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FASTENING Design of BRIGGS XTRAWIDE PRECOATED T&G for **DIRECT STICK** TO EXISTING T&G WOOD FLOOR, PLYWOOD

Xtrawide flooring is specially designed to the Australian Timber Engineering Standards; Residential Timber-framed Construction AS 1684 & Timber Structures AS1720 & The Building Code of Australia (herein 'BCA') references AS1720-1997

These Standards specify that any "other method(s) of design" may be used provided that the assumptions and criteria for design demonstrate satisfactory safety and serviceability performance and his document is the "reports containing complete information on the basis for the use of any material or method of design shall be made available".

Because Briggs Xtrawide flooring is fastened only to an existing structural surface, this surface must comply with the 'BCA' requirements. Briggs Xtrawide flooring is .

fastened by glue to an existing structural surface and is required to transmit loads imposed through the installed Xtrawide flooring to the structure below it. The design therefore must ensure these loads can be fully transmitted.

The loads on the Xtrawide floor can be vertical due to dead and live loads and horizontal due to natural wood movement in service. The design method adopted is to compare the capacity to withstand loads achieved using the recommended installation method of hardwood flooring with the installation method specified[1] for Briggs Xtrawide flooring.

[1] See Briggs document "Install Xtrawide PRE-COATED T&G DIRECT STICK TO EXISTING WOOD, PLYWOOD .doc"

DESIGN STRENGTH OF COMPARATIVE METHODS OF INSTALLATION

CONVENTIONAL T&G INSTALLATION
for floor boards up to 85mm wide.

a/ ***calculate the vertical 'hold down' strength***.
The worst case for this is when nailed into joint class JD6 joists.
This installation method uses a single secret nail spaced up to 450mm apart on one edge of a T&G board with the T&G relied on to transmit loads in the vertical direction between boards.
WITHDRAWAL ULTIMATE LOAD CAPACITY for a single nail 2.5mm diameter:
Q_k = 3.7N/mm
The length of shank of a nail 65mm long through 12mm of wood from the top of the tongue into a joist is 57mm. Therefore the withdrawal load is 0.85 x 57 x 3.7 = 179N.
Nails spaced 450mm lengthwise and 85mm across the grain give a total 'hold down' ultimate strength of 4.68kN/m2.

b/ ***calculate the shear strength***
The worst case for this is when nailed into joint class J6 joists.
Q_k = 220N for 2.5mm single shear loading
The nail holding shear ultimate capacity is 0.85 x 220 = 187N
When applied over 1m2 this gives an ultimate shear resistance of 4.89kN/m2.

BRIGGS XTRAWIDE T&G FLOOR INSTALLATION

When installing Briggs Xtrawide flooring the boards are glued to an existing structural surface and the ability to support the imposed load is only enhanced by the addition of the extrawide flooring. The hold down ability of the glue and the shear strength still needs to comply with OR EXEED the capacity of a floor up to 85mm wide when secret fastened in accordance with AS1684.

a/ The glue specified for installation of Briggs Xtrawide flooring has an ultimate load in tension of 1000kN/m2 and this is **200 TIME STRONGER** than the requirement of AS1684

b/ The glue specified for installation of Briggs Xtrawide flooring has an ultimate load in shear of 1496kN/m2 and this is **300 TIMES STRONGER** than the requirement of AS1684

The enormous reserve of strength obtained from use of the 100% bed of glue exceeds the requirements of the Standards and the assumptions and criteria for design demonstrate satisfactory safety and serviceability performance. Complete information on the basis for the use of the glue and wood materials and method of design are provided.