OBC EXTERIOR GUARDS DETAILS **SB-7**

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SB-7 Guards for Housing and Small **Buildings**

Section 1 General

Introduction

1.1.1. Scope

(See Appendix A.)

- (1) This Supplementary Standard includes details for the construction of wood guards.
- (2) Guards located on the exterior of a building, where they may be subject to deterioration, shall be constructed in accordance with Section 2 of this Supplementary Standard. (See Appendix A.)
- (3) Guards located inside a building shall be constructed in conformance with Section 2 or Section 3 of this Supplementary Standard.

1.2. **Design of Guards**

1.2.1. Cantilever Action

(1) The construction details for guards in this Supplementary Standard are based on the assumption that the guard acts as a cantilever in resisting lateral loads. (See Appendix A.)

1.2.2. Classification

- (1) The structural systems of guards described in this Supplementary Standard are grouped into the following classifications:
- (a) Post and Rail Systems, and
- (b) Cantilevered Picket Systems.

(See Appendix A.)

Section 2 Exterior Guards

2.1. Materials

2.1.1. Lumber Grades

- (1) The minimum grade of softwood dimension lumber for posts, rails and joists shall be Northern Species, No. 2.
- (2) The minimum grade of softwood dimension lumber for pickets shall be Northern Species, No. 2 Picket grade.
- (3) Wood for pickets shall be free of loose knots. (See Appendix A.)



2.1.2. Lumber Dimensions

(1) Except as permitted in Sentence (2), the minimum sizes of loadbearing elements of wood guards shall conform to Table 2.1.2.

Table 2.1.2.

Minimum Size of Loadbearing Elements

Guard Element	Minimum Size, mm (in)	
Post	89 x 89 (4" x 4" nominal)	
Top Rail	38 x 89 (2" x 4" nominal)	
Bottom Rail	38 x 89 (2" x 4" nominal)	
Picket / Baluster	32 x 32 (1 ⁹ /32" x 1 ⁹ /32")	
Column 1	2	

(2) Where a bottom rail is bevelled, the minimum sizes shown in Table 2.1.2. may be reduced to allow for a bevel, as detailed in Figure 2.1.2.

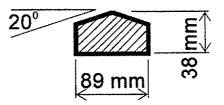


Figure 2.1.2. Bevel Detail

2.1.3. Floor Construction

- (1) The minimum dimensions of wood floor joists and wood decking shall conform to Table 2.1.3.
- (2) Except as provided in Details EA-1 to ED-5, wood decking shall be fastened to each floor joist with nailing conforming to Table 2.1.3.

(See Appendix A.)



Table 2.1.3. Minimum Size of Floor Elements

Floor Element	Minimum size, mm (in)	
Dimonojan Lumbor Dooking	25×140 (5 /4" \times 6" nominal), when each is plank fastened with 2 - 63 mm ($2\frac{1}{2}$ ") nails	
Dimension Lumber Decking	38×89 (2" x 4" nominal), when each plank is fastened with 2 - 76 mm (3") nails	
Dimension Lumber Joists	38 x 184 (2" x 8" nominal)	
Column 1	2	

2.1.4. Connectors

- (1) Nails, screws, lag bolts and machine bolts shall not cause splitting of wood elements.
- (2) Fasteners shall be resistant to corrosion.
- (3) All nails shall be common spiral.

(See Appendix A.) (See also A-2.1.4. in Appendix A. for glued joints.)

2.1.5. Decay-Resistant Lumber

- (1) Lumber for guard systems and floor systems shall be
- (a) a species resistant to decay,
- (b) preservative treated to prevent decay, or
- (c) pressure-treated.
- (See Appendix A.)
- (2) All cut ends of preservative treated lumber shall be treated to prevent decay.

2.2. Structural Details

2.2.1. Post and Rail System

(1) An exterior guard constructed as a Post and Rail System shall conform to the applicable connection details listed in Table 2.2.1.

2.2.2. Cantilevered Picket System

(1) An exterior guard constructed as a Cantilevered Picket System shall conform to the applicable connection details listed in Table 2.2.2.

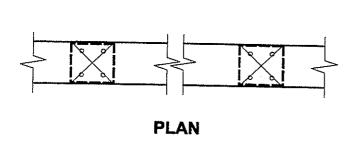


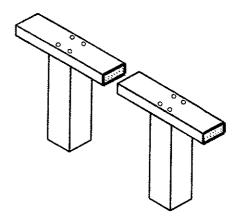
Table 2.2.1.
Exterior Post and Rail System Connection Details

Connection Detail	Detail Number	Description
	EA-1	Top rail nailed to post
Top Rail to Post	EA-2	Top/bottom rail skew nailed to post with 76 mm (3") nails
and/or	EA-3	Top/bottom rail skew nailed to post with 63 mm (2½") nails
Bottom Rail to Post	EA-4	Top/bottom rail face nailed or screwed to post
	EA-5	Top/bottom rail fastened to post with framing anchors
	EB-1	Post nailed to rim joist
	EB-2	Post screwed to rim joist
Post to Floor	EB-3	Post bolted to floor joist with 8 mm (5/16") machine bolts
Post to Floor	EB-4	Post bolted to floor joist with 9.5 mm (%") machine bolts
	EB-5	Post bolted to 2 floor joists
	EB-6	Post fastened to floor, where guard is parallel to floor joists
	EC-1	Picket nailed to endcap; endcap screwed to rail
Infill Picket	EC-2	Picket nailed to rail
IIIIII FICKEL	EC-3	Picket screwed to rail
	EC-4	Picket screwed to top rail and rim joist
Column 1	2	3

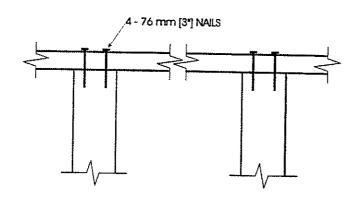
Table 2.2.2. Exterior Cantilevered Picket System Connection Details

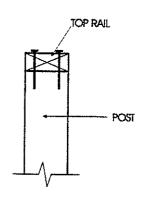
Connection Detail	Detail Number	Description
Cantilevered Picket	ED-1	Picket screwed to rim joist
(Douglas Fir-Larch, Spruce-Pine-Fir, Hem-Fir Species)	ED-2	Picket screwed to rim joist, where guard is parallel to floor joists
Cantilevered Picket	ED-3	Picket screwed to rim joist and deck
(Northern Species)	ED-4	Picket screwed to rim joist and deck, where guard is parallel to floor joists
Cantilevered Picket (Douglas Fir-Larch, Spruce-Pine-Fir, Hem-Fir Species, Northern Species)	ED-5	Corner
Column 1	2	3





AXONOMETRIC





FRONT ELEVATION

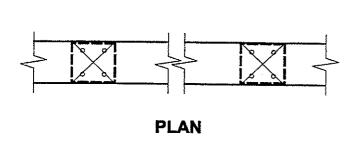
SIDE ELEVATION

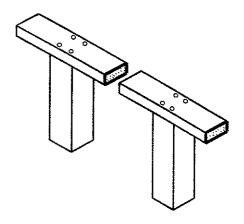
Detail EA-1 Exterior Connection: Top Rail Nailed to Post

Notes:

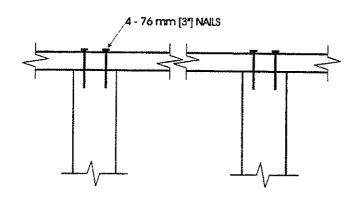
1. The top rail must be continuous. Use Detail EA-5 at the end spans, where continuity ends.

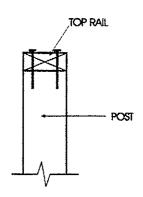
MAXIMUM SPAN OF RAIL BETWEEN POSTS		
Species	Maximum Span, m (ft-in)	
Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir	1.52 (5'-0")	
Northern Species	1.52 (5'-0")	
Column 1	2	





AXONOMETRIC





FRONT ELEVATION

SIDE ELEVATION

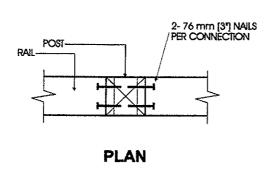
Detail EA-1 Exterior Connection: Top Rail Nailed to Post

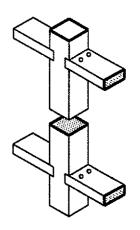
Notes:

1. The top rail must be continuous. Use Detail EA-5 at the end spans, where continuity ends.

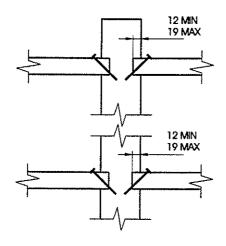
MAXIMUM SPAN OF RAIL BETWEEN POSTS		
Species	Maximum Span, m (ft-in)	
Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir	1.52 (5'-0")	
Northern Species	1.52 (5'-0*)	
Column 1	· 2	

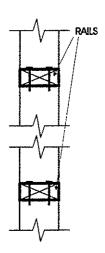






AXONOMETRIC





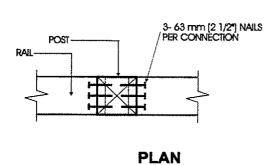
FRONT ELEVATION

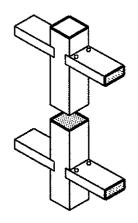
SIDE ELEVATION

Detail EA-2 Exterior Connection: Top/Bottom Rail Skew Nailed to Post - 76 mm (3") Nails

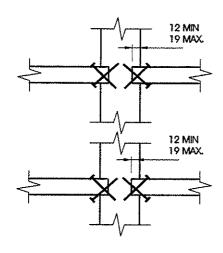
- 1. The maximum span is more often governed by post spacing.
- 2. Provide support to bottom rail at intervals not more than 2.0 m (6'-7").
- 3. The bottom rail may be bevelled as detailed in Figure 2.1.2.
- 4. Dimensions shown are in mm unless otherwise specified.

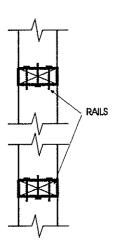
MAXIMUM SPAN OF RAIL BETWEEN POSTS		
Species Maximum Span, m (ft-in)		
Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir	2.72 (8'-11")	
Northern Species	2.18 (7'-2")	
Column 1 2		





AXONOMETRIC





FRONT ELEVATION

SIDE ELEVATION

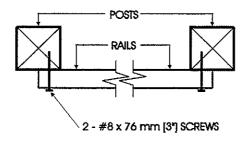
Detail EA-3

Exterior Connection: Top/Bottom Rall Skew Nailed to Post - 63 mm (21/2") Nails

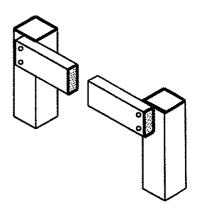
- 1. Provide support to bottom rail at intervals not more than 2.0 m (6'-7").
- 2. The bottom rail may be bevelled as detailed in Figure 2.1.2.
- 3. Dimensions shown are in mm unless otherwise specified.

MAXIMUM SPAN OF RAIL BETWEEN POSTS		
Species	Maximum Span, m (ft-in)	
Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir	2.72 (8'-11")	
Northern Species	2.18 (7'-2")	
Column 1	2	

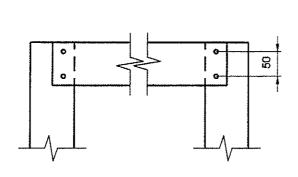




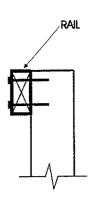
PLAN



AXONOMETRIC







SIDE ELEVATION

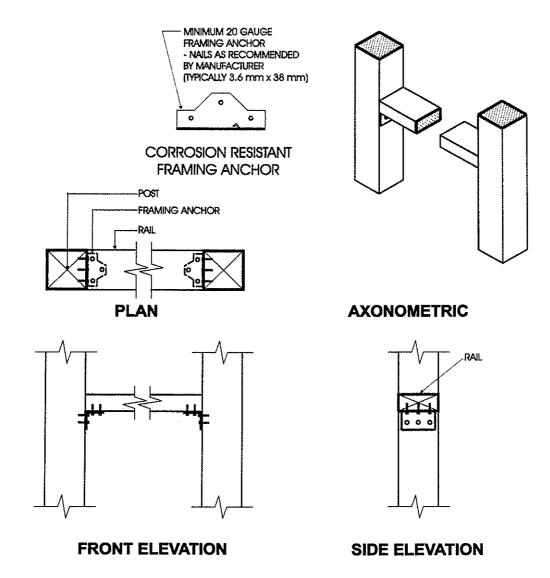
Detail EA-4

Exterior Connection: Top/Bottom Rail Face Nailed or Screwed to Post

- 1. If the rails are located on the deck side of the posts, 76 mm (3") nails may be used in place of the screws.
- 2. Where the top rail is continuous, the top rail may be fastened to each post with 3 #8 x 76 mm (3") screws.
- 3. Dimensions shown are in mm unless otherwise specified.

MAXIMUM SPAN OF RAIL BETWEEN POSTS		
Species	Maximum Span, m (ft-in)	
Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir	1.77 (5'-10")	
Northern Species	1.41 (4'-8")	
Column 1	2	



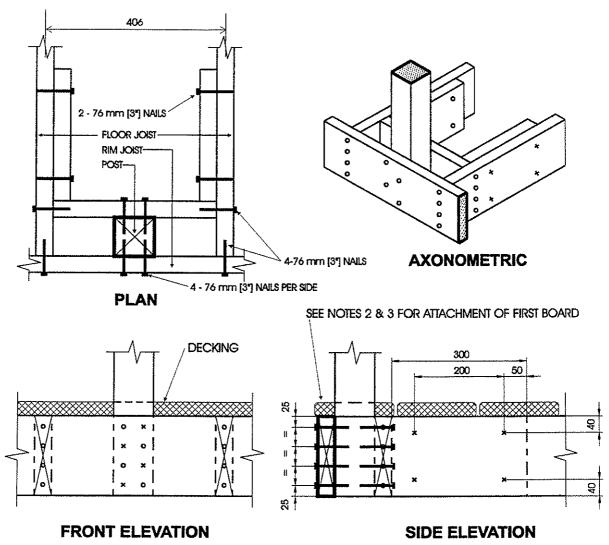


Detail EA-5 Exterior Connection: Top/Bottom Rail Fastened to Post with Framing Anchors

- 1. Provide support to bottom rail at intervals not more than 2.0 m (6'-7").
- 2. The bottom rail may be bevelled as detailed in Figure 2.1.2.
- 3. Dimensions shown are in mm unless otherwise specified.

MAXIMUM SPAN OF RAIL BETWEEN POSTS			
Species Maximum Span, m (ft-in)			
Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir	2.72 (8'-11")		
Northern Species	2.18 (7'-2")		
Column 1	2		



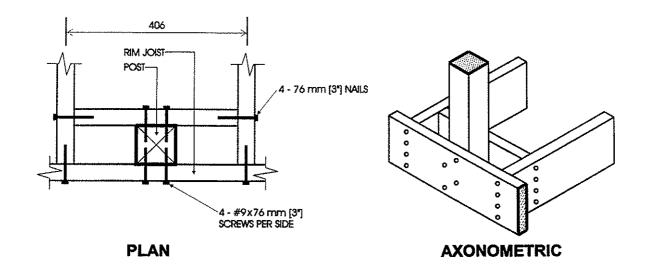


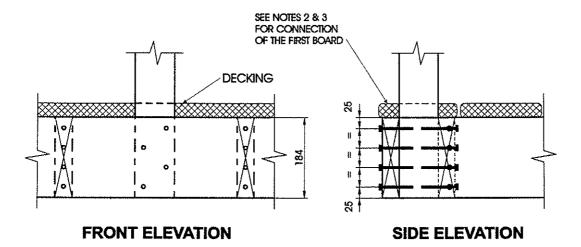
Detail EB-1

Exterior Connection: Post Nailed to Rim Joist

- 1. Decking is omitted from the plan view and the axonometric view for clarity.
- 2. Fasten 25 mm x 140 mm $(\frac{5}{4}$ " x 6" nominal) outer deck board to rim joist with 63 mm $(2\frac{1}{2}$ ") nails at 300 mm (12").
- 3. Fasten 25 mm x 140 mm (5/4" x 6" nominal) outer deck board to floor joist with 1 63 mm (2½") nail at each joist.
- 4. The post may be positioned anywhere between the joists.
- 5. Dimensions shown are in mm unless otherwise specified.

MAXIMUM SPACING BETWEEN POSTS		
Species	Maximum Spacing, m (ft-in)	
Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir	1.22 (4'-0")	
Northern Species	1.20 (3'-11")	
Column 1	2	



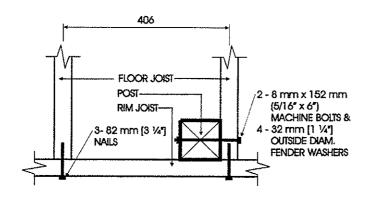


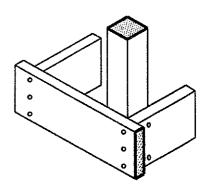
Detail EB-2

Exterior Connection: Post Screwed to Rim Joist

- 1. Decking is omitted from the plan view and the axonometric view for clarity.
- 2. Fasten 25 mm x 140 mm (5 /4" x 6" nominal) outer deck board to rim joist with 63 mm (2 /2") nails at 300 mm (12 ").
- 3. Fasten 25 mm x 140 mm (5/4" x 6" nominal) outer deck board to floor joist with 1 63 mm (2½") nail at each joist.
- 4. The post may be positioned anywhere between the joists.
- #9 screws may be replaced by #8 screws if the maximum spacing between posts is not more than 1.20 m (3'-11").
- 6. Dimensions shown are in mm unless otherwise specified.

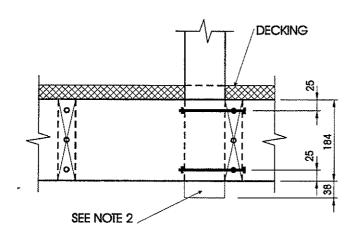
MAXIMUM SPACING BETWEEN POSTS					
Species Maximum Spacing, m (ft-in)					
Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir	1.56 (5'-1")				
Northern Species	1.20 (3'-11")				
Column 1	2				

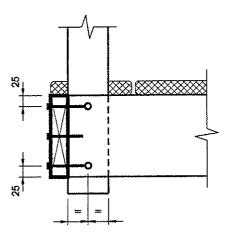




PLAN

AXONOMETRIC





FRONT ELEVATION

SIDE ELEVATION

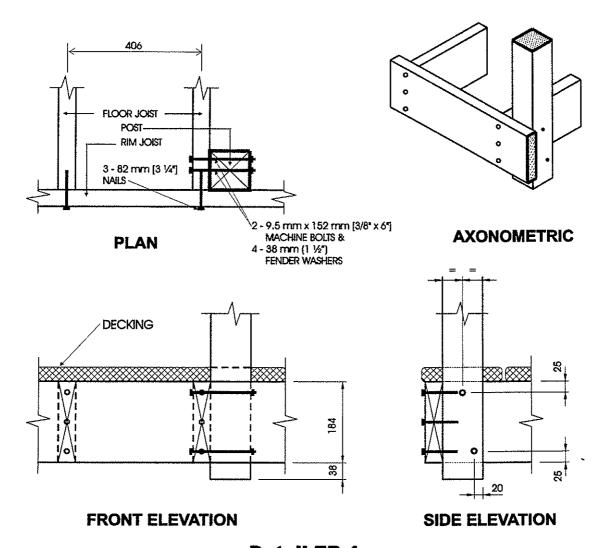
Detail EB-3

Exterior Connection: Post Bolted to Floor Joist - 8 mm (5/16") Bolts

- 1. Decking is omitted from the plan view and the axonometric view for clarity.
- 2. 38 mm (1½") post projection is not required where the maximum spacing between posts does not exceed 1.20 m (3'-11").
- 3. Joists may be spaced at 610 mm (24") o.c. or 406 mm (16") o.c.
- 4. Where floor joists are spaced at 610 mm (24") o.c., decking shall have a minimum thickness of 38 mm (1½") and shall be fastened to the floor with 2 76 mm (3") nails.
- 5. Dimensions shown are in mm unless otherwise specified.

MAXIMUM SPACING BETWEEN POSTS					
Species	Maximum Spacing, m (ft-in)				
Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir	1.29 (4'-3")				
Northern Species	1.20 (3'-11")				
Column 1	2				

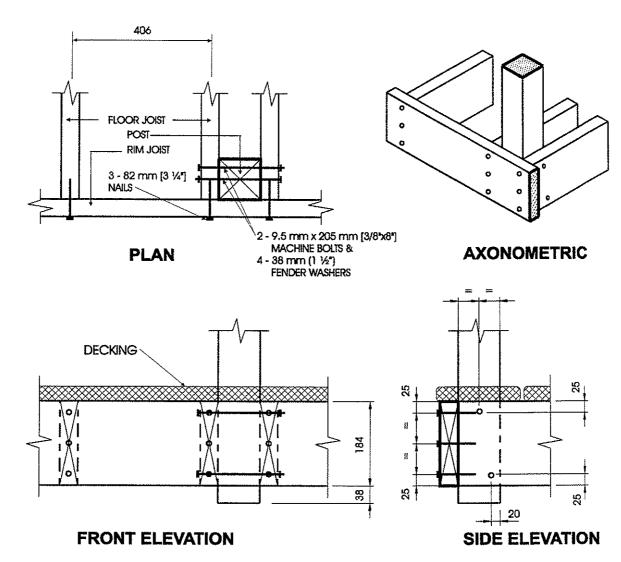




Detail EB-4
Exterior Connection: Post Bolted to Floor Joist - 9.5 mm (3/8") Bolts

- 1. Decking is omitted from the plan view and the axonometric view for clarity.
- 2. 38 mm (1½") post projection is not required where the maximum spacing between posts does not exceed 1.20 m (3'-11").
- 3. Joists may be spaced at 610 mm (24") o.c. or 406 mm (16") o.c.
- 4. Where floor joists are spaced at 610 mm (24") o.c., decking shall have a minimum thickness of 38 mm (1½") and shall be fastened to the floor with 2 76 mm (3") nails.
- 5. Dimensions shown are in mm unless otherwise specified.

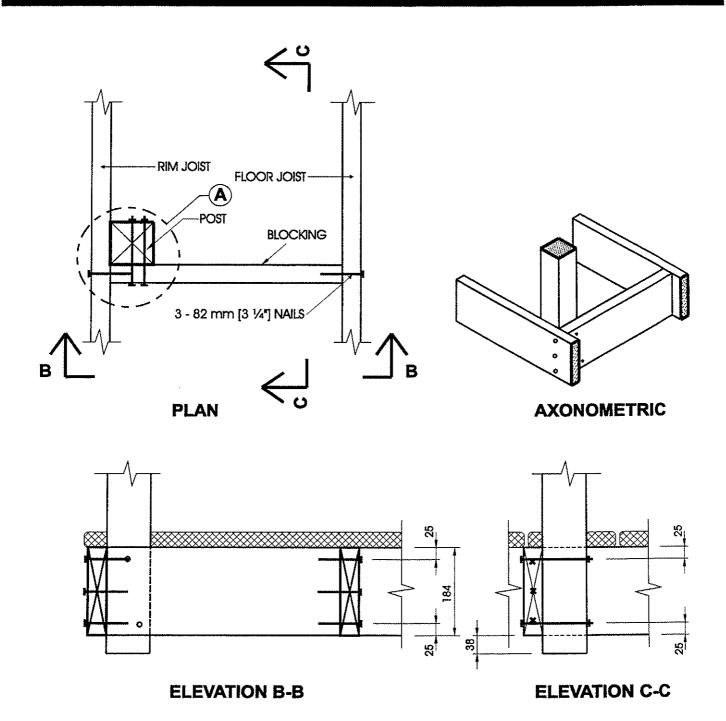
MAXIMUM SPACING BETWEEN POSTS				
Species Maximum Spacing, m (ft-in)				
Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir	1.49 (4'-11")			
Northern Species	1.20 (3'-11")			
Column 1	2			



Detail EB-5
Exterior Connection: Post Bolted to 2 Floor Joists

- 1. Decking is omitted from the plan view and the axonometric view for clarity.
- 2. 38 mm (1½") post projection is not required where the maximum spacing between posts does not exceed 1.20 m (3'-11").
- 3. Joists may be spaced at 610 mm (24") o.c. or 406 mm (16") o.c..
- 4. Where floor joists are spaced at 610 mm (24") o.c. decking shall have a minimum thickness of 38 mm (1½") and shall be fastened to the floor with 2 76 mm (3") nails.
- Dimensions shown are in mm unless otherwise specified.

MAXIMUM SPACING BETWEEN POSTS					
Species Maximum Spacing, m (ft-in)					
Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir	2.14 (7'-0")				
Northern Species	1.20 (3'-11")				
Column 1	2				

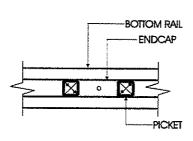


Detail EB-6

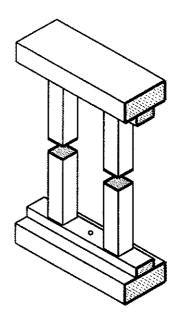
Exterior Connection: Post Fastened to Floor, Guard Parallel to Floor Joists

- 1. Use any of the connection details shown on Details EB-1 to EB-5 at location "A". Connection Detail EB-4 is shown in this detail, as an example.
- 2. Maximum spacing between posts is determined from connection detail used at location "A".
- 3. Decking is omitted from the plan view and the axonometric view for clarity.
- Blocking shall be not less than 38 mm x 184 mm (2" x 8" nominal).

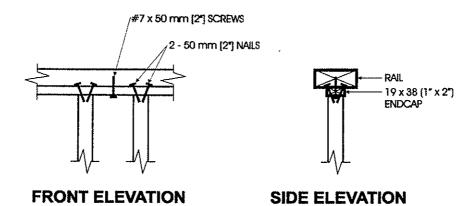
5. Dimensions shown are in mm unless otherwise specified.



PLAN BOTTOM RAIL

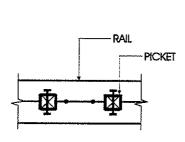


AXONOMETRIC

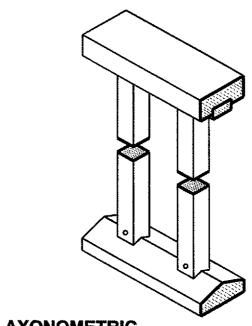


Detail EC-1 Exterior Connection: Infill Picket Nailed to Endcap - Endcap Screwed to Rail

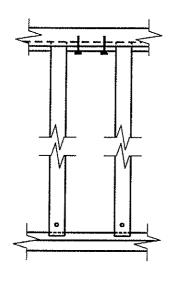
- 1. Fasten each end of each picket to endcaps with 2 50 mm (2") nails.
- Fasten endcaps to rails with #7 x 50 mm (2") screws at 300 mm (12") o.c.
- 3. See Table 2.1.2. for minimum sizes of pickets.



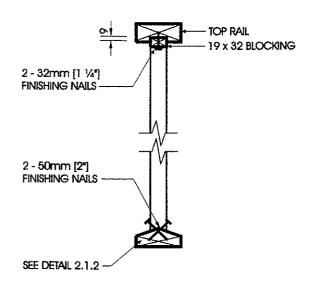
PLAN BOTTOM RAIL



AXONOMETRIC



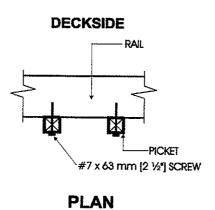
FRONT ELEVATION

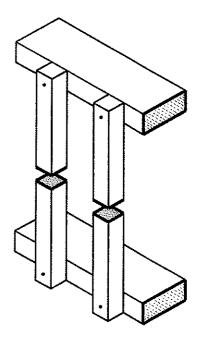


SIDE ELEVATION

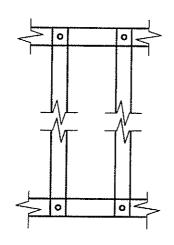
Detail EC-2 Exterior Connection: Infill Picket Nailed to Rail

- See Table 2.1.2. for minimum sizes of pickets.
- Dimensions shown are in mm unless otherwise specified.

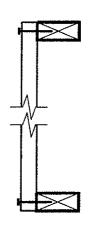








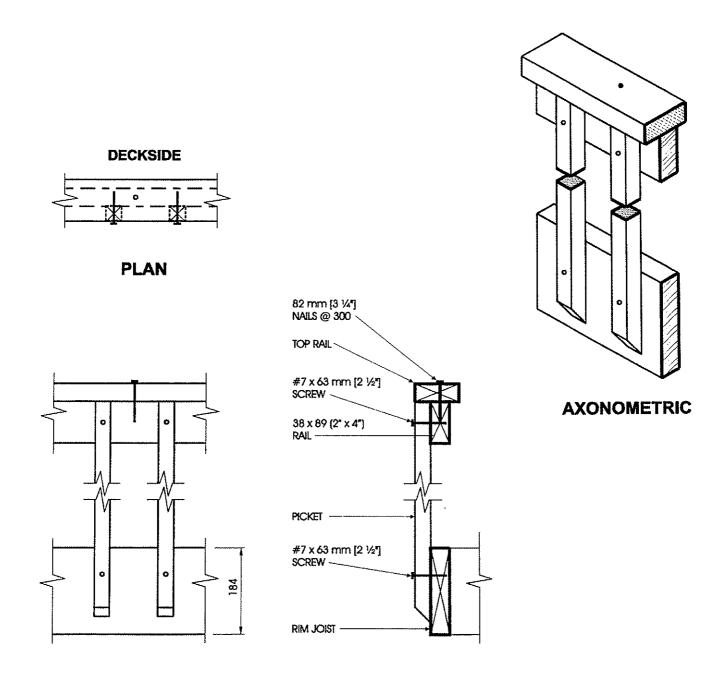
FRONT ELEVATION



SIDE ELEVATION

Detail EC-3
Exterior Connection: Infill Picket Screwed to Rail





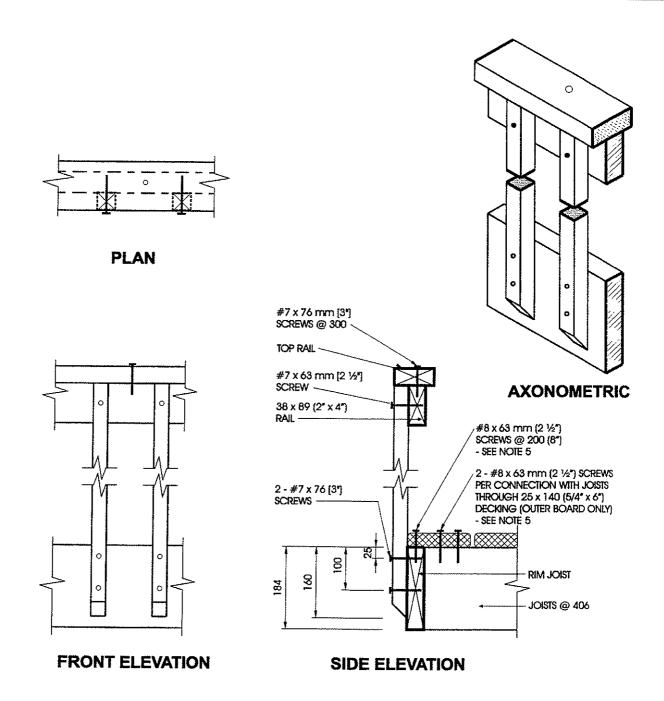
FRONT ELEVATION

SIDE ELEVATION

Detail EC-4 Exterior Connection: Infill Picket Screwed to Top Rail and Rim Joist

Note:

1. Dimensions shown are in mm unless otherwise specified.

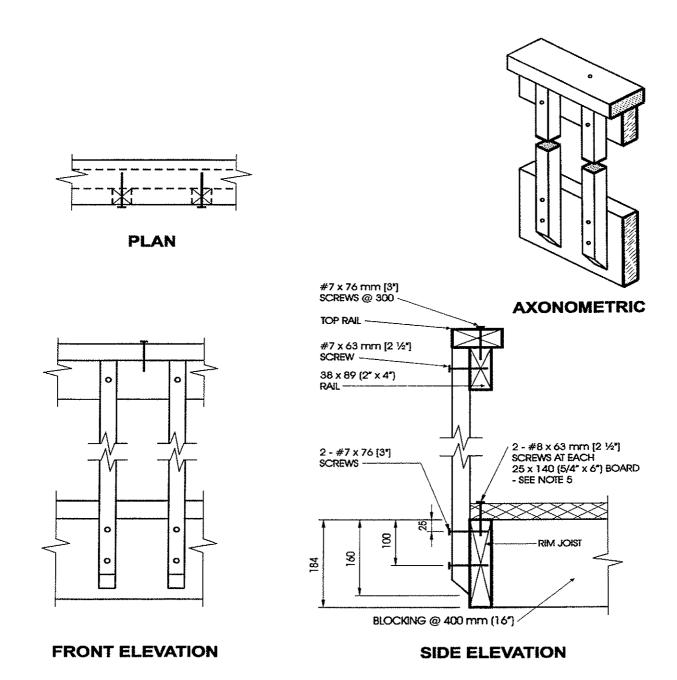


Detail ED-1

Exterior Connection: Cantilevered Picket Screwed to Rim Joist

- 1. Provide a suitable post, return, or solid support at each end of the guard.
- 2. Wood for cantilevered pickets shall be Douglas Fir-Larch, Spruce-Pine-Fir, or Hem-Fir Species.
- 3. Fasten rim joist to each floor joist with 3 82 mm (31/4") nails.
- 4. Dimensions shown are in mm unless otherwise specified.
- 5. The outer deck board shall not be less than 140 mm (6" nominal) wide. Where 38 mm (2" nominal) thick boards are used, the length of the wood screws shall be not less than 76 mm (3").

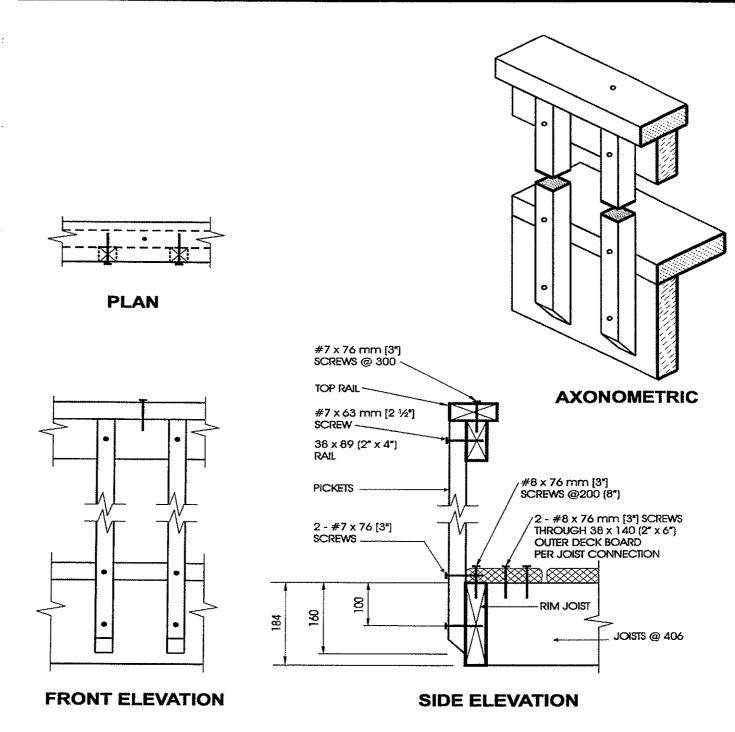




Detail ED-2

Exterior Connection: Cantilevered Picket Screwed to Rim Joist, Guard Parallel to Floor Joists

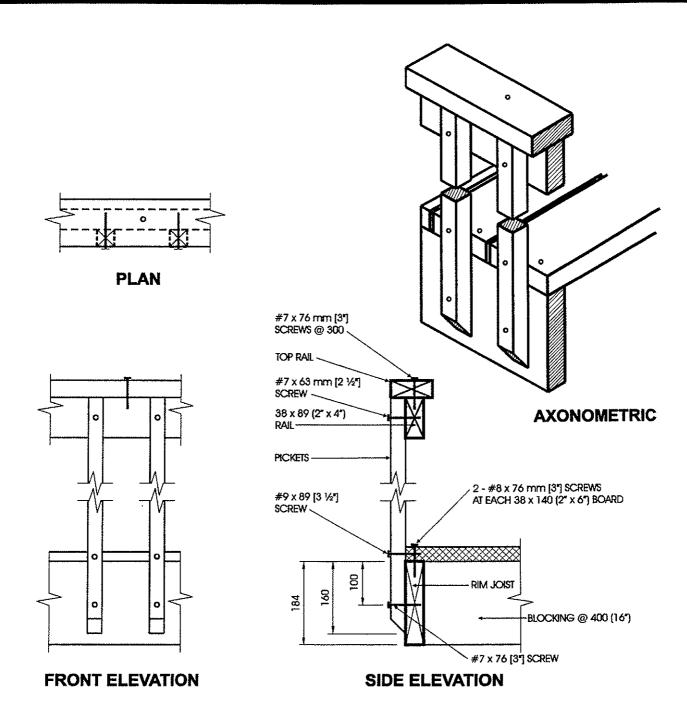
- 1. Provide a suitable post, return, or solid support at each end of the guard.
- 2. Wood for cantilevered pickets shall be Douglas Fir-Larch, Spruce-Pine-Fir, or Hem-Fir Species.
- 3. Fasten rim joist to blocking with 3 82 mm (31/4") nails.
- 4. Dimensions shown are in mm unless otherwise specified.
- Where 38 mm (2" nominal) thick boards are used, the length of the wood screws shall be not less than 76 mm (3").



Detail ED-3

Exterior Connection: Cantilevered Picket Screwed to Rim Joist and Deck

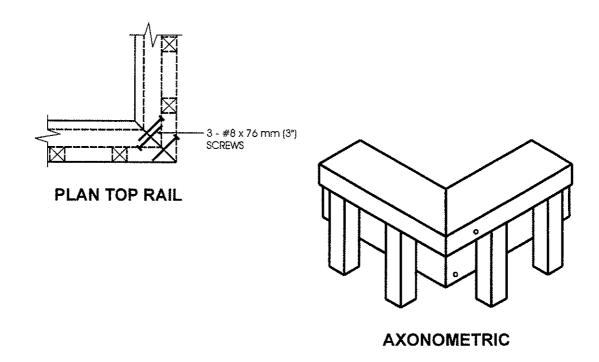
- 1. Provide a suitable post, return, or solid support at each end of the guard.
- 2. Wood for cantilevered pickets shall be Northern Species.
- 3. Fasten rim joist to each floor joist with 3 82 mm (31/4") nails.
- Dimensions shown are in mm unless otherwise specified.



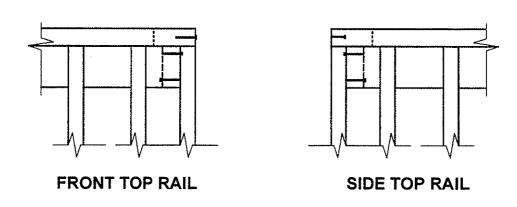
Detail ED-4

Exterior Connection: Cantilevered Picket Screwed to Rim Joist and Deck,
Guard Parallel to Floor Joists

- 1. Provide a suitable post, return, or solid support at each end of the guard.
- 2. Wood for cantilevered pickets shall be Northern Species.
- Fasten rim joist to blocking with 3 82 mm (3¼") nails.
- 4. Dimensions shown are in mm unless otherwise specified.



ONE FASTENER IN HORIZONTALLY ORIENTATED PORTION OF TOP RAIL AND TWO IN VERTICALLY ORIENTATED PORTION.



Detail ED-5Exterior Connection: Corner Joint

- 1. Screws fastening pickets are omitted for clarity.
- 2. Provide a minimum of 10 pickets beyond the return if end restraint of the guard is provided by this return detail only.

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9.8.8.3. Height of Guards (See Appendix A.)

- (1) Except as provided in Sentences (2) to (4), all guards shall be not less than 1 070 mm (3 ft 6 in) high.
- (2) All guards within dwelling units shall be not less than 900 mm (2 ft 11 in) high.
- (3) Exterior guards serving not more than one dwelling unit shall be not less than 900 mm (2 ft 11 in) high where the walking surface served by the guard is not more than 1 800 mm (5 ft 11 in) above the finished ground level.
- (4) Guards for flights of steps, except in required exit stairs, shall be not less than 900 mm (2 ft 11 in) high.
- (5) The height of guards for flights of steps shall be measured vertically from a line drawn through the leading edge of the treads served by the guard.

9.8.8.6. Design to Prevent Climbing (See Appendix A.)

- (1) Guards required by Article 9.8.8.1., except those in *industrial occupancies* and where it can be shown that the location and size of openings do not represent a hazard, shall be designed so that no member, attachment or opening will facilitate climbing.
- (2) Guards shall be deemed to comply with Sentence (1) where any elements protruding from the vertical and located within the area between 140 mm (5½ in) and 900 mm (2 ft 11 in) above the floor or walking surface protected by the guard,
 - (a) are located more than 450 mm (17% in) horizontally and vertically from each other,
 - (b) provide not more than 15 mm (e in) horizontal offset,
 - (c) do not provide a toe-space more than 45 mm (1¾ in) horizontally and 20 mm (13/16 in) vertically, or
 - (d) present more than a 1-in-2 slope on the offset.

9.8.8.5. Openings in Guards (See Appendix A.)

- (1) Except as provided in Sentence (2), openings through any guard that is required by Article 9.8.8.1. shall be of a size that will prevent the passage of a spherical object having a diameter of 100 mm (4 in) unless it can be shown that the location and size of openings that exceed this limit do not represent a hazard.
- (2) Openings through any *guard* that is required by Article 9.8.8.1. and that is installed in a *building* of *industrial* occupancy shall be of a size that will prevent the passage of a spherical object having a diameter of 200 mm (7f in) unless it can be shown that the location and size of such openings that exceed this limit do not represent a hazard.
- (3) Unless it can be shown that the location and size of openings that do not comply with the following limits do not represent a hazard, openings through any *guard* that is not required by Article 9.8.8.1. and that serves a *building* of other than *industrial occupancy*, shall be of a size that,
 - (a) will prevent the passage of a spherical object having a diameter of 100 mm (4 in), or
 - (b) will permit the passage of a spherical object having a diameter of 200 mm (7f in).

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- (1) Except as provided in Sentence (5), guards shall be designed to resist the loads specified in Table 9.8.8.2.
- (2) Where the width and spacing of balusters in *guards* within *dwelling units*, and exterior *guards* serving not more than 2 *dwelling units* is such that 3 balusters can be engaged by a load imposed over the 300 mm (11% in) width, the load shall be imposed so as to engage 3 balusters.
- (3) None of the loads specified in Table 9.8.8.2. need be considered to act simultaneously.
- (4) For *guards* within *dwelling units* and for exterior *guards* serving not more than 2 *dwelling units*, Table 9.8.8.2. need not apply where the *guard* construction has been demonstrated to provide effective performance.
- (5) Guards constructed in accordance with the requirements in Supplementary Standard SB-7 shall be deemed to satisfy the requirements of Sentence (1).

Table 9.8.8.2.

Specified Loads for Guards

Forming Part of Sentence 9.8.8.2.(1)

Location of Guard	Minimum Design Loads				
	Horizontal Load Applied Inward or Outward at any Point at the Top of the <i>Guard</i>	Horizontal Load Applied Inward or Outward on Elements Within the Guard, Including Solid Panels and Pickets	Evenly Distributed Vertical Load Applied at the Top of the Guard		
	concentrated load of 1.0 kN (224 lb) applied at any point (1)	0.5 kN (112 lb) applied over a maximum width of 300 mm (11% in) and a height of 300 mm (11% in) ⁽²⁾	1.5 kN/m (103 lb/ft)		
Guards serving access walkways to equipment platforms, continguous stairs and similar areas	1	Concentrated load of 0.5 kN (112 lb) applied at any point on individual elements	1.5 kN/m (103 lb/ft)		
All other <i>guards</i>	0.75 kN/m (52 lb/ft) or concentrated load of 1.0 kN (224 lb)applied at any point ⁽¹⁾	Concentrated load of 0.5 kN (112 lb) applied at any point on individual elements	1.5 kN/m (103 lb/ft)		
Column 1	.2	3	4		

Notes to Table 9.8.8.2.:

(2) See Sentence (2).