

Notching or drilling joists

When installing pipe-work or cabling, floor or ceiling joists may need to be notched or drilled. But this could weaken the floor to such an extent that it becomes structurally unsound.

The guidance in this leaflet is only for use in **domestic properties** to determine the maximum sizes of notches and holes and the permitted location where they may be cut into timbers without structural calculations to justify their adequacy.

Single / multiple timber structural beams, rafters, purlins and binders must **never** be notched or drilled without calculations to justify the remaining timber.

Rafters may be birdsmouthed by no more than $\frac{1}{3}$ rd of the depth.

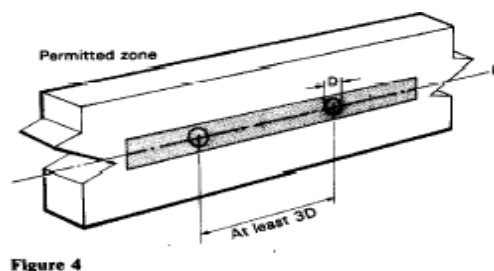
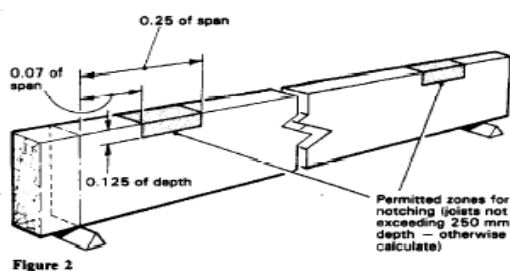
Notches of other sizes or in other locations may be acceptable if the joist is sufficiently oversized, however, you should always seek professional advice from a qualified structural engineer if the contents of this guidance does not include your proposal.

Remember

- Before you start work check that the joist size is adequate.
- Notches may only be made in the top of the joists, within the permitted area.
- Holes may only be made on the joists centreline within the permitted area.

Safe areas for notching

Depth and position of notches must be within the zones shown in the diagram below and only in the **top of the joists**.



Example to calculate safe areas for notching

Measure the clear span between supports and joist height .E.g. 3.0m (10'0") and 150mm (6").

Figures in bold type are constants

Safe area for notching is between

$$0.07 \times 3.0 (10'0") = 210\text{mm} (8\frac{1}{2}") \text{ and}$$

$$0.25 \times 3.0 (10'0") = 750\text{mm} (30")$$

The maximum depth of notch is

$$0.125 \times 150\text{mm} (6") = 19\text{mm} (3\frac{3}{4}")$$

So safe areas to notch are from 210 to 750mm from either wall, and up to 19mm deep.

Maximum depth of notch of any joist in any situation is 35mm.

Safe areas for drilling

Size and position of holes must be within the zones shown in the diagram above and only on the **centre line**.

Adjacent holes must be at least three times their diameter apart and no hole may be within 100mm (4") of a notch.

Example to calculate safe areas for drilling

Measure the clear span between supports and the joist height.

E.g. 3.0 m (10'0") and 150mm (6").

Figures in bold type are constants.

Safe area for drilling lies between

0.25 x 3.0 (10'0") = 750mm (30") and

0.40 x 3.0 (10'0") = 1200mm (48")

The maximum diameter of hole is

0.25 x 150mm (6") = 38mm (1½")

So safe areas to drill are from 750 to 1200mm from either end and up to 38mm diameter.

Maximum diameter of hole in any joist in any situation is 65mm.

Adequate floor and roof joist sizes

These tables are for floors and roofs of normal construction, and not coverings such as asphalt. Roof joists are not suitable for promenade decks. For other conditions please contact your designer or your Building Control surveyor.

- Measure the distance between the centres of adjacent joists and select the correct column.
- Look down the column until you find a length greater than or equal to the span of your joists.
- Read off the minimum joist size for that row.
- If your joists are this size or larger you may safely drill or notch them as recommended.

Information Taken From TRADA Eurocode 5 Span Tables – 3rd Edition

Floor joists (C16 grading)

Live (Imposed) Load 1.5kN/m² & Dead Load 0.25 – 0.5kN/m²

Minimum Joist size	Distance between joist centres		
	400mm	450mm	600mm
47 x 97	1.76	1.67	1.45
47 x 122	2.33	2.21	1.94
47 x 147	2.82	2.71	2.45
47 x 170	3.3	3.17	2.87
47 x 195	3.78	3.63	3.29
47 x 220	4.25	4.09	3.71

Flat Roof joists (C16 grading with maintenance access only)

Live (Imposed) Load 0.75kN/m² & Dead Load 0.5 – 0.75kN/m²

Minimum Joist size	Distance between joist centres		
	400mm	450mm	600mm
47 x 97	1.71	1.68	1.60
47 x 122	2.24	2.19	2.08
47 x 147	2.83	2.76	2.60
47 x 170	3.42	3.34	3.13
47 x 195	4.01	3.91	3.66
47 x 220	4.60	4.48	4.17