XYLOFON WASHER

SEPARATING WASHER FOR SCREWS

ACOUSTIC PERFORMANCE

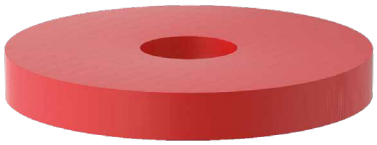
It improves soundproofing by decoupling of timber-to-timber joints made with screws.

STATICS

The washer increases the rope effect in the connection, thus improving the static performance of the detail.

SWELLING OF TIMBER

It gives the joint a certain adaptability to mitigate stresses resulting from shrinkage/swelling of the wood.



CODES AND DIMENSIONS

SEPARATING WASHER FOR SCREWS

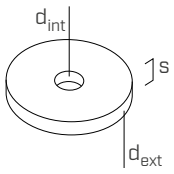
CODE	d_{SCREW}	d_{ext}		d_{int}		s	pcs
	[in]	[mm]	[in]	[mm]	[in]	[in]	
XYLW803811	0.32 - 0.40	38	1.50	11	0.44	0.24	50

ULS 440 - WASHER

CODE	d_{SCREW}	d_{ext}		d_{int}		s	pcs
	[in]	[mm]	[in]	[mm]	[in]	[in]	
ULS11343	0.32 - 0.40	34	1.34	11	0.44	0.12	200

For more information on the product, go to www.rothoblaas.com.

GEOMETRY



MATERIAL

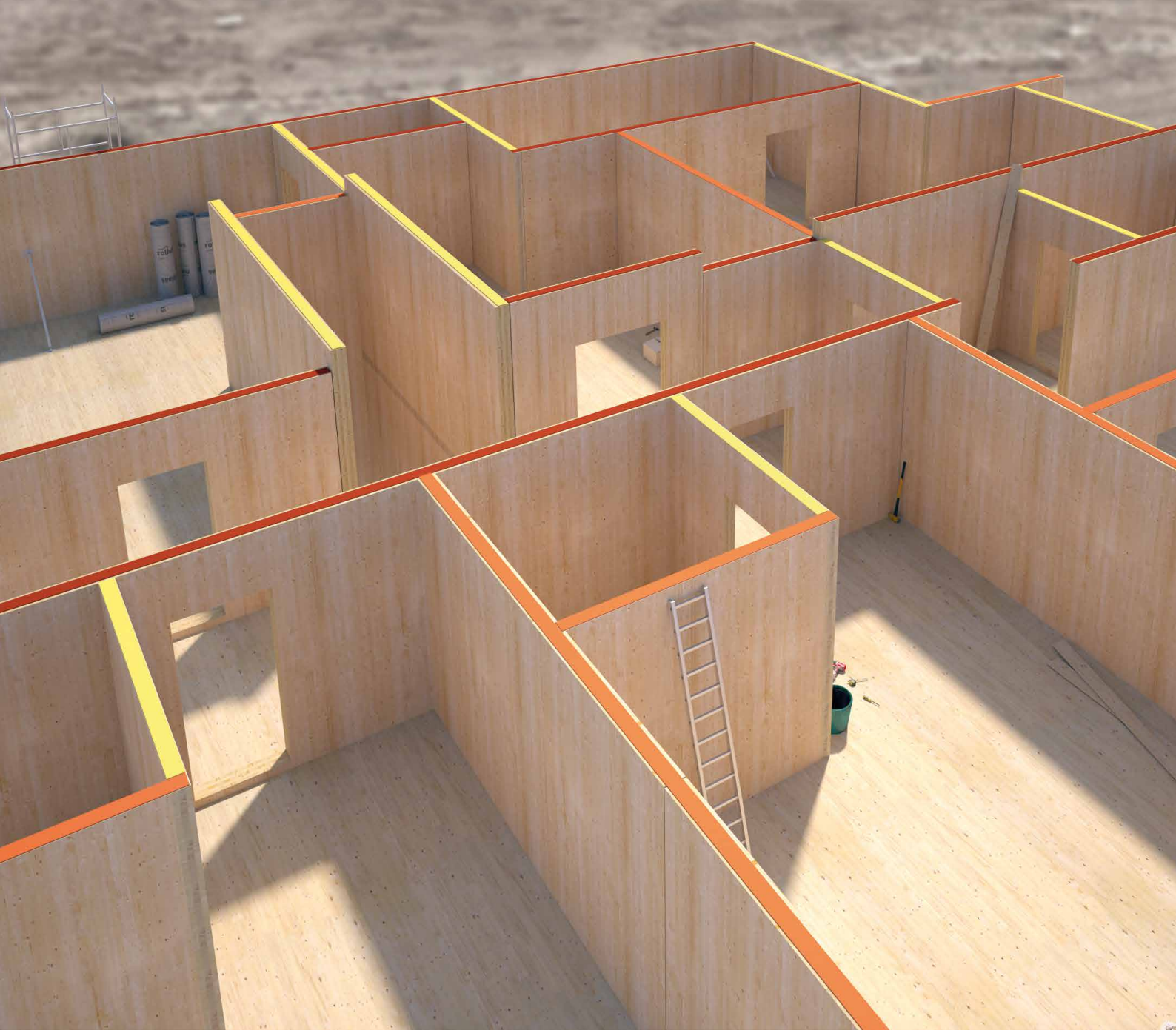
PU polyurethane

TESTED

The static performance has been tested at the University of Innsbruck for safe use in structural applications.

SAFE

Thanks to its modified polyurethane blend, it is extremely chemically stable and resistant to creep deformation.



More acoustic comfort in your timber house

XYLOFON is the very high performance resilient profile that ensures acoustic comfort in timber structures and houses. Made of a polyurethane compound, it is available in 5 versions from 20 to 90 shore, on the basis of the load it has to support. Tested and certified for use as a desolidarisation and mechanical interruption layer between building materials, it reduces the transmission of airborne and structural noise (up to more than 15 dB). Rely on the best performing acoustic profile on the market.

Scan the QR code and discover the technical features of XYLOFON

rothoblaas.com

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Solutions for Building Technology

RESEARCH & DEVELOPMENT

STRUCTURAL DESIGN AND ACOUSTICS

The mechanical behaviour of timber-to-timber shear connections with a resilient sound insulation profile in between was studied in depth, both in terms of strength and stiffness, through an extensive experimental campaign.

EXPERIMENTAL INVESTIGATION

1 ANALYTICAL CHARACTERISATION OF A GAP CONNECTION USING PREDICTIVE MODELS

For the analytical evaluation of the mechanical parameters of the connection (strength and stiffness), models available in the literature were applied, which modify Johansen's basic theory.

2 APPLICATION OF THE MODEL TO CONNECTIONS WITH AN INTERPOSED RESILIENT PROFILE

Over 50 configurations considered by varying numerous parameters.

RESILIENT PROFILES

Thickness investigated: 1/4", 2 x 1/4", 3 x 1/4"

XYLOFON 35-50-70-80-90

Polyurethane
(monolithic and deformable)

PIANO A-B

EPDM
(expanded and compressible)

PIANO C-D-E

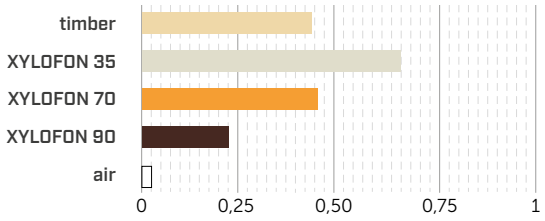
EPDM
(monolithic and deformable)

CONNECTORS

HBS Ø0.24 | HBS Ø0.32 | HBS Ø0.40
HBS + SHARP METAL

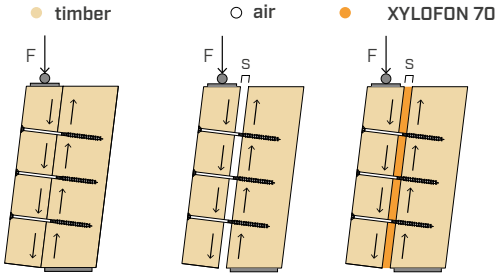
3 ASSESSMENT OF THE FRICTION COEFFICIENT μ FOR XYLOFON ACOUSTIC PROFILES

The tests carried out revealed interface properties of a frictional nature that seem to particularly influence the behaviour of the timber connections, especially in terms of strength.



4 EXECUTION OF MONOTONIC TESTS

For the validation of the predictive model studied, samples with one and two shear planes were tested.

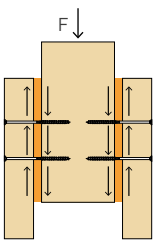


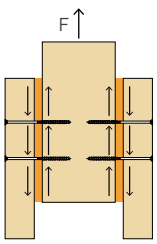
5 EXECUTION OF CYCLIC TESTS

For the comparison of the behaviour under monotonic and cyclic loads, samples with two shear planes were tested.

over **250 TESTS**

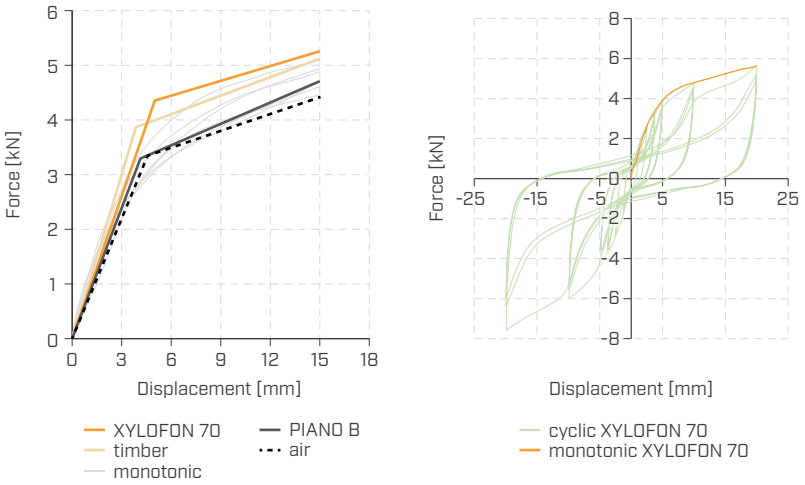
Experimental campaign carried out in cooperation with:
CIRI Edilizia e Costruzioni
Interdepartmental Centre for Industrial Research
Alma Mater Studiorum - Università di Bologna





6 CAMPAIGN RESULTS

The results were analysed by bi-linearising the experimental curves. It can be seen that the cyclic behaviour is consistent with the monotonic behaviour.



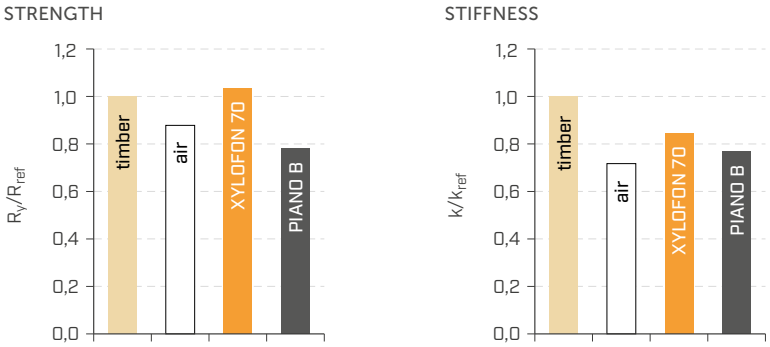
Graphical representation of experimental data from monotonic tests (left) and cyclic tests (right).

7 INTERPRETATION OF RESULTS

The comparative analysis focused mainly on strength and stiffness parameters.
The values obtained in the various configurations were made adimensional with respect to the TIMBER case.

Monolithic, deformable **polyurethane and EPDM** profiles (represented by XYLOFON 70 in the graphs) do not significantly change the strength **of the connection when the elastic modulus** of the material changes compared to the timber-to-timber case.

With expanded **and compressible profiles** (represented by PIANO B in the graphs), on the other hand, the variation from the reference configuration is more significant.



parameter	influence on strength		influence on stiffness
profile structure	**medium-high**	R_y ↓ as compressibility increases(*)	**medium**
s [profile thickness	**significant**	R_y ↓ as thickness increases (for s > 6 mm (1/4"))	**significant**
d [connector diameter	**medium**	ΔR_y ↓ as the diameter increases	**medium**
interface properties	**significant**	R_y ↑ as the profile hardness decreases (shore)	**low**

(*)Directly proportional to the % of air contained in the material.

According to the analytical model, the use of **large thickness values (s > 1/4")** leads to a progressive degradation of strength and stiffness regardless of the type of profile interposed.

Mechanical stiffness, on the other hand, shows a more or less marked degradation trend depending on the different parameters investigated and their interconnection.

In conclusion, the mechanical behaviour of the investigated connections under monotonic and cyclic loading conditions is not particularly influenced by the presence of the monolithic XYLOFON and PIANO acoustic profiles.

The strength values, as a first approximation, can, in the case of profiles with a thickness not exceeding 1/4", always be traced back to the case of direct timber-to-timber connection, thus neglecting the presence of the acoustic profile.