

Downlights in Papakowhai homes

In this renovation research project, it was clear to see the impact of downlights on the homes' performance.

Nine homes in Papakowhai, Porirua, were renovated as part of Beacon's Papakowhai Renovation project. The extent of improvements varied from limited insulation, to full insulation and double glazing. These homes were ordinary 1970s houses and reflect typical styles and approaches to previous renovation. As these houses were monitored before and after renovation, it was possible to calculate the impact of downlights on the homes' insulation performance.

Case study 1

One case study home had 38 downlights penetrating the ceiling of the living, kitchen and dining areas, approximately one downlight per 1.6m^2 . Each had a 150-200mm-diameter uninsulated circle around it, significantly compromising the ceiling's effective R-value. Although ceiling insulation was upgraded to R5.2 in the living areas, the number of downlights meant effectively that 7.6m^2 of the ceiling would be uninsulated. The actual R-value of the insulation in the living areas would have been more like R2.5, less than the current Building Code minimum.

This was reflected in the low temperature improvements for this house, which raised indoor living room temperatures by only 1.1°C to a chilly average of 14.7°C .

Case study 2

Another home had 47 downlights throughout the house, equating to 1 downlight per 1.2m^2 and 6.1m^2 of uninsulated ceiling. Although the ceiling insulation was designed to reach R4.0, the number of downlights meant that it effectively reached only R2.2.



What can you do?

The best options: To get the most benefit from your ceiling insulation, replace your downlights with non-downlight fittings and fill in the hole in the insulation. You may be able to source a surface-mounted or pendant fitting which will cover and seal the downlight hole, or if you are undertaking major renovations, re-do your ceiling plasterboard.

Alternatively replace your downlights with new IC rated lights which can have insulation abutting and covering the lights.

Until you can renovate: Replace your old downlights with ‘CA-rated’ downlights. These downlights allow insulation to be butted directly up to them (‘closed abutted’ or ‘CA-rated’). They have an enclosed canister to stop the insulation being exposed to the heat from the bulb. However, you still cannot fit insulation (such as a blanket) over the top of the downlights. As well as changing your downlights, you should consider upgrading your ceiling insulation to compensate for the lost warmth. There is a range of CA-rated downlights available on the market. If you are not sure of the type you

For more information:

- See Factsheet 22 Downlights
- Beacon website www.beaconpathway.co.nz/existing-homes/article/what_is_the_papakowhai_renovation_project
- The Energywise website www.energywise.govt.nz has information about energy efficient lighting and advice on downlights and insulation.