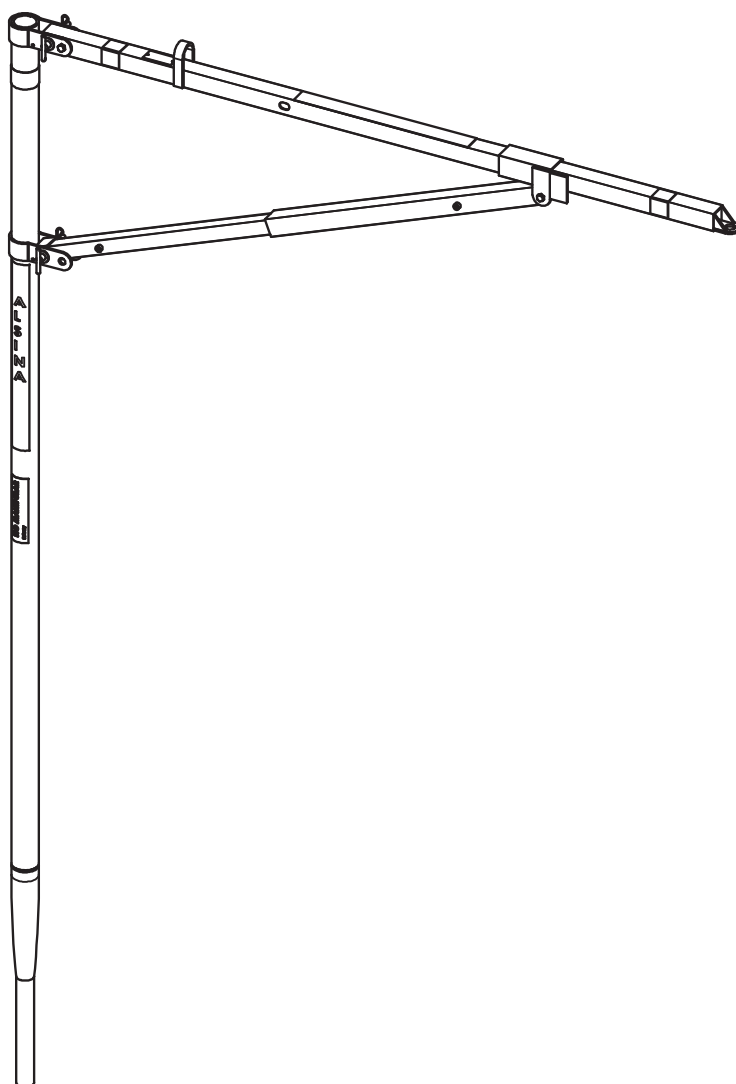


# Alsina

# ALUPERCHA SYSTEM

CE 0158 - EN 795:2012 B / D / E

## Assembly, Use and Safety Instruction Manual



## Introduction

Alsina's instructions for installation, use and safety are intended as a guide to the procedures required for safe and correct assembly, disassembly and use of formwork systems under normal conditions, in line with the standards commonly accepted on work sites. Any specific work circumstance falling outside these standards may require them to be adapted. When in doubt, do not hesitate to contact one of our technical departments, anywhere in the world.

The instructions in this document are intended to explain to users and technicians how the system works; they should ensure correct preparation and use of the equipment on site. Consequently, there will be references to general standards that any professional user should be familiar with. Thus, it is best not to reproduce them in this manual, since any modifications to these standards would lead to discrepancies between the standards and the manual and could cause confusion. Users should always refer to the latest version of the standards in force.

Therefore, the references in this manual in no way annul, replace or prevail over:

- 1- Standards and regulations on prevention of risks in the workplace specific to a country or region.
- 2- The instructions in the specific Health and Safety Plan for the works.
- 3- Safety instructions in the evaluations and plans applying to specific work functions in a company.
- 4- Technical orders and instructions specific to particular stages of the works, issued by the technical directors, the health and safety officer, the foremen and/or Prevention Resources.

Throughout the project, users shall respect, at all times, the specific laws, standards and regulations of the country or region related to prevention of risks in the workplace and any other legislation applicable to each case and, if necessary, supplement the instructions and adapt to other Work Safety Measures.

It is the customer's responsibility to prepare, document, implement and review the risk evaluation for the construction work. This documentation provides the basis for the evaluation of specific risks in the works, and Alsina's Instruction Manuals may in no case be regarded as a substitute.

Sets of vertical formwork equipment, as systems, are made up by joining different components. As far as possible, drawings and diagrams have been included as an aid to understanding these instructions. All personnel working with these products should be familiar with the contents of this document and the safety instructions therein.

The illustrations in this manual refer, in part, to different phases of the assembly process. Customers should ensure that they have a copy of the assembly and operating instructions, supplied by Alsina, and that these are known to and available to users on site.

Apart from the assembly and operating instructions, each chapter includes a series of safety recommendations. It is important that these are observed. However, these recommendations are neither exhaustive nor definitive, and should they not coincide with the indications in the Health and Safety Plan or its equivalent according to local legislation, the latter shall prevail.

If there are persons who cannot read the documentation or have difficulty doing so, they must follow the customer's instructions and indications.

Should you have any questions regarding the contents of this manual or any suggestions as to how it can be improved, please address your comments to your Alsina Marketing Technician or through our website: [www.alsina.com](http://www.alsina.com)



**Info** In order to obtain the best performance from its formwork systems, Alsina continuously updates the assembly and operation instructions for its products. For further information, contact the Alsina Marketing Technician in your area. The locations of the Alsina Group's Sales Network are available at [www.alsina.com](http://www.alsina.com), or you can e-mail us at [alsinainfo@alsina.com](mailto:alsinainfo@alsina.com)

Symbols used in this document:

**Information**

Information on a section of the assembly and use instructions, or additional information on the system that users and works technicians should take into account.

**Warning/Precaution/Danger**

Essential information that the reader must be aware of; disregarding this information may lead to material damages or serious personal injuries.

**Advice**

Indicates recommendations and advice for use, assembly, and safety.

## ISO 9001:2015 Certification

**The Alsina Group is ISO 9001:2015 certified.**

The Alsina Group has been granted the ISO 9001:2015 certification for their sales and rental service of concrete formwork equipment.

The certificate was granted by BVQI, an institution of renowned prestige and worldwide experience, under UKAS accreditation. The scope of this certification confirms the maturity and efficiency of our Quality Management System for the design, manufacture, marketing (sales and rental) and maintenance of concrete formwork equipment, provision of scaffolding erection services and implementation of collective protection systems, while ratifying the company's commitment to continuous improvement.

Alsina is possibly the only company in the formwork business with the ISO 9001:2015 certification for: "Design, fabrication, engineering services, and commercialization (sale and leasing) of concrete formwork equipment. Provision of assembly services for scaffolding and formwork equipment. On-site implementation of collective protection elements".



Encofrados J. Alsina, S.A.

# Alsina

## Alupercha (Aluminium Fall Arrest System)

Safety system designed to prevent falls from heights during the formwork boarding process.

### Alupercha

A safety system, especially useful for PERIMETERS, or during all work associated with decking for horizontal formwork operations. The system ensures completely safe conditions while installing: boards, safety handrails, gallows-type safety nets, formwork risers and all activities involved in formwork assembly where there is risk of falling from a height.

Easy to assemble and use, does not require outside installers. Due to the lightweight design of the Alupercha, it can be manoeuvred and installed by a single person, and it can also be moved by crane if that is preferred.

### Features of the system

- Allows the worker to work safely covering an area of aprox 125 m<sup>2</sup> and moving within a radius of 6.0 m around the column, with the PPE length up to 4m, and aprox 230 m<sup>2</sup> when combined with PPE length up to 6.5 m (working procedure with extended PPE on page 8).
- Inverted "L" shaped and 100% aluminium structure measuring 2.0 m long and 3.10 m high (2.25 m when attached to the column).
- A built-in energy-absorber device reduces the forces transmitted to the structure and to the user.
- Lightweight structure weighing just 19 Kg, made of high quality elastic aluminium.
- Retractable fall arrest block measuring 4m (SRL+lanyard) maximum length, or optional with SRL 6.0 m or 6.5 m maximum length.
- Alupercha housing steel tube measuring 85 cm long.
- To be manoeuvred and installed by a single person with no lifting equipments, or the be moved by crane if that is preferred.
- Wide range of accessories for use in any building site situation, ensuring safety at all times.
- A system designed for columns spaced up to 8.5 m (this requires use of the hook accessory).

**i** Info The system and its components must be used by competent, qualified personnel.

**i** Info The system and its accessories must be inspected by a competent, qualified personnel:

- Before first use and subsequent use.
- If the product is activated by a fall, it must be withdrawn from service immediately and replaced.
- At regular intervals (at least once a year). The inspection records may be called for.
- Certain individual components may require inspection at shorter intervals.
- Never use the equipment if wear, rust or unauthorized repair attempts are detected in any part of the system.
- Do not use the system for any use other than that which it was designed for.
- Use approved harnesses only.
- Do not use or fasten any components or accessories that have not been supplied by the manufacturer.
- The user must assess the risk involved before using the system

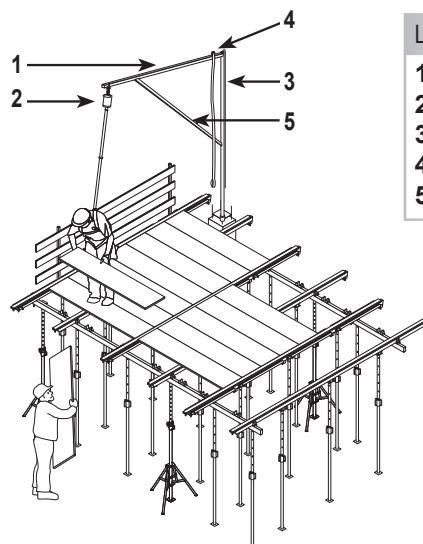


The illustrations in this assembly and safety manual are guidelines and, at any event, they may not reflect all the possible assembly formats.

### Limitations of the system

- The structure on which the system is mounted must be capable of bearing the weights indicated.
- The maximum working radius when the worker is anchored to the system with the safety harness is 6 m. Do not attempt to extend this working radius with ropes or other such methods.
- The maximum number of users connected simultaneously to one Alupercha is 2 (two).
- During the use of Alupercha with housing tube (during formwork stage), the maximum distance between the 2 users connected simultaneously to one Alupercha will be: 1 (one) meter. Increasing this distance may cause injuries to users due to the "pull" effect.

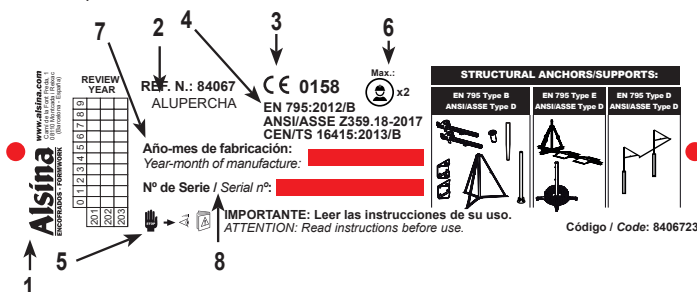
### System components



#### LEGEND

1. System body
2. SRL
3. Hook
4. Sling ring
5. Energy-absorber

Alupercha is CE certified in accordance with the DIN EN 795 type B / D / E, and compliance to ANSI/ASSE Z359.18-2017.



#### LEGEND

1. Manufacturer
2. Name of the product
3. Identification number of the notified body; DEKRA Testing and Certification
4. Compliance standard
5. Pictogram: read user instruction before use
6. Number of users allowed
7. Production year
8. Serial number



Read carefully through this user instruction before using the product. In case of questions and uncertainties, please contact Alsina for support

### **Safety instructions**

The Alupercha is only intended for the purpose stated in this user instruction, any other use is not recommended. The Alupercha is a personal fall protection anchor device, used to protect workers operating at height and if used incorrectly, there is a potential risk of accidents to both the user and other people in the vicinity. Please read this manual carefully before any usage.

- Accidents and dangerous situations may arise by the use of combinations of equipment in which the safe function of one item is affected by, or interferes, with the safe function of another.
- Under no circumstances shall the product be used as a makeshift crane or lifting/lowering device.
- Under no circumstances shall any item other than those provided with the system be used either in replacement or through preference as this may affect the performance of the product.
- Care should be taken in the transportation of the product between uses and locations. If any damage occurs or is detected in any part, the item should be withdrawn from use, inspected by a trained person and replaced if required.
- Care should be taken in the installation of the product and if any damage occurs or is detected in any part, the item should be withdrawn from use, inspected by a trained person and replaced if required.
- The site location where the Alupercha is being used should have a rescue plan in place, in the event of a fall arrest incident.
- The device is only intended for use by maximum 2 users at a time, under no circumstances shall multiple persons be attached to the device.
- If a crane is used as lifting device, be aware of the movements made by the crane and keep workers at a safe distance.
- The usage of the Alupercha is intended to be used within a zero factor fall arrest system. Make sure that the anchorage is always overhead and the self-retracting lifeline is taut between the anchorage point and the worker.
- The maximum vertical deflection of the anchor point that can occur during service is 1 user = 0.95 m / 2 users = 1.42 m.
- In case that Alupercha is re-sold outside the original country of destination, it is essential that the reseller provides user instructions in the language of the country in which the system is to be used.
- When referring to included components not produced by Alsina or official distributors, please refer to the specific user guide / manual for that specific item. When using a retractable fall arrest block, the certification of this product is only valid when the prescribed block is used, hence it is tested and approved in combination with the Alupercha.

- PFPE that is used together with the Alupercha must be CE-certified and approved in the specific country of use.

- It is not recommended to use the products stated in this user instruction if pregnant, suffering from cardiovascular disease, affected by alcohol or drugs or other health issues that might affect your mental or physical capacity.

Always check that the security seal of the energy-absorber is not broken or missing, before use. Withdraw the Alupercha from service and contact Alsina technical department or official distributor in case of doubts.

### **Always check products and equipment before use**

Check all component parts of the Alupercha before assembly. Never use damaged or rusty materials, as this can affect safety. Refer to the check list in the Maintenance chapter which must be followed prior to use.

The system must be withdrawn from use immediately, if any doubt arise about its condition for safe use.

### **Never combine products**

It is not recommended to install, combine or interconnect products other than those supplied by Alsina or official distributors.

### **Always use Personal Fall Protection Equipment**

Personal Fall Protection Equipment (PFPE) must always be worn during assembly and dismantling when a risk of falling exists. This also applies to work carried out from MEWPs (Mobile Elevating Working Platforms).

The worker must only use full body harnesses according to EN 361, with an arrest attachment point marked with (A).

### **Remember**

- Plan the fall prevention at an early stage, this will benefit everyone.
- Use only safety-checked products.
- Restrict access below and around the installation and working area to prevent injury to others from any fall hazard.
- Use tools designed for the type of work to be carried out.
- Keep the installation area in order.
- A safe workplace is a good workplace.
- Many fall accidents occur from a low height.

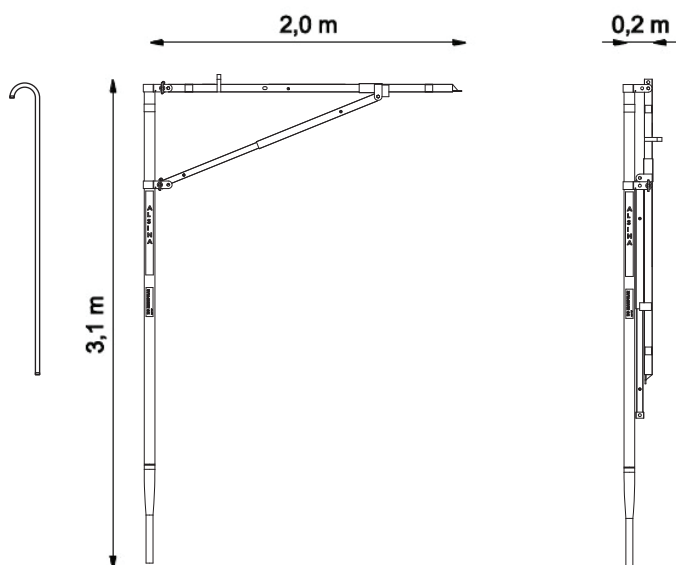
## Technical data

### Alupercha (Art. 84067)

The Alupercha is designed to be a lightweight product that can be folded for easy relocation, transport and space-saving storage. To secure both the assembled mode and the folded transportation mode, the attached Lock Pin is used. Due to the lightweight design on the Alupercha, it can be installed by a single person with no lift external equipment.

Incorporated to the Alupercha is the 3 m Sling which allows the product to be lifted by crane if needed.

Material: ..... Aluminium  
 Weight: ..... 19 kg  
 Height: ..... 3.1 m  
 Assembled width: ..... 2.0 m  
 Packed width: ..... 0.2 m



### Attachments

The Alupercha has been tested and approved to be used together with the following described attachments.

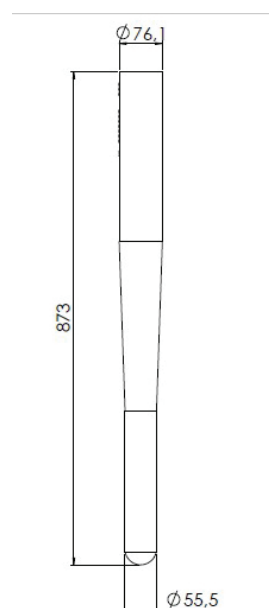
**IT IS IMPORTANT TO REMIND THAT THE ALUPERCHA CE-CERTIFICATION IS VALID ONLY WHEN USED WITH THESE ATTACHMENTS.**

### Housing Tube (Art. 84410)


The housing tube is a steel socket that shall be cast directly into the concrete on-site to house the Alupercha.


Please see the Attachment installation chapter for information on how to insert the housing tube into the concrete.

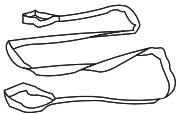
Material: ..... S235JR quality steel, conical shape  
 compatible with Alsipercha/Alupercha  
 Weight: ..... 2.6 kg  
 Height: ..... 0.873 m  
 Diameter: ..... 76 mm

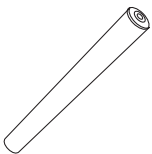



## Component Description


	<b>ALUPERCHA CE / ANSI</b>		
	Description: Aluminium overhead anchor point with built-in energy absorber, anchored to the column/structure, providing a working radius of 6.0 m.		
	code	dimensions (mm)	weight (kg)
	84067	3,100 x 2,000	19


	<b>HOOK</b>		
	Description: Component used to reach the subsequent Alupercha to change the anchor point.		
	code	dimensions (mm)	weight (kg)
	83068	140 x 2,250	1.6

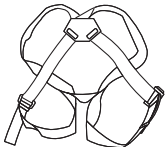
	<b>SLING</b>		
	Description: Used for crane handling if preferred, to take it out of the column, or remove it once the work is complete.		
	code	dimensions (mm)	weight (kg)
	84414	3,000	0.62


	<b>LEVELLER</b>		
	Description: Accesory to ensure the housing tube verticality and prevent from rising under the pressure of the concrete.		
	code	dimensions (mm)	weight (kg)
	83416	1,005 x Ø70	3.96

	<b>HOUSING TUBE</b>		
	Description: Component to be inserted into concrete structure, that houses the Alupercha fall arrest system.		
	code	dimensions (mm)	weight (kg)
	84410	873 x Ø76	2.71

	<b>RETRACTABLE DEVICE</b>		
	Description: Fall arrest block that stops in case of fall.		
	code	dimensions (mm)	weight (kg)
	8441201	2,500	1.599
	84439	3,500	1.80

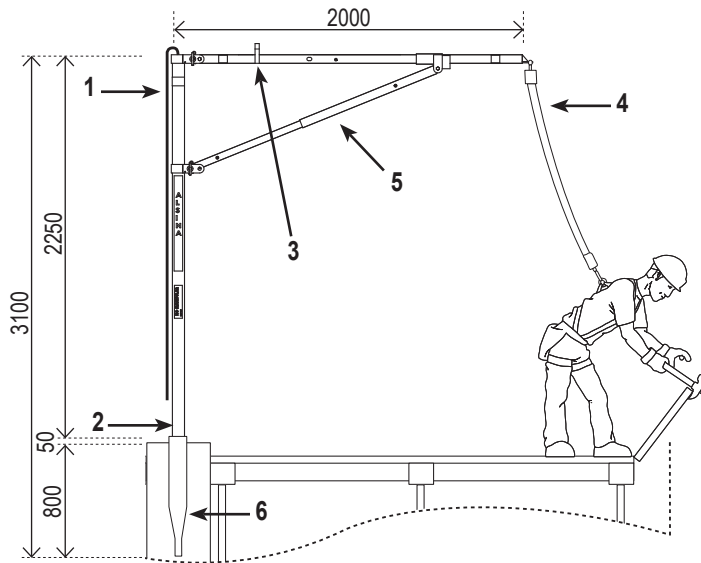
	<b>HARNESS EXTENSION</b>		
	Description: Component joining the worker to the retractable device.		
	code	dimensions (mm)	weight (kg)
	84423	1,500	0.31
	84474	500	0.15

	<b>HARNESS</b>		
	Description: Device anchoring the worker to the Alupercha fall arrest system.		
	code	dimensions (mm)	weight (kg)
	84415	500 x 150	1

	<b>CARABINER-EN 362</b>		
	Description: connects SRL to Alupercha and harness extension to the user harness.		
	code	dimensions (mm)	weight (kg)
	8341203	100	0.50

## Assembly process

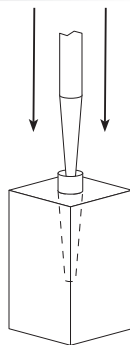
### Step 1/5 - System components



#### LEGEND

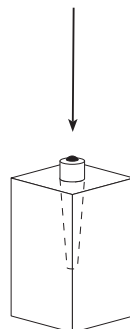
1. Hook (accessory for changing the anchor point)
2. Alupercha Body (the main body that turns through 360° and allows the worker to work freely)
3. Sling ring used to move with crane if preferred
4. Retractable device
5. Energy-absorber device
6. Housing tube

- 1.- Immediately after pouring the concrete columns, place the housing tube into the center of the column, protruding 50 mm. This tube will later accommodate the Alupercha.



Detail of the placement of the Fall Arrest System in the housing tube

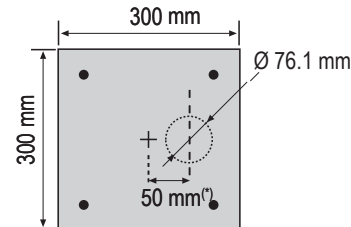
- 2.- Use the leveller to make sure that the tube is vertical and does not rise up. The column is strengthened by the steel housing tube.



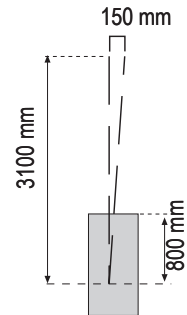
Leveller detail.

Technical details for arranging the housing tube.  
Housing tube tolerances.

1) TOLERANCE IN DIVERSION, WITH RESPECT TO THE CENTRE OF THE COLUMN



2) TOLERANCE IN VERTICAL DIVERSION



(\*) This tolerance will vary depending on the column section. If using the Alupercha system in columns with a section smaller than 300 mm, cracks may appear in the concrete. In this case, consult the structure client.



Warning - When 2 users are connected simultaneously to one Alupercha, the maximum distance between them will be 1 (one) meter. Increasing this distance may cause injuries to users due to the "pull" effect.

### Step 2/5

36 hours after pouring the column concrete, the Alupercha can be used to: install boards, handrails, risers,...

When all the boards, handrails, netting for perimeter and openings have been put in place and the perimeter boards have been nailed and watered (dry climate), the Alupercha Body can be removed.

Now we can start the panelling process from one end of the floor, working in an assured position with a radius of 6.0 m., which is equivalent to around 125 m<sup>2</sup>.



#### System limitations:

- The maximum number of users in each system will only be 2 (two).
- The structure where the system is assembled must be sufficiently resistant.
- The maximum action radius, once the system is anchored, is 6.0 m. Do not try to widen this radius by lengthening the retractable system to which it is tied.

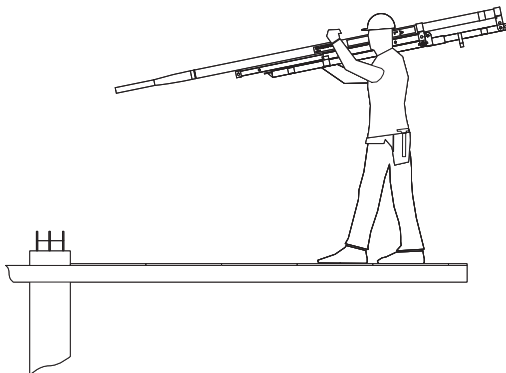
#### Precaution

- ONLY use slings supplied by Alsina.
- Do not keep weight hanging from the sling, as this may damage it.
- Protect the sling from inclement weather conditions.
- Each sling must be checked before being used. Reject it if it has any cuts, particularly if the cuts are at the ends.
- Place the sling in its correct position of use and the load stable.

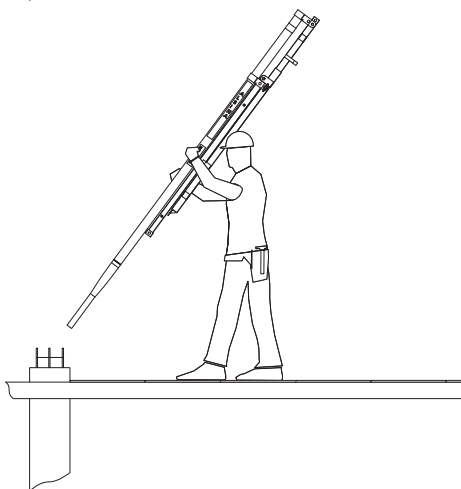
Always check that the security seal of the energy-absorber is not broken or missing, before use. Withdraw the Alupercha from service and contact Alsina technical department or official distributor in case of doubts.

## Step 3/5 - System assembly

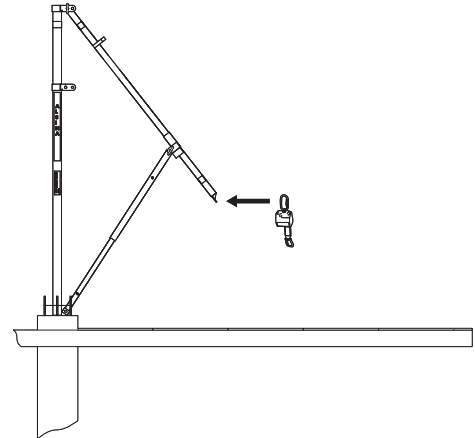
1.-



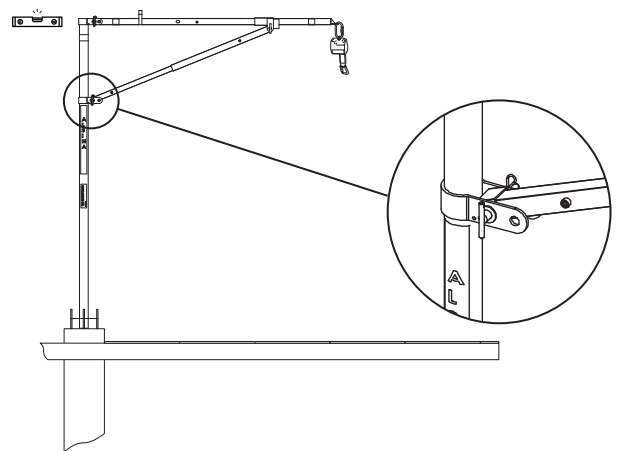
2.-



4.-



5.-

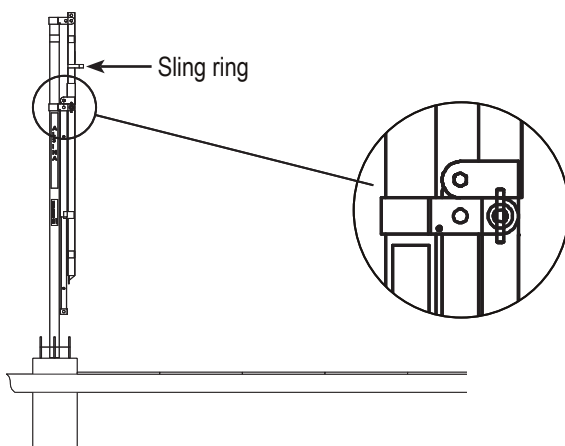


**Info** Always take care during installation; keep hands away from hinge or folding parts to avoid injury. Keep a firm grip of the Alupercha brace, during final unfolding, to avoid contact/impact with the head or other parts of the body.

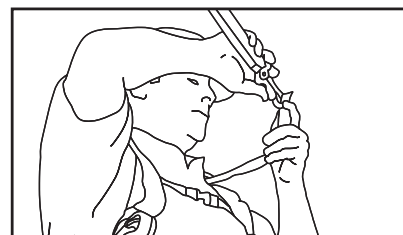


**Info** Make sure that the Lock Pin is properly installed. Under no circumstances should a Lock Pin other than the ones provided by Alsina be used. The Alupercha should be able to rotate freely after installation, make sure that nothing prevents the rotation.

3.- Remove the lock pin



6.- Connect SRL to harness



**Info** If the Alupercha is expected to be moved by crane, attach the crane hook to the sling, using the sling ring, and lift the Alupercha. For more information go to **Move by crane** section.



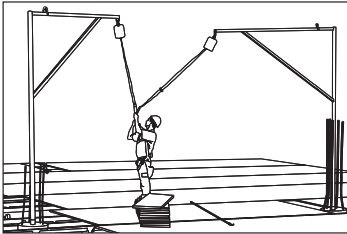
**Info** Before using the retractable device, **check**:

- That the strap winds and unwinds completely without difficulty.
- That the locking function works correctly, by jerking the strap.
- That the entire assembly is in perfect condition, with no cuts or loose threads.
- That the metal parts are not rusted and the snap hooks work and close correctly.
- When not in use, keep it clean and store in a dry place.

## Dismantling

The installation procedure should be performed in the reverse order when dismantling.

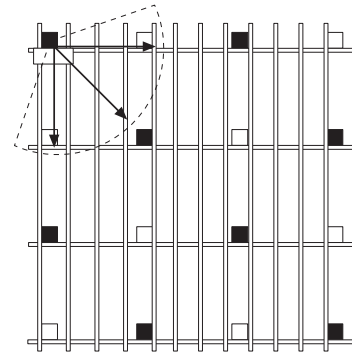
## Step 4/5 - Repositioning the Alupercha



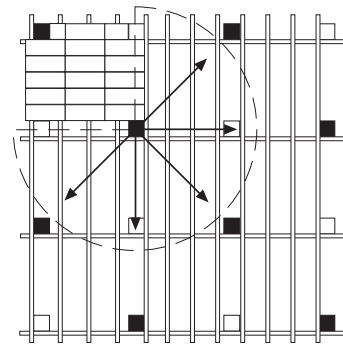
The Alupercha allows the worker to change anchorings before unhooking from the first Alupercha Body, so safety is maintained at all times.

Use the hook to do this if the next Alupercha is positioned so that the worker cannot reach to anchor themselves.

## Working with the Alupercha System

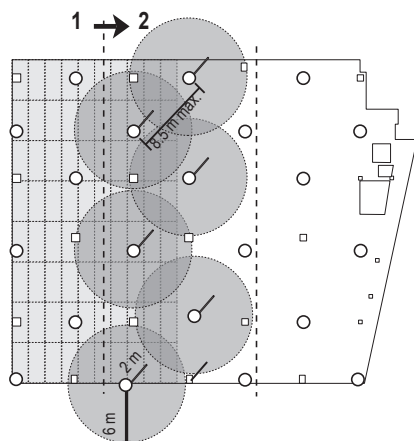


First, locate the embedded tubes in the columns where the Fall Arrest System is going to be accommodated and then begin the boarding process from that point.



Then begin the boarding process from one end of the surface and work safely with a radius of 6.0 m, which equals approximately 125 m<sup>2</sup>.

## Example of onsite layout



### LEGEND

○ Columns with a housing tube

Body - 2.0 m

Working radius - 6.0 m

Distance between columns - 8.5 m

1.- Starting the boarding of the floor

2.- Direction of progress during boarding process

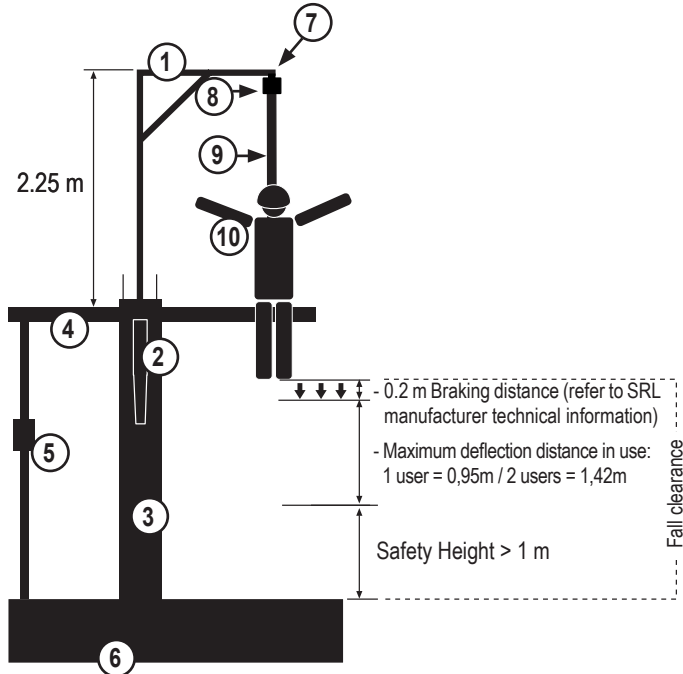
To facilitate use of the Alupercha, we recommend prior planning of the working area where it is going to be used.

Thanks to advanced CAD systems, we can know where to place the Alupercha and how many are needed to optimize their use within the working radius.



**Info** A set of approximately 6 Alupercha units are sufficient for complete formwork of a floor measuring approximately 500 m<sup>2</sup>.

The work should be carried out in such a way, as to minimise both the potential for falls and potential fall distance. (Optimisation to reduce the possible fall distance to the minimum.)



## Extended user equipment for Alupercha

When all the boards, handrails, netting for perimeter and openings have been put in place and the perimeter boards have been nailed and watered (dry climate), the Alupercha Body can be removed.



### Important

It is extremely important that this increased protected area, is decked in a progressive, leading edge fashion working forwards from the Alupercha body, in the priority sequence as shown beside.

By replacing the Retractable Element and the Harness Lengthener (84423) with a Fall Arrest Block (EN360 Compliance) of 6.0 m, or combination of 6m + 0.5m extender, the user can increase the distance forward from the Alupercha body that is protected.

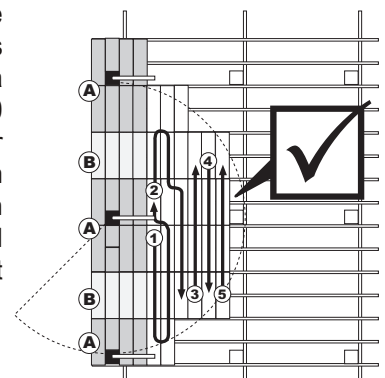


Image 1

The protected area covered by a single Alupercha unit can be extended by using an alternative set of user equipment, however this MUST be used in a controlled and disciplined manner. Failure to follow the revised working method in detail, could result in a pendulum fall, or in an increased fall distance to the level below, both could result in injury or even death.

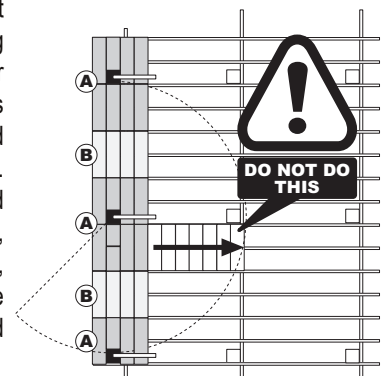


Image 2

## LEGEND

- |                 |                      |
|-----------------|----------------------|
| 1. Alupercha    | 6. Ground            |
| 2. Housing tube | 7. Anchor point      |
| 3. Column       | 8. SRL               |
| 4. Formwork     | 9. Harness extension |
| 5. Struts       | 10. Worker           |



**Info** Rescue of worker after a fall: It is important that when workers work with the Alupercha Fall Prevention System, they are not alone. In this way, in the event of a fall, the other worker can rescue the other, hopefully within a few minutes, in order to prevent injury due to loss of blood circulation in the legs. The rescuing worker, anchored to a safety point uses a hook to carry the trapped worker to the panelling area, in order to be able to stand up.

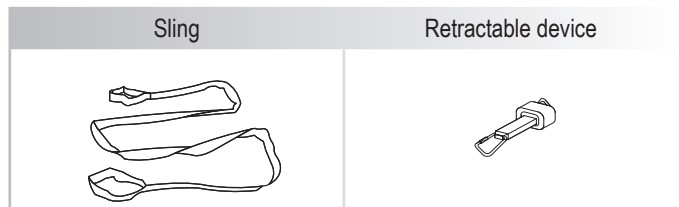


Step 5/5

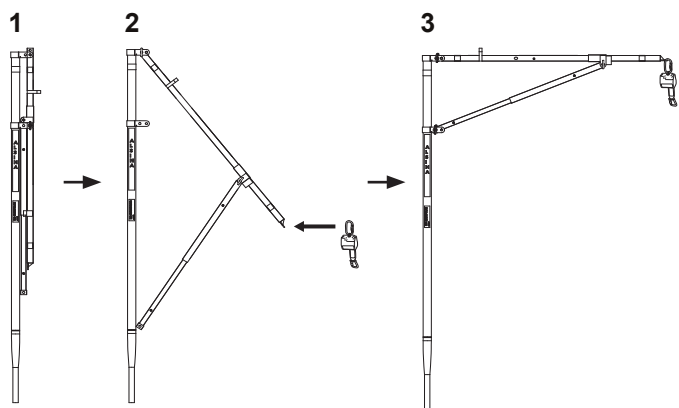
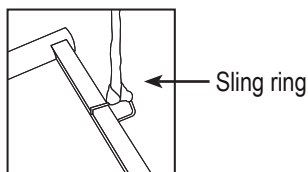
## Move by crane

### A - On the ground

1.- Install the sling and the self retractable device.

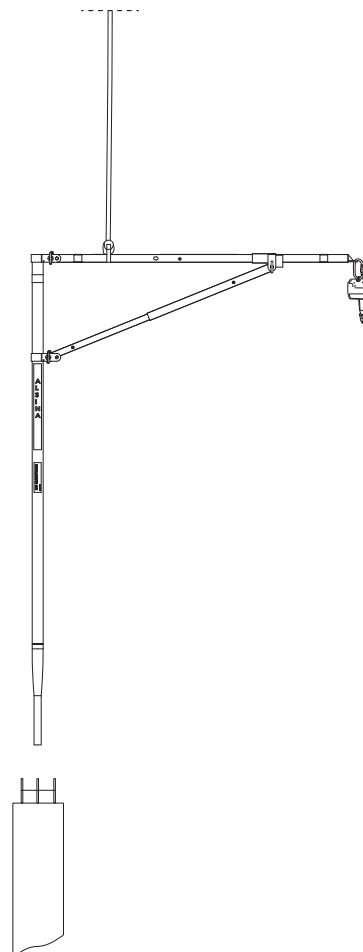


Detail of sling installation:  
To move the Alupercha to its location on the column, and to remove it once hazardous operations have been completed.



### B - With product erected

1.- Lift Alupercha from current position.

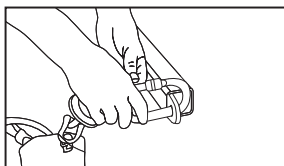


### Precautions:

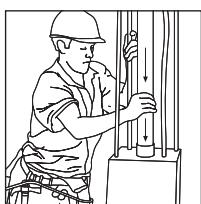


#### Warning Precautions:

- Use the slings supplied by Alsina.
- Do not allow loads to rest on the sling if they could damage it.
- Protect the sling against adverse weather conditions.
- Each sling should be examined before use. Remove the sling if it presents cuts, especially at the edges.
- Place the sling in its correct position (bight angles no greater than 120° and stable load).



Detail of the installation of the retractable device  
It is important to close the clasp properly.



#### Note: Dismantling

The installation procedure should be performed in the reverse order when dismantling.

## Employment and Loading of the system

### Table of minimum concrete strengths

Shown below are the time periods for use (the time between pouring column concrete and when the Alupercha can be used) depending on ambient temperature and column cross-section.

The results shown below are from tests performed with Alupercha in columns measuring 30 x 30 cm<sup>2</sup>, 25 x 25 cm<sup>2</sup> and 15 x 40 cm<sup>2</sup>.

Type of concrete	Column section (cm <sup>2</sup> )	Min. compression value (Mpa)*1	Indirect tensile value (Mpa)*1	AMBIENT TEMPERATURE				Time periods for use in hours
				5°C	10°C	15°C	≥20°C	
Any type of structural concrete (HA-25 or superior)	30 x 30 (or superior) *2	3.27	0.37	28 h	23 h	19 h	15 h	
	25 x 25 *3	4.72	0.52	30 h	24 h	20 h	16 h	
	15 x 40 *3	5.70	0.62	32 h	26 h	21 h	17 h	

(\*1) When using the system for the first time.

(\*2) For sections of 30x30 cm<sup>2</sup> or greater, the system allows for a maximum deviation in the position of the housing tube of 50 mm from the center of the column.

(\*3) For sections of 25x25 cm<sup>2</sup> and 15x40 cm<sup>2</sup>, the system allows for a maximum deviation in the position of the housing tube of 10 mm from the center of the column. Based on the tolerances allowed by the Spanish EHE Standard for deviation in column cross-sectional dimensions.



**Info.** Study performed by the Universidad Politécnica de Valencia.

## Report by the Association of Building Consultants (ACE)\*

### 1. BACKGROUND AND PURPOSE OF THE REPORT

...the checks to assess the structural impact of this system, which is the subject of this report, will be carried out in accordance with the following regulations:

- **EUROCODE 2:** Design of concrete structures. Part 1-1: General rules and rules for buildings. **UNE-EN 1992-1-1:2013**
- **EUROCODE 3:** Design of steel structures. Part 1-1: General rules and rules for buildings. **UNE-EN 1993-1-1:2008**

### 5. SUMMARY AND CONCLUSIONS

In the case of a C25/30 concrete column, placing an S-235JR tube of the dimensions specified in point 2 of this report inside it does not imply any reduction of its resistant characteristics, as demonstrated in the previous point.

As a summary, and for different concrete and steel resistances, two tables (compression and shear) are shown with all possible combinations:

#### COMPRESSION

Concrete	Steel		
	S235 JR	S235 JR	S355 JR
C25/30	1.302	1.524	1.968
C30/37	1.085	1.270	1.640
C35/45	0.930	1.089	1.405
C40/50	0.814	0.953	1.230
C45/55	0.724	0.847	1.093
C50/60	0.651	0.762	0.984

#### SHEAR STRESS

Concrete	Steel		
	S235 JR	S235 JR	S355 JR
C25/30	1.892	2.214	2.858
C30/37	1.615	1.890	2.440
C35/45	1.411	1.651	2.131
C40/50	1.253	1.466	1.893
C45/55	1.128	1.320	1.703
C50/60	1.025	1.200	1.549

It is observed, for example, that for a steel S-235JR such as that of the current tube, in concrete with a characteristic strength equal to or greater than 35 MPa, the safety coefficient is lower than the unit. Therefore, in this case and in all those that appear in red in the compression table, the incorporated tube as part of the ALUPERCHA system supposes a decrease in the resistance capacity of the column. In these cases, once the formwork has been placed and the system is no longer used, the hole should be cleaned and then filled with a GROUT mortar of the same resistant characteristics as the concrete of the column.

We present, for all relevant purposes and based on our firm knowledge and understanding, our opinion which we defer to any other better-founded opinion, in Girona, on July 11, 2019.

**BG**  
Blázquez Guanter

Antoni Blázquez y Boya  
BLÁZQUEZ GUANTER SLP

**ACE**  
ASOCIACIÓN DE CONSULTORES D'ESTRUCTURES

Jorge Blasco  
A.C.E Technical Commission

## Report by the Universidad Politécnica de Valencia (UPV)\*

(.../...)

### 4.- CONCLUSIONS

- This study analyzes the influence exerted on the behavior of the reinforced concrete columns by the use of the Fall Arrest System developed by ENCOFRADOS J. Alsina, S.A.

(.../...)

The most important conclusions are as follow:

- 1.- Although the sizes of concrete column sections are usually selected for shear stress and flexocompression separately, this study has considered these jointly, in a similar way to the analysis of metal structural sections. This makes it easier to consider the influence of the steel tube.
- 2.- As a result, we estimate that the reduction of section shear stress resistance caused by the hole in the concrete would be absorbed assuming, in the flexocompression calculation, that the steel of the tube experiences a reduction in elastic limit which has been taken as 5%, to be on the safe side.
- 3.- Considering this reduction in the elastic limit of the steel, the Axis-Moment interaction diagrams for the section were calculated without modification and including the tube (for different types of steel and thicknesses of tube). Accordingly we have determined, for each type of concrete and steel, the tube thicknesses that cause the interaction diagram for the modified section to wrap around the original section. This ensures that there is no loss of resistance for the section for that thickness of tube.

*[Signature]*

Signed: Pedro A. Calderón García  
Dr. Civil Engineering, C. and P.  
Head Teacher in Building  
and Prefabrication

*[Signature]*

Signed: Juan Navarro Gregori  
Civil Engineering, C. and P.  
Assistant Teacher in Concrete



**Info\*** The original document consists of 8 pages, and is available to our customers for inspection.

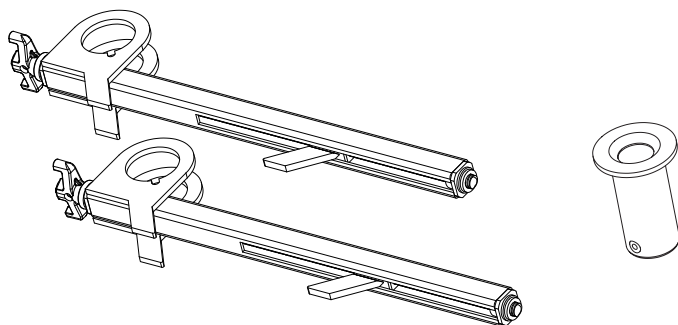


**Info\*** The original document consists of 17 pages, and is available to our customers for inspection.


### Assembly process


#### Characteristics and advantages

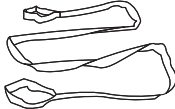
- Patented product made in steel, proving to be a much more lightweight accessory, easy and quick to assemble, and which only needs a hammer for attachment.
- Designed and tested in compliance to EN:795:2012 and ANSI/ASSE Z359.18-2017.
- It can be attached to steel columns (Sections with IPE, IPN, HEB type wings, etc.) with sections from 120 to 450 mm.
- Only two sellable codes which, once assembled, are inseparable (Integrated Safety).
- Can be assembled by competent works personnel.
- To be installed following the use of crane assembly model (refer to step 5/5 of the "Move by crane section" on Page 12).





### Component Description

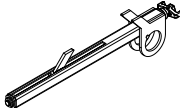
	ALUPERCHA CE / ANSI		
	Description: Aluminium overhead anchor point with built-in energy absorber, to combine with the column clamps.		
	code	dimensions (mm)	weight (kg)
	84067	3100 x 2,000	19

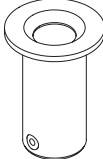
	HOOK		
	Description: Component used to reach the subsequent Alupercha to change the anchor point.		
	code	dimensions (mm)	weight (kg)
	83068	140 x 2,250	1.6

	SLING		
	Description: An essential component used to move the assembly with a crane (if that is preferred), or remove it once the work is complete.		
	code	dimensions (mm)	weight (kg)
	84414	3,000	0.62

	RETRACTABLE DEVICE		
	Description: Fall arrest block that stops in case of fall.		
	code	dimensions (mm)	weight (kg)
	8441201	2,500	1.599
	84439	3,500	1.80
	8441205	10,000	7

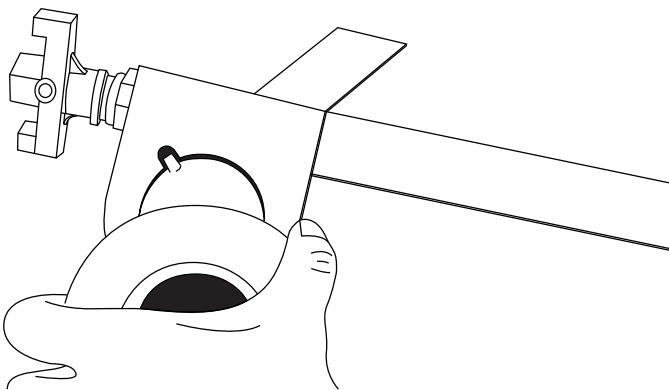
	HARNESS		
	Description: Device anchoring the worker to the Alupercha fall arrest system.		
	code	dimensions (mm)	weight (kg)
	84415	500 x 150	1

	COLUMN CLAMP		
	Description: Column clamp to anchor the Alupercha to steel wide flange columns.		
	code	dimensions (mm)	weight (kg)
	83424	755 x 55	6,27

	COLUMN CLAMP SLEEVE		
	Description: Column clamp accessory necessary to support the end of the Alupercha.		
	code	dimensions (mm)	weight (kg)
	83426	154 Ø65	1.24

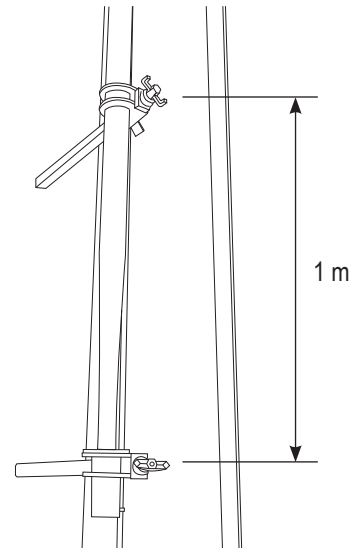
### Assembly process

- 1.- A set of Alupercha system with column clamps will be made of:  
1 Alupercha body (84067), 2 column clamps (83424) and 1 column clamp sleeve (83426).
- 2.- The COLUMN CLAMP SLEEVE unit (83426) will be assembled into one of the COLUMN CLAMP (83424), passing the nipple of the sleeve through the grooves of the clamp plate (this solution is called the "labyrinth", and once the SLEEVE is assembled in the clamp it prevents them from separating from one another). See picture below.

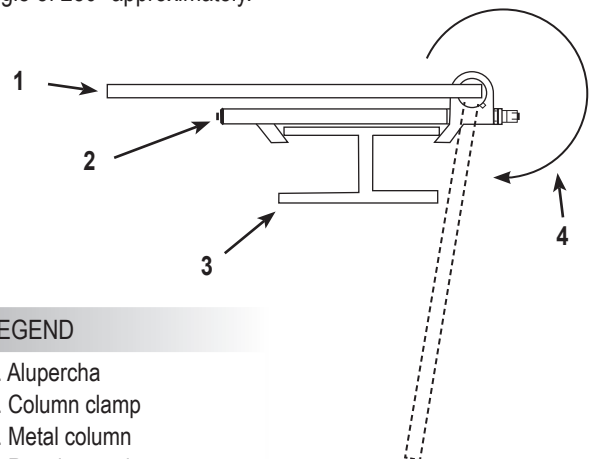


- 3.- Both column clamps (83424) will be connected to the steel column, distanced by 1m. Attach both column clamps using a hammer, hitting the end nut hard (up to 50 Nm).

**Note:** The clamp which has the column sleeve connected must be situated on the bottom position, as shown in the below figure



- 4.- Sustituir por: Now the Alupercha body (84067) will be inserted through the rings of both column clamps connected, until the bottom part of the Alupercha body is inserted into the column clamp sleeve. Once the Alupercha is connected, and the worker is connected to his safety harness, the worker has a free rotation angle of 280° approximately.



#### LEGEND

1. Alupercha
2. Column clamp
3. Metal column
4. Rotation angle

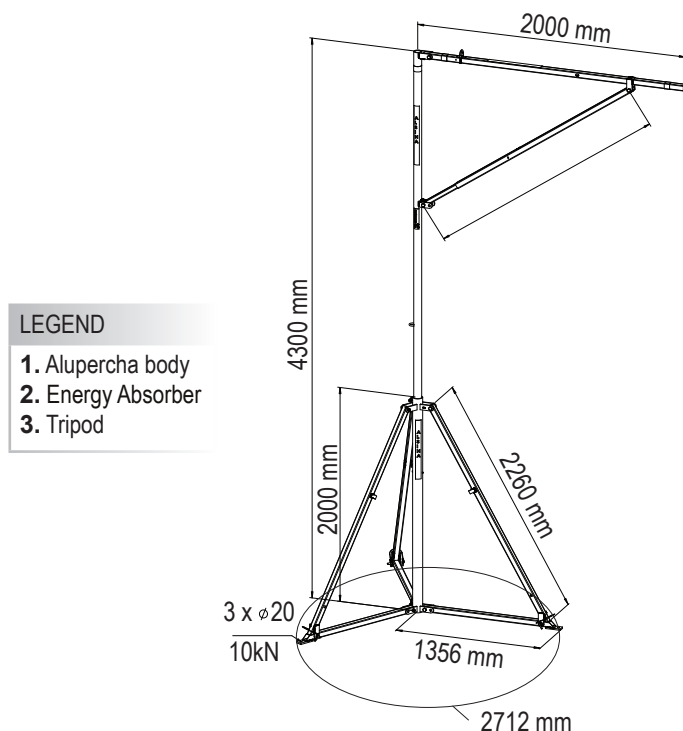
## Alupercha Tripod

### Alupercha Tripod assembly procedure

Designed and tested in compliance to EN:795:2012 and ANSI/ASSE Z359.18-2017, the Alupercha with tripod, is a solution that allows workers to safely load/unload trucks from a trailer.

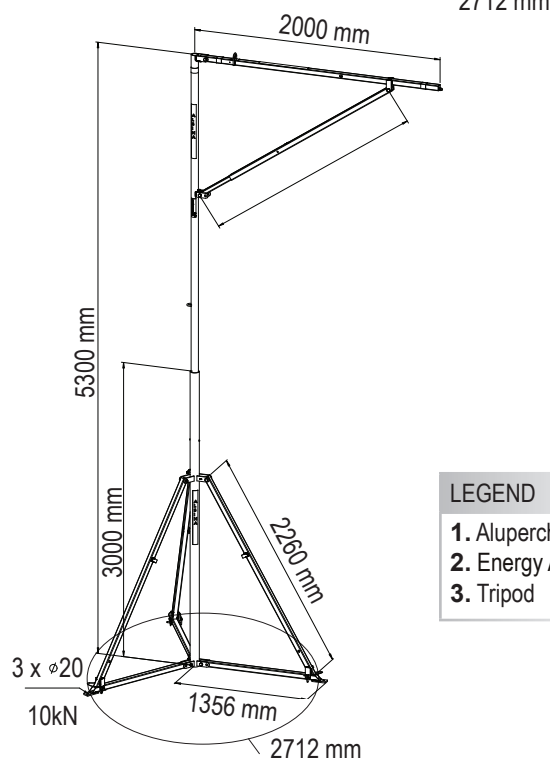
The ALUPERCHA TRIPOD is folded up when it is delivered onsite. Once it has been placed in its work position, it is assembled according to the following steps:

To be installed following the use of crane assembly model (refer to step 5/5 of the "Move by crane section" on Page 12)



#### LEGEND

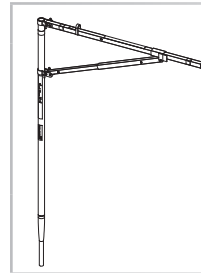
1. Alupercha body
2. Energy Absorber
3. Tripod



#### LEGEND

1. Alupercha body
2. Energy Absorber
3. Tripod

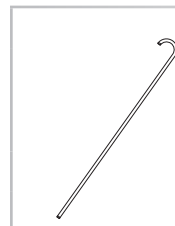
## Component Description



### ALUPERCHA CE / ANSI

Description: Aluminium overhead anchor point with built-in energy absorber, to combine with the tripod.

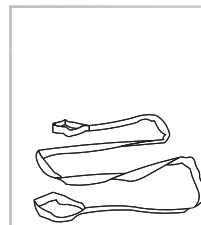
code	dimensions (mm)	weight (kg)
84067	3,100 x 2,000	19



### HOOK

Description: Component used to reach the subsequent Alupercha to change the anchor point.

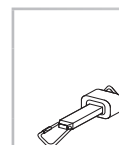
code	dimensions (mm)	weight (kg)
83068	140 x 2,250	1,6



### SLING

Description: An essential component used to move the assembly with a crane (if that is preferred), or remove it once the work is complete.

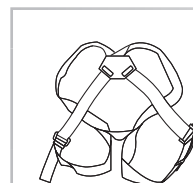
code	dimensions (mm)	weight (kg)
84414	3,000	0,62



### RETRACTABLE DEVICE 10M

Description: Retractable component that locks on a sudden acceleration.

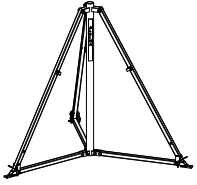
code	dimensions (mm)	weight (kg)
8441205	10,000	7




### HARNESS

Description: Device anchoring the worker to the Alupercha fall arrest system.

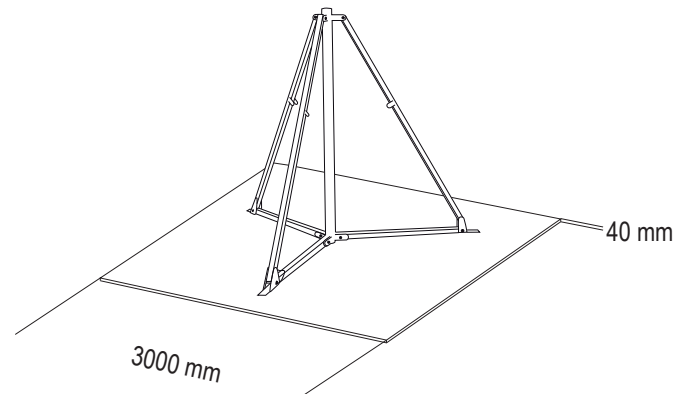
code	dimensions (mm)	weight (kg)
84415	500 x 150	1

	TRIPOD		
	Description: Element that supports and stabilizes the Alupercha.		
	code	dimensions (mm)	weight (kg)
	84475	2,000	90
	84478	3,000	98

	FH FISCHER ANCHORS Ø18 M12X138.		
	Description: Accessory to anchor the tripod.		
	code	dimensions (mm)	weight (kg)
	83479	18 x 80 x 25 S	0.01

#### Option of anchoring to steel plate

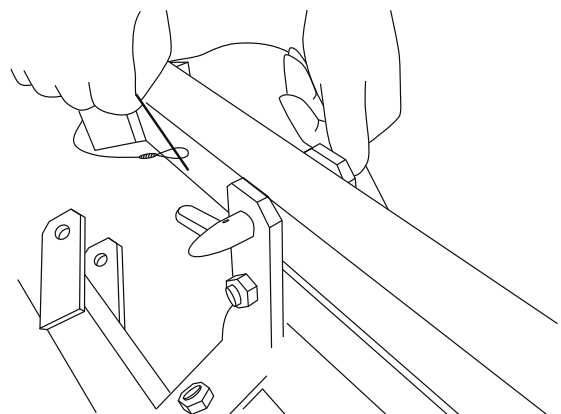
- Place the tripod on a steel plate that has the following characteristics as a minimum: measurements of 300 x 300 cm and 4 cm thickness, with three M18 previously-bored threaded holes through which the anchors will pass (in this case it will be an 8.8 quality M18x50 DIN933 galvanised screw with an M18 DIN 125-A washer).



**Warning** - Prepare and adapt the ground/surface where the system is intended to be installed, in order to ensure a 0° % of unevenness.

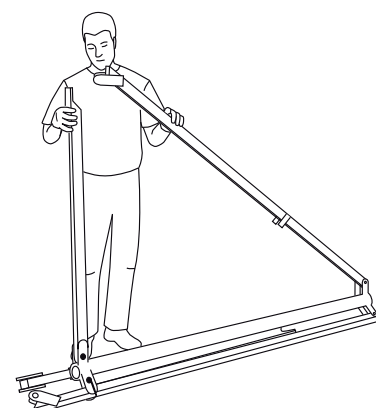
#### Step 1

To open the tripod feet, release the connecting PINS.



#### Step 2

Once the pin has been released, the first foot will open.



### Alupercha tripod assembly procedure

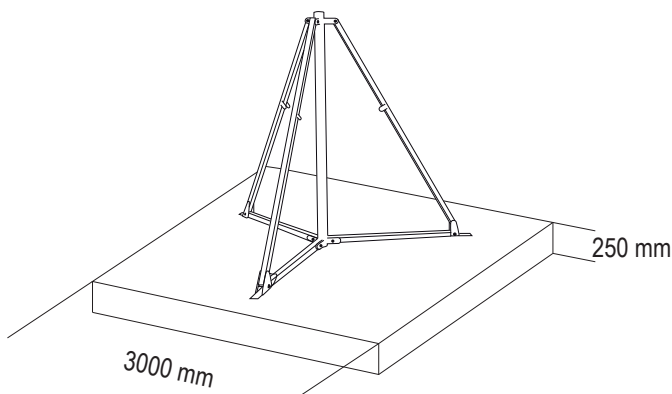


**Info.** It is very important to mount the ALUPERCHA TRIPOD on sufficiently compact and resistant terrain so that the anchor device provides sufficient safety guarantees. There are various terrain / slab / footing options:

#### Option of anchoring to concrete/slab footing

- Create a concrete footing that has the following characteristics as a minimum: HA25 concrete or higher (minimum resistance of concrete for use = 10 MPa, if fresh concrete is used), measurements of 300 x 300 cm and thickness of 25 cm, as well as a scrap metal covering.

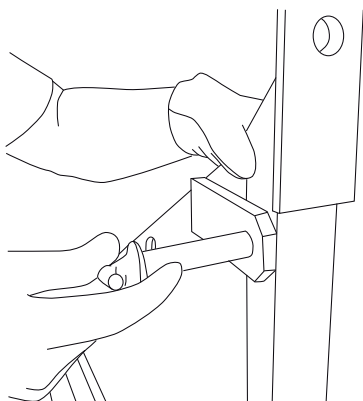
In this case, the anchor will consist of placing 3 "M12 FISCHER FH 18X80/25 S HIGH RESISTANCE ANCHORS" (or equivalent).





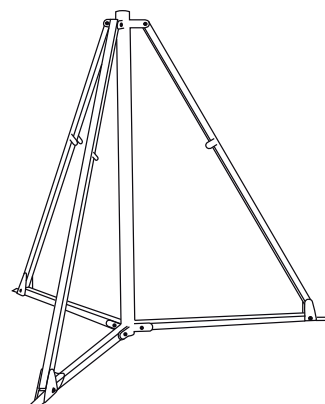
#### Step 3

Secure it in the open position by placing the pin in the R position.



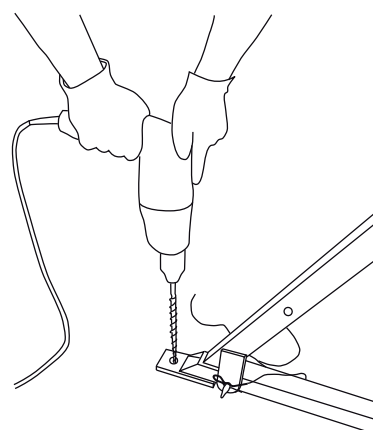
#### Step 6

ALSINA TRIPOD in the working position.



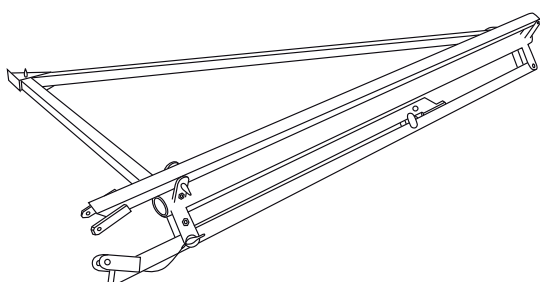
#### Step 7

On the HA25 concrete sole plate, drill with an 18 mm - diameter bit to a depth of 140 mm.



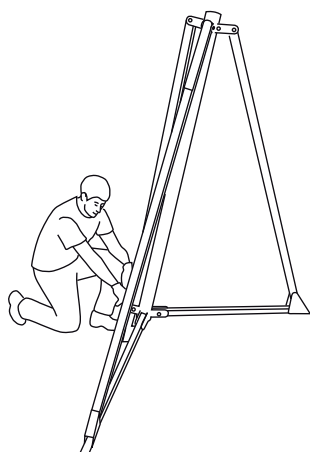
#### Step 4

ALSINA TRIPOD with one foot open.



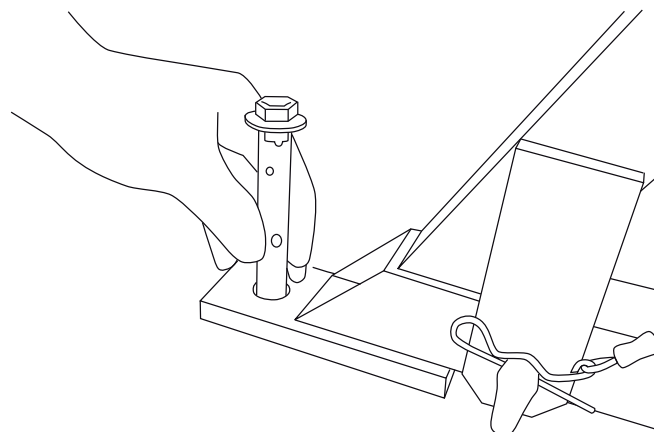
#### Step 5

Turn the TRIPOD 180 degrees, open the second foot, and place it upright. Use an anchoring element to secure the tripod to a high, fixed point so the structure does not overturn. Proceed to open the third foot.



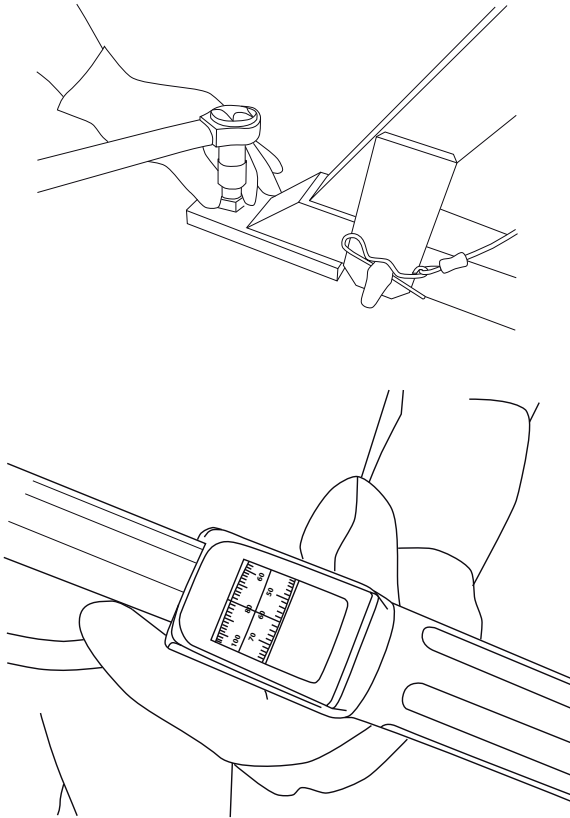
#### Step 8

The M12 FISCHER FH 18X80/25 S HIGH RESISTANCE ANCHOR is fitted.



#### Step 9

With a dynamometric wrench, torque to 80 Nm. Repeat for all three anchors. Finally, using the crane, place the Alupercha on top of the ALUPERCHA TRIPOD.



### Procedure for use on site

#### General Information

There are 4.3 or 5.3 meters from the anchor point to the floor, depending on the type of tripod chosen, meaning that the worker can work above the truck load in complete safety. The diameter of the circular surface occupied by the tripod base is 2.7 m

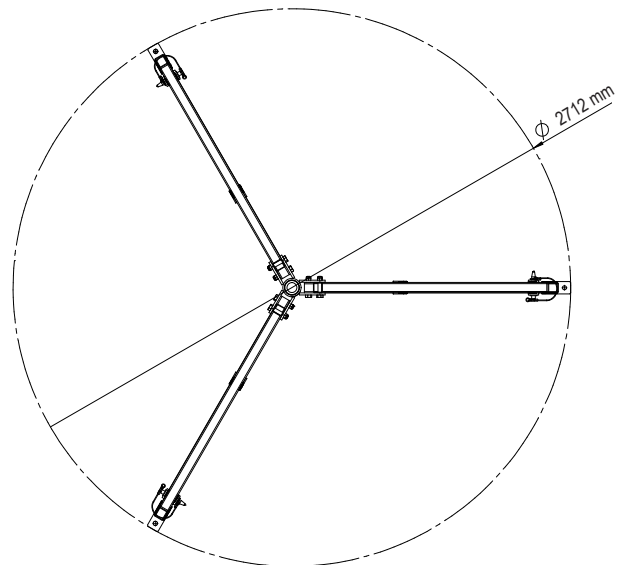
#### Safety information

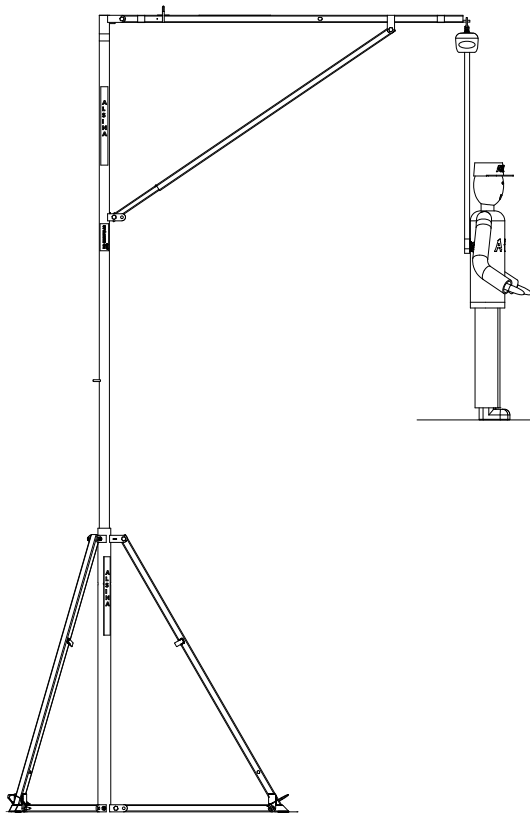
The Alupercha is only for the operations indicated in this document, to prevent them from falling when loading on or unloading from delivery vehicle platforms.

Other spare parts that are not supplied with the system must not be used.

Check all the parts of the Alsina unloading system components before installing. Never use the equipment if it is damaged or rusty, as this may affect its safety.

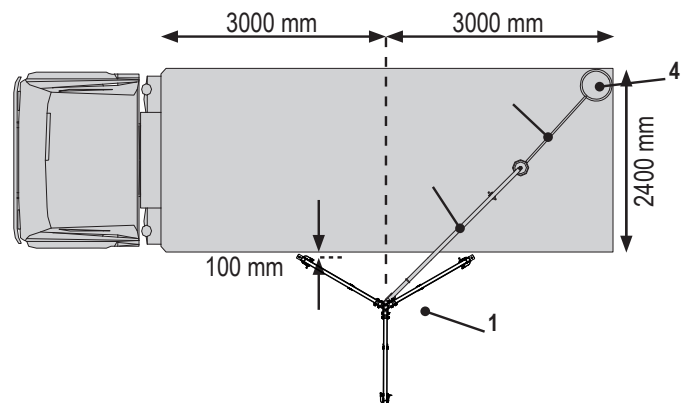
If anyone falls when using the Alupercha system, the retractable system must be withdrawn from service and inspected by an appropriate person. If you have any queries, please contact Alsina.





#### Trucks that are 6 m long

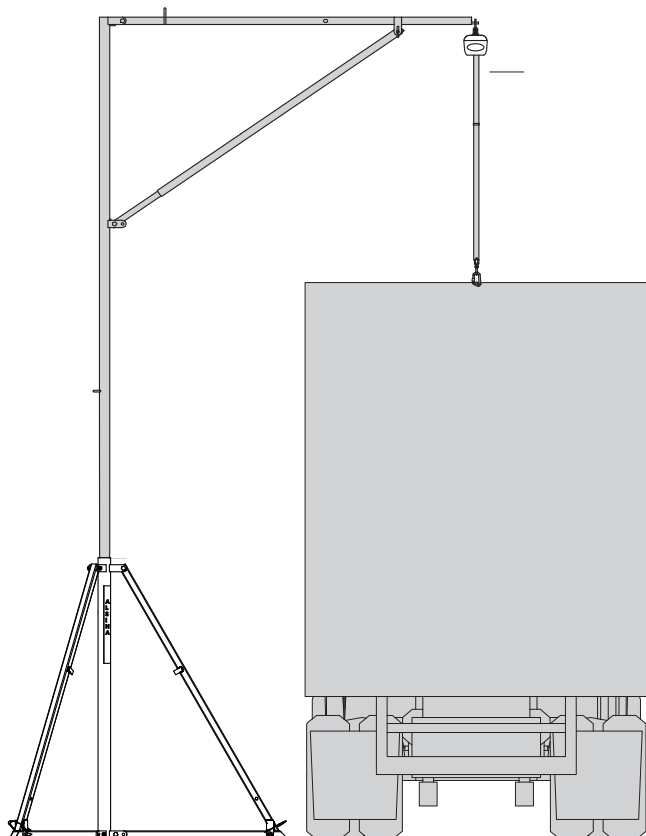
To unload the 6-metre platform of a truck, only one Alupercha system will need to be used. When parking the truck, the rear box/platform must be situated according to the distances shown in the following illustration:



#### LEGEND

1. Alupercha tripod
2. Alupercha System
3. 10 m retractable element
4. Worker

#### Final assembly



Any worker unloading a truck with a 6 m platform, must use:

- Suitable footwear
- A reflective jacket and a helmet with chin protection
- a safety harness
- 0.3 m additional extension rope for subsequent anchoring

Once the worker has the PPE correct (Personal Protection Equipment), he can hang the additional 0.3 m rope on his harness by rolling it up and attach the other end of the fall arrest device to the retractable element with a snap hook.

The fall-stop device must include a retractable 10 m inertia reel.

The worker must be connected to the system before accessing the platform.



**Warning** - Prepare and adapt the ground/surface where the system is intended to be installed, in order to ensure a 0° % of unevenness.

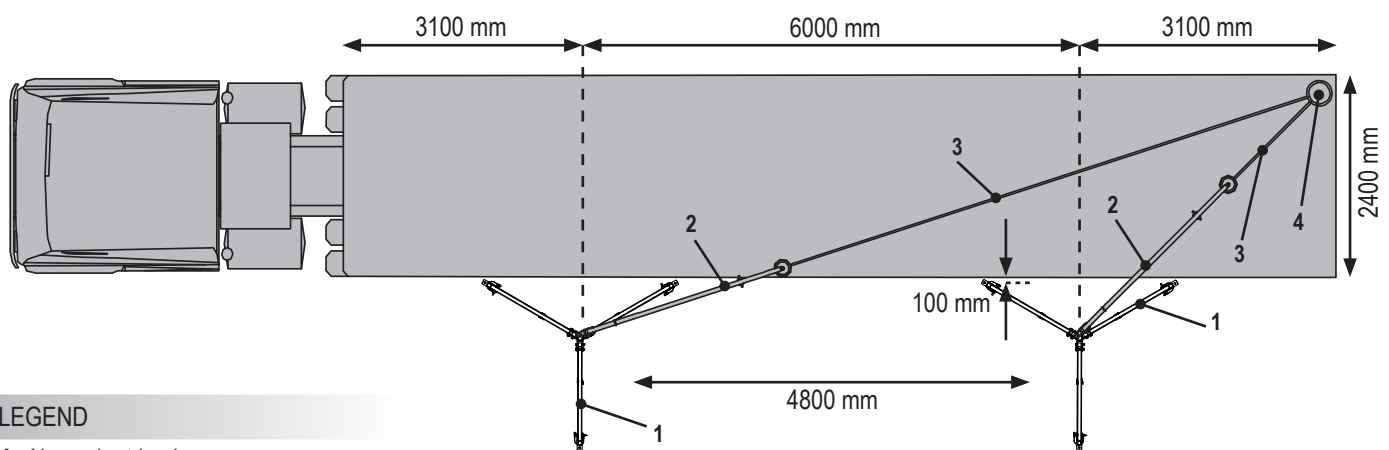
#### Trucks that are 12 m long

As the image below shows, when a 12-metre truck is loaded and unloaded, two Alupercha systems must be used simultaneously.

When parking the truck, the rear box/platform must be situated according to the distances shown in the illustration below.

The worker must be attached to two Alupercha systems. This will help him control the movement on the 12 m long platform in the event of a fall.

If it should be necessary to access the outer corners of the platform, it is best to move the truck to ensure that the worker is within a range of 3.5 m from the structure.



#### LEGEND

1. Alupercha tripod
2. Alupercha System
3. 10 m retractable element
4. Worker

Any worker unloading a truck with 12 m platform, must use:

- suitable footwear
- a reflective jacket and a helmet with chin protection
- a safety harness
- 0.3 m additional extension rope for subsequent anchoring

Once the worker has the correct PPE (Personal Protection Equipment) he can hang the additional 0.3 m rope on his harness by rolling it up and attach the other end of the fall arrest device to the retractable element with a snap hook.

The fall arrest device is comprised of a retractable inertia reel of 10 m, to allow the worker to move freely to the ends of the truck.

The worker must be connected to the two systems before accessing the platform.



**Warning - Prepare and adapt the ground/surface where the system is intended to be installed, in order to ensure a 0° % of unevenness.**

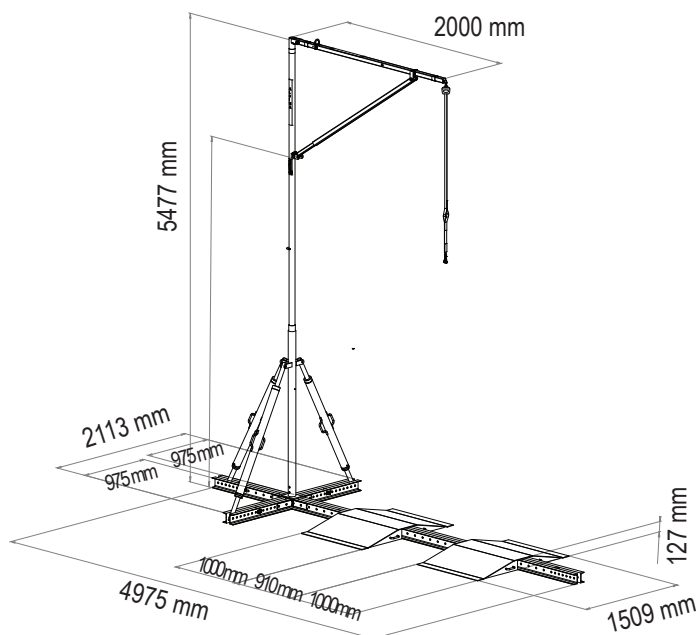
## Alupercha COUNTERWEIGHT MF

### Introduction

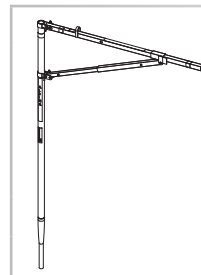
The MF Counterweight solution, together with the ALUPERCHA fall prevention system, has been designed to allow the loading and unloading of equipment from the top of a flatbed delivery truck/trailer in a safe manner

Designed and tested in compliance to EN:795:2012 and ANSI/ASSE Z359.18-2017. the MF Counterweight solution can be used on a site or in a loading yard and can be moved to alternative locations as the needs arise. The MF Counterweight solution incorporates an ALUPERCHA unit, which can be separated and folded up for ease of transport between locations.

To be installed following the use of crane assembly model (refer to step 5/5 of the "Move by crane section" on Page 12).



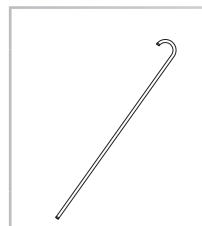
### Component Description



#### ALUPERCHA CE / ANSI

Description: Aluminium overhead anchor point with built-in energy absorber, to combine with the MF Counterweight system.

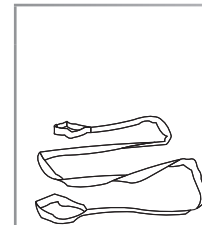
code	dimensions (mm)	weight (kg)
84067	3,100 x 2,000	19



#### HOOK

Description: Component used to reach the subsequent Alupercha to change the anchor point.

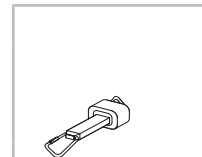
code	dimensions (mm)	weight (kg)
83068	140 x 2,250	1.6



#### SLING

Description: An essential component used to move the assembly with a crane (if that is preferred), or remove it once the work is complete.

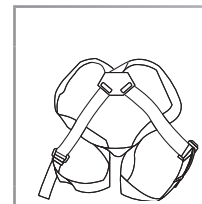
code	dimensions (mm)	weight (kg)
84414	3,000	0.62



#### RETRACTABLE DEVICE 10M

Description: Retractable component that locks on a sudden acceleration.

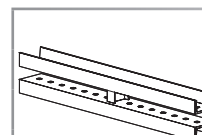
code	dimensions (mm)	weight (kg)
8441205	10,000	7



#### HARNESS

Description: Device anchoring the worker to the Alupercha fall arrest system.

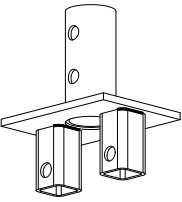
code	dimensions (mm)	weight (kg)
84415	500 x 150	1

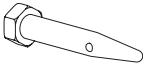


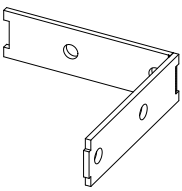
#### 2UPN MF GIRDER

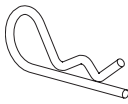
Description: Main structural beam.


code	dimensions (mm)	weight (kg)
3490122	1,220	30.76
3490497	4,970	124.7

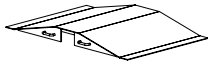
	<b>ALUPERCHA MF AXIS SUPPORT</b>		
	Description: Connector to the central support axis.		
	code	dimensions (mm)	weight (kg)
	83039	200 x 150 x 250	4


	<b>D/20X130 MF NUT</b>		
	Description: Component connection.		
	code	dimensions (mm)	weight (kg)
	33701	142 x 30	0.32


	<b>ALUPERCHA MF STRENGTHENER</b>		
	Description: Component waler.		
	code	dimensions (mm)	weight (kg)
	83038	252 x 249 x 70	2

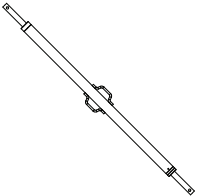
	<b>PASADOR (R) SAFETY 4/74MM MF</b>		
	Description: Component connection.		
	code	dimensions (mm)	weight (kg)
	33700	74 x 30	0.14

	<b>DIN931 8.8 ZN SCREW</b>		
	Description: Component connection.		
	code	dimensions (mm)	weight (kg)
	33729	20 x 100	0,4
	83046	20 x 120	0,35

	<b>ALSIP. MF TRUCK WHEEL BASE</b>		
	Description: Platform.		
	code	dimensions (mm)	weight (kg)
	83034	1,510 x 1,000 x 130	90

	<b>M 20 DIN985 NUT</b>		
	Description: Component connection.		
	code	dimensions (mm)	weight (kg)
	630000167	10 x 10	0,05

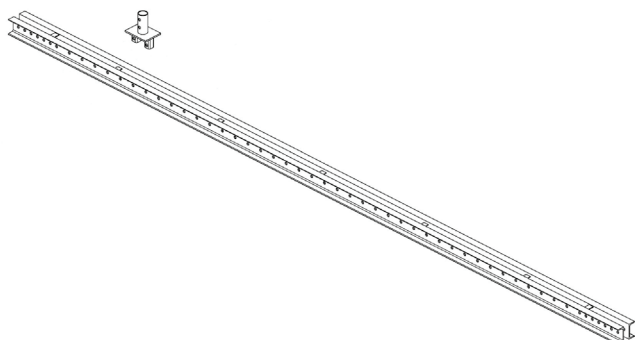
	<b>ALUPERCHA MF AXIS</b>		
	Description: Central support axis.		
	code	dimensions (mm)	weight (kg)
	84044	2,000	35.4
	84059	3,000	50.9

	<b>PULLPROP 1,50-2,25 MF</b>		
	Description: Component for aligning.		
	code	dimensions (mm)	weight (kg)
	34603	1,500 - 2,250	22.5

### Assembly instructions

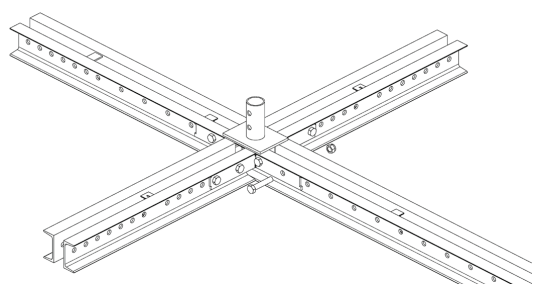
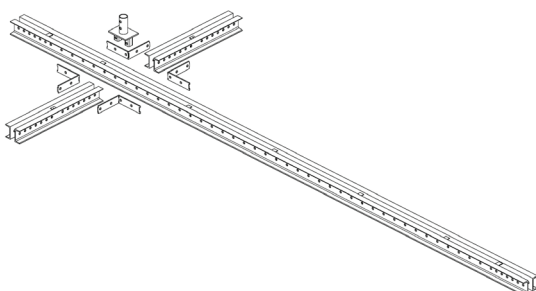
#### Step 1

On a flat surface, must be placed the 2UPN 4.97M MF GIRDER (Code 3490497). Then, the ALUPERCHA MF AXIS (Code 83039) has to be installed over the girder, by using the 6th and 7th hole from the more spaced series of holes of the beam.



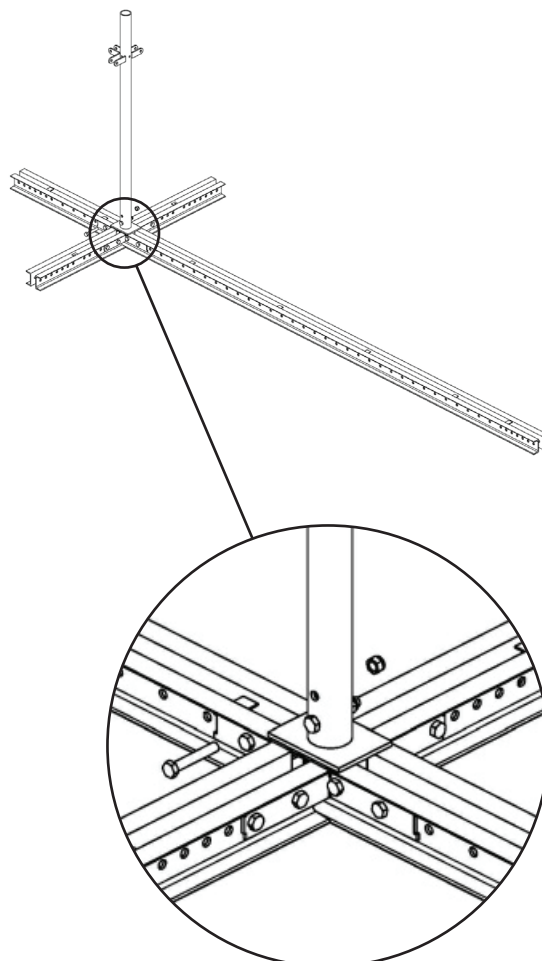
#### Step 2

The shortest beams 2UPN 1,22M MF GIRDER (Code 3490122) needs to be placed perpendicular to the 2UPN 4.97M MF GIRDER (Code 3490497), by using the ALUPERCHA MF STRENGTHENER (Code 83038). The beams joint must be done by using the M20X100 DIN931 8.8 ZN SCREW (Code 33729) with the M 20 DIN985 NUT (Code 630000167), as follows:



#### Step 3

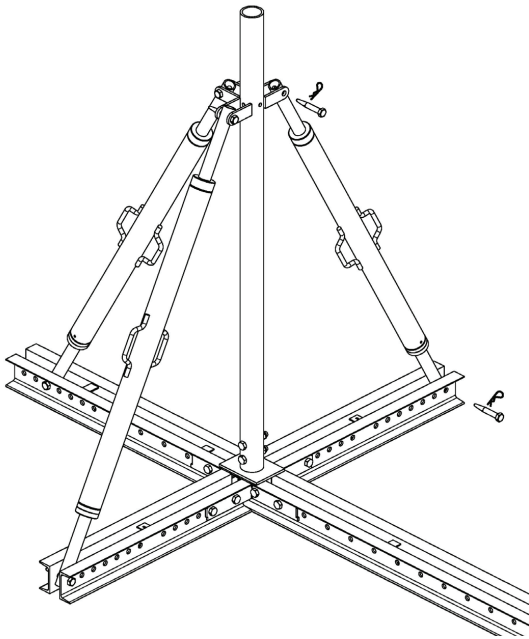
The ALUPERCHA MF AXIS (Code 84044) must be connected to the ALUPERCHA MF AXIS SUPPORT (Code 83039), by using the M 20X120 DIN931 8.8 ZN SCREW (Code 83046), and the M 20 DIN985 NUT (Code 630000167), as follows:





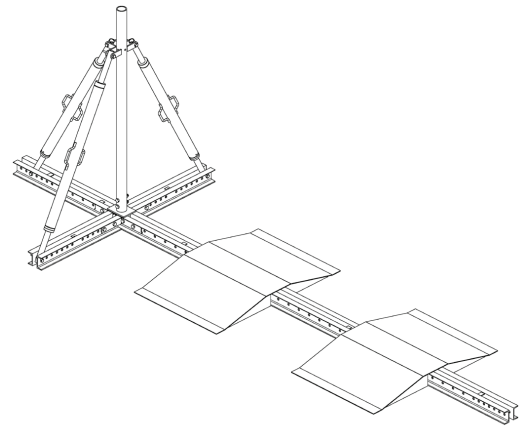
### Step 4

The PULLPROP 1,50-2,25 MF (Code 34603), has to be joined to the ALUPERCHA MF AXIS (Code 84044), and to the two kind of GIRDERS (Codes 3490122 and 3490497), by using the D/20X130 MF NUT (Code 33701) and the PASADOR (R) SAFETY 4/74MM MF (Code 33700), as follows:



### Step 5

The ALSIP. MF TRUCK WHEEL BASE (Code 83034) has to be put over the 2UPN 4,97M MF GIRDER (Code 3490497) at a distance between 0,85m and 1,00m from the ALUPERCHA MF AXIS (Code 84044 or 84059). The distance between the TRUCK WHEEL BASES (Code 83034), will depend on the distance between the axis trucks.



**Info.** When installing with the ALUPERCHA MF AXIS 2000 mm height (84044), the connection of the aligners (34603) to the 2 UPN beams shall take place using the holes:  
 2 UPN beam with a length of 1,220 mm (3490122) => the outermost of the ALUPERCHA MF AXIS (84044)  
 2 UPN beam with a length of 4,970 mm (3490497) => the third (starting with the outermost hole towards the ALUPERCHA MF AXIS).



**Warning** - Ensure that the surface/ground where the system is intended to be installed, must have **0° % of unevenness**.



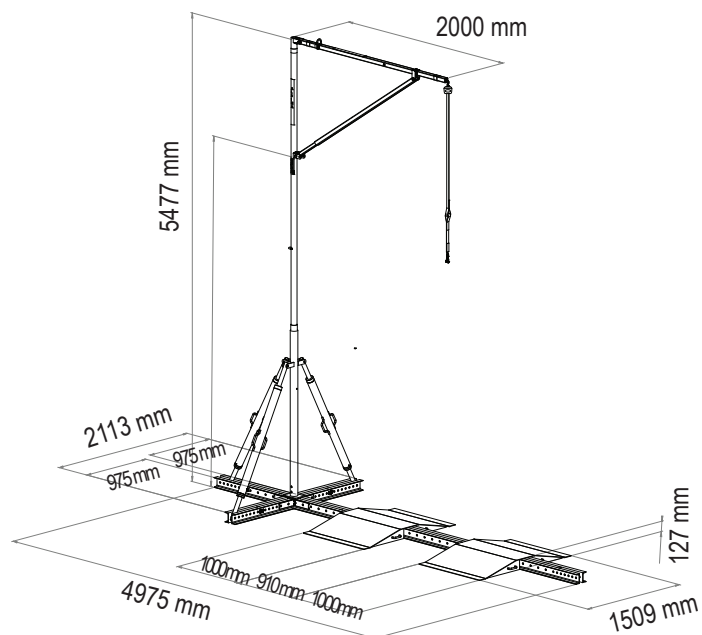
**Warning** - All persons using this equipment must read, understand and follow all instructions. Failure to do so may result in serious injury or death. Pregnant women and minors must not use this product.



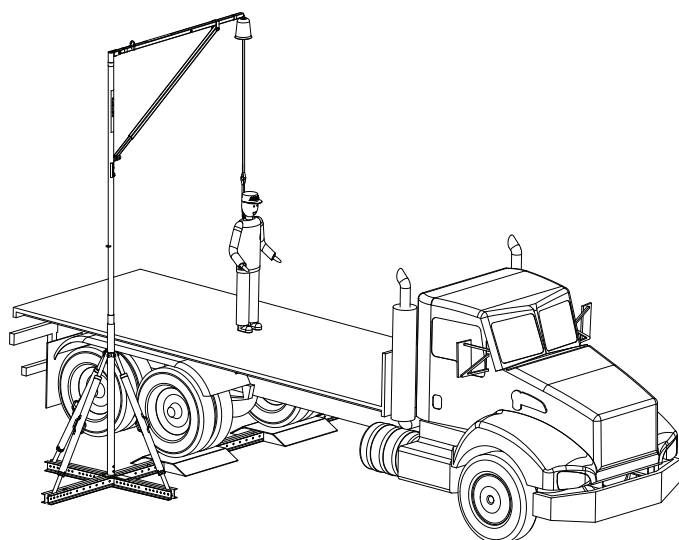
**Info.** When installing with the ALUPERCHA MF AXIS 3.000 mm height (84059), the connection of the aligners (34603) to the 2 UPN beams shall take place using the holes:  
 2 UPN beam with a length of 1,220 mm (3490122) => those of the fourth position, starting from the outermost of the ALUPERCHA MF AXIS (84059)  
 2 UPN beam with a length of 4,970 mm (3490497) => the sixth (starting with the outermost hole towards the ALUPERCHA MF AXIS).

### Step 6

Finally, the ALUPERCHA FALL PREVENTION SYSTEM (Code 84067) has to be installed inside the ALUPERCHA MF AXIS (Code 84044 or 84059), to adopt its final configuration.



**Warning** - Prepare and adapt the ground/surface where the system is intended to be installed, in order to ensure a 0° % of unevenness.



## Description

The **Alupercha + Wall Brackets** system, designed and tested in compliance to EN:795:2012 and ANSI/ASSE Z359.18-2017, consist of a pair of connectors (upper bracket + lower bracket), through which the **Alupercha** will later be inserted. It consists of a pair of steel galvanized pair of brackets, with main central holes through which the **Alupercha** will pass through, and distanced between them at a minimum distance of 1m.

This combination provides a versatile solution, as it can be anchored to columns/walls/surface made of reinforced concrete.

To be installed following the use of crane assembly model (refer to step 5/5 of the "Move by crane section" on Page 12).

## Safety warnings

The **Alupercha + Wall Brackets** has been designed to protect workers when there is a risk to fall from heights.

- Under no circumstances shall the product be used as a makeshift crane or lifting/lowering device.
- Under no circumstances shall any items, other than those provided with the system be used either in replacement or through preference as this may affect the performance of the product.
- Care should be taken in the transportation of the product between uses and locations. If any damage occurs or is detected in any part, the item should be withdrawn from use, inspected by a trained person and replaced if required.
- Care should be taken in the installation of the product and if any damage occurs or is detected in any part, the item should be withdrawn from use, inspected by a trained person and replaced if required.
- The location where the **Alupercha + Wall Brackets** is being used should have a rescue plan in place, in the event of a fall incident.
- The device is only intended for use by one person at a time.  
**Under no circumstances shall multiple persons be attached to the device.**
- When a crane is lifting the **Alupercha** unit, be aware of the movements made by the crane and keep workers at a safe distance.
- The **Alupercha + Wall Brackets** is intended to be used within a zero factor fall arrest system. Make sure that the anchorage is always overhead and the lifeline is taut between the anchorage point and the worker.
- In case that this product is re-sold outside the original country of destination, it is essential that the reseller provides user instructions in the language of the country in which the system is to be used.
- Under no circumstances shall any item other than those provided with the system be used either in replacement or through preference as this may affect the performance of the product.
- The equipment must be inspected before each use.
- Do not use damaged or rusty materials, as this may affect product performance.

To be installed following the use of crane assembly model (refer to step 5/5 of the "Move by crane section" on Page 12).

### Always remember:

- Plan fall prevention at an early stage, this will benefit everyone.
- Use only safety-checked products.
- Restrict access below and around installation and working area to prevent injury to others from any fall hazard.
- Use tools designed for the type of work to be carried out.
- Keep the installation area in order.
- A safe workplace is a good workplace.
- Many fall accidents occur from a low height.
- Parts might be slippery when wet, be cautious when handling.

## Check list prior to usage

Checking of the system shall be performed before each use, if any of the listed statements below are not satisfied make sure to correct any issue before using the product.

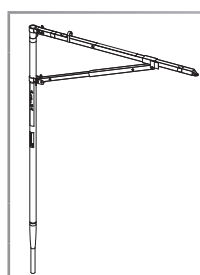
### Checking includes the following steps (made by a qualified person):

- Ensure that there is no weld damage or deformation to any part of the system.
- Ensure that no corrosion that can affect the strength of the system has occurred.
- Ensure there are no loose parts e.g. gravel, dirt, concrete etc. in any sleeves or tubes where another part shall be inserted.
- Ensure the correct insertion of the **Alupercha** unit, and it rotates freely.

## Components of the system

The **Alupercha + Wall Brackets** is made by: 1 **Alupercha**, combined with a pair of galvanized Steel wall brackets, which their main central holes will later allocate the **Alupercha**, providing an effective overhead anchor point.




**ALUPERCHA CE / ANSI**

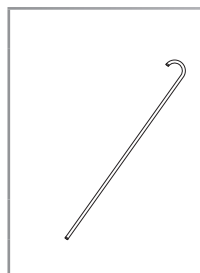
Description: Aluminium overhead anchor point with built-in energy absorber, to combine with the wall brackets system.

Code	Dimensions (mm)	Weight (kg)
84067	3,100 x 2,000	19


**M12DIN 127 - M16 WASHER**

Description: Part required to install the anchoring and BRACKETS on the wall.

Code	Dimensions (mm)	Weight (kg)
83855	27.4 x 3	0.010


**ALUPERCHA HOOK**

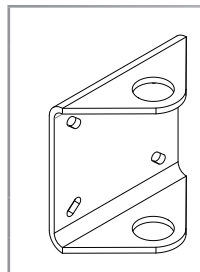
Description: Component used to reach the subsequent Alupercha, if required, to change the anchor point.

Code	Dimensions (mm)	Weight (kg)
83068	140 x 2,250	1.6


**DIN 125 - M16 WASHER**

Description: Part required to install the anchoring and BRACKETS on the wall.

Code	Dimensions (mm)	Weight (kg)
83856	29.5 x 3	0.010


**UPPER WALL BRACKETS**

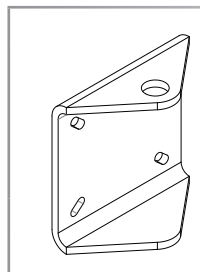
Description: Upper BRACKETS to secure the Alupercha to a wall or concrete structure.

Code	Dimensions (mm)	Weight (kg)
83851	300 x 300 x 155	15


**DIN 9021 - M16 WASHER**

Description: Part required to install the anchoring and BRACKETS on the wall.

Code	Dimensions (mm)	Weight (kg)
83857	50 x 3	0.012


**LOWER WALL BRACKETS**

Description: Lower BRACKETS to secure the Alupercha to a wall or concrete structure.

Code	Dimensions (mm)	Weight (kg)
83852	300 x 300 x 155	15


**410ML EPOXY RESIN**

Description: Part required to install the anchoring and BRACKETS on the wall.

Code	Dimensions (mm)	Weight (kg)
84858	300 x 300 x 155	0.400


**WALL BRACKETS ANCHORING**

Description: Part to anchor the BRACKETS to the wall.

Code	Dimensions (mm)	Weight (kg)
83853	16 x 190	0.190


**5.5M RETRACTABLE DEVICE EN 360**

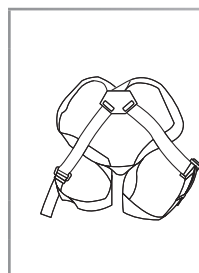
Description: Retractable component that locks on a sudden acceleration.

Code	Dimensions (mm)	Weight (kg)
83056	5,500	1.5


**DIN 934-M16 NUT**

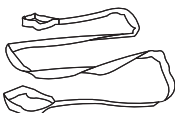
Description: Part required to install the anchoring and BRACKETS on the wall.

Code	Dimensions (mm)	Weight (kg)
83854	26.8 x 13	0.020

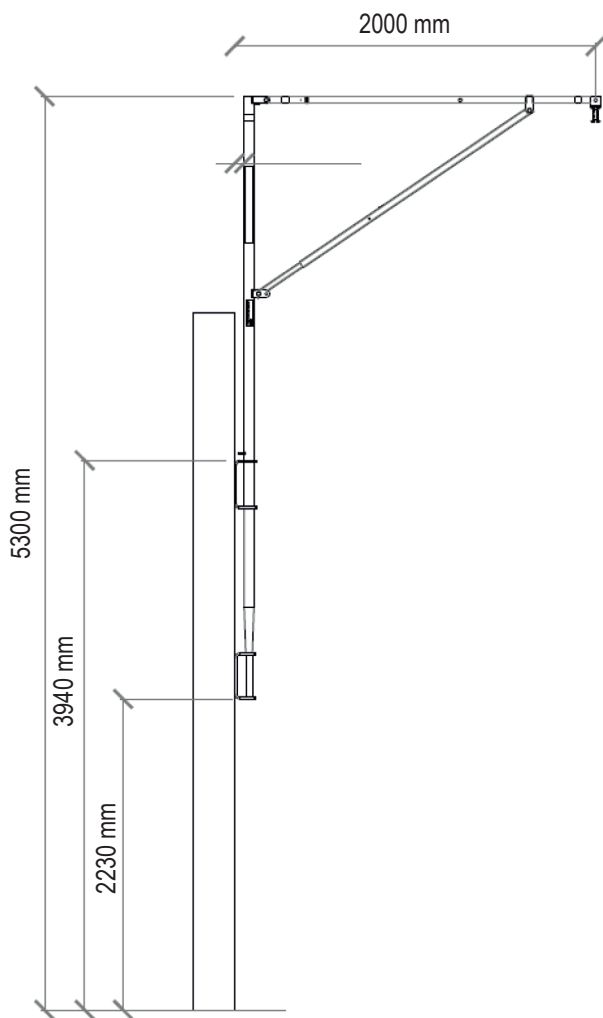

**HARNESS**

Device anchoring the operator to the Alupercha fall prevention system.

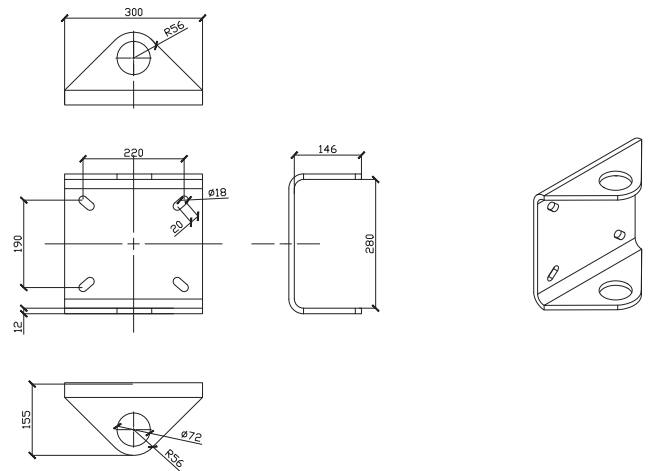
Code	Dimensions (mm)	Weight (kg)
84415	500 x 150	1

	SLING (3M)		
	Description: An essential component used to move the system with a crane or remove it once the work is complete.		
	Code	Dimensions (mm)	Weight (kg)
	84414	3,000	0.62

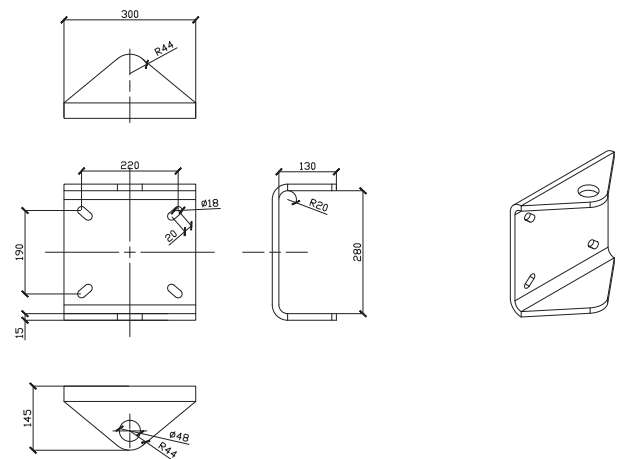
Dimensions with Alupercha



UPPER WALL BRACKET



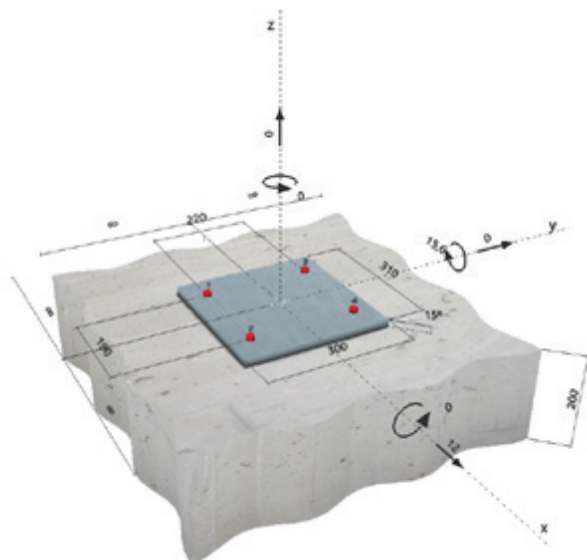
LOWER WALL BRACKET



## Anchoring requirements

- Calculation method: ETAG BOND Guide (EOTA TR029)
- Anchor base: Regular concrete, C25/30, EN 206
- Condition of concrete: Compressed, dry perforation
- Edge reinforcement: No Reinforcement.
- No reinforcement on the longitudinal edge.

## Load geometry (not considering weight):



## Resulting actions on the anchors:

### Reactions to the anchor (kN)

Shear load: (+Traction, -Compression)

Anchor Nr.	Traction loads	Shear loads	Shear X	Shear Y
1	33,379	3,000	3,000	0,000
2	1,140	3,000	3,000	0,000
3	33,379	3,000	3,000	0,000
4	1,140	3,000	3,000	0,000

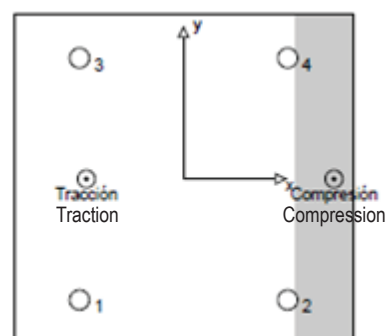
Maximum extension of the concrete under compression: 0,29 [‰]

Maximum tension of the concrete under compression: 8,64 [N/mm<sup>2</sup>]

Resulting traction in (x/y)=(-89/0): 69,037 [kN]

Resulting compression in (x/y)=(137/0): 69,037 [kN]

The forces on the anchors are calculated with the hypothesis of a rigid anchor plate.

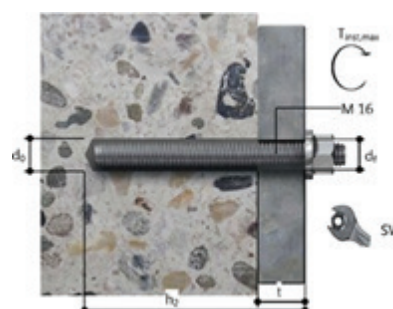


## Anchor systems to be used:

- HILTI injection resins: HIT-CT 1
- Object to fasten: Threaded rod HIT-V-F M 16x190, zinc-plated/stainless steel, minimum strength 5.8

## Assembly details:

- Thread diameter: M16
- Diameter of the drill:  $d_o = 18 \text{ mm}$
- Depth of the drill:  $h_2 = 158 \text{ mm}$
- Depth of the anchor:  $h_{ef} = 138 \text{ mm}$
- Drilling method: Hammer Drill
- Cleaning of the drill: Using brush and compressed air
- Maximum tightening torque:  $T_{max} = 80 \text{ Nm}$





## Assembly process

The following sequence of steps must be taken in order to correctly assembly the **Alupercha + Wall Brackets** system:

- 1.- Clean and clearance the area where is planned to install the **Wall Brackets**.
- 2.- Lay out, and properly define the distance, height and alignment between brackets, using appropriate levels and elements, ensuring to have a distance between brackets of minimum 1m.
- 3.- Lay out and drill the surface by using a percussion drill.



- 4.- Proceed to install the 4 chemical anchors per **Wall Bracket** (total 8 units of M16 stud bolts).



- 5.- Perform a traction test on the chemical anchors, arriving at 11 KN.

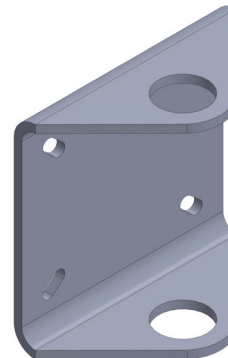


- 6.- Proceed to install the upper Wall Bracket (above the lower Wall bracket) and the lower Wall Bracket (below the upper Wall Bracket), through the anchors.

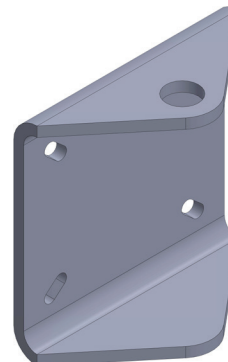
Ensure the correct alignment between both brackets, and their correct leveling. Finally, proceed to install the Wall brackets on the chemical anchors, inserting through the brackets holes, ensuring all of them fit correctly.



- 7.- The right position to install the Wall brackets are as follows::
  - a. Upper Wall Bracket above the lower Wall Bracket.
  - b. The central hole of the lower bracket, which will later be used to insert the lower part of the **Alupercha**, must be facing the upper bracket. The side without the central hole of the lower bracket, must be facing to the ground:



*Upper Wall bracket correct installation position*



*Lower Wall bracket correct installation position*

- 8.- By the use of an appropriate lifting equipment, proceed to insert the **Alupercha** through the central holes of the wall brackets, starting with the upper Wall Bracket, and ending with the lower Wall Bracket.



#### Installation elements

- Epoxy resin for chemical blocks.
- M16x190 mm. stud bolt.
- M16 nut.
- 16 mm. split lock washer.
- 16x48x3 mm. wide washer.

#### Tools

- Hammer drill.
- Blower pump, and brush to clean drill holes.
- Epoxy resin tool.
- Wrenches/nut tightening machine (dynamometric).
- Traction test kit.
- Leveller.

#### Lifting equipment

- Crane truck or according lifting equipment.

## Description

The **Alupercha + Post for reduced spaces** system (PRS), designed and tested in compliance to EN:795:2012 and ANSI/ASSE Z359.18-2017, has a base of minimum dimensions (just 350 mm diameter), providing a perfect solution for installation of the **Alupercha** overhead anchor point, in spaces with reduced or limited available space. It consists of a cold-formed and hot-dipped structural steel tube, fitted with a circular mounting flange with mounting holes for easy installation.

It also includes two special Nylatron GSM sockets contributing to a free and smooth rotation of the **Alupercha**.

To be installed following the use of crane assembly model (refer to step 5/5 of the "Move by crane section" on Page 12).

## Safety warnings

The **Alupercha + Post for reduced spaces** (PRS) has been designed to protect workers when there is a risk to fall from heights.

- Under no circumstances shall the product be used as a makeshift crane or lifting/lowering device.
- Under no circumstances shall any items, other than those provided with the system be used either in replacement or through preference as this may affect the performance of the product.
- Care should be taken in the transportation of the product between uses and locations. If any damage occurs or is detected in any part, the item should be withdrawn from use, inspected by a trained person and replaced if required.
- Care should be taken in the installation of the product and if any damage occurs or is detected in any part, the item should be withdrawn from use, inspected by a trained person and replaced if required.
- The location where the **Alupercha + PRS** is being used should have a rescue plan in place, in the event of a fall incident.
- The device is only intended for use by one person at a time.

**Under no circumstances shall multiple persons be attached to the device.**

- When a crane is lifting the **Alupercha** unit, be aware of the movements made by the crane and keep workers at a safe distance.
- The **Alupercha + PRS** is intended to be used within a zero factor fall arrest system. Make sure that the anchorage is always overhead and the lifeline is taut between the anchorage point and the worker.
- In case that this product is re-sold outside the original country of destination, it is essential that the reseller provides user instructions in the language of the country in which the system is to be used.
- Under no circumstances shall any item other than those provided with the system be used either in replacement or through preference as this may affect the performance of the product.
- The equipment must be inspected before each use.
- Do not use damaged or rusty materials, as this may affect product performance.

To be installed following the use of crane assembly model (refer to step 5/5 of the "Move by crane section" on Page 12).

### Always remember:

- Plan fall prevention at an early stage, this will benefit everyone.
- Use only safety-checked products.
- Restrict access below and around installation and working area to prevent injury to others from any fall hazard.
- Use tools designed for the type of work to be carried out.
- Keep the installation area in order.
- A safe workplace is a good workplace.
- Many fall accidents occur from a low height.
- Parts might be slippery when wet, be cautious when handling.

## Check list prior to usage

Checking of the system shall be performed before each use, if any of the listed statements below are not satisfied make sure to correct any issue before using the product.

### Checking includes the following steps (made by a qualified person):

- Ensure that there is no weld damage or deformation to any part of the system.
- Ensure that no corrosion that can affect the strength of the system has occurred.
- Ensure there are no loose parts e.g. gravel, dirt, concrete etc. in any sleeves or tubes where another part shall be inserted.
- Ensure the correct insertion of the **Alupercha** unit, and it rotates freely 360°



**Warning - Prepare and adapt the ground/surface where the system is intended to be installed, in order to ensure a 0° % of unevenness.**

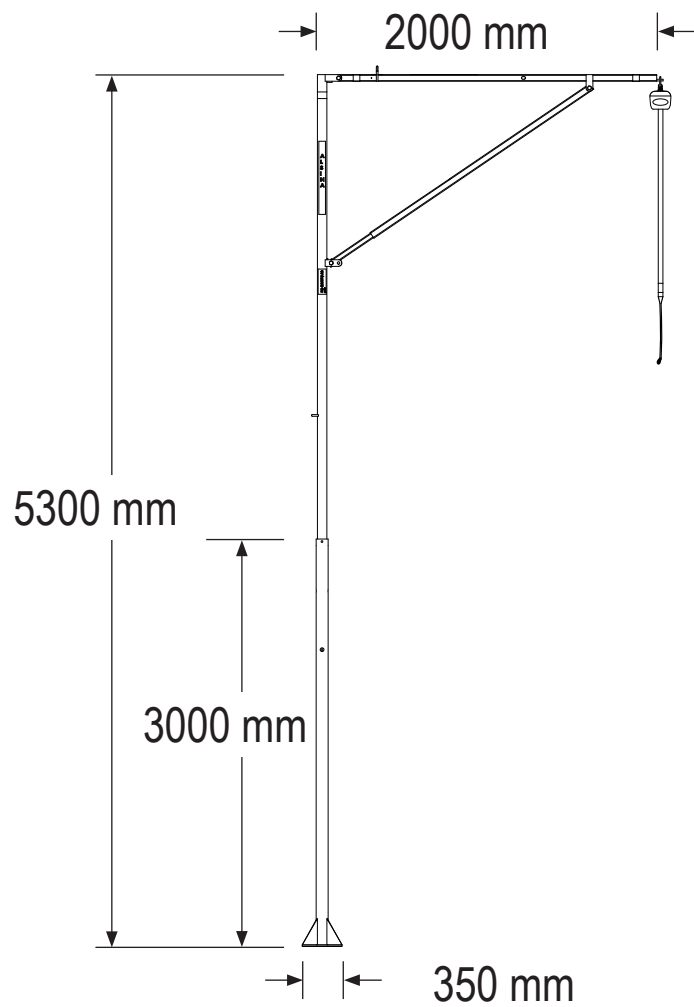
## Components of the system

The Post for reduced spaces is made by a main vertical tube that will allocate the **Alupercha**, manufactured with galvanized steel (10 mm thick), with a base of minimum dimensions (350 mm diameter).

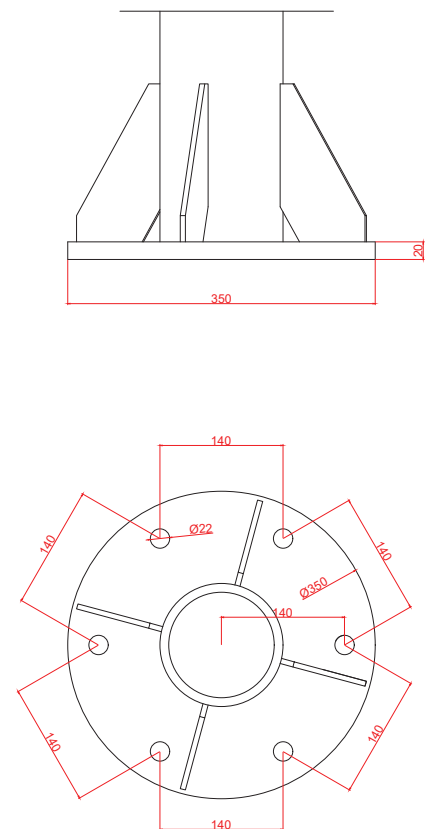
The main vertical post is welded to the base and reinforced with four brackets.



Dimensions with Alupercha



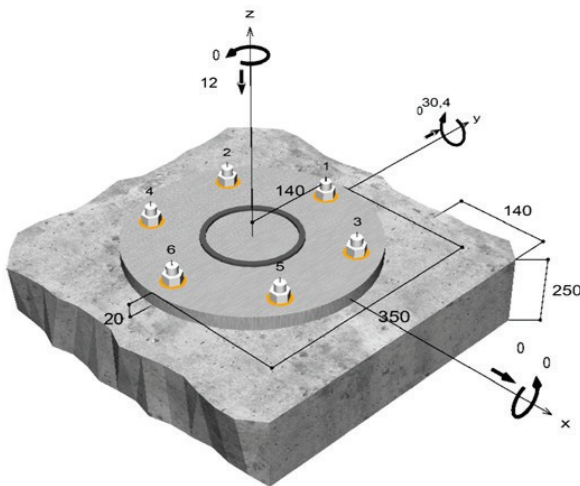
Sizes of the PRS base



## Anchoring requirements

- Calculation method: DITE 001 Guide, TR 029, Appendix C, Method A
- Anchor base: Normal concrete, C25/30, EN 206
- Condition of concrete: Compressed, dry perforation
- Edge reinforcement: With normal or mass reinforcement. No edge reinforcement

## Load geometry (not considering own weight)



## Resulting actions on the anchors:

### Reactions to the anchor (kN)

Shear load: (+Traction, -Compression)

Anchor Nr.	Action to traction kN	Shear kN	Shear X kN	Shear Y kN
1	18,97	0,00	0,00	0,00
2	45,31	0,00	0,00	0,00
3	0,00	0,00	0,00	0,00
4	45,31	0,00	0,00	0,00
5	0,00	0,00	0,00	0,00
6	18,97	0,00	0,00	0,00

Maximum deformation to concrete under compression: 0,58 [‰]

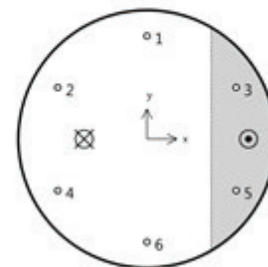
Maximum stress to concrete under compression: 18,2 [N/mm<sup>2</sup>]

Resulting action under traction: 128,57 [kN]

Coordinates X/Y (-85 / 0)

Resulting action under compression: 140,57 [kN]

Coordinates X/Y (138 / 0)



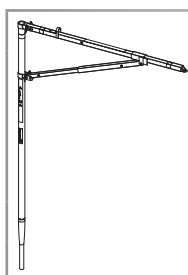
## Systems to be used

- FISCHER injection resins: FIS SB 390 S, FIS SB 585 S, FIS SB 1500 S, FIS SB High Speed S.
- Object to fasten: Threaded rod M 16x200, zinc-plated/stainless steel, minimum strength 5.8

## Assembly details

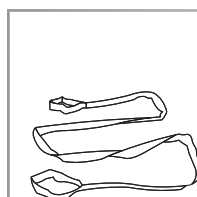
- Thread diameter: M16
- Diameter of the drill:  $d_o = 18$  mm
- Drill depth:  $h_2 = 180$  mm
- Anchor depth:  $h_{ef} = 160$  mm
- Drilling method: Percussion
- By brush and compressed air
- $T_{max} = 60$  Nm




**ALUPERCHA CE / ANSI**

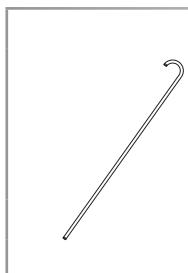
Description: Aluminium overhead anchor point with built-in energy absorber, to combine with the post for reduced spaces.

Code	Dimensions (mm)	Weight (kg)
84067	3,100 x 2,000	19


**SLING (3M)**

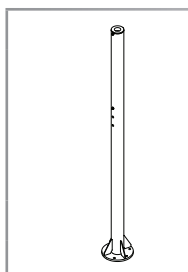
Description: An essential component used to move the system with a crane or remove it once the work is complete.

Code	Dimensions (mm)	Weight (kg)
84414	3,000	0.62


**ALUPERCHA HOOK**

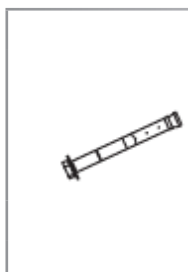
Description: Component used to reach the subsequent Alupercha, if required, to change the anchor point.

Code	Dimensions (mm)	Weight (kg)
83068	140 x 2,250	1.6


**3M POST FOR REDUCED SPACES**

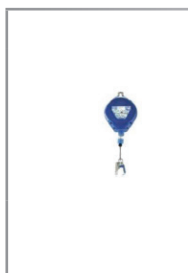
Description: Alupercha support component.

Code	Dimensions (mm)	Weight (kg)
83061	3,000 x 350	81


**ANCHORING**

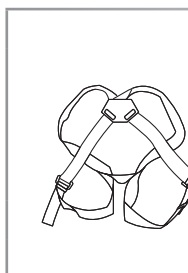
Description: Accessory to anchor the Post for reduced spaces.

Code	Dimensions (mm)	Weight (kg)
83495	20 x 260	0.01


**5.5M RETRACTABLE DEVICE EN 360**

Description: Retractable component that locks on a sudden acceleration.

Code	Dimensions (mm)	Weight (kg)
83056	5,500	1.5


**HARNESS**

Description: Device anchoring the operator to the Alupercha fall prevention system.

Code	Dimensions (mm)	Weight (kg)
84415	500 x 150	1





**Warning** - Prepare and adapt the ground/surface where the system is intended to be installed, in order to ensure a 0° % of unevenness.

## Assembly process

The following sequence of steps must be taken in order to correctly assembly the anchoring system:

- 1.- Clean and clearance the area where is planned to install the PRS.
- 2.- Lay out and drill the surface by using a percussion drill. (a pre-holes location template can be used for an easy process)



- 3.- Proceed to install the 6 chemical anchors per PRS (6 M20 stud bolts).
- 4.- Perform a traction test on the chemical anchors, arriving at 11 KN.



- 5.- Ensure the right level of the Surface where the post are going to be installed.
- 6.- By the use of an appropriate lifting equipment, proceed to install the PRF on the chemical anchors, inserting through the PRF holes, ensuring all of them fit correctly.



- 7.- Tighten up the 6 anchors.



- 8.- By the use of an appropriate lifting equipment, proceed to install the **Alupercha** into the PRS, ensuring the system is fully inserted.

### Installation elements

- Epoxy resin for chemical anchors.
- 6 M20x260 mm. zinc-plated stud bolts.
- 6 M20 mm. zinc-plated bolts.
- 6 x 20 mm. zinc-plated split lock washers.
- 6 x 20x60x4 mm. zinc-plated wide washers.

### Tools

- Hammer drill.
- Blower pump, and brush to clean drill holes.
- Epoxy resin tool.
- Wrenches/nut tightening machine (dynamometric).
- Traction test kit.
- Leveller.

### Lifting equipment

- Crane truck or according lifting equipment.

## Description

The engineered MOBILE BASE UNIT designed for the **Alupercha**, protect workers from the risk of falling from heights, providing portability and high versatility of location with no need to anchor the system.

The system has been designed to provide overhead fall protection to users when there is no possibility to install permanent fall protection systems, or there is the need to provide fall protection in different places and areas frequently.

It consists of a main **Alupercha** body, fastened to a **MOBILE BASE UNIT (MBU)**, that provides the stability of the whole system thanks to a set of counterweights (1000-1200 kg).

**Prepare and adapt the ground where the system is intended to be installed, in order to ensure a 0° % of unevenness.**

Certified according to CE (EN 795:2012 type E)

(Notified body DEKRA 0158)

Engineered according to ANSI/ASSE Z359. 18-2017

(Notified body DEKRA 0158)

To be installed following the use of crane assembly model (refer to step 5/5 of the "Move by crane section" on Page 12).

## Safety warnings

The **Alupercha + MBU** has been designed to protect workers when there is a risk to fall from heights.

- Under no circumstances shall the product be used as a makeshift crane or lifting/lowering device.
- Under no circumstances shall any items, other than those provided with the system be used either in replacement or through preference as this may affect the performance of the product.
- Care should be taken in the transportation of the product between uses and locations. If any damage occurs or is detected in any part, the item should be withdrawn from use, inspected by a trained person and replaced if required.
- Care should be taken in the installation of the product and if any damage occurs or is detected in any part, the item should be withdrawn from use, inspected by a trained person and replaced if required.
- The location where the **Alupercha + MBU** is being used should have a rescue plan in place, in the event of a fall incident.
- The device is only intended for use by one person at a time.  
**Under no circumstances shall multiple persons be attached to the device.**
- When a crane is lifting the **Alupercha** unit, be aware of the movements made by the crane and keep workers at a safe distance.
- The **Alupercha + MBU** is intended to be used within a zero factor fall arrest system. Make sure that the anchorage is always overhead and the lifeline is taut between the anchorage point and the worker.
- In case that this product is re-sold outside the original country of destination, it is essential that the reseller provides user instructions in the language of the country in which the system is to be used.

- Under no circumstances shall any item other than those provided with the system be used either in replacement or through preference as this may affect the performance of the product.
- The equipment must be inspected before each use.
- Do not use damaged or rusty materials, as this may affect product performance.
- The surface/ground where the system is intended to be installed, must have **0° % of unevenness**.

To be installed following the use of crane assembly model (refer to step 5/5 of the "Move by crane section" on Page 12).

Always remember:

- Plan fall prevention at an early stage, this will benefit everyone.
- Use only safety-checked products.
- Restrict access below and around installation and working area to prevent injury to others from any fall hazard.
- Use tools designed for the type of work to be carried out.
- Keep the installation area in order.
- A safe workplace is a good workplace.
- Many fall accidents occur from a low height.
- Parts might be slippery when wet, be cautious when handling.
- Un lugar de trabajo seguro es un lugar de trabajo agradable.
- Muchos accidentes de caída se producen en bajas alturas.

## Check list prior to usage

Checking of the system shall be performed before each use, if any of the listed statements below are not satisfied make sure to correct any issue before using the product.

Checking includes the following steps (made by a qualified person):

- Ensure that there is no weld damage or deformation to any part of the system.
- Ensure that no corrosion that can affect the strength of the system has occurred.
- Ensure that the Feet are fully adjustable.
- Ensure that the base unit is level (uneven not higher than 10°)
- Ensure there are no loose parts e.g. gravel, dirt, concrete etc. in any sleeves or tubes where another part shall be inserted.
- Ensure the correct insertion of the **Alupercha** unit, and it rotates freely 360°.
- The surface/ground where the system is intended to be installed, must have **0° % of unevenness**.



## Components of the system

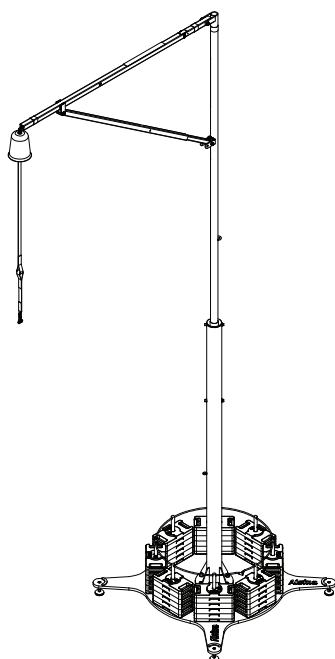
The system consists of a base, a post for housing the **Alupercha** unit, and manual counterweights, that will provide the stability to the whole system in case of a fall.

The base is made by a circular steel plate with a 1320 mm diameter, with four star-shaped extensions to house the support levelling feet (maximum width 2240 mm).

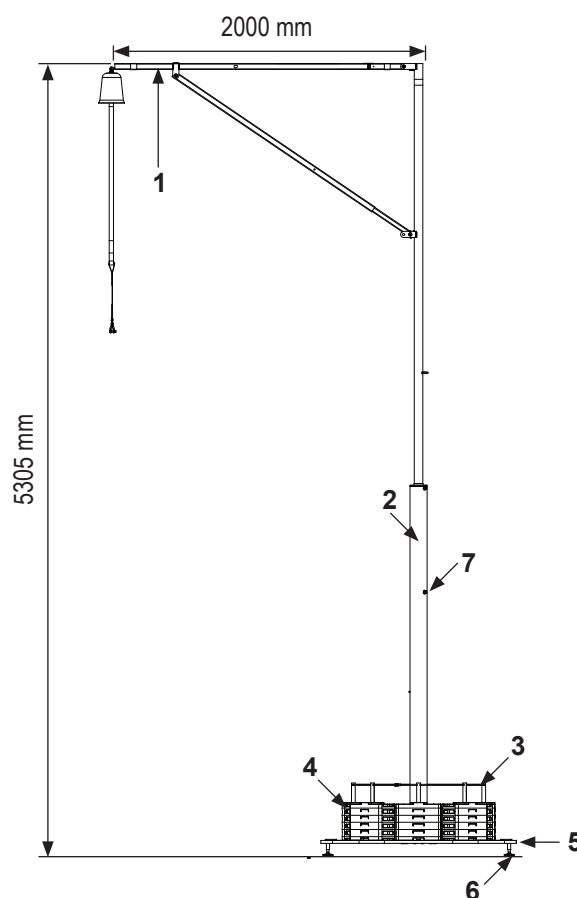
The base also includes a built-in level, rubber stickers for the location of the manual counterweights, 6 M20 bolts and bars to fit the counterweights.

In the center are the holes to install the main post that will House the **Alupercha**, by using 6 M20 bolts.

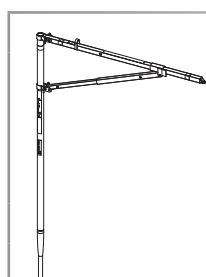
The 40 counterweight blocks weighing 25 kg each (supplied with the system), must be placed over the base rods. This weight will provide the system stability in case of activation due to a fall of a user.



## Dimensions with Alupercha

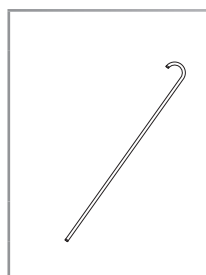


Reference	Units	Description
1	1	Alupercha unit
2	1	Post
3	1	Safety lock
4	40-48	Counterweights (25kg)
5	1	Base (including level, rubber stickers, adhesives, M20 bolts and counterweight rods)
6	4	Leveling feet
7	2	Rotation locking system (handles)


**ALUPERCHA CE / ANSI**

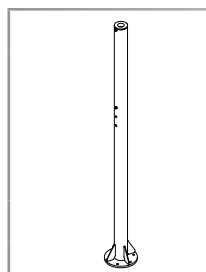
Description: Aluminium overhead anchor point with built-in energy absorber, to combine with the Mobile Base Unit.

Code	Dimensions (mm)	Weight (kg)
84067	3,100 x 2,000	19


**ALUPERCHA HOOK**

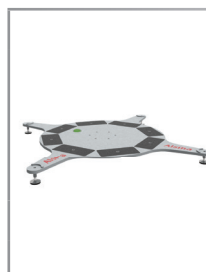
Description: Component used to reach the subsequent Alupercha, if required, to change the anchor point.

Code	Dimensions (mm)	Weight (kg)
83068	140 x 2,250	1.6


**3M POST FOR REDUCED SPACES**

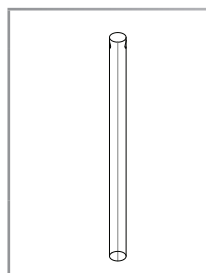
Description: Alupercha support component.

Code	Dimensions (mm)	Weight (kg)
83061	3,000 x 350	81


**ALUPERCHA MOBILE BASE UNIT**

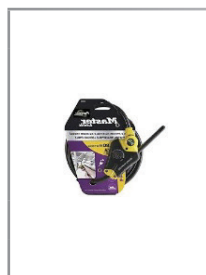
Description: Base that stabilizes the Alupercha system.

Code	Dimensions (mm)	Weight (kg)
84849	1,100 x 500	350


**ALUPERCHA MBU ROD**

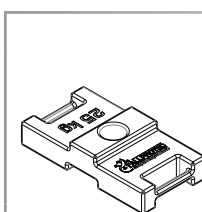
Description: Threaded rod through which the counterweights will be installed.

Code	Dimensions (mm)	Weight (kg)
83848	460	1.1


**MBU COUNTERWEIGHT LOCK**

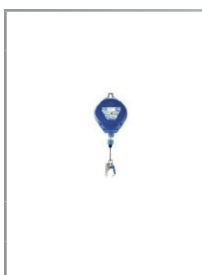
Description: Lock that prevents the counterweights from being handled after their installation.

Code	Dimensions (mm)	Weight (kg)
84859	350	1.2


**MBU COUNTERWEIGHTS (25KG)**

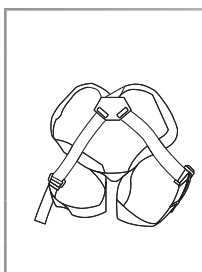
Description: Individual counterweights to guarantee the stability of the system.

Code	Dimensions (mm)	Weight (kg)
84832	370 x 80 x 18	25


**5.5M RETRACTABLE DEVICE EN360**

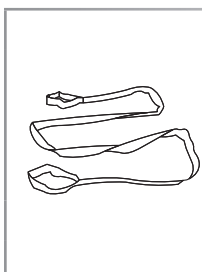
Description: Retractable component that locks on a sudden acceleration.

Code	Dimensions (mm)	Weight (kg)
83056	5,500	1.5


**HARNES**

Description: Device anchoring the operator to the Alupercha fall prevention system.

Code	Dimensions (mm)	Weight (kg)
84415	500 x 150	1


**SLING (3M)**

Description: An essential component used to move the system with a crane or remove it once the work is complete.

Code	Dimensions (mm)	Weight (kg)
84414	3,000	0.62

## Assembly process

The following sequence of steps must be taken in order to correctly assembly the anchoring system:

- 1.- Ensure that the level of the surface where the System is intended to be installed is  $= 0^\circ$ . Then position the base in the place chosen for its location. The leveling feet are capable of absorbing unevenness up to  $10^\circ$ .
- 2.- Adjust the leveling feet using the level installed on the base, as a guide.

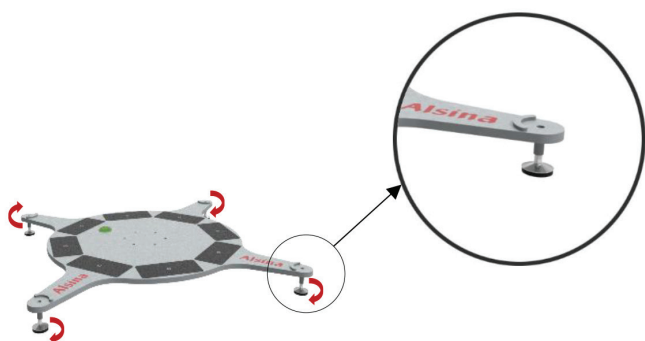


Fig. 4. Leveling feet adjustment

- 3.- Position and fasten the post unit to the base, by using the M20 bolts provided.

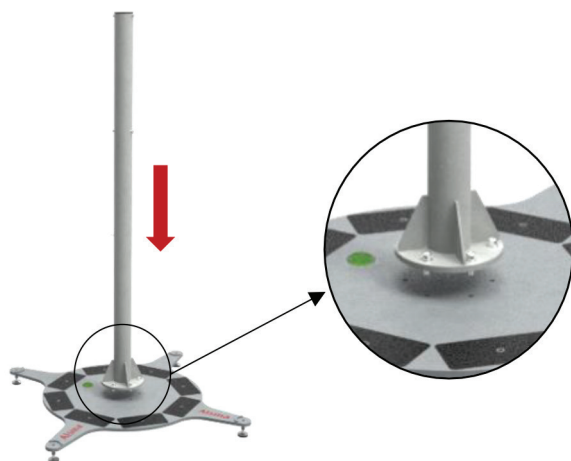


Fig. 5. Positioning and fastening of the post.

- 4.- Position and fasten the **Alupercha** to the MBU, by using an auxiliar equipment.

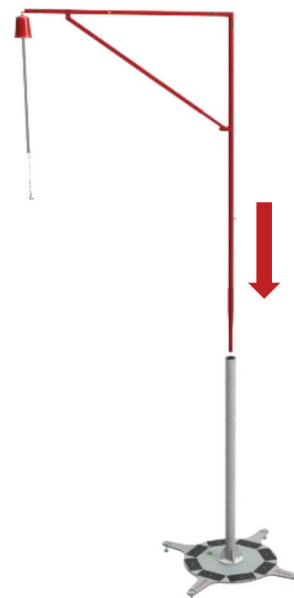


Fig. 6. Positioning and fastening the **Alupercha**

- 5.- Thread the rods by using the specific wholes on the base, placing the upper holes so that the safety lock can pass through them correctly.

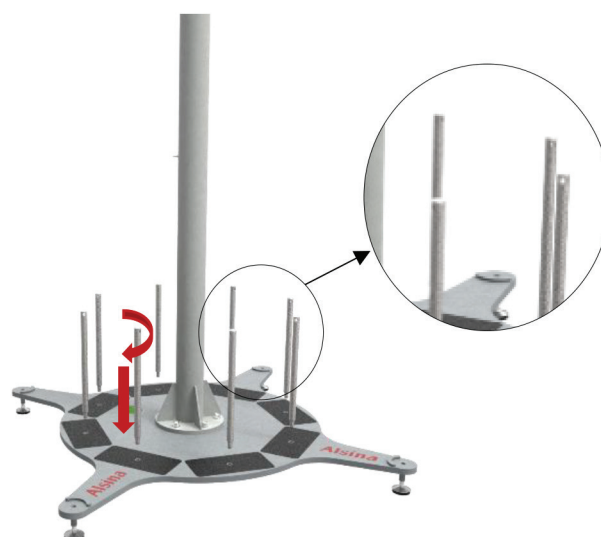


Fig. 7. Fastening the counterweight rods

- 6.- Place the 40 manual counterweights in their positions (total 1000 kg.)..



Fig. 8. Positioning the counterweights

- 7.- Fit the safety lock to prevent the counterweights from being handled.

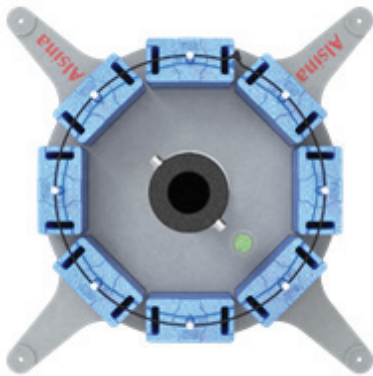


Fig. 9. Base with safety lock installed

- 8.- Finally, check the level of the base again and correct if necessary, and ensure the correct installation and free rotation of the **Alupercha** (360°).

## Relocation and locking system

It is possible to move the entire system without having to dismantle the components, bearing in mind the following aspects:

- 1.- Adjust the 2 handles on the locking system until they are fully closed (1 on each side):



- 2.- In all cases in which the **Alupercha + MBU** system is to be moved, the locking system must be activated - **always before it is moved** - to prevent the **Alupercha** from being able to rotate accidentally during transport.



- 3.- Once located in the required position and ensuring the system is correctly level, the locking system can be disabled and the system will be ready for use. If you prefer, it can also be used with the locking system activated, without the **Alupercha** rotating.

#### Assembly material

- No other material apart from that supplied is required.

#### Tools

- 17 mm. fixed wrench.
- 17 mm. hexagonal wrench (Allen).

#### Lifting methods

- Crane truck or according lifting equipment.



## Description

The **Alupercha + RAIL**, designed and tested in compliance to EN:795:2012, CEN/TS 16415:2013 and ANSI/ASSE Z359.18-2017, is an overhead anchor system, comprising an **Alupercha** anchor and a rigid lifeline RAIL, that protect workers against falls from heights, especially during the work over vehicles, trailers or machinery.

The **Alupercha + RAIL** system consists of an aluminum rail combined with trolleys for free operator movement along the entire run, protecting users against fall at every moment.

The **Alupercha + RAIL** system allows for movement over the area to be protected, without the operator having to unhook from the rail at any time. The system allows a maximum number of 2 users per 6m span.



*Example of installation of **RAIL**.*

The **Alupercha + RAIL** system, is designed to protect people from falling from heights. Users must wear harness and PPE according to the local standards and regulations.

The main criteria for use of the **Alupercha + RAIL** life line are:

- Number of users 1, 2, 3, 4 (depending on the length of the system), maximum 2 per 6m span.
- Maximum distance between Aluperchas/Aluperchas = 6 meters (a study is required for longer distances).
- The trolley follow the user without delay.
- The system doesn't suffer permanent deformation after being activated by a fall.  
(In which case must be inspected immediately after a fall occurs).
- The surface/ground where the system is intended to be installed, must have 0° % of unevenness.

**Prepare and adapt the ground where the system is intended to be installed, in order to ensure a 0° % of unevenness.**

**To be installed following the use of crane assembly model (refer to step 5/5 of the "Move by crane section" on Page 12).**

## Free-fall height

The free-fall height must be bigger than the free-fall distance, so that user do not impact any obstacles in case of fall.

It is essential that enough free distance is verified to closest underlying object.

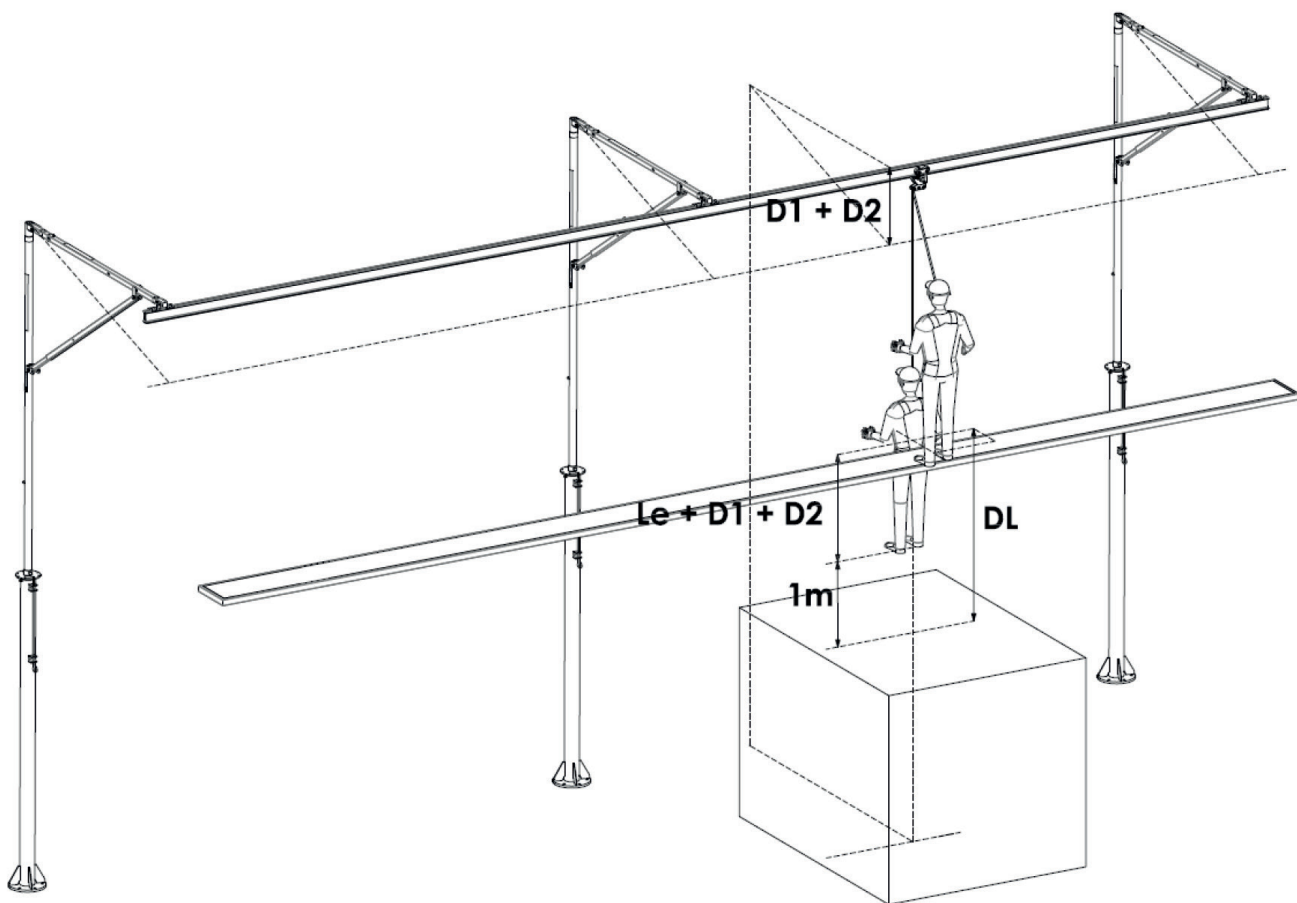
The free-fall height is the sum of the following factors:

- The braking distance of the energy absorber <Le> (refer to the manufacturer's user manuals for specific value)
- The RAIL deflection distance in use <D1> (maximum value = 3cm)
- The impact absorption distance of the RAIL in case of fall of a user <D2> (maximum value = 142 cm)
- Safety distance = 1 m

The safety equation result to:  $Le + D1 + D2 + 1\text{ m} < DL$   
(free fall distance)

$Le < 0,5\text{ m}$

With Alupercha → D1: in a worst-case scenario = 3 cm / D2: in a worst-case scenario = 142 cm



## Components of the Alupercha + RAIL system

### Alupercha

The **Alupercha** consists of a 3.10 m tall mast and an arm with a radius of 2.0 m. The system includes a built-in energy absorber (diagonal device), that reduce the impact forces in case of activation by a fall. Two supports connect the **Alupercha** to the **RAIL**.

The **Alupercha**, made of elastic and high quality aluminum, weights 19kgs.

- The rigid lifeline **RAIL** is made of ENAW6060 T6 anodized aluminum alloy, also available in a gray powder coat finish (other colors are available to order). The rails are supplied in 6 m spans. Other measurements are available under demand. Weight = 5 kg/m.
- Combined with the **RAIL**, the **Alupercha** is compatible with the following accesories/complements: (refer to the specific installation chapter on this document): Tripod, Post for reduced spaces, column clamps, counterweight MF, Mobile Base Unit and wall brackets).

To be installed following the use of crane assembly model (refer to step 5/5 of the "Move by crane section" on Page 12).

## Configuration

The total length of the **Alupercha + RAIL** combination, will depend on the total length intended to protect workers. Below are the suggested configurations, in accordance to the most common truck lengths. Additional or different lengths must be quoted and studied.

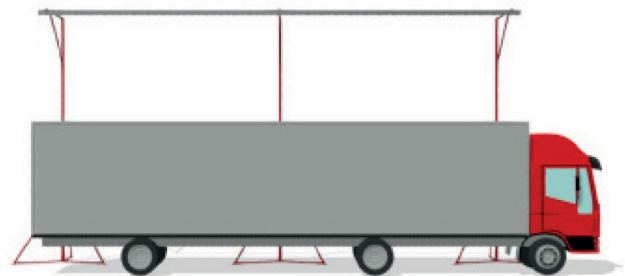
### Configuration for 6-meter trucks

Distance between **Aluperchas** = 5.700 mm

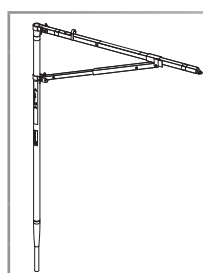


### Configuration for 12-meter trucks

Distance between **Aluperchas** = 5.700 mm






**ALUPERCHA CE / ANSI**

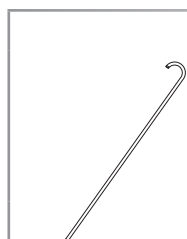
Description: Aluminium overhead anchor point with built-in energy absorber, to combine the RAIL lifeline and use most of the many different accessories/supports in the Alupercha range.

Code	Dimensions (mm)	Weight (kg)
84067	3,100 x 2,000	19


**IDENTIFICATION BATCH**

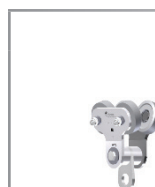
Description: Identification batch for the installed system.

Code	Dimensions (mm)	Weight (kg)
83052	300 x 200	0.10


**ALUPERCHA HOOK**

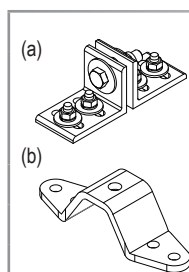
Description: Component used to reach the subsequent Alupercha, if required, to change the anchor point.

Code	Dimensions (mm)	Weight (kg)
83068	140 x 2,250	1.6


**RETRACTABLE ADVANCING CARRIAGE**

Description: Device that moves the retractable fall arrester device over the RAIL.

Code	Dimensions (mm)	Weight (kg)
83053	150 x 260 x 170	1.2


**RAIL SUPPORT CONNECTORS (FIXED / FOLDING)**

Description: Part connecting the Alupercha and the RAIL, in FIXED position (a) and in FOLDING position (b).

Code	Dimensions (mm)	Weight (kg)
83047 (a)	100 x 100	0.35
83837 (b)	260 x 60 x 40	0.70


**5.5M RETRACTABLE DEVICE EN 360**

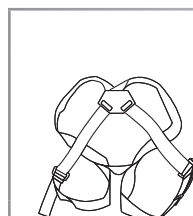
Description: Retractable component that locks on a sudden acceleration.

Code	Dimensions (mm)	Weight (kg)
83056	5,500	1.5


**RAIL INNER REINFORCEMENT**

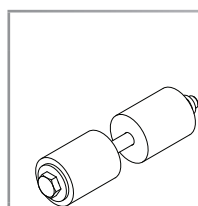
Description: Part reinforcing the inside of the RAIL when it is to be combined with additional RAILS for lengths over 6 m.

Code	Dimensions (mm)	Weight (kg)
83057	250 x 250	0.20


**HARNESS EN 361**

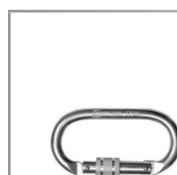
Description: Device anchoring the operator to the Alupercha fall prevention system.

Code	Dimensions (mm)	Weight (kg)
83058	500 x 150	1


**STEEL/NYLON RAIL BUFFER**

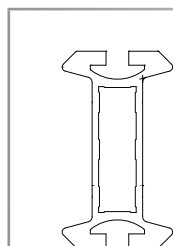
Description: Part preventing the RAIL from coming out of the carriage with retractable device.

Code	Dimensions (mm)	Weight (kg)
83049	70 x 170	0.15


**CARABINER EN 362**

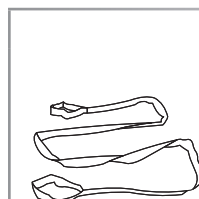
Description: Part connecting the retractable device to the Alupercha and to the user's harness extension.

Code	Dimensions (mm)	Weight (kg)
83054	100	0.50


**ALUMINUM RAIL (ATEX)**

Description: Rigid lifeline that connects to the Alupercha and over which the carriage with retractable device moves that keeps the user protected.

Code	Dimensions (mm)	Weight (kg)
83051	6,000 x 113 x 63	30 (5 kg/m)


**SLING (3M)**

Description: An essential component used to move the system with a crane or remove it once the work is complete.

Code	Dimensions (mm)	Weight (kg)
84414	3,000	0.62

## Assembly

For the step by step installation procedure of the **Alupercha** system, please refer to the specific chapter for each type of **Alupercha** support.

Once the necessary **Alupercha** units have been fastened to the selected support, the **RAIL** must be installed following the below step by step procedure:

The easy and suggested way of installing the **Alupercha + RAIL** system, is laying out the **RAIL** on the ground.

By using an appropriate lifting equipment, proceed to lift and connect the assembled **RAILS** to the **Alupercha** units.

A **RAIL INNER REINFORCEMENT** (83057) must be installed between the union of each 2 **RAIL** span of 6m.

To be installed following the use of crane assembly model (refer to step 5/5 of the "Move by crane section" on Page 12).

### Step 1

Installation of the **Alupercha** with the selected support (follow **Alupercha** installation manual according to each type of support).

Make sure that distances between the **Aluperchas** do not exceed 5.7 m.

Ensure that the level of the ground to which is intended to install the system is = 0°

### Step 2

Proceed to assemble and joint the set of 2 rails (83051) for 12m, by using the reinforcement joint (83057). Rivet the reinforcement joint (83057), making sure it is centered as follows:

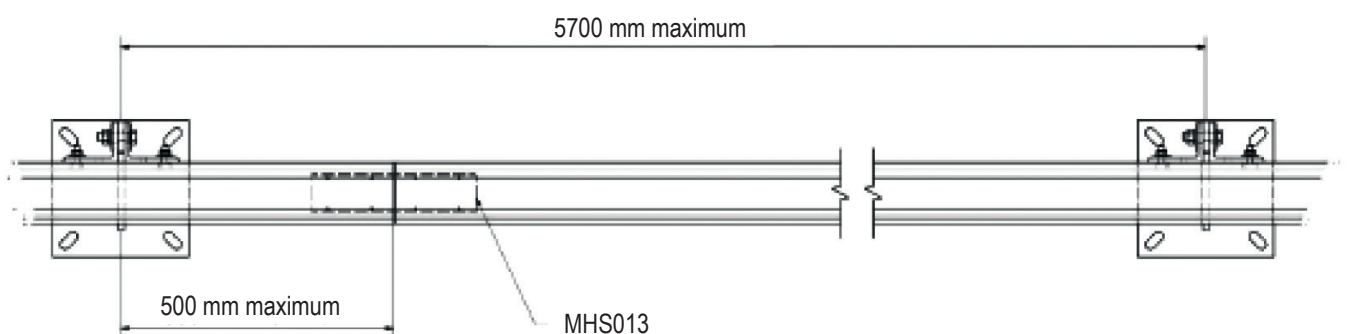
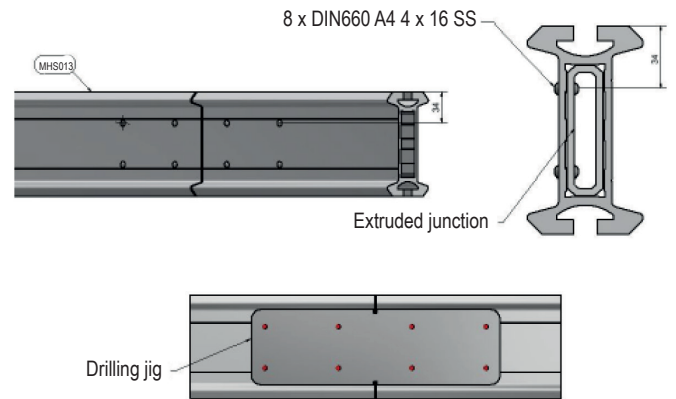


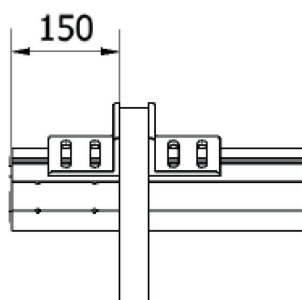
Fig. 7 – Distance between the joint and the **Alupercha**

**Step 3**

Fit the round-head bolts (M12 DIN603 A2) as shown in the following picture (4 units per **Alupercha**):


**Step 4**

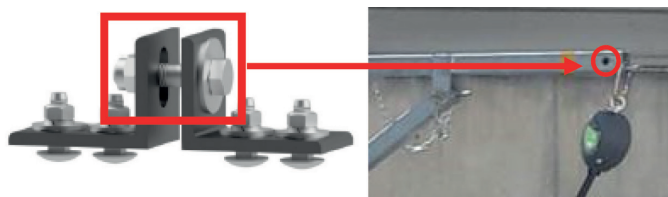
Position the two joint/supports (83047) without tightening completely the nuts.


**Step 5**

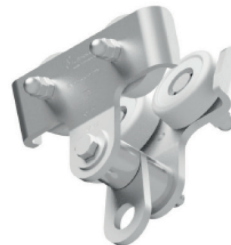
Position and connect the **RAIL** (83051) with the joint/supports (83047) using auxiliary lifting methods and fasten them with the M12 DIN603 A2 bolts (provided with the joint/supports (83047)).

**Step 6**

Connect joint/supports (83047) to the **Alupercha** upper tube, using the hole shown below, using the screw metric 16x100mm A2, as follows:


**Step 7**

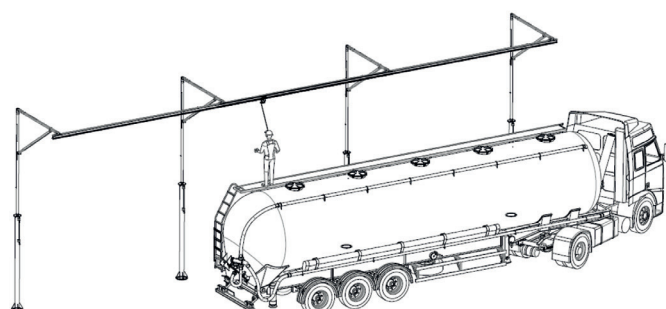
Fasten all joint/supports (83047) nuts and screws, and proceed to install the SRL trolley.


**Step 8**

Installation of the STEEL/NYLON RAIL BUFFER (83049). Drill the **RAIL** (it is recommended to perform it on the ground), and pass the central screw, adjusting the two protections on both sides of the **RAIL**. This action must be performed on both ends of the **RAIL**.


**Step 9**

Check that the SRL Trolley moves correctly along the entire length of the system, and that the whole system works properly and is safely connected before the first use.



## Appendix 1: Conditions of use on site

Below are the guidelines for reviewing each component of the Alupercha system. Reviews should be performed regularly, once per year at the very least.

As explained in Alsina's Alupercha Assembly and Safety Manual, this review does not replace the visual inspection that the user should perform each time before using the Fall Arrest System.

### Retractable Review Procedure

Control guidelines	Procedure
Check that the belt <b>winds automatically</b> and unwinds normally along its whole length.	If it does not work, put the product to one side as <b>it is faulty</b> .
Check that the blocking function is operative, by pulling the belt sharply.	If it does not work, put the product to one side as <b>it is faulty</b> .
That the textile is in perfect condition, <b>without tears or loose ends</b> .	If it does not work, put the product to one side as <b>it is faulty</b> .
That the metallic parts <b>are not oxidised</b> and that the karabiners work and <b>block correctly</b> .	
It is important to check that the continuous energy absorber protected by the plastic and the fibres <b>forming it, have not broken</b> .	Otherwise the product will have to be put to one side because it has been dropped, and consequently <b>it is faulty</b>

### Energy absorber security seal

Control guidelines	Procedure
- Inspect and control that the security seal of the built-in energy absorber is not broken or missing.	Withdraw product from use, and replace it.

Inspection procedure for main items (Alupercha, column clamps, tripod, counterweight MF, wall bracket, post for reduced spaces, MBU and RAIL), as well as for the connection/supports/accessories.

Control guidelines	Procedure
Place the item on an stable surface, to:	
- Check that the bolts, pins, and nuts of the various extensions are in good condition and that they can move freely.	
- Check that the extensions tubes are neither askew, bended nor misshapen (maximum tolerance in both directions is 5 mm). Pay special attention to ensuring that the diagonal tube energy-absorber is straight.	If problems are identified with any of the above, contact the Alsina Service Department, or any of our official distributors.
- Clean the concrete and particularly some areas between the two lugs, as this is the area where various hanger accessories are housed. If these are closed, open them with a hammer, until the beam can enter.	
- Inspect the welds, especially on the ring to which the SRL is attached.	



**Warning - Never remove the Alupercha Body's diagonal tube. Handling the tube may be dangerous. If any problem is observed in this diagonal, contact the Alsina Commercial Technician.**

### Hook Review Procedure

Control guidelines	Procedure
- Check that the hook is neither askew nor misshapen.	If the deformation is minor, it can be fixed provided that the tube structure is not misshapen.
- Clean the concrete.	
- Check that there are no fractures.	

**Leveller Procedure**

Control guidelines	Procedure
<ul style="list-style-type: none"> <li>- Check that the leveller is in its original condition. Verify that it enters and exits a housing tube that is in good condition.</li> <li>- Check that there is no washer. Verify the level. Check that the leveller is not broken.</li> </ul>	<p>If problems are identified with any of the above, contact the Alsina Service Department.</p>

**Textile Components review procedure:**  
**Sling, Harness, Harness Lengthener**

Control guidelines	Procedure
<ul style="list-style-type: none"> <li>- Check that all textile elements are present. Check that there are no tears (especially along the edges) or loose threads.</li> <li>- The textile material must be kept in a clean, dry place.</li> </ul>	<p>Otherwise reject</p>

## Maintenance, use and safety

### Alsina performance criteria with regard to Technical Requirements, Safety and Accident Prevention at the worksite

#### Background

After more than 60 years in the Spanish market, the Alsina Group has become one of the largest companies in the formwork sector, with a construction market share of more than 20%. From its foundation, company priorities have been **safety** at the worksite, **quality** in the widest sense and **productivity**. The primary aim of the company is to industrialize concrete structure formwork.

Alsina dedicates a large part of its technical resources to working towards continuous improvement of products and processes, in order to add new solutions at both the functional and safety levels and make available a state-of-the-art and innovative range of products. More than 50 patents in Spain, in addition to several recent international patents, bear witness to the company's commitment in this area.

#### R+D+I

Both the Technical Department and the R+D Department use advanced computer equipment to simulate real situations when performing product related calculations. This allows us to develop a large number of new high quality and innovative products; the company also works closely with Universities, Laboratories and Engineering Companies.

In general we govern ourselves in relation to safety and technical requirements based on European regulations. Our products are certified on the basis of Spanish and European Community standards by recognised institutions. The most significant of these, among others, are: Intermac, Indus, Itec, ACE, LGAI, Bureau Veritas, etc.

#### Training and Standards

Above all, the purpose of this Assembly and Safety Manual is to assist whoever works with our products. This is why we make it available to our customer before the start of formwork assembly work. If you do not have a copy or require more copies, do not hesitate to contact Alsina directly or the Technical Salesperson responsible for your project.

This Manual has been prepared with the intention of supporting the theoretical-practical training given at the beginning of the construction work. Figures and diagrams are included to promote maximum understanding on the part of the workers who will be involved in the use and maintenance of the equipment.

../..

Alsina supplies the formwork material and is responsible for the delivery of the equipment in good working condition, in compliance with the criteria set out in our quality manual. Given that Alsina does not perform the assembly or manage the construction work, **the user bears responsibility for the use and maintenance of the equipment.**

In addition to the recommendations contained in this manual, the safety and health standards in force for the construction sector in force in each geographical area.

Periodical inspections to the system must be done, in order to ensure that the system is in good conditions for use.

The safety of users depends upon the continued efficiency and durability of the equipment.

The legibility of the product markings, must also be checked periodically.

### **Conditions of use**

The Alupercha system has been designed and created for the specific uses and applications described in this manual. Therefore, we take no responsibility for the use of the equipment in situations other than those considered in this document.

At the time of assembly, the components must always be checked by a competent person, who must ensure that they are fit for use. To this end, each system has specific control guidelines. These guidelines can be found in the Annex (Annex 1) at the end of this section. In accordance with these criteria, when a part that is not fit for use is identified, it must be taken out of service.

Set out below are the main considerations to be taken into account during the installation, recovery and system maintenance phases.

### **Installing the components of the system**

1. All the components are sufficiently strong and stable to support the loads and stresses described in this manual. It is essential to install all the components included in the system, with all the accessories assembled and correctly attached and especially to verify that the panels are correctly positioned and supported.
2. Alsina is absolved of all responsibility if the system components are substituted with other, similar components supplied by another company.

**STORAGE.** *Before storing, clean the Alupercha body and accessories, to remove any dirt, grease or other materials that may have accumulated. Store in a clean dry area when not in use.*

A		DEVICE IDENTIFICATION SHEET
(A) Distributor / Reseller / Details		
(B) Manufacturer	<b>Encofrados J. Alsina S.A.</b> Pol. Ind. Pla d'en Coll Camí de la Font Freda, 1 08110 - Montcada i Reixac (Barcelona - Spain)	
(C) Product (type, model, code)		
(D) User (company, name and address)		
(E) Serial number / batch		
(F) Year of manufacturer		
(G) Purchase date		
(H) Date of first use		
(M) Notified Body that performed the CE certification/check	<b>DEKRA Testing and Certification GmbH</b> Dinnendahlstrasse 9 - D-44809 BOCHUM Phone : +49 (0) 234 3696 105 Website : <a href="http://www.dekra-testing-and-certification.de">www.dekra-testing-and-certification.de</a>	

B		DEVICE PERIODIC	CHECK SHEET			
No.	(O) Date	(P) Reason for check	(Q) Name and signature of the person responsible for checking	(R) Notes (defects found or other relevant information)	(S) Check results	(T) Date of next check
1		<input type="checkbox"/> Periodic check <input type="checkbox"/> Additional check			<input type="checkbox"/> Device fit for use <input type="checkbox"/> Device unfit for use <input type="checkbox"/> Device to be checked	
2		<input type="checkbox"/> Periodic check <input type="checkbox"/> Additional check			<input type="checkbox"/> Device fit for use <input type="checkbox"/> Device unfit for use <input type="checkbox"/> Device to be checked	
3		<input type="checkbox"/> Periodic check <input type="checkbox"/> Additional check			<input type="checkbox"/> Device fit for use <input type="checkbox"/> Device unfit for use <input type="checkbox"/> Device to be checked	
4		<input type="checkbox"/> Periodic check <input type="checkbox"/> Additional check			<input type="checkbox"/> Device fit for use <input type="checkbox"/> Device unfit for use <input type="checkbox"/> Device to be checked	
5		<input type="checkbox"/> Periodic check <input type="checkbox"/> Additional check			<input type="checkbox"/> Device fit for use <input type="checkbox"/> Device unfit for use <input type="checkbox"/> Device to be checked	
6		<input type="checkbox"/> Periodic check <input type="checkbox"/> Additional check			<input type="checkbox"/> Device fit for use <input type="checkbox"/> Device unfit for use <input type="checkbox"/> Device to be checked	
7		<input type="checkbox"/> Periodic check <input type="checkbox"/> Additional check			<input type="checkbox"/> Device fit for use <input type="checkbox"/> Device unfit for use <input type="checkbox"/> Device to be checked	
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9		<input type="checkbox"/> Periodic check <input type="checkbox"/> Additional check			<input type="checkbox"/> Device fit for use <input type="checkbox"/> Device unfit for use <input type="checkbox"/> Device to be checked	
10		<input type="checkbox"/> Periodic check <input type="checkbox"/> Additional check			<input type="checkbox"/> Device fit for use <input type="checkbox"/> Device unfit for use <input type="checkbox"/> Device to be checked	