



















PRODUCT DATASHEET

Angelus

Product identification:

Medium density fiberboard (MDF) melamine faced, with a face finished in high gloss identified by the client as Angelus

PHYSICAL-MECHANICAL CHARACTERISTICS OF THE PRODUCT

TEST		RESULT		NORMATIVE
	Chemical stress	Assessment	16 h. Acetone and etil-butyl acetate: 1 Remaider: 0	DIN 68 861-1:81
		Class	10'' Acetone and etil-butyl acetate: 0	
	Resistance to cold liquids 1h. (Assessment)		5	UNE EN 12720:09
	Cross-cut test (Classification)		0	UNE EN ISO 2409:07
	Resistance to cracking (Ratting)		5	UNE EN 14323:04
	Surface soundness (N/mm ²)		1,5 (0,1) ¹⁾	AIDIMA
	Cold check test (Assessment after 40 cycles)		Without cracks or surface distortion	UNE EN 14323:04
	Light fastness	Blue scale grade	8	UNE EN 12722:09
		Grey scale grade	5	
	Resistance to dry heat 100°C (Assessment)		5	UNE EN 12722:09
	Resistance to wet heat 85°C (Assessment)		5	UNE EN 12721:09
	Resistance to cigarette burns (Ratting)		1	UNE EN 14323:04
	Resistance to scratching (N)		6,0	UNE EN 14323:04
	Resistance to water copour (Ratting)		4	UNE EN 14323:04
	Resistance to impact (Drop height without cracks in cm)		140	UNE EN 14323:04
	Dimensional tolerance		± 0,5 mm	TAFISUB
	Flatness		1 mm / 1m	TAFISUB
	Specular gloss		91±5GU	TAFISUB

1) Average value and standars deviation (value in brackets)

**REPORT MADE BY AIDIMA's LABORATORIES****ON THE REQUEST OF:**

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CONCERNING:

PRODUCT: MELAMINE FACED FIBERBOARD (MDF) HIGH
GLOSS FINISH ANGELUS
TESTING: SEVERAL

DATE OF THE RECEPTION OF SAMPLES: 24/03/2014
STARTING DATE: 26/03/2014
FINISHING DATE: 8/04/2014

THIS REPORT CONSISTS OF 10 PAGES NUMBERED ACCORDINGLY.

The test samples will remain at AIDIMA over a period of three months from the date of issuing this report. That period having expired, it will be destroyed, so any claim on it must be made within these limits.

**1. DESCRIPTION AND IDENTIFICATION OF THE TESTED OBJECT.
EXAMINATION PRIOR TO TESTING**

Medium density fiberboard (MDF) melamine faced, with a face finished in high gloss identified by the client as ANGELUS.
The sample is referenced by AIDIMA as 1403106-01.

2. ORIGIN OF THE SAMPLE

Samples supplied by the customer.

3. ASKED FOR TEST

- Chemical stress
- Resistance to cold liquids
- Cross-cut test
- Resistance to cracking
- Surface soundness
- Cold-check test
- Light fastness
- Resistance to wet heat
- Resistance to dry heat
- Resistance to cigarette burns
- Resistance to scratching
- Resistance to water vapour
- Resistance to impact by large diameter ball
- Dimensions
- Determination of flatness
- Specular gloss

4. ADAPTATION OF THE TEST, METHOD OR PROCEDURE TO STANDARD

The test method is carried out according to standard:

Chemical stress	DIN 68 861-1:81
Resistance to cold liquids	UNE EN 12720:09
Cross-cut test	UNE EN ISO 2409:07
Resistance to cracking	UNE EN 14323:04
Surface soundness	UNE EN 311:02
Cold-check test	UNE 48 025:1979 except for the initial temperature, where it is applied 60° C, subjecting sample to 40 cycles in total.
Light fastness	UNE EN 14323:04
Resistance to wet heat	UNE EN 12722:09
Resistance to dry heat	UNE EN 12721:09
Resistance to cigarette burns	UNE EN 14323:04
Resistance to scratching	UNE EN 14323:04
Resistance to water vapour	UNE EN 14323:04
Resistance to impact by large diameter ball	UNE EN 14323:04
Dimensions	UNE EN 14323:04
Determination of flatness	UNE EN 14323:04
Specular gloss	UNE EN 14323:04

5. DESCRIPTION OF THE TEST METHOD

CHEMICAL STRESS

It consists of placing the sample in contact with a number of staining agents, normally used, over a period of time and specific contact conditions for each of these agents.

Some drops of each product were placed on two points of the surface and remain covered with watch glass a period of time specified for each staining agent.

After this period, samples were washed and examined to determine any surface marks according to the following rating scale:

Appearance	Assessment
▪ No visible change	0
▪ Visible variations of brightness, and / or color.	1
▪ Slight change in the brightness and / or color. Test surface is not affected.	2
▪ Strong mark. Test surface without changes.	3
▪ Strong mark and test surface damaged.	4
▪ Strong alteration of test surface and/or removal.	5

Staining agents are the following:

- Vinegar (16 h)
- Citric acid 10% solution (16 h)
- Sodium carbonate 10% solution(16 h)
- Ammonia 10% solution(16 h)
- Ethanol 48% solution (16 h)
- Wine (16 h)
- Beer (16 h)
- Coke drink (16 h)
- Coffee (16 h)
- Tea (16 h)
- Redcurrant (16 h)
- Milk (16 h)
- Water (16 h)
- Heptane (16 h)
- Acetone (16h)
- Ethyl butyl acetate (16h)
- Butter (16 h)
- Oil (16 h)
- Mustard (16 h)
- Sodium chloride 5% solution (16h)
- Onion juice (16 h)
- Lipstick (16 h)
- Fenol al 0.5% (16 h)
- Ball point ink (16 h)
- Hair colouring (16 h)
- Detergent (16 h)
- Cleansing agents (16 h)

RESISTANCE TO COLD LIQUIDS

Disc of soft filter paper saturated with the test liquids are placed on the test surface and covered with an inverted glass dish. The test liquids are: acetic acid 10% aqueous solution, acetone, ammonia 10% aqueous solution, citric acid 10% aqueous solution, cleansing agent, coffee, disinfectant (fenol 0,5%), ink, ethanol 96% aqueous solution, condensed milk, etil-butyl acetate 1:1 (V/V), olive oil, paraffin oil, sodium carbonate 10% and sodium chloride 5% aqueous solutions, tea, desioned water and acid and basic perspiration.

After a test period of 16 hours at room temperature, glasses and paper discs are removed and any remaining of test liquid is soaked up with the absorbent paper. For 16h to 24h the test surface is kept in the test atmosphere. After this period the test surface is washed by lightly rubbing with the cleaning cloth soaked first in cleansing solution and then only in water and wiped with an absorbent cloth.

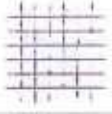

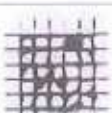

Past 30 minutes the area tested is assessed from various angles. Then, possible discolorations, changes in gloss or colour, structural attack and other possible defects are evaluated according to the rating code in the following table:

DESCRIPTION	ASSESSMENT
<ul style="list-style-type: none"> No change. The test area is not unlike the adjacent surrounding area. 	5
<ul style="list-style-type: none"> Change slight. The test area can be distinguished from the surrounding area adjacent only when the light source is reflected in the test area to the observer's eye, for example, discoloration, change brightness and colour. No changes in the structure of the surface, for example, deformation, swelling or bulging of the fiber, cracking, blistering. 	4
<ul style="list-style-type: none"> Moderate change. The test area can be distinguished from adjacent surrounding area, so visible from various viewing angles, for example, discoloration, change brightness and color. No changes in the structure of the surface, for example, deformation, swelling or bulging of the fibre, cracking, blistering. 	3
<ul style="list-style-type: none"> Significant change. The test area can be distinguished from adjacent surrounding area, so visible from any angle of view, for example, discoloration, change brightness and color y/o slight changes in surface structure, for example, deformation, swelling or bulging of fiber, cracking, blistering. 	2
<ul style="list-style-type: none"> Strong change. The surface structure has clearly changed, and / or discoloration, change brightness and color, and / or surface material is removed in whole or in part, and / or polyamide fiber cloth has been attached to the surface. 	1

ADHERENCE COATING / SUBSTRATE (CROSS-CUT TEST)

Two perpendicular sets of 6 parallel cuts, are carried out on the test sample by a standardized tool. Each two adjacent cuts are separated 2mm. When the surface has fibre, the cuts are carried out with 45 ° slope respect to the fibre direction.

The cuts have to arrive to the substrate, without penetrating in it. The surface is assessed according to this table:

Description	Appearance of surface	Classification
The edges of the cuts are completely smooth; none of the squares of the lattice is detached.	--	0
Detachment of small flakes of the coating at the intersections of the cuts. A cross-cut area not greater than 5% is affected.		1
The coating has flaked along the edges and/or at the intersections of the cuts. A cross-cut area greater than 5%, but not greater than 15%, is affected.		2
The coating has flaked along the edges of the cuts partly or wholly in large ribbons, and/or it has flaked partly or wholly on different parts of the squares. A cross-cut area greater than 15%, but not greater than 35%, is affected.		3
The coating has flaked along the edges of the in large ribbons and/or some squares have detached partly or wholly. A cross-cut area greater than 35%, but not greater than 65%, is affected.		4
Any degree of flaking that cannot even be classified by classification 4.	--	5

RESISTANCE TO CRACKING

Square test specimens (250 ± 2) mm, are taken from the test sample and are placed in an oven at a temperature of 70 °C in a period of 24 hours.

After this period, and once cooled to room temperature, specimens are examined with the naked eye and under x6 magnification to determine the presence and extent of any cracking. The result is expressed as the following scale:

DAMAGE NATURE	RATting
• Without fissures	5
• Isolated capillary fissures	4
• Capillary fissures spread randomly over all the surface	3
• In addition to grade 3, one or two little fissures <25mm are visible on the surface at a distance of 400mm	2
• Visible fissures located in the total surface	1

SURFACE SOUNDNESS

Squared pieces are taken from sample. A steel standardized cylinder is glued at one side of each piece doing a circular slot. Load necessary to pull off steel cylinder is measured by a universal test machine.

Strength value to pull off the surface SS in N/mm^2 is calculated using the following formula:

$$SS = \frac{F}{A}$$

where,

F is the maximum load in Newton

A is the cylinder surface in mm^2

This value is calculated to the nearest 0,01 N/mm^2 .

COLD-CHECK TEST

The specimens are subjected to 40 cycles, each consisting of:

- 1 hour $(60 \pm 2)^\circ C$ in forced air oven.
- 1 hour $(-20 \pm 1)^\circ C$ in refrigerator.
- 15 minutes at room temperature.

After each cycle the samples are examined for signs of damage appearance of the finish surface and re-start a new cycle.

As a result, gives the number of cycles at which it is detected any deterioration on the surface, or maximum number of cycles performed on the specimens.

LIGHT FASTNESS

This test determines the resistance to change color of the laminate to be tested under the action of light from a xenon lamp under the following conditions:

- Black panel temperature: $(65 \pm 3)^\circ C$
- Relative humidity of the chamber: $(50 \pm 5)\%$
- Duration of test: when the contrast between the exposed and unexposed portions of the blue wool reference 6 is equal to grade 4 on the grey scale (ISO 105-A02).

The assessment is given based on the gray scale pattern and is expressed in terms of the contrast being greater than, equal to or less than grade 4 of the grey scale.

RESISTANCE TO DRY HEAT

An aluminium block of dimensions given, is preheated to the specified temperature ($100^\circ C$), and allowed to cool for 20 minutes on the surface to be tested. After this time, clean surface using a soft tissue and kept at room temperature for at least 16 hours.

The test surface is evaluated in observation camera from different angles as the rating scale showed at resistance to cold liquids.

RESISTANCE TO WEAT HEAT

An aluminium block of dimensions given, is preheated to the specified temperature ($85^\circ C$), and allowed to cool for 20 minutes on the surface to be tested, by interposing a nylon fabric or cloth soaked in distilled water.

After this time, clean and dry surface using a soft tissue and kept at room temperature for at least 16 hours.

The test surface is evaluated in observation camera from different angles as the rating scale showed at resistance to cold liquids.

RESISTANCE TO CIGARETTE BURNS

Three burning blond cigarettes of different brands, are placed in full-length contact with the sample horizontal surface, once cigarettes are ignited and let it burn to consume a length of approximately 10mm.

The cigarettes continue burning until an additional 20mm. After this occurs, any superficial combustion residues are removed and the area is cleaned with a soft cloth moistened with ethanol. The surface is examined with the naked eye for any changes according to the following rating scale:

Rating	Appearance
5	<ul style="list-style-type: none"> ▪ No visible change
4	<ul style="list-style-type: none"> ▪ Slight change of gloss only visible at certain viewing angles and/or slight brown stain.
3	<ul style="list-style-type: none"> ▪ Moderate change of gloss and/or moderate brown stain
2	<ul style="list-style-type: none"> ▪ Severe brown mark, but no destruction of the surface.
1	<ul style="list-style-type: none"> ▪ Blistering and/or cracks.

RESISTANCE TO SCRATCHING

The scratch resistance is expressed as the minimum applied load, by a diamond scratching point of defined geometry, which produces a continuous surface scratch, visible to the naked eye.

The scratch resistance of the laminate under test is expressed in Newtons.

WATER VAPOUR RESISTANCE

A specimen of 100 mm side is taken from the test sample, and is placed over the neck of a flask containing boiling water, so that the decorative surface is exposed to the water vapour. After (60 ± 2) minutes, the specimen is removed and allowed to recover for 24 hours, assessing any change in appearance as the following table:

DAMAGE NATURE	RATting
• No visible change	5
• Slight change of gloss and/or colour only visible at certain viewing angles	4
• Moderate change of gloss and/or colour	3
• Marked change of gloss and/or colour	2
• Blistering and/or delamination	1

RESISTANCE TO IMPACT BY LARGE DIAMETER BALL

The specimen is placed in the clamping frame in a ball free fall test apparatus. The specimen is covered with a sheet of carbon paper with its coated faced in contact with the decorative surface. Drop height of the ball is adjusted at 60cm.

The steel ball of $(324.0 \pm 5.0)\text{g}$ (42.8 ± 0.2) mm falls on the specimen, catching the ball on the first rebound so that multiple impacts do not occur. If cracking is evident, or the carbon imprint is greater than 10mm diameter the electromagnet of the ball is lowered and the ball is dropped again. If not, the ball is dropped from a height higher than 10cm, trying to the distance between two impacts, and between them and the edge of the specimen have a measure at least of 50mm.

The impact resistance of the laminate under test is defined as the maximum height for which no visible surface cracking or imprint greater than 10mm diameter occurs in five successive strikes.

DIMENSIONS: WIDTH, LENGTH AND THICKNESS

The length and width measurements are obtained using a flexometer and the average values are calculated to the nearest 1mm; with a micrometer, the thickness of the sample is measured in six points located at its four corners and in the middle of each side. The average is obtained to the nearest 0.1mm.

FLATNESS

The flatness is determined using a metallic rigid rule placed in parallel in the major and minor sides of the sample. With block gauges, the maximum deviation with accuracy of 0.1mm is obtained. The result is the maximum value to the nearest 0.1 mm.

SPECULAR GLOSS

The specular gloss is measured as the percentage of reflected light by a glossmeter in three angles, 20° , 60° and 85° . The angle of 60° is used in any case, the 20° angle is used in samples whose specular gloss at 60° is greater than 70 units (high brightness) and the angle of 85° is used in the case of specular gloss at 60° is lower than 10 units (low brightness).

6. OBTAINED RESULTS

TEST	RESULT	
Chemical stress Assessment	16 hours Acetone and etil-butyl acetate: 1 Remaider: 0	10sec Acetone and etil-butyl acetate: 0
Class	1B	
Resistance to cold liquids- 1 hour (assessment)	5	
Cross-cut test (classification)	0	
Resistance to cracking (ratting)	5	
Sourface soundness (N/mm ²)	1,5 (0,1) ¹⁾	
Cold-check test (assessment after 40 cycles)	Without cracks or surface distortion.	
Light fastness		
Blue scale grade	8	
Grey scale grade	5	
Resistance to dry heat 100°C (assessment)	5	
Resistance to wet heat 85°C (assessment)	5	
Resistance to cigarette burns (ratting)	1	
Resistance to scratching (N)	6,0	
Resistance to water vapour (ratting)	4	
Resistance to impact (drop height without cracks in cm)	140	
Dimensions (mm)		
Thickness	18,1	
Length	2801	
Width	1222	
Flatness (mm/m)	0,6	
Specular gloss (20°)	88,5	

1) Average value and standard deviation (value in brackets).

The result of the test/s only concerns to the tested object.

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Note: This report is an English version of the report 1403106-01m issued in date 9th December, 2014.

Date: 9th December, 2014



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