Technical information about Technistone®

Technistone® production

BRETON Technology - high quality technology for stone processing

- Created a new sector in the countertop industry
- Current production capacity of over 55,000 m2 per month, during 2016 increase to 80,000 m2 per month
- 95 % of production is for export
- Technistone is regularly certified according to ISO 9001 standard

[Download our Good Practice Guide](#).

Product composition

Production group	Trade names	Nature, Inorganic components	% by weight	Binder	% by weight	Coloring additives	% by weight
Sand	Elegance Gobi	Silica sand, glass	89,0 - 91,0	Resin	8,5 - 10,5	Color pigments	<0,1 - 0,5
Granite	Taurus Sonora Karpat	Granite, silica sand, quartz	90,3 - 92,0	Resin	7,5 - 9,2	Color pigments	<0,1 - 0,5
Mirrors	Starlight Brilliant	Crushed mirrors glass, silica sand, quartz	88,2 - 91,2	Resin	8,0 - 10,8	Color pigments	<0,1 - 1,0
Crystal	Crystal Classic Harmonia Noble Noble Pro	Quartz, silica sand, crushed mirrors, glass, granite	84,5 - 90,5	Resin	8,0 - 14,0	Color pigments	<0,1 - 1,7

- Carefully selected and high quality raw materials are necessary for the production of Technistone engineered stone
- Technistone uses 4 primary raw materials –resin, filler, grits and pigments

High-quality, nonporous, composite material, built-up from hard, inorganic, polishablegranulates, compactly bound together with a binder and a filler, colored with various pigments, having a smooth, resistant surface, in a variety of sizes and with a wide range of applications.

Quartz surfaces -depend on the Product Group, but are generally:

- 90 % of natural raw materials –crushed quartz, mirrors, glass and granite (high performance polyester resin)
- 10 % of technological improvements (light-fast color pigments and special additives)

Product testing

Resin testing and certifications

Technistone ensures that all of our Resin manufactures are in compliance with EU REACH.

Our laboratory the following tests are performed for every batch of incoming resin:

- Dynamic viscosity
- Color(haze/ATHA)
- Time of curing (maximal temperature of curing)
- Content of styrene
- Density
- Specific gravity
- Volumetric shrinkage
- Shelf life

Production group	Density (g/cm³)		Water absorption after 48 hours (%)		Flexural strength (MPa)	
	range of values	average value	range of values	average value	range of values	average value
Sand	2,35 – 2,44	2,39	0,01 – 0,05	0,03	44 – 71	57
Granite	2,40 – 2,58	2,48	0,01 – 0,07	0,04	32 – 55	46
Mirrors	2,31 – 2,45	2,38	0,01 – 0,05	0,02	36 – 68	49
Crystal (Noble)	2,20 – 2,37	2,30	0,01 – 0,05	0,03	63 – 93	78
Crystal (grains < 2,5 mm)	2,20 – 2,44	2,37	0,01– 0,05	0,02	50 – 97	69
Crystal (grains ≥ 2,5 mm)	2,39 – 2,47	2,47	0,01 – 0,04	0,02	31 – 54	47
Applied standard	EN 14617-1	EN 14617-1	EN 14617-1	EN 14617-1	EN 14617-2	EN 14617-2
Stated in	Technistone Laboratory	Technistone Laboratory	Technistone Laboratory	Technistone Laboratory	Technistone Laboratory	Technistone Laboratory

- Hardness (Barcol)

Product testing according to European standards

- **EN 14617-1** Density, Water absorption
- **EN 14617-2** Flexural strength
- **EN 14617-4** Abrasion
- **EN 14617-5** Freeze thaw resistance
- **EN 14617-6** Thermal Shock resistance
- **EN 14617-09** Impact resistance
- **EN 14617-10** Resistance to Chemicals
- **EN 14617-11** Thermal expansion coefficient
- **EN 13501-1** Flammability
- **ČSN 725191** or **P CEN/TS 16165** Slipperiness

Product testing according to American standards (ASTM)

- **ASTM C97** (Absorption, Bulk Specific Gravity)

- **ASTM C99** (Modulus of Rupture)
- **ASTM C880** (Flexural strength (bending))

Production group	Thermal expansion coefficient α (30 to 60 °C)	Thermal expansion coefficient α (20 to 130 °C)	Frost resistance coefficient (average)	Abrasion (average)
	(10^{-6} /°C)	(10^{-6} /°C)	-	(mm^3)
Sand	21,8	30,0	90 - 110	6840
Granite	13,4	17,3	90 - 110	8125
Mirrors	17,5	22,7	90 - 110	7900
Crystal	17,5 - 34,6	22,7 - 40,2	90 - 110	6700
Applied standard	EN 14617-11	EN 14617-11	EN 14617-5	EN 4157 (B)
Stated in	TZÚS Plzeň	TZÚS Plzeň	Stone and gravel test plant Hořice	Stone and gravel test plant Hořice

- **ASTM C1028** (Static Coefficient of Friction)
- **ASTM C650** (Resistance to Chemical Substances)
- **ASTM C1378** (Resistance to Staining)
- **ASTM C484** (Thermal Shock Resistance)
- **ASTM C648** (Breaking Strength)
- **ASTM C241** (Abrasion Resistance)
- **ASTM E84** (Flammability)
- **ASTM E228** (Thermal expansion coefficient)

- **TCNA USA** = Tile Council of North America USA
- **AME USA** = Applied Materials & Engineering USA

Single tests details

Apparent density test:

Dried specimen is weighted in air and immersed in water. Quotient of both values is the weight per volume unit of a material including voids - apparent density.

Standard EN 4617-1

Relations: Being defined as mass material per volume unit, apparent density refers to material “heaviness”, compares weights of different materials in same volume.Engineered stone weights less in comparison to nature stone due its lower density.

Water Absorbtion test:

The mass of water absorbed by the material, under specified conditions, expressed as a percentage of the mass of the dry material.

Standard EN 14617-1

Relations: Depends on absorption of used raw chips (granite / quartz / glass). Refers to ability to absorb liquid into material, thus level of resistance to staining, resistance to general surface uncleaning, simplicity of maintenance, resistance to bacteria growth and changing of other mechanical and physical properties due to liquid presence in material.

Flexural strength test:

Flexural strength, also known as modulus of rupture or bend strength is measured in terms of stress, and thus is expressed in units of pressure. The value represents the highest stress experienced within the material at its moment of rupture.

Standard: EN 14617-2

Relations: Flexural strength value refers to strength and flexibility of material, thus its resistance to break or to load.

Linear thermal expansion test:

When the temperature of a material changes, the energy stored in the bonds between atoms changes, so does the length of the molecular bonds. As a result, solids typically expand in response to heating and contract on cooling; this dimensional response to temperature change is expressed by its coefficient of thermal expansion

Standard: EN 14617-11

Relations: Refers to changing of the product size by thermal influence. The most important for construction and design of floor and wall claddings (dilatation, fixing system…).

The use of the thermal expansion coefficient ά during the calculation:

relation: $\delta_1 = \alpha \square (c_2 - c_1) * l_0$

Example: tile Taurus Brown Pearl 40 x 40 cm, temperature change from 20 to 70 °C. The length difference of one tile due to temperature change δ1 is 0,42 mm.

To be calculated after substitution of the relevant values into the relation. According to that, the tile size will be 400,42 mm long at the temperature of 70 °C(ά = 21x10-6, c2 = 70 °C, c1 = 20 °C, l0 = 400,0 mm).

Impact resistance test:

20/20 cm body is placed in the center of the vessel in sand. Steel ball (1 kg) is allowed to fall. The height of drop shall be measured between the lowest point of the ball and surface impact. The test is being repeated (increased height of falling ball) until the sample breaks.

Standard: EN 14617-9

Relations: Previous destructive test designed to determine product resistance to the impact of a suddenly applied force. Impact resistance of engineered stone depends mostly on:

product thickness,resin content – formulation. It reaches several times higher levels than in natural stones area.

Thermal shock resistance test:

20 cycles of product have to be performed by 18 hours heating to 70 or 105 °C, then 6 hours immersion in water of 15 °C. After test product look, stains, color change, cracks, weight and flexural strength are evaluated.

Standard: EN 14617-6

Relations: High local thermal stresses can lead to the propagation of cracks, discoloration or color change, surface degradation, loss of weight, decrease of flexural strength.

Abrasion test:

Specimen abrasion by abrasion machine and special abrasives. Size of tool mark (or specimen size) worn by abrasion is measured and expressed in - length (mm), area (mm2) or volume (mm3). Lower value – higher abrasion resistance.

Standard: EN 14157 (B)

Relations: The ability of a material to stand up mechanical action such as rubbing, scraping, or erosion, which tends progressively to remove material from its surface. This ability helps to maintain the material's original appearance and structure. Refers to surface resistance to scratches, cuts, gloss deterioration….

Slip resistance test:

Measuring walkway surface traction. This test is used for testing slip resistance of a surface to shoe or foot traffic tested on a ramp.

Standard: DIN 51130 or ČSN 725191

Relations: One of the key components of safety is defining how slippery the floor is; this is known as its 'slip resistance'.

Ramp Test: The Ramp Test is split into DIN 51130 Shod and DIN 51097 Barefoot.
This method of testing slip resistance involves test subjects wearing standard soled boots (shod) on an oily floor surface or barefoot on a wet 'soapy' floor surface; the floor is then inclined gradually until they slip. The ramp test is useful for measuring slip resistance in industrial areas and in wet areas, such as swimming pools.

Dimensional stability test:

Determination of product dimensional stability by measurement of possible vertical movement of tile edges against reference plane by influence of moisture during 24 hours. Measured movements are evaluated to 3 classes A - C.

- *Class A - movement less than 0,3 mm*
- *Class B - movement 0,3 - 0,6 mm*
- *Class C - movement more than 0,6 mm*

Standard: EN 14617 - 12

Relations: Mainly refers to behavior of tiles after fixing to wet glue. Based on reached class proper glue has to be used.
All TechniStone® products are classified in class A.
Source: TZÚS Plzeň institute Czech republic

Flammability test:

Flammability is defined at how easily something will burn or ignite, causing fire or combustion. The degree of difficulty required to cause the combustion of a substance is subject to quantification through fire testing.

Standard: EN 13501-1

Relations: Engineered stone is generally classified in class B due to resin content, nature stone is in class A. This fact has to be respected according to national building construction regulation, might be applied in flooring, mostly does not effect in counters using.

TechniStone® possibilities: Technistone a.s. finished R&D of new product for exterior wall claddings with flammability classification A2-s1, d0Projects with special requirements are possible to arrange production of standard products with this treatment too.This product has to be used as a floor, wall or construction element, not as a counter for direct food contact.

Freeze test:

25 cycles of product exposure have to be performed by 4 hours freezing to - 20 °C then at least 4 hours immersion in water of 20 °C. Result is expressed as coefficient of decreasing / increasing of flexural strength value before and after testing. Due to resin content values range around 1 (no influence).

Standard: EN 14617-5

Relations: Refers to material resistance against freeze and thaw which can lead to many failures in materials.Quartz based engineered stone is completely resistant.

Chemical resistance test:

Surface gloss comparison before and after 8 hours of chemical influence (HCl, NaOH) expressed in gloss decrease in %, evaluate into class.

Standard: EN 14617-10

Relations: Refers to material surface resistance against chemicals influence, which may occur in counters tops using also (drinks, juices, jams, household cleaners...). Chemical influence could be caused by chemical reaction (HCl / Marble – surface destroying) or by absorption into surface (stains)

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