

Technistone

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General Overview

Product advantages



Whitest white



Highly scratch
resistant



Highly bacteria
resistant



Stain
resistant



Natural juice
resistant



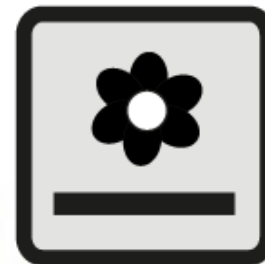
Solid for cutting



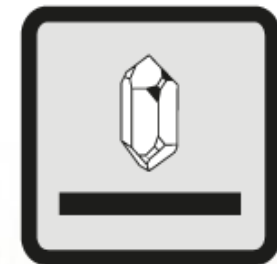
Long life
& durability



Waterproof



Made of natural
raw materials



Quartz product

Quartz - General Advantages

- Design - possibilities are limitless
- Durability - exceptional hardness, strength and durability
- Resistant - to high temperatures, chemicals, abrasion, scratches and cuts
- Low waste - during fabrication when compared to natural stone (no veins and cracks)

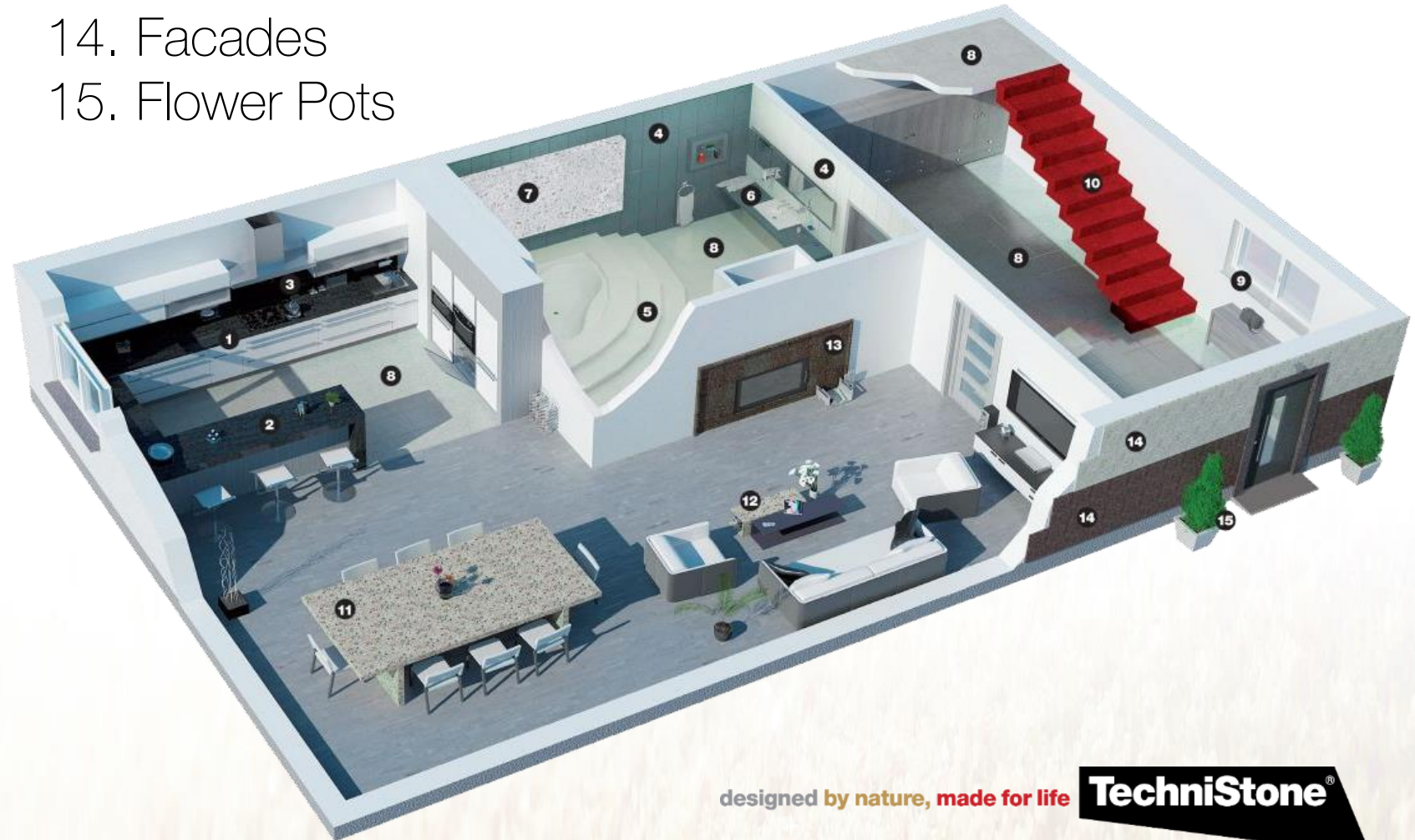
Quartz - General Advantages (cont.)

- Minimal bacteria growth - thanks to extremely low porosity, engineered stone satisfies all hygienic requirements and is very easy to maintain
- Highly stain resistant - practical for daily use (red wine, coke, oil, coffee..)
- Easy polishing, cutting and manufacturing – similar to nature granite
- Less heavy than natural stone, but more flexible
- Surface uniformity – easy to create seams due to its consistent structure

Product usage

1. Kitchen Worktops
2. Bars
3. Kitchen Wall Tiles
4. Bathroom Wall Tiles
5. Bathtub Tiles
6. Vanity Unit
7. Transparent Walls
8. Tiles
9. Window Sills
10. Stairs Treads & Risers
11. Kitchen Tables
12. Coffee Tables
13. Fireplace Tiling

14. Facades
15. Flower Pots



Technistone production

- BRETON Technology - Original 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



Surface Types & Sizes

- Slabs – 305 x 142,5 cm x (1,2 cm; 2 cm; 3 cm)
- Tiles – 30x30 cm, 60x60 cm, 30 x 60 cm and other special formats x (1 cm; 1,2 cm; 2 cm)



Polish



Antique



Matt



Honed



Brushed



Slate

Color range

Color range – Noble Collection – the latest



Noble Supreme White



Noble Carrara



Noble Troya



Noble Calista



Noble Botticino



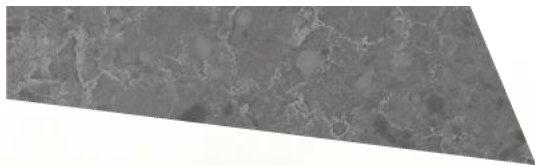
Noble Olympos Mist



Noble Ivory White



Noble Imperial Grey



Noble Desiree Grey



Noble Cloudy Onyx



Noble Pietra Grey



Noble Athos Brown



Noble Concrete Grey

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Color range – Starlight Collection – the first



Brilliant White



Starlight White



Brilliant Black



Starlight Black



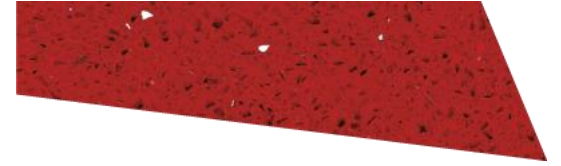
Starlight Grey



Starlight Sand



Starlight Brown



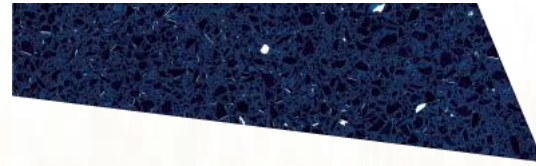
Starlight Ruby



Starlight Red



Starlight Blue



Starlight Sapphire



Starlight Green

Color range – Harmonia Collection



Harmonia Yosemite



Harmonia Dolomites



Harmonia Altay



Harmonia Sierra



Harmonia Velasco

Color range – Essentials Collection

Crystal Absolute White



Crystal Polar White



Crystal Royal



Crystal Creme Beige



Crystal Diamond



Crystal Quartz White



Elegance Dark Grey



Crystal Nevada



Gobi Brown



Gobi Grey



Classic Ice



Crystal Anthracite



Gobi Black

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Color range – Rustic Collection



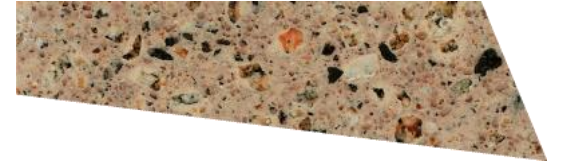
Karpaz Arizona



Sonora



Crystal Sahara



Taurus Gold



Taurus Brown Pearl



Taurus



Taurus Black

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TechniStone[®]

Manufacturing Process

R&D Department

- Internal development is one of the most important activities of Technistone
- Our experienced development team is able to create products as successful as the Starlight or Translucent ranges, it can also fulfill specific design wishes of customers from all over the world.
- Real look, structure and shade

R&D ► Pilot plant ► Plant test ► Evaluation & adjustment ► Trial production ► Standard production

Raw materials possibilities



**Original Breton
pilot plant equipment**



Pilot plant press



Samples polishing



Technistone product composition



- 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

Basic Composition

High-quality, nonporous, composite material, built-up from hard, inorganic, polishable granulates, 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
- 10 % of technological improvements
 - high performance polyester resin
 - light-fast color pigments and special additives



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Technistone Production Groups

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 Karpát Classic	Granite, silica sand, quartz	90,3 – 92,0	Resin	7,5 – 9,2	Color pigments	< 0,1 - 0,5
Mirrors	Starlight Translucent Fresh Venetian, Brilliant	Crushed mirrors, glass, silica sand, quartz	88,2 – 91,2	Resin	7,8 – 10,8	Color pigments	< 0,1 - 1,0
Crystal	Crystal Classic, Harmonia Noble	Quartz, silica sand, crushed mirrors, glass, granite	84,5 - 90,5	Resin	7,8 – 13,8	Color pigments	< 0,1 - 1,7

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Raw materials

- 1) Unsaturated polyester resin binding the individual components together and lending to the stone the necessary strength, special additives (accelerator, initiator and silane) are added to resin
- 2) Filler (very finely ground silica sand – under 45 µm is more than 95%)
- 3) Grits (quartz, granite, glass and mirrors chips, selected, cleaned, crushed and sieved to sizes from 0.1 to 8 mm), the appearance of product depends on the grits' type and size
- 4) Pigments (high quality, minimal temperature and light reactivity) ensuring excellent aesthetics and color stability

If only one kind of pigment (one color) is used, we define this as a mono-color product, if more than one type of pigment is used, we define these as multicolor products.

Raw Material Preparation

- Raw materials inspection, sorting and cleaning
- Tanks for UP resin
- Silos for filler and silica sands
- Storage of selected quartz grits in big-bags
- Grinders for crushing of mirrors, granites...
- Two sets of vibrating sorters and separators
- Silos for crushed and sieved grits
- Machine for pigments mixing



Mixing & Spreading

Mixing:

According to Technistone special formula, raw materials flow into the mixing machines, where inorganic grits, fillers and pigments are combine with UP resin. The whole process is computerized.



Spreading:

Prepared mixture is transported to a special spreading machine. The mixture is either filled into rubber mould (line LL2) or between two paper sheets (line LL1). Next, it is evenly spread.



Pressing & Heating

Pressing:

Special vibro-press machine changes the mixture of materials in a vacuum environment into the compact mass by vibration. The prepared slab is free of any gaps or bubbles between individual particles.

Kiln:

A soft plate is carefully put into the curing oven, where it is heated on both sides to the appropriate temperature. This ensure uniform polymerization of the polyester resin in the slab and that it is completely cured. After that the plate is cooled down in the cooling tube.



Finishing Operations

Calibrating & Polishing:

The slabs are measured, calibrated for the required thickness and finalized. The product surface is finished step by step in a polishing machine by special tools. Based on customers' demands, products surface treatment is performed to obtain a polished, honed, brushed, antique, matt or slate surface finishing.

Tiles Cutting (only on one line):

Slabs can be further cut to almost any sizes. The most common sizes are 30x30, 40x40, 60x60 cm. Tile edges can be bevelled up to size 60*61 cm.



Label Information (figure1-1)

Surface finish:
P = polish
H = honed
ANT = antique
M = matt
BS = brushed
SL = slate

NSF mark Serial number Surface finish: Quality class Lot/batch number Color code

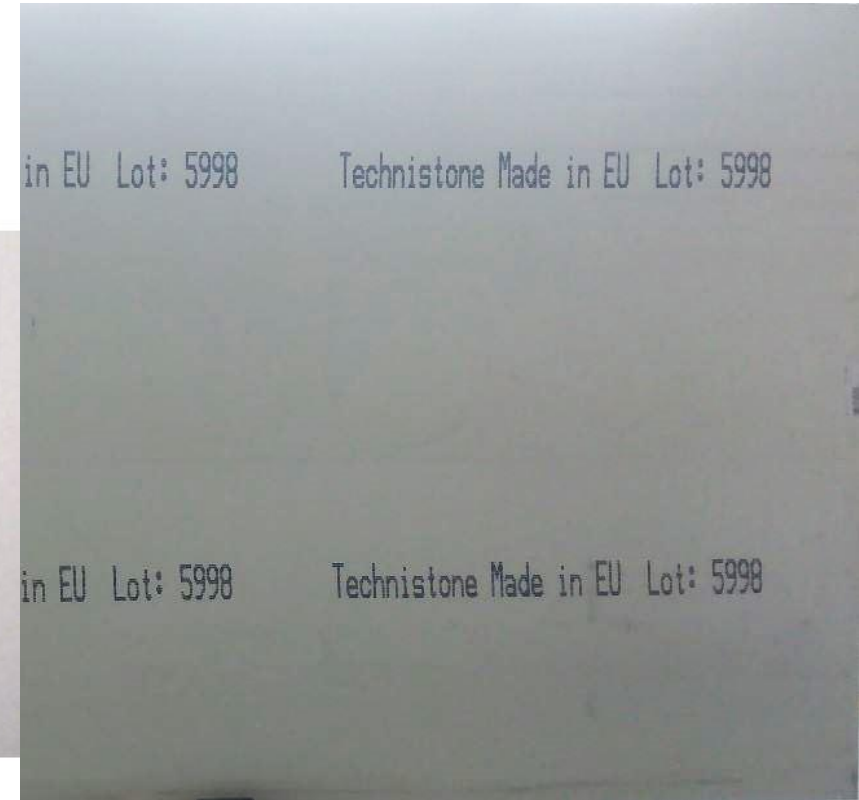
ProductS/N Finish Quality Lot Shade

NSF. 0937100555 P 1 1533 556

CRYSTAL SAHARA 20
TechniStone

M
Made in Czech Republic 7.7.2015 13:58

Internal mark Product name Date and time Thickness Bar code



Quality & Standards

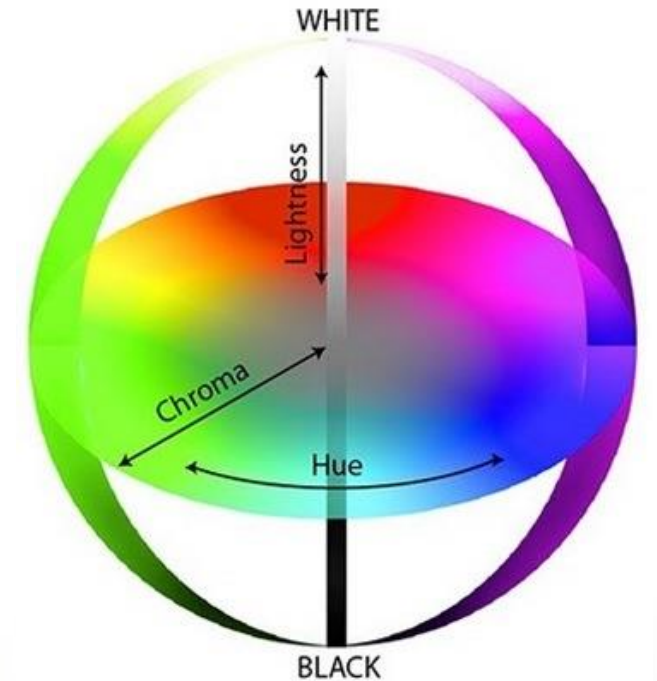
Quality Control

All slabs are inspected and sorted according to their quality by trained personnel. Each slab is measured by an objective colour measurement system to determine the exact colour shade. The result – high quality products and satisfied customers.



Quality Control

Color shades consistency (slabs) - Being made from natural materials, slight optical colour differences are normal and should be considered when planning work. TechniStone® has developed a sophisticated method to precisely evaluate the shade of each slab to enable a more rapid fabrication process. This method is not based on an operator's visual acuity (human eyes), but each slab surface is scanned by measuring devices to check all color shade information. Each slab has its own color code / shade marking consisting from three numbers as indicated in figure 1-1. It is very important to keep the slab's bar-code color shade marking during the fabrication process so as not to lose information regarding the shade of each piece cut from the slab.



Quality Class 1

Quality Class 1 Slabs: are identified by a yellow sticker and bar code. They have a usable surface area as stated in table 1-1

Table 1-1(usable area)

Thickness (mm)	usable area (sqm) 304cmx140cm	usable area (sqm) 305cmx142,5cm	tolerance of usable area
20, 30	4.26	4.35	-1% up to + 1,6%
10, 12	4.26	4.35	-2% up to + 1,6%

The usable area represents the entire area of the slabs excluding the technological margin at the edges of the slab, which are connected to the tolerance of the usable area with respect to the basic slab size.

Table 1-2 (Acceptance Criteria)

2.8.1. Acceptance Criteria: Quality Class 1 slabs are manufactured and inspected in accordance with the following:

Group	Element	Max. size 1) (cm)	Max. quantity of elements of max. size
Slabs with fine grain \leq 2.5 mm(2)	Fine structured spot	1	3
Slabs with fine grain $>$ 2.5 mm(3)	Fine structured spot	2.5	4
Granite	Defect in the structure of used granite	0.3	Unlimited
Crystal	Grey spot / line	1	4
Mirrors	Coloured glass	0.8 * 0.5	4
Mirrors	Mirror chips circular	1.2	2
Mirrors	Mirror chips with visible coloured back printing	1.2	Unlimited
Translucent & Fresh	Particles inside mass visible after illumination	2	Unlimited
Generally	Nature mineral chips presence	0.8	3
Generally	One colour spot	2	4

- Note: 1) The presence of spots with sizes smaller than the maximum allowed is not considered as a defect.
- Note: 2) Materials with fine grain structure, up to and including 2.5 mm: Brilliant Black, Brilliant White, Crystal Absolute White, Crystal Diamond, Crystal Polar White, Crystal Nevada, Crystal Quartz White, Crystal Royal, Elegance Dark Grey, Gobi Black, Gobi Brown, Gobi Grey, Harmonia Altay, Harmonia Cerros, Harmonia Dolomites, Harmonia Sierra, Harmonia Velasco, Harmonia Yosemite, Harmonia Highlands, Harmonia Merida, Harmonia Blanca, Crystal Anthracite, Noble Supreme White, Noble Carrara, Noble Botticino, Noble Calista, Noble Troya.
- Note: 3) Materials with coarse grain structure 2.5 mm and up: Classic Ice, Crystal Creme Beige, Crystal Sahara, Fresh Green, Fresh Orange, Karpat Arizona, Sonora, Starlight Black, Starlight Blue, Starlight Brown, Starlight Sand, Starlight Green, Starlight Grey, Starlight Red, Starlight Ruby, Starlight Sapphire, Starlight White, Taurus, Taurus Brown Pearl, Taurus Gold, Venetian Galaxy, Taurus Black.

Additional Quality Classes (Available only on request)

- Quality Class 2 Slabs: Have the same specifications as Quality Class 1, with the exception that the usable area is reduced to 3.65sqm for **305cm x 142,5cm** slabs and 3.56sqm for 304cm x 140cm slabs due to defects that could not be corrected during the production process.
- Quality Class 3 Slabs: includes products with mechanical and visual defects such as: outstanding circular or lengthwise grooves, significant low-gloss polished areas, damaged corners and edges, impurities, different colour spots, spots with the same colour shade exceeding allowed dimensions given in the specification of the quality class 1, incorrectly pressed areas, cracks, pressed-in paper etc.
- Quality Class Project Slabs: are identified in accordance with the appropriate quality class markings. Project Quality slabs require a minimum order of 800sqm.
- For project orders (more than 800sqm), the required first class slab delivery will include a minimum of:
 - 2.13.1. (a) 85% - Quality Class 1 Slabs
 - 2.13.1. (b) 10% - Quality Class 2 Slabs
 - 2.13.1. (c) 05% - Quality Class 3 Slabs
- Project Quality may not include: porosity, cracks, broken corners, significant polishing marks and scratches.

Laboratory

- The fully equipped development lab provides sample development background for work on improving the aesthetic and physical/mechanical properties of the products.
- Laboratory makes the receipt inspection of raw materials, such as: polyester resin, pigments, fillers, insert's, additives.
- Laboratory performs control tests of all products.
- Laboratory cooperates during the development and testing of new possible products, all pilot plant samples, etc.
- Laboratory has an complete archives of pilot plant samples, standards samples of product, raw materials, used formulations.



TS products, services, supports for our customers

Set for quick, invisible repairs

- Useful for fabrication and installation - available for TS customers and distributors
- Technistone provides training for your staff!



before



after

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*

Average values of achieved basic physical and mechanical characteristics of the production groups

Production group	Density (g / cm ³)		Water absorption after 48 hours (% by weight)		Flexural strength (MPa)	
	range of values	average value	range of values	average value	range of values	average value
Sand	2,35 - 2,44	2,40	0,01 - 0,05	0,02	42 - 74	59
Granite	2,40 - 2,58	2,44	0,01 - 0,07	0,03	32 - 55	44
Mirrors	2,32 - 2,42	2,39	0,01 - 0,05	0,03	32 - 68	47
Crystal	2,21 - 2,47	2,41	0,01 - 0,05	0,02	40 - 95	63
Crystal coarse grained	2,43 - 2,47	2,45	0,02 - 0,04	0,02	29 - 47	38
Marble	2,48 - 2,50	2,50	0,03 - 0,04	0,03	50 - 51	50
Applied standard	ČSN EN 14617-1		ČSN EN 14617-1		ČSN EN 14617-2	
Stated	Technistone laboratory					

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	90 - 110	6700
Marble	19,9	28,3	90 - 110	13901
Applied standard	ČSN EN 14617-11	ČSN EN 14617-11	ČSN EN 14617-5	ČSN EN 4157 (B)
Stated	TZÚS Plzeň		Stone and gravel test plant Hořice	

Product testing according to American standards (ASTM)

- ASTM C97 (*Absorption, Bulk Specific Gravity*)
 - ASTM C99 (*Modulus of Rupture*)
 - ASTM C880 (*Flexural strength (bending)*)
 - 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

Average values of achieved basic physical and mechanical characteristics of the production groups

Applied standard	Characteristic	Unit	Value for Technistone® product
ASTM C97	Absorption	%	0,01
ASTM C97	Bulk Specific Gravity	lb/ft3	151,3
ASTM C99	Modulus of Rupture	psi	5699 (dry) 6904 (wet)
ASTM C880	Flexural strength (bending)	psi	5771 (dry) 6698 (wet)
ASTM C1378	Resistance to Staining	-	no effect
ASTM C650	Resistance to Chemical Substances	-	no effect
ASTM C484	Thermal Shock Resistance	-	no visual defects
ASTM C648	Breaking Strength	lbf	1625
ASTM C1028	Static Coefficient of Friction	-	0,80 (dry) 0,57 (wet)
ASTM E84-10	Flammability	-	Class A
ASTM C241-09	Abrasion Resistance	-	79,16
ASTM E228	Thermal expansion coefficient (30-60°C)	10-6C-1	22,4

Apparent Density

- Test explanation: 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.

Apparent density	Standard	Required values (min)	Real values (average)	Range of values
Production Group	EN 4617-1	Unit [g/cm ³]		
Sand		2,30	2,40	2,35 - 2,44
Granite			2,44	2,40 – 2,58
Mirrors			2,39	2,32 – 2,42
Crystal			2,41	2,21 - 2,47
Crystal coarse grained			2,45	2,43 - 2,47
Source		-	Technistone laboratory 2015	

Water Absorption

- Test explanation: 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 .

Water absorption	Standard	Required values (maximum)	Real values (average)	Real values (average)
Production Group	EN 14617-1	Unit [hm. %]		
Sand		0,06	0,02	0,01 - 0,05
Granite		0,09	0,03	0,01 - 0,07
Mirrors		0,06	0,03	0,01 - 0,05
Crystal		0,07	0,02	0,01 - 0,05
Crystal coarse grained		0,07	0,03	0,02 -0,04
Source		-	Technistone laboratory 2015	

Flexural Strength

- Test explanation: 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.

Flexural strength	Standard	Required values (min)	Real values (average)	Range of values
Production Group	EN 14617-2	Unit [MPa]		
Sand		40	59	42 - 74
Granite		30	49	32 - 55
Mirrors		30	47	32 - 68
Crystal		35	63	40 - 95
Crystal coarse grained		25	38	29 - 47
Source		-	Technistone laboratory 2015	

Flexural strength - product comparison

Flexural strength of engineered stone depends on:

- raw materials quality,
- product grain (smaller grain product has mostly higher flexural strength than bigger grain product),
- resin content – formulation
- flexural strength of use chips.

It reaches several times higher levels than in natural stone.

Production Group	Product	Flexural strength (MPa)	Characterization
Mirror	Starlight White	48	Medium grain 1.2 – 2.5 mm
	Starlight Grey	44	Big grain 2.5 – 4.5 mm
	Translucent Ice	42	Bigger grain 2.5 – 6.0 mm
Crystal	Crystal Polar White	72	Smallest grain to 0.5 mm
	Crystal Diamond	56	Small grain to 1.2 mm
	Crystal Quartz White	49	Medium grain 1.2 – 2.5 mm
	Crystal Topaz	46	Big grain 2.5 – 4.5 mm
	Crystal Sahara	41	Biggest grain 4.5 – 8.5 mm

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Linear Thermal Expansion

- Test explanation: 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...).

Linear thermal expansion	Standard	Linear thermal expansion coefficient $\Delta T (30-60)^\circ\text{C}$		Linear thermal expansion coefficient $\Delta T (20-130)^\circ\text{C}$	
		Required values (maximum)	Real values (average)	Required values (maximum)	Real values (average)
Production Group		Unit [$^\circ\text{C}^{-1} \times 10^{-6}$]			
Sand	EN 14617-11	30	21,8	35	30
Granite		20	13,4	25	17,3
Mirrors		25	17,5	30	22,7
Crystal		35	17,5 – 34,6	40	22,7 - 40
Source	TZÚS Plzeň institute Czech republic				

Linear Thermal Expansion

The use of the thermal expansion coefficient α during the calculation

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

δ_1 = length difference (mm)	c_2 = final temperature (°C)	l_0 = initial length (mm)
α = thermal expansion coefficient	c_1 = initial temperature (°C)	

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 δ_1 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

($\alpha = 21 \times 10^{-6}$, $c_2 = 70$ °C, $c_1 = 20$ °C, $l_0 = 400,0$ mm).

Impact Resistance

- Test explanation: 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	Standard	Range of values (thickness 20 mm)	Height necessary to destroy 20 mm sample by 1 kg ball
Production Group	EN 14617-9	Unit [J]	Unit [cm]
Sand		5,5 – 7,9	58 - 83
Granite		4,6 – 6,5	48 - 68
Mirrors		4,1 – 6,3	43 - 67
Crystal		6,2 – 13,1	65 - 138
Source		Technistone laboratory	

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 explanation: 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.

Thermal shock resistance	Standard	Required values	Real values (average)
Production Group	EN 14617-6	Unit [-]	
Sand		mechanical characteristics without any changes, material without any cracks, slightly visible yellowing	
Granite			
Mirrors			
Crystal			
Source	Technistone laboratory		

Abrasion Resistance

- Test explanation: 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....

Abrasion resistance	Standard	Required values (maximum)	Real values (average)
Production Group	EN 14157 (B)	Unit [mm ³]	
Sand		7300	6840
Granite		8600	8125
Mirrors		8700	7900
Crystal		7600	6700
Source	ZKK Hořice institute Czech republic		

Slip resistance

- Test explanation: 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'.

Slip resistance	Standard	Surface finishing	Real values
Production Group	DIN 51130	Unit [class]	
Sand		Honed	R10
Granite		Honed	R10
		Matt	R10
		Brushed	R10
Mirrors		Antique	R9
		Polished	R9
		Honed	R10
Crystals		Brushed	R10
		Polished	R9
		Slate	R10
Source		TZÚS Pízeň institute	

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 explanation: 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.
- 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.

Class	Movement (mm)
A	Less than 0.3
B	0.3 – 0.6
C	More than 0.6

All Technistone products are classified in class A.

Source: TZÚS Plzeň institute Czech republic

Flammability

- Test explanation: 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.

Flammability	Standard	Reaction to fire classification	Standard	Reaction to fire classification
Production Group	EN 13501-1	Unit [class]	DIN 4102 - 1	Unit [class]
Sand		B-s2, d0		B1
Granite				
Mirrors				
Crystal				
Source	CSI Praha institute Czech republic	Baustoffprufstelle Wismar GmbH Germany		

B - reaction to fire behavior
s2 - in relation to smoke production
d0 - in relation to flaming droplets/particles

Flammability

Classification:

A1 – natural stone

A2 – new Technistone Exterior

B – standard Technistone product

Flammability increase

C

D

E

F

Technistone possibilities:

Technistone a.s. finished R&D of new product for exterior wall claddings with flammability classification A2-s1, d0

Projects 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.

Flammability tiles only!

Reaction to fire

B_{fl} , $s1^*$,

$A2_{fl}$ $s1^{**}$

* valid for products: Crystal Absolute White, Crystal Polar White, Harmonia Blanca, Harmonia Merida, Crystal Arctic, products from Noble collection

** valid for all products except: Crystal Absolute White, Crystal Polar White, Harmonia Blanca, Harmonia Merida, Crystal Arctic, products from Noble collection.

According to standard: EN 13501-1

Freeze / Thaw Resistance

- Test explanation: 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.

Coefficient of freeze resistance	Standard	Required values (minimum)	Real values (average)
Production Group	EN 14617-5	Unit [-]	
Sand		80	90 - 110
Granite		80	90 - 110
Mirrors		80	90 - 110
Crystal		80	90 - 110
Source	ZKK Hořice institute Czech republic		

Chemical Resistance

- Test explanation: 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)

Resistance to chemicals	Standard	Real values polished surface *	Standard	Real values polished surface
Production Group	EN 14617-10	Unit [class]	ASTM C 650	Unit [-]
All Technistone products		C4		not affected
Source	Technistone Laboratory		Smith -Emery laboratories Washington	

C4 – highest resistance product keeps more than 80 % of gloss
 C1 – lowest resistance product keeps less than 60 % of gloss

*stain resistance (tee, coffee, oil, red wine, coke) - after 24 hours of treatment and after washing - no visible effect

Certifications

Suitability for food contact and interior usage

Relations: Refers to usage as kitchen countertops and furniture or in the construction of interior elements.

Food contact Interior using	Food contact	Food contact	Specification of organic volatile compounds (VOC)	Specification of organic volatile compounds (VOC)
All Technistone products	Food equipment materials – Food / Splash zone	Suitable for kitchen counter top application according EC regulations	No volatile organic compounds were found in Technistone product	No volatile organic compounds were found in Technistone product
Source	NSF USA	National Institute of public health Czech republic	National Institute of public health Czech republic	Tile Council of North America, Inc.



SCS Recycled content program

Technistone, a.s. obtained the certification regarding minimum recycled content of products, in four categories:

- ✓ Minimum 20% recycled materials in the product
- ✓ Minimum 30% recycled materials in the product
- ✓ Minimum 40% recycled materials in the product
- ✓ Minimum 70% recycled materials in the product

Technistone uses a large amount of recyclable materials, particularly in the form of broken clear glass, broken mirrors or recycled filler.

FULLY 19 PRODUCTS for year 2015/2016!



MINIMUM 70% RECYCLED CONTENT
PRE-CONSUMER

SCS Recycled content program

Nr.	Production group	Product / Recycled material:	GROUP	number of products	recycled item
1	mirrors	Starlight Black	minimum 70% of recycled content	1	glass, mirror, filler
2	mirrors	Starlight Ruby	minimum 40% of recycled content	1	glass, mirror
3	mirrors	Starlight Sapphire	minimum 30% of recycled content	9	glass, mirror
4	mirrors	Starlight White			
5	mirrors	Starlight Grey			
6	mirrors	Starlight Blue			
7	mirrors	Starlight Green			
8	mirrors	Starlight Red			
9	mirrors	Starlight Brown			
10	mirrors	Brilliant Black			
11	mirrors	Starlight Sand			
12	mirrors	Brilliant White	minimum 20% of recycled content	5	glass, mirror
13	sand	Elegance Dark Grey			
14	sand	Gobi Black			
15	sand	Gobi Brown			
16	crystal	Classic Ice	minimum 20% of recycled content	3	glass, mirror, filler
17	sand	Gobi Negro			
18	granite	Classic Black			
19	mirrors	Venetian Galaxy			

20% Recycled Content

SCS Global Services does hereby certify that an independent assessment has been conducted on behalf of:

Technistone, a.s.

Bratři Stefanu 1070, Hradec Kralove, Hradec Kralove, Czech Republic

For the following product(s):

Brilliant White, Elegance Dark Grey, Gobi Black, Gobi Brown, Classic Ice

This product meets all of the necessary qualifications to be certified for the following claim:

Minimum 20% Pre-Consumer Recycled Mirror and Glass Content

Conforms to the SCS Recycled Content Standard V7-0

Registration # SCS-MC-02825

Valid from: September 1, 2015 to August 31, 2016



A handwritten signature in black ink that reads "Robert J. Hrubes".

Robert J. Hrubes, Ph.D., Executive Vice President
SCS Global Services
2000 Powell Street, Ste. 600, Emeryville, CA 94608 USA

SCSglobal
SERVICES

designed by nature, made for life **TechniStone®**

30% Recycled Content

SCS Global Services does hereby certify that an independent assessment has been conducted on behalf of:

Technistone, a.s.

Bratři Stefanu 1070, Hradec Kralove, Hradec Kralove, Czech Republic

For the following product(s):

Starlight Sapphire, Starlight White, Starlight Grey, Starlight Blue, Starlight Green, Starlight Red, Starlight Brown, Brilliant Black, Starlight Sand

This product meets all of the necessary qualifications to be certified for the following claim:

Minimum 30% Pre-Consumer Recycled Mirror and Glass Content

Conforms to the SCS Recycled Content Standard V7-0

Registration # SCS-MC-02824

Valid from: September 1, 2015 to August 31, 2016

SCSglobal
SERVICES



A handwritten signature in black ink that reads "Robert J. Hrubes".

Robert J. Hrubes, Ph.D., Executive Vice President
SCS Global Services
2000 Powell Street, Ste. 600, Emeryville, CA 94608 USA

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40% Recycled Content

SCS Global Services does hereby certify that an independent assessment has been conducted on behalf of:

Technistone, a.s.

Bratri Stefanu 1070, Hradec Kralove, Hradec Kralove, Czech Republic

For the following product(s):

Starlight Ruby

This product meets all of the necessary qualifications to be certified for the following claim:

Minimum 40% Pre-Consumer Recycled Mirror and Glass Content

Conforms to the SCS Recycled Content Standard V7-0

Registration # SCS-MC-02823

Valid from: September 1, 2015 to August 31, 2016



MINIMUM 40% RECYCLED CONTENT
PRE-CONSUMER

Robert J. Hrubes, Ph.D., Executive Vice President
SCS Global Services
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TechniStone®

70% Recycled Content!

SCS Global Services does hereby certify that an independent assessment has been conducted on behalf of:

Technistone, a.s.

Bratri Stefanu 1070, Hradec Kralove, Hradec Kralove, Czech Republic

For the following product(s):

Starlight Black

This product meets all of the necessary qualifications to be certified for the following claim:

Minimum 70% Pre-Consumer Recycled Mirror, Filler, and Glass Content

Conforms to the SCS Recycled Content Standard V7-0

Registration # SCS-MC-03444

Valid from: September 1, 2015 to August 31, 2016



MINIMUM 70% RECYCLED CONTENT
PRE-CONSUMER



A handwritten signature in black ink that reads "Robert J. Hrubes".

Robert J. Hrubes, Ph.D., Executive Vice President
SCS Global Services
2000 Powell Street, Ste. 600, Emeryville, CA 94608 USA

signed by nature, made for life

TechniStone®

Memberships



Technistone, Inc. is an active member of A.St.A. World-Wide (World-Wide association of manufacturers of agglomerated stones) and regularly attends its meetings and activities (commenting on the standards relating to the engineered stone, safety issues, etc.).



Since the beginning of April 2014 Technistone has been a member of the USGBC, a nonprofit organization committed to a prosperous and sustainable future through cost-efficient and energy-saving green buildings that operate within the LEED program.

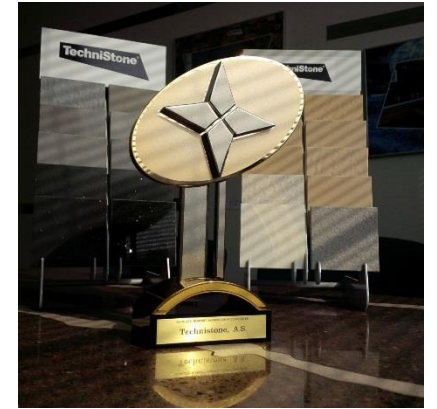
Certifications & Technology



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Awards

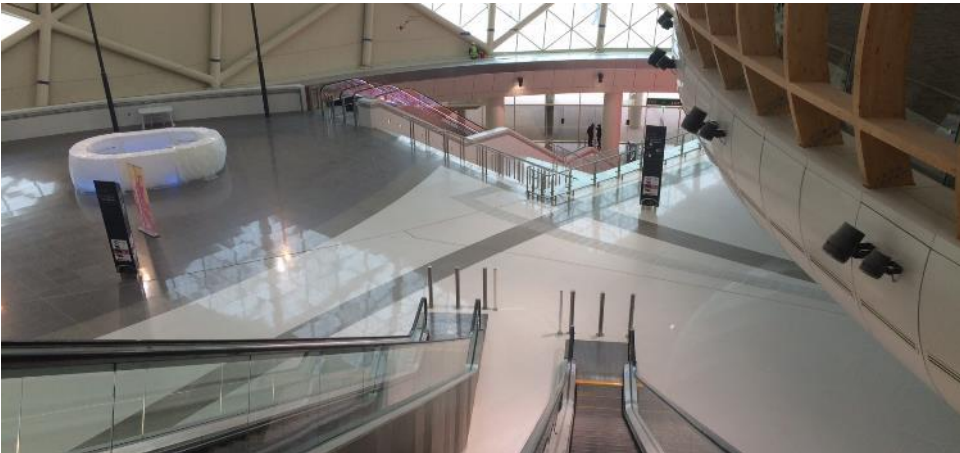
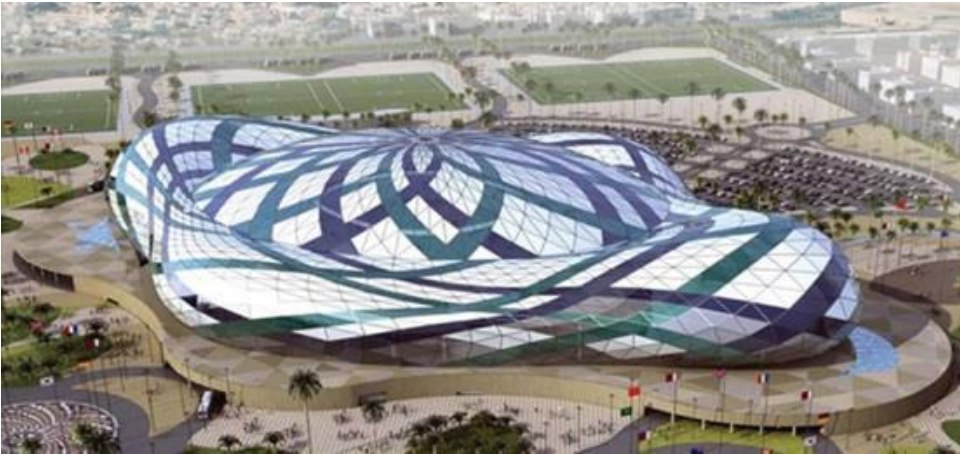
- **BID 2015** - The Golden Award for Excellence and Business Prestige from the Business Initiative Directions Institution, May 2015, New York
- **Quality Award** – the gold in the category PRODUCT – TECHNOLOGY for the building and architecture, June 2015, Prague



References & Projects

Large projects

Lusail, Qatar



Heathrow, London, Great Britain



Large projects

Hotel Kempinski, Prague, Czech R.



Hotel Hilton, Lodz, Poland



Large projects



Airports

- Bejrút, Lebanon
- Changi - terminal 3, Singapore
- Gatwick, London, Great Britain
- Heathrow - terminál 3, London, Great Britain
- John F. Kennedy, New York, USA
- Edinburgh, Velká Británie
- Birmingham, Velká Británie
- Stanstead, Londýn, Velká Británie

Hotels

- Hotel Kempinski, Prague, Czech Republic
- Hotel Kingston, Guam
- Hotel Kempinski, Bombai, India
- Hotel Redcastle, Donegal, Ireland
- Hotel Capisani, Venice, Italy
- Hotel Hilton, Lodz, Poland
- Hotel Don Giovanni, Prague, Czech Republic
- Hotel Cambridge, Jesolo Lido, Italy
- Hotel Am Stephan Platz, Vienna, Austria

Banks and administrative buildings

- ČSOB, Prague, Czech Republic
- Banca Popolare di Ferrera, Ferrera, Italy
- AIA Tower, Hong Kong, China
- Various buildings of Saudi Post, Saudi Arabia

Others

- O2 Arena, Prague, Czech Republic
- Lusail Multipurpose Hall, Doha, Qatar
- Forever 21, Munchen, Germany
- Amusement park GUDZON, Moscow, Russia
- Karen Millen, Singapore

Our partners



Kitchens



Bathrooms



Thank you for your attention!

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