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# TECHNICAL INFORMATION SHEET

## ENVIRONMENTAL STATEMENT

Pyrolave's lava stone comes from our quarry in Volvic, central France. The stone is extracted from lava flows within the Auvergne Volcanoes Regional Nature Park in France, with the extraction sites upon the flow being very small. All aspects of extraction are carefully monitored by Pyrolave to ensure stringent observance of environmental controls and standards.

Each extraction area is subjected to an "administrative authorisation for extraction within a classified zone" following a 2 year study of the zone. Additionally, the undertaking of regular environmental impact studies and site restoration processes after extraction are compulsory requirements.

The authorisation file includes the analysis & control of direct & indirect, temporary & permanent effects upon the environment & specifically a landscape study, a study on noise, dust & vibration analysis, and hydro-geologic & hydrologic studies. The developer must prove that there is no risk of pollution due to hydrocarbon, organic or mineral waste.

The annual extraction limit imposed by regulation is the equivalent of an area 50 sq m x 10 m high. We can guarantee a yearly yield of 10,000 - 20,000 sq m continually over a 20 year period in strict respect of the environmental rules. The lava extraction sites are situated over the flow zone of Volvic mineral waters owned by the multinational food company Groupe Danone who are equally stringent about the environmental risks.

## PRODUCTION PROCESS

The randomly sized boulders of lava are lifted by crane from the flow following the natural fault lines and shrinkage cracks. The block is then sliced into slabs of varying thickness by diamond-tipped saws. These rough-sized slabs are then sent to the factory in Castelsarrasin, near Toulouse, where they are shaped by CNC and water-jet cutting technology. All stone-working tasks are then completed using a combination of CNC technology and manual work. The surface is refined by filling all microscopic holes, and the stone and filler are bonded together during the first kiln firing cycle.

This 8-hour firing creates enormous stress on the stone, enabling any failed stone to be identified and discarded. Those pieces that prove their strength and stability are then rigorously sanded and polished as smooth as glass to remove all surface imperfections. A glaze undercoat is then applied to the entire surface to neutralize the colour. This is left to dry naturally after which the second coating of coloured enamel is applied over the undercoat by hand.

The pieces then are returned to the computer-controlled kilns for a second and longer firing cycle at temperatures over 1000°C. At these high temperatures, the glaze is fused to the stone. As the stone cools down, the different contracting rates cause the signature crazing to the surface. The pieces are finally grouped together for quality control inspection before being packed into rigid wooden crates with card and foam separators.

## TEST PROCEDURES

Consistent with our commitment to quality standards and product assurance, Pyrolave has engaged the services of various recognized testing centres or national laboratories to carry out a range of standard tests. The results reveal that the lava tested passes all tests outright, in many cases exceeding the highest test standards.

Test	Standard	Applicable to	Testing Centre
Modulus of rupture	ISO-10545-4	Lava	Bologna, Italy
Determination of colour to light	DIN 51094	Enamel	Bologna, Italy
Determination of chemical resistance	ISO-10545-13 § 8	Enamel	Bologna, Italy
Determination of stain resistant (to white)	ISO-10545-14	Enamel	Bologna, Italy
Determination of scratch hardness according to MOHs	EN101	Enamel	Bologna, Italy
Determination of chemical resistance (glazed tile)	EN122	Enamel	Bologna, Italy
Flex resistance	NF EN12372	Lava	CEBTP, Paris France
Thermal conductivity	139-829	Lava	National Lab, Paris France
Freeze resistance *	NF EN ISO 545-12	Lava & enamel	SFDP, Paris France
Light (impact) shock resistance *	An. 7 notes 3515 CSTB	Enamel	SFDP, Paris France
Stain resistance *	NF EN ISO 10545-14	Enamel	SFDP, Paris France
Thermal shock resistance (immersion *)	NF EN ISO 10545-9	Lava & enamel	SFDP, Paris France
Thermal shock resistance (surface contact *)	NF EN 1183 method B	Enamel	SFDP, Paris France
UV light and colour fast test	DIN 51024	Enamel	SFDP, Paris France
Abrasion & anti-slip resistance testing	BSEN 1341 2000 Ann.D	Enamel	Sandberg, London UK
Impact – hard & soft body testing	BS 200:1985 Sct.7 Ap.G	Lava	Taylor Woodrow, UK
Cooking directly upon surface via induction	Practical testing	Lava & enamel	Induced Energy, UK
Anchor pull out tests	ETA-0/0266	Lava	Fischer Group Germany
EN1469 Accredited	EN1469	Lava & enamel	LERM France

\*On 9 typical colours

## PHYSICAL PROPERTIES

Resistant to all climatic conditions  
 Frost resistant  
 No expansion from 0 – 100 degrees  
 Average conductivity K (cal) over h.m. °C = 0.42  
 Average density 2.2  
 Average porosity (unglazed) 22.4%  
 Compression resistance 63 MPA  
 Flex resistance 19 MPA  
 Resistant to all acids except fluorhydric  
 Enamels are colour fast – UV stable  
 Surface crazing (enameled lava)  
 Will not rot, crumble or delaminate

## CHEMICAL ANALYSIS

Silica (SiO <sub>2</sub> )	57.5%
Alumina (Al <sub>2</sub> O <sub>3</sub> )	17.4%
Titanium (Ti)	1.5%
Iron (Fe)	6.7%
Manganese (Mo)	0.3%
Calcium (Ca O)	4.2%
Magnesium Oxide (Mg O)	2.5%
Sodium (Na <sub>2</sub> O)	5.2%
Potassium (K <sub>2</sub> O)	3.0%
Sulphur Trioxide (S O <sub>3</sub> )	0.4%
Phosphorus (P <sub>2</sub> O <sub>5</sub> )	0.4%
Loss of weight if fired @ 1050°	0%

## BENEFITS OF PYROLAVE'S GLAZED LAVA FOR ARCHITECTURE

<b>Colour</b>	Any colour by matching to RAL, PANTONE scales etc
<b>Lustre</b>	Lustrous depth of colour
<b>Size</b>	Any size from mosaics up to slabs of 2.6m x 1.3m or larger
<b>Thickness/weight</b>	Any thickness from 8mm up to 80mm for slabs (or 160mm for Massives)
<b>Strength</b>	The strength of stone with the resistance of an enamel coating
<b>Flexibility</b>	Interior or exterior, wet or dry, hot or cold
<b>Insulation</b>	Excellent sound & heat insulation properties
<b>Stability</b>	Class 0 fire rating (cannot burn or emit toxic fumes)
<b>Versatility</b>	As one-off or as production run
<b>Unique signature</b>	Bespoke design with high visual impact
<b>Aesthetic</b>	Lustrous depth of glaze, smooth and cool to touch
<b>Care &amp; maintenance</b>	Easy to clean using household cleaners



## MAXIMUM SIZE TO THICKNESS & WEIGHT

Slab thickness in mm	Size in cm	Weight per m <sup>2</sup> in kg
10	30 x 30	22
15	60 x 120	33
25	100 x 200	55
30	130 x 260	66
40	130 x 260	88
60	130 x 260	95
80	130 x 260	100

**Note:** Slabs of 60mm and 80mm thick are honed out underneath leaving the full thickness only at the perimeter.

## CARE & MAINTENANCE OF GLAZED LAVA

Application	Frequent Cleaning	Stubborn Marks
<b>Building cladding</b>	Hot soapy water Climatic cycle self cleans	Bleach, paint stripper, thinners, white spirit Cement scale removers, lime scale removers, tile & glass cleaners
<b>Bartops</b>	Hot soapy water	Acetone, tile & glass cleaners
<b>Kitchen worktops</b>	Hot soapy water	Acetone, tile & glass cleaners
<b>Vanity tops / shower trays</b>	Hot soapy water	Acetone & lime scale remover, tile & glass cleaners
<b>Tables</b>	Hot soapy water	Acetone, tile & glass cleaners

**Note:** Never use anything abrasive on the surface (eg scrapers, wire wool, commercial scourers). Always use a soft cloth or sponge.

## REPAIRS

Problem	Repair	
<b>Glazed Lava</b>	Small chips (up to 2/3mm)	Cold glaze supplied by Pyrolave
	Larger chips (5mm +)	Epoxy resin filler coloured to match enamel & and finished using thinners – any supplier
	Cracks & large chunks or breakages	Irreparable
<b>Natural Lava</b>	Small chips (up to 2/3mm)	Grey or anthracite coloured cement – any supplier
	Larger chips (5mm +)	Epoxy resin filler coloured to match enamel & and finished using thinners – any supplier
	Cracks & large chunks or breakages	Irreparable

## CONTACT

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