



TIMBER NOGGINS

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To AS 1684 or beyond

It's the cornerstone standard and covers much of residential building, but not all.

It's the stalwart of our industry. A bible that evolved from TRADAC and Timber Framing Manuals. And it is referenced on almost every architectural or engineering plan – "All timber framing details to comply to AS 1684" or similar. How far does this mysterious document extend, and what happens to those structures that go beyond?

The AS 1684 series is titled Residential timber-framed construction and comes in four parts:

- AS 1684.1 – Design Criteria
- AS 1684.2 – Non-Cyclonic Areas
- AS 1684.3 – Cyclonic Areas
- AS 1684.4 – Simplified Non-Cyclonic Areas

As a brief side note, AS 1684.1 was replaced by AS 1720.3 in 2016 but is still available as a superseded standard. There are many span tables which accompany AS 1684 and also design calculations within AS 1684 which rely on AS 1684.1. It is for this reason that until a full revision occurs on AS 1684 parts 2-4 to fully align it with AS 1720.3 that AS 1684.1 will still be referenced. AS 1684.4 is a simplified version of AS 1684.2 and not often used in practice.

The AS 1684 series does need some limitations, which are explained in this



Figure 1 – 3 levels and 49° roof pitch put this building outside of AS1684 requirements

article, otherwise you could potentially use it to build timber skyscrapers. The first of these relates to the type of building. AS 1684 is directly applicable to Class 1 and Class 10 buildings, hence the "residential" wording in the title. That being said, the scope also states it may be applicable to other classes of building where the parameters (such as floor live loads) are within its limitations. Therefore, if the building certifier agrees, AS 1684 can be used for a two-storey motel (Class 3), an office building (Class 5), restaurant (Class 6) or an aged care home (Class 9c).

The size of the building is also important to allow items such as wind bracing and uplift to be calculated correctly. The wind classification method (N1-N6, C1-C4) using AS 4055 is aligned with the geometric

limitations of AS 1684. If the building is outside these limits the wind classification will also be outside the scope of AS 4055.

AS 1684 is limited to two storeys which is defined as two levels of trafficable floors. This includes lofts and attics, so if you have a two-storey house with an attic room, AS 1684 is no longer directly applicable.

The width of the building must be a maximum of 16m, excluding eaves. This relates to the individual blocks of the building and not the plan dimensions of the overall house but even still there are many houses in rural settings that would be over this.

Then the roof pitch needs to be a maximum of 35°, which is normally the case. Note the building in Figure 1 (in the photograph above) has three levels and a 49° roof pitch, so crosses more than one of the limitations above.

Then, throughout the document there are some other items to be wary of. As an example, the maximum wall height is limited to 3m in common external walls (gable end walls can be higher). There is a note that

allows an increase to 3.6m where consideration is given to bracing forces and member sizes. Is a house that has a raked ceiling in the living area which has the lower wall at 2700mm and the higher wall at 3800mm outside the scope of AS 1684?

WATCHPOINTS

There will be many instances of these minor anomalies and a degree of sensibility should be used. If it is only in a small section and if the house would otherwise comply (say if it were a trussed roof) then the intent of the standard still exists, although care needs to be taken as noted above when designing wall studs etc. "Wall bracing to AS 1684" is a further catchphrase used on many plans which needs to satisfy more than just the geometric limitations, such as even distribution and spacing between bracing wall requirements.

Another more obscure item is that the subfloor of a two-storey house needs to be less than 1800mm from the ground. This is most likely to be encountered in high-set house construction in the Northern parts of the country (Qld/NT).

One item which can cause confusion is the notion of a pitched roof. This can be a non-coupled roof where rafters are sitting directly on support walls, ridge beams or intermediate beams. Alternatively, it can be a coupled roof construction with underpurlins and a ridge board which also requires ceiling joists and collar ties.

There are many instances where a pitched roof is constructed in part of a house where a ridge board, collar ties and rafters are used without a ceiling joist. This means of construction is not in accordance with AS 1684 and needs engineering design and sign-off.

What do you do if you are outside the limitations noted above? Much of this comes down to the level of departure and whether the standard still applies. Once the builder is aware of any items, the first discussion would be best had with the building certifier. They are ultimately responsible to ensure the building is in accordance with the NCC and will make a decision to still use AS 1684, use AS 1684 with some modifications or alternatively get appropriate sign-off on the required

elements that don't comply. If the latter is needed, your EWP supplier or nailplate company will have the capacity to help provide this documentation.

The limitations included in the AS 1684 series allow for a document that covers the majority of houses and other similar structures to be easily designed in timber in a deemed-to-satisfy manner. With architectural trends changing however, there are more houses which fall outside this scope, and when designing or supplying items you should be making the builder aware of this.

An astute building certifier is within their rights to ask for alternative certification by an engineer. Or as in the case of Figure 1, pictured opposite, the builder was on the front foot and had the structure certified by an engineer from the outset.

This proves that you can go through AS 1684 and continue beyond; you just need to tread carefully. **T**



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Above: AS 1684 is divided into several related parts.

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