CAI Safety’s Aluminum Fixed Mounted Guardrails is fixed to the surface permanently. This guardrail system is mounted to a roof surface or parapet of roofs, loading docks, mezzanines, truck bays, and similar applications. The advantage is that the guardrail system is always present and safe access to the application is always possible for authorized personnel, creating a safe zone for anyone working at heights.

There are two types of mounts with this guardrail system, the Top Floor Mount and the Side Flush Mount. The Top Mount is installed on top of the roof surface or parapet, and the Side Mount is installed on the inside of the parapet/wall.
About this manual

This manual covers instructions for the usage, installation and maintenance of the Aluminum Guardrail system, which is designed and produced for installation on new and existing buildings with working platforms, roofs and/or technical terraces with a maximum slope of 10° that are not publicly accessible.

This manual has been prepared with utmost care. Not reading and understanding this manual can have serious consequences.

Be aware that all CAI Safety Systems products must be installed by a certified CAI Safety Systems Partner and that all installations must be performed using installation materials supplied by CAI Safety Systems.

In case of any questions or problems regarding usage and maintenance of the Aluminum Guardrail system, comments about this manual, questions about Personal Protective Equipment (PPE), edge protection systems, or the latest version of the manual, please contact your local CAI Safety Systems Partner. CAI Safety Systems cannot be held responsible for consequences of misuse of the Aluminum Guardrail system.

⚠️ WARNINGS

- Only qualified workers who are in good health may use fall arrest systems, edge protection systems and guardrail.

- The Aluminum Fixed Mounted Guardrails shall only be installed on working platforms, roofs and/or technical terraces with a maximum angle of the working surface from the horizontal of less than 10°.

- The Aluminum Fixed Mounted Guardrails shall only be installed on working platforms, roofs and/or technical terraces that are not publicly accessible.

- Carrying out repairs to the Aluminum Fixed Mounted Guardrails without consulting CAI Safety Systems is strictly prohibited.
1.1 Purpose of use

The Aluminum Guardrail system is designed and produced to create a safe working environment. The Aluminum Guardrail product range includes temporary as well as permanent edge protection systems, which allows the guardrail system to be installed on various types of roof materials, such as, but not limited to bitumen, epdm and pvc.

The Aluminum Guardrail system shall only be installed on working surfaces, roofs and/or technical terraces with a maximum angle of less than 10° above the horizon.

The Aluminum Guardrail system shall only be installed on working surfaces, roofs and/or technical terraces that are not publicly accessible.

If any defects are observed, do not use the equipment! If there are any questions and/or concerns, contact your local CAI Safety Systems dealer.

1.2 Compliance with standards and requirements

CAI Safety Systems is ISO 9001:2008 certified and all CAI Safety Systems products comply with the latest standards and requirements. The Aluminum Fixed Mounted Guardrails has been tested throughout the entire development phase and its conformity has been approved according to OSHA standards:

- OSHA 1910.23 – General Industry
- OSHA 1926 – Construction
- EN 13374: 2013 – Temporary Edge Protection
- EN-ISO 14122: 2016 – Permanent Edge Protection
- AS 1657: 2013 – Fixed platforms, walkways, stairways, ladders
- AS.NZS 4994.1: 2009
Main components

**Top Floor Mount**

The Top Floor Mount system is installed permanently onto the floor or surface of roofs, parapets, loading docks, or mezzanines.
**Side Flush Mount**

The Side Flush Mount system is installed permanently on the inside of the side wall or parapet of roofs, parapet walls, loading docks, or mezzanines.

**PLEASE NOTE: DO NOT FIX ON THE OUTSIDE OF A PARAPET**
## System Components

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Top-rail / Mid-rail</strong>&lt;br&gt;9' 10 2/16&quot; (3 meters)</td>
<td>The connecting element that connects all stanchions/uprights together.</td>
</tr>
<tr>
<td><strong>Rail Connector</strong>&lt;br&gt;[PAIR]</td>
<td>Is a small solid tube that is used to make a connection tubes, 45°, 90°, finishing end, and wall mounted brackets.</td>
</tr>
<tr>
<td><strong>Adjustable Bracket</strong>&lt;br&gt;[PAIR]</td>
<td>Is used to construct a corner between 80° and 180° in the guardrail system.</td>
</tr>
<tr>
<td><strong>90° Corner Bracket</strong>&lt;br&gt;[PAIR]</td>
<td>is used to construct a 90 degree bend in the guardrail system.</td>
</tr>
<tr>
<td><strong>45° Corner Bracket</strong>&lt;br&gt;[PAIR]</td>
<td>is used to construct a 45 degree bend in the guardrail system.</td>
</tr>
<tr>
<td><strong>Finishing End Bracket</strong>&lt;br&gt;[PAIR]</td>
<td>Is used to connect the top-rail to the mid-rail at a free end of the guardrail system.</td>
</tr>
</tbody>
</table>
| **Wall End Mount**  
| **PAIR**  
| Is used to make a connection between the fixed guardrail system and a wall. Two pieces are needed for top-rail & mid-rail wall connection. |

| **Toeboard / Kickboard**  
| **7.87 ft.**  
| Toeboards are necessary when there is no parapet on the roof to prevent debris from falling off. |

| **Toeboard Connector**  
| **PAIR**  
| Required to be installed on either side of each upright so that the toeboards can easily slide into place. |

| **Safety Swing Gate**  
| Is used as an access door to a roof, caged ladder, hatch, or any access entry point. The safety gate can be fitted in between two uprights of the fixed guardrail system. |
Markings:

The following components of the Aluminum Fixed Mounted Guardrail system are marked:

1. Handrail
2. Knee rail
3. Toe board
4. Upright posts
5. Counterweight

Marking on the main components of the Aluminum Fixed Mounted Guardrail system includes the following signs and/or icons:

1. The manufacturer’s name.
2. The product name.
3. Batch or serial number for traceability. The number is formed as follows: TTTTT (type number) – YYMM (year and month of production) – XXXA (number from batch A).
4. Numbers of standards which the product complies to.
5. The text “Always read and follow the warnings and instructions for use” together with the corresponding icon.

Example of marking
Safety Instructions

Serious injuries and damages may occur if the following instructions are not followed:

 Do not make any alterations or additions to the Aluminum Fixed Mounted Guardrail system without prior written consent of the manufacturer. The manufacturer is not responsible for misuse or (consequences of) malfunctions caused by using materials other than original or compatible to the original materials for maintenance.

 Do not use the Aluminum Fixed Mounted Guardrail system and any of its components as fall arrest anchor.

 Assembly, usage and maintenance operations of the Aluminum Fixed Mounted Guardrail system shall comply with valid national regulations. See Inspection form in this manual.

 Defects or malfunctions detected ought to be immediately reported to the supervisor and a warning sign needs to be placed. Until the defects are repaired, access to the working area is not allowed without proper personal fall protection.

 The site supervisor must have a rescue plan for the users and others involved. All should read and understand this rescue plan. If this is not the case, someone must be present to instruct the users and other workers.

 Check before usage if there are no damaged, lose or missing parts.

 Check before usage if the Aluminum Fixed Mounted Guardrail system is mounted properly.

 Check before usage if the Aluminum Fixed Mounted Guardrail system counterweights are mounted properly and locked to prevent removal by unauthorized persons.

 Always ensure the Safety Swing Gate is locked until and unless required. Avoid unintentional opening of the gate.
Installation

The modular design of the Aluminum Fixed Mounted Guardrails allows the operator to easily install the Aluminum Fixed Mounted Guardrails on various types of roof, walls and/or parapets. During installation, none of the components may be modified. Contact the manufacturer for proper advice in case of technical issues.

During installation do not modify any component other than stated in this manual.

If any of the Aluminum Fixed Mounted Guardrail system components do not properly fit, contact your manufacturer for proper advice.

Preparation:

Before starting with the installation of the Aluminum Fixed Mounted Guardrails, ensure the content of the package is correct and check for any damage. If there are any questions or concerns, please contact the manufacturer.

Before installation of the Aluminum Fixed Mounted Guardrails, check the roof material for damage and validate the maximum slope angle does not exceed 10° above the horizon. Please use an inclinometer.

Put on a full body harness including all necessary fall protection components and gather the following tools listed below that are required to install the Aluminum Fixed Mounted Guardrail system.
General requirements:

The Aluminum Fixed Mounted Guardrail system must be installed with a maximum distance of 8 feet (2.43 meters) between two uprights, and shall not exceed 8 feet.

PLEASE NOTE THAT AS PER OSHA, CAL-OSHA & ANSI REGULATIONS, MAXIMUM SPACING BETWEEN UPRIGHTS/STANCHIONS REQUIRED MUST BE 8 FEET OR LESS. THESE BASES HAVE ALREADY BEEN INCLUDED IN THE GUARDRAIL KIT BASED ON YOUR SELECTIONS. READ THE DECLARATION OF CONFORMITY.
General dimensions

Independent of the type of upright that will be installed, the maximum distance between two uprights shall not exceed 8 feet (2.43 meters). The same maximum distance applies to the distance between the Upright and the Wall Mounted End Bracket on the side wall.

The minimum distance between the rails, as well as the minimum distance between the lowest rail and the working surface is 18” (0.45 meters). In case a toe board is used, the distance between the toe board’s top and the rail above shall not exceed 18” (0.45 meters).

45° Corner Bracket – Inner Bend
The 45° Corner Bracket is used in order to make a 45° inner corner. The maximum distance between the center of a 45° Corner Bracket and one of the two uprights is 1’ 7 11/16". The second upright must be installed within 47 1/4”.

45° Corner Bracket – Outer Bend
In case a 45° outer corner must be made, the maximum distance between any of the uprights and the center of the 45° Corner Bracket is 1’ 7 11/16".
**90° + Adjustable Corner Brackets – Inner Bend**

In addition to the requirements, in case the Adjustable Corner Bracket is used in order to make an inner corner of 80° to 180°, the maximum distance between the center of an Adjustable Bracket and one of the two uprights is 1' 7 11/16". The second upright must be installed within 59".

**90° + Adjustable Corner Brackets – Outer Bend**

In case an outer corner of 80° to 180° must be made, the maximum distance between any of the uprights and the center of the 90° Corner Bracket is 1'7 11/16”.

**Finishing End Bracket**

In addition to the requirements, the maximum distance between the Finishing End Bracket and the upright is 29' 17/35".
‘Top Floor Mount’ Guardrail Installation:

**STEP 1**
Place the upright assembly in the correct position and mark the drill holes with a marker pen or chalk.

**STEP 2**
Drill two 15 mm (0.59”) holes in the working surface with a depth of at least 90 mm (3.5”). After drilling, blow out dust and loose materials. Brush the hole and blow it out again.

**STEP 3**
Inject (mixed) adhesive into the hole until approximately halfway full OR Insert Fischer anchor TA M10.

**STEP 4**
Mount two M10 threaded rods A2-70 within the holes immediately after applying the chemical anchor.
STEP 5
Mount the upright assembly once anchor is hardened (approximately 60 min) using washers and nuts M10 A2-70.

STEP 6
Install the next Top Floor Mount Upright assembly at a maximum distance of 2440 mm (8 ft.) from the one just installed.

‘Side Flush Mount’ Guardrail Installation - ON BRICK WALL

STEP 1
Place the wall connector in the correct position and mark the drill holes with a marker pen or a piece of chalk.

Note: Make sure to place the markings as close to the middle of the brick as possible.

STEP 2
Remove the wall connector and drill two 16 mm (5/8”) holes in the wall and make sure that you drill in the structural wall. The minimum depth of the drilling hole is 80 mm (3 3/16”) (3 3/16”) (3.14”).
STEP 3
Place a mesh in both holes to prevent mastic leaking into the cavity. Cut the mesh along the wall in order to align the end with the wall.

STEP 4
Put Hilti Hit-HY 70 in the hole using the correct clamp.

STEP 5
Put a piece of threaded rod in the holes and cut it at a distance of 25 mm (0.98”) measured from the wall. Do this two times.

STEP 6
Place the wall connector over the threaded rods followed by washers and nuts.
**STEP 7**
Slide the upright assembly over the profile connector and tighten the bolts with a torque of 25 Nm. Make sure that the bottom of the upright assembly and the bottom of the wall connector are aligned.

**STEP 8**
Install the next Side Flush Mount Upright assembly at a maximum distance of 2440 mm (8 ft.) from the one just installed.

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**‘Side Flush Mount’ Guardrail Installation - ON CONCRETE WALL**

**STEP 1**
Place the wall connector in the correct position and mark the drill holes with a marker pen or a piece of chalk.

**STEP 2**
Remove the wall connector and drill two 16 mm (5/8") holes in the concrete wall. The minimum depth of the drilling hole is 80 mm (3 3/16").
**STEP 3**
Place a mesh in both holes to prevent mastic leaking into the cavity. Cut the mesh along the wall in order to align the end with the wall.

**STEP 4**
Put Hilti Hit-HY 70 in the hole using the correct clamp.

**STEP 5**
Put a piece of threaded rod in the holes and cut it at a distance of 25 mm (0.98") measured from the wall. Do this two times.

**STEP 6**
Place the **wall connector** over the threaded rods followed by washers and nuts.

**STEP 7**
Place the **wall connector** over the threaded rods followed by washers and nuts.
Install / Setup of System

Aluminum Rail / Tube:  
(Using a hacksaw or pipe-cutter)

**STEP 1**
Measure the correct length of the Aluminum Rail and mark it.

**STEP 2**
Use a hacksaw or pipe-cutter for aluminum tubes. Make sure the cut is perpendicular to the tube’s length.

**STEP 3**
Use a metal file to remove any burrs.

**Rail Connector:**

**STEP 4**
Place the Aluminum Rail in the upper tube holder of two uprights.

**STEP 5**
Place the Aluminum Rail in the lower tube holder of two uprights.
**STEP 6**
Repeat **STEP 4 and 5** for the next two uprights. Do not tighten the bolts of the tube holders yet.

**STEP 7**
Slide a Rail Connector into the upper and lower tube of one guardrail section.

**STEP 8**
Slide the tubes of the other guardrail section over the two Rail Connectors.

**STEP 9**
Use a 5 mm (0.19") Allen key to tighten the M10 set screw with a torque of 25 Nm.
Finishing End Bracket:

**STEP 1**
Slide a **Rail Connector** into the upper and lower tube of one guardrail section.

**STEP 2**
Slide the **Finishing End Bracket** over the two **Rail Connectors**.

**STEP 3**
Use a 5 mm (0.19") Allen key to tighten the M10 set screw with a torque of 25 Nm.
Wall Mounted End Bracket:

**STEP 1**
Mark the place where the **Wall Mounted End Bracket** should be mounted on the wall.

**STEP 2**
Mount the **Wall Mounted End Bracket** on the wall by means of two screws according to the specifications in the table below.

**STEP 3**
Attach the **Rail Connector** between the **Wall Mounted End Bracket** and **Rail** and adjust it end to end. Cut the extra **Rail** if required.

**STEP 4**
Tighten the **Rail Connector** with a 5 mm (0.19") Allen key with a torque of 25 Nm.

### Wall construction specifications

<table>
<thead>
<tr>
<th>Wall construction</th>
<th>Drill depth</th>
<th>Drill diameter</th>
<th>Screw type</th>
<th>Screw diameter/length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wooden wall</td>
<td>60 mm (2.36&quot;)</td>
<td>N/A</td>
<td>Coach screw</td>
<td>8 mmx60 mm</td>
</tr>
<tr>
<td>Concrete wall</td>
<td>60 mm (2.36&quot;)</td>
<td>10 MM (0.39&quot;)</td>
<td>Plug and screw</td>
<td>8 mmx60 mm</td>
</tr>
<tr>
<td>Brick/stone</td>
<td>60 mm (2.36&quot;)</td>
<td>10 MM (0.39&quot;)</td>
<td>Plug and screw</td>
<td>8 mmx60 mm</td>
</tr>
<tr>
<td>Steel</td>
<td>60 mm (2.36&quot;)</td>
<td>N/A</td>
<td>Self-drilling</td>
<td>6 mmx40 mm</td>
</tr>
</tbody>
</table>
45° / 90° Corner Brackets:

**STEP 1**
Slide a Rail Connector into two Rails.

**STEP 2**
Slide the 45° / 90° Corner Brackets over the Rail Connectors and use a 5 mm (0.19") Allen key to tighten the bolt with a torque of 25 Nm.

**STEP 3**
Slide a Rail Connector into the upper tube of one guardrail section.

**STEP 4**
Slide the 45° / 90° Corner Bracket + Rail assembly over the Rail Connector. Tighten the bolt just enough so that the Corner Brackets stays in place when adjusting the Rail.
**STEP 5**
Place the Rail in the Tube holder of the next upright.

**STEP 6**
Use a 5 mm (0.19”) Allen key to tighten the bolt of the Rail Connector with a torque of 25 Nm.

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**Adjustable Corner Brackets:**

**STEP 1**
Slide the Adjustable Corner Bracket into two Rails.

**STEP 2**
Slide the next Rail over the other end of the Adjustable Corner Bracket.
**STEP 3**
Use a 6 mm (0.23") Allen key to tighten the bolt with a torque of 25 Nm.

**STEP 4**
Drill two holes of 5 mm (0.2") and insert two rivets of 4,8 x 14 mm (0,18 x 0,55”).

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**Toeboard Installation:**

Toeboard installation on the ‘Top Floor Mount’ & ‘Side Flush Mount’:

**STEP 1**
After installing the uprights, attach the **Toeboard Connector Plates** on both sides of the upright as shown. Keep the bolts loose.

**STEP 2**
Slide in the **Toeboard** in the **Toeboard Connector Plates**.
**STEP 3**
Arrange the **Toeboard** as per required and slide the toeboard further to the next upright.

**STEP 4**
Repeat the step 1 to 3 for attachment to other uprights. Tighten the bolt with a torque of 25 Nm after final installation setup.

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**Safety Swing Gate:**

**STEP 1**
Make sure there is a distance of 1000 mm (39") between the two uprights on which the **Safety Swing Gate** is to be attached.

**STEP 2**
On the left side of the **Safety Swing Gate** a (magnetic) latch is attached with two screws, the first screw is positioned 208 mm.

**STEP 3**
On the right side of the **Safety Swing Gate** there are two hinges attached to the upright. The first hinge is 120 mm (4.72") from the upper side of the upright. The second hinge is placed 336 mm (13.22") below the first hinge.
**STEP 4**
Slide/click the hinges into position and fix them in place with a screw. Attach the latch for the **Safety Swing Gate** in the same way.

**STEP 5**
Put the **Safety Swing Gate** in place and fit it using the screws. Attach the springs.

**NOTE: After installation:** After installing the Aluminum Fixed Mounted Guardrail system, a competent person needs to verify if the system has been installed correctly.
Pre-use Check

The Aluminum Fixed Mounted Guardrails is designed to be used without any specific user knowledge of fall protection systems. However, when entering the work surface the user should always check the Aluminum Fixed Mounted Guardrail System for:

- Damage;
- Oxidation and corrosion;
- Loose or missing parts; and
- Visible signs of structural damage, which could lead to decreasing rigidity of the system.

If any defect is found, or if there is any doubt about the Aluminum Fixed Mounted Guardrail system safety, discontinue using the system and contact the manufacturer. Do not use the Aluminum Fixed Mounted Guardrail system again until an authorized installer has tested, completed any repairs and declared in writing that the product and/or its components are safe.

Maintenance

To ensure the safety of the users of the Aluminum Fixed Mounted Guardrail system, the system needs to be inspected before every use. In addition, maintenance operations need to be performed by the manufacturer’s approved installer at least every 12 months. The inspector produces an inspection report which is handed over to the systems owner. The Aluminum Fixed Mounted Guardrail system and its components can be inspected on location and must be inspected according to the procedures described in this chapter.

Always start maintenance operations with the pre-use check as described above.

After that, inspect the Aluminum Fixed Mounted Guardrail system for the following points:

- **Deformation**
  
  Check all components of the Aluminum Fixed Mounted Guardrail system for damage and bending.

- **Wear**
  
  Check all components of the Aluminum Fixed Mounted Guardrail system for wear.
- **Oxidation**
  Check all components of the Aluminum Fixed Mounted Guardrail system for oxidation. Remove any dirt that could prevent water from draining. Local surface oxidation is not considered a defect.

- **Bolts**
  Check the anchoring of all bolts. If necessary, retighten the bolts and/or replace the bolts.

- **Markings**
  Check the legibility of the product markings and, if necessary, replace the product markings.

- **Checking the upright – horizontal beam connection**
  Perform the following checks on the top:
  - Check the upright for any backlash. If any backlash is present, tighten the two connectors that connect the upright with the horizontal beam.
  - Check for oxidation. If required, replace the connecting elements which include the bolt, nut, and insert. A bloom of oxidation does not affect the strength of the connection and can be wiped off.
  - If applicable: clean the products with a non-aggressive cleaning product and a dry rag.

If any problems occur during the inspection, do not use the system until the concerning components are replaced.
In the event of a fall

If components of the Aluminum Fixed Mounted Guardrail system show any sign of deformation, they shall be replaced. Determine if the deformation is the result of a fall or another external event. If the Aluminum Fixed Mounted Guardrail system has arrested a fall, do not use the system until it is inspected by a certified installer or supplier. All components need to be inspected and the damaged parts need to be replaced before the Aluminum Fixed Mounted Guardrail system can be used again.

The Aluminum Fixed Mounted Guardrail system contains no components that may be modified or be repaired by the user/operator. Do not make any alterations or additions to the Aluminum Fixed Mounted Guardrail system without prior written consent of the manufacturer. Any repair shall only be carried out in accordance with the procedures prescribed by the manufacturer and may only be completed by a certified installer or supplier.

Environment

The manufacturer mainly uses aluminum, steel, and stainless steel in its products. Stainless steel and aluminum are 100% recyclable. More than 50% of all stainless steel is produced from reclaimed material. The aluminum used by the manufacturer is 80% recycled material. Stainless steel and aluminum are therefore environmentally friendly materials.

Dispose of packaging materials and defective products in an environmentally friendly manner where possible to allow the materials to be reused. Materials must be disposed in accordance with government regulations such as those which apply for location and time of disposal.
T&C, warranty and liability

The manufacturer guarantees that the delivered goods will be free from defects for a period of 12 months. If goods delivered do not comply and the warranty applies, the supplier shall replace the defective component at his discretion, within a reasonable term following receipt of written notification of the defect by the customer. In the event that the component is replaced, the customer shall undertake to return the component to be replaced to the supplier and to transfer the ownership thereof to the manufacturer.

The warranty does not apply if:

- The defect as a result of improper use or misuse of the delivered item.
- The delivered item has been used for a purpose or at a location other than the one it was intended for.
- The customer or third parties have modified or re-paired, disassembled or done other work on the delivered item without the suppliers’ prior consent in writing.
- The delivered item was not put into operation and/or assembled in accordance with the instructions and/or in conformity with the assembly instructions given by the supplier during commissioning.
- The customer is in default of payment to the supplier.
- Insofar as the warranty covers goods which the supplier has acquired from a third party, said warranty shall be limited to any warranty the third party has given to the supplier in this respect.
- No warranty shall be given with respect to any inspection carried out by, any advice given or any similar services rendered by the supplier.
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CAI SAFETY SYSTEMS
CUSTOM ENGINEERED FALL PROTECTION SYSTEMS

Phone: (888) 246-6999

Websites:
https://caisafety.com

Email:
info@caisafety.com
webstore@caisafety.com