

QUADGUARD SYSTEM

REVISION REGISTER

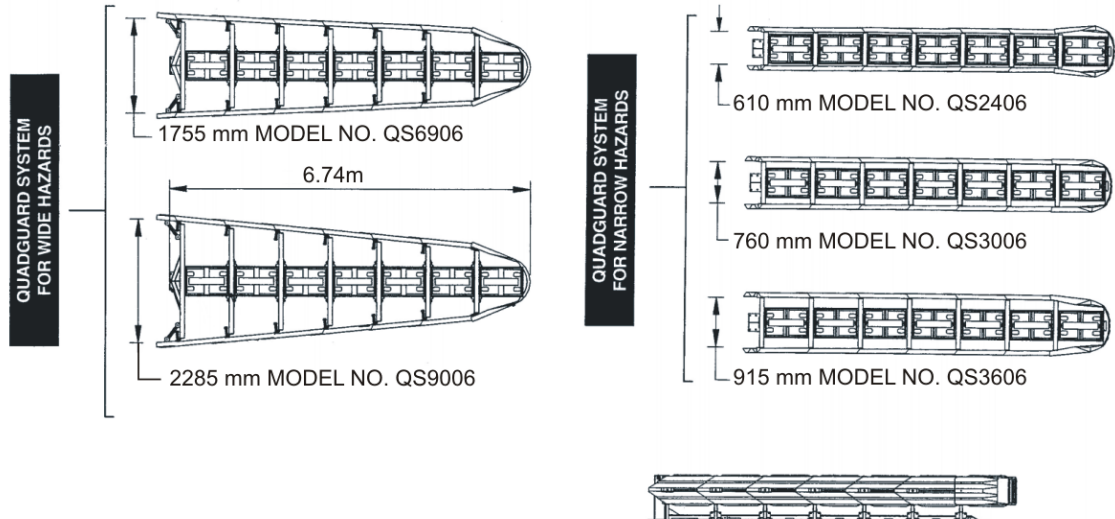
Revision	Description	Date
1	Issued for use.	23/2/2004.
1 A	Minor editorial revisions.	3/3/2006.
1 B	Supplier details amended. Photograph added. Minor editorial revisions	19/12/2013
1 C	Update Supplier details	17/08/15

The QuadGuard System is a redirective, non-gating crash attenuator which uses crushable cartridges to absorb the energy from impact. Damaged cartridges must be replaced after impact.

Identification Photograph:



Drawing:



PLAN & ELEVATION
(Six bay system with Tension Strt backup Shown)

Note: The nose section is not considered a bay, although there is a cartridge in the nose.

Ownership: Energy Absorption Systems Inc Chicago, Illinois
www.energyabsorption.com

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

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Test Level: Tested in accordance with NCHRP 350 to TL 2 & TL3.

Test Level	Number of Bays	System* Length (m)	Effective* Length (m)	Width (mm) & Model Numbers				
				610	760	915	1755	2285
2 (70 km/hr)	3	4	3.56	QS2403	QS3003	QS3603	QS6903	QS9003
3 (100/km/hr)	6	6.74	6.3	QS2406	QS3006	QS3606	QS6906	QS9006

* These are the lengths for the system with tension strut back-up. Lengths with concrete back-up are approximately 400 mm longer.

Configuration:

- Unit to be installed with a Tension Strut Back-up and a 28 MPa concrete pad to anchor the system for ease of construction.
- Concrete back-up should be used when the unit is connecting to a concrete barrier being constructed as part of the works.
- All supplied units are to have the yellow plastic nose.

Design:

- Design to be in accordance with the QuadGuard® System Product Manual.
- With this unit design speed in increments of 10 km/hr are available. The Designer must select the appropriate design speed.
- To be used where the design speed is 100 km/hr or less in accordance with the Table below (note TL 2 & TL3 systems are specified under Testing above).

Design Speed (km/hr)	Number of Bays	System Length (m)	Effective Length (m)	Width (mm)				
				610	760	915	1755	2285
40	1	2.18	1.73	QS2401	QS3001	QS3601	N/A	N/A
60	2	3.08	2.64	QS2402	QS3002	QS3602	N/A	N/A
80	4	4.91	4.47	QS2404	QS3004	QS3604	QS6904	QS9004
90	5	5.83	5.38	QS2405	QS3005	QS3605	QS6905	QS9005

- No elevated kerbs, islands, drainage structures or any other item that can affect the height at which a vehicle could impact the unit at shall be placed 15m prior to the unit or along the length of the unit to the rear of the backup. Only flush kerbing shall be permitted around the unit.
- Available in the following nominal widths 610, 760, 915, 1755 & 2285 mm.
- In situations where traffic is approaching from the rear of the system the Designer has the choice of the following transitions; Quad panel to Concrete safety barrier, Thrie-beam, W-beam, End Shoe (refer to Figures 5-8 respectively of the Quadguard® System Product Manual)
- Transition type must be specified by the Designer.
- Upon impact, the fender panels telescope towards and beyond the backup by as much as 635mm from their pre-impact position. Therefore the unit must be positioned a minimum of 635mm forward of objects that could interfere with movement of the panels.

Limitations:

Cannot be used on crossfalls steeper than 8%.

Installation and Maintenance Requirements:

The end treatment shall be installed and repaired after impact in accordance with the QuadGuard® System Installation Manual.

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Parts to be Replaced after Impact:

Cartridges Types I and II and fender panels depending on location and size of impact.

Parts Typically Re-Useable after Impact:

Undamaged cartridges and fender panels are retained.

References:

Manuals

Available on the Boylan Group website:

Quadguard® System Product Manual, Rev 1/15/08

Quadguard® System Installation Manual, Rev A 7/10/09

Relevant FHWA Approval Letters

(Refer to website http://safety.fhwa.dot.gov/fourthlevel/hardware/term_cush.htm)

Code	Description
CC35B	TL 3 – Reverse hit approval.
CC35	TL 3 – Approval.