LGA QualiTest GmbH
Institut für Warenprüfung und Qualitätsüberwachung
Möbelprüfinstitut

Test report

No. **Q IWQ MBL 734 1107**

Applicant:	Niemann Möbelteile Karl W. Niemann GmbH + Co.KG Hedemer Str. 4 32361 Preußisch Oldendorf
Test unit:	**V**arious kitchen fronts (Test samples supplied by the applicant)
Test order:	Resistance to wet and alternate atmosphere (AMK instruction 09/02) as well as thermal evaluation according to AMK instructions.

Conclusion:

Various decorated kitchen front panels were submitted to comprehensive evaluation when subjected to wet- and alternate atmospheres, partially in accordance with AMK instruction 09/2002. The evaluation was supplemented by thermal tests and one surface soundness test to assess the adhesive force between decorated face and substrate. The tests were carried out in a thermal cabinet (manufactured by Fa. Weiss).
New samples were taken for every test.

Surface and edges show a high resistance to dissolving and warping when subjected to high and wet atmosphere. The results, however, should be strengthened by testing a larger number of samples also to realize weak factors within the process chain.

For more details on the test performances and test results see the following pages.

Nuremberg, 19.03.04
IWQ /hy/di/şe

LGA - QualiTest GmbH
Möbelprüfinstitut
Furniture Testing Institute

Responsible for the test

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This test report comprises 10 text pages.

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T e s t R e s u l t s

Test unit

Designation/type: Various examples of kitchen doors

Delivery slip-No.:
Test unit:
Submitted on: 25.02.03
by: Fa. Niemann Möbelteile

Scope of tests

General tests

AMK instructions 02/03
- Test module 2 Water damp
- Test module 4 Resistance to alternate climates
- Cold Shock Behavior
- Rising Temperature on the Edge up to 75 °C
- Alternate temperature RAL GZ 430
- High temperatures and wet conditions
- Surface soundness DIN 311 (8/02)

Scope of the test results

The test results refer only to the sample submitted to the test. The digital photos – if any, serve only for supplementary explanation and do not constitute an own part of the test report.

General tolerances

Unless otherwise specified the accuracy of the linear dimension is defined according to DIN 7168-g for old drawings respectively to DIN ISO 2768 part 1 "c" for new drawings. All other physical dimensions shall have an accuracy of ± 5% of the nominal force. The tests were carried out at ambient temperature, unless otherwise stated.

General tests

Short descriptions of the test samples

6 pcs. MDF / thickness: approx. 500 x 500 x 19 mm
Front is covered with surface material, back is provided with melamine resin layer.
Edges: plastic material.
Surface material: various colors
The numbers on the samples were provided by the applicant.

Sample 1	red
Sample 2	black
Sample 3	yellow
Sample 4	red
Sample 5	black
Sample 6	yellow

Technical test

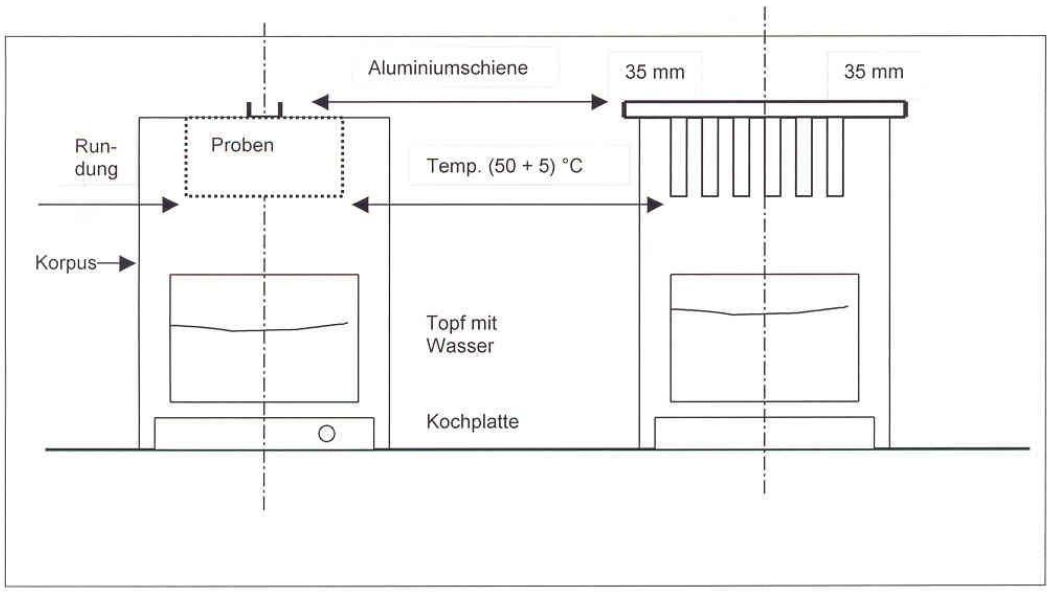
Test module 2 (Water damp)

Test conditions

Test specimen: approx. 200 x 200 mm
(Door section, open edge is covered with adhesive material)
Pre-treatment: 7 days conditioning under normal climate DIN 50 014
Bores, grooves and open narrow surface sections shall be sealed using silicone.

1. Test methods

The test specimens shall be hanged vertically in a carcass, with the narrow surface section to be tested. (see picture 1):



Aluminiumschine: alu rail *Rundung: rounding* *Proben: samples*

Korpus: carcass

Topf mit Wasser: pot with water

Kochplatte: cooking plate

- Temperature to be stated at the lower edge of the samples (50 + 5) °C
- Distance water surface to lower edge of the sample: ca. 300 mm

Test duration:
- 5 cycles / 30 min water damp each and then 30 min drying.

Requirements:

No swelling, joints or gaps, no dissolving of the foil on the edges to be stated.

Result:
Sample No. 3: swelling of the edges approx. 2 cm length
Apart from this, there is no visible change

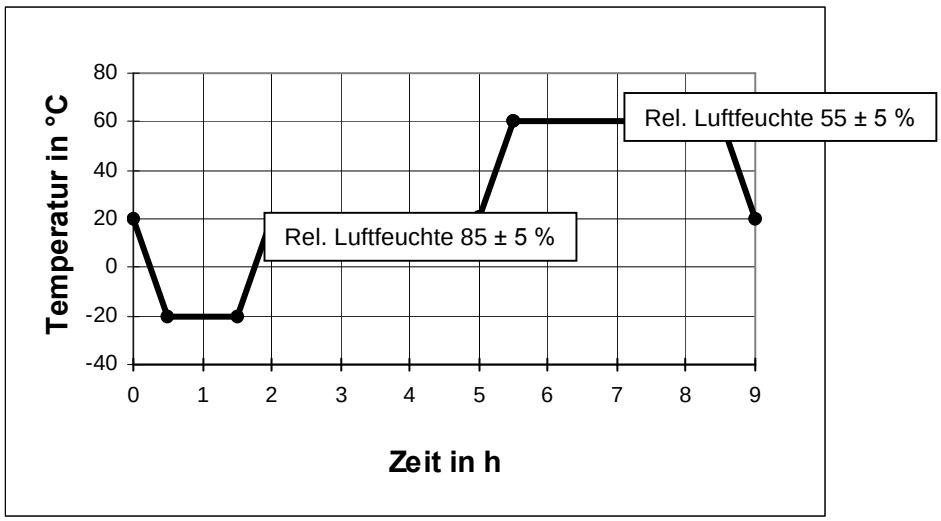
Module 4: Resistance to alternate atmosphere

Test conditions:
Test specimen: ca. 290 x 290 mm
(Door section, open edge is covered with adhesive material)
Test equipment: Thermal cabinet (Producer: Weiss)
Pre-treatment: 7 days
Conditioning of the samples at standard temperature (DIN 50 014).

Test method
Conditioning of the samples at the atmosphere conditions as follows:

- 0,5 h Cooling to -20°C with cooling velocity of 0,5 ± 0,1 K/min
- 1 h Constant temperature of (-20 ± 2) °C
- 0,5 h Heating up to 20°C with the heating velocity of 0,5 ± 0,1 K/min
- 3 h Conditioning at (20 ± 2)°C and (85 ± 5) % rel. air humity
- 0,5 h Heating up to 60°C with the heating velocity of 0,5 ± 0,1 K/min
- 3 h Conditioning at (60 ± 2) °C and (55 ± 5) % rel. air humidity
- 0,5 h Cooling to 20°C with cooling velocity 0,5 ± 0,1 K/min

The cycle was repeated 20 x



Cycle / test at alternate atmosphere

Test performance

The samples were positioned in a holding device in position of use
Conditioning in a thermal cabinet.
Distance: approx.30 mm

Requirements

There shall be neither formation of grooves nor dissolving of the edges/film. +

Test at temperature variations
(Cold Shock Test)

The determination of the behavior at variations of temperature
was carried out with reference to UNI 9429 by sample conditioning
at the following temperatures:

4 h at - 40 °C
4 h at + 40 °C
The test cycle was repeated 3 x.

Requirements

Not permitted: visible changes. +

Testing the resistance to variations of temperature
Rising temperature, thermal stress

Test conditions

According to AMK – instructions (05.03)
Test specimen: ca. 290 x 290 mm
(Door sections, open edge is covered with adhesive material)
Test equipment: Thermal cabinet, product: Weiss

Pre-treatment of the samples: 7 days
Conditioning at ambient temperature (DIN 50 014)

The resistance to temperature shall at least: 75 °C
at the following test conditions:

1 hour at 50 °C
1 hour at 60 °C
4 hours at 75 °C

The test was carried out at circulating air and with the air humidity.

Evaluation parameters:
Shrinkage, cracks, dissolving of the surface material from the substrate and deformation of the front.

Requirement

No visible changes +

Test on the resistance of humidity

Test conditions
With reference to RAL-GZ 430/1B and DIN 68 930

Test specimen: ca. 290 x 290 mm
(Door section open edge was covered with adhesive material)
Test equipment: Thermal cabinet (producer: Weiss)
Pre-treatment of the samples: 7 days
Conditioning at ambient climate (DIN 50 014)

The determination of the alternate wet atmosphere
DIN 50 016 (12.1962) conditioning of the samples
5 h at 23 °C and 83 % RHA /Relative Air Humidity
14 h at 40 °C and 92 % RHA
24 h at 23 °C and 50 % RHA

The test was repeated 3 x (RAL)

Requirement

Not permitted: Visible changes +

Test on high temperature –and dry and wet atmosphere

Test conditions

Test specimen: approx. 290 x 290 mm
(Door section, open edge was covered with adhesive material)
Test equipment: thermal cabinet (Product: Weiss)
Pre-treatment of the samples: 7 days
Conditioning at ambient temperature DIN 50 014

Test method:

The temperature and humidity cycle was as follows:

1 h - 10 °C
2 h + 45 °C and 90 % rel. humidity
4 h + 90 °C and 30 % rel. humdity

Requirements: none

Result: the edges were solid (not dissolved or loose), the edge of all samples was on both ends shorter, approx. 2-3 mm (particleboard was visible) and somewhat larger, so that the edge is projecting the surface

Surface soundness of the front (DIN EN 311 issued: 92)

Surface soundness of the front (DIN EN 311)

Marking of the sample	Number of the sample	$\square_{max}$ in MPa	Failure
1.	1	1,54	Glued together
	2	1,61	Glued together
	3	0,96	Glued together
	4	2,13	MDF, together
2.	1	1,48	Glued together
	2	1,35	Glued together
	3	1,48	Glued together
3.	1	1,33	Glued together
	2	1,39	Glued together
	3	1,42	Glued together
4.	1	2,15	MDF
	2	1,77	MDF
	3	2,04	MDF
	4	2,22	MDF
5.	2	2,13	MDF
	3	2,10	MDF, glued together
	4	1,64	MDF
6.	1	2,02	MDF
	3	2,18	MDF
	4	2,10	MDF, In-between layer/coating

Note:
According to DIN EN 13329 Laminate Floor Coverings the surface soundness of the laminate is defined with min.1,0 N/mm²
(1 Mpa = 1 N/mm²)