



# ***Margaritelli Ferroviaria H2BL-01 Safety Barrier System***

Longitudinal Barrier

Updated September 2022



**Trusted infrastructure products**

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CSP® may make changes to this Product Manual from time to time. Please check the CSP website prior to using this Product Manual to ensure that you have the latest version.

## Introduction

The Margaritelli Ferroviaria H2BL-01 System is a roadside aesthetic guardrail system comprised of both steel and wood element suitable for containing, redirecting and shielding vehicles from roadside obstacles. As an additional benefit the H2BL-01 provides aesthetic alternatives to standard W-Beam products for use at roadway locations where scenic beauty would be enhanced by its use. The barrier has been designed and tested to meet the evaluation criteria of EN1317 H2 and meets or exceeds the criteria of MASH Test Level 3 for a longitudinal barrier. This is the current state of the art performance criteria, exceeding the requirements of NCHRP 350 Test Level 3.

The Margaritelli Ferroviaria H2BL-01 System has an initial installation height of 830 mm to the top of the rail, providing the system with the ability to withstand numerous road surface overlays without the need to relevel or lifting of the barrier. The Margaritelli Ferroviaria H2BL-01 System can be installed with a sloped down end or curved terminal end, which are not energy absorbing, on the approach end, however it is recommended that these terminals be installed swept back away from the roadway and outside the zone of safety.

The rounded edges to the Margaritelli Ferroviaria H2BL-01 Post, the open side of the shape on should be away from the roadway, and wood cladding provide increased protection for vulnerable road users. The C-100 post used with the Margaritelli Ferroviaria H2BL-01 Post are easy to drive into all soil types and provide increased resistance to rotation in the soil when impacted. Unlike other systems on the market, any damage caused to the top of the posts or to the rail mounting points during installation will not affect the performance of the system.

The connection system between the rail and posts is formed using conventional M16 fasteners providing it with the greatest tolerance of any aesthetic system on the market. If the connection is damaged in any way it can be easily replaced without replacing the posts allowing for simpler installations and repairs. The Margaritelli Ferroviaria H2BL-01 System is installed quickly using conventional installation tools and equipment.



## System Overview

The Margaritelli Ferroviaria H2BL-01 System is designed to provide acceptable structural adequacy, minimal occupant risk and safe vehicle trajectory as required by the latest in safety standards, EN1317 Part 1 and 2 Test Level H2, equivalent to AASHTO MASH 16 Test Level 3 (TL-3). This standard requires the system to be independently evaluated with full scaling testing using 900 kg and 13,000 kg vehicles traveling at speeds of 100 km/h at a 20° impact angle and 70 km/h at a 20° impact angle, respectively. The requirements of EN1317 Parts 1 & 2 are so stringent that the system is required to absorb nearly twice as much energy during the impact than the MASH 16 TL-3 requirements.

When impacted by an errant vehicle, the Margaritelli Ferroviaria H2BL-01 System will redirect the vehicle along the face of the barrier system, bringing it to a controlled stop. The system has been developed, through the use of glu-laminated wooden elements, to produce very limited debris during an impact, with all posts designed to remain firmly located in the soil and the connection details to remain attached to the rail. Repair of the system is completed by removing and replacing any bent or damaged rails and posts impacted accordingly. Any posts with damaged connections can be repaired by replacing the connection hardware only, reducing the need to remove posts and repair damaged ground.

Key specifications for the Margaritelli Ferroviaria H2BL-01 System are:

|                                  |         |
|----------------------------------|---------|
| System width                     | 362mm   |
| Height to top of rail            | 830mm   |
| Height to top of wood post cover | 870mm   |
| Post weight                      | 15.83kg |
| Post length                      | 1.77m   |
| Post spacing                     | 2.0m    |
| H1 TB11 dynamic deflection       | 0.46m   |
| H1 TB42 dynamic deflection       | 1.59m   |

The minimum Length of Need (LON) of the Margaritelli Ferroviaria H2BL-01 System is dependent on the posted speed limit. Please refer to Road Controlling Authority approval letters for local minimum length requirements. However, a minimum length of need for a two-way road with a posted speed limit of 100 km/hr with a clear zone of approaching traffic is recommended as 90 m, excluding terminal ends.

The Margaritelli Ferroviaria H2BL-01 System has been used in Europe for nearly 10 years. It has an excellent record of in-service performance and has shown to stand the test of time. The quality of the glu-laminated wooden elements and the preservation processes used to treat them have seen some of the previous designs still in use, 20 years after installation.

## Limitations and Warnings

The Margaritelli Ferroviaria H2BL-01 System forms part of an approved roadside protection system and it must be installed in conjunction with an approved terminal end system on both the approach and trailing ends. When installed in accordance with the manufacturer's instruction the barrier system allows an impacting vehicle to be re-directed in a safe and predictable manner under the MASH impact conditions.

Vehicle impacts that vary from the MASH impact conditions for longitudinal barriers may result in significantly different outcomes from those obtained in the experimental testing and may not meet the MASH evaluation criteria.

The selection and placement of the Margaritelli Ferroviaria H2BL-01 System must be in accordance with the Roadway Controlling Authority's guidelines and the details shown in the construction drawings. Installation must be within strict accordance with the installation instructions for the product. Alternative installation techniques will be required if the soil conditions on site do not meet the minimum requirements stated in this manual.

## Training

All Installers must undergo formal training on the installation of the Margaritelli Ferroviaria H2BL-01 System. This includes the correct identification of each Margaritelli Ferroviaria H2BL-01 System components and installing it as per the product specification and Installation Manual.

By the end of the training installers will be able to identify each component of the Margaritelli Ferroviaria H2BL-01 System and have the knowledge to safely install the barrier as per the Installation Manual and Specifications required.

The training will cover and include the correct Personal Protective Equipment (PPE) required to be worn during installation and maintenance. Additionally, by the end of the training workers will know the correct methods required to handle and install all components of the Margaritelli Ferroviaria H2BL-01 System.

## Health and Safety

Installers should comply with all necessary health and safety legislation in the local jurisdiction, including all safe work and lifting practices.

All appropriate traffic safety precautions must be adopted. All workers must wear the required safety clothing, including but not limited to, high visibility vests, steel capped footwear, gloves and protective glasses etc.

Before undertaking any earth works, including drilling or driving of posts, always check with the appropriate service providers that the area is clear of underground services

All installers must be well clear of machinery when posts are being driven.

## Before Installation

Design, selection and placement of the Margaritelli Ferroviaria H2BL-01 System shall be in accordance with the local Road Controlling Authority's guidelines and as per the details shown in the construction drawings. Installation shall be in accordance with the installation instructions supplied for this product.

The Margaritelli Ferroviaria H2BL-01 System is an engineered safety device. Before starting installation ensure familiarity with the makeup of the system.

**NOTE:** Soil conditions may require a local geotechnical engineer to confirm the soil condition on site met the required condition described in the manual.

## Safety statements

### General Safety

- All required traffic safety precautions should be complied with. All workers should wear required safety clothing (examples, but not limited to, include: high visibility vests, steel capped footwear, gloves etc).
- Only authorised trained personnel should operate any machinery. Where overhead machinery is used, care must be taken to avoid any overhead hazards.
- Before drilling or excavation always ensure that the area is clear of underground services. The appropriate service providers may need to be contacted.

### System Safety Statements

- All installers must be a safe distance from all drilling or excavating machinery operating.
- The components are not heavy enough to require specialised lifting equipment, but due to the dimensions and bulky nature, care should be taken when lifting the larger components into position.
- Avoid placing hands or fingers in and around moving machine parts when components are being lifted and manoeuvred into place.

## Limited Warranty

CSP® has tested the impact performance of its barrier systems and crash cushion systems, and other highway safety hardware under controlled conditions, however, CSP does not represent nor warrant that the results of those controlled conditions would necessarily avoid injury to persons or property.

TO THE MAXIMUM EXTENT PERMITTED BY LAW, CSP EXPRESSLY DISCLAIMS ANY WARRANTY OR LIABILITY FOR CLAIMS ARISING BY REASONS OF DEATH OR PERSONAL INJURY OR DAMAGE TO PROPERTY RESULTING FROM ANY IMPACT, COLLISION OR HARMFUL CONTACT WITH THE PRODUCTS OR NEARBY HAZARDS OR OBJECTS BY ANY VEHICLE, OBJECTS OR PERSONS.

CSP warrants that any product or component part manufactured by CSP will be free from defects in material or workmanship. CSP will replace free of cost any product or component part manufactured by CSP that contains such a defect.

TO THE MAXIMUM EXTENT PERMITTED BY LAW, CSP EXPRESSLY DISCLAIMS THE FOREGOING WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES NOT EXPRESSLY SET FORTH HEREIN, WHETHER EXPRESS OR IMPLIED BY OPERATION OF LAW OR OTHERWISE, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. CSP'S LIABILITY UNDER THIS WARRANTY IS EXPRESSLY LIMITED TO REPLACEMENT FREE OF COST OF PARTS SUPPLIED BY CSP ONLY (IN THE FORM AND UNDER THE TERMS ORIGINALLY SHIPPED), OR TO REPAIR OR TO MANUFACTURE BY CSP, PRODUCTS OR PARTS NOT COMPLYING WITH CSP SPECIFICATIONS, OR, AT CSP'S ELECTION, TO THE REPAYMENT OF AN AMOUNT EQUAL TO THE PURCHASE PRICE OF SUCH PRODUCTS OR PARTS, WHETHER SUCH CLAIMS ARE FOR BREACH OF WARRANTY OR NEGLIGENCE. CSP SHALL NOT BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL LOSSES, DAMAGES OR EXPENSES OF ANY KIND, INCLUDING, WITHOUT LIMITATION, ANY SUCH LOSSES, DAMAGES OR EXPENSES ARISING DIRECTLY OR INDIRECTLY FROM THE SALE, HANDLING OR USE OF THE PRODUCTS FROM ANY OTHER CAUSE RELATING THERETO, OR FROM PERSONAL INJURY OR LOSS OF PROFIT.

Any claim by the Buyer with reference to Products sold hereunder for any cause shall be deemed waived by the Buyer unless CSP is notified in writing, in the case of defects apparent on visual inspection, within ninety (90) days from the delivery date, or, in the case of defects not apparent on visual inspection, within twelve (12) months from the said delivery date. Products claimed to be defective may be returned prepaid to CSP's plant for inspection in accordance with return shipping instructions that CSP shall furnish to the Buyer forthwith upon receipt of the Buyer's notice of claim. If the claim is established, CSP will reimburse that Buyer for all carriage costs incurred hereunder.

The forgoing warranty benefits shall not apply to (i) any Products that have been subject to improper storage, accident, misuse or unauthorised alterations, or that have not been installed, operated and maintained in accordance with approved procedures and (ii) any components manufactured by the Buyer.

The customer acknowledges that it has acquired the Goods for the purposes of a business and that the Consumer Guarantees Act 1993 will not apply to the supply of the Goods by CSP to it.



## Design Considerations

### Kerbs

As with all road side safety hardware, the Margaritelli Ferroviaria H2BL-01 System has been designed and tested so that the centre of gravity of the impacting vehicle is at a constant height in relation to the system. For this reason, it is preferred that kerbs or channels are not in front or directly behind the Margaritelli Ferroviaria H2BL-01 System as they may result in altering the height of the vehicle at impact.

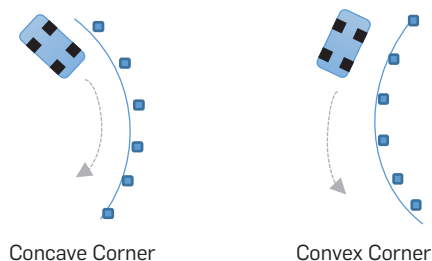
If interaction with a kerb cannot be avoided consult the local Road Controlling Authority guidelines regarding allowable kerb heights, kerb shapes, and barrier offset distance.

### Slopes

Margaritelli Ferroviaria 21BL-01 System can be installed on ground with a maximum cross fall of 6H:1V. For steeper slopes it is recommended that the system is installed no closer than 300mm to the batter hinge point of the slope. If installations with less clearance are required, please contact CSP.

### Horizontal and Vertical Curves

The Margaritelli Ferroviaria H2BL-01 System can accommodate both horizontally and vertically curved guardrail panels if required by site conditions. For radii less than 12.5m the project should be reviewed in case special parts are needed. Please refer to approved details of the local Road Controlling Authority where necessary.



### Undulating ground conditions

Site specific grading may be necessary to ensure that there are no 'humps' or 'hollows' that may significantly alter the impacting vehicles stability or substantially alter the longitudinal rail heights in relation to the

ground. The Margaritelli Ferroviaria H2BL-01 System is required to be installed level and centred on the barrier line as stated in the Installation Procedure.

Care must be taken to ensure all posts in the Margaritelli Ferroviaria H2BL-01 System are installed to the correct height, alignment and orientation. It is strongly recommended that smoothing of uneven ground conditions be completed along the length of the Margaritelli Ferroviaria H2BL-01 System.

### Clear Zone

Clear Zones are areas adjacent to traffic lanes that provide errant vehicles the opportunity to slow down or recover. The clear zone must be kept clear from roadside features that could be hazardous to errant vehicles, such as but not limited to trees, poles and culverts. Although it is desirable to maximise the available clear zone, please refer to your local Road Controlling Authority for confirmation of the minimum width requirements.

## System Design

### Terminal Ends

The Margaritelli Ferroviaria H2BL-01 System is designed to be compatible with drop down, non-energy absorbing end treatments which serve as anchors for the system and prevent blunt ends of the longitudinal rail from being exposed. The ends also provide tensile and deflection strength necessary to ensure the errant vehicle is redirected for the length-of-need required.

Curved ends may also be employed when and where needed only when drop ends cannot be installed due to site specific reasons.

The ends should be installed swept back from the roadway and outside the zone of safety.

- Care must be taken to ensure the correct post spacing is ALWAYS used during the installation.
- Care must be taken to ensure the posts are orientated correctly during installation and to ensure all rail bolts are inserted and tightened accordingly.
- Care must be taken to ensure the line posts are installed at the correct height.

## Soil Condition

The Margaritelli Ferroviaria H2BL-01 System is a soil-mounted system driven directly into the soil. To meet the barriers performance requires the soil to meet AASHTO Grade A1-a standard and requirements set out by AS/NZS 3845.1:2015 and TNZ Specification M/4 2006.

Soil conditions on site not meet these requirements will require alternative installation. Contact CSP for details.

It is strongly recommended that soil tests be completed at the location where the Margaritelli Ferroviaria H2BL-01 System is to be installed.

**NOTE:** All technical information required to assist in designing a site-specific foundation is available from CSP.

**IF SOIL CONDITIONS ON SITE DO NOT MEET OR EXCEED THE REQUIRED STRENGTH, SITE SPECIFIC CONDITIONS, REFER TO A LOCAL GEOTECHNICAL ENGINEER FOR FURTHER ADVICE.**

## Length of Need

The minimum Length of Need (LoN) of the Margaritelli Ferroviaria H2BL-01 System is dependent on the specific hazard being protected and the posted speed limit. Please refer to Road Controlling Authority approval letters for local minimum length requirements.

The minimum length of need for a two-way road with a posted speed limit of 100 km/hr with a clear zone of approaching traffic is recommend as 90 m plus the length of the terminal end regions on either end of the barrier system. We recommend Installers contact their local Rooding Control Authority for further information or guidance.

**NOTE:** As per the LoN design section of the Rooding Control Authority's guidelines, care must be taken when calculating the actual length of a barrier required verses the theoretical length of need.

## System Deflection

The transverse deflection of a barrier during a crash is dependent upon the mass, speed, and impact angle of the errant vehicle. The maximum level of dynamic deflections measured during impact testing are presented below.

|                    | Test TB11 | Test TB51 |
|--------------------|-----------|-----------|
| Vehicle type       | Compact   | Bus       |
| Vehicle mass       | 876kg     | 12,670kg  |
| Vehicle speed      | 102.5km/h | 73.1km/h  |
| Impact angle       | 20°       | 20°       |
| Dynamic deflection | 0.46m     | 1.59m     |

Crash testing typically represents the extremes impact parameters. A review of the proposed barrier location can be undertaken to assess the following variables influence on the likely maximum system deflection:

- Maximum attainable impact angle;
- Design speed; and
- Design vehicle.

Please refer to CSP for assistance on determining site specific deflections based on these parameters. The ends should be installed swept back from the roadway and outside the zone of safety.

## Parts Identification

### Steel components



Margaritelli Ferroviaria H2BL-01 System Post (C-100 x 1770)

### Hardware



Margaritelli Ferroviaria H2BL-01 System Post Bolt (M16 x 30)



Margaritelli Ferroviaria H2BL-01 System Block Out



Margaritelli Ferroviaria H2BL-01 System Rail Carriage Bolt (M16 x 125)



Margaritelli Ferroviaria H2BL-01 System Splice Plate



Margaritelli Ferroviaria H2BL-01 System Post Cover Bolt (M10 x 100)

## Parts Identification (cont.)

### Wood components



Margaritelli Ferroviaria H2BL-01 System Post Cover

### End Treatment Assemblies



Margaritelli Ferroviaria H2BL-01 System Drop End Assembly



Margaritelli Ferroviaria H2BL-01 System Rail Assembly



Margaritelli Ferroviaria H2BL-01 System Curved End Assembly

## Bill of Materials

| Checklist per panel (3 m of barrier) installed               | Y |
|--|---|
| 2x H2BL-01 System C-100 Posts                                |   |
| 2x H2BL-01 System Post Covers (one per post)                 |   |
| 1x H2BL-01 System Rail Assembly                              |   |
| 2x H2BL-01 Splice Plate                                      |   |
| 2x H2BL-01 Block Out   |   |
| 16x Carriage Bolts M16 x 125mm (1 x washer and nut per bolt) |   |
| 4x Carriage Bolts M10 x 100mm (1 x washer and nut per bolt)  |   |
| 14x Rail Bolts M16 x 30mm (1 x washer and nut per bolt)      |   |
|  |   |
| General equipment required                                   |   |
| Drilling or post driver suitable for foundation              |   |
| String line and pegs   |   |
| Measuring tape   |   |
| Level  |   |
| 24mm Wrench or Ratchet                                       |   |
| 24mm Ring Spanner  |   |
| 16mm Spanner or Ratchet                                      |   |
| 16mm Ring Spanner  |   |
| Torque Wrench  |   |



## Installation

### Getting Started

The Margaritelli Ferroviaria H2BL-01 System is an aesthetic safety barrier comprised of both wood and steel elements designed to run the length of need required and is anchored by drop end terminals. The minimum Length of Need (LON) allowed is dependent on the post speed limit. For a 100 km/hr zone a minimum LoN of 81 metres is recommended, excluding the drop end terminal.

### Preparation

Before installing an Margaritelli Ferroviaria H2BL-01 System, ensure that all components required for the system are on site and have been identified. The Margaritelli Ferroviaria H2BL-01 System is an engineered safety device. Before starting installation ensure familiarity with the makeup of the system. Refer to the Bill of Materials and Parts Identification sections in this manual for more information.

Ensure that the area where the Margaritelli Ferroviaria H2BL-01 System is to be installed is sufficiently flat so that the posts and rail assemblies can be installed within the allowable tolerance and aligned to the drop ends. Minor site grading may be required.

### Soil Conditions

The Margaritelli Ferroviaria H2BL-01 System has been designed to withstand a constant static load, thermal loading, and dynamic impact load that can be applied from the impact of an errant vehicle. To perform, the Margaritelli Ferroviaria H2BL-01 System must be attached to a drop end which provides proper anchor to provide the necessary safety benefits. It is recommended that the soil tests are carried out at the location the Margaritelli Ferroviaria H2BL-01 System prior to being installed.

**IF SOIL CONDITIONS ON SITE DO NOT MEET OR EXCEED THE REQUIRED STRENGTH DETAILED IN THIS MANUAL, SITE SPECIFIC FOUNDATIONS MUST BE DESIGNED BY A LOCAL GEOTECHNICAL ENGINEER.**

## Tools Required

The tools required to install the Margaritelli Ferroviaria H2BL-01 System are similar to other W-Beam barriers. It requires:

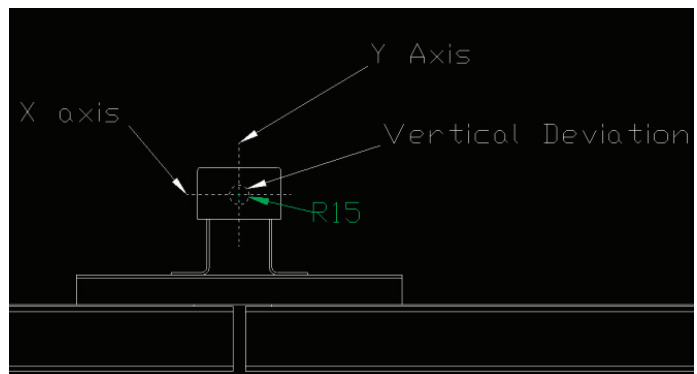
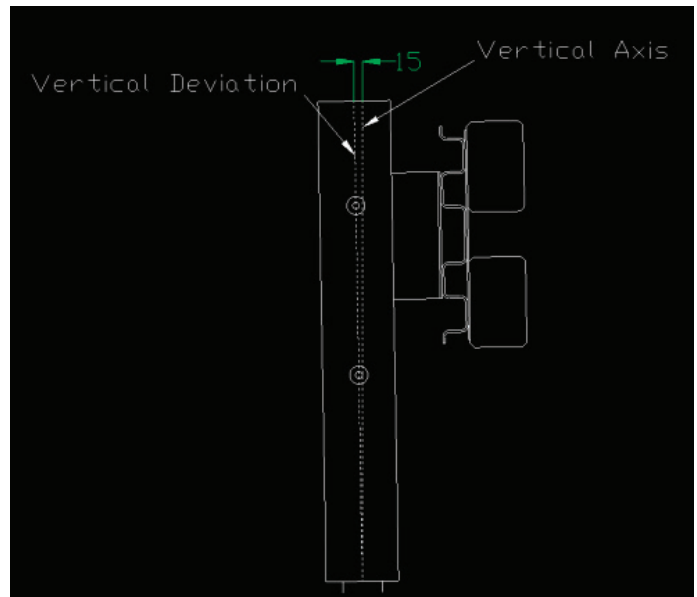
- Appropriate personal protective equipment
- Drilling or post driving machinery (suitable for soil conditions and with a driving head to avoid damage to posts during installation)
- String line
- Measuring tape
- Level
- 24mm and 16mm Socket wrench or Ratchet
- 24mm and 16 mm Ring spanner
- Torque Wrench

## Installation Tolerances

The Margaritelli Ferroviaria H2BL-01 System is an engineered safety device. To obtain optimal performance it is important to install all components of the system to within the allowable tolerances stated below. Particular care must be taken to ensure:

- Suitable horizontal alignment and verticality of the line posts.
- Consistency in the vertical height of the line posts.

Margaritelli Ferroviaria H2BL-01 System has to be installed at 770mm to the top of the post. A vertical height tolerance of -10mm and +30mm is acceptable for both the Margaritelli Ferroviaria H2BL-01 System Post. The top of the aesthetic rail is to be positioned 60mm above the top of the Margaritelli Ferroviaria H2BL-01 System Post with a tolerance of  $\pm 5$ mm. The Margaritelli Ferroviaria H2BL-01 System Post laterally is constrained to  $\pm 15$ mm tolerance. It is of upmost importance for these tolerances to be adhered to in order to ensure safe function of the Margaritelli Ferroviaria H2BL-01 System.



## Installation Instructions

Before installing the Margaritelli Ferroviaria H2BL-01 System, ensure that all components required for the system are on site and have been identified. The Margaritelli Ferroviaria H2BL-01 System is an engineered safety device made up of relatively small number of parts. Please ensure familiarity with the makeup of the system and the installation process prior to commencing. If required, refer to the Bill of Materials and Parts Identification sections in this manual for more information.

### Site Preparation

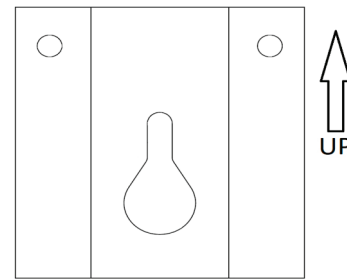
It is preferred that the Margaritelli Ferroviaria H2BL-01 System be installed on flat, level ground and tethered to an approved terminal end or crash cushion. The positioning of the Margaritelli Ferroviaria H2BL-01 System commences from the last post connected to the drop end, working upstream to the prior drop end. It is recommended that a string line be used to obtain the correct orientation and placement of the posts and are aligned to the drop end.

**BEFORE DRILLING OR EXCAVATION ALWAYS ENSURE THAT THE AREA IS CLEAR OF UNDERGROUND SERVICES.**

## Installation procedure (Posts and Rail Assembly)

### Step 1

Review the site location and identify possible hazards prior to commencing the installation of the Margaritelli Ferroviaria H2BL-01 System. Any concerns, please refer to the local Roding Authority.



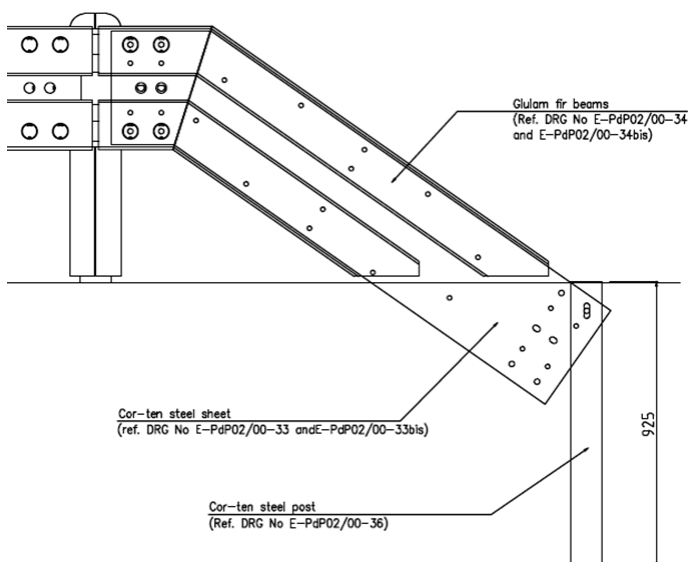
Block Out Proper Orientation

Affix a Splice Plate 18mm x 40mm slots to the Block Out 18mm holes using the two (2) M16x30mm Rail Bolts. The bolts should only be 'finger tight' for now.



### Step 2

Excavate shallow trench 400mm long x 330mm wide x 430mm deep. Install downstream Drop End Post (925mm long) driving it flush and level with the foundation surface. Install Standard C-100 Post (1770mm long) 1587mm from Drop End Post to height of 770mm.



Affix a Block Out to the Standard C-100 Post using one (1) M16x30mm Rail Bolt with the left and right 18mm holes on the flanges up and towards the roadway. The bolts should only be 'finger tight' for now.

Next confirm alignment using the level and adjust appropriately. Then tighten the one (1) M16x30mm Rail Bolt between the C-100 Post and Block Out, and the two (2) M16x30mm Rail Bolt (which were 'finger tight') to 120Nm using the Torque Wrench.

The Drop End Assembly has 4 (four) M16 x 125mm Carriage Bolts attached remove the nuts but leave the bolts in place. Next using the 4 (four) M16x125mm pass the bolts through Splice Plate. Install the nuts only 'finger tight' for now.

Affix Drop End Assembly to the Drop End Post using the 1 x M16x30mm at the top right hole (18mm) on the Drop End Assembly. Only tighten the nuts 'finger tight'.

Finally, confirm, using the level that the Drop End Assembly is level and adjust if necessary. Now that the Drop End Assembly is confirmed that it is level tighten the 4 (four) M16x125mm to 200Nm using the Torque Wrench.

### Step 3

Place a string line from the centre of the downstream drop end to required location of the upstream drop end. The string line should pass over the centre of each post location and be marked accordingly as the required location for drilling or driving each post.



### Step 4

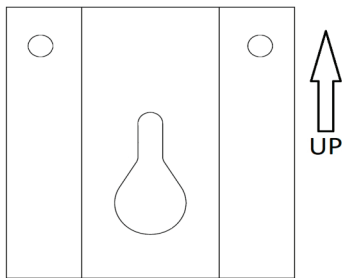
Identify the correct orientation (open side away from the roadway) of the post (refer to Appendix A – MARGARITELLI FERROVIARIA H2BL-01 SYSTEM) and drive post to the predetermined depth of 1000mm (770 mm protruding above ground) as stipulated in Appendix A - MARGARITELLI FERROVIARIA H2BL-01 SYSTEM. The post must be vertically aligned and within the tolerance level stated in the Installation Tolerance section (page 15). The driving of the post should not incur any damage to the post. If a post is damaged it must be inspected and removed if considered that the damage will affect the performance.





### Step 5

Affix a Block Out to the Standard C-100 Post using one (1) M16x30mm Rail Bolt with the left and right 18mm holes on the flanges up and towards the roadway. The bolts should only be 'finger tight' for now.



Block Out Proper Orientation



Block Out

Affix a Splice Plate 18mm x 40mm slots to the Block Out 18mm holes using the two (2) M16x30mm Rail Bolts. The bolts should only be 'finger tight' for now.



Next confirm alignment using the level and adjust appropriately. Then tighten the one (1) M16x30mm Rail Bolt between the C-100 Post and Block Out, and the two (2) M16x30mm Rail Bolt (which were 'finger tight') to 120Nm using the Torque Wrench.

### Step 6

Supporting the Rail Assembly in the desired location, remove the 8 (eight) M16x125mm Carriage Bolts (four per end) but do not remove the 8 bolts. Pass each set of 4 (four) M16x125mm Carriage Bolts through the previously installed Splice Plates.



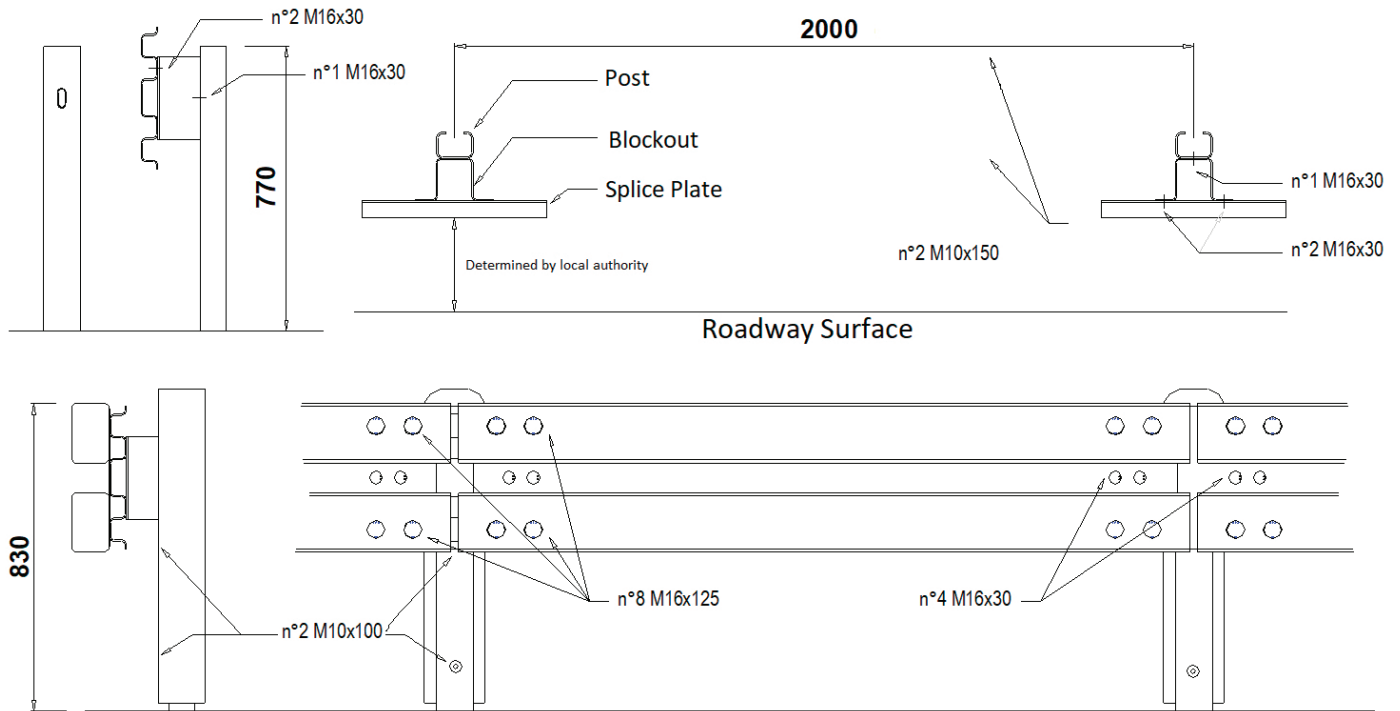
Once the Rail Assembly is in place affix the nuts, 'finger tight' to each end. Once the nuts are in place, using a level assure that the Rail Assembly is level and adjust appropriately if not.

Now that the Rail Assembly is confirmed that it is level tighten the 8 (eight) M16x125mm to 200Nm using the Torque Wrench.

Failure to correctly install the Rail Assembly may cause snagging, poor barrier performance or risk injury or death to the driver of the errant vehicle.

## Step 7

Continue working along the barrier from the first installed Rail Assembly to the upstream drop end at the other end of the project run. Once the barrier is installed a detailed visual inspection should be completed to install all components are correctly installed. All bolts should be confirmed to be installed to the appropriate torque.



### Inspection and Maintenance Frequency

The Margaritelli Ferroviaria H2BL-01 System is maintenance free. However, it is recommended that Margaritelli Ferroviaria H2BL-01 System is inspected after being impacted to ensure that the appropriate strength is maintained. Refer to Installation Procedure in this manual for more information.

### Maintenance requirement for repair after a Bushfire

Following a severe bushfire a detailed inspection of the Margaritelli Ferroviaria H2BL-01 System should be undertaken. If heat damage is noted, it is recommended the Rail Assembly and C-100 posts are replaced immediately.

## Installation Checklist

| Item   | Y | N |
|--|---|---|
| Ensure the posts are orientated in the correct direction and consistent with the drop ends.              |   |   |
| The height of the finished rail should be 830mm (-10mm+30mm) above the finished ground level.            |   |   |
| The height to the top of the posts should be 770mm (-10mm+30mm) above finished ground level.             |   |   |
| The posts are free from damage.  |   |   |
| The correct Margaritelli Ferroviaria H2BL-01 System hardware is installed to the correct torque.         |   |   |
| The Rail Assembly must be level and aligned to the drop ends drawings. Refer to Appendix A for guidance. |   |   |
| Ensure posts are free of debris prior to installing the Rail Assembly.                                   |   |   |

|                       |  |       |  |
|-----------------------|--|-------|--|
| Job Number:           |  |       |  |
| Location:             |  |       |  |
| Client/Asset Owner:   |  |       |  |
| Principal Contractor: |  |       |  |
| Installer:            |  |       |  |
| Installed by:         |  | Date: |  |
| Inspected by:         |  | Date: |  |

Contact CSP for more information on this or other road safety products.

## Frequently Asked Questions

1. What type of equipment is required to install the Margaritelli Ferroviaria H2BL-01 System?

Standard tools required include a wrench, torque wrench, measuring tape, string line and machinery suitable for drilling or compacting the post into soil.

2. Does your company provide spare parts? What is the lead-time for supply?

It is important to fix a damaged Margaritelli Ferroviaria H2BL-01 barrier as soon possible because it most probably won't perform as designed when damaged. For this reason, it is recommended that spares are held by CSP. The lead time for parts will generally be next day delivery or collection from one of our distribution centres.

3. On average, how long does it take to install the Margaritelli Ferroviaria H2BL-01 System?

Depending on circumstances at the site, installation and assembly of the system should take a three-person crew less than 15 mins per Rail Assembly panel (3.0 m length) when using automatic post driving equipment. Installation time will vary depending on ground conditions when hand digging and re-compacting posts.

4. What about vandalism, can the Margaritelli Ferroviaria H2BL-01 System be damaged easily?

No, once the system has been fully installed it becomes a rigid system unlikely to be damaged or weaken the performance of the system.

5. How easily can the Margaritelli Ferroviaria H2BL-01 System be restored after impact?

Margaritelli Ferroviaria H2BL-01 System is easily repaired following an impact. Damaged posts can be removed using a crow bar and new posts installed before replacement Rail Assemblies, Block Outs, and Splice Plates.

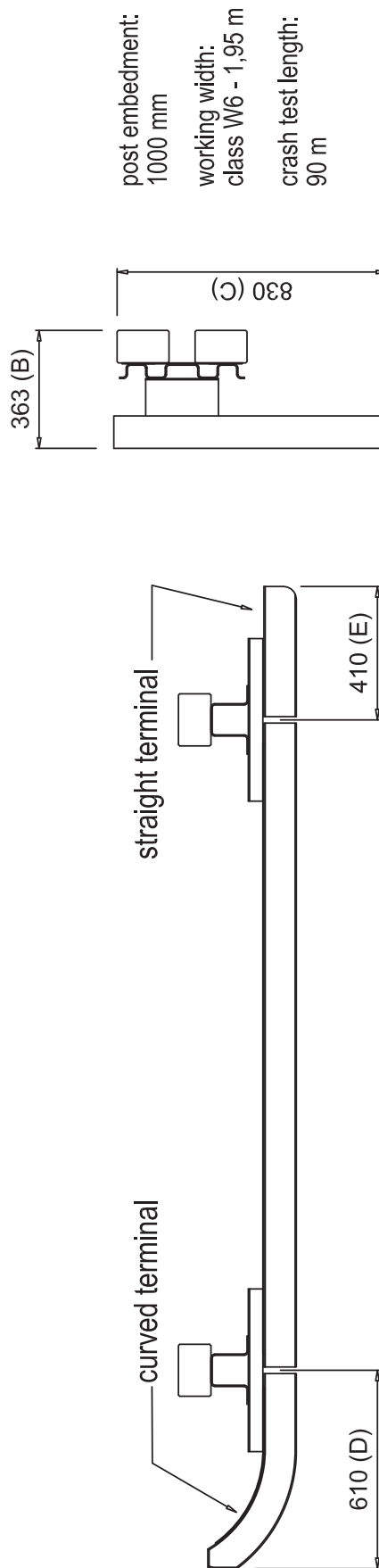
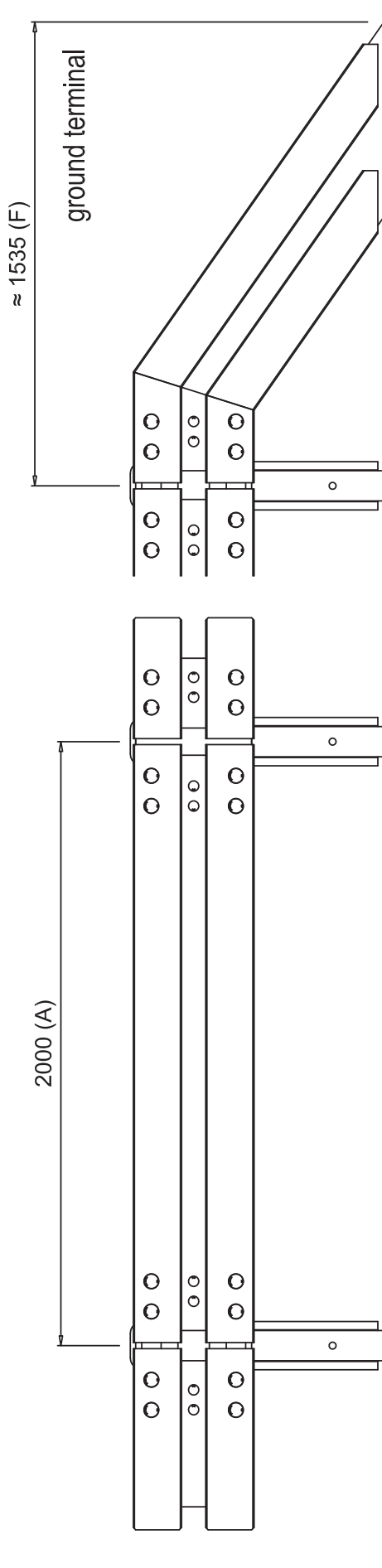
6. What maintenance does the Margaritelli Ferroviaria H2BL-01 System require?

The Margaritelli Ferroviaria H2BL-01 System is maintenance free. However, it is recommended that all barrier systems are checked after impacts to ensure that the integrity of the barrier is maintained.



## ***Appendix***

Technical Drawings



**technical sheet:**  
in millimeters

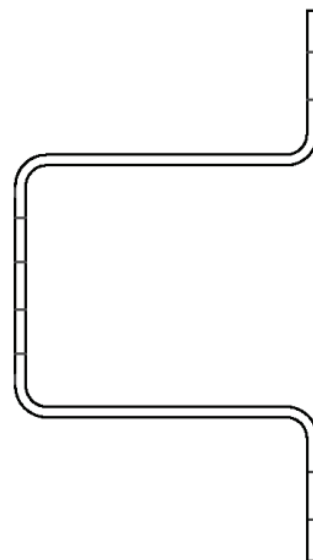
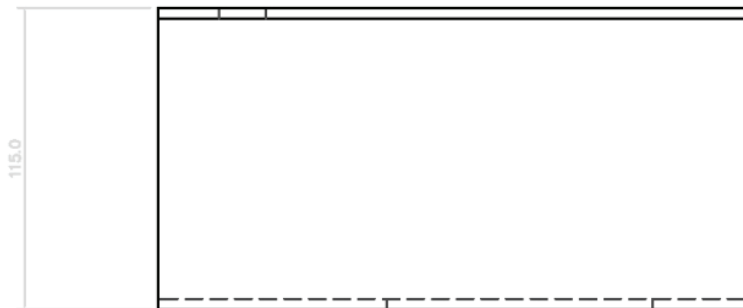
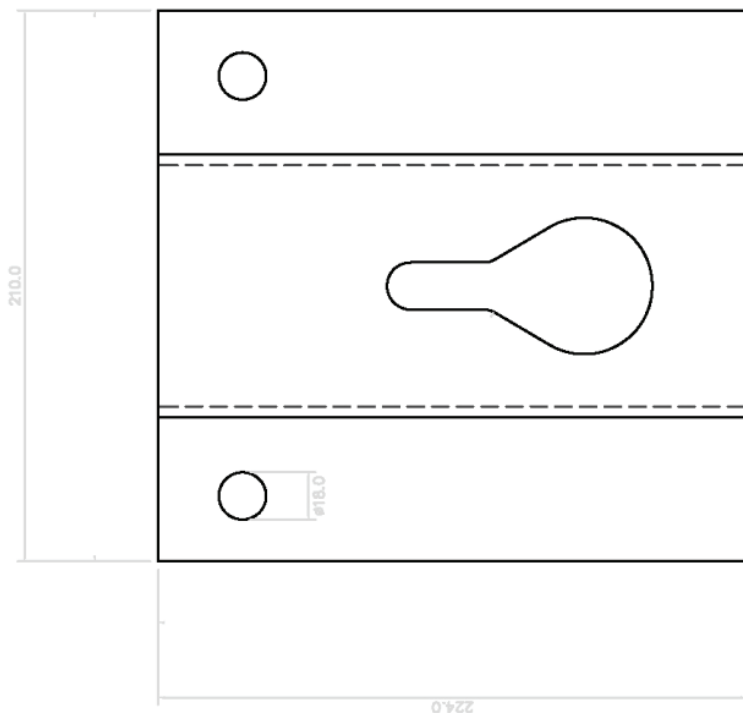
- A = post spacing
- B = maximum lateral size
- C = protection rail height
- D = curved terminal maximum size
- E = straight terminal maximum size
- F = ground terminal maximum size




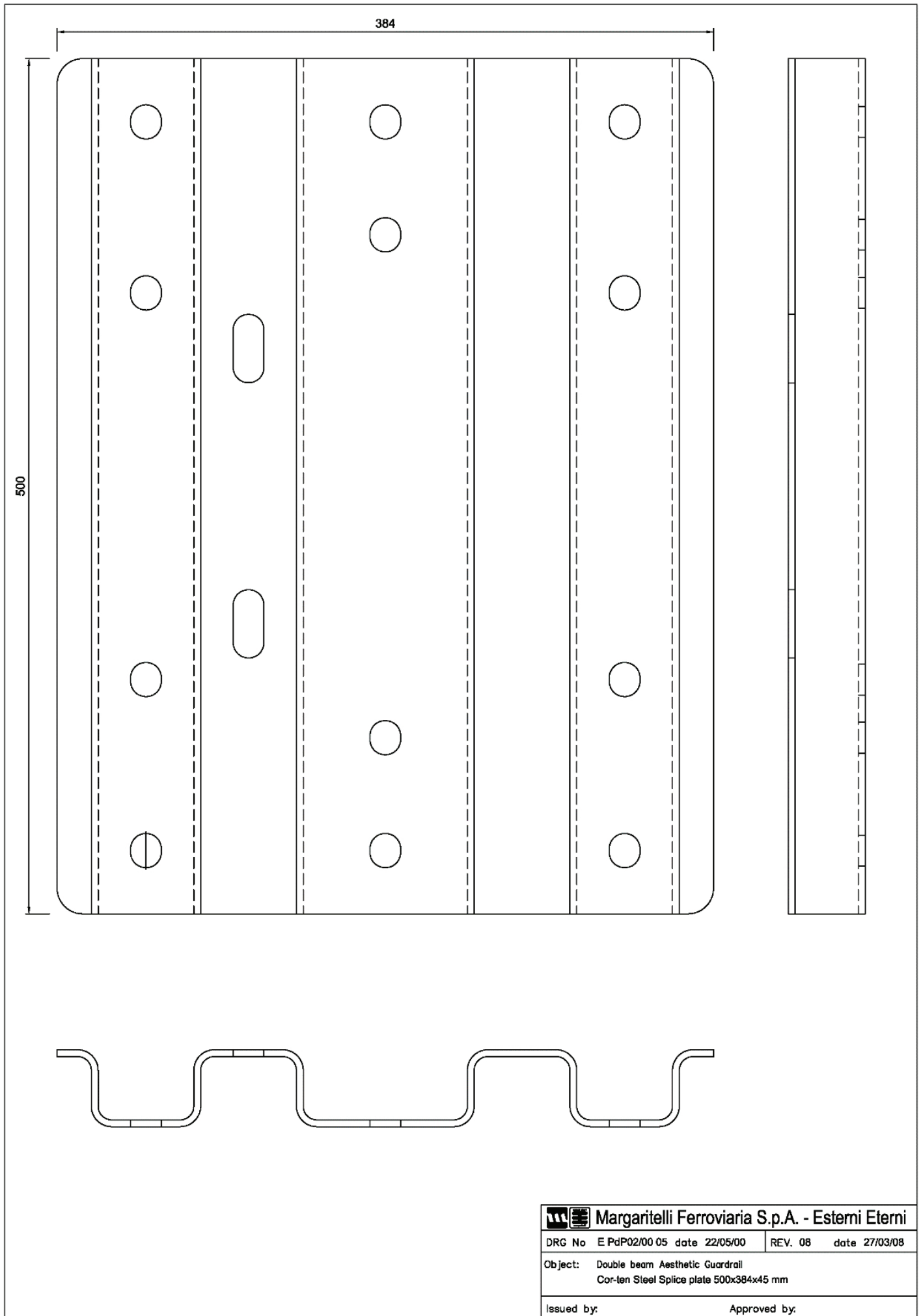
**Margaritelli Ferroviaria S.p.A. - Esterni Eterni**


Side safety barrier - H2 containment level - H2BL-01  
CE Conformity Certificate n°CPD/0497/3154/09

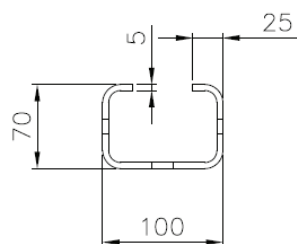
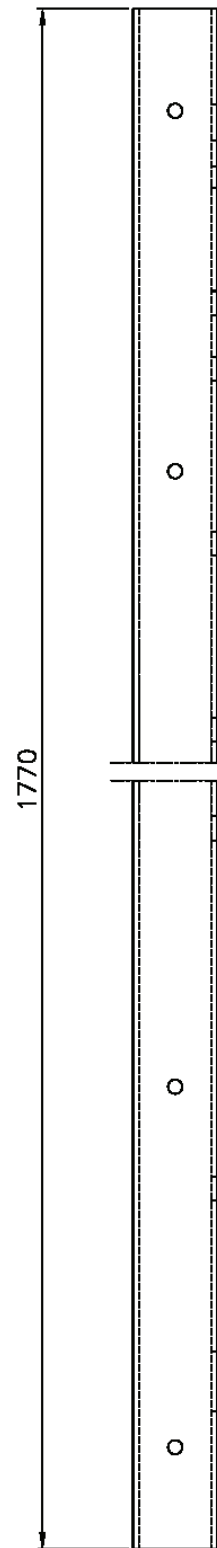
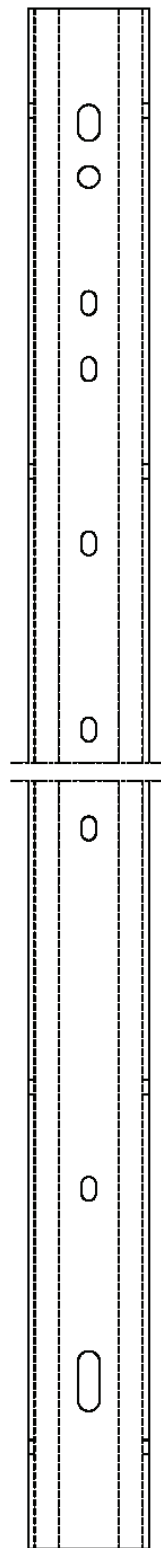
document: ENG BSS H2BL-01      date: 07/09/10      rev: 01      date: 09.07.2018




|   |               |                     |            |
|---|---------------|---------------------|------------|
|  <b>Margaritelli Ferroviaria S.p.A. - Esterni Eterni</b> |               |                     |            |
| DRG No E PdP04/07 03  | date 05/02/08 | REV. 00             | date --/-- |
| <b>Object:</b> Double beam Aesthetic Guardrail<br>Cor-ten steel Blockout 210x224x115 mm   |               |                     |            |
| <b>Issued by:</b>   |               | <b>Approved by:</b> |            |



|   |               |              |          |
|---|---------------|--------------|----------|
|  <b>Margaritelli Ferroviaria S.p.A. - Esterni Eterni</b> |               |              |          |
| DRG No  | E PdP02/00 05 | date         | 22/05/00 |
| REV.  | 08            | date         | 27/03/08 |
| Object: Double beam Aesthetic Guardrail<br>Cor-ten Steel Splice plate 500x384x45 mm   |               |              |          |
| Issued by:  |               | Approved by: |          |



|   |               |                     |                 |
|---|---------------|---------------------|-----------------|
|  <b>Margaritelli Ferroviaria S.p.A. - Esterni Eterni</b> |               |                     |                 |
| DRG No E PdP 03/09 25   | date 07/12/16 | REV. 01             | date 09.07.2018 |
| <b>Object:</b> Double beam Aesthetic Guardrail H1/H2-BL01<br>C section cor-ten steel post 5x70x100x1770 mm<br>(Single cover post version)   |               |                     |                 |
| <b>Issued by:</b>   |               | <b>Approved by:</b> |                 |

| Review |            |                 |
|--------|------------|-----------------|
| REV    | date       | Description     |
| 00     | 07.12.2016 | First issue     |
| 01     | 09.07.2018 | English version |



