

Test report

No.. Q IWQ MBL 938 1041

Customer: Niemann furniture parts
 Karl W. Niemann GmbH & Co.KG
 Hedemerstr. 4
 32361 Preußisch Oldendorf

Test object: MDF panel with PET surface with scrub resistant foil

Task: Testing of the panels for chemical resistance, resistance to abrasion, resistance to scratches, behaviour when exposed to dry / wet heat in accordance with DIN 68861, cross cut testing, climate change testing AMK module 4, light fastness in accordance with DIN EN 105 -B

Declaration:

An investigation of the surface characteristics was carried on the following test samples out in accordance with the standards listed below and the latest state of technology:

The samples have reached the following results and are to be assigned to the following test standards as follows:

DIN 68861 furniture surfaces; Behaviour	Surface finishes, varnished, veneered wood, for example Load groups
	Surface PET with foil
DIN 68861, Part 1, Edition 04.2001, behaviour when subjected to chemical load.	1 A
DIN 68861, Part 2, Edition 12.1981, behaviour when subjected to abrasion.	2 A
DIN 68861, Part 4, Edition 12.1981, behaviour when subjected to scratches.	4 E
DUB 588561, Part 7, Edition 04 2001,behaviour when subjected to dry heat	7 B

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DIN EN 68861, Part 8, Edition 04 2001, Behaviour when exposed to wet heat	8 A
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Cross cut test DIN EN ISO 2409	Cross cut characteristic value 1:
Light fastness-Xenon arc lamp DIN EN ISO 105-B02	4

Climate change test AMK module 4	no changes
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Results:

It has generally been observed the PET surface with foil meets the requirements of set by the RAL-GZ 430. Further details on the performance of the tests and the results can be taken from the following pages.

Nürnberg, 18.02.2008
Q MBL N hy/wi/se

LGA QualiTest GmbH
Furniture Testing Institute

Dipl.-Ing. (FH) R. Heym
Head of specialist centre

Dipl.-Ing. (FH) Frank Wildförster
Official in charge

TEST RESULTS

Test object

Article: Shiny surface of the front of a piece of furniture
Description: with PET scrub resistant foil
Test sample: 12 x 400 x 400 mm, 12 x 100 x 100 mm und 4 x 300 x 500 mm panels
Delivered on: 08.01.2008
Delivered by: The customer
Reg. No.: 0025

Scope of tests

- Tests in conformity with DIN EN 68 861
- Behaviour under chemical load, Part 1, Edition 04.2001
- Behaviour when subjected to abrasion, Part 2, Edition 12.1981
- Behaviour when subjected to scratches, Part 4, Edition 12.1981
- Behaviour when subjected to dry / wet heat in accordance with Part 7/8 Edition 04.2001
- Cross cut test in accordance with DIN EN ISO 2409
- Climate change test AMK module 4
- Light fastness test in accordance with DIN EN ISO 105-B02

Area of application for the test results

The test results only refer to the testing done on the test items which have been submitted. The digital photographs which may have been assigned to the test report only used for extra explanation and are not part of the test report.

Measurement accuracy

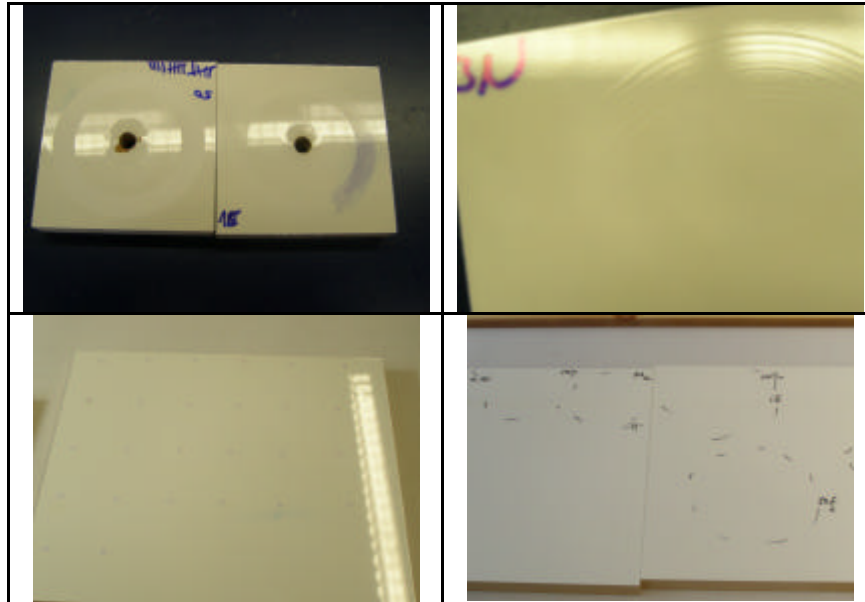
Unless otherwise stated, the measurement accuracy for longitudinal dimensions is in accordance with DIN 7168-g

For old constructions and DIN ISO 2768 Part 1 "c" for new constructions. Measurement inaccuracy is < 5 % for all other physical measurement sizes. Testing is done under the usual climate conditions.

General test

Short description of the test item (manufacturer's details)

Description: MDF panel with surface covered with shiny foil,
White plastic coated underside, thickness $d = 19$ mm



Surface tests

Chemical load

Test conditions

Test according to DIN 68 861, Part 1, Edition 04/2001

The test material is applied to the surface to be tested and covered with Petri dishes.
Time take to produce an effect: up to 16 hours.

Assessment:

- 5 No visible changes
- 4 Hardly noticeable changes in shine or colour
- 3 Slight changes in shine or colour; the structure of the test surface has not changed
- 2 Heavy changes noticeable; the structure of the test surface has remained more or less undamaged, however.
- 1 Heavy changes noticeable; the structure of the test surface has changed.
- ./ Test surface heavily changed or destroyed.

Load groups 1 A to 1 C tested according to table 1 (the test material has not attacked the surface in group C.)

Requirements

The panel surfaces are classified according to their resistance into the load groups of the following

page.

Test results on the following page.

Chemical load

Test sample	PET with foil
Load group reached	1 A

Test material	1 A		
	Time to take effect	Requirement	Result
1. Acetic acid		5	5
2, Citric acid	16 h	5	5
3 Sodium carbonate	16 h	5	5
4 Liquid ammonia	16 h	5	5
5 Ethyl alcohol	16 h	5	5
6 White wine, red wine, Med.wine	16 h	5	5
7 Beer	16 h	5	5
8 Cola drinks	16 h	5	5
9 Coffee powder	16 h	5	5
10 Black tea	16 h	5	5
11 Dark blackcurrant juice Johannisbeersaft	16 h	5	5
12 Condensed milk	16 h	5	5
13 Water	16 h	5	5
14 Petrol	16 h	5	5
15 Acetone	16 h	5	5
16 Ethyl- butyl acetate	16 h	5	5
17 Butter	16 h	5	5
18 Olive oil	16 h	5	5
19 Mustard	16 h	5	5
20 Table salt	16 h	5	5
21 Onion juice	16 h	-	-*
22 Disinfectant	16 h	5	5
23 Black gel ball point ink	16 h	--	4*
24 Stamping ink	16 h	5	5
25 Cleaning material	16 h	5	5
26 Cleaning solution	16 h	5	5

Ewd – time to take effect; Anf – requirement; Erg – result

(*Onion juice was not tested; black gel ink from a ball-point pen can be ignored.)

Requirement

RAL-GZ 430/2 – Tables, chairs, corner benches – varnished materials -
Load group 1 B/C

Behaviour when subjected to abrasion

Test conditions

Test according to DIN 68 861, Part 2, Edition 12/1981

Sample dimensions:: 100 x 100 mm
 Number of test items: 3 ea.
 Test device: Abrasion test device; Manufacture Frank scrub test device
 Pre-treatment of the test items: 72 h storage under normal climate conditions in accordance with
 DIN 50 014
 Temperature in the test chamber: 23 °C

Load groups

Furniture surfaces exposed to abrasion are classified into the groups 2A to 2F, according to their resistance:

RPM reached	Load group
over 650	2 A
over 350 up to 650	2 B
over 150 up to 350	2 C
over 50 up to 150	2 D
over 25 up to 50	2 E
up to 25	2 F

Requirements

Testing is stopped, if:

Up to 50 % of the wood, or the design with decorative surfaces has been attacked: when 50% of the colour disappears and / or the base (core) can be seen in solid colour surfaces.

Results

Sample	RPM reached	Load group
PET, foil	> 650 Extremely shiny surface destroyed after 20 RPM	2 A

Requirement

RAL-GZ 430/2 – Tables, chairs, corner benches – varnished materials -

Load group **2 E/F**

Behaviour when subjected to scratches

Test conditions

Test according to DIN 68 861, Part 4, 12/1981

Test bodies: 100 x 100 mm
 Number of test items: 3 ea.
 Test device: Scratch test device; Manufacture Erichsen
 Pre-treatment of the test items: 7 h storage under normal climate conditions in accordance with DIN 50 014
 Temperature in the test chamber: 23 °C
 Evaluation: Tilting of the test body up to approx. 10°

Load groups

Furniture surfaces exposed to scratches are classified into the groups 4A to 4F, according to their resistance:

	Load group
Low weight force N, which still produces a closed mark	
over 4.0	4 A
over 2.0 up to 4.0	4 B
over 1.5 up to 2.0	4 C
over 1.0 up to 1.5	4 D
over 0.5 up to 1.0	4 E
up to 0.5	4 F

Requirements

Lowest weight force N, which still produces a closed mark

Results

Sample	Lowest weight force in N	Load group
PET, foil	0.5	4 F

Requirement

RAL-GZ 430/1A –Living area – varnished materials -
 Living area. Load group **4 EF**

Behaviour when exposed to dry heat

Test conditions

Test according to DIN 12722 10/1997

Test body: 1 ea.

Temperature of the testing device: from 180 °C

Test device: Test stamp Ø 9.5 cm, climate cabinet "Memert II30"

Duration of the load: 20 min

Pre-treatment of the test items: With test material 26

according to DIN 68 861, Part 1 cleaned,

then storage in normal climate 72 h.

Load groups

Furniture surfaces exposed to dry heat are classified into the groups 7 A to 7 E, according to their resistance:

Test temperature in °C ($\pm 1^\circ\text{C}$)	Load group
180	7 A
140	7 B
100	7 C
70	7 D
55	7 E

Requirements

The test is successful at the test temperature which has not caused any visible changes in the test surface.

Visible changes are the formation of blisters, a change in shininess, a change in colour, deformation, marking by the test device, cracks

Results

Sample	Temperature reached in °C	Load group
PET, foil	140	7 B

Requirement

RAL-GZ 430/2 –Tables, chairs, corner benches – varnished materials -
Load group **7 B**

Behaviour when exposed to wet heat

Test conditions

Test according to DIN 12721 08/2006

Test body: 1 ea.

Temperature of the testing device: up to 100° C

Test device: Test stamp Ø 9.5 cm, climate cabinet "Memert II30"

Duration of the load: 20 min

Pre-treatment of the test items: With test material 26
according to DIN 68 861, Part 1 cleaned,
then storage in normal climate 72 h.

Load groups

Furniture surfaces exposed to wet heat are classified into the groups 8 A to 8 C, according to their resistance:

Test temperature in °C (± 1)	Load group
100	8 A
70	8 B
55	8 C

Requirements

The test is successful at the test temperature which has not caused any visible changes in the test surface.

Visible changes are the formation of blisters, a change in shininess, a change in colour, deformation, marking by the test device, cracks

Results

Sample	Temperature reached in °C	Load group
PET, foil	100	8 A

Requirement

RAL-GZ 430/2 –Tables, chairs, corner benches – varnished materials -

Load group **8 B**

Cross cut test

Test conditions

DIN EN ISO 2409, edition 10.1994

Sample dimensions: at least 150 x 100 mm

Number of tests: 2 ea.

Pre-treatment of the test items:

Conditioning of the test bodies at a temperature of $(23 \pm 2) ^\circ\text{C}$ and a relative air humidity of $(50 \pm 5) \%$

Test device: Multiple cutting device, Manufacture BYK-Gardner

Cutting interval: 2 mm

Evaluation according to DIN EN ISO 2409, table 1	Sample	Cross cut characteristic value
Classification of the test results	PET, foil	1

Cross cut characteristic value 1:

Small splinters have broken from the coating at the cutting points of the cross cut lines. The burst areas are not significantly larger than 5 % of the cross cut surface.

Climate change test according to AMK module 4

Test:

The fronts of the samples are subjected to a test for resistance to humidity in accordance with AMK: climate and humidity resistance for kitchen furniture components – module 4 – resistance to climate change.

Test cycle

0.5 hours Cooling down to $-20 ^\circ\text{C}$ with a cooling down rate of $1.33 \pm 0.1 \text{ K/min}$

1.0 hours cConstant temperature of $(-20 \pm 2) ^\circ\text{C}$

0.5 hours Heating up to $20 ^\circ\text{C}$ with a heating up rate of $1.33 \pm 0.1 \text{ K/min}$

3.0 hours Storage at $20 \pm 2 ^\circ\text{C}$ and $(85 \pm 5) \%$ relative Air humidity

0.5 hours Heating up to $60 ^\circ\text{C}$ with a heating up rate of $1.33 \pm 0.1 \text{ K/min}$

3.0 hours Storage at $60 \pm 2 ^\circ\text{C}$ and $55 \pm 5) \%$ relative Air humidity

0.5 hours Cooling down to $20 ^\circ\text{C}$ with a cooling down rate of $1.33 \pm 0.1 \text{ K/min}$

The cycle is run 20 times.

Requirement: No development of cracks, discolouration or peeling of the edges / foils

Result:

No changes were found.

Testing the colour fastness:

The surface samples were tested with a rapid lighting device, Sunset CPS +, up to level 6 (with an extra filter consisting of special window glass). The assessment is done with the blue scale DIN EN 105-B02.

Result:

Sample: PET, foil	level reached on the Grey Scale
Light fastness-xenon arc lamp DIN EN ISO 105-B02	4