Multi-Ply AJS® and BCI® Members

Multiple ply AJS/BCI members may be used in many applications where single joists and/or beams are not suitable. Proper attachment of AJS/BCI joists is dependent upon the quantity of plies and the type of loading applied. The following document defines loading types and specifies the proper connection for the corresponding application.

Loading on a Multi-Ply AJS/BCI Member

Loading can be classified into the following groups depending upon orientation:

Uniform Top Loading – See page 2
- Floor joist application for longer spans/heavier design loads
- Beam application for supporting a parallel load-bearing or partition wall
- Dropped header application for supporting uniform load from above

Uniform Side Loading – See pages 3 & 4 for the Filler Block Specifications
- Header or girder application for supporting flush framing
- Top flange hangers hung from the side of a double joist

Concentrated Side Loading – See page 5
- Trimmer application for supporting a header for a rough opening
- Girder application for supporting beams

Concentrated Top Loading – See page 7
- Beam application for supporting posts, perpendicular walls

Uniform Load Connections

The table below lists the proper connection for the corresponding **uniform** load type; connection specifications follow.

AJS and BCI Series	Double Member	Triple Member	Quadruple Member
4500s 5000, 5000s	Uniform Top Load: Flange Nailing (optional) Uniform Side Load: Filler Block	Uniform Top Load: Flange Nailing Uniform Side Load – Not Allowed	Not Allowed
6000, 6000s, 60, 60s,	Uniform Top Load: Flange Nailing (optional) Uniform Side Load: Filler Block	Uniform Top Load: Flange Nailing Uniform Side Load – Not Allowed	Not Allowed
AJS 140, 150, 190 AJS 20	Uniform Top Load: Flange Nailing (optional) Uniform Side Load: Filler Block	Uniform Top Load: Flange Nailing Uniform Side Load – Not Allowed	Not Allowed
6500, 6500s,	Uniform Top Load: Flange Nailing (optional) Uniform Side Load: Filler Block	Not Allowed	Not Allowed
AJS 25, 30 90, 90s	Filler Block for all Applications	Not Allowed	Not Allowed

***Note**: Uniform top load must be evenly distributed to all joists for flange nailing to be applicable, with the exception of non-load bearing partition walls (page 4 – flange nailing specifications; page 2 – filler block detail).*

Evenly Top Loaded Members

As noted in the previous table, multiple BCI® / AJS® members (with the exception of AJS® 25, 30 and BCI® 90) that are evenly applied top loaded to each ply do not require attachment. However, the application of construction adhesive to the adjacent flange sides may be beneficial in limiting floor squeaks. Top loaded applications where the load is not evenly distributed (e.g.: bearing wall offset over member) shall be connected by filler block or evaluated by the project design professional of record. As noted, flange gluing is recommended but not structurally required.

Flange Nailing Specifications

Flange nailing may be installed for multiple BCI members that are evenly loaded with no side loads. The connection is intended to reduce the movement between joists and to limit any future floor squeaks. Apply construction adhesive to the sides of the flanges can also prevent such squeaks. **Top loaded applications where the load is not evenly distributed (bearing wall not centered over member, etc.) shall be connected with the filler block as shown on page 2.** As noted, flange nailing/gluing is recommended but **not structurally required**. Flange nailing is required when double joists are necessary to support non-load bearing partition walls.

AJS and BCI Series	Nailing
4500s	10d box or common – 16” on-center
5000, 5000s	10d box or common – 16” on-center
6000, 6000s, 60, 60s, 6500, 6500s AJS 140, 150, 190, 20	16d box or sinker – 16” on-center
90, 90s AJS 25, 30	Filler block between webs for all applications

Notes

- *Double Members: Nail into one side.*
- *Triple Members: Nail into both outside joists, stagger nails to avoid splitting of inside joist.*
- *Nail into both top and bottom flanges.*
- *Nail sheathing to all joists per diaphragm nailing schedule.*

Filler Block Connection Specifications

Filler block connections are to be used in applications where the joists are not loaded evenly. Filler block connections shall be used for uniform/concentrated side load conditions and top load conditions where the load is not centered or evenly distributed (flange nailing is structurally adequate for non-load bearing partition walls).

Stacked Filler Block (web cut for visibility)

AJS and BCI Series	Depth	Filler Block	COMMON WIRE NAILS Nailing Pattern	Maximum Factored Uniform Side Load (plf) given by connectors
4500s	9 ½”	Double 5/8” wood panel or 2x lumber	2 rows 10d nails @ 12" o.c., staggered & clinched	260
	11 7/8”, 14”			
	16”		3 rows 10d nails @ 12" o.c., staggered & clinched	390
5000, 5000s	9 ½”	Double ¾” wood panel or 2 x 6 lumber	2 rows 10d nails @ 12" o.c., staggered & clinched	260
	11 7/8"	Double ¾” wood panel or 2 x 8 lumber		
	14”			

AJS and BCI Series	Depth	Filler Block	COMMON WIRE NAILS Nailing Pattern	Maximum Factored Uniform Side Load (plf) given by connectors
6000, 6000s	9 ½”	2 x 6 lumber + 7/16” or 1/2” wood panel	2 rows 10d nails @ 12" o.c., staggered & clinched	260
6000, 6000s 60, 60s	11 7/8", 14"	2 x 8 lumber + 7/16” or 1/2" wood panel	2 rows 10d nails @ 12" o.c., staggered & clinched	260
	16"	2 x 10 lumber + 7/16” or 1/2" wood panel	3 rows 10d nails @ 12" o.c., staggered & clinched	390
AJS 140, 150,190	9 ½”, 11 7/8”	2 x __ lumber + 5/8” wood panel	2 rows 10d nails @ 12" o.c., staggered & clinched	260
AJS 20	9 ½”, 11 7/8”, 14”	2 x __ lumber + 5/8” wood panel	2 rows 10d nails @ 12" o.c., staggered & clinched	260
	16”		3 rows 10d nails @ 12" o.c., staggered & clinched	390
6500, 6500s	9 ½”	2 x 6 lumber + 5/8” wood panel	2 rows 10d nails @ 12" o.c., staggered & clinched	260
	11 7/8”, 14”	2 x 8 lumber + 5/8" wood panel	2 rows 10d nails @ 12" o.c., staggered & clinched	260
	16”	2 x 10 lumber + 5/8" wood panel	3 rows 10d nails @ 12" o.c., staggered & clinched	390
AJS 25. 30	9 ½”, 11 7/8”, 14”	Double 2 x __ lumber	2 rows 16d nails @ 12" o.c., staggered, nailed from both sides	270
	16”		3 rows 16d nails @ 12" o.c., staggered, nailed from both sides	405
	18” to 24”		4 rows 16d nails @ 12" o.c., staggered, nailed from both sides	545
90, 90s	11 7/8", 14"	Double 2 x 8 lumber	2 rows 16d nails @ 12" o.c., staggered, nailed from both sides	270
	16"	Double 2 x 10 lumber	3 rows 16d nails @ 12" o.c., staggered, nailed from both sides	405
90	18" & 20"	Double 2 x 12 lumber	4 rows 16d nails @ 12" o.c., staggered, nailed from both sides	545

Notes

- *Filler block is required between joists for the full length of span for uniform side loads, 24” minimum at concentrated side loads locations. Filler blocks do not need to be of a single length; butt joints are allowed, though no closer than 48” apart.*
- *Leave 1/8”- ¼” gap between the filler block and the bottom of top flange or the top of the bottom flange*
- *Nail sheathing to all joists per diaphragm nailing schedule*
- *The maximum factored uniform side load given by connectors can be doubled if the nails o/c spacing is reduced to 6”; AJS/BCI joists capacities should also be checked to determine if they can carry these maximum uniform side loads(governed by connectors)*

Concentrated Load Connections

Concentrated Side Loads

The following details show the proper connection of concentrated side loads to single and multiple BCI® / AJS® members.

TOP FLANGE HANGER
Hanger Max Factored Load = 1000
(350 lb w/o Backer Block)

FACE MOUNT HANGER
SINGLE BCI®/AJS® HEADER (typ.)
Hanger Max Factored Load = 1800 lb

FACE MOUNT HANGER
DOUBLE BCI®/AJS® HEADER (typ.)
Hanger Max Factored Load = 3500 lb

Notes

- *Use filler block thickness for corresponding AJS/BCI series as specified in filler block connection table (pages 3 – 4).For single concentrated side loads, minimum filler block length is 24" connected with min. 10 -10d nails.*
- *Nail sheathing to all joists per diaphragm nailing schedule.*
- *Refer to hanger manufacturer literature for reductions in hanger capacity due to I-joist headers.*
- *All backer blocks to be nailed with 10 -10d nails. AJS/BCI joists capacities should also be checked to determine if they can carry this maximum concentrated side load.*
- *All nails protruding more than ¼" shall be clinched.*
- *Hanger nails not shown in drawing for clarity – typ.*

BCI® / AJS® Header Blocking at Side Loaded Conditions

Required for triple members, recommended best practices for double members

Plan

Section A-A

Concentrated Top Loads

If the concentrated load is evenly supported by all the AJS/BCI's in the multiple members, no connection is required. However as is the case with uniform top loading, flange nailing/gluing is recommended. For concentrated top loads that are not evenly distributed, connect the AJS/BCI's at the load location using the filler block and nailing shown for concentrated side loads.

Double Joists Used as Lateral Load Collectors/ Drag Struts

As is the case with all lateral design, the connections of components are critical. If each individual joist is properly connected to adjoining framing, a filler block may not be required. However, the design of such a lateral force element shall be the responsibility of the project's design professional of record. Using a filler block between a double AJS/BCI joist drag strut does add structural redundancy to the component.