ALL ON EDGE

Development of Objective Test Methods for Furniture Edges and Rims

„Contact heat/temperature resistance”

Workpackage WP-B

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3rd UC Meeting Poznan, 03-04 April 2017

The aims of WP-B

- Development or modification of resistance test methods to **WATER/DAMP** and **CONTACT HEAT/TEMPERATURE**.

- Comparison of methods on their repeatability and reproducibility level.

- Preparation of the final description of suitable short-term methods as a proposal for the European Standardization Group.

Activities of WP-B

Leader: ITD

TASKS	ACTIVITY	RESPONSIBLE	TASK STATUS
B-1	Definition, preparation and providing of different furniture edges	IHD/ITD	done
B-2	Methodological investigations on new test methods for damp and water resistance	IHD	in progress
B-3	Methodological investigations on new test methods for contact heat and temperature resistance	ITD	in progress
B-4	Comparative tests of the developed short-term methods	IHD/ITD	
B-5	Round Robin Tests of optimized short-term methods	IHD/ITD	
B-6	Final description of suitable short-term methods	IHD/ITD	

„ Contact heat/temperature resistance” status

- **Comparative tests** in about 1-2 months
- **Planned milestone M-B3**: Assessment of the developed test methods for heat resistance on the ability for differentiation and the repeatability is almost reached
- **Round Robin Test** in about 3-6 months

work package	activity/task	(project months)																					
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Task-B1	Definition, production and providing of samples with different furniture edges	x	x	x	x																			
Task-B2	Methodological investigations on new test methods on damp and water resistance				x	x	x	x	x	x	x	x												
Task-B3	Methodological investigations on new test methods on contact heat and temperature resistance				x	x	x	x	x	x	x	x	x											
Task-B4	Comparative tests of the optimised short-term test methods											x	x	x	x									
Task-B5	Round robin tests of optimized short-term test methods															x	x	x	x					
Task-B6	Final description of suitable short-term methods																			x				
	Deliverables and Milestones																							
	Deliverable											D-A2 D-B2	D-A3 D-B3		D-A4 D-B4 D-C2					D-C3	D-C4			D-A6 D-B6 D-C6
	Milestones									M-A2 M-B2	M-A3 M-B3			M-C2					M-A5 M-B5 M-C3				M-C5	
	Reports												R1											

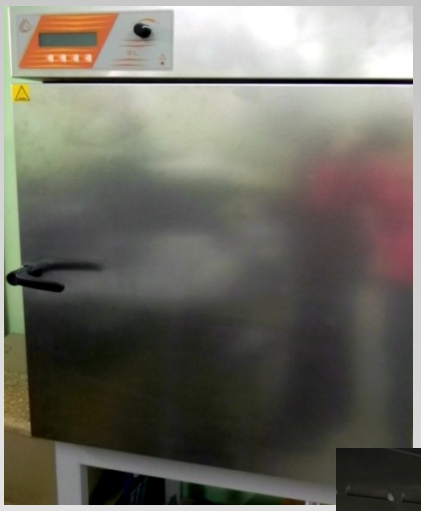
Task B-1 Test materials

Variant	Substrate	Material on the edge	Glue-Type for the edge	Material on the board surface	Profile-type
3.1	MDF1	ABS2*	PUR Hot melt	MF or HPL	flat
3.2	MDF1	ABS2*	EVA Hot melt	MF or HPL	flat
3.3	MDF1	ABS2*	PO Hot melt	MF or HPL	flat
6.1	MDF	ABS	Polymer (**laser**)	MF or HPL	flat
6.2	MDF	PP	Polymer (**laser**)	MF or HPL	flat
7.2	MDF	Foils PET	Waterborne, 2K - PUR dispersion	Foils PET	3D PVC foil

Task B-3
Developed test methods

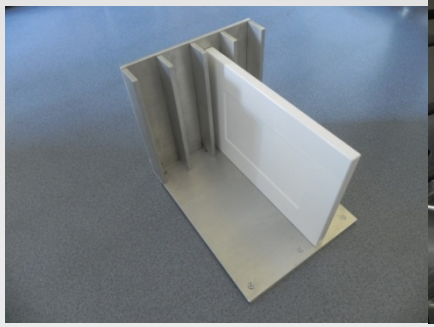
✓**Temperature resistance test**:

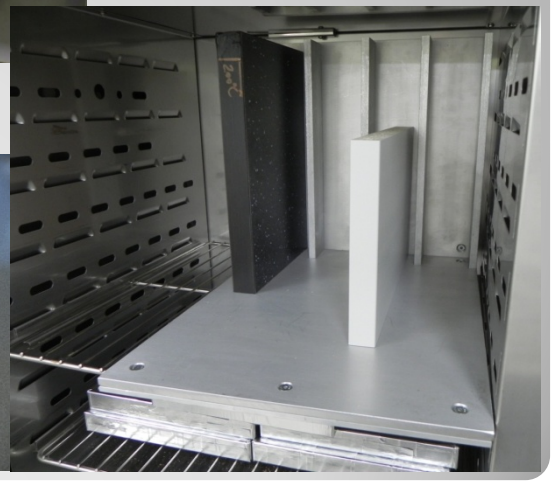
- laboratory drier 50-110°C



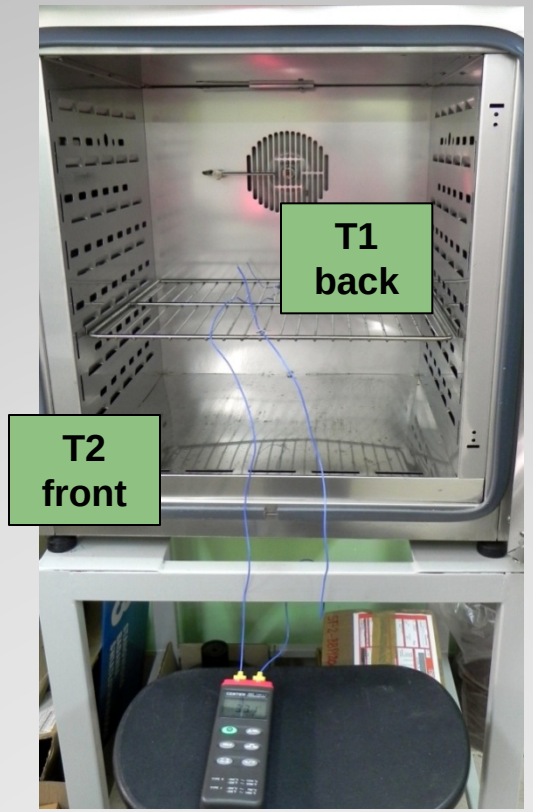
✓**Combaining contact heat with temperature resistance test**:

- laboratory drier with aluminium block 50-110°C





Task B-3
Temperature monitoring in the drier



Task B-3

Temperature monitoring in the drier

70 °C												
Time [minutes]	5	10	15	20	25	30	35	40	45	50	55	60
Drier [°C]	70,0	70,1	70,1	70,1	70,1	70,1	70,1	70,1	70,1	70,0	70,0	70,0
Thermocouple back T1 [°C]	69,7	69,6	70,0	69,6	69,7	69,7	69,6	69,6	69,6	69,6	69,5	69,5
Thermocouple front T2 [°C]	68,9	68,9	69,1	69,1	69,2	69,2	69,2	69,2	69,1	69,1	69,1	69,1
90 °C												
Time [minutes]	5	10	15	20	25	30	35	40	45	50	55	60
Drier [°C]	90,0	89,9	90,0	90,0	90,0	90,0	90,0	90,0	90,0	90,0	90,0	90,0
Thermocouple back T1 [°C]	89,5	89,3	89,3	89,4	89,4	89,6	89,4	89,6	89,5	89,6	89,5	89,6
Thermocouple front T2 [°C]	88,9	88,9	88,9	89,4	89,1	89,0	89,0	89,0	89,0	89,0	89,0	89,0
110 °C												
Time [minutes]	5	10	15	20	25	30	35	40	45	50	55	60
Drier [°C]	110,0	110,0	110,1	109,9	110,0	111,0	109,9	109,9	110,0	109,9	109,9	109,9
Thermocouple back T1 [°C]	109,8	109,6	109,8	109,6	109,6	109,6	109,5	109,5	109,6	109,6	109,6	109,6
Thermocouple front T2 [°C]	108,9	109,1	109,2	109,0	109,0	109,1	109,2	109,1	109,2	109,1	109,1	109,1

Task B-3
Description of test methods

✓**Principle:**

Furniture parts are subjected to **short-term action of temperature**. The final result is the **highest temperature** at which glue joint and/or coating reveals **no defined damages on three individual samples**.

✓**Test apparatus:**

Laboratory drier or laboratory drier with aluminium block

✓**Test parameters**:

- The range of temperature: 50-110°C
- The initial temperature: 80°C
- Time of contact at each temperature: 1h
- in case of no damages - increase in temperature by 5°C
- in case of visible damages - increase in temperature by 5°C starting from 50°C

✓**Evaluation**:

pass/fail scale rate (0-1)

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
Assessment - example

Resistant to temperature [°C]					
Variant	**MDF/ PET foil/ 2K PUR dispersion/ 3D profile**				
TP	1.1	1.2	1.3	1.4	1.5
temperature[°C]	**Rating scale 0-1 A/B/C**				
50	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0
55	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0
60	**0/0/0**	**0/0/0**	**0/0/0**	**0/0/0**	**0/0/0**
65	0/1/0	0/1/0	0/1/0	0/1/0	0/1/0
70					
75					
Start: 80	0/1/0	0/1/0	0/1/0	0/1/0	0/1/0

Task B-3
Assessment - example

Resistant to temperature [°C]					
Variant	**MDF/ ABS/laser**				
TP	1.1	1.2	1.3	1.4	1.5
temperature[°C]	**Rating scale 0-1 A/B/C**				
Start: 80	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0
85	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0
90	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0
95	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0
100	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0
105	**0/0/0**	**0/0/0**	**0/0/0**	**0/0/0**	**0/0/0**
110	0/1/0	0/1/0	0/1/0	0/1/0	0/1/0

Task B-3
Results - repeatability

Criterium of repeatability: **difference in results - 5°C**

TP	Resistance to temperature [°C]					
	Variants					
	MDF/ PET foil/ 2K PUR dispersion/ 3D profile	MDF/ ABS/ laser	MDF/ PP/ laser	MDF/ ABS/ PUR hot melt	MDF/ ABS/ EVA hot melt	MDF/ ABS/ PO hot melt
	Final result – temperature [°C]					
1	60	95	100	110	75	95
2	60	95	100	110	75	95
3	60	110	105	110	75	85
4	60	110	105	110	75	85
5	60	110	105	110	75	85
Fullfil	**YES**	**NO**	**YES**	**YES**	**YES**	**NO**

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**

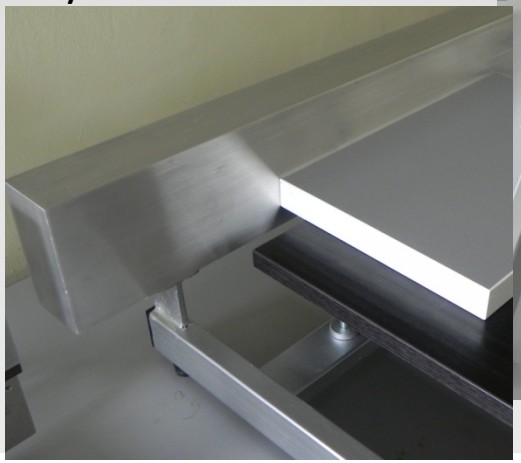
✓**Heating rail** with housing to keep the constant temperature

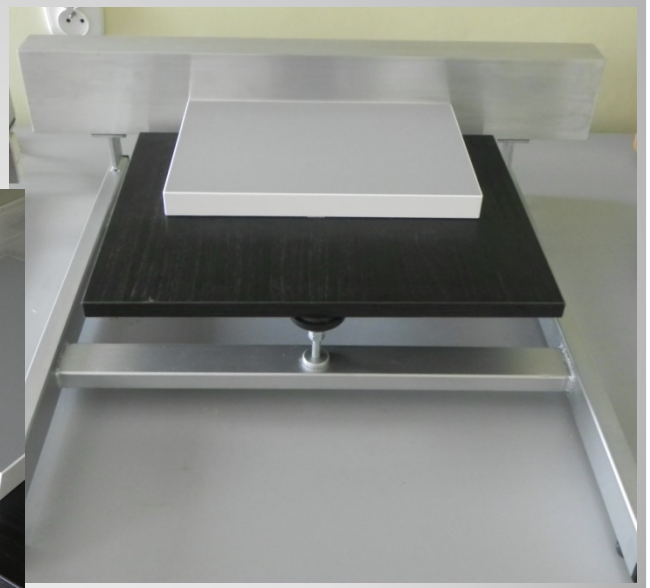
✓**Test parameters**:

- temperature range: 60-140°C
- increase in temperature by 10±2°C
- time of exposure 1 h

✓**Assessment**:

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



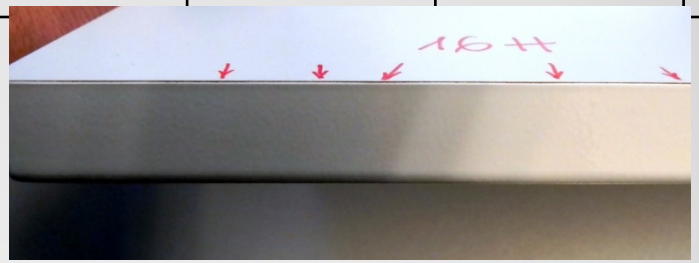


Task B-3
Preliminary results

✓ regarding to test with the use of **IKEA heating rail with temperature 85 °C**

Edge resistance to contact heat (85°C)	Variants					
	MDF/ PET foil/ 2K PUR dispersion/ 3D profile	MDF/ ABS/ laser	MDF/ PP/ laser	MDF/ ABS/ PUR hot melt	MDF/ ABS/ EVA hot melt	MDF/ ABS/ PO hot melt
	Rating scale 0-1 A/B/C					
First tested edge	0/1*/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0
Second tested edge	0/1*/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0

*collapsing of the foil



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	

Thank You for your attention!

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