

Design snow loads (s)

Design snow loads on steel sheds and garages can be broken down into two of the sub-categories covered by AS/NZS 1170.3, roof snow load and snow overhanging the edge of a roof.

AS/NZS 1170.3 states that the “loads shall be assumed to act vertically and refer to the horizontal projection of the area of the roof”.

TABLE 14 DESIGN SNOW LOADS

Roof snow load	Using the sections above for the respective load cases. $s = s_g C_e \mu_x$ Note that for all ground snow load less than 0.75kPa in sub-alpine areas, one load case of a balanced distributed load of only 0.4 kPa needs to be applied.
Snow overhanging the edge of a roof	This sub-category applies only to sections where the roof cantilevers out beyond the wall, such as an eave overhang system. Should be considered in addition to the roof snow load for that section of roof. $s_e = k(s_g C_e \mu_x)^2 / \gamma$ where, $k = 0.5$, coefficient to take account of irregular shape of snow at roof edges.

Source: Adapted from AS1170.3 Section 4

2.3 PERMANENT and IMPOSED ACTIONS

PERMANENT ACTIONS (G)

Permanent actions shall be determined in accordance with AS/NZS 1170.1 including the self-weight of the structure, all attached materials, *permanent* equipment and fittings.

Some permanent types of equipment and fittings incorporated in a building may be removable, but should still be considered as permanent actions. Where such items are not an essential part of the structure, and their removal could create an adverse load case, this should be considered in the ultimate limit state design.

IMPOSED ACTIONS (Q)

Uniformly distributed and concentrated actions shall be considered separately, as required by AS/NZS 1170.1.

Floors

Mezzanine floors should be designed for an imposed uniformly distributed action Q_1 appropriate to the building classification and intended use or a concentrated action Q_2 in accordance with Table 3.1 of AS/NZS 1170.1. A reduction factor as noted in Clause 3.4.2 of AS/NZS 1170.1 may also be applied.

Imposed actions for earthen floors and slabs for farm structures should be determined in accordance with AS/NZS 1170.1 Appendix B.

Roofs

Most roofs of steel sheds will be R2 roofs as defined in AS/NZS 1170.1. R2 roofs are not accessible from adjoining structures, windows, awnings, balconies, etc.

As specified in AS/NZS 1170.1, an imposed uniformly distributed action Q_1 of $(1.8/A + 0.12)$ kPa but not less than 0.25 kPa shall be applied vertically downwards to all R2 roof planes. The area 'A' is the plan projection of the surface area supported by the member under analysis, in square metres.



Designers should note particularly the application of Q_1 where a structural element of an R2 roof supports more than 200 square metres of roof area.

As specified in AS/NZS 1170.1, roof cladding should be designed to resist a concentrated action Q_2 of 1.1 kN. A concentrated action shall also be applied to structural elements, including roof purlins or battens, of R2 roofs. The value of Q_2 selected by the designer for structural elements may vary between 0.5 kN and 1.4 kN depending on the accessibility of the particular member and on the building classification.

2.4 LIQUID PRESSURE ACTIONS

The NCC requires that resistance to liquid pressure actions be considered in the structural design of buildings. Such actions may arise from:

- Static or moving floodwater, or from water-borne debris or contaminants;
- Contained liquids (e.g. storage vessels or silos); or
- Hydraulic ground water pressure.

In designated flood hazard areas, the NCC requires that certain building classes be designed to conform to the ABCB *Standard for construction of buildings in flood hazard areas*. This applies to buildings of NCC Class 2, 3, 9a (health care), 9c (aged care) and any Class 4 part of a building.

This Guide does not include specific recommendations for the design of buildings that may be subject to liquid pressure actions. AS/NZS 1170.1 contains limited information on determining actions for static liquids and ground water.

It is recommended that generic designs should contain an appropriate general exclusion for the effects of these actions. Generic buildings should not be recommended or sold for construction on sites where liquid pressure may act on the building.

Where resistance to liquid pressure actions is a specific design requirement, or the Building Authority rejects the exclusion, designers should exercise judgement and seek appropriate specialist advice.

Some guidance on flood resistant design and construction can be found in ASCE 24-05 (2006).

2.5 ACTION COMBINATIONS

TABLE 15 BASIC COMBINATIONS FOR STABILITY

STRUCTURAL SITUATION	ACTION COMBINATIONS
Net stabilising effects	0.9G
Net destabilising effects	1.35G 1.2G + 1.5 Q_1 1.2G + 1.5 Q_2 1.2G + W_u 1.2 G + F_{sn}



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