ALL ON EDGE

Development of Objective Test Methods for Furniture Edges and Rims

„Contact heat/temperature resistance”

Workpackage WP-B

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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

Overview of working steps

START

- Background: Existing methods not satisfying

MATERIAL

- Chosen: 24 finished samples
- Delivered: 6 finished samples

INVESTIGATION ON THE SHORT-TERM METHODS

- Knowledge about the REPEATABILITY of the test results

OPTIMIZATION OF THE CHOSEN TEST METHODS

- **Water resistance test**
- **Contact heat and temperature resistance test**
- Knowledge about the REPRODUCIBILITY of the test results

GOAL

- New test methods

Activities of WP-B

Leader: ITD

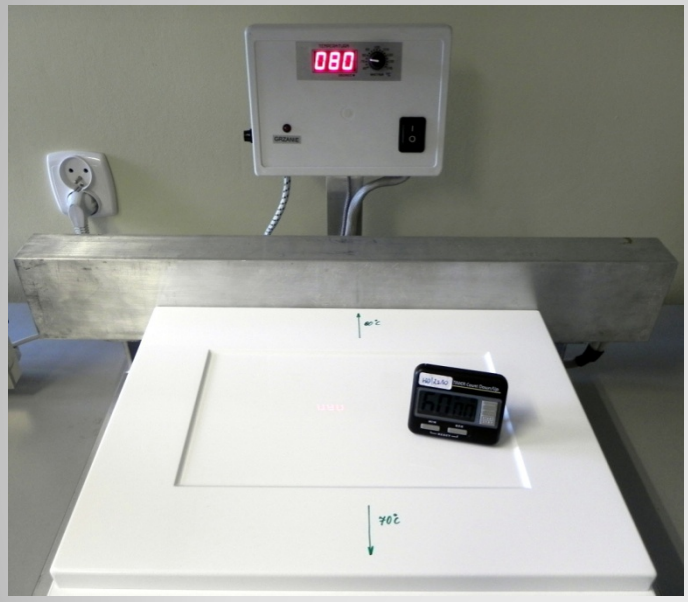
TASKS	ACTIVITY	RESPONSIBLE	TASK STATUS
B-1	Definition, preparation and providing of different furniture edges	IHD/ITD	✓
B-2	Methodological investigations on new test methods for damp and water resistance	IHD	✓
B-3	Methodological investigations on new test methods for contact heat and temperature resistance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

Test materials

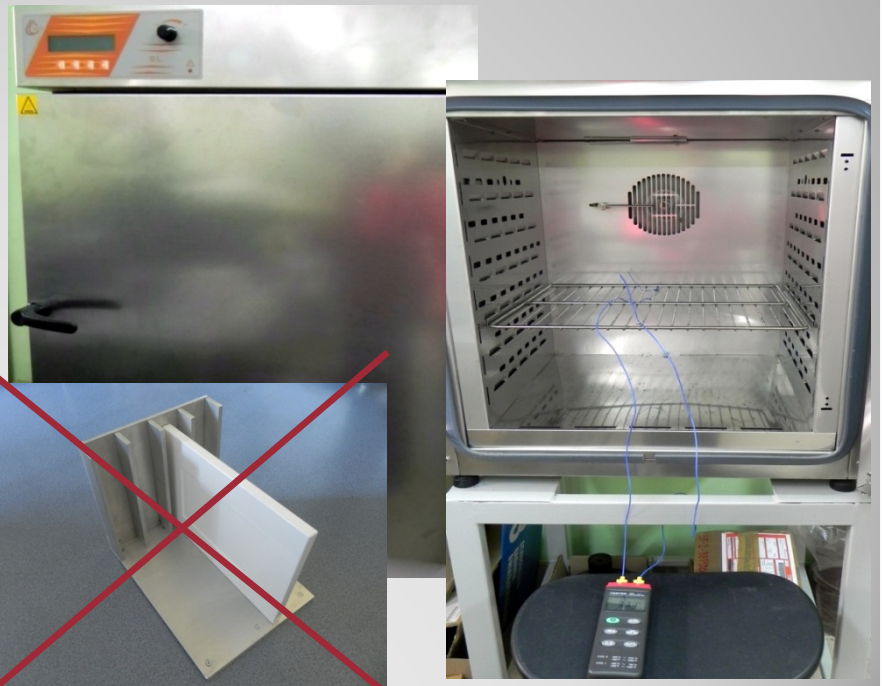
Variant	Substrate	Material on the edge	Glue-Type for the edge	Material on the board surface	Profile-type
3.1	MDF	ABS	PUR Hot melt	MF or HPL	flat
3.2	MDF	ABS	EVA Hot melt	MF or HPL	flat
3.3	MDF	ABS	PO Hot melt	MF or HPL	flat
6.1	MDF	ABS	Polymer (laser)	MF or HPL	flat
6.2	MDF	PP	Polymer (laser)	MF or HPL	flat
7.1/7.2	MDF	PET Foil	Waterborne, 2K - PUR dispersion	PET Foil	3D PVC foil
14	MDF	Green-pigmented waterborne acrylic	-	Green-pigmented waterborne UV	flat
15	MDF	Black-pigmented waterborne acrylic	-	Black-pigmented waterborne UV	flat

Developed test methods

- ✓ **Contact heat resistance test**:
  - Heating rail 60-140°C



- ✓ **Temperature resistance test**:
  - Laboratory drier 50-110°C



Work standard

DRAFT – Edges resistance to contact heat

✓Principle:

- The test panel is placed on the horizontal plate with the tested edge against the **heating rail**
- After a specified period of time the test panel is removed and assessed
- The test area is examined for signs of damages:
  - changes in the surface structure of the edges e.g. cracking, blistering, peeling
  - changes in glue joints e.g. collapsing and/or opening of glue joint, and/or shrinking of edge band
  - and delamination
- Assessment of the test results in terms of a descriptive numerical rating code (0-1)

Work standard

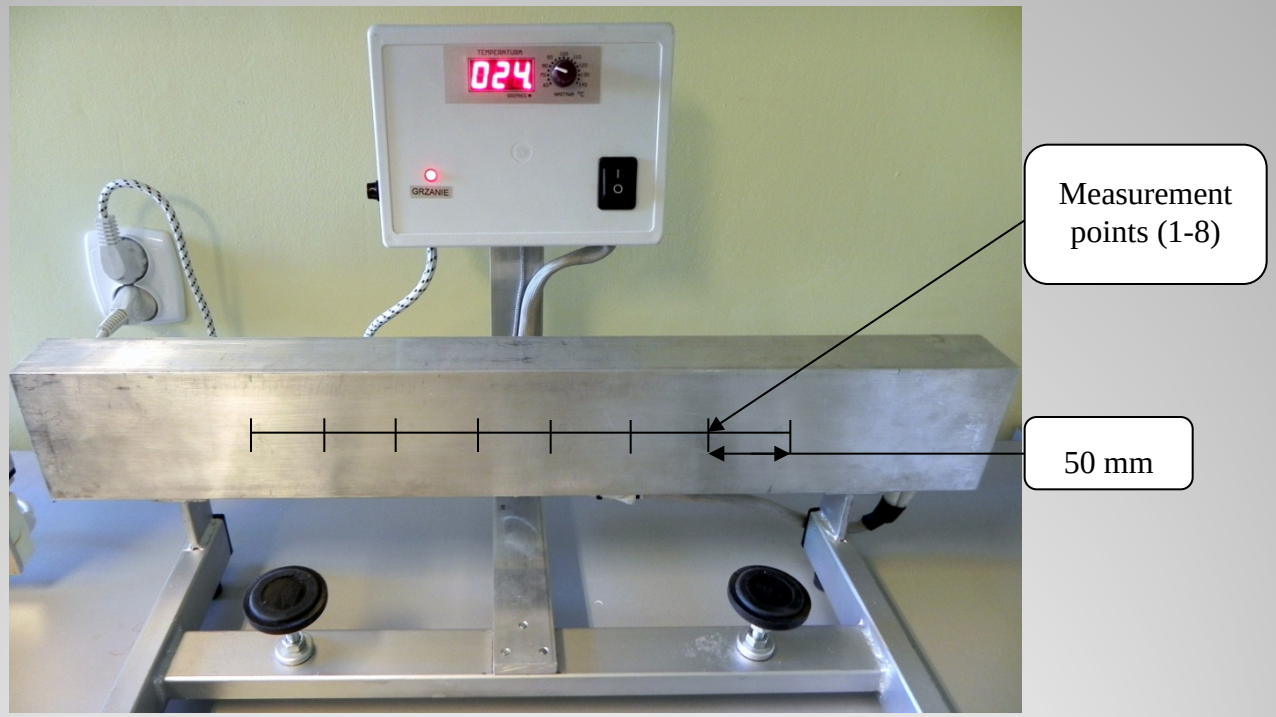
DRAFT – Edges resistance to contact heat

✓Test apparatus

Thermal rail (made of aluminium block) with adjustable temperature, electronic controller with thermostat and horizontal plate.

Linear distribution of temperature along the thermal rail

in the range of 60-140°C



Max. deviation from the set temperature: 1°C

Work standard

DRAFT – Edges resistance to contact heat

✓Test panels

All surfaces and edges of test panel shall be finished.

Size: at least (250 x 250 x thickness) mm

✓Test parameters

- The range of temperature: **60-140°C**
- The initial temperature: **100°C**
- in case of no damages - **increase in temperature by 10°C**
- in case of visible damages - increase in temperature by 10°C starting from 60°C
- Time of contact at each temperature: **1h**

Work standard

DRAFT – Edges resistance to contact heat

✓Assessment

- The result is the highest temperature at which test area reveals **no damages defined in table**

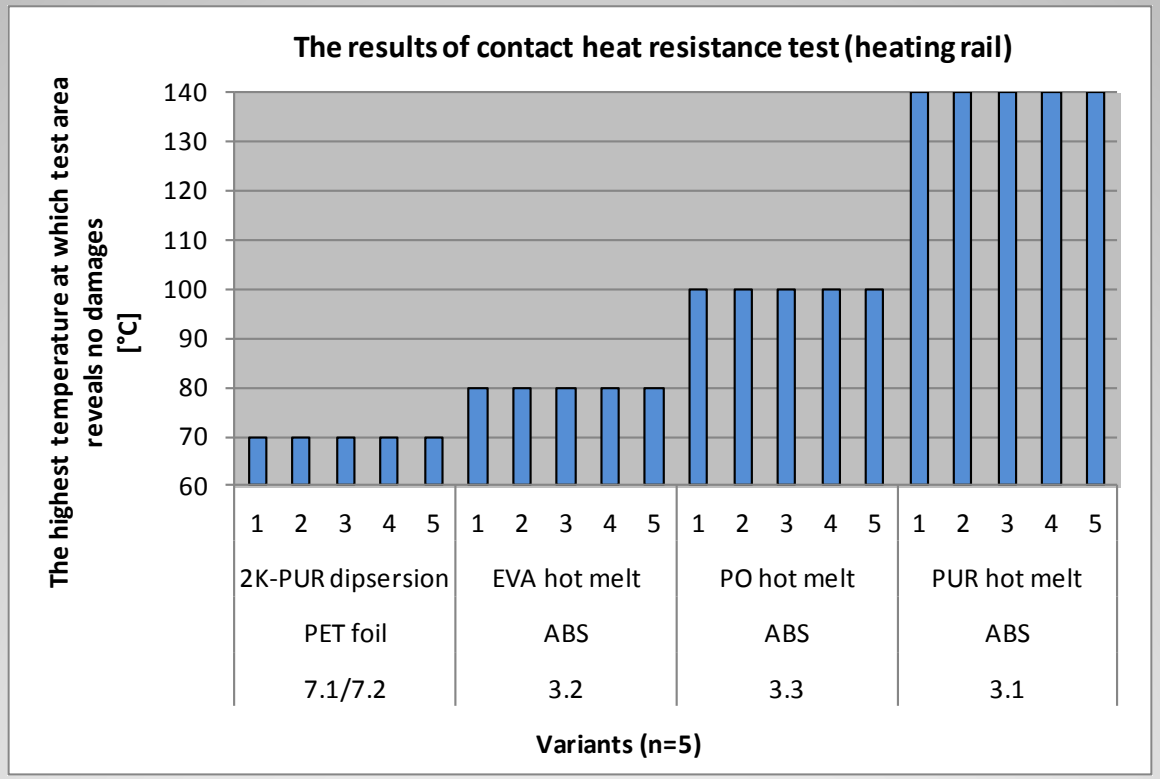
Type of damages	Numerical rating	
	0	1
A. Changes in the surface structure of the edges	No changes in the surface structure	Visible changes in the surface structure (cracking and/or blistering and/or peeling etc.)
B. Changes in glue joints	No changes in glue joints	Visible changes in glue joints (collapsing and/or opening of glue joint, and/or shrinking of edge band and/or cracking of edge band)
C. Delamination	No delamination	Visible delamination/ edge band detached

✓Expression of the test results

- The individual values of **3 test areas** shall be specified
- **The final result is the lowest value of the 3 individual test areas**

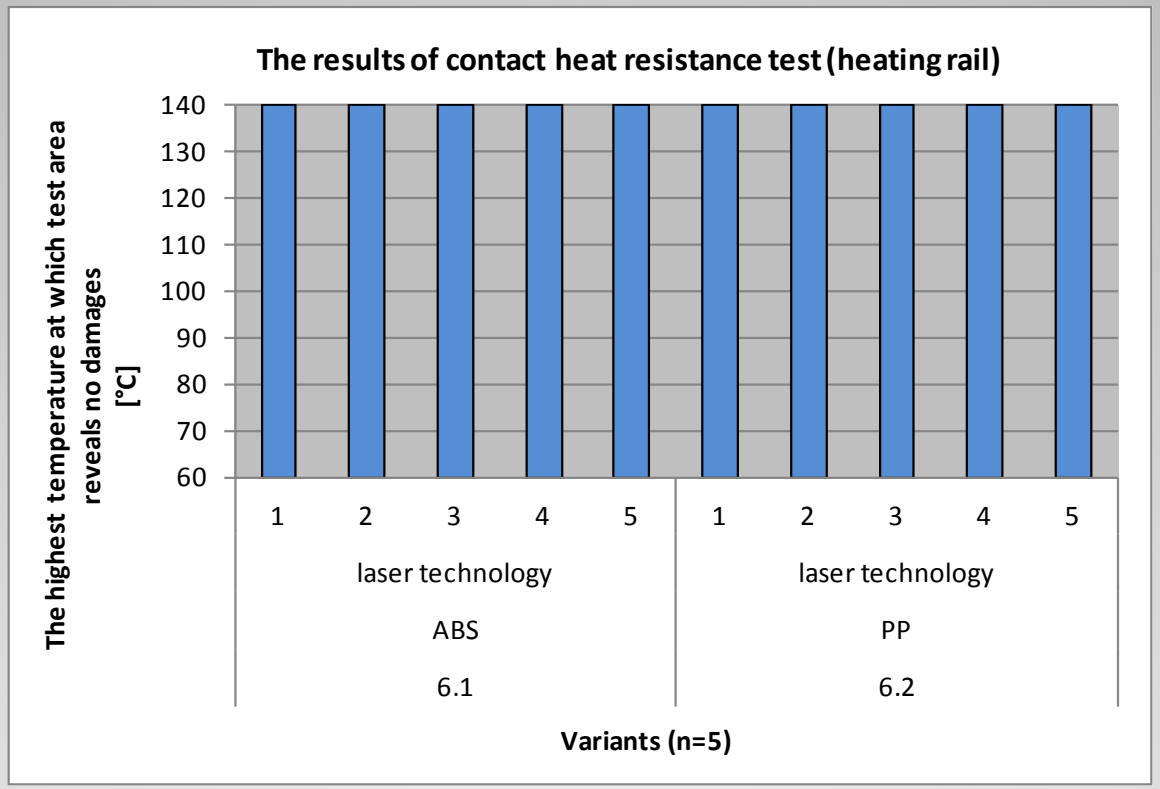
Results: **Repeatability**

Criterium of repeatability: difference in results 10°C



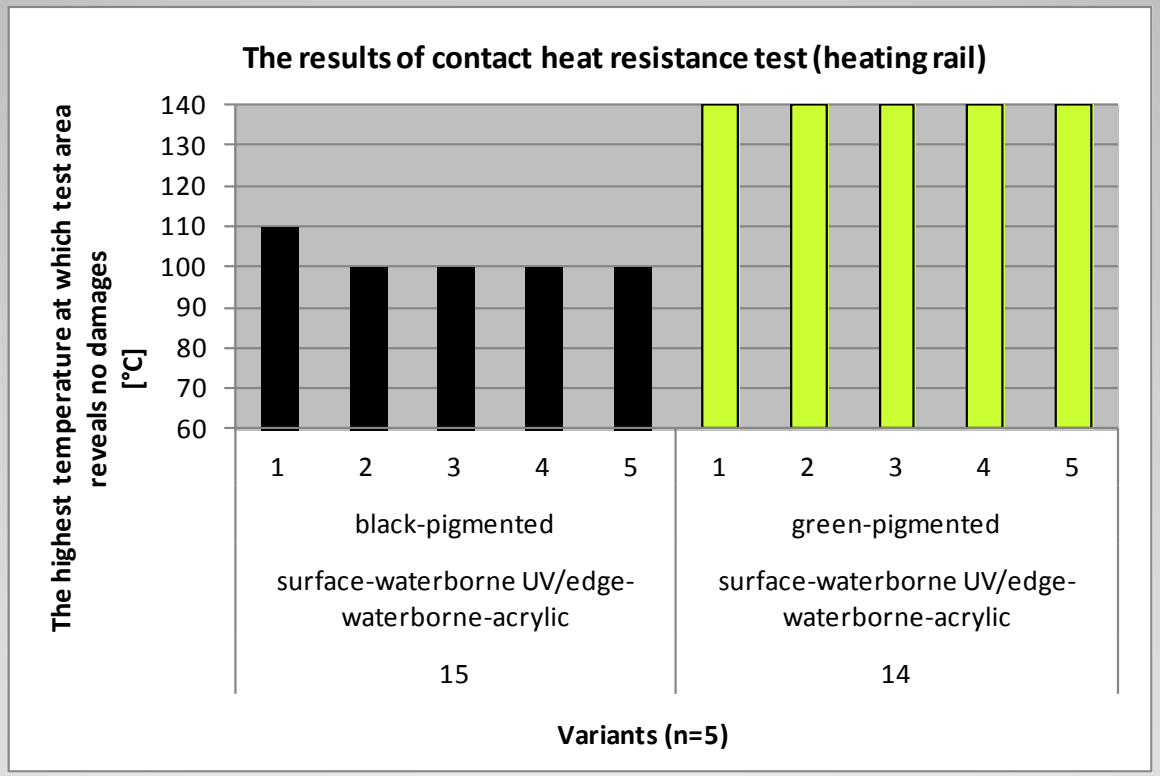
Results: **Repeatability**

Criterium of repeatability: difference in results 10°C



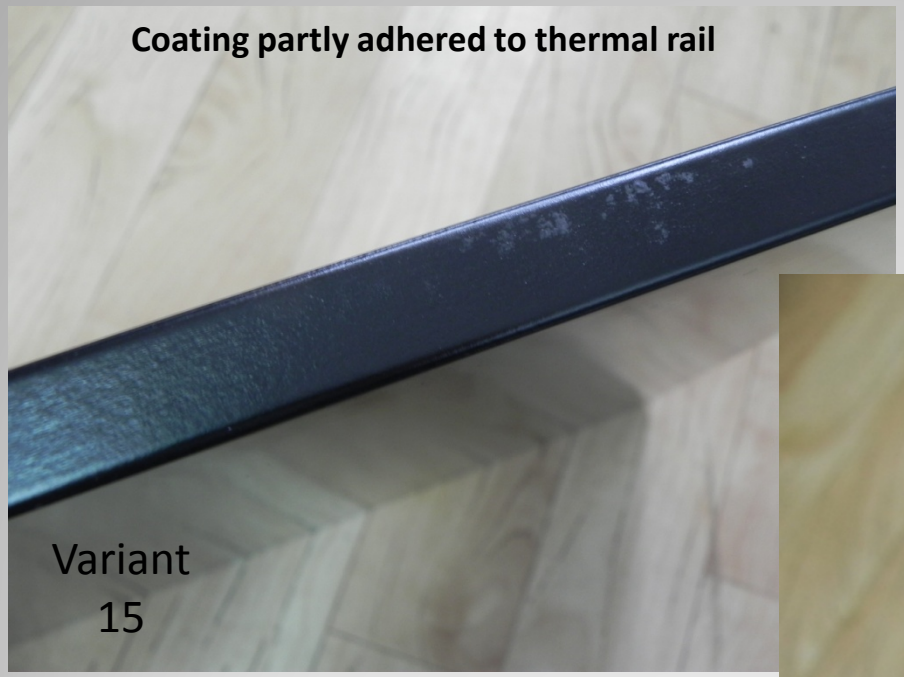
Results: **Repeatability**

Criterium of repeatability: difference in results 10°C



Results: types of damages

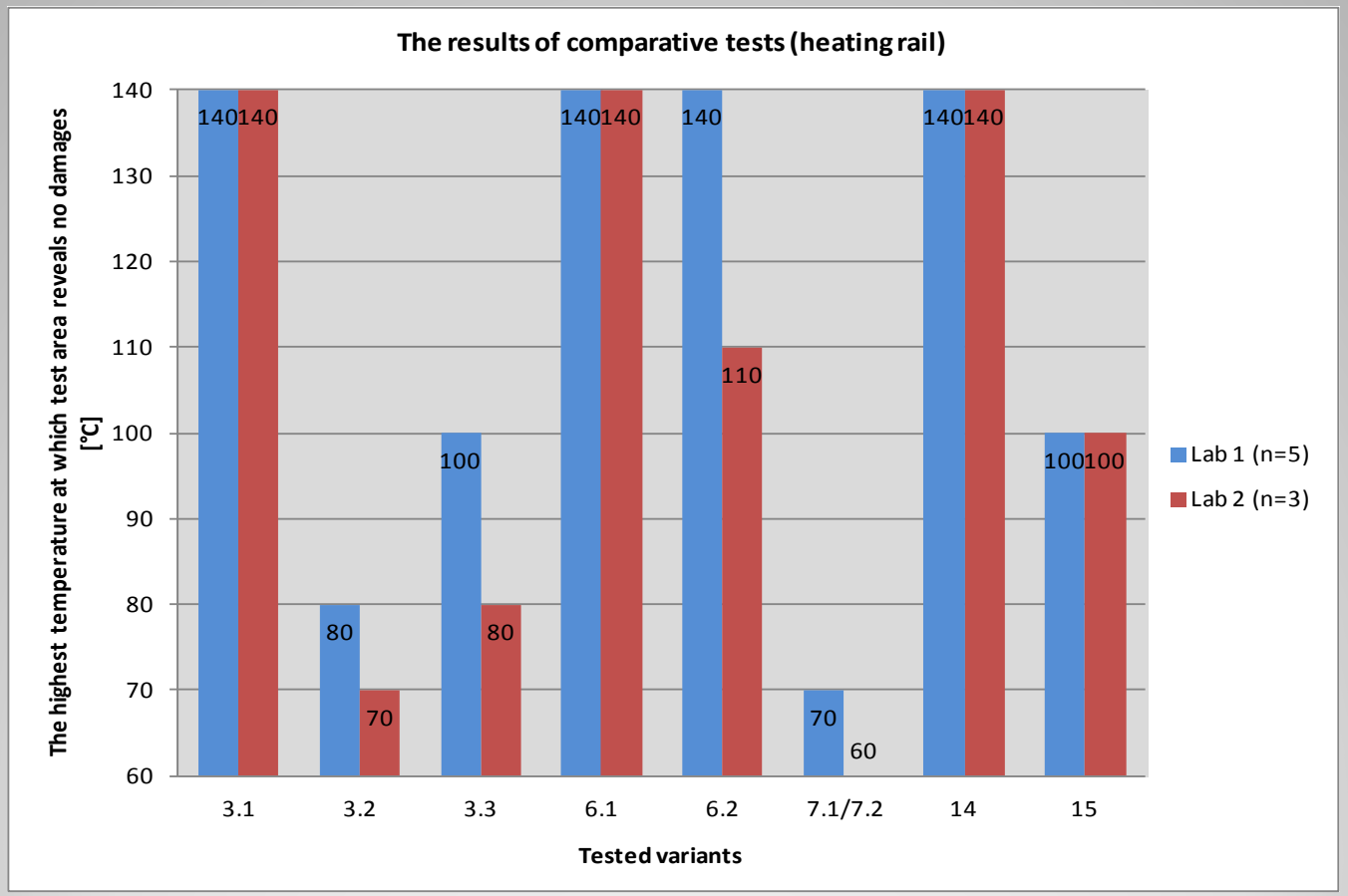
A. Changes in the surface structure of the edges:



B. Changes in glue joint:

Results: **Reproducibility**

Criterium of reproducibility: difference in results 10°C



SUMMARY

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

- ✓The method have a very good repeatability
- ✓Reproducibility should be confirmed by RRT
- ✓A clear differentiation between the qualities of edges has been shown
- ✓The proposed method and device are suitable for edge testing
- ✓Easy handling

Work standard

DRAFT – Edges resistance to temperature

✓Principle:

- The test panel is placed in **oven** at a specified test temperatures.
- After a specified period of time the test panel is removed from oven and assessed.
- The test area is examined for signs of damages:
  - changes in the surface structure of the edges e.g. cracking, blistering, peeling;
  - changes in glue joints e.g. collapsing and/or opening of glue joint, and/or shrinking of edge band;
  - and delamination.
- Assessment of the test results in terms of a descriptive numerical rating code (0-1).

Work standard

DRAFT – Edges resistance to temperature

✓Test panels

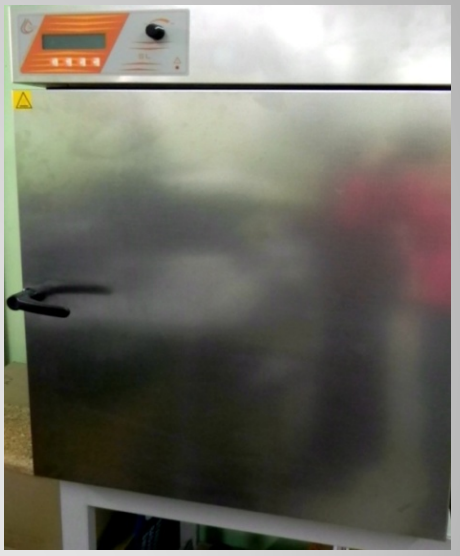
The all surfaces and edges of test panel shall be finished.

Size: from (250 x 250 x thickness)mm to (400 x 400 x thickness)mm

✓Test apparatus

An oven with forced air circulation which can

heat test panel to specified temperature.



✓Test parameters

- The range of temperature: **50-110°C**
- The initial temperature: **80°C**
- in case of no damages - **increase in temperature by 10°C**
- in case of visible damages - increase in temperature by 10°C starting from 50°C
- Time of contact at each temperature: **1h**

Work standard

DRAFT – Edges resistance to temperature

✓Assessment

- The result is the highest temperature at which test area reveals **no damages defined in table**

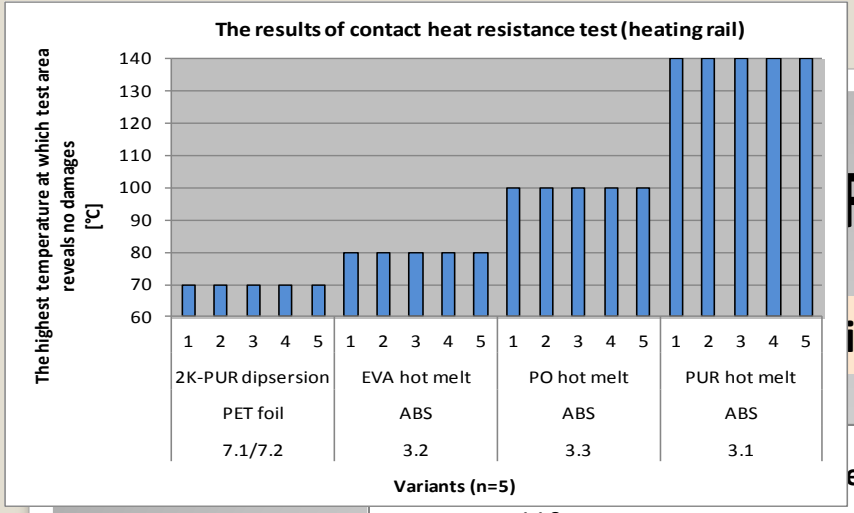
Type of damages	Numerical rating	
	0	1
A. Changes in the surface structure of the edges	No changes in the surface structure	Visible changes in the surface structure (cracking and/or blistering and/or peeling etc.)
B. Changes in glue joints	No changes in glue joints	Visible changes in glue joints (collapsing and/or opening of glue joint, and/or shrinking of edge band and/or cracking of edge band)
C. Delamination	No delamination	Visible delamination/ edge band detached

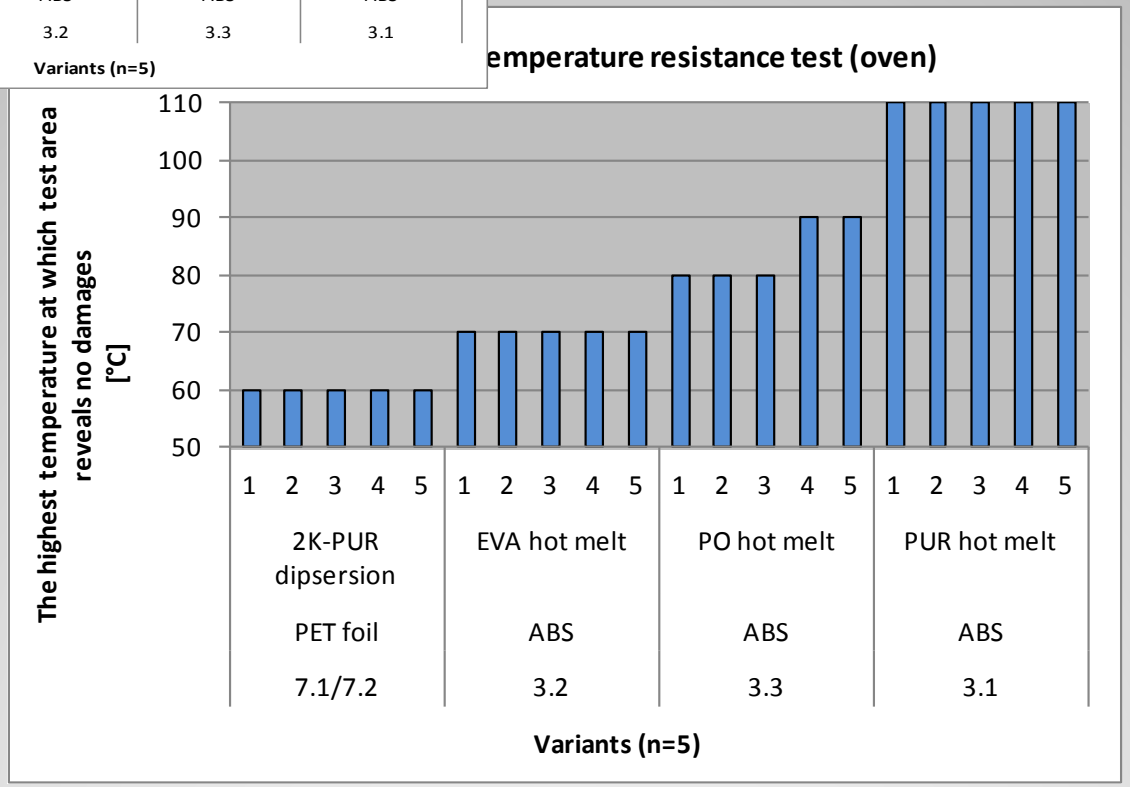
✓Expression of the test results

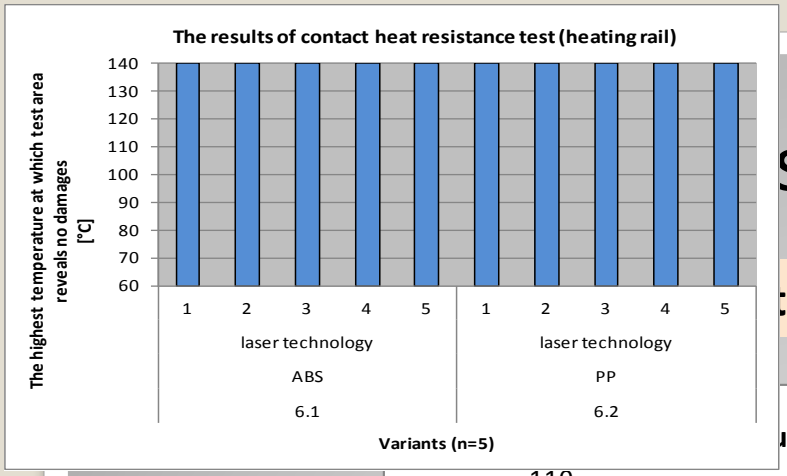
- The individual values of **2 test areas** shall be specified
- **The final result is the lowest value of the 2 individual test areas**

Repeatability

ity: difference in results 10°C

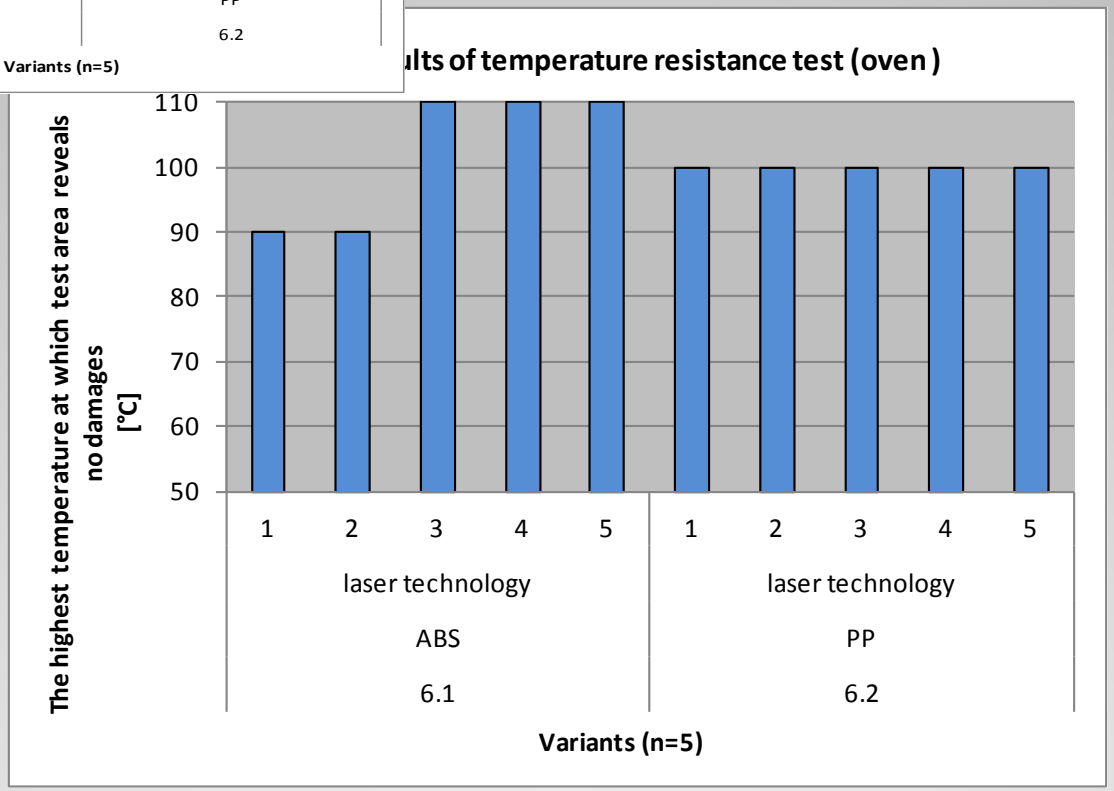






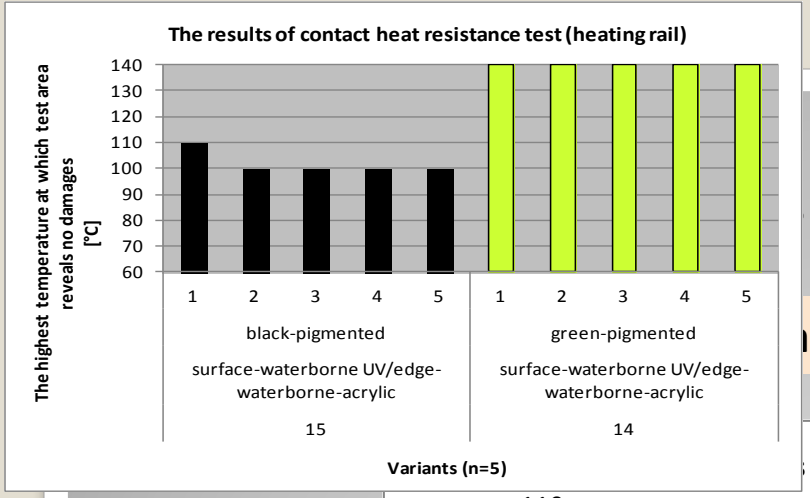
s: Repeatability

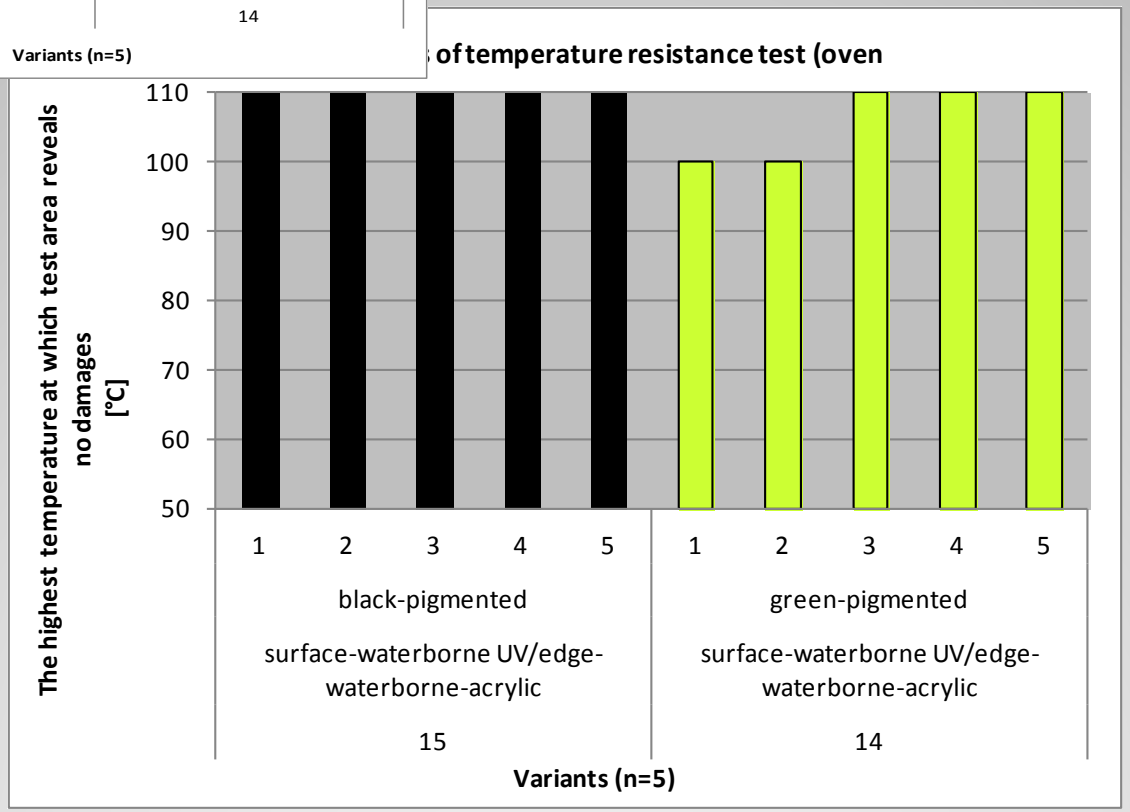
tability: difference in results 10°C



: Repeatability

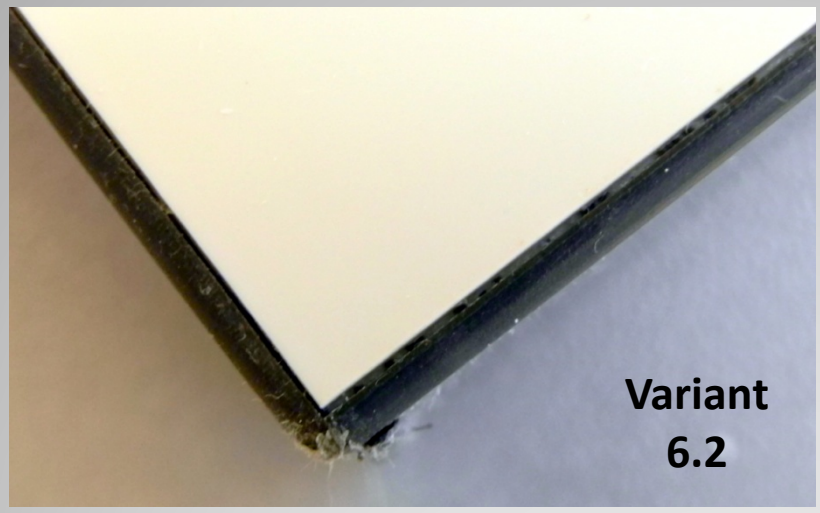
bility: difference in results 10°C

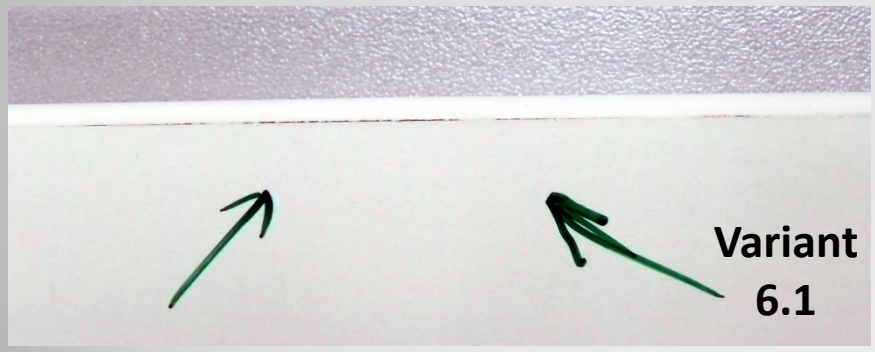




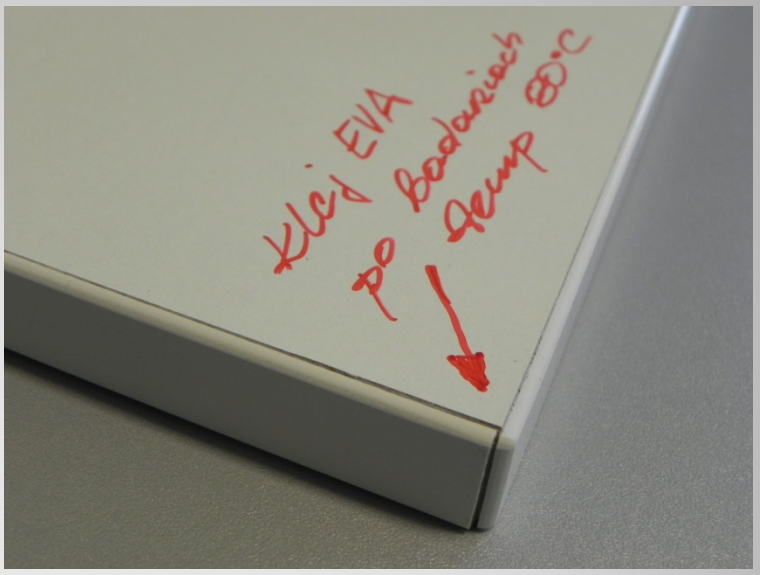
Results: types of damages

B. Changes in glue joint: opening of the glue joint





Variant
3.2

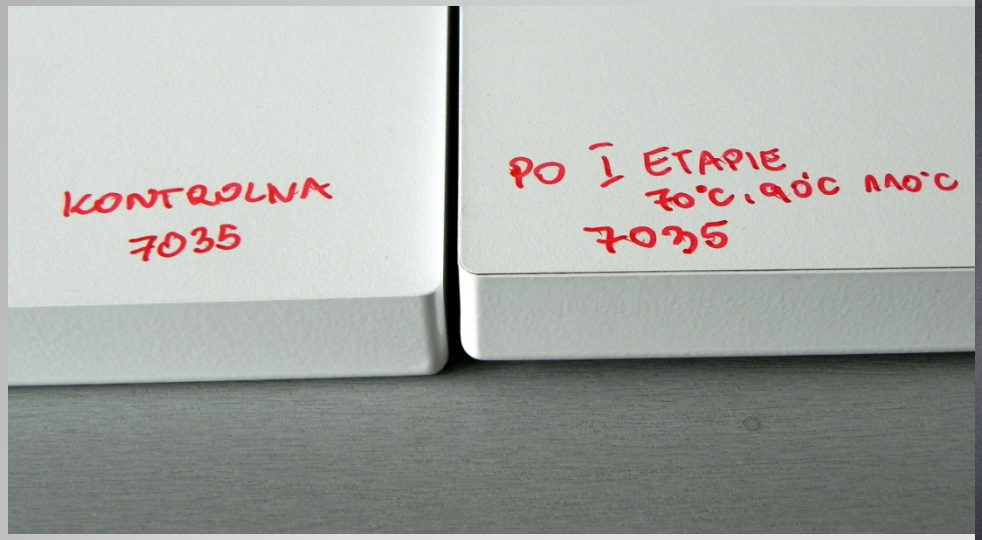


Results: types of damages

B. Changes in glue joint:

Small gaps in joint on the back of the test panel

Swelling of the board

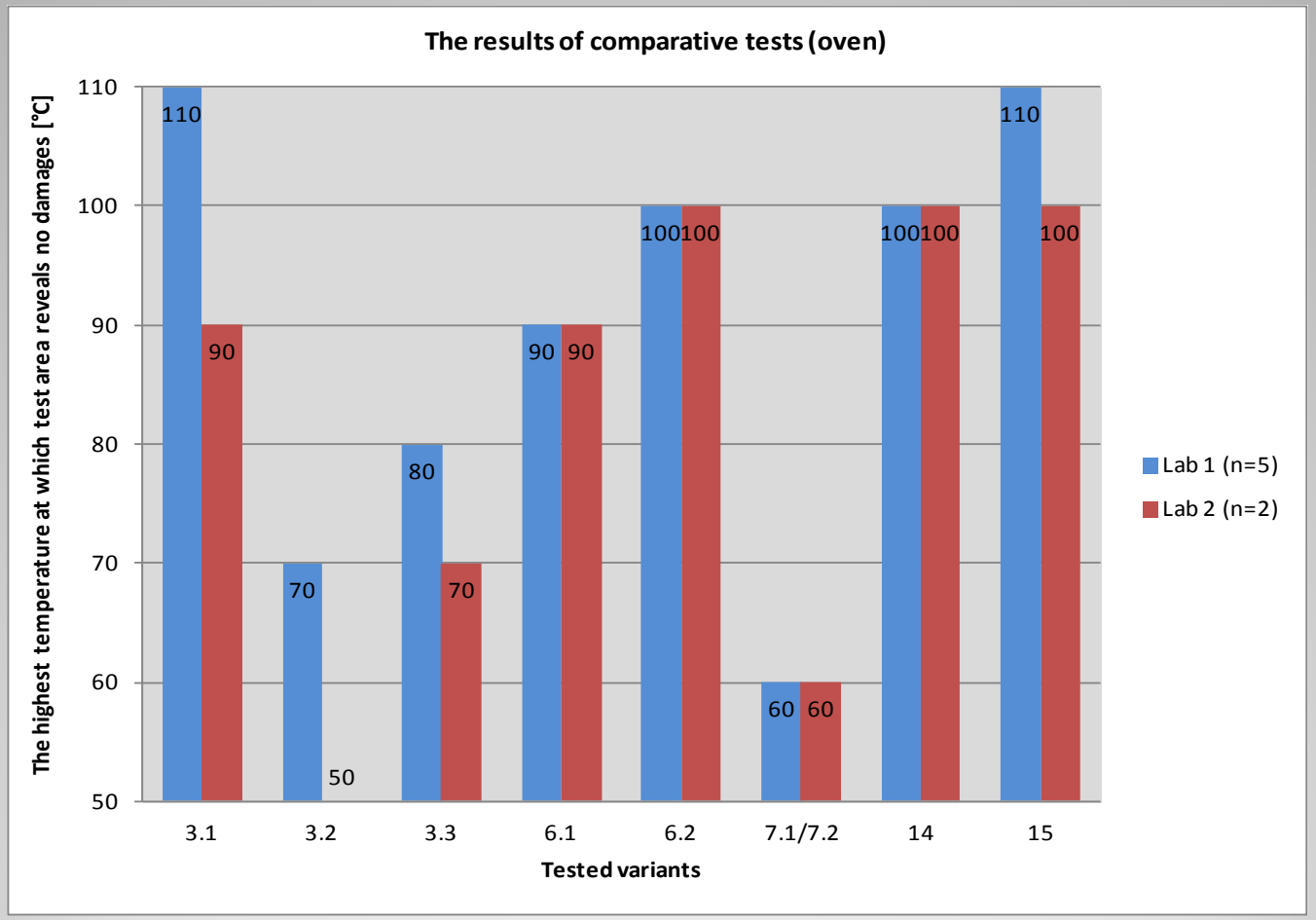


Variant 7.1/7.2

Swelling of the PET foil

Results: **Reproducibility**

Criterium of reproducibility: difference in results 10°C



SUMMARY

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

- ✓The method have a very good repeatability
- ✓Reproducibility should be confirmed by RRT
- ✓A clear differentiation between the qualities of edges has been shown
- ✓The proposed method and device are suitable for edge testing
- ✓Availability of drier in laboratories

Drawbacks:

- ✓ long time (10-30 min) to obtain defined temperature. Time depending on the type of apparatus and filling the oven
- ✓ the whole element is heated
- ✓ emission of harmful gases during test performance

NEXT STEPS

- **Optimization of contact heat/temperature test methods - RRT**

  Assessment with UC participants: **at today's meeting**

- Description of the suitable short-term test methods: **method A and/or B**

Further step after the project:

- Application of housing to the thermal rail to keep more constant temperature during the test?
- **Work standard** proposal for the **European Standardization Group**

Thank You for your attention!

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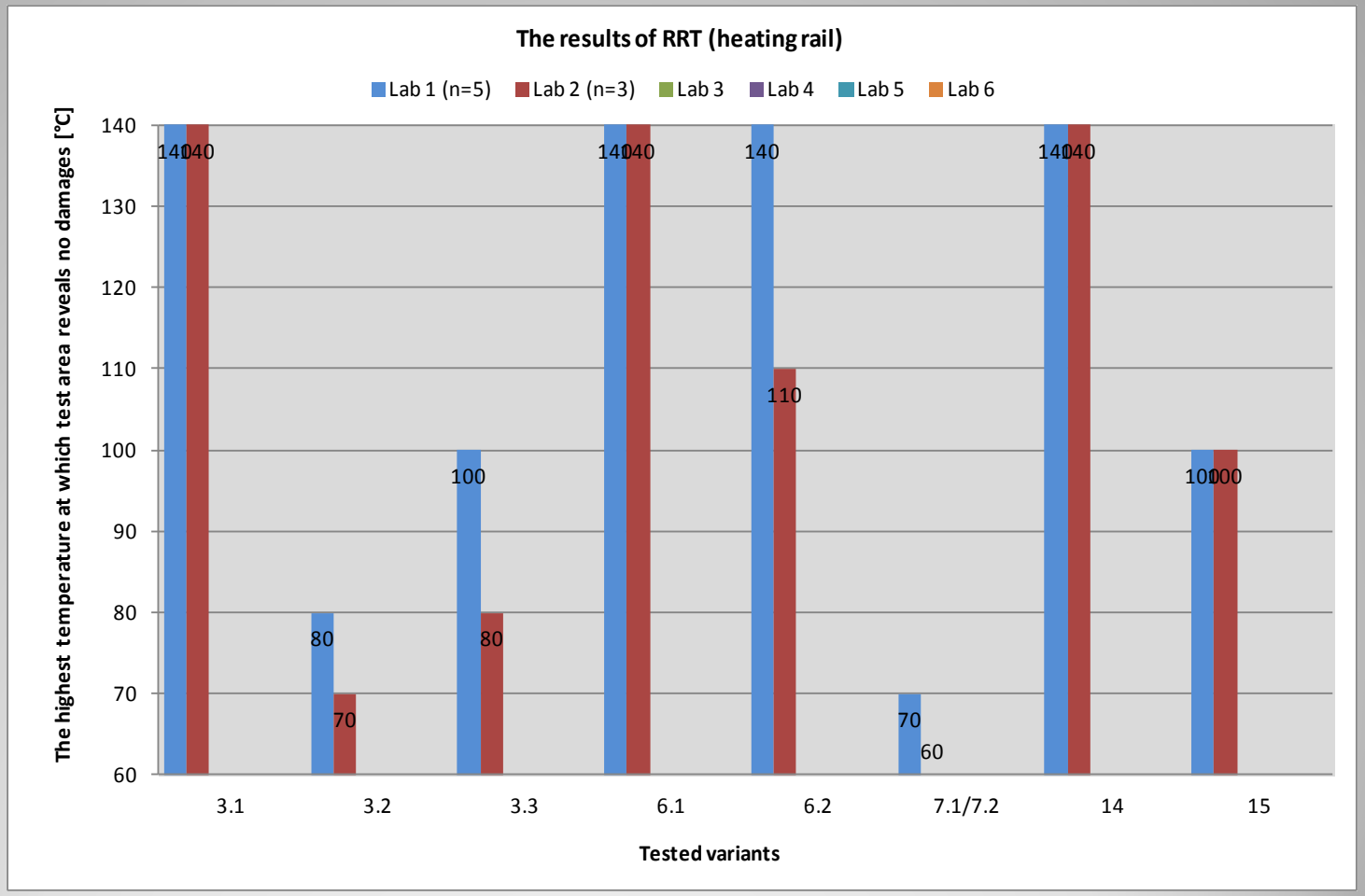
RRT- assessment with UC Participants

Lab 3:…?
Lab 4:…?
Lab 5:…?
Lab 6:…?



RRT- assessment with UC Participants

Lab 3:…?
Lab 4:…?
Lab 5:…?
Lab 6:…?