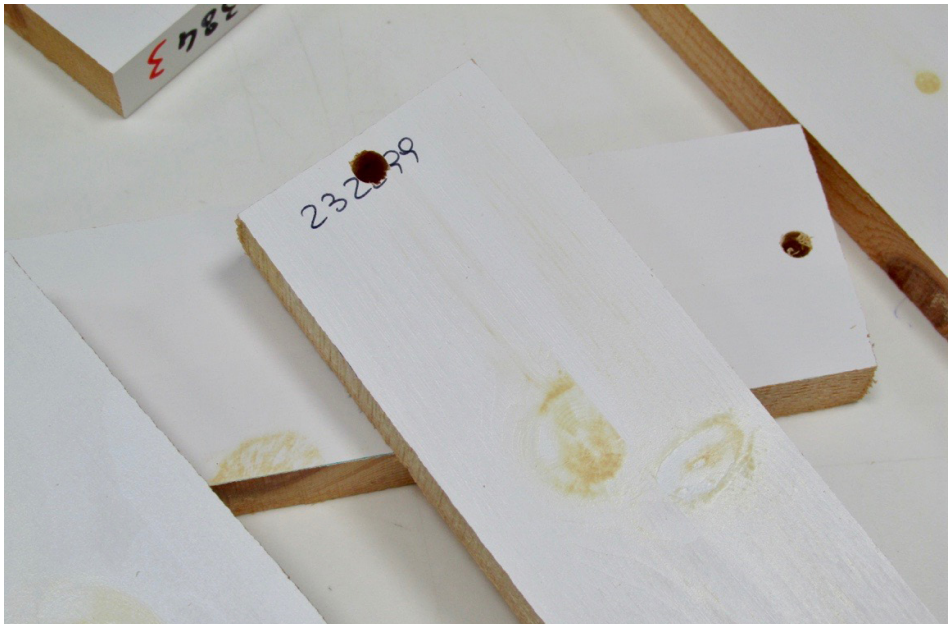
Yellowing of knots on lacquered softwood: results after one year of testing

Sara Moruzzi

A new IKEA specification was released last year in order to assess the behavior of stained and lacquered softwood with knots. This is because knots might give rise to a natural yellowing due to exposure to light, appearing as an indelible "stain" on furniture surfaces.
CATAS, as IKEA recognized laboratory, has immediately set up this kind of test to provide it to its customers and now, after one year from the beginning of the testing, shows its first results.



More than 500 specimens have been tested, with white (91 %) or grey (9 %), water-based, water-based UV or "mixed" coatings (combinations of one or more than one water-based layers with more than one water-based UV layers).
The most relevant data shown by this analysis is this: **only 63 % of samples pass the test**, that are 67 % of white samples and only 24 % of grey samples (see table 1, figure 1 and 2).

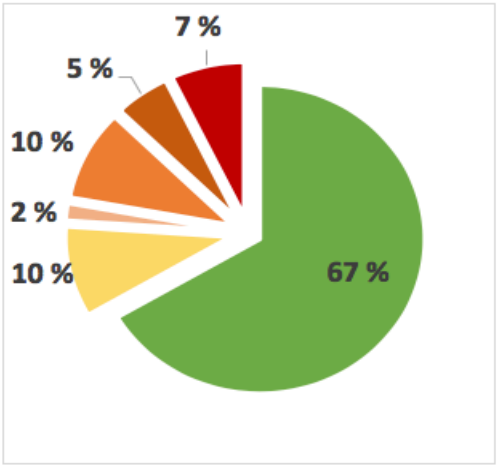


Figure 1 – Percentage for each rating of examined WHITE samples.

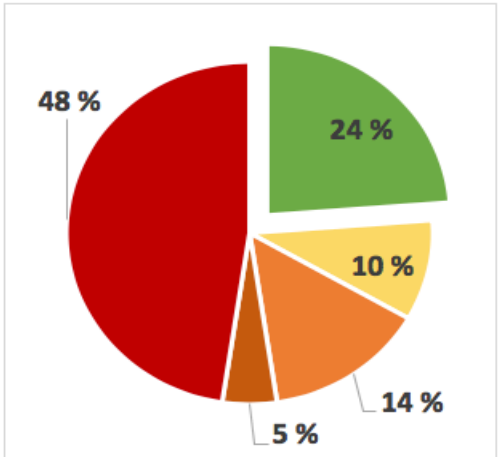


Figure 2 – Percentage of each rating of examined GREY samples.

What does "yellowing of knot" test consist of?
The "yellowing of knot" is based on an artificial weathering test which simulates the natural weathering of wood in an indoor environment and allows to evaluate the degree of colour change specific of the knots. The test can also be useful to assess the characteristics of the specific wood used and the ability of the coating to prevent this phenomenon.

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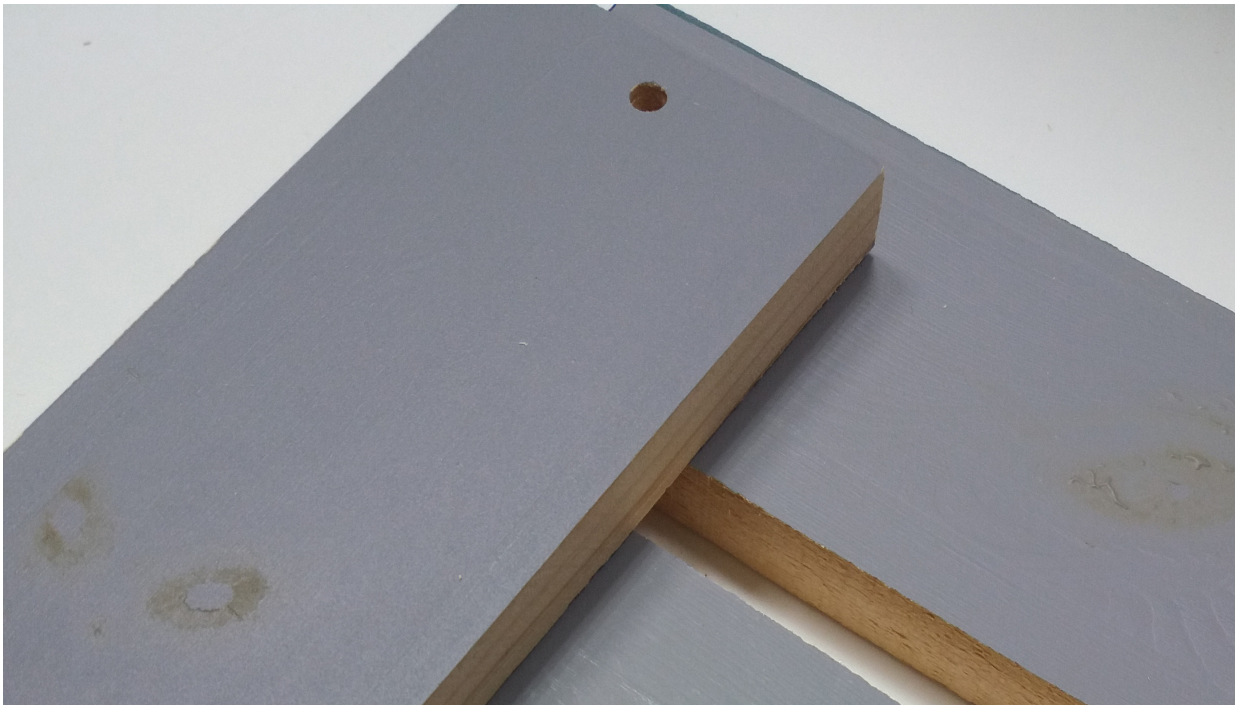
	WHITE	GREY	TOTAL
TOTAL	91,3	8,7	100,0
PASS	60,7	2,1	62,8
FAIL	30,6	6,6	37,2
that are:			
2-2	8,7	1,2	9,9
3-3	6,6	4,1	10,7
MIXED RESULTS	15,3	1,2	16,5
that are:			
1-2	8,7	0,8	9,5
2-3	5,0	0,4	5,4
1-3	1,7	0,0	1,7

Table 1 – Percentage for each rating of examined samples.

According to the testing method, two specimens of the same sample have to be tested and then assessed basing on the degree of colour change:
1 – no visible knot yellowing;
2 – slightly visible knot yellowing;
3 – strongly visible knot yellowing.
This analysis shows that **in 16,5% of cases the two specimens of the same sample obtained a different result** ("mixed ratings" 1-2, 1-3, 2-3, all fails, see tab. 1), probably because of the inherent variability of wood substrates.



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Do different types of coating lead to different results?

This analysis underlines that the majority of samples that do not pass the test are coated with a water-based coating (see tab. 2 and 3).

In particular, **all grey samples with water-based coating do not pass the test,** while about 67 % of grey water-based UV coated samples and 50 % of grey samples with "mixed coatings" pass the test.

As to white samples, test is passed by 55 % of water-based coated samples, 91 % of water-based UV coated samples and 100 % of samples with "mixed coatings".

	TYPE OF COATING		
	water - based	UV water - based	mixed coatings
PASS	54,9	91,3	100,0
FAIL	45,1	8,7	0,0
that are:			
2-2	14,3		
3-3	6,8	4,3	
MISTI	24,1		
that are:			
1-2	13,5	4,3	
2-3	7,5		
1-3	3,0		

Table 2 - Percentage of examined WHITE samples, distinguished by coating type.

	TYPE OF COATING		
	water - based	UV water - based	mixed coatings
PASS	0,0	66,7	50,0
FAIL	100,0	33,3	50,0
that are:			
2-2	14,3		50,0
3-3	71,4	33,3	
MISTI	14,3		
that are:			
1-2			
2-3	14,3		
1-3			

Table 3 - Percentage of examined GREY samples, distinguished by coating type.

This analysis shows that water-based coatings are not able to prevent the "yellowing of knots" phenomenon as the water-based UV coatings. Therefore, we hope that this stimulating result might encourage both the producers and the users of different coating products to study and test new and increasingly more resistant formulations and coating cycles.

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