INGAL

CIVIL PRODUCTS

A valmont COMPANY

Product Catalogue

Featuring **MASH** COMPLIANT Products

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INGAL CIVIL PRODUCTS
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MASH COMPLIANT

EZY-GUARD INGAL CIVIL PRODUCTS SMART

EZY-GUARD 4 INGAL CIVIL PRODUCTS

EZY-GUARD INGAL CIVIL PRODUCTS HC

EZY-GUARD INGAL CIVIL PRODUCTS LDS

EZY-GUARD INGAL CIVIL PRODUCTS HD

EZY-GUARD BRIDGE BARRIER

Ingal MPR
Motorcyclist Protection Rail

Ingal RBT
Wire Rope Safety Barrier

Ezy-Lift
W-Beam Height Adjustment

MashFlex TL4
Wire Rope Safety Barrier

ET-SS
Guardrail End Terminal

TREND Median
Guardrail End Terminal

QuadGuard M10
Crash Cushion

QuadGuard Elite M10
Crash Cushion

QuadGuard M Wide
Crash Cushion

Raptor
Pole Protection Crash Cushion

ArmorZone
Temporary Barrier

ArmorBuffa
Temporary End Treatment

SafeStop
Truck Mounted Attenuator

HighwayGuard
Standard Portable Steel Safety Barrier

BG800
Portable Steel Safety Barrier

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CONTENTS

Product Range

Ingal Civil Products

Australia's leading manufacturer of road safety barriers since 1933

Committed to Your Safety

Road Safety Barriers • Crash Cushions • Motorcyclist Barriers

Delineation • Truck Mounted Attenuators • Carpark Barriers

Industrial Barriers • Pedestrian Fencing • Boundary Fencing

WHO WE ARE

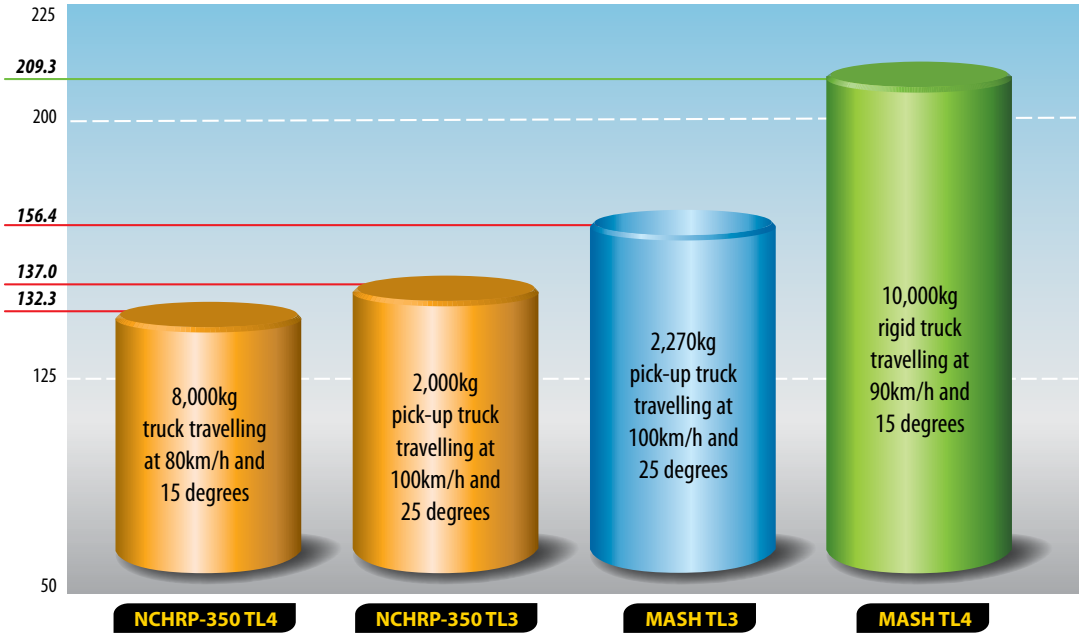
Established in 1933, Ingal Civil Products is Australia's leading manufacturer and distributor of safety barrier systems for roads and carpark applications throughout the Asia-Pacific region. As a division of Industrial Galvanizers Corporation Pty Ltd, we are part of a large network of companies specialising in engineered steel products and galvanizing services whilst employing over 8000 people in more than 20 countries.

At Ingal Civil Products we pride ourselves on having made a significant contribution to the safety of our roads. Our product range includes road safety barriers, carpark & industrial barriers, workzone & traffic control products, delineation and fencing products. We are the market leader for safety barrier systems and continue to service our customers through our ongoing program of research and development.

Innovative Engineering Made in Australia

Containment Levels

Roadside Safety Barrier Testing Standards Explained



Crash Test Containment Level

Note: The MASH TL4 impact severity is 209.3kJ

WHAT IS A CONTAINMENT TEST LEVEL?

The containment level categorises the capacity of a highway safety device in terms of the vehicle type and mass, speed and impact angle. MASH (Manual for Assessing Safety Hardware) is an international standard that has been adopted in Australia as the basis for all crash testing of highway safety devices. MASH replaced the previous testing standard NCHRP-350 in 2009 and was introduced to better reflect the current vehicle fleet.

For each containment level, or test level, the road safety barrier system is tested using a minimum of two vehicle types. The logic behind this requirement is by testing with a light vehicle and a heavy vehicle within each test level, the capacity of the system will be verified with the large vehicle and the occupant risk parameters of the device will be verified with the small vehicle. In MASH, Test Levels 1, 2 and 3 cover different speed environments from 50km/h up to 100km/h, and test levels 4, 5 and 6 are for heavy vehicles ranging from 10,000kg up to 36,000kg.

MASH TL3 COMPLIANT

Demonstrates the ability to contain and redirect the following:

- 1,100kg car at 100km/h and 25°
- 2,270kg pick-up (ute) at 100km/h and 25°

MASH TL4 COMPLIANT

Demonstrates the ability to contain and redirect the following:

- 1,100kg car at 100km/h and 25°
- 2,270kg pick-up (ute) at 100km/h and 25°
- 10,000kg truck at 90km/h and 15°

NCHRP-350 TL3 COMPLIANT

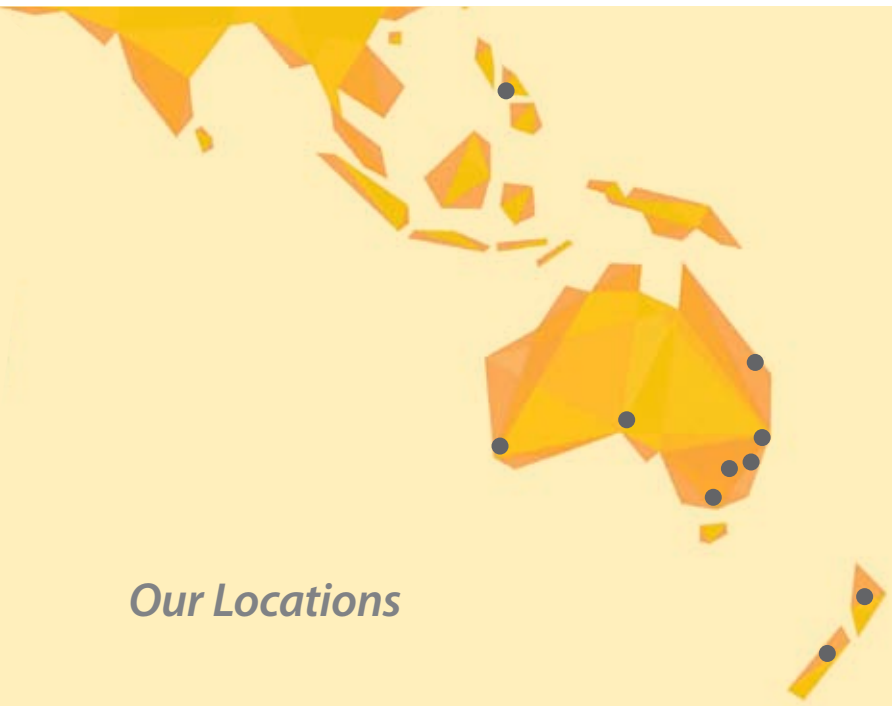
Demonstrates the ability to contain and redirect the following:

- 820kg car at 100km/h and 20°
- 2,000kg pickup (ute) at 100km/h and 25°

NCHRP-350 TL4 COMPLIANT

Demonstrates the ability to contain and redirect the following:

- 820kg car at 100km/h and 20°
- 2,000kg pickup (ute) at 100km/h and 25°
- 8,000kg truck at 80km/h and 15°



Our Locations

Locations Australia Wide

2 Locations in New Zealand

Philippines Malaysia

Australia's Leading Solution Provider for Roadside Safety Barriers

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Australia	
Sydney	(02) 9827 3333
Brisbane	(07) 3489 9120
Melbourne	(03) 9358 4100
Perth	(08) 9452 9111
Adelaide/NT	0438 153 482
Newcastle	0400 235 883
Wagga	0427 779 588

New Zealand	
North Island	021 2464 997
South Island	021 1983 311
Email	sales@ingalcivil.co.nz

FAQs

Visit our website for more information ***www.ingalcivil.com.au***

WHAT IS AS/NZS 3845.1:2015?

The Australian standard relating to road barrier systems. Under AS/NZS 3845.1:2015, MASH has been nominated as the crash testing standard for safety barrier systems.

WHAT IS A CLEAR ZONE?

The horizontal width of space available for the safe use of an errant vehicle which consists of the verge area and is measured from the nearside edge of the left hand traffic lane. In the case of a divided road it is also measured from the offside edge of the right-hand traffic lane to the edge of pavement for opposing traffic.

WHAT IS THE WORKING WIDTH?

The maximum width that is required to prevent an impacting vehicle from colliding with an object behind a road safety barrier system. This includes both the dynamic deflection and the extra width due to the roll of the impacting vehicle.

WHAT IS A TERMINAL?

The specially designed end pieces of a road safety barrier system. The leading terminal is on the end of the road safety barrier system that faces oncoming traffic and the trailing terminal is on the other end. Terminals are subdivided into classifications of gating and non-gating terminals.

WHAT IS A GATING TERMINAL?

Terminals that are designed to break away, pivot or hinge, and that allow a vehicle to pass through when impacted at an angle to the end, or at a point upstream of the beginning length of the associated road safety barrier system.

WHAT IS A NON-GATING TERMINAL?

Terminals that are designed to redirect a vehicle and absorb part of the energy of an impacting vehicle at any point along the terminal without allowing it to pass behind the road safety barrier system.

WHAT IS THE POINT OF NEED?

The point that a terminal will redirect an errant vehicle rather than allowing it to pass through. This is measured from the beginning of the terminal.

WHAT DOES MASH MEAN?

MASH (Manual for Assessing Safety Hardware) is an international standard that has been adopted in Australia for crash testing of safety devices. The 2009 MASH replaces the previous testing standard: the NCHRP-350. ASBAP have nominated MASH as the basis for all barrier testing.

MASH TL2 COMPLIANT

The TL2 is a containment level under the MASH Standard. Compliance with this test demonstrates the system's ability to contain and redirect the following:

- 1,100kg car at 70km/h and 25°
- 2,270kg pick-up (ute) at 70km/h and 25°

MASH TL3 COMPLIANT

The TL3 is a containment level under the MASH Standard. Compliance with this test demonstrates the system's ability to contain and redirect the following:

- 1,100kg car at 100km/h and 25°
- 2,270kg pick-up (ute) at 100km/h and 25°

MASH TL4 COMPLIANT

The TL4 is a containment level under the MASH Standard. Compliance with this test demonstrates the system's ability to contain and redirect the following:

- 1,100kg car at 100km/h and 25°
- 2,270kg pick-up (ute) at 100km/h and 25°
- 10,000kg truck at 90km/h and 15°

WHAT DOES NCHRP-350 MEAN?

NCHRP-350 (National Cooperative Highway Research Program Report 350) is an international standard that was previously adopted in Australia for crash testing of safety devices. This has now been superseded by the MASH standard. NCHRP-350 accepted hardware is still approved for new installation and replacement. All new product innovations must be tested under the updated MASH standard.

NCHRP-350 TL2 COMPLIANT

Compliance with this test demonstrates the system's ability to contain and redirect the following :

- 820kg car at 70km/h and 20°
- 2,000kg pickup (ute) at 70km/h and 25°

NCHRP-350 TL3 COMPLIANT

Compliance with this test demonstrates the system's ability to contain and redirect the following:

- 820kg car at 100km/h and 20°
- 2,000kg pickup (ute) at 100km/h and 25°

NCHRP-350 TL4 COMPLIANT

Compliance with this test demonstrates the system's ability to contain and redirect the following:

- 820kg car at 100km/h and 20°
- 2,000kg pickup (ute) at 100km/h and 25°
- 8,000kg truck at 80km/h and 15°

Ezy-Guard Smart

Ezy-Guard 4

Ezy-Guard HC

Ezy-Guard LDS

Ezy-Guard HD

Bridge Barrier

FlexBeam G4

Accessories

Guardrail Safety Barriers

Guardrail Safety Barriers

QUICK REFERENCE GUIDE

PART No. (4m Kit)	PRODUCT	TYPE	CRASH RATING	CRASH TEST DEFLECTION	SYSTEM MASS (KG/M)
10005582	Ezy-Guard® Smart MASH	W-Beam	MASH TL3	1.65m	18.6
10008202	Ezy-Guard® 4 MASH	W-Beam	MASH TL3 & NCHRP350 TL4	1.65m	18.6
10008484	Ezy-Guard® HC MASH	Thrie Beam	MASH TL4	1.20m	21.3
10010183	Ezy-Guard® LDS MASH	Thrie Beam	MASH TL4	1.10m	28.8
10005584	Ezy-Guard® HD MASH	W-Beam	MASH TL3	1.28m	28.8
	Ezy-Guard® Bridge Barrier MASH	Thrie Beam	MASH TL2 & TL3	Depends on configuration	13.5
10002135	FlexBeam W-Beam (G4)	W-Beam	NCHRP350 TL3*	1m*	27
10008486	Ezy-Lift Carriage MASH	W-Beam Height Adjuster	MASH TL3	Height adjustment carriage to ensure a compliant barrier height after the road has been over-layed.	

*Deemed to comply - not crash tested. Check approval status before design or install.

EZY-GUARD® INGAL CIVIL PRODUCTS SMART

MASH TL3 Compliant Roadside Safety Barrier

MASH TL3 COMPLIANT

RAPID INSTALLATION	Few components facilitate rapid installation.
SAFER	Fully compliant to MASH TL3.
COST SAVINGS	Savings on freight and faster to install.
NARROW WIDTH	A system width of just 200mm conserves valuable formation width.
FEWER PARTS	No blocking pieces or rail stiffener plates.

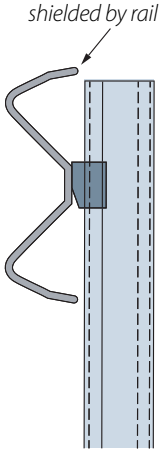
Ezy-Guard Smart by Ingal is the next generation steel guardrail barrier providing superior design, rapid installation, driver confidence, and more metres of barrier for your dollar. Ingal Civil is a trusted and respected brand in the industry. Ezy-Guard Smart provides the perfect guard rail solution.

Using significantly less steel than conventional steel guardrail barriers; Ezy-Guard Smart is designed to provide stable vehicle containment and re-direction and minimises occupant risk. The Z-post profile shields post edges from vulnerable road users.

An Ezy-Carriage bracket is used to secure the W-beam rails to the Z-posts and eliminates the requirement for blocking pieces and rail stiffening plates.

In the event that the Z-post cannot be installed to the required in-ground depth, the use of a base plate mounted on a suitable foundation can be adopted. Posts on base plates are typically used at culvert locations and in areas where underground services restrict posts from being driven into the ground.

Top of Z-post shielded by rail



- Consideration for Motorcyclists.
- No snag points.
- Quick installation.

EZY-GUARD SMART SPECIFICATIONS

Z-post length:	1,600mm
Z-post mass:	12.3kg
System mass:	18.6kg per meter
Rail height above ground:	730mm
Z-post height above ground:	720mm
Post spacing:	2,000mm
System width:	200mm
Crash rating	MASH TL3
Crash test deflection:	1.65m
Surface treatment:	Galvanised AS/NZS 4680

PART NUMBERS

4m Kit	10005582
Finish Post Kit	10005694
Rail	10000177
Posts	10008201
Carriage	10004115
Delineator (Red)	10005588

Reducing the post spacing will lead to a reduction in dynamic deflection. Contact your Ingal representative for more information.

EZY-GUARD 4®

INGAL CIVIL PRODUCTS

MASH TL3 and NCHRP-350 TL4 Compliant Roadside Safety Barrier

MASH TL3 COMPLIANT **NCHRP-350 TL4** COMPLIANT

RAPID INSTALLATION	Fewer components facilitate rapid installation.
SAFER	Fully compliant to MASH TL3 & NCHRP-350 TL4.
COST SAVINGS	Savings on freight costs and faster to install.
FEWER PARTS	No blocking pieces or rail stiffener plates.
NARROW WIDTH	A system width of just 200mm conserves valuable formation width.

Introducing the Ezy-Guard 4. This next generation steel guardrail barrier provides one of the best guardrail solutions available today. It provides MASH TL3 and NCHRP-350 TL4 containment. The superior design offers rapid installation, improved motorist safety and more metres of barrier for your dollar. If you need a highway barrier which is built is to last, is cost effective and can be deployed quickly, this guard rail is the ideal choice.

The Z-post profile shields vulnerable road users from post edges and provides sectional strength when driving through difficult ground conditions. For locations with a high volume of motorcycle traffic, the Ingal MPR system can be used with Ezy-Guard 4, offering additional protection to vulnerable road users.

An Ezy-Carriage is used to secure the W-beam rails to the Z-posts eliminating the requirement for blocking pieces and rail stiffening plates. This unique connection provides a soft ride-down for the occupants and smooth vehicle containment and redirection. Road Safety barriers today are far advanced from their predecessor; this next generation safety guardrail safety barrier will stand the test of time and deliver superb safety standards that are currently unrivalled.

In the event that the Z-post cannot be installed to the required in-ground depth due to a conflict with underground services, there are two solutions to choose from. These are to install a concrete strip footing and use baseplated posts, or alternatively the posts can be omitted up to a maximum 6m clear span.

Reducing the post spacing will lead to a reduction in dynamic deflection. Contact your Ingal representative for more information.

- Fewer parts.
- Narrow width.
- Rapid installation.
- High performance.
- Local design and manufacture.
- Consideration for motorcyclists.
- 6m Clear Span approved.

EZY-GUARD 4 SPECIFICATIONS

Z-post length:	1,650mm
Z-post mass:	12.5kg
System mass:	18.6kg per meter
Rail height above ground:	787mm
Z-post height above ground:	777mm
Post spacing:	2m
System width:	200mm
Crash rating:	MASH TL3 & NCHRP-350 TL4
Crash test deflection:	1.65m
Surface treatment:	Galvanised AS/NZS 4680

PART NUMBERS

4m Kit	10008202
Finish Post Kit	10006246
Rail	10000177
Posts	10007390
Carriage	10004115
Delineator (Red)	10005588

EZY-GUARD HC®

INGAL CIVIL PRODUCTS

High Containment Roadside Safety Barrier

MASH TL3 COMPLIANT **MASH TL4** COMPLIANT

HIGH PERFORMANCE	Demonstrated containment and re-direction of a 10,000kg truck travelling at 90km/h.
SAFER	Fully compliant to MASH TL4.
FEWER PARTS	No blocking pieces or rail stiffener plates.
RAPID INSTALLATION	Fewer components facilitate rapid installation.
COST SAVINGS	Savings on freight costs and faster to install.
NARROW WIDTH	A system width of just 245mm conserves valuable formation.

INTRODUCTION

Introducing Ezy-Guard High Containment. A member of the Ezy-Guard family, and the next generation steel guardrail barrier. Providing superior motorist safety with a tested containment of MASH Test Level 4.

Ezy-Guard HC is crash tested to the latest performance standards, distinguishing this particular guardrail from all existing public domain guardrail barrier systems in Australia.

The Z-post profile shields vulnerable road users from post edges and provides sectional strength when driving through difficult conditions.

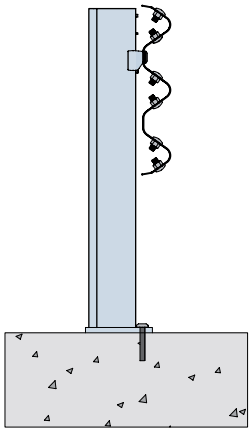
An Ezy-HC-Carriage is used to secure the ThrieBeam rails to the post, eliminating the requirement for blocking/offset pieces and rail stiffening plates. This unique connection provides a soft ride-down for the occupants and a smooth vehicle containment and redirection.

In the event that the Z-post cannot be installed to the required in-ground depth, the use of a base plate mounted post on a suitable foundation can be adopted. Posts on base plates are typically used at culvert locations and in areas where underground services restrict posts from being driven into the ground.

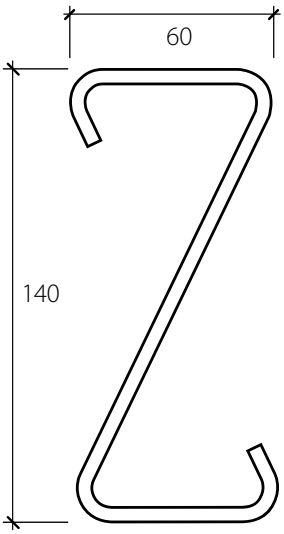
- Fully compliant to MASH TL4.
- High containment.
- Locally designed and manufactured.
- Narrow footprint saving road width.
- Consideration for motorcyclists with rounded post corners.
- Easy to transport and simple to install.

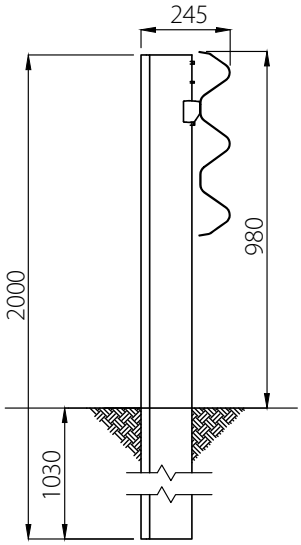
SPECIFICATIONS

Ezy-Guard HC Z-post length:	2,000mm
Ezy-Guard HC Z-post mass:	19.5kg
Ezy-Guard HC system mass:	28.8kg per metre
Rail height above ground:	980 mm
Z-post height above ground:	970mm
Post spacing:	2,000mm
Ezy-Guard HC system width:	245mm
Crash rating:	MASH TL4
MASH TL3 crash test deflection:	1.16m
MASH TL4 crash test deflection:	1.20m
NCHRP TL4 crash test deflection:	1.0m



Baseplated Installation





PART NUMBERS

4m Kit	10008484	HC Posts (2m)	10005540
Finish Post Kit	10008485	HC Carriage	10004116
ThrieBeam Rail	10000837	Retrofit Carriage	10008486

EZY-GUARDHC® INGAL CIVIL PRODUCTS

EZY-GUARD LDS™

INGAL CIVIL PRODUCTS

TL4 Compliant Low Deflection Roadside Safety Barrier

MASH TL3 COMPLIANT **MASH TL4** COMPLIANT

LOW DEFLECTION	Only 1.1m low deflection when crash tested with a 10,000kg truck at 90km/h.
INNOVATIVE	Suitable for installation in rock, asphalt or concrete mowing strips.
POST ON BASEPLATE	Can be installed as a post-on-baseplate for areas where underground services restrict posts from being driven into the ground.
SAFER	Ezy-Guard LDS is compatible with the MPR Motorcyclist Protection Rail offering further protection for motorcyclists.
NARROW WIDTH	A system width of just 245mm conserves valuable formation width.

INTRODUCTION

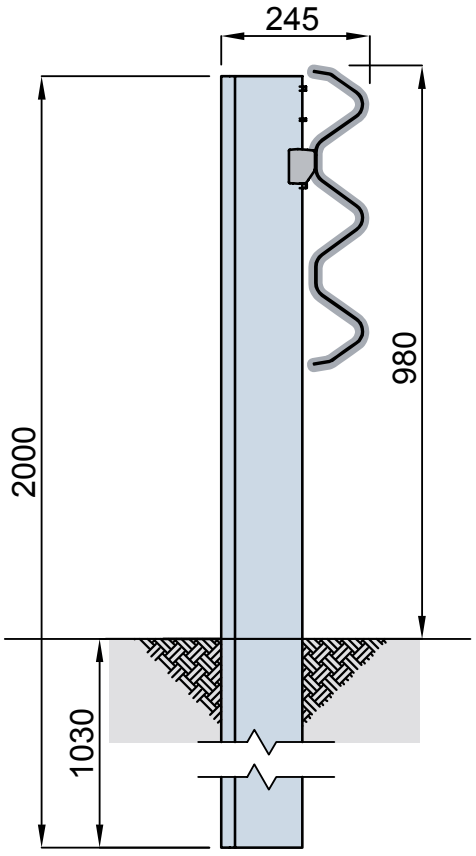
Introducing Ezy-Guard LDS, a member of the Ezy-Guard family, the next generation steel guardrail barrier providing superior motorist safety. The Ezy-Guard LDS (Low Deflection System) roadside safety barrier offers superior hazard protection for highways with constrained verges or medians. Ezy-Guard LDS is crash tested to the superior MASH Test Level 4, where it demonstrated containment and re-direction of a 10,000kg truck travelling at 90km/h and a 2,270kg pick-up truck travelling at 100km/h with a low deflection of only 1.1 metres.

An Ezy-LDS-Carriage is used to secure the Thrie-beam rails to the posts eliminating the requirement for blocking/offset pieces and rail stiffening plates. This unique connection provides a soft ride-down for the occupants and smooth vehicle containment and redirection.

The innovative engineering of the Ezy-Guard LDS Z-post design makes it suitable for installation in rock, asphalt or concrete mowing strips. The Z-post profile shields post edges from vulnerable road users and provides sectional strength when driving through difficult conditions.

In the event that the Z-post cannot be installed to the required in-ground depth, the use of a base plate mounted post on a suitable foundation can be adopted. Posts on base plates are typically used at culvert locations and in areas where underground services restrict posts from being driven into the ground.

- Fully compliant to MASH TL4.
- Low deflection (only 1.1m).
- Locally designed and manufactured.
- Narrow footprint saving road width.
- Compatible with MPR Motorcyclist Protection Rail.
- Components are stamped to ensure traceability and quality control.
- Easy to transport and simple to install.



SPECIFICATIONS

Ezy-Guard LDS Z-post length:	2,000mm
Ezy-Guard LDS Z-post mass:	19.5kg
Ezy-Guard LDS system mass:	28.8kg per metre
Rail height above ground:	980 mm
Z-post height above ground:	970mm
Post spacing:	2,000mm
Ezy-Guard LDS system width:	245mm
Crash rating:	MASH TL4
MASH TL3 crash test deflection:	1.10m
MASH TL4 crash test deflection:	1.10m

PART NUMBERS

4m Ezy-Guard LDS (2.7) Kit with 2m posts	10010183

EZY-GUARD LDS™ INGAL CIVIL PRODUCTS

EZY-GUARD HD®

INGAL CIVIL PRODUCTS

Heavy Duty Roadside Safety Barrier

MASH TL3 COMPLIANT

SAFER	Fully compliant to MASH TL3.
POST ON BASEPLATE	Can be installed as a post-on-baseplate for areas where underground services restrict posts from being driven into the ground.
FEWER PARTS	No blocking pieces or rail stiffener plates.
RAPID INSTALLATION	Fewer components facilitate rapid installation.
COST SAVINGS	Savings on freight costs and faster to install.
NARROW WIDTH	A system width of just 245mm conserves valuable formation.

INTRODUCTION

Introducing Ezy-Guard Heavy Duty (HD), crash tested to MASH Test Level 3 and offering superior deflection performance with the quick installation of a W-Beam barrier. An Ezy-Carriage is used to secure the w-beam rails to the posts eliminating the requirement for blocking pieces and rail stiffening plates. This unique connection provides a soft ride-down for occupants and smooth vehicle containment and redirection.

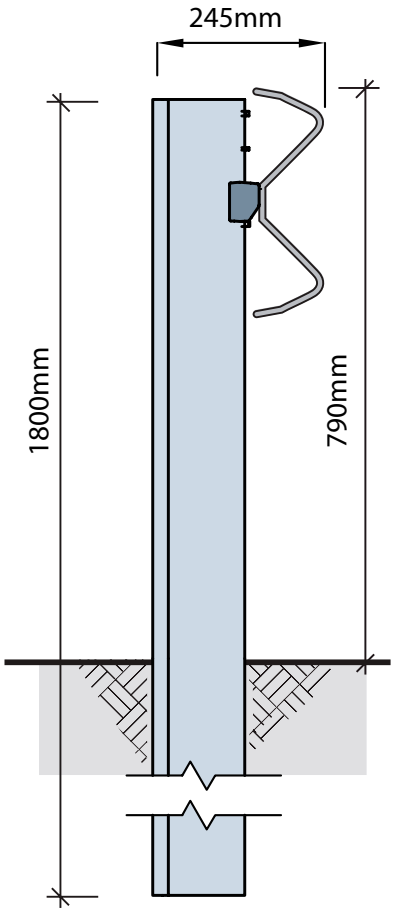
Ezy-Guard HD has been designed to provide consideration to vulnerable road users through an innovative Z-post profile that shields post edges and provides sectional strength when driving through difficult ground conditions. The Ezy-Guard HD design does not contain any elements that become projectiles and there are no aggressive edges.

The Ezy-Guard HD design uses fewer components and features Z-posts that are rapidly driven into the ground. Ezy-Guard HD installation can be up to twice as fast to install than conventional guardrail barriers and unlike cable barrier systems, no concrete is required, providing significant cost savings.

Ezy-Guard HD is manufactured in Australia by Ingal Civil Products using steel manufactured by BlueScope Steel. Z-posts and rail are stamped providing traceability. Hot dip galvanising is performed internally by Ingal and daily inspections ensure zinc thickness readings are in accordance with AS/NZS standards.

In the event that the Z-post cannot be installed to the required in-ground depth, the use of a base plate mounted post on a suitable foundation can be adopted. Posts on base plates are typically used at culvert locations and in areas where underground services restrict posts from being driven into the ground.

- Fully compliant to MASH TL3.
- Heavy duty.
- Can be installed as post on baseplate.
- Locally designed and manufactured.
- Narrow footprint saving road width.
- Consideration for motorcyclists with rounded post corners.
- Easy to transport and simple to install.



SPECIFICATIONS

Ezy-Guard HD Z-post length:	1,800mm
Ezy-Guard HD Z-post mass:	17.8kg
Ezy-Guard HD system mass:	21.3kg per metre
Rail height above ground:	790 mm
Z-post height above ground:	780mm
Post spacing:	2,000mm
Ezy-Guard HD system width:	245mm
Crash rating:	MASH TL3
MASH TL3 crash test deflection:	1.28m

PART NUMBERS

4m Ezy-Guard HD with 1800mm Z-Posts	10005584

EZY-GUARD HEAVY DUTY®
INGAL CIVIL PRODUCTS

EZY-GUARD HC®
INGAL CIVIL PRODUCTS

Back to Back Install

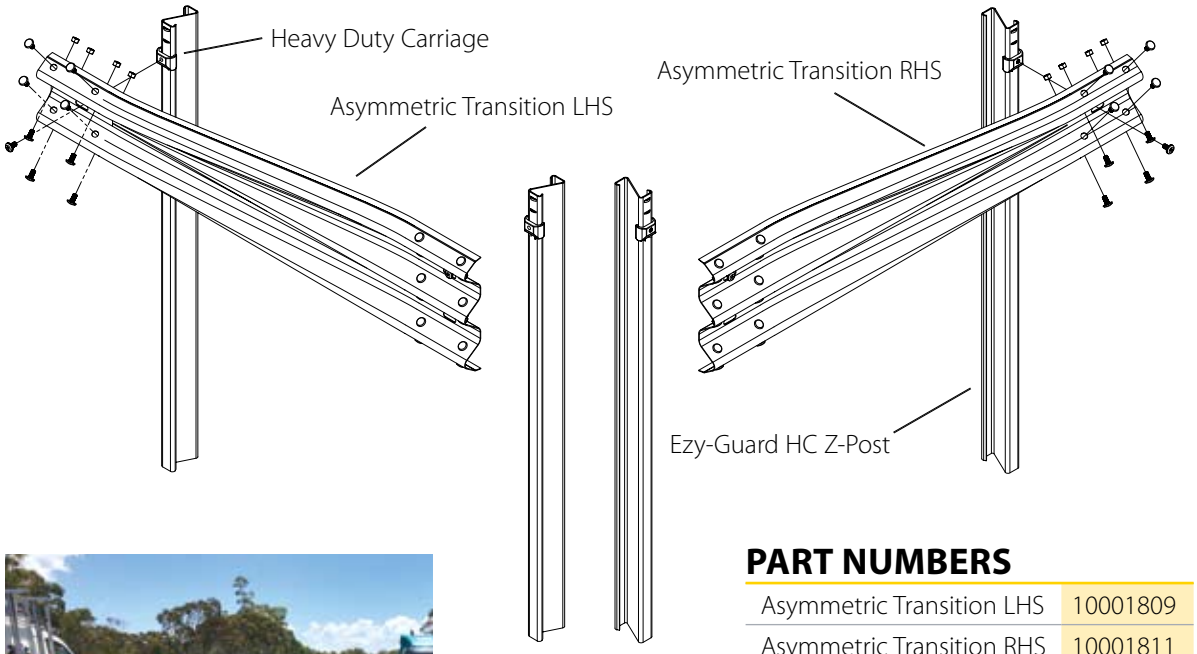
Maintaining MASH roadside safety with less components

MASH TL3 COMPLIANT **MASH TL4** COMPLIANT

ADVANTAGES

The Ezy-Guard High Containment barrier can be installed "back to back" which provides several advantages over traditional dual guardrail systems:

- Less components provides faster installation
- Less visual clutter
- Uses less roadside space than traditional dual guardrail systems
- Maintains TL3/TL4 MASH compliance
- Compatible with Ezy-Lift Carriage to maintain crash-test rating when road is overlayed



PART NUMBERS

Asymmetric Transition LHS	10001809
Asymmetric Transition RHS	10001811

EZY-GUARD

BRIDGE BARRIER

AS5100 Deck and Side Mounted Bridge Barrier

TL2 & TL3 OPTIONS | **AS 5100.2** COMPLIANT | **AS/NZS 3845.1** COMPLIANT

SAFER	Integrated components provide superior safety to MASH TL2/TL3.
ENGINEERED	Low load transfer into the structure, minimising concrete damage in a crash.
COST SAVINGS	Off the shelf components with stock readily available.
VERSATILE	Deck or side mounted options available.
ADAPTABLE	Can be easily retrofitted to existing structures.

The new addition to the Ezy-Guard family is the Ezy-Guard Bridge Barrier System. Using many components from the MASH Test Level 4 Ezy-Guard High Containment system, the bridge barrier configuration is designed for bridges and structures requiring AS5100 compliant edge protection. The Ezy-Guard Bridge Barrier can be deck or side mounted to the bridge structure, saving valuable lane width. It can also be easily retrofitted to existing structures.

The Ezy-Guard Bridge Barrier system uses all off-the shelf components, with all stock readily available, minimising repair time in the event of a vehicle impact.

The Ezy-Guard Bridge Barrier is designed for minimal load transfer into the structure, reducing potential concrete damage in a crash. This means less road closures or need to repair concrete after impact damage.

The Ezy-Guard Bridge Barrier System is compatible with W-Beam Guardrails, but maximum MASH rating is achieved through the use of Ingal's proprietary Ezy-Guard 4 or Ezy-Guard HC guardrail systems.

- Lower impact risk to vehicle occupants through controlled yielding of barrier posts
- Low load transfer into the structure, minimising concrete damage in a crash
- MASH TL2 and TL3 options available to suit your needs
- Off the shelf components with stock readily available
- Narrow 250mm footprint, saving valuable lane width
- Easily retrofitted to existing structures
- Deck or side mounted options

***BRIDGE BARRIER** utilises components from*

EZY-GUARD HC INGAL CIVIL PRODUCTS

SPECIFICATIONS

Thrie-Beam Length:	4,000mm
Ezy-Guard BB Z-Post Mass:	13.5kg
Corrosive Protection:	HDG to AS4680
Rail Height Above Ground:	980mm
Z-Post Height Above Ground:	970mm
Post Spacing:	1m or 2m
Ezy-Guard BB System Width:	245mm

FlexBeam W-Beam Guardrail (G4)

Roadside Safety Barrier

HIGH VISIBILITY	Ensures driver confidence regard less of weather conditions.
PERFECT FOR GUTTERS AND RAISED MEDIANS	Often regarded as hazards, the post and block design of this road barrier increases safety and lessens the risk of rollover or vaulting.
DEEMED TO COMPLY TO TL3	G4 is deemed to comply to NCHRP-350 Test Level 3.



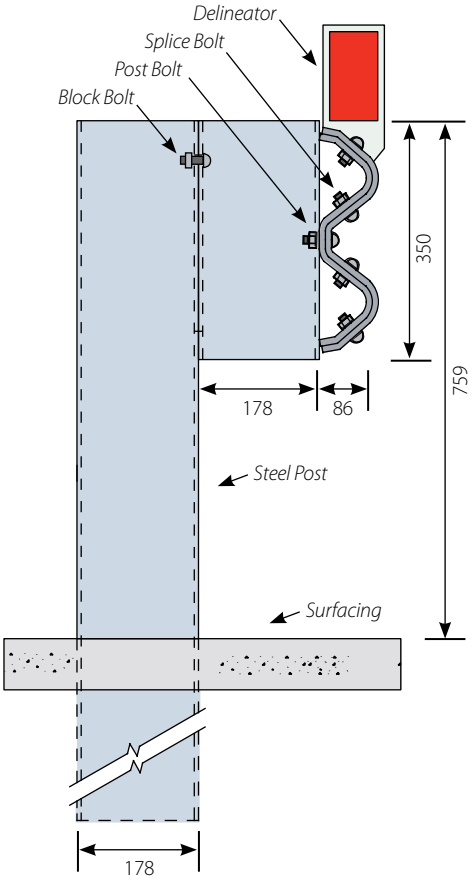
INTRODUCTION

Roadside barriers have been developed over the years to safely redirect vehicles that leave the roadway. Ingal are market leaders in guardrails and provide roadside barriers that are built to last. Many different rigid, semi-rigid and flexible designs for roadside barriers have now evolved. The most common system consists of a steel W-beam rail supported on steel posts with end treatments and transitions of various designs using similar materials.

The Ingal Civil FlexBeam guardrail's uniform high resistance to impacts is assured by its continuous flexible beam action. This prevents dangerous pocketing and minimises the ride down deceleration that is experienced by the vehicle and its occupants.

The high visibility of the FlexBeam guardrail creates driver confidence. This is an intangible but exceedingly important factor. At night or in foggy conditions, the excellent visibility of the Ingal Civil FlexBeam guardrail highlights the limit of safe travel and reduces dangerous centreline crowding.

Inline with the Austroads transition to MASH compliant systems, the G4 and Type B safety barriers may no longer be approved for new installs in your jurisdiction, please consult your local Ingal representative for further information. For a fully compliant MASH TL3 guardrail barrier, please refer to our Ezy-Guard Smart W-Beam system.



SPECIFICATIONS

G4 post length:	1,800mm
G4 post mass:	24kg
G4 system mass:	27kg per metre
Post height above ground:	730mm
Post spacing:	2.0m
G4 system width:	385mm
Crash rating:	Deemed to comply to NCHRP-350 TL3*
Crash test deflection:	1m*
Surface treatment:	Galvanised to AS/NZS 4680

PART NUMBERS

4m Kit	10002135	Posts	10001078
Finish Post Kit	10003739	Rail	10000177

*Deemed to comply - not crash tested.

Ezy-Lift® Carriage

Future-proofing your guardrail installation

MASH TL3 COMPLIANT

INTRODUCTION

The Ezy-Lift® Carriage is an innovative height adjustment carriage to ensure a compliant barrier height after the road has been over-layed. For existing Ezy-Guard installations where the road surface has been over-layed or resurfaced, resulting in the barrier height being outside of the installation tolerance, the Ezy-Lift carriage is available to bring the W-Beam back to the appropriate height.

The carriage gives the option to lift the W-Beam by +50, +100, +150 and +180mm.

There is no need to reinstall new road safety barriers after resurfacing, meaning a cost effective solution with minimal road closure time. The Ezy-Lift Carriage can be easily retrofitted in the field and uses the same reliable and proven technology of the Ezy-Guard Smart road safety barrier, maintaining your MASH TL-3 containment level.

- Fully tested & compliant system.
- Compatible with MASH TL3 Ezy-Guard Smart and TL4 Ezy-Guard 4.
- Easy-to-install.
- Option to lift the W-Beam by +50, +100, +150 and +180mm.
- Retrofit to existing Ezy-Guard after resurfacing.
- No need to reinstall new road safety barriers.
- Consistent high performance.

PART NUMBER

Ezy-Lift Carriage	10008486

Guardrail Delineators

Improving guardrail visibility

Ingal Guardrail Delineators are UV resistant and will not fade or crack. In the event of an impact they incur zero damage to the vehicle. A clever "Click-in" design requires no bolt connection for attachment to Ingal blocking piece.

- Delineator tape meets the requirements of class 1A material as defined AS/NZS 1906.1.
- Compliant to state road authority specifications.
- Manufactured from durable PET.
- Will not shatter or crack.
- Vandal resistant.
- Available for attachment to steel blocking pieces or Ingal blocking pieces.

PART NUMBERS

SM Delineator Bracket - Red and White	10007530
SM Delineator Bracket - Double Sided Yellow	10007828
SM Delineator Bracket - Single Sided Yellow	10009684
SM Delineator Bracket - Single Sided Red	10009683
Red/White PET Delineator Steel Block Attachment	10000790
Red/White PET Delineator Ingal Block Attachment	10000799

Ingal Post Cap

Making guardrail safer

The use of guardrail barriers in areas of pedestrian or cyclist activity may result in contact with the back of the guardrail system causing injury and damage. Traditional steel backing rails may result in vehicle spearing when the safety barrier is impacted.

The Ingal Post Cap is a rapid and safe solution that will not compromise the performance of the safety barrier. The cap can be attached to new or existing FlexBeam guardrail installations utilising Z, I and C posts and shields the sharp edges of the post and block.

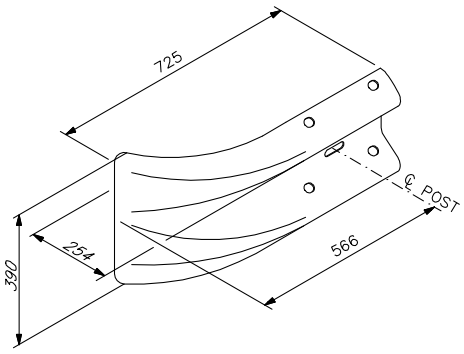
- Available for attachment to Z, I and C posts and blocks.
- Can be retro-fitted to existing installations.
- 100% Recyclable.
- UV stable.
- Suitable for use with guardrail systems using steel or plastic blocks.

PART NUMBER

C Post Cap	10001068
Ezy-Guard Post Cap	10008228
I-Beam Post Cap	10008998

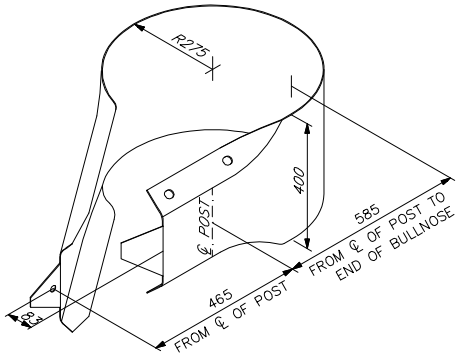
Other Accessories

Suitable for off-road applications



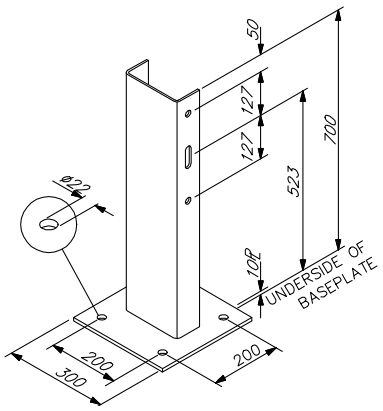
Fishtail

Part No. 10000473



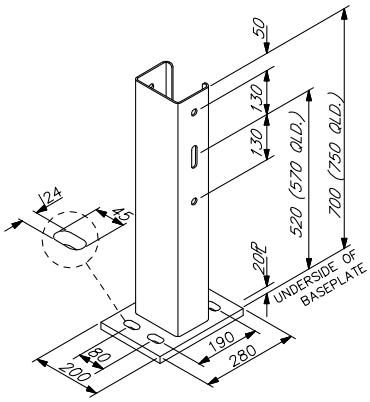
Bullnose

Part No. 10000485



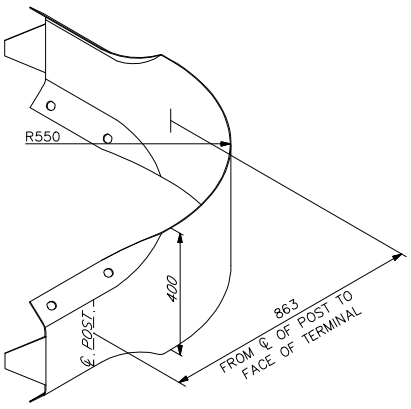
U-Post on Base Plate

Part No. 10000566



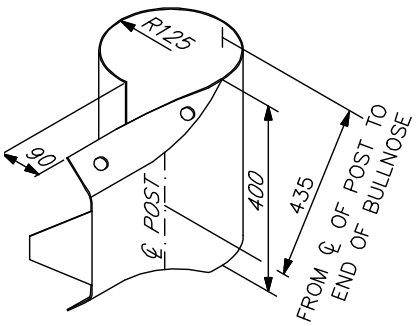
C-Post on Base Plate

Part No. 10001142
Part No. 10001086



Right Angle Terminal

Part No. 10000501 – Convex
10000504 – Concave



Short Bullnose

Part No. 10000493

ET-SS

TREND® Median

ET2000

Trailing Terminal

Guardrail Transitions

Ingal RBT

Guardrail End Terminals

Guardrail End Terminals

QUICK REFERENCE GUIDE

PART No.	PRODUCT	TERMINAL ALIGNMENT	END IMPACTS	END IMPACT ABSORPTION METHOD	LENGTH	POINT OF NEED	CRASH RATING*
10009335	ET-SS TL3 MASH	Straight	Yes	Anchor Rail Tension	15.48m	5.07m	MASH TL3
		APPLICATIONS: W-Beam End Treatments subject to end-on impacts.					
10009337	ET-SS TL2 MASH	Straight	Yes	Anchor Rail Tension	7.86m	3.18m	MASH TL2
		APPLICATIONS: W-Beam End Treatments subject to end-on impacts.					
	TREND® Median MASH	Straight	Yes	Rail Deformation	10.48m	3.81m	MASH TL3
		APPLICATIONS: Median/Gore guardrail end-terminal.					
10006450	ET2000 TL3	Straight	Yes	Rail Extrusion	15.24m	3.81m	TL3**
		APPLICATIONS: W-Beam End Treatments subject to end-on impacts on roads with a posted speed greater than 70km/h. Ideal in locations with limited clear zones.					
10006446	Trailing Terminal	Curved	No	N/A	4.0m	N/A	TL3
		APPLICATIONS: Departure terminations not subject to end-on impacts.					
10007191	Guardrail Transitions	Straight	N/A	N/A	6.0m**	0m	MASH TL3
		APPLICATIONS: W-Beam transition to rigid structures.					
10010399	Ingal RBT MASH						MASH TL3
		APPLICATIONS: Semi-rigid barrier to rigid concrete structure transition.					

*All crash ratings are NCHRP-350 unless otherwise noted. **Varies with jurisdiction. Before design or installation, please check the current acceptance conditions of the local road authority.

ET-SS

Front Anchored Technology

MASH TL2 COMPLIANT **MASH TL3** COMPLIANT

EASY ASSEMBLY	Splices at mid-span of the posts allow for easy assembly.
SAFER	Protective cover available for vulnerable road users, ideal for shared use paths.
VERSATILE	Compatible with various proprietary and public domain guardrail systems.
ADAPTABLE INSTALLATION	Baseplated and concrete anchor post options for challenging installation sites.
COST SAVINGS	Vertically compressed rail is flattened and maintains connection to unit for quicker repair and clean up.


Optional fireproof cover


Optional protective cover available for vulnerable road users

INTRODUCTION

The ET-SS is an all-steel tangent end terminal for use with W-beam guardrail systems. Using a proprietary head that flattens and extrudes W-beam guardrail upon end-on impacts within the MASH testing criteria, the ET-SS dissipates energy while guiding flattened rail through the mouth at the bottom of the unit. The system is MASH Test Level 3 compliant as a redirective, gating end terminal. It is also available in Test Level 2 configuration.

- Splices at mid-span of the posts allow for easy assembly.
- Extruded rail is flattened and maintains connection to unit for quicker repair and clean up.
- Compatible with various W-beam guardrail systems.

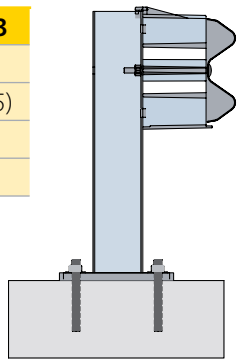
BASEPLATED & CONCRETE ANCHOR POST OPTIONS

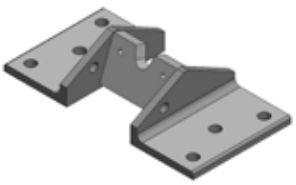
For locations where the posts cannot be driven to the appropriate depth due to an underground services conflict or similar, a surface mounted option is now available. This variant uses baseplated posts which are chemically anchored to a 250mm thick concrete pad. A concrete anchor post option is also available for locations where the 1.8m anchor post cannot be installed.

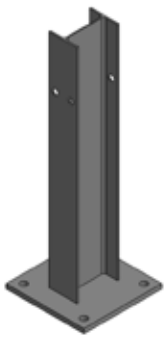
- Tall narrow extruder head provides less obstruction for ongoing maintenance operations such as mowing and snow removal.
- 100% galvanized steel head and post design reduces weather or UV related issues.
- The ET-SS head has the potential to be reused after impact. The ultimate decision of reusability rests with the specifying transportation authority.
- Unique anchorage design allows guardrail run to remain anchored after end-on impacts, when impacted according to MASH guidelines.

SPECIFICATIONS

Test Level	MASH TL2	MASH TL3
System Length	7.86m	15.48m
Optional System Offset	Up to 610mm over 15.2m (1:25)	
Point of Need	Post #2	Post #3
Head Width	178mm	


Baseplated Installation


ET-SS Anchor Baseplate


ET-SS Line Post

PART NUMBERS

Approach ET-SS MASH (7.89m) TL2 Terminal	10009335
Departure ET-SS MASH (7.89m) TL2 Terminal	10009336
Approach ET-SS MASH (15.48m) TL3 Terminal	10009337
Departure ET-SS MASH (15.48m) TL3 Terminal	10009338
Approach ET-SS MASH (7.9m) TL2 on Baseplate Terminal	10009780
Departure ET-SS MASH (7.9m) TL2 on Baseplate Terminal	10009781
Approach ET-SS MASH (7.9m) TL2 on Baseplate Terminal with Moto Cover	10009782
Departure ET-SS MASH (7.9m) TL2 on Baseplate Terminal with Moto Cover	10009783
Approach ET-SS MASH (7.9m) TL2 on Baseplate Terminal Steel Cover	10009784
Departure ET-SS MASH (7.9m) TL2 on Baseplate Terminal Steel Cover	10009785

Approach ET-SS MASH (15.48m) TL3 Terminal (Vic)	10009460
Departure ET-SS MASH (15.48m) TL3 Terminal (Vic)	10009461
Approach ET-SS MASH (7.89m) TL2 Terminal Steel Cover	10009463
Departure ET-SS MASH (7.89m) TL2 Terminal Steel Cover	10009464
Approach ET-SS MASH (15.48m) TL3 Terminal Steel Cover	10009465
Departure ET-SS MASH (15.48m) TL3 Terminal Steel Cover	10009466
Approach ET-SS MASH (7.89m) TL2 Terminal with Moto Cover	10009339

Departure ET-SS MASH (7.89m) TL2 Terminal with Moto Cover	10009340
Approach ET-SS MASH (15.48m) TL3 Terminal with Moto Cover	10009341
Departure ET-SS MASH (15.48m) TL3 Terminal with Moto Cover	10009342
ET-SS Moto Cover - Yellow LHS	10009281
ET-SS Moto Cover - Yellow RHS	10009282
ET-SS Steel Cover	10009462
ET-SS Fastener Bag	10009383
ET-SS Repair Kit (7.86m)	10009384

TREND® Median

Tangent, double-sided, re-directive/gating attenuator/end terminal

MASH TL3 COMPLIANT

INTRODUCTION

The TREND Median is a double-sided, re-directive/gating and energy absorbing end terminal, for use with various longitudinal safety barriers. It can be used in either unidirectional or bidirectional traffic applications, to include roadside shoulder, median and gore installations.

The terminal is designed to provide superior protection for drivers and passengers in the event of a median impact crash. It is engineered to redirect a 2270kg utility safely away from the median, reducing the risk of serious injury or fatality.

Extensive testing has been conducted to ensure its effectiveness and reliability and is compliant with MASH Test Level 3.

The TREND Median guardrail terminal features a unique design that uses a slotted rail and shaper-fin arrangement, whereby upon end-on impact, a cutter-bolt shears through the slots and the shaper-fins deform the rail, absorbing the kinetic energy of the impacting vehicle bringing it to a controlled stop.

- Compliant to MASH TL3.
- Suitable for back-to-back guardrail installations
- TREND Median system length of 10.477m long .
- Point of Need at the third post.
- All posts and rails are hot dip galvanized in accordance with AS/NZS 4680.

SPECIFICATIONS (TL3)

System Weight	692 kg
System Length	10.48 m
System Width (at impact head)	737 mm
System Height (except impact head)	787 mm, +25 mm/-0 mm
Beginning Length-of-Need ("BLON") established during MASH Test 3-35 at Post #3	3.81 m from Post 1

ET2000

Tangential End Treatment

NCHRP-350 TL3 COMPLIANT

INTRODUCTION

The Ingal Civil ET2000 Plus guardrail extruder terminal has been designed specifically to absorb the kinetic energy of an impacting vehicle at a controlled rate, providing a soft ride-down for vehicle occupants.

Unlike traditional flared guardrail terminals, the ET2000 Plus from Ingal is a tangential end treatment that is installed on a straight alignment The use of an ET2000 Plus provides an end treatment solution for applications where there is insufficient space for a flared end terminal or when it is cost prohibitive to place an embankment for a flared terminal.

Inline with the Austroads transition to MASH compliant systems, the ET2000 end-terminal may no longer be approved for new installs in your jurisdiction, please consult your local Ingal representative for further information. For a fully compliant MASH TL3 end-terminal, please refer to our ET-SS system..

SPECIFICATIONS

Test Level	NCHRP TL2	NCHRP TL3
Overall Length	7.62m	15.24m
Total Mass	330kg	540kg
Point of Need	Post 3 (3,810mm)	
Width	385mm	

PART NUMBERS

ET2000 TL3	10006450
ET2000 TL2	10006448

- Compliant to NCHRP 350.
- Available in TL2 or TL3 configurations.
- Can be installed parallel or with a tapered offset to the roadway.
- Absorbs vehicle impact energy.
- Available packaged as individual units.

Trailing Terminal

Anchorage provision for W-Beam crash barriers

INTRODUCTION

In some cases, such as when installed on divided roadways, downstream ends of roadside barriers may not be subject to head-on impacts. For such cases, the terminal end needs to provide the necessary longitudinal support to redirect vehicles that impact the barrier near the end of the system.

Trailing Terminals are intended to provide anchorage for the barrier. They are not crash-worthy terminals when struck head-on since they are not designed to break away.

SPECIFICATIONS

Overall length	4m
Surface Treatment	Galvanised to AS/NZS 4680 after fabrication

PART NUMBERS

Trailing Terminal Kit	10006446

Guardrail Transitions

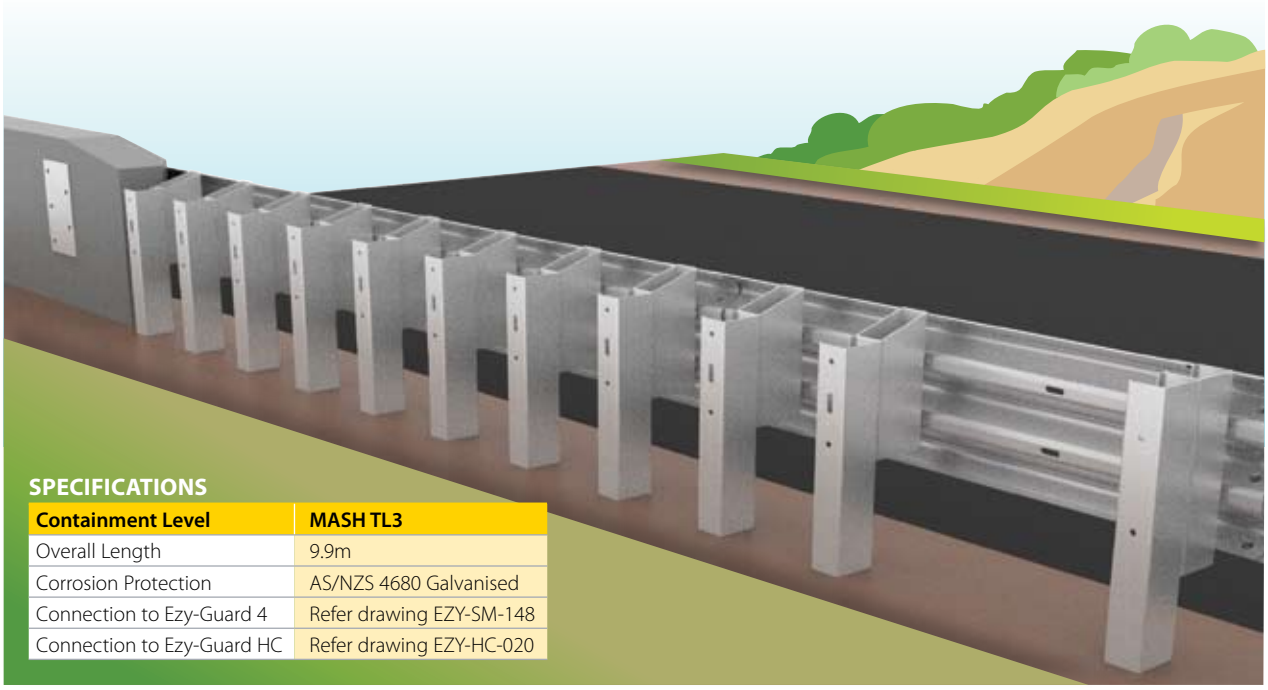
ASBAP Semi-rigid to rigid barrier transition

INTRODUCTION

The most common types of bridge barriers are reinforced concrete walls or metal rails on concrete parapets. If improperly treated, the exposed ends of these barriers can pose a significant hazard to errant vehicles. In most instances an approach guardrail is used to shield the exposed end and to prevent vehicles from impacting these rigid ends.

Guardrail is typically more flexible than the bridge barriers to which they are attached. A transition section is therefore required wherever there is an increase in stiffness when going from a semi-rigid W-Beam/Thriebeam barrier into a more rigid bridge barrier.

Ezy-Guard 4 and Ezy-Guard HC are both approved for connection to the recently approved ASBAP rigid transition. This is a longer transition compared to the older NCHRP-350 rigid transitions and uses the asymmetric transition panel and SHS blocks in place of the C-section blocks.



SPECIFICATIONS

Containment Level	MASH TL3
Overall Length	9.9m
Corrosion Protection	AS/NZS 4680 Galvanised
Connection to Ezy-Guard 4	Refer drawing EZY-SM-148
Connection to Ezy-Guard HC	Refer drawing EZY-HC-020

Ingal RBT

Semi-rigid barrier to rigid concrete structure transition

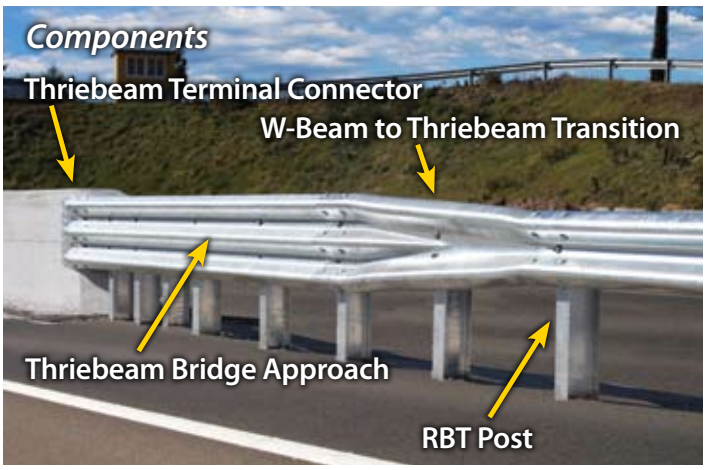
INTRODUCTION

The Ingal RBT is a MASH Test Level 3 compliant transition for connecting a range of semi-rigid barriers to a rigid concrete structure. The transition is 6m long and comprises a series of I-Beam posts at 1m and 0.5m spacing on the approach to the rigid structure. The transition posts are a common section used in guardrail end-terminals.

The posts support a 3.5mm BMT thrie-beam panel and a symmetric W-beam to thrie-beam transition panel. Upon impact, the stiffness of the I-Beam resists lateral deflection of the rail, leading to the containment and redirection of the vehicle without excessive pocketing.

The upstream end of the transition can connect directly into the Ezy-Guard 4 system via the symmetric transition panel. Alternatively, the transition can connect to the Ezy-Guard HC and LDS systems, with the height discrepancy transitioned over two thrie-beam panels.

The Ingal RBT has been crash tested when attached to the same rigid concrete barrier as detailed in Austroads SBTA 21-005 Transition.



MASH TL3 COMPLIANT

- Compliant to MASH TL3.
- Simple to install.
- Adaptable - connects to existing Ezy-Guard Smart, Ezy-Guard 4 and Ezy-Guard HC guardrail systems.
- Narrow profile, saving valuable formation width.
- Fast to repair in the event of a collision.
- Uses off-the-shelf components.
- Custom designed delineators.
- Maximum cross fall for installation of the Ingal RBT is 10H:1V (10%).
- Posts and rails are hot dip galvanized in accordance with AS/NZS 4680.

SPECIFICATIONS (TL3)

Ingal RBT Post Length	1,830mm
Ingal RBT Post Mass	25kg
Ingal RBT System Mass	251kg
Rail Height Above Ground	880mm
Post Spacing	1,000mm & 500mm
Ingal RBT System Width	235mm
Containment Level	MASH Test Level 3

PART NUMBERS

Ingal RBT to Ezy 4 – 6m LHS approach	10010399
Ingal RBT to Ezy HC – 8m LHS approach	10010400

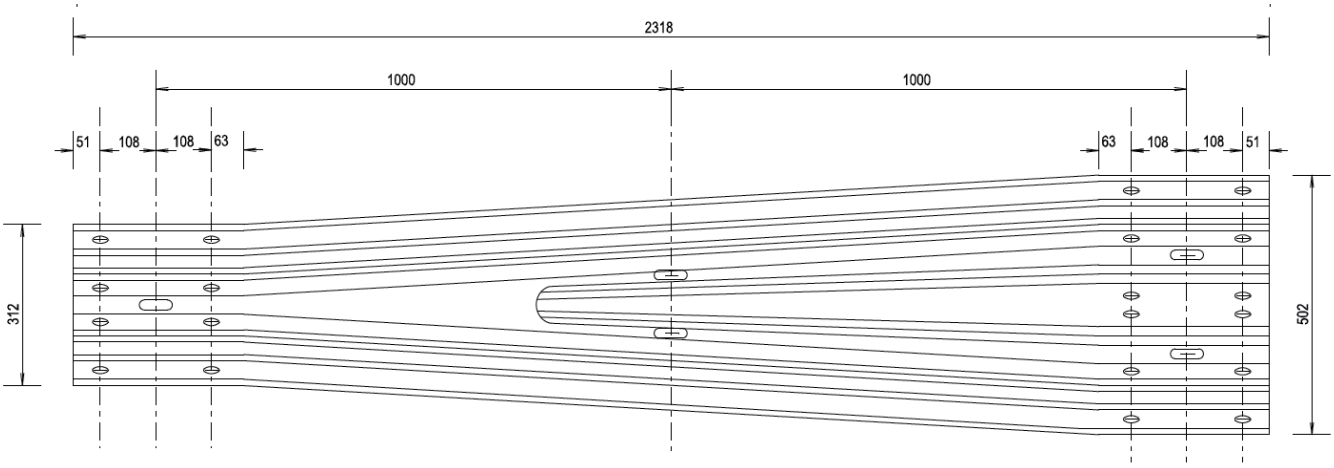
W-Beam to ThrieBeam Transition Panels

SPECIFICATIONS

Effective length	2m
Surface Treatment	AS/NZS 4680 Galvanised

PART NUMBERS

Symmetric Transition	10000869



Symmetric Transition W-Beam to ThrieBeam

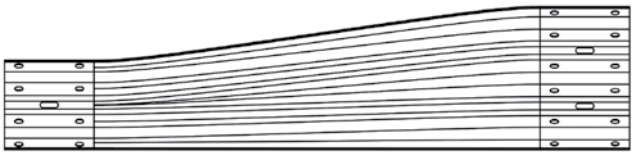
Asymmetric Transition Panels

SPECIFICATIONS

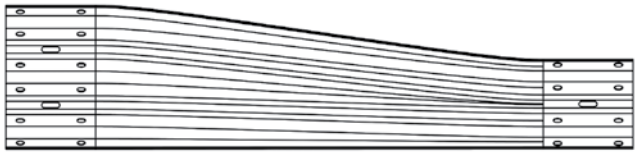
Effective length	1.905m
Surface Treatment	AS/NZS 4680 Galvanised

PART NUMBERS

Asymmetric Transition LHS	10001809
Asymmetric Transition RHS	10001811

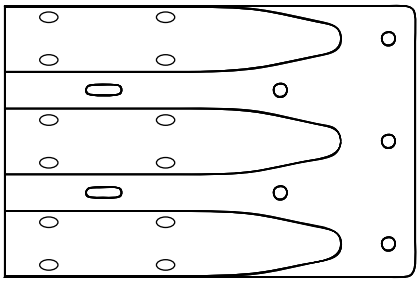


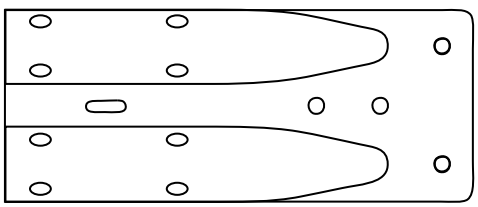
Asymmetric Transition from W-Beam to ThrieBeam - LHS



Asymmetric Transition from ThrieBeam to W-Beam - RHS

ThrieBeam and W-Beam Terminal Connector





PART NUMBERS

ThrieBeam Connector	10001174
W-Beam Connector	10000489

MashFlex® TL4 WRSB

FlexFence® WRSB

Accessories

Wire Rope Safety Barriers

INGAL CIVIL PRODUCTS
A valmont COMPANY

Wire Rope Safety Barriers

QUICK REFERENCE GUIDE

PART No.	PRODUCT	STANDARD POST SPACING	POST TYPE	CRASH RATING	CRASH TEST DEFLECTION (TL3)	POST HOLE VOLUME M³	ANCHOR HOLE VOLUME M³
	MashFlex® MASH	2.5m / 3m	Concrete/ Driven	MASH TL3 MASH TL4	2.2m / 2.7m 2.8m	0.043	2.64
10007374	FlexFence®	2.5m / 3m	Concrete/ Driven	NCHRP-350 TL3/TL4	1.4m	0.043	2.64

MashFlex® TL4 Wire Rope Safety Barrier

MASH TL3/TL4 Compliant Roadside Safety Barrier

MASH TL3 COMPLIANT **MASH TL4** COMPLIANT

NEXT GENERATION	MashFlex is the latest evolution of the FlexFence WRSB.
EASY TO INSTALL	The straight alignment of the ropes allows for easy installation and tensioning.
ECONOMICAL	Rapidly installed to maximum run length of 1200m.
LOW MAINTENANCE	Except for repairs due to impacts, there is virtually no maintenance required for the system.
VERSATILE	Can be installed with Driven Sleeve option meaning no post concrete is required.

INTRODUCTION

Introducing MashFlex, a member of the Flexfence family, the next generation wire rope safety barrier (WRSB), providing superior motorist safety and more metres of barrier for your dollar. The superior design and clean lines of the FlexFence WRSB have seen it become the road safety industry's preferred wire rope barrier. These design characteristics have continued in this next generation of the product, MashFlex, with an improved design and simplified assembly sequence.

The straight alignment of the ropes allows for easy installation and tensioning. Post footings are typically concrete with a sleeve to form a recess. Once the anchors and footings are poured, the ropes are cut to length, stainless steel end fittings are machine swaged and the ropes are tensioned.

MashFlex is a 4-rope barrier and crash tested to the latest performance standard, the Manual for Assessing Safety Hardware (MASH) Test Level 3 (TL3) and Test Level 4 (TL4), making it compliant to the current AS/NZS 3845.1:2015.

In situations where the MashFlex post cannot be installed to the required in-ground depth, the use of a base plate can be adopted.

MashFlex uses recycled plastics.

- Crash tested to MASH TL3 and TL4.
- Superior 4 rope system.
- Machine swaged, stainless steel fittings for dependable in-service performance.
- Variable post spacing to suit deflection requirements.
- Posts can be powder-coated.
- Point of need for MashFlex system is 11.73m.

SPECIFICATIONS

Steel wire rope mass:	1.21kg/m
Steel wire rope ultimate tensile strength:	165.5 kN
Sigma posts:	To AS/NZS1594
Swage fittings material:	Stainless Steel Grade 304
Steel wire rope finish:	Galvanised coating
Sigma post finish:	Galvanised to AS/NZS 4680
Anchor bracket finish:	Galvanised to AS/NZS 4680
Rope diameter:	19.0mm
Sigma post length:	1,230mm
Top cable height:	800mm
2nd from top cable height:	780mm
2nd from bottom cable height:	670mm
Bottom cable height:	570mm

PART NUMBERS

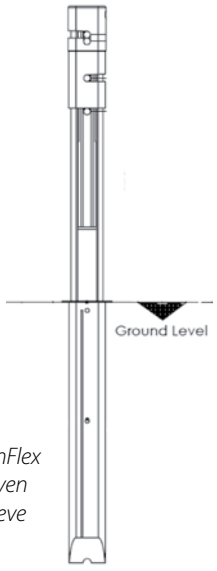
Above Ground Kit	
Below Ground Kit	
Anchor Post Repair Kits	
Post only (White)	10009360
MashFlex Driven Sleeve	10009739

The **MashFlex Driven Sleeve** is an alternative to the typical concrete post footing where a steel sleeve foundation is driven into the ground.

Benefits

- No post concrete required
- Rapid installation
- Minimal soil removal
- Hot Dip Galvanised to AS/NZS 4680

MashFlex Driven Sleeve



FlexFence® TL4 WRSB

Peace of mind with the most popular WRSB in Australia

NCHRP-350 TL3 COMPLIANT

NCHRP-350 TL4 COMPLIANT

EASY TO INSTALL	The straight alignment of the ropes allows for easy installation and tensioning.
SAFER	Soft ride-down due to high level of flexibility.
COST SAVINGS	Low concrete consumption.
EASY TO REPAIR	In most instances the posts simply need to be inserted back into the sleeve and the wire re-tensioned.

INTRODUCTION

The superior design and clean lines of the FlexFence Wire Rope Safety Barrier (WRSB) have seen it become the road safety industry's most preferred wire rope safety barrier. FlexFence has gained popularity as a median barrier for the prevention of cross-median accidents. Cross-median accidents are typically violent collisions with a high probability of multiple serious injuries and death. Thus, the design trend is towards providing positive vehicle containment in wider median applications for which wire rope safety barriers have not historically been warranted.

Inline with the Austroads transition to MASH compliant systems, FlexFence may no longer be approved for new installs in your jurisdiction, please consult your local Ingal representative for further information. For a fully compliant MASH WRSB, please refer to our MashFlex system.

For existing installations of FlexFence, an upgrade kit is available to convert the system to the MASH TL4 compliant MashFlex. Where suitable, the existing concrete footings and cable can be reused, saving significant cost.

- Compliant to NCHRP 350.
- Available in TL3 or TL4 configuration.
- Superior 4 rope system.
- Machine swaged, stainless steel fittings for dependable in-service performance.
- Variable post spacing to suit deflection requirements.
- Posts can be powder-coated.
- Available with TL3 Terminal – non releasing terminal, allowing the system to retain cable tension after an impact.

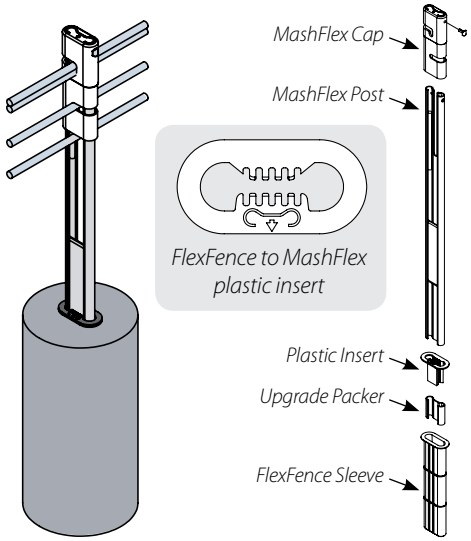
SPECIFICATIONS

Steel wire rope mass:	1.21kg/m
Steel wire rope ultimate tensile strength:	165.5kn
Swage fittings material:	Stainless Steel Grade 304
Steel wire rope finish:	Galvanised coating
Sigma post finish:	Galvanised to AS/NZS 4680
Rope diameter:	19.0mm
Sigma post height:	1,230mm
Top cable height:	720mm
2nd from top cable height:	640mm
2nd from bottom cable height:	560mm (TL4 only)
Bottom cable height:	480mm
Standard post spacing:	2.5m or 3.0m

PART NUMBERS

TL3 Above Ground Kits	10007371	Anchor Post Repair Kits	10007087
TL3 Below Ground Kits	10007372	Post only (White)	10007750
TL4 Above Ground Kit	10007373	Post only (Black)	10007748
TL4 Below Ground Kit	10007374	Post only (Green)	10007749

A **FlexFence to MashFlex Upgrade Kit** is available to facilitate the upgrading of your existing FlexFence system to the superior MashFlex WRSB. It consists of a MashFlex plug, cap, post, plastic insert and packer.



Tension Unit

For the installation and maintenance of FlexFence WRSB

The Ingal Tension Unit is a portable device used for the installation and maintenance of FlexFence WRSB Wire Rope Safety Barrier. Comprising of a hydraulic hand pump and tension assembly, the unit can be used to increase or decrease the tension in the cable barrier system. During installation, the unit is used to tension the barrier system according to the ambient temperature conditions. FlexFence is installed using pre-stretched wire rope cable, meaning that the barrier tension is retained when impacted under normal conditions.

During repair, it may be necessary to release the tension in the barrier system.

PART NUMBER	
Hand Pump and Tension Rig	10001674

Swaging Unit

Used to attach end fittings to the wire rope cable

The Ingal Swaging Unit is a portable device used to attach end fittings to the wire rope cable during the assembly of FlexFence WRSB Wire Rope Safety Barrier. The use of swaged fittings provides a secure attachment to the cable barrier which is critical in the performance of the system.

The cutting and swaging of cables on site ensures the barrier is installed according to site conditions.

PART NUMBER	
Swaging Unit	10001688


DUAL CONTROL
LEFT HAND DRIVE
SMS
IVECO

QuadGuard® M10 MASH

QuadGuard® Elite M10/M10 Wide

QuadGuard® CZ

QuadGuard® Crash Cushion

Crash Cushions and Attenuators

Raptor™ Crash Cushion

Crash Cushions and Attenuators

QUICK REFERENCE GUIDE

PART No.	PRODUCT	APPLICATION
10100618	QuadGuard® M10 MASH	MASH compliant, reusable non-gating redirective crash cushion.
10100207	QuadGuard® Elite M10 MASH	MASH compliant, redirective, non-gating redirective crash cushion.
10100154	QuadGuard® CZ M10 MASH	MASH compliant, reusable non-gating, redirective crash cushion.
10100621	QuadGuard® M Wide MASH	MASH compliant crash cushion able to shield hazards up to 1.75m.
10100202	QuadGuard® Elite	Highly reusable, self-restoring, non-gating redirective crash cushion.
10100318	QuadGuard® Crash Cushion	Non-gating fully re-directive crash cushion.
10100153	QuadGuard® CZ	Relocatable/Temporary work-zone QuadGuard (entire system can be moved as a single unit).
10200018	Raptor™ MASH	Designed to reduce the impact severity of vehicles with a pole or tree.

QuadGuard® Range of Crash Cushions

The QuadGuard family has a solution for every situation

MASH TL2 / TL3 COMPLIANT **NCHRP-350 TL3** COMPLIANT

REPAIRABLE	High efficiency and often with repairability/reusability after most design impacts.
COMPACT	Modular designs for all the QuadGuard® family, making a versatile system.
SAFE	QuadGuard® crash cushions are fully compliant to safety standards.
ADAPTABLE	Workzone and temporary applications, wide hazards, low and high speed situations.

The QuadGuard®range of crash cushions has an engineered solution for any application where a redirective crash cushion is required to shield hazards up to 3200mm wide.

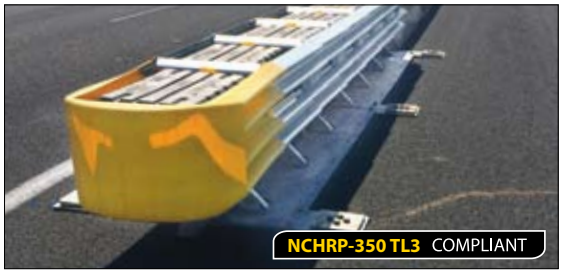
QuadGuard® M10 MASH

QuadGuard® Elite M10/M10 Wide

QuadGuard® CZ M10

QuadGuard® M Wide

QuadGuard® Crash Cushion



QuadGuard® CZ

QuadGuard® M10

MASH Compliant, reusable non-gating redirective crash cushion

INTRODUCTION

The QuadGuard® M10 is a redirective, non-gating crash cushion that consists of an engineered steel nose and crushable, energy absorbing cartridges surrounded by a framework of steel Quad-Beam™ panels. The system is tested to the Manual for Assessing Safety Hardware (MASH) Test Level 3. It can be used to shield fixed objects of 610 mm wide.

The QuadGuard® M10, as a member of the QuadGuard® family of crash cushions, consists of many of the same components as the original Test Level 3 QuadGuard® platform and framework in addition to an engineered steel nose and monorail shims.

The QuadGuard® M10 system utilises two types of cartridges in a "staged" configuration that are designed and tested to address vehicles as defined by MASH for both lighter cars and heavier, high centre-of-gravity vehicles.

During head-on impact testing within MASH criteria, the QuadGuard® M10 has been shown to telescope rearward to absorb the energy of impact. When impacted from the side, within the applicable MASH criteria, is has been shown to redirect the vehicle back towards its original travel path and away from the highway feature.

SPECIFICATIONS

Test Level	MASH TL2	MASH TL3
System length	3.96m	6.71m
Effective length	3.55m	6.30m
System width	610mm	

PART NUMBER

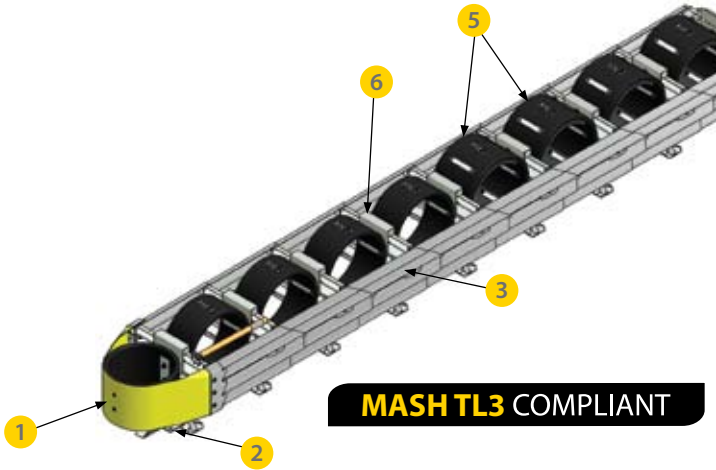
QuadGuard® M10 TL3	10100617
QuadGuard® M10 TL2	10100619

QuadGuard® M10 Features

- Compliant to MASH TL3 and TL2.
- Self-supporting steel nose.
- Tension strut backup.
- Monorail guide stabilisers.
- Anchorage in concrete or asphalt.
- High strength Quad-Beam™ panels.
- Does not use anchoring chains or tension cables.
- Damaged cartridges are replaceable.
- Potentially reusable after an impact within MASH crash test standards.*

QuadGuard® Elite M10 M10 Wide

MASH Compliant, redirective, non-gating crash cushion



1 Flex-Belt Nose
2 Monorail Base
3 Quad-Beam Panel
4 Backup
5 HDPE Cylinder
6 Diaphragm

The QuadGuard® Elite M10 is a severe-duty, self-restoring crash cushion and has passed MASH-16 Test Level 3 for re-directive crash cushions. It consists of a flex-belt nose, and High Density Polyethylene (HDPE) cylinders surrounded by a framework of steel Quad-Beam™ panels. The QuadGuard® Elite M10 is also available in a Wide configuration to provide TL3 protection for wider hazards.

- Cylinders are potentially reusable after an impact within MASH crash test standards.
- High strength Quad-Beam™ panels.
- Does not use anchoring chains or tension cables.
- Available in 610mm (24") or 1.75m (69") wide configurations.
- Available in TL-2 (70km/h) or TL-3 (100km/h) configurations.

PART NUMBER

QuadGuard® Elite M10 TL3	10100207
QuadGuard® Elite M10 Wide TL3	10100209

QuadGuard® CZ M10

Relocatable/temporary work-zone QuadGuard MASH TL2/TL3 COMPLIANT

The QuadGuard® M10 CZ is a development of the MASH-16 QuadGuard® M10, adapted for temporary installation. Use of steel baseplates brings the anchors outside of the system, allowing quick and easy installation and removal. Lifting brackets make relocation by crane simple and safe.

- Available in 610mm (24") wide configuration.
- Available in TL-2 (70km/h) or TL-3 (100km/h) configurations.

PART NUMBER

QuadGuard® CZ M10 TL3	10100103
QuadGuard® CZ M10 TL2	10100155

QuadGuard® M Wide

MASH crash cushion able to shield hazards up to 1.75m **MASH TL3 COMPLIANT**

The QuadGuard® M Wide is a MASH TL-3 crash cushion, able to effectively shield hazards up to 1755mm wide. Wider hazards may be accommodated by flaring outward with guardrail or concrete barrier.

The QuadGuard® M Wide shares the basic architecture and a majority of components with the 610mm TL-3 QuadGuard® M10, including the energy absorbing cartridges.

PART NUMBERS

QuadGuard® M Wide	10100621

QuadGuard® Crash Cushion

Non-gating fully re-directive crash cushion

- Compact, modular design (accommodates speeds from 40 to 120 km/h).
- Able to shield hazards up to 3200mm wide.
- Quad-Beam™ panels provide 30% higher beam strength than ThrieBeam.
- High efficiency 80% reusability after most design impacts.

The QuadGuard® may be upgraded to QuadGuard® M10 MASH standard with the addition of a new components including Monorail shims and a steel nose which includes a new front diaphragm support bracket.

PART NUMBERS

QuadGuard®	10100318
QuadGuard® TL-3 Upgrade Kit	10101704
QuadGuard® TL-2 Upgrade Kit	10101703

QuadGuard® crash cushions are available to shield hazards from 610mm to 3200mm wide, and for speeds from 40km/h to 120km/h. Each QuadGuard® System consists of crushable, energy-absorbing cartridges surrounded by a framework of exclusive steel Quad-Beam™ panels.

The QuadGuard® System has successfully passed the complete NCHRP 350 Test Level 2 & 3 test matrix. Higher speed units are available. During head-on design impacts, the QuadGuard® Systems telescope rearward and progressively crush the cartridges to absorb the energy of impact.

When impacted from the side, the QuadGuard® System safely redirects the errant vehicle back toward its original path without gating. Fully-tested transition panels are available to all common guard rail profiles, concrete structures and temporary steel barriers.

CONFIGURATION OPTIONS

Standard QuadGuard®

Speed	Bays	Length	Hazard Width - Max	Height	Part No.
60km/h	2	3.08m	915mm	817mm	10100300
70km/h	3	4.00m	2285mm	817mm	10100303
80km/h	4	4.91m	2285mm	817mm	10100308
90km/h	5	5.83m	2285mm	817mm	10100313
100km/h	6	6.74m	3200mm	817mm	10100318
110km/h	8	8.54m	2285mm	817mm	10100323
115km/h	9	9.49m	2285mm	817mm	10100328

QuadGuard® CZ

Relocatable/temporary work-zone QuadGuard **NCHRP-350 TL3** COMPLIANT

Entire system can be moved as a single unit.

- Relocatable crash cushion offering the latest technology for shielding hazards 610mm to 915mm wide.
- Monorail base eliminates the need for anchoring chains and tension cable
- High efficiency – 80% reusability after most design impacts.
- Fully-tested transition panels and lifting brackets.

The QuadGuard® CZ may be upgraded to QuadGuard® CZ M10 MASH standard with the addition of a new components including Monorail shims and a steel nose which includes a new front diaphragm support bracket.

PART NUMBERS

QuadGuard® CZ	10100153
QuadGuard® TL-3 Upgrade Kit	10101704
QuadGuard® TL-2 Upgrade Kit	10101703

QuadGuard® Parts

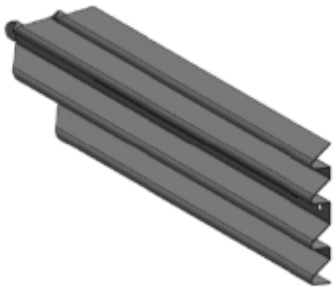
Rapid and easy installation on-site for continued road safety

Cartridge Assy, Type 1

Type 1	10102903

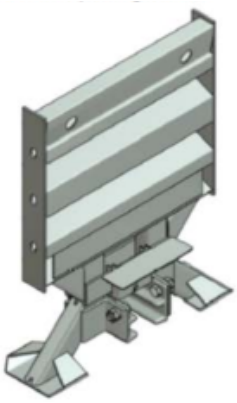
Cartridge Assy, Type 2

Type 2	10102904



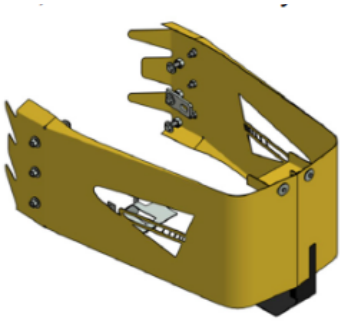
Panel, Fender (QG)

Panel, Fender (QG)	10102002



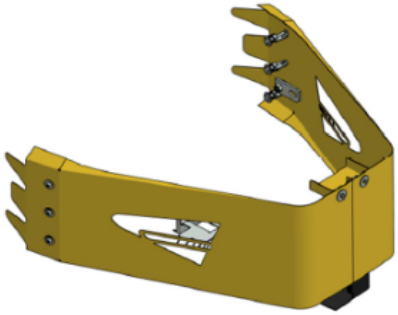
Narrow Diaphragm Kit

610mm (24")	10101100



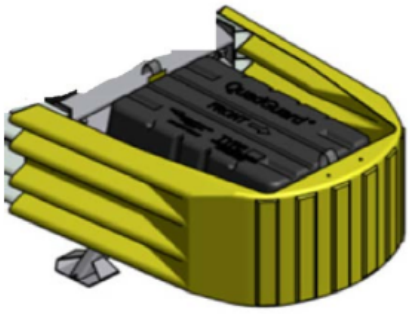
Nose Narrow Assembly

Steel	10101200
Plastic	10101202



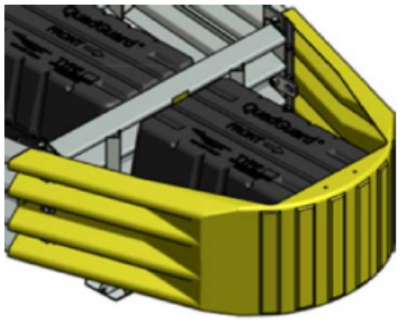
Nose Wide Assembly

Steel	10101203
Plastic	10101201



Plastic Narrow Nose Assembly

Plastic Narrow Nose Kit	10101202
Nose with adjustable support bracket	10102201
Nose narrow bolt pack	10101608



Plastic Wide Nose Assembly

Plastic Wide Nose Kit	10101201
Nose with adjustable support bracket	10102201
Bracket, nose attachment, wide	10102409
Nose wide bolt pack	10101609

Raptor™ Pole Protection Crash Cushions

Exceptional energy-absorbing capability

MASH TL1 COMPLIANT **NCHRP-350** COMPLIANT

SPECIALISED	Reduces the impact severity of errant vehicles with a utility pole or tree.
SAFE	Designed, tested and accepted to MASH TL1 and NCHRP 350 TL-1 criteria.
RELIABLE	Made from stabilised PE (UV8).
REPAIRABLE	Installation and repairs can be done under 30 minutes.

2000kg Pick-up truck impacting head-on with a pole using the Raptor™ at 50kph

INTRODUCTION

The Raptor™ is an energy absorbing device designed to reduce the severity of vehicle impacts with utility poles or trees. Its unique technology offers a compact low-cost solution in places where typical crash cushions would not physically fit.

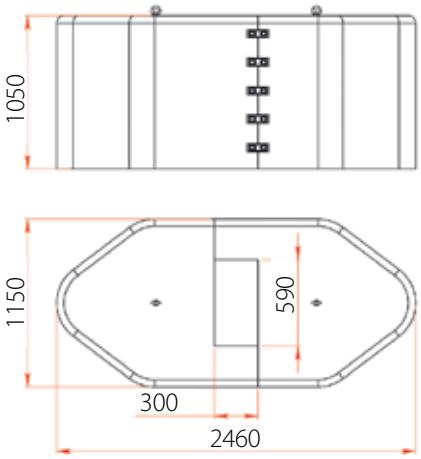
A utility pole (or a tree) offers no energy absorption during a head on impact; consequently the occupants and vehicle will absorb all the impact energy being released from a vehicle decelerating to a halt in a fraction of a second. Approximately 30% of the run-off-road fatalities involve severe impacts with hard objects such as poles and trees. The cost of removing these hazards can be prohibitive as it may involve re-layout of the road itself; as a consequence these hazards are often left unattended until a serious accident occurs.

The impact energy is absorbed by internal plastic cartridges. RAPTOR™ is also capable of deflecting a vehicle in side-on angled impacts. The RAPTOR™ system has been tested and judged to have satisfied the required evaluation criteria for acceptance to both MASH TL1 and NCHRP-350 guidelines for a gating, non re-directive crash cushion.

- Highly reduces the severity of vehicle impacts against poles and trees.
- Meets both MASH TL1 and NCHRP 350 test criteria (TL-1).
- Usable in places typically impossible to protect.
- Compact size and easy installation (under 30 minutes).
- Two sizes available to fit multiple width hazards.
- Zero maintenance, UV stabilised, expected lifespan 25 years.
- Smooth surfaces and geometry, suitable for vulnerable road users.
- After a collision occurs, the non-impacted side can still be re-used.
- No foundations are required.
- Fully recyclable very low cost protection.
- Available in black or yellow.

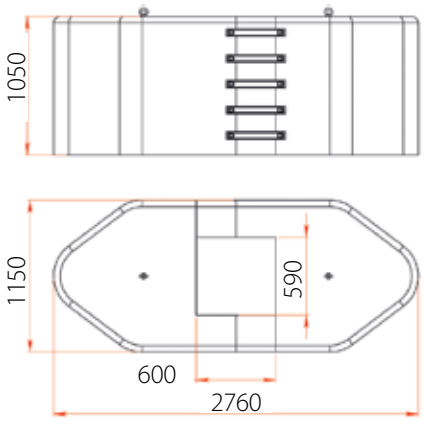
Raptor™ 300

Overall Length	2460mm
Height	1050mm
Width	1150mm
Void Size	300mm x 590mm
Shells & Cartridges	Stabilised PE (UV8)
Connector & Fixings	Galvanised Steel
Weight (per shell)	110kg
300 Black Kit	10200017
300 Yellow Kit	10200018



Raptor™ 600

Overall Length	2760mm
Height	1050mm
Width	1150mm
Void Size	600mm x 590mm
Shells & Cartridges	Stabilised PE (UV8)
Connector & Fixings	Galvanised Steel
Weight (per shell)	110kg
Weight (per packer)	12kg
600 Black Kit	10200019
600 Yellow Kit	10200020



Ingal MPR

Protection Shield

Post Cap

Stack Cushion

Motorcyclist Protection

INGAL
CIVIL PRODUCTS
A valmont COMPANY

Motorcyclist Protection

QUICK REFERENCE GUIDE

PART No.	PRODUCT	APPLICATION
10007333	Ingal MPR MASH	Protective enhancement installed on existing guardrail barriers.
10008088	Protection Shield	Added protection to motorcyclists from hazards in impacting end-terminals.
10008228	Post Cap	Post cap to mitigate injury risk to vulnerable road users.
10001555	Stack Cushion	Protects motorcyclists from impacting posts on a wire rope safety barrier.

Ingal MPR

Offering the highest level of protection to our motorcyclists

MASH TL3 COMPLIANT

EN1317 COMPLIANT

SMART DESIGN	More space between the system and the ground (60mm), allowing water drainage, snow clearance, cleaning of hard shoulders, etc.
SAFER	Compliant to AS/NZS 3845:2015 and crash tested to EN1317 and MASH TL3.
COST SAVINGS	No modification required to traditional guardrail barriers to accommodate Ingal MPR.
EASY TO INSTALL	Quick installation on new or retrofit projects.

INTRODUCTION

The Ingal Motorcyclist Protection Rail (Ingal MPR) is a protective enhancement installed on existing four-wheel vehicle restraint systems to reduce the chances of serious injury to motorcyclists and pillion passengers in run-off road accidents.

Class A impact severity recorded from dummy testing, this offers the motorcyclist the highest level of protection from head injury.

Traditional highway safety barriers installed on the road carriageways to restrain vehicles from impacting roadside hazards, these typically take the form of the W-Beam rail supported by a series of posts. These posts introduce a significant hazard to an errant motorcyclist in a run-off road accident. The Ingal MPR consists of an under-riding rail which is mounted on a spring bracket. Upon impacting this rail, the spring bracket deflects back absorbing some of the impact energy from the motorcyclist, whilst the rail contains and re-directs the motorcyclist away from the rigid posts and hazards.

- The specially designed anchoring system fully facilitates the positioning of the guard rail at the correct height, ensuring a uniform distance from the ground throughout the run and compensating for uneven terrain and height differences in the existing barriers.
- The mounting bracket also allows the motorcyclist rail to be raised to match alterations in the level of the road surface.
- The motorcyclist rail can be assembled and raised without the need to modify the traditional vehicle barrier system.
- More space between the system and the ground (60mm), allowing water drainage, snow clearance, cleaning of hard shoulders, etc.
- The mounting bracket is symmetric, and is therefore the same for both the right and left side of the carriageway.
- Small number of components and ease of installation make the system very cost-effective.

SPECIFICATIONS

Ingal MPR Rail Length:	4m or 5m NLL
4m MPR Rail Mass:	12.3kg
Ingal MPR System Mass:	4.65kg per metre
Rail Height Above Ground:	60mm
Post Spacing:	2m or 2.5m
Ingal MPR Crash Test Performance:	Level 1
Manufactured from:	Hot-rolled steel flat products in accordance with AS/NZS 1594
Finish	Galvanised to AS/NZS 4680

PART NUMBERS

MPR Kit	10007333
Rail	10006773
Mounting Bracket	10006772

Protection Shield

Superior terminal protection for motorcyclists

HIGH SAFETY	Improved visibility for increased motorcyclist awareness.
COST SAVINGS	Small number of components and ease of installation make the system cost-effective.
SMART DESIGN	Design includes post cap for Post 1 removing potential snag point.

INTRODUCTION

The Motorcyclist Protection Shields are a specially engineered design from Ingal that provides increased safety for motorcyclists when impacting on the extruder head.

A modified face shield offers greater visibility and softer impact to vulnerable motorcyclists. The innovative design also includes a post cap that fixes to Post 1, removing this cumbersome snag point.

The Motorcyclist Protection Shields are manufactured to be resistant to UV, moisture, oil and extreme temperatures. The small number of components result in a quick installation on new or retrofit projects, making the system very cost-effective. Ingal MPS is also cyclist and pedestrian friendly.

PART NUMBERS

Assembly Kit	10008088
Side Cover	10007891
Cover Post Cap	10007892

- New cover for added protection to motorcyclists from hazards in impacting extruder head.
- Modified face shield offering greater visibility and softer impact.
- Design includes post cap for Post 1, removing snag point.
- Quick installation on new or retrofit projects.
- Resistant to UV, moisture, oil and extreme temperature variations.
- No effect on vehicle containment or impact performance.
- Small number of components and ease of installation make the system very cost-effective.
- Pedestrian and cyclist friendly.

Stack Cushion

Protects motorcyclists from impacting posts



IMPROVING SAFETY	Designed for attachment to wire rope safety barrier.
SAFER	No aggressive edges or corners.
EASY TO INSTALL	No dismantling of the existing wire rope system required for Ingal Stack Cushion attachment.

INTRODUCTION

Ingal Stack Cushion protects motorcyclists from impacting posts and is designed for attachment to wire rope safety barrier.

No dismantling of the existing wire rope system required for Ingal Stack Cushion attachment. There are no aggressive edges or corners which further enhances safety.

- Ingal Stack Cushion is designed for attachment to wire rope safety barrier.
- Ingal Stack Cushion protects motorcyclists from impacting posts.
- No dismantling of the existing wire rope system required for Ingal Stack Cushion attachment.
- No aggressive edges or corners.

SPECIFICATIONS

Maximum post size:	100 x 50mm
Ingal Stack Cushion length:	490mm
Ingal Stack Cushion diameter:	200mm

PART NUMBERS

Ingal Stack Cushion Kit	10001555

TMA

Truck Mounted Attenuator

SAFER	MASH Test Level 3 (100km/h) safety.
HIGH VISIBILITY	Full 24v electrics and LED lighting package.
SERVICEABLE	Simplified cable-free design with replaceable, energy absorbing cartridges.
ADAPTABLE	Short height while in storage mode ideal for garage storage and low overpasses.

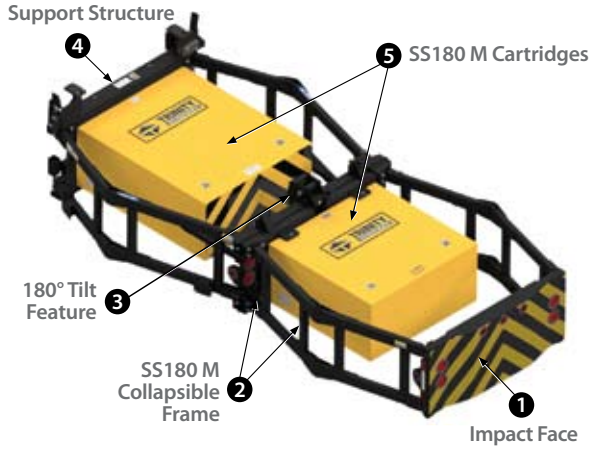
QUICK REFERENCE GUIDE

PART No.	PRODUCT	APPLICATION
10100407	Safe-Stop SS180M™ TMA MASH MASH	A truck mounted attenuator for use on stationary or moving shadow or support vehicles – assessed to crash test level MASH 16.

Safe-Stop SS180M®

TMA MASH

Assessed to MASH-TL3 and is accepted for use in Australia



MASH COMPLIANT

INTRODUCTION

The SS180M is a truck mounted attenuator for use on stationary or moving shadow or support vehicles. The SS180M TMA has been assessed to MASH-16 and is accepted for use in Australia. The unit is comprised of two lightweight aluminium cartridges contained in a potentially reusable steel support frame, and a 180° tilt feature which folds at the centre to stack the two cartridge sections on top of each other.

The SS180M is designed to help absorb rear-end impacts at speeds up to 100 km/h (62 mph) when impacted within MASH crash test standards.

Multiple attachment options are available for standard trucks. Attaches to existing Safe-Stop TMA® mounts for standard and tailgate operations.

- MASH Test Level 3 100km/h performance.
- Full 24v Electrics and LED lighting package.
- Simplified cable-free design.
- Short height while in storage mode ideal for garage storage and low overpasses.
- Replaceable, energy absorbing cartridges.
- Potentially reusable steel support frame.
- Designed to help minimise damage from low-speed nuisance hits up to 6 mph (10 km/h).

SPECIFICATIONS

Height Deployed	959mm
Height Folded	2000mm
Max Width	2090mm
Length Deployed	4460mm
Length Folded	2350mm
Weight	922kg

RECOMMENDED HOST VEHICLE TARE WIGHT

Minimum	6,150kg
Maximum	11,000kg

PART NUMBERS

SST180M TMA MASH	10100407

Boundary Fencing

Pedestrian Fencing

Fencing

INGAL
CIVIL PRODUCTS
A valmont COMPANY

Fencing

QUICK REFERENCE GUIDE

PART No.	PRODUCT	APPLICATIONS
10002647	Boundary Fencing	Improving site security around sporting fields, parkland & bushland.
10001755	Pedestrian Fencing	Used to channel pedestrians in a predictable and safe way in traffic areas.

Boundary Fencing

Improving site security around sporting fields, parkland and bushland

BOUNDARY FENCING

Prevents unauthorised vehicle access to protect areas such as sporting fields, parkland & bushland.

The Rigid C posts are driven into the ground and are fitted with Post Caps to protect pedestrians from post edges. Twin 19mm diameter cables pass through pre-punched holes in each post.

All posts are hot dipped galvanized for improved durability. Rapid and low-cost installation is a feature of Ingal Boundary Fencing as no concrete is required for installation.

- Rigid C-Posts are driven into the ground.
- Hot dipped galvanised.
- Twin 19mm cables.
- Protects bushland, sporting fields and parkland from unauthorised vehicle access.
- No concrete required.

Pedestrian Fencing

Crucial to maintaining Road Authority Safety Standards

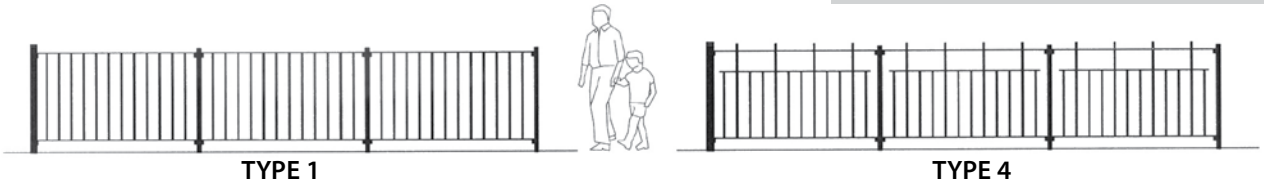
PEDESTRIAN FENCING

Applications:

- Shopping Centres
- School Zones
- Intersections
- Sports Arenas and Events
- Entertainment Venues
- Tourist Attractions

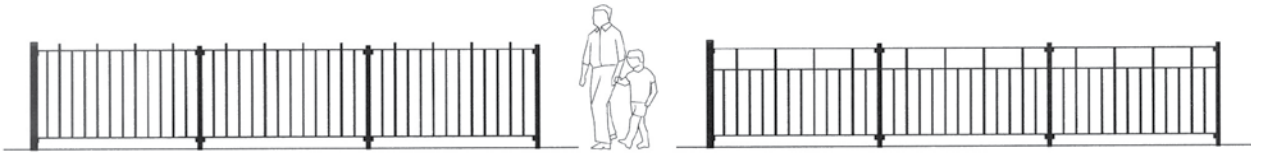
Pedestrian fencing is used to channel pedestrians in a predictable and safe way in traffic areas. The Pedestrian Fence design has been created using solid steel members and joined with nut and bolt connections which allows the panels to collapse as an entire panel and reduce the potential for detachment of the individual pedestrian fencing elements. Not only does this provide additional pedestrian safety, but it can also prevent the impacting vehicle from becoming impaled.

- Manufactured to State Road Authority specifications.
- Hot dipped galvanised.
- Available in median or verge configuration.
- Separates pedestrian and vehicle activity.
- Designed NOT to spear impacting vehicles.
- Anti-climb design.



TYPE 1

TYPE 4



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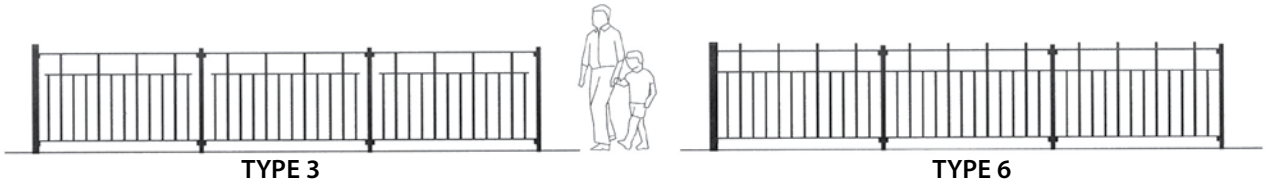
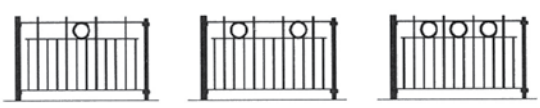


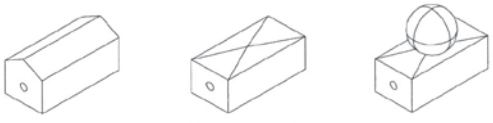
TYPE 3

TYPE 6



1 CIRCLE **2 CIRCLE** **3 CIRCLE**

EMBELLISHMENTS



GABLE **CROSS BREAK** **SPHERE**

CAPS

ZEE-Park®

ZEE-Park® DeckGuard

ZEE-Park® Sentinel

ZEE-Park® TruckShield

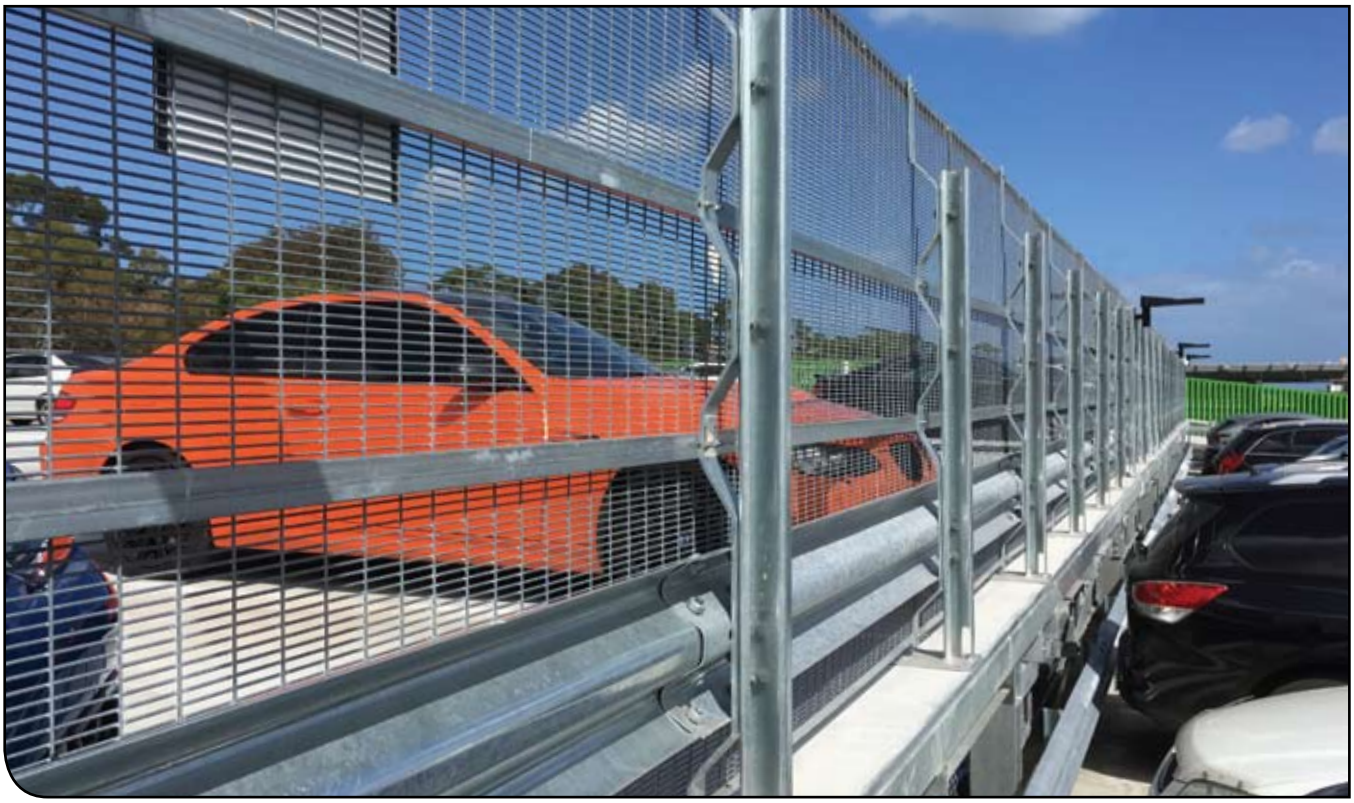
Spring Steel BUFFA™

Column BUFFA™

Cable BUFFA™

Rigid Post / Corners / Accessories

Carpark Barriers



QUICK REFERENCE GUIDE

PART No.	PRODUCT	TYPE
10007701	ZEE-Park®	The original and most versatile carpark barrier system.
10008115	ZEE-Park® DeckGuard	For fixing rails to decked or edge-applications.
10008112	ZEE-Park® Sentinel	High-containment carpark barrier.
10008108	ZEE-Park® TruckShield	Heavy-duty barrier solution for separation of heavy vehicles.
10002088	Spring Steel BUFFA™	Elegantly designed, flexible car park barrier protection.
10008306	Column BUFFA™	Pole and post protection.
	Cable BUFFA™	Low profile galvanized wire rope car park barrier.
10001142	Rigid Post	High-Impact protection.
	Angles & Corners	Completing your car park barrier safety system.
	Accessories	Integrated solutions to complement your car park.

Enhanced Car Park Safety

Carpark Barriers are a type of guardrail system specifically designed to be used in low-speed areas such as car parks, private roads, warehouses and other non-road environments. Ingal Civil Products use a range of options to meet the varied needs of each application which includes semi-flexible posts, restricted space designs, fall protection and balustrade designs.

ZEE-Park®

AS/NZS 1170.1 COMPLIANT

The most versatile car park barrier system available

INTRODUCTION

With a light 'nudge' impact, the ZEE Park® Post deforms elastically within tightly controlled limits. When the force is removed the ZEE Park Post springs back to its original position.

With a more severe impact, the ZEE Park Post yields in a consistent and predictable manner, absorbing much of the vehicle's energy - without overloading the anchor or damaging the structure. The innovative ZEE Park Post permanent deflection is directly proportional to the energy of the impacting vehicle. Individual ZEE Park Posts will only need replacement after a substantial impact, and have been proven to effectively absorb over twice the force proscribed by standard AS/NZS 1170.1 for light traffic areas.

- Fully tested & compliant system for peace of mind.
- Suitable for edge protection close to structures or building facades.
- Low initial deflection
- Yielding design prevents damage to footings with larger impacts.
- Consistent high performance with high containment capacity.
- Single anchor design – easier, cost-effective installation.
- Handrail & Anti-Climb Mesh attachments available for BCA compliance.
- Very low footprint (only 100mm x 200mm).
- 100% Australian Made using Australian Steel & Australian Zinc.

PART NUMBER

ZEE-Park	10007701

DeckGuard

AS/NZS 1170.1 COMPLIANT

Suitable for edge protection in multi-storey carparks

INTRODUCTION

The new ZEE Park® DeckGuard barrier system is an exciting evolution of the proven ZEE Park AS/NZS 1170.1 compliant car park barrier. ZEE Park DeckGuard is designed to allow maximum use of car park floor space, by placing the Flex-Beam guard rail right at the edge of the car park deck. This gives maximum protection with a minimum of space.

The ZEE Park DeckGuard also uses the proven Ezy-Guard post profile, and is a high-strength semi-rigid system. DeckGuard is tested and designed to exceed the force prescribed under AS/NZS 1170.1 for light traffic areas. This is achieved with a single anchor per post.

The ZEE Park is designed to spring under light 'nudge' impacts, but predictably yield under severe impacts, preventing damage to the car park structure.

PART NUMBER

DeckGuard	10008115

Sentinel

AS/NZS 1170.1 COMPLIANT

Suitable wherever high-containment barriers are required

INTRODUCTION

ZEE Park® Sentinel has been tested to the 240kN requirement of AS1170.1 for the ends of down ramps. The new ZEE Park Sentinel barrier system is an exciting evolution of the proven ZEE Park AS/NZS 1170.1 compliant car park barrier.

Until now, bespoke barriers were the only option for these locations. Now, with ZEE Park Sentinel, there is a low-cost proprietary system available. Car parks can now be designed with ease – using ZEE Park for deck perimeters and ramp sides, continuing with ZEE Park Sentinel at the ramp ends, or anywhere else a high-strength barrier system is required.

ZEE Park Sentinel uses a heavier-duty version of the proven Ezy-Guard post profile, and is a high-strength semi-rigid system. Sentinel is tested and designed to exceed the 240kN force prescribed under AS/NZS 1170.1. This is achieved with only two anchors per post.

The ZEE Park is designed to spring under light 'nudge' impacts, but predictably yield under severe impacts, preventing damage to the car park structure. Integrates easily with the Ingal range of car park barriers to create a complete solution.

PART NUMBER

Sentinel	10008112

TruckShield

AS/NZS 1170.1 COMPLIANT

Heavy-duty barrier solution for separation of heavy vehicles

INTRODUCTION

The new ZEE Park® TruckShield barrier system is an exciting evolution of the proven ZEE Park AS/NZS 1170.1 compliant car park barrier. ZEE Park® TruckShield has been tested to the requirements of AS1170.1 for medium traffic areas, and is suitable for freight terminals, logistics facilities, loading docks, or anywhere separation of heavy vehicles and pedestrians is required.

ZEE Park® TruckShield uses a heavier-duty version of the proven Ezy-Guard post profile, and is a high-strength semi-rigid system. Truck Shield is tested and designed to exceed the force prescribed under AS/NZS 1170.1 for medium traffic areas. This is achieved with only two anchors per post.

- Easy installation.
- Australian made.
- Heavy duty car park barrier system.
- Integrates easily with the Ingal range of car park barriers to create a complete solution.
- AS/NZS 1170.1 rating.

PART NUMBER

TruckShield	10008108

ZEE-Park® 1800

Elegantly designed car park barrier protection

INTRODUCTION

An Ingal Spring Steel BUFFA™ is designed to deflect upon impact, reducing the pullout forces on the anchor bolts. The absorption of energy during impact offers a reduced risk of damage to barrier, vehicle and structure.

Classic BUFFA™ Applications:

- Offers protection from glancing blow collisions at low speeds with passenger vehicles.
- Internal and external barrier protection to walls and aluminium cladding in warehouses and logistic depots.
- Perimeter edge and split level protection to multi-storey car parks.
- Ramp protection on multi-storey car parks.
- Protection to high value plant and equipment.
- Head-on impact protection from fork-lift trucks.
- Loading bay ramps.

PART NUMBER

ZEE-Park 1800	10002088

- Compliant to loading requirements of AS/NZS 1170.1 "Type F light traffic" 1500kg vehicle travelling at 2m/s.
- Posts are manufactured from high grade spring steel and heat treated for strength and flexibility.
- Post height – 610mm.
- 1 off holding down bolt per post.
- Available with anti-climb mesh infill and/or handrail extensions.
- Rail can be mounted to either side of the post to maximise floor space.
- Crash tested to verify impact performance.
- Exclusive to Ingal Civil Products.

Column BUFFA™

Support column protection

INTRODUCTION

The Ingal Column BUFFA™ distributes the impact forces evenly onto the spring steel support posts. The posts are designed to deflect, reducing the pullout forces on the anchor bolts. The absorption of energy during impact offers a reduced risk of damage to barrier, vehicle and structure.

Ingal Column BUFFA™ Applications:

- Offers protection from collisions at low speeds with fork-lift trucks or pallet movers.
- Protects lighting columns, structural columns and racking supports in car parks, warehouses and logistic depots.

- Minimum 750mm internal diameter – also available in 1000mm internal diameter.
- Post height - 610mm.
- Rail width – 150mm.
- Posts are manufactured from high grade spring steel and heat treated for strength and flexibility.
- Available as a single, double or triple hoop system.
- Available in full or semi circle units.
- Post supports can be turned inwards to prevent a trip hazard or damage to tyres.
- Exclusive to Ingal Civil Products.

PART NUMBER

1000mm Column BUFFA	10008306
750mm Column BUFFA	10008312

Cable BUFFA™

AS/NZS 1170.1 COMPLIANT

Low-profile car park barrier for light traffic areas

INTRODUCTION

Utilising the same high-strength galvanized wire rope as our Flex-Fence and MASH Flex highway barriers, Cable Buffa has been proven to easily withstand over twice the required impact loads.

Cable Buffa removes the visual bulk of traditional guardrail barriers, and is ideal for locations where a less obtrusive aesthetic is required. Unlike other cable barriers, Cable Buffa does not require drilling through or connecting to supporting columns. Cable Buffa is surface mounted, and simply bolts down to the car park deck.

SPECIFICATIONS

Height Top Cable	720mm
Height Lower Cable	400mm
Minimum Length	5000mm
Max Post Centres	5000mm

- Compliant to loading requirements of AS/NZS 1170.1 "Type F light traffic".
- Utilising off-the-shelf components.
- Lighter visual bulk.
- Does not require drilling through or connecting to supporting columns.
- Bolts down to the car park deck.
- Exclusive to Ingal Civil Products.

PART NUMBER

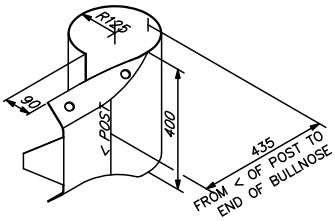
Cable BUFFA	

Angles and Corners

Ingal car park barriers provide safety at every turn

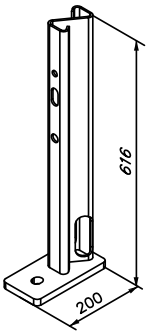
INTRODUCTION

Car park barriers meeting at an angle can be joined using one of our many 45 degree or 90 degree angled sections. These enable use of a continuous barrier system throughout. For more information contact your local Ingal Civil representative.



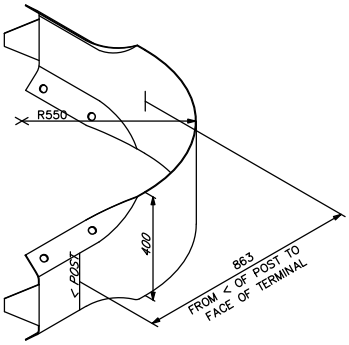
Short Bullnose

Part No. 10000493



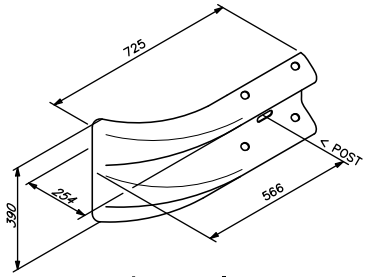
ZEE-Park Post

Part No. 10007635



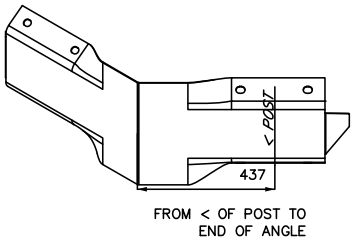
Right Angle Terminal

Part No. 10000501 - Convex
Part No. 10000504 - Concaave



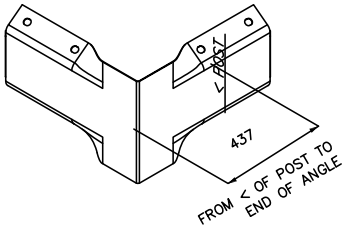
Fishtail

Part No. 10000473



45° Convex Corner

Part No. 10008391 - Convex
Part No. 10008393 - Concave



90° Convex Corner

Part No. 10008395 - Convex
Part No. 10008397 - Concave

Rigid Post

Barrier protection for walls

- Available as C posts or U posts depending upon site requirements.
- Glancing blow collisions at low speeds with light vehicles.
- Internal and external barrier protection for walls in warehouses and logistic depots.

Rigid post consists of C or U shape posts and are particularly suitable for warehouses and industrial applications where guardrail is required.

Steel Bollards

Ingal Steel Bollards are suitable for situations where a hard-stop is required. Particularly suitable for edge-protection of buildings and around sensitive infrastructure (eg electricity boxes, air conditioning, concrete edges, etc).

Rigid Post	10001142

Accessories

Complete integrated solutions for the Ingal range of car park barriers

Complement your car park and industrial barriers with our complete accessory range:

- Post Caps
- Short W-beam Bullnose Ends
- Wheel Stops
- Corner Protectas
- Plastic Rail Caps
- Steel Bollards

Zee-Park® 1800

Zee-Park® 1800

DeckGuard

TruckShield with 1800 Mesh

TruckShield with 1800 Mesh

Column BUFFA

Big Column BUFFA

Installation Rigs

PART No.	PRODUCT	APPLICATION
10002069	Orteco Heavy Duty Post Driver HD1000	Powerful, fast and easy to operate Post Driver. Reduce installation time on large scale guardrail projects.

Orteco®
Heavy Duty Post Driver

Safety barrier installation rig

COST EFFECTIVE	Saves installation time over traditional methods.
POWERFUL	1200 Joules per blow with 570-1180 blows per minute.
EASY TO USE	Intuitive and responsive controls.
ADAPTABLE	Available with any of the following attachments: 254mm Down-the-Hole Hammer, Post extractor kit, 300mm Auger.

- Available attachments.
- 254mm down the hole hammer.
- Post extractor kit.
- 300mm Auger.
- Alternating use of post driver and down the hole hammer with no dismantling.
- Suitable for all guardrail post.

INTRODUCTION

The self-propelled Ingal Heavy Duty Post Driver is specially designed for large-scale guardrail projects that require a heavier and more powerful machine. A few simple commands move the machine from the 'shipping' position to the 'working' position reducing valuable set-up time.

The vertical column can be hydraulically positioned when installing on steep sites and is conveniently lowered during transportation. The column also extends up to 1.4m horizontally allowing the machine to be positioned a safe distance from the edges of steep embankments.

The translation control panel is located away from the vertical column ensuring operator safety and providing precise movement. The hammer is able to drive all types of guardrail posts and is encapsulated and cushioned to reduce noise and vibration.

The down the hole drilling system allows the operator to alternate between drilling and post driving without any dismantling minimising disruption to production.

SPECIFICATIONS

Electric start	12 volt
Fuel tank capacity	60 litres
Noise level	75dbA @ 2600 rpm
HYDRAULIC SYSTEM	
Tank capacity –	160 litres
Pump capacity –	110 litres/min @ 2600rpm
Max. operating pressure	18 Mpa
PILE DRIVER	
Power per blow	1200 Joules
Blows per minute	570 to 1180
Oil flow rate	80 to 110 litres/min
MACHINE DIMENSIONS	
Dimensions	2125mm wide x 2369mm long
Total mass	4000kg
Crawler width	280mm
Max. height in transport	2850mm

ArmorZone™

ArmorBuffa™

ArmorCade™

Highway Guard™

BG800®

Resista Post®

Temporary Barriers

Kona Post®

Temporary Barriers

QUICK REFERENCE GUIDE

PART No.	PRODUCT	APPLICATION
10200041	ArmorZone™ MASH	Crash tested, high performance temporary work-zone barrier protection.
10200043	ArmorZone™ End Treatment MASH	MASH and NCHRP-350 crash tested yellow end treatment.
10200320	ArmorBuffa™ MASH	MASH temporary end treatment for use on F-Type concrete barriers.
10200300	ArmorCade™	Temporary solution for pedestrian, cyclist and vehicular management.
10100914	Highway Guard™ MASH	Portable workzone steel barrier with high performance and low deflection.
10100874	BG800® MASH	Portable steel barrier to protect both motorists and construction workers.
10103702	Resista Post	High performance delineator best utilised in locations with high speed/high impact frequency (eg construction zones, heavy traffic areas and bridges).
10103701	Kona Post®	Quick change delineator, ideal for reoccurring applications.

ArmorZone™

High performance temporary work-zone barrier

MASH TL2 COMPLIANT **NCHRP-350** COMPLIANT

SAFETY	Provides work-zone protection to temporary construction sites and other roadside activities.
ATTRACTIVE	Economical to transport, fast to install and relocate.
SAFE	Crash tested to MASH TL2 and NCHRP-350 standards for speeds up to 70km/h.
RAPID INSTALLATION	Water filled barrier is rapidly deployed by only 2 personnel. Up to 156m transported per truck.

INTRODUCTION

The water-filled nature of the ArmorZone™ barrier simplifies its deployment and transportation while increasing safety during the installation process as the empty barriers only weigh 50 kg and are easily handled by two operators.

The ArmorZone™ barrier has been crash tested at 70 km/h as a longitudinal barrier with terminal ends and accepted by controlling road authorities as a "temporary system". Upon impact with a wide range of vehicles ArmorZone™ safely re-directed them from impact at angles up to 25° and speeds up to 80 km/h (EN1317, TB31, N1). Safe and predictable trajectories were observed during the tests.

ArmorZone™ deployment involves interlocking the 2.16 m long units with a unique connecting pin and filling each barrier with 520L of water. ArmorZone™ can be deployed straight or with low curvature, on either roadside or median applications, in speed zones up to 70 km/h. The ArmorZone™ barrier has many advantages in the market place including high durability, high performance, fast (and safe installation) at a very competitive cost.

ArmorZone™ is accepted by controlling road authorities as a "temporary system". It has been designed with ease of deployment and removal in mind. It excels in durability while performing with a very competitive deflection in its market category. All this being possible due to its unique HDPE formula which places ArmorZone™ in a league of its own as the ideal temporary barrier for the civil construction market.

- Excellent work zone barrier protection.
- Exceptionally good vehicle control and low deflection.
- Simple to use end treatment available.
- Easy install and transportation.
- Smooth surfaces and geometry, more forgiving on vulnerable road users.
- Container "friendly" dimensions allow for effective shipping (84 units fit in a 40' container).
- Stabilised HDPE modules strong enough to absorb nuisance impact without repair.
- Environmentally friendly – 100% recyclable.
- 120m/h deployment rate.

SPECIFICATIONS

Overall Length	2160mm (effective 2000mm)	
Height	870mm	
Width	450mm	
Material	HD Stabilised PE (UV8)	
Connecting Pin	Galvanised Steel	
STANDARD	**NCHRP-350**	**MASH**
Weight	50kg (570kg when full)	56kg (496kg when full)
Water Required	520L (per unit)	440L (per unit)
Deflection	1.5m (50 km/h)	2.16m (50 km/h – TL1)
	2.1m (70 km/h)	4.1m (70 km/h – TL2)
Leading point of need	16m	24m

PART NUMBER

ArmorZone®	10200041
ArmorZone® End Treatment	10200043

ArmorBuffa™

Temporary end treatment for use on F-Type concrete barrier and HighwayGuard steel barrier

MASH TL2 COMPLIANT **MASH TL3** COMPLIANT

SAFETY	MASH TL2 approved (for speed zones up to 70km/h). MASH TL3 approved (for speed zones up to 80km/h).
ADAPTABLE	Designed to perform on a variety of foundations including concrete, asphalt, and any other surfaces capable of bearing the weight of the system.
VERSATILE	Cross slopes of up to 8% (5° or 1:12 slope) can be accommodated with the standard hardware.
ENVIRONMENTALLY FRIENDLY	Manufactured from HDPE and MDPE and any units damaged beyond repair can be recycled, whilst the connector pins, nosepiece and transition are manufactured from steel and can also be recycled.

INTRODUCTION

The ArmorBuffa™ is designed to protect the end of a temporary F-Type concrete barrier and HighwayGuard steel barrier. It is approved for MASH TL2 use (for speed zones up to 70km/h by using 1 yellow and 1 orange element) and MASH TL3 use (for speed zones up to 80km/h by using 3 yellow and 1 orange element).

The innovative ArmorBuffa™ system utilises a Nose Piece, water-filled Elements, Pins, a Transition and mechanical anchors to absorb kinetic energy of impacting vehicles. All Elements are always filled with water.

Like the ArmorZone™ barrier, the ArmorBuffa™ is easy to transport and provides rapid installation with minimal labour. Once in place the ArmorBuffa™ is filled with water, making it quick and simple to deploy on-site with minimal traffic disruption.

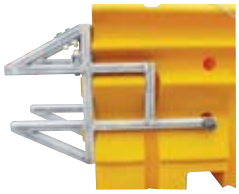
The ArmorBuffa is designed in Australia and made from Australian and New Zealand components, ensuring the same high visibility, reliable durability, high performance and rapid installation as our popular ArmorZone™ barrier.

The system can be repaired in event of minor or nuisance impacts and any components damaged beyond repair can be recycled. In addition, the connector pins, nosepiece and transition are manufactured from steel and can also be recycled.

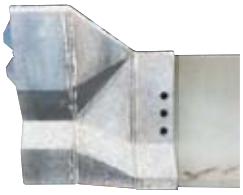
- Compliant to MASH TL2 (up to 70km/h) and MASH TL3 (up to 80km/h).
- Designed to perform on a variety of foundations including concrete, asphalt, and any other surfaces capable of bearing the weight of the system.
- Simple to install.
- Narrow profile, saving space on confined or constricted worksites.
- Easy to transport, fast to install and dismantle.
- Cross slopes of up to 8% (5° or 1:12 slope) can be accommodated with the standard hardware.

Made from Australian and New Zealand Components

ARMORBUFFA ELEMENTS



ArmorBuffa™ Steel Nose Assembly



ArmorBuffa™ Transition F-Type Concrete

ArmorBuffa™ Element – Yellow

ArmorBuffa™ Element – Orange

SPECIFICATIONS

Temporary F-Type Concrete Barrier or HighwayGuard Steel Barrier	TL2	TL3
Nominal Height	1100mm	1100mm
Effective Length	5316mm	9313mm
System Width	525mm	525mm
Liquid Capacity	1400 Litres	2800 Litres
Material	HDPE and MDPE	
Connecting Pin	Galvanised Steel	

ArmorBuffa™ Nose Cover

ArmorBuffa™ Nose Pin

ArmorZone™ Pin

ArmorBuffa™ Asymmetric Pin

PART NUMBERS

ArmorBuffa™ MASH TL3 F-Type Concrete Kit	10200045
ArmorBuffa™ MASH TL3 HighwayGuard Kit	10200047
ArmorBuffa™ MASH TL2 F-Type Concrete Kit	10200052

ArmorCade®

Temporary delineator

ADAPTABLE	Innovative design for adaptable use.
EASY TO STORE	Units are stackable so they are easy to store in a small space.
COST SAVINGS	Low cost of procurement.
EASY TO INSTALL	Secure connection can be installed from straight up to a 90° curve.

INTRODUCTION

The latest solution for temporary pedestrian, cyclist and vehicular management.

ArmorCade is made up of 2.0m long plastic units (MDPE) that join together using integral interlocking lugs to form a continuous delineator.

Through innovative design, ArmorCade can be installed straight or with acute radius curves, up to 90 degrees if required.

- Made in New Zealand for superior quality and durability.
- Low procurement costs.
- Low long distance shipping costs: 144 units fit into a 40' container.
- Low transportation costs: 60 units fit a 6m truck deck.
- Easy installation with no steel pins required.
- Long lifespan due to quality MDPE construction.
- 100% recyclable – no internal or external steel.
- Economical use of water (optional).

SPECIFICATIONS

Secure Connection	Yes
Stackable	Yes
Movable	Yes
Adaptive Radius	Up to 90°
Weight	20kg
Length	2000mm
Height	1000mm
Base Width	380mm

PART NUMBER

ArmorCade®	1020300

HighwayGuard™

TL4 Standard Portable Steel Safety Barrier

MASH TL3 COMPLIANT **MASH TL4** COMPLIANT

HIGH PERFORMANCE	Fully tested and compliant at 58m anchor spacing providing rapid deployment.
FAST INSTALLATION	Flexible deployment, reconfiguration and removal made easy using T-connector.
ADAPTABLE	Single 6m barrier module can be installed in 6, 12 or 18m lengths.
INNOVATIVE DESIGN	Patented T-Connector is fast to install and allows easy installation at challenging site conditions.





INTRODUCTION

HighwayGuard™ MASH 16 TL-3 & TL-4 fully tested and compliant at 58m anchor spacing, providing rapid deployment with less anchoring.

The simple barrier system uses a single 6m module with integrated anchoring, drainage and forklift access points. The integral T-top design provides exceptional MASH TL-3 and TL-4 performance without the need for additional components.

The unique patented T-Connector can be left connected to one piece of barrier. Installation only requires another piece of barrier to be connected (in any direction). Any later barrier alterations, or maintenance works are quick and simple.

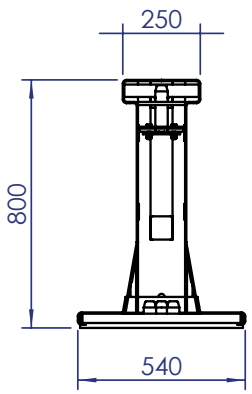
Can be transitioned to existing BG800® steel barrier where required.


SPECIFICATIONS

Module length	6m
Module weight	552kg
T-Connector	43kg
System weight	99kg/m

PART NUMBERS

HighwayGuard 6m module	10100914
Radius Kit	
Mobility wheels	10100834



- Latest generation MASH 16 TL-3 & TL4 barrier.
- Single 6m barrier module can be installed in 6, 12 or even 18m lengths.
- Optional angled barrier and T-Connector components.
- Increased efficiencies in transportation and installation - minimum 192m per 40' container or truck flatbed, with faster on-site installation.
- Narrow footprint, just 0.54m wide.
- Rapid installation with flexible deployment, reconfiguration and removal made easy using the patented T-Connector.
- Optional 2.5, 5 and 10° angle T-Connectors and radius sections- smoothly deal with challenging site conditions (eg, roundabouts or intersections).
- Wheelset option - ability to add wheels for easy barrier mobility.
- Integrated mounting points - quick attachment of screens, fencing, signs or other ancillary traffic equipment.
- Compact dimensions and weight keep logistics costs down and the optional angled sections and T-Connectors ensure ability to smoothly handle difficult geometries.
- Integral T-top designed in - providing exceptional TL-3 & TL-4 performance without additional components.

BG800®

High-Performance Portable Steel Safety Barrier

MASH TL3 COMPLIANT **PAS 68** Security Testing COMPLIANT

EASILY INSTALLED	Unique connector design allows installation of up to 300 metres of barrier per hour – Quicker to install than concrete barrier.
DURABLE	Proven to withstand multiple design impacts without need for major repair or replacement.
COST SAVINGS	Only 90kg/m making it quick to install or remove and economical to transport (up to 4 times more barrier per load than concrete).
VERSATILE	Available in 6 and 12 metre section lengths with special angle sections for tight radii.

INTRODUCTION

BG800 portable steel barrier is the latest in road barrier technology, designed to protect both motorists and construction workers. Rigorously tested to meet the highest demands throughout the world, BG800 has achieved the highest performance levels of any portable steel barrier for NCHRP350 TL-1, TL-2, TL-3 or TL-4, MASH TL-3, EN1317-2 N2 & H2 and Security PAS 68.

BG800's unique stepped profile has proven to reduce damage to both vehicle and barrier during impact, minimising the need for repair or replacement. During impact, BG800 provides an extremely shallow exit angle for the vehicle, minimising the risk of secondary accidents.

BG800's galvanised steel structure offers an expected life cycle of 25 years and with its exceptional durability, the need for replacement through handling or impact damage, unlike similar portable barriers, is greatly reduced.

At only 90kg per metre and with 6 or 12m modules available, up to 216m can be loaded on a truck bed, providing high savings in transportation when compared with similar concrete or steel systems. In addition, BG800's 'Quick-Link' connection allows for rapid installation, at speeds of up to 300m per hour with just three operatives – offering clients and contractors a vast saving in both time and labour resources when compared to conventional high performance portable systems.

Additional options to adapt the barrier for specific requirements:

BG800 Portable

BG800 provides portable protection at work zones as well as emergency protection of bridge parapets and guardrail impact sites. Offering high performance protection with cost-effective transportation and ease of installation. Gates can be included within the runs for providing temporary access during maintenance or construction works.

BG800 Wheeled

Allows for longitudinal or lateral movement of the barrier to accommodate work zone requirements. Ideal for repetitive regular maintenance operations where barrier lengths of 200-500m can be moved short distances.

BG800 Permanent

For use on structures or as a high performance median barrier. The light weight system is ideal for use on structures with weight limits such as bridges. Durable in comparison to guard rail or parapets and can withstand multiple impacts without the need for replacement.

- Tested to MASH TL-3.
- Unique stepped profile with narrow footprint - only 540mm.
- Lightweight and quick install - 90kgs per metre, 300m per hour.
- 6m & 12m section available - up to 144m transported on a single truck.
- Six metre sections with a speedy 'Quick-Link' connection.
- Rapid deployment, installation/ removal.
- Easily relocated to provide positive protection of work areas.
- Relocate locally without need for transportation or lifting equipment.

SPECIFICATIONS

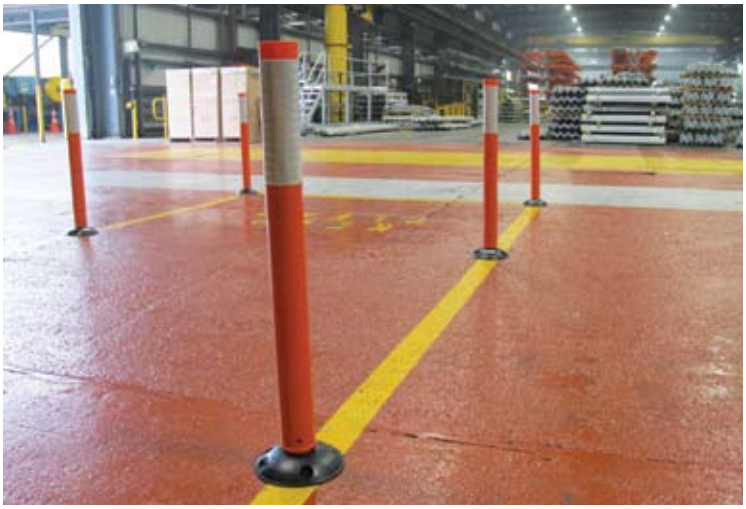
Length:	6m or 12m
Height:	800mm or 920mm
Width:	540mm
Weight:	90kg per metre

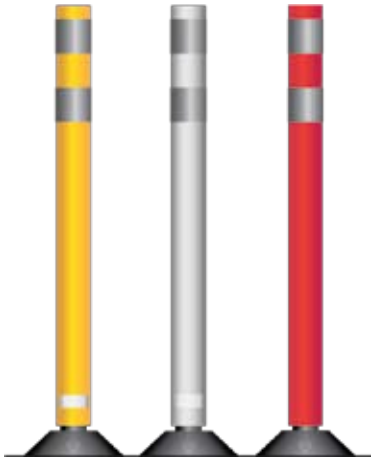
PART NUMBER

BG800 12m	10100874
BG800 6m	10100818

Resista-Post Delineator

High-performance delineator





INTRODUCTION

The Resista-Post High Performance Delineator is an injection molded urethane flexible post that has been tested to withstand an extreme number of high speed impacts. Resista-Post is best utilised in locations with high speed/high impact frequency and is ideal for installation in construction zones, heavy traffic areas and bridges.

Base and anchor options are either a surface mount for asphalt/concrete or a soil anchor. The Resista-Post is easy to install and lasts longer than standard delineators. These features mean it requires less repair labor.

- Tapered one piece urethane design.
- Extreme impact performance.
- 360° visibility.
- Flexible at extreme temperatures.
- High intensity, flexible prismatic reflective sheeting standard.
- Standard post colors: white, yellow, orange.
- Standard reflective colors: silver, amber, orange.
- Custom post colors: blue, green, black, red, dark gray, light gray, yellow-green.
- Various lengths available.

PART NUMBER

Resista-Post	10103702
Base	10103704
Adhesive Pad	10103700
Reflective Sleeve	10103705

Screw Down/ Epoxy Base

Soil Anchor

SPECIFICATIONS

Post Height	914mm
Post Diameter	76mm
Weight	0.95kg
Base Diameter	203mm

KonaPost® Delineator

Quick-change delineator

INTRODUCTION

The KonaPost® is an excellent alternative to traditional orange cones. It is ideal for reoccurring applications where orange cones or markers are often impacted and must be quickly deployed in specific patterns on a regular basis.

The unique design of the KonaPost enables it to take multiple impacts and stay in place. It has been tested to take over 200 direct wheel impacts at 72 km/h. The flexible 152mm plug easily inserts into a hot-dip galvanised steel receptacle that is recessed into the pavement. The posts can be deployed when needed and quickly removed by lifting them out of the pavement receptacles.

The heavy duty KonaPost can be used as a channelising, marking, delineation device in many applications, including:

- Gate closures
- Reversible lanes and lane redirect
- Parking lots and garage environments
- Event management

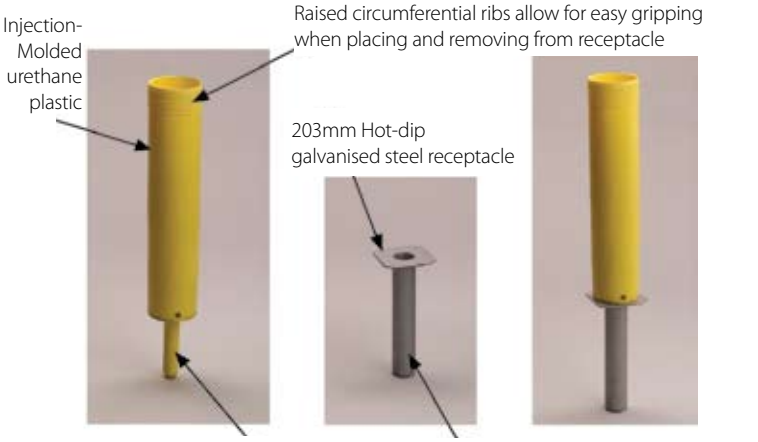
- Extremely impact resistant.
- 360° full visibility.
- No protruding metal parts.
- One piece post construction.
- Withstands extreme temperatures.
- Easy placement.
- Reflective sheeting available.
- Available in white, yellow and orange (custom colors available).

PART NUMBER

Kona Post	10103701
Receptacle	10103703
Receptacle Sleeve	10103705

SPECIFICATIONS

Post Height	483mm
Post Width	102mm
Plug Height	152mm
Receptacle Plate Width	114mm
Receptacle Depth	203mm



Durable plug ensures self-righting, accurate and consistent placement.

Specially designed receptacle tested to stay in place and survive over 200 impacts @ 72 km/h).

Emergency Access Gate

ADAPTABLE	Connections to both concrete and guardrail systems. Multiple opening options – sections hinged or completely removed.
SAFER	Crash tested to NCHRP-350 TL3.
COST SAVINGS	Opens quickly – only two operatives required. Low maintenance.
PORTABLE	Ideal solution for access within temporary construction barriers.

PART No.	PRODUCT	APPLICATION
10100800	BG800 Median Gate	Provides access between temporary or permanent barriers.

BG800 Median Gate

NCHRP-350 TL3 COMPLIANT

Emergency, maintenance or construction access gate

INTRODUCTION

BG800 Gate has been designed as a quick and easy means to provide an open access between temporary or permanent barriers for emergency vehicles or a works access during highways construction.

When in situ the BG800 Gate is a high performance longitudinal barrier meeting the performance requirements for NCHRP 350 and EN1317. However when required, the gate can be opened easily by two operatives within a matter of minutes.

Designed as a modular system, BG800 Gate can provide openings as small as 6m and can be extended using 3m or 6m modules to the required gate size.

Highly durable due to the BG design, the gate has demonstrated that easy opening is still possible after a design impact (2000kg pickup, 25 degrees and 100 km/h). The specially developed wheel sets stored within the gate allow for both longitudinal and lateral movement, providing the operator with multiple opening and storage options. Heavy duty, galvanised steel components offer minimum maintenance requirements with a maximum life expectancy.

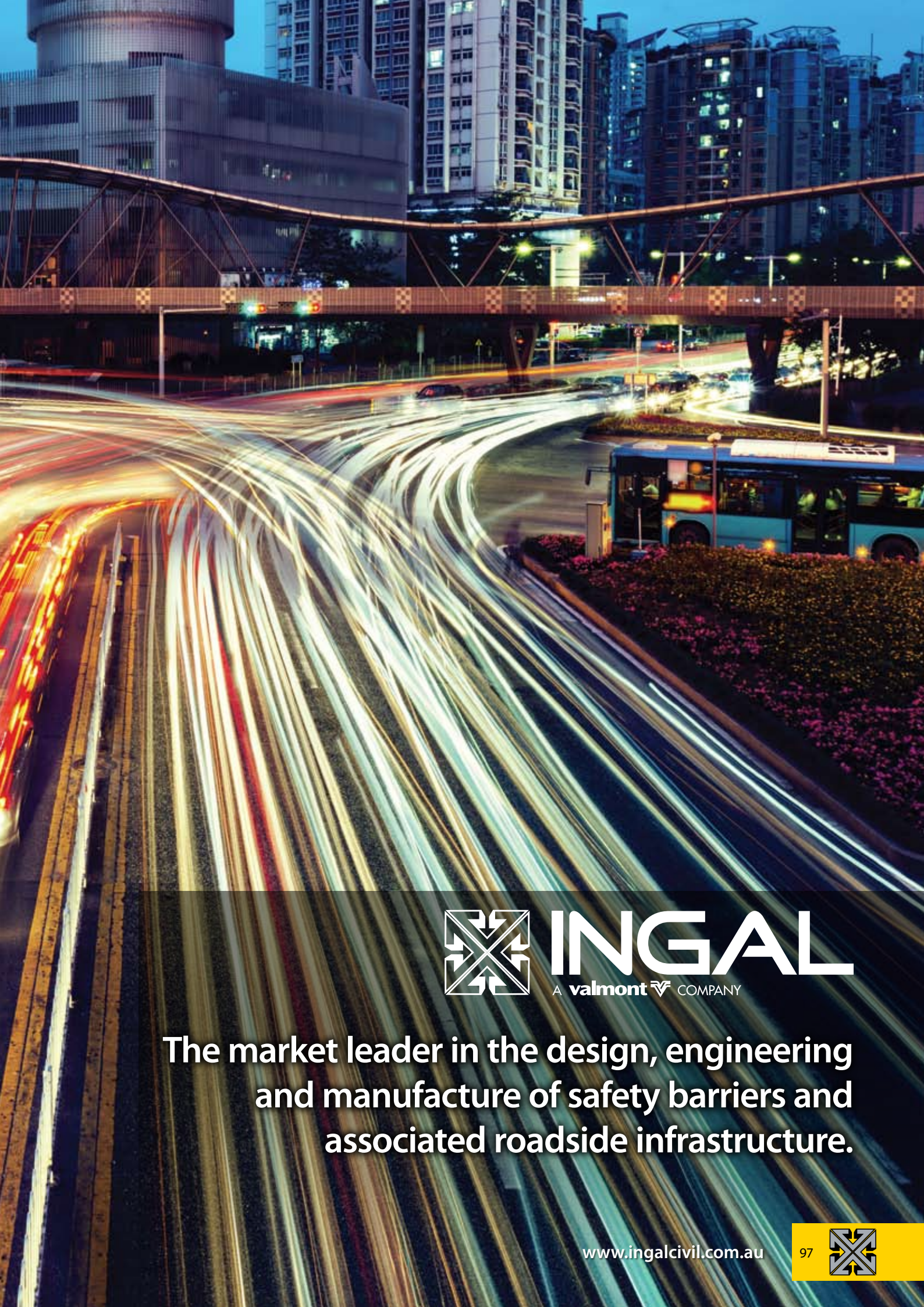
- Durable design – proven to open after 'design' impact.
- Connections to both concrete and guardrail systems.
- Portable solution – used for access within temporary construction barriers.
- Multiple opening options – sections hinged or completely removed.
- Modular 6m sections.
- Low maintenance.
- Opens quickly – only two operatives required.

SPECIFICATIONS

Module Length	6/12/18/24/30
Minimum Opening	4.7m
Maximum Opening	28.7m
Height	915mm
Width at Base	540mm
Width at Top	474mm
Weight (Per Metre)	135kg
Maximum Deflection	1.07m (2000kg, 100km/h @ 25deg)

PART NUMBER

BG800 Gate	10100800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