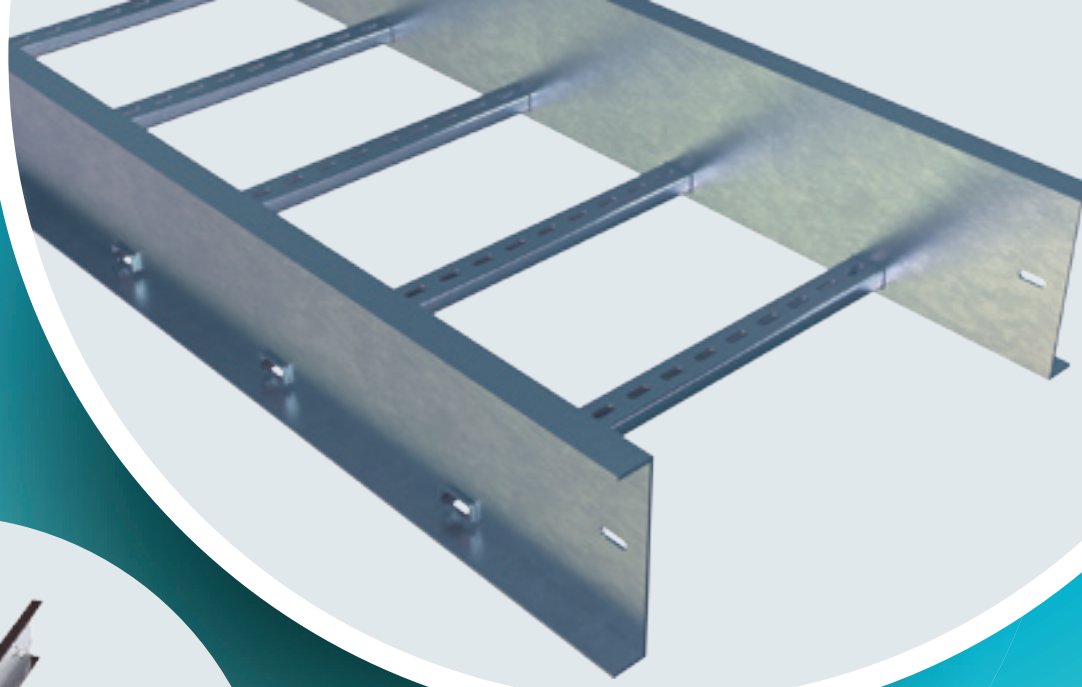

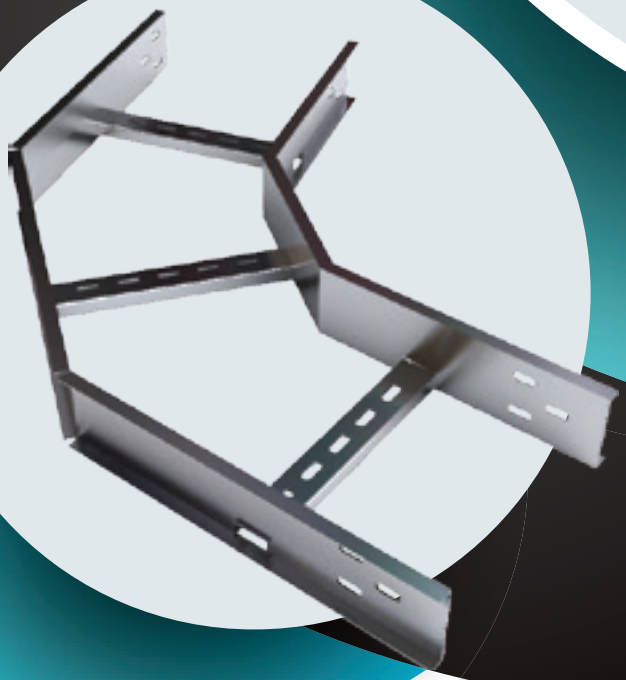

CABLE LADDER TRAYS
CATALOGUE

SFSP
Specialized Factory
for Steel Products /s.a.r.l
www.sfsp-lebanon.com

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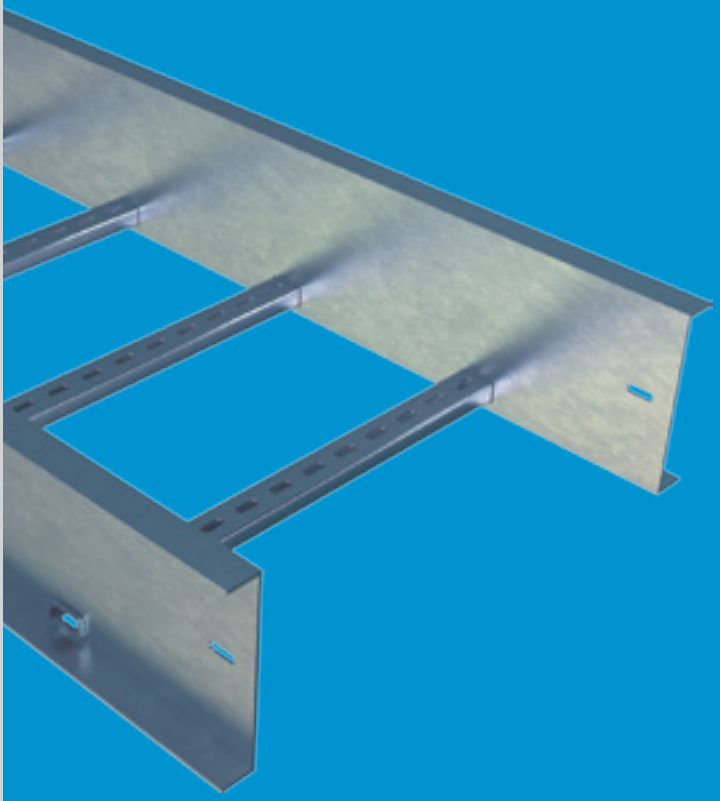
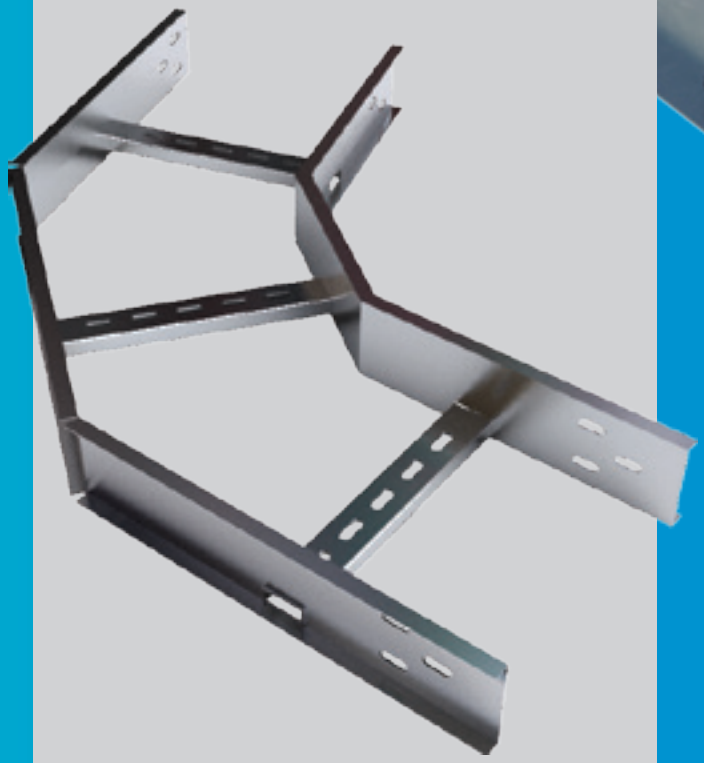




SFSP
Specialized Factory
for Steel Products /s.a.r.l
www.sfsp-lebanon.com

Specialized Factory for Steel Products is a leading factory in Lebanon, established in the year 2011 to serve the steel construction products industry in Lebanon and the region.
Production at the factory is observed using modern practices of manufacturing methods in the steel construction industry with a definite compliance to international standards of fabrication.
SFSP adapts quickly and easily to market demands and requirements. The factory is operating a top of the line production machinery, automated with high technology to ensure quality and maintain speed with delicacy.
Quality at SFSP is uncompromised; the factory is working as per ISO 9001: 2008 Quality Management System, with care for the safety of its workers and clients as well as the welfare of its society by acknowledging the environmental key issues, trying to maintain a pollution-free production facility

TECHNICAL SERVICES

A crucial factor in the job of a factory is to provide continuous technical services and consultations.
That's why SFSP has invested in a professional team of researchers and specialists.
SFSP has recruited brilliant graduates and experienced engineers having the appropriate knowhow on the on latest technology changes and development in the steel building materials industry.
The product range is developed and updated according to the relevant standards of fabrication across markets, whilst the business processes are evaluated to achieve maximum efficiency.

SFSP R&D Core Objectives

- Carry out responsibilities effectively in a safe and healthy work environment.
- Develop and implement research programs relevant to the products and solutions introduced and ensure that the results are communicated clearly in-house and among the clients , concisely and accurately.

SOCIAL RESPONSIBILITY

Being socially responsible is a part of who we are and how we do our business. We aim to provide useful products and services, to provide jobs and development opportunities for our communities, and to gain satisfaction through meaningful work.
We make a difference by acting on the values and principles of our societies and we inspire others to do so. At SFSP, we anticipate and reduce threats caused by environmental changes or natural disasters, and we are well adapted to significant social changes.
We contribute to a more sustainable society by means of value and support to our consumers, supply chains, and stakeholders. We are keen to identify ways they can improve our impacts on the people and places we work and live in, and thereby become more valuable and valued members of society.

- Organizational governance: We promote accountability and transparency at all levels, thus, promoting responsibility
- Human care: We treat individuals with respect; and make efforts to help members of vulnerable groups
- Labor practices: We provide just, safe and favorable conditions to workers
- Environment: At SFSP, we Identify and improve environmental impacts of our operations, including the resource use of natural resources and waste disposal.
- Fair operating practices: Practicing accountability and fairness in dealings with other businesses

At SFSP, we are committed to continuous improvement ongoing learning, process review and innovative thinking that foster new initiatives; and better practices. Our environmental programs evolve to meet today's changing needs while; protecting resources for future; generations.

ENVIRONMENTAL AWARENESS

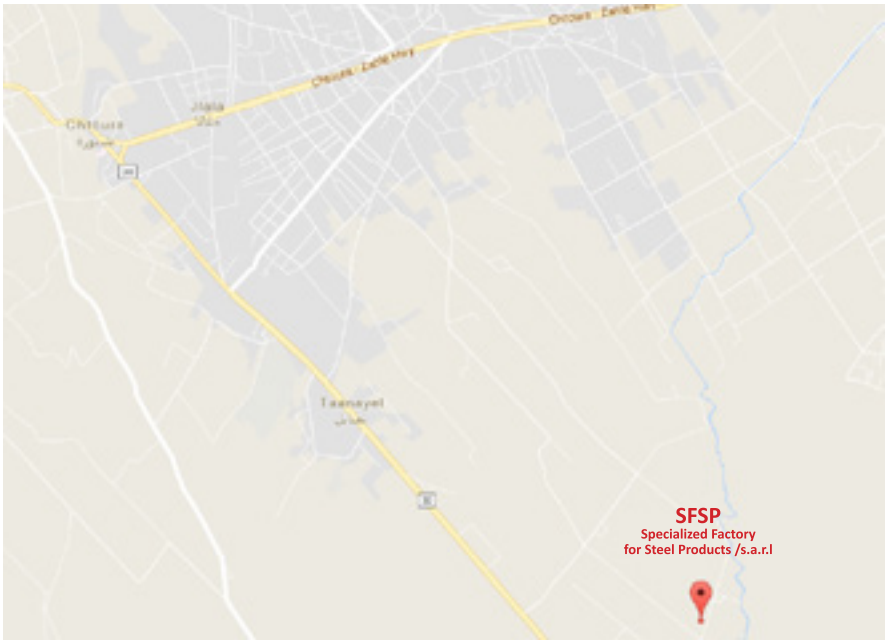
SFSP is committed to the following:

- Compliance with all statutory and regulatory requirements related to its activities, products and services and the environmental aspects.
- Identifying quality and environmental objectives by review and audit of the processes both in-house and on-site.
- Formally setting objectives based on the results of the process reviews and their significance in relation to their impact on the environment and the continual improvement of the quality and environmental management system.
- Implementing management programs to achieve these objectives.
- Investing in a well-trained and motivated workforce.
- Working closely with suppliers and customers to ensure mutual understanding and benefits of the environmental aspects consideration.
- Reviewing our policy and objectives as part of the Management Review Process.
- Communicating this policy to all persons working for or on behalf of the organization.
- Preventing and minimizing Pollution to the environment.

LOCATION

SFSP / Lebanon
management@sfsp-lebanon.com

Specialized Factory for Steel Products / s.a.r.l
Tanayel, Bekaa
Tel: +961 8 514 290
Fax: +961 8 514 291



HEALTH AND SAFETY

The Factory Management regard the health and safety of the employees, clients and all others that may be affected by their operations to be of a major importance.

In support of this, the management promotes health and safety throughout the Factory's operations and endeavour to engender a positive attitude in all employees towards the prevention of accidents and maintenance of healthy working arrangements.

The Factory satisfies the requirements of the Health, Safety and related legislation by setting out the responsibilities of all levels of staff and the arrangements for carrying out those responsibilities and in particular do what is reasonably practicable to:

1. Maintains safe & healthy working conditions.
2. Ensures that all facilities and equipment are safe and properly maintained.
3. Provides products that can be applied and used safely and without risk to health.
4. Provides and maintain working procedures, that are safe and without risk to health, throughout the its operations in respect of:

- **The use, handling, storage, transports and disposal of materials and substances.**
- **The use of factory equipment.**
- **Potential emergency situations, including first aid, fire and escape of substances.**

5. Ensure the competence of employees.

SFSP facilities are equipped with advanced machinery amongst are Cable Management Production Lines, Steel cladding systems production lines, metal lathes and blockwork production line, garbage and linen chutes production line, and also partition and ceiling profiles production capacity, and Computerized Numerical Cut machines to ensure delicacy and speed of delivery.

SFSP PRODUCTS

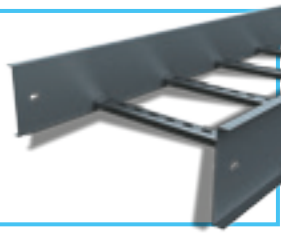
SFSP produces a variety of products ranging from cable management systems; cable trays, cable ladders, basket trays, trunkings and support systems, to mechanical cladding fixations, steel lintels and block work accessories, plasterers' beads, expanded metal and block work reinforcement, strut channel systems, pipe clamps & hangers, gypsum profiles as well as garbage and linen chutes. With the introduction of new machines and the enhancement of production methods, SFSP continues to develop its production methods systematically as well as thoroughly.

CABLE TRAYS & ACCESSORIES

Cable Trays are designed to meet most requirements of cable and electrical wire installations and comply to local and international standards of fabrications and finishes.

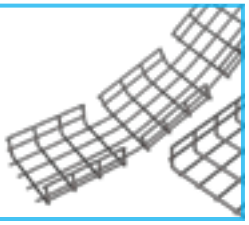
CABLE LADDERS (WELDED & SWAGED)

Cable Ladders of different side heights are available upon request.



BASKET TRAYS & ACCESSORIES

SFSP's Basket Tray systems make connections fast and simple with limited need for tools. Its design allows for continuous airflow, and prevents heating up of cables. SFSP's Basket Tray comes in a full range of sizes and is made with high-strength welded steel wires.



CABLE TRUNKINGS

Cable Trunkings and Accessories are offered in a comprehensive range. Mill galvanized, hot-dip galvanized, and powder coated are the various finishes produced in our factories.

UNDERFLOOR TRUNKING

Underfloor Trunking Systems solutions incorporate a range of products for the distribution of power and data services , it is a coordinated set of containments that protect, segregate, contain, and route cables within a given environment.

CABLE MANAGEMENT SUPPORT SYSTEMS

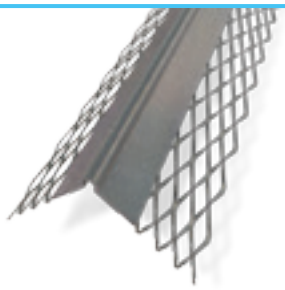
Cable Support Systems are well designed to provide necessary support for cable trays, cable ladders and trunkings. Cable supports are manufactured according to common standards from high quality raw materials.

C-CHANNEL STRUT SYSTEMS

SFSP's Metal Framing Systems provide an economical solution for electrical, mechanical and industrial supports with a wide variety of applications in the construction industry.
Applications: - Pipe and Conduit Supports - Tunnel Pipe Stanchions - Racks and Shelvings - Wall Framings.

EXPANDED METALS, PLASTERERS` BEADS

Expanded Metals help the formation of joints, protection of corners and resistance against cracks, chips and impact damage.



BLOCK LADDER REINFORCEMENT

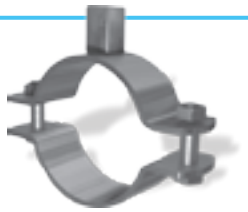
SFSP ladder and truss types are used for the reinforcement of brick and block masonry to give improved tensile strength to walls subjected to lateral loading e.g. wind and seismic. SFSPblock reinforcements reduces the risk of cracking either at stress concentration around opening.

STEEL LINTELS & BLOCK WORK ACCESSORIES

Steel Lintels provide a combination of strength and light weight, resulting in efficient load bearing performance and increased productivity on site. They are characterized by their ease of installation in addition to time as well as money saving.

PIPE CLAMPS & HANGERS

Pipe Clamps and Hangers from SFSP used in the support of pipes and equipments are manufactured according to the highest standards of fabrication.A diversified choice of Pipe Hangers, Pipe Clamps, EMT Straps, Omega Clamps, Beam Clamps, J and U-Bolts and Threaded Accessories.



MARBLE & GRANITE FIXINGS

Stangle Cladding Fixation includes design, calculation and production of several types of mechanical fixings and accessories used for cladding purposes. Stainless and galvanized steel are among the various materials used in the fabrication.

DRY WALL & CEILING PROFILES

SFSP provides a complete product range for dry wall and ceiling constructions. Studs, Runners, Furring Channels, Ceiling Channels and Wall Angles are among the range of products produced to service the dry wall installers.

GARBAGE & LINEN CHUTES

Chutes from SFSP are very convenient, simple and low cost method of controlling and disposing of refuse and linen. Chutes meet the most stringent requirements of environmental health and safety. Chutes are used as original equipment in new buildings, such as : Hotels, Hospitals, High Rises and Residential Towers.

EXPANSION JOINTS COVERS

SFSP manufactures architectural lines of thermal, seismic, waterproof, and fire-rated expansion joint systems meeting aesthetic and structural demands of multiple projects including airports, hospitals, commercial and residential buildings, shopping malls, and several other structural types

Materials used in SFSP expansion joints systems includes 6063 Aluminum, Rubber (Natural and Neoprene), Stainless Steel, TPE.

CABLE MANAGEMENT SYSTEMS

SFSP Cable Management Systems, fittings and accessories are manufactured in compliance with international standards. SFSP provides a wide range of products capable of providing the characteristics which respond to the proposed application, along with quality of assembly, speed of installation and cost-saving Cable Management Systems. Calculations are provided by our design office in Stuttgart, Germany.

SFSP Cable Management Systems are designed to meet most requirements of cable and electrical wire installations and comply to local and international standards of fabrication and finishing.
Cable Management Systems are economical wire and cable management systems designed to support and protect electrical wires and cables.

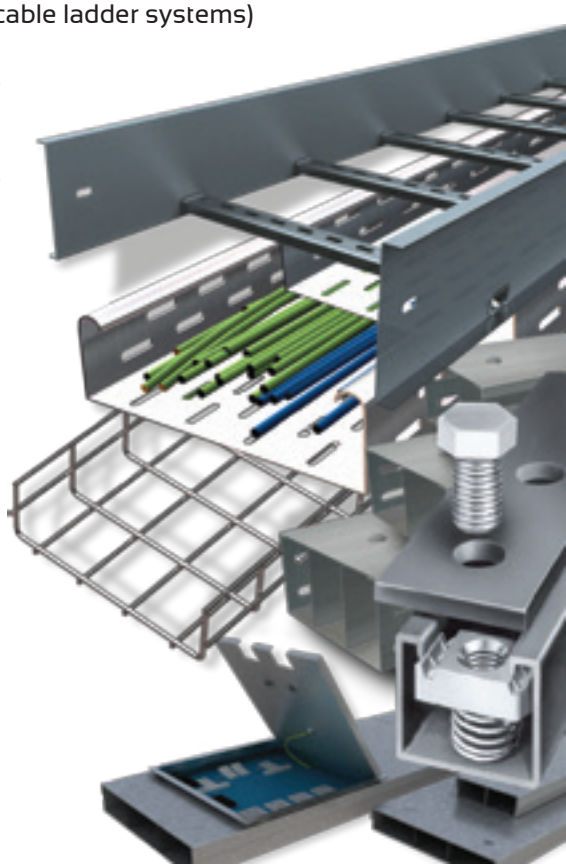
National Electric Code (NEC) permits Cable Trays in a wide variety of indoor and outdoor applications. The NEC also permits Cable Trays for use as equipment ground conductor.

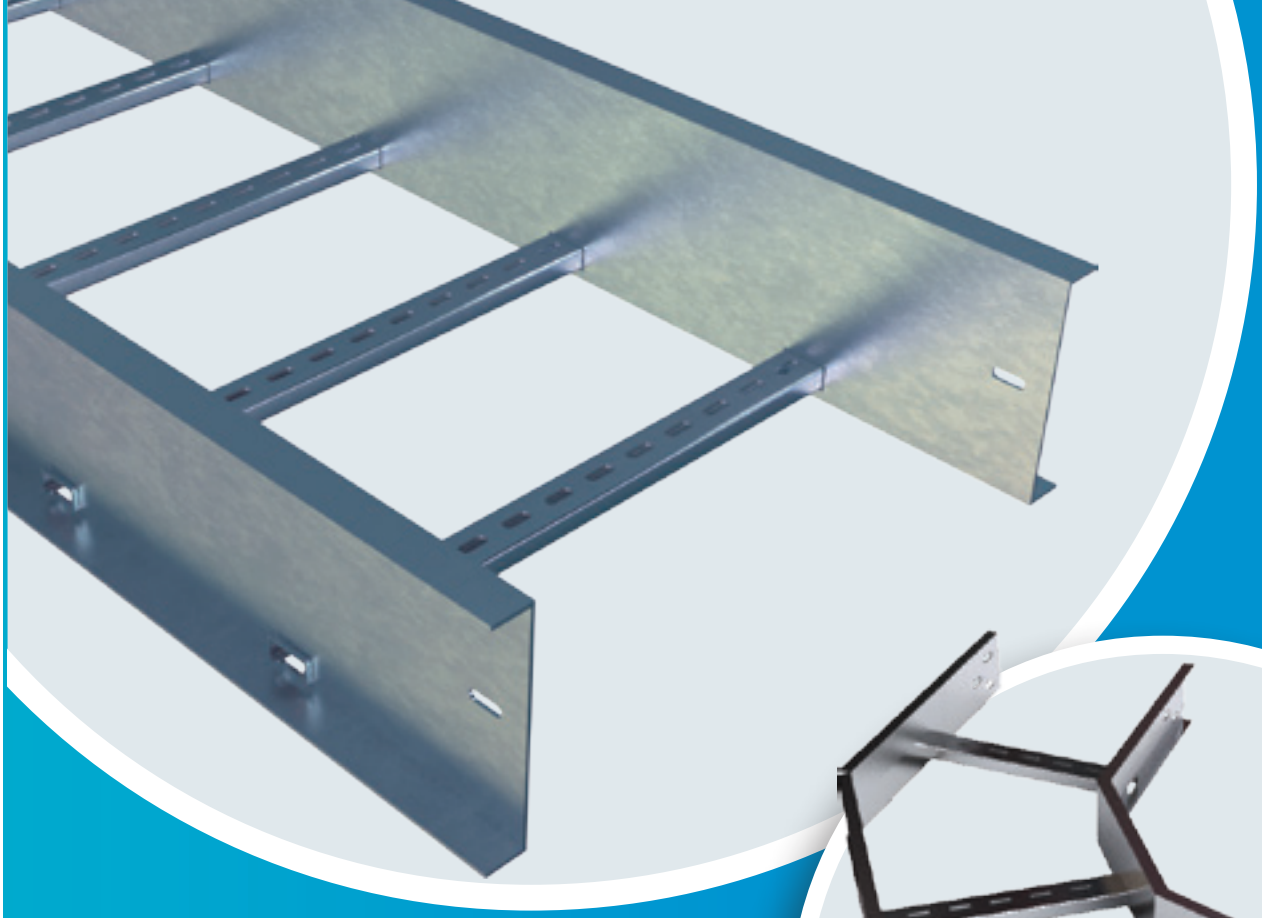
Cable Management Systems can provide significant advantages in cable filling over other wiring methods. This can provide savings in the size or number of raceways required, thereby, reducing both material and labor costs. In many cases, NEC permits greater conductor ampacities in Cable Tray Systems than for other wiring methods.

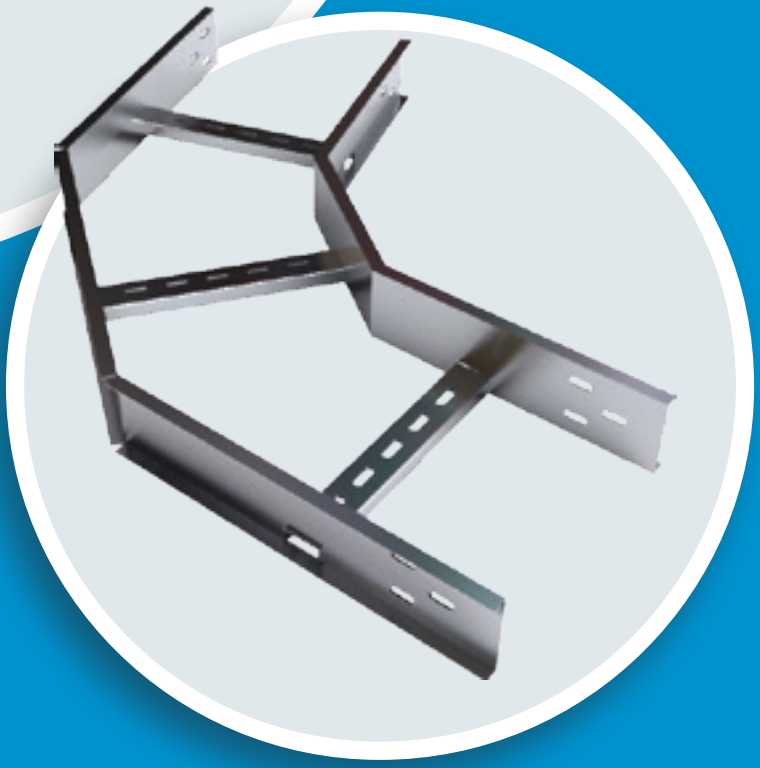
Under certain conditions, the NEC allows "Free Air" rating of large, single conductor power cables (4/0 & larger) in ventilated Cable Management Systems. This can provide significant savings in conductor costs. Cable Management Systems permit much greater spacing between support hangers than most other systems, providing savings in support costs and installation labor.

Cable Management Systems` types fittings and accessories from SFSP are manufactured in compliance with :

- IEC 61537:2007 - BS EN 61537:2007	International Electrotechnical Commission (Cable management, Cable tray systems and cable ladder systems)
- SASO IEC (61537:2006)	Saudi Standard (Cable management, Cable tray systems and cable ladder systems)
- NEMA VE 1 - 2009	National Electrical Manufacturers Association. (Metal Cable Tray Systems)
- NEMA VE 2 - 2006	National Electrical Manufacturers Association. (Metal Cable Tray Installation Guide Lines)
- NEC (ANSI / NFPA 70)	National Electric Code (Metal Cable Tray Guide Lines)





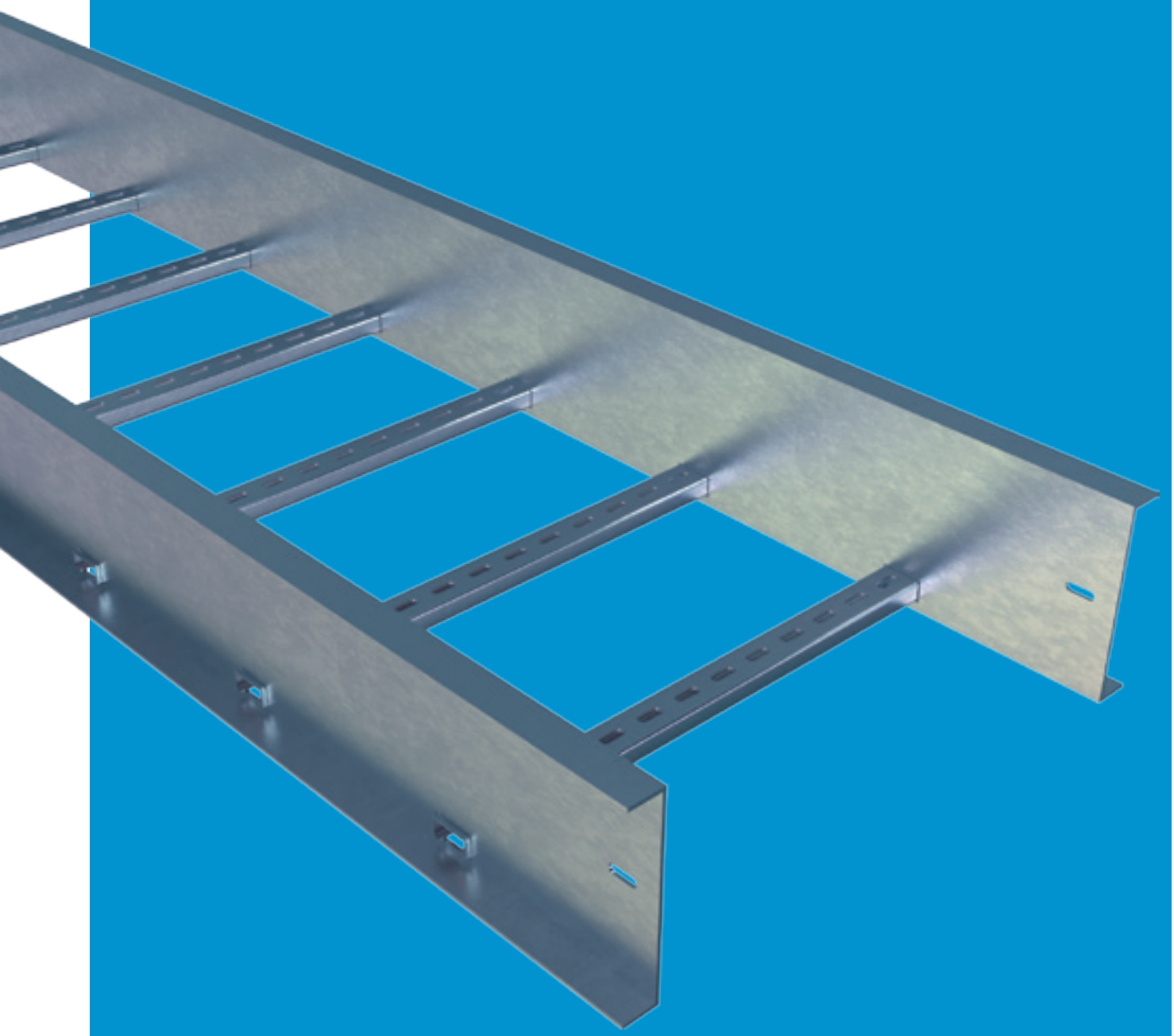


CABLE LADDER TRAY

Cable Ladder Trays are are designed to meet most requirements of cable and electrical wire installations and comply to local and international standards of fabrication and finishing.

This catalogue is designed to be helpful to engineers and contractors in the application and selection of Ladder Tray products for construction and maintenance.

If a unique application requires a special product not included in this catalogue , SFSP engineering personnel are ready to furnish design consultation and realistic cost estimates. In addition, know-how are available for your convenience.

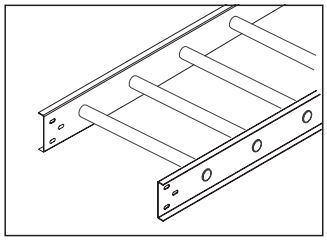


PRODUCTS RANGE

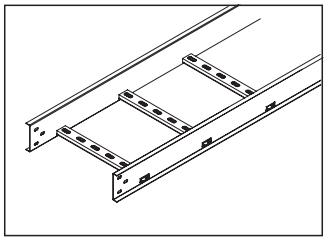
The different types of tray designs are described below:

Ladder Tray (Cable Ladder)

Swaged rounded tubular (Aluminum or Steel) or welded c-channel (steel). A prefabricated metal structure consisting of two side rails connected by individual transverse embers or rungs. Cable Ladder Trays are the most common and the most economical types of trays.
They also provide maximum ventilation for cabling.



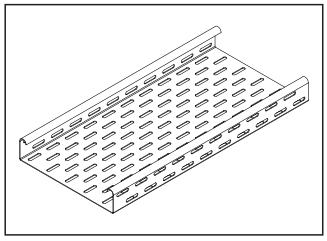
Swaged Rounded Tubular



Welded C-Channel

Perforated Cable Tray (Cable Trays)

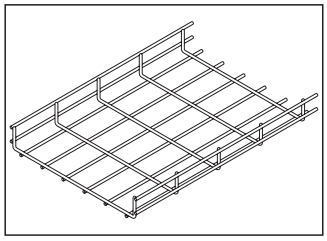
A prefabricated metal structure consisting of a bottom with openings within the cable bearing surface.
Solid bottom Cable Trays completely eliminate cable sagging and offer maximum protection for the cables.



Perforated Cable Tray

Wire Mesh (Basket Tray)

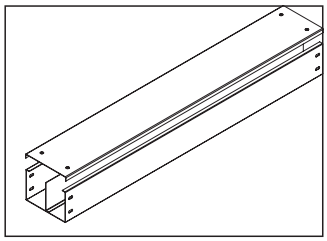
Is ideally suitable for light - to medium-duty commercial and industrial applications where space is at a premium. SFSP wire Basket Trays have a fast connection profile for installations requiring long runs of straight Cable Trays lengths. Applications : Network cabling, wiring closets, fiber-to-desktop applications and can often be used in suspended ceiling plenum areas and under computer room flooring.

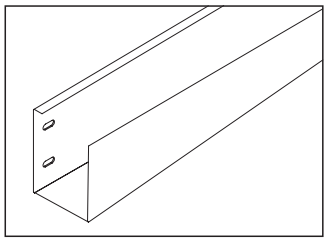


Wire Mesh

Solid (Cable Trunking)

A prefabricated metal structure consisting of a one-piece solid bottom channel section because we are reaching 600mm.





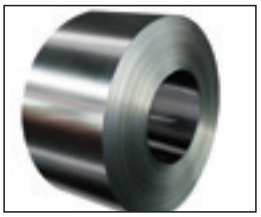
Cable Trunking

MATERIALS & FINISHES

Materials

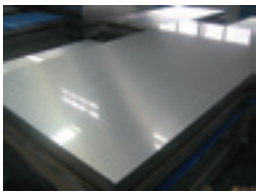
Mild Steel - Plain

A. Hot Rolled Steel Plates, Sheets and Coils S235 JR, as per:
EN 10025 -2 / DIN 17100 / BS 4360 / ASTM A 653M / ASTM A 1011 / ASTM A 1011-01a
JIS 3101 / JIS 3106 / GB 700 / GB / T1591.
ASTM A 907 / ASTM A 1018M.
ASTM A 570M / ASTM A 572M.
B. Cold Rolled Steel DC 01, as per:
EN 10130 / DIN 1623, Part 2 / BS 1449:1 / ASTM A366 / ASTM A 1008 / JIS G 3141 / GB 699.
EN 10131 / ASTM A 568M



Mild Steel - Galvanized

C. Continuously Pre- Galvanized Hot–Dip Zinc Coated Steel DX 51D + Z, as per:
EN 10327 / DIN 17162 / BS 2989/ ASTM A 527M / ASTM A 653M / JIS G 3302.
EN 10326/ EN 10142 / ASTM A 526, 527, 528/ ASTM A 146



D. Electro Galvanized Steel (Electrolytic Coating) DC01 + ZE v, as per:
EN 10152 / DIN 17163 / ASTM A591 / JIS G 3313 / JIS G 3141/BS 1449:1
EN 10131

Aluminum

E. Aluminum 6063 T6

Stainless Steel

F.Austenitic Stainless Steels SS 304 & SS 316, as per:
ASTM A 240 /EN 10088-2/ DIN 17400 / BS 1449:2 / ASTM A480 / ASTM A666 / ISO 3506 / EN 10028-7 /JIS G 4304
F.1 Stainless Steel Fasteners EN 3506
F.2 Stainless Steel Wire BS 1554 ,ASTM A276

Finishes

1- Hot–DIP Galvanization after Fabrication

as per:
ASTM A 123 / ASTM A 153 / ISO 1461.
BS 729 / DIN 50976

2- Zinc Electroplating after Fabrication

as per:
ASTM B633 / EN 12329 / ISO 4042/ BS 1706 / BS 3382 / DIN 50961

3- Powder Coating

Epoxy / Polyester / Epoxy & Polyester
BS 3900 / ISO 2409 / ISO 1519 / ISO 1520

SFSP Cable Ladder Tray Systems, fittings and accessories from SFSP are manufactured in compliance with :v

- IEC 61537	International Electrotechnical Commission (Cable management – Cable tray systems and cable ladder systems)
- SASO IEC (61537/2007)	Saudi Standard (Cable management – Cable tray systems and cable ladder systems)
- NEMA VE 1 - 2009	National Electrical Manufacturers Association. (Metal Cable Tray Systems)
- NEMA VE 1 class 20 C	
- NEMA VE 2 - 2006	National Electrical Manufacturers Association. (Metal Cable Tray Installation Guide Lines)
- NEC (ANSI / NFPA 70)	National Electric Code (Metal Cable Tray Guide Lines)

SFSP Cable Ladder Tray Systems are designed to meet most requirements of cable and electrical wire installations and comply to local and international standards of fabrication and finishing.

Cable Ladder Systems are economical wire and cable management systems designed to support and protect electrical wires and cables.

National Electric Code (NEC) permits Cable Ladder in a wide variety of indoor and outdoor applications.

The NEC also permits Cable Ladder for use as equipment ground conductor.

Cable Ladder Systems can provide significant advantages in cable filling over other wiring methods.

This can provide savings in the size or number of raceways required, thereby, reducing both material and labor costs.

In many cases, NEC permits greater conductor ampacities in Cable Ladder Systems than for other wiring methods.

Under certain conditions, the NEC allows “Free Air” rating of large, single conductor power cables (4/0 & larger) in ventilated Cable Ladder Systems. This can provide significant savings in conductor costs.

Cable Ladder permit much greater spacing between support hangers than most other systems, providing savings in support costs and installation labor.

TECHNICAL INFORMATION ACCORDING TO IEC 61537 STANDARD

Product under IEC 61537 - 2008 standard are in compliance with the requirement of the European directive.
This standard specifies the requirements for:

- Installation
- Load testing
- Classification
- Marking, dimensions
- Electrical Continuity

MATERIAL:	METALLIC:
Flame spreading resistance:	Non Flame Spreading
Electrical Conductivity Characteristics	With Conductivity
Electrical Continuity Characteristics	With Continuity

SFSP products meet electrical continuity requirement: Resistance ≤ 5 milli Ohm/mm
without couplers
Resistance ≤ 50 milli Ohm with splice plate

Splice Plate

The system components are designed to withstand. The stress likely to occur during recommended transport and storage. Cable tray system and cable ladder systems according to IEC are not intended to be used for human support.

Table 1

Classification for resistance against corrosion

Class	Reference - Material and Finish
0[a]	None
1	Electroplated to a minimum thickness of 5 µm
2	Electroplated to a minimum thickness of 12 µm
3	Pre-galvanised to grade 275 to EN 10327 and EN 10326
4	Pre-galvanised to grade 350 to EN 10327 and EN 10326
5	Post-galvanised tp a zinc mean coating thickness (minimum) of 45 µm according to ISO 1461 for zinc thickness only
6	Post-galvanised tp a zinc mean coating thickness (minimum) of 55 µm according to ISO 1461 for zinc thickness only
7	Post-galvanised tp a zinc mean coating thickness (minimum) of 70 µm according to ISO 1461 for zinc thickness only
8	Post-galvanised tp a zinc mean coating thickness (minimum) of 85 µm according to ISO 1461 for zinc thickness only (usually high silicon steel)
9A	Stainless steel manufactured to ASTM: A 240/A 240M - 95a designation S30400 or EN 10088 grade 1 - 4301 without a post-treatment[b]
9B	Stainless steel manufactured to ASTM: A 240/A 240M - 95a designation S31603 or EN 10088 grade 1 - 4301 without a post-treatment[b]
9C	Stainless steel manufactured to ASTM: A 240/A 240M - 95a designation S30400 or EN 10088 grade 1 - 4301 with a post-treatment[b]
9D	Stainless steel manufactured to ASTM: A 240/A 240M - 95a designation S31603 or EN 10088 grade 1 - 4404 with a post-treatment[b]

[a] For materials which have no declared corrosion resistance classification
[b] the post - treatment process is used to improve the protection against crevice crack corrosion and the contamination by other steels.

Table 2 Minimum temperature for the system component as given in **table 2**

Minimum Temperature Classification
Minimum transport, storage, installation and application temperature ºC
+5
-5
-15
-20
-40
-50

Table 3 Maximum temperature for the system component as given in **table 3**

Maximum Temperature Classification
Maximum transport, storage, installation and application temperature ºC
+40
+60
+90
+105
+120
+150

Table 4

Perforation base area Classification	
Classification	**Perforation in the base area**
A	up to 2%
B	over 2 % and up to 15 %
C	over 15 % and up to 30 %
D	More than 30 %

NOTE Classification D relates to IEC 60364 - 5 - 52, Sub clause A.52.6.2, second paragraph

Table 5

Free base area classification (Cable Ladder Length)	
Classification	**Free base area**
X	up to 80%
Y	over 80 % and up to 90 %
Z	More than 90 %

NOTE Classification Z relates to IEC 60364 - 5 - 52, Sub clause A.52.6.2, third paragraph

Table 6

Zinc coating thickness of reference materials			
Class	**Minimum Thickness**	**Minimum coating thickness as given in EN 10327 or EN 10326**	**Mean coating thickness (minimum) to ISO 1461**
	µm	**µm**	**µm**
0a	-	-	-
1	5	-	-
2	12	-	-
3	-	15	-
4	-	19	-
5	-	-	45
6	-	-	55
7	-	-	70
8	-	-	85

As declared by the manufacturer or responsible vendor

Table 7

Salt spray test duration	
Class (as detailed in Table 1	**Duration h**
0	-
1	24
2	96
3	155
4	195
5	450
6	550
7	700
8	850

TECHNICAL INFORMATION ACCORDING TO IEC 61537 STANDARD

Products covered by this standard are, in normal use, passive in respect of electromagnetic influences, emission and immunity. NOTE: When products covered by this standard are installed as part of a wiring installation, the installation may emit or may be influenced by electromagnetic signals. The degree of influence will depend on the nature of the installation within its operating environment and the apparatus connected by the wiring.

Power supply cables and signal cables can share the same cable conveyance systems (Trays, Channels, Etc.) Adequate seperation need to be provided (by distance or shielding) between power cables and signal cables. Power cables and signal cables need to be cross at right angles. In order to prevent disturbances, the minimum seperation between power cables and signal cables depends on many factors, such as following:

a) The level of immunity from the various electromagnetic interferance (surges, overcurrents, lighting impulses, ring waves, continuous waves, ect.) of the equipment connected to the signal cabling system.
b) The connection of the equipment to the grounding system.
c) The local electromagnetic environment (the simultaneous appearance of disturbances: for example, harmonics added to discharges and to continuous waves).
d) The electromagnetic spectrum.
e) The distances that the cables run parallel to each other (the coupling zone).
f) The kind of cable.
g) Cable attenuation against coupling.
h) The quality of the connections between the connectors and the cable.
f) The type of cable conveyance system and its accessories.

Seperation between signal cabling and power cabling

Type of installation	Distance		
	Without a dividing wall or with a non metal divider [1]	Aluminum divider	Steel divider
Unshielded power cable and Unshielded signal cable	200 mm	100 mm	50 mm
Unshielded power cable and shielded signal cable [2]	50 mm	20 mm	5 mm
shielded power cable and Unshielded signal cable	30 mm	10 mm	2 mm
shielded power cable and shielded signal cable	0 mm	0 mm	0 mm

1) It is assumed that in the event of a metal divider, the design of the cable conveyance system will provide shielding attenuation that is approximate to the material used in the divider.
2) Shielded signal cables have to be comply with the EN 50288 series.

Metal systems for cable conveyance: trays, channels, etc.

Metal systems for cable conveyance should always be connected to the local ground at both ends. Over long distances (more than 50 m), additional connections to the ground systems are recommended at irregular intervals. All ground should be a short as possible.

Ground and equipotentiel connections

Overview, the basic purposes of connection and grounding applicable to unshielded and shielded wiring systems are as follow:

- **Safety:** to limit contact voltage and provide a return path in the event of a fault to ground;
- **EMC:** to have zero potential and equipotentiality, which provide a shielding effect.

1. Terms and definition:

1.1 Cable tray system or cable ladder tray system assembly of cable supports consisting of cable tray lengths or cable ladder lengths and other systems components.

1.2 System Component

Parts used with in the system components are as follows:
a) Cable tray length or cable ladder tray length
b) Cable tray fitting or cable ladder tray fitting
c) Support device
d) Mounting device
e) System accessory

1.3 Fitting System component used to join, change direction, change dimension or terminate cable tray length (couplers, bends, tees, crosses).

1.4 Support device System component designed to provide mechanical support and which may limit movement of cable runway.

1.5 Mounting device System component used to attach or fix other devices to the cable runway.

1.6 Internal fixing device Device for joining and for fixing system components to other system components.

1.7 External fixing device Device used for fixing a support device to walls, ceiling or other structural parts.

2. Mechanical properties:

2.1 Mechanical strength: SFSP cable tray systems and cable ladder tray systems provide adequate mechanical strength. The SWL (safe working load) has been tested .The load has been increased to 1.7 times the SWL (according to IEC).

3. Electrical properties:

3.1 Electrical continuity

Cable tray system and cable ladder tray systems have adequate electrical continuity to ensure equipotential bonding and connections to earth.

3.2 Electrical non-conductivity

Cable tray system components and cable ladder tray system components have been declared electrically non conductive.
An overall accuracy of surface resistance has been guarantee: surface resistivity= Rx X p/g
ъ= surface resistivity in Ohm, Rx = Measured surface Resistance, P = twice the width of cable tray (mm), g = Distance between electrodes in mm.

All necessary information for a proper and safe installation and use of the cable tray system and cable ladder system has been provided. The safe working load and impact resistance is valid for the whole temperature declared.
The information include:
a) Instructions for the assembly and installation of system components and for the precautions required to avoid excessive transverse deflection which could cause damage to the cables.

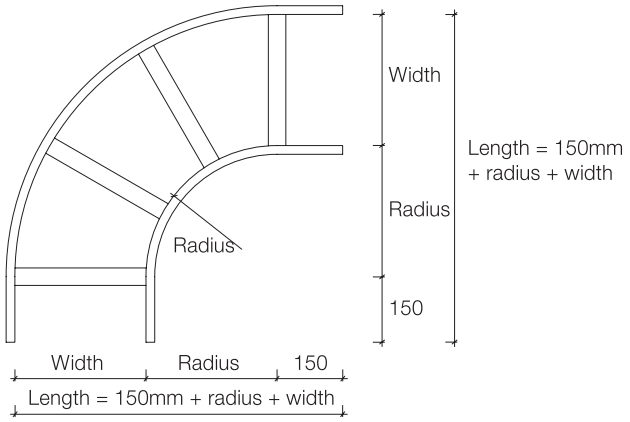
Transverse deflection:
Vertical deflection across the width of the base area, omitting the longitudinal deflection, when mounted horizontally.
The transverse deflection of each span at the safe working load shall not exceed 1/20th of the cantilever.

Mid-Span deflection:
The practical mid-span deflection as SWL shall not exceed 1/100th of the span.
If the span is greater than the cable tray length or cable ladder the joint shall be placed at min span.

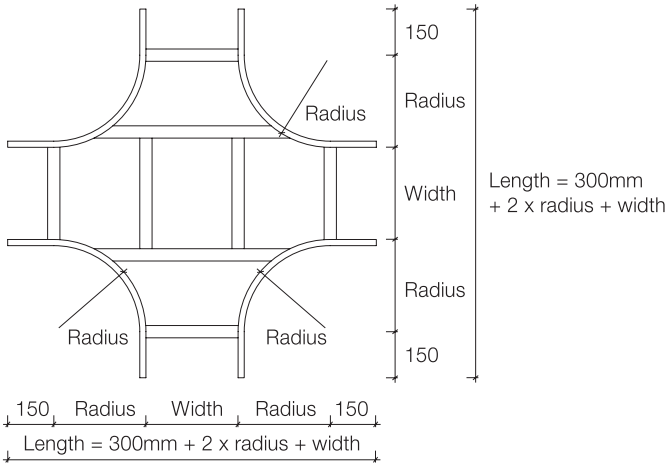
Product footprint

Cable ladder tray — accessory foot print standard radius is 300 mm.

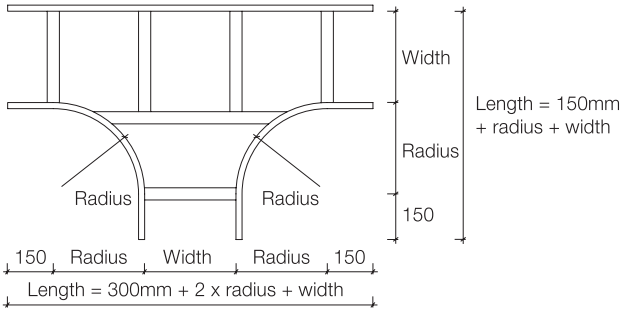
90 Degree Flat Bend



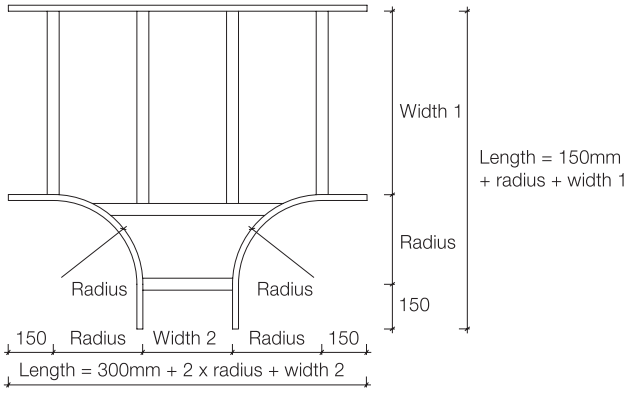
Crossover



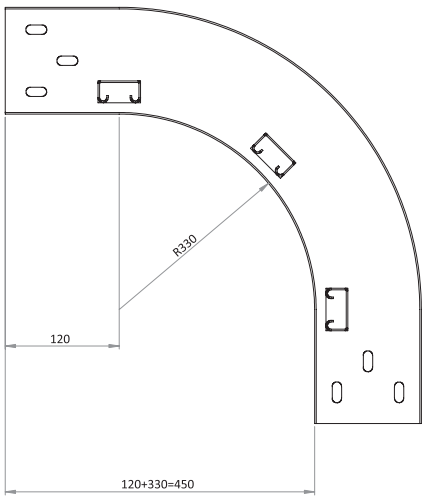
Equal Tee



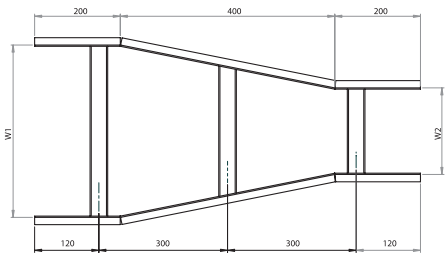
Unequal Tee

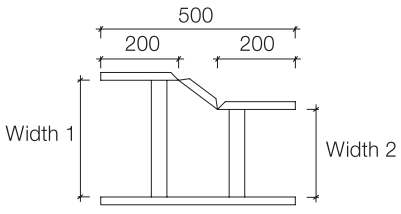


Outside Riser



Central, right, or left hand reducer





NEMA VE1 / SELECTION PROCESS

The following factors shall be considered when determining the appropriate Cable Trays Systems:

- Materials and Finishes
- Types of Cable Trays
- NEMA Classification
- NEMA Classes
- Cavity Size – Load Depth/Width of Tray

NEMA CLASSIFICATION

The National Electrical Manufacturers Association (NEMA VE-1) USA, classifications for Cable Trays were established to simplify and standardize the specifications of Cable Trays. This classification is based on the working load (the total weight of the cables), and the support span (the distance between supports).

Cable Load/Working Load

The Cable load or the working load is the total weight of the cables to be placed in the tray.
The NEMA classes are based on cable loads of 50Lbs/Ft., (74 kg/m), 75Lbs/Ft. (112 kg/m), and 100Lbs/Ft. (149 kg/m) .
This is the total weight of cables in the tray.
For purposes of selecting a suitable tray, this weight shall be rounded off to the next higher NEMA working (allowable) load.

Support Spans

Support span is the distance between the supports.
The NEMA standard support spans are based on 8’ (2.4m), 12’ (3.7m), 16’ (4.9m) and 20’ (6.0m).

NEMA CLASSES

The following table summarizes the NEMA classes based on cable/working load and support span described previously.

Table 1

NEMA Load/Span Designations

Class Designation	Support Span Feet		Working Load	
	Feet	m	Lbs./Ft.	Kg/m
8A	8	2.4	50	74
8B	8	2.4	75	112
8C	8	2.4	100	149
12A	12	3.7	50	74
12B	12	3.7	75	112
12C	12	3.7	100	149
16A	16	4.9	50	74
16B	16	4.9	75	112
16C	16	4.9	100	149
20A	20	6.0	50	74
20B	20	6.0	75	112
20C	20	6.0	100	149
D	20	6.0	45	67

Other Loading Considerations

Destruction Load Capacity

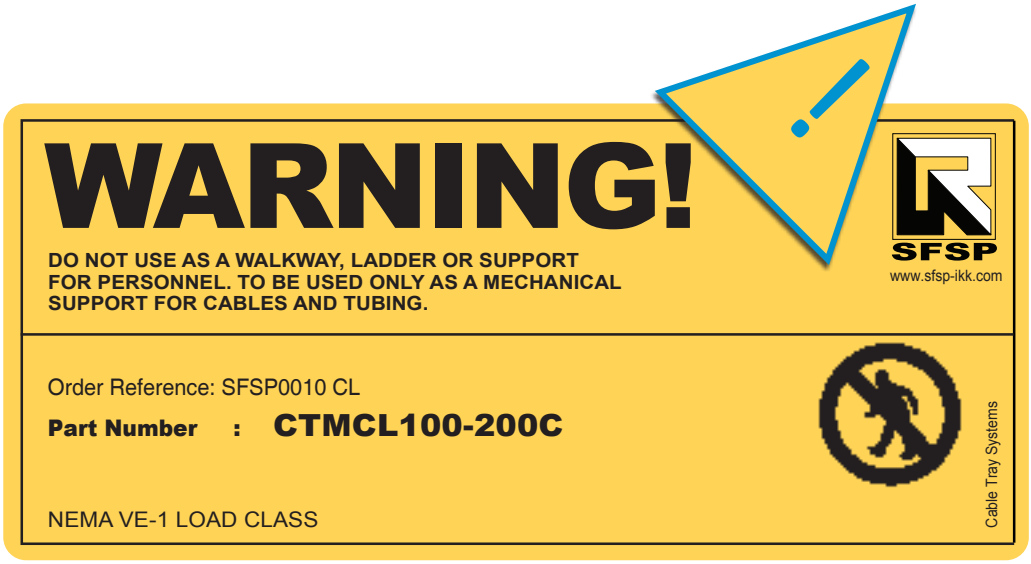
The total weight in the tray which causes the tray to collapse, is called the “destruction load capacity”. When trays do collapse, they generally do so by premature lateral buckling (compression) of the top flange.

Concentrated Loads

A concentrated load is a static weight applied between the side rails at mid span. When specified, these concentrated static loads may be converted to an equivalent uniform load (We), in pounds per linear foot or Kg/m, using the following formula:

$$We = \frac{2 \times \text{Concentrated Load}}{\text{Support Span in mm}}$$

This load is added to the static weight of the cable before selecting the appropriate NEMA load span designation.
Please note per the NEMA VE-1 guidelines all SFSP Cable Ladder Trays are labeled as follows:



Safety Factor

All loads stated in the selection charts have a 1.5 safety factor, in accordance with the NEMA VE-1 guidelines.
A safety factor is the reserve strength, above the actual cable loading, for which a tray system was designed.

Conversion of Safety Factor from 1.5 to 2.0

The loads stated in the selection charts have a safety factor of 1.5 per the NEMA VE-1 guidelines. To convert the load carrying capabilities, as listed in these charts, to a 2.0 safety factor, multiply the stated loads by 0.75.

Testing Methods

Loading data stated in the catalogue have been derived from actual testing of the tray systems, or by means of structural calculations. These figures are based on simple beam calculation, per the NEMA VE-1 guidelines.

When tray is supported as a simple beam, the load causes bending moments all along the beam resulting in deflection, called sag, inducing stress in the beam. The material above the longitudinal center line (neutral axis) is compressed.

Material below, is stretched and is in tension. The maximum stress in a simple beam is at the center of the span. Failure of Cable Trays will occur in compression before tension. This is why tray rails often have stiffened top flanges.

A simple beam is present when a single straight section of tray is supported on each end. When a series of straight sections are connected and supported by more than one support it is referred to as a continuous beam.

The NEMA VE-1 standards consider only a simple beam for testing purposes, due to the following reasons:

1. It requires maximum properties for a given load and support spacing.
2. It is the easiest when it comes to approximation by calculation.
3. It represents the most severe or worst case loading.
4. Destruction load capacities can be easily verified.

Deflection vs. Economy

Cable Ladder Trays meet all performance and dimensional criteria with safety factor. When deflection limitations are imposed, a less economical tray system may result. If deflection is a concern, **SFSP** recommends these maximum limits for the optimum design.

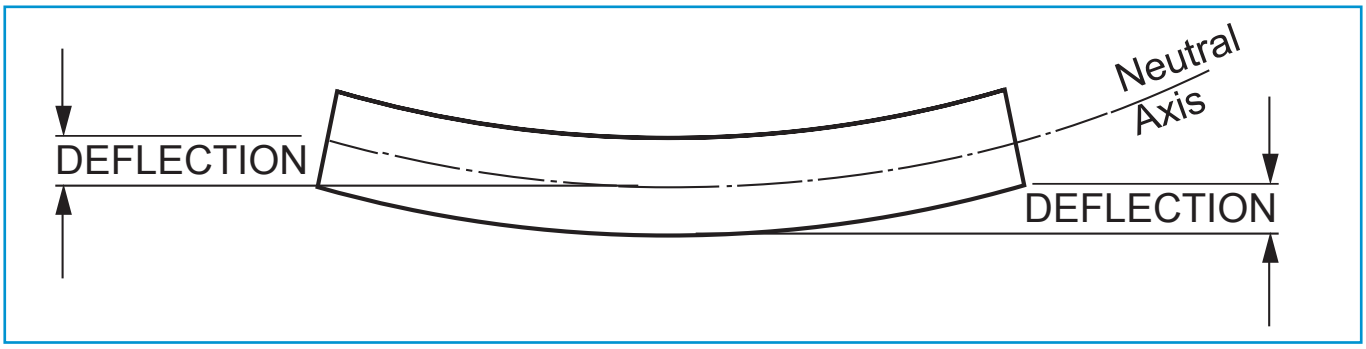


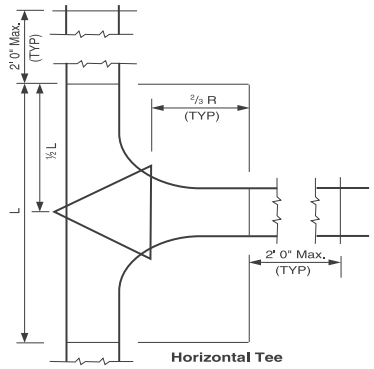
Table 2

	Simple Beam Span (m 3.60) '12	(m 6.00) '20
STEEL	1/100	1/75
ALUMINUM	1/75	1/50

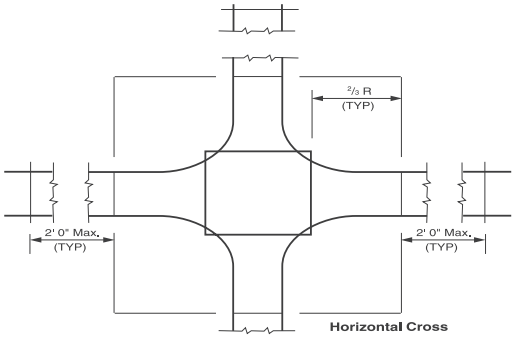
Continuous beams (such as installed tray) deflect approximately as much as 1⁄2 of Welded Cable Ladder Trays of simple beams.

Select the Fittings

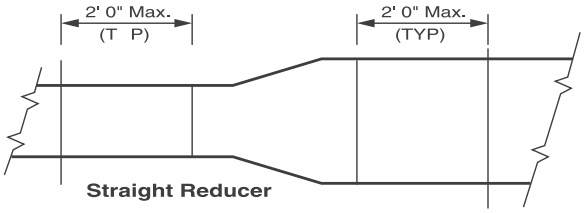
Fittings are used to change the size or direction of the Cable Ladder Trays. The most important decision to be made in fitting design concerns radius. The radius of the bend, whether horizontal or vertical, can be 305mm, 607mm, 914mm and 1219 mm, or even greater on a custom basis. The selection requires a compromise with the considerations being available space, minimum bending radius of cables, ease of cable pulling, and cost. The typical radius is 607mm. When a standard angle will not work, field fittings or adjustable elbows can be used. It may be necessary to add supports to the tray at these points. Refer to NEMA VE2 Installation Guidelines for suggested support locations. Note that fittings are not subject to NEMA/CSA load ratings.



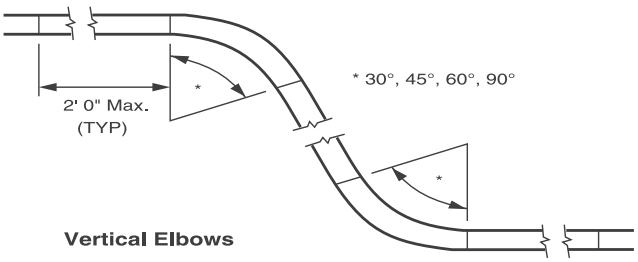
Horizontal Tee



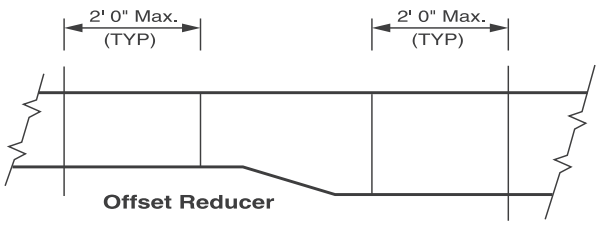
Horizontal Cross



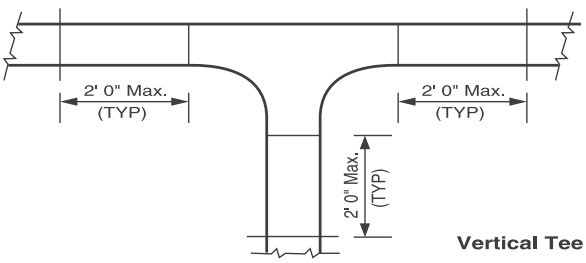
Straight Reducer



Vertical Elbows



Offset Reducer



Vertical Tee

Location of Couplings

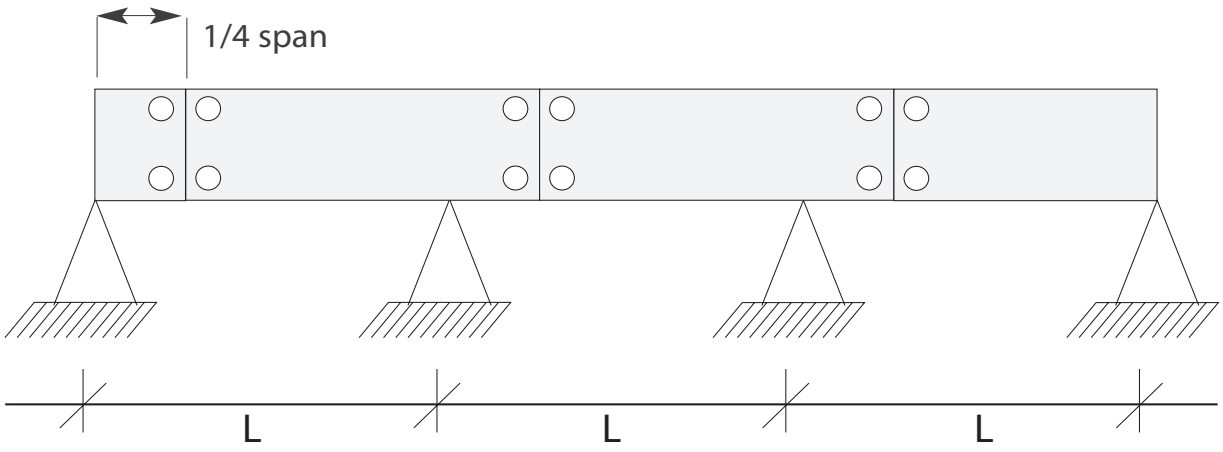
Since different bending moments are created in each span, there is no simple factor to approximate deflection as the number of spans increases. It is possible to calculate these deflections at any given point by using second integration of the basic differential equation for beams. Testing shows that the center span of a three-tray continuous beam can deflect less than 10 % of its simple beam deflection.

Couplers at 1/4 from Support Span

The support span cant be greater than the straight section length, to ensure no more than one splice is located between supports.

Location of Couplers. The location of the coupler dramatically affects the deflection of a Cable Ladder Trays System under equal loading conditions. Testing indicates that the maximum deflection of the center span of a three-span tray run can decrease four times if the couplers are moved from one-quarter span to above the supports. This can be a major concern for designers considering modular systems for tray and pipe racks.

Support Locations for Fittings



LENGTHS OF STRAIGHT SECTIONS

Cable Ladder Trays are available in 12'(3.7m) and 24'(7.4m) lengths in accordance with the NEMA Standards.
Customized lengths are also available upon request.
The following factors need to be considered when specifying the lengths of the trays:

Support Span

- The support span shall not be greater than the tray length. This ensures that the two splice plate connections will not fall within one support span.

Space Constraints

- When installing trays in a limited space, as often encountered in commercial applications, 10' (3.0m) and 12' (3.7m) lengths of tray are easier to handle and therefore are better suited for those applications.

Labor Costs

- Where trays are being installed in an industrial facility, where space is not a significant issue, handling 20' (6.1m) and 24' (7.4m) lengths may be more economical. In this instance, half as many tray connections need to be made.

Additionally, if the proper tray system is specified, support spans may be lengthened.

RADIUS OF FITTINGS

Cable Ladder Tray fittings are used to change directions both horizontally and vertically.

The standard radii for Cable Ladder Tray fittings are 12”(305mm), 24”(610mm), and 36”(915mm).

The radii of the fittings shall be based upon minimum bending radius of the cables.

This information can be obtained from the cable manufacturer.

Based on the total number of cables to be placed in the tray it may be more practical to use the next higher radius.

CABLE LADDER TRAY SUPPORT POSITIONS

Straight Sections

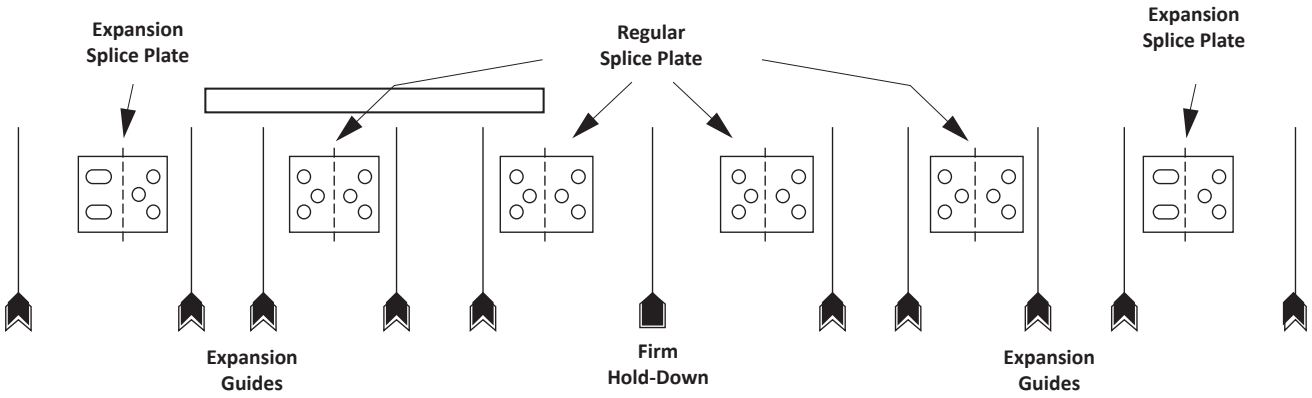
A general rule of thumb is that the splice plates shall not fall beyond the 1⁄4 point of the span, or the distance between supports. For example: On a 20 (6.1m) support span, the splice plates shall not be further than 5’ (1.5m) away from the support location. Under no circumstances shall two Cable Ladder Tray splices fall between any pair of supports. For special applications, mid-span splice plates can be furnished. Please contact the factory.

Fittings

Supports for Cable Ladder Tray elbows are critical. It is important to note that the Cable Ladder Tray will come under its greatest stress when cables are being pulled into the tray. Therefore, proper placement of supports is necessary to ensure that the integrity of the tray system is maintained during the cable pulling operation.
The diagrams on page 2-10 show the recommended support locations for fittings.

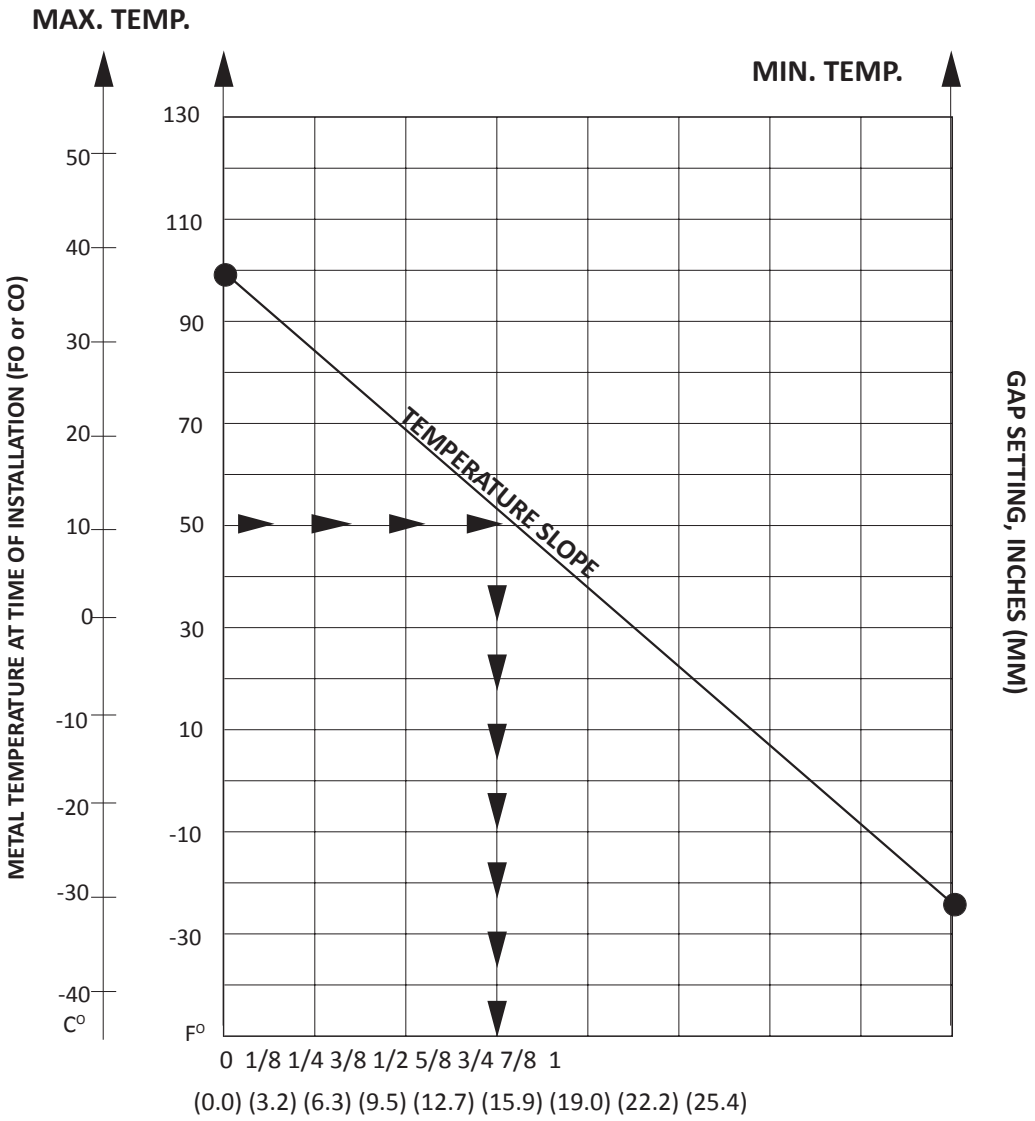
Thermal Expansion and Contraction

It is important to use expansion connectors when installing long runs of Cable Ladder Trays. The number of expansion connectors required will depend on:
(1) the maximum temperature difference
(2) the tray material being installed
Expansion Connectors allow 1” (2.5cm) of travel. This table illustrates how often expansion splice plates shall be used.



CABLE LADDER TRAY SUPPORT POSITIONS

The below mentioned table is used to determine the proper gap setting between trays. The metal temperature determines the proper gap setting at the time of installation. Establish maximum and minimum temperatures in summer and winter for the area. Draw a line connecting them.
Using the metal temperature at time of installation (C° or F°) draw a horizontal to temperature slope and plot straight down to find the gap distance at expansion joint.
This diagram illustrates the proper installation of an expansion system. It is important to note that Cable Ladder Trays grounding straps are required when expansion connections are made. This will ensure proper grounding continuity.



Temperature Difference		Distance between Expansion Joints					
		Steel		Aluminum		Copper	
25°F	(14°C)	512’	(156m)	260’	(79m)	363’	(111m)
50°F	(28°C)	256’	(78m)	130’	(40m)	182’	(55m)
75°F	(42°C)	171’	(52m)	87’	(27m)	121’	(37m)
100°F	(56°C)	128’	(39m)	65’	(20m)	90’	(27m)
125°F	(70°C)	102'	(31m)	52’	(16m)	72’	(22m)
150°F	(83°C)	85’	(26m)	43’	(13m)	60’	(18m)
175°F	(97°C)	73’	(22m)	37’	(11m)	52’	(16m)

Table 3

ELECTRICAL GROUNDING

NEC (ANSI / NFPA 70), Article 318-7 allows for Cable Trays to be used as an equipment grounding conductor in commercial and industrial establishments. The following table lists specific ampere ratings and the minimum cross sectional area requirements for each rating.

SFSP produces Cable Tray Systems which meet the National Electrical Code (ANSI/NFPA 70), these can be used for any project worldwide except where another standard may take precedence, such as the Canadian Standards Association (CSA).

When required, Cable Trays can be installed per the Canadian Electrical Code Parts I and II (CEC). Trays and splice plates meet the bonding requirements of the CSA Standards and the CEC.

The cross-sectional area for each Cable Trays System, straight sections and fittings can be found on the appropriate selection charts contained within this publication. In addition, all Cable Trays, straight sections and fittings are supplied with pressure sensitive labels indicating the cross sectional area of both side rails, as required by the (NEC) National Electrical Code.

Table 4

Max. Fuse Amp Rating Circuit Breaker Amp Trip Setting or Relay Amp Trip Setting for Ground Fault Protection of any Cable Trays Circuit In the Cable Trays Systems	Minimum Cross Sectional Area of Metal* Steel Cable Trays		Aluminum Cable Trays	
	In^2	mm^2	In^2	mm^2
60	0.2	129	0.2	129
100	0.4	258	0.2	129
200	0.7	452	0.2	129
400	1	645	0.4	258
600	1.50**	968	0.4	258
1,000	-		0.6	387
1,200	-		1	645
1,600	-		1.5	968
2,000	-		2.00**	1,290

**Total cross sectional area of both side rails for ladder trough type trays, or the minimum cross-sectional area for metal in channel type Cable Trays or Cable Trays of one piece construction.*

Bonding Jumpers / Straps

Cable Tray connections made with standard rigid splice plates, these rigid type connections do not require electrical bonding straps. Electrical bonding straps are required where Cable Trays are joined by connectors which allow movement, such as: vertical adjustable connectors, horizontal adjustable connectors and expansion connectors.

Proper grounding is also necessary where Cable Trays run parallel to each other, are stacked upon one another and in other instances where tray runs are discontinuous.

Summary

You are now ready to select the best Cable Trays System to meet your needs. By now, we hope you've decided to select the system using the NEMA CLASSIFICATION (8A, 12B, 20C, etc.) which makes your work so much easier.

Selection is also possible using physical dimensions, performance or any combination of these data listed NEMA oriented.

CABLE SPECIFICATIONS

Most cable manufacturers offer a very accurate method of calculating cable weights, and appropriates lists or tables can be obtained from them.

Important: The tables only provide a rough overview. They are average values, which may vary from manufacturer to manufacturer. Please refer to the manufacturer‘s specifications for the exact values.

Actual cable weights of different cable types

Insulated power cables		Insulated power cables				Telecommunication Cables	
Type	Cable load kg/m	Type	Cable load kg/m	Type	Cable load kg/m	Type	Cable load kg/m
1 x 4	0.08	1 x 10	0.18	4 x 50	2.3	2 x 2 x 0,6	0.03
1 x 6	0.105	1 x 16	0.24	4 x 70	3.1	4 x 2 x 0,6	0.035
1 x 10	0.155	1 x 25	0.35	4 x 95	4.2	6 x 2 x 0,6	0.05
1 x 16	0.23	1 x 35	0.46	4 x 120	5.2	10 x 2 x 0,6	0.065
1 x 25	0.33	1 x 50	0.6	4 x 150	6.4	20 x 2 x 0,6	0.11
3 x 1.5	0.135	1 x 70	0.8	4 x 185	8.05	40 x 2 x 0,6	0.2
3 x 2.5	0.19	1 x 95	1.1	4 x 240	11	60 x 2 x 0,6	0.275
3 x 4	0.265	1 x 120	1.35	5 x 1,5	0.27	100 x 2 x 0,6	0.445
4 x 1.5	0.16	1 x 150	1.65	5 x 2,5	0.35	200 x 2 x 0,6	0.87
4 x 2.5	0.23	1 x 185	2	5 x 6	0.61	2 x 2 x 0,8	0.04
4 x 4	0.33	1 x 240	2.6	5 x 10	0.55	4 x 2 x 0,8	0.055
4 x 6	0.46	1 x 300	3.2	5 x 16	1.25	6 x 2 x 0,8	0.08
4 x 10	0.69	3 x 1,5	0.19	5 x 25	1.95	10 x 2 x 0,8	0.115
4 x 16	1.09	3 x 2,5	0.24	5 x 35	2.4	20 x 2 x 0,8	0.205
4 x 25	1.64	3 x 10	0.58	5 x 50	3.5	40 x 2 x 0,8	0.38
4 x 35	2.09	3 x 16	0.81			60 x 2 x 0,8	0.54
5 x 5.1	0.19	3 x 50	1.8			100 x 2 x 0,8	0.875
5 x 2.5	0.27	3 x 70	2.4			200 x 2 x 0,8	1.79
5 x 4	0.41	3 x 120	4				
5 x 6	0.54	4 x 1,5	0.22				
5 x 10	0.85	4 x 2,5	0.29				
5 x 16	1.35	4 x 6	0.4				
5 x 25	1.99	4 x 16	1.05				
7 x 1.5	0.24	4 x 25	1.6				
7 x 2.5	0.35	4 x 35	1.75				

IT cables type cat		Coax cable (Standard)	
Type	Cable load kg/m	Type	Cable load kg/m
Cat. 5/Cat. 6	0.06	SAT/BK cable	0.06

CABLE SPECIFICATIONS

External diameter and cross section

Insulated power cables		
Type	Ø mm	Useful cross-section cm²
1 x 4	6.50	0.42
1 x 6	7.00	0.49
1 x 10	8.00	0.64
1 x 16	9.50	0.90
1 x 25	12.50	1.56
3 x 1.5	8.50	0.72
3 x 2.5	9.50	0.90
3 x 4	11.00	1.21
4 x 1.5	9.00	0.81
4 x 2.5	10.50	1.10
4 x 4	2.50	1.54
4 x 6	13.50	1.82
4 x 10	16.50	2.72
4 x 16	19.00	3.61
4 x 25	23.50	5.52
4 x 35	26.00	6.76
5 x 5.1	9.50	0.90
5 x 2.5	11.00	1.21
5 x 4	13.50	1.82
5 x 6	14.50	2.10
5 x 10	18.00	3.24
5 x 16	21.50	4.62
5 x 25	26.00	6.76
7 x 1.5	10.50	1.10
7 x 2.5	13.00	1.69

Insulated power cables		
Type	Ø mm	Useful cross-section cm²
1 x 10	10.50	1.10
1 x 16	11.50	1.32
1 x 25	12.50	1.32
1 x 35	13.50	1.82
1 x 50	15.50	2.40
1 x 70	16.50	2.72
1 x 95	18.50	3.42
1 x 120	20.50	4.20
1 x 150	22.50	5.06
1 x 185	25.00	6.25
1 x 240	28.00	7.84
1 x 300	30.00	9.00
3 x 1,5	11.50	1.32
3 x 2,5	12.50	1.56
3 x 10	17.50	3.06
3 x 16	19.50	3.80
3 x 50	26.00	6.76
3 x 70	30.00	9.00
3 x 120	36.00	12.96
4 x 1,5	12.50	1.56
5 x 2,5	13.50	1.82
4 x 6	16.50	2.72
4 x 10	18.50	3.42
4 x 16	21.50	4.62
4 x 25	25.50	6.50
4 x 35	28.00	7.84
4 x 50	30.00	9.00
4 x 70	34.00	11.56
4 x 95	39.00	15.21
4 x 120	42.00	17.64
4 x 150	47.00	22.00
4 x 185	52.00	27.00
4 x 240	58.00	33.60
5 x 1,5	13.50	1.82
5 x 2,5	14.50	2.10
5 x 6	18.50	3.42
5 x 10	20.50	4.20
5 x 16	22.50	5.06
5 x 25	27.50	7.65
5 x 35	34.00	11.56
5 x 50	40.00	16.00

Telecommunication Cables		
Type	Ø mm	Useful cross-section cm²
2 x 2 x 0,6	5.00	0.25
4 x 2 x 0,6	5.60	0.30
6 x 2 x 0,6	6.50	0.42
10 x 2 x 0,6	7.50	0.56
20 x 2 x 0,6	9.00	0.81
40 x 2 x 0,6	11.00	1.12
60 x 2 x 0,6	13.00	1.69
100 x 2 x 0,6	17.00	2.89
200 x 2 x 0,6	23.00	5.29
2 x 2 x 0,8	6.00	0.36
4 x 2 x 0,8	7.00	0.49
6 x 2 x 0,8	8.50	0.72
10 x 2 x 0,8	9.50	0.90
20 x 2 x 0,8	13.00	1.69
40 x 2 x 0,8	16.50	2.72
60 x 2 x 0,8	20.00	4.00
100 x 2 x 0,8	25.50	6.50
200 x 2 x 0,8	32.00	10.24

The choice is made under consideration of:
1- The number of cable to be passed in a Cable Tray (Load carrying capacity of the tray).
2- The load of cable to be passed in a cable tray and support distance.

Cable Capacity

For the estimation of cable area, the table shown below is used to help.

Table 1

Space needed for cable to type NYY for example:

Cable	Diameter	Area per cable x Number of cable	Usable area
4 x 1,5	12,5	1,5 x 1	1,5
4 x 2,5	14,0	1,8 x 1	1,8
4 x 6,0	16,5	3,0 x 1	3,0
4 x 16	22	5,0 x 1	5,0
4 x 35	31	12,0 x 1	12,0
4 x 70	41	16,0 x 1	16,0
			A ≥ ∑ 39,30 cm²

For cables of any size the area per cable is multiplied with the number of cables , whereas the sum(A) is the total area of the cables. The result is the needed cross section area of the Cable Tray .

Example

For the cable shown in table 1 (using 1 cable of each type) we need min. a Cable tray of 40.0 cm² .

Table 2

Weight of cables type NYY (Power Cable)

Cable NYY	Cable weight N/m	x	Number of Cables (variable)	=	Total weight N/m
4 x 1,5	1,6	x	1	=	1,6
4 x 2,5	2,3	x	1	=	2,3
4 x 6,0	4,6	x	1	=	4,6
4 x 16	10,9	x	1	=	10,9
4 x 35	20,9	x	1	=	20,9
4 x 70	31,0	x	1	=	31,0

Cable Load F = ∑ 71,3 N/m

Cable Weight

To determine the total weight, each cable weight is multiplied with the its number. The result is the estimated cable load (F).
The highest possible cable load is decisive. This is calculated by multiplication of the usable diameter with the specific cable weight.

According to DIN VDE 0639

Type of Cable Support	Cable	Specific Cable weight
Cable Ladder	Control line cables	Usable section x 2,8N/m x cm²
Cable Tray	Voltage line cables	Usable sectionx1,5 N/m x cm²

In order to choose construction pieced of sufficient weight load ability, the load of each Cable Tray or Cable Ladder at the support point has to be determined.

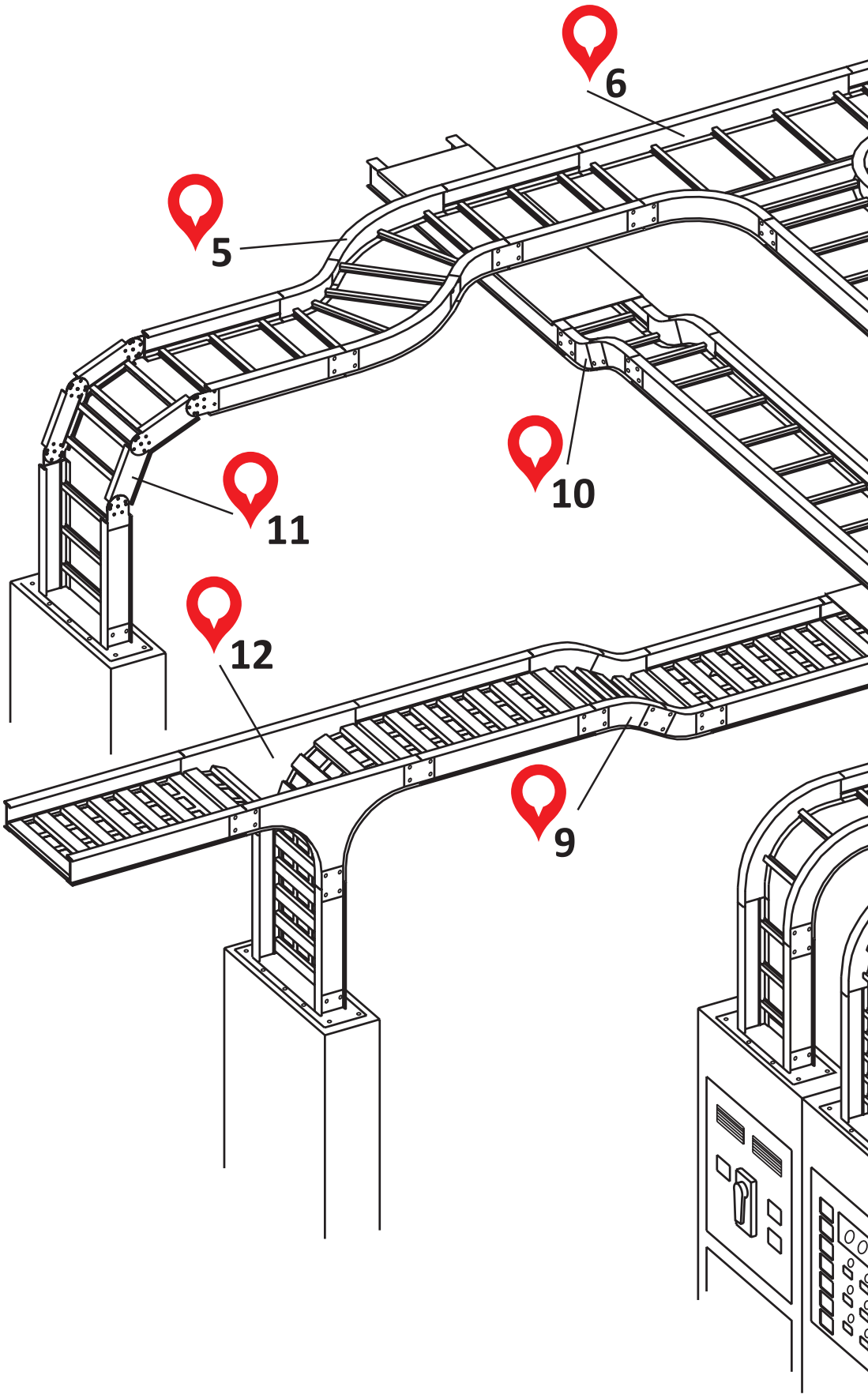
Supporting structures

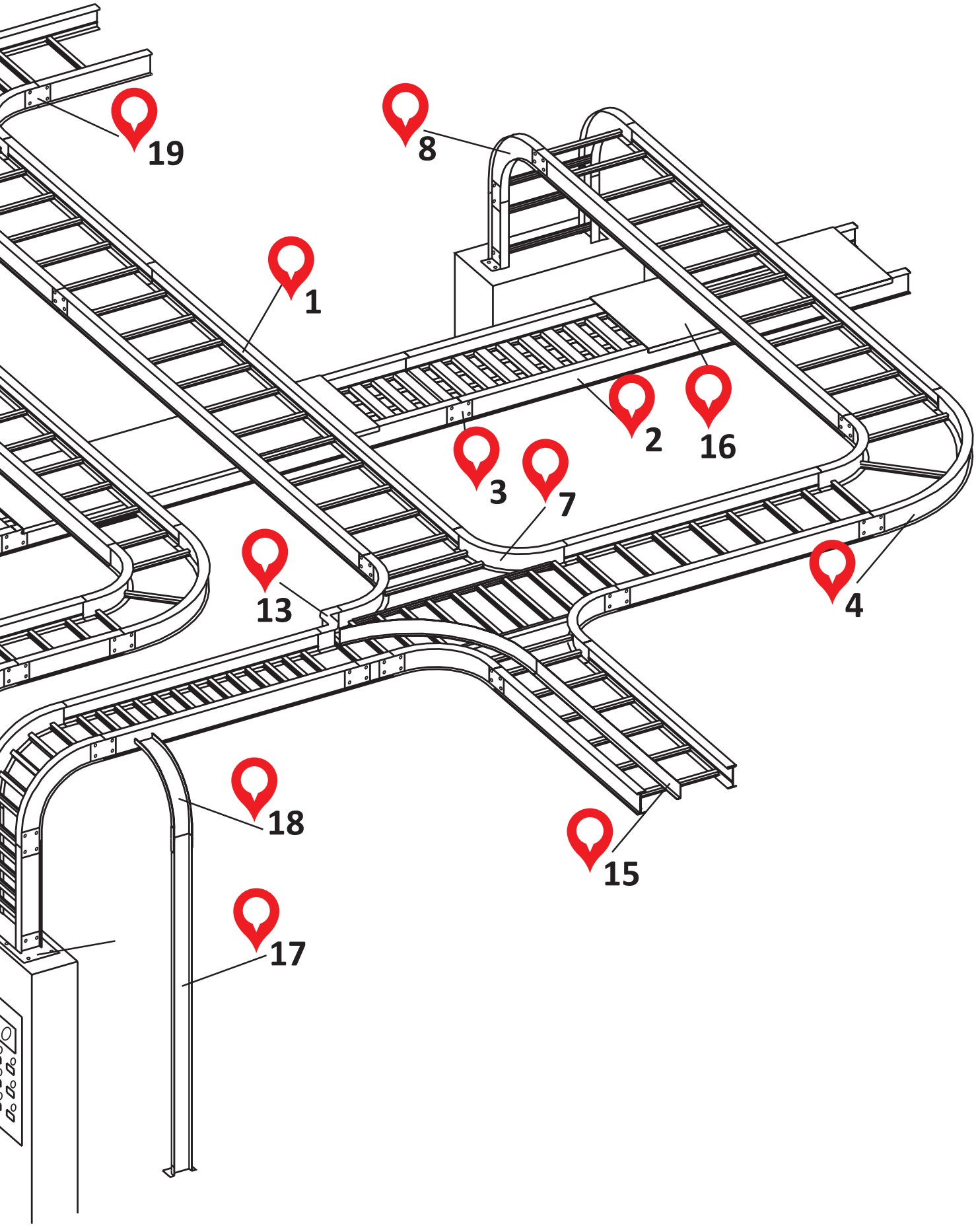
The supporting structures for Cable Tray or Cable Ladder contain
a) On walls: bracket support or wall bracket
b) On ceiling: ceiling bracket support

CABLE LADDER TRAYS SYSTEM DESIGN

Nomenclature

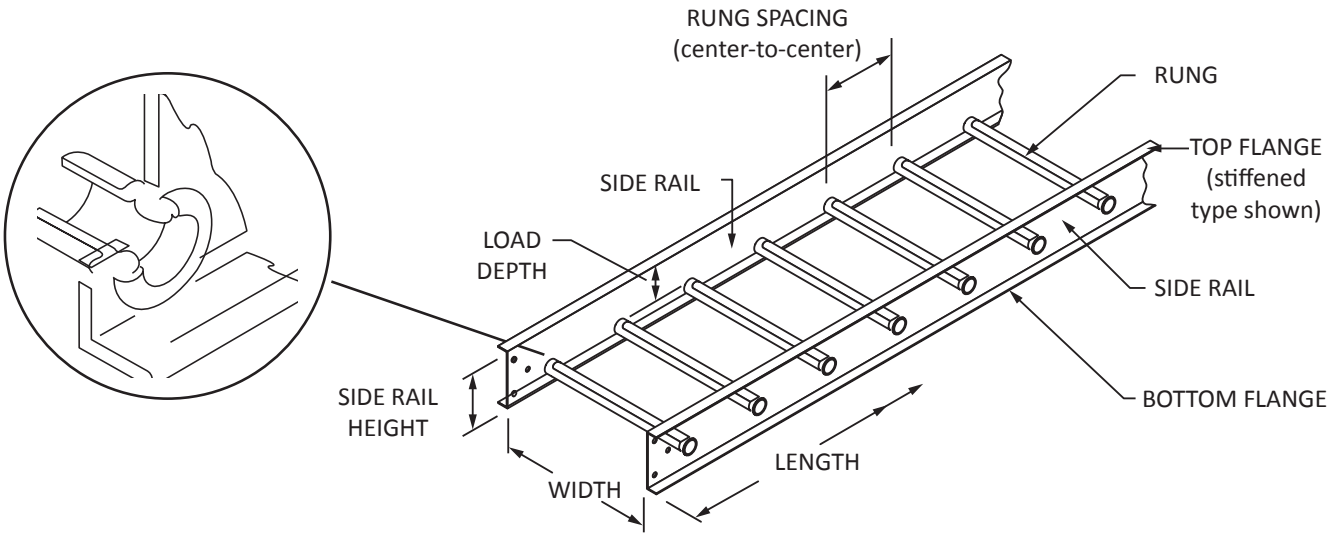
1. Cable Ladder Trays
2. Ventilated Cable Ladder Trays
3. Joint Plate / Fish Plate
4. 90°Horizontal Bend
5. 45°Horizontal Bend
6. Horizontal Tee
7. Horizontal Cross
8. 90°Vertical Outside Bend
9. 45°Vertical Outside Bend
10. 45°Vertical Inside Bend
11. Vertical Bend
12. Vertical Tee
13. Left Reducer
14. Frame Type Box Connector
15. Barrier Strip
16. Solid Flanged Tray Cover
17. Channel Straight Section
18. Channel Cable Ladder Trays, 90°Vertical Outside
19. Expansion Connectors




19
8
1
2
16
3
7
13
4
18
15
17

ALUMINUM SWAGED TUBULAR CABLE LADDER TRAYS

Is a structure consisting of two side rails, connected by individual rungs and is manufactured in accordance with NEMA Standard #VE-1. Rungs are fastened to the side members by an exclusive swaging process. This assembly method ensures a superior mechanical and electrical connection.



Side Members

• Side members are designed with top and bottom flanges turned outwards. This simplifies fastening the Cable Ladder Trays to the supports. Cable Ladder Trays with outward facing flanges allow complete access within the cable loading area and eliminate the possibility of cable damage from sharp edges within the cable area. The return on the top flange strengthens the side member and allows cables to be smoothly dropped over the side.

Rung

• Ladder rungs are 1.00”(25mm) diameter tubings flattened on top to provide a cable bearing surface.
This construction allows cables to drop out anywhere without contacting a sharp edge.

Rung Spacing

• The interval at which rungs are swaged to the side member. This is measured from center line of rung to center line of rung. SFSP manufactures straight lengths with four standard rung spacings: 6”(150mm), 9”(229mm), 12”(305mm) and 18”(457mm). Rung spacing is generally determined by the size and type of the cable being supported. When in doubt, 9”(229mm) rung spacing is a generally accepted compromise.

Length

• The longitudinal dimensions of standard Cable Ladder Trays are 10’(3.0m), 12’(3.7m), 20’(6.1m) and 24’(7.4m).

Width

• The transverse dimensions of Cable Ladder Trays are measured inside (from side member web to side member web) and are furnished in seven standard widths: 6”(150mm), 9”(229mm), 12”(305mm), 18”(457mm), 24”(610mm), 30”(750mm) and 36”(915mm).

Overall Width

• Overall ladder width is equal to the inside or nominal width plus the width of the side member flanges.

Load Depth

• Measured from top surface of rung to the top of the side member. This is not to be confused with the overall height.
SFSP manufactures four loading depths: 3”(75mm), 4”(100mm), 5”(125mm) and 6”(150mm) in accordance with NEMA Standard VE-1.

Overall Height

• Overall height is equal to the loading depth plus 1.25”(30mm).

Fittings

• For changing direction horizontally and vertically, SFSP manufactures elbows, tees and crosses in all widths and loading depths. Fittings are available in three standard radii; 12”(305mm), 24”(610mm) and 36”(915mm). Maintain a nominal 9”(229mm) rung spacing through the center line of all fittings.

Swaged Rounded Tubular Cable Ladder Trays Features:

1. Universal Curvilinear Splice Plate System

The splice plates for rigid connections have a slight curve so that they can be used on straight sections or fittings. Tightening of the fastener pulls the plate flush with the side rail ,which makes the fasteners snug and the joint becomes superior structurally and electrically. Even when hand-tight, there is pressure on the fastener to hold it securely.
Note: Heavy Duty and Mid Span Splice Plates are available upon request .

2. New Zero Tangent Fittings

Tangent as referred to on Cable Ladder Trays fittings is the straight part at the end of the curve to accommodate a flat splice plate. This wastes space in tightly packed areas, such as spreader rooms, where the heat of thousands of cables accumulate. Eliminating tangents allows more tray runs to distribute the heat. Zero tangent fittings can save up to 12‘ (3.7m) per row of tray.

3. Swaged Rung Cable Ladder Trays System Process

The heart of the design is the tubular rung and its connection to the side rail by cold swaging, a process where special machinery compresses and locks the tubular rung material around both the inside and outside of the Cable Trays’ side rails.
This connection is made without the use of heat which can potentially disturb the molecular structure of the metal and weaken it.
The tubular rung is flattened during the swaging process to ensure a proper cable bearing surface.

Swage Advantages

• Swaging allows the side rails to be turned outwards, simplifying cable installation and providing 100% access to the cables. Cold swaging yields the most rigid tray systems in the industry. The swaged rung connection resists stresses in all directions: up or down, side to side or in and out. The swaged ladder also resists the camber and warping effects encountered in a typical welde system.

The increased rigidity means that a 24’(7.4m) section of tray can be lifted on one end with little or no twisting or bending of the tray section. This rigid construction makes the trays safer for field personnel to handle and reduces shipping damage.

Electrical Properties

• Electrically, the 106 tons of pressure in the swaging process virtually eliminates the interstices and a homogenous electrical path results in the following:
Resistance of Aluminum Swaged Tray: 31 microhms
Resistance of Steel Swaged Tray: 37.3 microhms
Resistance of Popular Aluminum Welded Tray: 101 microhms

Conclusion

• Cold swaging yields a very strong, efficient and aesthetically pleasing system that stands the test of time and offers installation savings due to its ease of handling.

STEEL CABLE LADDER TRAYS

Is a prefabricated metal structure consisting of reinforced Welded Cable Ladder Trays -shaped rungs, arc welded to the side rails and is manufactured according to NEMA Standard VE-1. Welded Cable Ladder Trays' rungs are fastened to the side rails with an automatic, self-indexing MIG-arc-welding system, plug welding a 0.5"(12.5mm) diameter zone. The superior strength of the plug weld withstands the rigors of shipping, handling, erection and cable support service.

Side Members

Welded Cable Ladder Trays' side members are designed with top and bottom flanges turned inwards. This minimizes the space requirements of the Cable Trays Systems, and allows a very low side rail height for each NEMA Standard VE-1 load depth.

Slotted Rungs

Slotted shaped rungs are provided on trays 6"(150mm), 9"(229mm), 12"(305mm), 18"(457mm) and 24"(610mm) wide. All slotted rungs are 2.5"(63mm), and provide a 1.25"(30mm) cable bearing surface. Slots provide a neat, convenient option for cable tie down requirements. Slots are 5⁄16"(6.25mm) wide and 5⁄8"(12.5mm) in length, and are located on 1"(25mm) centers across the entire width of the rung

Solid Rungs

Solid shaped Rungs are provided on trays 30"(750mm) and 36"(915mm) wide. Solid Rungs for steel trays are 2.25"(58mm) wide and provide a 7⁄8"(22mm) cable bearing surface.

Rung Spacing

SFSP manufactures straight lengths with four standard rung spacings; 6"(150mm), 9"(229mm), 12"(305mm) and 18"(457mm). The 6"(150mm) rung spacing results in a 3.75"(94mm) opening between rungs allowing the tray to be classified as a ventilated trough per NEMA Standard VE-1.

Length

The longitudinal dimensions of standard Welded Cable Ladder Trays are 10'(3.0m), 12'(3.7m), 20'(6.1m) and 24'(7.4m).

Width

The transverse dimensions of Welded Cable Ladder Trays are measured from the inside and are furnished in seven standard widths: 6"(150mm), 9"(229mm), 12"(305mm), 18"(457mm), 24"(610mm), 30"(750mm) and 36"(915mm).

Overall Width

Overall tray width is equal to the inside or nominal width plus the thickness of the two side rail webs. Overall Tray Width = Nominal + 3⁄16"(5mm) Width.

Load Depth

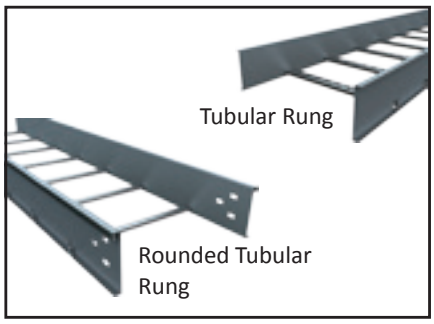
Measured from the top surface of the rungs to the top of the side member.
SFSP manufactures four load depths; 2 7⁄8"(73mm), 3 5⁄8"(101mm), 4 5⁄8"(127mm) and 5 5⁄8"(153mm) corresponding to the four nominal load depths in NEMA Standard 1"(25mm), 3"(75mm), 4"(100mm), 5" (125mm) and 6"(150mm).

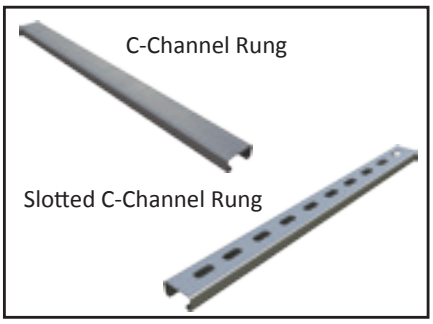
Overall Height

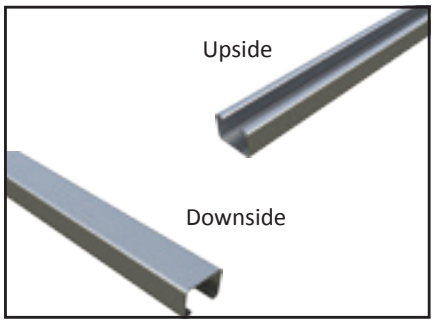
Welded Cable Ladder Trays' overall height is equal to the load depth plus 1.25"(30mm).

Fittings

For changing direction both horizontally and vertically, **SFSP** manufactures tees and crosses in all widths and load depths. Standard fittings maintain a nominal 9"(229mm) rung spacing through the center line of the fitting.







Welded Ladder Cable Tray Features:

1. Compact Economical System

Welded Cable Ladder Trays are an extremely compact economical flange in Cable Trays Systems which allow the designer to utilize these Cable Trays in tight locations. The extremely low profile Welded Cable Ladder Trays Rungs (5⁄8" high) minimize the required side rail height while maintaining NEMA Standard VE-1 nominal load depths. Overall system height is only 5⁄8" greater than the actual load depth.

2. Universal Curvilinear Splice Plate System

The splice plates for rigid connections have a slight curve so they can be used on straight sections or fittings. Tightening of the fastener pulls the plate flush with the side rail. The fasteners are snug and the joint is superior structurally and electrically. Even when hand-tight, there is pressure on the fastener to hold it securely.
Note: Heavy Duty and Mid Span Splice Plates are available upon request.

3. Zero Tangent Fittings

"Tangent" as referred to on Cable Tray fittings is the straight part at the end of the curve to accommodate a flat splice plate. This wastes space in tightly packed areas, such as spreader rooms, where the heat of thousands of cables accumulate. Eliminating tangents allows more tray runs to distribute the heat.

Inspection of proper installation of splice plates is done visually.
If the plate is bowed away from the rail, nuts shall be tightened.

4. Welded Assembly System

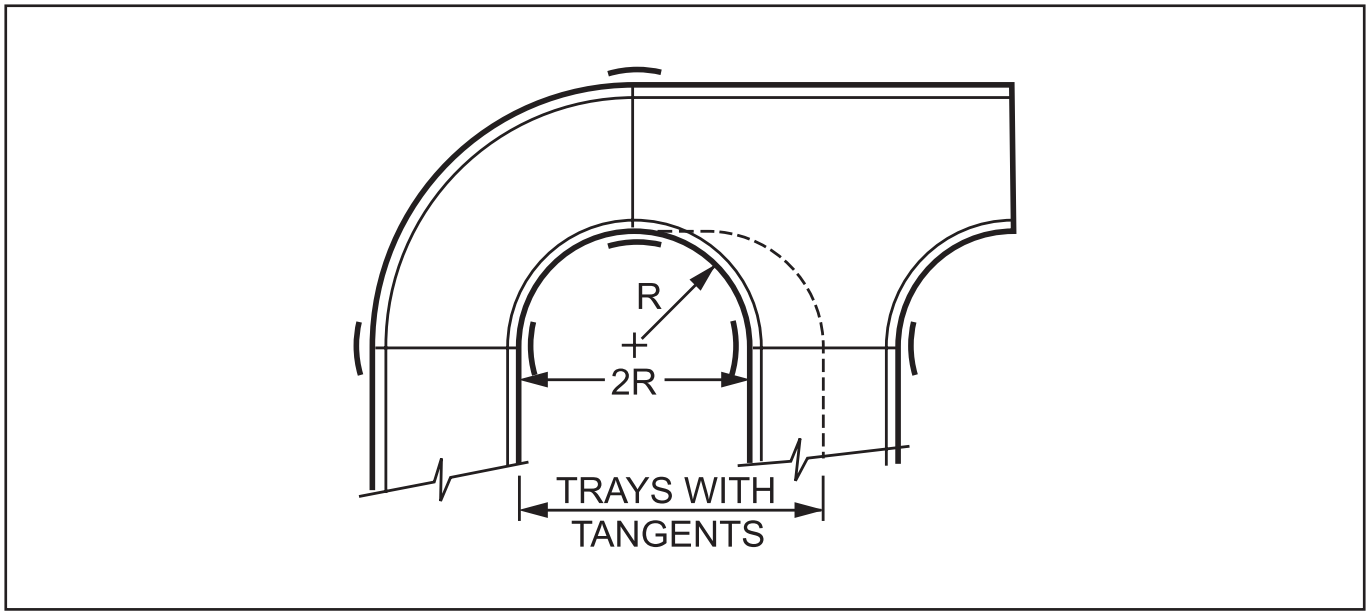
- Welded Cable Ladder Trays rungs on straight sections are assembled to the side rails using an automatic, these welds are 700% larger and stronger than the common resistance (spot) weld in use today. Electrical properties of the assembly are unequalled; are well within the NEMA requirements due to the continuous electrical path.

The mechanical strength of this welded assembly withstands the rigors of shipping, handling, erection and service.

The size of the weld keeps the vertical axis of the side rail from sloping inwards under load. The weld maintains the 90° angle between the side rail and bottom. This allows full use of the section properties. Spot welds do not permit this.

Also, stresses on spot welds (barely 1⁄8" (3mm) in diameter) are so severe that breakage often occurs during shipping and erection.

Welded Cable Ladder Trays fittings are also assembled by MIG-arc welding.



CABLE LADDER TRAY SYSTEMS OVERVIEW

SFSP's Cable Ladder Trays Systems are available in a variety of finishes, and in varying width and load depth for many applications including primary service entrances, main power feeders, branch wirings, instruments and communications cables.

Applications:

- Industrial:
Gas facilities, Oil facilities, Power Plants, Petrochemical Plants, Automotive Plants, Paper Plants, Food Processing, Power Plants, Refineries, Manufacturing, Mining.

- Commercial:
Shopping Centers, Control Buildings, Schools, Hospitals, Office Buildings, Airports, Stadiums

Features:

- Rounded side rail flanges protect cables.
- All designs permit easy cable dropout with no sharp edges to damage insulation.
- Slotted C-Channel rungs allow simple cable fastening.
- High strength splices allow random locations between supports (full sections used on all simple beams).
- Standard straight section length is 3000 mm. • Complete line of fittings and accessories.

Cable Ladder Trays consist of two longitudinal side rails connected by rungs. **SFSP** designs are very popular due to their versatility and low costs. They also provide: maximum ventilation for conductor cooling, smooth edges on side rails and rungs to protect cables and slots for easy cable fastening when required. Various rung spacings are available to provide support for most cables, from small flexible cables to the most rigid interlocked armor power cable.

SWAGED CABLE LADDER TRAYS (ALUMINUM)

Aluminum 6063 T6 - Side Rails

Design Data

Side Rail	Height (mm)	Load Depth Fd (mm)	Thickness (mm)	F (mm)	W cm^3	I cm^4
A1	110	80	2.0	20	8.12	46.06
A2	136	106	2.0	20	11.24	78.95
A3	162	132	2.0	20	14.78	123.85
A4	188	158	2.5	20	23.14	224.70

Aluminum 6063 T6 Load Classes

Side Rail	Load kg/m	Span (m)	Classes NEMA
A1	52	3.0	A
A2	89	3.0	C
A3	74	3.70	12A
A4	134	3.70	12B

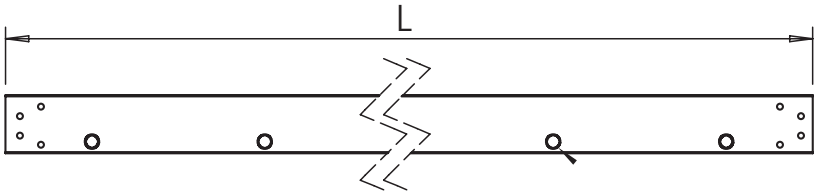
SFSP's Swaged Cable Ladder Trays consist of 2 outside rails that are connected by a round tubular rung of 25 mm outside diameter.

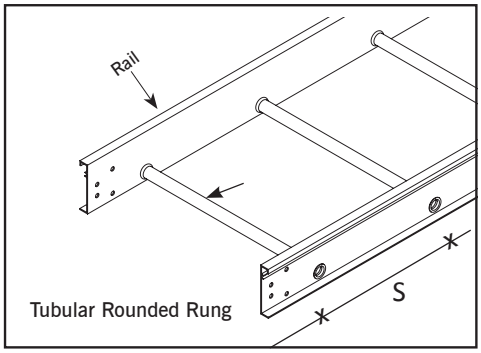
- SFSP's Swaged Cable Ladder Trays are manufactured in widths (w): 150 mm, 225 mm, 300 mm, 450 mm, 500 mm, 600 mm, 750 mm and 900 mm.

Other dimensions are available upon request.

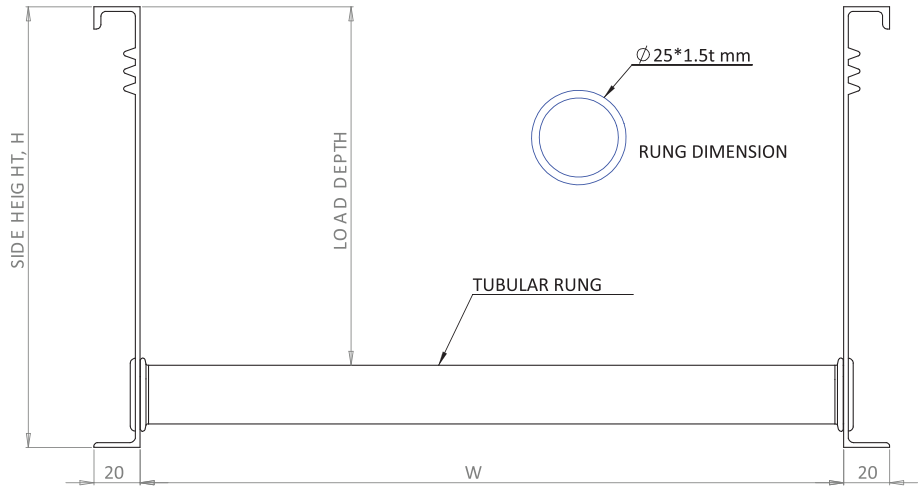
Tubular Rungs

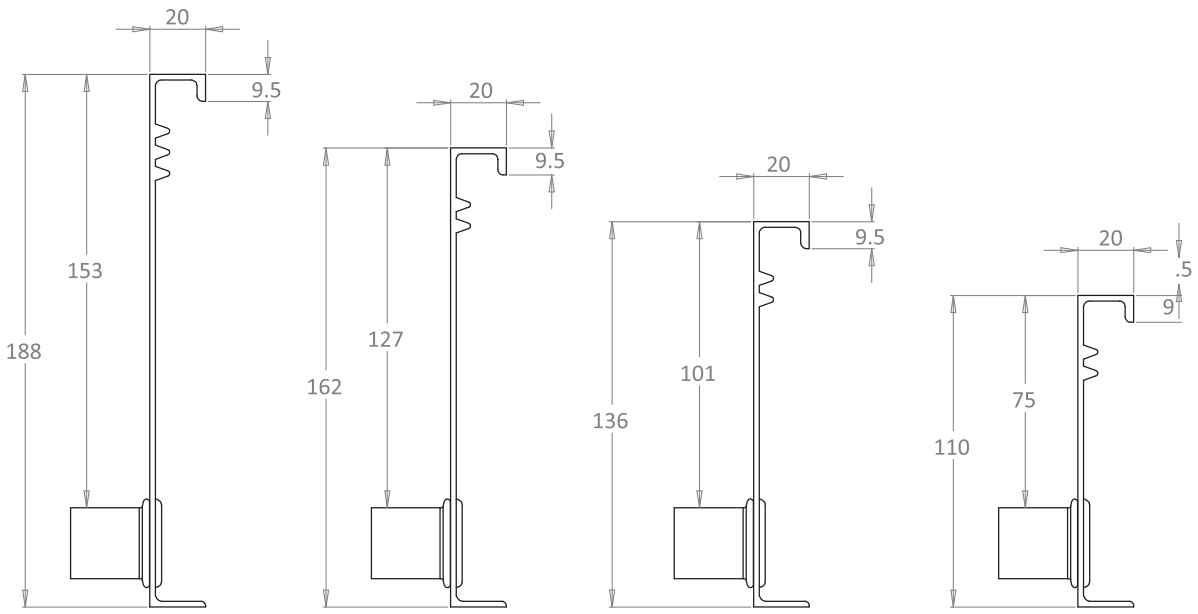
The available distance spacing (S) between the rungs is 229 mm. Length (L): 2440/3000 mm. Side height of the side rail is 110 mm, 136 mm, 162 mm and 188 mm. *Other dimensions are available upon request.*
Swaged Cable Ladder Trays are available in: Aluminum 6063 T6





SWAGED CABLE LADDER TRAYS (ALUMINUM)



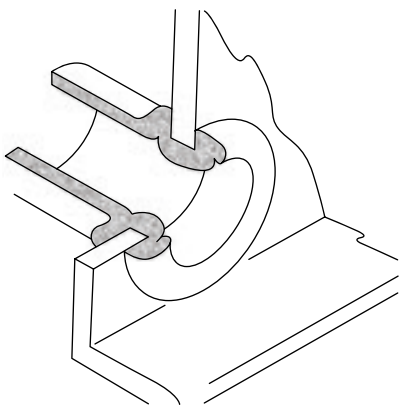


LOAD DEPTH 6"
(153 mm)

LOAD DEPTH 5"
(127 mm)

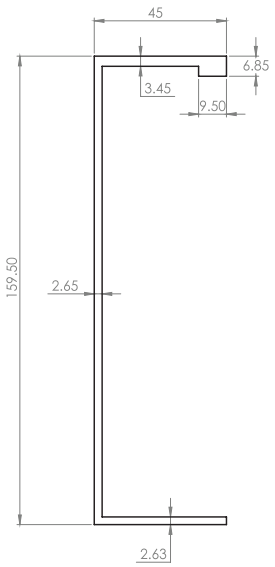
LOAD DEPTH 4"
(101 mm)

LOAD DEPTH 3"
(75 mm)



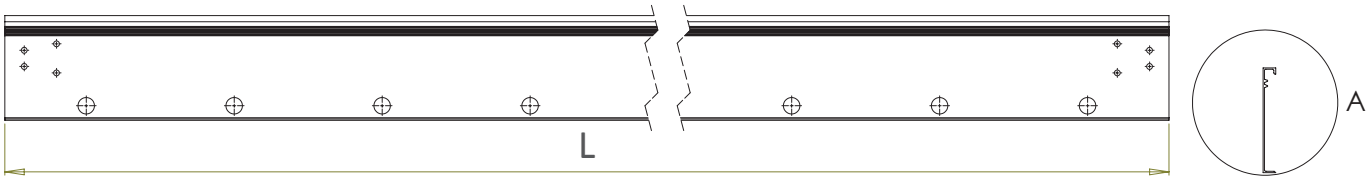
Swaged connections make the most rigid tray system in the industry. The swaging process does not affect the temper and strength of surrounding metal the way that traditional welding does.

C Type

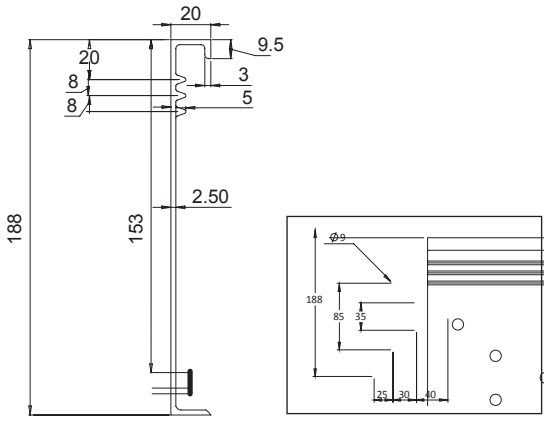


SWAGED CABLE LADDER TRAYS (ALUMINUM)

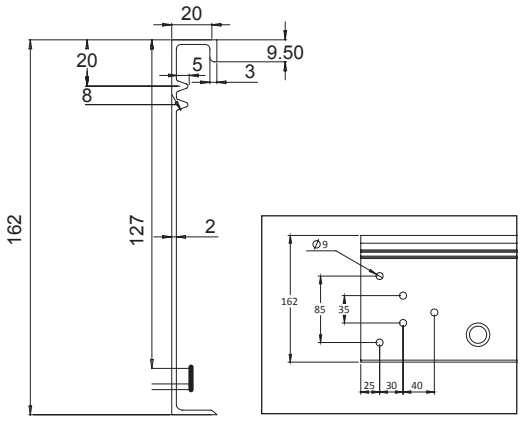
Aluminum Cable Ladder Trays - General Overview



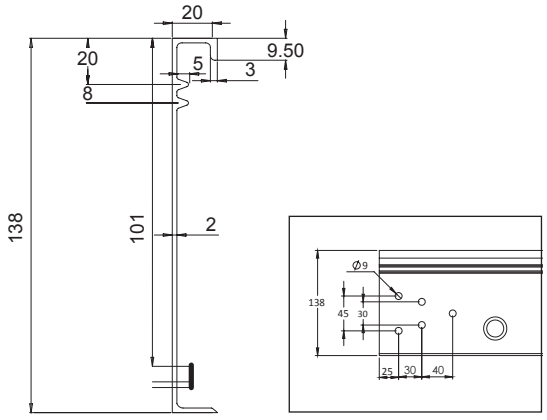
C.Ladder Side Rail 6“



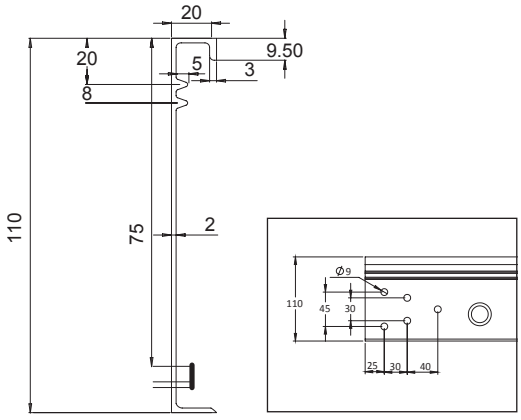
C.Ladder Side Rail 5“



C.Ladder Side Rail 4“



C.Ladder Side Rail 3“



SFSP can make modifications and design materials or finishes as it deems necessary or desirable .
All illustrations, drawings and descriptive material in this publication are of a generally informative nature only, and do not form a complete package of the specifications or description of the goods . Most of the dimensions shown are nominal .

STEEL CABLE LADDER TRAYS (STEEL S235 JRG2)

RUNG TYPES (Swaged and Channel)

Swaged Type (Aluminum & Steel)
- Rounded tubular with 25 mm diameter
- Rung standard spacing 229 mm

Channel Type (Steel)
- Plain or slotted, and can be mounted upwards or downwards.
- Rung standard spacing 229 mm

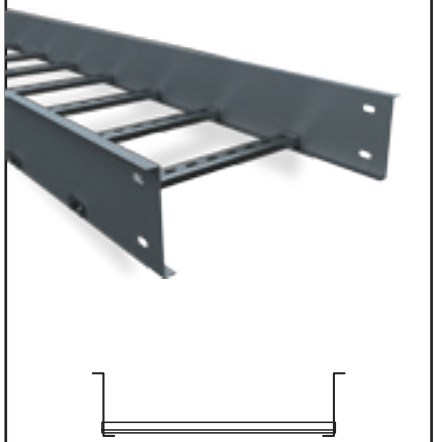
RAIL TYPES

Types of Rail:
- C-Type, Z-Type and R-Type

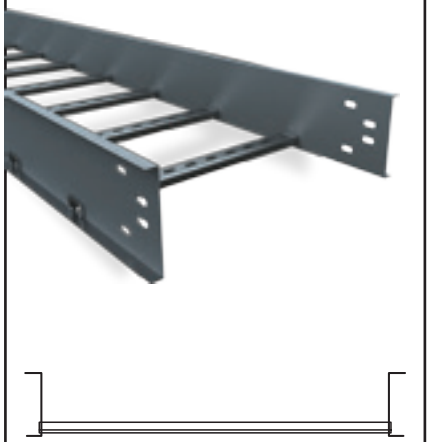
Rounded Tubular - Swaged or Welded

Plain Channel (Steel)

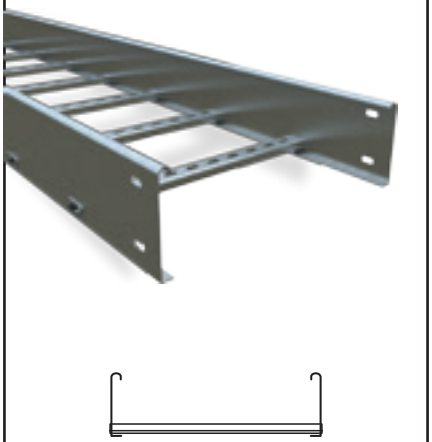
Slotted Channel (Steel)



Z-Type



C-Type



R-Type

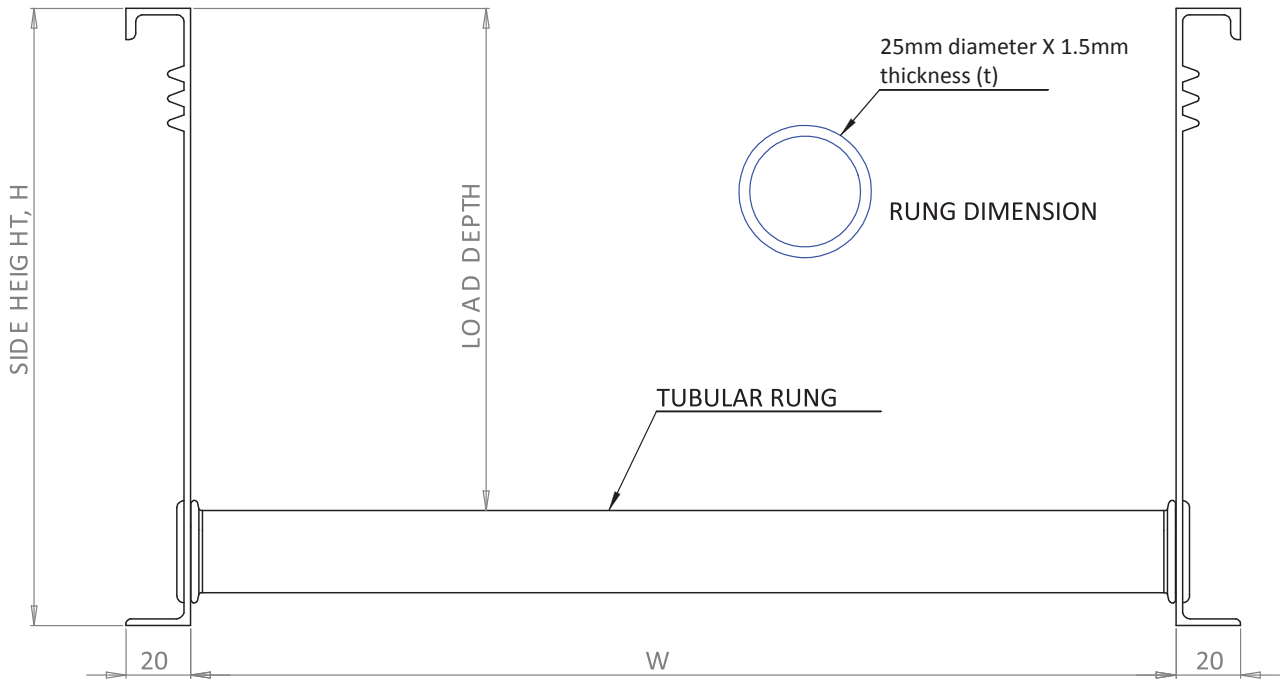
MATERIALS
- Pre-Galvanized / Stainless Steel

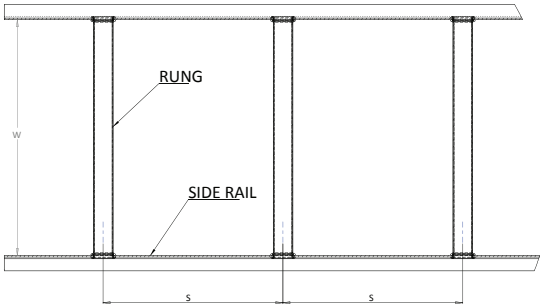
FINISHES
- Hot-Dip Galvanized, Zinc Electroplating and Epoxy Powder Coating.

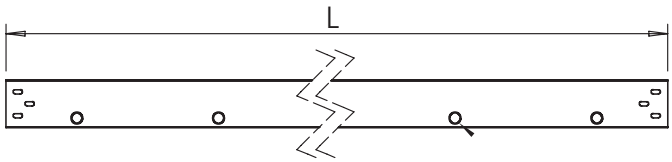
MATERIAL THICKNESS
1.50 mm 2.00 mm 2.50 mm

STEEL CABLE LADDER TRAYS - GENERAL OVERVIEW

Tubular Rounded Rung

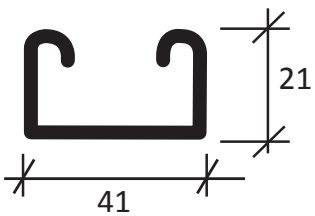


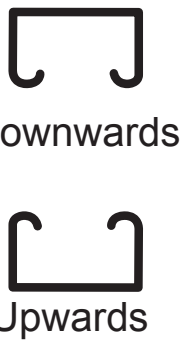


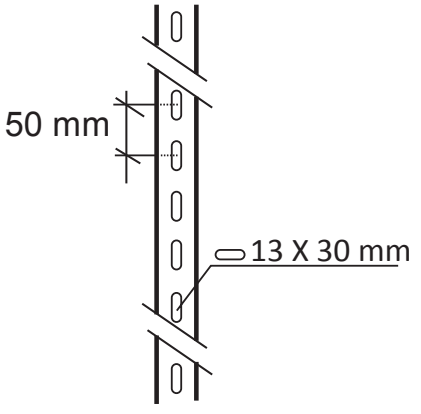


Rung Types and Dimensions

Rung Thicknesses: 1.5 mm, 2.0 mm and 2.5mm

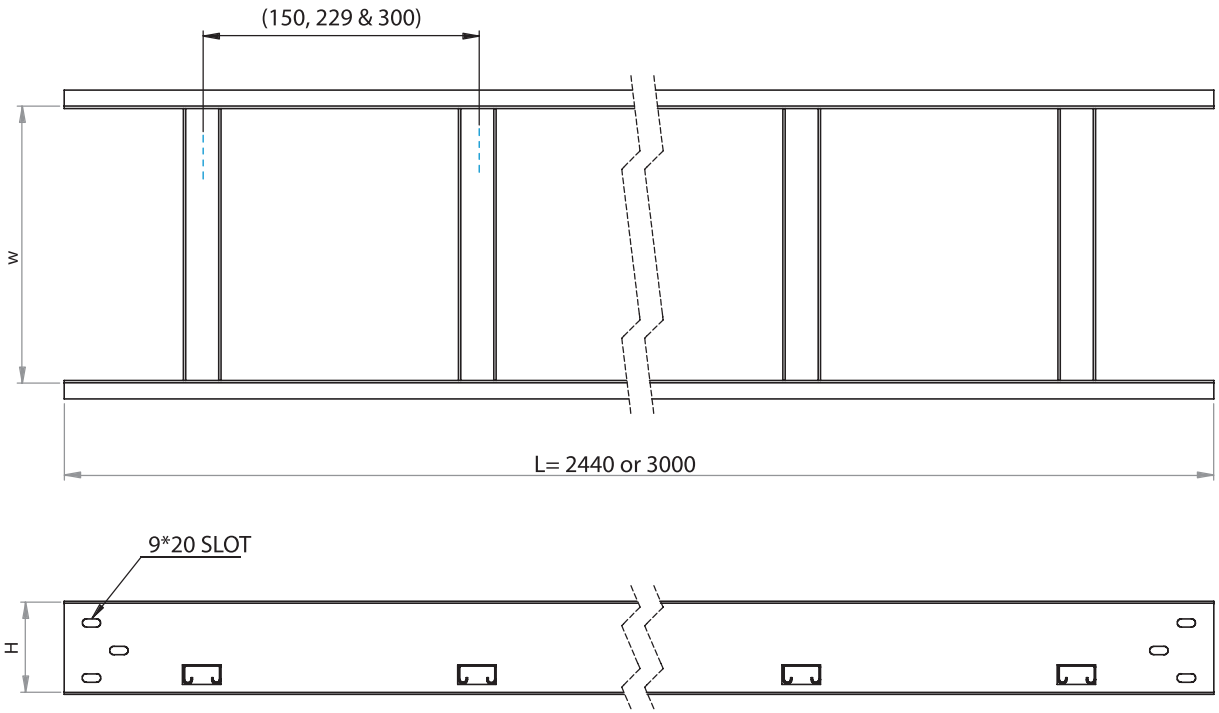






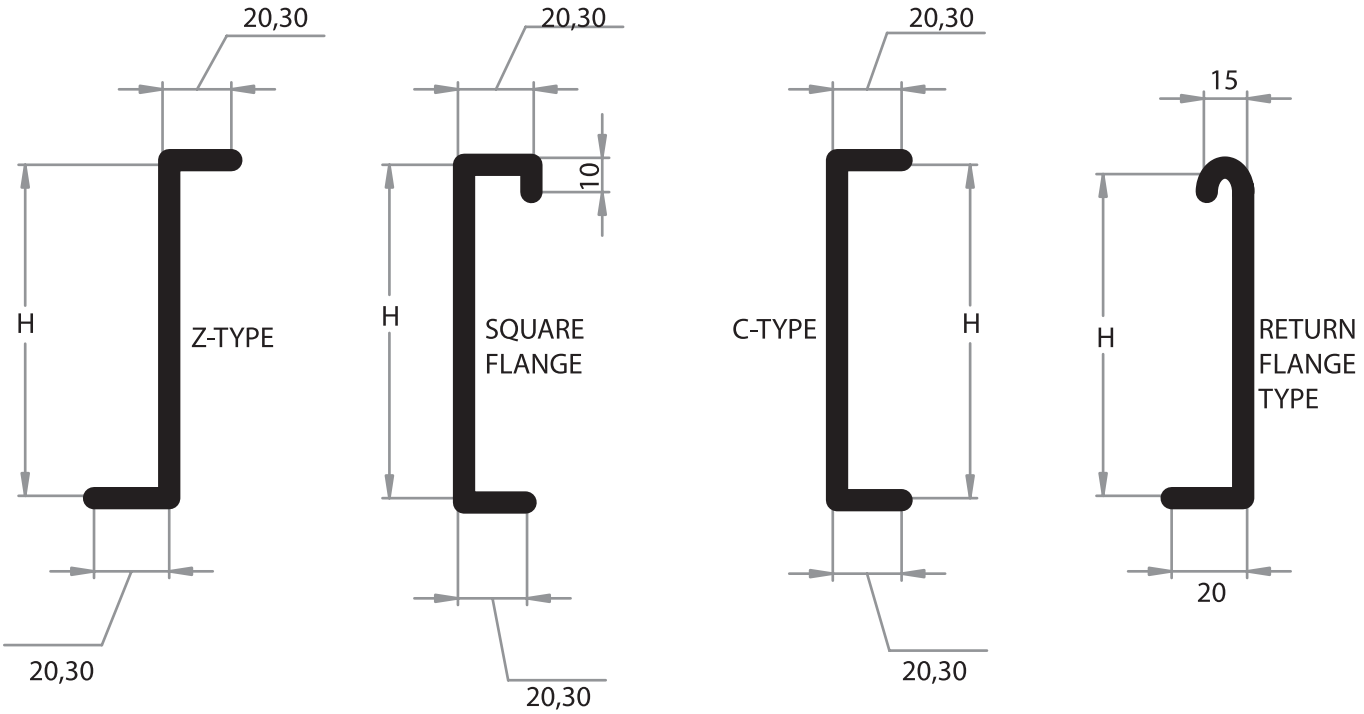
(slots only upon request)

Length and Rung Spacing

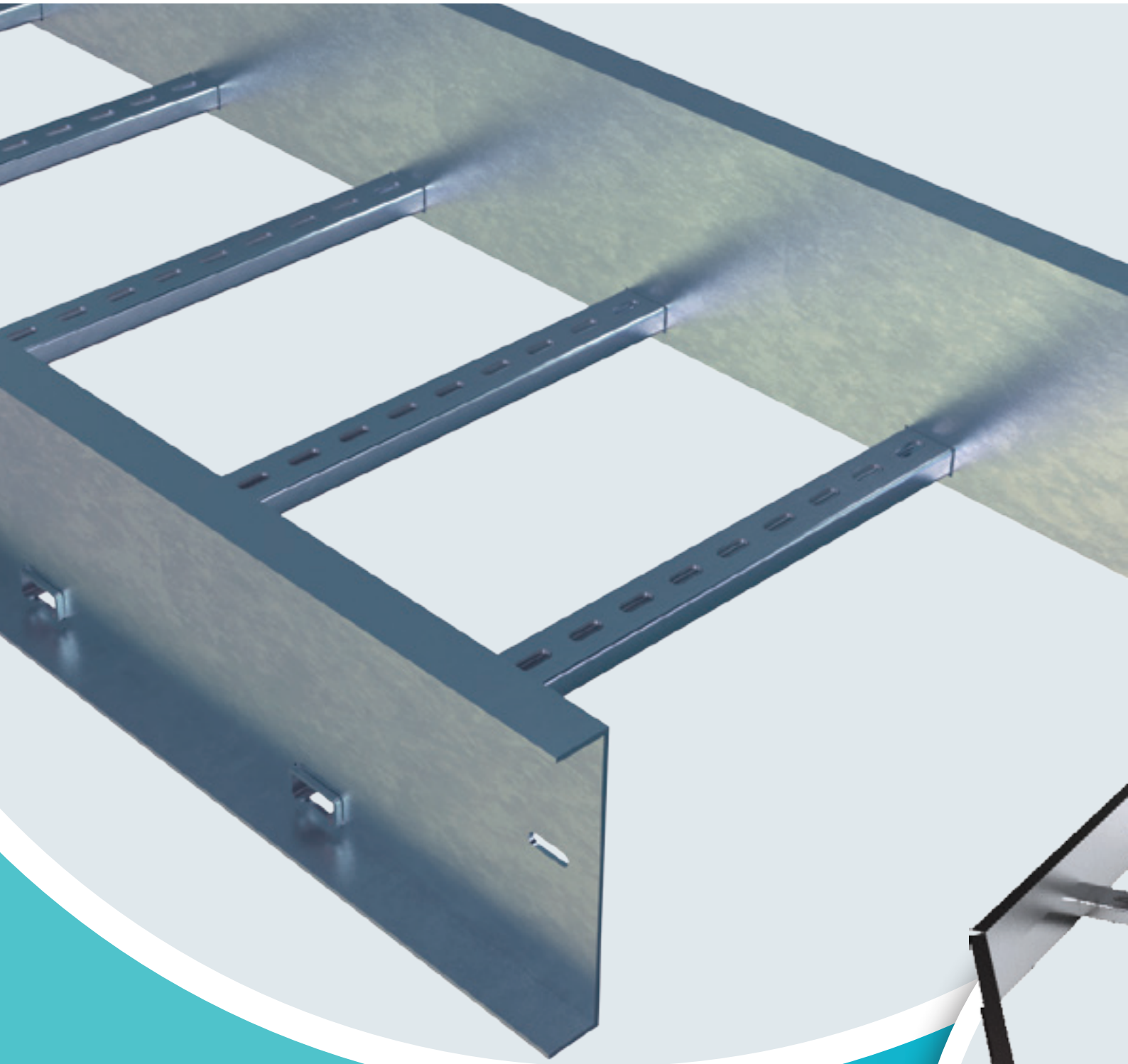


Side Rail Types

Height of rail 50mm - 150mm

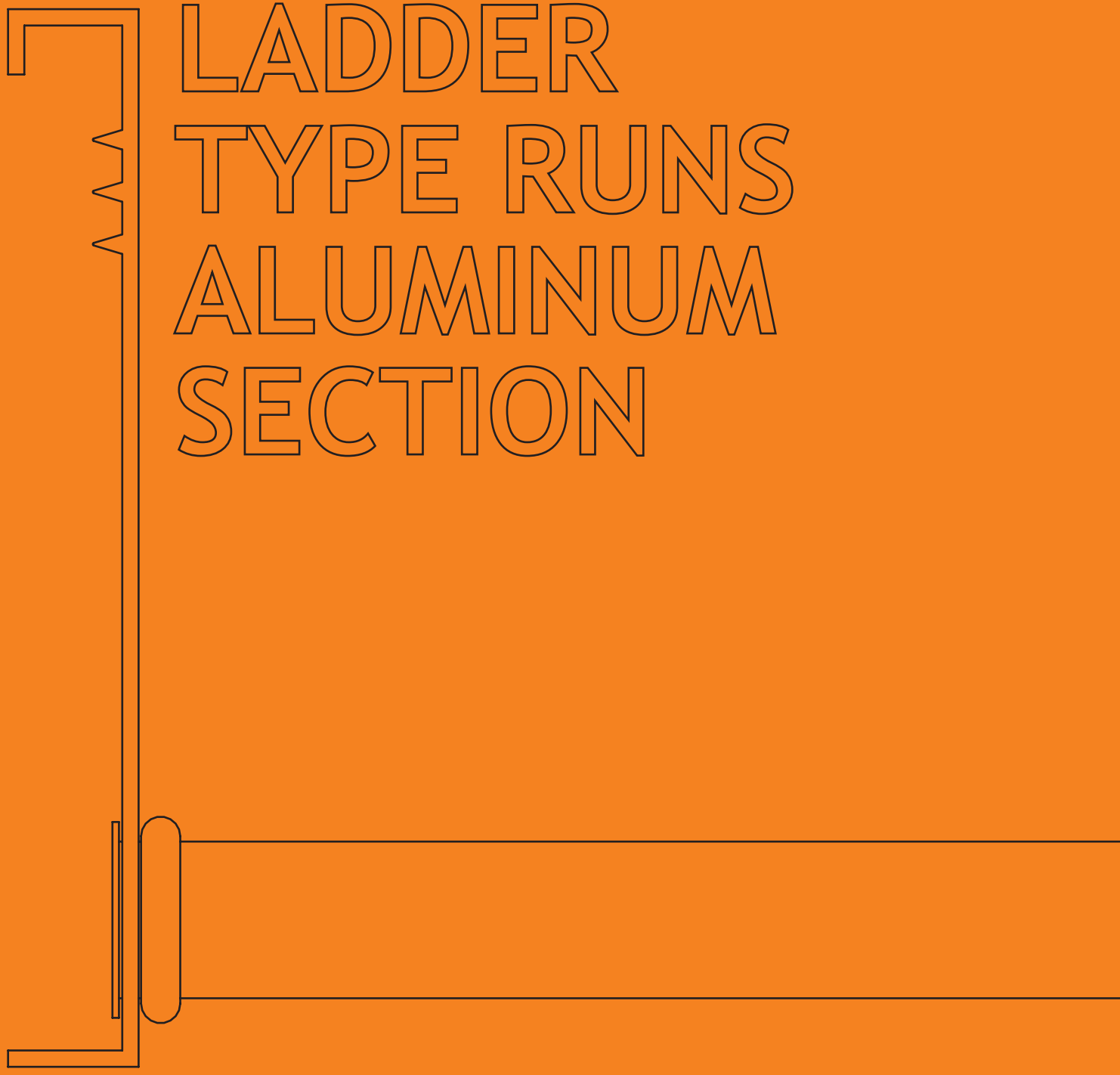


All Units are in (mm)



CABLE LADDER TRAY RUNS

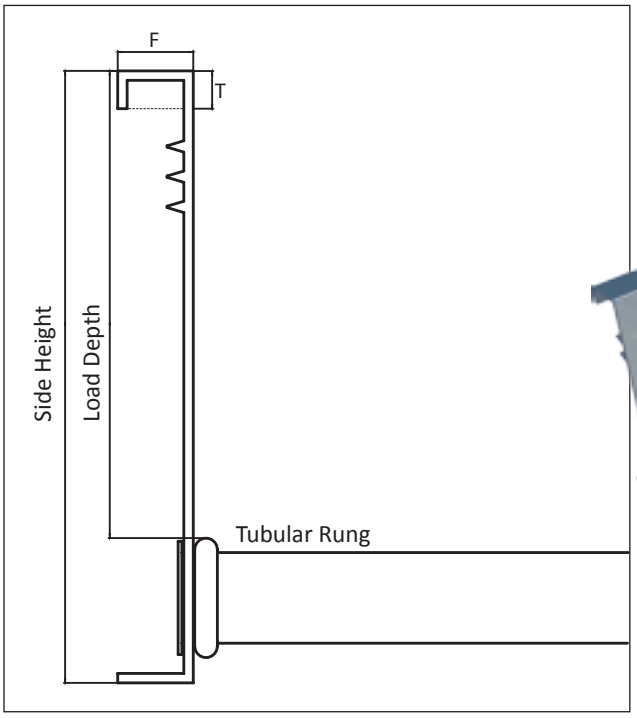
LADDER TYPE RUNS ALUMINUM SECTION

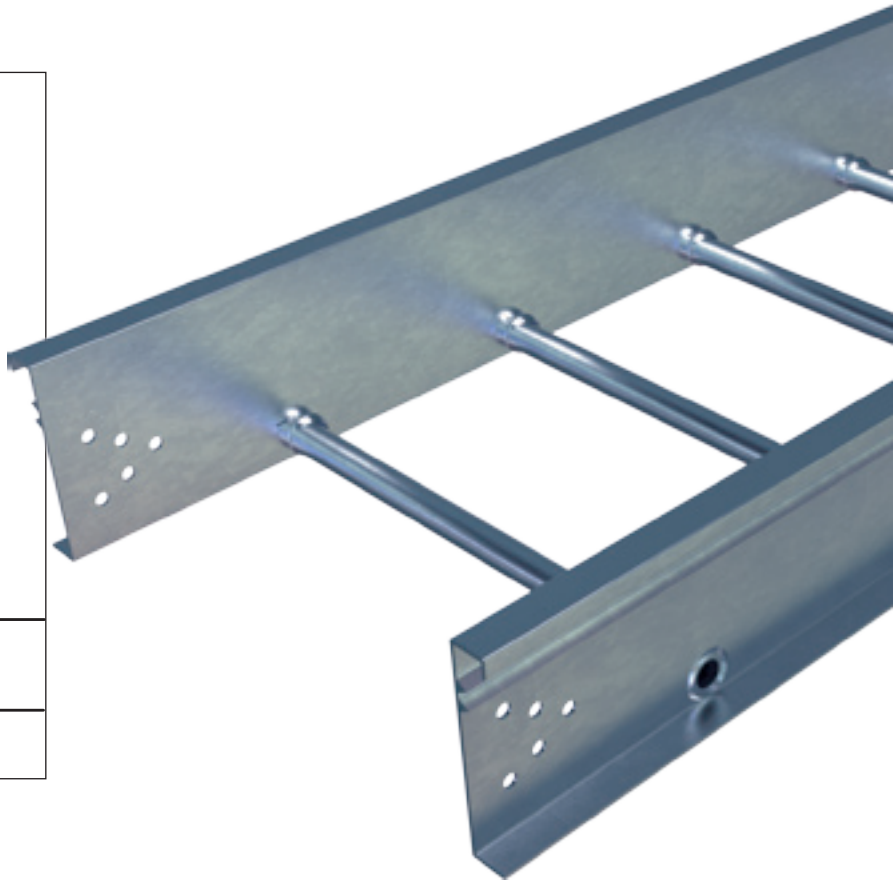


SWAGED TUBULAR RUNG

ALUMINUM 6063 T6

- **NEMA Class A (52 kg/m by 3.0m) and 8A (95 kg/m by 2.40m)**
- **NEMA Class C (97.0 kg/m by 3.0 m)**
- **NEMA Class 12 A (74 kg/m by 3.70 m)**
- **NEMA Class 12 B (134 kg/m by 3.70 m)**





Aluminum 6063 T6 - Side Rails

Design Data

Side Rail	Height (mm)	Load Depth Fd (mm)	Thickness (mm)	F (mm)	W cm^3	I cm^4
A1	110	80	2.0	20	8.12	46.06
A2	136	106	2.0	20	11.24	78.95
A3	162	132	2.0	20	14.78	123.85
A4	188	158	2.5	20	23.14	224.70

Load Classes

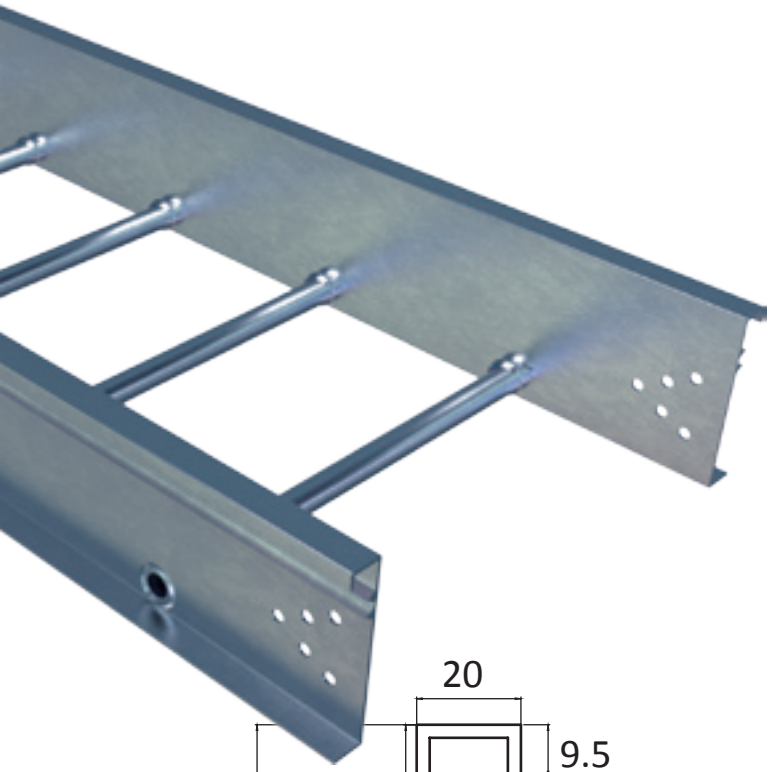
Side Rail	Load kg/m	Span (m)	Classes NEMA
A1	52	3.0	A
A2	97	3.0	C
A3	74	3.70	12A
A4	134	3.70	12B

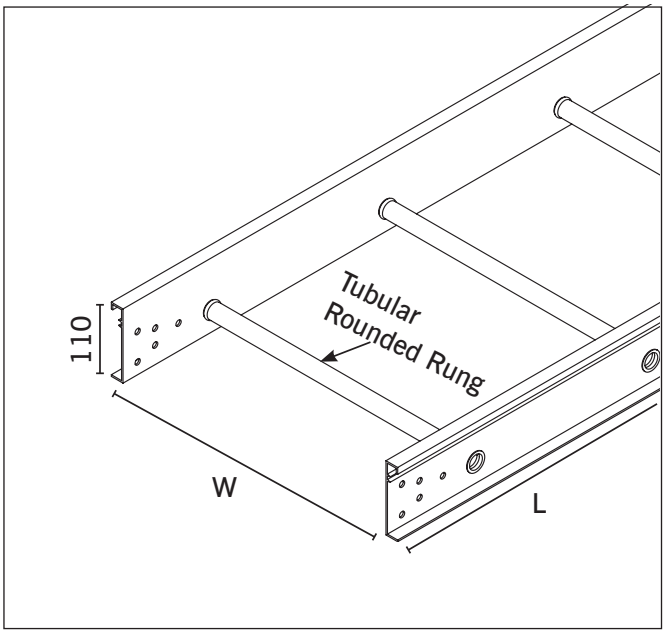
ALT - A1 (SWAGED ROUNDED TUBULAR)

2.00 mm Thickness

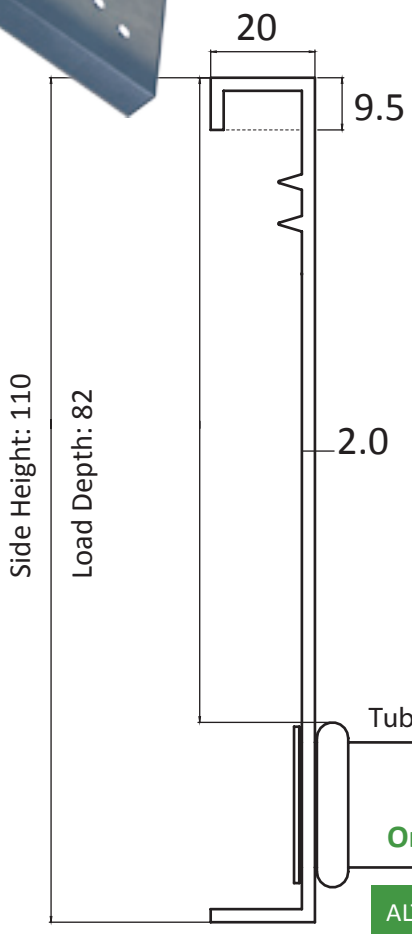
(Side Height 110 mm)

- NEMA Class A (52 kg/m by 3,0m) and 8A (95 kg/m by 2,40m)
- Side Rail: A1
- Height: 110 mm
- Load Depth: 82 mm
- Rung Spacing: 229 mm





All Units are in (mm)



Tubular Rung

Order Example:

ALT - A1 - Side height (h) - Width(w) - Side type
Other dimensions can be manufactured and supplied upon request.
For more ordering details, please check page 134

Width (mm)	Order Example			
	Item	(h)	(w)	Type
150	ALT - A1	110	150	C
225	ALT - A1	110	225	C

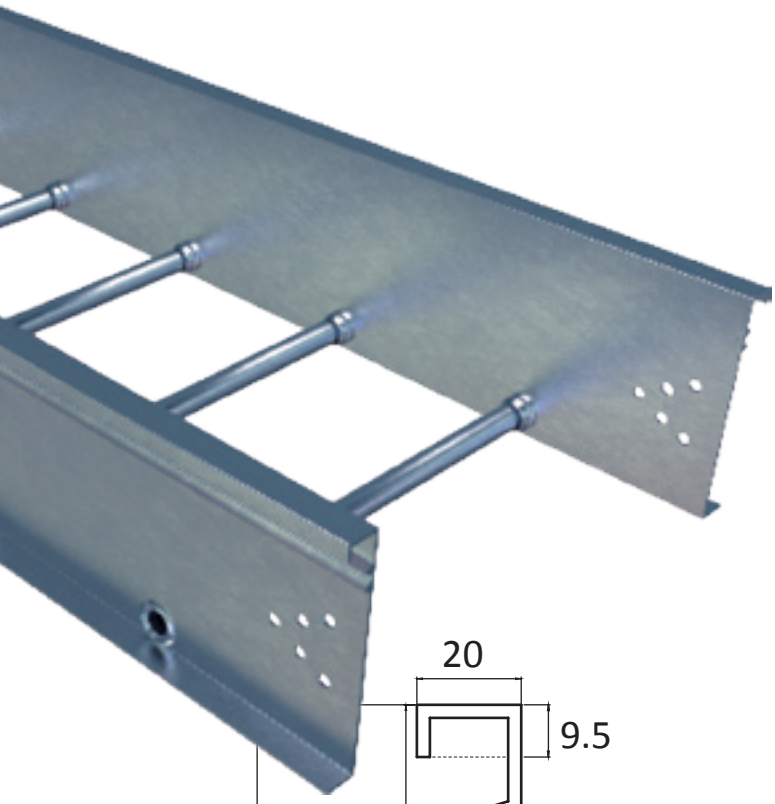
NEMA CLASS A	Width	Support Distance	Load	Deflection		Side Rail A1
				Rung	Rail	
	(mm)	(m)	KN/m	(mm)	(mm)	
110 X 20 X 2.0	150	2.40	1.35	0.02	7.96	Rung 25x1.5 mm
		3.0	0.66	0.01	9.95	
		3.70	0.32	0.00	12.22	
		4.90	0.10	0.00	16.10	
	225	2.40	1.34	0.06	7.99	
		3.0	0.65	0.03	9.93	
		3.70	0.31	0.01	12.15	
		4.90	0.09	0.00	15.86	
	300	2.40	1.32	0.13	7.99	
		3.0	0.64	0.06	9.93	
		3.70	0.30	0.03	12.08	
		4.90	0.08	0.01	15.62	
	450	2.40	1.25	0.42	7.97	
		3.0	0.61	0.21	9.87	
		3.70	0.29	0.10	12.31	
		4.90	0.07	0.02	16.12	
	600	2.40	1.15	0.92	7.99	
		3.0	0.58	0.46	9.92	
		3.70	0.27	0.22	12.27	
		4.90	0.05	0.04	15.65	
	750	2.40	1.01	1.57	7.94	
		3.0	0.54	0.84	9.96	
		3.70	0.25	0.39	12.28	
		4.90	0.04	0.06	16.16	
	900	2.40	0.86	2.31	7.93	
		3.0	0.49	1.32	9.95	
		3.70	0.22	0.59	12.01	
		4.90	0.02	0.05	15.66	

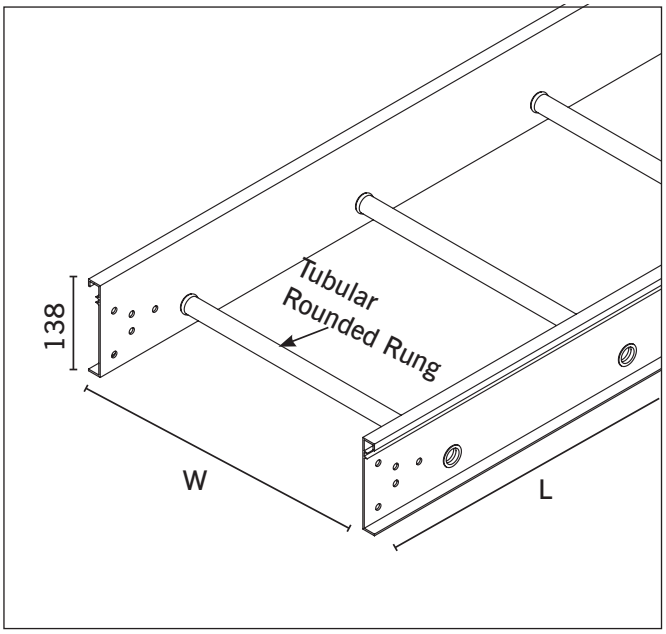
ALT - A2 (SWAGED ROUNDED TUBULAR)

2.00 mm Thickness

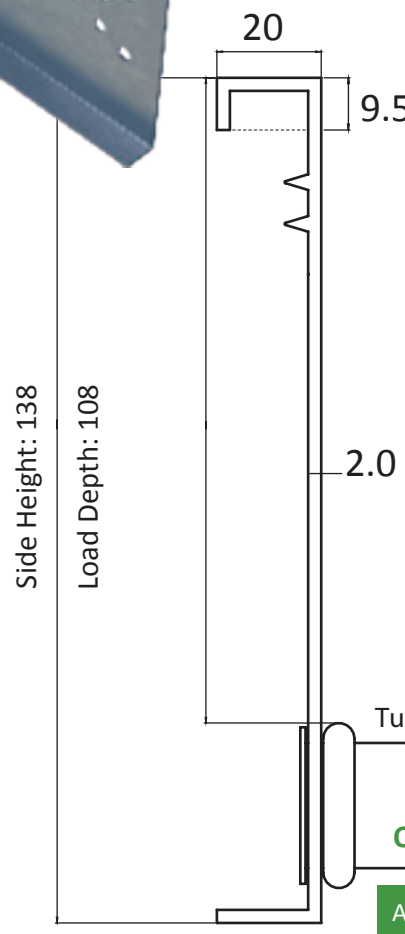
(Side Height 138 mm)

- NEMA Class C (97.0 kg/m by 3.0 m)
- Side Rail: A2
- Height: 138 mm
- Load Depth: 108 mm
- Rung Spacing: 229 mm





All Units are in (mm)



Tubular Rung

Order Example:

ALT - A2 - Side height (h) - Width(w) - Side type
Other dimensions can be manufactured and supplied upon request.
For more ordering details, please check page 134

Width (mm)	Order Example			
	Item	(h)	(w)	Type
150	ALT - A2	136	150	C
225	ALT - A2	136	225	C

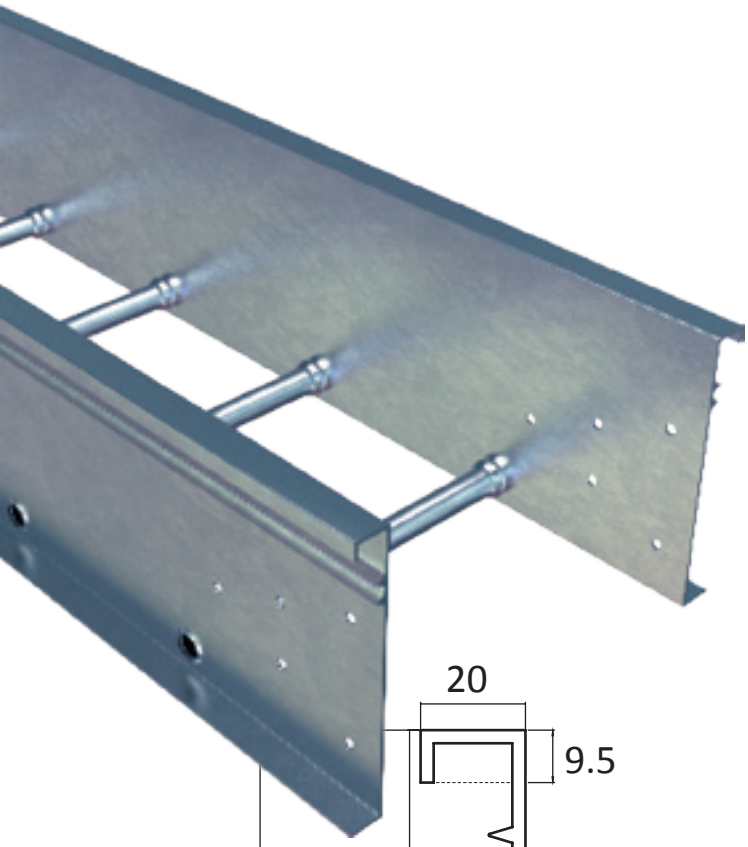
NEMA CLASS A	Width	Support Distance	Load	Deflection		Side Rail A1
				Rung	Rail	
	(mm)	(m)	KN/m	(mm)	(mm)	
138 X 20 X 2.0	150	2.40	2.35	0.04	7.98	Tubular Rung: 25x1.5 mm
		3.0	1.17	0.02	9.94	
		3.70	0.59	0.01	12.18	
		4.90	0.22	0.00	16.29	
	225	2.40	2.32	0.13	8.00	
		3.0	1.16	0.06	9.96	
		3.70	0.58	0.03	12.16	
		4.90	0.21	0.01	16.16	
	300	2.40	2.25	0.29	7.96	
		3.0	1.1	0.15	9.95	
		3.70	0.57	0.07	12.15	
		4.90	0.20	0.03	16.03	
	450	2.40	2.06	0.91	8.0	
		3.0	1.09	0.48	10.-	
		3.70	0.55	0.24	12.23	
		4.90	0.18	0.08	15.80	
	600	2.40	1.85	1.55	8.00	Tubular Rung: 25x2.0 mm
		3.0	1.02	0.85	9.93	
		3.70	0.52	0.44	12.14	
		4.90	0.17	0.18	16.18	
	750	2.40	1.70	1.95	7.95	Tubular Rung: 30x1.5 mm
		3.0	0.98	1.12	10	
		3.70	0.50	0.57	12.19	
		4.90	0.15	0.17	15.89	
	900	2.40	1.29	2.55	7.26	
		3.0	0.88	1.74	9.93	
		3.70	0.47	0.93	12.27	
		4.90	0.14	0.28	16.28	

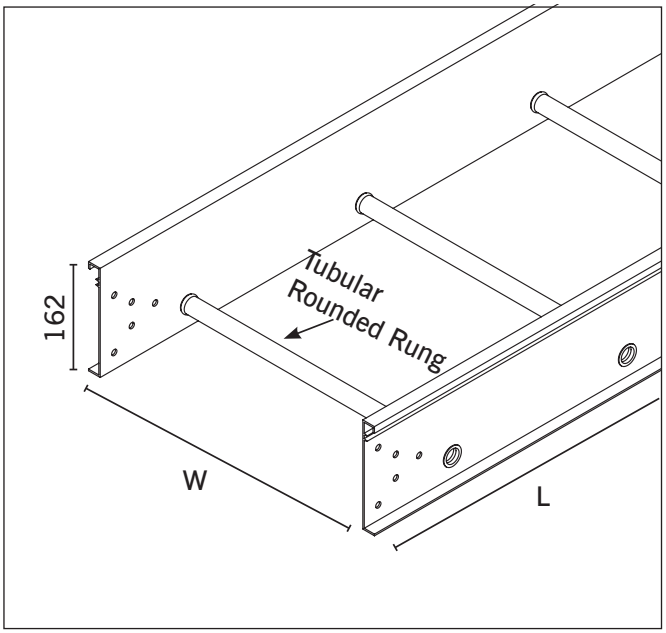
ALT - A3 (SWAGED ROUNDED TUBULAR)

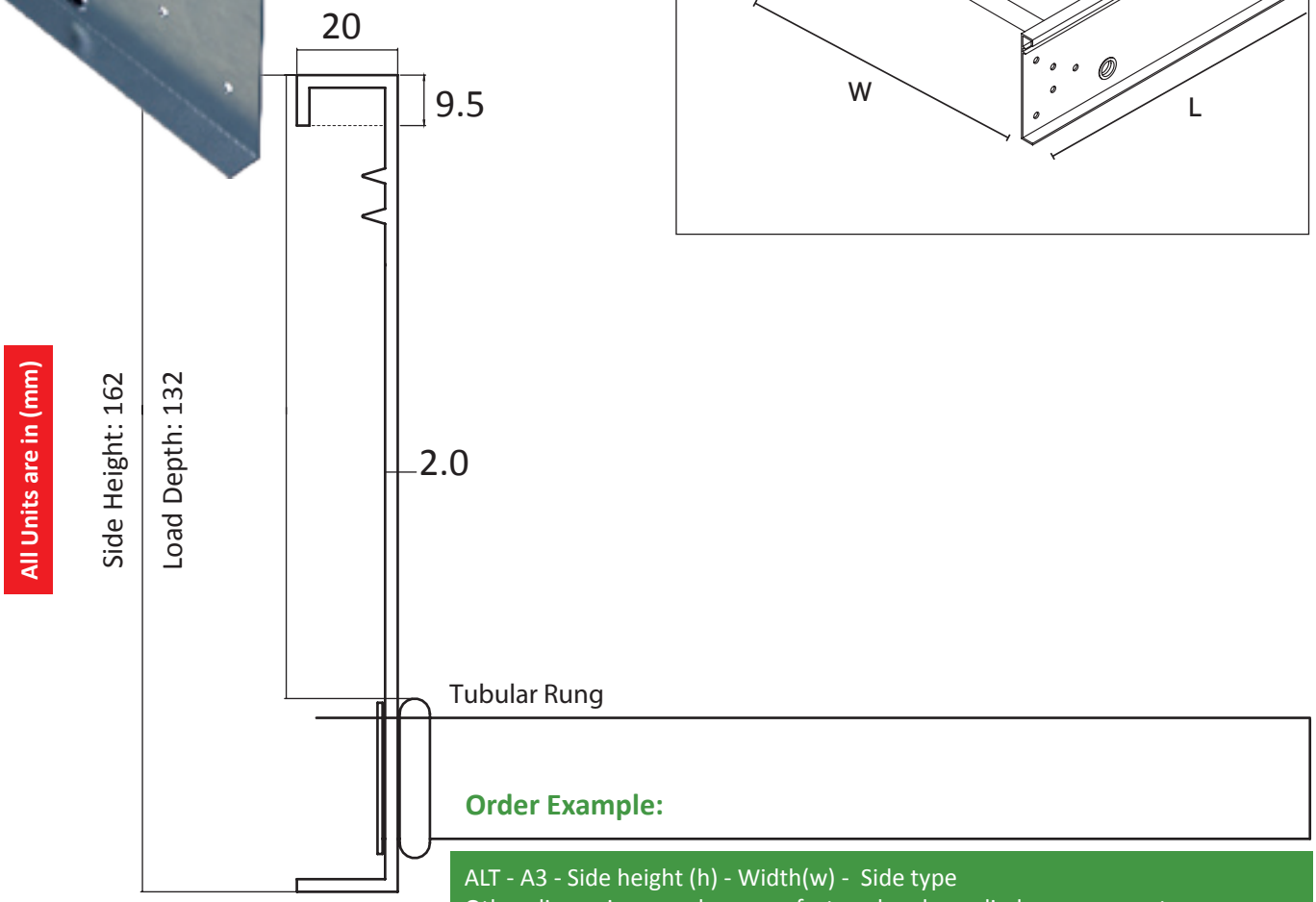
2.00 mm Thickness

(Side Height 162 mm)

- NEMA Class 12 A (74 kg/m by 3.70 m)
- Side Rail: A3
- Height: 162 mm
- Load Depth: 132 mm
- Rung Spacing: 229 mm







All Units are in (mm)

Order Example:

ALT - A3 - Side height (h) - Width(w) - Side type
Other dimensions can be manufactured and supplied upon request.
For more ordering details, please check page 134

Width (mm)	Order Example			
	Item	(h)	(w)	Type
150	ALT - A3	162	150	C
225	ALT - A3	162	225	C

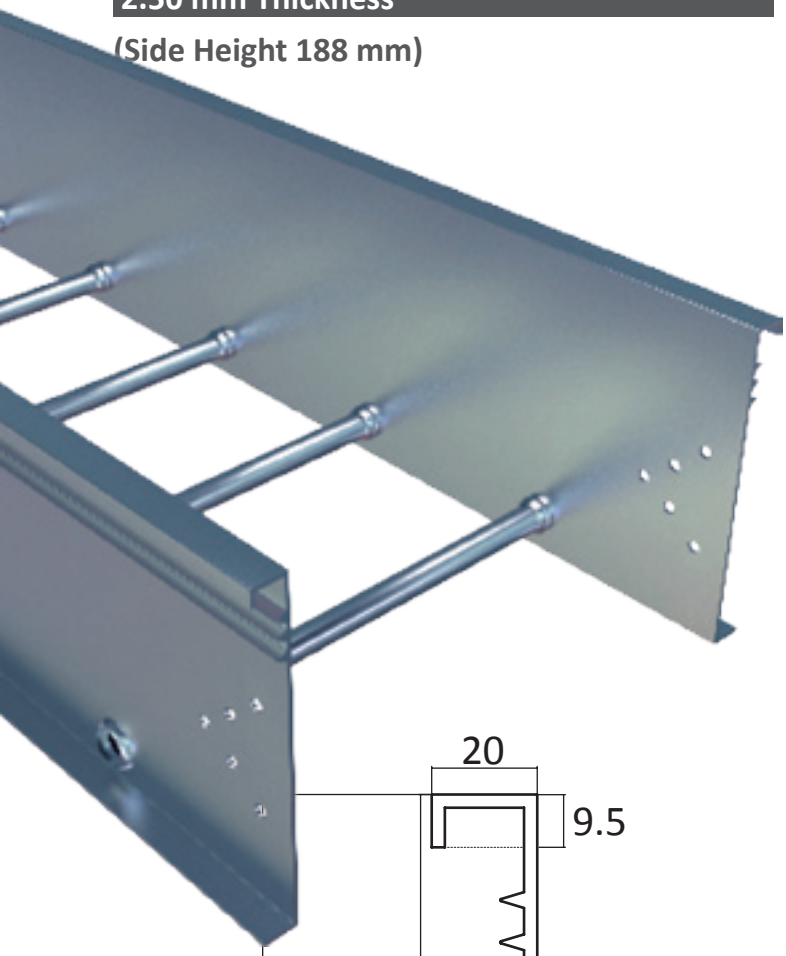
NEMA CLASS A	Width	Support Distance	Load	Deflection		Side Rail A1
				Rung	Rail	
	(mm)	(m)	KN/m	(mm)	(mm)	
162 X 20 X 2.0	150	2.40	3.67	0.06	7.92	Tubular Rung: 25x1.5 mm
		3.0	1.87	0.03	9.97	
		3.70	0.97	0.02	12.31	
		4.90	0.38	0.01	16.27	
	225	2.40	3.63	0.20	7.99	
		3.0	1.85	0.10	9.97	
		3.70	0.96	0.05	12.32	
		4.90	0.37	0.02	16.19	
	300	2.40	3.50	0.46	7.99	
		3.0	1.80	0.24	9.99	
		3.70	0.94	0.12	12.24	
		4.90	0.36	0.05	16.13	
	450	2.40	3.17	1.12	7.99	
		3.0	1.73	0.61	9.98	
		3.70	0.91	0.3	12.26	
		4.90	0.34	0.15	16.05	
	600	2.40	2.88	1.69	7.98	Tubular Rung: 25x2.0 mm
		3.0	1.64	0.96	9.95	
		3.70	0.88	0.52	12.28	
		4.90	0.33	0.19	16.27	
	750	2.40	2.45	2.14	7.07	Tubular Rung: 30x1.5 mm
		3.0	1.55	1.36	9.96	
		3.70	0.85	0.74	12.33	
		4.90	0.31	0.36	16.25	
	900	2.40	1.70	2.57	6.44	
		3.0	1.39	2.10	9.96	
		3.70	0.79	1.19	12.24	
		4.90	0.29	0.44	16.15	

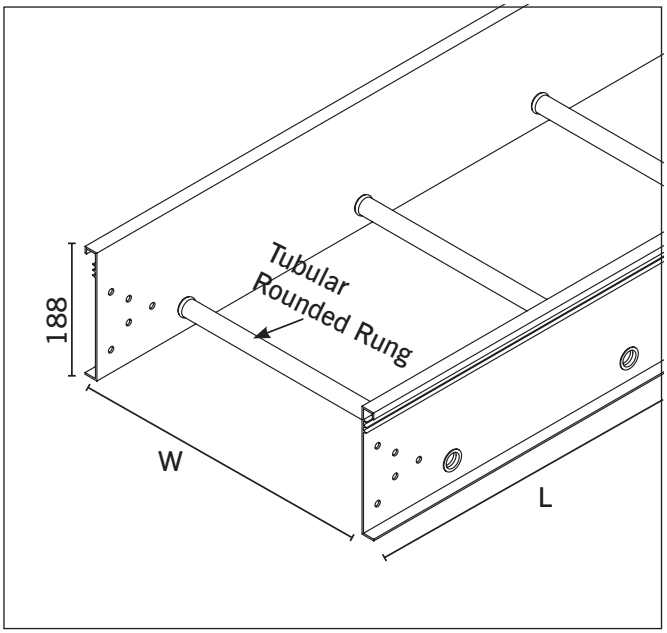
ALT - A4 (SWAGED ROUNDED TUBULAR)

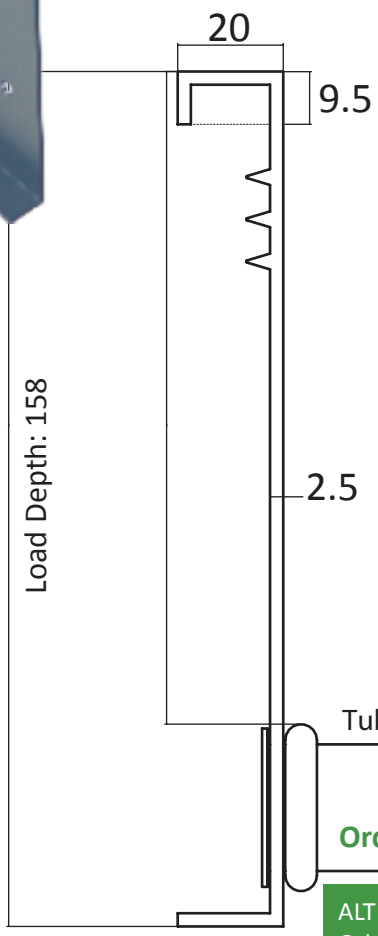
2.50 mm Thickness

(Side Height 188 mm)

- NEMA Class 12 B (134 kg/m by 3.70 m)
- Side Rail: A4
- Height: 188 mm
- Load Depth: 158 mm
- Rung Spacing: 229 mm







All Units are in (mm)

Order Example:

ALT - A4 - Side height (h) - Width(w) - Side type
Other dimensions can be manufactured and supplied upon request.
For more ordering details, please check page 134

Width (mm)	Order Example			
	Item	(h)	(w)	Type
150	ALT - A4	188	150	C
225	ALT - A4	188	225	C

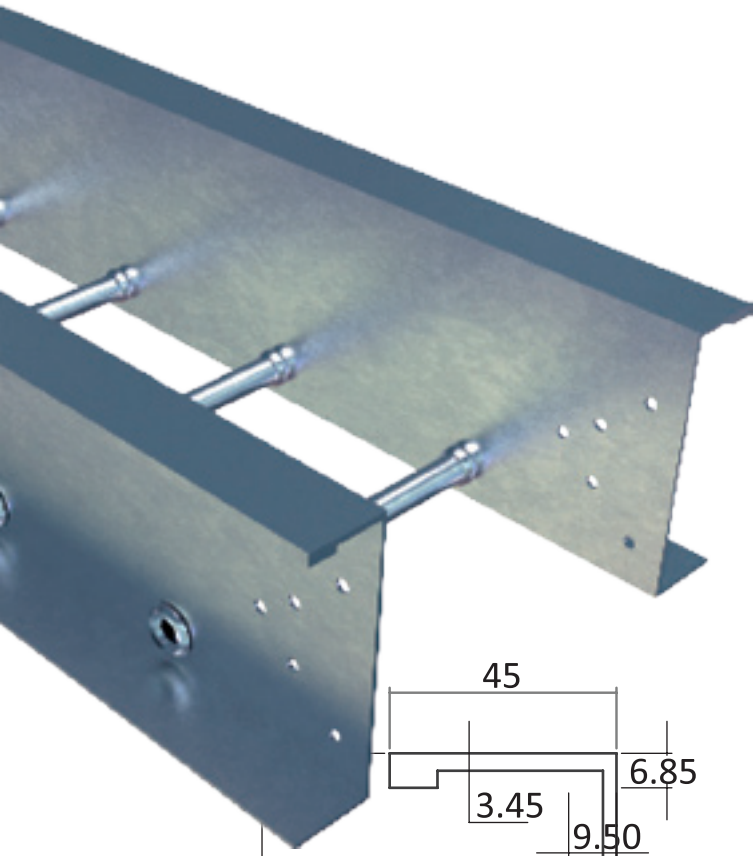
NEMA CLASS A	Width	Support Distance	Load	Deflection		Side Rail A1
				Rung	Rail	
	(mm)	(m)	KN/m	(mm)	(mm)	
188 X 20 X 2.5	150	2.40	4.55	0.06	5.41	Tubular Rung: 25x1.5 mm
		3.0	3.45	0.04	10.0	
		3.70	1.81	0.02	12.31	
		4.90	0.74	0.01	16.23	
	225	2.40	4.55	0.19	5.55	
		3.0	3.40	0.14	9.98	
		3.70	1.79	0.08	12.28	
		4.90	0.73	0.03	16.20	
	300	2.40	4.55	0.45	5.82	
		3.0	3.33	0.33	9.99	
		3.70	1.77	0.18	12.30	
		4.90	0.72	0.07	16.19	
	450	2.40	4.55	1.23	6.61	Tubular Rung: 25x2.0 mm
		3.0	3.13	0.84	9.98	
		3.70	1.71	0.46	12.29	
		4.90	0.70	0.19	16.21	
	600	2.40	3.82	1.71	6.27	Tubular Rung: 30x1.5 mm
		3.0	2.95	1.32	9.99	
		3.70	1.65	0.74	12.27	
		4.90	0.68	0.30	16.23	
	750	2.40	3.09	2.14	5.87	Tubular Rung: 30x2.0 mm
		3.0	2.73	1.89	9.98	
		3.70	1.58	1.09	12.27	
		4.90	0.66	0.46	16.28	
	900	2.40	2.14	2.56	5.21	
		3.0	2.14	2.56	9.02	
		3.70	1.47	1.76	12.32	
		4.90	0.63	0.75	16.27	

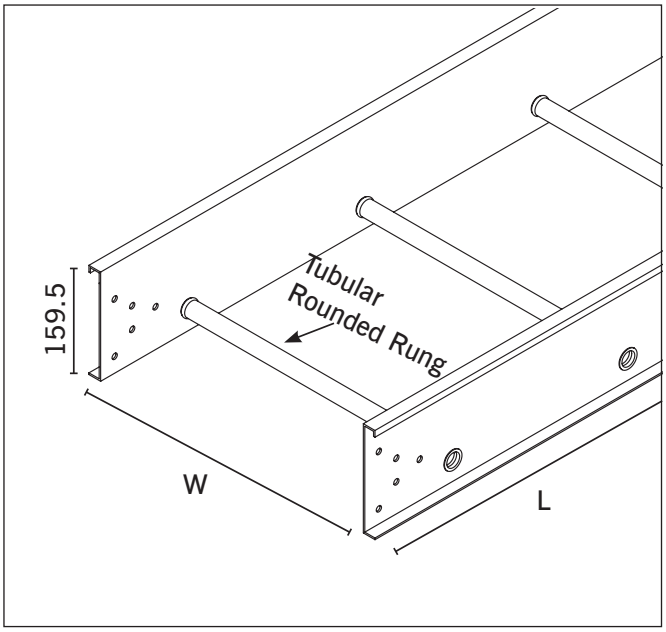
ALT - A5 (SWAGED ROUNDED TUBULAR)

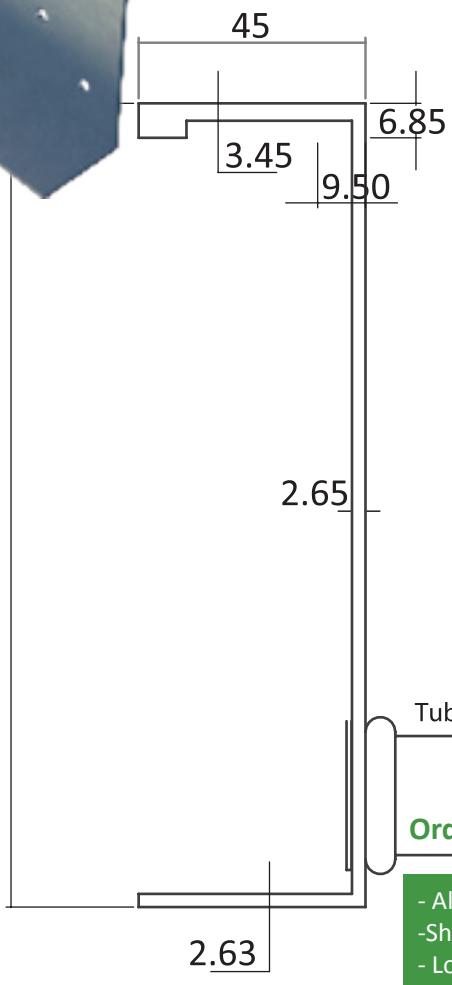
2.65 mm Thickness

(Side Height 159.5 mm)

- NEMA Class 20 C (149 kg/m)
- Side Rail: A5
- Height: 159.5 mm
- Thickness 2.65 mm
- Load Depth: 127 mm
- Rung Spacing: 229 mm
- Length: 6 Meter







All Units are in (mm)

Tubular

Order Example:

- Allowable TENSILE STRESS 145 N/mm² = 14,5 kN/cm²
-Short support + big width = Rung decisive
- Long support + short width = Rail decisive

For more ordering details, please check page 134

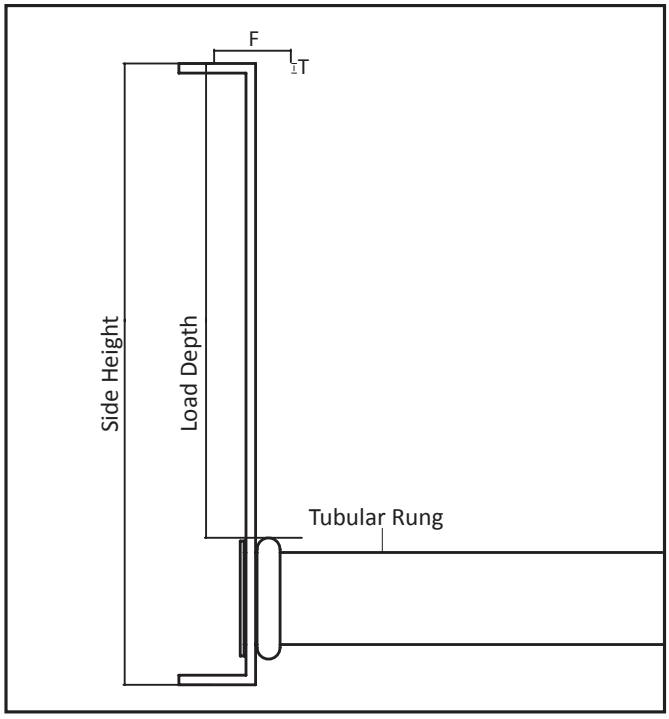
NEMA CLASS A	Width	Support Distance	Load	Deflection	
				Rung	Rail
	(mm)	(m)	KN/m	(mm)	(mm)
159.5 x 45 x 2.65	150	2.40	6.10	0.04	8.26
		3.00	3.25	0.02	9.96
		3.70	1.70	0.01	12.25
	225	2.40	6.10	0.14	7.72
		3.00	3.20	0.08	9.89
		3.70	1.69	0.00	12.26
	300	2.40	6.10	0.34	7.93
		3.00	3.15	0.18	9.86
		3.70	1.68	0.09	12.30
	450	2.40	5.55	1.05	7.99
		3.00	3.00	0.57	9.84
		3.70	1.60	0.30	12.06
	600	2.40	3.80	1.70	6.50
		3.00	2.80	1.25	9.98
		3.70	1.55	0.69	12.21
	750	2.40	2.45	2.14	5.30
		3.00	2.45	2.14	9.86
		3.70	1.49	1.30	12.50
	900	2.40	1.70	2.57	4.83
		3.00	1.70	2.57	8.08
		3.70	1.49	2.25	13.56

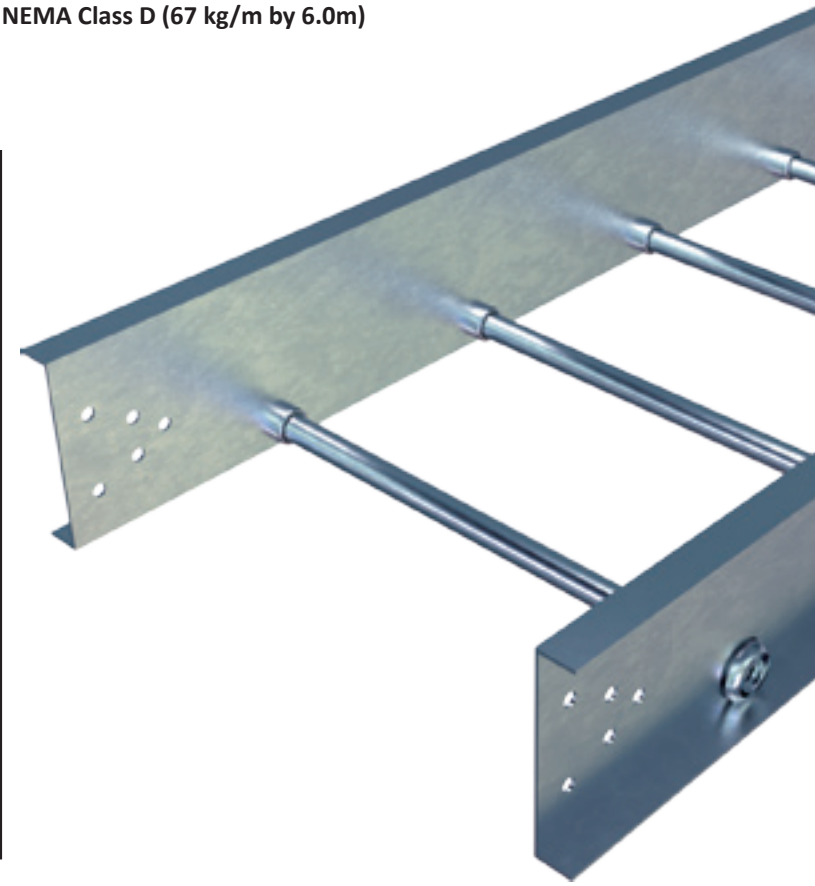
STEEL LADDER TYPE RUNS STEEL SECTION

SWAGED TUBULAR RUNG

STEEL S235 JRG2

- NEMA Class 8C (149 kg/m by 2.40m)
- NEMA Class 12A (74 kg/m by 3.70m)
- NEMA Class 12B (118 kg/m by 3.70m)
- NEMA Class 12A (74 kg/m by 3.70m)
- NEMA Class 12B (123 kg/m by 3.70m)
- NEMA Class 16A (82 kg/m by 4.90m)
- NEMA Class 12A (87 kg/m by 3.70m)
- NEMA Class 12C (150 kg/m by 3.70m)
- NEMA Class D (67 kg/m by 6.0m)





Steel S235 JRG2 - Side Rails

Design Data							Classes	
Side Rail	Height (mm)	Load Depth Fd (mm)	Thickness (mm)	F (mm)	W cm^3	I cm^4	NEMA Span	NEMA Class
S1	105	75	2.0	22	6.83	35.87	3.70	12A
S2	130	100	2.0	22	9.55	62.08	3.70	12B
S3	155	125	2.0	22	12.67	98.17	4.90	16A
S4	105	75	2.5	22	8.34	43.81	3.70	12A
S5	130	100	2.5	22	11.71	76.15	3.70	12C
S6	155	125	2.5	22	15.58	120.75	6.0	D

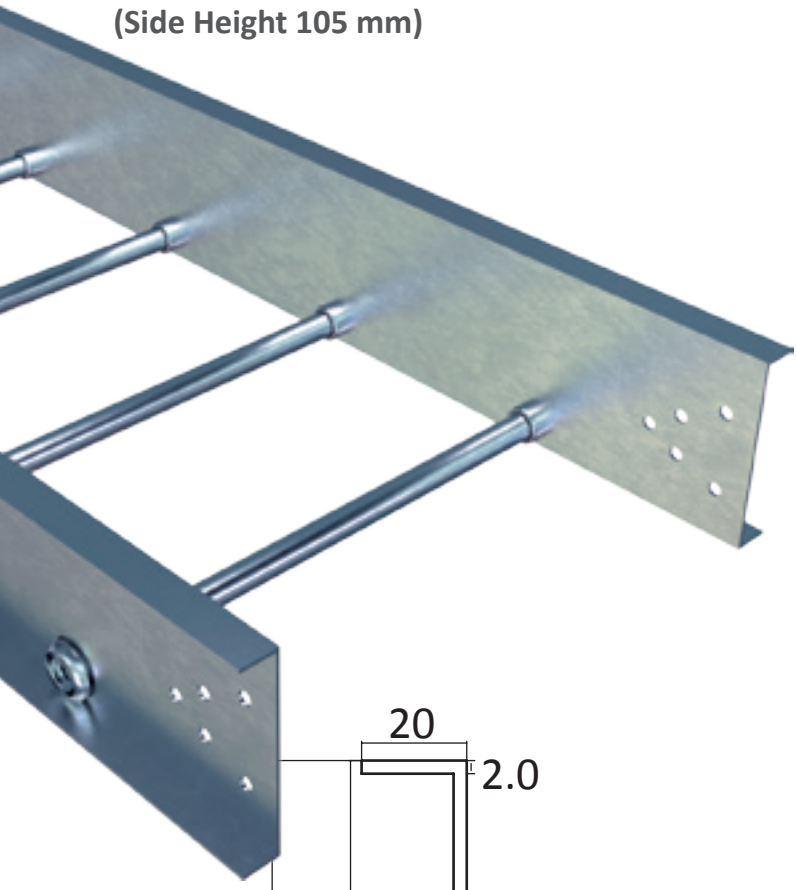
Load Classes

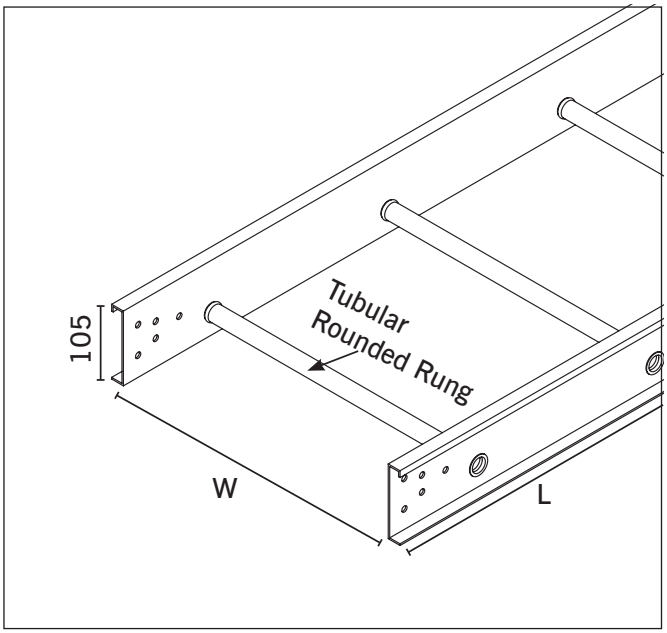
Side Rail	Load kg/m	Span (m)	Classes NEMA
S1	74	3.70	12A
S2	123	3.70	12B
S3	82	4.90	16A
S4	87	3.70	12A
S5	150	3.70	12C
S6	67	6.00	D

2.00 mm Thickness

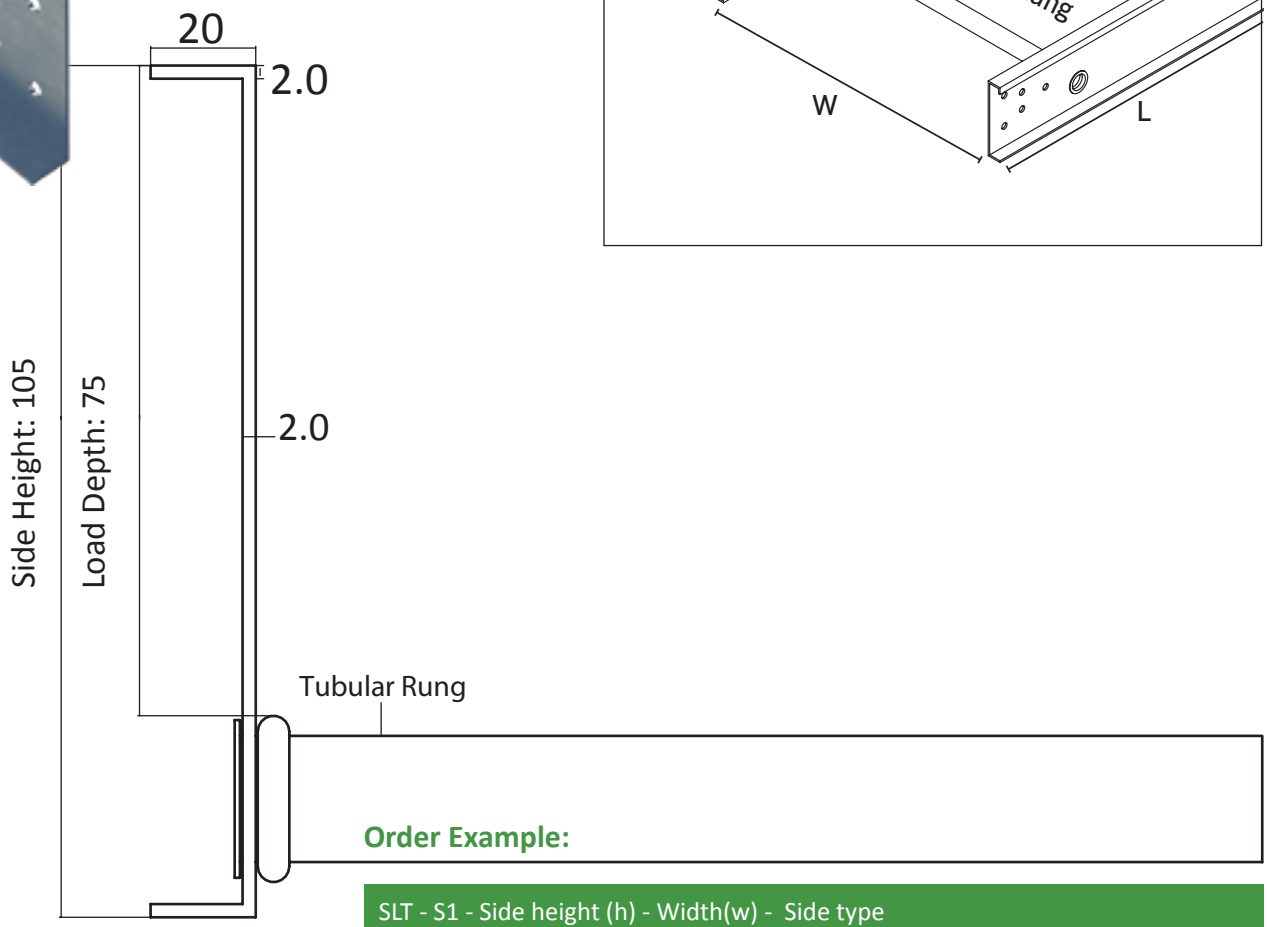
(Side Height 105 mm)

- NEMA Class 12A (74 kg/m by 3.70m)
- Side Rail: S1
- Height: 105 mm
- Load Depth: 75 mm
- Rung - Spacing: 229 mm





All Units are in (mm)



Order Example:

SLT - S1 - Side height (h) - Width(w) - Side type
Other dimensions can be manufactured and supplied upon request.
For more ordering details, please check page 134

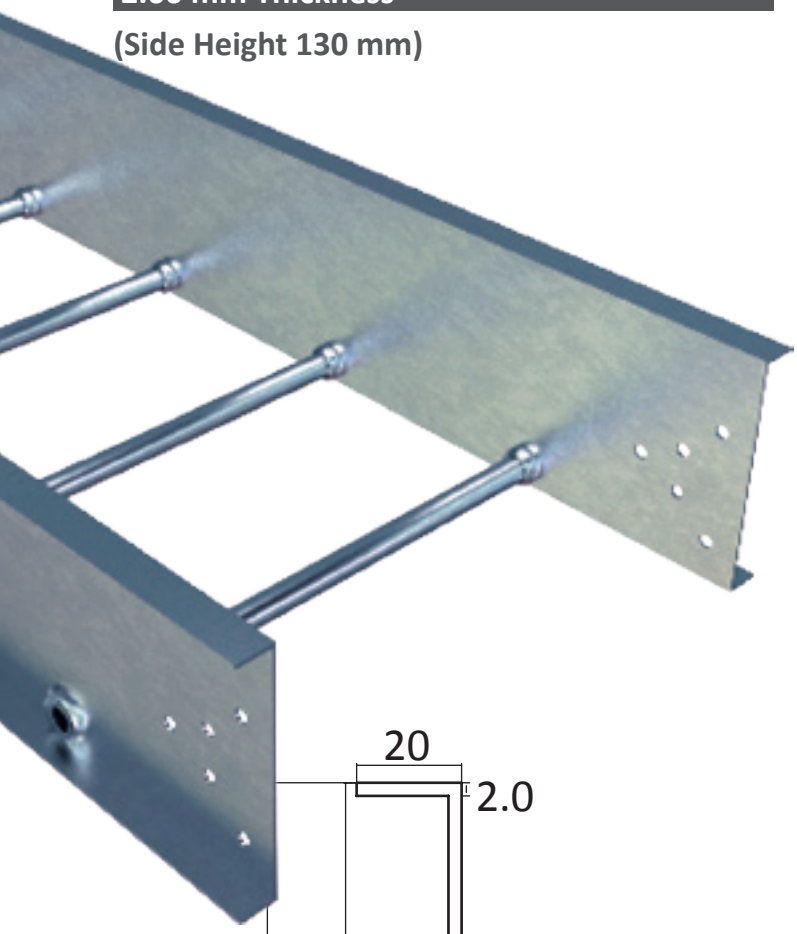
Width (mm)	Order Example			
	Item	(h)	(w)	Type
150	SLT - S1	105	150	C
225	SLT - S1	105	225	C

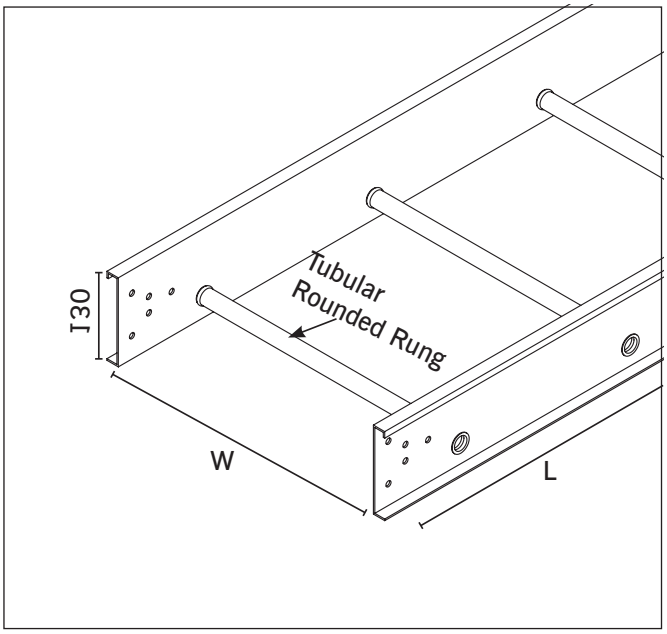
NEMA CLASS 12A	Width	Support Distance	Load	Deflection		Side Rail S1
				Rung	Rail	
	(mm)	(m)	KN/m	(mm)	(mm)	
105 X 20 X 2.0	150	2.40	2.72	0.01	6.32	Tubular Rung: 25 X 1.5 mm
		3.0	1.74	0.01	9.99	
		3.70	0.89	0.00	12.22	
		4.90	0.35	0.00	16.33	
	225	2.40	2.71	0.04	6.34	
		3.0	1.73	0.02	9.99	
		3.70	0.89	0.01	12.32	
		4.90	0.34	0.00	16.24	
	300	2.40	2.71	0.09	6.41	
		3.0	1.71	0.06	9.95	
		3.70	0.88	0.03	12.31	
		4.90	0.33	0.01	16.14	
	450	2.40	2.69	0.30	6.61	
		3.0	1.67	0.19	9.94	
		3.70	0.86	0.10	12.31	
		4.90	0.31	0.03	15.97	
	600	2.40	2.68	0.71	7.03	
		3.0	1.62	0.43	9.99	
		3.70	0.83	0.22	12.24	
		4.90	0.30	0.08	16.21	
	750	2.40	2.66	1.38	7.69	
		3.0	1.53	0.79	9.94	
		3.70	0.80	0.41	12.25	
		4.90	0.28	0.15	16.08	
	900	2.40	2.43	2.18	8.00	
		3.0	1.43	1.28	9.96	
		3.70	0.77	0.69	12.33	
		4.90	0.26	0.23	15.97	

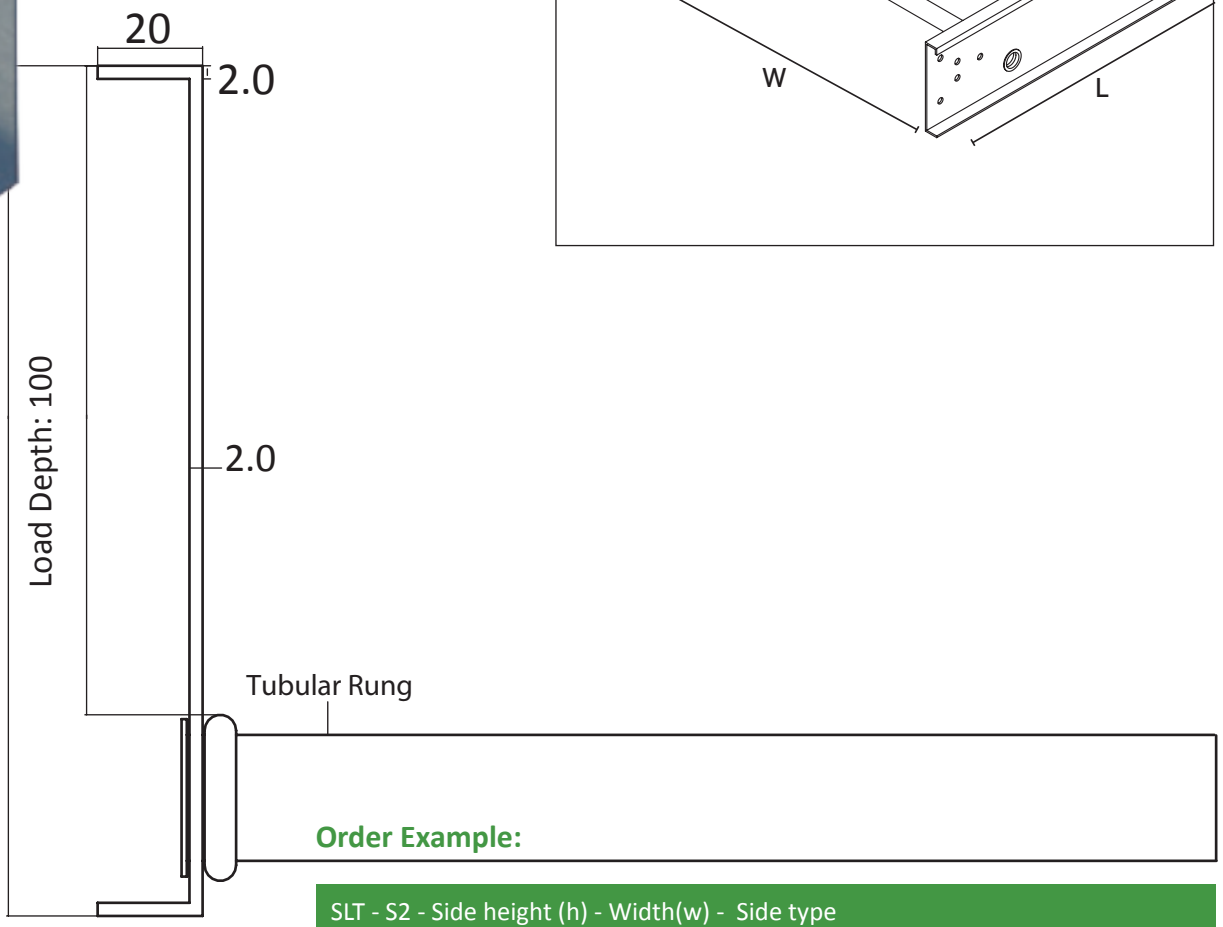
2.00 mm Thickness

(Side Height 130 mm)

- NEMA Class 12B (123 kg/m by 3.70m)
- Side Rail: S2
- Height: 130 mm
- Load Depth: 100 mm
- Rung Spacing: 229 mm







All Units are in (mm)

Order Example:

SLT - S2 - Side height (h) - Width(w) - Side type
Other dimensions can be manufactured and supplied upon request.
For more ordering details, please check page 134

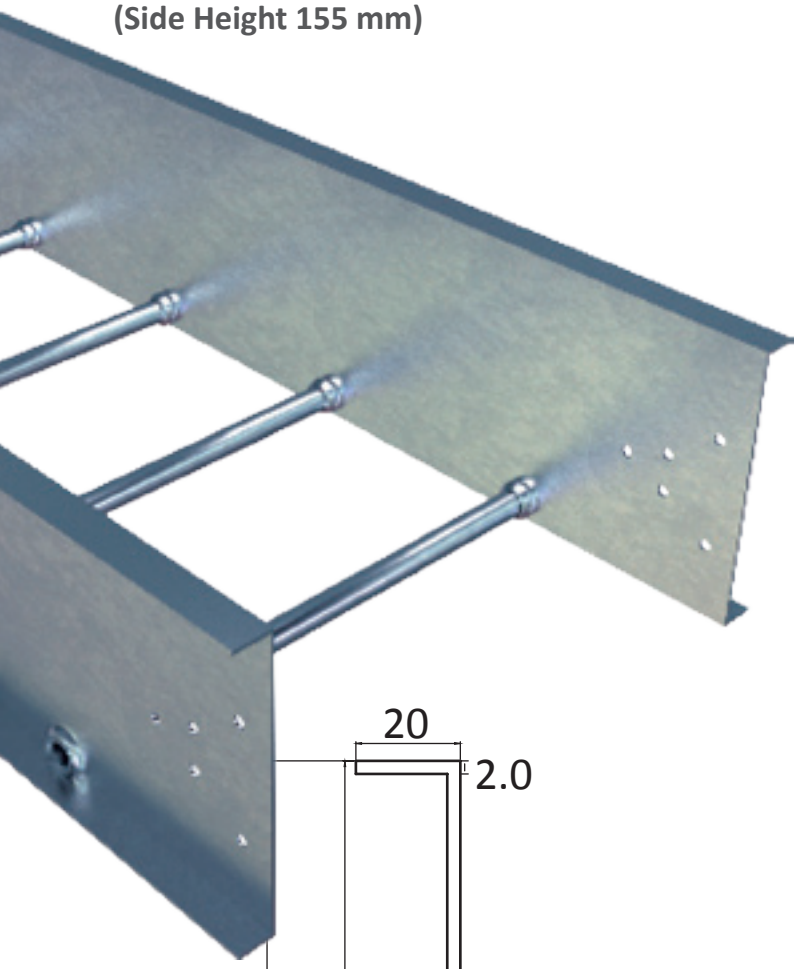
Width (mm)	Order Example			
	Item	(h)	(w)	Type
150	SLT - S2	130	150	C
225	SLT - S2	130	225	C

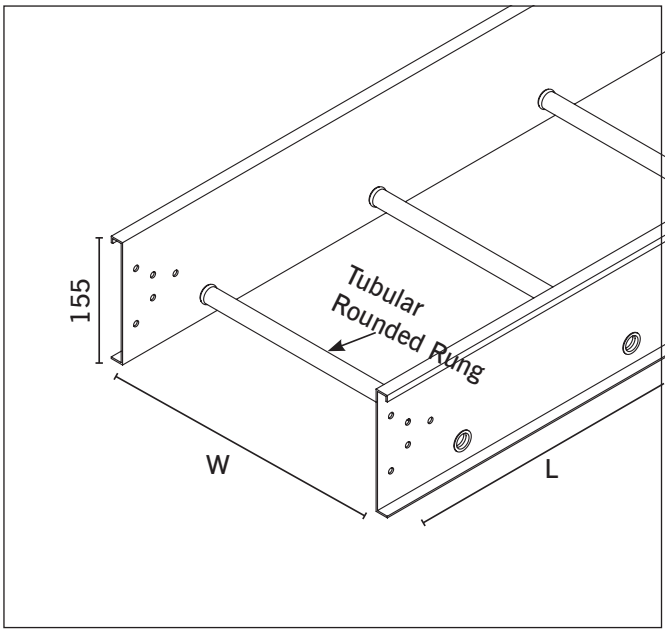
NEMA CLASS 12A	Width	Support Distance	Load	Deflection		Side Rail S1
				Rung	Rail	
	(mm)	(m)	KN/m	(mm)	(mm)	
130 X 20 X 2.0	150	2.40	3.76	0.02	5.05	Tubular Rung: 25 X 1.5 mm
		3.0	2.43	0.01	8.02	
		3.70	1.59	0.01	12.30	
		4.90	0.64	0.00	16.11	
	225	2.40	3.76	0.05	5.09	
		3.0	2.43	0.03	8.07	
		3.70	1.58	0.02	12.30	
		4.90	0.64	0.01	16.29	
	300	2.40	3.75	0.12	5.16	
		3.0	2.42	0.08	8.11	
		3.70	1.57	0.05	12.31	
		4.90	0.63	0.02	16.25	
	450	2.40	3.74	0.42	5.46	
		3.0	2.41	0.27	8.31	
		3.70	1.54	0.17	12.32	
		4.90	0.61	0.07	16.18	
	600	2.40	3.72	0.99	6.02	
		3.0	2.39	0.63	8.66	
		3.70	1.49	0.40	12.28	
		4.90	0.59	0.16	16.15	
	750	2.40	3.71	1.92	6.97	
		3.0	2.38	1.23	9.28	
		3.70	1.43	0.74	12.29	
		4.90	0.57	0.30	16.18	
	900	2.40	2.86	2.56	6.51	
		3.0	2.32	2.08	9.98	
		3.70	1.35	1.21	12.28	
		4.90	0.55	0.49	16.26	

2.00 mm Thickness

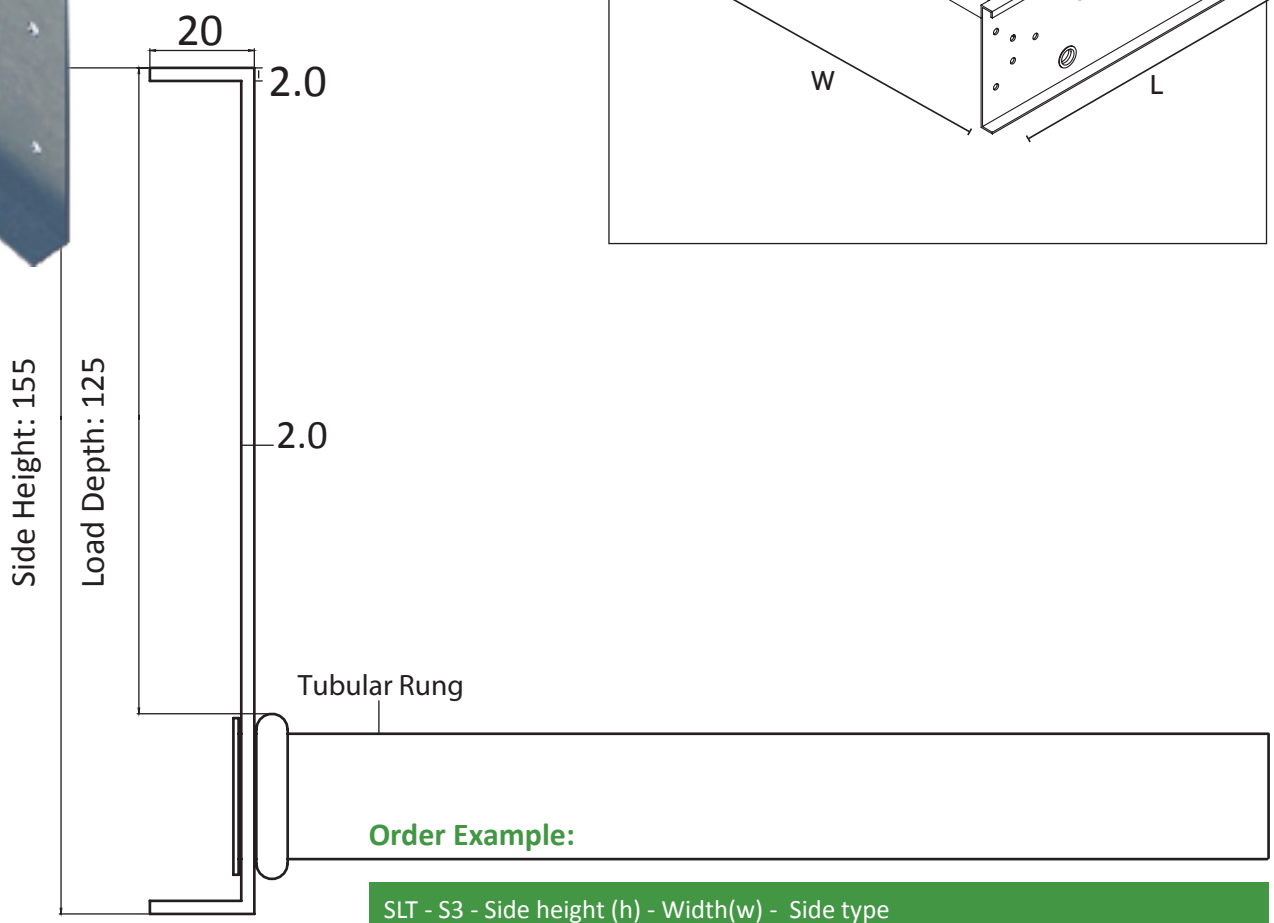
(Side Height 155 mm)

- NEMA Class 16A (82 kg/m by 4.90m)
- Side Rail: S3
- Height: 155 mm
- Load Depth: 125 mm
- Rung Spacing: 229 mm





All Units are in (mm)



Order Example:

SLT - S3 - Side height (h) - Width(w) - Side type
Other dimensions can be manufactured and supplied upon request.
For more ordering details, please check page 134

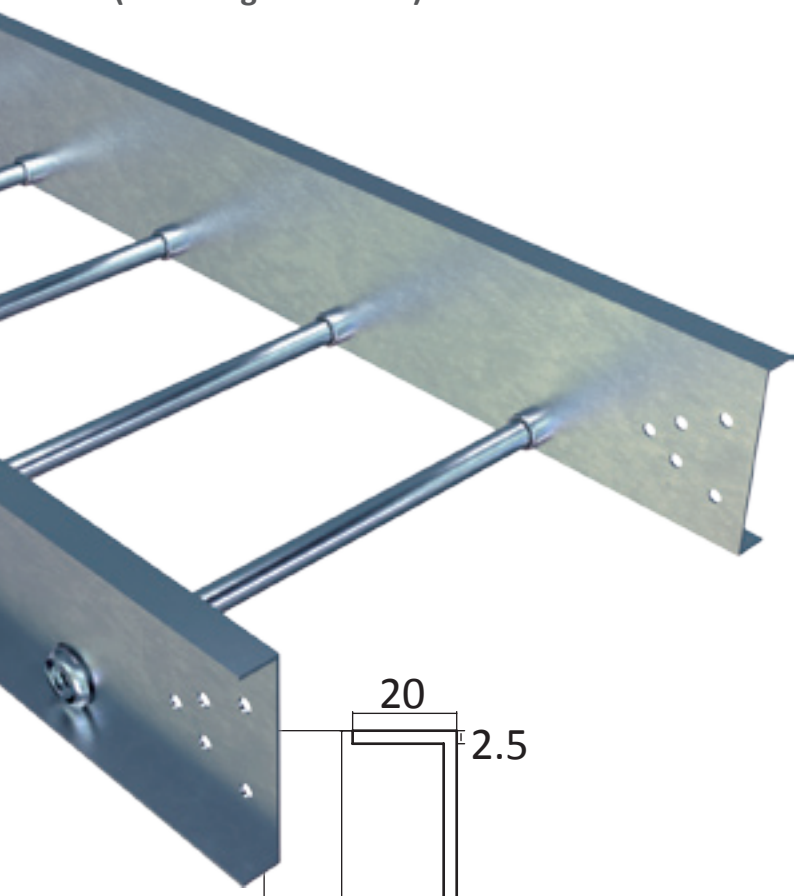
Width (mm)	Order Example			
	Item	(h)	(w)	Type
150	SLT - S3	155	150	C
225	SLT - S3	155	225	C

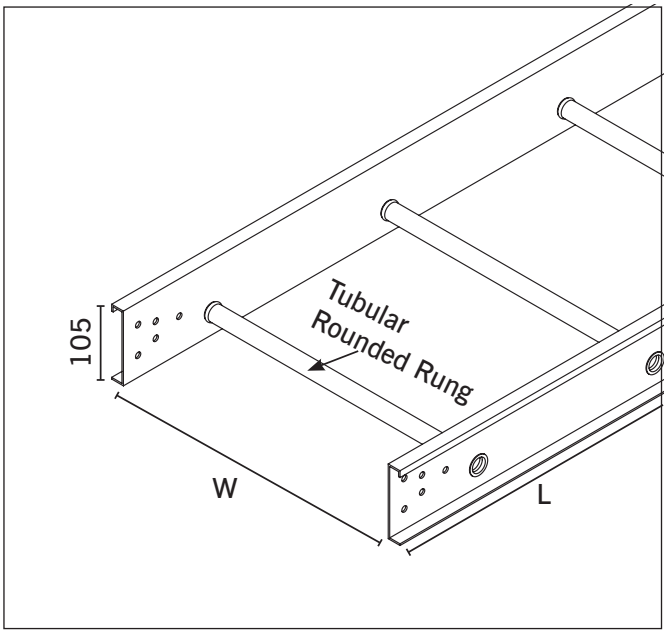
NEMA CLASS 12A	Width	Support Distance	Load	Deflection		Side Rail S1
				Rung	Rail	
	(mm)	(m)	KN/m	(mm)	(mm)	
155 X 20 X 2.0	150	2.40	4.93	0.02	4.19	Tubular Rung: 25 X 1.5 mm
		3.0	3.21	0.01	6.69	
		3.70	2.12	0.01	10.32	
		4.90	1.06	0.00	16.33	
	225	2.40	4.92	0.07	4.24	
		3.0	3.20	0.04	6.72	
		3.70	2.11	0.03	10.33	
		4.90	1.05	0.01	16.31	
	300	2.40	4.92	0.16	4.34	
		3.0	3.19	0.11	6.77	
		3.70	2.11	0.07	10.40	
		4.90	1.04	0.03	16.29	
	450	2.40	4.90	0.55	4.72	
		3.0	3.18	0.36	7.04	
		3.70	2.09	0.23	10.54	
		4.90	1.02	0.11	16.30	
	600	2.40	4.87	1.29	5.45	
		3.0	3.17	0.84	7.53	
		3.70	2.08	0.55	70.89	
		4.90	0.99	0.26	16.23	
	750	2.40	4.10	2.13	5.66	
		3.0	3.15	1.63	8.31	
		3.70	2.07	1.07	11.43	
		4.90	0.96	0.50	16.25	
	900	2.40	2.86	2.56	5.07	
		3.0	2.86	2.56	8.68	
		3.70	2.05	1.84	12.17	
		4.90	0.92	0.82	16.21	

2.50 mm Thickness

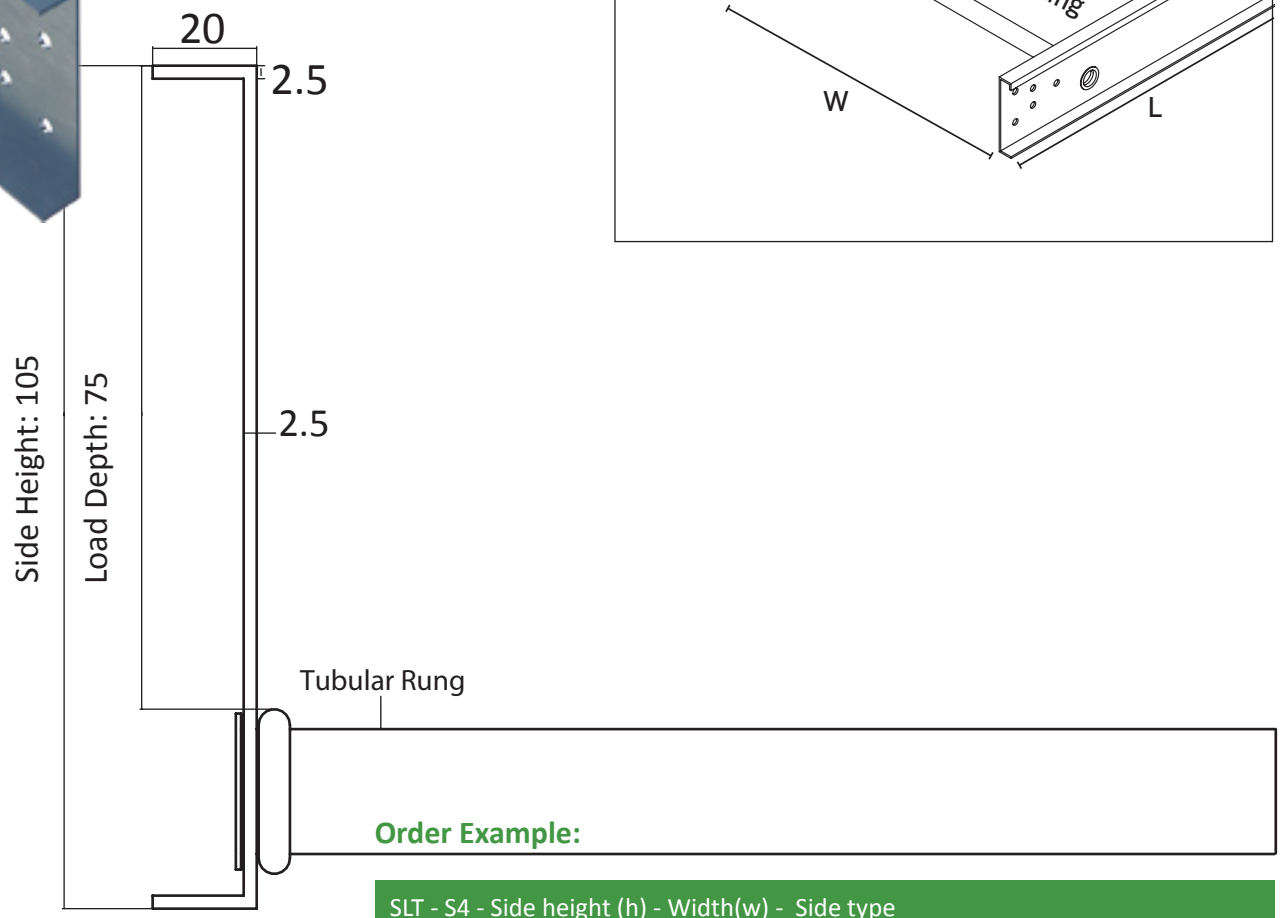
(Side Height 105 mm)

- NEMA Class 12A (87 kg/m by 3.70m)
- Side Rail: S4
- Height: 105 mm
- Load Depth: 75 mm
- Rung Spacing: 229 mm





All Units are in (mm)



Order Example:

SLT - S4 - Side height (h) - Width(w) - Side type
Other dimensions can be manufactured and supplied upon request.
For more ordering details, please check page 134

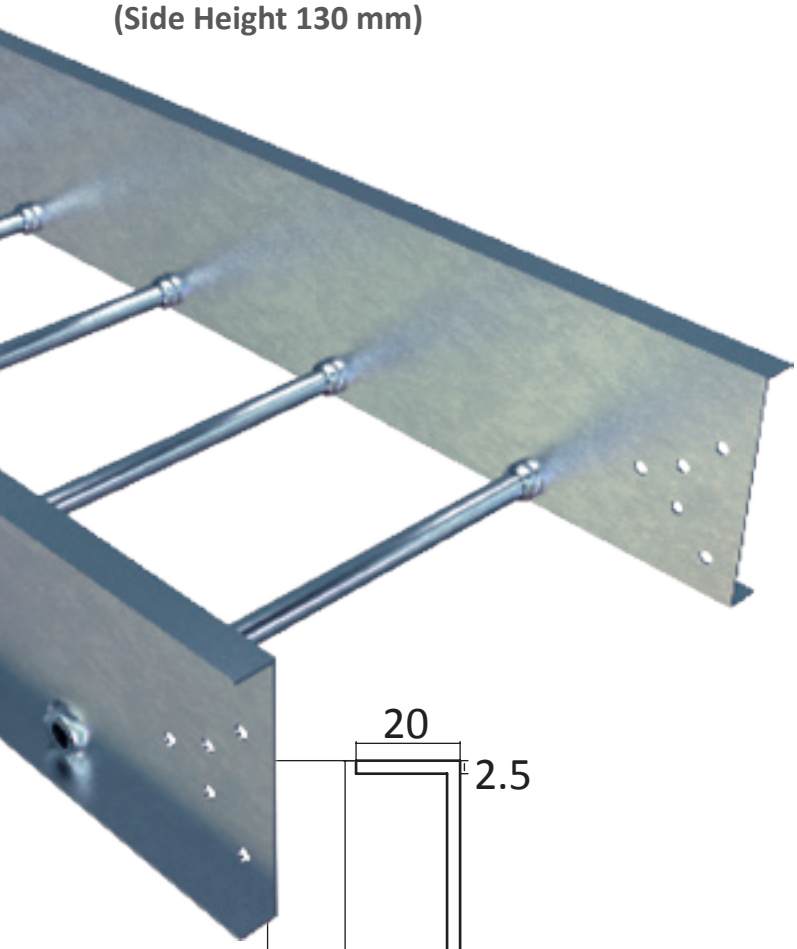
Width (mm)	Order Example			
	Item	(h)	(w)	Type
150	SLT - S4	105	150	C
225	SLT - S4	105	225	C

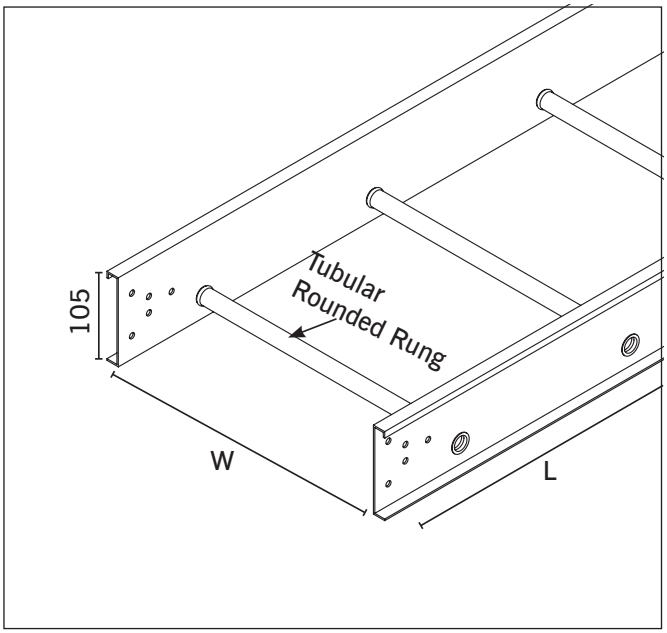
NEMA CLASS 12A	Width	Support Distance	Load	Deflection		Side Rail S1
				Rung	Rail	
	(mm)	(m)	KN/m	(mm)	(mm)	
105 X 20 X 2.5	150	2.40	3.34	0.01	6.33	Tubular Rung: 25 X 1.5 mm
		3.0	2.14	0.01	9.99	
		3.70	1.11	0.00	12.31	
		4.90	0.44	0.00	16.27	
	225	2.40	3.33	0.05	6.35	
		3.0	2.13	0.03	10.00	
		3.70	1.10	0.02	12.29	
		4.90	0.43	0.01	16.19	
	300	2.40	3.33	0.11	6.43	
		3.0	2.11	0.07	9.98	
		3.70	1.09	0.04	12.29	
		4.90	0.42	0.01	16.12	
	450	2.40	3.32	0.37	6.70	
		3.0	2.06	0.23	9.98	
		3.70	1.07	0.12	12.32	
		4.90	0.41	0.05	16.31	
	600	2.40	3.30	0.88	7.20	
		3.0	1.98	0.53	9.98	
		3.70	1.04	0.28	12.32	
		4.90	0.39	0.10	16.21	
	750	2.40	3.27	1.70	7.99	
		3.0	1.87	0.97	10.0	
		3.70	1.0	0.52	12.30	
		4.90	0.37	0.19	16.13	
	900	2.40	2.81	2.52	7.99	
		3.0	1.72	1.54	9.96	
		3.70	0.95	0.85	12.26	
		4.90	0.35	0.31	16.10	

2.50 mm Thickness

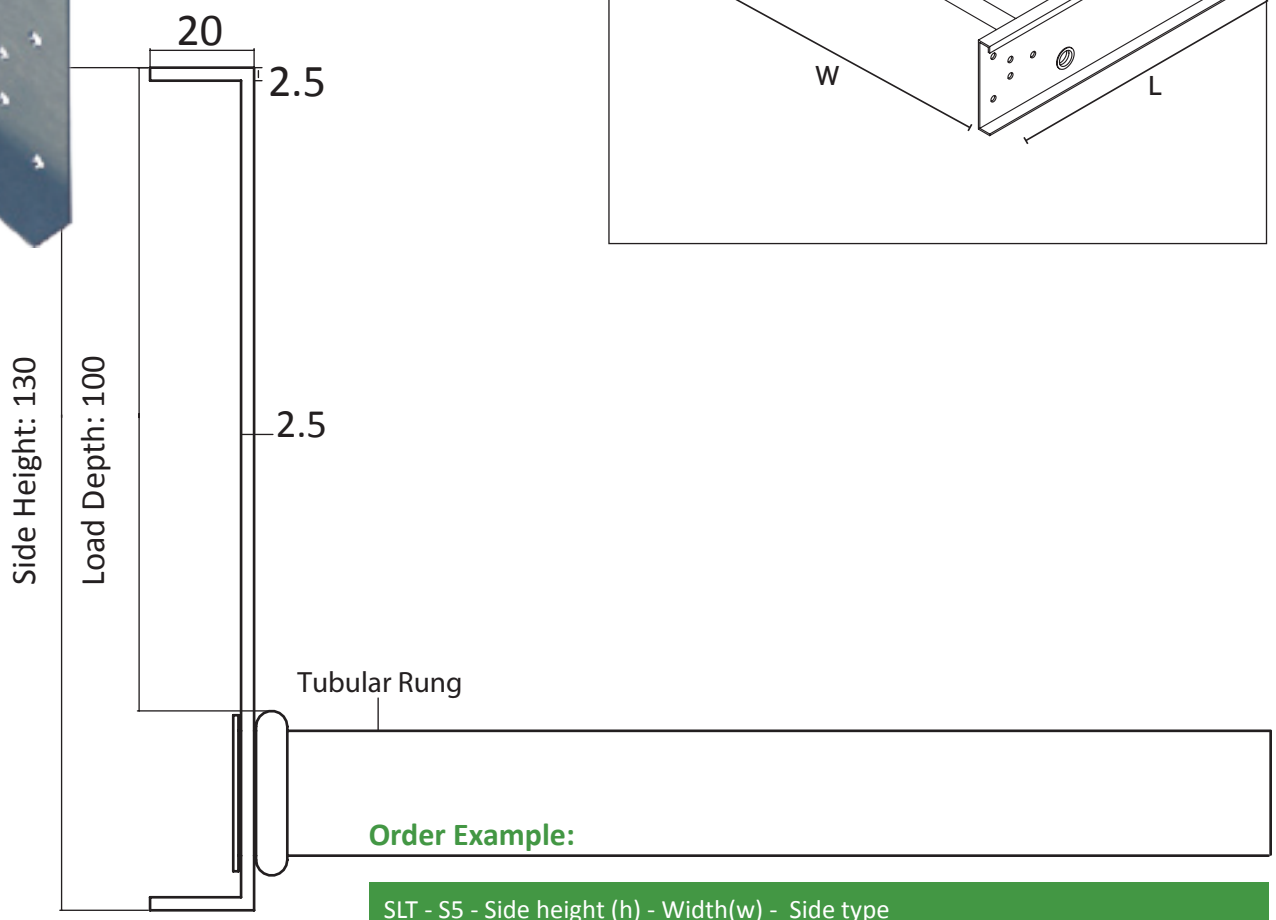
(Side Height 130 mm)

- NEMA Class 12C (150 kg/m by 3.70m)
- Side Rail: S5
- Height: 130 mm
- Load Depth: 100 mm
- Rung Spacing: 229 mm





All Units are in (mm)



Order Example:

SLT - S5 - Side height (h) - Width(w) - Side type
Other dimensions can be manufactured and supplied upon request.
For more ordering details, please check page 134

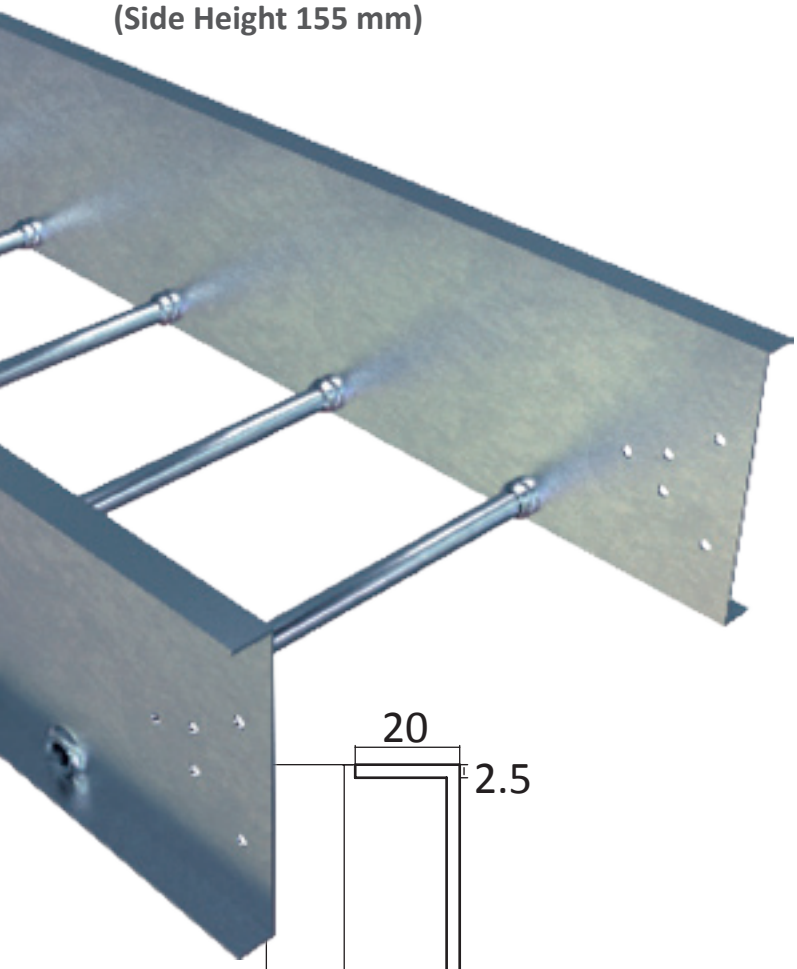
Width (mm)	Order Example			
	Item	(h)	(w)	Type
150	SLT - S5	130	150	C
225	SLT - S5	130	225	C

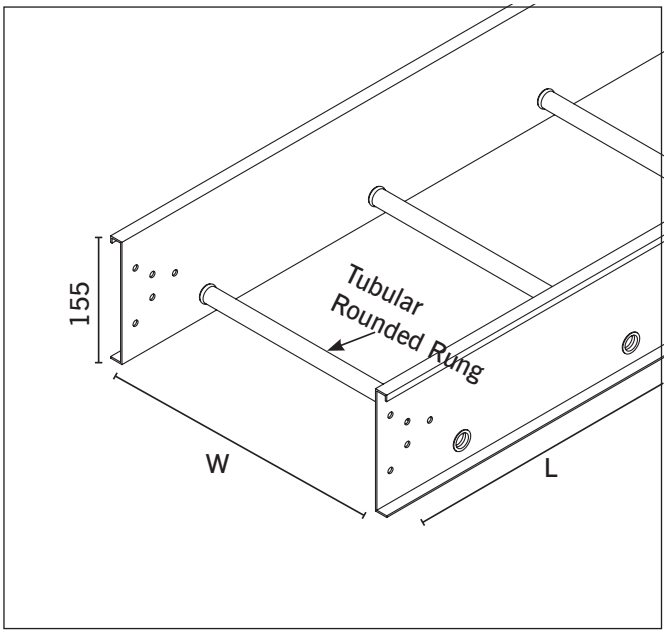
NEMA CLASS 12A	Width	Support Distance	Load	Deflection		Side Rail S1
				Rung	Rail	
	(mm)	(m)	KN/m	(mm)	(mm)	
130 X 20 X 2.5	150	2.40	4.64	0.02	5.06	Tubular Rung: 25 X 1.5 mm
		3.0	3.0	0.01	8.03	
		3.70	1.97	0.01	12.33	
		4.90	0.81	0.00	16.30	
	225	2.40	4.63	0.06	5.11	
		3.0	3.0	0.04	8.08	
		3.70	1.95	0.03	12.28	
		4.90	0.80	0.01	16.26	
	300	2.40	4.63	0.15	5.20	
		3.0	2.99	0.10	8.13	
		3.70	1.94	0.06	12.30	
		4.90	0.79	0.03	16.23	
	450	2.40	4.61	0.52	5.56	
		3.0	2.98	0.33	8.38	
		3.70	1.90	0.21	12.29	
		4.90	0.77	0.09	16.20	
	600	2.40	4.60	1.22	6.27	
		3.0	2.96	0.79	8.82	
		3.70	1.84	0.49	12.30	
		4.90	0.75	0.20	16.22	
	750	2.40	4.12	2.14	6.69	
		3.0	2.95	1.53	9.58	
		3.70	1.76	0.91	12.33	
		4.90	0.73	0.38	16.31	
	900	2.40	2.86	2.56	5.78	
		3.0	2.74	2.46	9.99	
		3.70	1.65	1.48	12.32	
		4.90	0.70	0.63	16.28	

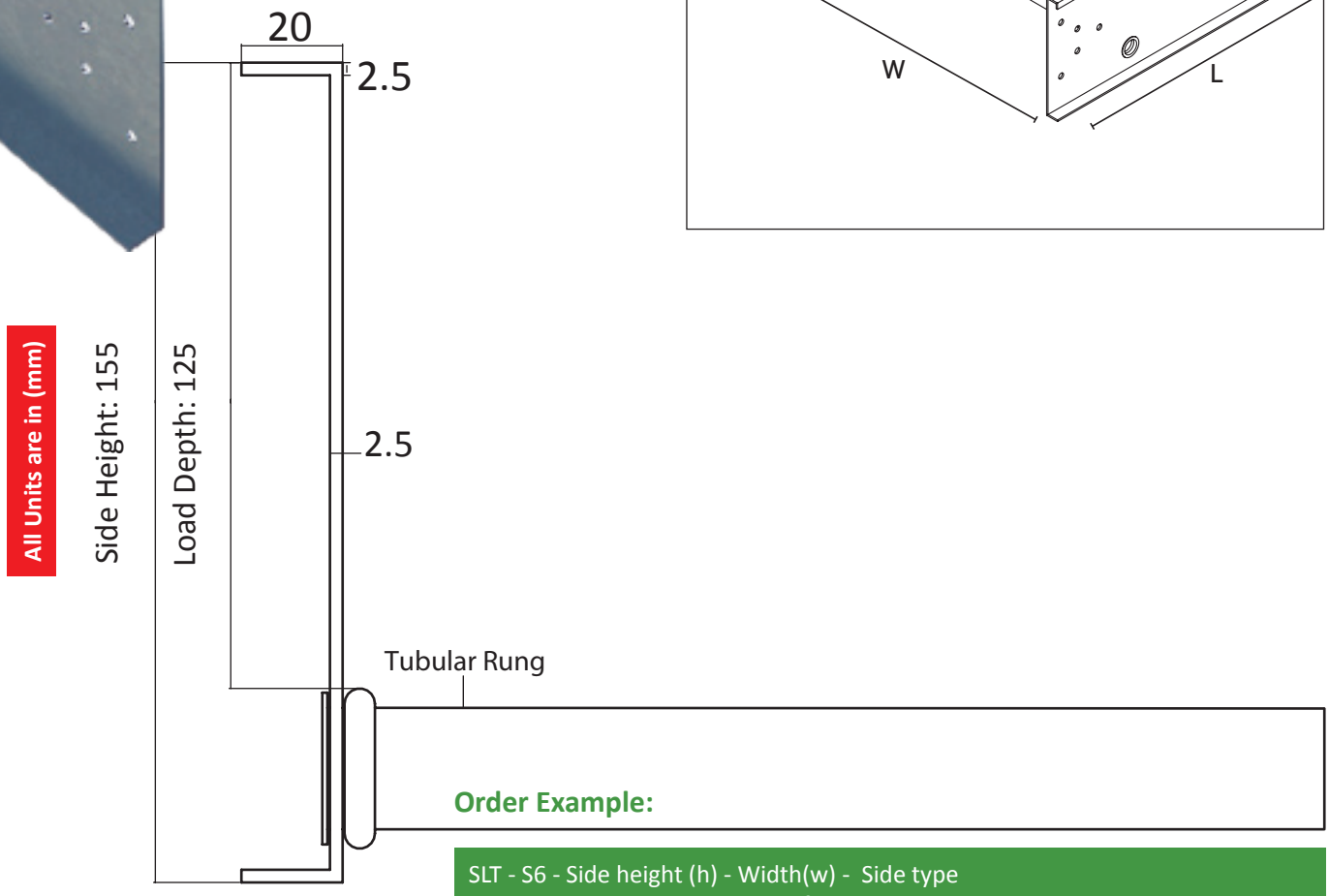
2.50 mm Thickness

(Side Height 155 mm)

- NEMA Class D (67 kg/m by 6.0m)
- Side Rail: S6
- Height: 155 mm
- Load Depth: 125 mm
- Rung - Spacing: 229 mm







All Units are in (mm)

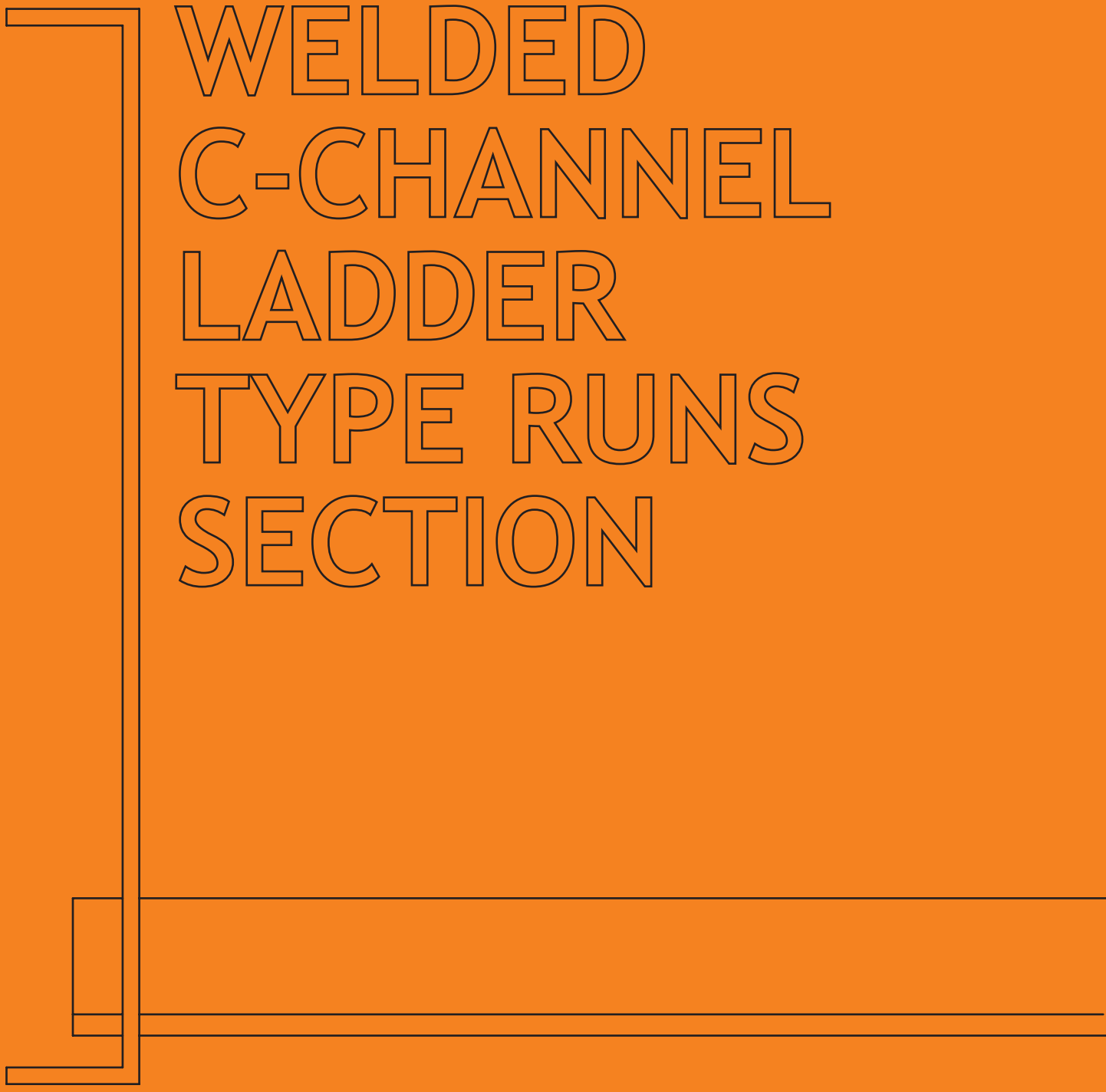
Order Example:

SLT - S6 - Side height (h) - Width(w) - Side type
Other dimensions can be manufactured and supplied upon request.
For more ordering details, please check page 134

Width (mm)	Order Example			
	Item	(h)	(w)	Type
150	SLT - S6	155	150	C
225	SLT - S6	155	225	C

NEMA CLASS 12A	Width	Support Distance	Load	Deflection		Side Rail S1
				Rung	Rail	
	(mm)	(m)	KN/m	(mm)	(mm)	
155 X 20 X 2.5	150	2.40	6.09	0.03	4.20	Tubular Rung: 25 X 1.5 mm
		3.0	3.97	0.02	6.71	
		3.70	2.62	0.01	10.31	
		4.90	1.31	0.01	16.23	
	225	2.40	6.08	0.09	4.26	
		3.0	3.96	0.06	6.74	
		3.70	2.61	0.04	10.33	
		4.90	1.31	0.02	16.33	
	300	2.40	6.08	0.20	4.38	
		3.0	3.95	0.13	6.81	
		3.70	2.60	0.09	10.37	
		4.90	1.30	0.04	16.32	
	450	2.40	6.07	0.68	4.87	
		3.0	3.94	0.44	7.13	
		3.70	2.60	0.29	10.63	
		4.90	1.27	0.14	16.25	
	600	2.40	5.16	1.37	4.95	
		3.0	3.93	1.04	7.74	
		3.70	2.58	0.69	11.00	
		4.90	1.24	0.33	16.26	
	750	2.40	4.13	2.14	5.03	
		3.0	3.91	2.03	8.72	
		3.70	2.57	1.33	11.67	
		4.90	1.20	0.62	16.26	
	900	2.40	3.57	2.57	5.09	Tubular Rung: 25 X 2.0 mm
		3.0	3.57	2.57	8.72	
		3.70	2.56	1.84	12.20	
		4.90	1.17	0.84	16.30	

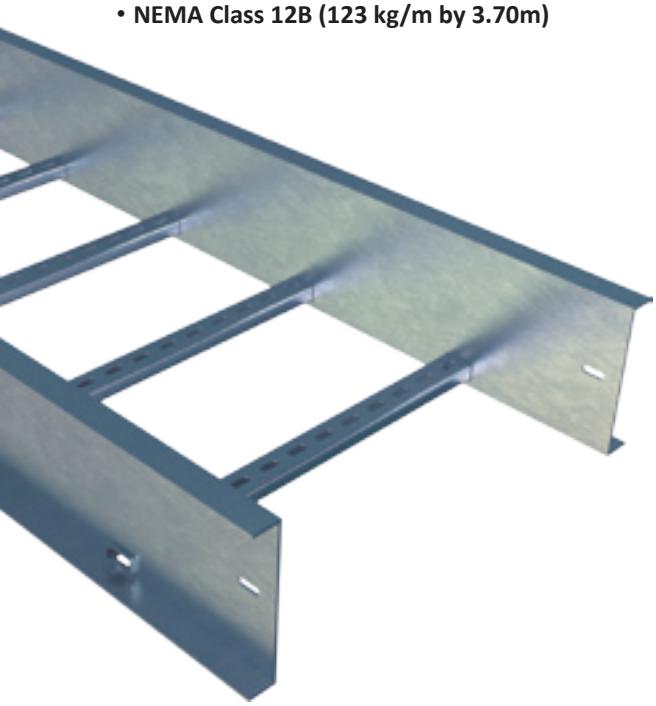
WELDED C-CHANNEL LADDER TYPE RUNS SECTION

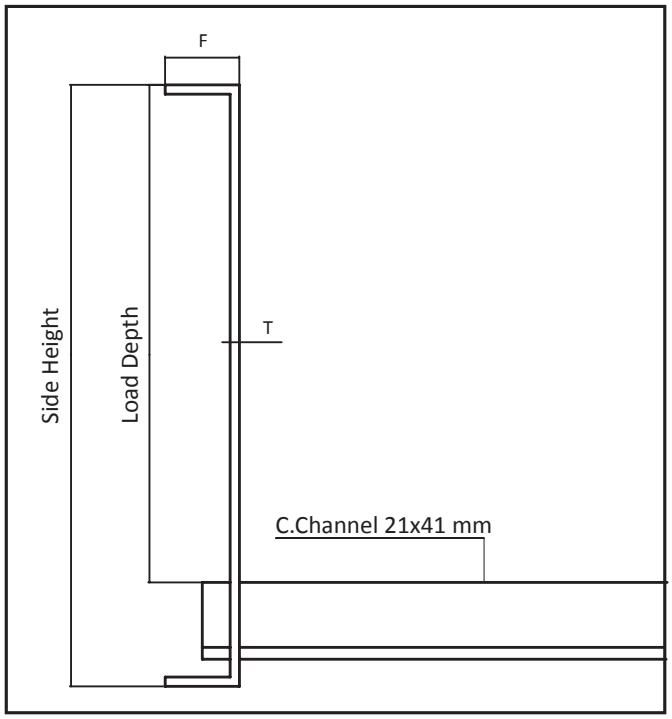


WELDED C-CHANNEL - LADDER TYPE RUNS

STEEL S235 JRG2

- NEMA Class 8C (149 kg/m by 2.40m)
- NEMA Class 12A (74 kg/m by 3.70m)
- NEMA Class 12B (118 kg/m by 3.70m)
- NEMA Class 12A (74 kg/m by 3.70m)
- NEMA Class 12B (123 kg/m by 3.70m)
- NEMA Class 16A (82 kg/m by 4.90m)
- NEMA Class 12A (87 kg/m by 3.70m)
- NEMA Class 12C (150 kg/m by 3.70m)
- NEMA Class D (67 kg/m by 6.0m)





Steel S235 JRG2 - Side Rails

Design Data							Classes	
Side Rail	Height (mm)	Load Depth Fd (mm)	Thickness (mm)	F (mm)	W cm^3	I cm^4	NEMA Span	NEMA Class
S1	105	75	2.0	22	6.83	35.87	3.70	12A
S2	130	100	2.0	22	9.55	62.08	3.70	12B
S3	155	125	2.0	22	12.67	98.17	4.90	16A
S4	105	75	2.5	22	8.34	43.81	3.70	12A
S5	130	100	2.5	22	11.71	76.15	3.70	12C
S6	155	125	2.5	22	15.58	120.75	6.0	D

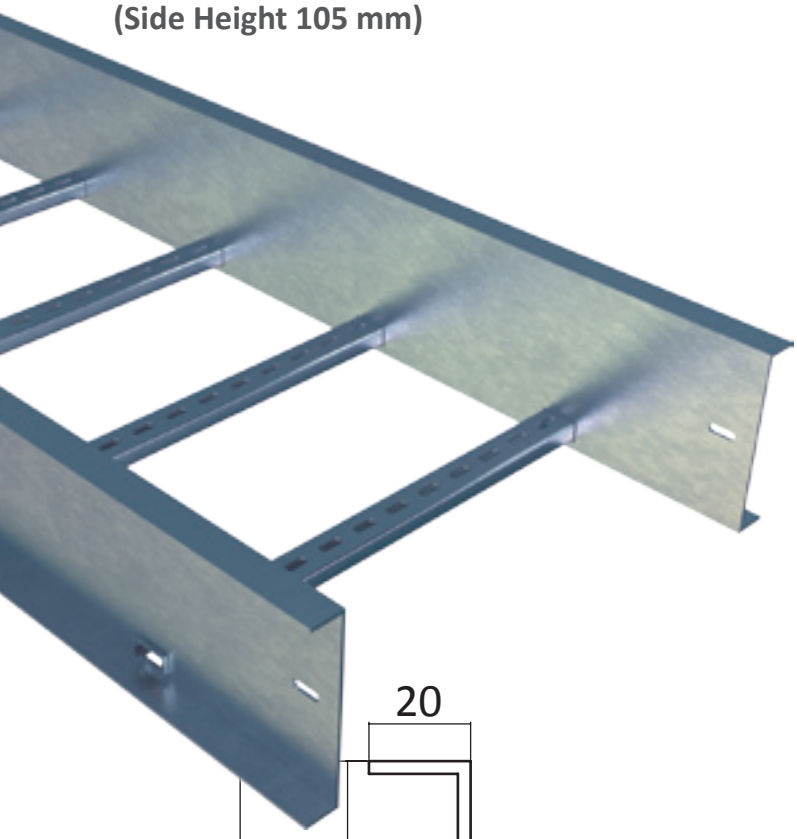
Load Classes

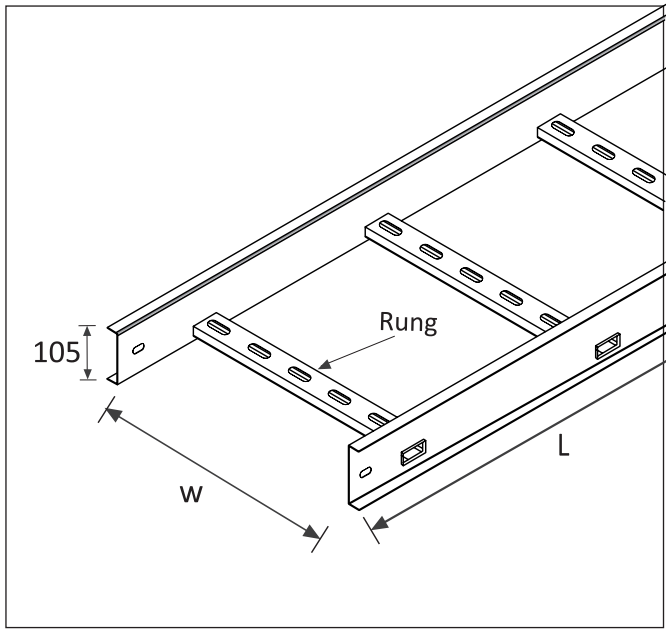
Side Rail	Load kg/m	Span (m)	Classes NEMA
S1	74	3.70	12A
S2	123	3.70	12B
S3	82	4.90	16A
S4	87	3.70	12A
S5	150	3.70	12C
S6	67	6.00	D

2.00 mm Thickness

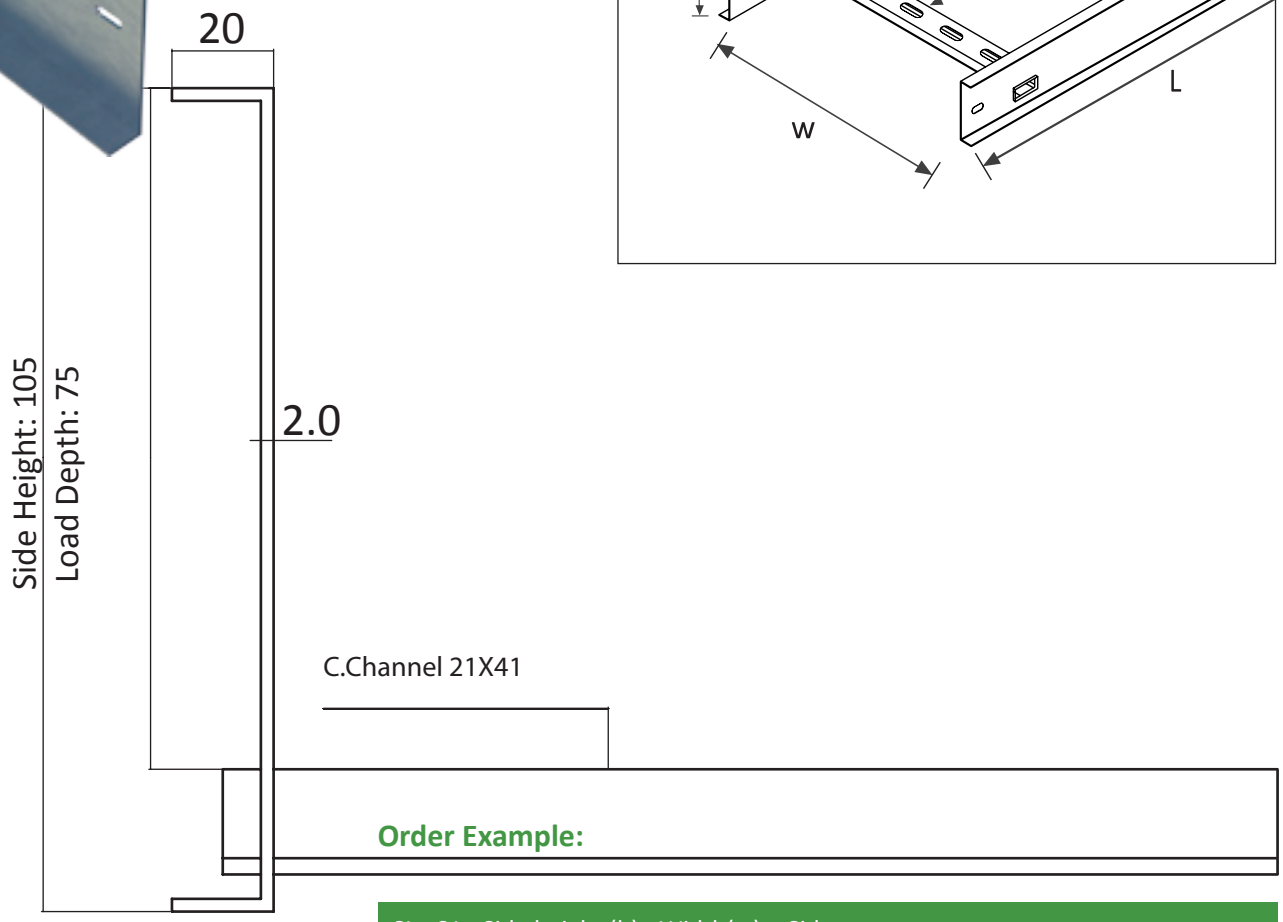
(Side Height 105 mm)

- NEMA Class 12A (74 kg/m by 3.70m)
- Side Rail: S1
- Height: 105 mm
- Load Depth: 75 mm
- Rung - Spacing: 229 mm





All Units are in (mm)



Order Example:

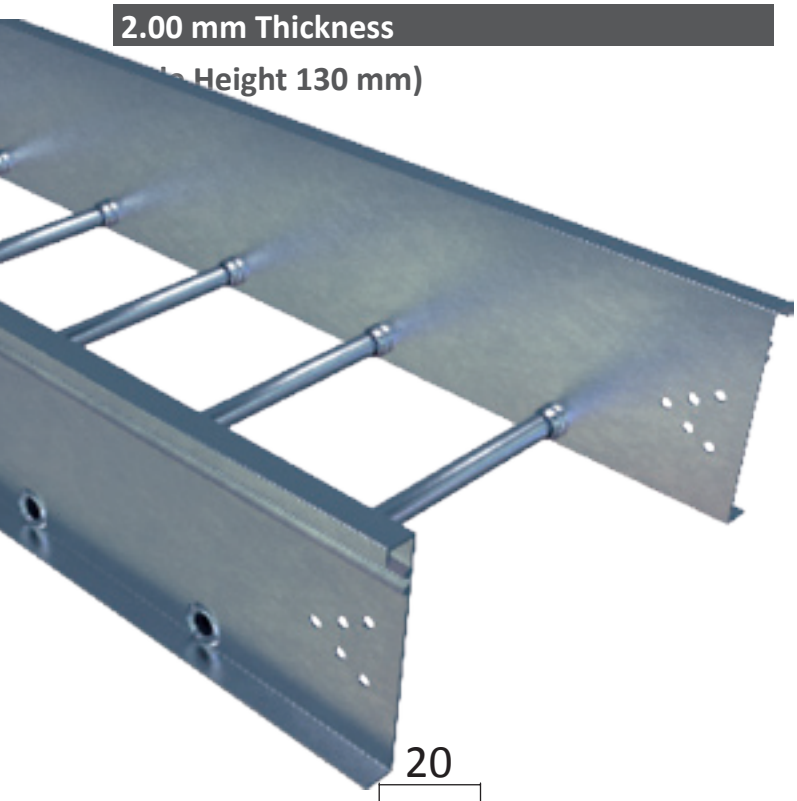
SL - S1 - Side height (h) - Width(w) - Side type
Other dimensions can be manufactured and supplied upon request.
For more ordering details, please check page 134

Width (mm)	Order Example			
	Item	(h)	(w)	Type
150	SL - S1	105	150	C
225	SL - S1	105	225	C

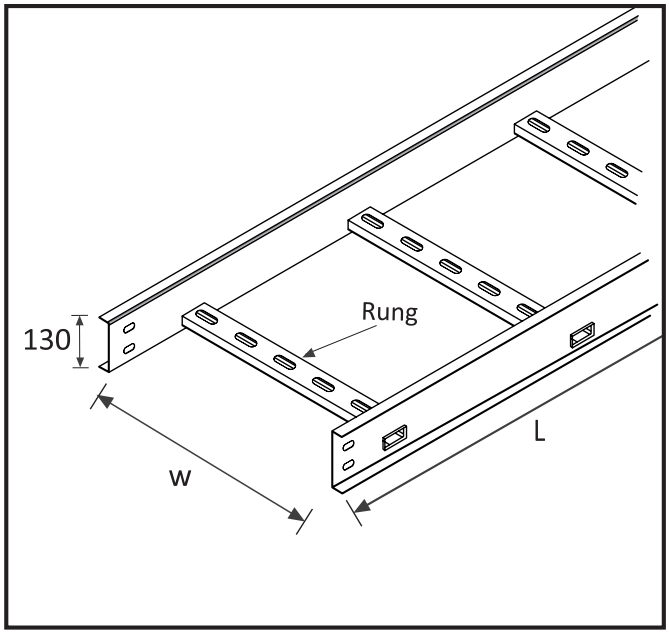
NEMA CLASS 12A	Width	Support Distance	Load	Deflection		Side Rail S1
				Rung	Rail	
	(mm)	(m)	KN/m	(mm)	(mm)	
105 X 20 X 2.0	150	2.40	2.69	0.01	6.33	Rung 41 x 21 x 1.5 mm
		3.0	1.70	0.01	9.96	
		3.70	0.86	0.00	12.28	
		4.90	0.31	0.00	16.13	
	225	2.40	2.69	0.04	6.36	
		3.0	1.70	0.03	9.98	
		3.70	0.86	0.01	12.29	
		4.90	0.31	0.00	16.14	
	300	2.40	2.69	0.10	6.42	
		3.0	1.69	0.06	9.96	
		3.70	0.86	0.03	12.31	
		4.90	0.31	0.01	14.14	
	450	2.40	2.69	0.33	6.65	
		3.0	1.67	0.21	9.99	
		3.70	0.85	0.1	12.26	
		4.90	0.31	0.04	26.17	
	600	2.40	2.69	0.75	3.10	
		3.0	1.62	0.47	3.98	
		3.70	0.84	0.25	12.27	
		4.90	0.31	0.09	16.22	
	750	2.40	2.69	1.53	7.85	
		3.0	1.54	0.88	9.95	
		3.70	0.82	0.47	10.24	
		4.90	0.31	0.18	10.31	
	900	2.40	2.39	2.36	7.99	
		3.0	1.45	1.43	10.00	
		3.70	0.80	0.79	12.30	
		4.90	0.30	0.30	16.03	

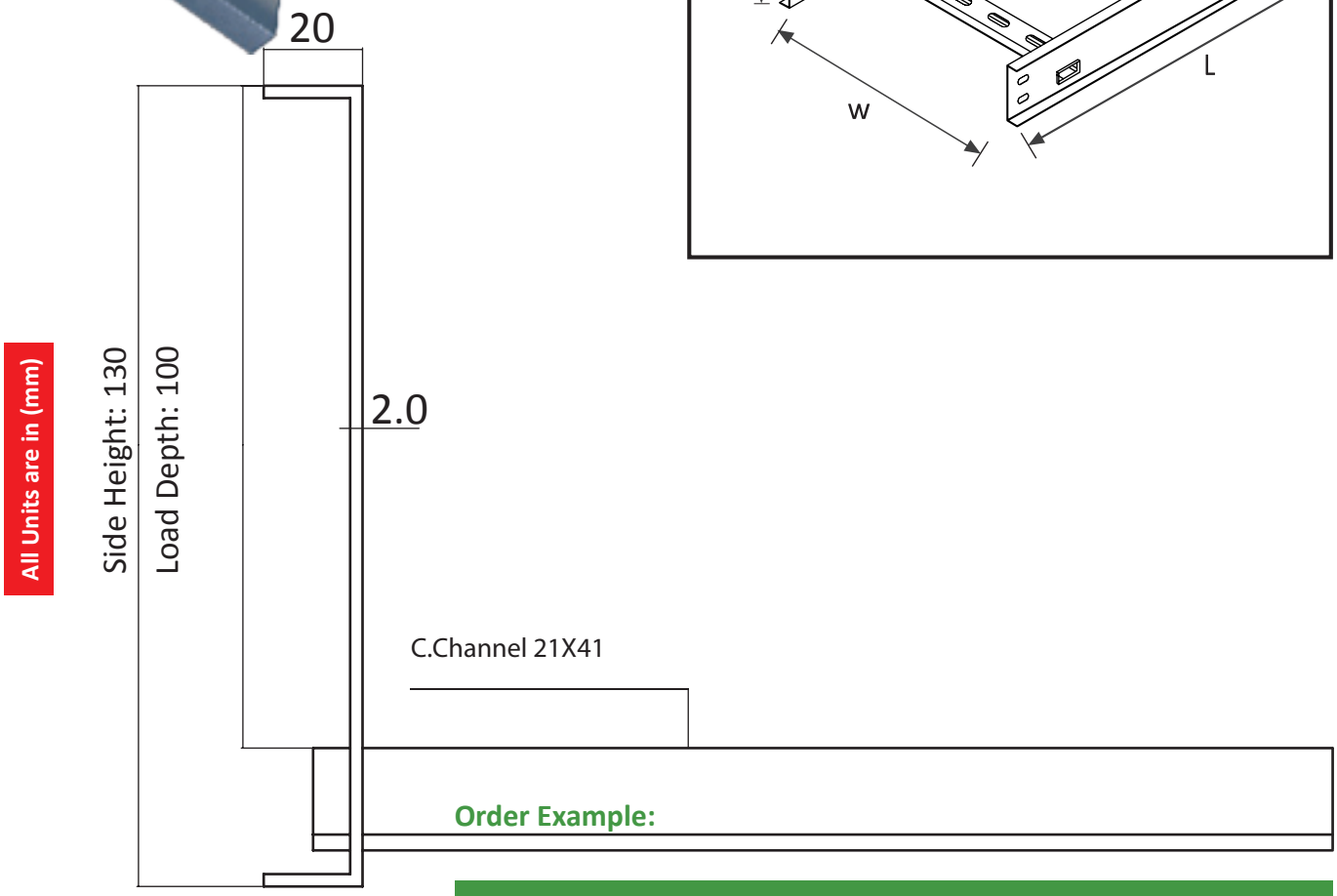
2.00 mm Thickness

Height 130 mm)



- NEMA Class 12B (123 kg/m by 3.70m)
- Side Rail: S2
- Height: 130 mm
- Load Depth: 100 mm
- Rung Spacing: 229 mm





All Units are in (mm)

Order Example:

SL - S2 - Side height (h) - Width(w) - Side type
Other dimensions can be manufactured and supplied upon request.
For more ordering details, please check page 134

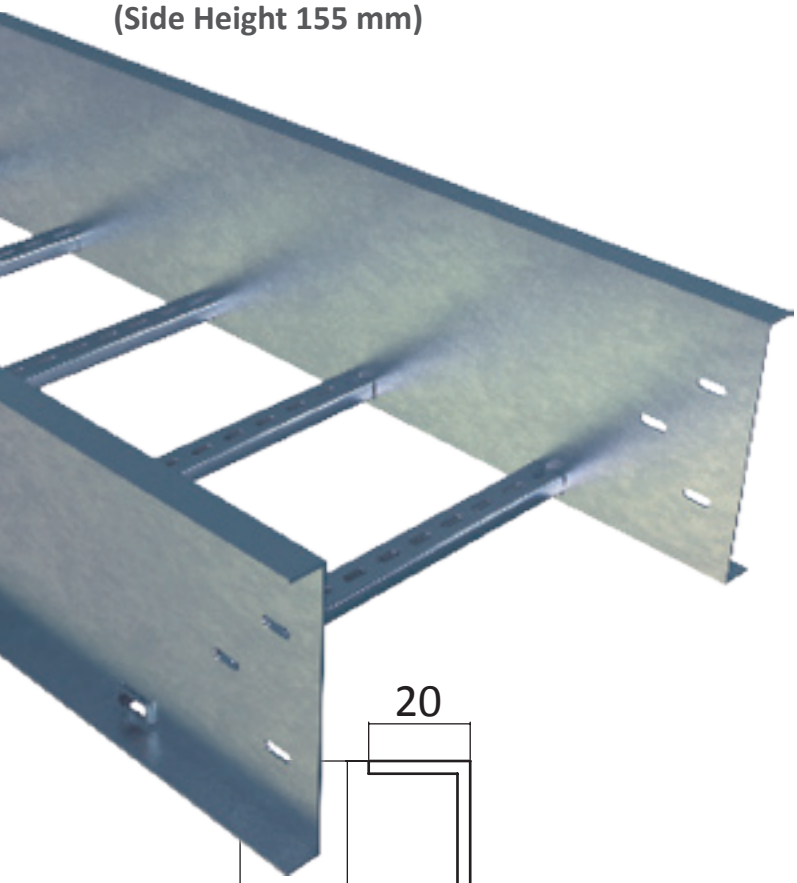
Width (mm)	Order Example			
	Item	(h)	(w)	Type
150	SL - S2	130	150	C
225	SL - S2	130	225	C

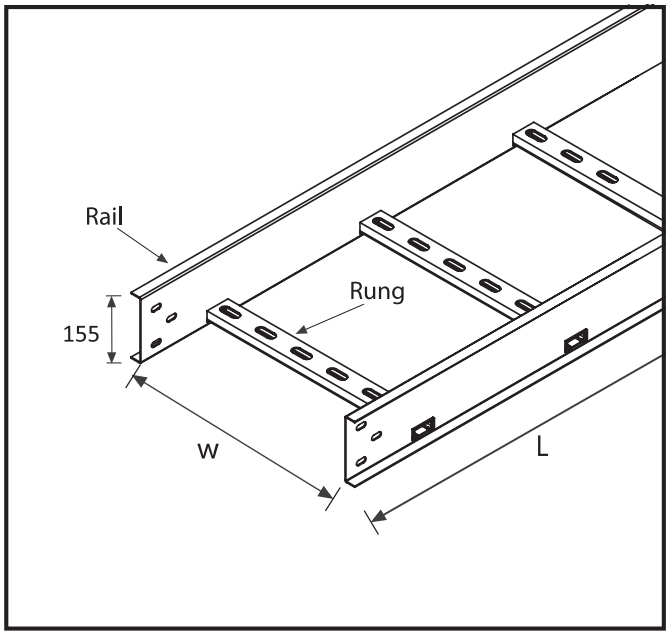
NEMA CLASS 12A	Width	Support Distance	Load	Deflection		Side Rail S1
				Rung	Rail	
	(mm)	(m)	KN/m	(mm)	(mm)	
130 X 20 X 2.0	150	2.40	3.73	0.02	5.05	Rung 41 x 21 x 1.5 mm
		3.0	2.40	0.01	8.01	
		3.70	1.55	0.01	12.27	
		4.90	0.60	0.00	16.00	
	225	2.40	3.73	0.06	5.09	
		3.0	2.40	0.04	8.06	
		3.70	1.55	0.02	12.28	
		4.90	0.60	0.01	16.01	
	300	2.40	3.73	0.14	5.17	
		3.0	2.40	0.09	8.11	
		3.70	1.55	0.06	12.31	
		4.90	0.60	0.02	16.02	
	450	2.40	3.73	0.46	5.50	
		3.0	2.40	0.30	8.32	
		3.70	1.53	0.19	12.30	
		4.90	0.60	0.07	16.07	
	600	2.40	3.73	1.09	6.13	
		3.0	2.40	0.70	8.73	
		3.70	1.50	0.44	12.32	
		4.90	0.60	0.18	16.17	
	750	2.40	3.73	2.13	7.17	
		3.0	2.40	1.37	9.40	
		3.70	1.44	0.82	12.26	
		4.90	0.59	0.34	13.10	
	900	2.40	3.27	2.56	7.0	
		3.0	2.30	2.27	9.97	
		3.70	1.36	1.34	12.19	
		4.90	0.58	0.57	16.11	

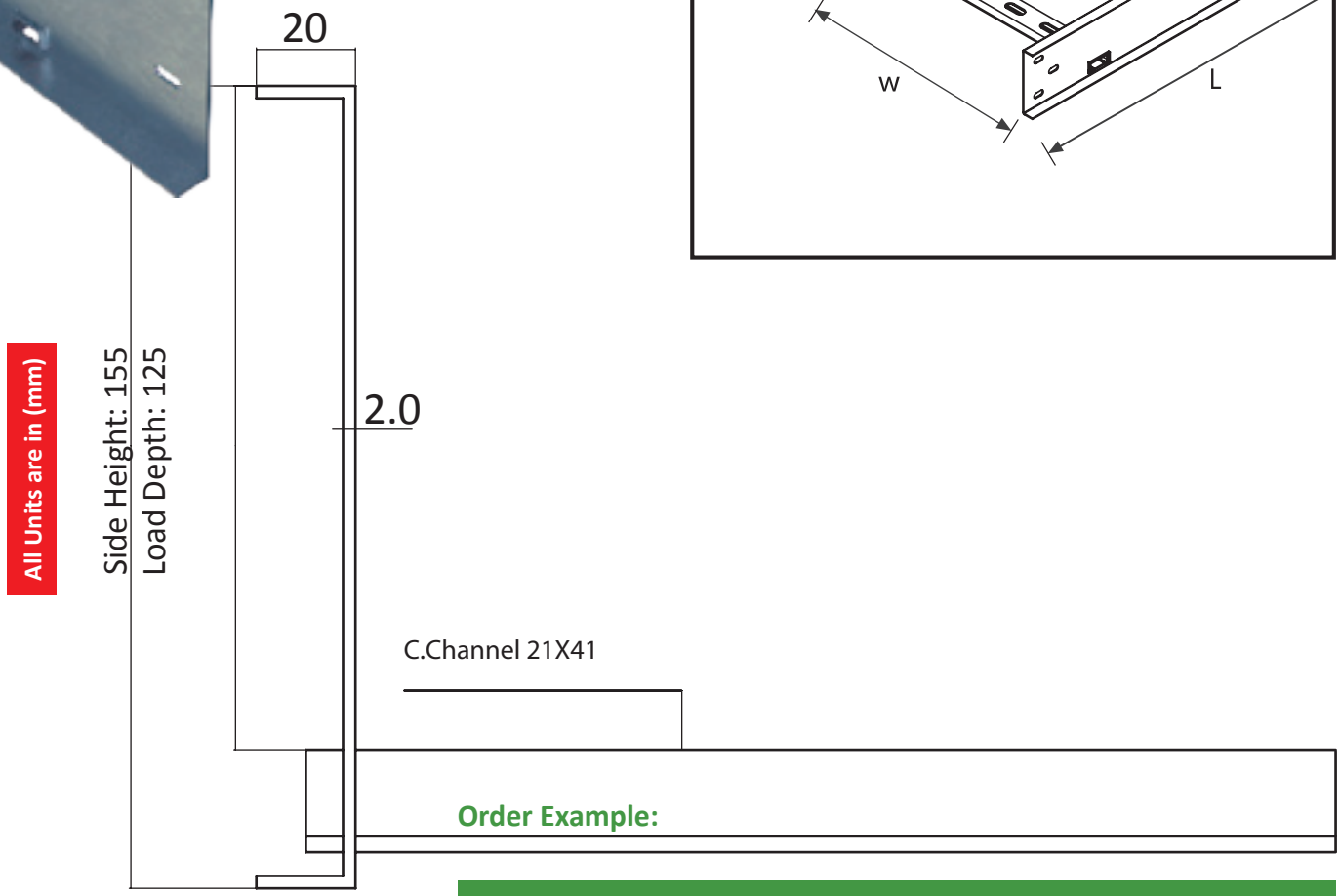
2.00 mm Thickness

(Side Height 155 mm)

- NEMA Class 16A (82 kg/m by 4.90m)
- Side Rail: S3
- Height: 155 mm
- Load Depth: 125 mm
- Rung Spacing: 229 mm







All Units are in (mm)

Order Example:

SL - S3 - Side height (h) - Width(w) - Side type
Other dimensions can be manufactured and supplied upon request.
For more ordering details, please check page 134

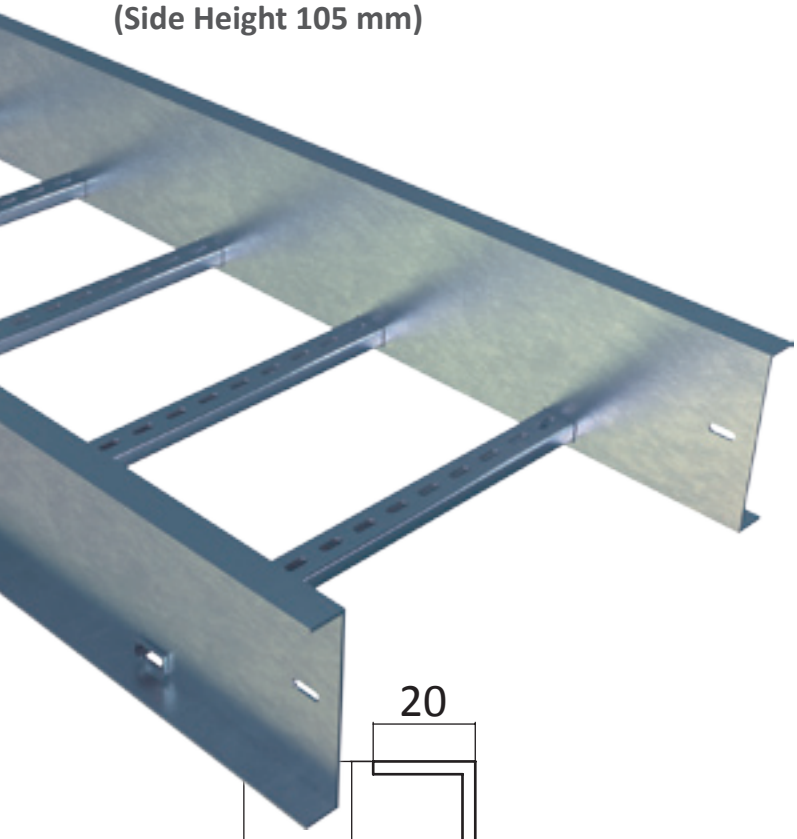
Width (mm)	Order Example			
	Item	(h)	(w)	Type
150	SL - S3	155	150	C
225	SL - S3	155	225	C

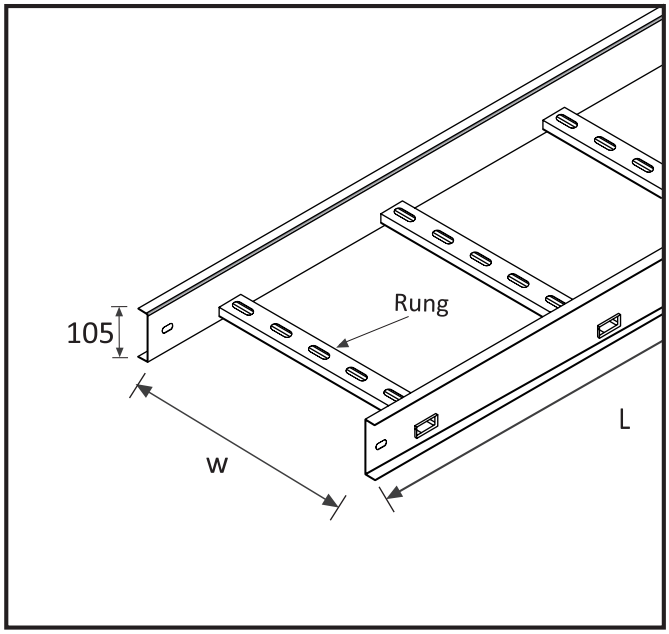
NEMA CLASS 12A	Width	Support Distance	Load	Deflection		Side Rail S1
				Rung	Rail	
	(mm)	(m)	KN/m	(mm)	(mm)	
155 X 20 X 2.0	150	2.40	4.90	0.02	4.20	Rung 41 x 21 x 1.5 mm
		3.0	3.18	0.01	6.70	
		3.70	2.09	0.01	10.34	
		4.90	1.02	0.00	16.24	
	225	2.40	4.90	0.08	4.25	
		3.0	3.18	0.05	6.74	
		3.70	2.09	0.03	10.37	
		4.90	1.02	0.02	16.27	
	300	2.40	4.90	0.18	4.36	
		3.0	3.18	0.12	6.81	
		3.70	2.09	0.08	10.41	
		4.90	1.02	0.04	16.29	
	450	2.40	4.90	0.60	4.78	
		3.0	3.18	0.39	7.08	
		3.70	2.09	0.26	10.59	
		4.90	1.00	0.12	16.09	
	600	2.40	4.90	1.43	5.61	
		3.0	3.18	0.93	7.62	
		3.70	2.09	0.61	10.94	
		4.90	1.0	0.29	16.26	
	750	2.40	4.90	2.14	6.17	Rung 41 x 41 x 1.5 mm
		3.0	3.18	1.81	8.50	
		3.70	2.09	1.19	18.53	
		4.90	0.98	0.56	16.23	
	900	2.40	4.90	0.87	5.05	Rung 41 x 41 x 1.5 mm
		3.0	3.18	2.45	9.18	Rung 41 x 212.0 mm
		3.70	2.09	1.64	11.97	
		4.90	0.97	0.76	16.29	

2.50 mm Thickness

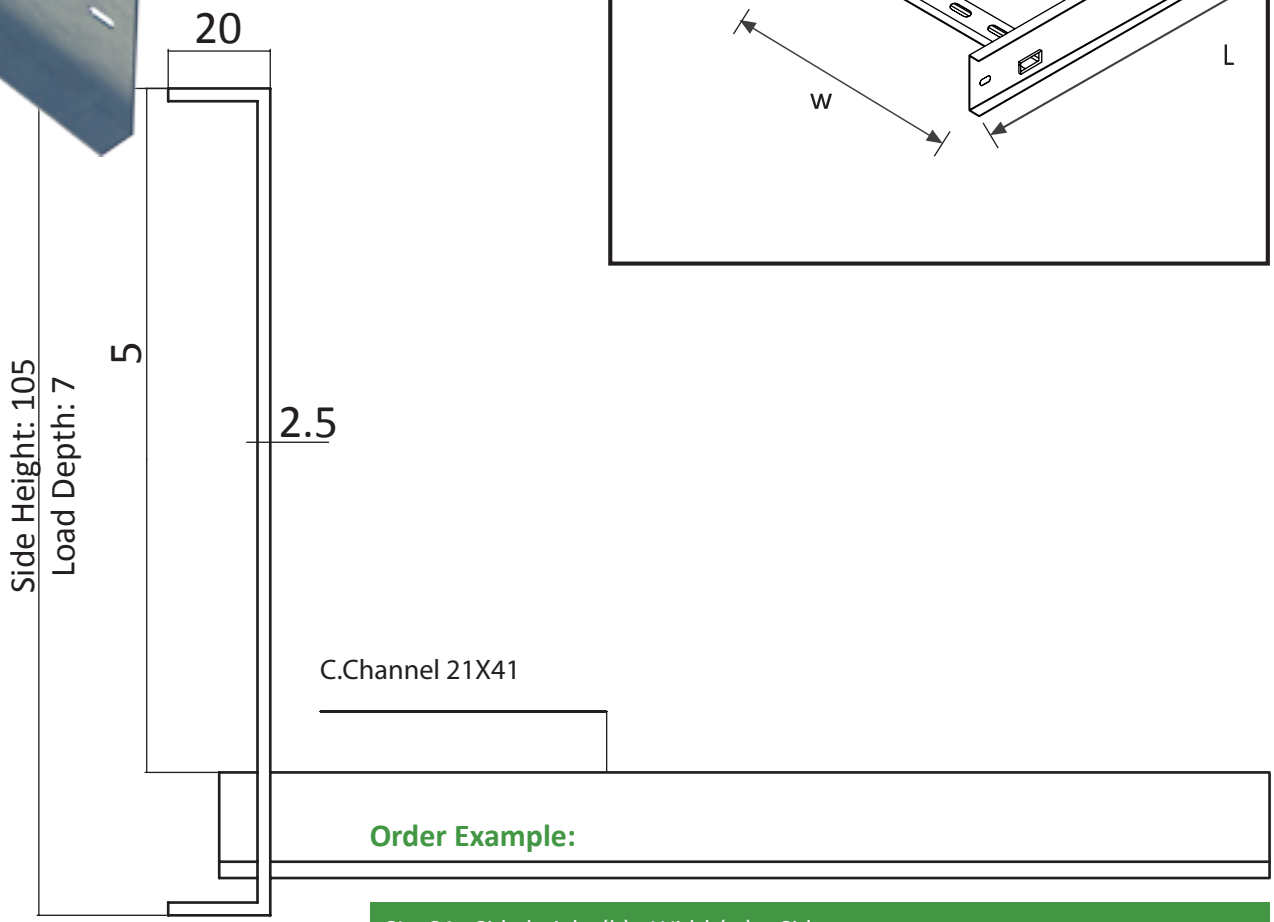
(Side Height 105 mm)

- NEMA Class 12A (87 kg/m by 3.70m)
- Side Rail: S4
- Height: 105 mm
- Load Depth: 75 mm
- Rung Spacing: 229 mm





All Units are in (mm)



Order Example:

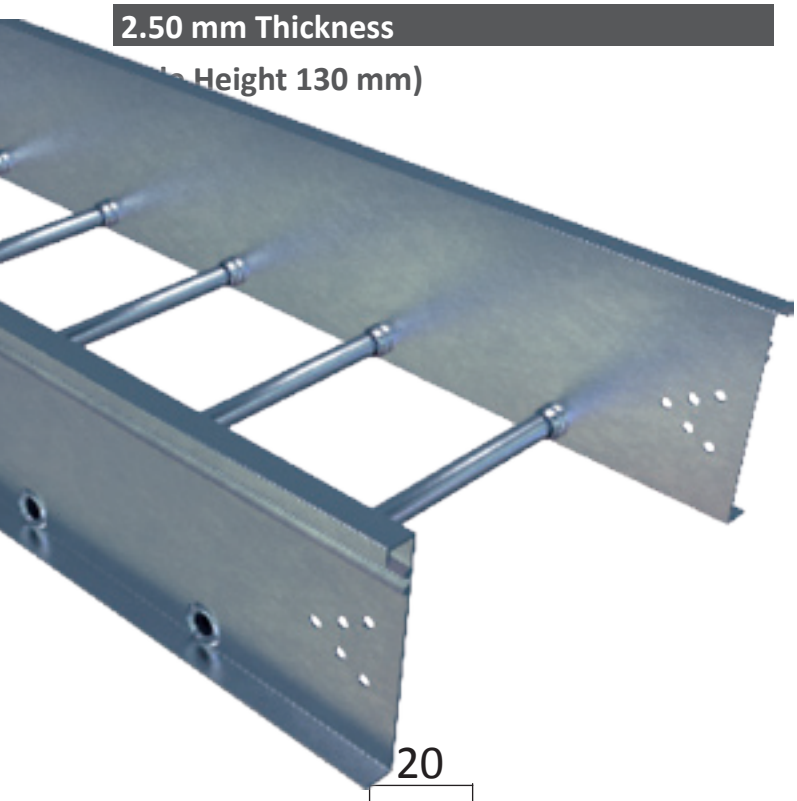
SL - S4 - Side height (h) - Width(w) - Side type
Other dimensions can be manufactured and supplied upon request.
For more ordering details, please check page 134

Width (mm)	Order Example			
	Item	(h)	(w)	Type
150	SL - S4	150	150	C
225	SL - S4	150	225	C

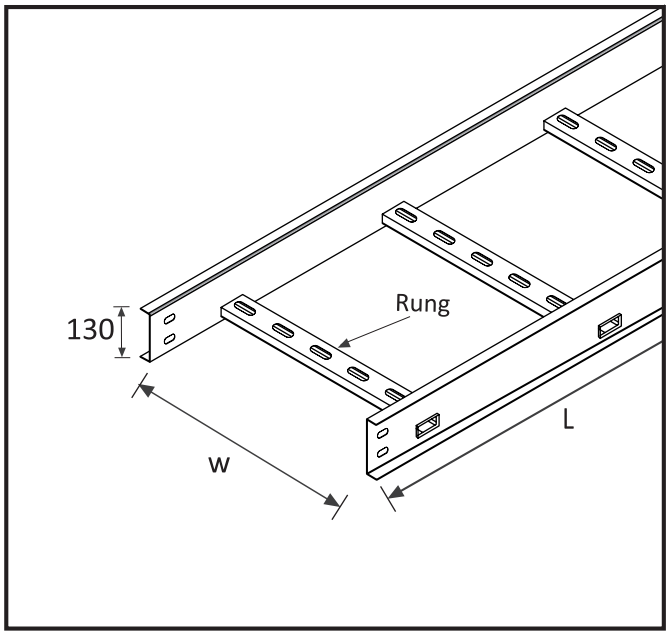
NEMA CLASS 12A	Width	Support Distance	Load	Deflection		Side Rail S1
				Rung	Rail	
	(mm)	(m)	KN/m	(mm)	(mm)	
130 X 20 X 2.5	150	2.40	3.30	0.02	6.32	Rung 41 x 21 x 1.5 mm
		3.0	2.10	0.01	9.97	
		3.70	1.07	0.00	12.26	
		4.90	0.40	0.00	16.11	
	225	2.40	3.30	0.05	6.35	
		3.0	2.10	0.03	9.99	
		3.70	1.07	0.02	12.27	
		4.90	0.40	0.01	14.11	
	300	2.40	3.30	0.12	6.42	
		3.0	2.09	0.08	9.99	
		3.70	1.07	0.04	12.29	
		4.90	0.40	0.01	16.12	
	450	2.40	3.30	0.41	6.71	
		3.0	2.05	0.25	9.98	
		3.70	1.06	0.13	12.28	
		4.90	0.40	0.05	16.15	
	600	2.40	3.22	1.84	7.99	
		3.0	1.98	0.58	9.99	
		3.70	1.02	0.58	12.31	
		4.90	0.40	0.23	10.33	
	750	2.40	3.22	1.84	7.99	
		3.0	1.87	1.07	9.98	
		3.70	1.02	0.58	12.31	
		4.90	0.40	0.23	12.33	
	900	2.40	2.95	2.31	7.97	Rung 41 x 21 x 2.0 mm
		3.0	1.78	1.40	9.90	
		3.70	1.0	0.99	12.50	
		4.90	0.39	0.38	16.17	

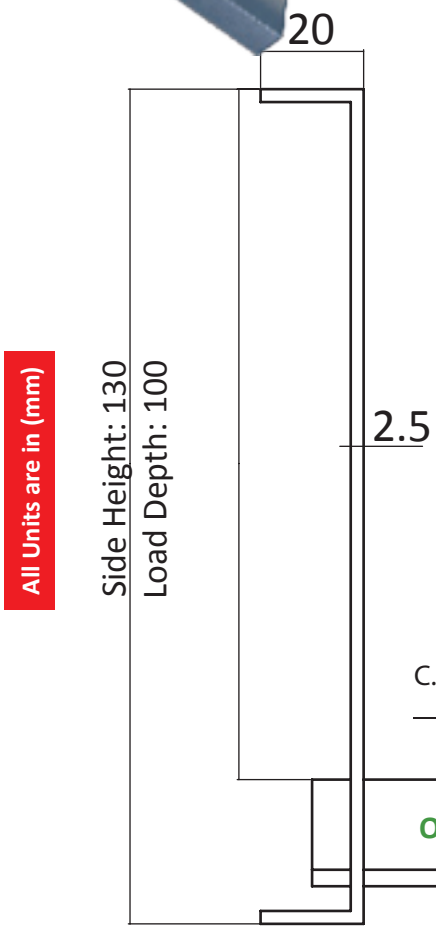
2.50 mm Thickness

...e Height 130 mm)



- NEMA Class 12C (150 kg/m by 3.70m)
- Side Rail: S5
- Height: 130 mm
- Load Depth: 100 mm
- Rung Spacing: 229 mm





All Units are in (mm)

Order Example:

SL - S5 - Side height (h) - Width(w) - Side type
Other dimensions can be manufactured and supplied upon request.
For more ordering details, please check page 134

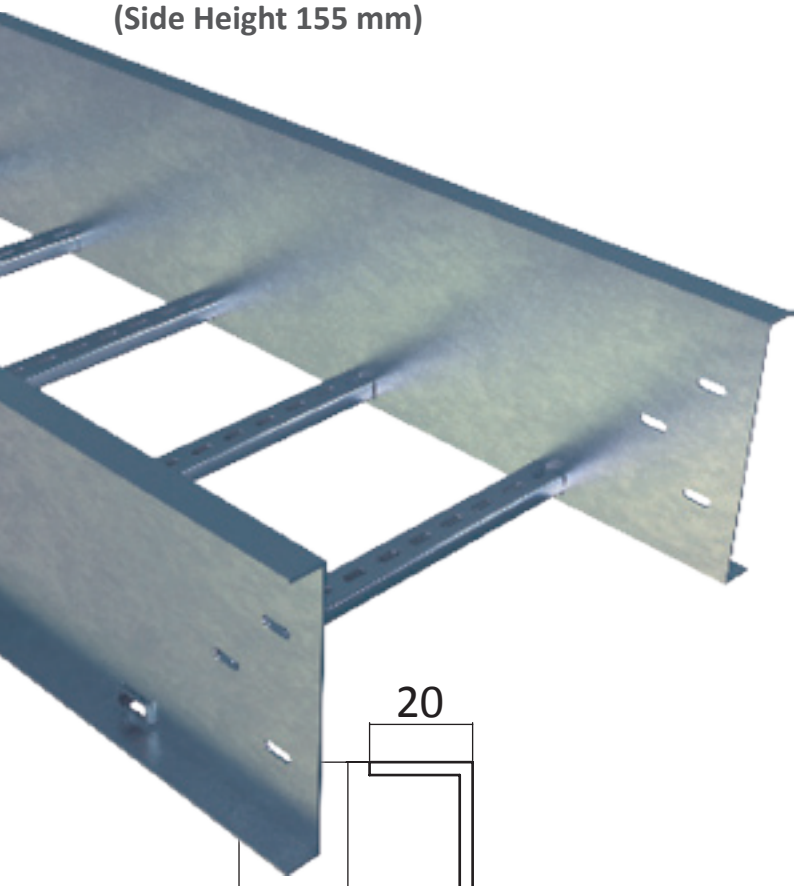
Width (mm)	Order Example			
	Item	(h)	(w)	Type
150	SL - S5	130	150	C
225	SL - S5	130	225	C

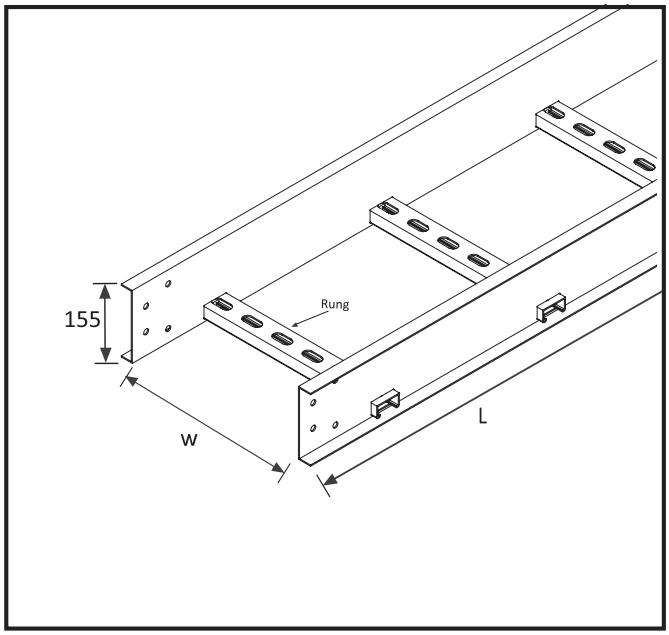
NEMA CLASS 12A	Width	Support Distance	Load	Deflection		Side Rail S1
				Rung	Rail	
	(mm)	(m)	KN/m	(mm)	(mm)	
130 X 20 X 2.5	150	2.40	4.6	0.02	5.07	Rung 41 x 21 x 1.5 mm
		3.0	2.97	0.01	8.05	
		3.70	1.93	0.01	12.30	
		4.90	0.77	0.00	16.21	
	225	2.40	4.61	0.07	5.12	
		3.0	2.97	0.05	8.05	
		3.70	1.93	0.03	12.32	
		4.90	0.77	0.01	16.22	
	300	2.40	4.6	0.17	5.22	
		3.0	2.97	0.11	8.14	
		3.70	1.92	0.07	12.30	
		4.90	0.77	0.03	16.23	
	450	2.40	4.61	0.57	5.62	
		3.0	2.97	0.37	8.40	
		3.70	1.89	0.23	12.28	
		4.90	0.77	0.09	16.30	
	600	2.40	4.61	1.35	6.40	
		3.0	2.97	0.87	8.90	
		3.70	1.84	0.54	12.29	
		4.90	0.76	0.22	16.24	
	750	2.40	4.61	2.09	7.84	Rung 41 x 21 x 2.0 mm
		3.0	2.97	1.69	9.73	
		3.70	1.76	1.00	12.27	
		4.90	0.75	0.43	16.26	
	900	2.40	4.61	0.82	5.87	Rung 41 x 41 x 1.5 mm
		3.0	2.86	2.24	9.99	Rung 41 x 21 x 2.0 mm
		3.70	1.66	1.64	12.30	
		4.90	0.73	0.72	16.18	

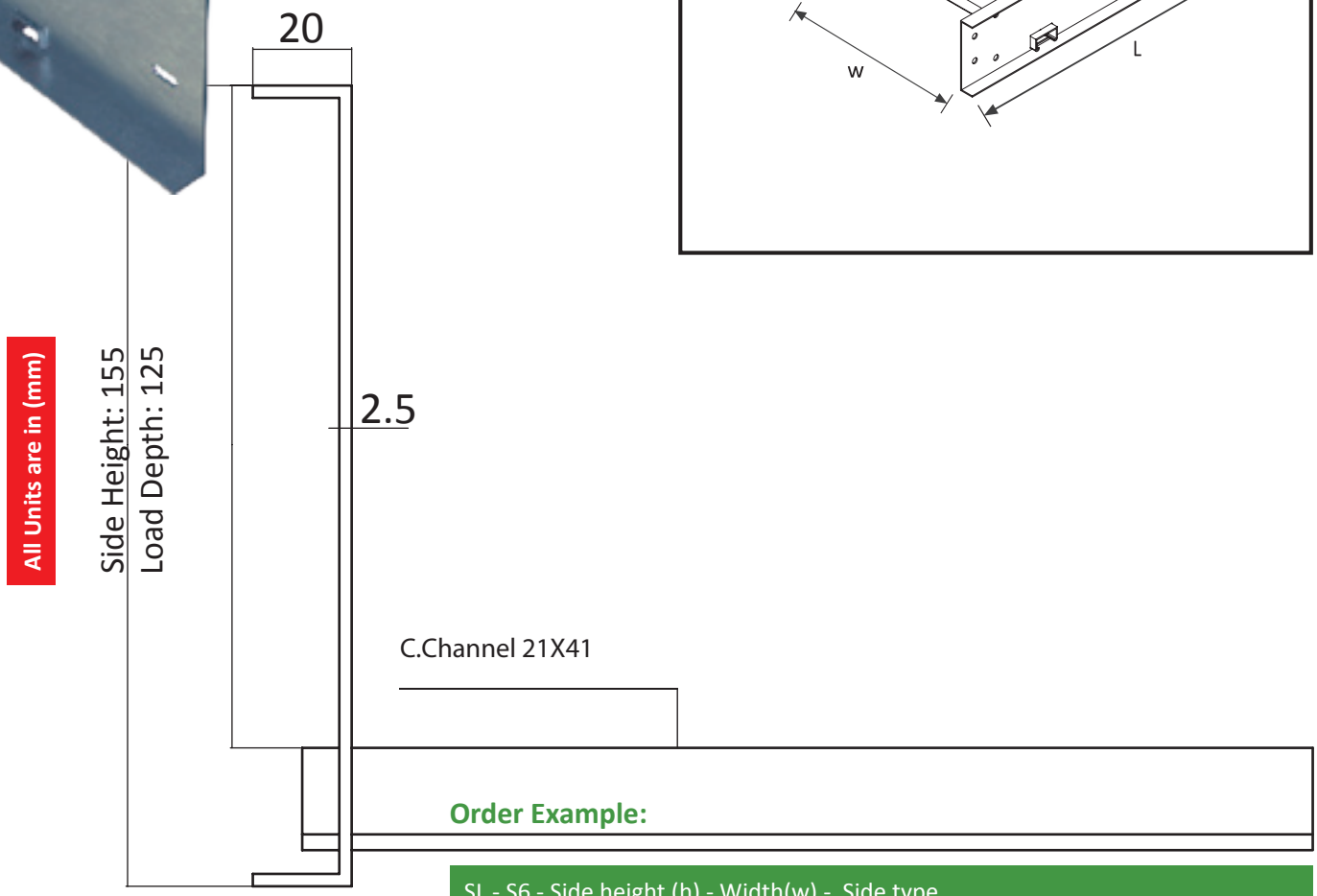
2.50 mm Thickness

(Side Height 155 mm)

- NEMA Class Steel S9
- Side Rail: S6
- Height: 155 mm
- Load Depth: 125 mm
- Rung Spacing: 229 mm







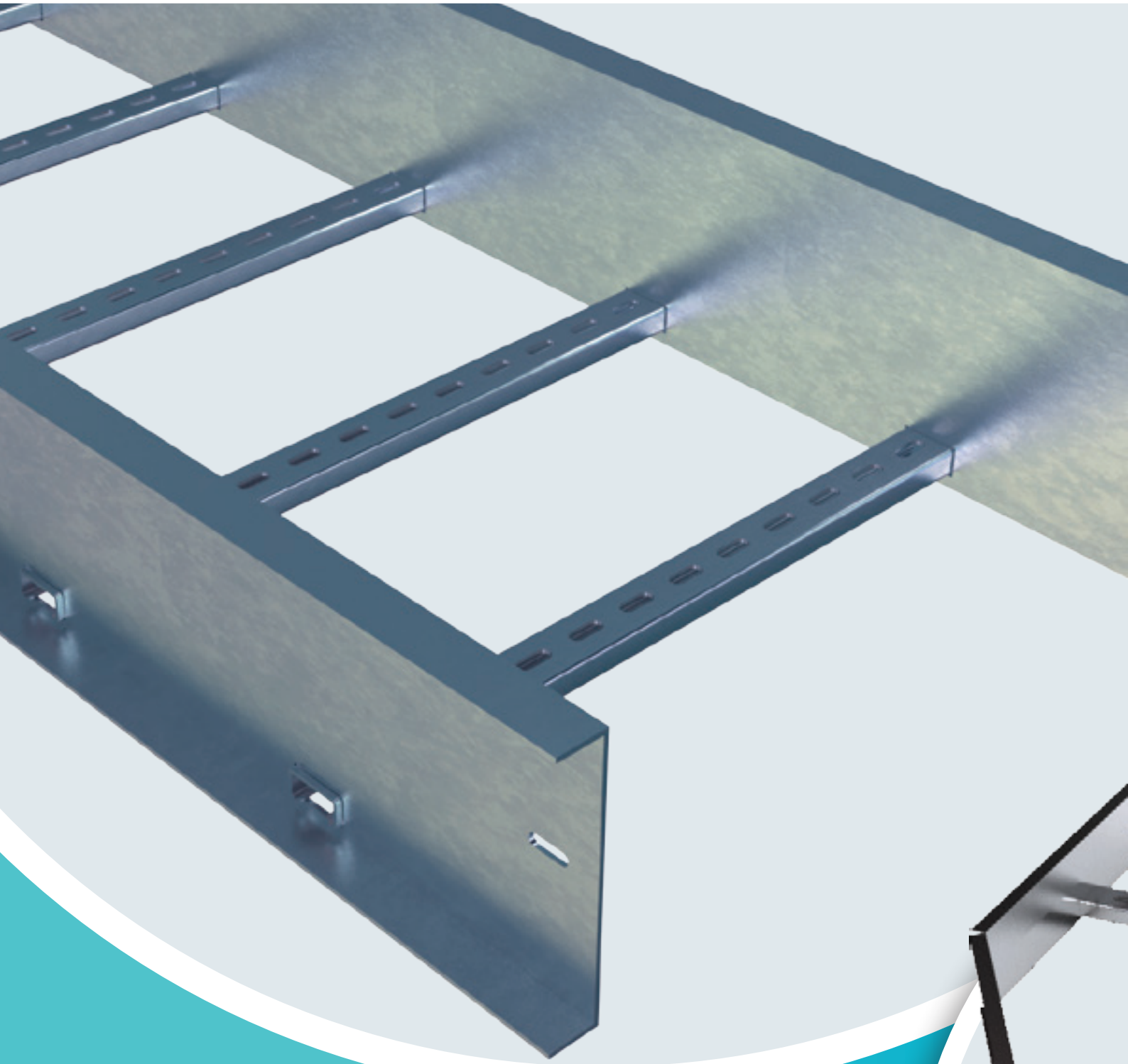
All Units are in (mm)

Order Example:

SL - S6 - Side height (h) - Width(w) - Side type
Other dimensions can be manufactured and supplied upon request.
For more ordering details, please check page 134

Width (mm)	Order Example			
	Item	(h)	(w)	Type
150	SL - S6	155	150	C
225	SL - S6	155	225	C

NEMA CLASS 12A	Width	Support Distance	Load	Deflection		Side Rail S1
				Rung	Rail	
	(mm)	(m)	KN/m	(mm)	(mm)	
155 X 20 X 2.5	150	2.40	6.06	0.03	4.21	Rung 41 x 21 x 1.5 mm
		3.0	3.94	0.02	6.72	
		3.70	2.59	0.01	1.33	
		4.90	1.28	0.01	16.29	
	225	2.40	6.06	0.09	4.28	
		3.0	3.94	0.06	6.76	
		3.70	2.59	0.04	10.36	
		4.90	1.28	0.02	16.30	
	300	2.40	6.06	0.22	4.40	
		3.0	3.94	0.14	6.24	
		3.70	2.59	0.09	10.41	
		4.90	1.28	0.05	16.33	
	450	2.40	6.06	0.75	4.93	
		3.0	3.94	0.49	10.8	
		3.70	2.59	0.32	10.64	
		4.90	1.27	0.16	16.32	
	600	2.40	6.06	1.41	5.59	Rung 41 x 21 x 2.0 mm
		3.0	3.94	1.15	7.35	
		3.70	2.59	0.76	11.07	
		4.90	1.25	0.37	16.29	
	750	2.40	6.06	0.63	4.21	Rung 41 x 41 x 1.5 mm
		3.0	3.94	1.79	8.49	Rung 41 x 21 x 2.0 mm
		3.70	2.50	1.48	11.80	
		4.90	1.22	0.70	16.27	
	900	2.40	6.06	1.08	5.26	Rung 41 x 41 x 1.5 mm
		3.0	3.94	2.64	9.34	Rung 41 x 21 x 2.5 mm
		3.70	2.47	2.43	12.29	
		4.90	1.18	1.16	16.27	



LADDER TYPE FITTINGS

BEND 45°

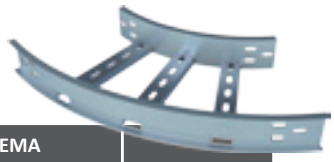
WELDED CORNERED

Side Heights: 105, 130 & 155 mm
Thicknesses: 2.00 and 2.50 mm

NEMA CLASS 12A	Width
105 X 20 X 2.0 105 X 20 X 2.5	150 mm
	225 mm
	300 mm
130 X 20 X 2.0 130 X 20 X 2.5	450 mm
	600 mm
155 X 20 X 2.0 155 X 20 X 2.5	750 mm
	900 mm

WELDED CURVED

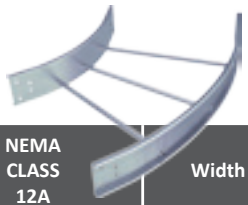
Side Heights: 105, 130 & 155 mm
Thicknesses: 2.00 and 2.50 mm



NEMA CLASS 12A	Width
105 X 20 X 2.0 105 X 20 X 2.5	150 mm
	225 mm
	300 mm
130 X 20 X 2.0 130 X 20 X 2.5	450 mm
	600 mm
155 X 20 X 2.0 155 X 20 X 2.5	750 mm
	900 mm

SWAGED TUBULAR RUNG

Side Heights: 105, 130 & 155 mm
Thicknesses: 2.00 and 2.50 mm

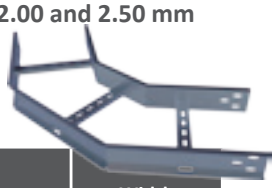


NEMA CLASS 12A	Width
105 X 20 X 2.0 105 X 20 X 2.5	150 mm
	225 mm
	300 mm
130 X 20 X 2.0 130 X 20 X 2.5	450 mm
	600 mm
155 X 20 X 2.0 155 X 20 X 2.5	750 mm
	900 mm

BEND 90°

WELDED CORNERED

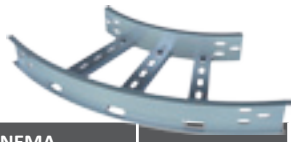
Side Heights: 105, 130 & 155 mm
Thicknesses: 2.00 and 2.50 mm



NEMA CLASS 12A	Width
105 X 20 X 2.0 105 X 20 X 2.5	150 mm
	225 mm
	300 mm
130 X 20 X 2.0 130 X 20 X 2.5	450 mm
	600 mm
155 X 20 X 2.0 155 X 20 X 2.5	750 mm
	900 mm

WELDED CURVED

Side Heights: 105, 130 & 155 mm
Thicknesses: 2.00 and 2.50 mm



NEMA CLASS 12A	Width
105 X 20 X 2.0 105 X 20 X 2.5	150 mm
	225 mm
	300 mm
130 X 20 X 2.0 130 X 20 X 2.5	450 mm
	600 mm
155 X 20 X 2.0 155 X 20 X 2.5	750 mm
	900 mm

SWAGED TUBULAR RUNG

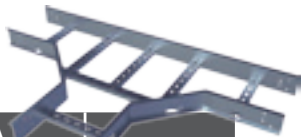
Side Heights: 105, 130 & 155 mm
Thicknesses: 2.00 and 2.50 mm

NEMA CLASS 12A	Width
105 X 20 X 2.0 105 X 20 X 2.5	150 mm
	225 mm
	300 mm
130 X 20 X 2.0 130 X 20 X 2.5	450 mm
	600 mm
155 X 20 X 2.0 155 X 20 X 2.5	750 mm
	900 mm

TEE BRANCH

WELDED CORNERED

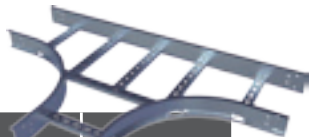
Side Heights: 105, 130 & 155 mm
Thicknesses: 2.00 and 2.50 mm



NEMA CLASS 12A	Width
105 X 20 X 2.0 105 X 20 X 2.5	150 mm
	225 mm
	300 mm
130 X 20 X 2.0 130 X 20 X 2.5	450 mm
	600 mm
155 X 20 X 2.0 155 X 20 X 2.5	750 mm
	900 mm

WELDED CURVED

Side Heights: 105, 130 & 155 mm
Thicknesses: 2.00 and 2.50 mm



NEMA CLASS 12A	Width
105 X 20 X 2.0 105 X 20 X 2.5	150 mm
	225 mm
	300 mm
130 X 20 X 2.0 130 X 20 X 2.5	450 mm
	600 mm
155 X 20 X 2.0 155 X 20 X 2.5	750 mm
	900 mm

SWAGED TUBULAR RUNG

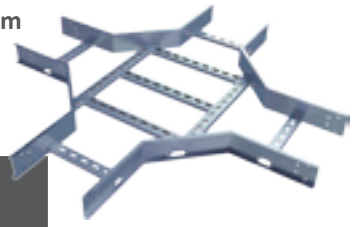
Side Heights: 105, 130 & 155 mm
Thicknesses: 2.00 and 2.50 mm

NEMA CLASS 12A	Width
105 X 20 X 2.0 105 X 20 X 2.5	150 mm
	225 mm
	300 mm
130 X 20 X 2.0 130 X 20 X 2.5	450 mm
	600 mm
155 X 20 X 2.0 155 X 20 X 2.5	750 mm
	900 mm

HORIZONTAL CROSS (INTERSECTION)

WELDED CORNERED

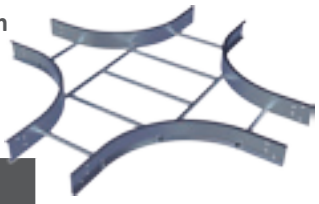
Side Heights: 105, 130 & 155 mm
Thicknesses: 2.00 and 2.50 mm



NEMA CLASS 12A	Width
105 X 20 X 2.0 105 X 20 X 2.5	150 mm
	225 mm
130 X 20 X 2.0 130 X 20 X 2.5	300 mm
	450 mm
155 X 20 X 2.0 155 X 20 X 2.5	600 mm
	750 mm
	900 mm

SWAGED TUBULAR RUNG

Side Heights: 105, 130 & 155 mm
Thicknesses: 2.00 and 2.50 mm

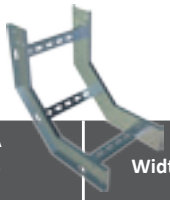


NEMA CLASS 12A	Width
105 X 20 X 2.0 105 X 20 X 2.5	150 mm
	225 mm
130 X 20 X 2.0 130 X 20 X 2.5	300 mm
	450 mm
155 X 20 X 2.0 155 X 20 X 2.5	600 mm
	750 mm
	900 mm

INSIDE VERTICAL ELBOW (INSIDE RISER)

WELDED CORNERED

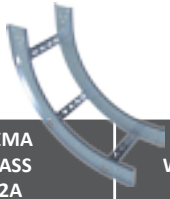
Side Heights: 105, 130 & 155 mm
Thicknesses: 2.00 and 2.50 mm



NEMA CLASS 12A	Width
105 X 20 X 2.0 105 X 20 X 2.5	150 mm
	225 mm
130 X 20 X 2.0 130 X 20 X 2.5	300 mm
	450 mm
155 X 20 X 2.0 155 X 20 X 2.5	600 mm
	750 mm
	900 mm

WELDED CURVED

Side Heights: 105, 130 & 155 mm
Thicknesses: 2.00 and 2.50 mm



NEMA CLASS 12A	Width
105 X 20 X 2.0 105 X 20 X 2.5	150 mm
	225 mm
130 X 20 X 2.0 130 X 20 X 2.5	300 mm
	450 mm
155 X 20 X 2.0 155 X 20 X 2.5	600 mm
	750 mm
	900 mm

SWAGED TUBULAR RUNG

Side Heights: 105, 130 & 155 mm
Thicknesses: 2.00 and 2.50 mm

NEMA CLASS 12A	Width
105 X 20 X 2.0 105 X 20 X 2.5	150 mm
	225 mm
130 X 20 X 2.0 130 X 20 X 2.5	300 mm
	450 mm
155 X 20 X 2.0 155 X 20 X 2.5	600 mm
	750 mm
	900 mm

OUTSIDE VERTICAL ELBOW (OUTSIDE RISER)

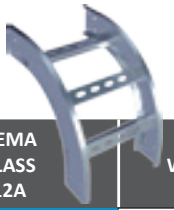
WELDED CORNERED

Side Heights: 105, 130 & 155 mm
Thicknesses: 2.00 and 2.50 mm

NEMA CLASS 12A	Width
105 X 20 X 2.0 105 X 20 X 2.5	150 mm
	225 mm
130 X 20 X 2.0 130 X 20 X 2.5	300 mm
	450 mm
155 X 20 X 2.0 155 X 20 X 2.5	600 mm
	750 mm
	900 mm

WELDED CURVED

Side Heights: 105, 130 & 155 mm
Thicknesses: 2.00 and 2.50 mm



NEMA CLASS 12A	Width
105 X 20 X 2.0 105 X 20 X 2.5	150 mm
	225 mm
130 X 20 X 2.0 130 X 20 X 2.5	300 mm
	450 mm
155 X 20 X 2.0 155 X 20 X 2.5	600 mm
	750 mm
	900 mm

SWAGED TUBULAR RUNG

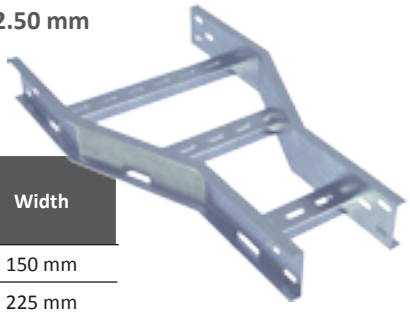
Side Heights: 105, 130 & 155 mm
Thicknesses: 2.00 and 2.50 mm

NEMA CLASS 12A	Width
105 X 20 X 2.0 105 X 20 X 2.5	150 mm
	225 mm
130 X 20 X 2.0 130 X 20 X 2.5	300 mm
	450 mm
155 X 20 X 2.0 155 X 20 X 2.5	600 mm
	750 mm
	900 mm

STRAIGHT CENTRAL REDUCERS

WELDED CORNERED

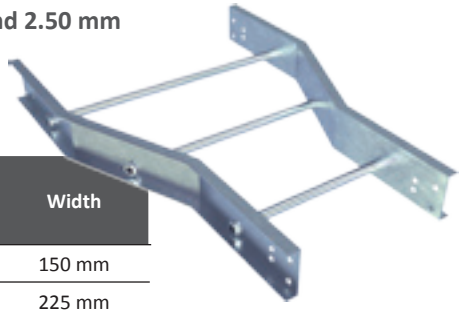
Side Heights: 105, 130 & 155 mm
Thicknesses: 2.00 and 2.50 mm



NEMA CLASS 12A	Width
105 X 20 X 2.0 105 X 20 X 2.5	150 mm
	225 mm
	300 mm
130 X 20 X 2.0 130 X 20 X 2.5	450 mm
	600 mm
155 X 20 X 2.0 155 X 20 X 2.5	750 mm
	900 mm

SWAGED TUBULAR RUNG

Side Heights: 105, 130 & 155 mm
Thicknesses: 2.00 and 2.50 mm

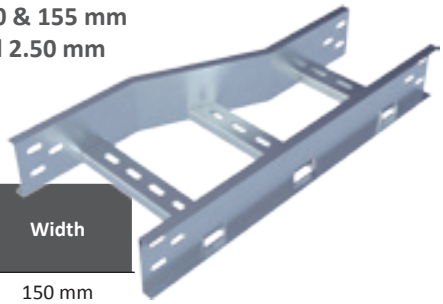


NEMA CLASS 12A	Width
105 X 20 X 2.0 105 X 20 X 2.5	150 mm
	225 mm
	300 mm
130 X 20 X 2.0 130 X 20 X 2.5	450 mm
	600 mm
155 X 20 X 2.0 155 X 20 X 2.5	750 mm
	900 mm

RIGHT HAND REDUCERS

WELDED CORNERED

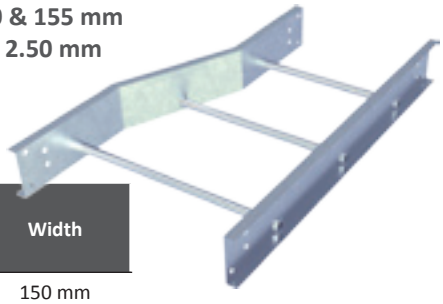
Side Heights: 105, 130 & 155 mm
Thicknesses: 2.00 and 2.50 mm



NEMA CLASS 12A	Width
105 X 20 X 2.0 105 X 20 X 2.5	150 mm
	225 mm
	300 mm
130 X 20 X 2.0 130 X 20 X 2.5	450 mm
	600 mm
155 X 20 X 2.0 155 X 20 X 2.5	750 mm
	900 mm

SWAGED TUBULAR RUNG

Side Heights: 105, 130 & 155 mm
Thicknesses: 2.00 and 2.50 mm

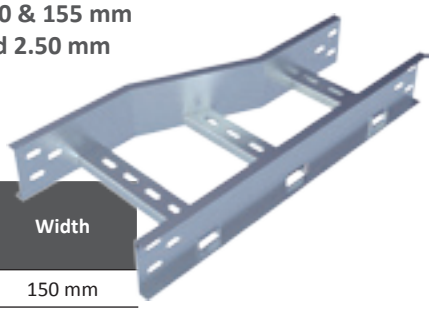


NEMA CLASS 12A	Width
105 X 20 X 2.0 105 X 20 X 2.5	150 mm
	225 mm
	300 mm
130 X 20 X 2.0 130 X 20 X 2.5	450 mm
	600 mm
155 X 20 X 2.0 155 X 20 X 2.5	750 mm
	900 mm

LEFT HAND REDUCERS

WELDED CORNERED

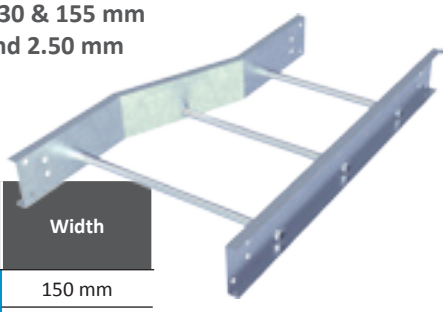
Side Heights: 105, 130 & 155 mm
Thicknesses: 2.00 and 2.50 mm



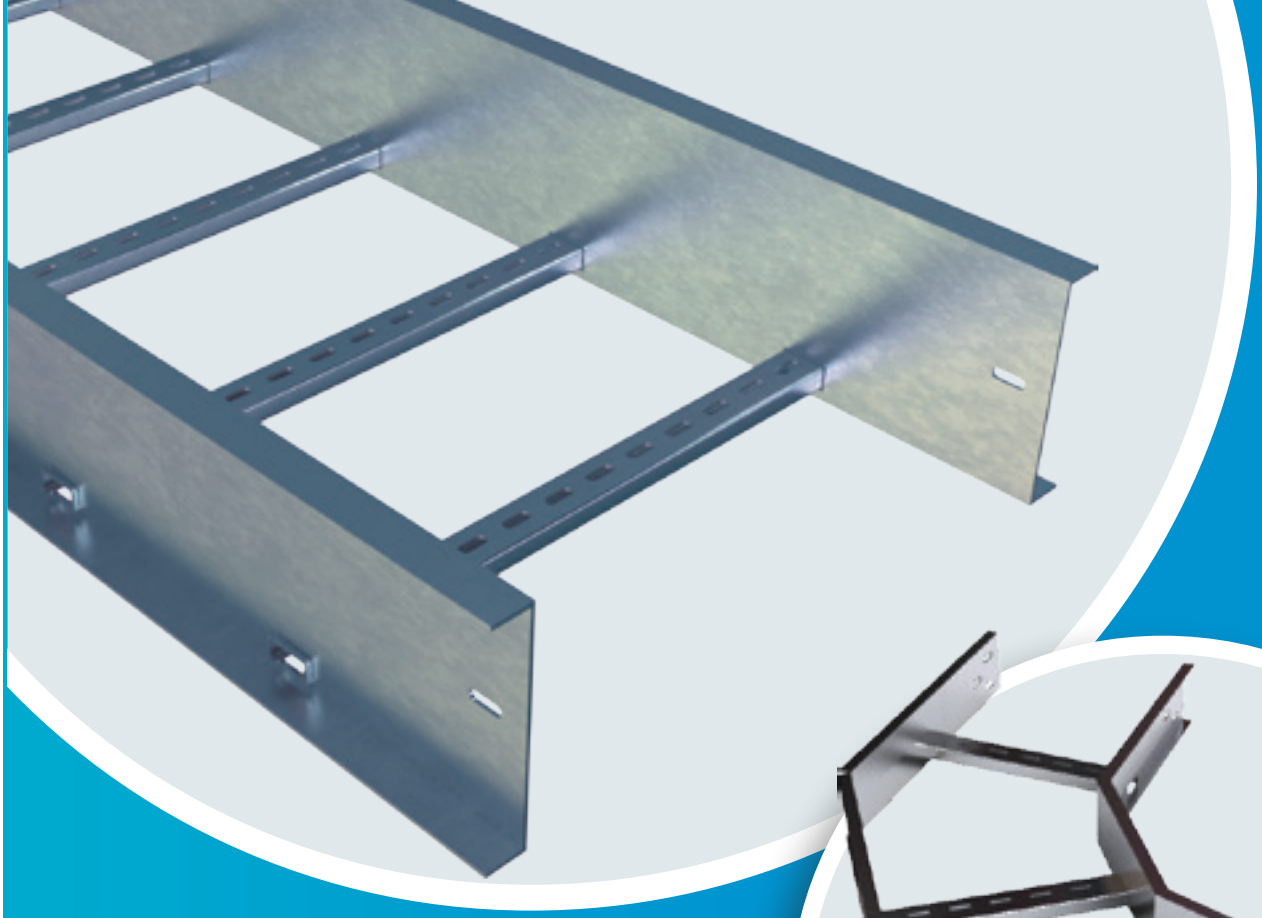
NEMA CLASS 12A	Width
105 X 20 X 2.0 105 X 20 X 2.5	150 mm
	225 mm
	300 mm
130 X 20 X 2.0 130 X 20 X 2.5	450 mm
	600 mm
155 X 20 X 2.0 155 X 20 X 2.5	750 mm
	900 mm

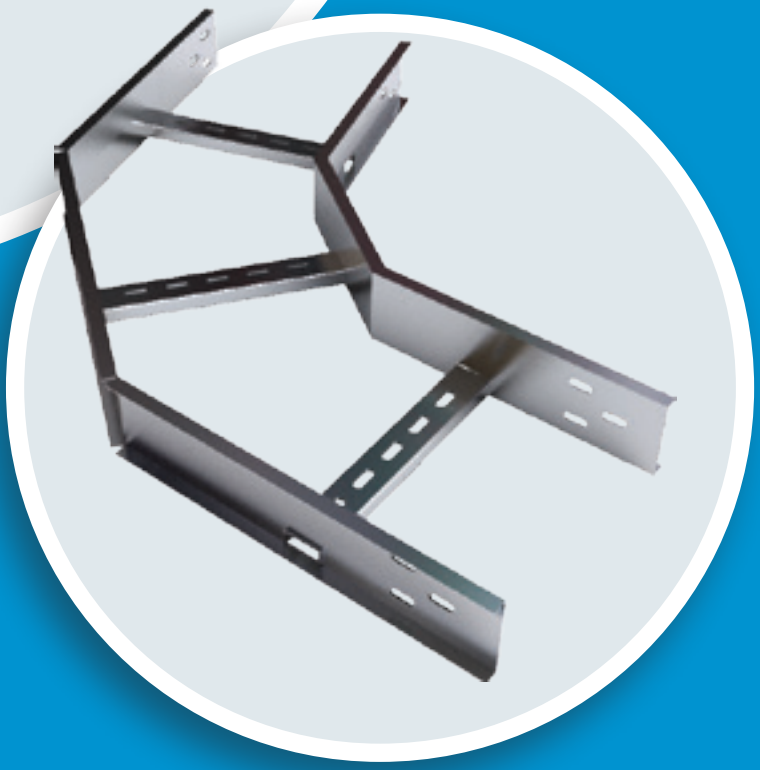
SWAGED TUBULAR RUNG

Side Heights: 105, 130 & 155 mm
Thicknesses: 2.00 and 2.50 mm



NEMA CLASS 12A	Width
105 X 20 X 2.0 105 X 20 X 2.5	150 mm
	225 mm
	300 mm
130 X 20 X 2.0 130 X 20 X 2.5	450 mm
	600 mm
155 X 20 X 2.0 155 X 20 X 2.5	750 mm
	900 mm

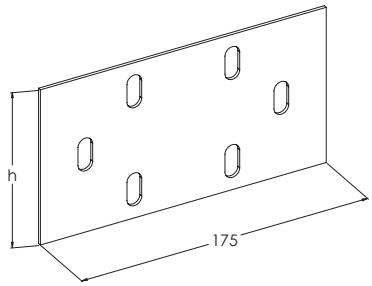




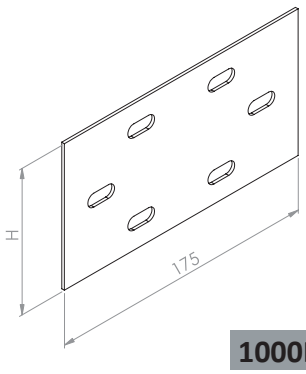
LADDER TRAY ACCESSORIES

CONNECTORS

Straight connector / 1000 - 1000 R



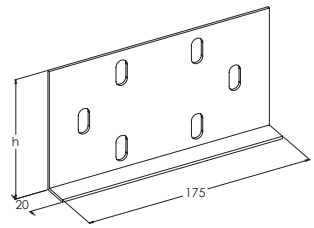
1000



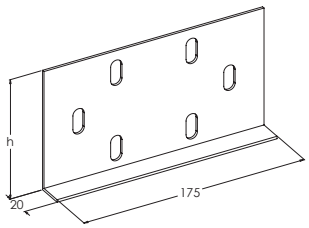
1000R

Order Example		
Item	(h)	(t)
1000	050	2
1000R	100	2

Angle connector / 1010 - 1010 R



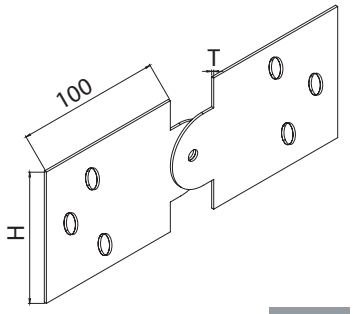
1010



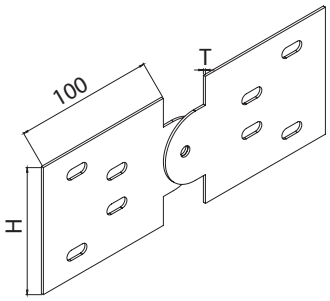
1010R

Order Example		
Item	(h)	(t)
1010	050	2
1010R	100	2

Adjustable Vertical Connector 1030 / 1030 R



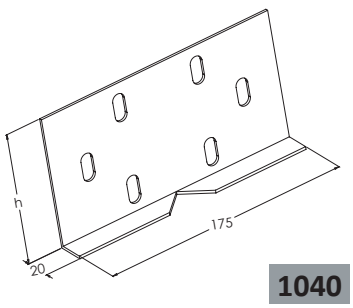
1030



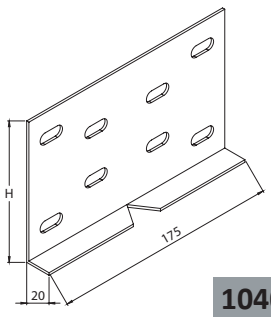
1030R

Order Example		
Item	(h)	(t)
1030	050	2
1030R	100	2

Adjustable Horizontal Connector 1040 / 1040 R



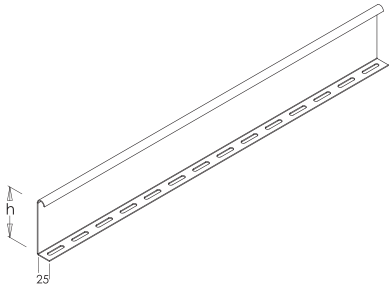
1040



1040R

Order Example		
Item	(h)	(t)
1040	050	2
1040R	100	2

Barrier Strip 1070

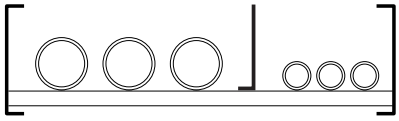


1070

For Cable Trays

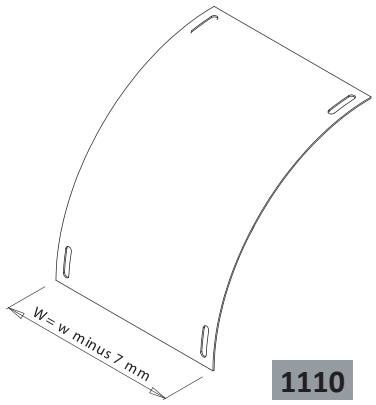
Available Lengths: 2440 / 3000 mm

For Cable Ladders



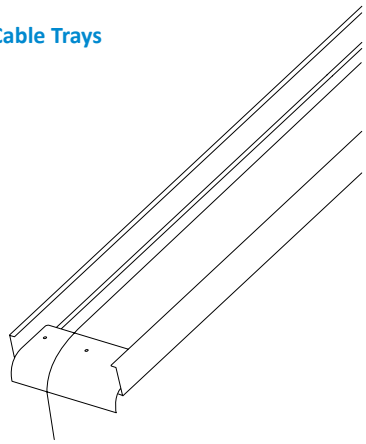
Available Lengths: 2440 / 3000 mm

Drop-out plate / 1110

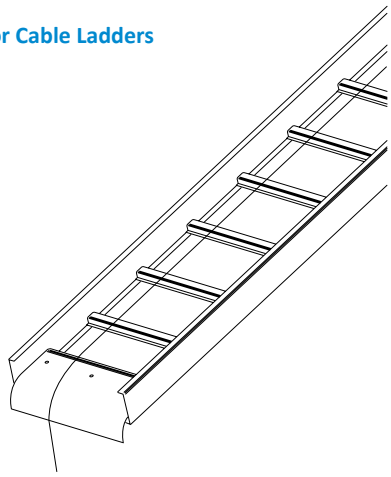


1110

For Cable Trays

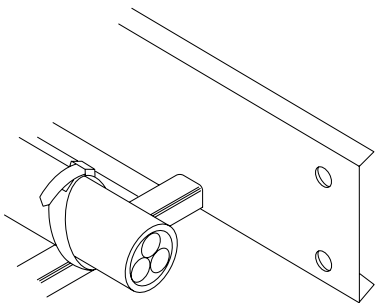


For Cable Ladders



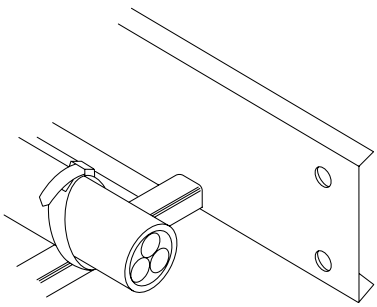
Cable Tie / 1120

For Cable Trays



1120

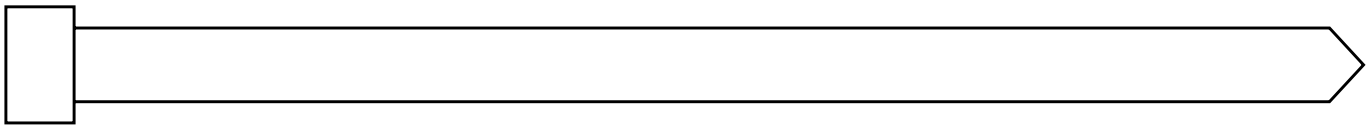
For Cable Ladders



1120

ELEMATIC

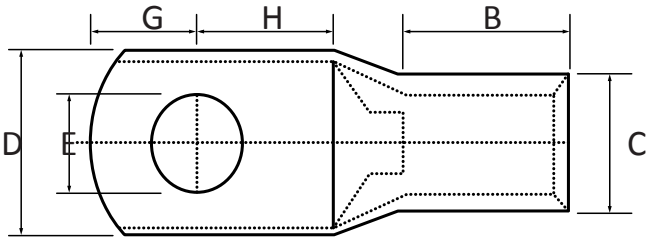
Nylon ties provide easy attachment of Ladder Cable Tray rungs

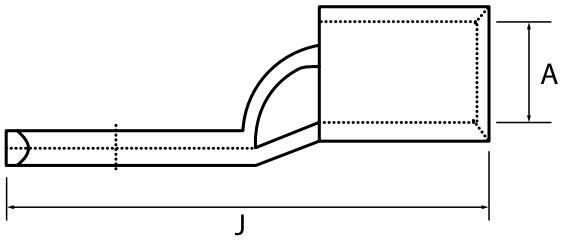


Crimping Type Copper / 2100

Tubular Cable Terminal Ends

2100



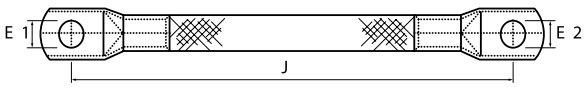


Cable mm²	Stud Hole	Dimensions (mm)						
		A	C	D	G	H	B	J
1.5	6.5	1.8	3.7	10	4	6	6	18
2.5	6.5	2.4	4	10	5	6	8	21
	8.4	2.4	4.2	12	6	9	8	26
4	6.5	3.1	4.8	10	5	6	8	21
	8.4	3.1	5.0	12	6	9	8	26
6	6.5	3.8	5.5	10	5	6	10	24
	8.4	3.8	5.5	12	6	9	10	28
10	6.5	4.5	6.2	11	6	7	10	26
	8.4	4.5	6.2	12	6	9	10	28
16	6.5	5.4	7.1	12	7	7	12	30
	8.4	5.4	7.1	12	7	7	12	30
20	8.4	6	7.7	12	7	7	12	32
25	6.5	6.8	8.8	13	7	7	12	30
	8.4	6.8	8.8	13	7	7	12	30

Tinned Copper Flexible Braids / 2200

Crimped with Connectors/ Terminals

2200



HFT- crimped with lugs

Size₂ mm	Dimensions (mm)			Current rating AMP
	J	E1	E2	
4	50	6	6	50
	100	6	6	50
	150	6	6	50
	200	6	6	50
10	50	6	6	90
	100	6	6	90
	150	6	6	90
	200	6	6	90
16	100	8.5	8.5	125
	150	8.5	8.5	125
	200	8.5	8.5	125
	250	8.5	8.5	125
	300	8.5	8.5	125
25	100	10	10	160
	150	10	10	160
	200	10	10	160
	250	10	10	160
	300	10	10	160

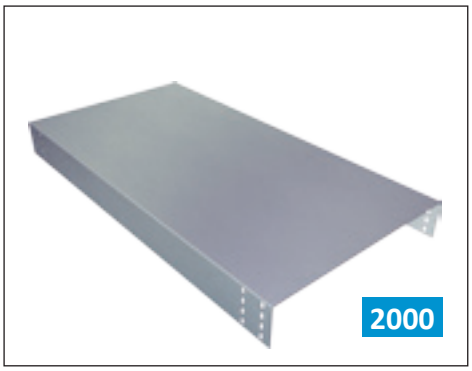
COVERS

Functions

Ladder Cable Tray covers shall be considered for any of the following purposes:

- Protection from falling objects or debris, as may occur beneath personnel walkways.
- Shielding from ultraviolet rays of the sun and guarding against other weathering elements.
- Minimizing accumulation of foreign contaminants such as ash or other industrial deposits.
- Protection of cables and personnel where a riser tray penetrates a floor or grating.

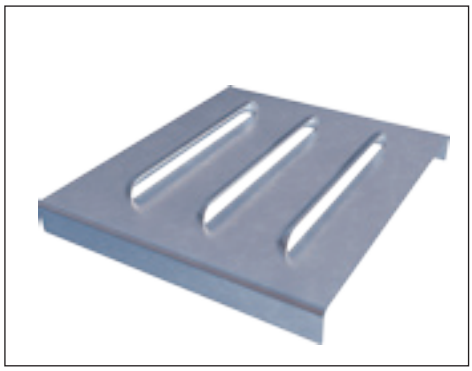
Solid Cover / 2000



Covers Side Height Types :

- Solid without flange - (SOF)
- Solid with flange - (SWF)
- Ventilated without flange - (VOF)
- Ventilated with flange - (VWF)

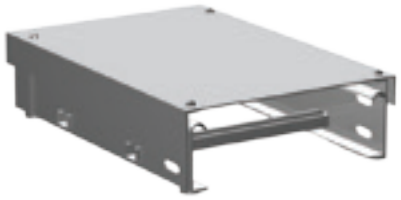
Ventilated Cover / 2010

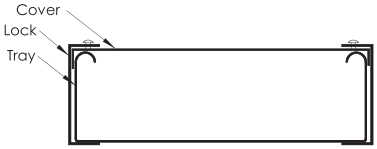


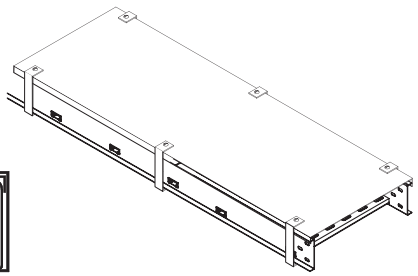
Width (mm)	Order Example			
	Item	Type	(W)	(t)
2000	SWF	050	2	50

- Cable covers are supplied with or without a 15 mm down turned flange.
- Straight section covers are furnished 3000 mm long. All fitting covers are furnished in solid design only.

Ladder Cable Tray Covers with Locking Clamp 2100





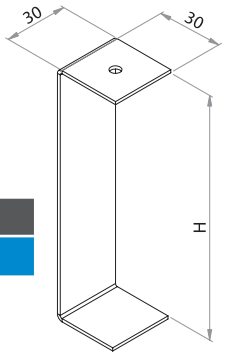


Covers' Side Height Types :

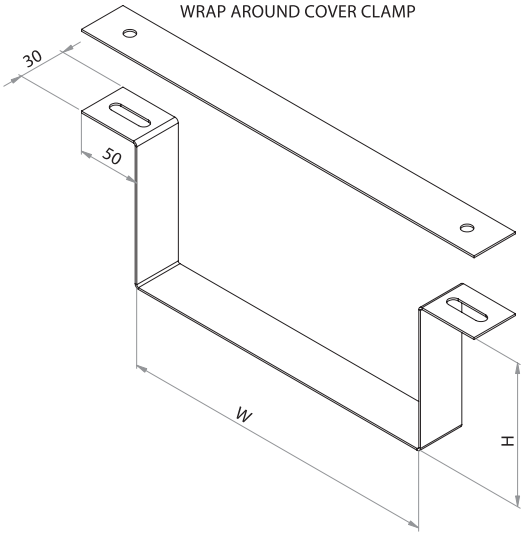
- Solid without flange - (VOF)
- Solid with flange - (VWF)

Width (mm)	Order Example		
	Item	(W)	(t)
50	2100	050	2

C-CLAMP



WRAP AROUND COVER CLAMP



FRAMING SYSTEMS

ASTM F436

Washers (SRW) | DIN 125 | ASTM F436

Zinc Plated	Stainless Steel	D	d	S
		(mm)	(mm)	(mm)
M6	M6	12	6.4	1.6
M8	M8	16	8.4	1.6
M10	M10	21	10.5	2
M12	M12	24	13	2.5
M16	M16	30	17	3
M18	M18	34	19	3.2
M20	M20	39	20.5	3.6

Round Washers DIN 440, DIN 9021

Washers (SRW) | DIN 440 | DIN 9021

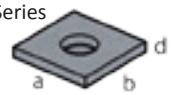
DIN	Zinc Plated	Stainless Steel	D	d	S
			(mm)	(mm)	(mm)
440	M6		22	6.6	2
9021	M8	M8	24	8.4	2
9021	M10	M10	30	10.5	2.5
440	M12		45	13.5	4
9021	M12	M12	37	13	3
9021	M16	M16	50	17	3

Square Washers SSW

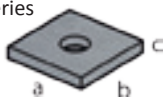
Square Washers (SSW)

H.D. Galvanized Bolt	Stainless Steel Bolt	a x b x d
		(mm)
M8	M10	40 x 40 x (4-5-6)
M10	M12	40 x 40 x (4-5-6)
M12	M16	40 x 40 x (4-5-6)

SSW 40/40 for all channels 41/21 Series



SSW 41/41 for all channels 41/41 Series



Fully Threaded Rods Grade 4.6 DIN 975 ASTM A 36, A193

Threaded Rod (STR) - DIN 975 - ASTM A36

Zinc Plated Thread	Length	Load cap.
	(mm)	(kN)
M6	2000/3000	2.2
M8	2000/3000	4.0
M10	2000/3000	6.4
M12	2000/3000	12.9
M16	2000/3000	17.3
M18	2000	22.0
M20	2000	27.0

Round Head Machine Screws

Round Head (SRH) | DIN 7985

Zinc Plated Thread	Length	d
	(mm)	(mm)
M6	30-40	6.0
M8	30-40	8.0
M10	20-60	10.0

Coupler Sleeves Rounded

Coupler Sleeves (SCS)

Electro-plated Thread	Stainless Steel Thread	D	L	Load Capacity
		(mm)	(mm)	(kN)
M6	M6	10/10	15	2.2
M8	M8	12/14	20	4.0
M10	M10	13/16	25	6.4
M12	M12	16/20	30	9.3
M16	M16	21/25	40	17.3
M20	M20	26/32	50	27.0

Roofing Bolts

Roofing Bolts (SRB)

- Materials : low carbon steel , carbon steel
- Steel S235 , grade 4.6 , 4.8 and 8.8
- Surfaces : plain , black and zinc plated
- Length = X (mm) – Y (mm)

Thread Size	M4 x - y	M5 x - y	M6 x - y	M8 x - y
	(mm)	(mm)	(mm)	(mm)
Length	10 - 50	10 - 80	12 - 120	16 - 150

Carriage Bolts with Nut Below Head DIN 603

Carriage Bolts (STC)

Zinc Plated	H.D. Galvanized Grade 4.6	Head	Head	Square Width	Square Depth
(E)	(E)	(A) mm	(H) mm	(O) mm	(P) mm
M5	M5	12.0	3.0	5.0	3.2
M6	M6	15.1	3.70	6.40	4.0
M8	M8	18.3	4.50	8.23	4.75
M10	M10	21.44	5.30	9.86	5.56
M16	M16	34.14	8.74	16.3	8.74

Hexagonal Rod Coupler Grade 8.8 ASTM a 563

Hexagonal Rod Coupler with view hole (SHR)

Electro-plated Thread	Stainless Steel Thread	D	L	Load capacity
		(mm)	(mm)	(kN)
M10	M10	13	40	6.4
M12	M12	17	40	9.3
M16	M16	22	50	17.3
M 18	M 18	23	60	22.0
M 20	M 20	25	70	27.0

Hexagon Nuts DIN 934, DIN EN 24032, ASTM A 563

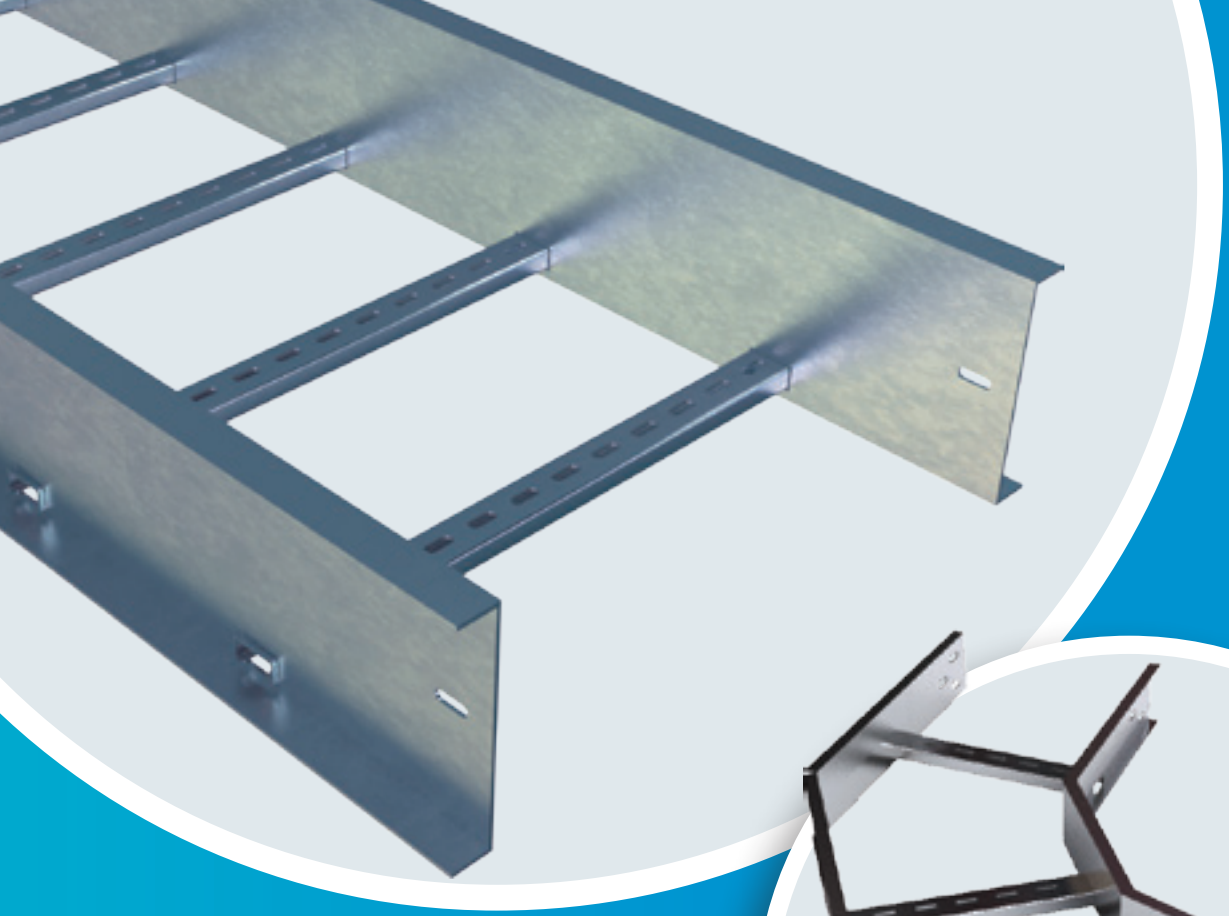
Hexagon nut (SHN) | DIN 934 or ISO 4032 (= DIN EN 24032) | ASTM A563

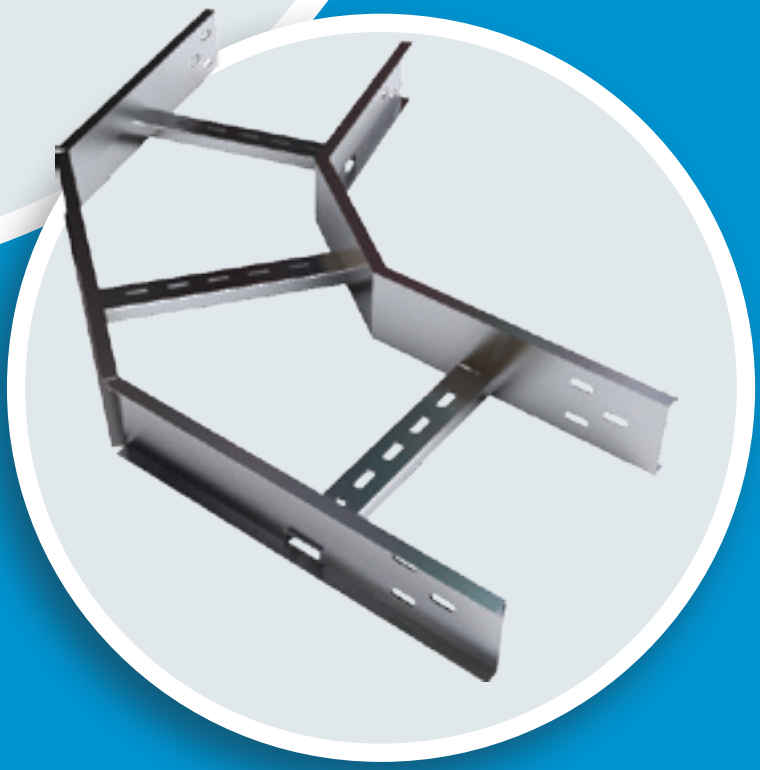
Zinc Plated Thread	Stainless Steel Thread	S/m DIN	S/m ISO	e
		(mm)	(mm)	(mm)
M6	M6	10/5	10/6	11.5
M8	M8	13/6.5	13/7.5	15.0
M10	M10	17/8	16/9.5	19.6
M12	M12	19/10	18/12	21.9
M16	M16	24/13	24/15.5	27.7
M18	M18	26/16	26/16	22.0
M20	M20	30/18	29/20.5	27.0

DIN 933, DIN 24017, ASTM A307, A449

Hex Head Bolt (SHB) | DIN 933 or EN 24017 ASTM A307, A449 (without nut)

Zinc Plated Dimension	Stainless Steel Dimension	S DIN	S EN
		(mm)	(mm)
M 6 x 12		10	10
M 6 x 25			
M 8 x 25	M 8 x 25	13	13
M 8 x 40			
M 10 x 20		17	16
M 10 x 30	M 10 x 30		
M 10 x 45	M 10 x 45		
M 10 x 60			
M 10 x 70			
M 12 x 22		19	18
M 12 x 25	M 12 x 25		
M 12 x 30	M 12 x 30		
M 12 x 40	M 12 x 40		
M 12 x 50			
M 12 x 60	M 12 x 60		
M 12 x 80	M 12 x 80		
M 12 x 90			
M 16 x 40	M 16 x 40	24	24
M 16 x 60	M 16 x 60		
M 16 x 90	M 16 x 90		
M 18 x 40	M 18 x 40	27	26
M 18 x 50	M 18 x 50		
M 18 x 60	M 18 x 60		
M 18 x 80	M 18 x 80		
M 20 x 40	M 20 x 40	32	32
M 20 x 50	M 20 x 50		
M 20 x 60	M 20 x 60		
M 20 x 80	M 20 x 80		





CABLE TRAY SUPPORT SYSTEM

GENERAL INFORMATION

CHANNEL

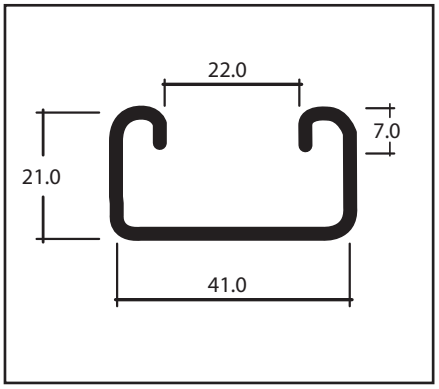
SFSP's metal framing channel is cold formed on modern rolling machines from low carbon steel manufactured according to BS 6946:1988. A continuous slot provides the ability to make attachments at any point.

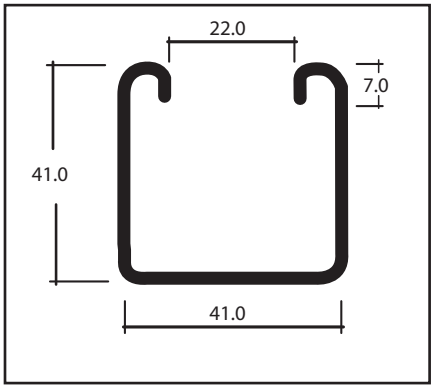
LENGTHS

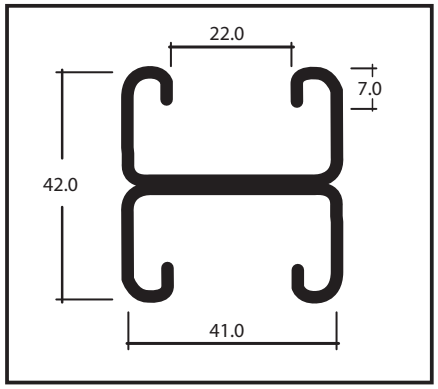
Standard length: 3000mm with ± 3.2mm length tolerance.
Custom lengths are available upon request.

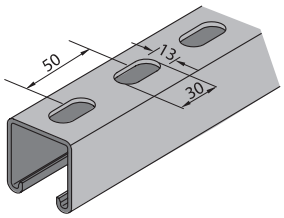
FINISHES

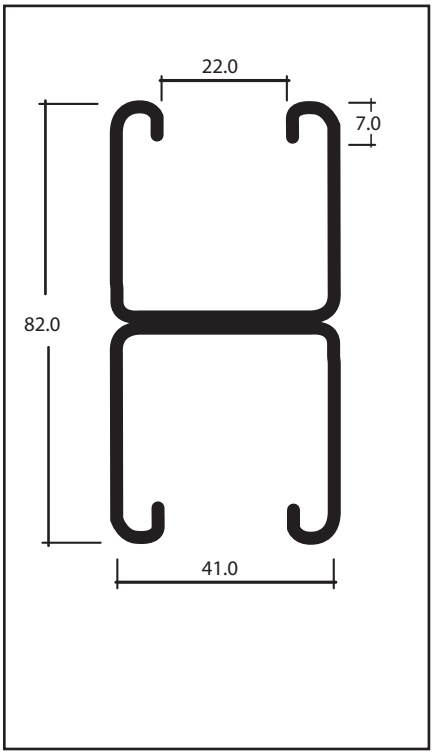
Standard Finishes: Pre-Galvanized finish (ASTM A653M coating G90 and G60). Hot Dip Galvanized after fabrication (ASTM A123 or BSEN ISO1461:2009) . Other custom coatings are available upon request.











Metal Framing Channels

SELECTION CHART

Part No	Channel Dimensions		Thickness
	Height "H"	Width "W"	
CCH - 220/221	21.0 mm	41.0 mm	1.5 mm
CCH - 240/241	41.0 mm	41.0 mm	1.5 mm
CCH - 320/321	21.0 mm	41.0 mm	2.0 mm
CCH - 340/341	41.0 mm	41.0 mm	2.0 mm
CCH - 420/421	21.0 mm	41.0 mm	2.5 mm
CCH - 440/441	41.0 mm	41.0 mm	2.5 mm

For Toothed Channel add "T" after the Part no. ex.: CCH-220T

CCH 320 **3** **2** **0** **T**

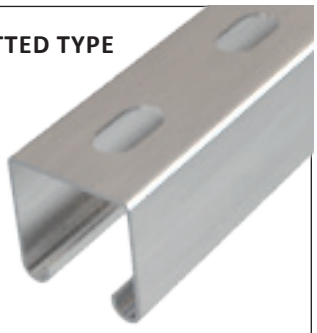
- **3** — Material Thickness: for 1.5 mm 2; for 2.0 mm 3; for 2.5 mm 4
- **2** — Size: mm 21/41 - 2; mm 41/41 - 4
- **0** — Channel Patterns: PT - 0; ST - 1; B2B - 2
- **T** — Toothed channel

Channel Hole Patterns

PT PLAIN TYPE

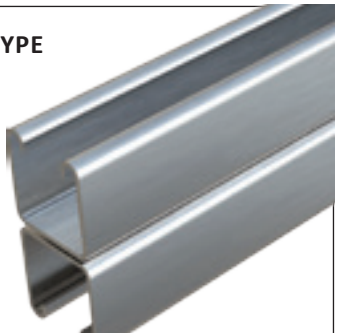
Part No	Thick. mm.	Height "H"
CCH-220	1.5	21.0
CCH-240	1.5	41.0
CCH-320	2.0	21.0
CCH-340	2.0	41.0
CCH-420	2.5	21.0
CCH-440	2.5	41.0

ST SLOTTED TYPE



Part No	Thick. mm.	Height "H"
CCH-221	1.5	21.0
CCH-241	1.5	41.0
CCH-321	2.0	21.0
CCH-341	2.0	41.0
CCH-421	2.5	21.0
CCH-441	2.5	41.0

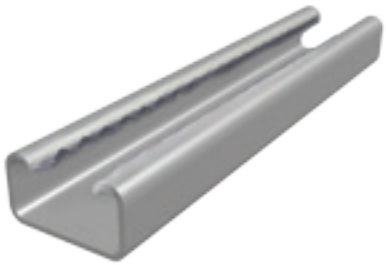
B2B TYPE

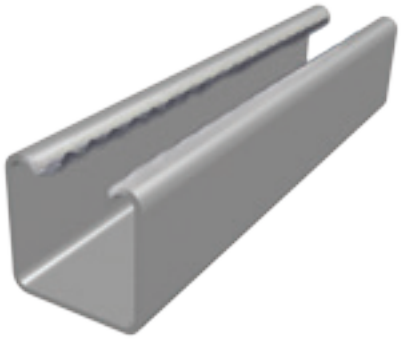


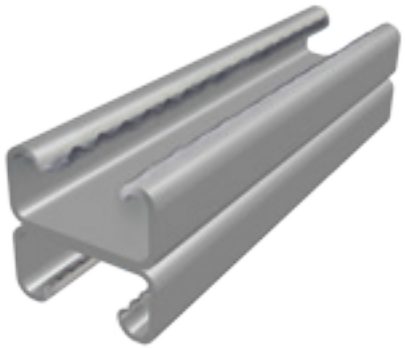
Part No	Thick. mm.	Height "H"
CCH-222	1.5	42.0
CCH-242	1.5	82.0
CCH-322	2.0	42.0
CCH-342	2.0	82.0
CCH-422	2.5	42.0
CCH-442	2.5	82.0

For Toothed Channel add "T" after the Part no. ex: CCH-220T

Toothed channel type



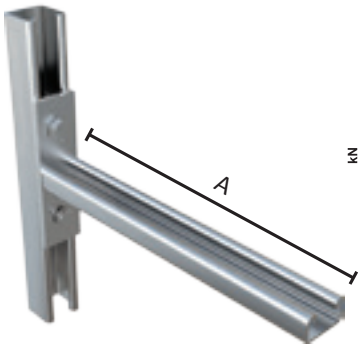


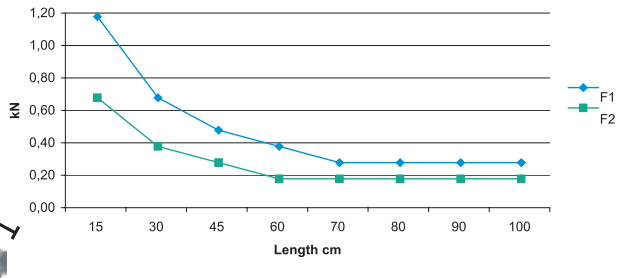


CANTILEVER ARM BRACKET

Cantilever Arm Brackets - SCA

CCH421 41x21x2.5

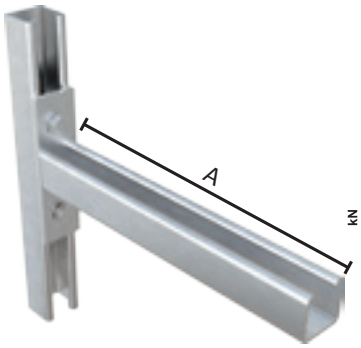


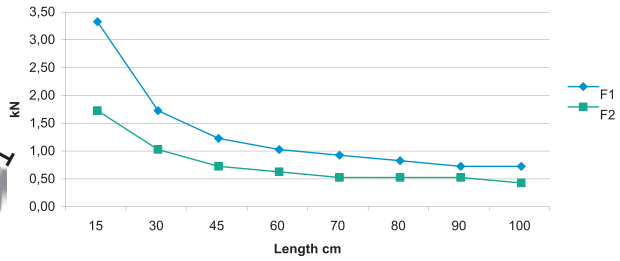


Length	Allowable Load		
A (mm)	F_1*	F_2*	F_z**
150	1.10	0.60	3.10
300	0.60	0.30	3.10
450	0.40	0.20	3.10
600	0.30	0.10	3.10
700	0.20	0.10	3.10
800	0.20	0.10	3.10
900	0.20	0.10	3.10
1000	0.20	0.10	3.10

Base plate : height (h) x width (b) x thickness (t)
100 50 8

•In the case of concrete support frame, use anchor M10
•In the case of concrete C-Channel frame, Hex bolt M8 .
*** Connection force (pull-out force) : 3.10 (kN)*



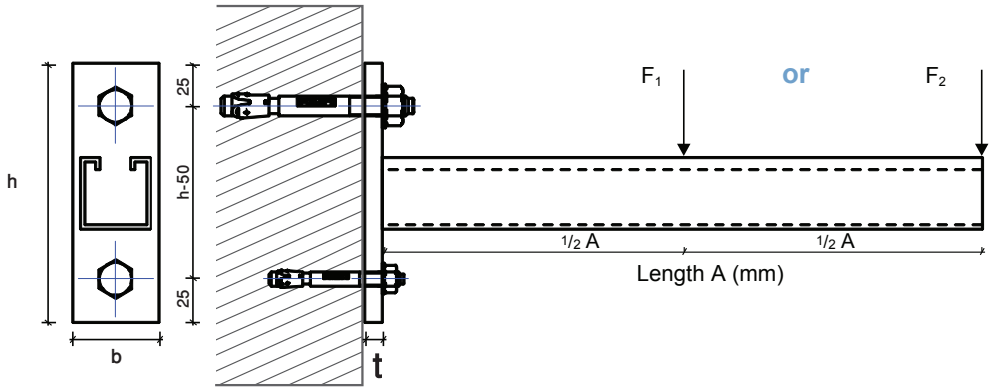


Length	Allowable Load		
A (mm)	F_1*	F_2*	F_z**
150	3.10	1.50	7.50
300	1.50	0.80	7.50
450	1.00	0.50	7.50
600	0.80	0.40	7.50
700	0.70	0.30	7.50
800	0.60	0.30	7.50
900	0.50	0.30	7.50
1000	0.50	0.20	7.50

Base plate : height (h) x width (b) x thickness (t)
140 50 10

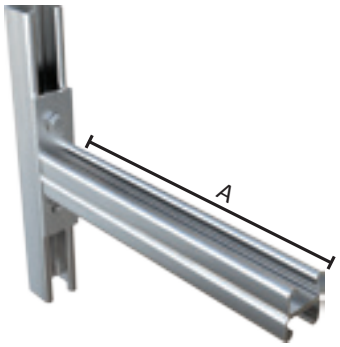
•In the case of concrete support frame, use anchor M16 .
•In the case of concrete C-Channel frame, Hex bolt M8.
*** Connection force (pull-out force) : 7.50 (kN)*

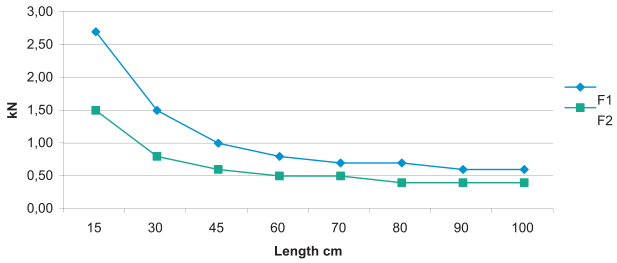
* Given Loads are always in [kN] " Allowable characteristic live load "



Cantilever Arm Brackets - SCA

CCH422 41x21x2.5 B2B





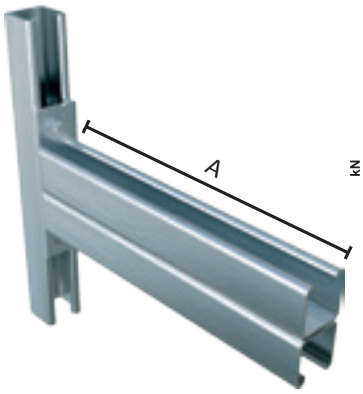
Length	Allowable Load		
A (mm)	F_1*	F_2*	F_z**
150	2.50	1.30	4.80
300	1.30	0.60	4.80
450	0.80	0.40	4.80
600	0.60	0.30	4.80
700	0.50	0.30	4.80
800	0.50	0.20	4.80
900	0.40	0.20	4.80
1000	0.40	0.20	4.80

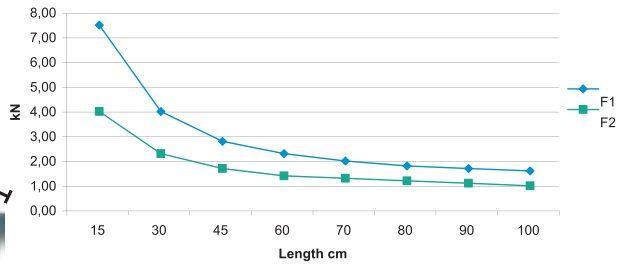
Base plate : height (h) x width (b) x thickness (t)

140 50 10

•In the case of concrete support frame, use anchor M12.
•In the case of concrete C-Channel frame, Hexbolt M8.
*** Connection force (pull-out force) : 4,8 (kN)*

CCH442 41x41x2.5 B2B





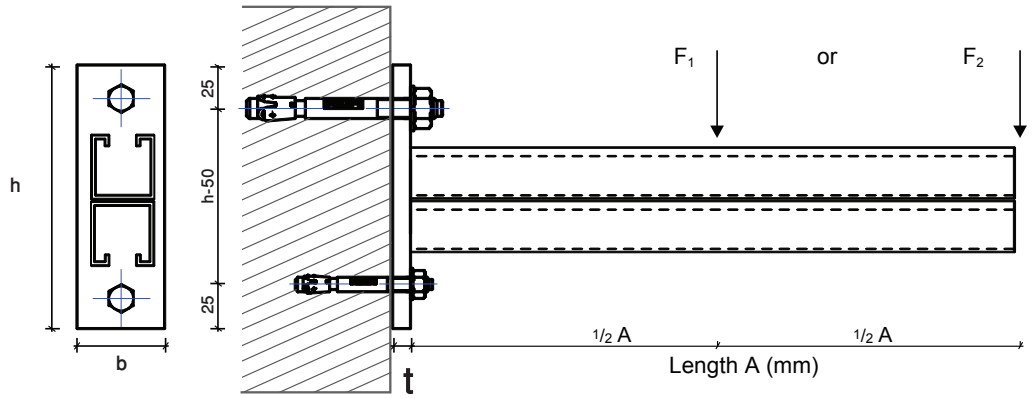
Length	Allowable Load		
A (mm)	F_1*	F_2*	F_z**
150	7.00	3.50	8.30
300	3.50	1.80	8.30
450	2.30	1.20	8.30
600	1.80	0.90	8.30
700	1.50	0.80	8.30
800	1.30	0.70	8.30
900	1.20	0.60	8.30
1000	1.10	0.50	8.30

Base plate : height (h) x width (b) x thickness (t)

180 60 12

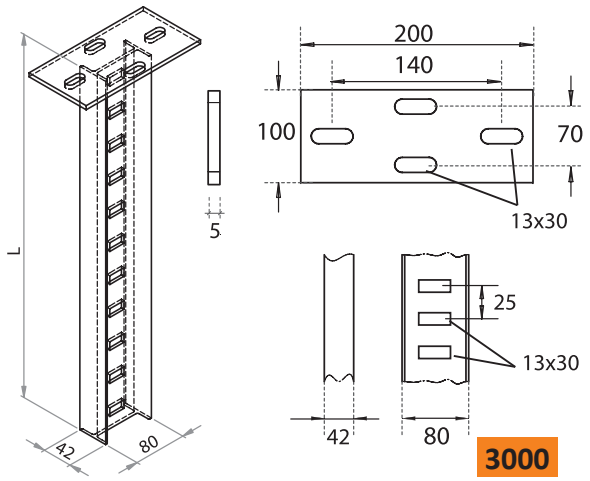
•In the case of concrete support frame, use anchor M16.
•In the case of concrete C-Channel frame, Hex bolt M10 .
*** Connection force (pull-out force) : 8,30 (kN)*

* Given Loads are always in [kN] " Allowable characteristic live load "

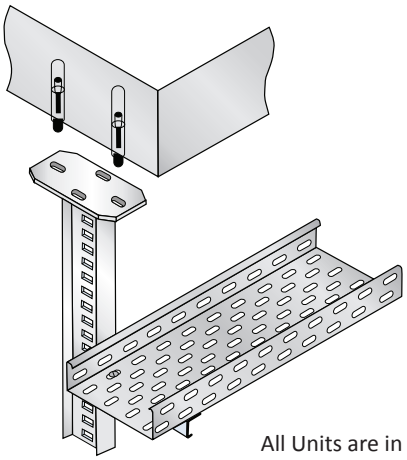


CANTILEVER ARM BRACKET

U - Support / 3000



3000



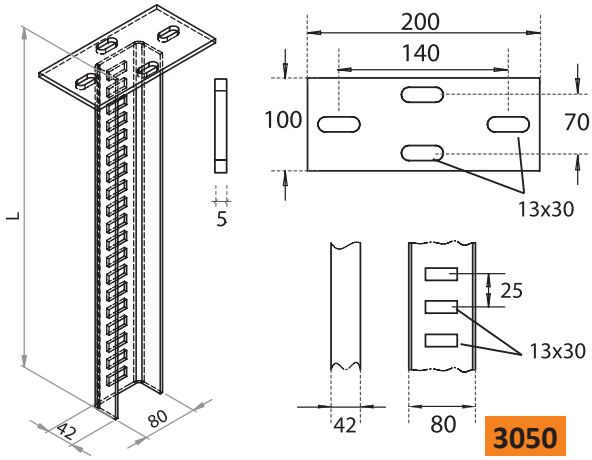
All Units are in (mm) .

U-Support with welded-on head plate 200 x 100 x 5mm

Order Example		
Item	(h)	(t)
5	0200	3000

Order Example:
3000 - Length (L) - Thickness (t)

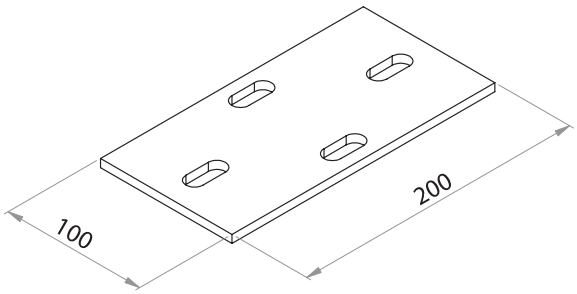
I - Support / 3050



3050

Head Plate / 3100

200 x 100 x 5mm



3100

All Units are in (mm) .

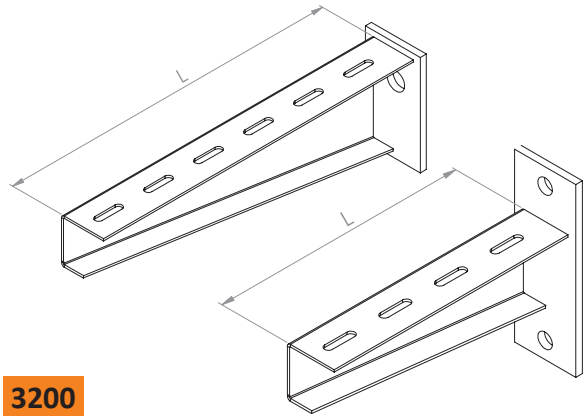
U-Support with welded-on head plate 200 x 100 x 5mm

Order Example		
Item	(h)	(t)
5	0200	3050

Order Example:
3000 - Length (L) - Thickness (t)

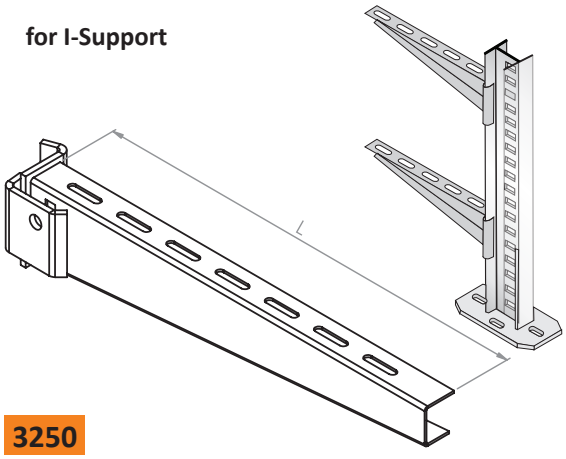
Wall Bracket / 3200 - 3250

For U-Support |Thickness 5 mm



3200

for I-Support



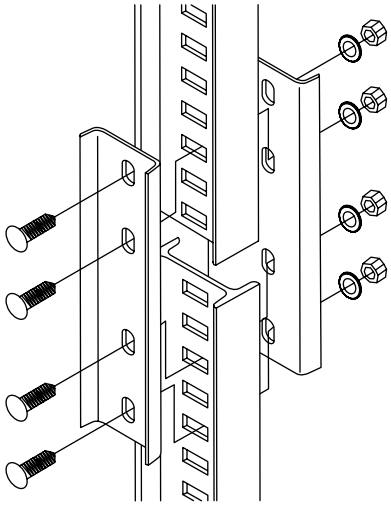
3250

U-Support with welded-on head plate 200 x 100 x 5mm

Order Example		
Item	(h)	(t)
5	0200	3200

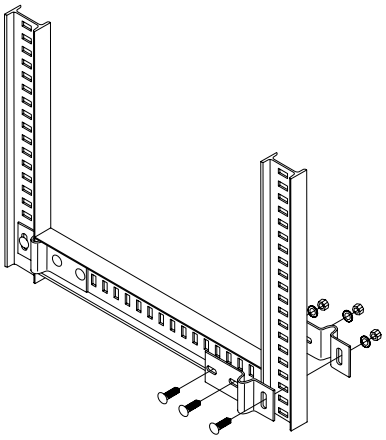
Order Example:
3200 - Length (L) - Thickness (t)

Support Connectors / 3300



3300

Clamping Plates / 3350

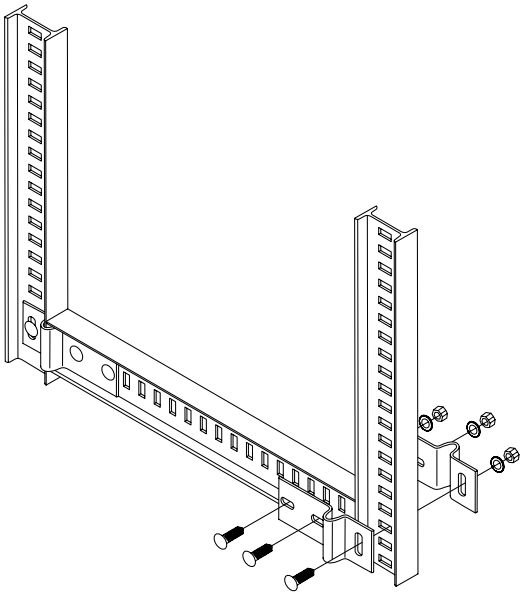


3350

Order Example		
Item	(h)	(t)
5	0200	3300
5	0200	3350

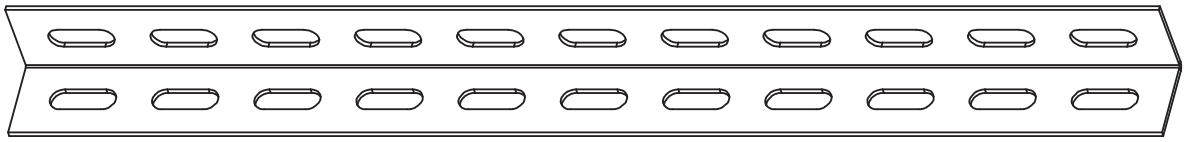
Order Example:
3300/3350 - Length (L) - Thickness (t)
For more ordering details, please check page 134

Support Plates / 3400

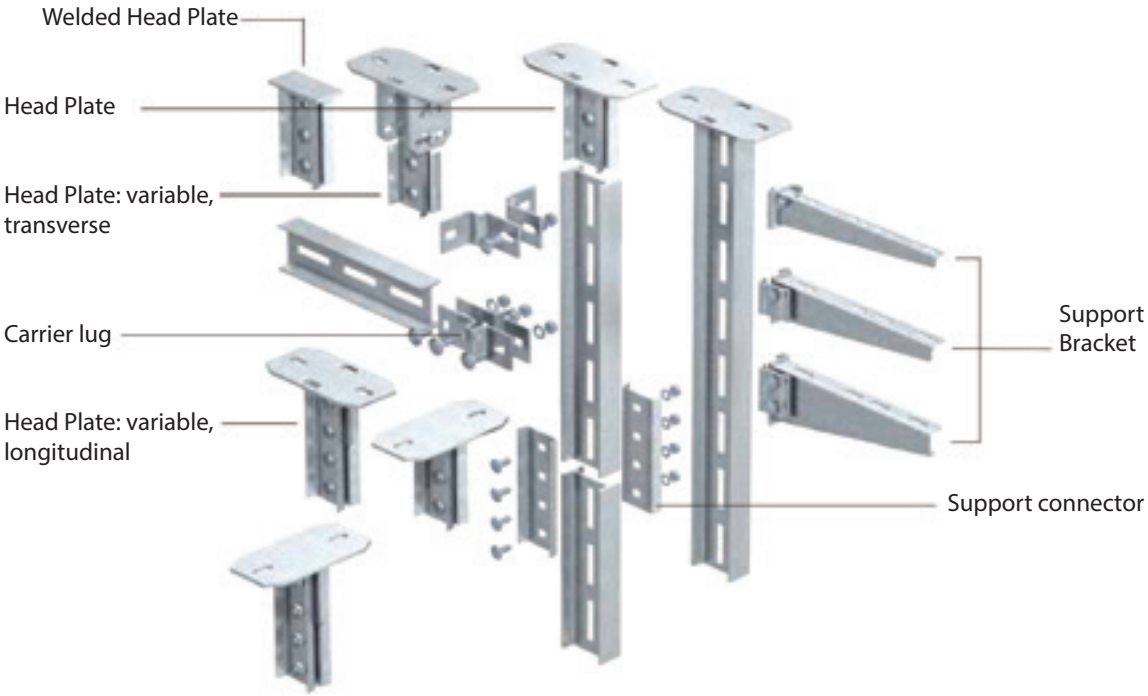


3400

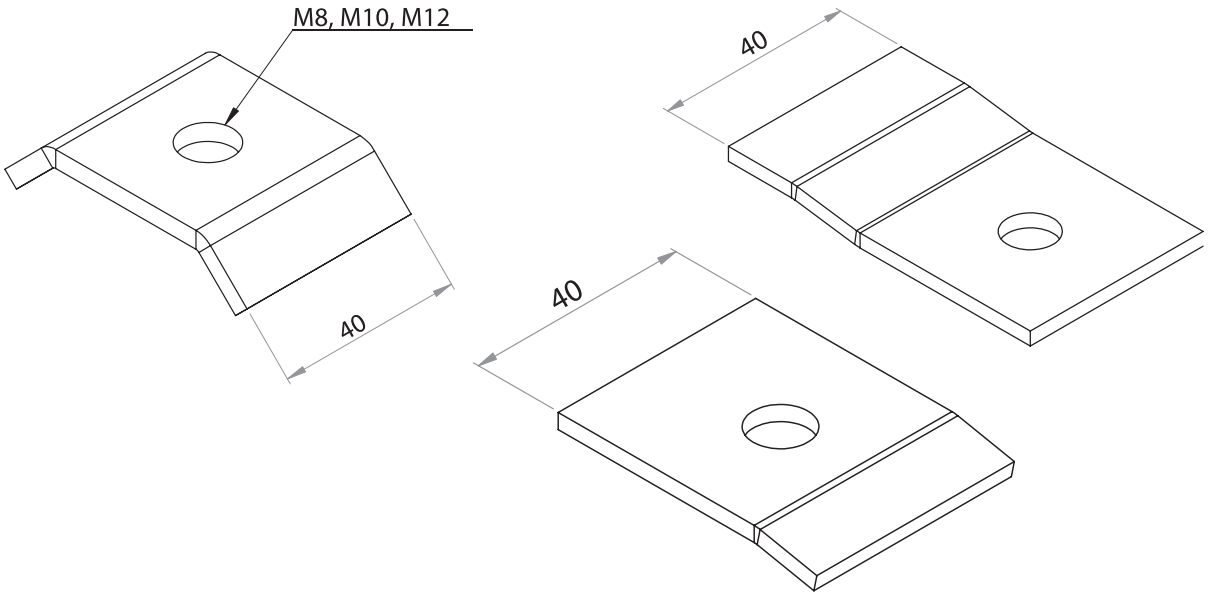
Angles / 3600



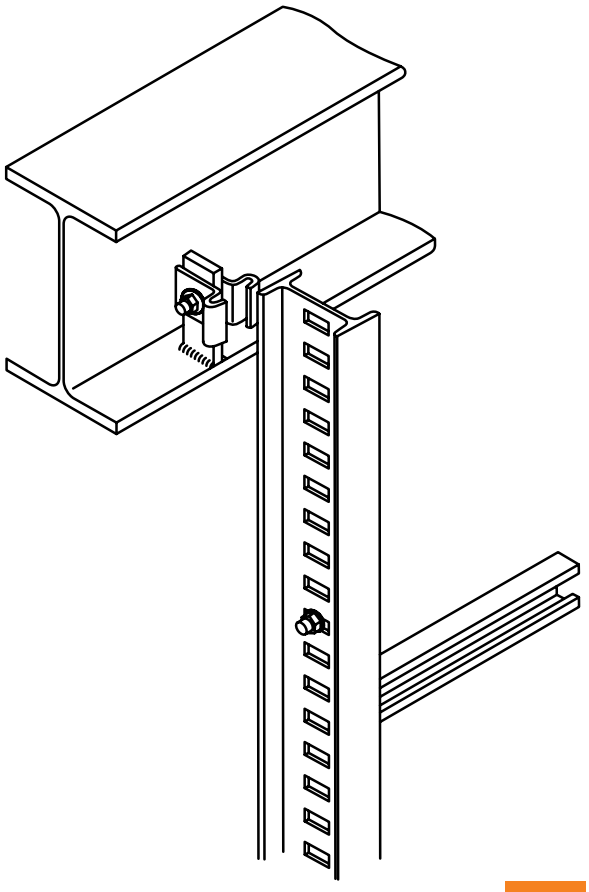
3600



Hold Down Clamp

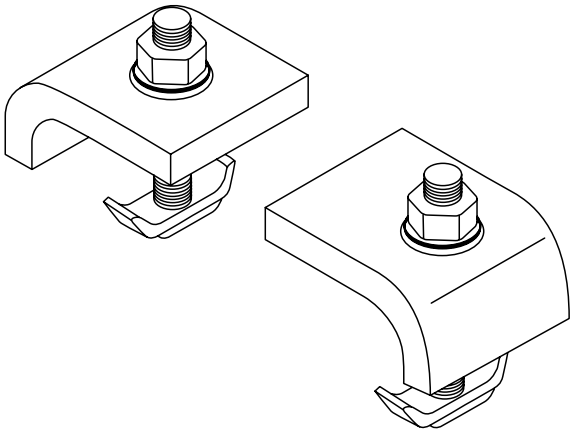


Support Clamps / 3450

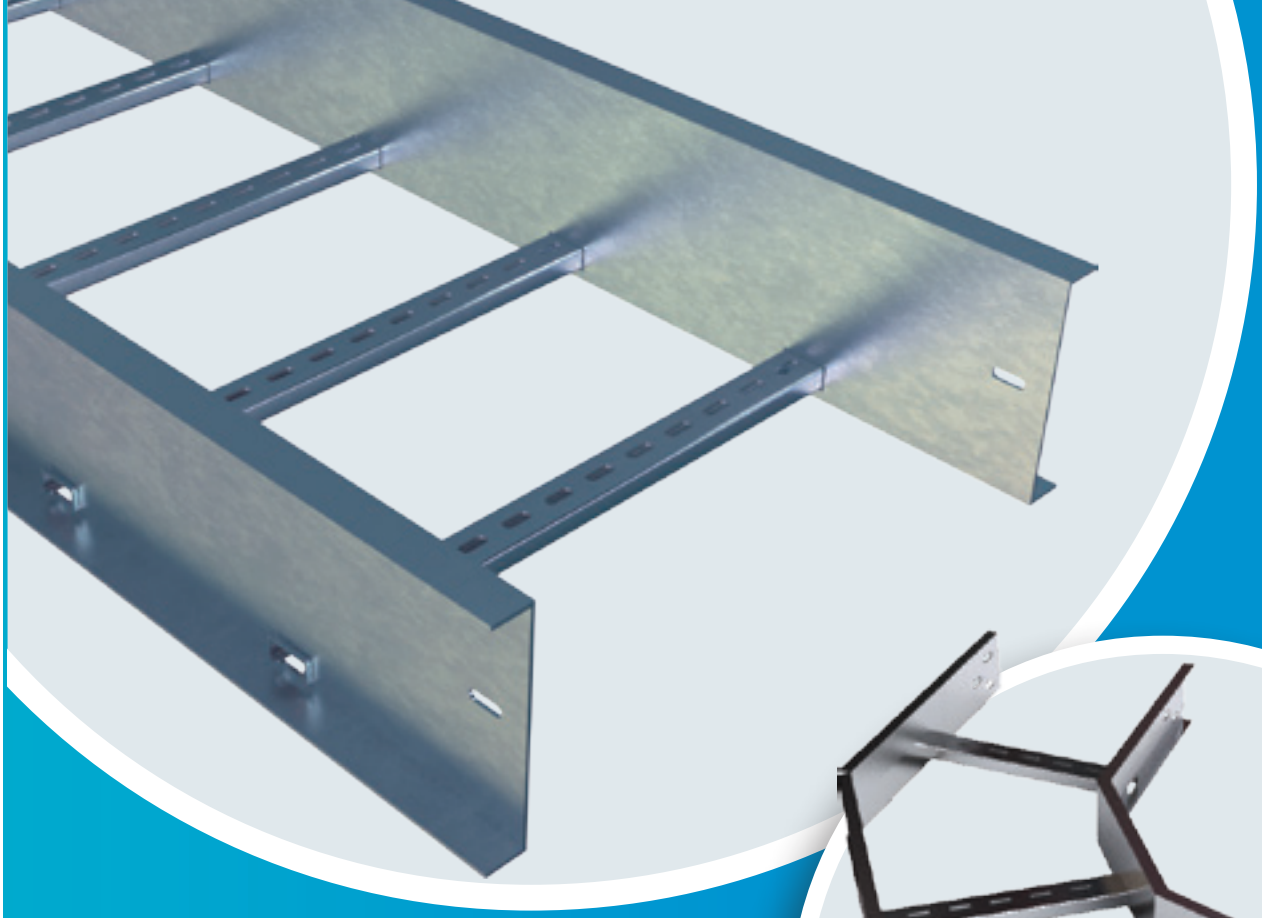


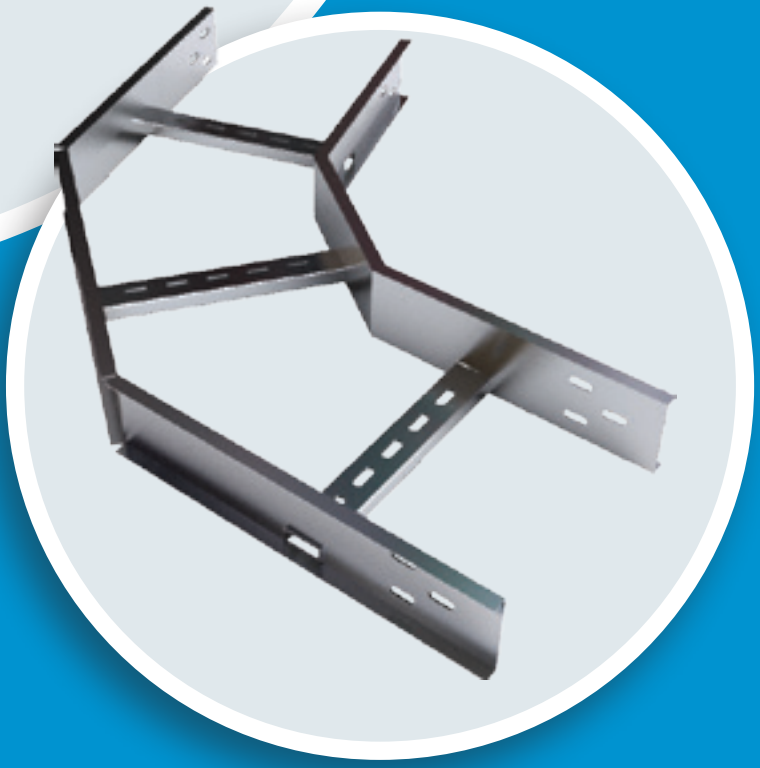
3450

Clamping Angles / 3550



3550





CONCRETE SUPPORT ANCHORS

Direction of Loading

The direction of the applied load shall be considered to determine the most appropriate anchor. The tension and shear components shall be lesser than the recommended load/design resistance in the direction concerned.

Tensile Loading

Tensile loads are applied along the axis of fixing *(see Fig.1).*

Common examples include suspended ceiling applications and the suspension of mechanical services, pipe work , duct work ,etc ...

Shear Loads

Shear loads act at right angles to the axis of fixing and directly against the face of the structural material *(see Fig.2).*

Shear performance is governed mainly by the shear strength of the bolt material and by the compressive strength of the supporting substrate.

Oblique / Combined Loads

Oblique loads are a combination of tension and shear components *(see Fig.3).*

If the angle of the applied oblique load is within 10˚ of pure tension or pure shear, the safe working load for that direction may be assumed. Otherwise, the applied oblique load shall be resolved into its shear and tensile components.

Offset Loads

Offset loads act at right angles to the fixing axis but are offset from the surface *(see Fig.4).*

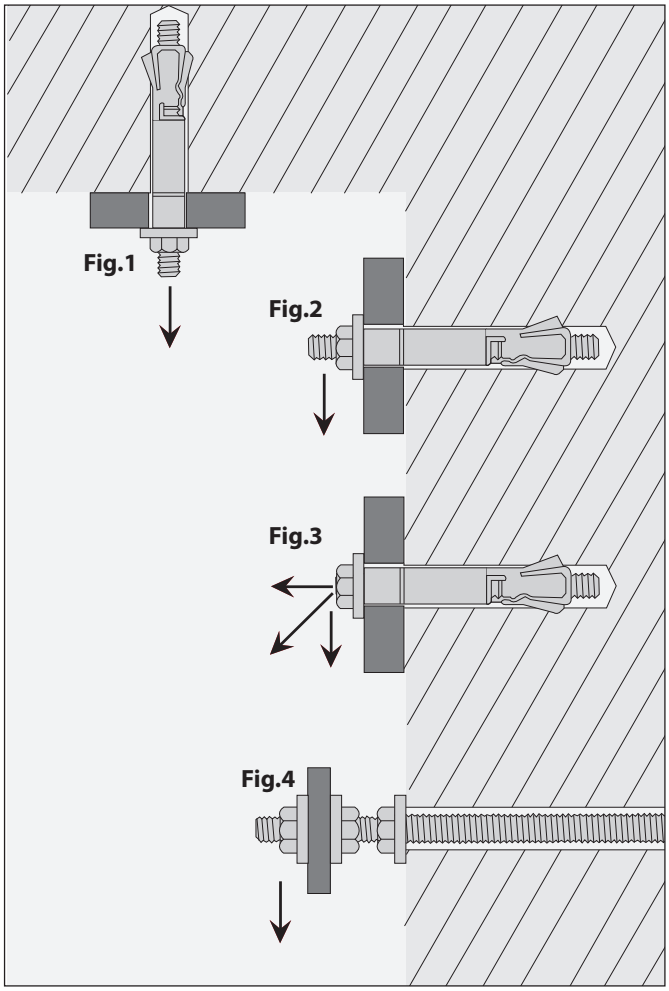
In this situation, the deflection of the bolt due to bending needs to be considered as well as the shear capacity of the anchor

Slotted Holes in Fixture

When fixing anchors through slotted holes; it is important to ensure that there is an adequate surface of contact between the washer and the fixture to guarantee a positive clamping force. If in doubt, a square plate washer with a thickness of 3mm or above would be recommended in place of the standard washer supplied.

Diamond Drilled Holes

When holes are formed in the structure using a diamond drilling system; extra care is required to ensure the holes are thoroughly cleaned by brushing and blowing for at least three times. Also, to make a key for the anchor (particularly if a bonded anchor is installed) the sides of the hole shall be roughened up by inserting a standard masonry bit into the hole attached to a hammer action drilling machine. A resin with minimal shrinkage shall be selected for diamond drilled holes.



STM

STM/H

Features:

- Suitable for all screws or threaded bolts with metric thread.
- Low energy impact, power-saving assembly.
- Multiple removing and fixing.
- Inside threaded anchor, allows great flexibility.
- Can use variable lengths and art of threaded rods or bolts.
- Small edge distance and small distance between anchors.
- Provide uniform load by tightening the screw or hexagon nut, the cone pulls into the expansion anchor and tightens against the drilled hole.
- Suitable for use in concrete and natural stone.

Typical Applications:

Cable Management , handrails, brackets, staircases, ladders, machines, window panels, base plates, scaffoldings and frameworks

Technical Data:

Recommended loads (non cracked -concrete C 20/25).

Type (Order No)	Tension Load	Shear Load	Bending Moment	Screw Grade
	(kN)	(kN)	(Nm)	
M6	2.5	2.3	3.9	8.8
M8	3.3	4.4	17	8.8
M10	4.7	6.5	34	8.8
M12	6.9	8.5	60	8.8
**for cracked concrete we shall use 0,5 x this value (approximately)*				

Materials:

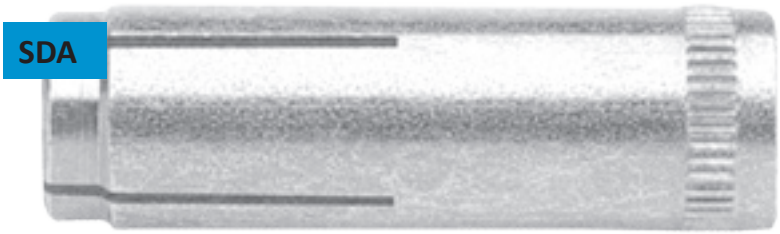
- Zinc plated steel.
- Stainless steel [SS 304 (A2), SS 316 (A4)].

Setting Data:

Edge distance > 1,5 x H e*ff*., distance between anchors > 3 x H e*ff*.
Thickness of foundation > 2 x H e*ff*.

Size	H e*ff*.	Edge Distance C	Distance Between Anchors S	Thickness of Foundation h_{min}	Washer	Tightening Torque	Spanner size
	(mm)	(mm)	(mm)	(mm)	(Ø)	(Nm)	(mm)
M6	40	60	120	100	12 x 1.6	10	10
M8	45	68	135	100	16 x 1.6	20	13
M10	55	83	165	110	20 x 2.0	40	17
M12	70	105	210	140	24 x 2.5	75	19

DROP-IN ANCHOR - SDA



Features:

- Provides permanently fixed threaded socket in concrete.
- Use in non-cracked concrete or cracked concrete and natural stone.
- The anchor will spread and tighten against the drilled hole after inserting with setting tool.
- Low setting depth, reduced drilling time.
- Enables cost-effective assembly .
- Multiple removing and fixing.

Typical Applications:

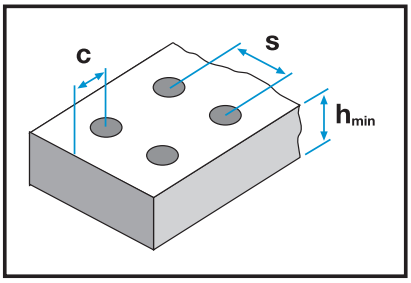
Pipes, ventilation ducts, suspended ceilings, sprinkler systems, brackets, threaded rods and Cable Trays.

Technical Data:

Type (Order No)	Tension Load	Shear Load	Bending Moment	Screw Grade
	(kN)	(kN)	(Nm)	
M6	2.5	2.3	3.9	8.8
M8	3.3	4.4	17	8.8
M10	4.7	6.5	34	8.8
M12	6.9	8.5	60	8.8
*for cracked concrete we shall use 0,5 x this value (approximately)				

Materials:

- Zinc plated steel.
- Stainless steel [SS 304 (A2), SS 316 (A4)].



Setting Data:

Edge distance > 1.5 x effective anchorage depth, distance between anchors > 3,0 x effective anchorage depth, min. thickness of foundation > 2,5 x H e*ff*.

Size	H e*ff*.	Edge Distance C	Distance Between Anchors S	Thickness of Foundation hmin	Washer	Tightening Torque	Spanner size
	(mm)	(mm)	(mm)	(mm)	(Ø)	(Nm)	(mm)
M6	25	37.5	75	100	4	10	10
M8	30	45	90	100	9	13	13
M10	40	60	120	130	17	17	17
M12	50	75	150	140	30	19	19
M16	65	197.5	195	160	75	24	

SLEEVE ANCHOR - SAS

Features:

- Suitable for use in concrete, natural stone, brickwork and blockwork
- Small distance between anchors.
- Optimum performance in most base material types.
- No protruding threads after installation.
- Small distance between anchors and from edge.
- Controlled expansion.
- Zinc plated > 5µm.
- Effective force distribution in the drilled hole.
- Sleeve anchor with hexagon screw or with threaded bolt.

SAS

Typical Applications:

Uni-channel ,railings, steel constructions , machines, high-racks, cable support systems and mechanical fixations.

Technical Data:

Recommended loads (non cracked-concreted C 20/25).

Bolt Size	Tension Load	Shear Load	Torque Moment
	(kN)	(kN)	(Nm)
M6	2.56	2.0	5.0
M8	3.33	3.3	12.5
M10	4.1	5.0	25.5
M12	6.66	7.5	.....

**for cracked concrete we shall use 0,5 x this value (approximately)*

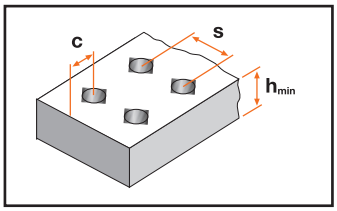
Materials:

- Zinc plated steel.
- Stainless steel [SS 304 (A2), SS 316 (A4)].

Setting Data:

Edge distance > 1.5 x effective anchorage depth, distance between anchors > 3,0 x effective anchorage depth, min. thickness of foundation > 2,5 x H eff.

Bolt Size	H eff.	Edge Distance C	Distance Between Anchors S	Thickness of Foundation h_{min}	Washer (Ø)	Tightening Torque	Spanner size
	(mm)	(mm)	(mm)	(mm)	(mm)	(Nm)	
M6	35	52.5	105	70	18 x 1.6	8	10
M8	40	60	120	80	16 x 1.6	25	13
M10	50	75	150	100	20 x 2.0	40	17
M12	75	112.5	225	150	26 x 2.0	50	19

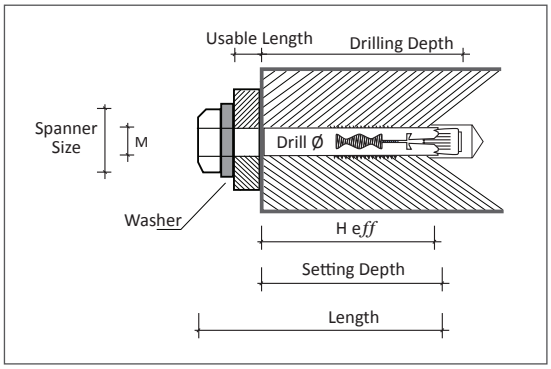


Sleeve Anchor - SAS:

With hexagon screw (non-cracked concrete C20/25).

Size	Length	Drill	Hole Ø in Fixture	Drilling Depth	Setting Depth	H eff.	Min.Usable Length
	(mm)	(Ø)	(mm)	(mm)	(Ø)	(mm)	(mm)
M6	45	8	10	55	35	35	5
M6	60	8	10	55	35	35	15
M8	60	10	12	60	40	40	15
M8	80	10	12	60	40	40	25
M10	70	12	14	70	50	50	15
M10	100	12	14	70	60	50	35

**for cracked concrete we shall use 0,5 x this value (approximately).*



THROUGH BOLT (WEDGE ANCHOR) - STB

Features:

- Suitable for use in cracked concrete or in non-cracked concrete and in natural stone.
- Special design of the clip in stainless steel which ensures a safe hold in the hole.
- Torque controlled expansion.
- Zinc plated > 5µm.
- User friendly, face fixing or through fixing.

SDB

Typical Applications:

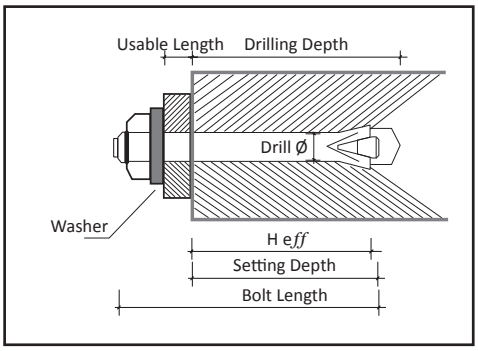
Uni - channel, hand rails, steel construction, Cable Trays, supports, brackets, ducts and shelf feet.

Technical Data:

Through Bolt zinc plated (non-cracked C20/25).

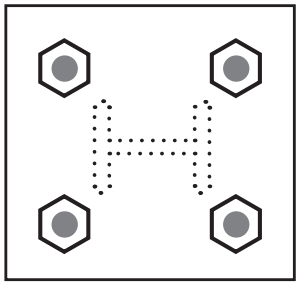
Bolt Size	Tension Load (kN)	Shear Load (kN)	Torque Moment (Nm)
M6	2.1	1.9	4.0
M8	4.0	4.0	15.0
M10	5.9	5.95	30.0
M12	8.8	10.0	50.0
M16	12	16.0	100

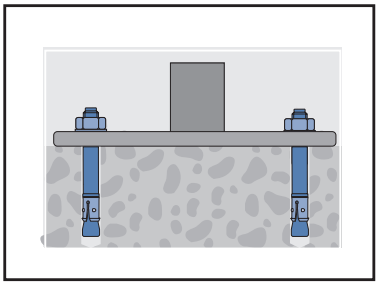
**for cracked concrete we shall use 0,5 x this value (approximately)*

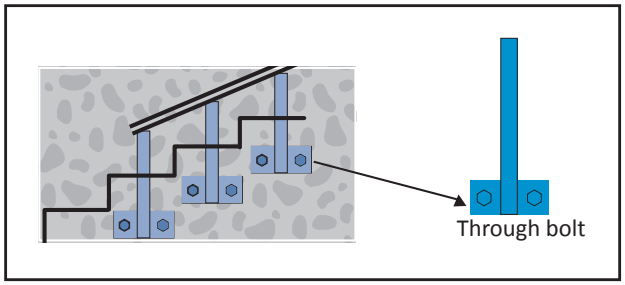


Materials:

- Zinc plated steel.
- Stainless steel [SS 304 (A2) , SS 316 (A4)].



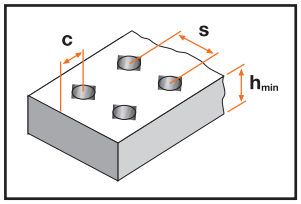




Setting Data:

Edge distance > 1,5 H eff. , distance between anchors > 3 x H eff.
Thickness of foundation > 2 x H eff.

Bolt Size	H eff. (mm)	Edge Distance C (mm)	Distance Between Anchors S (mm)	Washer (Ø)	Thickness of Foundation h_{min} (mm)	Tightening Torque (Nm)	Spanner Size
M6	40	60	120	12 x 1.6	100	7	10
M8	50	75	150	16 x 1.6	100	14	13
M10	58	87	174	20 x 2.0	120	30	17
M12	68	102	204	24 x 2.5	140	35	19
M16	80	120	240	30 x 3.0	160	80	24



SHIELD ANCHOR - SSA

Features:

- Assembly detachable, multiple removing and fixing.
- Low energy impact, power-saving assembly.
- Force controlled expansion.
- Flexibility inside threaded anchor.
- Variable length and art of threaded rods or bolts.
- By tightening the screw, the cone pulls into the sleeve and tense against the drill hole.
- Small edge distance and small distance between anchor.
- Expansion elements are held together by a spring.
- Optimum taper nut angle for maximum expansion.
- Pressed steel segment ensures consistent dimensional accuracy.
- Provide a projecting stud to support fixture during installation and removal.
- Suitable for use in concrete, natural stone, brick and sand stone.

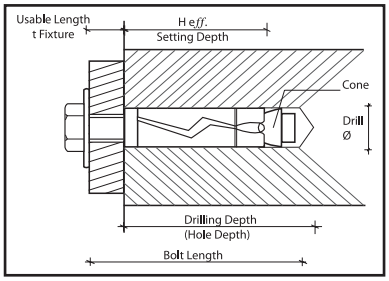
Typical Applications:

For fixing: steel constructions, handrails, consoles, brackets, ladders, gates and spacing designs.

Technical Data:

(Recommended loads concrete C 20/25 and in brick work).

Size	Distance to Edge C	Distance Between Anchors S	Min. Thickness of Foundation h_{min}	H *eff.*
	(mm)	(mm)	(mm)	(mm)
M6	52.5	105	70	35
M8	60	120	80	40
M10	75	150	100	50
M12	90	180	120	60



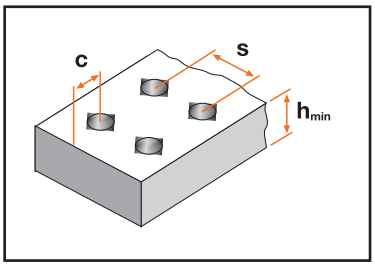
Materials:

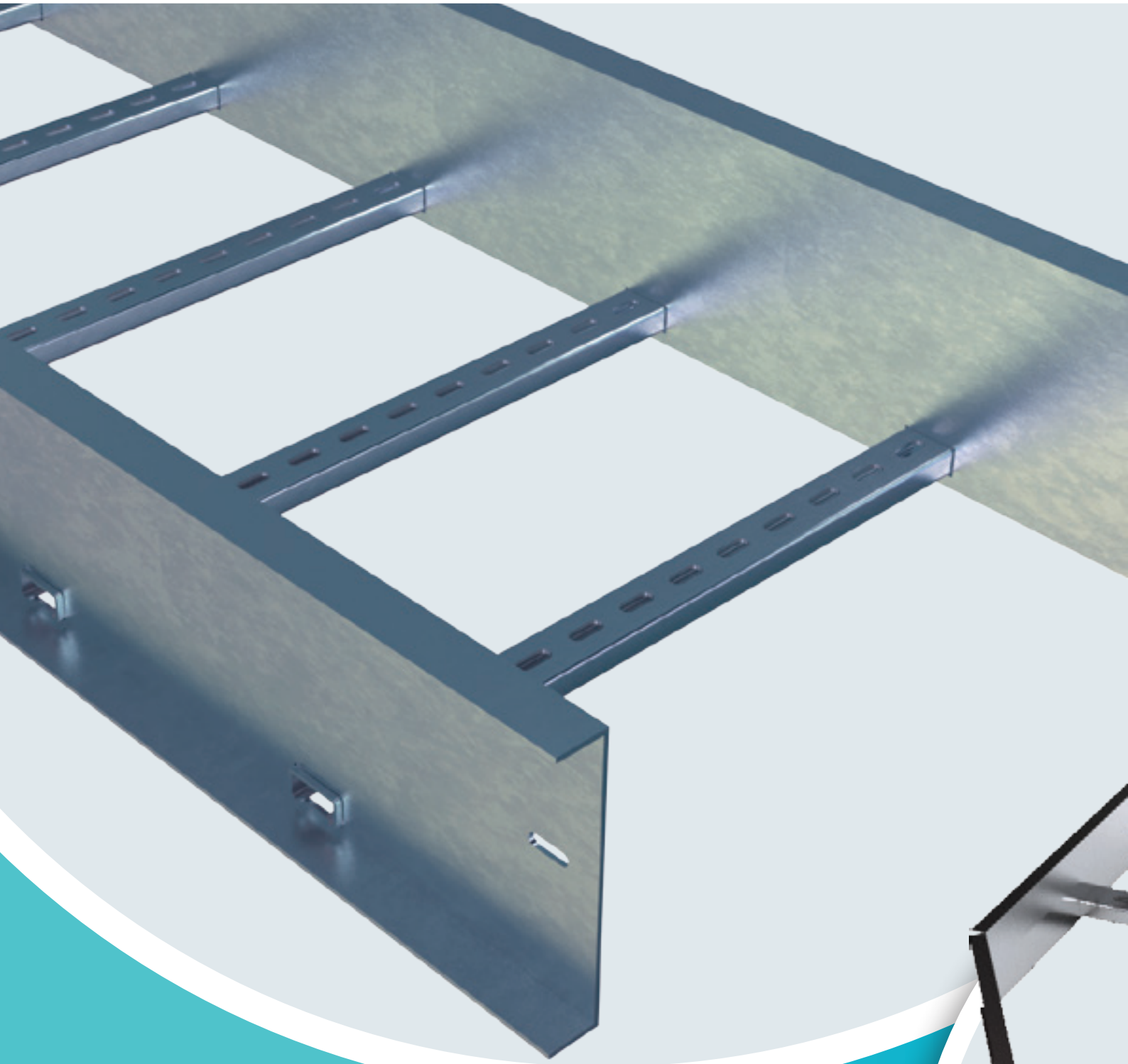
- Zinc plated and die-cast.

Setting Data:

Edge distance > 1,5 x H *eff.*, distance between anchors > 3 x H *eff.*
Thickness of foundation > 2 x H *eff.*

Size	Concrete		Brick Work Tension Shear	Torque Concrete	Torque Brick
	Tension	Shear			
	KN	KN	KN	N.m	N.m
M6	3.3	2.1	1.6	6.5	5.0
M8	4.8	4.4	2.1	15.0	7.5
M10	6.2	6.1	2.6	27.0	13.0
M12	9.7	12.4	3.9	50.0	23.0





FIRESTOP SYSTEMS

PRODUCT DESCRIPTION: • BASIC USE • COMPOSITION & MATERIALS
PRODUCT SELECTOR: • FIRESTOP SEALANTS • COMPOSITE SHEET • FIRESTOP MORTAR • FIRESTOP PUTTY • FIRESTOP PILLOWS • PATHWAYS • PUTTY PADS • FIRE PROTECTIVE CABLE COATING

BETA CONTECH

Beta Contech is specialized in advanced architectural and industrial products, ranging from raised access to flooring systems, architectural expansion joint systems, architectural impact protection systems, firestopping systems and others. The company operates within the GCC and MENA countries and has a wide reputation among contractors.

STI FIRESTOP

Specified Technologies is an industry leader solely committed to the development of innovative, reliable firestopping solutions that help stop the spread of fire smoke and toxic fumes . Beta Contech's innovative firestop solutions are for all types of new construction and retrofit applications.

PRODUCT DESCRIPTION

Basic Usage

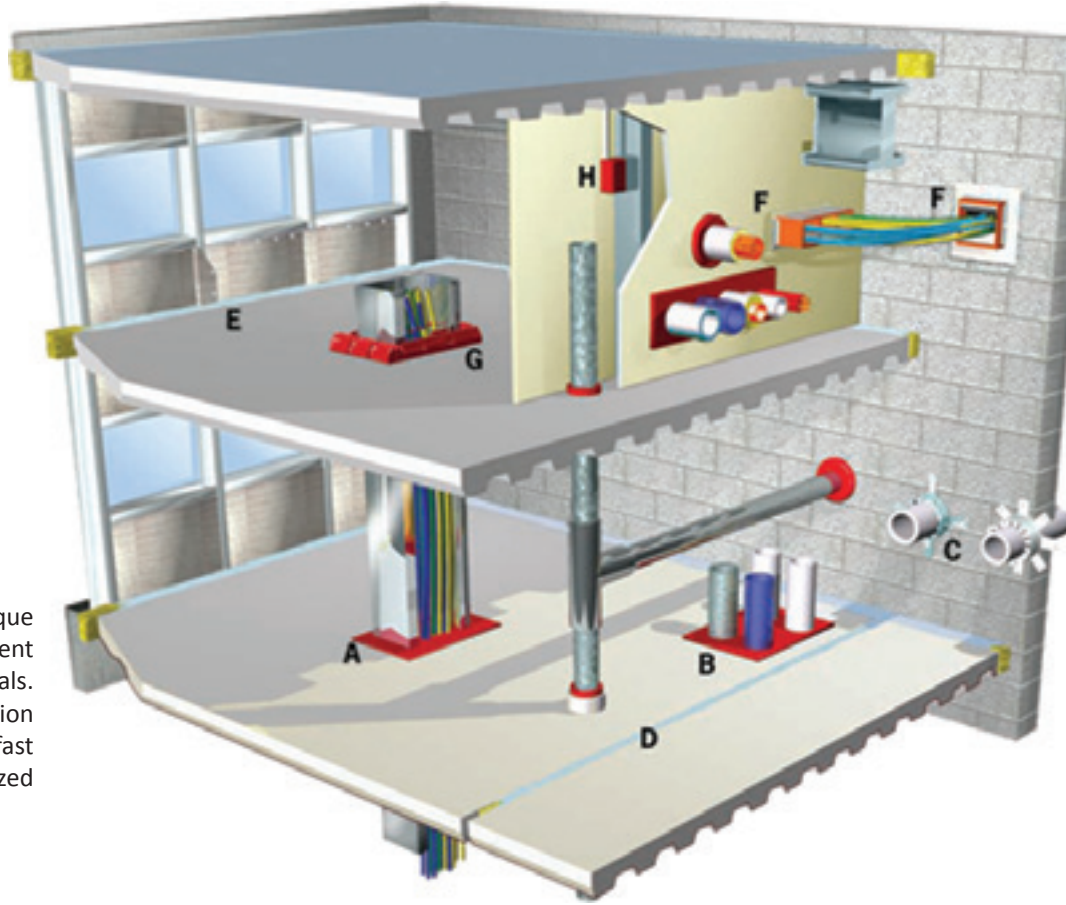
These products are used solely or in combination to construct firestop systems effective in sealing through-penetrations, construction joints and high traffic openings against the spread of fire, smoke or hot gasses. A wide range of tested systems is available for standard constructions and penetrants with ratings up to 4 hours.
These products and systems are suitable for sealing electrical, plumbing, mechanical or data/communications penetrations, including:

Pipes, Conduits or Ducts
- Metallic
- Nonmetallic
- Insulated

Cables
- Telephone
- Power
- Data and Control

Cable Trays and Bus Ducts
- Steel
- Aluminum and Copper

Construction Joints

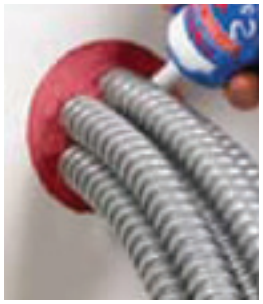


Composition & Materials

STI Firestop products are a unique combination of passive and intumescent (expands when heated) materials. Products utilizing this expansion mechanism exhibit unusually fast and aggressive, highly directionalized expansion.

PRODUCT DESCRIPTION

Firestop Sealants



Triple S®Intumescent Sealant
Premium grade, water-based firestop caulk featuring STI's patented two-stage intumescent technology. The perfect choice for the broadest array of combustible and non-combustible electrical penetrants requiring a permanent, durable seal.

Firestop Sealants

LCI Intumescent Sealant
Standard grade, water-based firestop caulk engineered to address most common combustible and noncombustible electrical applications typically found in light commercial construction.

Pathways

EZ-Path® Fire Rated Pathway
A mechanical cable pathway system utilizing a self-contained, self-sealing firestop system. Easy moves, adds and changes with no firestopping required ever. Three sizes and a full range of accessories adapt this system to virtually any application.

Putty Pads

SSP Putty Pads
When used with both metallic and non-metallic switch and receptacle boxes, pads are UL Tested and Classified to permit larger boxes and reduced spacing.

Composite Sheet

Intumescent Composite Sheet
Lightweight, easily fabricated panel surface mounts to walls and floors to provide a neat, clean seal for medium to large openings typically used for Cable Trays, bus ducts, and conduit banks.

Fire Protective Cable Coating

CS Cable Spray
Water-based spray applied coating used to provide short term circuit integrity and improved flame spread characteristics for grouped electrical cables.

Firestop Mortar

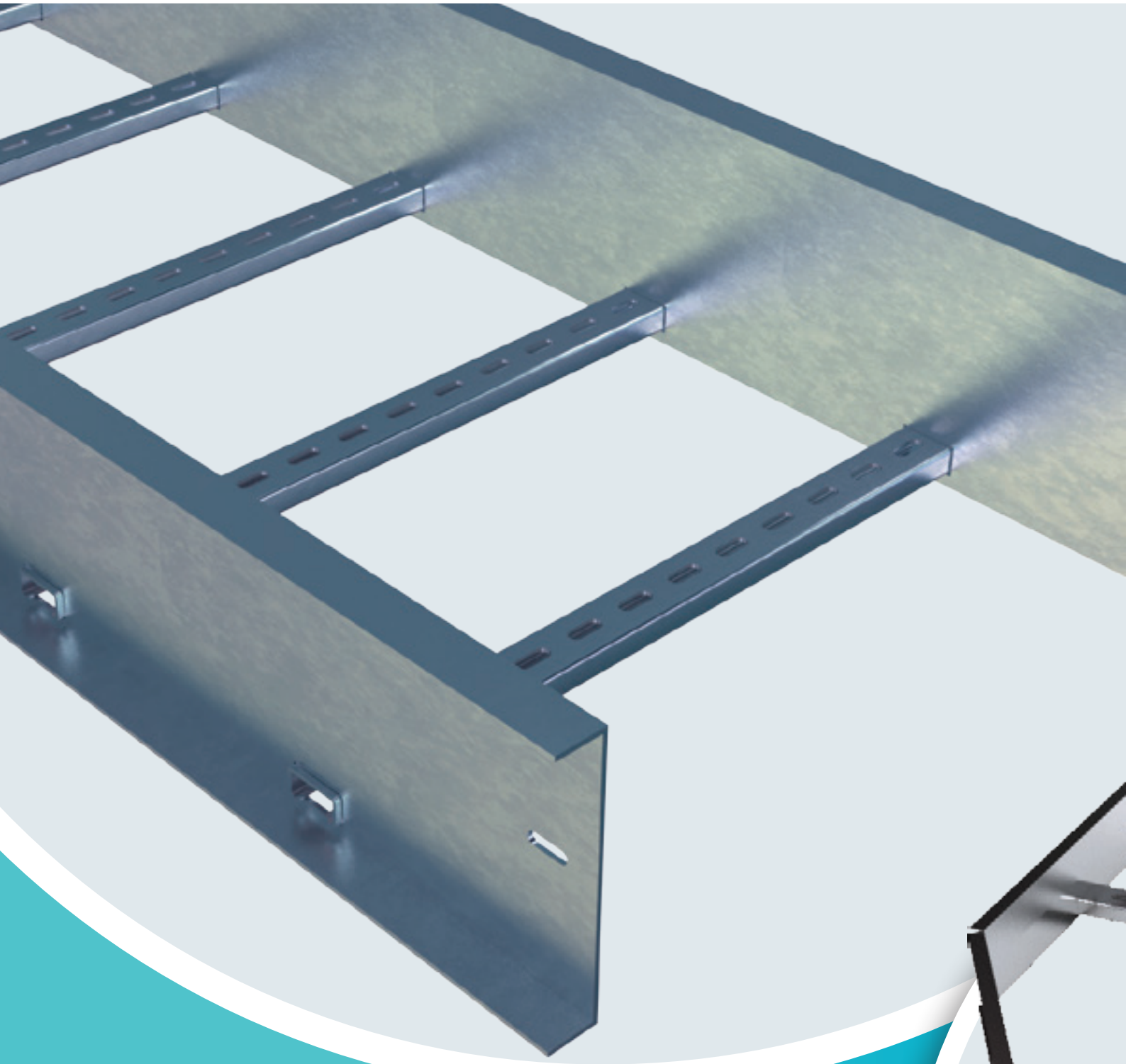
SSM Firestop Mortar
A strong, lightweight and cementitious mortar designed for large openings typically used for Cable Trays or banks of conduits.

Firestop Putty

SSP Intumescent Putty
Non-hardening intumescent putty which is easily installed and removed making it the perfect choice for cable penetrations requiring occasional retrofitting.

Firestop Pillows

SSB Intumescent Firestop Pillows
Compressible cushions are easily installed and removed. The perfect firestop solution for medium to large openings including cable bundles, Cable Trays, bus ducts and multiple conduits.



HOW TO ORDER

ORDERING CABLE LADDER TRAYS & ACCESSORIES

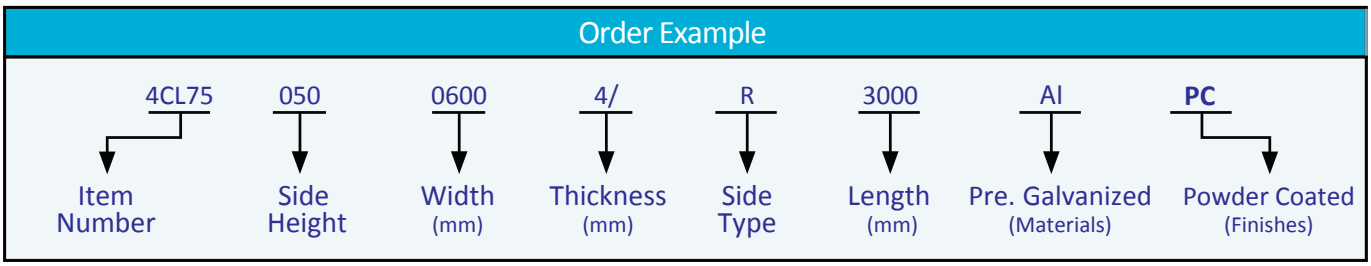
Materials and finishes abbreviations:

Cable trays and accessories are available in the following:

Materials & Finishes	Code
Aluminium	**AL**
Pre-Galvanized	**PG**
Stainless Steel	**SS**
Hot-dip Galvanized	**HD**
Electrolytic Galvanized	**EG**
Powder Coated	**PC**

- Item & Order Number for Sections & Fittings

When ordering cable ladder trays, the full order number shall include the material used, width of the tray, side height,- type of side and the length rail.



Examples:

1- Order number for Aluminum (6063-H34) cable ladder tray , 3050 mm length, 76.2 mm side height, 2.5 mm rail thickness, 1.5 mm rung thickness and 500 mm width with R-type return flange:
MCL76A 076 0500 R 3050 Al (6063-H34)

2- Order number for Pre-Galvanized 3000 mm length cable tray, 75 mm side height, 2.0 mm rail thickness, 2.0 mm rung thickness and 300 mm width with Z-type return flange:
HCL75 75 0300 Z 3000 PG PC

3- Order number for powder coated curved T-branch, 100 mm side height, and 700 mm width with straight end:
2710 100 0700 C PG PC

N.B.: Order number for connectors will include the item number, side height and thickness of the sheet.

SFSP makes every effort to maintain the accuracy and quality of the information provided in this Catalogue.

However, SFSP cannot guarantee and assumes legal liability or responsibility for the accuracy or completeness of the information provided.

Whilst every care has been exercised in the preparation of this catalogue to ensure that any advice, recommendations or information is accurate, no liability or responsibility of any kind is accepted.

Project working details should be entrusted to appropriately qualified and experienced persons, case by case.

With a policy of continuous product development, SFSP may modify product design and specification without due notice.

In case of any questions or remarks, feel free to contact the R&D Department.