K·LIFE

KRION®
PORCELANOSA SOLID SURFACE

SPECIFICATION SHEET

KRION™ K-LIFE 1100 EAST™

FE-KL-01-0617

NATURE INSPIRATION

INDEX

01 PRODUCT NAME

Product name:	KRION™ K-LIFE 1100 EAST™
Description for specifications:	KRION™ Porcelanosa Solid Surface (K-LIFE) has a Euroclass B s1 d0 fire resistance as per the EN 13501 – 1: 2003 standard; B1 fire rating with no restrictions as per DIN 4102; and class A FSI<10 SDI<10 rating as per ASTM E84. It is Greenguard Gold and NSF/ANSI 5 Food Equipment Materials certified, and it complies with the Reach Regulation, with certificate HKHL 1501002788JL. Photocatalytic properties have been incorporated throughout the whole of the sheets using KRION™ Eco-Active Solid Technology™. These properties are certified as complying with the ISO 22197 (Air Purification), ISO 27447 (Antibacterial), ISO 10678 (Chemical products degradation) and ISO 27448 (Self-cleaning performance) standards.
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02 PRODUCT DESCRIPTION

KRION™ K-LIFE 1100 EAST™ is a new generation solid surface developed by SYSTEMPOOL. S.A., a company that forms a part of the PORCELANOSA Group. A solid non-porous material, available in sheets. It is uniform throughout and smooth and warm to the touch. Different pieces of Krion can be bonded together to create seamless surfaces.

KRION™ K-LIFE 1100 EAST™ is a hygienic, inert and non-toxic product that is virtually fireproof, easy to maintain and repair, which can be transformed into a limitless variety of shapes and is highly resistant to chemical agents, steam or outdoor conditions. This exclusive combination of visual and technical features make KRION™ K-LIFE 1100 EAST® the ideal solution for a wide range of applications such as furnishings, kitchens, bathrooms, boat fixtures, wall coverings or architectural uses.

KRION™ K-LIFE 1100 EAST™ has been designed and manufactured using an exclusive new technology called "KRION™ ECO-ACTIVE SOLID TECHNOLOGY™". This incorporates photocatalytic properties throughout the whole of the KRION™, so that it can regenerate the air in places where it is fitted, eliminate harmful bacteria, and remove chemically harmful substances. This technology also makes the KRION™ easier to clean.

03 COMPOSITION

KRION™ K-LIFE 1100 EAST™ is made of two thirds natural minerals (alumina trihydrate) and one third cutting-edge acrylic resins developed by SYSTEM-POOL S.A., together with a series of activators that have been added to its formula using "KRION™ ECO-ACTIVE SOLID TECHNOLOGY™".

KRION™ K-LIFE 1100 EAST™ is manufactured solely and exclusively by SYSTEMPOOL S.A.

Thanks to KRION™ K-LIFE 1100 EAST™'s exclusive formula, it combines the technical and visual qualities of the minerals used to make it with polymeric and photocatalytic properties. This ensures a unique set of characteristics: its ability to purify the air and eliminate chemical substances, its additive-free capacity to eliminate bacteria and prevent them from spreading, its hardness, resistance, durability, low maintenance and easy-to-clean surface. For further information, read the corresponding safety sheets, technical notes and other related documents.

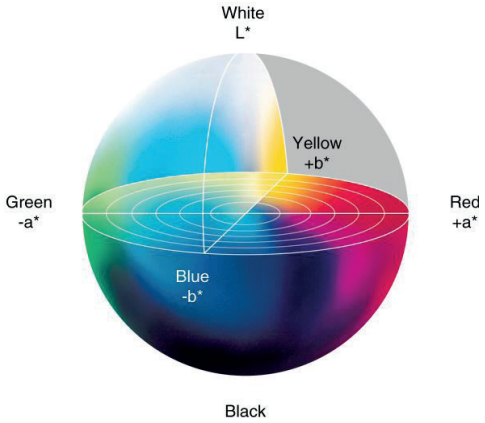
04 FORMATS OF THE SHEETS

KRION™ K-LIFE 1100 EAST™					
Formats mm (inches)	Thickness				
	3 mm (1/8")	6 mm (1/4")	9 mm (3/8")	12 mm (1/2")	19 mm (6/8")
2500x760 mm (98x30")	✓	✓	-	-	-
2500x930 mm (98x36")	✓	✓	-	-	-
3680x760 mm (145x30")	-	✓	✓	✓	✓
3680x930 mm (145x36")	-	✓	-	✓	-

05 AESTHETIC AND TECHNICAL PROPERTIES

a. COLOUR FASTNESS & ULTRA WHITENESS

KRION™ stands out for its colour fastness. SYSTEM-POOL S.A. pays particular attention to this aspect of the KRION™, with rigorous controls based on continuous L, a, b and ΔE measurements. Strict limits are also established to ensure that any variation in shade, if applicable, is as barely noticeable as possible. The human eye is able to perceive millions of colours, but each person sees them differently, which can cause problems for manufacturers. That is why colour spaces were developed. L, a, b is a colour space defined by the CIE (Commission Internationale de l'Éclairage), an organization considered to be an authority on the science of light and colour. It uses a numerical system to define an object's colour and to describe it objectively. (L) indicates the lightness, (a) is a colour axis ranging from red to green and (b) is a colour axis from yellow to blue:



A numerical comparison between a sample material and its standard version will show any difference in colour. To determine the colour difference in the 3 L, a, b coordinates, a formula is applied that will give us the ΔE. This indicates the total colour difference. By applying rigorous controls during the production process, SYSTEM-POOL S.A. makes sure that KRION™ sheets from the same batch never have a total colour difference or ΔE of more than 1, and sheets of the same colour from different batches will always have a ΔE of less than 2. ISO 12647-2 is the standard that deals with colours and, among numerous other definitions, it contains the tolerances for ΔE:

ΔE	QUALITY
<1	Excellent
1-2	Good
2-4	Normal
4-5	Sufficient
>5	Poor

A ΔE of less than 3 relates to a JND or "Just Noticeable Difference", barely perceptible to the human eye. KRION™ guarantees a maximum ΔE of less than 2.

KRION™ K-LIFE 1100 EAST™ boasts an ultra-whiteness rarely found in other materials classified as solid surfaces. This whiteness is very close to a perfect white.

	L	a	b
Perfect white	100	0	0
KRION™ K-LIFE 1100 EAST™	96,0	0,48	1,1

NOTE: These values have been ratified in the laboratories of KRION™, using calibrated measuring equipment (a Sphere Gloss BYK Spectrophotometer) and methods established in international standards.

05 AESTHETIC AND TECHNICAL PROPERTIES

b. TRANSLUCENCE

KRION™ K-LIFE 1100 EAST™ can vary in its translucence (the capacity for light to pass through them) from 78 to 1200 luxes, depending on the thickness of the sheets. The slimmer the sheets, the greater their translucence. The following table shows the translucence in luxes, depending on the thickness.

TRANSLUCENCE BY THICKNESS				
4 mm	6 mm	8 mm	10 mm	12 mm
1145 Lx	611 Lx	265 Lx	115 Lx	78 Lx

NOTE: Results obtained using a *HI 97500 Hanna Luxometer.* The backlighting effect will depend on the thickness of the KRION™ and type of lighting that is used. Before a design or project is created, it is very important to decide what lighting to use and to carry out tests to make sure that the right effect is achieved. See the section on translucency in the "Fabricator's Manual".

c. REFLECTANCE VALUE

KRION™ K-LIFE 1100 EAST™ has a light reflectance value (LRV) of 88.00, in accordance with ASTM C60, the standard test method for measuring light reflectance values and small colour differences in pieces of ceramic tiles. The reflectance value indicates the total amount of light that a surface reflects when it is illuminated by a light source, with 0 % representing black and 100 % representing absolute white (on a reflectance scale from 0 to 100 %).

NOTE: These values can be used to determine the visual contrast between two different materials when one object must stand out visually from the other. These values are also used to calculate a room's lighting requirements. When materials with a high reflectance value are used on ceilings, floors and walls, less lighting will be needed, since they will help to reflect any artificial or natural light.

d. UV RESISTANCE

KRION™ K-LIFE 1100 EAST™ is extremely colour fast when exposed to the elements for long periods. After 10 years, it will have a ΔE of less than1.5. This value was obtained in a series of laboratory tests that simulate the material's installation outdoors. Real outdoor exposure tests were also conducted at the test facilities of internationally known laboratories located in parts of the world with extreme or special climates:

1. Accelerated artificial ageing test using a QSUN test chamber, as per the ISO 4892-2:1994 standard. Methods of exposure to laboratory light sources, Part 2: Xenon-arc sources.
2. Accelerated artificial ageing test using a QUV test chamber, as per the ISO 4892-2: 1994 standard. Methods of exposure to laboratory light sources, Part 3: UV fluorescent lights.
3. Natural ageing test through direct exposure to solar radiation. Radiation of 150 to 200 W/m^2 in the test area.
4. Materials ageing test: Q-LAB Florida Q-LAB ARIZONA. Certified as per the ISO 17025 standard.

NOTE: Although the artificial ageing results' temporal equivalence is not empirical, correlations can be made between laboratory studies conducted in accordance with international standards and the results of natural ageing in the place where the material is fitted over a period of ten years. This assurance of UV resistance only relates to the KRION™ sheets and not to their sealants or bonding adhesives.

e. RESISTANCE TO FIRE

KRION™ Porcelanosa Solid Surface has conducted fire resistance tests at internationally known test facilities to provide fire response data. A summary of the results of these tests is shown in the following table:

Property		Standard	Result	Requirements	Units
Specific heat			1,361		J/g K
Thermal resistance	q	UNE-EN 12667 (2002)	104,8		W/m^2
	Thermal resistance (R)		0,05		m^2 K/W
	Thermal conductivity (λ)		0,396		W/m K
Resistance to radiant heat		NEMA LD3	>600 (with no deterioration)		seconds
Maritime use		IMO MED Marine Equipment Directive 96/98/EC modified by Directive 2014/93/EU	Satisfactory		
Railway use	Flammability test	DIN 54837 (12/2007)DIN 5510 part 2 (05/2009)	S4		
	Smoke development rating		SR2		
	Droplet formation		ST2		
	Smoke toxicity FED(TZUL=30 mins)	DIN-EN ISO 5659 (03/2013) DIN 5510 part 2 (05/2009)	0,01	<1	
Ventilated façades	Fire rating	UNE 13501-1:07 + A1:2002UNE 13823:12UNE-EN 11925-2:11	B s1 d0		
Fire rating		UNE 13501-1:07 + A1:2002UNE 13823:12UNE-EN 11925-2:11	B s1 d0		
		UNE 13501-1:07 + A1:2002UNE 13823:12UNE-EN 11925-2:11	B s1 d0		
Flammability		UL 94HB	Pass		
		DIN 4102-1	B1		
Flamma-bility	Class	ASTM E84-12	A		
	Flame Spread		< 10	0-25	
	Smoke Developed		< 10	≤ 450	
Reaction to fire properties standard	DIN 4102-1 (05-1998)	B1			
Potential heat		NFPA 259:2013	6037,08		kJ/kg

f. THERMAL CONDUCTIVITY

KRION™ K-LIFE 1100 EAST™ has a thermal conductivity value (λ) of 0.396 W/m^2. KRION™ has a low thermal conductivity so as to ensure improved energy efficiency, because the lower a product's thermal conductivity, the more insulation it provides. That is, it is good at preventing the transmission of heat and hence at preventing heat loss (or at preventing heat transmission from external sources in the case of refrigerated systems).

NOTE: Thermal conductivity and heat resistance depend on the temperature of the material, its density and internal structure, the level of atmospheric humidity, and air convection.

g. SOUND INSULATION

When tested at noise levels of between 2000 and 6000 Hz, 12 mm-thick KRION™ K-LIFE 1100 EAST™ provided 14 dB of overall sound insulation. The human hearing range is from 20 to 20000 Hz. Thanks to the intrinsic physical characteristics of KRION™, it provides insulation from different types of noise, mainly due to its density (1750 kg/m^3), lack of pores, type of seams and the thicknesses of the sheets used in designs.

05 AESTHETIC AND TECHNICAL PROPERTIES

h. THERMOBENDING

KRION™ K-LIFE 1100 EAST™ can easily be thermobent to achieve minimum inside radii of 20 mm and extreme 3-dimensional shapes.

NOTE: The Fabricator's Manual contains a series of guidelines and basic recommended procedures for thermobending KRION.

The temperature and heating time will depend on the thickness of the sheet to be thermoformed and the complexity of the design to be achieved. A basic design with very wide radii can be thermobent at just 130 °C. For narrower radii, temperatures close to 160 °C will be needed.

i. MECHANICAL PROPERTIES

Among the extensive list of mechanical properties that KRION™ K-LIFE 1100 EAST™ boasts, mention must be made of its bending strength and impact resistance, thanks to its exclusive formula and production process.

Because KRION™ K-LIFE 1100 EAST™ has a bending strength of 72 Mpa, it is far more than just a covering or decorative item, offering numerous potential applications. A prior feasibility study should be conducted in the case of more mechanically demanding designs.

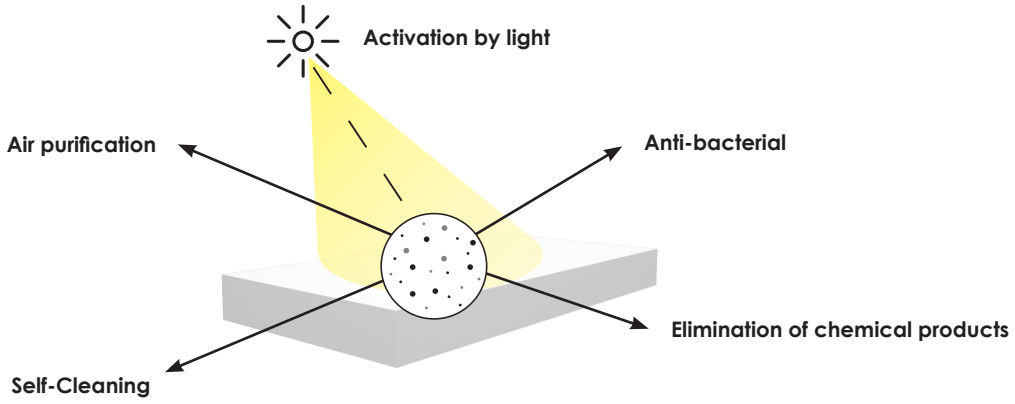
Due to its high impact resistance,KRION™ K-LIFE 1100 EAST™ absorbs the energy from knocks and impacts without breaking. 12 mm-thick KRION™ K-LIFE 1100 EAST™ successfully passed a test in which it received 10 impacts from a height of 1900 mm.

KRION™ K-LIFE 1100 EAST™ sheets can also be cold bent to achieve a minimum radius of 180 mm in the case of 12 mm thick sheets and 900 mm in the case of 6 mm thick sheets.

06 PHOTOCATALYTIC PROPERTIES: KRION™ ECO-ACTIVE SOLID TECHNOLOGY™

KRION™ Eco-Active Solid Technology™ is a new technology based on a natural phenomenon known as photocatalysis. This technology endows the KRION with multiple new properties, certified in accordance with the ISO 22197, ISO 27448, ISO 27447 and ISO 10678 standards. The outcome is a patent-pending internationally unique product, with innovative natural properties, long-lasting performance and a direct impact on our quality of life.

The secret of KRION™ Eco-Active's new technology is the incorporation of a series of activators specially developed by KRION™. When light of any kind falls on them, the following new properties are activated: the KRION™ **purifies the air, is self-cleaning and antibacterial, and it is able to eliminate chemical substances**. There is no limitation to the use of these new properties and they do not modify the physical characteristics or colour of the KRION™ in any way. This technology is not a surface treatment and neither does the KRION™ contain any kind of hazardous component.



05 PHOTOCATALYTIC PROPERTIES: KRION™ ECO-ACTIVE SOLID TECHNOLOGY™

a. AIR PURIFICATION

In the atmosphere and in our homes, due to pollution there are certain gases which are dangerous for humans and nature. In particular, these gases are nitrogen oxides (NOx), sulphur oxides (SOx) and volatile organic compounds (VOC).
When any of these gases come into contact with the activated Krion™ Eco-Active surface, there is a chemical degradation, generating harmless products such as mineral salts and water.

b. ANTI-BACTERIAL

Bacteria is naturally present in our surroundings, tending to form colonies and grow in spaces favourable to them, such as porous materials, joins or surfaces which are difficult to clean, and leading to illnesses which are dangerous to our health developing.

Thanks to the new KRION™ Eco-Active technology, not only can bacteria not grow in the material, but when coming into contact with the surface of the active material the bacteria is eliminated.

c. SELF-CLEANING

Thanks to the revolutionary new technology present in KRION™ Eco-Active, liquids and dirt can be cleaned from the surface of the material with greater ease, reducing the use of detergents.

D. ELIMINATION OF CHEMICAL PRODUCTS

Through the new technology present in KRION™ Eco-Active a large number of compounds that are dangerous to our health have been eliminated, such as pesticides present in our surroundings, and especially in the foods we consume.

07 ADHESIVE KRION™

KRION™ adhesive is a two-component acrylic adhesive for bonding and sealing KRION™. Formulated using cutting-edge technology for the solid surface sector, it ensures an excellent bond when used with solid surfaces. Likewise, users can also benefit from KRION™ adhesive's environmentally friendly properties. Manufactured in accordance with the strictest standards, the adhesives are subjected to the most exacting quality controls prior to their sale and distribution.

KRION™ adhesive is **GREENGUARD** certified as meeting the necessary requirements regarding low volatile organic compound emissions (VOC). It is also certified by the **NSF** as being food grade.

Thanks to KRION™ adhesive's exclusive formula, as well as meeting the above requirements and holding the aforementioned certificates, it also offers certain advantages in terms of its performance:

- Cures at room temperature
- High waterproof resistance
- Minimum preparation of the surface
- Excellent scratch resistance
- Excellent impact resistance
- Excellent bonding strength
- Easy to handle and use

For further information, see the Technical Note on KRION™ Adhesive.

08 SOCIALLY COMMITTED

a. LEED POINTS

LEED™ stands for Leadership in Energy and Environmental Design, a green rating system of increasing importance in the construction industry. Since the LEED™ green building system was first created in 1999 for new architecture, it has helped professionals from different countries to improve the quality of buildings and their impact on the environment. The green building sector is growing exponentially, and more and more building professionals, operators and owners are seeing the benefits of eco-friendly building and the LEED™ system.

The environmental benefits provided by KRION™ help buildings to achieve a better overall certification rating. KRION™ possesses a series of invaluable eco-friendly properties that can contribute to the obtainment of different LEED™ points. KRION™ Porcelanosa Solid Surface collaborates in the obtainment of credits in almost all existing categories: environmental quality, energy efficiency, innovation in design and, above all, in the materials and resources category for healthcare-related new construction projects, where it can account for up to **30 LEED™ points**.

Shown below are the different areas in which KRION™ can contribute to the obtainment of LEED™ points in each of the rating system's different categories;

LEED V4	
	Maximum LEED points*
BD+C; Building Design & Construction	30 pts
ID+C; Interior Design & Construction	21 pts
BO&M; Building Operation & Maintaining	12 pts
ND; Urban Developments	3 pts
HOMES; Home Design & Construction	8 pts
LEED V3	
Existing Buildings, Operations and Maintenance	9 pts
Comercial Interiors	15 pts
Retail; Commercial Interiors	16 pts
Core & Shell	14 pts
Healthcare	20 pts
Neigborhood Development	2 pts
Homes	12 pts
New Construction & Major Renovations	16 pts
Schools New Construction & Major Renovations	19 pts
Retail: New Construction & Major Renovations	18 pts

NOTE: *These maximum scores are theoretical and they are based on the calculation of points awarded for different factors. The points must be specifically calculated for each individual project. For further information, see the Technical Note KRION™ LEED™ POINTS. LEED™ certifies buildings, as opposed to building materials or products.

09 COMPLEMENTARY CERTIFICATES

a. GREENGUARD GOLD

This certificate, awarded by the Greenguard Environmental Institute, ensures that KRION™ complies with indoor air quality standards regarding volatile organic compounds (VOCs) in terms of the slabs and adhesives. The marks awarded are the "Indoor Air Quality Certification" and the "Children and Schools Certification."

b. BISPHENOL A

Bisphenol A (BPA) is an organic compound mainly used to make plastics. Following numerous studies, for some years Bisphenol A has been deemed to be possibly harmful to mankind. The continued presence of this compound in organisms has been associated with a higher risk of suffering from different disorders. Different countries are now prohibiting its use, in their legislation, in the manufacture of products that are or might be in contact with food.

Given all the above, we guarantee that no BPA was used to make KRION™, since this chemical compound does not form part of its composition. To check that none of the raw materials used to make it contains BPA, a study was conducted by an authorized external laboratory (study no. 220.I.1508.076.ES.01) which reached the following conclusion: **"No sign of any Bisphenol A was observed".**

c. NSF

NSF Certification (National Science Foundation), recognized body from the United States that acts in the issuance of health, hygiene, and environmental certificates, considers KRION™ as a safe material for its direct contact with all kinds of food, without posing any health risk.

d. REACH

The REACH regulation is aimed at controlling chemical products that are manufactured or included as substances in mixes or end products in the EU. Its main goal is to safeguard human health and the environment.

As part of its ongoing commitment to offer clients the best high-performance product on the market conspicuous for its quality while also caring for the environment, KRION™ has conducted tests to verify that none of the substances on the SVHC (Substances of Very High Concern) list, published by ECHA (European Chemicals Agency), are present in its formula.

In accordance with certificate HKHL1501002788JL, issued by an external laboratory, KRION™ complies with Article 7 "Registration & Notification of Substances Contained in Items" of the REACH Regulation and with the fact that it does not contain any SVCH in a concentration of over 0.1 %. This certificate also guarantees the obtainment of 1 LEED™ point.

10 REFERENCE STANDARDS & TESTS

The following standards are used as references in rigorous tests of KRION™ conducted in its own laboratories and in authorized certifiers of these standards:

INTERNATIONAL STANDARDS

1. **ISO 1183:** Plastics - Methods for determining the density of non-cellular plastics.
2. **ISO 178:** Plastics - Determination of flexural properties.
3. **ISO 527:** Determination of tensile properties of plastics. Test conditions for moulding and extrusion plastics.
4. **ISO 604:** Plastics. Determination of compressive properties.
5. **ISO 19712-2:** Plastics. Decorative solid surfacing materials.
6. **ISO 4586-2:** High-Pressure decoratives laminate - Sheets made from thermosetting resins.
7. **ISO 846:** Plastics. Evaluation of the action of microorganisms.
8. **ISO 11359-2:** Plastics - Thermomechanical analysis (TMA) Determination of coefficient of linear thermal expansion and glass transition temperature.
9. **ISO 4892-2:** Plastics. Methods of exposure to laboratory light sources. Xenon-arc lamps.
10. **ISO 4892-3:** Plastics. Methods of exposure to laboratory light sources. Fluorescent UV lamps.
11. **ISO-2039-2:** Plastics. Decorative solid surfacing materials.
12. **ISO-2039-1:** Plastics. Determination of hardness. Part 2: Rockwell hardness.
13. **ISO 6506:** Metallic materials. Brinell hardness test.
14. **ISO 22197:** Test methods for air-purification performance of semiconductor photocatalytic materials.
15. **ISO 27447: 2009:** Fine ceramics, advanced technical ceramics –Test method for antibacterial activity of semiconducting photocatalytic materials.
16. **ISO 10678; 2010:** The 'Determination of photocatalytic activity of surfaces in an aqueous medium by degradation of methylene blue'.
17. **ISO 27448: 2009:** Test method for self-cleaning performance of semiconductor photocatalytic materials - measurement of water contact angle.

10 REFERENCE STANDARDS & TESTS

US STANDARDS

18. **ASTM D792:** Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
19. **ASTM D790:** Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
20. **ASTM D638:** Standard Test Method for Tensile Properties of Plastics.
21. **ASTM G22:** Standard Practice for Determining Resistance of Plastics to Bacteria (Withdrawn 2002).
22. **ASTM G21:** Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
23. **ASTM C1028:** Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method (Withdrawn 2014).
24. **ASTM D696:** Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between −30°C and 30°C with a Vitreous Silica Dilatometer.
25. **ASTM D 2583:** Plastics. Decorative solid surfacing materials.
26. **ASTM D785:** Standard Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials.
27. **ASTM E84:** Standard Test Method for Surface Burning Characteristics of Building Materials.
28. **ASTM D570:** Standard Test Method for Water Absorption of Plastics.
29. **ASTM D648:** Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position.

EUROPEAN & SPANISH STANDARDS

30. **UNE EN 438-2:** High pressure decorative laminates. Sheets based on thermosetting resins (normally called laminates).
31. **UNE-EN 14581:** Natural stone test methods. Determination of linear thermal expansion coefficient.
32. **UNE 56868:** Bathroom furniture. Physical test methods.
33. **UNE 56843:** Kitchen furniture. Physical test methods.
34. **UNE EN 12667:** Building materials. Determination of thermal resistance by means of guarded hot plate and heat flow meter methods. Products of high and medium thermal resistance.
35. **UNE 56867:** Bathroom furniture. Testing of surface finishes.
36. **UNE 56842:** Kitchen furniture. Testing of surface finishes.
37. **UNE ENV 12633:** Method of determination of unpolished and polished slip/skid resistance value.
38. **UNE-EN 13501-1:** Fire classification of construction products and building elements.
39. **UNE 23721:** Reaction to fire test of building materials. Radiation test used for rigid materials or for materials on rigid substrates (flooring and finishes) of all thicknesses, and for flexible materials thicker than 5 mm.
40. **UNE-EN 12457-4:** Characterization of waste. Leaching. Compliance test for leaching of granular waste materials and sludges. Part 4: One stage batch test at a liquid to solid ratio of 10 l/kg for materials with particle size below 10 mm (without or with size reduction).
41. **UNE-EN ISO 11348-3:** Water quality - Determination of the inhibitory effect of water samples on the light emission of Vibrio fischeri (Luminescent bacteria test) - Part 3: Method using freeze-dried bacteria.

10 REFERENCE STANDARDS & TESTS

TESTS

KRION™ K-LIFE			
Property	**Test Method**	**Test Result**	**Units**
Density	ISO 1183 / ASTM D792	1,71 - 1,77	g/cm³
Flexural modulus of elasticity	ISO 178 / ASTM D790	8500 - 11900	MPa
Flexural strength		60 - 78	MPa
Elongation	ISO 178 / ASTM D638	0,7 - 0,85	%
Tensile modulus	ISO 527 / ASTM D638	9380 - 11325	MPa
Tensile strength		40 - 60	MPa
Compressive strength	ISO 604	97 - 117	MPa
Impact resistance (ball drop)	ISO 19712-2 UNE EN 438-2 ISO 4586-2 NEMA LD 3	Satisfactory (No break)	324 g ball / Height 1.9 m (2 m)
Abrasion resistance	UNE EN 438-2 ISO 4586-2	0,028	% mass / Δmass (%) every 25 rev.
Resistance to boiling water	UNE EN 438-2 ISO 4586-2	0,1 - 0,30	% weight
		0,1 - 0,30	% thickness
		Level 5: No change	Levels 1-5
Resistance to bacteria	ISO 846 / ASTM G22	No proliferation	
Resistance to fungi	ISO 846 / ASTM G21		
Antibacterial activity	ISO 27447:2009	Antibacterial activity	
Anti-slip properties depending of grit finish from (40-600)	UNE ENV 12633	Rd = 40 Clase 2 - Rd = 12 Clase 0	SR (Roughness) Pendulum
	ASTM C1028	0,8 - 0,69	Dry Static Coefficient
		0,82 - 0,62	Wet Static Coefficient
	ANSI A.137.1:2012	0,7 - 0,35	Wet Dynamic Coefficient
Dimensional stability	ISO 4586-2 UNE EN 438-2	0,02 (90 % HR y 23 °C)	% change in length
		0,08 (23 % HR y 23 °C)	
Dimensional stability at high temperatures	UNE-EN 438-2	0,18 (70 °C)	% change in length
		0,10 (95 % HR y 4 0 °C)	
Linear thermal expansion	ISO 11359-2 ASTM D696 UNE-EN 14581	3,5 x 10^{-5}	λ(mm/m °C)
Linear thermal expansion coefficient		0,112	3*λ(mm³/m³°C)
Resistance to artificial weathering. Xenon arc (3000 h)	ISO 4586-2 UNE EN 438-2 ISO 4892-2	Grado 5: No hay cambio	Grey scale. Levels 1-5
Resistance to ultra-violet light. UV-313 lamp (1500 h)	UNE EN 438-2 ISO 4892-3	Grado 4,5: Ligero cambio	Grey scale. Levels 1-5
Lightfastness (122 h)	ISO 19712-2 UNE 56868:2002	Grado 5: No hay cambio	Grey scale. Levels 1-5
Colour fastness	ISO-19712-2	Satisfactorio	
Air purification	ISO-22197-1:2007	Nitrogen oxide degradation activity	
Thermal resistance	UNE EN 12667	q = 104,8	W / m
		R = 0,05	m²·K / W
		λ = 0,396	W / m·K
Thermal shock resistance (90 - 20 °C / 194 - 68 °F)	ISO-19712-2	Satisfactory	250 Cycles
Surface resistance to damp heat	ISO 19712-2 ISO 4586-2	Satisfactory Level 5: No change	Levels 1-5
Surface resistance to dry heat	ISO 19712-2 UNE-EN 438-2 ISO 4586-2 UNE 56867 UNE 56842	Satisfactory Level 4: Slight change in gloss degree only visible from certain angles.	Levels 1-5
Boiling water resistance	NEMA LD3	Without visible changes	
High temperature resistance		Without changes	

10 REFERENCE STANDARDS & TESTS

TESTS

KRION™ K-LIFE			
Property	**Test Method**	**Test Result**	**Units**
Surface defects	ISO-19712-2	Satisfactory	No defects
Barcol hardness	ISO-19712-2 ASTM D 2583	60 - 65	Units
Rockwell hardness	ISO-19712-2 ASTM D785 ISO-2039-2	> 85	Units
Falling ball test	ISO-19712-2 ISO-2039-1	240 - 280	N/mm^2
Resistance to cigarette burns	ISO 19712-2 UNE-EN 438-2	Satisfactory. Level 4: Slight change in gloss degree only visible from certain angles	Levels 1-5
Load test	ISO-19712-2	Satisfactory (No cracks or fissures were observed after the test)	0.12 mm (residual deflection)
Chemical resistance (Method A)		Satisfactory 5 (In all cases, except acetone with level 4)	Levels 1-5
Chemical resistance (Method B)		27	Cleanliness rating from 0 to 75
Chemical resistance	UNE 56867	Satisfactory	
Degradation of chemical substances	ISO-10678:290	Methylene blue degradation activity	
Fire rating	UNE-EN 13501-1	B s1 d0	Euroclass
	ASTM E84	Class A	"IBC class"
	DIN 4102-1	B1 (with no restrictions)	
	UL94HB	Satisfactory	
	NFPA 259	Satisfactory	
Scratch resistance	UNE-EN 438-2	4	Levels 1-5
	Eq. Mohs	3	
Cracking resistance	UNE-EN 438-2	5	Levels 1-5
Surface permeability	NF T 30-801	8	g/m^2 day
Resistance to water vapor	UNE 56867 UNE 56842	Satisfactory (6.04 kJ/g)	
Specific heat	UNE 23721	1.361	J/g K
Water absorption	ASTM D570	0.03	%
Deflection temperature (load 1.82 N/mm^2)	ASTM D648	>95	°C
Wear & Cleanability	CSA B45.5-11 IAMPO Z124-2011	Complies	
Self-cleaning material	ISO-27448:2009	Water contact angle modification activity	
Cutting powder toxicity	UNE-EN ISO 11348-3 MTA/MA - 014 / A11 UNE EN 12457-4	Without effects	

11 FABRICATION AND FITTING

The "Fabricator's Manual" contains instructions on how to fabricate KRION™ correctly, without running risks. These procedures must be followed in order to ensure customer satisfaction. These fabrication procedures are recognized in the European, US, Middle East and African markets. For SYSTEMPOOL's 10-year limited warranty to be valid, these instructions must be followed. The outlined information is sufficient for most projects, although other advanced fabrication techniques may exist. Consult SYSTEMPOOL before trying out any technique not described in the manual. Read the information on how to fabricate KRION™. Contact your KRION™ supplier. SYSTEMPOOL cannot be held liable if these techniques are used with or applied to other products.

12 USE, CLEANING AND CARE

A cutting-edge material mainly formulated with natural materials using high-tech manufacturing processes, KRION™ helps to keep places where it has been fitted clean, aseptic and in perfect condition. This is due to its nil porosity, which prevents bacteria from spreading and allows for the creation of seamless surfaces with no joints or inaccessible corners. As a result, only minimum care is needed to keep the material in optimum condition. All places, whether public or private, require cleaning and care, with the subsequent cost in human effort and cleaning materials for households, companies or public bodies.

KRION™ is an easy-to-clean material. Nonetheless, this does not mean that no cleaning is required. Although KRION™ does not absorb liquids due to its lack of pores, stains should be cleaned away immediately when they are swifter and easier to remove. Whenever the surface is cleaned, it must be dried thoroughly afterwards to prevent lime scale from building up or the remains of detergents and cleaning products. For further information, see the Technical Note on Use, Cleaning and Care.

13 REGENERATION

As well as being easy to clean, KRION™ can swiftly be repaired on site. This is a huge advantage when compared with other materials, allowing you to keep your home or work facilities in perfect condition. This renewal work can be done by following the instructions in the Home Regeneration Kit or in the corresponding Technical Note. If more in-depth or thorough renewal work is required, contact your nearest K™ Associate Quality Fabricator

14 ESTIMATION OF SUBSTANCE ATTACK

Listed below are the substances or products that have been tested on the surface of KRION™ K-LIFE 1100 EAST™ to check its resistance to them. To conduct this test, drops of the said products were left on the surface for 18 hours. The stains were then removed using products developed by SYSTEM-POOL S.A. to clean and care for KRION™.

- **Type-1 substances.** The stain was removed with a cloth and K-Clean
- **Type-2 substances.** The stain was removed with a white scouring pad and K-Cream
- **Type-3* substances.** The stain can only be removed by renewing the surface

However, in the event of uncertainty or exposure to special substances, carry out tests before creating the final project.

TYPE-1	TYPE-2	TYPE-3
Olive oil	Ethyl acetate	Acetone
Cotton seed oil	Safranin O	Hydrochloric acid (38%)
Mineral oil	Pine oil	Hydrochloric acid(20%)
Cooking oil	Acetic acid (98%)	Hydrochloric acid(30%)
Amyl acetate	Formic acid (50%)	Hydrofluoric acid (50%)
Acetic acid (10%)	Phosphoric acid (75%)	Hydrofluoric acid (5%)
Citric acid (10%)	Trichloroacetic acid (10%)	Formic acid (91%)
Picric acid	Aqua regia	Nitric acid (72%)
Tannic acid	Isopropyl alcohol	Nitric acid (25%)
Uric acid	Aluminon	Nitric acid (30%)
Distilled water	Bromothymol blue	Nitric acid (6%)
Amylic acid	Dimethyl blue	Nitric acid (70%)
Aromatic alcohol (aromatic salts)	Lipstick	Perchloric acid
Butyl alcohol	Benzyne	Picric acid 1.2% (0.05M)
Ethyl alcohol (Ethanol)	Black shoe polish	Sulphuric acid (25%)
Ammonia (10%)	Sodium bisulphite	Sulphuric acid (33%)
Aromatic ammonia spirit	Cellosolve	Sulphuric acid (60%)
Saffron	Cigarette (nicotine)	Sulphuric acid (96%)
Sodium azide	Cleaning bang™	Hair dyes and bleaches

14 ESTIMATION OF SUBSTANCE ATTACK

TYPE-1	TYPE-2	TYPE-3
Sugar	Chlorobenzene	Methylene chloride derivates (paint strippers)
Trypan blue	Chloroform	Drain cleaner
Betadine™	Methylene chloride	Sodium hydroxide in flakes
Liquid bitumen	Iron chloride (10%)	Phenol
Coffee	Gram stain	Acridine orange
Zinc chloride (10%)	Quaternary ammonium compounds	4-chlorophenol
Food colouring	Cresol	Chromium trioxide
Zinc oxide cream	Acid drain cleaners	
Sodium chromate	Dimethylformamide	-
Chlorinated detergent (domestic)	Dioxane	-
Carbon disulfide	5% eosin methylene blue in alcohol	-
EDTA	Phenolphthalein	-
Ethyl ether	Ammonium phosphate	-
Ethylene glycol	Furfural	-
Eucaliptol	Sodium hydroxide (5%)	-
Phenolphthalein (1%)	Sodium hydroxide (50%)	-
Formaldehyde	Iodine	-
Formaldehyde (40%)	Nail polish	-
Formalin	Wright's blood stain	-
Formaldehyde (10%)	Methyl methacrylate	-
Sodium phosphate (30%)	Methanol	-
Trisodium phosphate (30%)	Methyl ethyl ketone	-
Oil	Pencil lead	-
Glutaraldehyde	Methyl orange (1%)	-
Ammonia hydroxide (28%)	Nigrosin	-
Ammonia hydroxide (5%)	ilver nitrate (10%)	-
Calcium hypochlorite	Toothpaste	-
Sodium hypochlorite (15%)	Phosphorous pentoxide	-
Sodium hypochlorite	Potassium permanganate (2%)	-
Domestic soaps	Hydrogen peroxide	-
Ketchup	MEK peroxide	-
Bleach (1%) and soap solution	Procaine	-
Household bleach	Products with methylene chloride	-
Liquids/powders for dishwashers	Nail polish remover	-
Mustard	Karl Fischer reagent	-
Naphthalene	Cresol red	-
Naphthalene	Methyl red (1%)	-
n-hexane	Permanent marker pen	-
Urine	Hydrochloric acid	-
Paraffin (petroleum jelly)	Sudan III	-
Phosphorus pentoxide	Tea	-
Kerosene	Tetrahydrofuran	-
Soy sauce	Thymol blue	-
Tomato sauce omato sauce	Thymol and alcohol	-
Blood	Penink	-
Shower Power	Mercurochrome	-
Benedict's solution	Merthiolate	-
Monsel's solution	Iodine	-
Saline solution(NaCl)	Trichloroethane	-
Ringer's lactate solution	Malachite green	-
Copper sulphate	Wine	-
Sodium sulphate (10%)	Crystal violet	-
Phosphate-buffered saline (PBS)	Gentian violet	-
Carbon tetrachloride	Xylene	-
Tetramethylrhodamine	Lemon juice / fruit and vegetable juice	-
Thymol in alcohol	Viacal™	-
Washable dyes	-	-

14 ESTIMATION OF SUBSTANCE ATTACK

TIPO 1	TIPO 2	TIPO 3
Haematoxylin colouring fluid	-	-
Wright's stain	-	-
Calcium thiocyanate (78%)	-	-
Sodium thiocyanate	-	-
Sodium thiosulfate	-	-
Toluene	-	-
Urea (6%)	-	-
Vinegar	-	-
Vitroclean™	-	-
Iodine (1% alcohol)	-	-
Iodine (dye)	-	-

* Type-3 substances are more aggressive and can damage the surface more quickly.

15 LEGAL TERMS & CONDITIONS

The information contained herein was obtained from sources that we deem to be reliable. However, no express or implicit guarantee can be made as to its exactitude.

The images, texts and data are the property of SYSTEM-POOL, S.A., with registered offices at Carretera Vila-real – Puebla de Arenoso (CV-20), 12.540 Vila-real (Castellón), Spain. The latter's express written consent shall be required for the use and dissemination of the said contents, whether totally or in part. SYSTEM-POOL, S.A. holds exclusive rights over the use of the said information, whatever the form, and, in particular, the rights to its reproduction, distribution, public dissemination and transformation. All this material is protected by intellectual property laws and any undue use may lead to sanctions, including criminal proceedings. SYSTEM-POOL, S.A. reserves the right to modify and update the information in this technical note and in its introduction at any time, with no need for advance warning. Likewise, the characteristics of the document may be altered to bring them in line with technical developments or to improve the contents through the incorporation of further data. SYSTEM-POOL, S.A. cannot be held liable for any outcomes or risks that are incurred as a result of the partial or total use of the information contained herein by fabricators, architects, designers, owners and/or users of the said KRION™ materials. The corresponding architect, designer, fabricator and/or user shall bear any and all responsibility for a design. The information shown herein does not contain any assurances and this document has no legal value.

16 WARRANTY

KRION™ Porcelanosa Solid Surface is a cutting-edge material. In addition to its compliance with all quality stipulations and standards relating to solid surfaces, it is manufactured in according with meticulous production processes. The quality of the KRION® is monitored throughout the whole of the production process, based on the quality management requirements of the ISO 9001 standard, the environmental management requirements of the ISO 14001 standard and, above all, criteria established by KRION™ Porcelanosa Solid Surface.

SYSTEM-POOL, S.A. provides a 10-year limited warranty for KRION™ materials (sheets) used to make end products. The limited warranty consists of the free repair or replacement, at the manufacturer's discretion, of manufacturing defects in KRION™ materials, depending on the time that has passed since the purchase date, provided that the fabrication and fitting of the material was done by a K™ Associate Quality Fabricator. The prior written agreement of SYSTEM-POOL, S.A. is required for the replacement or repair of material under guarantee and this work must be performed by a person appointed by SYSTEM-POOL, S.A. From the first year to the third, the warranty shall cover all the material and all labour. From the fourth year to the sixth, the warranty shall cover 75 % of the material and 50 % of the labour. From the seventh year to the ninth, it shall cover 50% of the material and 25 % of the labour. The tenth year, it shall cover 25 % of the material and no labour. In all cases, these percentages shall apply providing that the fault is attributable to a manufacturing defect in the KRION™ made by SYSTEM-POOL, S.A. This warranty is applicable worldwide, with the provisions of the national legislation prevailing in each case. For further information, see the official Warranty Document.

17 OTHER INFORMATION

The conditions or methods under which the product is handled, stored, used or eliminated are beyond our control and possibly also beyond our knowledge. For this and other reasons, we cannot be held liable in any way for losses, damage or expenses caused by or in any way related to the product's handling, storage, use or elimination. This Technical Data Sheet was solely devised and must only be used for this product. If the product is used as a component in other products, this information may not be applicable.

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