

MECANO®

Cable Tray Systems Leader

**CABLE TRAY
SYSTEMS**

**STRUCTURAL
SYSTEMS**

**PIPING
FASTENERS**



MECANO



Company Overview
Some MECANO Customers and Users

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Industrias Ceno S.A.

We are a very well known design, manufacture, and erection company in the metal mechanical sector.

In the electrical sector, particularly, we have developed several product lines such as power line transmission towers, communication towers, substation crossbars, cable tray systems, structural profiles, and piping fasteners.

Under the MECANO brand, INDUSTRIAS CENO S.A. has encompassed cable tray systems, structural systems, and piping fasteners.

Simple, easy, and fast erections, installations, changes, and additions partly due to our wide accessory range make the MECANO SYSTEM the choice of the most important projects.

INDUSTRIAS CENO S.A. has designed MECANO SYSTEM with the criteria that each element meets its objective at a minimal cost. For the installation, a good economy is achieved, then, not only in the initial installation costs, but also in the long term.

This catalog's objective is to assist the engineer design, find, and order each MECANO SYSTEM element with its catalog number. Nevertheless, for better customer attention, we offer engineering services to project the system the customer wants according to the building blueprints and the erection or installation specific requirements.

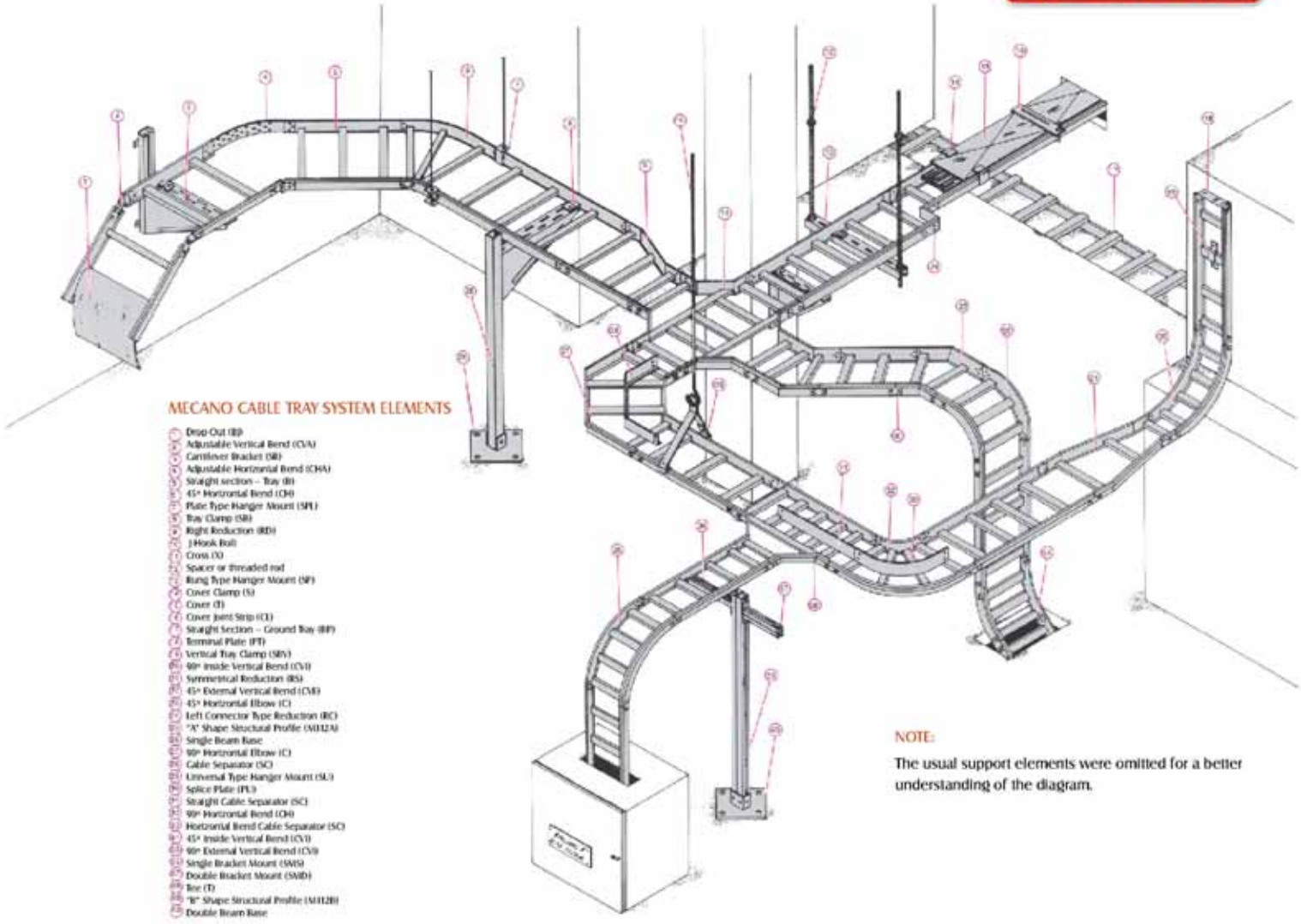
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CABLE TRAY SYSTEMS

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PHYSICAL DATA

Material:

Cold-rolled steel sheet for lightweight and intermediate weight and hot-rolled steel sheet for heavyweight. For special needs, we also offer aluminum.

Thickness:

We manufacture trays, bent elements, and branches like elbows, bends, crosses, etc., for each normalized width, in thickness according to the NEMA standard.

Length:

Straight elements come in 240 cm; different lengths under order. Bent elements vary in length according to their shape and width (See blueprints for each section).

Width:

Normalized between 10 and 60 cm (See catalog charts). Different widths available under order, according to the NEMA standards.

Height:

5 cm for the lightweight and 8 cm for the intermediate. The heavyweight varies according to the design.

We manufacture them in different heights, as well, under order, like we do in different widths and lengths.

Distance between Rungs:

Normalized for the lightweight at 15 cm and for the intermediate at 25 cm; for the heavyweight, according to the NEMA standard.

Materials and Finishing:

Material	Finishing	Recommended Application
Aluminum		Indoors / Outdoors Acid environments
Steel	Hot-dip galvanized	Indoors / Outdoors
	Electrostatic powder paint	Indoors Food industry
Stainless steel	Electrostatic paint hot-dip galvanized	Indoors / Outdoors
		Indoors / Outdoors Very corrosive Environments Food industry

Chart. Material and finishing

For the right selection of the system to be used, consider the following aspects:

- Material and finishing (See Material and Finishing Chart).
- Actual installation site atmospheric, chemical, or galvanic corrosion.
- Thermal contraction or expansion.
- Installation concerns.

GLOSSARY

Cable Load:

Cable load is considered uniformly distributed in kilograms per lineal meter (kg/m).

Load Capacity:

Represents the cable tray capacity resistance for a uniformly distributed stationary weight. That is, load capacity to destruction divided by the specified safety factor in kilograms per lineal meter (kg/m).

Rung Spacing:

Is the distance between rungs, generally measured between their center lines. Practically, this spacing can vary in a cable tray system, but the maximum possible spacing is determined by the cables and the support system. Do not overload.

Deflection:

Is the vertical distortion in the center between supports. Deflection varies according to the load and according to the length to the fourth power.

It is recommended not to exceed a 1/200 deflection between supports.

CALCULATION BASES

A Cable Tray System is similar to a continuous beam with several supports. However, due to the complexity of the calculations, the system is associated to a beam just resting on its supports. This procedure allows us to determine the system load capacity and, if necessary, the deflection between supports.

Please note that using the case of a beam just resting on its supports to calculate a cable tray system, we arrive to more conservative results than if we used a continuous beam case, which means greater safety and reliability.

TECHNICAL RECOMMENDATIONS

A series of concepts and recommendations that engineers and installers should keep in mind when installing a cable tray system. We would like to clarify that this is not a design or installation standard, simply some suggestions and recommendations. Consequently, the suggestions given in this section will be useful just as a base to be adapted in each particular system.

According to the previous paragraph, the items to be considered are:

- The characteristics of the cable tray system itself.
- System installation.

3. System grounding.

4. Cable installation on the trays and the maximum number of cables recommended.

System Characteristics

When specifying a Cable Tray System, the designer should consider:

- The system to be strong enough and rigid enough to serve as Adequate support, so the cables do not have any mechanical stress.
- Every strength that in a given moment could influence the system design, such as tractions due to operations during the system and cable installation, repairs, maintenance, short circuit, etc.
- That the constitutive Cable Tray System elements do not have any defects or sharp edges that could damage or cut cable insulations.
- That the system is manufactured with materials and anticorrosive treatments appropriate for the site environmental conditions.
- That the system allows easily future changes and additions.

System Installation

For the Cable Tray System installation, the installer should consider:

- To finish installing the Cable Tray System totally, before laying down the cables.
- In the spots where cables could go under undue stress, use the adequate support to avoid possible damages.
- The Cable Tray System should be installed in easy-access areas so maintenance does not become very difficult or complicated.
- If installing two or more Cable Tray Systems at different levels, they should have enough clearance so that additional operations might be executed easily.
- Everything that could affect the system installation, such as columns, standpipes, wall intersections, environmental changes, etc.

System Grounding

The Cable Tray System is a metallic structure that holds electrical cables; therefore, it is recommended for service personnel and facility safety to follow the bridging and grounding Colombian National Electrical Code Standard 250, or equivalent.

Cable Installation

Cable installation on cable trays is subject to a series of very important recommendations to keep in mind.

For detailed information, please see Colombian National Electrical Code (ICONTEC 2050 Standard) Section 318, latest edition, or equivalent. However, we would like the engineer to have the following guide for the cable installation on the cable trays:

- To avoid stress to the cables in long sections with slope changes, we suggest to tie the cables to the tray rungs with appropriate Cable ties.
- If the environment is contaminant enough to affect the cable isolation, we suggest installing tray covers on all trays and bent sections.

As for how many cables to install in a ventilated open ladder-type cable tray, we suggest to keep in mind the following:

a. MULTICONDUCTOR CABLES FOR 2,000 V OR LESS

a.1. Multiconductor cables AWG 4/0 or greater:

The sum of the diameter of all the cables should not exceed the tray width and the cables should be installed in one single layer. See Figure 1.

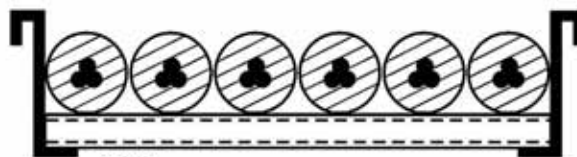


Figure 1

Example: Cable tray width is obtained as follows:

Cable sizes	Outside diameter (D)	Number of cables (N)	Multiply(D) x (N) = subtotal of the sum of the cable diameters
3/C - #500 kcmil	5.388 cm	1	5.388 cm
3/C - #250 kcmil	4.124 cm	2	8.248 cm
3/C - #4/0 AWG	3.702 cm	4	14.808 cm

The sum of the diameters (Sd) of all cables = 5.388 + 8.248 + 14.808 = 28.444 cm; therefore, a cable tray with a width of 30 cm is required.

a.2. Multiconductor cables AWG 4/0 or smaller:

It is recommended that the sum of the cross-sectional areas of all the cables (S), do not cover more than 50% of the tray cross-sectional area. See Figure 2.

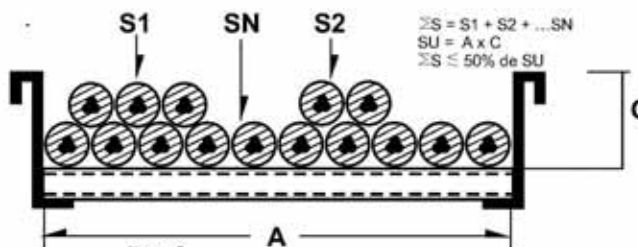


Figure 2

The total sum of the cross-sectional areas of all the cables should not exceed the fill area maximum surface as indicated in Column 1, Chart 1.

Inside Width of Cable Tray in	Column 1 Allowable Cable Area in cm ²
10	30
20	60
30	90
40	120
50	150
60	180

Chart 1. Allowable Cable Area

Example: Cable tray width is obtained as follows:

Cables sizes	Outside diameter (D)	Number of cables (N)	Multiply (A) x (N) = Subtotal of the sum of the cable diameters
3/C - #1/0 AWG	0.5348 cm ²	10	5.348 cm ²
3/C - #2/0 AWG	0.6743 cm ²	8	5.394 cm ²
3/C - #3/0 AWG	0.8503 cm ²	6	5.1018 cm ²

The total sum of the areas is 5.348 + 5.349 + 5.1018 = 15.84 cm²; according to Chart 1, the allowable cable area would be approximately 30 cm², giving us a tray width of 10 cm.

a.3. 4/0 or larger cables installed with cables smaller than 4/0:

The sum of the cross-sectional areas of all cables smaller than 4/0 AWG should not exceed the fill area maximum surface as indicated in Column 1, Chart 2, for the corresponding tray width. 4/0 AWG cables and larger should be installed in a single layer and no other cables should be placed on them. See Figure 3.

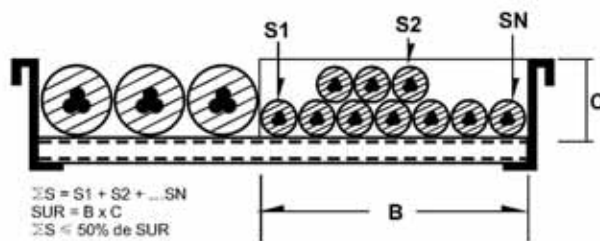


Figure 3

Inside Width of Tray in cm	Column 1 Allowable Cable Area in cm ²
10	30 - (1,2 Sd)
20	60 - (1,2 Sd)
30	90 - (1,2 Sd)
40	120 - (1,2 Sd)
50	150 - (1,2 Sd)
60	180 - (1,2 Sd)

Chart 2. Allowable Cable Area. The expression Sd is the sum of the 4/0 or greater multiconductor cable diameters.

Example: Cable tray width is obtained as follows:

Part A. Multiconductor cables greater than 4/0 AWG

Cable sizes	Outside diameter (D)	Number of cables (N)	Multiply(D) x (N) = subtotal of the sum of the cable diameters
3/C - #500kcmil	5.388 cm	1	5.388 cm
3/C - #4/0 AWG	3.702 cm	2	7.404 cm

Tray width required for larger cables = 5.388 + 7.404 = 12.792 cm.

Part B. Multiconductor cables smaller than 4/0 AWG

Cable sizes	Outside diameter (D)	Number of cables (N)	Multiply (A) x (N) = subtotal of the sum of the cable diameters
3/C - #1/0 AWG	0.5348 cm ²	8	4.2784 cm ²
3/C - #2/0 AWG	0.6743 cm ²	6	4.0458 cm ²
3/C - #3/0 AWG	0.8503 cm ²	2	1.7006 cm ²

The total sum of the areas (cm²) = 4.2784 + 4.0458 + 1.7006 = 10.0248 cm², according to Chart 1, the cable tray required for these cables must have a tray width of 10 cm.

The cable tray required for this case, is equal to the sum of the two selected widths in centimeters, 12.792 + 10 = 22.792 cm; therefore, a 30 cm tray is required.

a. 4. Multiconductor control and/or signal cables only:

A cable tray containing only control and/or signal cables, may have 50% of its total cross-sectional area filled with cable.

b. SINGLE CONDUCTOR CABLE FOR 2,000 V OR LESS

b.1. 1,000 Kcmil or larger single conductor cable:

The sum of the diameters of all single conductor cables shall not exceed the cable tray width.

b. 2 250 to 1,000 Kcmil single conductor cable:

When all the single conductor cables installed on a tray are 1,000 Kcmil or smaller, the total sum of the cross-sectional of all the single conductor cables must not exceed the allowable cable area of the tray width as in Column 1, Chart 3.

Inside Width of Cable Tray in cm	Column1 Allowable Cable Area in cm ²
10	28
20	56
30	84
40	112
50	140
60	168

Chart 3. Allowable Cable Area.

b.3. 1,000 Kcmil or greater cable installed with smaller than 1,000 Kcmil cables

The sum of the cross-sectional areas of all cables smaller than 1,000 Kcmil should not exceed the fill area maximum surface as indicated in Column 1, Chart 4, for the corresponding tray width.

Inside Width of Cable Tray in cm	Column1 Allowable Cable Area in cm ²
10	28 - (1,1 Sd)
20	56 - (1,1 Sd)
30	84 - (1,1 Sd)
40	112 - (1,1 Sd)
50	140 - (1,1 Sd)
60	168 - (1,1 Sd)

Chart 4. Allowable Cable Area. The expression Sd is the sum of the 250 to 1,000 Kcmil single conductor cable diameters.

b.4 1/0 through 4/0 AWG single cable:

The sum of the diameters of all single conductor cables should not exceed the tray width.

c. 2,001 V and over MV and MC cables

The sum of the diameters of all single conductor and multicunductor cables should not exceed the cable tray width and should be installed in a single layer. When the single cables come in groups of three, four, or in groups by circuit, the sum of the diameters should not exceed the cable tray width and these groups should be installed in one layer.

d. It is advisable if cables above and below 600 V are installed in the same tray, to separate them with a solid non-flammable barrier (Cable Separator)

e. It is very important to keep in mind current capacity limitations; see National Electrical Code, section 318-10.

As a briefing, the items to take into consideration when projecting a cable tray system, are:

1. Finishing wanted.
2. Rated weight in kilograms per lineal meter (kg/m) at different points along the system.
3. Additional loads the system must withhold at different points. For example, concentrated loads, wind pressure, load charges, etc.
4. Extreme temperature conditions.
5. Cable diameter and quantity.
6. Current cable capacity.
7. System lengths, widths, and heights.

INSTALLATIONS INSTRUCTIONS

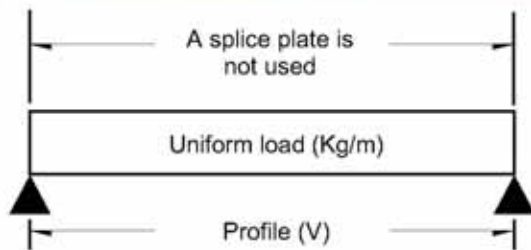
For a Cable Tray System mounting and installation, it is recommended to keep in mind the following suggestions:

1. To finish installing the Cable Tray System totally, before laying down the cables. Avoid hits and strengths that could affect the system before its installation.
2. Use accessories and supports designed for the manufacturer and its intended use only. This simplifies the installation, saving you time and money.
3. Should it be necessary to drill or cut finished parts, we recommend using anticorrosive paint to protect the affected surfaces from otherwise sure corrosion.
4. When using expansion plates, install them so that the long slotted bolts are centered and tight enough, so the system can be contracted or expanded.
5. The rated load capacity in the charts, in kilograms per tray lineal meter, is guaranteed if the tray is supported at its ends and splice points. For this reason, supports should be installed according to item 7 in this section.

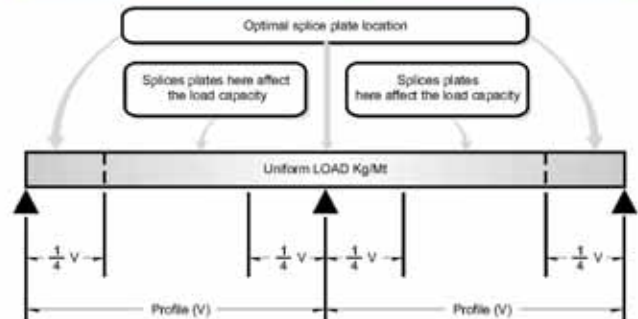
If the tray is supported in intermediate points and it is not done in the section splices, the splice points become weak points with potential damages to the structure and, besides, the rated manufacturing loads do not apply. Instead, if additionally to the splice point support, intermediate supports are installed, the system will be stronger and the load capacity increased.

6. In every point where sections other than straight are used, such as bends, tees, or crosses, or in other words, where splice plates must be used because of the mounting conditions, it is advisable to install support in those splice points as we explain next.
7. When installing splice, expansion or adjustable plates, or reduction connectors and similar splice plates, it is recommended to keep in mind the following:
 - a. Because every splice is a union and lower resistance point between trays, it is advisable that splices are installed where the strength is minimal, in other words, as close as possible to the cable tray system supports.
In the MECANO cable tray system, it would be 2.40 divided by 4 = 0.6 meters from the support. If the splice plates are installed following this rule, the rated load specifications would be kept practically without variation.
 - b. If the splice plates are installed near the middle of the section, its capacity would be reduced and it could be determined multiplying the rated load by a factor that is usually 0.7.
 - c. The previous value applies only to straight sections because it is assumed that all other elements like bends, tees, etc., have supports at both their ends as it was recommended above in Item 6. The section length, in this case, is not of significance to affect the system load capacity.
 - d. It is not recommended to use splice plates in Cable Tray System single beams or end profiles (See graph in the following page).
8. If for any reason the support can not be installed in the exact point, to avoid unnecessary strengths to the tray, it is recommended to use the closest supports using the combined plate support with a J-hook bolt as illustrated in the graph. When leaning on a structure, make sure the supports are as close to the structure nuts as possible.
9. In case of modifications and/or variations that could alter the Cable Tray System substantially, please contact the manufacturer.

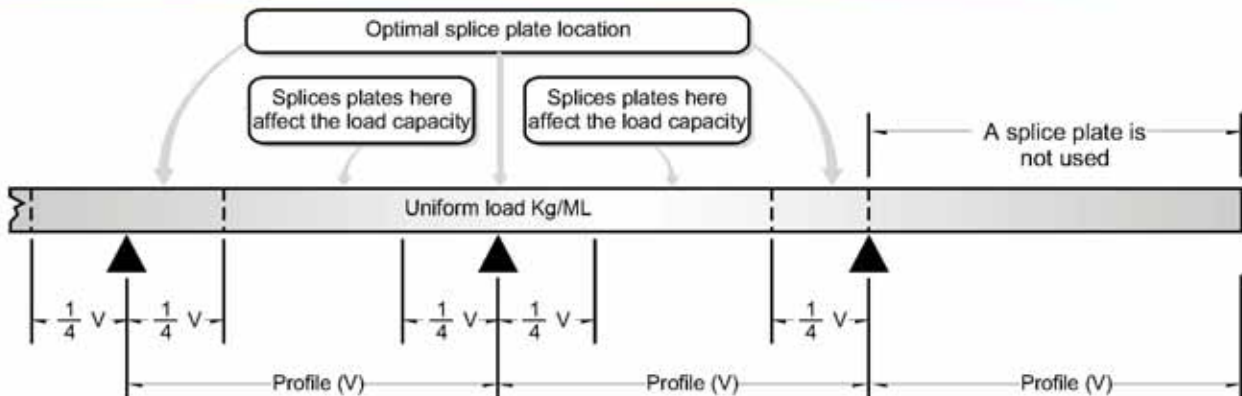
SINGLE BEAM



DOUBLE BEAM



CONTINUOUS BEAMS



LOAD GRADING CHART Vs. SUPPORT CLEARANCE (NEMA VE 1-2002 STANDARD)

Load		Length rating									
Kg/m	lb/ft	ft 8	m 2.4	ft 10	m 3.0	ft 12	m 3.7	ft 16	m 4.9	ft 20	m 6.0
25	37			A							
45	67									D	
50	74	8A				12A		16A		20A	
65	97			C							
75	112	8B				12B		16B		E o 20B	
100	149	8C				12C		16C		20C	
120	179			D							
200	299			E							

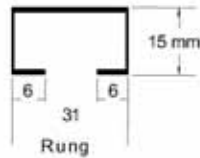
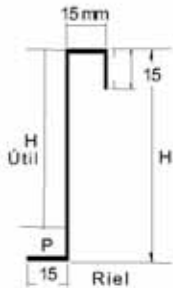
CONVERSION CHART

From	to	Multiply by
Angles		
Degrees	Radians	0.01745329
Radians	Degrees	57.295780
Length		
Feet	Centimeters	30.48006
Feet	Meters	0.30480
Feet	Inches	12
Inches	Centimeters	2.540005
Inches	Meters	0.02540
Centimeters	Meters	0.01000
Centimeters	Inches	0.3937008
Centimeters	Feet	0.032808
Strength		
Pound - strength	Newtons	4.4482
Feet²	Metros²	0.0929034
Inches²	Centimeters²	6.4516
Circular mil	Centimeters²	5.06707 x 10⁻⁶
Centimeters²	Inches²	0.1550003
meters²	Feet²	10.763910
meters²	Inches²	1550.003
meters²	circular mil	1973523000
Mass per Unit length		
Pound per foot	Kilogram per meter	1.488164
Pound per inch	Kilogram per meter	17.857970
Kilogram per meter	Pound pe Foot	0.6796890
Kilogram per meter	Pound per Inch	0.55997410
Symbols		
m = Meter	Kg = Kilograms	lb = Pound
cm = Centimeter	ft = Feet	Rad = Radians
mm = Milimeter	in = Inches	
N = Newtons	lbf = Pounds - Force	

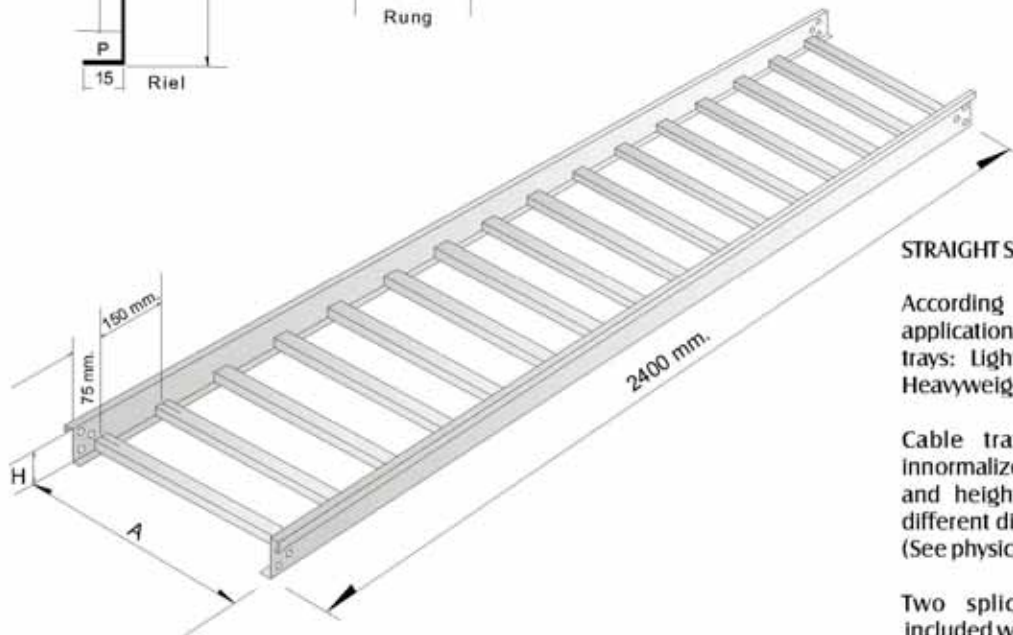
Erial Cable Tray



STRAIGHT SECTION - TRAY (B)



Nota: Approximate measures in mm



STRAIGHT SECTION - TRAY (B)

According to the your needs and applications, we offer three types of trays: Lightweight, Intermediate, and Heavyweight.

Cable tray systems are supplied innormalized thickness, length, width, and height; however, if you require different dimensions, please contact us (See physical data).

Two splice plates and hardware included with each straight section.

The diagram corresponds to the lightweight and intermediate types. The heavyweight and the extra heavyweight vary according to technical requirements and widths; 10, 12, and 15 cm heights; and 2.4, 3.0, 3.6, and 6.0 m lengths. Thickness upon request.

P = Rung Height
(Standard: 15 mm - Special: 19 mm)

TYPE	FILL WIDTH (Cm)	CATALOG NUMBER		LOAD CAPACITY (KG \ M)
		GALVANIZED (AG)	ELECTROSTATIC PAINT (AP)	
LIGHTWEIGHT	10	B5AG1025	B5AP1025	74
	20	B5AG2025	B5AP2025	74
	30	B5AG3025	B5AP3025	74
INTERMEDIATE	10	B8AG1015	B8AP1015	149
	20	B8AG2015	B8AP2015	149
	30	B8AG3015	B8AP3015	149
	40	B8AG4015	B8AP4015	149
	50	B8AG5015	B8AP5015	149
HEAVYWEIGHT	60	B8AG6015	B8AP6015	149
By request only				

STRAIGHT SECTION - TRAY (B) CATALOG NUMBER

B 8 AG 20 15



BENT SECTIONS AND BRANCHES

Elements used to change directions at same levels or to change levels and also for section change and branching. Like for the straight-sections, if you require different dimensions, please contact us (See physical data).

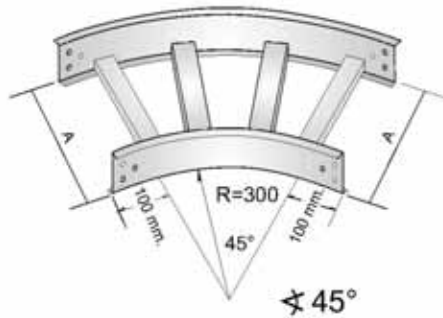
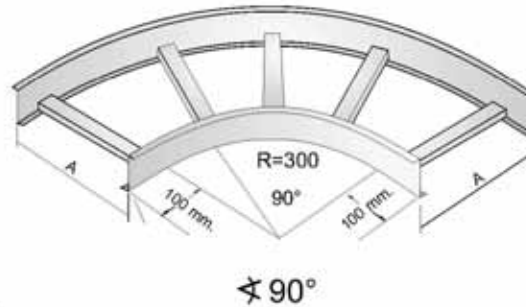
The diagrams correspond to the lightweight and intermediate types. The heavyweight varies according to the particular case.

Splice plates used with these elements are the same splice plates used for the straight sections and are included with each element.

HORIZONTAL BENDS (CH)

Used to change direction horizontally. (Two splice plates included with each bend).

90 HORIZONTAL BEND



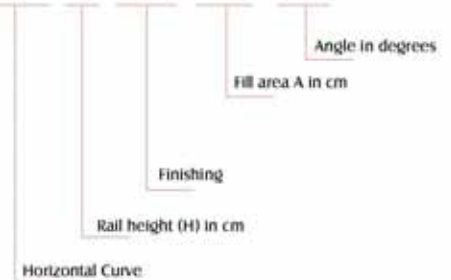
45 HORIZONTAL BEND

TYPE	FILL WIDTH (cm)	CATALOG NUMBER			
		HOT - DIP GAVANIZED (AG)		ELECTROSTATIC PAINT (AP)	
		45°	90°	45°	90°
LIGHTWEIGHT	10	CH5AG1045	CH5AG1090	CH5AP1045	CH5AP1090
	20	CH5AG2045	CH5AG2090	CH5AP2045	CH5AP2090
	30	CH5AG3045	CH5AG3090	CH5AP3045	CH5AP3090
INTERMEDIATE	10	CH8AG1045	CH8AG1090		
	20	CH8AG2045	CH8AG2090		
	30	CH8AG3045	CH8AG3090		
	40	CH8AG4045	CH8AG4090		
	50	CH8AG5045	CH8AG5090		
HEAVYWEIGHT	60	CH8AG6045	CH8AG6090		

BY REQUEST ONLY

CATALOG NUMBER

CH 8 AG 20 90



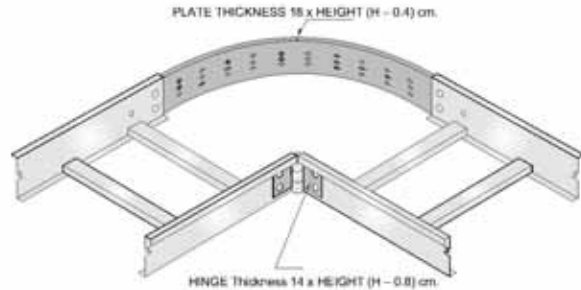
Aerial Cable Tray



- ADJUSTABLE HORIZONTAL BEND (CHA)

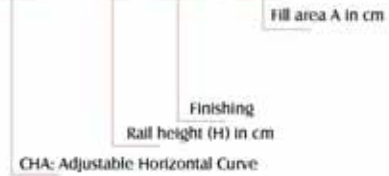
The way to change direction horizontally in special places and under special circumstances.

Applied to variable angles up to 90° and the set includes a plate drilled every 5 cm and a hinge; hardware included.



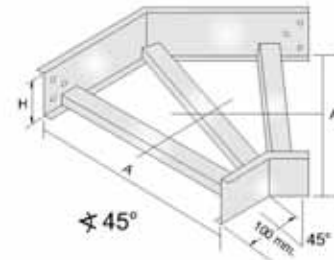
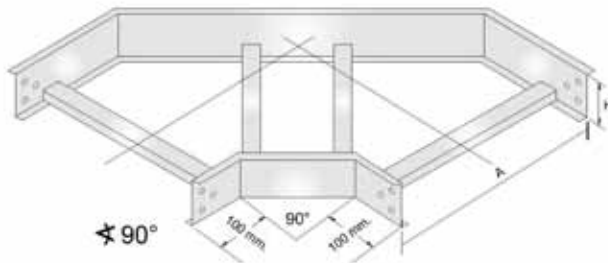
TYPE	FILL WIDTH (cm)	CATALOG NUMBER	
		HOT - DIP GALVANIZED (AG)	ELECTROSTATIC PAINT (AP)
LIGHTWEIGHT	10	CHA5AG10	CHA5AP10
	20	CHA5AG20	CHA5AP20
	30	CHA5AG30	CHA5AP30
INTERMEDIATE	10 y 20	CHA8AG20	
	30	CHA8AG30	
	40	CHA8AG40	
	50	CHA8AG50	
	60	CHA8AG60	

CATALOG NUMBER
CHA 8 AG 30



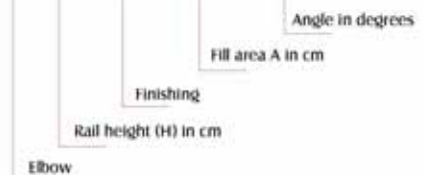
- ELBOWS (C)

Used to change direction horizontally, like in the horizontal bend case. (Two splice plates included with each elbow).



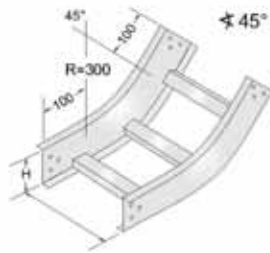
TYPE	FILL WIDTH (cm)	CATALOG NUMBER			
		HOT - DIP GALVANIZED (AG)		ELECTROSTATIC PAINT (AP)	
		45°	90°	45°	90°
LIGHTWEIGHT	10	C5AG1045	C5AG1090	C5AP1045	C5AP1090
	20	C5AG2045	C5AG2090	C5AP2045	C5AP2090
	30	C5AG3045	C5AG3090	C5AP3045	C5AP3090
INTERMEDIATE	10	C8AG1045	C8AG1090		
	20	C8AG2045	C8AG2090		
	30	C8AG3045	C8AG3090		
	40	C8AG4045	C8AG4090		
	50	C8AG5045	C8AG5090		
	60	C8AG6045	C8AG6090		
HEAVYWEIGHT		BY REQUEST ONLY			

CATALOG NUMBER
C 8 AG 20 90

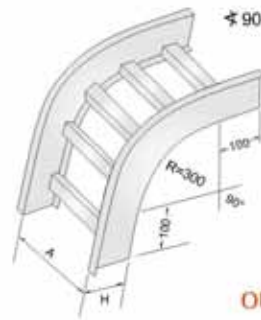
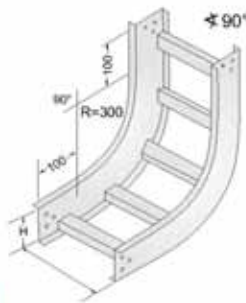


- VERTICAL BENDS (CV)

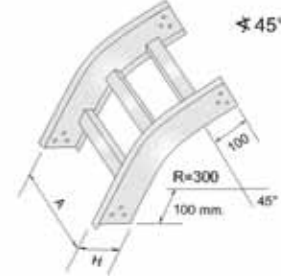
Used as transition elements to change levels. (Two splice plates included with each bend).



INSIDE VERTICAL BEND
(To go up)



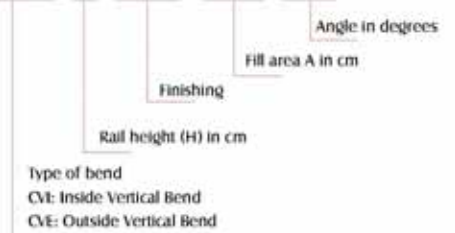
OUTSIDE VERTICAL BEND
(To go down)



TYPE	FILL WIDTH (cm)	CATALOG NUMBER			
		HOT - DIP GALVANIZED (AG)		ELECTROSTATIC PAINT (AP)	
		45°	90°	45°	90°
INTERIOR LIGHTWEIGHT	10	CVI5AG1045	CVI5AG1090	CVI5AP1045	CVI5AP1090
	20	CVI5AG2045	CVI5AG2090	CVI5AP2045	CVI5AP2090
	30	CVI5AG3045	CVI5AG3090	CVI5AP3045	CVI5AP3090
INTERIOR INTERMEDIATE	10	CVI8AG1045	CVI8AG1090		
	20	CVI8AG2045	CVI8AG2090		
	30	CVI8AG3045	CVI8AG3090		
	40	CVI8AG4045	CVI8AG4090		
	50	CVI8AG5045	CVI8AG5090		
	60	CVI8AG6045	CVI8AG6090		
HEAVYWEIGHT		BY REQUEST ONLY			

CATALOG NUMBER

CVI 8 AG 20 90



- UNIVERSAL VERTICAL BEND (CVU)

Used as inside vertical curve or outside vertical curve and the needed angle, due to its versatility.

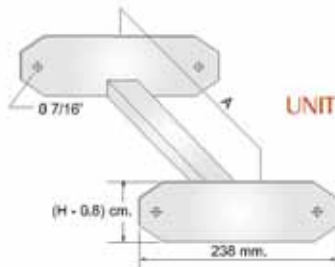
Two bolts, nuts and washers included. CVU is offered per rung unit: 5 rung units are required per each 90° bend, and 3 rung units per each 45° bend.



AS OUTSIDE VERTICAL BEND



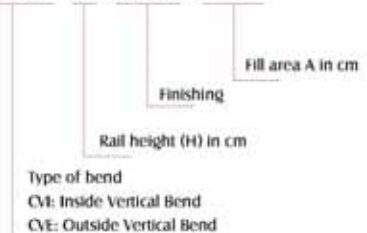
AS OUTSIDE VERTICAL BEND



TYPE	FILL WIDTH (cm)	CATALOG NUMBER
		HOT - DIP GALVANIZED (AG)
INTERMEDIATE	10	CVU8AG10
	20	CVU8AG20
	30	CVU8AG30
	40	CVU8AG40
	50	CVU8AG50
	60	CVU8AG60

CATALOG NUMBER

CVU 8 AG 20



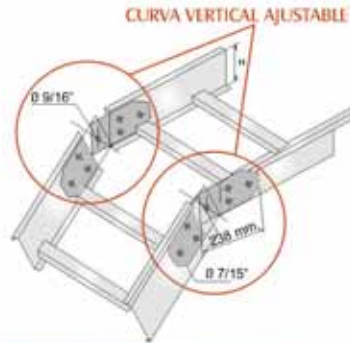
Aerial Cable Tray



- ADJUSTABLE VERTICAL BEND (CVA)

Used to make directional changes under special circumstances where fix-angle vertical bends are not possible to use. Useful for any angle.

The set includes two plates, a 1/2" x 1" bolt, and the required hardware.



TYPE	CATALOG NUMBER	
	HOP - DIP GALVANIZED (AG)	ELECTROSTATIC PAINT (AP)
LIGHTWEIGHT	CVA5AG	CVA5AP
INTERMEDIATE	CVA8AG	
HEAVYWEIGHT	BY REQUEST ONLY	

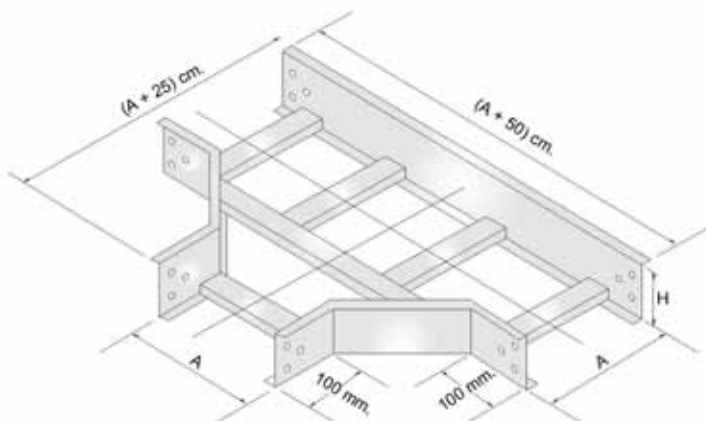
CATALOG NUMBER

CVA8AG

Finishing
Rail height (H) in cm
CVA: Vertical Bend

- TEE (T)

Used for a 90° horizontal level branch. (4 splice plates per Tee included).



TYPE	FILL WIDTH (cm)	CATALOG NUMBER	
		HOT - DIP GALVANIZED (AG)	ELECTROSTATIC PAINT (AP)
LIGHTWEIGHT	10	T5AG10	T5AP10
	20	T5AG20	T5AP20
	30	T5AG30	T5AP30
INTERMEDIATE	10	T8AG10	
	20	T8AG20	
	30	T8AG30	
	40	T8AG40	
	50	T8AG50	
HEAVYWEIGHT	60	T8AG60	
BY REQUEST ONLY			

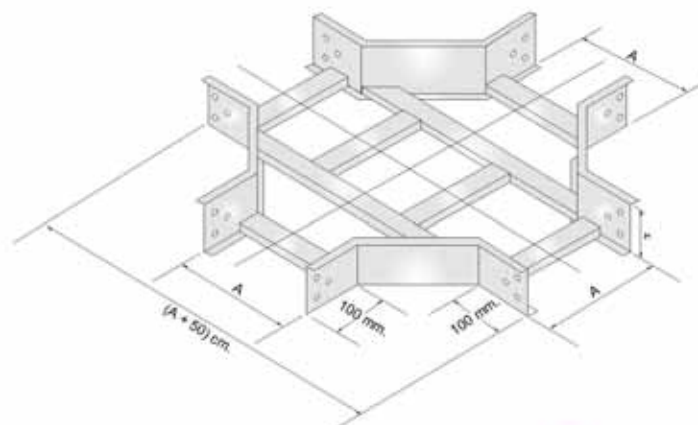
CATALOG NUMBER

T8AG20

Fill area A in cm
Finishing
Rail height (H) in cm
Tee (T)

- CROSSES (X)

Used for multiple 90° horizontal level branch. (6 splice plates per Cross included).



TYPE	FILL WIDTH (cm)	CATALOG NUMBER	
		HOT - DIP GALVANIZED (AG)	ELECTROSTATIC PAINT (AP)
LIGHTWEIGHT	10	X5AG10	X5AP10
	20	X5AG20	X5AP20
	30	X5AG30	X5AP30
INTERMEDIATE	10	X8AG10	
	20	X8AG20	
	30	X8AG30	
	40	X8AG40	
	50	X8AG50	
HEAVYWEIGHT	60	X8AG60	
BY REQUEST ONLY			

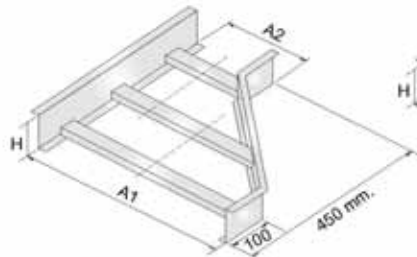
CATALOG NUMBER

X8AG20

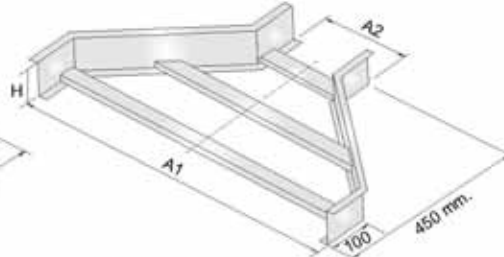
Fill area A in cm
Finishing
Rail height (H) in cm
Cross (X)

REDUCTIONS (RI, RD, RS)

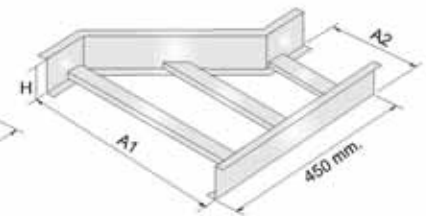
Elements used to change widths horizontally. Their use, left, right, and symmetrical, refer to the narrower side. (2 splice plates per reduction included).



LEFT REDUCTION



SYMMETRICAL REDUCTION



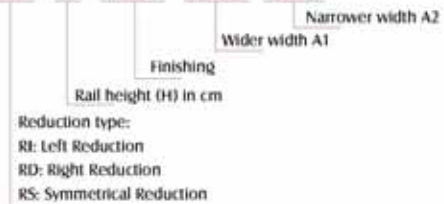
RIGHT REDUCTION

TYPE	FILL WIDTH (cm)		CATALOG NUMBER	
	A1	A2	HOT - DIP GALVANIZED (AG)	ELECTROSTATIC PAINT (AP)
LIGHTWEIGHT	20	10	RI5AG2010*	RI5AP2010
	30	20	RI5AG3020	RI5AP3020
	30	10	RI5AG3010	RI5AP3010
LEFT	30	20	RI8AG3020	
	40	30	RI8AG4030	
	40	20	RI8AG4020	
	50	40	RI8AG5040	
	50	30	RI8AG5030	
	50	20	RI8AG5020	
INTERMEDIATE	60	50	RI8AG6050	
	60	40	RI8AG6040	
	60	30	RI8AG6030	
HEAVYWEIGHT	BY REQUEST ONLY			

* NOTA: cuando se trate de una reducción derecha o simétrica, cambiar la "I" por "D" o "S"

CATALOG NUMBER

RI 8 AG 50 30



CONNECTOR TYPE REDUCTION (RC)

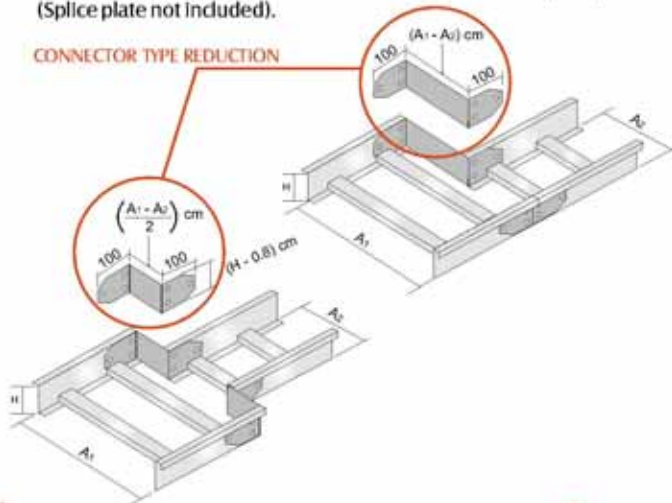
Splice plates used to join different width trays. Length varies according to the desired reduction.

Only one connector needed for left or right reductions and length is determined by the dimension to be reduced and a splice plate. (Splice plate not included).

For symmetrical reductions, two connector are needed, each one being half the length of the dimension to be reduced. (Splice plates not included).

Al igual que las platinas de unión se suministran por separado con tornillos.

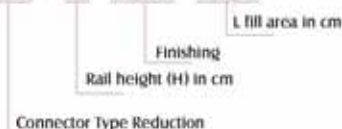
CONNECTOR TYPE REDUCTION



TYPE	FILL WIDTH (cm)	CATALOG NUMBER	
		HOT - DIP GALVANIZED (AG)	ELECTROSTATIC PAINT (AP)
LIGHTWEIGHT	5	RC5AG05	RC5AP05
	10	RC5AG10	RC5AP10
	20	RC5AG20	RC5AP20
INTERMEDIATE	5	RC8AG05	
	10	RC8AG10	
	15	RC8AG15	
HEAVYWEIGHT	20	RC8AG20	
	30	RC8AG30	
BY REQUEST ONLY			

CATALOG NUMBER

RC 8 AG 10



Aerial Cable Tray



ACCESSORIES

The Cable Tray System is complemented with additional accessories for various connecting and supporting applications for design flexibility and requirement and mounting conditions adaptability.

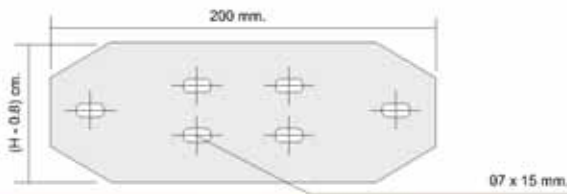
Lightweight and Intermediate accessories are kept in stock.

The diagram corresponds to the lightweight and intermediate types.

CONNECTION ACCESSORIES

SPLICE PLATE (PU)

Element used to interconnect trays and accessories. Supplied individually with 1/4" x 1/2" Ø bolts, nuts, and washers.

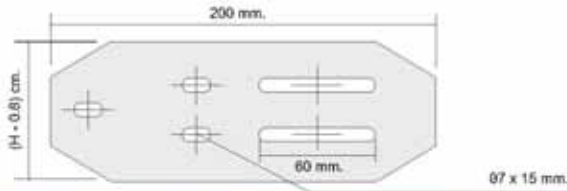


TYPE	CATALOG NUMBER	
	HOP - DIP GALVANIZED (AG)	ELECTROSTATIC PAINT (AP)
LIGHTWEIGHT	PU5AG	PU5AP
INTERMDIATE	PU8AG	
HEAVYWEIGHT	BY REQUEST ONLY	

EXPANSION SPLICE (JE)

Used in continuous tray beams over 100-meter long. Allows the system to absorb thermal change stresses, short circuit effects, and other stresses.

When the Cable Tray System is grounded, it is recommended to strengthen electrical continuity between trays using cooper connectors or cooper flexible tape.

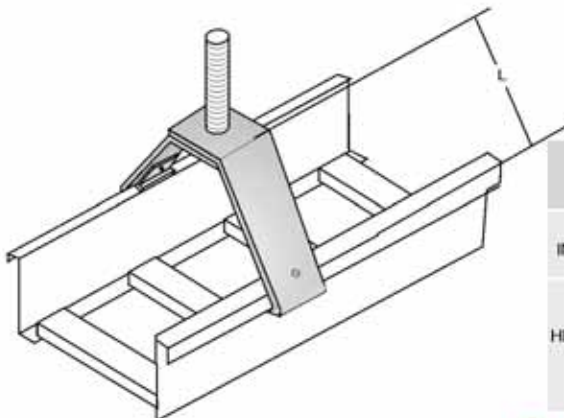


TYPE	CATALOG NUMBER	
	HOP - DIP GALVANIZED (AG)	ELECTROSTATIC PAINT (AP)
INTERMDIATE	JEBAG	
HEAVYWEIGHT	BY REQUEST ONLY	

MOUNTING ACCESSORIESE

UNIVERSAL TYPE HANGER MOUNT (SU)

Used to hang a Cable Tray System when only one hanging axis is available. Fixed using J Hooks and Threaded Rods (Not included) and bending the upper flanges the opposite way.

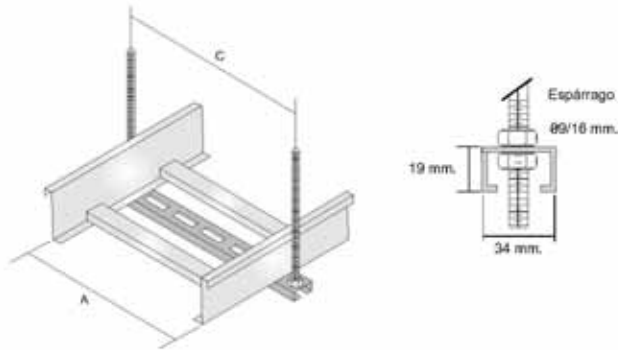


TYPE	FILL WIDTH (cm)	CATALOG NUMBER		L. Cm
		HOP - DIP GALVANIZED (AG)	ELECTROSTATIC PAINT (AP)	
INTERMDIATE	10	SUAG40	SUAP40	29
	20			
	30			
HEAVYWEIGHT	10	SUAG40		29
	20			
	30			
	40			
	50			
	60	SUAG60		46

▶ RUNG TYPE HANGER MOUNT (SP)

Special rung used to hang a Cable Tray System using J Hooks and Threaded Rods (Not Included) (See Section III in this catalog).

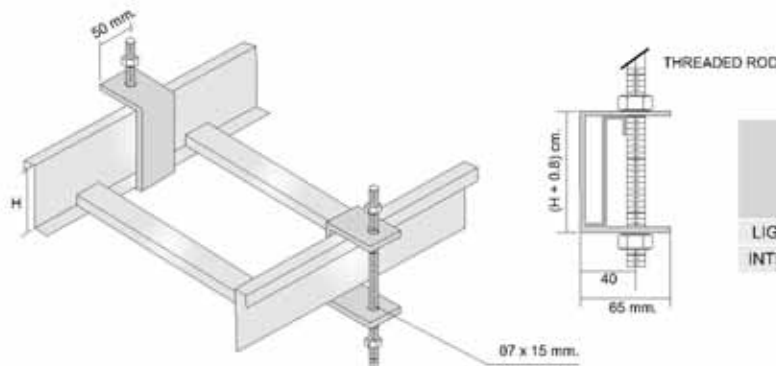
According to your needs, more than one tray can be hung from the same threaded rods, depending on their length.



TYPE	FILL WIDTH (cm)		CATALOG NUMBER	
	A	C	HOT - DIP GALVANIZED (AG)	ELECTROSTATIC PAINT (AP)
LIGHTWEIGHT	10	15	SPAG10	SPAP10
	20	25	SPAG20	SPAP20
	30	35	SPAG30	SPAP30
INTERMEDIATE	10	15	SPAG10	
	20	25	SPAG20	
	30	35	SPAG30	
	40	45	SPAG40	
	50	55	SPAG50	
	60	65	SPAG60	

▶ PLATE TYPE HANGER MOUNT (SPL)

C plate that clamps the tray side rails and is hung using J Hooks or Threaded Rods (Not Included).

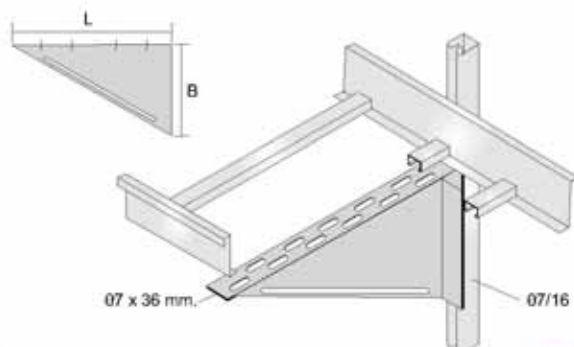


TYPE	CATALOG NUMBER	
	HOT - DIP GALVANIZED (AG)	ELECTROSTATIC PAINT (AP)
LIGHTWEIGHT	SPL5AG	SPL5AP
INTERMEDIATE	SPL8AG	

▶ CANTILEVER BRACKET (SR)

Used as support in corbels or overhanging areas; can be anchored directly to concrete walls using expansion bolts or can be fixed to other MECANO elements.

When the Cable Tray System needs to have clearance from the wall, to avoid obstacles, make sure to select longer cantilever brackets.



CANTILEVER BRACKET		
CATALOG NUMBER	LENGTH L	LENGTH B
SR126	126	176
SR226	226	182
SR326	326	188
SR426	426	194
SR526	526	290
SR626	626	294
SR726	726	298

Aerial Cable Tray



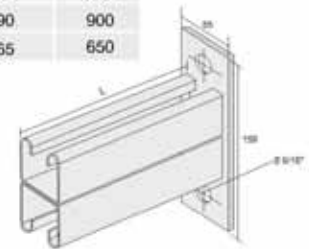
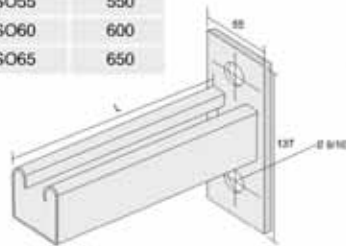
BRACKET MOUNT (SM)

Profile manufactured with a mounting plate in lengths according to MECANO Cable Trays. For example, for a 20 cm tray, use a 30 cm bracket mount.

When used a tray mount, instead of an SBAG, an SBAGM - Tray to Bracket Clamp-with a Locknut (Page I-14) must be used.

SINGLE BRACKET MOUNT			
CATALOG NUMBER	LENGTH (L) mm	CATALOG NUMBER	LENGTH (L) mm
SMSO15	150	SMSO45	450
SMSO25	250	SMSO50	500
SMSO30	300	SMSO55	550
SMSO35	350	SMSO60	600
SMSO40	400	SMSO65	650

DOUBLE BRACKET MOUNT			
CATALOG NUMBER	LENGTH (L) mm	CATALOG NUMBER	LENGTH (L) mm
SMD030	300	SMD070	700
SMD045	450	SMD075	750
SMD050	500	SMD080	800
SMD060	600	SMD090	900
SMD065	650	SMD065	650

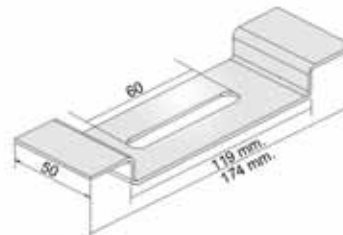
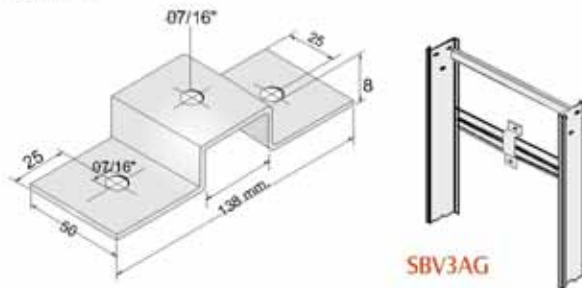


NOTE: support length must be at least 5 cm greater than the tray width.

VERTICAL TRAY CLAMP (SBV)

Used to fix the tray rung to a concrete wall with expansion bolts or to a structure profile with bolts, when the tray installation is done vertically.

It is also very much used to fix the tray rungs to the ceiling, with threaded rods and other hanging supports. Maximum width: 20 cm. For greater widths, we recommend using Plate Catalog Number M21136 (Page II-10).



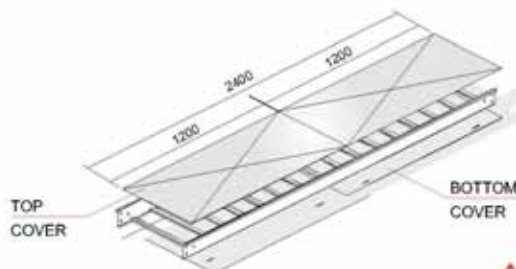
COVERS (T)

Used to protect cables from dust and other contaminant agents. Manufactured to cover trays, curves, and branching. For straight sections, covers come in two 1,200-mm long galvanized sheet sections, totaling 2,400 mm.

NOTE: Catalog references shown are for straight tray sections; for other elements, just place the letter T in front of the corresponding catalog number (elbows, curves, tees, crosses, reductions). For example, TC8AG2090 (Hot-dip galvanized 90° and 20 cm Elbow Cover).

Bottom covers are also offered for straight sections and accessories with the required perforations to mount them.

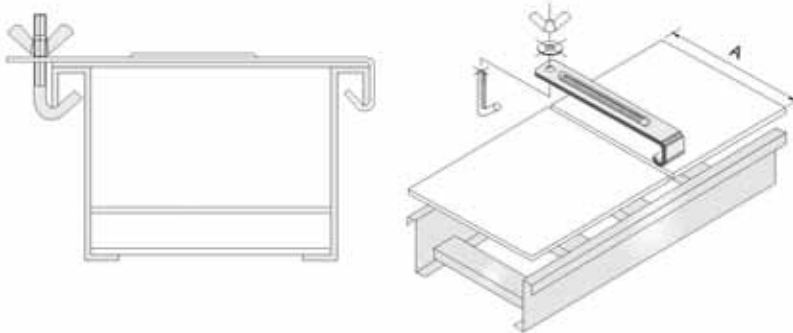
For Bottom Covers, take the corresponding catalog number and place a letter I at the end of it.



FILL AREA (cm)	CATALOG NUMBER	
	HOT - DIP GALVANIZED (AG)	
	TOP	BOTTOM
10	TB AG10 C20	TB AG10 C20I
20	TB AG20 C20	TB AG20 C20I
30	TB AG30 C20	TB AG30 C20I
40	TB AG40 C20	TB AG40 C20I
50	TB AG50 C20	TB AG50 C20I
60	TB AG60 C20	TB AG60 C20I

- COVER JOINT STRIP (CL)

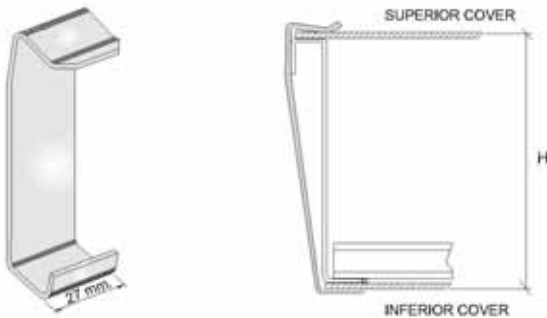
Used to cover spacing between covers, joint them and fix them to the rail. J hook, butterfly nut, and washer included for each 2400 mm section).



FILL AREA (cm)	CATALOG NUMBER	
	HOT - DIP GALVANIZED (AG)	HOT - DIP GALVANIZED (AG)
10	CL AG10	
20	CL AG20	
30	CL AG30	
40	CL AG40	
50	CL AG50	
60	CL AG60	

- COVER CLAMP (S)

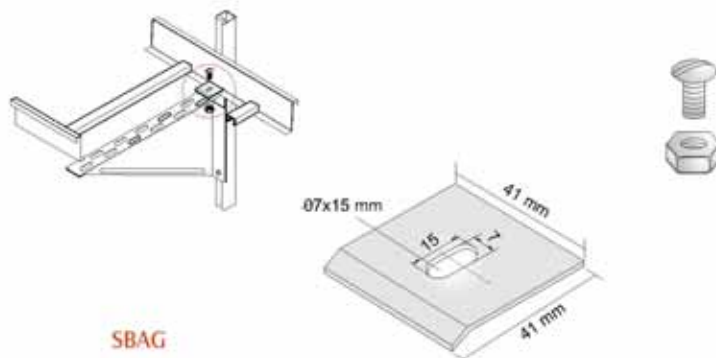
Used as an effective way to fix the top cover and the bottom cover to the tray or any other associated element. Minimum 4 Cover Clamps recommended for each 1200 mm section.



TYPE	CATALOG NUMBER	
	HOT - DIP GALVANIZED (AG)	ELECTROSTATIC PAINT (AP)
LIGHTWEIGHT	S5AG	S5AP
INTERMEDIATE	S8AG	
HEAVYWEIGHT	BY REQUEST ONLY	

- TRAY CLAMP (SBAG)

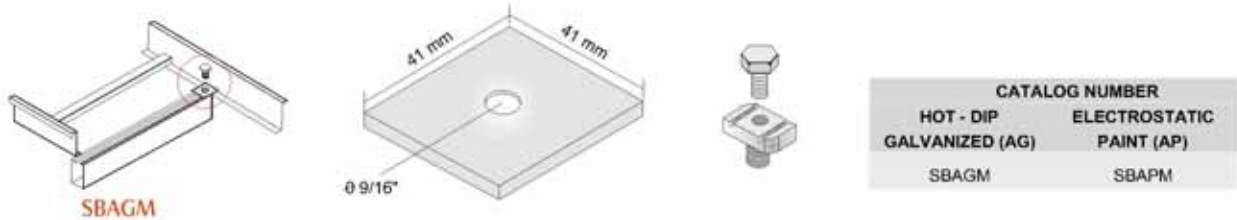
Used to fix the tray rail to its support - Rung Mount or Cantilever Bracket (screw and nut included). Minimum 2 clamps per support.



CATALOG NUMBER	
HOT - DIP GALVANIZED (AG)	ELECTROSTATIC PAINT (AP)
SBAG	SBAP

TRAY TO BRACKET CLAMP (SBAGM)

Used to fix the tray rail to a Bracket Clamp (See Section II) with a Locknut (Catalog Number 403F223).



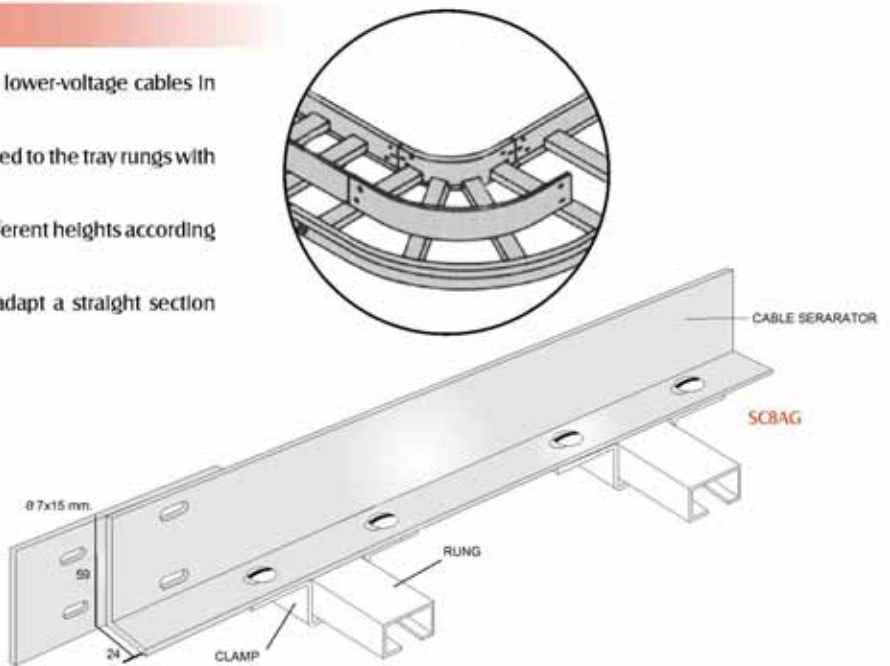
CABLE SEPARATOR (SC8AG)

Used when installing 600 V or more cables with lower-voltage cables in the same tray.

It is a galvanized, bent, and drilled plate that is fixed to the tray rungs with a special mounting plate.

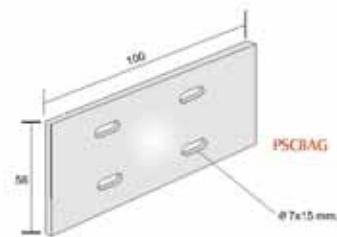
Manufactured in 2.40 m straight sections and different heights according to the case.

For the curved elements, the installer should adapt a straight section accordingly.



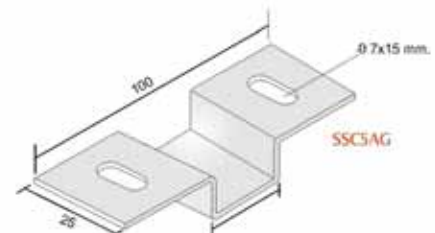
CABLE SEPARATOR SPLICE PLATE (PSC8AG)

Used to joint Cable Separators. 4 1/4" x 1/2" Ø bolts, nuts, and washers included.

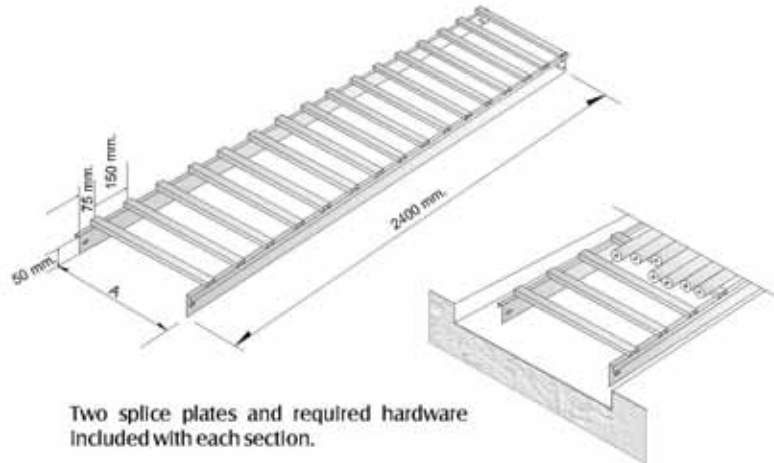


CABLE SEPARATOR CLAMP (SSC5AG)

Used to fix Cable Separators to the Cable Tray rungs. (2 1/4" x 1/2" Ø bolts included).



- STRAIGHT SECTION - GROUND TRAY (BP)



Two splice plates and required hardware included with each section.

FILL AREA (cm)	CATALOG NUMBER	
	HOT - DIP GALVANIZED (AG)	
10	BP5AG1015	
20	BP5AG2015	
30	BP5AG3015	
40	BP5AG4015	
50	BP5AG5015	
60	BP5AG6015	

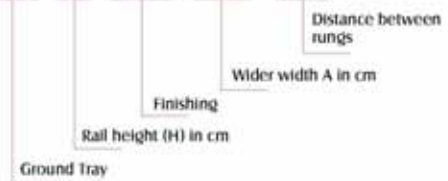
GROUND CABLE TRAY

Ground Cable Tray Systems to increase ground installation useful life, such as airports, shopping centers, malls, manufacturing plants, utility installations, etc.

Only 5-cm high lightweight sections are supplied. Widths have been standardized with aerial Cable Tray Systems for integration easiness. Schedule 18 and 14 rungs.

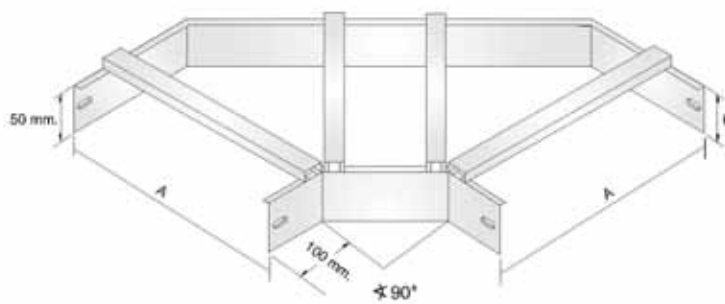
CATALOG NUMBER

BP 5 AG 20 15

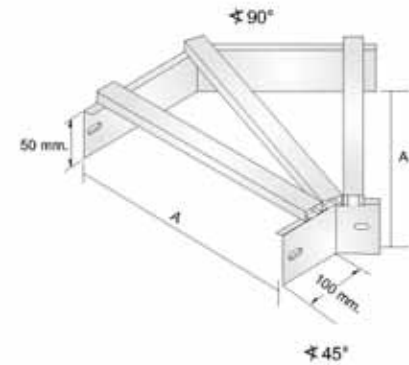


- GROUND ELBOWS (CP)

Used to change direction horizontally.

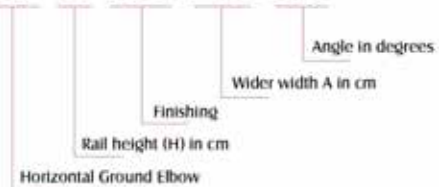


FILL AREA (cm)	CATALOG NUMBER	
	HOT - DIP GALVANIZED (AG)	
	45°	90°
10	CP5AG1045	CP5AG1090
20	CP5AG2045	CP5AG2090
30	CP5AG3045	CP5AG3090
40	CP5AG4045	CP5AG4090
50	CP5AG5045	CP5AG5090
60	CP5AG6045	CP5AG6090



CATALOG NUMBER

CP 5 AG 20 90



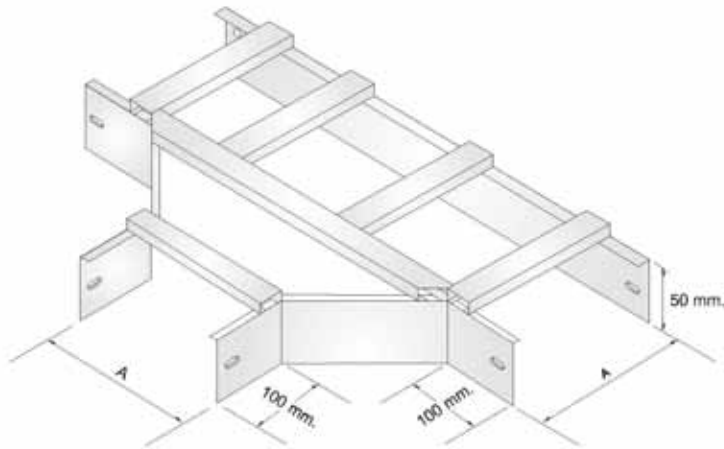
Ground Cable Tray



CABLE TRAY SYSTEMS

- GROUND TEES (TP)

Used for a 90° horizontal level branch.



FILL AREA (cm)	CATALOG NUMBER
	HOT - DIP GALVANIZED (AG)
10	TP5AG10
20	TP5AG20
30	TP5AG30
40	TP5AG40
50	TP5AG50
60	TP5AG60

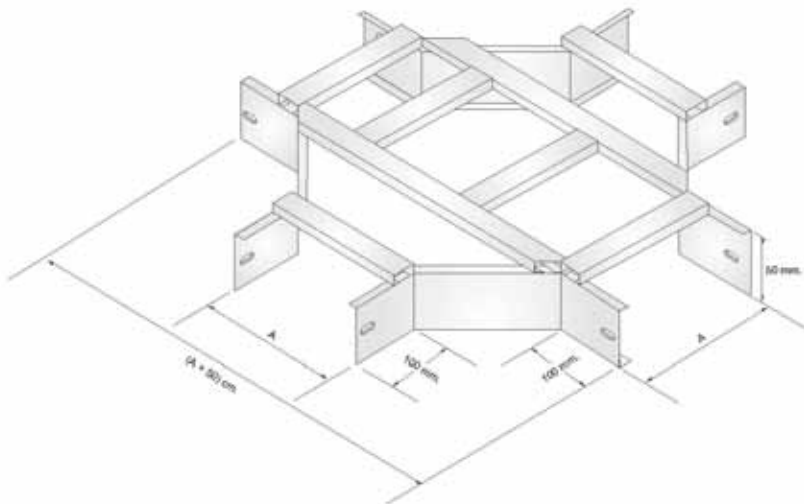
CATALOG NUMBER

TP 5 AG 20



- GROUND CROSSES (XP)

Used for multiple 90° horizontal level branch.



FILL AREA (cm)	CATALOG NUMBER
	HOT - DIP GALVANIZED (AG)
10	XP5AG10
20	XP5AG20
30	XP5AG30
40	XP5AG40
50	XP5AG50
60	XP5AG60

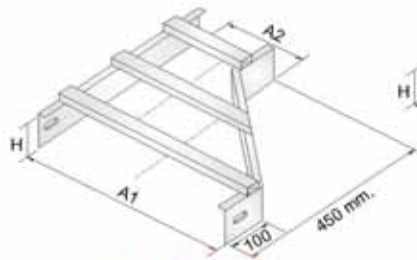
CATALOG NUMBER

XP 5 AG 20

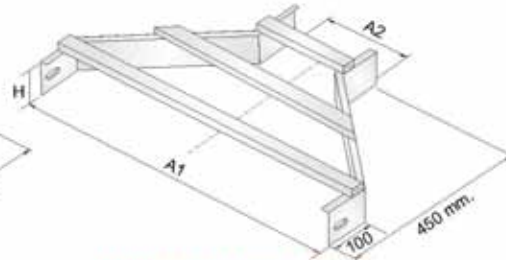


- GROUND REDUCTIONS (RIP, RDP, RSP)

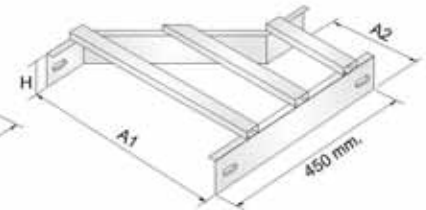
Elements used to change widths horizontally. Their use, left, right, and symmetrical, refer to the narrower side. (2 splice plates per reduction included).



LEFT REDUCTION



SYMMETRICAL REDUCTION

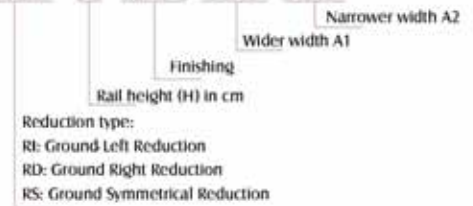


RIGHT REDUCTION

FILL AREA (cm)		CATALOG NUMBER
		HOT - DIP GALVANIZED (AG)
A1	A2	RIP5AG2010
20	10	
30	20	RIP5AG3020
	10	RIP5AG3010
40	30	RIP5AG4030
	20	RIP5AG4020
50	10	RIP5AG4010
	40	RIP5AG5040
	30	RIP5AG5030
60	20	RIP5AG5020
	50	RIP5AG6050
	40	RIP5AG6040
	30	RIP5AG6030
	20	RIP5AG6020

CATALOG NUMBER

RIP 8 AG 50 30



* NOTE: If the reduction is right or symmetrical, Change the "I" for a "D" or for an "S", according to the case

- GROUND SPLICE PLATE (PUP)

Element used to interconnect ground trays and accessories. Two 1/4" x 1/2" bolts, nuts, and washers included.



CATALOG NUMBER

HOT - DIP GALVANIZED

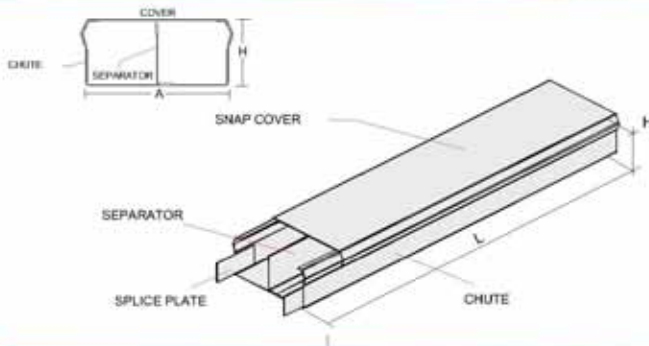
PUP5AG

GENERAL ASPECTS

- Snap covers that do not require screws to protect cables and to give the Cable Tray System a better look.
- Electrostatic powder paint very resistant to hits, bending, and scratching.
- Straight sections come with two welded plates at both ends for a perfect assembling and leveling.

- To ease the power outlet installation, we offer 12-cm long drilled cover sections with the chute width.
- Straight sections and accessories come with a welded separator.
- We also offer double and triple die-cast covers in different combinations.

STRAIGHT SECTION - CHUTE (CR)



CATALOG NUMBER	MEASUREMENTS		
	LENGTH (L) mm	WIDTH (A) mm	HEIGHT (H) mm
CR8 x 4P22A	2400	80	40
CR10 x 4P22A	2400	100	40
CR11 x 5P22A	2400	110	50
CR12 x 5P22A	2400	120	50

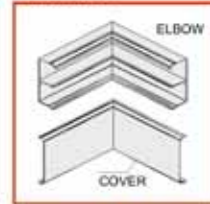
ACCESSORIES - ELBOWS

CCE8 X 4P22A



OUTSIDE ELBOW

CC18 X 4P22A



INSIDE ELBOW

CCP8 X 4P22A



FLAT ELBOW

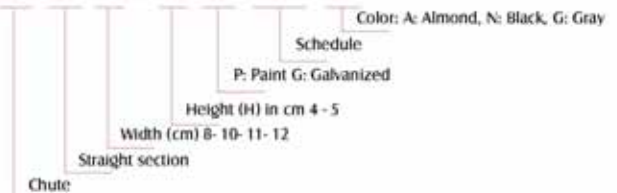
CT8 X 4P22A



TEE

CATALOG NUMBER

C R 8 x 4 P 2 2 A



OUTSIDE ELBOW	INSIDE ELBOW	FLAT ELBOW	TEE
CCE 8x4P22A	CC18 x 4P22A	CCP8x 4P22A	CT8x 4P22A
CCE10x4P22A	CC110 x 4P22A	CCP10x 4P22A	CT10x 4P22A
CCE11x5P22A	CC111 x 5P22A	CCP11x 5P22A	CT11x 5P22A
CCE12x5P22A	CC112 x 5P22A	CCP12x 5P22A	CT12x 5P22A

ACCESSORIES - DIE-CAST COVERS

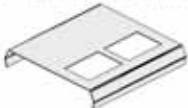
LEVITON - CATALOG NUMBER CTT8LA



OUTLET - CATALOG NUMBER CTT8RDA



OUTLET - CATALOG NUMBER CTT10LA

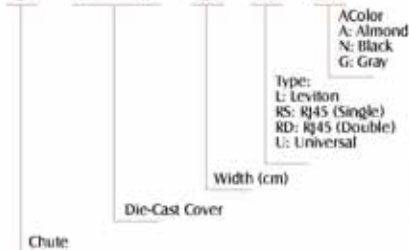


UNIVERSAL - CTT10UA



CATALOG NUMBER

C T T 8 L A



DIE-CAST COVERS

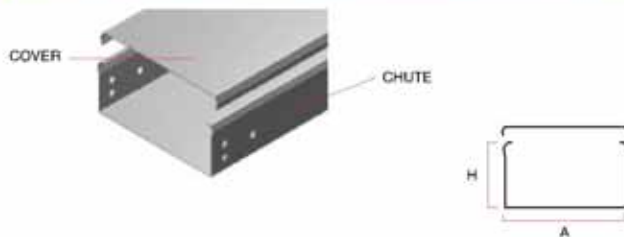
CTT8LA
CTT10LA
CTT11LA
CTT12LA

Para la otras referencias reemplazar la letra L por: RS, RD ó U según la necesidad.

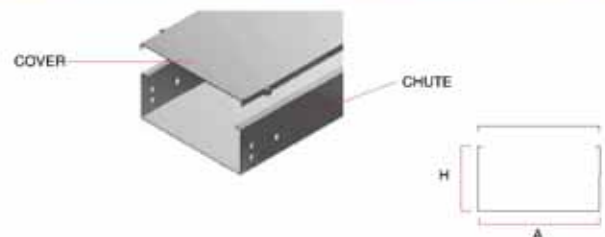
TECHNICAL CHARACTERISTICS

- Ducts are manufactured in schedule 18, 20 or 22 schedule cold-rolled sheet, according to required dimensions.
- Almond, flat black, and gray electrostatic powder paint very resistant to hits, bending, and scratching
- Snap covers that do not require screws.
- Two 1.5-mm or 2 mm splice plates and six _ x _ bolts, washers, and nuts included with each element.
- 300 mm radius for all elements.

BOLTED COVER – STRAIGHT SECTION

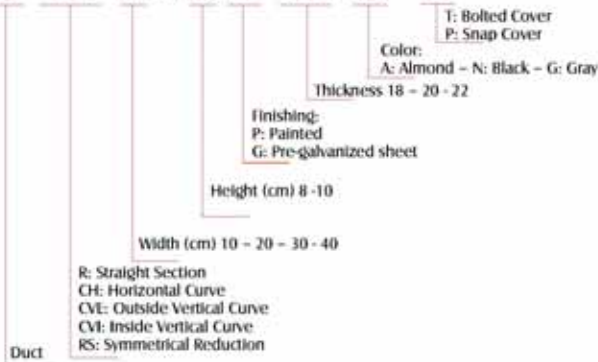


SNAP COVER – STRAIGHT SECTION



STRAIGHT SECTION AND ACCESSORIES CATALOG NUMBER

D R 10X8 P 22 A T



STRAIGHT SECTION Catalog Number	MEASUREMENTS			Load capacity Kg/m	NEMA Standard VE 1-2002
	LENGTH (L) mm	WIDTH (A) mm	HEIGHT (H) mm		
DR10X8P22AT	2400	10	8	48	-
DR20X8P20AT	2400	20	8	51	-
DR30X8P18AT	2400	30	8	103	8A
DR40X8P18AT	2400	40	8	120	8B
DR20X10P20AT	2400	20	10	74	8A
DR30X10P18AT	2400	30	10	139	8B
DR40X10P18AT	2400	40	10	158	8C

For different color and dimensions, contact us.

OUTSIDE VERTICAL BEND



Catalog Number	Width (A) mm	Height (H) mm	Angle
DCVE10X8P22AT90	10	8	90
DCVE20X8P20AT90	20	8	90
DCVE30X8P18AT90	30	8	90
DCVE40X8P18AT90	40	8	90
DCVE20X10P20AT90	20	10	90
DCVE30X10P18AT90	30	10	90
DCVE40X10P18AT90	40	10	90

INSIDE VERTICAL BEND



Catalog Number	Width (A) mm	Height (H) mm	Angle
DCVI10X8P22AT90	10	8	90
DCVI20X8P20AT90	20	8	90
DCVI30X8P18AT90	30	8	90
DCVI40X8P18AT90	40	8	90
DCVI20X10P20AT90	20	10	90
DCVI30X10P18AT90	30	10	90
DCVI40X10P18AT90	40	10	90

↘ CROSSES



Catalog Number

DX10X8P22AT
DX20X8P20AT
DX30X8P18AT
DX40X8P18AT
DX20X10P20AT
DX30X10P18AT
DX40X10P18AT

↘ TEE



Catalog Number

DT10X8P22AT
DT20X8P20AT
DT30X8P18AT
DT40X8P18AT
DT20X10P20AT
DT30X10P18AT
DT40X10P18AT

↘ HORIZONTAL BEND



Catalog Number

DCH10X8P22AT90
DCH20X8P20AT90
DCH30X8P18AT90
DCH40X8P18AT90
DCH20X10P20AT90
DCH30X10P18AT90
DCH40X10P18AT90

↘ SYMMETRICAL REDUCTION



Catalog Number

Catalog Number	Width A1 (mm)	Width A2 (mm)	Height cm
DRS2010X8P20AT	20	10	8
DRS3010X8P18AT	30	10	8
DRS3020X8P18AT	30	20	8
DRS4010X8P18AT	40	10	8
DRS4020X8P18AT	40	20	8
DRS4030X8P18AT	40	30	8
DRS3020X10P18AT	30	20	10
DRS4020X10P18AT	40	20	10
DRS4030X10P18AT	40	30	10

MECANO[®]

Cable Tray Systems Leader

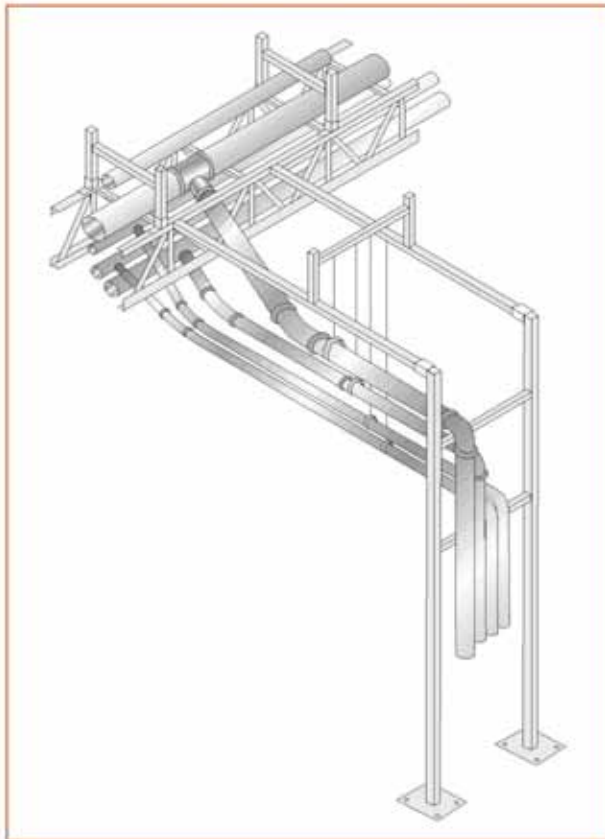
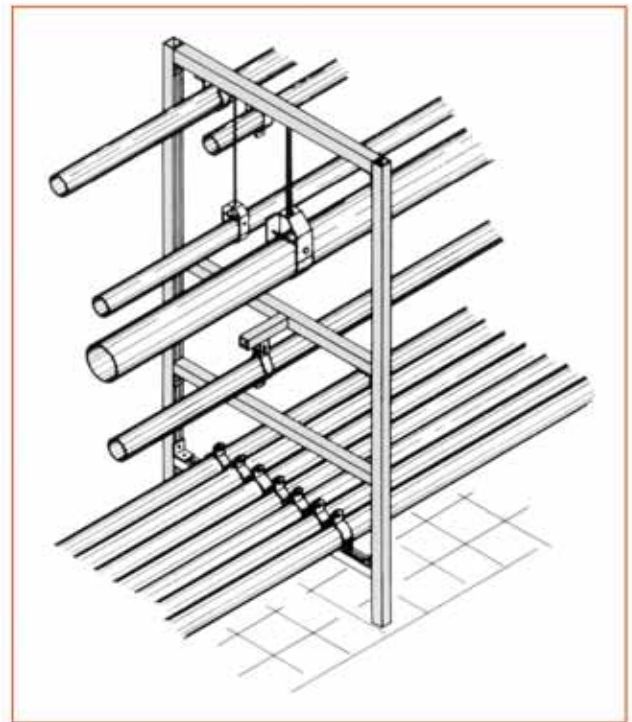
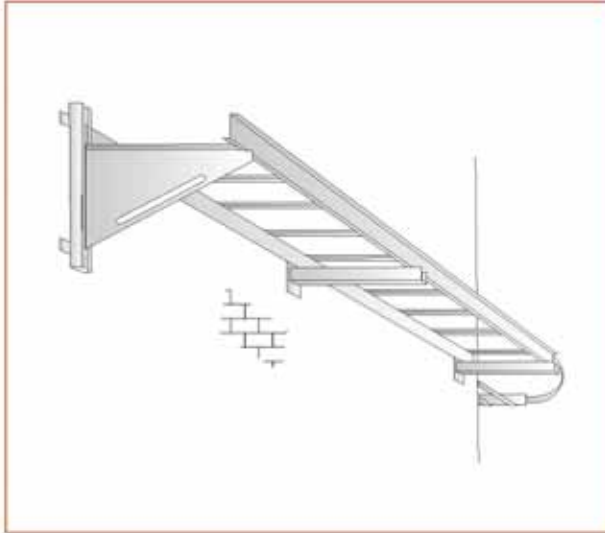


**STRUCTURAL
SYSTEMS**

CENO INDUSTRIAS CENO S.A.
Leadership in Engineering and Quality

Structural System

MECANO
CABLE TRAY SYSTEMS



MECANO STRUCTURAL SYSTEM, a fast, safe, and economical support, fasten, and multiple-use solution.

ADVANTAGES

The MECANO STRUCTURAL SYSTEM allows you to build a great variety of structural systems without drilling or welding.

MECANO elements can be used to create an endless variety of industry elements of use and supports.

Versatility and Functionality

Due to its assembling form, its elements can be disassembled easily and reutilized for another purpose; It is also possible to modify and add to what is already assembled.

Each element has an intended application, but it is possible to use them differently.

Easy and Fast

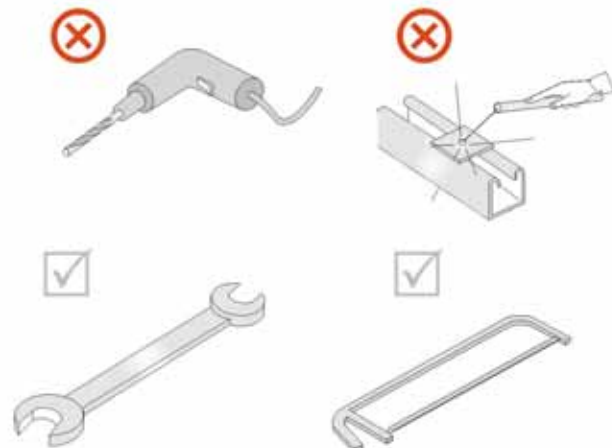
With the MECANO STRUCTURAL SYSTEM, it is possible to assemble something in minutes that would take otherwise hours. With the locknuts an easy, positive, and precise installation is achieved fast; no specialized tools are needed; nor special skills. MECANO structures can be disassembled as easily as they were assembled.

Simplicity and Economy

MECANO STRUCTURAL SYSTEM main advantage is time saving, because no welding or drilling is needed.

Required parts are always reusable.

The required tools are just a hacksaw to saw the material and an open-end wrench to tighten bolts and nuts; which make these projects as flexible as your imagination.



APPLICATIONS

MECANO STRUCTURAL SYSTEM can be used structurally in constructions and industries for applications such as:

Heavy duty racking for storage of drums, rods, automotive industry spare parts, metal sheets, dies, engines, etc.

Divisions, floors, ceilings, doors, and railings.

Electrical supports: Bus bars, cable trays, electrical equipments, conductors, etc.

Lighting support: Fluorescent lamps, luminous ceilings, studio illumination, spot lights, etc.

Other applications: Instrumentation, mezzanines, stairways, manual conveyors, x-ray supports, underground cables, etc. Ideal for isolation materials in refrigerating units.

TECHNICAL ASPECTS

PHYSICAL DATA

MECANO STRUCTURAL SYSTEM base is a hot-rolled sheet profile, cold bent with modern machinery that guarantees products standardization. Continuous slots and rigid flanges in the inside.

Locknuts are plate manufactured and cold die-cast.

Assembling elements are also steel plate manufactured, cold die-cast and cold bent.

All line elements, including profiles, are hot-dip galvanized, complying with ICONTEC 2076 and 3320 standards.

Before galvanization, they undergo a chemical cleaning treatment, grease freed, and phosphate covered to delay corrosion and to increase adhesion point leaving all surfaces free of imperfections.

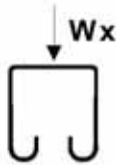
LOAD RATED CAPACITY

As a Beam

To use the profile horizontally, we are going to take two terms into consideration: Uniform Load and Deflection.

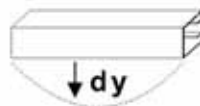
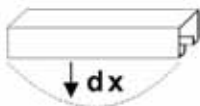
Uniform Load

It is the uniform load applied along the profile. This is the load capacity it has to support a given weight in direct relation to the length used. Based on the profile design, load should be applied only in two ways (as shown next) and are described as W_x and W_y in kilograms.



Deflection

It is the sagging present in the center of not supported lengths with uniform loads without showing permanent deformation. This deformation is expressed in cm and identified as dx and dy, as shown in the following graph.



As a Column

If we use the profile as a vertical support, only vertical loads are considered. This is known as axial load (not eccentric).

At this point should also be clarified that any deformation caused by the expressed load on the charts, is inside the elastic range and therefore will not be permanent. If eccentric loads are necessary to consider, implied reductions to the support load should be analyzed, loads are expressed in kilograms and in the way shown in the graph.



M112A MECANO PROFILE ADMISSIBLE LOADS					
UNIFORM LOAD			DEFLECTION		AXIAL LOAD
(m)	(kg/m)		(cm)		(kg)
L	Wx	Wy	dx	dy	Pa
0.300	2289	3075	0.02	0.02	2168
0.400	1287	1730	0.04	0.04	2106
0.500	824	1107	0.05	0.06	2029
0.600	572	769	0.08	0.09	1942
0.700	420	565	0.11	0.12	1847
0.800	322	432	0.14	0.15	1746
0.900	254	342	0.18	0.19	1641
1.000	206	277	0.22	0.24	1535
1.100	170	299	0.27	0.29	1427
1.200	143	192	0.32	0.34	1320
1.300	122	164	0.37	0.40	1214
1.400	105	141	0.43	0.47	1108
1.500	92	121	0.49	0.53	1016
1.600	80	104	0.56	0.59	939
1.700	71	90	0.64	0.65	874
1.800	64	79	0.71	0.71	817
1.900	57	69	0.79	0.78	768
2.000	51	61	0.88	0.84	724
2.100	47	54	0.97	0.90	686
2.200	43	47	1.06	0.96	651
2.300	39	42	1.16	1.01	619
2.400	36	37	1.27	1.07	590
2.500	33	33	1.37	1.12	564
2.600	30	29	1.49	1.16	539
2.700	28	26	1.60	1.20	517
2.800	26	23	1.72	1.23	496
2.900	24	20	1.85	1.25	476
3.000	23	18	1.98	1.26	0

M112B MECANO PROFILE ADMISSIBLE LOADS					
UNIFORM LOAD			DEFLECTION		AXIAL LOAD
(m)	(kg/m)		(cm)		(kg)
L	Wx	Wy	dx	dy	Pa
0.300	3423	6150	0.01	0.02	4477
0.400	3613	3459	0.02	0.04	4454
0.500	2312	2214	0.03	0.06	4425
0.600	1606	1538	0.04	0.09	4389
0.700	1180	1130	0.06	0.12	4346
0.800	903	865	0.08	0.15	4297
0.900	714	683	0.10	0.19	4242
1.000	578	554	0.12	0.24	4180
1.100	478	457	0.14	0.29	4111
1.200	401	384	0.17	0.34	4036
1.300	342	328	0.20	0.40	3954
1.400	295	281	0.23	0.47	3866
1.500	257	241	0.27	0.53	3771
1.600	226	208	0.31	0.59	3669
1.700	200	181	0.35	0.66	3561
1.800	178	158	0.39	0.71	3447
1.900	160	138	0.43	0.78	3326
2.000	145	121	0.48	0.84	3198
2.100	131	107	0.53	0.90	3064
2.200	119	95	0.58	0.96	2924
2.300	109	84	0.63	1.01	2777
2.400	100	74	0.69	1.07	2623
2.500	92	66	0.75	1.12	2463
2.600	86	59	0.81	1.16	2296
2.700	79	52	0.87	1.20	2130
2.800	74	46	0.94	1.23	1980
2.900	69	41	1.01	1.25	1846
3.000	64	36	1.08	1.26	1725

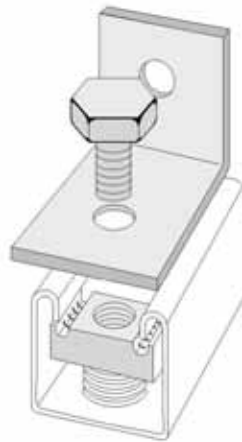
ASSEMBLING

Three basic elements are used when assembling any MECANO STRUCTURAL SYSTEM:

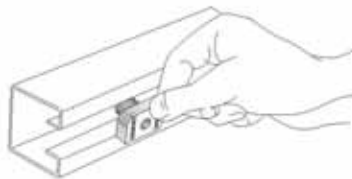
The profile or straight section, the required splice plate or joint element, and the bolt-nut set or locknut to join them.

The profile channel-like design and the serrated flange locknuts guarantee a safe joint.

For M132A240 and M332A240, use 403F211M 3/8" serrated flange locknuts without spring, specially designed for these profiles.

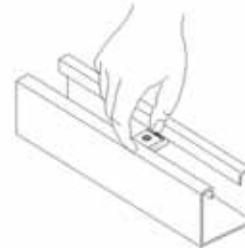


1



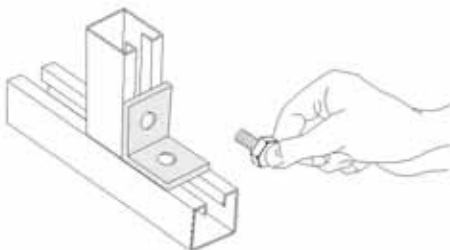
SPRING SERRATED FLANGE LOCKNUTS ARE INSERTED ANYWHERE ALONG THE CONTINUOUS SLOT. ROUNDED EDGES ALLOW EASY INSERTION.

2



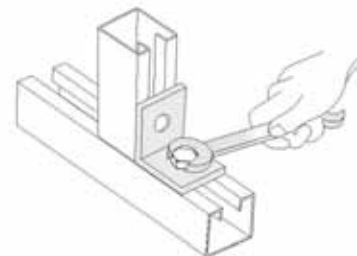
A 90° TURN PLACES THE SERRATED PART OF THE LOCKNUT AGAINST THE PROFILE EDGES.

3



THE LOCKNUT AND BOLT ASSEMBLE CONNECTS THE PROFILES OR THE PROFILE WITH OTHER ACCESSORY.

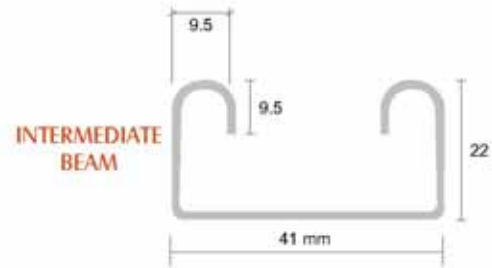
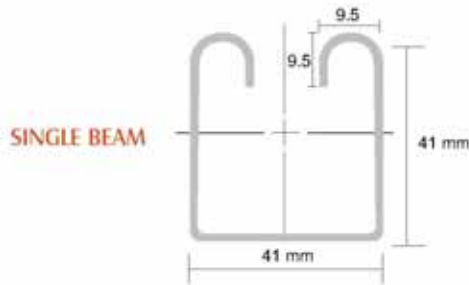
4



TIGHTENING WITH AN OPEN-END WRENCH, THE SERRATED PART OF THE LOCKNUT TIGHTENS AGAINST THE PROFILE EDGES, ACHIEVING THIS WAY A STRONG CONNECTION.

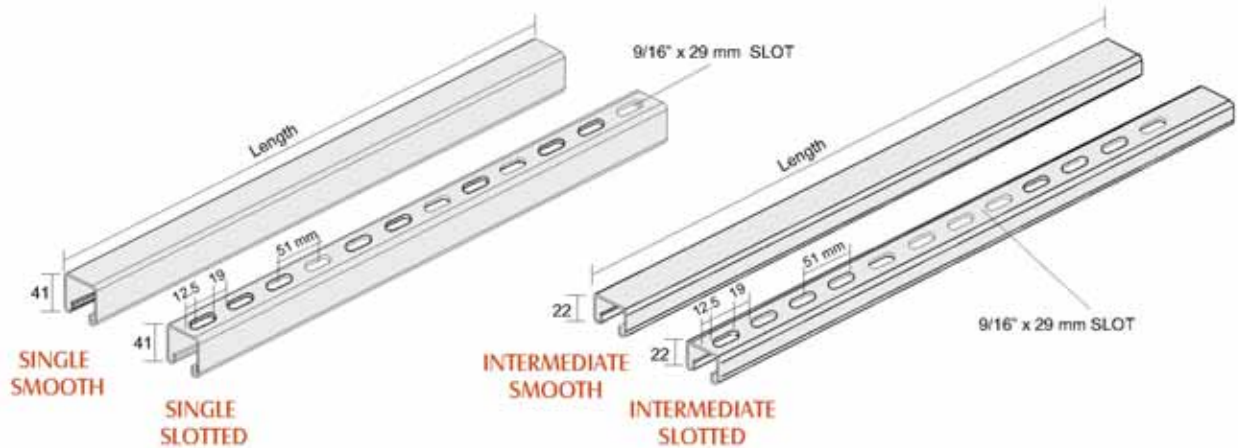
PROFILES OR STRAIGHT SECTIONS

Manufactured, as previously said, from a cold-rolled sheet profile, cold bent and HOT-DIP GALVANIZED. Schedule 2.0 and 2.5 mm sheets are normally used. Standard lengths of 2.40 and 3.0 m with the measurements indicated in the graph.



SINGLE BEAM OR TYPE A

This profile is manufactured with smooth or slotted surfaces, according to your needs and it is kept in stock in lengths of 2.4 and 3.0 meter. Different lengths and specifications by order only. 2.4-m long intermediate smooth and slotted profiles are also kept in stock.



SINGLE	SMOOTH		
	CATALOG NUMBER	LENGTH (L)	SCHEDULE (mm)
SINGLE	M111A240	2.40 m	2.5
	M112A240	2.40 m	2.0
	M111A300	3.00 m	2.5
	M112A300	3.00 m	2.0
INTERMEDIATE	M132A240	2.40 m	2.0

SINGLE	SLOTTED		
	CATALOG NUMBER	LENGTH (L)	SCHEDULE (mm)
SINGLE	M311A240	2.40 m	2.5
	M311A300	3.00 m	2.5
	INTERMEDIATE	M332A240	2.40 m

Combined Profiles



CABLE TRAY SYSTEMS

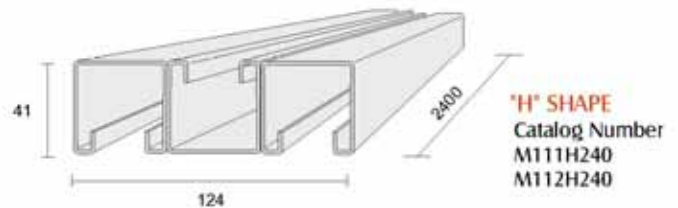
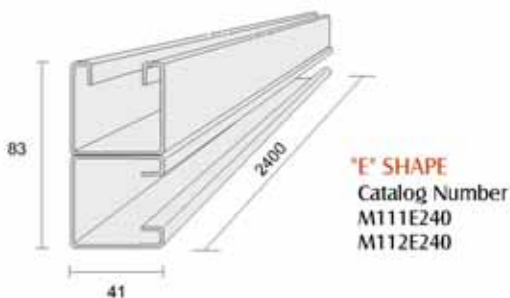
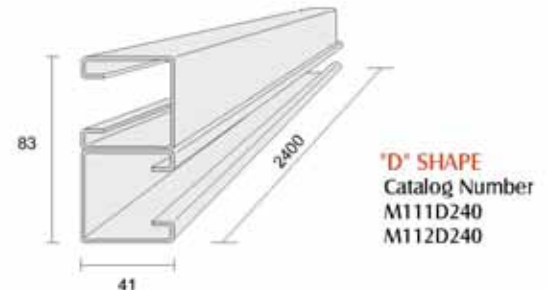
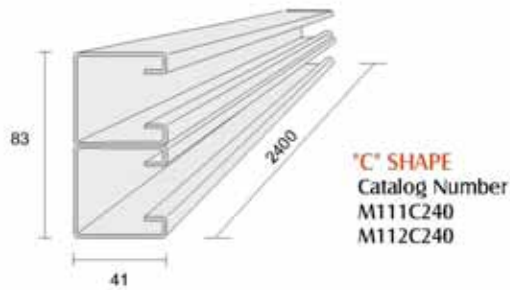
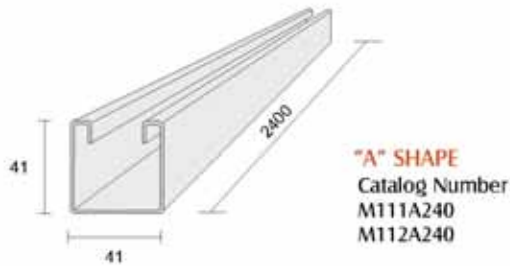
Combined Profiles

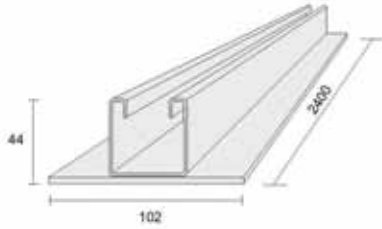
Other shapes are also offered by combining the single profile or shape A. This shapes are manufactured by order only in the established lengths and schedules.

For special cases, as far as lengths and schedules, please check with our engineers first.

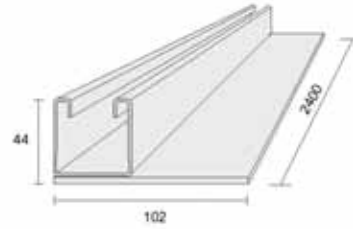
Next, please find the various shapes, drawings, and catalog numbers in lengths of 2.40 m. Catalog numbers that begin with M111 are 2.5 mm schedule and catalog number that begin with M112 are 2.0 mm schedule.

Note: all measurements given in millimeters (mm).

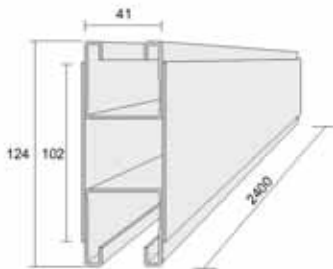




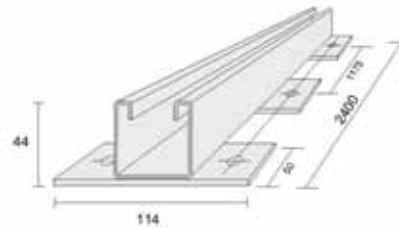
"L" SHAPE
Catalog Number
M111L240
M112L240



"M" SHAPE
Catalog Number
M111M240
M112M240



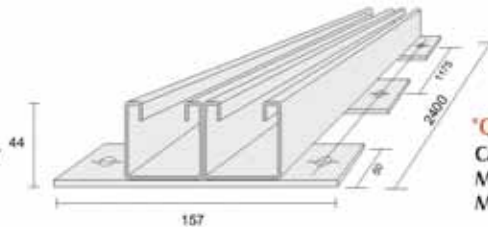
"N" SHAPE
Catalog Number
M111N240
M112N240



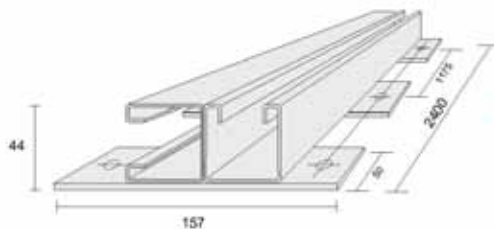
"O" SHAPE
Catalog Number
M111O240
M112O240



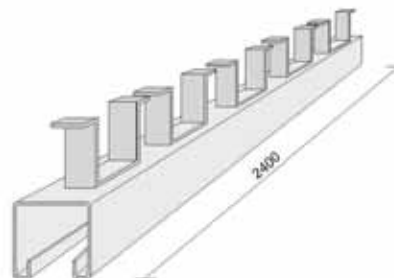
"P" SHAPE
Catalog Number
M111P240
M112P240



"Q" SHAPE
Catalog Number
M111Q240
M112Q240



"R" SHAPE
Catalog Number
M111R240
M112R240



"T" SHAPE
Catalog Number
M111T240
M112T240

The structural system also has some accessories to ease the installation process and are not included with the standard elements. All these elements are die-cast steel plate manufactured and hot-dip galvanized.

- LOCKNUT

It is a rectangular locknut with a 1-1/2"-long bolt included and 1/2" or 3/8" diameter.

One of the purposes of the spring locknut is to fix the locknut against the profile edges, avoiding slippage when vertically installed and not tightened yet.

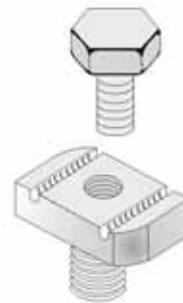
Before selecting the right locknut, please consider the following aspects:

- Horizontally or vertically used.
- The rectangular locknut can be used as the structure is assembled, because its rounded edges allow to turn it to the ideal position.
- The rectangular locknut can be used as the structure is assembled, because its rounded edges allow to turn it to the ideal position.
- 1/2" and 3/8" bolts available.

RECTANGULAR NUT

WITH SPRING

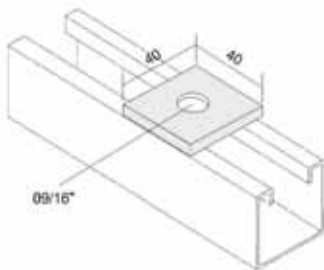
With Spring	
CATALOG NUMBER	0
403F223	1/2"
403F221	3/8"



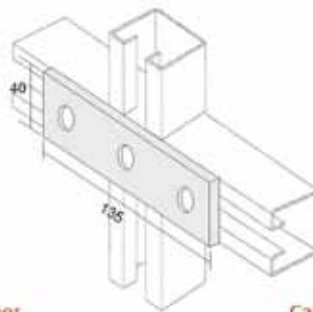
- SPLICE PLATES AND COUPLERS

Fixed elements used to mount or interconnect two or more profiles. 3/16" schedule steel sheet and plate manufactured with \bar{y} 9/16" slots to allow 1/2" or 3/8" bolts that come with the locknut. When using 3/8" locknuts, for safety, add 3/8" washers.

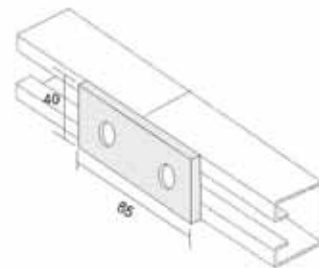
Splice plates are flat and with bends in different shapes and angles, for different applications as indicated in each element drawing.



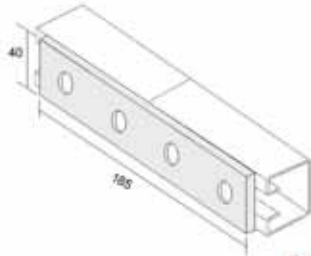
Catalog Number
M21003



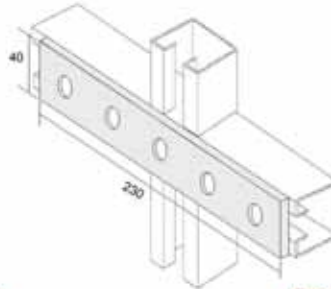
Catalog Number
M21008



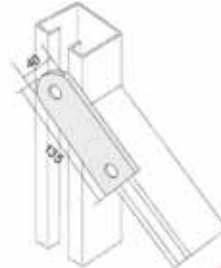
Catalog Number
M21009



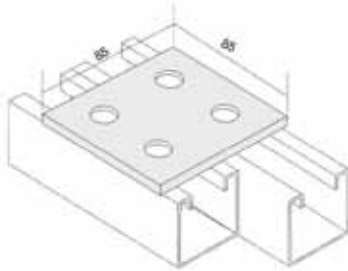
Catolog Number
M21011



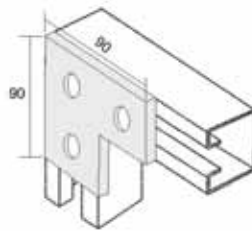
Catolog Number
M21012



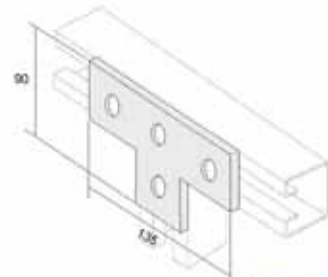
Catolog Number
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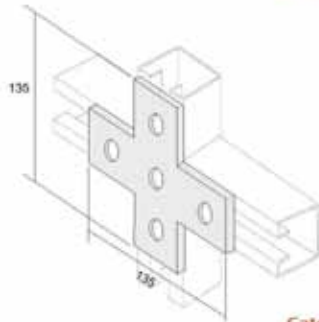
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M21015



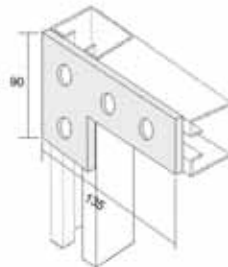
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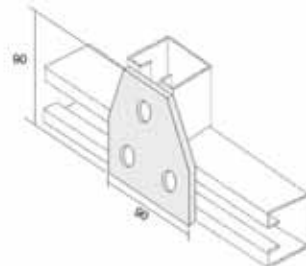
Catolog Number
M21017



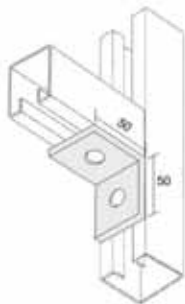
Catolog Number
M21018



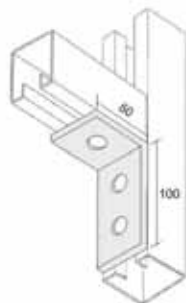
Catolog Number
M21020



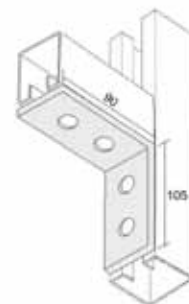
Catolog Number
M21023



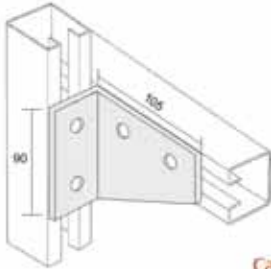
Catolog Number
M21033



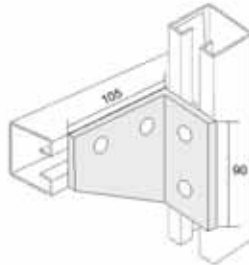
Catolog Number
M21038



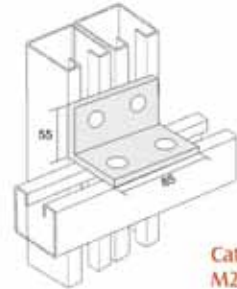
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M21040



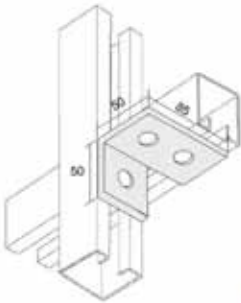
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M21042



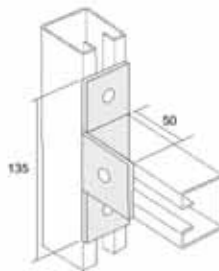
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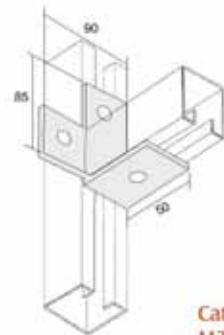
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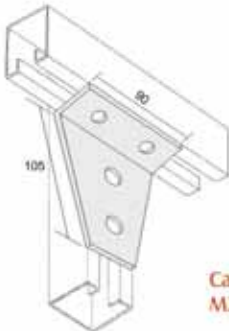
Catolog Number
M21045



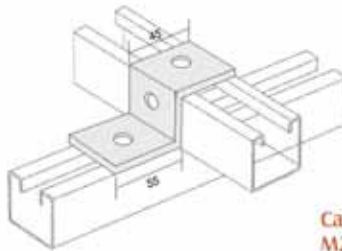
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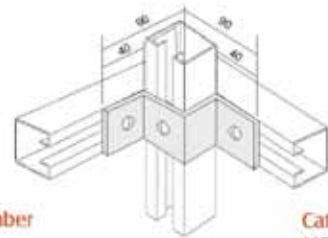
Catolog Number
M21051



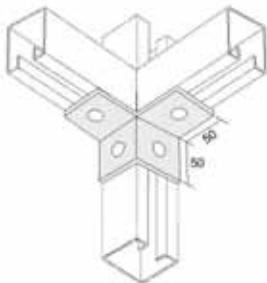
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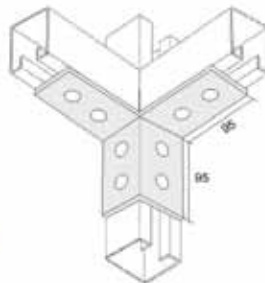
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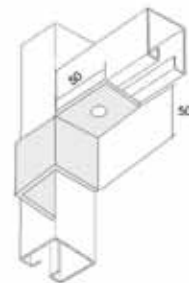
Catolog Number
M21106



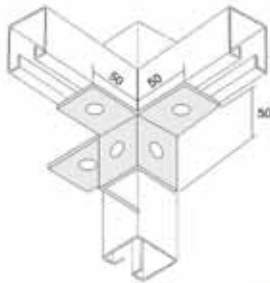
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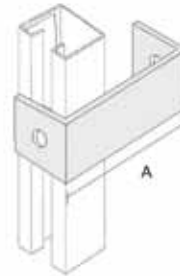
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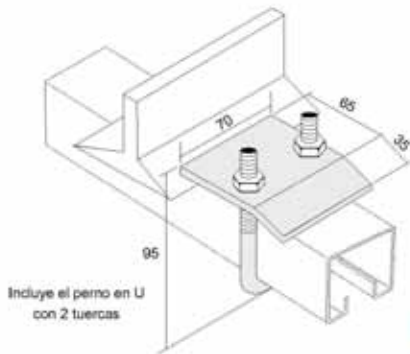
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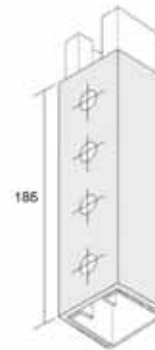
Catalog Number
M21153



Catalog Number	A
M21110	100
M21111	125
M21112	150
M21113	180
M21114	205

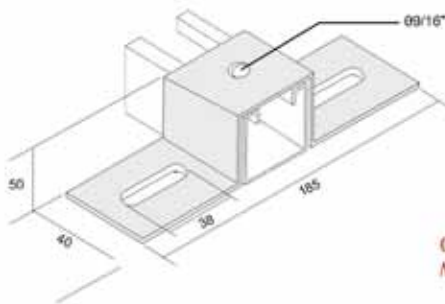


Catalog Number
M22225

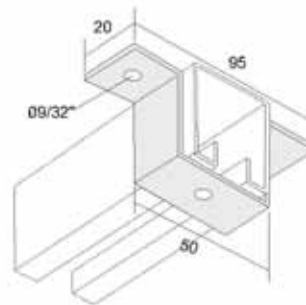


COUPLER

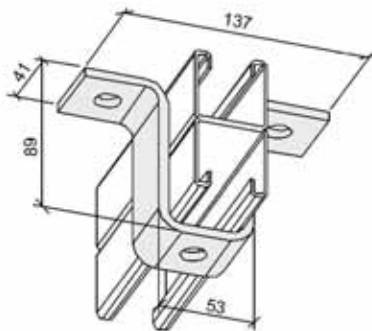
Catalog Number
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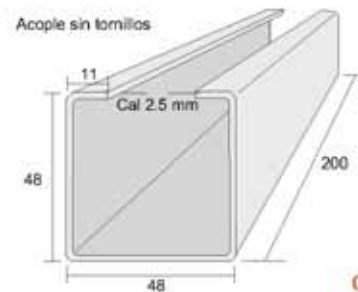
Catalog Number
M21136



Catalog Number
M31140



Catalog Number
M21130



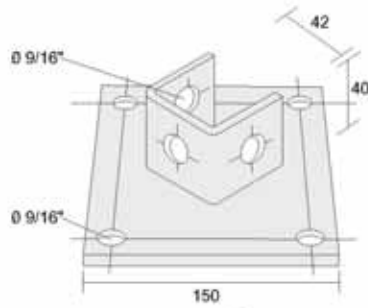
Catalog Number
M61200

- BASES

Elements used to fix the elements to the floor to get a more rigid structure. Available single and double.

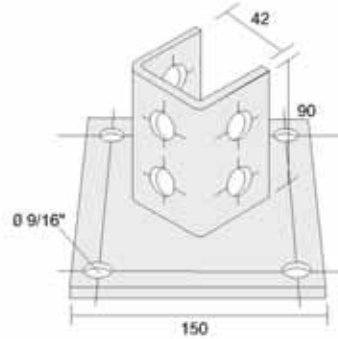
Bases have the required drillings for the locknuts and for the floor expansion bolts.

SINGLE PROFILE SHORT BASE



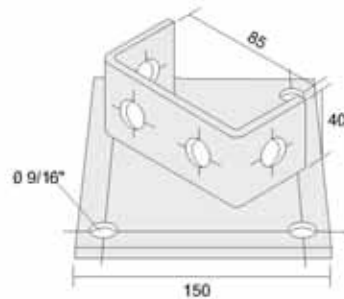
Catalog Number
M21164

SINGLE PROFILE HIGH BASE



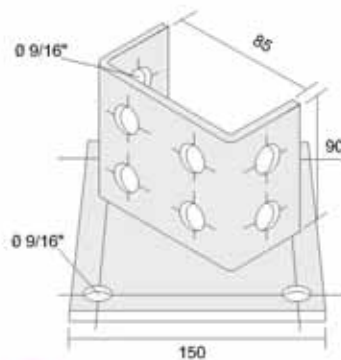
Catalog Number
M21165

DOUBLE PROFILE SHORT BASE



Catalog Number
M21166

DOUBLE PROFILE HIGH BASE



Catalog Number
M21167

MECANO

Cable Tray Systems Leader



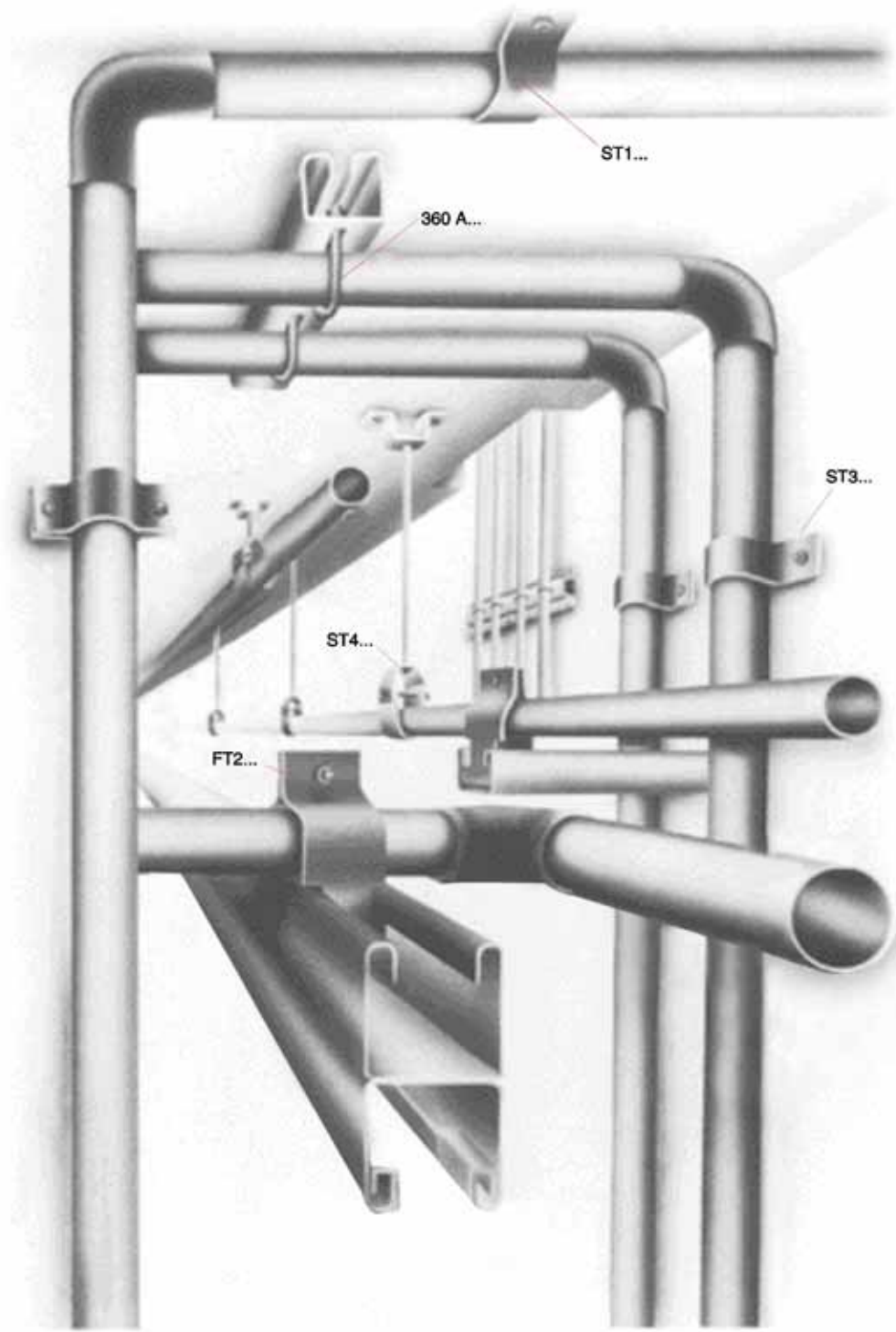
PIPING FASTENERS

CENO INDUSTRIAS CENO S.A.
Leadership in Engineering and Quality

Piping Fasteners



PIPING FASTENERS



General Aspects and Applications

MECANO

PIPING FASTENERS

We have the most complete pipe fastener range of products in different shapes and designs to meet all your needs.

In some cases, the elements allow lateral piping displacement, while in others, vertical, to avoid equipment or piping damages.

Materials and finishing will satisfy all your needs and requirements.

Advantages

Fast installation, excellent prices, easy piping fastening, disassembling possibility when required, and piping displacement just by loosening the bolts.

TECHNICAL ASPECTS

Material

All elements are die-cast hot-rolled steel sheet or steel plate, according to the case.

Thickness

Depends on the element.

Finishing

All elements are HOT-DIP GALVANIZED, complying with ICONTEC 2076 and 3320.

Technical Recommendations

Before starting your installation, you should consider the piping weight, diameter and contents to define the support type and capacity.

We recommend using this fastening system and the MECANO STRUCTURAL SYSTEM found in this catalog, as well.

When designing and selecting your catalog numbers, take into consideration if the piping is rigid or if it will have any kind of movement due to temperature changes, knocking, expansion, vibration, etc.

Use 3 fasteners for every 6-meter section.

For installations on concrete surfaces, expansion bolts can be used.

When choosing any element, check the outside piping diameter and material: conduit, structural, galvanized, stainless steel, cooper plated, etc.

APPLICATIONS

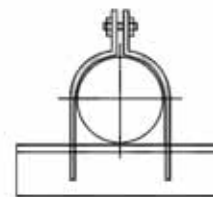
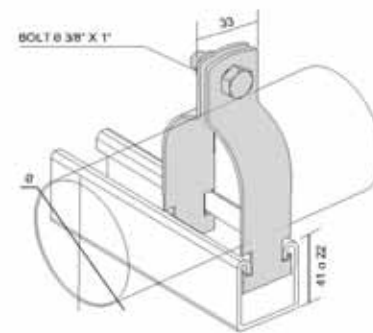
DIRECT USE WITH PROFILES.

PERPENDICULAR-TO-THE-PROFILE PIPE FASTENER (FT2)

Used to hold pipes that have a perpendicular axis to the profile longitudinal axis that are going to be fastened and should always be used with MECANO STRUCTURAL SYSTEM.

The perfect fit in the MECANO profile flanges, guarantees strong holding for any position on ceilings, walls, or floors. 3/8" x 1" bolts included.

Can be used to form piping banks, not necessarily all with the same diameter. We have the required elements for each diameter.

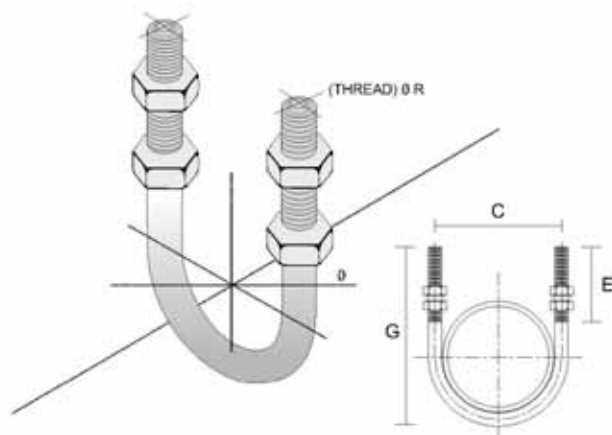


CATALOG NUMBER	Ø PIPING NOMINAL
FT2AG050	1/2"
FT2AG075	3/4"
FT2AG100	1"
FT2AG125	1-1/4"
FT2AG150	1-1/2"
FT2AG200	2"
FT2AG250	2-1/2"
FT2AG300	3"
FT2AG400	4"

SHEET, PROFILE, OR FLAT SURFACE USE

U BOLT (360A)

Special for sheet applications, slotted MECANO profiles, metallic floors, etc. Presses the pipe against the support element and it is a U bolt threaded on both ends with double nut for each end.

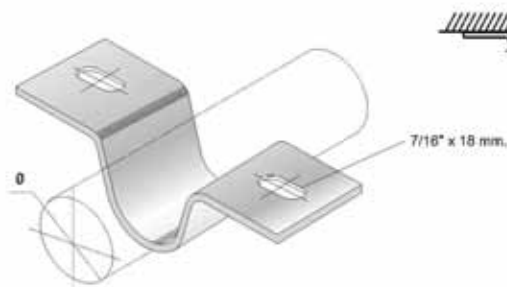


REFERENCIA	PIPE NOMINAL Ø	BOLT FIAMETER Ø R	G mm	CLEARANCE C mm	THREAD LENGTH E mm
360A434	1 1/2"		83	30	54
360A435	3/4"	1 1/4"	84	35	54
360A436	1"		88	41	54
361A437	1 - 1/4"		95	52	54
361A438	1 - 1/2"	3/8"	102	60	64
361A439	2"		115	71	64
362A440	2 - 1/2"		133	87	76
362A441	3"	1 1/2"	148	103	76
362A442	4"		174	129	76
362A443	5"		191	140	76
363A446	6"	5/8"	243	187	95
363A447	8"		294	238	95

LOOSE PIPE MOUNTING CLAMP (ST1)

Can be fixed on concrete with expansion bolts, to a sheet with screws, and to a MECANO structural profile with a 3/8" locknut. (See MECANO STRUCTURAL SYSTEM section).

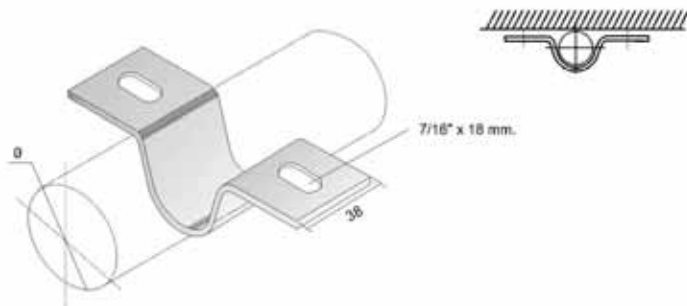
ST1 should only be used horizontally because it does not tighten the pipe completely to allow longitudinal expansion (due to temperature changes), making it special for steam piping applications.



ST1AG050	1 1/2"
ST1AG075	3/4"
ST1AG100	1"
ST1AG125	1 - 1/4"
ST1AG150	1 - 1/2"
ST1AG200	2"
ST1AG250	2 - 1/2"
ST1AG300	3"
ST1AG400	4"
ST1AG600	6"

TIGHT PIPE MOUNTING CLAMP (ST3)

ST3 presses the pipe and can be used horizontally or vertically.



CATALOG NUMBER	PIPING NOMINAL Ø
ST3AG050	1 1/2"
ST3AG075	3/4"
ST3AG100	1"
ST3AG125	1 - 1/4"
ST3AG150	1 - 1/2"
ST3AG200	2"
ST3AG250	2 - 1/2"
ST3AG300	3"
ST3AG400	4"
ST3AG600	6"

Additional Applications

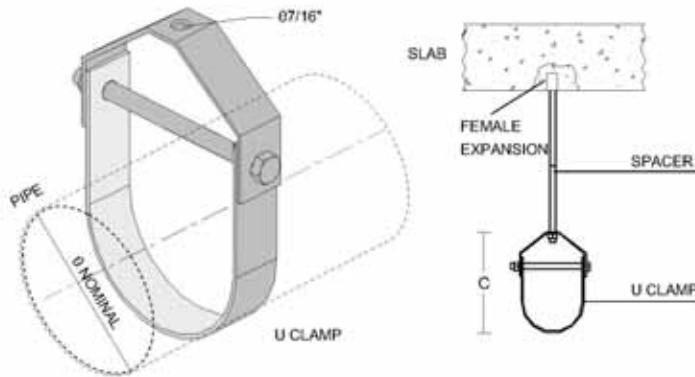
MECANO

PIPING FASTENERS

- U CLAMP (ST4)

Used to fasten horizontal piping with J hooks or threaded rods.

The clamp holds the pipe very well and allows movements, which are absorbed by the J hook or the treaded rod. It is made up by two U plates put together by a bolt and a nut.



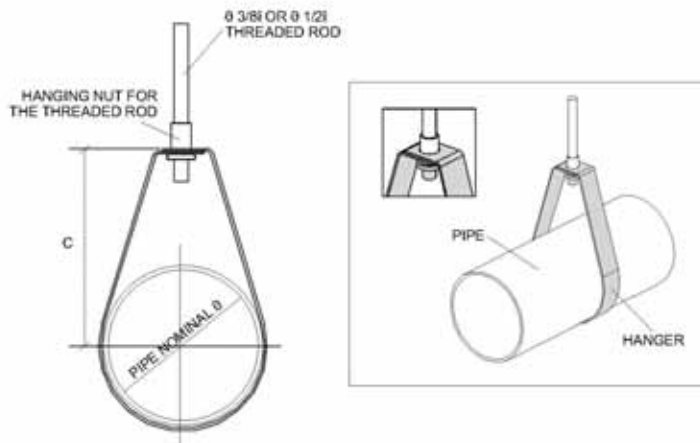
CATALOG NUMBER	PIPE NOMINAL Ø	BOLT Ø INCHES	C mm
ST4AG050	1/2"	3/8"	66
ST4AG075	3/4"		72
ST4AG100	1"		78
ST4AG125	1-1/4"		89
ST4AG150	1-1/2"		106
ST4AG200	2"		129
ST4AG250	2-1/2"		155
ST4AG300	3"		170
ST4AG400	4"	1 1/2"	203
ST4AG500	5"		230
ST4AG600	6"		285

- PIPE HANGER (ST5)

Used to fasten (hang) horizontal piping with J hooks and/or threaded rods (spacers).

Its design allows pipe displacement for fast and easy installation.

The hanger is made up by a nut, a flange, an inside 3/8" or 1/2" thread, and a bent plate with widths and thickness according to the pipe it will hold.

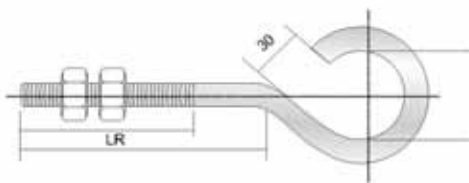


CATALOG NUMBER	PIPE NOMINAL Ø	BOLT Ø INCHES	C mm
ST5AG050	1/2"	3/8"	60
ST5AG075	3/4"		60
ST5AG100	1"		67
ST5AG125	1-1/4"		73
ST5AG150	1-1/2"		80
ST5AG200	2"		90
ST5AG250	2-1/2"		102
ST5AG300	3"		114
ST5AG350	3-1/2"	1 1/2"	125
ST5AG400	4"		132
ST5AG500	5"		145
ST5AG600	6"		173
ST5AG800	8"	205	

We wanted to include in this section some elements that, even though are not part of the MECANO line, they are complementary and frequently used to support other elements part of the MECANO line.

J-HOOK BOLTS

Frequently used with supports to hang cable tray systems (See Cable Tray System section, SP series). They are steel rod manufactured and HOT-DIP GALVANIZED. Diameters offered 3/8", 1/2", 5/8", and 3/4" and lengths L (see chart). Two hexagonal bolt included per bolt.



J-HOOK BOLT

Ø DIAMETER	CATALOG NUMBER	MEASUREMENTS		Ø DIAMETER	CATALOG NUMBER	MEASUREMENTS	
		OPEN	L R L			OPEN	L R L
3/8"	221A04	4"	3"	1/2"	222A04	4"	3"
	221A06	6"	4"		222A06	6"	4"
	221A08	8"	6"		222A08	8"	6"
	221A10	10"	6"		222A10	10"	6"
	221A12	12"	6"		222A12	12"	6"
	221A14	14"	6"		222A14	14"	6"
	221A16	16"	14"		222A16	16"	14"
	221A18	18"	16"		222A18	18"	16"
	221A20	20"	18"		222A20	20"	18"
	221A22	22"	20"		222A22	22"	20"
	221A24	24"	22"		222A24	24"	22"
	221A26	26"	24"		222A26	26"	24"

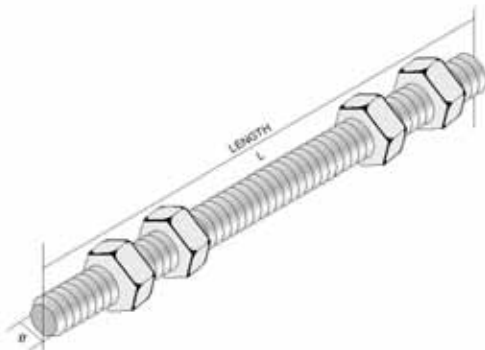
SPACERS

Catalog numbers in the chart are kept in stock; different measurements, by request only. They are also known as asparagus or threaded rods.

Like the J-hook bolts, they are to support cable tray systems with the rung-type hanger mounts and the plate-type hanger mounts (See Cable Tray System section, SP and SPL series) and with U clamps and pipe hangers. They are steel rod manufactured and HOT-DIP GALVANIZED. Four hexagonal bolt included.

Diameters offered 3/8", 1/2", 5/8", and 3/4" and lengths up to 100 cm.

For correct installation, use female expansion nuts with revised inside thread.



CATALOG NUMBER	Ø DIAMETER		LENGTH	
	INCHES	mm	INCHES	cm
21E3820	3/8"	9.3	8	20
21E3825			10	25
21E3830			12	30
21E3835			14	35
21E3840			16	40
21E3845			18	45
21E3850			20	50
21E3855			22	55
21E3860			24	60
21E3870			28	70
21E3880			32	80
21E3890			36	90
21E38100	40	100		
21E1220	1/2"	12.7	8	20
21E1225			10	25
21E1230			12	30
21E1235			14	35
21E1240			16	40
21E1245			18	45
21E1250			20	50
21E1255			22	55
21E1260			24	60
21E1270			28	70
21E1280			32	80
21E1290			36	90
21E12100	40	100		

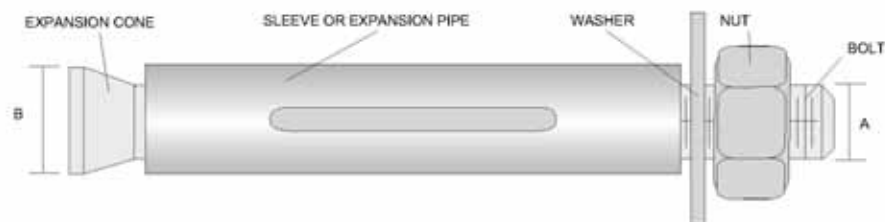
- RIGID COUPLER NUT (TA)

Used to join threaded elements, such as j-hooks and spacers.



CATALOG NUMBER	Ø A
TA1	3/8"
TA2	1/2"

- EXPANSION BOLTS



Very useful elements where strong securing is required, such as structures, poles, electrical supports, metallic racking, furnishing, machinery, doors, signs, hanging objects, etc.

It is made up by a conic-head bolt (forged, sheeting threaded, drawn steel rod – UNC – Type 2 [ANSI B 1-1] thread) and a die-cast and bent sleeve manufactured under the most strict quality controls, complying with SAE J429h – Grade 1 standard).

Bolts, washers, and nuts are cold galvanized and the sleeve or expansion pipe is electro statically painted.

Diameters offered 3/8", 1/2", and 5/8" (BØ) and lengths (C) from 1-7/8" to 6-1/4", depending on the diameter.

CATALOG NUMBER	BOLT DENOMINATION	BOLT DIAMETER A		CONE DIAMETER B		BIT DIAMETER INCHES	BOLT TOTAL LENGTH		LAST EXTRACTION RESISTANCE KG	LAST CUT RESISTANCE KG	MAXIMUM FIXED ELEMENT THICKNESS INCHES	(2) MINIMAL DISTANCE BETWEEN BOLTS mm	(2) MINIMAL DISTANCE TO THE EDGE mm
		Inches	mm	Inches	mm		Inches	mm					
TEA08 x 055 TEA08 x 075	3/8" x 1 7/8" 3/8" x 3"	5/16"	7.9	3/8"	9.5	3/8"	1 7/8" 3"	48 75	1178	1302	3/8" 1 1/2"	90	48
TEA10 x 070	1/2" x 3"	3/8"	9.5	1/2"	12.7	1/2"	3"	76	2442	2631	1 1/8"	114	57

INSIDE THREAD FEMALE EXPANSION BOLTS

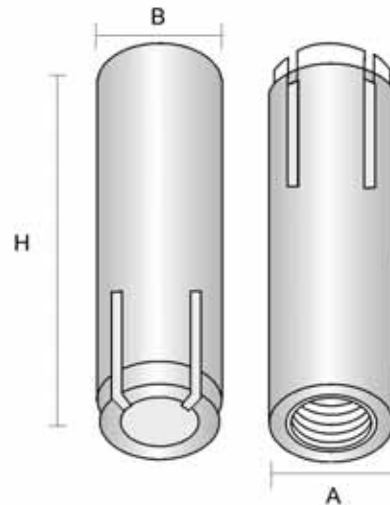
CHARACTERISTICS

- This anchor can be installed easily, solving heavy duty concrete anchoring problems.
- Can be installed in a hole at any depth or at the concrete edge.
- Available for common drill operation.
- Four notches assure uniform and firm expansion.
- Reviewed inside thread for correct coupling with hot-dip galvanized spacers.

See available sizes in the specifications chart.

MOUNTING INSTRUCTIONS

1. Drill a hole with the anchor's diameter and length.
2. Clean the hole with the dust extractor, eliminating all debris.
3. Push the anchor in to the concrete edge level.
4. Expand the anchor with then puncher.
5. Install the threaded element.



APPLICATIONS

To be used in situations where an inside bolt is preferable. Useful for heavy-duty applications in concrete, thin walls, or compacted concrete. Ideal for piping hanging, valve and heavy ceiling mounting, machinery and rack, isolation, transformer, fan, pump anchoring, and cable tray system hanging.

CATALOG NUMBER	THREAD DIAMETER A		BIT DIAMETER B		THREAD DEPTH	HOLE MINIMAL DEPTH H	EXTRACTION CAPACITY	SHEARING STRESS CAPACITY
	Inches	mm	Inches	mm				
T EH 38x 158	3 / 8"	9.5	1 / 2"	12.7	12.7	38.1	560	480
T EH 12x 200	1 / 2"	12.7	5 / 8"	15.9	22.3	50.8	765	705

NOTE: use carbide or tungsten drill bits to guarantee optimal anchoring results. Use the right punchers so the wedge can expand correctly. Loads for 250 kg/cm² concrete; for regular concrete (210 kg/cm²), load is reduced 30%.



www.industriasceno.com

ITAGÜÍ: Calle 86 No. 45-90

PBX +574 255 51 11 Ventas +574 255 51 99 - Fax +574 255 51 79

e-mail: mecano@industriasceno.com

BOGOTÁ: Calle 17A No. 23 - 65 Paloquemao

PBX +571 277 97 08 Fax +571 201 49 62

e-mail: ventasbogota@industriasceno.com

BARRANQUILLA: Carrera 58 No. 75 - 158 Oficina 406

PBX +575 360 97 77 Fax +575 369 46 53

e-mail: ventasnorte@industriasceno.com