



# RIGID SAFETY BARRIER 15C

MUNICIPAL  
INFRASTRUCTURE  
TECHNICAL  
SPECIFICATION  
**15 - ROAD SIDE FURNITURE**

Transport Canberra and  
City Services

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# 1 RIGID ROAD SAFETY BARRIER SYSTEMS

## 1.1 General

### 1.1.1 Responsibilities

#### 1.1.1.1 General

Requirement: Provide concrete safety barriers from precast units, fixed forms or slip forming, as documented or as directed. This Specification details the requirements for public domain, Type F and VCB rigid road safety barrier systems. Proprietary systems shall be installed according to the manufacturer's specification.

#### 1.1.1.2 Performance

Requirements: All new road safety barriers must be accepted by RMS for used on classified roads.

### 1.1.2 Cross references

#### 1.1.2.1 Design Standards

General: The following Design Standards are related to this Specification:

MITS 00	Preliminaries
MITS 01	Traffic Management
MITS 10	Concrete works
MITS 11	Pavement marking
MITS 14	Road signs

### 1.1.3 Referenced documents

#### 1.1.3.1 Standards

General: The following documents are incorporated into this Specification by reference:

##### Australian standards

AS 1289	Methods of testing soils for engineering purposes.
AS 1289.5.4.1	Soil compaction and density tests—Compaction control test—Dry density ratio, moisture variation and moisture ratio.
AS 1379	Specification and supply of concrete.
AS 1906	Retroreflective materials and devices for road traffic control purposes.
AS 1906.2	Retroreflective devices (non pavement application).
AS 3610	Formwork for concrete.
AS 3610.1	Documentation and surface finish
AS 3799	Liquid membrane-forming curing compounds for concrete.
AS/NZS 3845	Road safety barrier systems.

## 1.1.4 Standard

### 1.1.4.1 General

Standard: To AS/NZS 3845.

Proprietary products: To *TCCS Products previously considered for use list*

## 1.1.5 Interpretation

### 1.1.5.1 Definitions

General: General: For the purpose of this Specification, the definitions of terms used to define the components of the road reserve are in conformance with AS 1348, *Glossary of Austroads Terms* and AGRD03, the definitions given below also apply:

Rigid road safety barrier system: A road safety barrier system where there is no observable dynamic deflection. The deformation is contained in the impacting vehicle.

## 1.1.6 Hold points and witness points

### 1.1.6.1 Notice

General: Give written notice to the Authorised person so that the documented inspection and submissions may be made to the **Hold point table** and the **Witness point table**.

**Table 15C-1 Hold point table**

Item	Clause title	Requirement	Notice for inspection	Release by
<b>Materials</b>				
15C.1	General - Approved Products	Submit compliance certification	1 week prior to erection	Authorised Person
15C.2	Concrete – Properties	Confirm concrete strength requirements for slip forming	5 working days before commencing works	Authorised Person
<b>Execution</b>				
15C.3	Establishment – Method Statement	Process description for the manufacture, supply and installation of any road safety barrier system	7 working days before commencing works	Authorised Person
15C.4	Establishment – Location of barriers	Safety barrier set out approval	2 working days before construction	Authorised Person
15C.5	Manufacture of precast reinforced concrete – Procedures	Submit process details for the manufacture of precast safety barriers	5 days before commencing manufacture	Authorised Person
15C.6	Manufacture of precast reinforced concrete – Manufacturing records	Submit information on specific precast barriers	3 working days before use	Authorised Person
15C.7	Placing, compacting and finishing concrete – Slip forming	Submit proprietary extrusion machines for approval	5 working days prior to commencing works	Authorised Person

Item	Clause title	Requirement	Notice for inspection	Release by
15C.8	Joints in concrete placed in-situ – Expansion joints	Jointing material for approval	3 working days before ordering	Authorised Person
15C.9	Curing – General	Curing method and materials for approval	3 working days before placing concrete	Authorised Person
15C.10	Signage and line marking at barrier - Removal of temporary traffic control devices	Inspection of permanent works before removal of temporary works	24 hours before removal	Authorised Person

**Table 15C-2 Witness point table**

Item	Clause title	Requirement	Notice for inspection
<b>Execution</b>			
15C.1	Traffic safety – General	Protect concrete barriers from impact by general traffic for a period of 7 days	Progressive
15C.2	Quality requirements – Concrete strength	Strength results to be submitted	Progressive
15C.3	Installation – Dowelled base fixings	Provide dowels fixed in place for inspection	Prior to installing barriers
15C.4	Installation – Compaction of foundations	Provide the compacted base for inspection with relative compaction test results	Prior to installing barriers
15C.5	Installation – Electrical conduits	Location of conduits subject to approval	24 hours before placing conduits
15C.6	Placing, compacting and finishing concrete – Fixed form construction	Immediately carry out any necessary repairs	Progressive
15C.7	Curing – Curing compound	Certificate of compliance required	Prior to use

## 1.2 Materials

### 1.2.1 General

#### 1.2.1.1 Approved products

General: Transport Canberra require that all new safety barrier products must be accepted by Roads and Maritime Services (RMS) NSW for use on classified roads within NSW prior to use in the ACT.

Certification: Submit compliance certification by the manufacturer that the barrier system meets all specified criteria.

This is a **HOLD POINT**.

### 1.2.2 Concrete

#### 1.2.2.1 Properties

Standard: To *AS 1379*.

Concrete: Supply and placement of concrete, steel reinforcement, formwork, tolerances, construction joints and protection conform to *MITS 10 Concrete works* except as specified in this Specification.

Minimum concrete strength: 30MPa at 28 days for cast-in-situ formed concrete or precast concrete.

Slip form strength: Obtain approval for minimum strength for slip forming prior to commencing works.

This is a **HOLD POINT**.

Aggregate size: 20mm maximum nominal size.

Slump: Conform to the following specified slump at the point of placement:

- > Extrusion: 15mm.
- > Slip forming: 25mm.
- > Fixed forms: 75mm.

Ready mixed concrete: If ready-mixed concrete is used, mix and deliver the concrete to conform to *AS 1379*.

### 1.2.3 Reinforcement

#### 1.2.3.1 General

Drawings: Reinforcing steel as shown on the drawings.

Cover: The minimum cover to the nearest concrete surface is 50mm unless documented otherwise on the drawings.

Supports: Do not use wire, timber or coarse aggregate to support reinforcing steel. Use either concrete or plastic.

## 1.3 Execution

### 1.3.1 Provision for traffic

#### 1.3.1.1 General

Requirement: Conform to *MITS 01 Traffic Management*.

### 1.3.2 Site establishment

#### 1.3.2.1 Survey

Requirement: Confirm site surface and benchmarks. Conform to *MITS 00 Preliminaries*.

### 1.3.3 Traffic safety

#### 1.3.3.1 General

Traffic control: To *MITS 01 Traffic Management*.

Material stacks: Locate any temporary stacks of new or surplus material associated with the works clear of the traffic flow and behind the line of the safety barrier system being removed, under construction or to be constructed.

Works program: Manage the sequence for construction to make sure that there are no traffic hazards or safety issues for road users.

Protection from traffic: Protect constructed concrete barriers from impact by general traffic for a period of 7 days.

This is a **WITNESS POINT**.

### 1.3.4 Establishment

#### 1.3.4.1 Method Statement

Submit: Prior to the installation of any road safety barrier system, submit a process description for the manufacture, supply and installation of road safety barrier systems for approval. Include the source of any precast manufacturing or proprietary items.

This is a **HOLD POINT**.

#### 1.3.4.2 Location of barriers

Set out: Set out the work so that all road safety barriers are located to conform to the drawings or as directed. Peg or paint mark the start and finish points and line of safety barrier.

This is a **HOLD POINT**.



## **1.3.5 Manufacture of precast reinforced concrete**

### **1.3.5.1 Precast reinforced concrete**

General: Conform to dimensions and details as shown on the drawings to conform to the requirements for rigid road safety barrier systems in *AS 3845*.

Location of manufacturer: Precast concrete units may be supplied by an offsite manufacturer, or manufactured onsite by the Contractor.

### **1.3.5.2 Procedures**

Method statement for the precast units: Submit the proposed methods of manufacture, including handling, transport, storage and erection, program of manufacture and delivery details.

This is a **HOLD POINT**.

### **1.3.5.3 Manufacturing records**

Records: Submit the following information prior to erecting the precast concrete safety barriers:

- > Unit number or other identification mark.
- > Date and time of casting.
- > Concrete temperature and ambient temperature.
- > Date and time of lifting from the mould.
- > Quality and type of concrete materials.
- > Details of curing prior to lifting from mould.
- > Details of curing while stacked in the casting yard.
- > The date of transport to the site.
- > Any non-conformance or defect and any remedial works carried out.

This is a **HOLD POINT**.

## **1.3.6 Installation**

### **1.3.6.1 General**

Method: Unless otherwise stated on the drawings, the barrier may be precast, constructed in fixed forms or slip-formed to the dimensions and details as shown on the drawings.

### **1.3.6.2 Connections to non-rigid barriers**

Connections: If a non-rigid road safety barrier will be connected to a rigid road safety barrier, cast anchorage assemblies into the road safety barrier to the dimensions and details shown on the drawings. All other components for non-rigid road safety barriers are specified in *MITG 15B Non-rigid safety barrier systems*.

### **1.3.6.3 Preparation of the base**

Cleaning: Clean the base of all loose materials and dust before any works are commenced.

### **1.3.6.4 Dowelled base fixings**

Location: Safety barriers constructed on new or existing pavements.

Cored holes: Provide 25mm diameter 200mm in length dowels in fine concrete or cement-mortar-filled holes at regular staggered spacings to conform to *AS 3845* and as shown on the drawings.

Dowels: Dowel sizing and location as shown on the drawings.

This is a **WITNESS POINT**.

Precast spacings: If precast units are used, accurately align and space the cored holes.

#### **1.3.6.5 Compaction of foundations**

Firm base: Shape and compact the foundation material to form a firm base.

Relative compaction: Other than for barriers constructed on pavement courses, achieve relative compaction of 95% to conform to *AS 1289.5.4.1* for standard compactive effort. Submit test results.

This is a **WITNESS POINT**.

Pavement courses: If barriers placed on pavement courses, compact the foundation to the requirements of the respective pavement course.

#### **1.3.6.6 Electrical conduits**

Cables location: For safety barriers containing street lighting standards, locate the conduit carrying electrical cables in the base rather than in the barrier, as detailed on the drawings, unless otherwise approved.

This is a **WITNESS POINT**.

Keyed conduit trench: Unless shown otherwise on the drawings, the conduit trench forms a key and no dowels are required for slip-formed barriers.

#### **1.3.6.7 Precast safety barrier segments**

Mortar pad: After debonding the concrete surface, construct a (nominal) 10mm cement mortar pad beneath the barrier full width and length.

### **1.3.7 Placing, compacting and finishing concrete**

#### **1.3.7.1 General**

Continuous: Place concrete continuously between the ends of the concrete safety barrier systems or between construction joints or within a precast safety barrier segment.

Placement: Except at properly formed construction joints, do not place fresh concrete against concrete that has taken its initial set.

Compaction: Compact concrete thoroughly.

Formwork design: Conform to *AS 3610 section 4*.

Formwork construction: Conform to *AS 3610.1*.

Concrete finish: Finish surfaces uniform in appearance with a class 3 surface finish to *AS 3610.1* unless otherwise shown on drawings or directed.

Cracks: Construct/supply finished concrete barriers free of any cracks other than of movement joints no wider than 0.05mm at any point on the surface at the completion of the curing period.

Rejected: Barriers with cracks wider than 0.05mm will be rejected.

### **1.3.7.2 Fixed form construction**

Tamping: Tamp unformed surfaces to bring a layer of fines to the surface and then screed to the documented level.

High/low spots: Immediately following compaction and screeding, test unformed surfaces for high or low spots and make any necessary corrections before the concrete hardens.

Repairs: Immediately after stripping the forms, use an approved method to perform any necessary repairs to the formed surfaces.

This is a **WITNESS POINT**.

### **1.3.7.3 Hand finishing**

Concrete finish: If hand finishing is required for slip form construction, provide a barrier of uniform appearance.

### **1.3.7.4 Slip forming**

Submit: Prior to extruding any concrete safety barrier, submit evidence that the proposed proprietary machine can extrude the barrier shape to conform to the specification and drawings.

This is a **HOLD POINT**.

## **1.3.8 Alignment and level**

### **1.3.8.1 Finish and appearance**

Top and face of the barrier: True to line with the top surface of uniform width, free from humps, sags and other irregularities.

### **1.3.8.2 Line and level tolerance**

Design line: Within  $\pm 50$ mm of the plan location as shown on drawings.

Design levels: Within  $\pm 20$ mm of the design levels as shown on the drawings.

### **1.3.8.3 Surface tolerance**

Test:  $\pm 5$  mm surface deviation from the edge of a 3 m straightedge laid on top of or along any face of the barrier except at grade changes or curves in which case the faces are to transition uniformly.

## **1.3.9 Joints in concrete placed in-situ**

### **1.3.9.1 Contraction joints**

Fixed or slip forms: Straight, square ( $\pm 5^\circ$ ) to the line of the barrier.

Depth: 50 ( $\pm 5$ ) mm on all exposed surfaces at 4m spacing.

Method: Sawn or formed.

Sawing: Saw joints before uncontrolled cracking begins and within 12 hours after placing the concrete.

### **1.3.9.2 Expansion joints**

Type: Straight, square ( $\pm 5^\circ$ ) to the line of the barrier.

Width and spacing: As shown on the drawings.

Sealant: Fill with a preformed joint filler of bituminous fibreboard or an approved equivalent.

This is a **HOLD POINT**.

### **1.3.9.3 Pavement joints**

Matching: If the barrier is cast on concrete pavement, continue the contraction, isolation, tied or expansion joints in the pavement through the barrier to form a continuous joint through both structures.

### **1.3.9.4 Adjacent to pavement**

Match: If the barrier is cast adjacent to a concrete pavement, form the contraction joints at 4m centres.

### **1.3.9.5 Precast units**

Connections: Place precast units so that all connections are tight, secure and true in line and level.

## **1.3.10 Curing**

### **1.3.10.1 General**

Method: Cure concrete placed in safety barriers by either steam curing, moisture curing or by spraying an approved curing compound on all exposed surfaces of the fresh concrete.

Submission: Submit the proposed method and materials for curing for approval prior to use.

This is a **HOLD POINT**.

Protection: Protect exposed surfaces from rain or other damage, until hard set has occurred.

Curing time: Maintain the curing membrane intact in a continuous and unbroken film for 7 days after placing the concrete.

Damage: Make good any damage to the membrane by respraying the affected area as soon as the damage occurs.

### **1.3.10.2 Curing compound**

Slip-formed barriers: Provide wax emulsion, hydrocarbon resin or water borne curing compounds in conformance with AS 3799 Class A Type 1, Class B Type 1-D or Class Z Type 1-D respectively.

Compliance: Provide a certificate of compliance for the curing compound from a laboratory with appropriate NATA registration.

This is a **WITNESS POINT**.

Application rate: Apply the curing compound in a fine spray to provide even coverage at a rate of 0.2 l/m<sup>2</sup> or the rate determined on the test certificate to achieve 95 % water retention, whichever is the greater.

Equipment on site: Keep equipment and materials for the curing operations on site at all times during slip-forming of the barrier.

## **1.3.11 Delineators**

### **1.3.11.1 Fixing**

Standards: Conform to *AS 1906.2*.

Method: Fix with brackets to the concrete safety barrier as shown on the drawings.

### **1.3.11.2 Arrangement and colour**

Approaching colour: Arrange the delineators so that drivers approaching from either direction will see only red reflectors on their left side and white reflectors on their right.

## **1.3.12 Signage and line marking at barrier**

### **1.3.12.1 Permanent signage, and longitudinal line marking**

Provide: Provide permanent signage, and longitudinal line marking adjacent to the concrete safety barrier to conform to *MITS 11 Pavement marking* and *MITS 14 Road signs*.

### **1.3.12.2 Removal of temporary traffic control devices**

Inspect: Do not remove temporary traffic control devices installed for the control of traffic before the concrete safety barrier, permanent signing and longitudinal line marking have been inspected and approved.

This is a **HOLD POINT**

## **1.4 Completion**

### **1.4.1 Submissions**

Work as Executed Records: To *MITS 00B Quality Requirements*.

## 2 MEASUREMENT AND PAYMENT

### 2.1 Measurement

#### 2.1.1.1 General

Payments made to the Bill of Quantities: To *MITS 00A General requirements*, this Specification, the drawings and **Pay items**.

#### 2.1.1.2 Methodology

The following methodology will be applied for measurement and payment:

- > Allow for all work, materials, testing and quality assurance requirements in each Pay Item.
- > Traffic control: To conform to *MITS 01 Traffic Management*.
- > Concrete safety barrier: To conform to this Specification and not *MITS 10 Concrete works*.
- > Linemarking and signage: To conform to *MITS 11 Pavement marking* and *MITS 15A Guide posts*.
- > Removal of road safety barriers: To *MITS 15B Non-rigid safety barrier systems*.
- > A concrete barrier transition shall be regarded as any change in shape from the standard section for the concrete safety barrier type.

### 2.2 Pay items

**Table 15C-3 Pay items table**

Item no	Pay items	Unit of measurement	Schedule of rates scope
<b>15C.1</b>	Road safety barrier	Linear metre of barrier constructed, measured along the centre line of the barrier, excluding terminal ends.	All activities associated with the supply and installation of the barrier, including delineators. Separate pay items shall be included for different base conditions.
<b>15C.2</b>	Terminal ends	Each terminal section	All activities associated with the supply and installation of the terminals, including cast in anchorage assemblies for the connection of non-rigid road safety barriers. A separate pay item shall be included in the Contract for each terminal type.



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