BERLING

Color has a Name!

The Sick Building Syndrome.
How it affects our stay indoors and how we can protect ourselves from its annoying effects.

Dimitris Kokkonis
Chemist
Research and Development Director

Chapters

- Indoor Air Quality (IAQ)
- Sick Building Syndrome
- Indoor air pollutants and their effects
- Ways of dealing with– Formafree case

Indoor Air Quality (IAQ)

The quality of indoor air (IAQ) is related to the presence or absence of harmful and dangerous factors in the indoor air of buildings.
These factors, in turn, are largely responsible for the mood and health of residents and building users in general.
In recent years, many agencies, government agencies, research institutes and institutes, as well as many private companies, have been dealing with indoor air quality, the parameters that affect it and the ways in which it can be improved.

Indoor Air Quality (IAQ)

Among others, they have dealt extensively with the issue

The World Health Organization (WHO)
The European Environmental Agency (EEA)
The United States Environment Agency (EPA)

But also many other health institutions and organizations

Indoor Air Quality (IAQ)

The indoor air quality of buildings is of particular interest due to the fact that people spend more than 90% of their time inside them.
Today, due to the construction of buildings, it is very common for indoor air quality to be much lower than outdoor air quality.
So indoors now, we find a lot of chemicals and particles, which significantly reduce air quality.

Indoor Air Quality (IAQ)

Indoor Air Quality (IAQ)

In the air of the interior there are many substances and particles as seen from the previous slide.

Main substances responsible for poor air quality

- Various chemical compounds
- Volatile organic compounds - VOCs
- Various solid particles - PMs
- Bacteria
- Existence of moisture

Sick Building Syndrome (SBS)

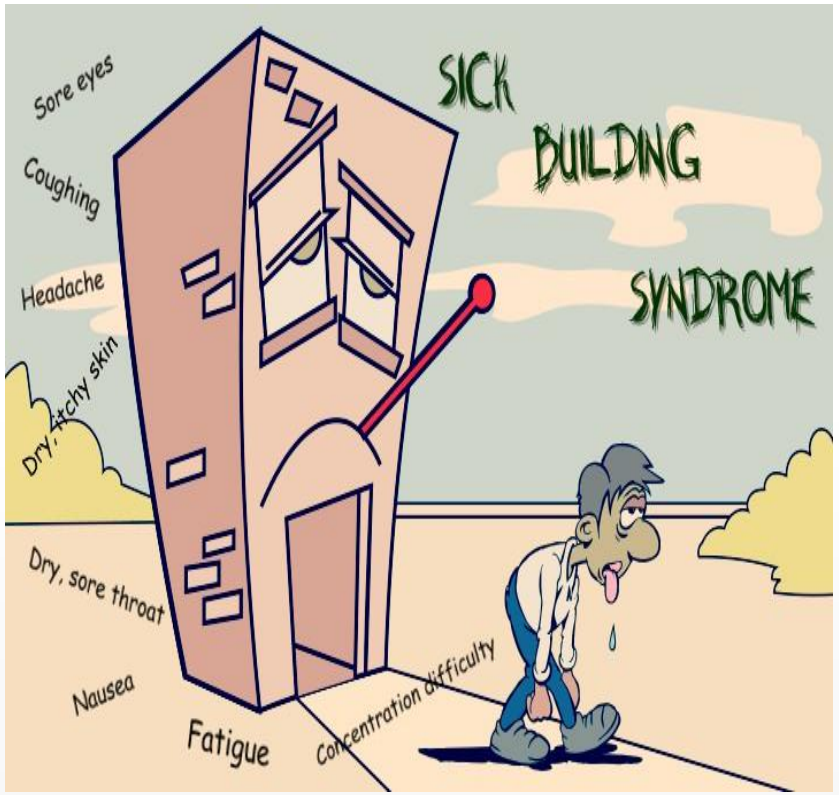
Sick building syndrome (SBS) is a medical condition where people in a building suffer from symptoms of illness or feel unwell for no apparent reason. Symptoms tend to increase with the time people spend in the building and improve over time or even disappear when people are away from the building.

Sick Building Syndrome (SBS)

The main observation is an increased frequency of symptoms such as headache, eye, nose and throat irritation, fatigue and dizziness and nausea. These symptoms appear to be related to the time spent in a building, although no specific disease or cause can be identified.

Sick Building Syndrome (SBS)

- Poor indoor air quality leads to this phenomenon.
- The sources of the substances that cause the syndrome can be internal and external.
- Internal sources can be materials that emit volatile organic compounds, such as paints, but also materials that emit chemicals such as carpets, wooden furniture, cigarette smoke, curtains, etc. The main external source is exhaust gases from various activities.



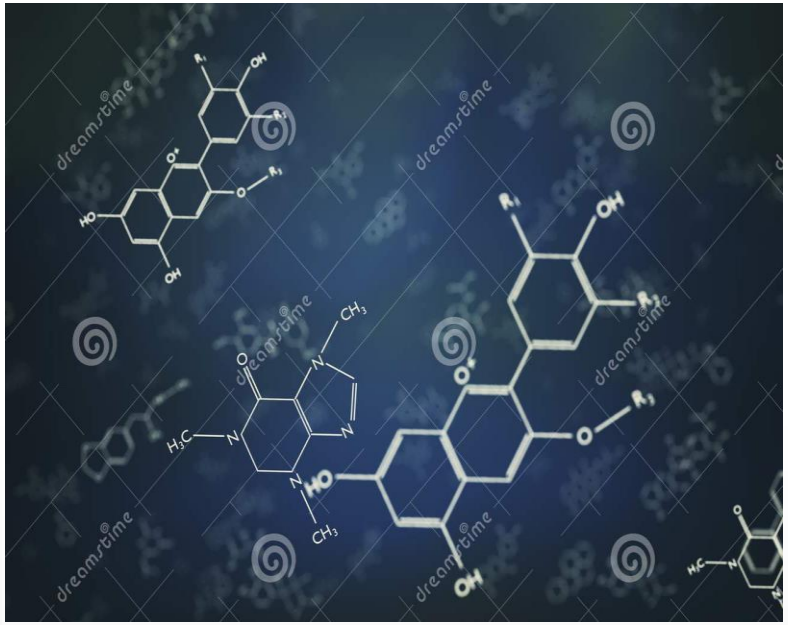
Sick Building Syndrome (SBS)

Syndrome results

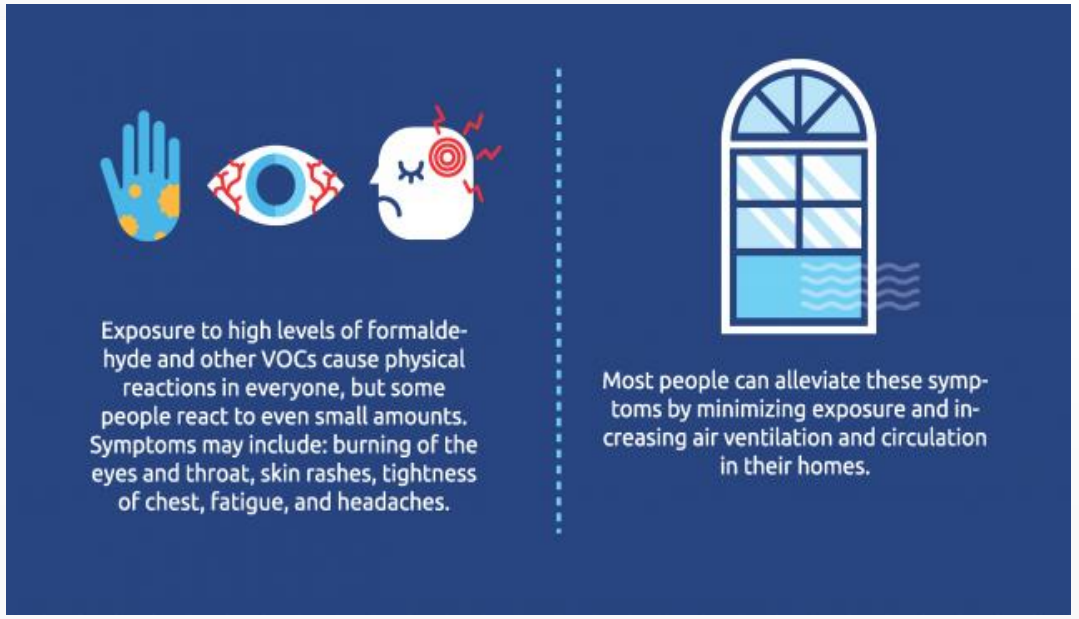
Main indoor air pollutants

Among the main chemical pollutants in the interior are volatile organic compounds - VOCs, formaldehyde, polycyclic aromatic compounds, carbon monoxide.

Volatile organic compounds (VOCs) are organic compounds that have a high vapor pressure at normal room temperature. Their high vapor pressure causes the large number of molecules in the compound to evaporate and enter the ambient air. Some VOCs are dangerous to human health or harm the natural environment. Harmful VOCs are usually not very toxic but have long-term health effects. Because concentrations are usually low and symptoms develop slowly, research on VOCs and their effects is difficult.

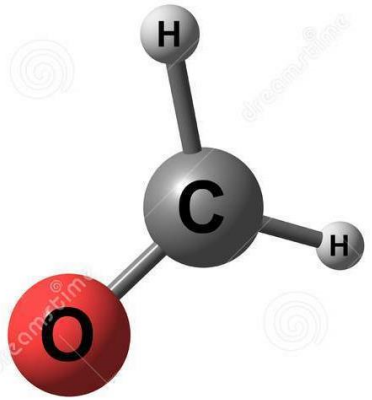


Main indoor air pollutants



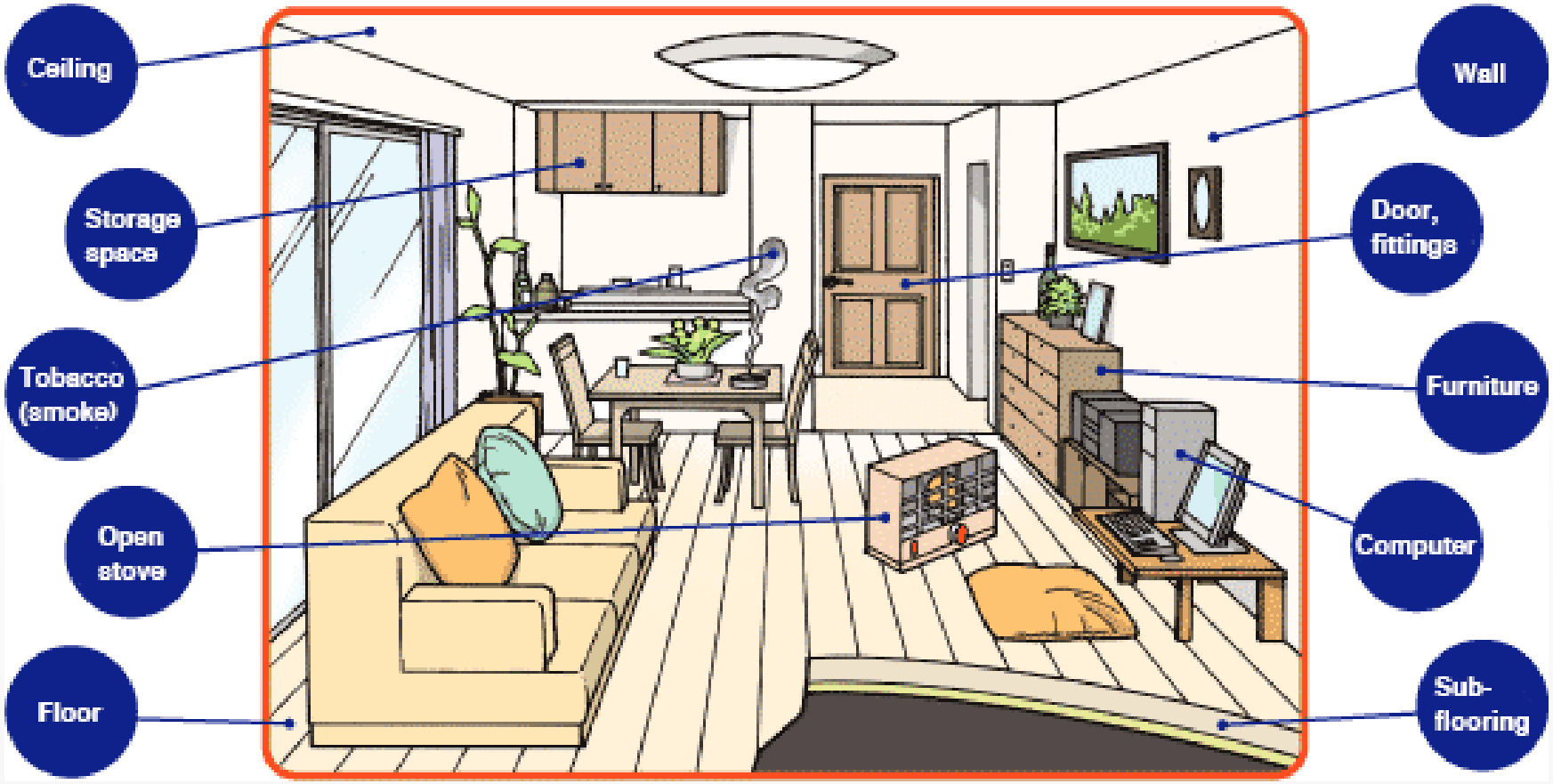
Main indoor air pollutants

Methanal or formaldehyde is an organic chemical compound, with the molecular formula CH2O. It is the simplest aldehyde, as its systematic name states, "methanal". It is a colorless flammable gas, with a characteristic strong, irritating odor. Formaldehyde is an extremely dangerous chemical compound, mainly affecting the eyes, nose and larynx. At concentrations greater than 0.1 ppm in the air it can irritate the eyes, cause headaches, a burning sensation in the throat and difficulty breathing. Larger formaldehyde exposures can also be fatal. Due to its widespread use, significant toxicity and flammability, exposure to methanol is a significant risk to human health. In 2011, the US National Toxicology Program described methanal as a "... known to be a human carcinogen ...".



Main indoor air pollutants

Where from the chemical pollutants are emitted



Main indoor air pollutants

Workplaces

Main indoor air pollutants

Education areas

Main indoor air pollutants

Public services

Main indoor air pollutants

Residence

Ways of dealing with

In recent years, the science of chemistry, like many other sciences, has grown rapidly, trying to provide solutions to difficult problems and improve the quality of life. The technological leaps of the last decades are impressive and the discoveries at all levels are very encouraging and promising for the future.

Ways of dealing with

The knowledge we constantly acquire allows us to know better the risks we face and, in this way, to be able to more easily find ways to deal with them. The research carried out both at private and public level (companies - organizations - research centers - educational institutions) has results both in terms of innovative solutions and in the way of understanding what is happening.

Ways of dealing with

To reduce the effects of sick building phenomenon, we could suggest several actions .For example , it would be good for the official state to establish regulations on the use of more friendly materials, which must meet at least some certain specifications, especially in places where a large number of people gather every day.
Public services, public buildings, schools, places of education are some examples.

Ways of dealing with

On a private level, both for our homes and for spaces with daily use by a large crowd and until there are more specific regulations, we could suggest the following ways to deal with

- **Use of materials with more stringent standards more user-friendly and environmentally friendly - the paint industry now has plenty of such materials to offer. Strict selection should be made for all other materials related to other industries**
- **Use of innovative and functional materials - as in our case**
- **Adherence to very simple good practices - such as adequate and frequent ventilation of the premises**
- **Avoiding bad practices - such as smoking indoors**

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Color has a Name!

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Formafree is one of the most advanced and functional paints which the Greek paint industry has to present at the moment and places Berling very high in the field of innovation in the paint industry.

It is a high-quality paint with functional characteristics.
It was certified with the gold certification by the leading European laboratory Eurofins which specializes in indoor air quality issues.

ÉMISSIONS DANS L'AIR INTÉRIEUR*
A+
A+ A B C

INDOOR AIR COMFORT®
eurofins
GOLD
CERTIFIED PRODUCT

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formafree

Gold certification means that the paint has zero emissions of volatile organic compounds VOCs and at the same time has extremely low to zero emissions of hazardous chemical compounds.
These 2 features make it odorless and harmless coating.
Also due to these 2 very important properties, it improves the air quality in the interior and thus significantly reduce the possibility of the occurrence of the sick building syndrome and the consequences that result from its appearance.

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Finally Gold certification means compliance with almost all the latest and most popular environmental schemes like LEED , BREEAM , WELL Building ,M1 ,AgBB

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eurofins | Product Testing

Eurofins Product Testing A/S
Smedeskovvej 38
8464 Galten
Denmark

CustomerSupport@eurofins.com
www.eurofins.com/VOC-testing

BERLING S.A
Oinofyta Voiotias
32011 Oinofyta
GREECE

VOC EMISSION TEST REPORT
Indoor Air Comfort GOLD®

20 February 2020

1 Sample Information

Sample name	FORMAFREE BASE C
Batch no.	589770
Production date	23/07/2019
Product type	Paint
Sample reception	06/11/2019

2 Brief Evaluation of the Results

Regulation or protocol	Conclusion	Version of regulation or protocol
French VOC Regulation	A+	Regulation of March and May 2011 (DEVL1101903D and DEVL1104875A)
French CMR components	Pass	Regulation of April and May 2009 (DEVP0908633A and DEVP0910046A)
Italian CAM	Pass	Decree 11 January 2017 (GU n.23 del 28-1-2017)
ABG	Pass	Anforderungen an bauliche Anlagen bezüglich des Gesundheitsschutzes (ABG), Entwurf 31.08.2017/August 2018 (AgBB)
Belgian Regulation	Pass	Royal decree of May 2015 (C-2014/24239)
Indoor Air Comfort®	Pass	Indoor Air Comfort 6.0 of February 2017
Indoor Air Comfort GOLD®	Pass	Indoor Air Comfort GOLD 6.0 of February 2017

Full details based on the testing and direct comparison with limit values are available in the following pages

Malene Laugesen
Analytical Service Manager

Rasmus Stenggaard Christensen
Analytical Service Manager, MSc in Chemistry

45m²
H₂O
½ - 1h

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5.2 VOC Emission Test Results after 28 Days

	CAS No.	Retention time [min]	ID-Cat	Specific Conc. [µg/m³]	Toluene eq. [µg/m³]	Specific SER [µg/(m²·h)]	R_D	R_B
VOC with NIK/LCI								
None determined								
VOC without NIK/LCI								
Not identified *		15.10	4	5.5	5.5	2.0		
Sum of VOC without NIK/LCI				5.5	5.5	2.0		
VVOC compounds								
None determined								
TVVOC				< 5	< 5	< 2		
SVOC compounds								
Sum of not identified SVOC >C16 *		15.1-15.8	2	20	20	7.3		
TSVOC				20	20	7.3		
Carcinogens								
Total carcinogens				< 1	< 1	< 1		
CMR substances								
Benzene	71-43-2		1	< 1		< 1		
Trichloroethylene	79-01-6		1	< 1		< 1		
Dibutylphthalate (DBP)*	84-74-2		1	< 1		< 1		
Diethylhexylphthalate (DEHP)*	117-81-7		1	< 1		< 1		
Aldehydes								
Formaldehyde	50-00-0		1	< 3		< 2		
Acetaldehyde	75-07-0		1	< 3		< 2		
Propionaldehyde	123-38-6		1	< 3		< 2		
Butyraldehyde	123-72-8		1	< 3		< 2		
2-butenal	123-73-9		1	< 5		< 2		
Glutaraldehyde	111-30-8		1	< 5		< 2		
R-values							0	0
TVOC				5.5	5.5	2.0		

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formaldehyde filtered air HCHO

VOC=0 zero emissions

PURIFIED indoor air quality

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Formafree is also a functional coating.
Functional coatings perform other functions besides decorating the area.
Thus in the case of Formafree, the surface of the material is functional and has the ability to continuously neutralize the formaldehyde found in the air.
Neutralization rates are high and can reach 75-80% efficiency
This practically means that by using the product we reduce by 75- 80 % the amount of formaldehyde that may be present in the air.
This feature that makes the product innovative
has been certified by the Eurofins laboratory with the method
ISO 16000 - 23

45m²

H₂O

½ - 1h

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formaldehyde filtered air HCHO

VOC=0 zero emissions

PURIFIED indoor air quality

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A+ A B C

eurofins | Product Testing

ilac-MRA DANAK TEST Reg.nr. 522

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Oinofyta Voiotias
32011 Oinofyta
GREECE

Eurofins Product Testing A/S
Smedeskovvej 38
8464 Galten
Denmark

CustomerSupport@eurofins.com
www.eurofins.com/VOC-testing

VOC EMISSION TEST REPORT

Formaldehyde Reduction

16 July 2019

1 Sample Information

Sample name	FORMAFREE BASE C
Batch no.	LABORATORY
Production date	08/04/2019
Product type	Paint
Sample reception	03/05/2019

Nanna Boholm
Analytical Chemist

Rasmus Stenggaard Christensen
Analytical Service Manager, MSc in Chemistry

45m²

H₂O

½ - 1h

ISO 14001 ISO 9001 VOC OHSAS 18001

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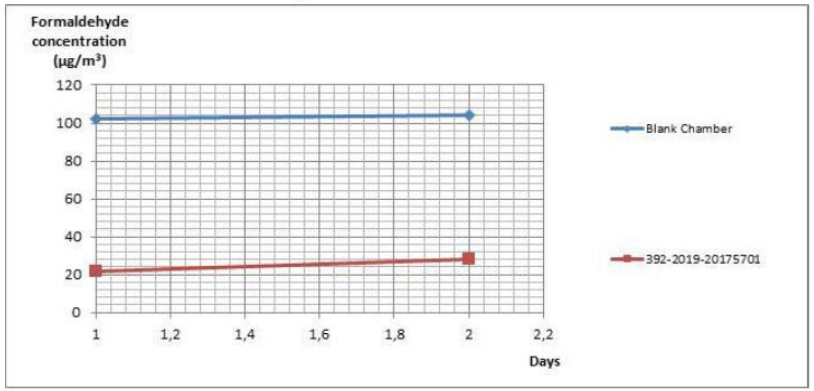
eurofins | Product Testing

4 Results

4.1 Formaldehyde Test Results

Sampling	Sample [µg/m³]	Empty chamber [µg/m³]	Sorption flux [µg/m²h]	Consumption [%]
1 day	22	100	29	79
2 days	28	100	27	73
1 day desorption	< 3	-	no injection	

4.2 Overview of the Formaldehyde Reduction



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Technical Data

In addition to all these innovative and excellent properties, the Formafree is also a paint of exceptional quality.
It is odorless, has excellent coating behavior, very good coverage, very high performance and very good resistance to washing – Class 1

Binder	**Special functional water-based resin**
Total emissions	**Class A+ (Eurofins – ISO 16000)**
Gloss	**1,0 - 1,5 units at 60^0 / 2,0 - 2,5 units at 85^0**
Coverage	**13-15 m^2/lt per layer**
Wet scrub resistance	**Class 1 – EN ISO 11998/EN 13300**
Opacity CR	**> 98,5 (150μm wet film thickness)**
Solvent	**Water**

BERLING

Το χρώμα έχει Όνομα!

45m²

H₂O

½ - 1h

6

Reasons to choose Forma free

Discover them

Κάντε κλίκ ή Scroll down

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