

Imerys extends its chamotte portfolio for sanitaryware production

WORLD

Fine fireclay sanitaryware production has been developing over the last decade, enabling the production of large and complex formats thanks to the dimensional stability fine fireclay offers during the firing process. With the addition of chamotte the shrinkage and deformation can be reduced during the drying and firing process. Thus the production of large-sized, complex shape products is facilitated.

Chamotte is calcined clay containing a high proportion of alumina. It is produced by firing selected fire clays in a rotary kiln to temperatures between 1400°C and 1600°C, before grinding and screening to specific particle sizes.

Imerys has been producing calcined clays for refractories and ceramics applications for decades. To answer the increasing demand for large and complex design of sanitaryware pieces, the Group has developed specific know-how and processes resulting in a dedicated range of calcined clay products. This product range addresses the specific requirements of the production of the fire clay, fine fire clay, super fine fire clay and thin/strong ceramic formulas.

Closer to customer requirements

Imerys is continuously investing to be even closer to its customers and to sustain the fast growing demand of the ceramic industries in Eastern Europe and Middle East & Africa, with for example the installation of new processing plants. The platforms recently built in Ukraine and Egypt have been developed thanks to our strong production process know-how.

From its local operations located near Cairo - Egypt, Imerys' team has access to all calcined clays produced by the Group and has been able to develop bespoke products to serve the local and surrounding sanitaryware producers in the Middle East and North Africa.

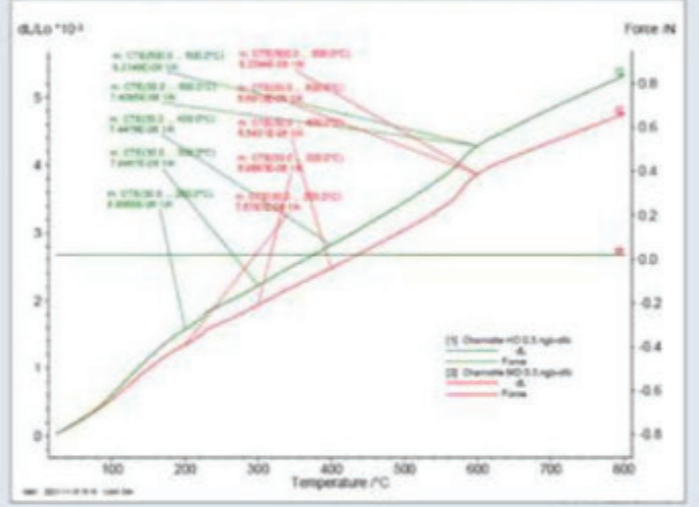


Imerys site location in Egypt and Ceramics cluster mapping

Table 1: Characteristics for ICE Chamotte HD 0.3 and MD 0.3

	ICE Chamotte HD 0.3	ICE Chamotte MD 0.3	
Chemical analysis using analytical Epsilon 4 XRF - (%)	Na ₂ O	0.28	0.17
	MgO	0.11	0.08
	Al ₂ O ₃	36.2	37.1
	SiO ₂	58.7	58.3
	P ₂ O ₅	0.08	0.08
	K ₂ O	0.31	0.33
	CaO	0.38	0.24
	TiO ₂	2.36	2.36
	MnO	0.01	0.01
	Fe ₂ O ₃	1.27	1.09
	BaO	0.00	0.00
	LOI	0.32	0.26
Cumulative particle size distribution by sieving - (%)	> 325 μm	5.2	9.74
	> 200 μm	18.0	26.49
	> 100 μm	45.0	50.15
	> 45 μm	69.6	69.33
Dilatation using NETZSCH DIL 402 Expedit Classic (x10 ⁻⁶ K)	m.CTE(30.0 ... 200.0°C)	8.87	7.58
	m.CTE(30.0 ... 300.0°C)	7.99	6.96
	m.CTE(30.0 ... 600.0°C)	7.41	6.68
	m.CTE(500.0 ... 600.0°C)	8.31	8.24

Graph 1. Thermal expansion curves for ICE Chamotte HD 0.3 and MD 0.3



High quality standards to increase fine fire clay body performance

ICE Chamotte product range benefits the high quality standard applied to Imerys calcined products, particularly in terms of physical properties like particle size distribution, thermal expansion and performance required in a fine fire clay formula.

Optimum suspension performances

ICE Chamotte can be introduced into a sanitaryware formula without modifying the rheological set-up of the suspension.

The optimised particle-size distribution (PSD) curve of the chamotte allows it to reach a favorable balance of properties (Table 2):

- High density suspension
- High fluidity and controlled thixotropy
- Good casting rate/baroid permeability
- Higher mechanical strength by improving the packing of the body.

Table 2. Typical full body characteristics with ICE Chamotte MD 0.3

		Standard	New formula
Plastic mix	%	55	55
Imerys EPUREE	%	25	25
Competition	%	20	0
ICE Chamotte MD 0.3	%	0	20
Density		1.974	1.972
Viscosity 0	*	274	268
Viscosity 6	*	177	175
Baroid moisture	%	17.3	17.3
Baroid dry	g	82	83
MOR	kg.cm⁻²	28	35
Water absorption	%	12.6	12.8
Thermal shock	°C	170	165
Deformation	mm	5	4.5

Table 3. Body formulation using ICE Chamotte HD 0.3

		Standard	New formula
Plastic mix	%	55	55
Imerys EPUREE	%	25	25
Competition HD	%	20	0
ICE Chamotte HD 0.3	%	0	20
Dry shrinkage	%	2.0	2.0
Total shrinkage	%	5.1	5.1
Deformation	mm	5	0.4
Water absorption	%	9.2	9.9
Crazing lines (autoclave)	N°	0	0

Thermal behaviour

The selection of high temperature calcined components to produce ICE Chamotte guarantees thermal stability during firing and the post firing product characteristics. ICE chamotte presents a reduced moisture expansion, essential to better control the post-firing expansion.

Imerys technical teams are continuously looking at ways to develop solutions to better meet manufacturers' needs. In order to boost the properties of its minerals and foster innovation, Imerys has set up major ceramic technology centres in Europe, Asia, & Middle East. Blending platforms and R&D facilities located near ceramic clusters enable their technicians to provide technical assistance and develop made-to-measure formulations to sustain its customers' development.



Table 4. Imerys calcined mineral portfolio

Imerys product	Origin	Base Raw materials	Analysis	Thermal exp. at 600°C (ΔL/L ₀ °10 ⁻³)	PSD available (μm)
EPUREE	Céram. France	Refined ball clay	Al ₂ O ₃ 38 SiO ₂ 57	4.0	100/200/300/500
SMD		Selected ball clay	Al ₂ O ₃ 38.5 SiO ₂ 56.7	4.2	100/200/300/500
SHD		Selected ball clay	Al ₂ O ₃ 35 SiO ₂ 60	4.8	100/250/500
CHK-C1	Vulturne, Ukraine	Selected ball clay	Al ₂ O ₃ 42 SiO ₂ 55	4.5	Run of kiln
Molochite	Cornwall, UK	Refined Kaolin	Al ₂ O ₃ 42 SiO ₂ 54	2.5	Milled
ICE Chamotte MD	Cairo, Egypt	Ball clay/ Kaolin	Al ₂ O ₃ 37 SiO ₂ 58	4.2	200/300
ICE Chamotte HD	Cairo, Egypt	Ball clay/ Kaolin	Al ₂ O ₃ 37 SiO ₂ 58	4.6	200/300