



4.....	Legislation;
4.....	Warnings;
4.....	Attention;
5.....	Before assembly;
5.....	Assembly tools;
6.....	Cantilthor components;
7.....	Column sectional view;
8.....	Tapered arm;
9.....	Column's assembly sequence;
9.....	Base: frontal view;
9.....	Base: bolts position;
10.....	Steel-bumper base protection;
10.....	Crossbracing;
11.....	Crossbracing positioning;
12.....	Arms assembly;
12.....	Accessories: containment panel;
12.....	Support and containment pipe;
12.....	Crossbar for panels use;
13.....	Attention;
14.....	Load types configuration;
15.....	Load's barycentre;
16.....	FEM 10.2.03;
17.....	Inspection;
17.....	Cause of damage;

LEGISLATION



Product's design, adhibition and safety norms:

- UNI EN 1993-1-1 - Eurocode 3: Design of steel structures - Part 1-1: General rules and rules for buildings
- UNI EN 1993-1-1 – Eurocode 3 Design of steel structures - Part 1-1: General rules and rules for buildings.;
- UNI EN 1993-1-3 - Eurocode 3: Design of steel structures - Part 1-3: General rules - Supplementary rules for cold-formed members and sheeting [Authority: The European Union Per Regulation 305/2011, Directive 98/34/EC, Directive 2004/18/EC]
- UNI 11262-1:2008 “Metallic storage systems - Steel commercial storage systems - Part 1: Requirements, calculation methods and tests”
- UNI EN 15629:2009 “Steel static storage systems – Specification of storage equipment”
- UNI EN 15635:2009 “Steel static storage systems - Application and maintenance of storage equipments”
- Italian Legislative Decree 81/2008 regarding health and safety protection in the workplace;
- D. Lgs 21 maggio 2004 n. 172, implementation of the Directive n.2001/95/CE concerning the general product safety;

WARNINGS

Do not place dynamic vertical and / or horizontal loads on the shelves. Bumping and / or leaning on the rack with fork lifts, trucks and other vehicles must be avoided. It is forbidden to use this shelving rack in a different way than described in this user's manual. This shelving rack is designed for a certain use. Any changes to the rack's geometry are possible only with prior approval of our technical office.

ATTENTION

The given instructions are to be considered exhaustive for the following purposes: right assembly, use and maintenance. Precise dimensions are to be found in the documentation. The drawings contained in the present manual are presented solely for descriptive purposes of trade.

In case of installation performed by the client, the Rainini Scaffalature Metalliche s.r.l. declines any responsibility in case of wrong assembly and for damage to objects or persons due to this activity.

BEFORE ASSEMBLY



Verify the floor resistance to concentrated loads and its effective capacity.

Check floor surface leveling.

Check possible interference with existing structures.

Verify the available space adequacy in order to ensure safe assembly operations.

In order to ensure optimal working conditions to the staff, check the floor and the lighting condition in the working area.

Accidents prevention devices necessary for the assembly procedures (helmet, gloves, safety shoes, safety belts, etc.) must be provided to the personnel involved in plant assembly.

ASSEMBLY TOOLS

Wrench set



Screwdriver



Rubber hammer



Plier



Drill



Torque wrench



Spirit level



Jemmy

Plumbob

Optical levels

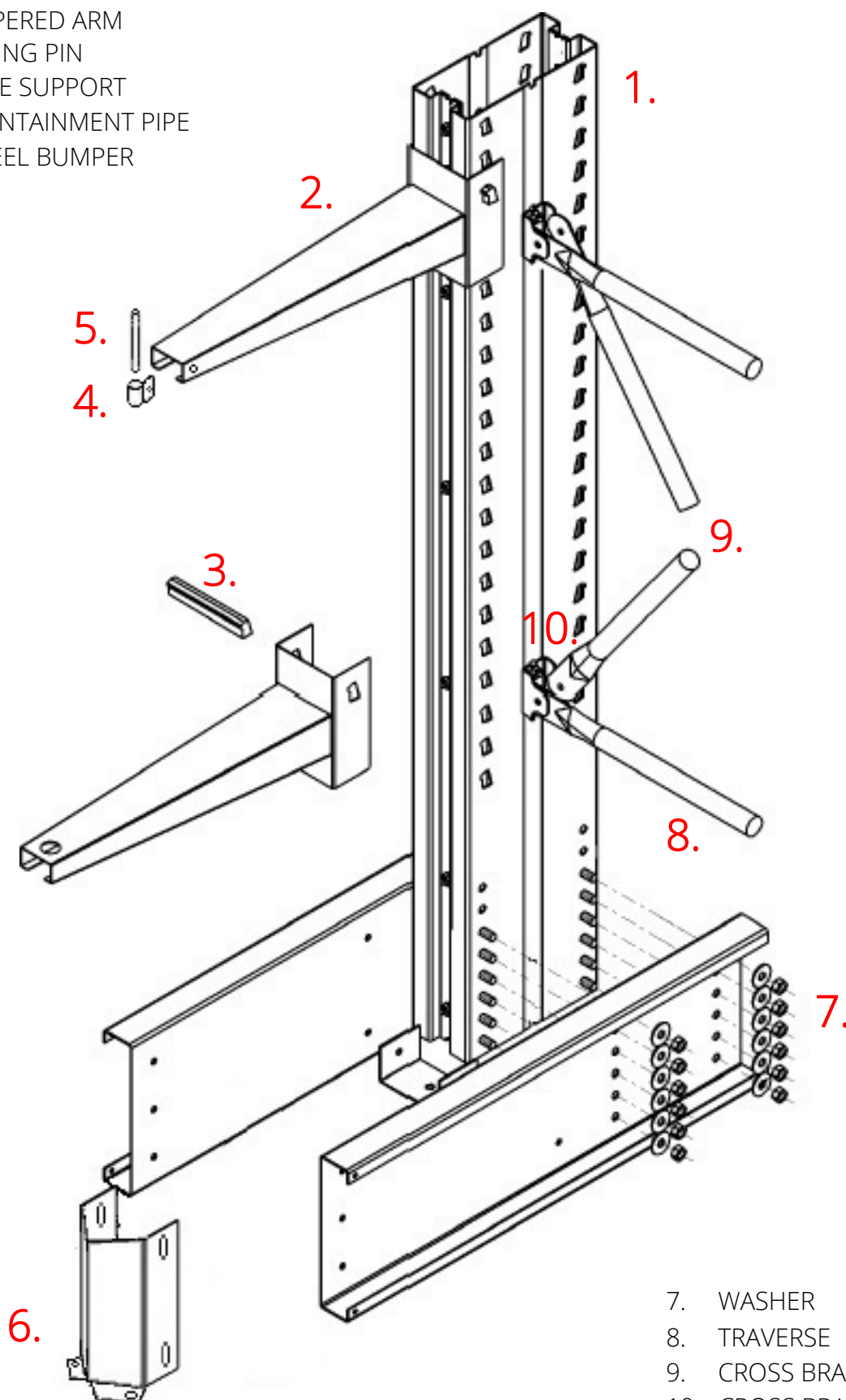
Safety belts



CANTILTHOR COMPONENTS



1. COLUMN
2. TAPERED ARM
3. FIXING PIN
4. PIPE SUPPORT
5. CONTAINMENT PIPE
6. STEEL BUMPER

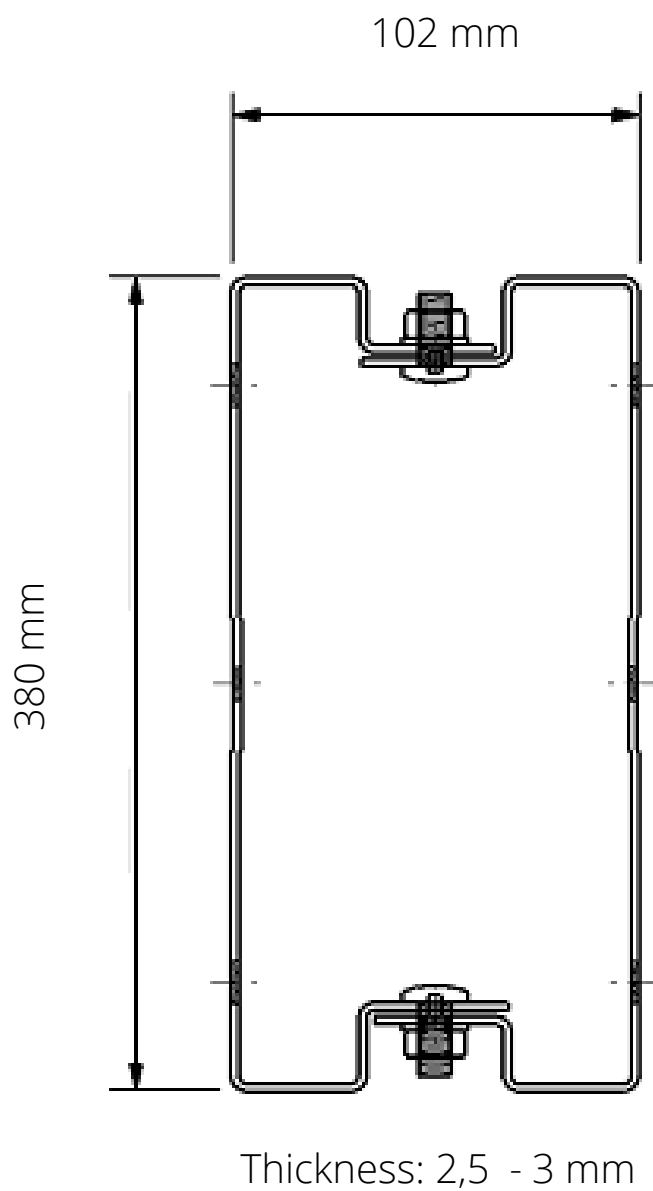


7. WASHER
8. TRAVERSE
9. CROSS BRACING
10. CROSS BRACING CONNECTION

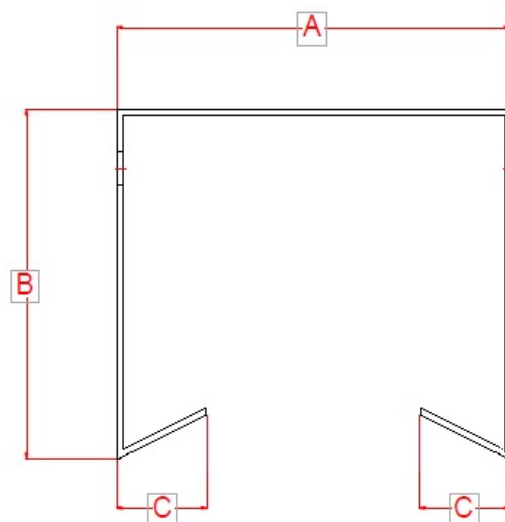
COLUMN SECTIONAL VIEW



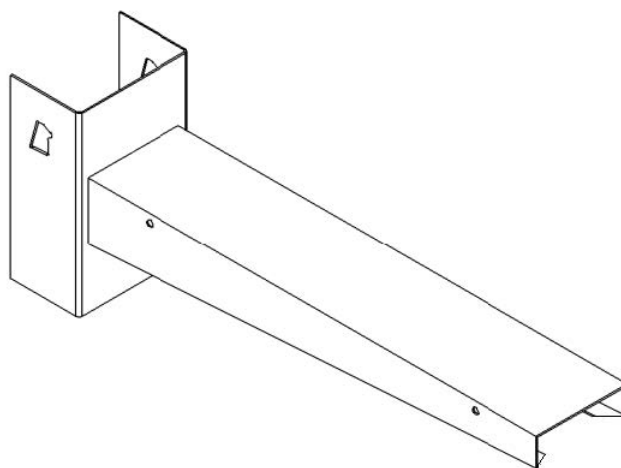
Arm hooking pitch : 80mm



TAPERED ARM



Linkage side



A - mm	B - mm	C - mm
75 -> 110	75 -> 110	18

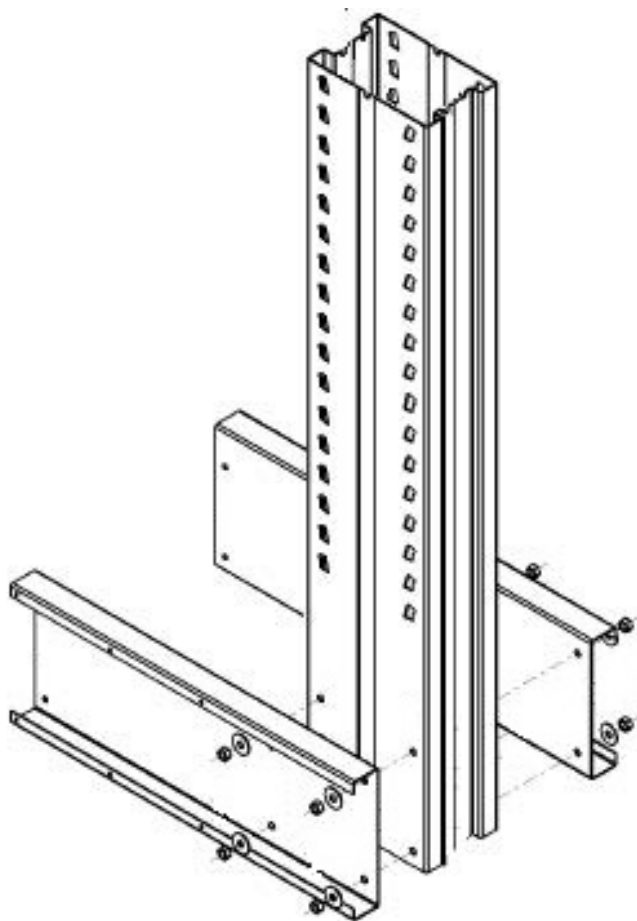
COLUMN ASSEMBLY SEQUENCE



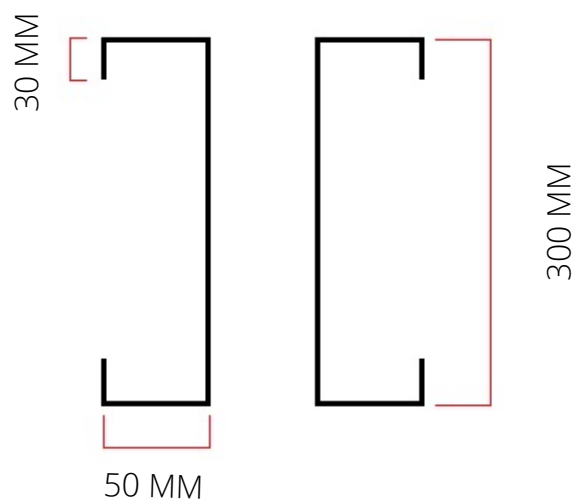
Assemble all the columns on the floor assembling them to the bases through special M16x20 hexagonal bolts.

M16 bolts must be tightened to the base with a tightening torque of 210 N·m

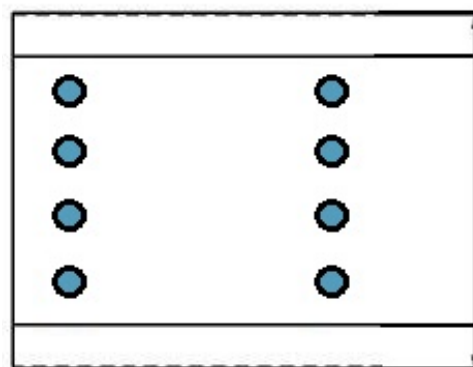
Assemble the steel-tip to the base through M10x20 screws and bolts on the sides and secure it to the floor with screw anchors.



BASE: FRONTAL VIEW



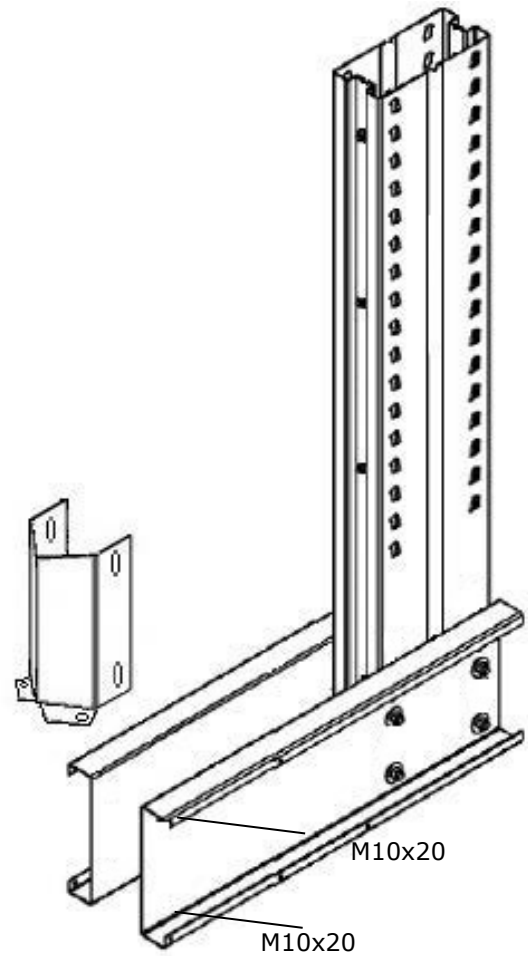
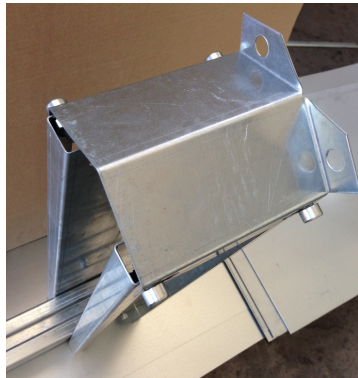
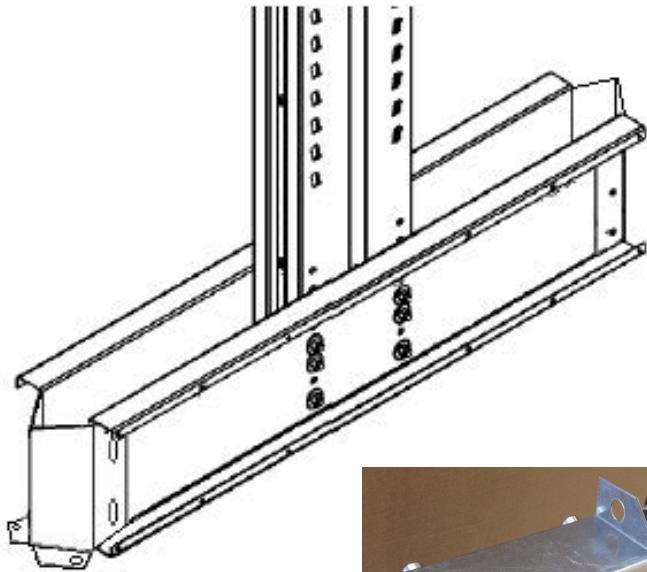
BASE: BOLTS POSITIONING



STEEL-BUMPER BASE PROTECTION



Assembly the tip and secure it through M10x20 screws and bolts on the sides and secure it to the floor with screw anchors.



CROSS BRACING

Raise the first two complete columns (column + base).

Insert the cross bracing's brackets into the column's slot.

Place the cross bracing on top of the bracket and the diagonal rod on the back and secure them with a M10 screw and bolt. On the diagonals crossing point use a screw and bolt to fix it.

Lift the next column and assembly the cross bracing; repeat the operation for the following columns.

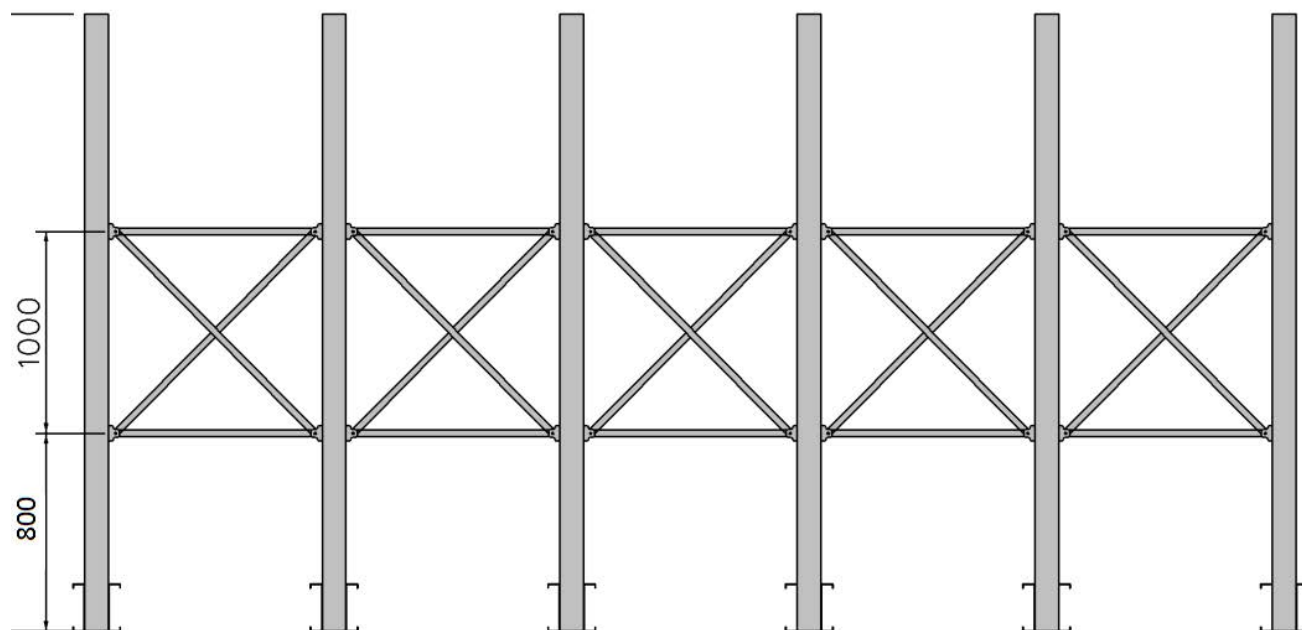
Check the leveling and perpendicularity for each column



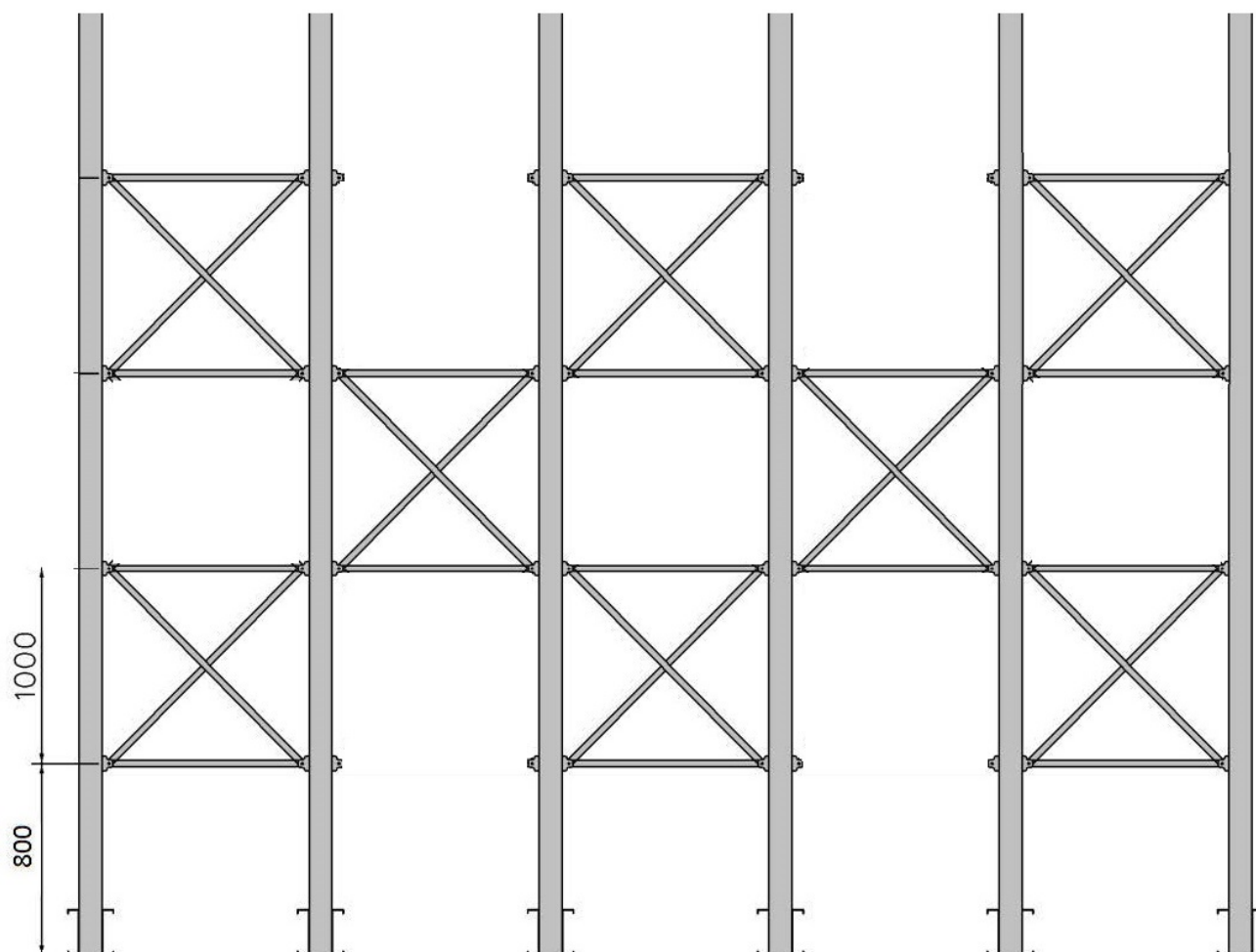
CROSS BRACING POSITIONING



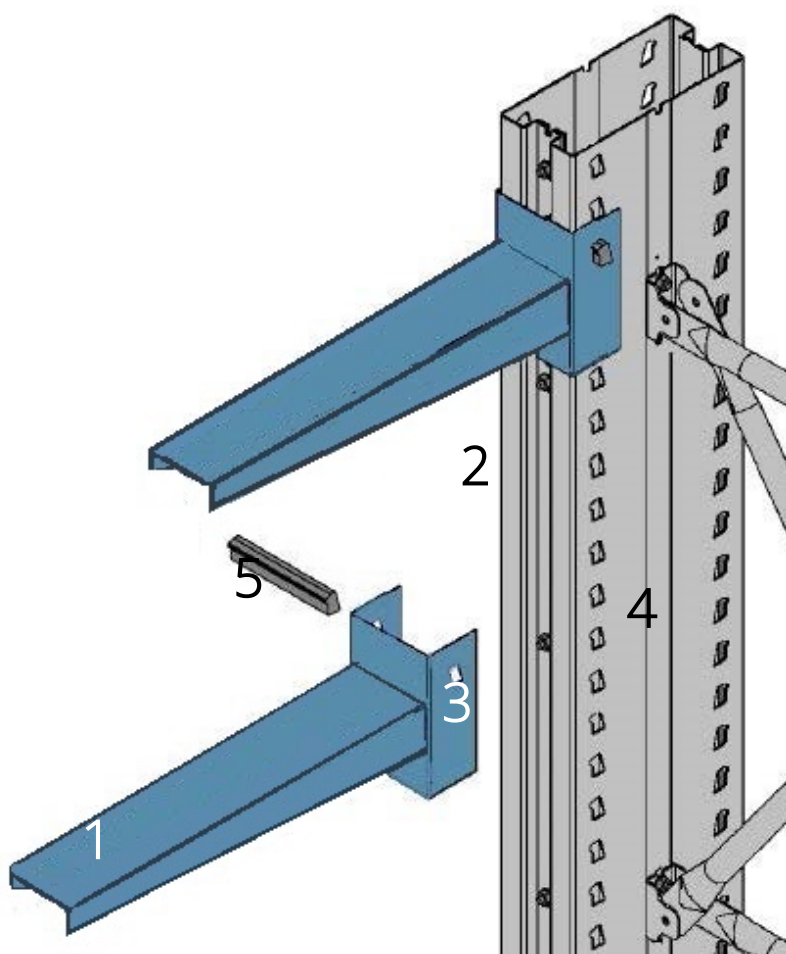
Up to 4800 mm column height use 1 bracing



Up to 6000 mm column height, use 2 bracing at the highest and lowest section, in the middle section alternate 1 or 2 bracings.



ARMS ASSEMBLY



Before assembling the arms, state the centre to centre distance in height in order to partition the necessary space to store the goods. Usually the necessary measure is to be found in the lay-out project.

Proceed inserting the arm (1) from the 102 cm side of the column (2) so that the arm's holes (3) and the column's holes (4) overlap and secure them through a fixing pin (5).

To avoid an accidental pull-out of the fixing pin, it is recommended to use split pins (6), two for each fixing pin, pierced in the dedicated holes at the ends of the fixing pin itself.

It is now possible to proceed with the accessory assembly.

CONTAINMENT PANEL

Before slotting the panel inside the crossbar, proceed with the panel slotting (7) in the inner-lower section of the panel.

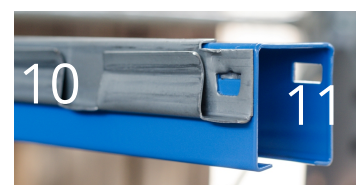
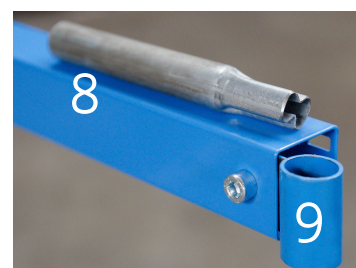
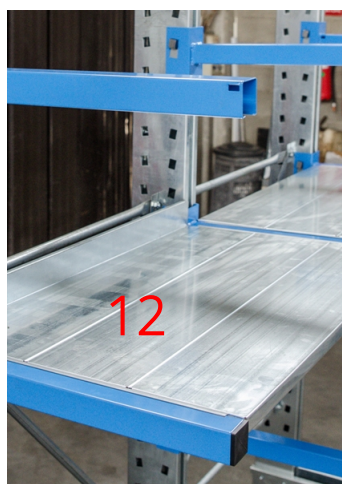
SUPPORT AND CONTAINMENT PIPE

The galvanized containment pipe (8) it is used as a containment frame for loose goods such as pipes,

merce sfusa, come tubi, sections, beams, etc. Place the support (9) inside arm's front-part and secure it with a M10x30 screw + nut and washer. Put the containment pipe inside the support.

CROSSBAR FOR PANELS USE

Fix the crossbar (10) in the holes (11) on arm's extremities. Once the crossbars are hooked panels can be slotted-in. (12).



ATTENTION



The given data about the capacity refer to a load properly distributed and the most onerous working condition, ie, with arrangement of the load on a front and properly distributed.

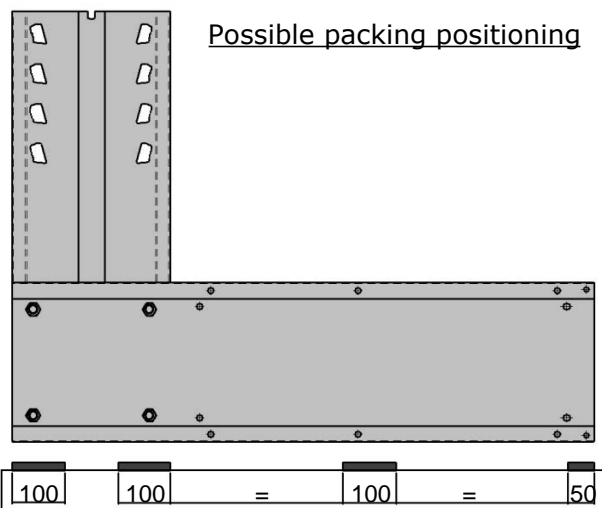
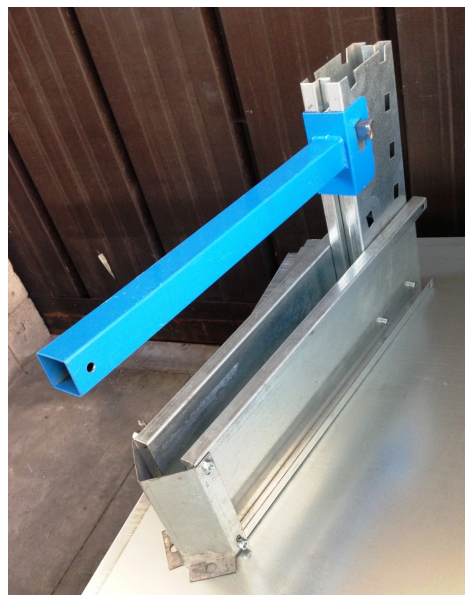
In order to achieve stability and security it is required to anchor the columns to the ground with 2 screw anchors.

The strength class of the concrete floor is assumed to be not less than $R_{b'k} = 250$.

In the case of floors with a lower resistance a verification is required. In any case the company disclaims any responsibility due to problems related with a damaged or a not adequate or damaged floor.

For a correct column installation it is advisable that the floor does not present planarian waste greater than 0.5 mm per meter.

In case of flatness restoring, it is mandatory to guarantee a strong support, not a yielding one, of the two feet section at least under 4 points: under the column, the mid-part and the extremities.

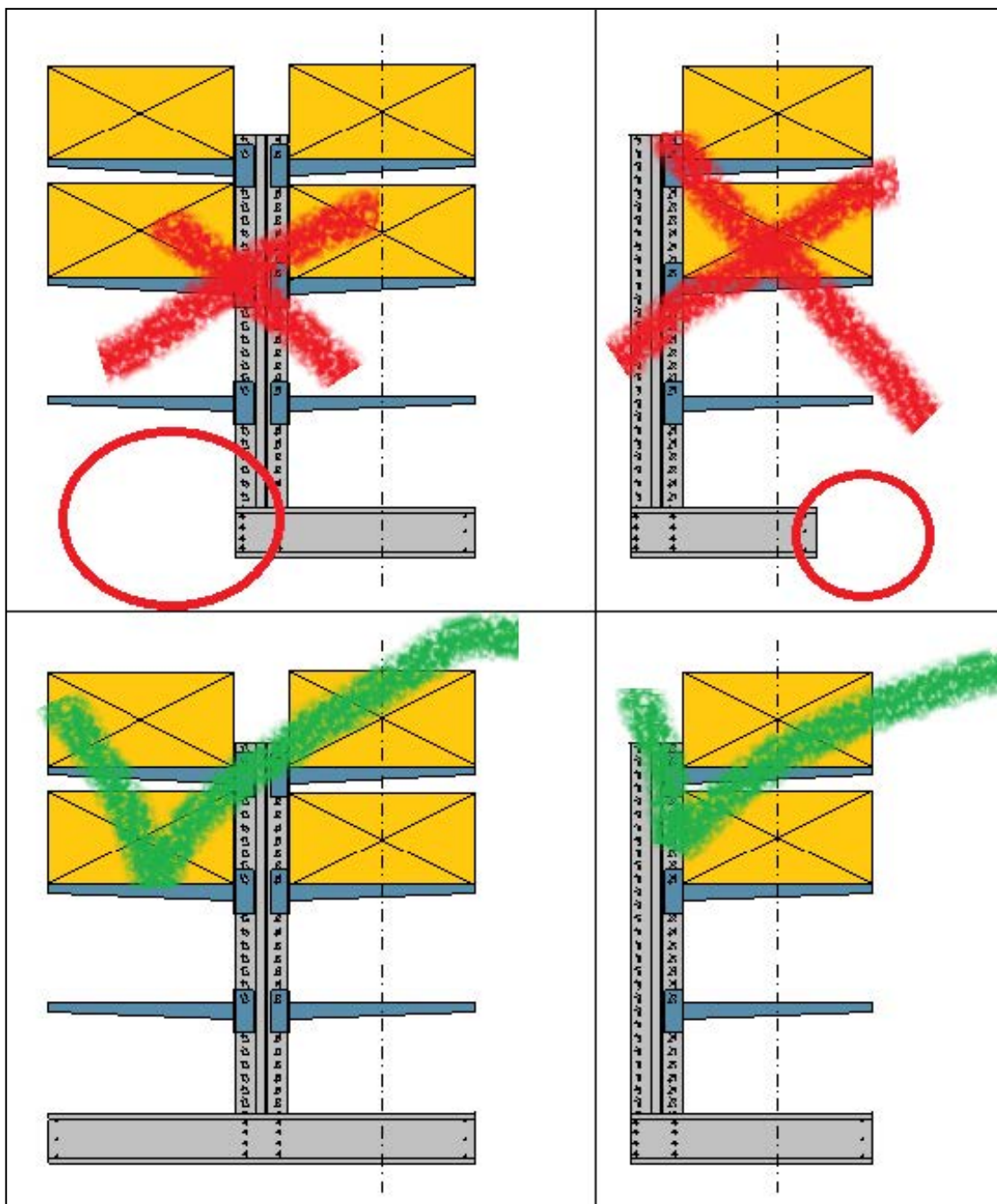


At the end of this assembly sequence the shelving rack is ready to be used





Below are shown some of the allowed load modes.



LOADS BARYCENTRE

can not be greater than half the length of the arm



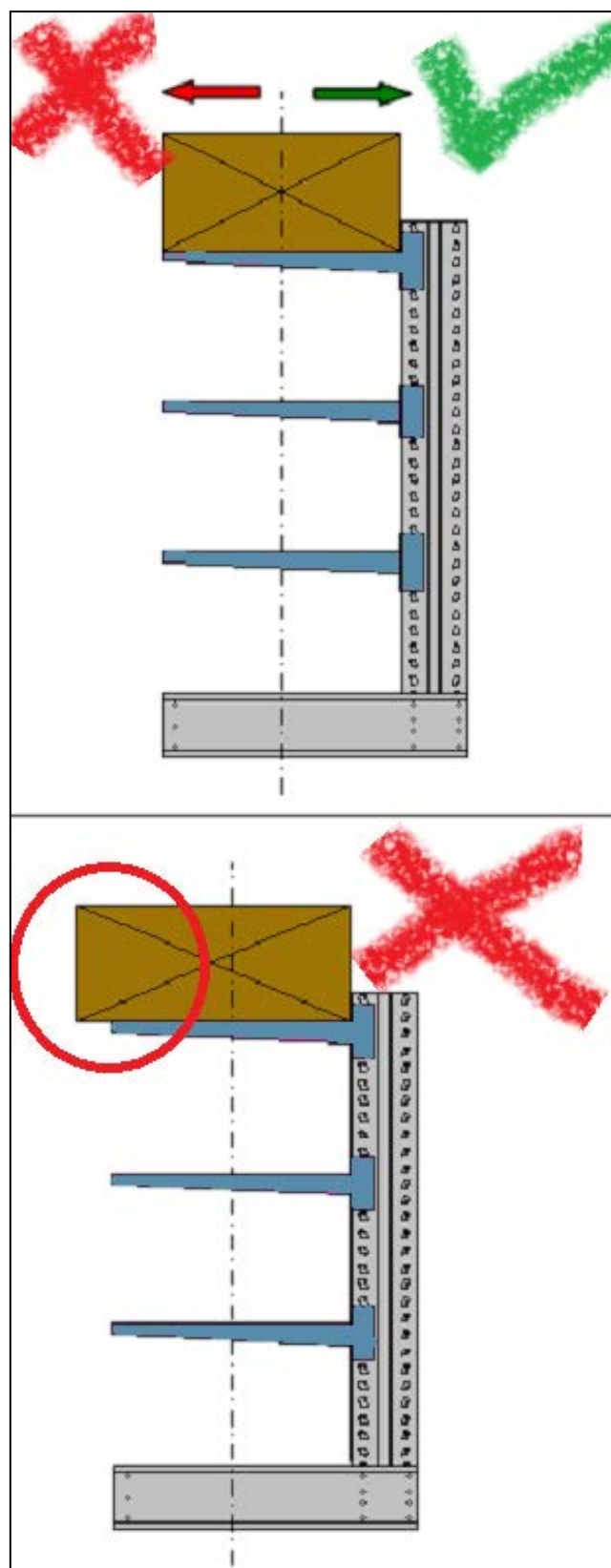
Configuration of load limit: the barycentre is on the center line of the shelf. Any other configuration that applies the barycentre inside the center line of the shelf is to be considered correct.

Arm capacity load should NEVER be higher than 1/3 of column's load capacity.

For instance:

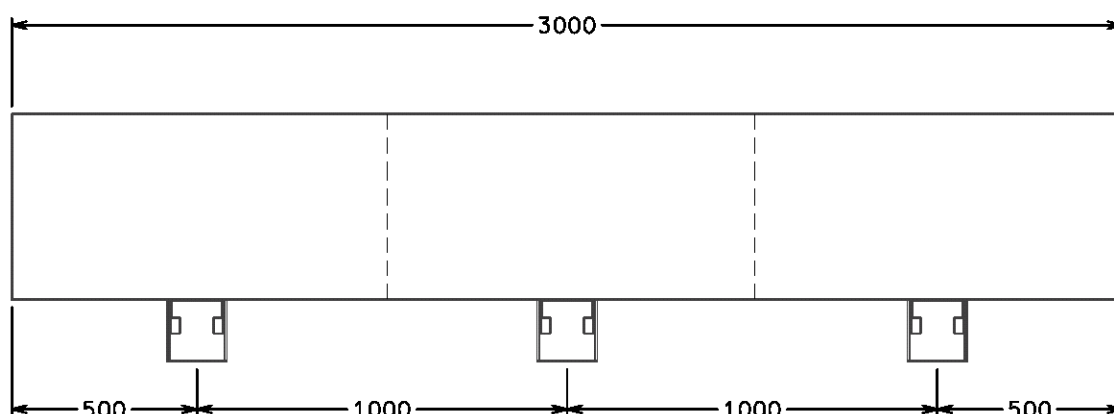
On a column with max load capacity of 3000 kg it is possible to use arms with a 1000 kg load capacity.

Forbidden shelf load configuration: the barycentre is outside shelves' center line.



F.E.M. 10.2.03

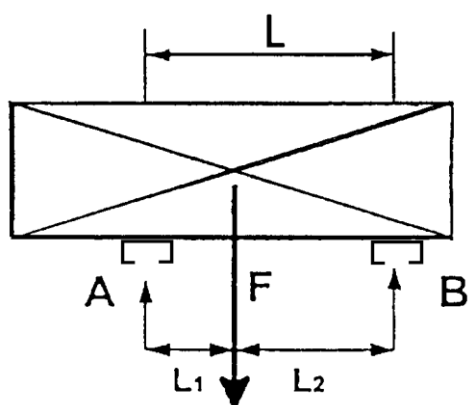
Configuration, type of load and center of gravity position



Example of correct positioning of the load on a module of three arms

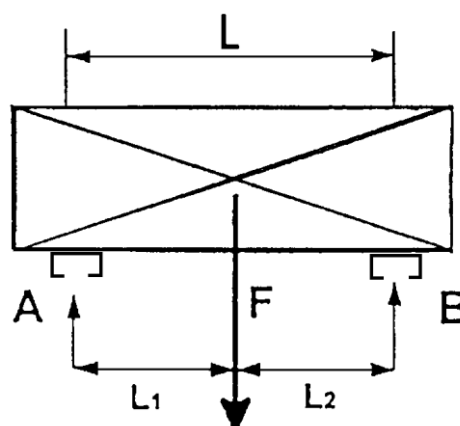


Loads centering following F.E.M. 02/10/03 rule
Loads barycentre must be symmetrically positioned with the arms



Irregular load barycentre $L_2 > L_1$
(asymmetric)

Therefore, the A arm bears a greater load than arm B



Well distributed load $L_1 = L_2$
(symmetric)





Provide periodic inspections to detect abnormalities not detected during normal use of the structure. Thanks to scheduled maintenance dangerous situations can be avoided which cause accidents and injuries, avoiding activity interruption and economic loss as well as criminal proceedings against the buyer for failing maintenance.

Control type	Periodicity
Column integrity	Biannual
Base integrity	Biannual
Arms integrity	Biannual
Vertical structure's alignment	Annual
Horizontal structure's alignment	Annual
Excessive loads	Monthly
Loads position	Monthly
Painting	Annual

We suggest to carry out inspections, paying particular attention to:

- o damaged areas following an impact;
- o off the lead columns;
- o conditions and efficiency of the thickness, anchors, safety pins junctions and bumpers;
- o potential fixing pin leakage from the slots;
- o floor's conditions.

Moreover it is crucial to check that:

- o tables of loads are available and up to date;
- o there are no areas of overloaded shelving;
- o pallets' conditions and other load's accessories are satisfactory;
- o the shelving rack is stable.

CAUSE OF DAMAGE

The inspection report has to show the found damage and activate a procedure to investigate the problem and search for possible solutions in order to reduce or eliminate the cause of the damage; The possible causes are:

- o wrong actions performed by the forklift;
- o changes in the type of equipment used for the goods movement;
- o poor training of the forklift-truck driver;
- o changes in the type or quality of the pallets used;
- o narrow maneuvering space;
- o damaged pallets ;
 - o narrow corridors;
 - o overloaded pallets;
 - o equipment used for handling not perfectly efficient;
 - o poor shelving's maintenance;
 - o presence of loose packages and pallets blocking the aisle's load.