

ALL ON EDGE

**Development of Objective Test Methods
for Furniture Edges and Rims**

Summary of the 3rd User Committee Meeting

Work Plan

WP-A
Mechanical and adhesion
resistance

WP-B
Short-term methods

WP-C
Long-time prognosis

WP-D
Dissemination and Meetings

Work Package	Activity/Task
WP-A	Mechanical and adhesion resistance
Task-A1	Definition, production and providing of samples with different furniture edges
Task-A2	Methodological investigations on new test methods on impact on edges and rims
Task-A3	Methodological investigations on new test methods on adhesion resistance on rims
Task-A4	Comparative tests of the optimised methods on mechanical resistance
Task-A5	Round robin tests of optimized test methods on mechanical resistance
Task-A6	Final description of suitable methods for mechanical resistance
WP-B	Short-term methods
Task-B1	Definition, production and providing of samples with different furniture edges
Task-B2	Methodological investigations on new test methods on damp and water resistance
Task-B3	Methodological investigations on new test methods on contact heat and temperature resistance
Task-B4	Comparative tests of the optimised short-term test methods
Task-B5	Round robin tests of optimized short-term test methods
Task-B6	Final description of suitable short-term methods
WP-C	Long-time prognosis
Task-C1	Definition, production and providing of different coating/glue materials and furniture edges
Task-C2	Investigations on aging behaviour of coatings and glues under the influence of temperature and humidity
Task-C3	Methodological investigations on long-term prognosis
Task-C4	Comparative tests of the developed long-term methods
Task-C5	Round robin tests of optimized long-term methods
Task-C6	Final description of suitable long-time methods
WP-D	Dissemination and Meetings
Task-D1	Conference papers or articles
Task-D2	Technical reports and draft descriptions of test methods
Task-D3	User Committee Meetings
Task-D4	Project promotion - website, fairs, branch magazines etc.

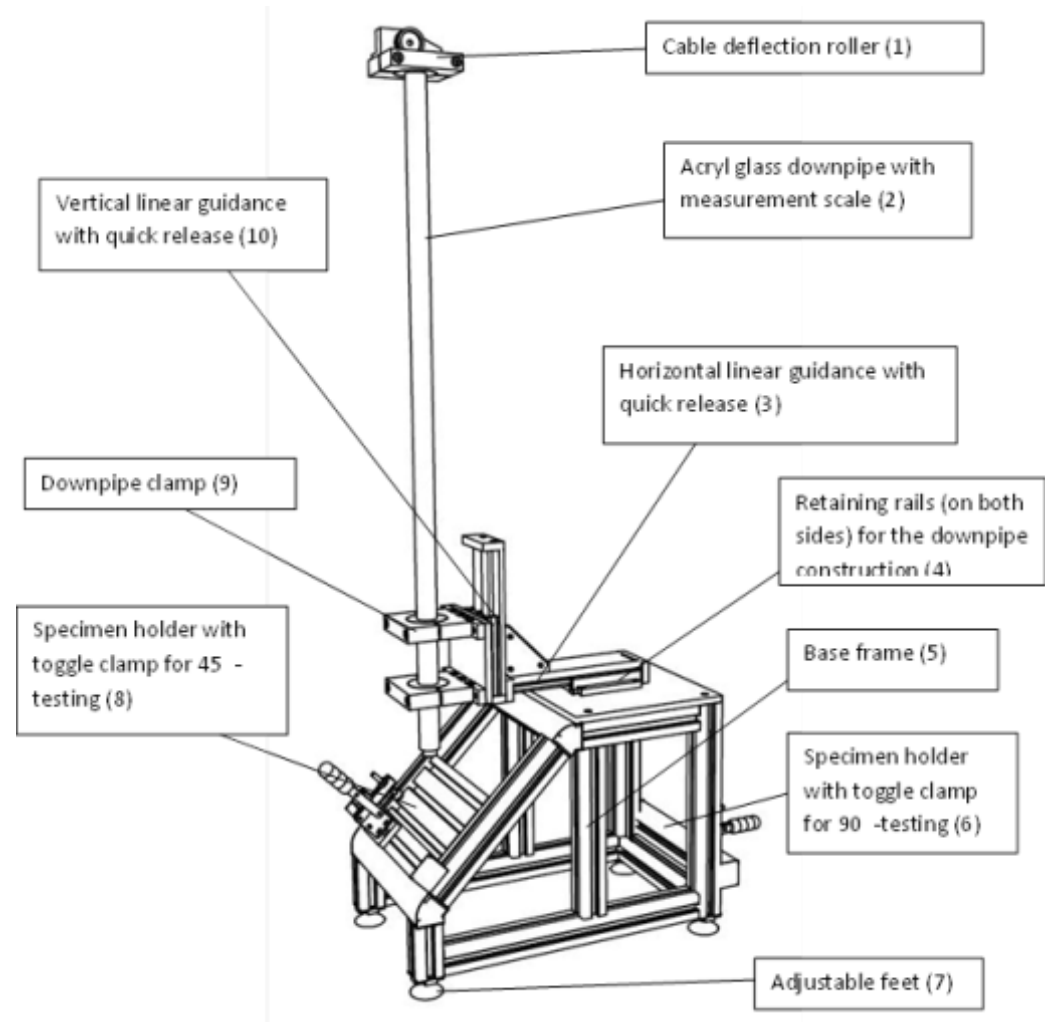
Work Package A

„Mechanical and adhesion resistance“

Part „Impact“

- Time shift about 6 months.
- New test resistance device with different impact masses constructed.
- Comparative tests finished.
- RRT started, more participants needed.
 - The method seems to have a very good repeatability and reproducibility
 - this must be confirmed by further RRT participants
 - Also the RRT has shown until now a clear differentiation between the qualities.

Appliance 2: Finished testing device with different impactors



Appliance 2: Finished testing device with different impactors

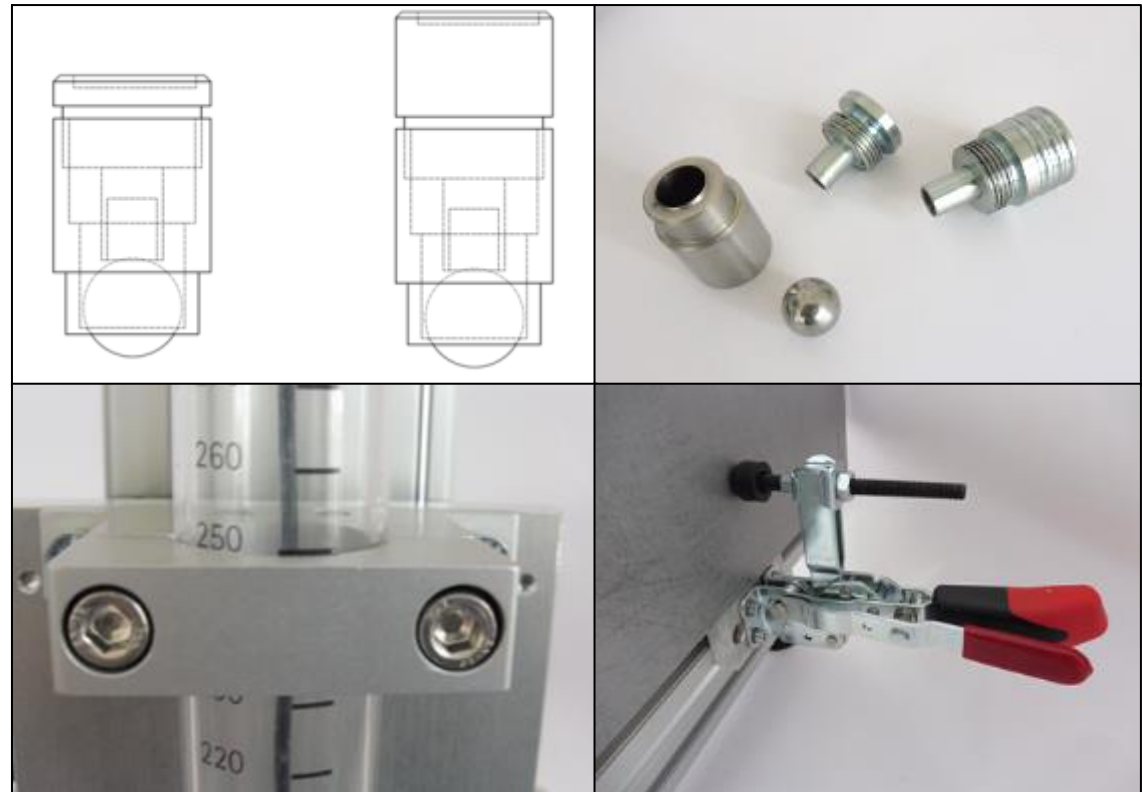
Mass change is realised through a defined weight of the upper part

100 g

150 g

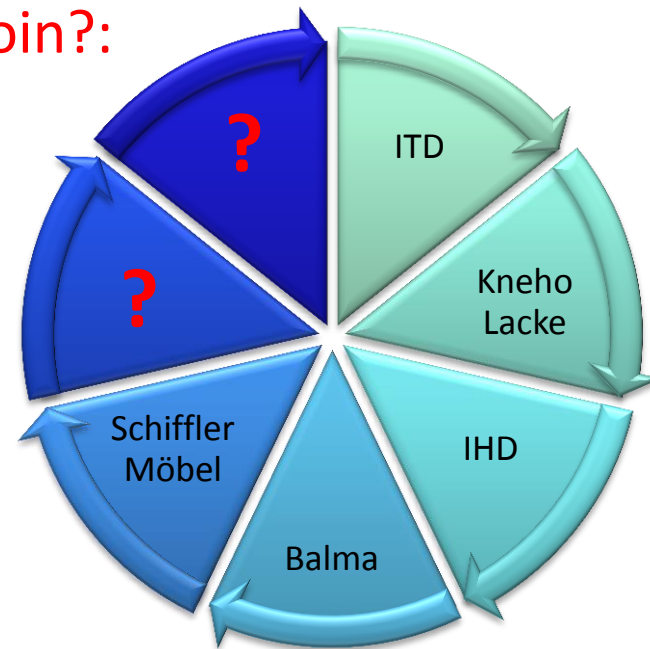
100 g

150 g



Summary and further work

- The proposed method and device are suitable for rim and edge testing.
- Best parameters need to be found in the RRT.
 - Proposal: 100 g and 150 g, different heights (5-60 cm).
- RRT participants – **who could join?:**
 - ITD
 - Kneho Lacke
 - IHD
 - Balma
 - Schiffler Möbel
 - ?
 - ?



Work Package A

„Mechanical and adhesion resistance“

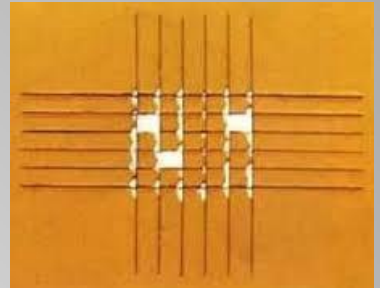
Part „Adhesion resistance“

- Time shift about 6 months.
- Tests with planned device delivered no satisfactory results.

Task A-3

New assumption of adhesion test

- ✓ Use the methodology of adhesion test for flat surfaces – **cross-cut test**
- ✓ Assessing the resistance of paint coatings **on rim** to separation from substrates when a **strip pattern** is cut into the coating, penetrating through to the substrate.
- ✓ Medium: cutting knife
- ✓ Evaluation: **Pass/fail** scale rate after a **short treatment with adhesive tape**





**mtv cross cut test with self adjusting cutting head
and automatic reset function, ideal for curved surfaces**

CC 5000-1 (ca. 780,- €)

Cutting knife with single resiliently mounted cutting edges

Cutting distance 6 x 1 mm (0-60 μ m)

Conform to DIN EN ISO 2409

Next steps

- ✓ **Development of new method for adhesion resistance test**
- ✓ **Assessment of test method on repeatability**
- ✓ **Comparative test** - the test round at IHD & ITD
 - Start: May-June 2017?
- ✓ **Round Robin Test**
 - Start: September-October 2017?
 - Participants

Lp.	Participant
1	ITD
2	IHD
3	
4	
5	

Work Package B „Short-term methods“ – Part „Water and damp resistance“

- Time shift about 6 months (project prolonged)
- Problems with material delivery – method development with 6 materials only
- Status:
 - Methodological investigations on damp resistance finished
 - Comparative tests for damp resistance possible – problems with temperature distribution within the testing device
 - RRT postponed or change to water resistance RRT
 - Orientating methodological tests for water resistance finished

Summary and outlook

- The preliminary results do not allow a predicament of suitability of the procedure for further testing for all types of gluing, as a good differentiation does not seem to be possible at the moment
 - the procedure needs changing (harsher but shorter?)
- Weight gain analysis confirms the information from the test but gives no additional knowledge. For swelling assessment, mean and maximum value shall be noted + as visible swellings between the measurement points.
- It is crucial to pursue the tests with more samples of different qualities to develop a reliable and differentiating test method – **who can deliver?**
- RRT could start in Summer 2017 (July/August):
 - **Who would participate in a RRT on water and/or damp resistance?**
 - ITD
 - IHD
 - ...
 - ...
 - ...

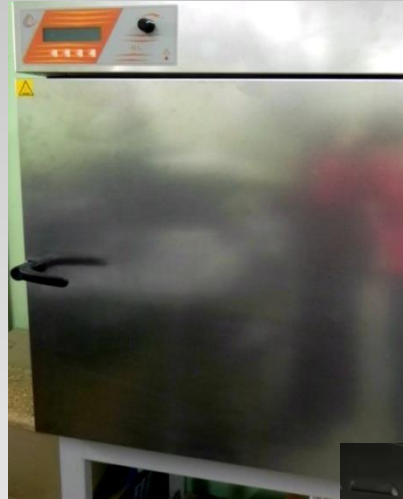
Work Package B „Short-term methods“ – Part „Temperature resistance“

Task B-3

Developed test methods

✓ Temperature resistance test:

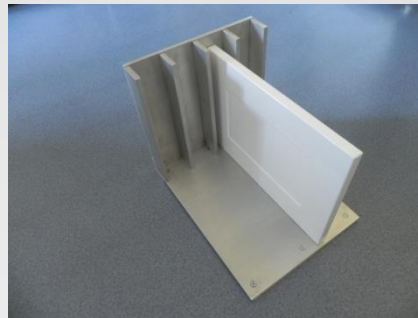
- laboratory drier 50-110°C



✓ Combining contact heat with temperature resistance test:

- ~~laboratory drier with aluminium~~

~~block 50-110°C~~



Task B-3

Assessment

Scale rate **0-1** for **defects (A/B/C)** on **edges** of tested sample

A.Changes in the surface structure of the edges (cracking, blistering, peeling)

0 – no change in the surface structure

1 – visible change in the surface structure

B.Changes in glue joints (collapsing and/or opening of glue joint, and/or shrinking of edge band)

0 – no changes in glue joints

1 – visible changes in glue joints

C.Delamination

0– no delamination

1– visible delamination/ edge band detached

Task B-3

Temperature resistance test

Comments:

- ✓ No difference in the resistance of edges exposed to temperature test and combined contact heat with temperature test
- ✓ After 1h of temperature contact, samples shall be **conditioned 24 h before assessment**

Advantages:

- ✓ Reliable to discriminate between products of different quality levels
- ✓ Availability of drier in laboratories

Disadvantages:

- ✓ long time (15-30 min) to obtain defined temperature
- ✓ the whole element is heated
- ✓ emission of harmful gases during test performance

Task B-3

Test method to be elaborated

✓ **Contact heat resistance** test with the use of **heating rail** with adjustable constant temperature – **background: IKEA test method**

✓ **Heating rail** with housing to keep the constant temperature

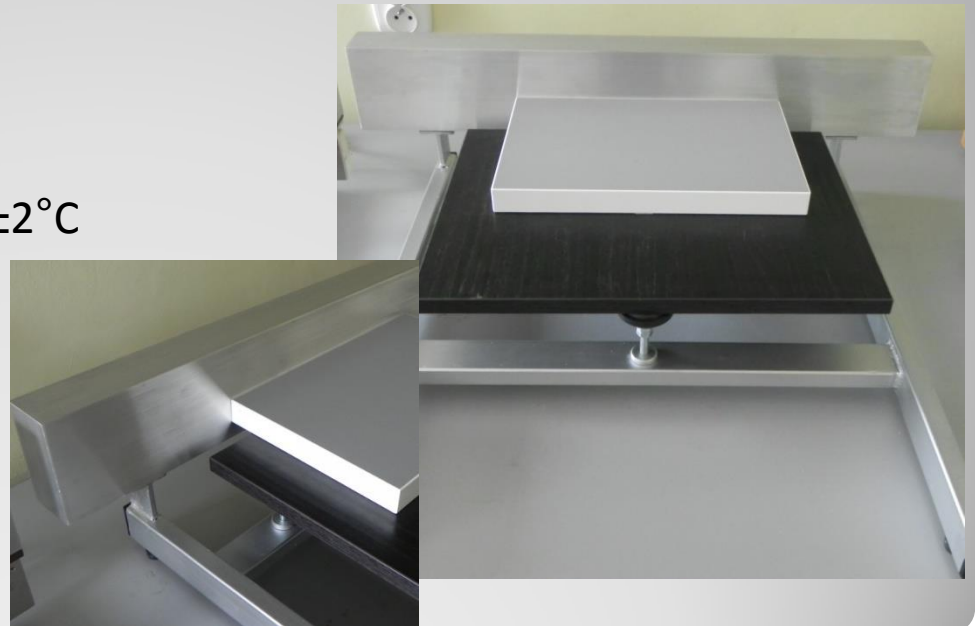
✓ **Size of test pieces will be defined.**

✓ **Test parameters:**

- temperature range: 60-140°C
- increase in temperature by $10 \pm 2^\circ\text{C}$
- time of exposure 1 h

✓ **Assessment:**

- scale rate 0-1
(the same as in temperature resistance test?)



Next steps

- ✓ Performance of **contact heat resistance** test and if necessary modification of test procedure – April/May 2017
- ✓ **Chosen** of test method with the **highest repeatability and suitability for edges quality assessment** - May 2017
- ✓ **Comparative test** - the test round at IHD & ITD
 - Start: May – June 2017?
- ✓ **Round Robin Test**
 - Start: June or September 2017?
 - Participants

Lp.	Participant
1	ITD
2	IHD
3	
4	
5	

Work Package C „Long-term methods“

Summary

- PP and ABS reveal no significant thermal- and humidity-induced aging behavior
- Both primers decrease the microhardness of ABS and PP → advantageous
- Both primers raise the surface energy of the coated plastics and the polar part coincidentally
- The overall SE values of both plastics (with and without primer) are high enough for a complete wetting of the surfaces by all adhesives investigated
- All hotmelts show a more or less intensive thermal- and humidity-induced aging behavior according to their chemical stability
- PUR hotmelt as the only reactive hotmelt undergoes a strong chemical changing resulting in strong decreasing polar part
- The EVA hotmelt variants are the most suitable glues for application on the substrates investigated considering their SE values and the resulting adhesion prediction
- The SE analysis disregards effects such as penetration or chemical bonding

Next steps regarding long time comparative test

- Based on the results of the aging regime done for adhesives and edge materials only (30 d: 12 h 50 °C/50 % r. h.; 12 h 50 °C/90 % r. h.) the following cycle for complete composites was deduced for a round robin test:
 - 55 °C / 90 % r. h. / **8** h
 - 10 °C / 90 % r. h. / **8** h
 - -10 °C / **8** h
 - 30-60 days, evaluation **in the 1st week every day** and than each **7** days
 - **Rate of heating/cooling must be defined**
 - **For lacquered parts maybe with a pre-test on abrasion or layer thickness on rims?**
- Who can imagine taking part on an RRT?:
 - ITD
 - FCBA
 - IHD
 - **?**
 - **?**

Work Package D „Dissemination Measures“

- Previous activities:
 - MEBLE POLSKA Furniture Fairs, 9.03.2016, Poznań Poland – ITD.
 - Seminar about projects realized in programs TANGO1 and CORNET, 24.10.2016, Faculty of Wood Technology SGGW, Warsaw, Poland – OIGPM and ITD.
 - Information on the OIGPM website
 - Information in the OIGPM Newsletter
- Draft IHD Works Standard on Impact Resistance
- Planned:
 - SEMINAR – FURNICA – SEPTEMBER 2017 – POZNAŃ (International Trade Fair of Components for Furniture Production)
 - MEBLE POLSKA Furniture Fair 2018, March, Poznań Poland

Please write us an e-mail or call us
if you could deliver any samples
or take part in an RRT.

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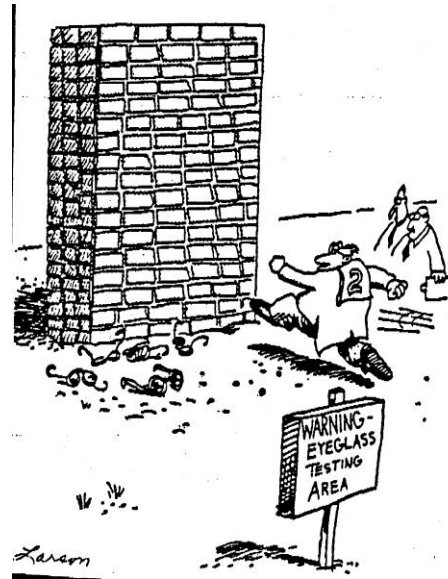
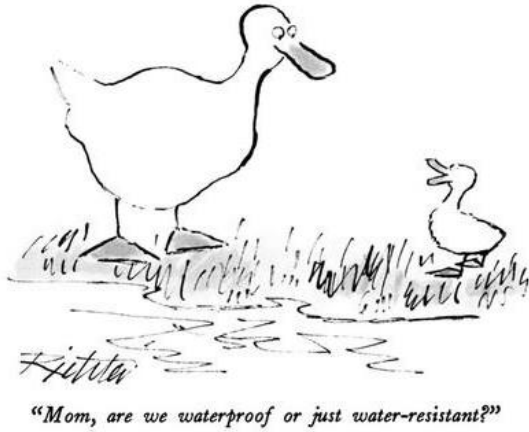
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We would like to thank all the companies for the cooperation within the project, especially for the delivered material, fruitful discussions and feedback.

We will be glad to welcome you at IHD Dresden on 13.-14.11.2017





Impact testing ;-)



Thank you!

