TRANSPORT FOR NSW (TfNSW)

SPECIFICATION D&C (TS 03291.2) R132

SAFETY BARRIER SYSTEMS

REVISION REGISTER

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Transport for NSW

SPECIFICATION D&C R132

SAFETY BARRIER SYSTEMS

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VERSION FOR: DATE:

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CLAUSE PAGE

FOREWORD

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BASE SPECIFICATION

This document is based on Specification TS 03291.1:101 (TfNSW R132 Edition 3 Revision 6).

TfNSW SPECIFICATION D&C (TS 03291.2) R132

SAFETY BARRIER SYSTEMS

1 GENERAL

1.1 SCOPE

This Specification sets out the requirements for the construction of new safety barrier systems, including safety barriers, end treatments, transitions and delineation, and the removal of existing safety barrier systems. It does not include the construction of clear areas behind safety barrier systems.

Pedestrian fences have a road safety function but are not road safety barriers. Their construction is not included in the scope of this Specification.

1.2 STRUCTURE OF THE SPECIFICATION

This Specification includes a series of annexures that detail additional requirements.

1.2.1 (Not Used)

1.2.2 (Not Used)

1.2.3 Schedules of HOLD POINTS and Identified Records

The schedules in Annexure R132/C list the **HOLD POINTS** that must be observed. Refer to Specification TS 01572.2 (TfNSW D&C Q6) for the definition of **HOLD POINTS**.

The records listed in Annexure R132/C are **Identified Records** for the purposes of TS 01572.2 (TfNSW D&C Q6) Annexure Q/E.

1.2.4 Planning Documents

The PROJECT QUALITY PLAN must include each of the documents and requirements listed in Annexure R132/D and must be implemented.

In all cases where this Specification refers to the manufacturer's recommendations, these must be included in the PROJECT QUALITY PLAN along with any applicable TfNSW requirements.

1.2.5 Referenced Documents

Standards, specifications and test methods are referred to in abbreviated form (e.g. AS 2350). For convenience, the full titles are given in Annexure R132/M.

1.3 DEFINITIONS

The terms "you" and "your" mean "the Contractor" and "the Contractor's" respectively.

The following definitions apply to this Specification.

(a) **ASHTAS**: Austroads Safety Hardware Training Accreditation Scheme.

(b) **Crash cushion**: See "end treatment".

(c) **Delineation unit**: Delineation refers to treatments which enhance the visual definition of the roadway operating area. In the context of this Specification, a delineation unit is either:

- a retroreflector fixed to a mounting plate attached to a road safety barrier, or
- a retroreflector attached to, or placed immediately in front of, an end treatment.

(d) **Departure end treatment**: An end treatment for a safety barrier system of a type which is used only at the departure end with respect to the direction of flow of traffic.

(e) **Device**: A generic term used to refer to a safety barrier, an end treatment or a transition. In this context, a device is usually part of a safety barrier system.

The term is also used to describe a type of retroreflector. Refer to AS/NZS 1906.2 for further information.

(f) **End treatment**: A device to protect vehicle occupants from injury in an impact with the end of a safety barrier. End treatments can be either leading end treatments or departure end treatments.

(g) **Joint**: Three types of joints are used in concrete road safety barriers:

Construction joints are provided for the convenience of construction and their presence must not impair the load-carrying capacity and serviceability of the structures.

Contraction joints are joints provided to control shrinkage cracking without impairing the strength of the structure.

Movement joints (also called expansion or isolation joints) are provided between portions of a structure or between adjacent structures to permit relative movements between the portions or structures on either sides of the joints.

Reinforcing steel usually continues through construction and contraction joints but not through movement joints. Movement joints may include dowels or other items designed to limit relative movements in some directions.

(h) **Leading end treatment**: An end treatment at the end of a safety barrier which faces oncoming traffic.

(i) **List of accepted safety barrier products**: The list of road safety barrier products that have been accepted by the Transport for NSW for use on classified roads. For a copy of this list, refer to Clause 2.1. The date of issue of this list is as shown.

(j) **Manufacturer's recommendations**: The specification, installation manual and drawings for a specific proprietary safety barrier system or device, prepared by or for the manufacturer, detailing the components, the system or device, and the methods and/or procedures for installation.

(k) **Nested rails**: Two or more steel rails erected together (one inside the other) to increase stiffness. Nested rails share bolts.

(l) **Safety barrier system**: A longitudinal structure whose prime purpose is to restrain and/or redirect in a controlled manner vehicles which are out of control. A safety barrier system includes one or more safety barriers with associated end treatments and transitions.

(m) **TfNSW requirements**: When used in relation to a proprietary products, this phrase refers to any specific requirements for the product included in the TfNSW's acceptance advice to the supplier. It is a requirement of each acceptance that these requirements be made known to any purchaser of the product for use on the NSW classified road system.

(n) **Safety barrier**: That part of a safety barrier system other than end treatments and transitions.

(o) **Terminal**: See "end treatment".

(p) **Transition**: A connecting device to provide effective continuity of the protection offered by a safety barrier between safety barriers of different properties or dimensions. The part of a safety barrier system with varying properties such as stiffness and dimensions, between and linking safety barriers with different properties or dimensions. A transition may also link or connect a safety barrier to a fixture.

1.4 TRAFFIC MANAGEMENT

On a road open to traffic, you must implement a suitable traffic management plan, conforming to Specification TS 03401.2 (TfNSW D&C G10), to shield any partly dismantled or partly constructed safety barrier system or any safety barrier system without fully operational end treatments.

Should you wish to vary this requirement, you must provide to the Principal full details of your proposals to protect the passing traffic. Your submission must include risk assessment.

HOLD POINT

Process Held:	On a road open to traffic, allowing any safety barrier system which does not have fully operational end treatments to be unshielded.
Submission Details:	Submit, at least 3 working days before the proposed exposure of the safety barrier system without fully operational end treatments, full details of your proposals together with a risk assessment of your proposals.
Release of Hold Point:	The Nominated Authority will examine the proposals and the associated risk assessment prior to authorising the release of the Hold Point.

On a road open to traffic, you must consider the locations of any temporary stacks of new or surplus materials or components when preparing your traffic management plan in accordance with Specification TS 03401.2 (TfNSW D&C G10) .

If stacks are located behind a serviceable road safety barrier system, the clear space between the road safety barrier system and the stack must allow for the dynamic deflection of the system and be at sufficient distance from the ends of the system to allow the proper functioning of the end treatments.

2 COMPONENTS FOR SAFETY BARRIER SYSTEMS

2.1 STANDARDS

Road safety barrier systems must comply with this Specification, the manufacturer's recommendations along with any applicable TfNSW requirements, or the Design Documentation drawings, as applicable.

All road safety barrier systems must have been accepted by the Transport for NSW for use on classified roads. Refer to TS 00028 - for a full list of TfNSW accepted safety barrier products. TS 00028 can be accessed via the Transport Standards Portal https://standards.transport.nsw.gov.au/

Their manufacture, supply and construction must comply with this Specification and:

(a) for public domain systems, the TfNSW Model Drawings; or

(b) for proprietary systems, the manufacturer's recommendations and any TfNSW requirements for the product,

as applicable.

2.2 IDENTIFICATION

Mark on any steel rails, precast concrete segments and all plastic components of safety barrier systems and devices unobtrusively and permanently in text not more than 20 mm high, the following information:

(a) name of the manufacturer;

(b) batch number, or date of manufacture;

(c) strength grade and base metal thickness of the steel rails.

2.3 CERTIFICATES OF COMPLIANCE

At least seven (7) days prior to the proposed use of any materials and components supplied by you, your Quality Manager must certify that the materials and components supplied comply with the requirements of this Specification. Support this statement with any relevant test reports and a copy of your verification checklist.

For galvanised steel components, include a manufacturer's certificate of compliance certifying that the zinc coating mass is in accordance with the requirements of AS/NZS 4680, or, for components of proprietary safety barrier systems or devices, the manufacturer's recommendations and any specified TfNSW requirements.

2.4 STEEL

2.4.1 Properties

Steel for the safety barriers must comply with the following:

Item	Standard	Requirement
Posts and blockouts	AS/NZS 1594	Grade HA 300
Rails and rail stiffening pieces	AS/NZS 1594	Grade HA 350, 2.7 mm base metal thickness unless shown otherwise on the Design Documentation drawings
Strut and yoke	AS 1163 and AS/NZS 3678	Tubes to be Grade C350. Yoke to be fabricated from Grade 250
Tubes for breakaway posts and soil plates	AS/NZS 1594	Grade HA 250
Base plates	AS/NZS 3678	Grade 250

For proprietary products, steel must comply with the manufacturer's recommendations and any TfNSW requirements.

2.4.2 Bolts, Nuts and Washers

Bolts, nuts and washers must comply with the details shown on the Design Documentation drawings or the manufacturer's recommendations and any TfNSW requirements.

2.4.3 Protective Treatment

Unless stated otherwise in the manufacturer's recommendations and any TfNSW requirements for a specified proprietary safety barrier system or device, the surfaces of all ferrous metal components including posts, blockout pieces, rail elements, anchor plates, connectors and end treatment pieces must, after fabrication, be treated in accordance with AS 1627.4 or AS 1627.5, and finished by hot-dipped galvanising in accordance with AS/NZS 4680.

Galvanise all ferrous bolts, nuts and washers in accordance with AS 1214.

2.4.4 Curving Steel Rail

Where a radius of less than 45 m is specified, curve the steel rail at the factory. Carry out the curving operation in a manner that will not result in damage to the galvanising.

Clearly mark the curve radius in a permanent manner on the rear face of factory curved steel rail.

2.4.5 Wire Rope

Wire rope for post and rail end treatments must comply with AS 3569 and the details shown on the Design Documentation drawings.

Wire rope used in proprietary systems must comply with the manufacturer's recommendations and any applicable TfNSW requirements.

2.5 CONCRETE AND MORTAR

Unless stated otherwise in the manufacturer's recommendations and any applicable TfNSW requirements for a specified proprietary safety barrier system or device, or in Clause 4.3 for a concrete safety barrier system or device, the supply, placing and curing of concrete and mortar must comply with Specification TS 03264.2 (TfNSW D&C R53).

If steam curing is nominated, submit such details as part of your PROJECT QUALITY PLAN (refer Annexure R132/D).

2.6 PLASTIC

Plastic components must comply with the manufacturer's recommendations and any applicable TfNSW requirements or the Design Documentation drawings, as applicable.

2.7 ALUMINIUM

Sheet aluminium for delineator mounting plates for concrete road safety barriers must comply with AS/NZS 1734. Sheet must be alloy designation 1150 and anodised black in accordance with AS 1231. Anodising thickness grade must be AA15.

2.8 RETROREFLECTIVE MATERIALS

Retroreflective materials and combination of fluorescent/retroreflective materials must comply with AS 1906.1 or AS 1906.2 as appropriate. Colour testing for fluorescent material in daylight must be carried out by the double monochromator method.

2.9 POWDER COATING

Powder coating must comply with AS 4506.

2.10 TIMBER

Timber posts and blockout pieces where specified for terminals must be strength grade F8 Australian Slash Pine, preservative treated to hazard level H4 in accordance with AS 1604.1. Preservative treatment must be carried out using a vacuum/pressure autoclave process in a State Forests of NSW approved facility. The preservative used must not contain any chromium or arsenic. After treatment, the timber must not be resawn, dressed, planed or otherwise have its original dimensions altered.

Address the hazards associated with timber preservatives and treated timber to comply with Specification TS 02338.2 (TfNSW D&C G22) and comply with WorkCover NSW Code of Practice for the Safe Handling of Timber Preservatives and Treated Timber.

3 REMOVAL OF SAFETY BARRIER SYSTEMS

3.1 REMOVAL - SCOPE

Removal of an existing installed safety barrier system includes:

(a) dismantling or demolition of safety barriers, transitions and end treatments;

(b) extracting all posts, anchors and other in-ground components and materials;

(c) removing all components and waste materials from the Site;

(d) cleaning, backfilling and mechanically compacting all excavations and holes formed by the extraction of posts, anchors and other in-ground components and materials; and

(e) stacking or disposing of components and waste materials.

3.2 COORDINATION AND SEQUENCE OF WORK

Where the safety barrier system being removed is on a road open to traffic, coordinate the removal with other work at the site to eliminate or minimise the exposure of an incomplete safety barrier system to traffic.

If practicable, commence removal of a safety barrier system from the departure end (remote from the approach of traffic) to improve traffic safety.

3.3 POST HOLES

Remove all redundant posts, anchors and other in-ground components by extraction or excavation. Following removal of the posts, clean out and backfill the holes. Backfilling and compaction of holes

must proceed in 150 mm layers using similar materials to existing surrounding layers. Compact backfill to not less than the density of the surrounding layers.

3.4 STACKING OR DISPOSING OF COMPONENTS

Temporary stacking of materials on site must comply with Clause 1.4.

All surplus materials resulting from removal of safety barrier systems become your property, and must be removed from the site.

4 CONSTRUCTION OF SAFETY BARRIER SYSTEMS

4.1 CONSTRUCTION - GENERAL

Construction of safety barrier systems includes supply, delivery, handling and assembly of components and devices, setting out, and supply and installation of delineation.

From 1 July 2024, all permanent safety barrier systems and device installations, maintenance and repairs must be undertaken by ASHTAS Operative accredited individuals. It is recognised that there may be circumstances where meeting the 1 July 2024 Operative accreditation deadline may not be feasible for **all** members of a work crew. Therefore, TfNSW is offering a six month transition period to 31 December 2024 for such circumstances.

Plan and execute your work in a manner that prevents damage to underground and above ground facilities such as utilities, services, structures, pavements, vegetation, etc.

Unless stated otherwise in the manufacturer's recommendations or shown on the Design Documentation drawings, construct safety barrier systems with post supports with the posts vertical. Construct other safety barrier systems with the upright axis normal to the surface at the front of the barrier.

Construct the safety barrier system to form a smooth line vertically and horizontally, when viewed along the line of the system, free from humps, sags, or other irregularities, within tolerances.

Any component of a safety barrier system must not be welded or flame cut in the field under any circumstances. Welding and flame cutting in a workshop may be undertaken only where shown on the Design Documentation drawings or in accordance with the manufacturer's recommendations.

Record details of any non-standard materials or installation as nonconformities in your Quality Records.

4.1.1 Damage

Transport, handle and install components of safety barrier systems to avoid damage.

Where damage occurs, address the nonconformity in accordance with TS 01572.2 (TfNSW D&C Q6).

After installation, components must not be left with splits, burrs, or sharp edges.

Repair any minor damage to galvanising in accordance with Appendix E of AS/NZS 4680 immediately, if practicable, and in any case within 24 hours, using at least two coats of a zinc-rich paint in accordance with AS/NZS 3750.9. Match the colour of the original surface either directly or

by applying a further compatible treatment. Restrict this method of repair to individual areas not exceeding 40 cm^2 for any point repaired and a total 0.1% of the surface area of any face for multiple repairs.

4.1.2 Setting out

Survey work must comply with Specification TS 01456.2 (TfNSW D&C G71).

Install pegs in the ground (or mark with paint on hard ground) to mark the start and finish points and line of safety barriers, transitions and end treatments including the line of flare if applicable, before commencing construction. Measure offsets for flares from a line parallel to the adjacent lane line.

HOLD POINT

Process Held:	Installation of safety barrier system.
Submission Details:	Notification that the set out is in accordance with this Specification, the Design Documentation drawings and the manufacturer's recommendations, at least two full working days before the proposed commencement of installation of posts or assembly of components or devices, or commencement to place concrete, whichever is earlier.
Release of Hold Point:	The Nominated Authority will inspect the set out of the safety barriers prior to authorising the release of the Hold Point.

4.1.3 Sequence of Work

Where a safety barrier system is being constructed on a road open to traffic, commence the work at the end closest to approaching traffic, except where the barrier connects at its departure end to a fixed object such as an existing barrier or the end of a bridge or tunnel.

Commission end treatments and transitions at the earliest practicable time. Provide temporary end treatments until the permanent treatment is complete.

4.2 POST AND RAIL SAFETY BARRIER SYSTEMS

4.2.1 Installation of Posts - Method Constraints

Where the post is to be installed through a bound pavement layer, , or when installing the posts for a Modified Eccentric Loader Terminal (MELT), carry out excavation or preboring to achieve a minimum hole diameter of 400 mm. Extend this hole diameter at least to within 300 mm of the level of the bottom of the installed post.

Locate each hole so that the post will be positioned centrally or towards the nearest traffic lane in the prebored hole.

Backfill around the steel tubes at Posts Nos 1 and 2 in a Modified Eccentric Loader Terminal (MELT) must be clean, well graded, granular material. Do not add cement to this backfill.

Backfill around other posts must be clean, well graded, non-cementitious granular material or material obtained from excavating the post holes, provided that any different material types from within a hole are placed to match surrounding layers.

4.2.2 Installation of Posts - Acceptance Criteria

Installation of the posts must comply with the following requirements:

(a) The posts must be installed to the depth, line and spacing shown on the Design Documentation drawings, and to the tolerances in Clause 4.5;

(b) The installation process must not cause any structural damage to the post, including any soil plates attached to the post.;

(c) The installation must not cause any damage to the pavement beyond 100 mm from any part of any post, including any soil plate attached to the post;

(d) When a lateral force of 1 kN is applied in any direction within the top 200 mm of an installed post but before the rail is secured, the movement of the post at ground level must be not more than 3 mm;

(e) Backfill material around the steel tubes and soil plates of gating leading end treatments, and at Posts Nos 1 and 2 in a Modified Eccentric Loader Terminal (MELT), must be compacted to a minimum 95%relative compaction, measured in accordance with TS 02795.28 (Test Method TfNSW T166);

(f) The disturbed pavement or ground around a post must be trimmed and compacted to a dense, tight, smooth and sealed condition so that resistance to water penetration is similar to that of the adjacent surface.

4.2.3 (Not Used)

4.2.4 (Not Used)

4.2.5 Cables in End Treatments

Tension cables in end treatments by tightening the nuts at both ends of each cable to 50 Nm as part of the construction of end treatments.

Maintain tension in cables in end treatments until Construction Completion, and keep the nuts at both ends tightened to 50 Nm.

4.3 CONCRETE SAFETY BARRIER SYSTEMS

4.3.1 General

Construct concrete safety barrier systems using either precast segments, by placing concrete using fixed forms or by slipforming, or a combination of these methods.

4.3.2 Preparatory Work on a Rigid Pavement (Concrete Surface)

Prior to constructing any part of a concrete safety barrier system on a concrete surface, you must:

(a) where you intend to use fixed forms or slipforming,

(i) fill each joint in the concrete surface on the line of the barrier with a bead of silicone sealant, extending the full width and a minimum of 100 mm outside both edges of the base of the safety barrier system, and forming a convex surface wholly proud of the plane of the pavement;

(ii) after filling each joint as in (i) above, debond the concrete surface on the line of the barrier by applying a uniform cover of curing compound at the rate of 0.3 litre/m^2, extending the full width and a minimum of 100 mm outside both edges of the base of the safety barrier system; and

(b) where you intend to use precast safety barrier system segments, after debonding the concrete surface, construct a (nominal) 15 mm cement mortar pad beneath and for the full width and length of the barrier system.

4.3.3 Joints in Concrete Placed Insitu

For concrete placed insitu (either using fixed forms or by slipforming), control the shrinkage cracking by sawing or forming contraction joints. Contraction joints must be straight, square to the line of the barrier, 50 mm deep, and spaced at intervals of not more than 4.5 m along the barrier.

Where you elect to use sawing to control cracks, carry out sawing before uncontrolled cracking begins, and in any case, within 12 hours after placing the concrete.

Construct movement joints where shown on the Design Documentation drawings. Movement joints must be straight, square to the line of the barrier, and 6 mm wide. Fill movement joints with a preformed joint filler complying with Specification TS 03322.2 (TfNSW D&C 3204).

Where a concrete safety barrier system is cast or slipformed adjacent to or on top of a concrete pavement base layer, the same type of movement or contraction joint in the concrete base must be made in the safety barrier system and located to form a continuous joint through both structures.

4.4 WIRE ROPE SAFETY BARRIER SYSTEMS

Construct wire rope safety barrier systems in accordance with the manufacturer's recommendations and any applicable TfNSW requirements. All posts must be coloured white.

Where the horizontal radius of the barrier is less than 200 m or the vertical curvature at a sag is such that K (which is the length of the vertical curve measured in metres divided by the change in grade expressed as a %) is less than 30 m, do not install a wire rope safety barrier system.

4.5 CONSTRUCTION TOLERANCES

4.5.1 General

Unless stated otherwise in the manufacturer's recommendations and any applicable TfNSW requirements for a particular proprietary safety barrier system or device, tolerances for construction of all safety barrier systems and devices must be as follows:

(a) For height of barrier: ± 20 mm;

(b) For line of safety barrier system: ± 20 mm in plan view; and

(c) For departures from the upright axis (vertical or normal to the surface as applicable - see Clause 4.1): ± 15 mm at the top of the barrier.

The height must be measured vertically for systems constructed with vertical posts and normal to the road surface for other systems. Measure the height as follows:

(i) where the barrier is within the pavement, from the pavement surface;

(ii) where the barrier is adjacent to the pavement, from the line of pavement crossfall extended to the barrier line; and

(iii) for all other circumstances, as shown on the Design Documentation drawings.

Do not take into account local surface level deviations with maximum horizontal dimensions of 2 m when measuring heights.

Do not exceed the height tolerance on the basis of producing a straight line along the top of a barrier.

In addition to the above, the tolerances stated in Clauses 4.5.2, 4.5.3 and 4.5.4 will also apply as appropriate.

4.5.2 Post and Rail Safety Barrier Systems

Refer to Figure R132.1.

The tolerance on post spacing must be plus or minus 25 mm. The deviation of the top of any post from a straight line joining the tops of the posts on either side must not exceed 10 mm, after allowing for horizontal and vertical curves

When the barrier is erected, the maximum combined tolerance for rotation in plan of the post and blockout piece must be 30 mm, except that this may be increased to 60 mm for an isolated post where separated by at least 8 m from another post with a rotation in plan beyond 30 mm.

Where the rail is supported on a shelf angle, there must be no horizontal or vertical gap between the rail and the inner faces of the shelf angle.

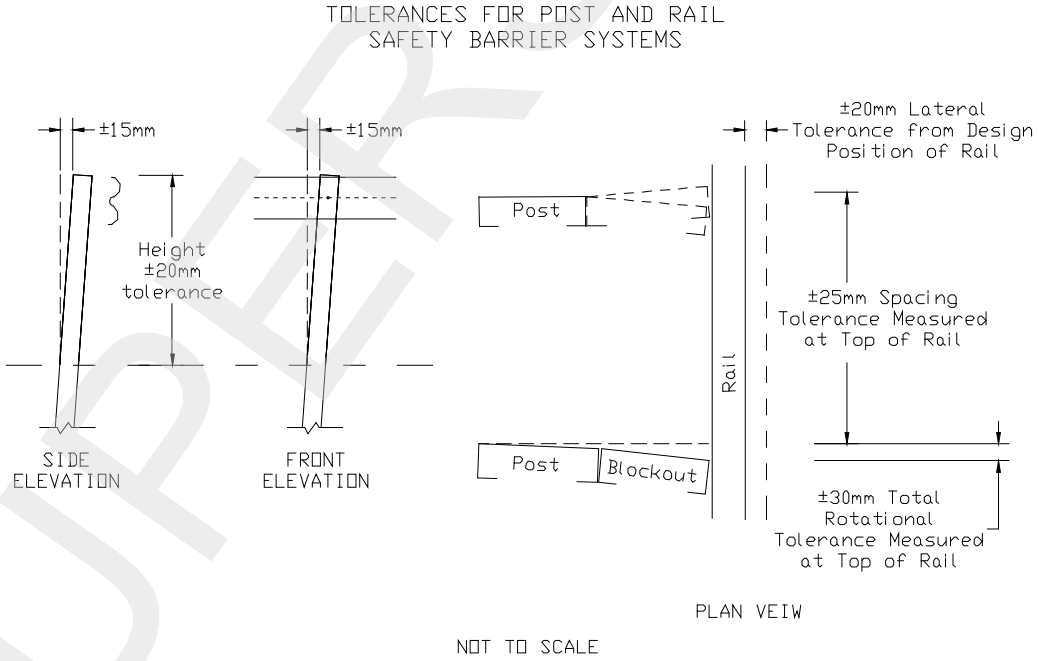

Figure R132.1 – Tolerances for post rail safety barrier systems

4.5.3 Concrete Safety Barrier Systems

Face steps, including at construction joints, must not exceed the limits in Table 3.4.2 in AS 3610 for Class 3 surface finish, *viz* 5 mm for 100% of readings and 3 mm for 80% of readings.

The deviation from any specified plan or cross-sectional dimension must not exceed 1/200 times the specified dimension, or 5 mm, whichever is the greater.

The deviation of any point from a straight line joining any two points on top of the barrier must not exceed 1/250 times the length of the line or 10 mm, whichever is the greater, after allowing for horizontal and vertical curves.

Surface undulations on the faces of a barrier must not exceed the limits in Table 3.4.2 in AS 3610 for Class 3 surface finish, *viz*:

Length of Straight Edge	**Percent of Readings**	
	80%	100%
300 mm	3 mm	4 mm
1,500 mm	5 mm	7 mm

Any offset between the line of an existing joint in a concrete pavement base layer and the line of the corresponding joint in the concrete safety barrier system placed insitu adjacent to or on top of the concrete pavement base layer must not exceed 15 mm at the bottom of the barrier.

The line of a transverse joint must not deviate by more than 10 mm from a line comprising a series of contiguous straight lines on the surfaces of the barrier. Contraction joints must not deviate more than 5° from the square to the line of the barrier and be 50 (± 5) mm deep. Movement joints must not deviate from the square to the line of the barrier by more than 5° and the width must be within – 0, + 2 mm of the specified width.

4.5.4. Wire Rope Safety Barrier Systems

Comply with the tolerances specified in Clause 4.5.1, the manufacturer's recommendations and any applicable TfNSW requirements.

4.6 DELINEATION

Supply delineation units and mount them on safety barrier systems at locations and spacings as shown on the Design Documentation drawings.

Except on a concrete safety barrier, arrange delineation units so that drivers approaching from either direction will see only:

(a) red retro-reflectors on their left;

(b) white retro-reflectors on their right on two-way carriageways; and

(c) yellow retro-reflectors on their right on one-way carriageways and medians separating traffic in opposing directions.

The retro-reflectors must be either discrete device type retro-reflectors or sheeting type retroreflectors complying with AS 1906.2.

Fix slash markers G9-257(L) or G9-257(R) as appropriate to end treatments for post and rail safety barriers. Remove any manufacturer's labels or markings.

Sheeting must be Class 1 in areas without roadway lighting and Class 1W in areas which are lit.

Retro-reflectors on concrete safety barriers must be as shown on TfNSW Model Drawing R0720 – 06.

The combination fluorescent/retro-reflective sheeting must comply with AS 1906.1 for Class 1 in areas without roadway lighting and for Class 1W in areas which are lit.

Fasten the base plate to the top of the barrier using an epoxy adhesive formulated for the purpose. Use the adhesive in accordance with the manufacturer's recommendations and any applicable TfNSW requirements.

Safety barrier delineators are to be spaced to comply with AS 1742.2 or at 20 metre centres, whichever gives the closer spacing.

4.7 WASTE

Recycle, reuse or dispose of all surplus material, rubbish and other debris in accordance with the requirements of Specification TS 01450.2 (TfNSW D&C G36).

ANNEXURES R132/A TO R132/B – (NOT USED)

ANNEXURE R132/C – SCHEDULES OF HOLD POINTS AND IDENTIFIED RECORDS

Refer to Clause 1.2.3.

C1 SCHEDULE OF HOLD POINTS

Clause	Description
1.4	Exposure of traffic to a barrier without operational end treatments.
4.1.2	Setting out.

C2 SCHEDULE OF IDENTIFIED RECORDS

The records listed below are Identified Records for the purposes of TS 01572.2 (TfNSW D&C Q6) Annexure Q/E.

Clause	Description of Identified Record
2.3	Statement that the materials and components comply with the requirements of this Specification, supported by test reports and a copy of your verification checklist.
4.1	Details of non-standard materials or installation.
4.2.1	The locations at which you consider that ground conditions are such that 400 mm diameter holes are necessary

ANNEXURE R132/D – PLANNING DOCUMENTS

Refer to Clause 1.2.4.

The following documents are a summary of documents that must be included in the PROJECT QUALITY PLAN. The requirements of this Specification and others included in the deed must be reviewed to determine additional documentation requirements.

Information to be supplied by you as part of the PROJECT QUALITY PLAN must include, but not be limited to, the following:

Clause	Description
1.2.4	Copies of the manufacturer's recommendations and any TfNSW requirements for the product for each proprietary system to be used.
2.4	Details of proposed steam curing of concrete.
4.1	Precautions to prevent damage to underground and above ground facilities (utilities, services, structures, etc).
4.1.4	Procedure to provide temporary shielding to end treatments on roads open to traffic.
4.2.2	Details of driving equipment and helmet proposed for driving steel posts, plus procedure to prevent damage to posts if installing by driving.

ANNEXURES R132/E TO R132/L – (NOT USED)

ANNEXURE R132/M – REFERENCED DOCUMENTS

Refer to Clause 1.2.5.

TfNSW Specifications

TS 03401.2 (TfNSW D&C G10)	Traffic Management
TS 02338.2 (TfNSW D&C G22)	Work Health and Safety (Construction Work)
TS 01450.2 (TfNSW D&C G36)	Environmental Protection
TS 01456.2 (TfNSW D&C G71)	Construction Surveys
TS 01572.2 (TfNSW D&C Q6)	Quality Management System (Type 6)
TS 03264.2 (TfNSW D&C R53)	Concrete for General Works
TS 03322.2 (TfNSW D&C 3204)	Preformed Joint Fillers for Concrete Road Pavements and Structures

TfNSW Test Methods

TS 02795.28 (TfNSW T166)	Determination of relative compaction

TfNSW Model Drawings for Each Public Domain System or Device

R0720 - 06	Concrete Barrier Delineation Unit

Australian Standards

AS 1163	Structural steel hollow sections
AS 1214	Hot-dip galvanised coatings on threaded fasteners (ISO metric course thread series)
AS 1231	Aluminium and aluminium alloys – Anodic oxidation coatings
AS/NZS 1594	Hot-rolled steel flat products
AS 1627.4	Metal finishing – Preparation and pretreatment of surfaces Part 4: Abrasive blast cleaning of steel
AS 1627.5	Metal finishing – Preparation and pretreatment of surfaces Part 5: Pickling
AS/NZS 1734	Aluminium and aluminium alloys – Flat sheet, coiled sheet and plate
AS 1742.2	Manual of uniform traffic control devices Part 2: Traffic control devices for general use
AS/NZS 1906.1	Retroreflective materials and devices for road traffic control purposes Part 1: Retroreflective sheeting
AS/NZS 1906.2	Retroreflective materials and devices for road traffic control purposes Part 2: Retroreflective devices (non-pavement application)
AS 3569	Steel wire ropes – Product specification
AS 3610	Formwork for concrete
AS/NZS 3678	Structural steel – Hot-rolled plates, floorplates and slabs

AS/NZS 3750.9	Paints for steel structures Part 9: Organic zinc-rich primer
AS 4506	Metal finishing – Thermoset powder coatings
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles

Other Documents

Manufacturer's recommendations and any applicable TfNSW requirements for each proprietary safety barrier system or device.

TS 00028	Accepted Road Safety Barrier Systems and Devices