



Title: Gluability of Accoya™ wood with PURBOND SW 400 for use in joinery

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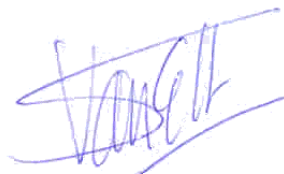
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Project number: 7.039

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Entries: Gluability, BRL 2339, accelerated weathering, PURBOND SW 400, Accoya™ wood, KOMO certification, BRL 0605

Summary

Titan Wood B.V. appointed SHR to investigate the gluability of Accoya™ wood for use in joinery with PURBOND SW 400 according to part 3 of the BRL 2339 “Adhesives for non loadbaering applications” dated 1999-02-01. The technology behind Accoya™ wood is based on wood acetylation. In this investigation Accoya™ wood was tested as part of the research scheme for KOMO certification BRL 0605 “Modified Timber”.

Based on the test results, it can be concluded Accoya™ wood glued with PURBOND SW 400 does comply with the requirements as described in part 3 of the BRL 2339 “Adhesives for non loadbaering applications” dated 1999-02-01.



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1 Assignment

Titan Wood B.V. appointed SHR to investigate the gluability of Accoya™ wood for use in joinery with PURBOND SW 400 according to part 3 of the BRL 2339 “Adhesives for non loadbearing applications” dated 1999-02-01. The technology behind Accoya™ wood is based on wood acetylation. In this investigation Accoya™ wood was tested as part of the research scheme for KOMO certification BRL 0605 “Modified Timber”.

In co-operation with a Dutch certification body, SKH, and research institute, SHR, Titan Wood has established an independent research programme to test the quality of Accoya™ wood. This programme consists of:

1. KOMO certificate BRL 0605 “Modified Timber”. Here the emphasis is on the uniformity and reproducibility of the production process, as well as on Titan Wood’s quality system.
2. Fulfilment of the (material) requirements as listed for use in certified Dutch joinery (SKH Publication 97-04). The Emphasis here is on material properties, such as durability, dimensional stability and paintability.

In this research the gluability of Accoya™ wood with PURBOND SW 400 was tested according to BRL 2339 (part 3), dated 1999-02-01.

2 Execution of the test

2.1 Identification and description of the samples

Accoya™ wood samples (original wood species Radiata Pine) were produced in Titan Wood’s pilot plant. The adhesive PURBOND SW 400 was produced by Purbond AG. There was no product information sheet delivered with the adhesive. Gluing was performed according to information given by Titan Wood.

2.2 Period of the test

The test was carried out from 9th March 2007 to 2nd May 2007.

2.3 Procedure

The test was carried out according to the assessment guideline BRL 2339.

The suitability for use in joinery after 3 weeks of accelerated weathering consists of 3 parts:

1. Preparation of the test pieces
2. Treatment of the test pieces
3. Evaluation of the test pieces

Part 1 Preparation of the test pieces

Five T-joints with hardwood dowels (Ø 14) were glued at 90° to each other in accordance with the following process:

Part of sill (horizontal part) 6 x 114 x 300 mm, part of stile (vertical part) 67 x 114x 200 mm. The glue was applied on one side (total 350 g/m²) and the dowel was glued-in. After this the T-joint was kept under pressure for 25 minutes (pressure 1,2 N/mm²). Before the accelerated weathering test, the cross-sectional ends (end grain) of the T-joints were sealed.

Part 2 Treatment of the test pieces

The test pieces were treated in an accelerated weathering chamber for 6 weeks according to the following cycle:

- 8 hours of IR-radiating with a maximum surface temperature of 70 °C
- 24 hours sprinkling with water of 15 °C
- 40 hours freezing at a temperature of -10 °C
- 8 hours sprinkling with water of 15 °C
- 16 hours rest (no actions)
- 8 hours of IR-radiating with a maximum surface temperature of 70 °C
- 64 hours rest (no action)

This cycle took one week and was repeated six times.

Part 3 Evaluation of the test pieces

After completion of the drying period the test pieces were evaluated. The total length of the open glue joints was determined with an accuracy of 1 mm. After the accelerated weathering and the determination of the length of the open glue joint, the strength and wood fracture of the T-joints was measured using a pressure test.

2.4 Apparatus

- Woodworking machinery
- Sandpaper grit 100
- Balance with an accuracy of 0,1 gram
- Mechanical glue press (Zwick and Instron).
- Climate room; 65 ± 5% R.H. and 20 ± 2°C.
- Precision magnifying glass.
- Feeler gauge 0,1 mm.
- Accelerated weathering chambers.

3 Results of the test

In table 1 the results of the suitability for use in joinery according to BRL 2339 are shown.

Table 1. Results of the suitability for use in joinery according to BRL 2339

Test specimen	Weight specimen		Total length of glue joint [mm]	Open glue joint				Wood failure (%)
	Before weathering [g]	After weathering [g]		After 3 weeks [mm]	After 3 weeks (%)	After 6 weeks [mm]	After 6 weeks (%)	
7039.1	2055	2580	135	0	0.0	0	0.0	10
7039.2	1932	2480	135	28*	21.1	42	31.4	10
7039.3	1873	2280	135	8*	5.7	17	12.4	30
7039.4	1926	2277	135	0	0.0	0	0.0	10
7039.5	1736	2089	135	0	0.0	4	2.6	20
Average								16

*Open glue joint is the result of a local glue line thickness of > 0,1 mm and therefore not used for the final evaluation.

In the BRL 2339 it is stated that a positive recommendation for a glue, for the use in joinery, can be given when;

- the samples tested have no open glue line (after 3 weeks accelerated weathering) **or**,
- a minimum average of wood failure of 80% after the pressure test.

4 Conclusion

Based on the test results it can be concluded that Accoya™ wood glued with PURBOND SW 400 does comply with the requirements as described in part 3 of the BRL 2339, dated 1999-02-01.

References

BRL 0605 (dated 31-01-2003). National Assessment Directive for the KOMO® Product Certificate Modified Timber. Stichting Keuringsbureau Hout SKH, Wageningen, the Netherlands.

BRL 2339 (dated 1999-02-01). Adhesives for non-load bearing applications. Stichting Keuringsbureau Hout SKH, Wageningen, the Netherlands.

SKH Publicatie 97-04 (Nieuw concept 13 april 2006). Beoordelingsgrondslag Houtsoorten voor toepassing in geveltimmerwerk; eisen en bepalingsmethoden. Stichting Keuringsbureau Hout SKH, Wageningen.