

# CEILING DIAPHRAGMS - LETS CONQUER THE CONFUSION

## TALKING TRADE

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There are many different thoughts about where and when a ceiling diaphragm is required. In a nutshell, ceiling diaphragms under light and heavy roofs are required to comply with NZS 3604:2011.

Bringing it back to basics, you need to understand bracing lines - the imaginary lines running along and across the full length or width of the plan for a timber framed building. Usually they are at a maximum of 6m apart. They have no physical significance but are required to control the positioning of bracing elements and allow even distribution. By understanding the bracing line concept and not being restricted by exact placement of supporting walls, designers have more freedom with room sizes.

Any 10mm or 13mm GIB® Plasterboard can be used for a GIB® ceiling diaphragm. Both timber and steel battens may be used for the structure of the diaphragm.

A GIB® plasterboard ceiling diaphragm is a stiff and strong horizontal element which will effectively transfer loads to connected

bracing walls/lines exceeding 6m or 7.5m with dragon ties to a maximum of 12m. The diaphragm itself does not have a bracing unit rating but is used when bracing lines exceed 6m separation. The basic shape of a ceiling diaphragm is square or rectangular (1:1 or 1:2). Protrusions are permitted but cut-outs for walls or sky lights are not. If a larger opening is unavoidable this must be in the middle 1/3<sup>rd</sup> of the diaphragm.\* Where fireplace flues or range hood openings are required to penetrate the diaphragm, use a galvanised metal backing plate as in the image on right.

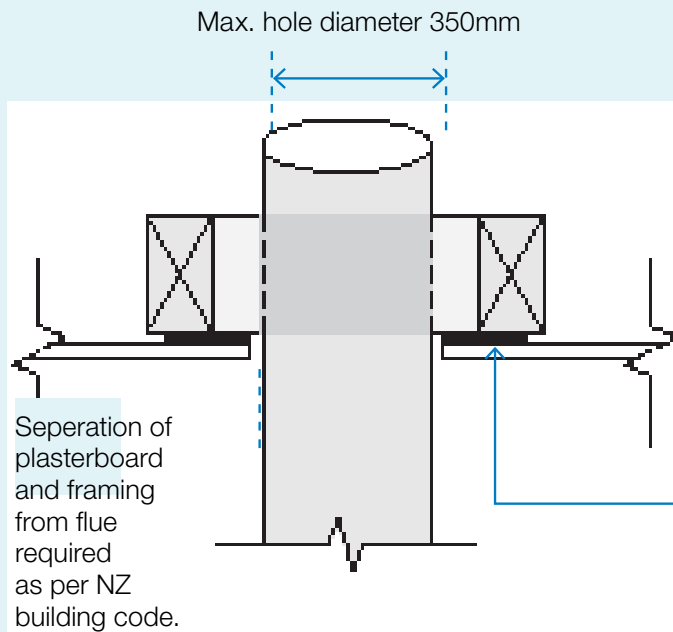
*\* Allowances for openings in the middle 3<sup>rd</sup>, please see Page 20 of our GIB EzyBrace® Systems Book.*

The length of a ceiling diaphragm shall not exceed twice its width, keep in mind this dimension is measured between supporting bracing lines, not the physical walls. Supporting bracing lines shall have a bracing capacity no less than the greater of 100 bracing units or 15 bracing units per metre of diaphragm dimension, these supporting walls are measured at right angles to the line being considered.

Linings must be installed over the entire area of the diaphragm. Fasteners are placed at specific centres around the perimeter of the ceiling diaphragm using the GIB EzyBrace® fastener pattern. For GIB® Rondo® Metal Battens, a metal channel or metal angle is required at the perimeter of the diaphragm. When planning your sheet set out, use full width sheets where possible. Minimum sheet size of 600mm x 1800mm provided all adjacent sheets are back blocked.

**For further information download the 'Best Practice Series No 6 and 7' from the GIB® Website or call the GIB® Helpline on 0800 100 442.**

## Section view



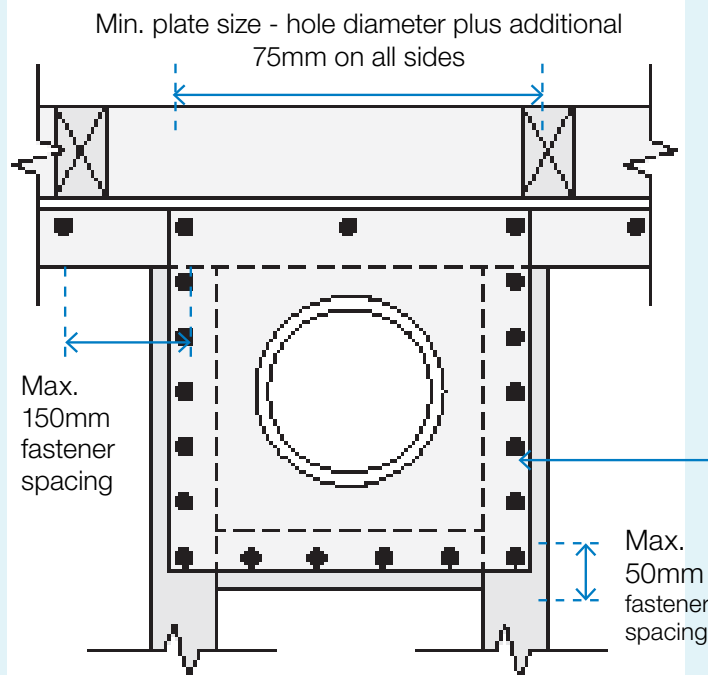
### Steel plate

0.55 BMT  
Galvanised sheet  
Max. opening  
350mm diameter.  
Installed prior to  
GIB® plasterboard.

### Framing

90 x 45mm framing  
trimmed to provide  
extra fixing.

## Plan view



### GIB® plasterboard ceiling

Installed over the  
steel plate and into  
framing using a  
minimum of 32mm  
x 6g GIB® Grabber®  
High Thread or  
32mm x 7g GIB®  
Grabber® Dual  
Thread screws at  
50mm max centre  
spacing.

Plasterboard ceiling not shown in plan view

Figure 1: Fireplace Flues and Range Hood Openings