Engineered for the impossible

Arfinio® technical data

Arfinio®

covestro

Contents

01

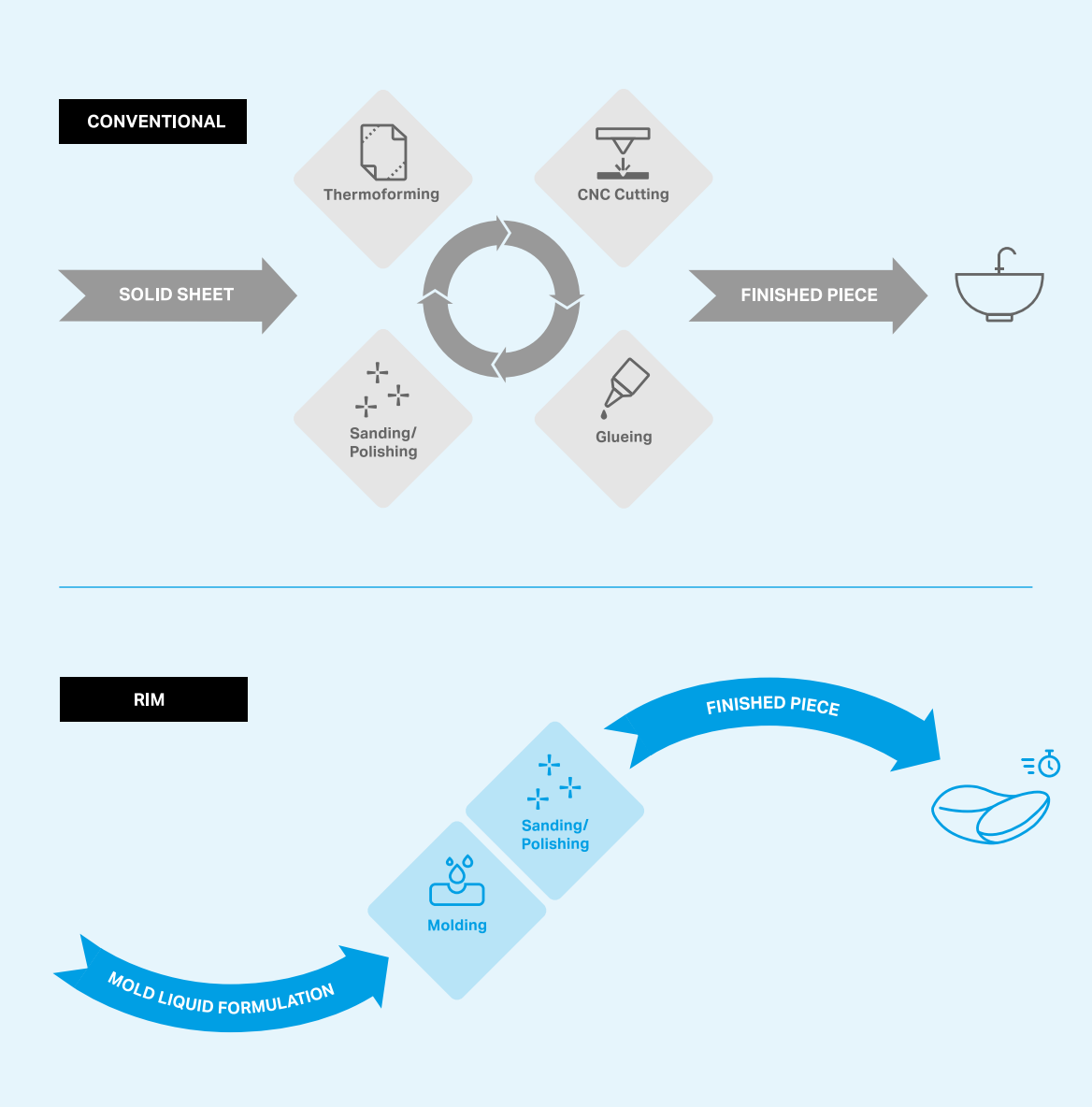
Introducing Arfinio®

Arfinio® was engineered to realize the impossible with sustainability in mind: its low weight, durability, repairability, and mono-material character leads to lower material consumption, a longer lifetime, and easy recyclability.

Unlimited expression has arrived

An injection-moldable solid-surface material

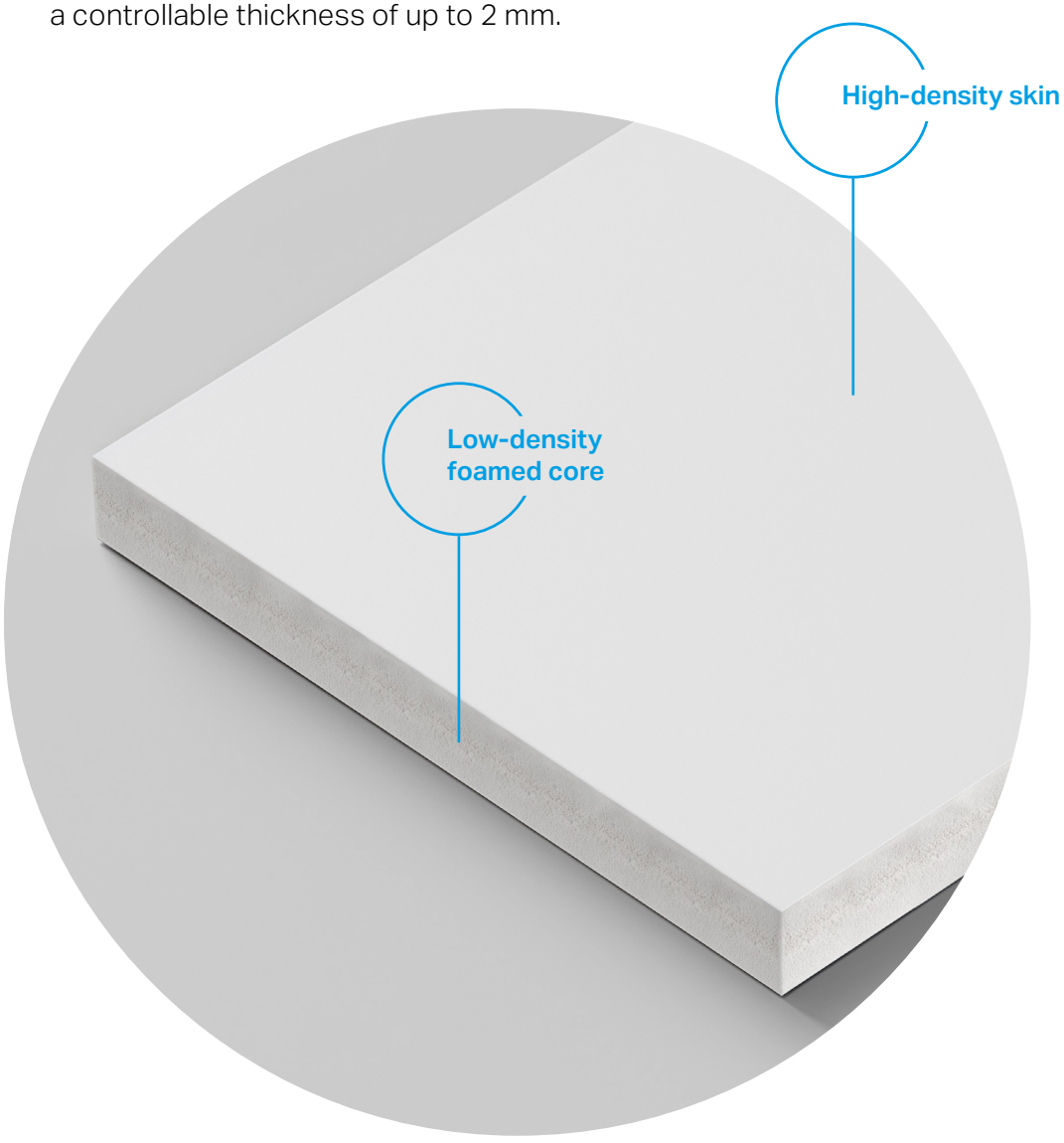
Arfinio® is an innovative material with the look and feel of a solid-surface material, but that can be produced in one piece using reaction injection molding (RIM).



A lightweight solid surface for next-generation products

Mono-material composition with varying densities:

- Low-density foamed core.
- Compact and perfectly even surface with a controllable thickness of up to 2 mm.



The skin becomes thicker on the convex edges of the piece, making it more durable in the most exposed areas.

02

Mechanical properties

Arfinio® combines the best of two worlds: the character of a solid surface and the outstanding performance of polyurethane. Because durability is the first step to sustainability.

Mechanical properties

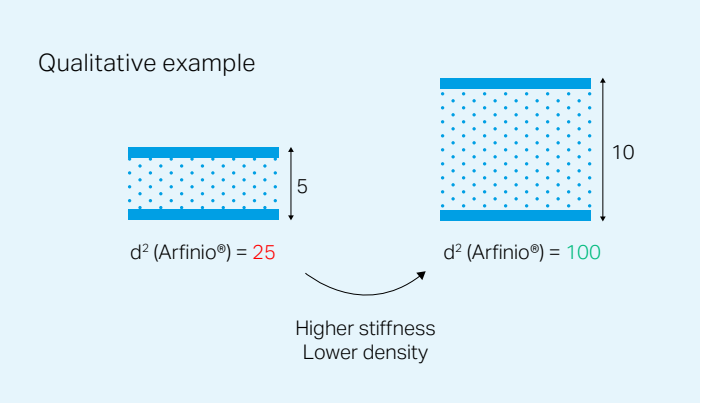
Engineered to perform

	TEST	NORM	RESULT	UNIT
ELONGATION				
	Tensile analysis	DIN EN ISO 527 : 07 / 2012		
	Elongation at break*		5.97	%
	E-modulus*		1,310	MPA
IMPACT RESISTANCE				
	Charpy impact test*	DIN EN ISO 179 : 11 / 2010		
	at complete break*		14.53	KJ/m^2
	with big diameter ball (drop height)	ISO 19712-2	> 2,000	mm
HARDNESS				
	Shore D	ISO 48-4:2018	80	SHD
	Barcol	(ASTM D 2583)/ ISO 19712-1	9	
	Brinell	ISO 19712-1	62.1	N/mm^2
	Rockwell	(ISO 2039-1)	PENDING	
SCRATCH RESISTANCE				
	Classification	UNE EN 438-2 Ap 25	Grade 3	(4 N)*
ABRASION				
	Loss of weight	UNE EN 438-2	97	mg/100 cycles
	Loss of weight	UNE EN 438-2	0.018	M%/100 cycles

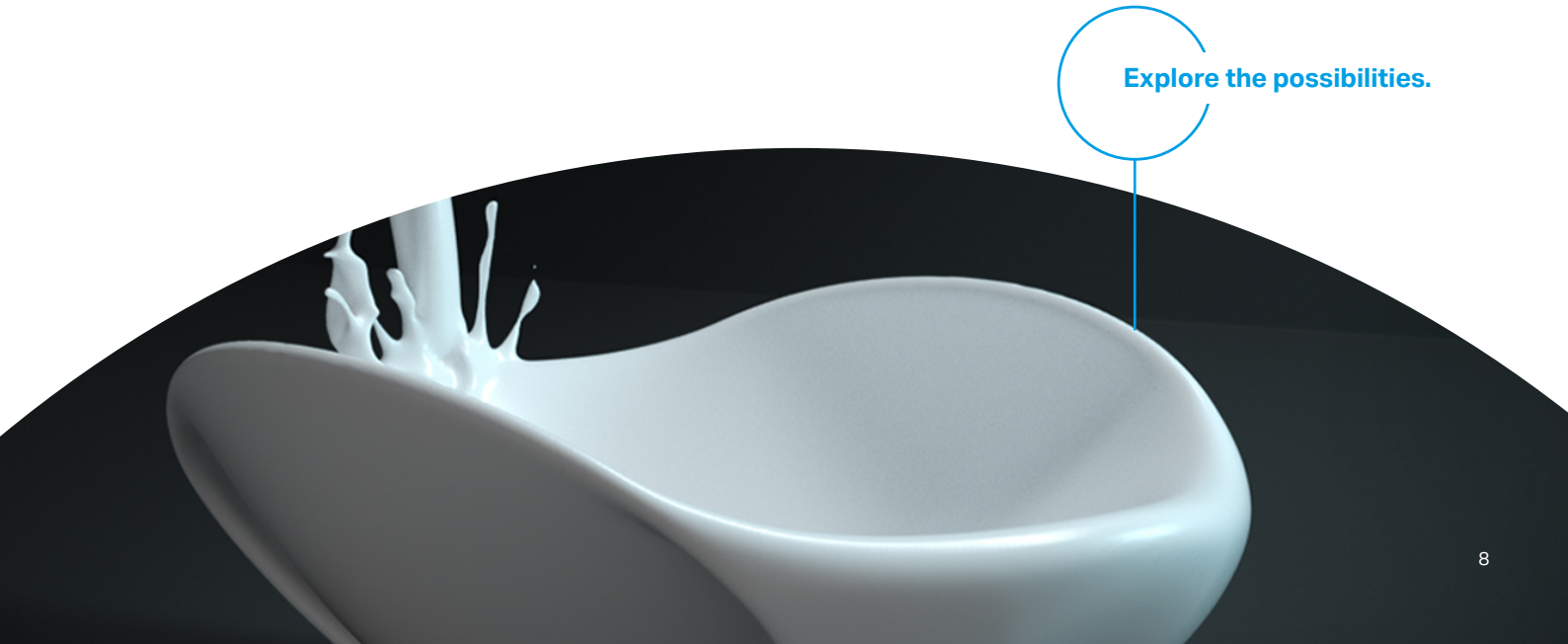
*Unique data that we obtained from a 10.5 mm thick plate with a density of 800 kg/m^3.

	TEST	NORM	RESULT	UNIT
DENSITY				
	Density	DIN EN ISO 845	650 – 750 (adjustable on request)	kg/m^3
FLEX				
	Bending test	DIN EN ISO 178 - A : 09 / 2013		
	Tension at 3.5% flex*		36.3	MPA
	E-modulus*		1,867	MPA

*Unique data that we obtained from a 10.5 mm thick plate with a density of 800 kg/m^3.



- Moment of inertia, directly related to the stiffness of a piece, increases with the square of the thickness, d^2.
- **Arfinio®'s** sandwich structure with a low-density core allows for an increase in thickness with hardly any increase in weight.
- Therefore, **Arfinio®** can achieve a required stiffness at significantly lower material consumption compared to a mono-density material.



03

Staining and chemical properties

Arfinio® is hard to soil. Its surface is non-porous, so even nasty stains do not penetrate.

Non-cleanable stains (e.g. permanent marker) can easily be removed by light sanding.

Staining and chemical resistance

Stain resistance

- All tests carried out in accordance with ISO 19712-2.
- Based on a battery of tests with different reagents used in the domestic environment, such as selected chemical agents.

GROUP	AGENT	TEST PERIOD	RESISTANCE LEVEL	RESULT
GROUP 1				
	Coffee at 80 °C	16 hours	5	No visible change
GROUP 3				
	Sodium hydroxide (25%)	10 min	5	No visible change
	Hydrogen peroxide (30%)	10 min	5	No visible change
	Acetone	10 min	5	No visible change
	Shoe polish	10 min	5	No visible change
GROUP 4				
	Citric acid (10%)	20 min (100 °C)	1	Blistering* (due to the heating)

*Despite the product presenting a very high resistance to soiling, the standard requires that the test for the last group is carried out by applying a metal plate at 100 °C. Under these conditions, the material presents a characteristic swelling.

Cleanability

- All tests carried out in accordance with ISO 19712-2. Soiling agents are cleaned using common cleaning agents of increasing aggressiveness on a scale of one to five.

AGENT	GRADE OF AGGRESSIVENESS	RESULT
Distilled water	0	No visible change
Ethanol (50%)	0	No visible change
Ammonia for domestic use	0	No visible change
Citric acid (10%)	0	No visible change
Vegetable oil	0	No visible change
Coffee	0	No visible change
Tea	0	No visible change
Ketchup	1	No visible change
Mustard	1	No visible change
Tincture of iodine	0	No visible change
Acetone	0	No visible change
Black permanent marker	2	No visible change
HB hardness pencil	0	No visible change
Wax crayon	2	No visible change
Shoe polish	3	No visible change
Valuation	**9**	**PASS (<16)**

- Immersion of a matte **Arfinio®** surface in eight different commercially available aggressive cleaning agents for 15 days did not result in any defects.

Repairability

Can parts made of **Arfinio®** be repaired?

Arfinio® is a non-porous material, so stains do not penetrate through the surface. Therefore, parts made of **Arfinio®** can be completely renewed by sanding the surface with the same grain as the original polishing. In addition, the extraordinary abrasion resistance of the material allows this process to be repeated several times.

Abrasion resistance	CS 17 (500U)	11.8	Very good
Abrasion resistance	S33 (500U)	644	Very good

Results of internal tests normally used to evaluate the abrasion of a parquet coating.

Resistance to microorganisms

TYPE	NORM	RESULT	
UNTREATED ARFINIO®			
RESISTANCE TO FUNGI	ISO 846:2019 (Method A)	Not resistant to attack by fungi or bacteria. Once the incubation time is over and the material cleaned with alcohol, no type of staining is observed.	
RESISTANCE TO BACTERIA	ISO 846:2019 (Method C)	Not resistant to attack by fungi or bacteria. Once the incubation time is over and the material cleaned with alcohol, no type of staining is observed.	
ARFINIO® WITH BIOCIDE ADDED IN BULK			
RESISTANCE TO BACTERIA	ISO 22196	99.99	% bacteria eliminated

04

Thermal properties

Arfinio® is a surprising material with many additional features – more than you'd expect.

Thermal properties

- Highly effective insulating properties, thanks to outstanding thermal coefficient when compared to standard solid surfaces

TEST	NORM	RESULT	UNIT
Thermal conductivity	DIN 52616 11 / 1977	0.074	W/mK
Thermal dilation	Range: -20 º – 60 º	0.065	mm/mºK
HDT	DIN EN ISO 75 -2 : 08 / 2013	55.3	ºC
T_g per DSC		107	ºC
Dimensional stability at high temperature	UNE EN 438-2	1.33–1.50	%

TEST	NORM	RESULT	UNIT
Resistance to cigarette burns	UNE EN 19712-2	Severe brown mark with surface deterioration	
Resistance to dry heat at 180 ºC appearance (assessment)	UNE EN 19712-2	1	Not passed
Resistance to dry heat at 180 ºC appearance (defect)	UNE EN 19712-2	Blisters	Degradation
Resistance to humid heat, method A	UNE EN 19712-2	Bubbles and cracks	Degradation
Resistance to hot/cold water cycles (*)	EN 14688:2016+A1	Pass	OK

*Washbasin version

Partially bio-based raw materials help close the carbon loop.

Other properties

Lightfastness

TYPE	NORM	RESULT	
UV LIGHT	ISO 105-A02 (gray scale)	5	No effect (passed if ≥4-5)
SUNLIGHT	Results after 3 years exposed to sunlight are excellent. In all cases, the colorimeter indicates a difference of the order of 1% (in Delta E) between the covered and the uncovered part, imperceptible to the eye.		

Slip resistance

TYPE	NORM	RESULT	
WET SLIP CLASS	UNE ENV 12633:2003	3	Suitable for swimming pool areas

Homologation of parts produced with **Arfinio®**

TYPE	NORM	RESULT
CE MARKING SHOWER PLATES	UNE-EN 14527:2016 CL1	Passed
CE MARKING WASHBASIN	UNE-EN 14688:2016	Passed

Fire resistance

TYPE	NORM	RESULT	
FLAMMABILITY	UNE EN 60695-11-10:2014	V0	Self-extinguishing, highest level

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