

SENTRYLINE II – 4 WIRE ROPE SAFETY BARRIER

REVISION REGISTER

Revision	Description	Date
1	Issued for use.	18/10/2011
1A	Post footing depth on terminal drawing removed. Additional information on End Treatments added.	12/8/2013
1B	Photographs added, nominal rope tension added, clarification on use of end treatments and intermediate anchors. Reference to Supplier's manual updated.	9/9/2014
1C	Sentryline III terminal end approved for use.	18/7/2016

The Sentryline II four wire rope system is a flexible barrier system accepted for use by Main Roads. The Sentryline III terminal end (a gating terminal that does not “release” the wire ropes when impacted) is accepted for use by Main Roads.

Note that a Sentryline II three wire rope system is also manufactured, but is not accepted for use by Main Roads.

Note that the Sentryline II terminal (ATE) end (a gating terminal that “releases” the wire ropes when impacted) was previously accepted by Main Roads. This end treatment is no longer accepted for new installations.

Images:

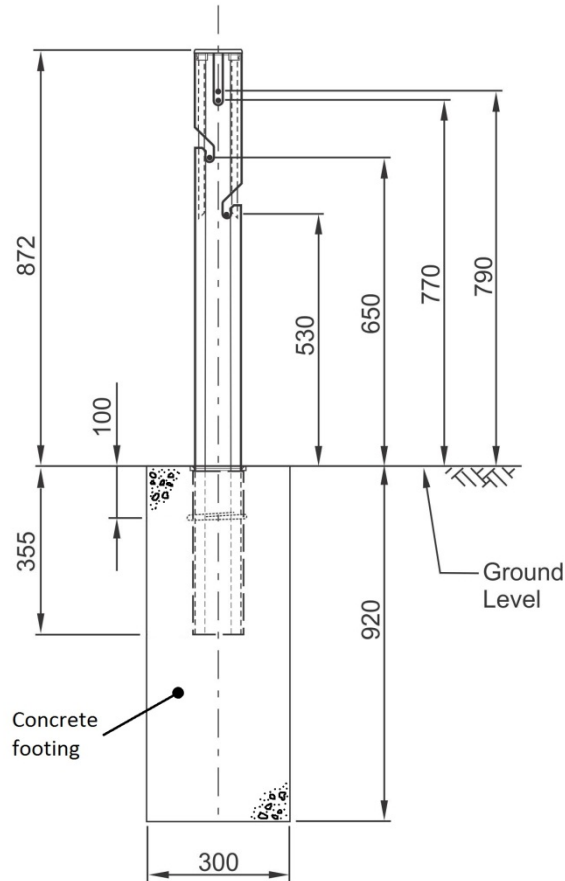


Photograph of Sentryline II wire rope safety barrier installation.

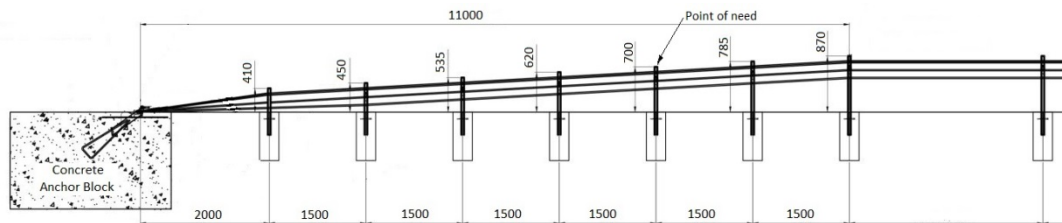


Photograph of Sentryline III end terminal installation.

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Typical cross section of Sentryline II through post.



Detail of Sentryline III end terminal
(refer to Supplier for Concrete Anchor Block details)

Owner and Supplier:

Australian Construction Products (ACP)
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PO Box 565 PANANIA NSW 2213
Website - <http://www.acprod.com.au>

Test Level: NCHRP 350 TL 4 (barrier)
NCHRP 350 TL 3 (terminal).

Accepted Barrier Configuration:

- Post spacing of 3.0 m, two upper wire ropes located at heights of 770 mm and 790 mm and the lower two ropes located at heights of 530 mm and 650 mm.
- Ropes at a nominal 25 kN tension.
- Installed with cast in-situ concrete footings.

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Note that to avoid the cast in-situ concrete footings clashing with underground services the spacing of barrier posts may be reduced. Post spacing may not be increased above 3.0m.

Design Considerations:

Design should be undertaken in accordance with relevant manuals (Sentryline II Cable Barrier - Product and Installation Manual – version dated June 2016 and Sentryline Terminal End III - Training and Product Installation Manual – version dated June 2016) provided by the Supplier.

Deflection:

1.65 m under TL 4 conditions (8000 kg vehicle at 80 km/h impacting at 15 degrees, post spacing 3.0 m).

1.54 m under TL 3 conditions (2000 kg vehicle at 100 km/h impacting at 25 degrees, post spacing 3.0 m).

For other speeds refer to Supplier.

Working Width:

2.15 m under TL 4 conditions (8000 kg vehicle at 80 km/h impacting at 15 degrees, post spacing 3.0 m).

Deflection Correction Factors:

In the Sentryline II Cable Barrier - Product and Installation Manual, correction factors for the deflection and working width are provided where the barrier is installed on a convex curve and/or lengths greater than 100 m. The correction factors for radius 1500 m+ should be applied when the Sentryline II barrier is installed on a straight.

Footings

In the Sentryline II Cable Barrier - Product and Installation Manual different footing depths are given for different soil conditions. For installations in WA a footing depth of 920 mm shall be used unless confirmed otherwise by the Supplier and supported by specific soil investigations.

Minimum Length:

114 m (excluding terminal ends) under TL 4 conditions.

90 m (excluding terminal ends) under TL 3 conditions.

Length of Need:

The beginning of the length of need of the barrier commences 8m from the anchor point which is at the 5th post starting from the anchor.

Offset from Kerbing:

- Only mountable type kerbing should be used and the centreline of the post placed 450 mm from the face of the kerb to minimise nuisance impacts. Locations offset further from the kerb are not preferred because of the possibility of vehicle either vaulting the barrier or not being redirected by the barrier.
- If semi-mountable kerbing is used then offset to the centreline of post is 380 mm.
- Locations offset further from the kerb are not preferred because of the possibility of vehicle either vaulting the barrier or not being redirected by the barrier.

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Height Correction:

If placed within 1.5 m of the edge of carriageway the mounting height is measured from the pavement surface. At greater offsets the mounting height is measured from the adjacent finished surface levels.

End Treatments:

The barrier comes with its own gating end treatment, Sentryline III End Terminal which complies with NCHRP 350 TL 3.

Delineators:

For all installations, delineation of the Sentryline II barrier is to be provided by posts marked with a 50 mm (wide) x 150 mm (high) Class 1A reflective tape. Posts to be marked at suitable intervals based on post spacing to approximate 25 m intervals between markings.

Limitations:

- The cross slope shall be not greater than 10% for the area between the edge of travelled way and the barrier, and the area immediately behind the barrier for the width of the deflection.
- Refer to the MRWA Supplement to Austroads Guide to Road Design – Part 6, Section 6.3.14.1 for further guidance on the verge and permissible slopes requirements on single carriageways.
- Preferably should not be installed behind kerbs. If kerbing is required then the only acceptable kerbing is mountable Type A 100 mm in high-speed situations.
- Semi-mountable kerbs may be acceptable in lower speed environments (< 70 km/h) but are not desirable.
- Refer to Main Roads Standard Drawing 9331-0376 for kerb types.
- Shall not be used on curves less than 200 m radius without seeking guidance from the Supplier regarding the necessary changes in post spacing. Post spacing shall be based on a 2000 kg vehicle at the appropriate design speed.
- Shall not be used on sag curves with a K value less than 14.

Intermediate Anchors:

In the Sentryline II Cable Barrier - Product and Installation Manual intermediate anchors are referred to. Note that for this system there are no “intermediate anchors” and that anchorage is provided by installation of separate barrier lengths with overlaps.

The Sentryline II Cable Barrier - Product and Installation Manual limits the length of barrier between terminals to 1000 m.

The Sentryline II Cable Barrier - Product and Installation Manual contains a detail of the intermediate anchor titled “Sentryline II Terminal End – Overlap”. This detail shows the distance between the overlapping barriers as 300 mm. This is not accepted by Main Roads, as a vehicle impact may release both terminals and an unacceptable length of barrier will be non-functioning. The distance between overlapping barriers should be at least 2000 mm (i.e. greater than the test deflection).

Joining Wire Ropes

The Sentryline II Cable Barrier - Product and Installation Manual includes a method of joining sections of wire ropes using a swaged coupling system. For installations in WA, only a mechanically swaged coupling system shall be used.

Parts to be Replaced after Impact:

Damaged posts, damaged cables, post caps and any other system componentry

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Parts Typically Re-Useable after Impact:

Wire Rope. Unless strands are damaged then it must be replaced

References:

Sentryline II Cable Barrier - Product and Installation Manual. – version dated June 2016

Sentryline Terminal End III - Training and Product Installation Manual – version dated June 2016

Refer to website:

<http://www.acprod.com.au>

Relevant FHWA Approval Letters

Refer to website:

http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/barriers

Code	Description
CC-98, CC-105	TL3 approval for 4 cable barrier end treatment.

Item	Description
1	Barrier system tested to NCHRP 350 Test 4-12 on 9 August 2009 by Holmes Solutions. A copy of the test report can be found on Main Roads file 09/4233.
2	Barrier system tested to NCHRP 350 Test 3-10 on 9 February 2010 by Holmes Solutions. A copy of the test report summary can be found on Main Roads file 09/4233.
3	Sentryline III Terminal End tested to NCHRP 350 by Holmes Solutions. A copy of this testing can be found on Main Roads file 09/4233.

Drawings:

Refer to ACP Drawing GAS3-NR ANCH for general arrangement of the terminal.