technical
information sheet

Lamination of Multiple LVL's

Introduction

Wesbeam Design Centre solutions, consulting engineer specifications, or span table applications may require the use of multiple LVLs mechanically fastened as a single beam, as denoted by the "/ " in the LVL size (e.g. 2 / 300x45 LVL = 2 of 300x45 LVLs)

Methods of fastening include:

- Nails
- Type 17 Tek Screws, or
- Bolt

Lamination Care

It is important to ensure that the individual LVL's are lined up on their top and bottom surfaces so as to ensure that loads can be transferred equally between the individual members after lamination

To avoid reducing the fastener efficiency, care should also be taken to ensure that the individual LVL members are dry and not cupped or warped before or after lamination.

Moisture entry between laminated members as such should be minimised or prevented by the use of elastomeric adhesives or sealants, of which should be applied along the top edge between individual members as shown in the figure below.

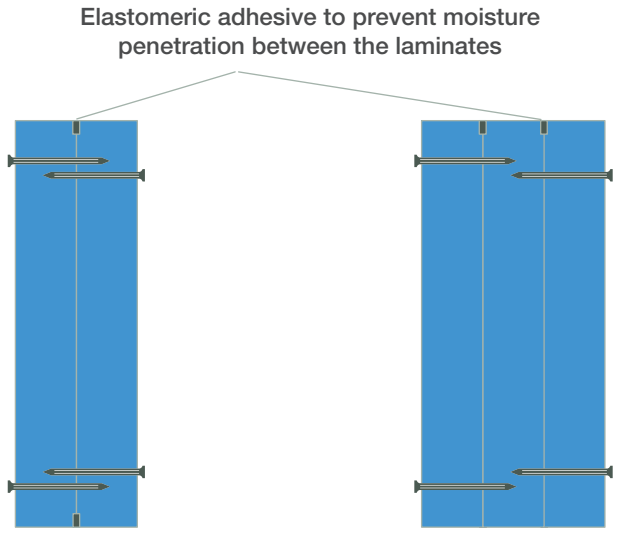
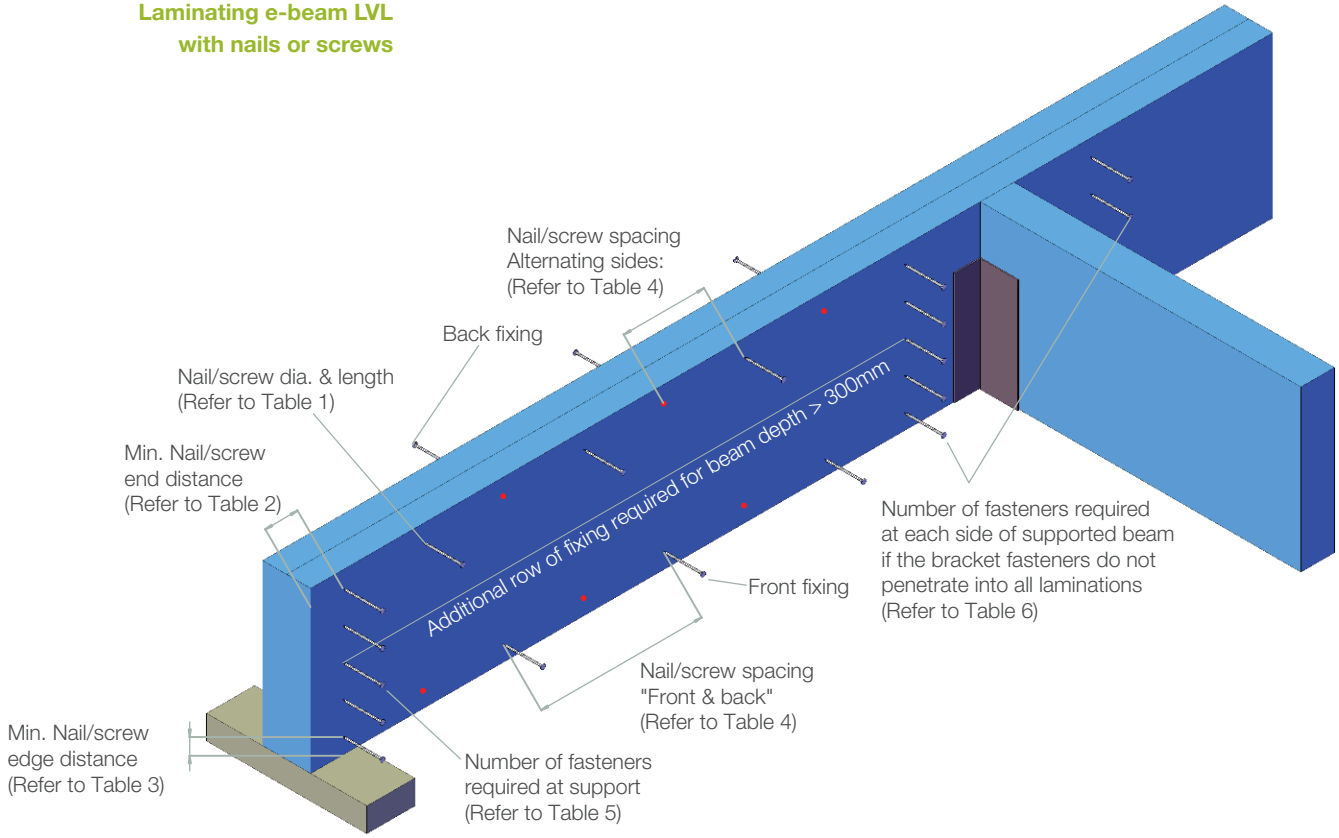


Figure 1: Screw/nail lamination

The following options for lamination of multiple e-beam LVL's can be used on site in residential applications. Where alternative fixing solutions are proposed, this should be confirmed by the project structural engineer or Wesbeam's engineering team prior to proceeding

Laminating e-beam LVL with nails or screws



Notes:

1 Where nails used are longer that the overall end thickness, exposed ends should be clenched over.

2 When using Type 17 or Bugle Batten wood screws it is recommended that the multiple section members be tightly clamped together. This will prevent the face of the second or third LVL member being pushed away while installing the screw.

3 Where a flush finish is required to the member a Bugle Batten screw fastener is recommended.

4 Type 17 screws with Hex heads are only suitable for joining 2 members together.

5 Multiple section members comprising 3 members should use Bugle Batten screw fasteners for internal lamina.

6 The top edge of the beams must be kept dry and shielded from weather exposure.

7 Minimum 2 rows of nails/screws are required for beam sizes upto and including 300mm depth. For beam sizes greater than 300mm depth, 3 rows of nails/screws are required.

Laminating e-beam LVL with nails or screw

The following table and diagrams outline the requirements for nail-laminating or screw-laminating multiple e-beam LVL members.

Table 1. Recommended fastener sizes

Laminated Section	Nails		Screws		
	Min. nail diameter	Min. nail length	Min. screw gauge	Screw shank dia.	Min. screw length
2/45 e-beam	3.05 mm	75 mm	No. 12	5.5 mm	75 mm
2/63 e-beam	3.33 mm	100 mm	No. 14	6.3 mm	100 mm
45+63 e-beam	3.33 mm	100 mm	No. 14	6.3 mm	100 mm
3/45 e-beam	3.05 mm	75 mm	No. 12	5.5 mm	75 mm

Table 2. Recommended fastener end distances

Laminated Section	Nails		Screws	
	Nail diameter	End distance	Screw gauge	End distance
2/45 e-beam	3.05 mm	65 mm	No. 12	60 mm
2/63 e-beam	3.33 mm	70 mm	No. 14	65 mm
45+63 e-beam	3.33 mm	70 mm	No. 14	65 mm
3/45 e-beam	3.05 mm	65 mm	No. 12	60 mm

Table 3. Recommended fastener edge distances

Laminated Section	Nails		Screws	
	Nail diameter	Edge distance	Screw gauge	Edge distance
2/45 e-beam	3.05 mm	20 mm	No. 12	30 mm
2/63 e-beam	3.33 mm	20 mm	No. 14	35 mm
45+63 e-beam	3.33 mm	20 mm	No. 14	35 mm
3/45 e-beam	3.05 mm	20 mm	No. 12	30 mm

Table 4. Recommended spacing of fasteners along beams

Laminated Section	Nails spacing		Screws spacing	
	Front & back	Alternating sides	Front & back	Alternating sides
2/45 e-beam	300 mm	150 mm	400 mm	200 mm
2/63 e-beam	300 mm	150 mm	600 mm	300 mm
45+63 e-beam	300 mm	150 mm	600 mm	300 mm
3/45 e-beam	300 mm	150 mm	400 mm	200 mm

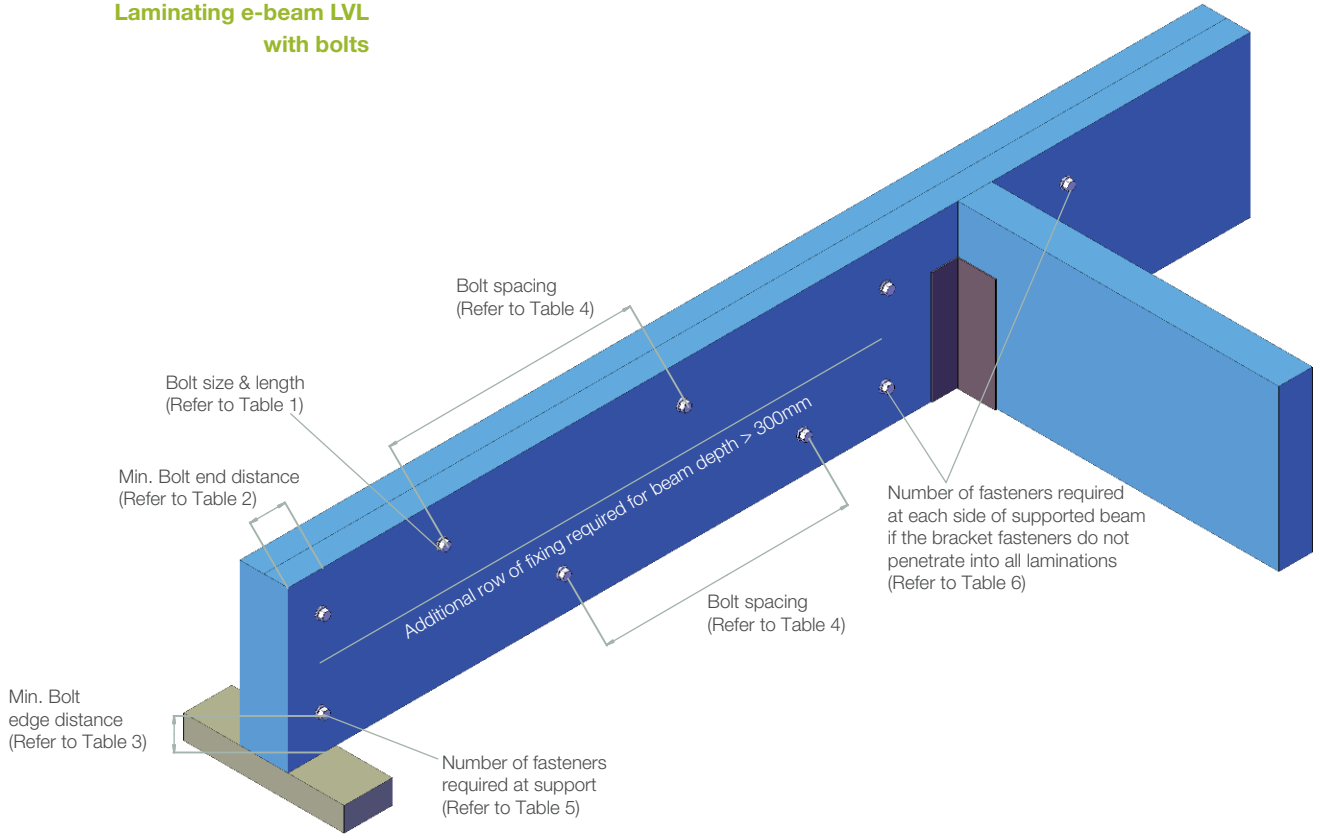
Table 5. Recommended number of fasteners required at supports

Beam Depth	Nails	Screws
90 to 170 mm	2	2
200 to 240 mm	4	3
300 mm	5	4
360 mm	6	4
400 mm	6	4

Table 6. Recommended number of fasteners at beam to beam connection

Beam Depth	Nails	Screws
90 to 170 mm	3	2
200 to 240 mm	5	3
300 mm	6	4
360 mm	8	4
400 mm	8	4

Laminating e-beam LVL with bolts



Notes:

1 Holes drilled for the installation of bolt fasteners should be the same dia. as the bolt shank dia. but not more than 1mm greater than the bolt shank dia. eg for 12mm bolts the max drill hole should be <13mm.

2 Where bolt fasteners are utilised to join multiple section members together the ends of the bolts are to be finished with 3mm thick, 5mm dia. flat steel washers.

3 Minimum 2 rows of bolts required.

Laminating e-beam LVL with bolts

The following table and diagrams outline the requirements for bolt-laminating multiple e-beam LVL members.

Table 1. Recommended fastener sizes

Laminated Section	Hex-head Bolts	
	Min. bolt size	Min. bolt length
2/45 e-beam	M12	125 mm
2/63 e-beam	M12	150 mm
45+63 e-beam	M12	125 mm
3/45 e-beam	M12	150 mm

Table 2. Recommended fastener end distances

Laminated Section	Hex-head Bolts	
	Bolt diameter	Bolt end distance
2/45 e-beam	12 mm	60 mm
2/63 e-beam	12 mm	60 mm
45+63 e-beam	12 mm	60 mm
3/45 e-beam	12 mm	60 mm

Table 3. Recommended fastener edge distances

Laminated Section	Hex-head Bolts	
	Bolt diameter	Bolt edge distance
2/45 e-beam	12 mm	60 mm
2/63 e-beam	12 mm	60 mm
45+63 e-beam	12 mm	60 mm
3/45 e-beam	12 mm	60 mm

Table 4. Recommended spacing of fasteners along beams

Laminated Section	Bolt spacing
2/45 e-beam	450 mm
2/63 e-beam	450 mm
45+63 e-beam	450 mm
3/45 e-beam	450 mm

Table 5. Recommended number of fasteners required at supports

Beam Depth	Bolts
90 to 170 mm	1
200 to 240 mm	2
300 mm	3
360 mm	3
400 mm	3

Table 6. Recommended number of fasteners at beam to beam connection

Beam Depth	Bolts
90 to 170 mm	1
200 to 240 mm	2
300 mm	3
360 mm	3
400 mm	3