

# ALL ON EDGE

Development of Objective Test Methods for Furniture Edges and Rims



## „Adhesion resistance”

Workpackage WP-A



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4<sup>rd</sup> UC Meeting

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# The aims of WP-A

- Development or modification of resistance test methods to **IMPACT** and **ADHESION**.
- Comparison of methods on their repeatability and reproducibility level.
- Preparation of the final description of suitable mechanical and adhesion methods as a proposal for the European Standardization Group.

# Activities of WP-A - Adhesion

Responsible: ITD

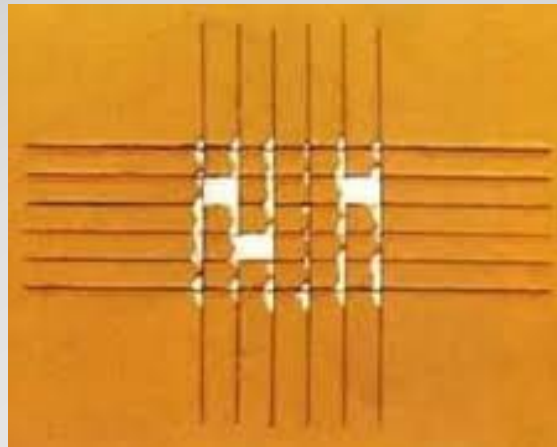
TASKS	ACTIVITY	RESPONSIBLE	TASK STATUS
A-1	Definition, preparation and providing of different furniture edges	IHD/ITD	Done
A-3	Methodological investigations on new adhesion test methods	ITD	Done
A-4	Comparative tests of the methods on mechanical resistance	ITD/IHD	Lack of test samples
A-5	Round Robin Tests of optimized test methods - adhesion	IHD/ITD	During UC meeting/assessment
A-6	Final description of suitable methods for mechanical resistance	IHD/ITD	Work standard

# Test materials

Variant	Substrate	Material on the edge	Material on the board surface
14	MDF	Green-pigmented waterborne acrylic	Green-pigmented waterborne UV
16	MDF	Grey-pigmented waterborne UV	Grey-pigmented waterborne UV
17	MDF	Pink-pigmented waterborne UV	Pink-pigmented waterborne UV
18	Beech solid wood	Stain(black)/ 1K waterborne	Stain(black)/ 1K waterborne
19	beech solid wood	Grey pigmented UV	Grey pigmented UV
20	particleboard	Yellow-pigmented UV	Yellow-pigmented UV

# New assumption of adhesion test

Use elements of methodology of– **cross-cut test** for flat surfaces –  
**acc to EN ISO 2409**

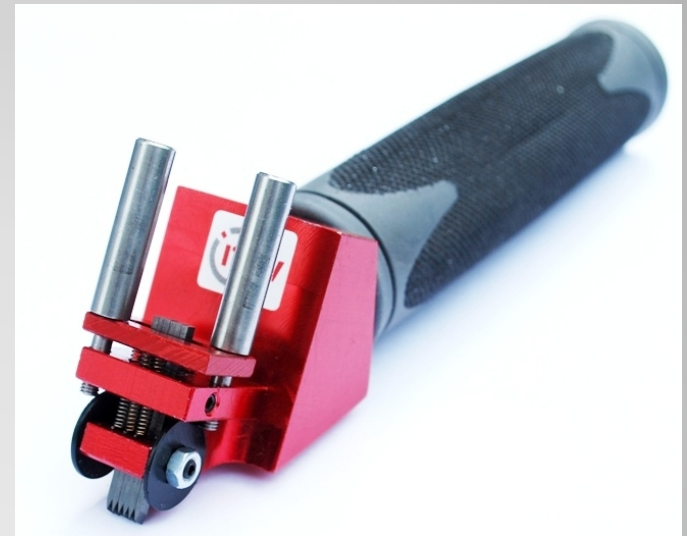


# Method on the base of EN ISO 2409 – **Test 1**

## EQUIPMENT

**Multi-blade cutting tool - Spacing of cuts - 6 x 1 mm**

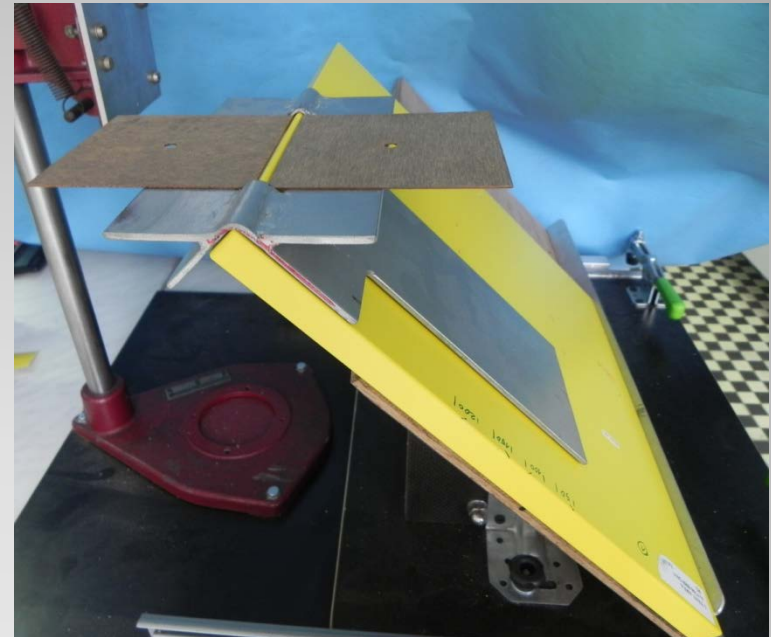
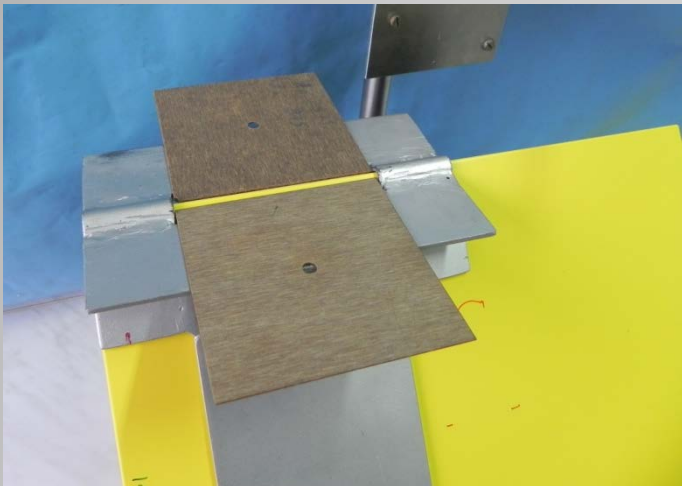
The tests were done with self adjusting cutting head with automatic reset function for curved surfaces



**Cutting knife with single resiliently mounted cutting edges**

# Method on the base of EN ISO 2409 – **Test 1**

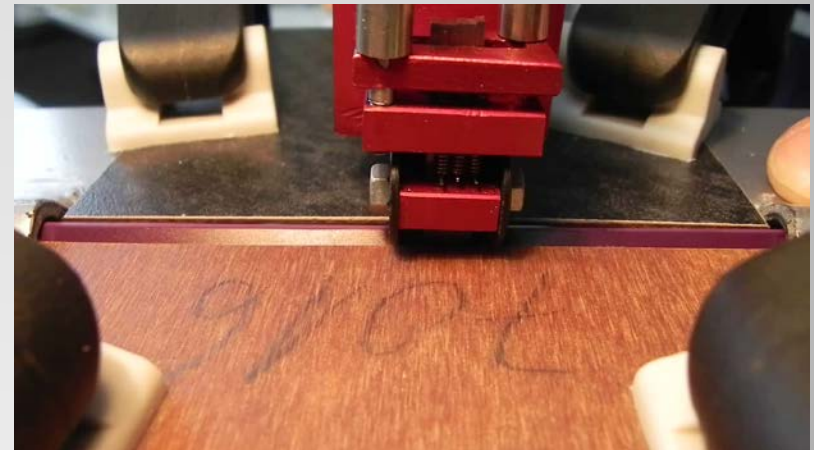
Positioning of test samples



Cutting of rims is made only in one direction

The way of assessment - pass/fail scale rate after a short treatment with adhesive tape

# Method on the base of EN ISO 2409 – **Test 1**





# Method on the base of EN ISO 2409 – **Test 1**

## **Test results**



# Method on the base of EN ISO 2409 – **Test 1**

## Comments:

### Test performance

Difficulty in uniform operating of the cutting tool taking into account:

- influence of the type of rim (the biggest issue on square edges)
- influence of substrate

### Assessment

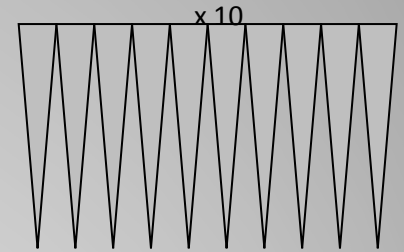
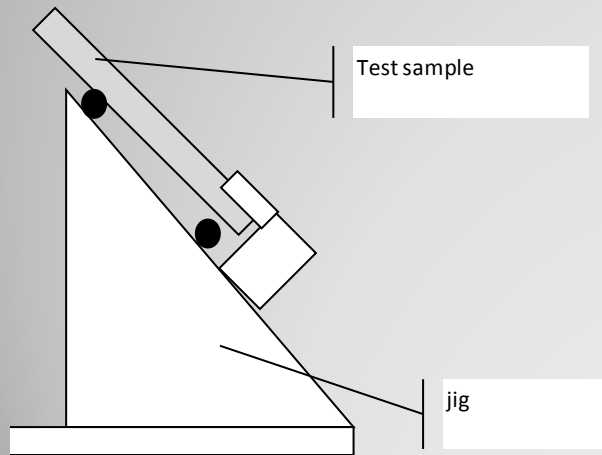
- visible cutting mark without pulling of coating
- due to rugged movement, the strong damage of coating, specially on the end movement
- no lacquer flakes on the adhesive tape

**The method wasn't considered to further tests**

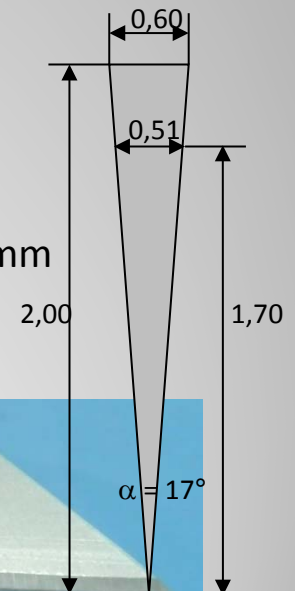
# Method on the base of EN ISO 2409 – **Test 2**

## Equipment:

- ✓ the mobile jig (base) – test sample placed at an angle of  $45^\circ$  with upper edge extending beyond jig
- ✓ Set of 10 blades, distans 0,60 mm
- ✓ Instron mechanical testing machine
- ✓ Magnifier glass with backlight



Dimension in mm



# Method on the base of EN ISO 2409 – **Test 2**

## Test assumption

- Test panels**            the all surfaces and edges of test panel shall be finished  
Size at least (250 x 250 x thickness) mm
- Test parameters**      – the load from 50 N to 500 N, with step 50 N  
                                 – head speed: 1mm/minute
- Assessment**            the result of test is the highest load [N] at which test area (rim)  
                                 reveals no damages

Damages are defined as :

P – The coating has flaked – substrate is visible

M – The coating has flaked – interlayer coating is visible

## Expression of the test results

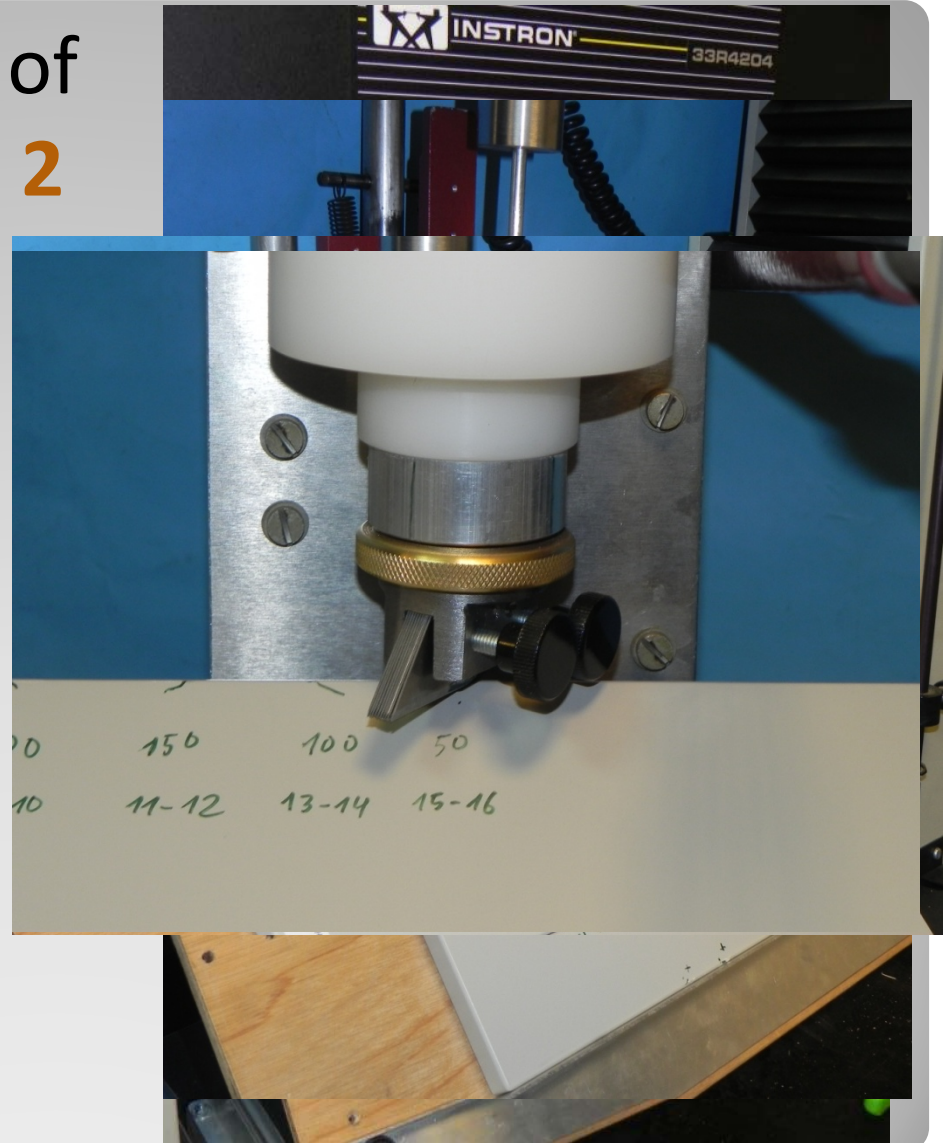
The individual values of 3 test areas (rim) shall be specified

**The final result is the lowest value of the 3 individual test areas**

# Method on the base of EN ISO 2409 – **Test 2**

## Test procedure:

1. Place the mobile jig (base) with test sample in Instron machine
2. Fix the head with the blade set at the angle of  $45^\circ$  to the rim
3. Place the head on the rim
4. Set the load
5. Start the test (the set of blade under defined load cut the rim)
6. Pull off the head
7. Turn the head  $90^\circ$  and place it on the rim
8. Repeat procedure acc. to point 4-6
9. Continue the test acc. to step 1-8 for the next loads



# Method on the base of EN ISO 2409 – **Test 2**

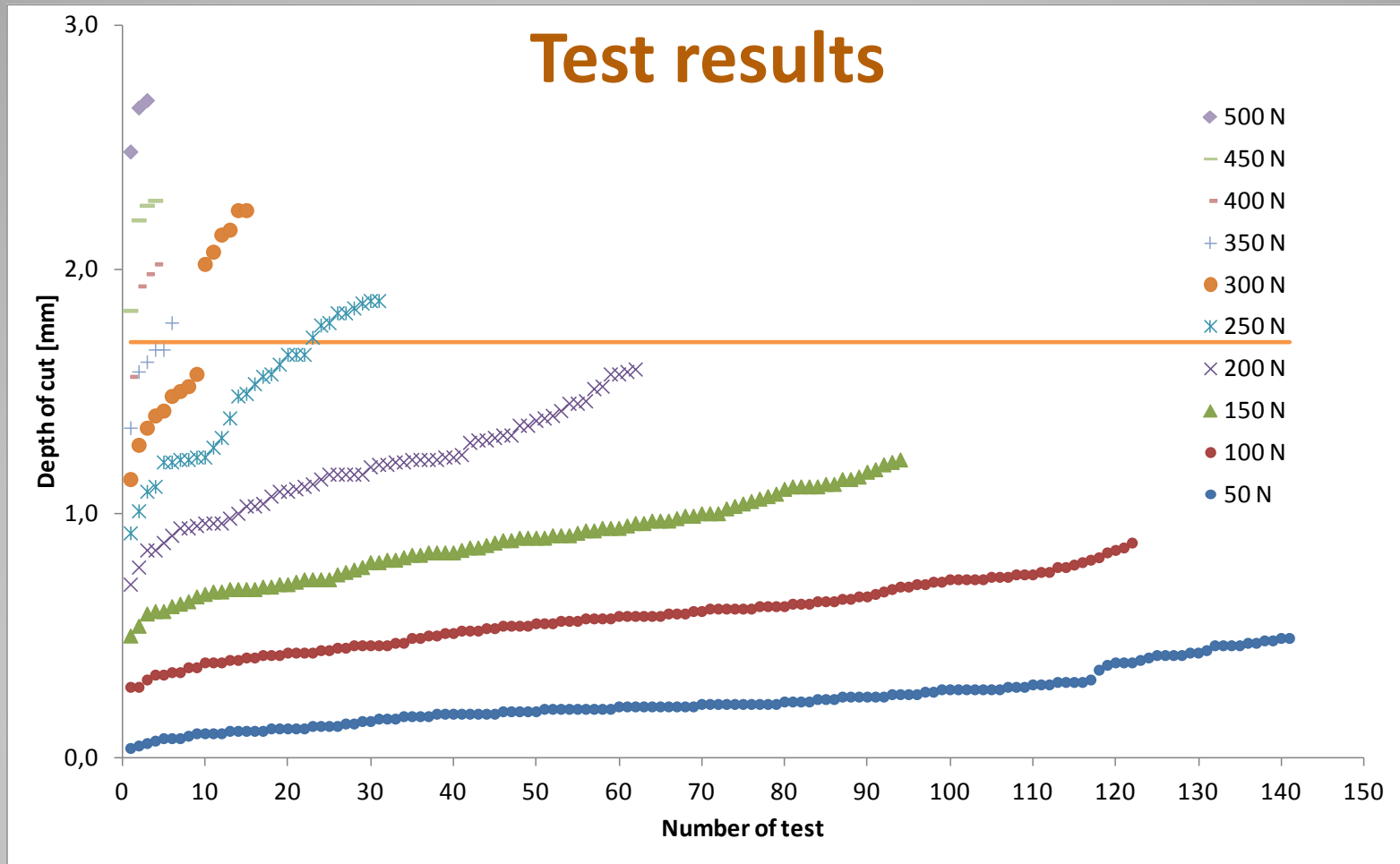


Fig. Depth of cut of rim depending on the load

# Method on the base of EN ISO 2409 – Test 2

## Test results

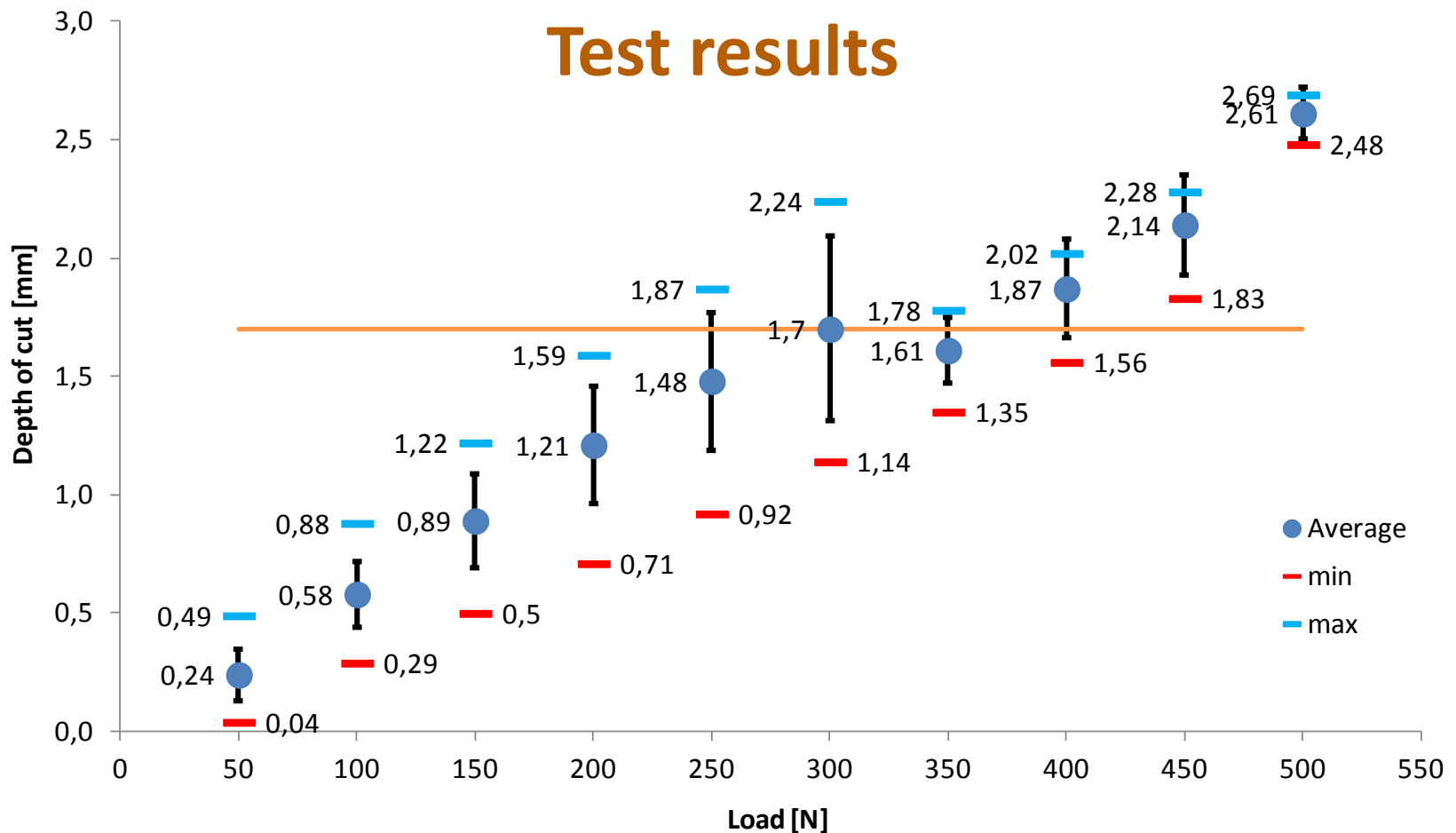


Fig. Depth of cut of rim depending on the load

# Method on the base of EN ISO 2409 – **Test 2**

## Test results

Variant	No.	Load [N]				Final result [N]	
		50	100	150	200	M	P
14	1	—	—	M	M	< 50	150
	2	—	—	M	M		
	3	M	M	M	P		
16	1	P	P	P	P	< 50	< 50
	2	—	—	P	P		
	3	—	P	P	P		
17	1	—	—	—	P	150	150
	2	—	—	—	—		
	3	—	—	—	—		
18	1	—	—	—	—	50	50
	1	—	P	P	P		
	2	—	—	—	P		
19	1	M	M	M	M	< 50	>200
	2	—	M	M	M		
	3	M	M	M	M		
20	1	—	—	—	P	150	150
	2	—	—	—	—		

P - The coating has flaked – substrate is visible, M - The coating has flaked – interlayer coating is visible



# Method on the base of EN ISO 2409 – **Test 2**

## Summary

**The method seems to be suitable for coated elements because**

- has good materials differentiation
- has clear and easy assessment way

**Further steps:**

- RRT – during today's UC meeting
- Description of test method

**Further steps after the project:**

- Elaboration of simplest equipment instead of mechanical testing machine
- Proposal of work standard for European Standardisation Group

# Thank You for your attention!

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