



INTRODUCTION OF NEW GLULAM GRADES AND PRODUCTS

With yet another challenging year coming to a close, I'm sure we are all looking forward to a well-deserved break from the ongoing COVID-19 pandemic, timber supply issues and the booming construction industry as a whole. Before we all head into holiday mode, this edition of Tech Talk is intended to provide a quick update on recent developments in the Glued Laminated timber space which could have an impact on your business in the very near future, if you are not already feeling the impacts so far.

Glue Laminated timber (Glulam for short) comes under the Engineered Wood Products (EWP) range along with some of the more commonly known products such as plywood, Oriented Strand Board (OSB) and Laminated Veneer Lumber (LVL), just to name a few. One of the key differences with Glulam when comparing against a product like LVL, is that the mechanical properties have traditionally been assigned against specific grades, much like the F-Grading system. There are several Australian Standards which Glulam must conform to with respect to specifications on the product requirements, manufacturing & quality control processes, adhesives, finger jointing, grading and testing etc. For design purposes, the mechanical properties are provided in *AS 1720.1-2010 Timber Structures – Design Methods* under several different grades ranging from GL8 to GL18, as shown in Figure 1, which are minimum values that must be achieved to align with the particular grade.

TABLE 7.1
CHARACTERISTIC VALUES FOR STRUCTURAL DESIGN—GL-GRADES

| Stress grade | Characteristic values, MPa | | | | | |
|--------------|----------------------------|-------------------------------------|-------------------------|---|--|--|
| | Bending (f_b) | Tension parallel to grain (f_t) | Shear in beam (f_v) | Compression parallel to grain (f_c) | Short duration average modulus of elasticity parallel to the grain (E) | Short duration average modulus of rigidity for beams (G) |
| GL18 | 45 | 25 | 5.0 | 45 | 18500 | 1230 |
| GL17 | 40 | 20 | 4.2 | 33 | 16700 | 1110 |
| GL13 | 33 | 16 | 4.2 | 26 | 13300 | 900 |
| GL12 | 25 | 11 | 4.2 | 22 | 11500 | 770 |
| GL10 | 22 | 8 | 3.7 | 18 | 10000 | 670 |
| GL8 | 19 | 6 | 3.7 | 14 | 8000 | 530 |

NOTE: The characteristic values for tension for GL grades apply for tension members with the larger cross-sectional dimension not greater than 150 mm. For tension members with a cross-sectional dimension greater than 150 mm, the characteristic values are determined by multiplying the value in the table by $(150/d)^{0.167}$, where d is the larger cross-sectional dimension of the section.

Fig. 1 – Extract of Table 7.1 from AS1720.1-2010

It is evident that the grade classification covers a wide spectrum of properties and there are higher grades above GL18 which are produced by some manufacturers marketed and certified under specific brand or product names for compliance with the NCC. Grades above GL17 have traditionally relied on raw material from dense hardwood species feedstock such as Tasmanian Oak, Victorian Ash or Blackbutt. Unlike the lower GL grades, which rely primarily on pine and softwood feedstock, the difficulties with sourcing raw material in the required volumes appears to be the biggest factor driving the recent changes. As a result, intermediate Glulam grades are being introduced that fall between GL13 and GL17, which just happens to land in the gap from the current grading classifications. This could potentially lead to the introduction of intermediate grades from GL14, GL15 and even GL16 although the more likely scenario would be a mid-range grade of GL15 to bridge the gap.



Fig. 2 – Typical Glulam section manufactured from softwood raw material.

Market demand is already pushing manufacturers to introduce their own intermediate Glulam grades as their higher-grade products are being discontinued with all indications pointing to the fact that the higher GL grades will remain unavailable for the immediate future. Accommodating these changes in the relevant Australian Standards will take time which means manufacturers are producing specifically graded and branded product(s) using alternative means of compliance in a similar manner to LVL products. Grades above GL18 were successfully introduced in the past using this same process so it may be the preferred option moving forward rather than adding new intermediate grades into Australian Standards. The result would be that a GL15 product from one manufacturer could have different properties to a similarly branded GL15 product from another manufacturer since a benchmark does not exist yet unless close co-ordination amongst manufacturers is undertaken in the interim. Otherwise, designers and end users will need to ensure that the correct brand of product is used for design and supplied to site since it may not be a case of direct substitution.

Glulam manufacturers and suppliers are leading the charge by ensuring all of the necessary compliance requirements are met as their new Glulam products are being released into the market. Properties for design purposes would be available for engineers and designers while span tables or product-specific substitution guides are examples of other sources of documentation that a manufacturer might provide in the interim period. The inclusion of these specifically branded or intermediate grade products into proprietary design software, such as from Glulam manufacturers, external timber design software providers and proprietary nailplate software packages will no doubt also form part of the market implementation process. In this interim period, please ensure that you seek advice from the appropriate Glulam manufacturer or supplier if you intend on using their new range of products. It is important to remember that intermediate grades between GL13 and GL17 do not currently exist therefore it is important to ensure you have all the available documentation from the supplier which provides verification for compliance and also includes guidance on design.

This edition of FTMA Tech Talk was written by Nick Cui, Design Services Manager ANZ of our Gold Sponsor, Pryda.



If you have any questions for Nick, please don't hesitate to contact him.

Ph: (03) 9554 7001

E: ncui@prydaanz.com