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MASTERING MATERIAL SELECTION FOR ACOUSTIC DESIGN

1. What is reverberation time and what is its impact on acoustic quality in an interior space?

Reverberation time refers to the amount of time it takes for sound to fade away after the source has ceased. If the reverberation time is too long, sound waves continue to reflect, creating echoes and making speech difficult to understand. Conversely, if the reverberation time is too short, the room may feel "dead".

2. In terms of acoustic design, what is the difference between perforated and unperforated wall and ceiling linings?

Perforated materials feature holes or slots that increase the surface area through which sound waves can enter. This quality improves sound absorption. In contrast, unperforated panels generally provide little to no sound absorption, depending on the material used.

3. What are the key differences between common wood-based products used in interior applications, such as solid wood, veneers, plywood and MDF?

Solid wood is natural timber cut directly from trees. Veneers are thin slices of wood applied to a substrate for a premium finish with reduced material use. Plywood is made from layered wood veneers bonded at right angles for strength and stability. MDF is composed of fine wood fibres bonded with resin, offering a smooth, consistent surface ideal for painted or machined finishes.

4. A wall or ceiling lining system must comply with the Group Number specified in Table S7C4. How are Group Numbers determined?

Group Numbers are determined by evaluating the fire performance of wall and ceiling lining materials according to the Australian Standard AS 5637.1. There are two primary methods for determining Group Numbers: AS ISO 9705 Full-Scale Room Test and AS/NZS 3837 Cone Calorimeter Test.

5. Explain why fibre cement is considered a sustainable material.

Fibre cement's use of Portland cement gives it a higher initial carbon footprint due to the energy-intensive production process. However, its sustainability lies in its durability and longevity, as it requires minimal maintenance and reduces the need for frequent replacements, lowering its overall environmental impact over time. It is also non-toxic and contains recycled content.

6. List at least three tools or resources that are useful when assessing a product or material's sustainability credentials.

Life-Cycle Assessment (LCA); Environmental Product Declarations; Green Building Rating Systems (e.g., LEED, Green Star, or WELL); Green Product Standards; and/or Product Certifications (e.g., FSC, PEFC or C2C).