EZY-GUARD SMART STEEL RAIL BARRIER

REVISION REGISTER

Revision	Description	Date
1	Issued for use.	25/11/2013
1 A	Installation in AASHTO weak soil permitted	13/12/2013
1 B	Update Supplier details	17/08/15
1 C	Changes to limitations re transitions, base plates and hinge point location.	28/04/16
1 D	TL2 test information & back-to-back configuration added	13/07/2018

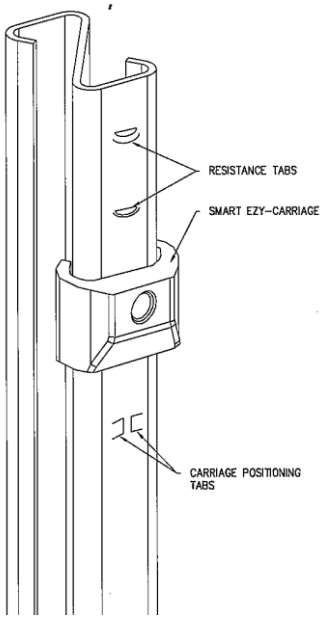
Ezy-Guard Smart is a semi-rigid steel rail barrier system which is accepted for use by Main Roads.

Identification Photographs:

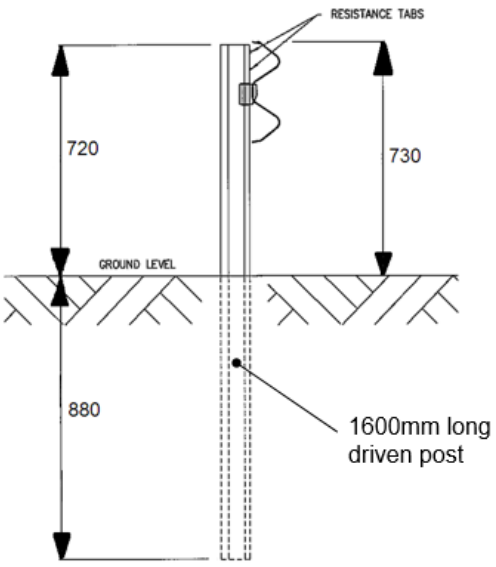
Front View

Rear View

Drawings:



Isometric View –
Z Posts and Ezy-Carriage
(W-beam omitted for clarity)



Typical Cross Section

EZY-GUARD SMART STEEL RAIL BARRIER

Ownership: Ingal Civil Products

Supplier: Ingal Civil Products
3 Temperley Close, Welshpool WA 6106
Ph: (08) 9452 9111 Fax: (08) 9358 9111
Website - http://www.ingalcivil.com.au/

Test Level:
NCHRP 350 TL 2 (2000 kg vehicle)
MASH TL 3 (2270 kg vehicle).

Configuration:
The Ezy-Guard Smart steel rail barrier consists of W-beam rail, which is attached to Z posts at 2000mm centres. The system does not have blockouts, but a slider carriage (referred to as the "Ezy-Carriage") to control the release of the rail from the posts during impacts.

The Z Posts are 1600mm long and driven into the ground so that the height of the top of post is 720mm above ground. The top of the W-beam rail is at a height 730mm above ground.

Unless stated in this document the installation shall be in accordance with the Ezy-Guard Smart Product Manual (Release 08/17) available on the Ingal Civil Products website.

Design Considerations:

Test Deflection:
0.89m under TL 2 conditions (2000 kg vehicle at 70 km/h and 25°)
1.65m under TL 3 conditions (2270 kg vehicle at 100 km/hr at 25^{o} impact angle)

For roads with a posted speed limit of 70 km/h and above, the MASH TL3 deflection shall be used.

Note that this deflection was measured in a crash test performed under controlled conditions. The deflection measured is the horizontal offset between the face of the w-beam rail measured prior to and following vehicle impact. Designers should be aware that the deflection figure published as a test result may not be the deflection value achieved in the field for all impacts by errant vehicles.

Minimum Length:
The minimum length of Ezy-Guard Smart barrier is 56m (full terminal lengths and transitions not included). That is, the minimum length does not include the length of public domain w-beam required for transitions to concrete barrier.

Offset from Kerbing:
As the Ezy-Guard Smart barrier does not include a blockout, a greater offset than public domain w-beam is required. The face of Ezy-Guard Smart barrier is to be placed 300mm from the face of the kerb to minimise nuisance impacts and allow driving of posts to be clear of the kerb.

Locations offset further from the kerb are not preferred because of the possibility of vehicle either vaulting the barrier or not being redirected by the barrier.

EZY-GUARD SMART STEEL RAIL BARRIER

Approach to barrier:
The approach to the barrier should be a trafficable running surface at a slope of 1 in 10 or flatter clear of objects and grade changes to allow an errant vehicle to hit the barrier at an appropriate height.

Height Correction:
If placed less than 3m from the face of the kerb the mounting height is measured from the pavement surface. At greater offsets the mounting height is measured from the adjacent finished surface levels.

End Treatments:
ET2000 Plus and public domain w-beam terminals. Refer to drawings CAB-STD-61 and EZY-SM-021 on the Ingal Civil Products website.

Transitions
Transitions from Ezy-Guard Smart barrier to modified thrie-beam or concrete barrier shall be in accordance with Ingal drawing EZY-SM-124, which is available on the Ingal Civil Products website.

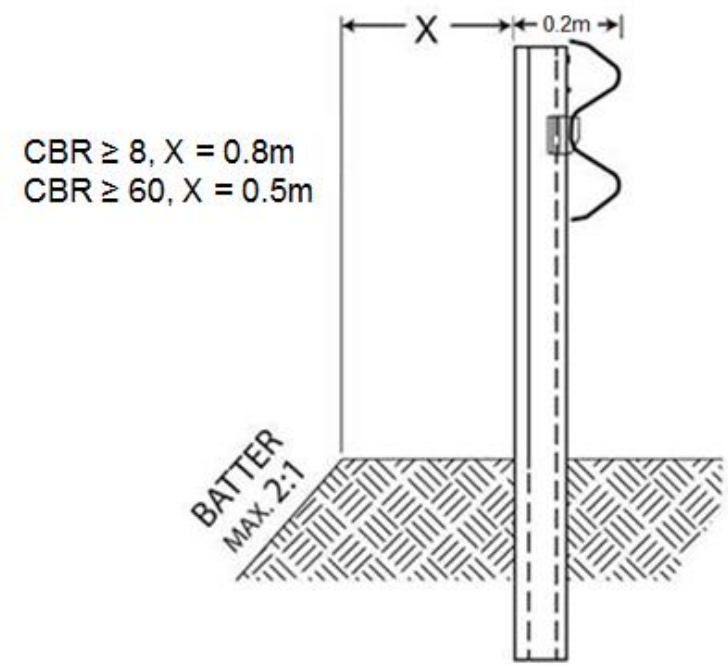
Delineation:
Refer to Ezy-Guard Smart Product Manual.

Limitations:

- The Ezy-Guard Smart barrier configuration utilising a post spacing other than what is stated above is not approved for use.
- The Ezy-Guard Smart barrier is a proprietary system that is designed as a “weak” post system, so its installation is restricted to soils equivalent to an AASHTO weak soil or stronger (i.e. CBR ≥ 8).
- The Ezy-Guard Smart barrier configuration of back to back W-beam attached to a single line of posts is approved for use provided it is installed as per Ingal drawing EZY-SM-110 and has either a crash cushion or an X-Tension 350 Median as the end terminals.
- The Ezy-Guard Smart barrier configuration using posts on base plates is available. However, approval is required from MRWA Road & Traffic Engineering Branch prior to specifying this configuration.
- For treatments in different foundation conditions refer to Ezy-Guard Smart Product Manual.
- When installed in embankment conditions in soils equivalent to AASHTO weak soil or stronger (i.e. CBR ≥ 8) the hinge point shall be offset a minimum of 0.8m from the rear of Ezy-Guard Smart barrier post (refer to figure below).
- When installed in embankment conditions in soils equivalent to AASHTO standard soil or stronger (i.e. CBR ≥ 60) the hinge point shall be offset a minimum of 0.5m from the rear of Ezy-Guard Smart barrier post (refer to figure below).
- The Ezy-Guard Smart configuration of a post embedded 1050mm into the ground with a smaller offset to the hinge point than shown in the figure below is not approved for use.
- Ezy-Guard Smart post installations in rock as per the product manual are not approved for use.
- The Ezy-Lift is not approved for use.
- Should not be installed behind kerbs if possible. If kerbing is required then the preferred kerbing is mountable Type A 100 mm. Semi-mountable is acceptable in some situations (speeds < 70 km/hr) but not preferred. Barrier kerbing shall not be used in front of barrier. Refer to Main Roads Standard Drawing 9331-0376 for kerb types.

EZY-GUARD SMART STEEL RAIL BARRIER

- Ezy-Guard Smart barrier is not to be used for repairs of damaged sections of public domain or other proprietary w-beam barrier systems.



Offset from hinge point

References:

Item	Description
1	System tested on March 1 and March 3, 2011 by Holmes Solution to MASH TL 3. A copy of this testing can be found on Main Roads file 10/2992.
2	Hinge point test conducted on November 1, 2012 2011 by Holmes Solution to MASH TL 3. A copy of this testing can be found on Main Roads file 10/2992.
3	Modified NCHRP 350 TL3-21 crash test of Ezy-Guard Smart transition to public domain W-Beam located at D12#99751.
4	System test on April 11, 2017 by Holmes Solution to NCHRP 300 TL2. A copy of this testing can be found on Main Roads file 10/2992.

Relevant FHWA Approval Letters:
Not applicable

Drawings:
Refer to Ingal Civil Product drawings EZY-SM-005 and EZY-SM-006 for assembly details.