

Boundary Fences

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1. Scope and Application

This specification details the technical requirements for boundary fences and gates for installation on Country Regional Network (CRN) corridors in accordance with the requirements of CRN Engineering Standard CRN CS 510 “Boundary Fences”.

2. References

2.1. Australian and International standards

AS 1163	Structural steel hollow sections
AS 1397	Steel sheet and strip – Hot-dipped zinc-coated or aluminium/zinc-coated
AS 1594	Hot-rolled steel flat products
AS 1725	Chain-link fabric security fences and gates
AS 2082	Timber – Hardwood – Visually stress-graded for structural purposes
AS 2423	Coated steel wire fencing products for terrestrial, aquatic and general use
AS 2728	Prefinished/pre-painted sheet metal products for interior/exterior building applications – Performance requirements
AS 3660	Termite management
AS 3679.1	Structural steel Part 1: Hot-rolled bars and sections
BS 1722.10	Specification for anti-intruder fences in chain link and welded mesh
BS 1722.12	Specification for steel palisade fences

Unless otherwise specified, all references relate to the latest standard versions, including amendments and relevant superseding standards.

- **CRN documents**

CRN CS 510
Boundary Fences

- **Drawings**

CC0001-01	Boundary Stock Fence General - strand wire & hinged joint mesh
CC0001-02	Boundary Stock Fence – gates
CC0001-03	Boundary Stock Fence - flood gate large creek
CC0001-04	Boundary Stock Fence - flood gate hinged
CV 0285934	Boundary Fences – Chain Link Fabric, Rail-Less
CV 0285935	Boundary Fences – Chain Link Fabric, With Top Rail Only

CV 0285936	Boundary Fences – Chain Link Fabric, With Bottom Rail Only
CV 0285937	Boundary Fences – Chain Link Fabric, With Top & Bottom Rail
CV 0285938	Boundary Fences – Chain Link Fabric, 1000 Wide Gate With Braced Panel
CV 0285939	Boundary Fences – Chain Link Fabric, 4000 Wide Gate With Braced Panel
CV 0285940	Boundary Fences – Chain Link Fabric, 6000 Wide Gate With Braced Panel
CV 0285941	Boundary Fences – Chain Link Fabric, 8000 Wide Gate With Braced Panel
CV 0285947	Boundary Fences – Residential Fence, Hardwood Timber Paling Fence
CV 0285948	Boundary Fences – Tubular Steel Fence, Fence Details
CV 0478381	Boundary Fences – Tubular Steel Fence, 4000 Wide Gate Details
CV 0478383	Boundary Fences – Close Spaced Welded Mesh Fence, Fence Details
CV 0478384	Boundary Fences – Close Spaced Welded Mesh Fence, 4000 Wide Gate Details

3. Acceptance standards

All materials and components shall comply with the requirements of the relevant specified Australian Standard, or of this specification.

Fence wires are to comply with AS 2423 “Coated steel wire fencing products for terrestrial, aquatic and general use”.

Test certificates shall be provided where necessary to demonstrate compliance with performance requirements.

4. Stock Fence

The stock fence shall be one of the following approved configurations:

- Strand wire
- Hinged joint mesh with additional plain and barbed wires.

4.1. Strand Wire Fence

The strand wire stock fence consists of four (4) plain wires and two (2) barbed wires as shown in Table 1.

Table 1 – Strand wire stock fence

Item	Specification
Fence height	1225mm

Item	Specification
Steel Star Posts - length	1800mm
Steel Star Posts - spacing	3000mm centres
Steel Star Posts - footings	posts driven into ground 550mm deep
Barbed wire (2 off)	2.5 mm heavy galvanised
Barbed wire (2 off) height top strand	25mm below top of star steel post
Barbed wire (2 off) height bottom strand	610mm below top strand
Plain wire (4 off)	2.5mm high tensile wire
Plain wire (4 off) height	330mm below top barbed wire
Plain wire (4 off) height	760mm below top barbed wire
Plain wire (4 off) height	910mm below top barbed wire
Plain wire (4 off) height	1045mm below top barbed wire
Ground clearance	175mm maximum

The general arrangement is shown on CRN Drawing No. CC0001-01 "Boundary Stock Fence General - strand wire & hinged joint mesh".

4.2. Hinged Joint Mesh Fence

Hinged joint fence details are as shown in Table 2.

Table 2 – Hinged joint mesh fence

Item	Specification
Fence height	1175mm
Hinged joint mesh	7/90/30
Steel Star Posts - length	1650mm
Steel Star Posts - spacing	3600mm centres
Steel Star Posts - footings	posts driven into ground 485mm deep
Steel Droppers - length	900mm
Steel Droppers - spacing	at mid-point between star posts
Steel Droppers - footing	Nil
Top barbed wire	2.5 mm
height	230mm above hinged joint fencing
Top plain wire	2.5mm high tensile wire
Centre plain wire	2.5mm high tensile wire
height	460mm above ground
Bottom plain wire	2.5mm high tensile wire

Item	Specification
Ground clearance	20mm maximum

The general arrangement is shown on Drawing Number No. CC0001-01.

4.3. Flood gates in stock fences

Where flood gates are specified they shall only be attached to hinged joint mesh fence in accordance with CRN Drawing No. CC0001-03 "Boundary Stock Fence - flood gate large creek" or CC0001-04 "Boundary Stock Fence - flood gate hinged"

4.4. Access gates in stock fences

Access gates shall be in accordance with the CC0001-02 "Boundary Stock Fence – gates"

5. Residential Fence

5.1. Timber

The timber residential boundary fence is a hardwood timber paling fence. Palings shall be seasoned hardwood complying with AS 2082 "Timber – Hardwood – Visually stress-graded for structural purposes", with a minimum stress grade of F7.

Timber shall be protected in accordance with AS 3660 "Termite Management".

Timber fence details are as shown in Table 3.

Table 3 – Timber fence details

Item	Specification
Fence height	1800mm (nominal)
Corner Posts	130 x 130mm
Posts	130 x 50mm
Post centres	2500mm
Post footing	250mm dia x 600mm deep, encased in 24MPa concrete
Rails	75 x 50mm
Palings	1800 x 100mm
Paling to rail fixing	Double nailed at each rail
Paling to paling gap	0mm (nominal)
Post to rail fixing	Posts to be mortised to receive rails at 1.2m centres Rails to be scarfed at ends to fit into post mortise
Ground clearance	80mm maximum

The general arrangement is shown on Drawing No. CV 0285947 “Boundary Fences – Residential Fence - Hardwood Timber Paling Fence”.

5.2. Colorbond Steel

A colorbond steel fence shall comply with the details specified below and the manufacturer’s specifications.

The steel shall comply with AS 1397 “Steel sheet and strip – Hot-dipped zinc-coated or aluminium/zinc-coated” and AS 2728 “Prefinished/pre-painted sheet metal products for interior/exterior building applications – Performance requirements”

Fence details are as shown in Table 4.

Table 4 – Colorbond steel fence details

Item	Specification
Fence height	1800 mm (nominal)
Ground clearance	80mm maximum

6. Urban Fence

6.1. Fence details

The urban fence shall be 1800mm high plain top chain-link fabric fence in accordance with AS 1725 “Chain-link fabric security fences and gates”, which provides for four (4) standard configurations:

- Rail-less
- Top rail only
- Bottom rail only
- Top and bottom rail.

For fencing without top rail, bracing panels or bracing stays shall be used on all ends, corners and gateposts, and at 150m spacing on straight sections.

All pipe posts and bracing rails and stays shall be medium quality to AS 1163 “Structural steel hollow sections” grade C250L0.

Fence details are as shown in Table 5

Table 5 – Urban fence details

Item	Specification
Fence height	1800mm (nominal)
Fabric height	1800mm

Item	Specification
Service duty	Heavy duty
Mesh size	50mm
Wire diameter	3.15mm galvanised 4.15mm PVC coated
Pipe grade	Class 1 (Medium quality)
Pipe size - corner post	DN50 (3.6mm thick, OD 60.3mm)
Pipe size - end post	DN50 (3.6mm thick, OD 60.3mm)
Pipe size - intermediate post	DN40 (3.2mm thick OD 48.3mm)
Pipe size - piperail (top & bottom)	DN32 (3.2mm thick, OD 42.4mm)
Support Cable	Twin strand 3.15mm wires, tensioned to 1.2 KN
Spacing of posts	3000mm maximum
Selvedge type	Knuckled barbed (KB)
Selvedge type - bottom	knuckled
Selvedge type - top	barbed
Ground clearance - bottom rail	80mm maximum
Ground clearance - no bottom rail	bottom of mesh at ground level

Note: DN = Nominal size in mm; OD = outside diameter

The general arrangement is shown on Drawing Nos:

CV 0285934	Boundary Fences – Chain Link Fabric, Rail-Less
CV 0285935	Boundary Fences – Chain Link Fabric, With Top Rail Only
CV 0285936	Boundary Fences – Chain Link Fabric, With Bottom Rail Only
CV 0285937	Boundary Fences – Chain Link Fabric, With Top & Bottom Rail

6.2. Access gates in chain-link fabric fence

Access gates shall be in accordance with the relevant standard drawing for the specified gate width:

CV 0285938	Boundary Fences – Chain Link Fabric, 1000 Wide Gate With Braced Panel
CV 0285939	Boundary Fences – Chain Link Fabric, 4000 Wide Gate With Braced Panel
CV 0285940	Boundary Fences – Chain Link Fabric, 6000 Wide Gate With Braced Panel
CV 0285941	Boundary Fences – Chain Link Fabric, 8000 Wide Gate With Braced Panel

7. Enhanced Urban Fence

7.1. Urban Fence with Extra Heavy Duty Mesh

This fence is the same specification as in Section 6 except that it has extra heavy duty mesh in accordance with AS 2423.

Approved configurations are:

- 25mm mesh size with 3.15mm diameter;
- 50mm mesh size with 4.00mm diameter wire.

7.2. Urban Fence with 3 Barbed Top

This fence is the standard chain-link fabric fence with a barbed top.

All pipe posts and bracing rails and stays shall be medium quality to AS 1163 "Structural steel hollow sections" grade C250L0.

Fence details are as shown in Table 6.

Table 6 – Urban fence with 3 barbed top

Item	Specification
Fence height	1800mm (nominal)
Fabric height	1800mm
Service duty	Heavy duty
Mesh size	50mm
Wire diameter	3.15mm galvanised 4.15mm PVC coated
Pipe grade	Class 1 (Medium quality)
Pipe size - corner post	DN50 (3.6mm thick, OD 60.3mm)
Pipe size - end post	DN50 (3.6mm thick, OD 60.3mm)
Pipe size - intermediate post	DN40 (3.2mm thick OD 48.3mm)
Pipe size - piperail (top & bottom)	DN32 (3.2mm thick, OD 42.4mm)
Support Cable	Twin strand 3.15mm wires, tensioned to 1.2 KN
Spacing of posts	3000mm maximum
Selvedge type	Knuckled barbed (KB)
Ground clearance - bottom rail	80mm maximum
Ground clearance - no bottom rail	bottom of mesh at ground level
Barbed top extension - wire	Heavy galvanised 1.57mm high tensile wire, 4 point barbs
Barbed top extension - height	450mm

Item	Specification
Barbed top extension - post	Cranked outwards

Note: DN = Nominal size in mm; OD = outside diameter

CV 0285934	Boundary Fences – Chain Link Fabric, Rail-Less
CV 0285935	Boundary Fences – Chain Link Fabric, With Top Rail Only
CV 0285936	Boundary Fences – Chain Link Fabric, With Bottom Rail Only
CV 0285937	Boundary Fences – Chain Link Fabric, With Top & Bottom Rail

7.3. Urban Fence 2100mm High

This fence is the same as in Section 6 except that the fabric height is 2100mm.

7.4. Tubular Steel Fence

The details for the tubular steel fence are as shown in Table 7.

Table 7 – Tubular steel fence details

Item	Specification
Fence height above ground	2100mm / 2400mm
Posts	2400mm centres
Posts - square hollow section	65 x 65 x 3 mm
Posts - concrete footing	300mm dia x 900mm deep
Posts - concrete strength	25 MPa
Rails (horizontal) - square hollow section	40 x 40 x 2.5 mm
Rails (horizontal) - rail centres	1870 mm / 2170 mm
Rail to post fixing	Rivetted
Pales - square hollow section	25 x 25 x 2 mm
Pales - maximum gap between pales	100mm
Pales - shape of top of pale	Pointed
Pale to rail fixing	Pales to pass through horizontal rails (see drawing CV 0285948 for details)
Finish	Black or dark green powder coat
Ground clearance	80mm maximum

Posts, rails and pales shall be to AS 1163 grade C350.

The general arrangement is shown on Drawing No. CV 0285948 “Boundary Fences – Tubular Steel Fence, Fence Details”.

7.5. Access gates in tubular steel fences

Access gates shall be in accordance with CV 0478381 Boundary Fences – Tubular Steel Fence, Gate Details.

Technical data for access gates:

- Bottom rails at the same level as the fence rails.
- Gate frame shall be of square hollow sections 65 x 65 x 3mm.
- Gate posts to be 100 x 100 x 5mm square hollow sections.
- Square hollow sections to AS 1163 grade C350.
- Gate post to be encased in concrete footing 500mm diameter x 1000mm deep with 25MPa concrete.
- Ground clearance shall be 80mm with the gate in the closed position.
- Clearance between gate leaves shall be 20mm.

8. Security Fence

8.1. Close Spaced Welded Mesh

The close spaced welded mesh fence is generally in accordance with BS 1722.10 “Specification for anti-intruder fences in chain link and welded mesh”.

Posts and rails shall be to AS 3679.1 “Structural steel Part 1: Hot-rolled bars and sections” grade 350 or to AS 1163 grade C350.

Fence details are as shown in Table 8.

Table 8 – Security fence details

Item	Specification
Fence height above ground	2400mm/2700mm
Posts	2400mm centres
Posts - channel section (back-to-back) or	51 x 104 x 26 x 4mm
Posts - universal column or	100 UC
Posts - engineering equivalent	
Concrete footing	300mm dia x 900mm deep
Concrete footing - concrete strength	25 MPa
Top and bottom rails - angle section	50 x 50 x 4mm
Rail to post fixing	M8 Galvanised tamper proof bolt & shear nut
Mesh profile	Not greater than 75mm x 13mm

Item	Specification
Wire diameter	4mm
Finish	Black or dark green powder coat
Ground clearance	80mm maximum

8.2. Access Gates in close spaced welded mesh fences

Access gates shall be in accordance with CV 0478384 Boundary Fences – Close Spaced Welded Mesh Fence, Gate Details.

Technical data for access gates:

- Comparable quality to adjacent fence, same height as fence with top and bottom rails at the same level as the fence rails.
- Frame size to be 100 x 60 x 5mm rectangular hollow sections.
- Gate posts to be 200 x 200 x 6mm square hollow sections.
- Rectangular and square hollow sections to AS 1163 grade C350.
- Gate post to be encased in concrete footing 600mm diameter x 1200mm deep with 25MPa concrete.
- Ground clearance shall be 80mm with the gate in the closed position.
- Clearance between gate leaves shall be 20mm.

8.3. Palisade

The palisade fence is generally in accordance with BS 1722.12 “Specification for steel palisade fences”.

Posts and rails shall be to AS 3679.1 grade 350. Pales shall be to AS 1594 “Hot-rolled steel flat products” grade HA300.

Fence details are as shown in Table 9.

Table 9 – Palisade security fence details

Item	Specification
Fence height above ground	2400mm/2700mm
Posts	2750mm centres
Posts - tapered flange beam or	100 TFB
Posts - engineering equivalent	
Concrete footing	300mm dia x 900mm deep
Concrete footing - concrete strength	25 MPa

Item	Specification
Rails (horizontal) - angle section	50 x 50 x 6mm
Rails (horizontal) - rail centres	1845mm
Post to rail fixing	M12 Galvanised tamper proof bolt & shear nut
Pales	Palisade 'W' profile with triple-point spear top
Pales - width	70mm
Pales - thickness	3.0mm
Pales - maximum gap between pales	80mm
Pales - top of pale from centre of top rail	475mm
Pales - bottom of pale from centre of bottom rail	380mm
Paling to rail fixing	M8 Galvanised tamper proof bolt & shear nut
Finish	Black or dark green powder coat
Ground clearance	80mm maximum
Additional horizontal rail	Fixed to pales 100mm from bottom of pales

8.4. Access gates in palisade fences

Technical data for access gates:

- Comparable quality to adjacent fence, same height as fence with top and bottom rails at the same level as the fence rails.
- Frame size to be 100 x 60 x 5mm rectangular hollow sections.
- Gate posts to be 200 x 200 x 6mm square hollow sections.
- Rectangular and square hollow sections to AS 1163 grade C350.
- Gate post to be encased in concrete footing 600mm diameter x 1200mm deep with 25MPa concrete.
- Ground clearance shall be 80mm with the gate in the closed position.
- Clearance between gate leaves shall be 20mm.

9. High Security Fence

9.1. Close Spaced Welded Mesh

The close spaced welded mesh fence is generally in accordance with BS 1722.10 "Specification for anti-intruder fences in chain link and welded mesh".

Posts and rails shall be to AS 3679.1 "Structural steel Part 1: Hot-rolled bars and sections" grade 350 or to AS 1163 grade C350.

Fence details are as shown in Table 10.

Table 10 – Welded mesh high security fence details

Item	Specification
Fence height above ground	3000mm, or 2400mm with 600mm concertina short barbed tape
Posts	2400mm centres
Posts - channel section (back-to-back), or	51 x 104 x 26 x 4mm
Posts - universal column, or	100 UC
Posts - engineering equivalent	
Concrete footing	300mm dia x 900mm deep
Concrete footing - concrete strength	25 MPa
Top and bottom rails - angle section	50 x 50 x 4mm
Rail to post fixing	M8 Galvanised tamper proof bolt & shear nut
Mesh profile	Not greater than 75mm x 13mm
Wire diameter	4mm
Finish	Black or dark green powder coat
Ground clearance	80mm maximum
Plinths	Centrally located beneath the fence 400mm (w) x 200mm(d)

9.2. Palisade

The palisade fence is generally in accordance with BS 1722.12 “Specification for steel palisade fences”.

Posts and rails shall be to AS 3679.1 grade 350. Pales shall be to AS 1594 “Hot-rolled steel flat products” grade HA300.

Fence details are as shown in Table 11.

Table 11 – Palisade high security fence details

Item	Specification
Fence height above ground	3000mm
Posts	2750mm centres
Posts - tapered flange beam, or	100 TFB
Posts - engineering equivalent	
Concrete footing	300mm dia x 900mm deep
Concrete footing - concrete strength	25 MPa
Rails (horizontal) - angle section	50 x 50 x 6mm
Rails (horizontal) - rail centres	2145mm

Item	Specification
Post to rail fixing	M12 Galvanised tamper proof bolt & shear nut
Pales	Palisade 'W' profile with triple-point spear top
Pales - width	70mm
Pales - thickness	3.0mm
Pales - maximum gap between pales	80mm
Pales - top of pale from centre of top rail	475mm
Pales - bottom of pale from centre of bottom rail	380mm
Paling to rail fixing	M8 Galvanised tamper proof bolt & shear nut
Finish	Black or dark green powder coat
Ground clearance	80mm maximum
Additional horizontal rail	Fixed to pales 100mm from bottom of pales
Plinths	Central beneath the fence 400mm (w) x 200mm(d)