered in 6 metre sections. All KS80 ladder's system accessories are compatible for the installation of KSE-ladders.

## Load carrying capacity

Choose the bearing distance using the load curves below:

### Load curves

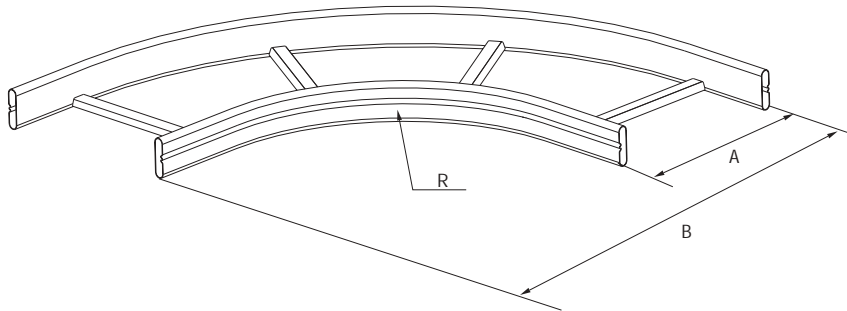


### Explanation of the cable ladder load curves

A five-span load-bearing beam is illustrated above (Case 1), in which the deflection  $f_1$  is measured in spans A and E. In long installations, the deflection is demonstrated by  $f_2$ . If the end of the ladder is securely fastened to the wall then, where the ladder begins, deflection  $f_2$  is used. If there is no end attachment, and if the load is at equal distances, the deflection of spans A and E can be measured at  $f_1$ , and the deflection of other spans, at  $f_2$ . If the end of the ladder is not attached to the wall, and the bearing distance for

spans A and E must be reduced by 20%, ie.  $0.8 \times L$  ( $L$  = bearing load at equal distances), in which case the load corresponds to the load in Case 2. The maximum deflection in each support span in Case 2 is demonstrated in Table 2. Deflection is also influenced by the type of the extensions which are used and by the method used to support the extensions. The value at the end of each load curve represents the maximum permitted load (safety factor  $\geq 2$ ), which must not be exceeded.

# Bend KSE90



Manufactured to order.

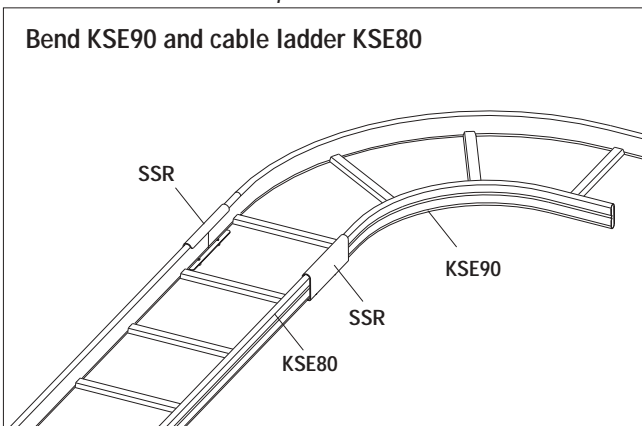
Product	Package pcs	Weight kg /100 pcs	A mm	B mm
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**RADIUS OF INSIDE ARC R=300**

Hot dip galvanised after manufacture

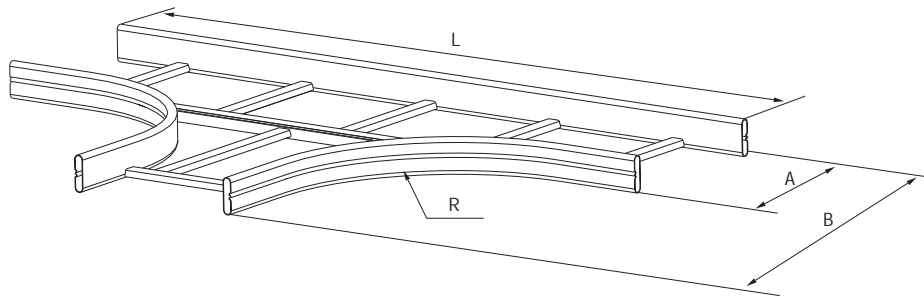
KSE90-150 R=300	1	220	150	600
KSE90-200 R=300	1	240	200	650
KSE90-300 R=300	1	300	300	750
KSE90-400 R=300	1	330	400	850
KSE90-500 R=300	1	400	500	950
KSE90-600 R=300	1	450	600	1050

*Installation example*



Bend KSE 90 is fastened onto cable ladder KSE80 with connections SSR.

# T-piece KSTE



Manufactured to order.

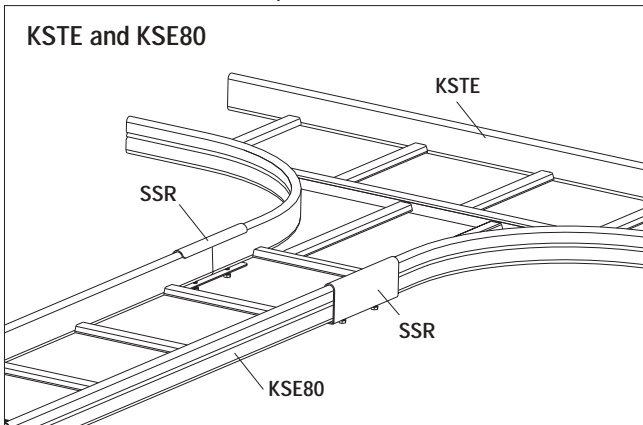
Product	Package pcs	Weight kg /100 pcs	A mm	B mm	L mm
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**RADIUS OF INSIDE ARC R=300**

Hot dip galvanised after manufacture

KSTE-150 R=300	1	400	150	600	1050
KSTE-200 R=300	1	440	200	650	1100
KSTE-300 R=300	1	510	300	750	1200
KSTE-400 R=300	1	580	400	850	1300
KSTE-500 R=300	1	670	500	950	1400
KSTE-600 R=300	1	700	600	1050	1500

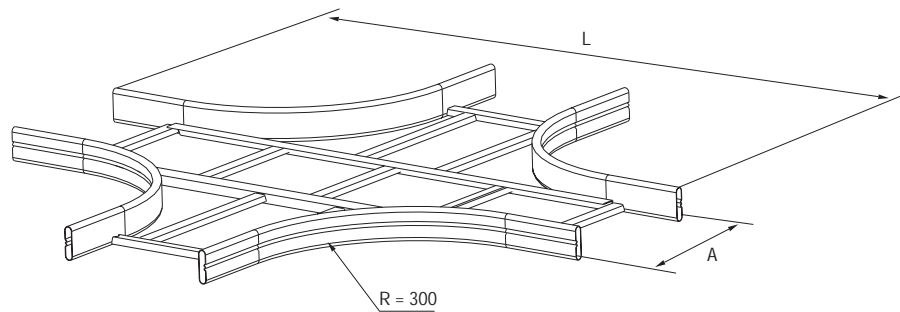
Installation example



T piece KSTE is fastened onto cable ladder KSE80 with connections SSR.

## BENDS, T and X PIECES

# X-piece KSXE R=300



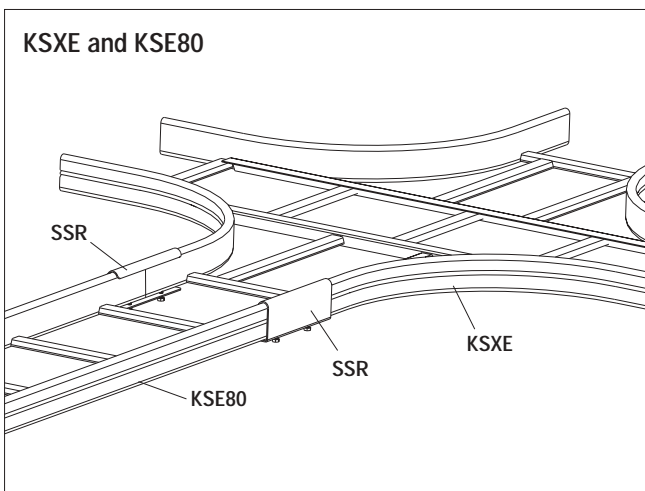
Manufactured to order.

Product	Package pcs	Weight kg /100 pcs	A mm	L mm
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Hot dip galvanised after manufacture

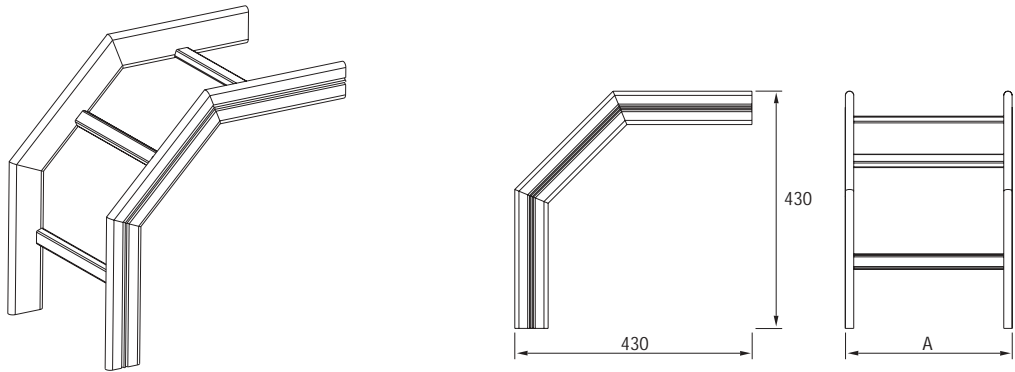
KSXE-150 R=300	1	530	150	1050
KSXE-200 R=300	1	626	200	1100
KSXE-300 R=300	1	660	300	1200
KSXE-400 R=300	1	700	400	1300
KSXE-500 R=300	1	780	500	1400
KSXE-600 R=300	1	833	600	1500

Installation example



X piece KSXE is fastened onto cable ladder KSE80 with connections SSR.

# Vertical angle KSVE



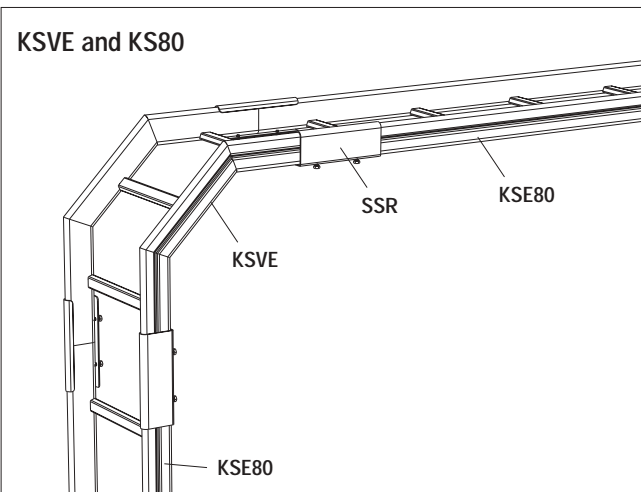
Manufactured to order.

Product	Package pcs	Weight kg /100 pcs	A mm
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Hot dip galvanised after manufacture

KSVE-150	1	190	150
KSVE-200	1	200	200
KSVE-300	1	220	300
KSVE-400	1	240	400
KSVE-500	1	260	500
KSVE-600	1	280	600

Installation example



Vertical angle KSVE is fastened onto cable ladder KSE80 with connections SSR.