KYOCERA

FRIDURIT®
TECHNICAL CERAMICS

Work surfaces meeting the highest requirements for design and functionality in the laboratory

www.kyocera-solutions.de

FOR LABORATORY PERFECTION

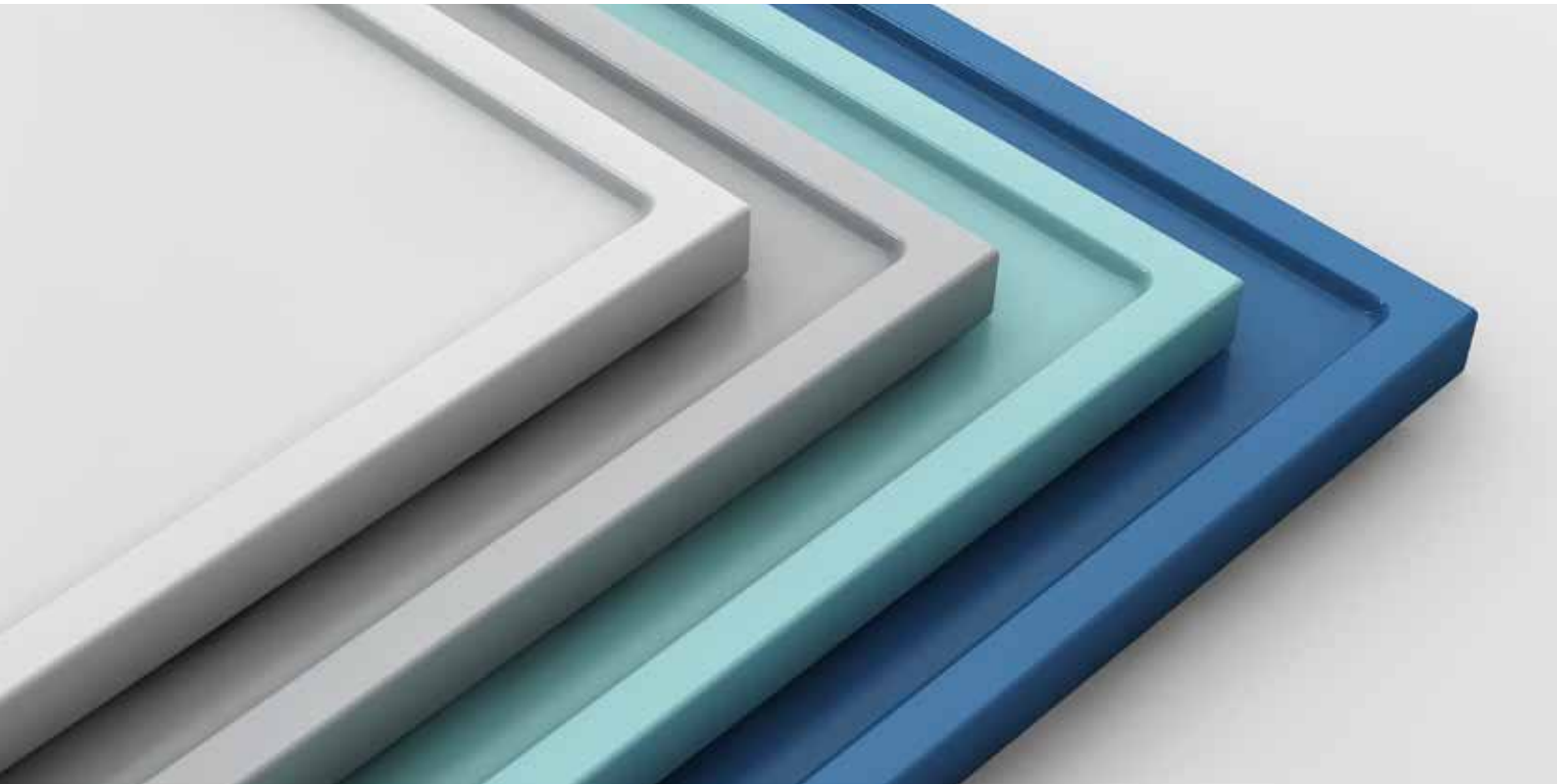
The requirements for quality in modern laboratories increase in accordance with the demands and standards imposed on products and services. The same applies to the environment in which tests, analyses and experiments are carried out. When kept intact, clean and hygienic, laboratory work surfaces contribute significantly to meeting these requirements. Such work environments support high-quality work and allow the necessary conditions to accomplish it. The condition of laboratory work surfaces also contributes to the overall impression of a laboratory.

FRIDURIT full-size laboratory benchtops and sinks made of Technical Ceramics have been used for many years in different laboratory applications.

The FRIDURIT Technical Ceramics surface is non-porous, offering a unique combination of chemical resistance, scratch resistance and temperature resistance.
This property profile allows the perfect work environment to be permanently maintained. The appearance of FRIDURIT laboratory worktops remains flawless - even after many years of intense use.

CUSTOMISED PERFECTION

Over many years, FRIDURIT laboratory benchtops and sinks made of Technical Ceramics have shown excellent results in a wide range of different laboratory environments. They are characterised by the highest resistance and individual design; their appearance is always like new.



Every FRIDURIT laboratory benchtop made of Technical Ceramics is produced as an individual piece and dispatched ready for mounting. All benchtops are self-suporting, i.e. they do not require mounting on an additional base but can be placed directly on the cupboard. A four-point support is sufficient.

The FRIDURIT premium product line has an integrated ceramic marine edge which protects liquids from overflowing, offering maximum sfety and the best possible hygiene in everyday laboratory work.

The 20 mm self-supporting FRIDRIT modular laboratory benchtop is an attractive alternative without a raised ceramic edge.

FRIDURIT laboratory sinks ideally complement laboratory applictions when water and other liquids are used.

Whether your primary concern is a permanent, stable work surface or the environment, or special requirements with regard to size, shape and colour - we always guarantee the highest quality and unique design - that is customised perfection.

GLAZE COLOURS

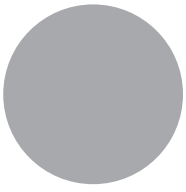
A wide range of standard glazes and special colours is available enabling FRIDURIT laboratory benchtops and sinks made of Technical Ceramics to meet the highest aesthetic demands.

You can find a selection of available glaze colours here. Laboratory benchtops and sinks are available in plain colours.

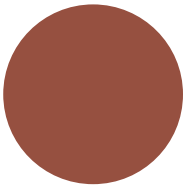
The benchtops are also available with black-speckled glazing. Printed patterns are non-binding and a sample of the colour of the material is shown. Ceramic colour samples are available on request.

PURE WHITE

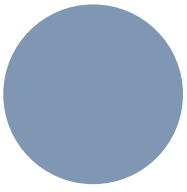
LIGHT GREY



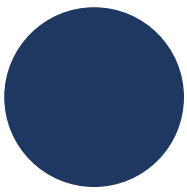
DIAMOND GREY



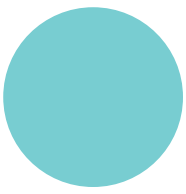
GRAND CANYON



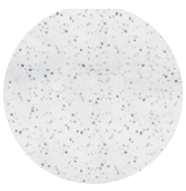
GREY BLUE



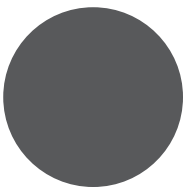
DARK BLUE



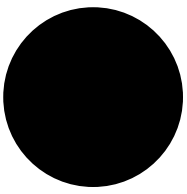
OPAL GREEN



LIGHT GREY WITH BLACK SPECKLES



LAVA GREY



BLACK

ALWAYS LIKE NEW

FRIDURIT Technical Ceramics show permanent resistance to exceptionally high requirements in the laboratory. The superior material density is more scratch-resistant when compared to other benchtop materials and has a non-porous surface.

EASY TO CLEAN

SCRATCH-PROOF

CHEMICALLY RESISTANT

THERMALLY RESISTANT

MICROBIOLOGICALLY PURE

ECO-FRIENDLY

The wide spectrum of ceramic materials ranges from porcelain tableware and floor tiles to high-temperature technology used in the aerospace industry. FRIDURIT Technical Ceramics belongs to the group of technical stoneware and is used primarily in chemical and technical applications. The ceramic formulation has been optimised over many years resulting in resistant and durable material properties that meet any everyday laboratory requirements.

EASY TO CLEAN

When compared to other materials, FRIDURIT laboratory benchtops made of Technical Ceramics are exceptional when it comes to hygiene and care. Superior cleanability and robust beauty are outstanding product advantages.

Cleaning laboratory work surfaces can put extreme stress on the surface, particularly when dirt is very hard to remove. Very few materials can withstand these cleaning procedures without being damaged. FRIDURIT laboratory benchtops made of Technical Ceramics are easy to clean: colours, coatings, dirt or grease - everything can be removed without leaving any residue.

Extreme hardness and wear resistance mean that our Technical Ceramics can withstand repeated cleaning procedures using aggressive detergents and tools.

We recommend cleaning the FRIDURIT laboratory benchtops with a sponge or cloth and conventional detergents suitable for cleaning of bathrooms.

Persistent dirt can be removed using a sponge for scrubbing glass ceramic surfaces.

Do not use detergents containing hydrofluoric acid or its compounds, as these will damage the surface.

We are at your disposal for further questions.

SCRATCH-PROOF

FRIDURIT laboratory benchtops always look like new. Their extraordinarily high scratch resistance prevents any sign of wear.

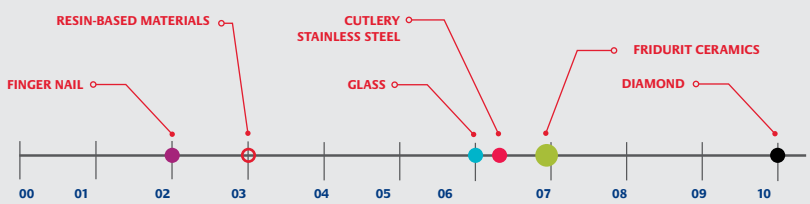
Hardness is an outstanding property of ceramic materials. Different methods such as Rockwell, Brinell, Vickers or Knoop are used to determine the hardness of a material.

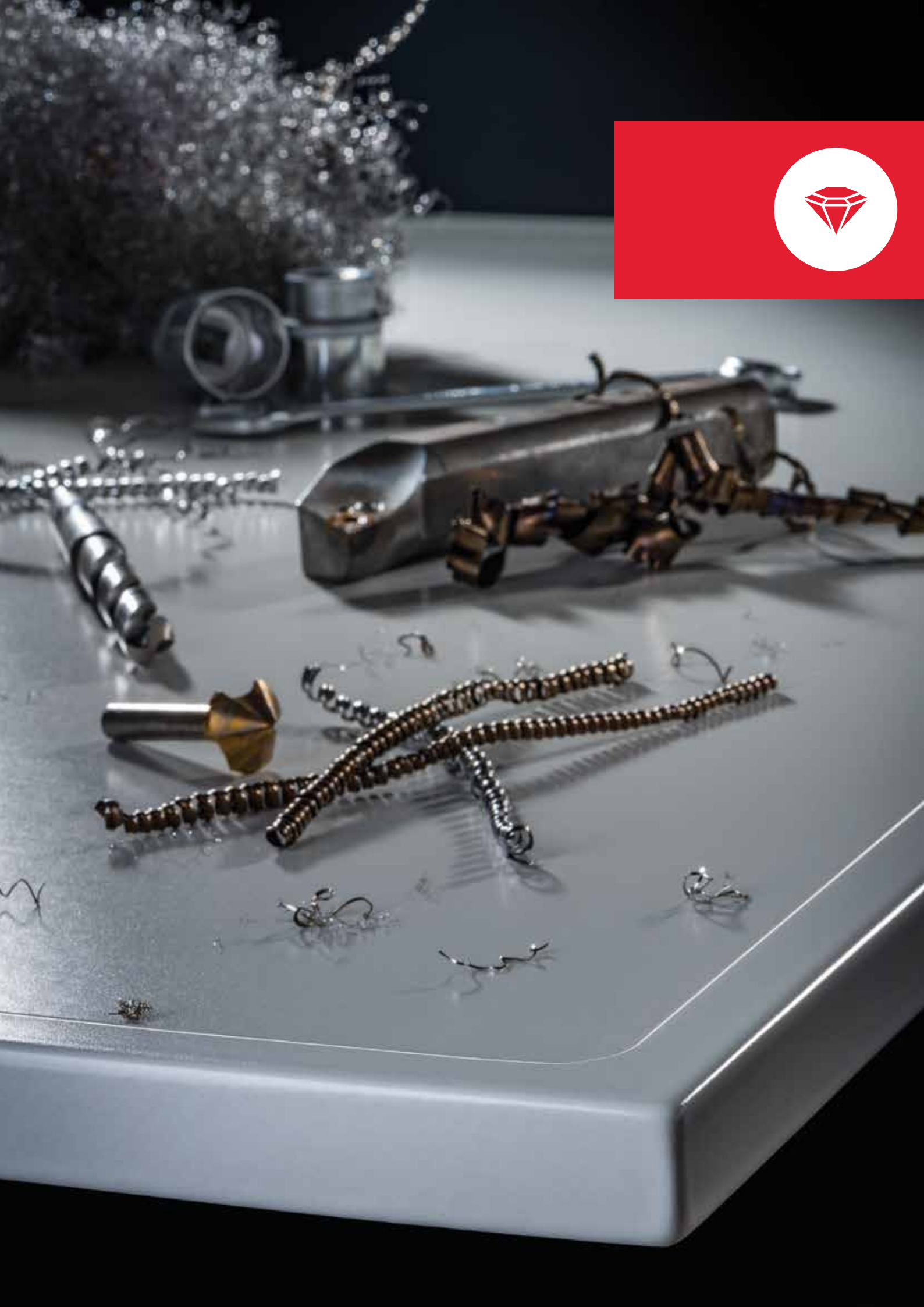
Mohs Hardness is a procedure that provides a clear classification of scratch-resistance of different materials. The test is carried out by dragging the point of a material of known hardness across the surface being evaluated and trying to scratch the surface of the material.

Diamond is the hardest material with a hardness rating of 10. It can scratch any material with a smaller hardness value. A standard cutlery steel cannot damage FRIDURIT Technical Ceramics.

FRIDURIT Technical Ceramics has a hardness rating of 7.

MOHS SCALE OF HARDNESS





CHEMICALLY RESISTANT

FRIDURIT Technical Ceramics can withstand common laboratory solvents and chemicals - even at high concentrations, extreme temperatures and long exposure times.

Years of experience with technical requirements in chemical apparatus engineering allowed KYOCERA Fineceramics Solutions GmbH to enhance its expertise in providing material solutions for the most demanding conditions. FRIDURIT laboratory benchtops have been subjected to practical tests for more than 50 years and have proven their resistance in laboratories all over the world.

Chemical resistance testing of laboratory benchtop materials is proposed by SEFA (Scientific Equipment and Furniture Association). These tests expose laboratory work surfaces to a reagent for a period of 24 hours. Results are rated as “No Effect - Slight change in colour or gloss - Slight surface etching or severe staining - Corrosion, pitting or surface etching”.

Many benchtop materials show significant changes when exposed to common laboratory chemicals, giving an unclean and unsightly impression. With the exception of hydrofluoric acid, FRIDURIT Technical Ceramics does not stain or lose its gloss, ensuring that surfaces are preserved in perfect condition.

The table on page 21 provides some examples showing the performance of the material.

THERMALLY RESISTANT

An outstanding feature of ceramic materials is their temperature resistance. FRIDURIT Technical Ceramics is manufactured in a sintering process at temperatures in excess of 1200°C; it can withstand continual thermal stress without damage.

Regular laboratory activities typically require extremely high or low temperatures.

When working with Bunsen burners, hotplates or samples from furnaces and dryers, work surfaces are exposed to high temperatures. On the other hand, laboratory work surfaces must be able to withstand nitrogen-cooled objects with temperatures below -196°C.

FRIDURIT Technical Ceramics exhibits permanent resistance to thermal influences. Its surface remains free of damage when in contact with hot crucibles or chemicals. Technical Ceramics is non-flammable and 100% fireproof.

The material is rated building material class A1 and therefore shows no risk of fire.

MICROBIOLOGICALLY CLEAN

Cleaning is crucial in laboratory applications. Laboratory benchtops made of FRIDURIT Technical Ceramics have a permanent solid surface providing the perfect working environment.

FRIDURIT work surfaces allow easy decontamination and disinfection. Their durable, scratch-resistant and non-porous surfaces do not provide a breeding ground for germs such as viruses and bacteria.

The durable soundness of work surfaces is decisive for laboratory users working with radioactive substances; it is extremely important to create conditions that guarantee reliable and safe decontamination. FRIDURIT Technical Ceramics is used in institutions where radioactivity is measured, such as the Regional Office for Environment and Radiation Protection. Such measurements may not be affected by changing radiation conditions in the working environment.

A smooth, sealed surface without damage guarantees hygienic conditions and prevents bacteria and other micro-organisms from getting into or growing on the surface. The ideal cleanability prevents the formation of nutrients on the surface.

ENVIROMENTALLY FRIENDLY

FRIDURIT Technical Ceramics is durable, fully recyclable and therefore particularly environmentally friendly and sustainable.

A decision for FRIDURIT Laboratory Technology is a decision for environmental responsiveness. Our products meet the highest national and international standards for safety, environmental protection and sustainability in laboratory construction projects.

Our products are manufactured solely from natural and recycled raw materials from the earth such as clay, kaolin and feldspar. As such materials contain no chemical components, they can be easily recycled at any time during the production process or disposed of after many years of use in laboratories.

FRIDURIT Technical Ceramics is a classic example of green building materials and is of great importance when implementing green building concepts. Concepts such as LEED or BREEAM increase the resource efficiency of buildings, at the same time reducing adverse effects on health and the environment. Laboratory users work on surfaces that are completely free of emissions and safe in every respect. FRIDURIT Technical Ceramics is non-flammable, reducing the risk of fire (building material class A1).

FRDURIT Technical Ceramics is produced in accordance with ISO standards for general process control (ISO 9001:2008), application of an energy management system (ISO 50001:2011) and compliance with environmentally relevant aspects (ISO 14001:2004).

MATERIAL PROPERTIES

PHYSICAL PROPERTIES

Property	Result	Unit	Standard applied
Raw density	2.24	g/cm³	DIN EN ISO 10545-3
Weight	65	kg/m²	
Scratch hardness	6	Mohs scale	DIN EN 15771
Crazing resistance	no crazing		DIN EN ISO 10545-11
Wear	Class 4		DIN EN ISO 10545-7

MECHANICAL PROPERTIES

Property	Result	Unit	Standard applied
Cold compression strength	159	MPa	DIN EN 993-5
Bending strength	42.1	N/mm²	DIN EN ISO 10545-4
Static modulus of elasticity	39	GPa	DIN EN 993-6

THERMAL PROPERTIES

Property	Result	Unit	Standard applied
Fire load	non-flammable, Euroclass A1		DIN EN 13501-1
Thermal conductivity	1.57	W/mK	DIN EN 821-2
Thermal expansion	$(\alpha_{25\text{-}400})$ $5.6 \cdot 10^{-6}$ $(\alpha_{25\text{-}800})$ $5.9 \cdot 10^{-6}$	K^{-1}	DIN 51045-2
Application temperature	up to 550 °C, temporary exposure up tp 800 °C		

CHEMICAL RESISTANCE

Property	Result	Description	Standard applied
Resistance to testing solutions (e.g. solution of hydrochloric acid and sodium hypochloride)	No visible effect on the test specimens.	Test samples made of FRIDURIT Technical Ceramics are exposed to testing solutions. The samples are examined visually after a specific period of time.	DIN EN ISO 10545-13
Resistance to staining (e.g. chrome green)	Stains can be completely removed with hot water (Class 5).		DIN EN ISO 10545-14

OPTICAL PROPERTIES

Silk finish surface in the current glaze colours. Other colours are available to special order.
Colour samples are available on request.

CHEMICAL RESISTANCE

	Reagent	Evaluation
01	Acetic acid (99%)	0
02	Acetic anhydride	0
03	Acetone	0
04	Acetonitrile	0
05	Acidrine orange	0
06	Alizarin complexone dihydrate	0
07	Ammonium hydroxide (28%)	0
08	Amylacetat	0
09	Aniline blue, water soluble	0
10	Benzene	0
11	Butyl alcohol	0
12	Carbol fuchsin	0
13	Carbon tetrachloride	0
14	Carmine	0
15	Chloroform	0
16	Chromium(VI)oxide (60%)	0
17	Congo red	0
18	Copper sulphate (10%)	0
19	Cresol	0
20	Crystal violet (gentian)	0
21	Dichlor acetic acid	0
22	Dichlormethane	0
23	Dioxane	0
24	Eosin B	0
25	Ethyl acetate	0
26	Ethylalcohol	0
27	Ethylene glycol	0
28	Ethyl ether	0
29	Ferric(III)chloride (10%)	0
30	Formaldehyde (37%)	0
31	Formic acid (99%)	0
32	Fuchsin (basic)	0
33	Furfural	0
34	Gasoline	0
35	Giemsa stain	0
36	Hydrochloric acid (10%)	0
37	Hydrochloric acid (37%)	0
38	Hydrofluoric acid	3.0
39	Hydrogen peroxide	0
40	Iodine solution (0.1 N)	0
41	Iodine (crystals)	0
42	Iodine (tincture)	0
43	Malachite green oxalate	0

	Reagent	Evaluation
44	Methylalcohol	0
45	Methylene blue	0
46	Methylethylketone	0
47	Methylisobutylketone	0
48	Methyl violet 2B	0
49	Mono Chlorbenzene	0
50	Naphtaline	0
51	n-Butyl acetate	0
52	Nitric acid (10%)	0
53	Nitric acid (20%)	0
54	Nitric acid (30%)	0
55	Nitric acid (65%)	0
56	Nitric acid (70%)	0
57	Nitric acid (65%) : hydrochloric acid (37%)	0
58	n-Hexane	0
59	Perchloric acid (60%)	0
60	Phenol	0
61	Phosphoric acid (85%)	0
62	Potassium iodite (10%)	0
63	Potassium permanganate (10%)	0
64	Safranine O	0
65	Silver nitrate (1%)	0
66	Sodium chloride (10%)	0
67	Sodium hydroxide (10%)	0
68	Sodium hydroxide (20%)	0
69	Sodium hydroxide (40%)	0
70	Sodium hydroxide (flakes)	0
71	Sodium hypochlorite (13%)	0
72	Sudan III	0
73	Sulphuric acid (10%)	0
74	Sulphuric acid (25%)	0
75	Sulphuric acid (33%)	0
76	Sulphuric acid (77%)	0
77	Sulphuric acid (85%)	0
78	Sulphuric acid (96-98%)	0
79	50% Sulphuric acid (77%): 50% Nitric acid (70%)	0
80	50% Sulphuric acid (85%): 50% Nitric acid (70%)	0
81	Tetrahydrofurane	0
82	Toluene	0
83	Trichlorethylene	0
84	Xylene	0
85	Zinc chloride (saturated)	0

TEST PROCEDURE

The chemical spot test was made by applying 5 drops of each reagent to the surface of each panel. The acids, bases, salts, specific chemicals and biological stains were covered with a watch glass concave side down to confine the reagent. The spot test of the solvents was tested as follows: A cotton wool ball was saturated with the solvent and placed on the surface. The cotton wool ball was covered by an inverted wide mouth bottle to retard evaporation. At the end of the 24-hour test period the chemicals have been removed by water and customary detergents, dried and valuated..

EVALUATION

0 No change in colour and/or gloss

3.0 Clear change in colour and/or gloss and etching and/or corrosion of the surface

FOR LABORATORY PERFECTION

FRIDURIT Laboratory Technology is a business section of KYOCERA Fineceramics Solutions GmbH. Laboratory benchtops and sinks made of Technical Ceramics, as well as fume scrubbers and neutralisation units are designed, manufactured and sold under the brand name FRIDURIT.

FRIDURIT laboratory benchtops and sinks made of Technical Ceramics have been tried and tested for a great many years and in a wide variety of laboratory environments. They are hallmarked by their extreme resilience, individual design and lasting good looks.

Due to its exceptional material density FRIDURIT Technical Ceramics is more scratch-resistant than all other materials used in benchtops and has a pore-free surface.

FRIDURIT has years of experience in decentralized waste-air treatment at the laboratory fume cupboard itself as well as neutralisation of acid and alkaline waste-water directly at the source of emission. Treatment of harmful substances from water and air at source ensures efficient work processes, preservation of the building substance and protection of the environment.

FRIDURIT stands for leading know-how in materials and innovative environmental technologies. Due to their extreme durability and suitability for recycling FRIDURIT products make a major contribution to sustainable manufacturing.

INNOVATIVE SOLUTIONS FOR THE GLOBAL MARKET

INNOVATIONS FOR MORE THAN 150 YEARS

With more than 150 years of experience in ceramic manufacturing, we offer a range of innovative solutions for many industries: system components for high technology applications in electrical and sensor technology, mechanical engineering, analytical technology, medical and semiconductor technology as well as laboratory technology. In the field of ceramic-to-metal assemblies we possess international leading know-how.

SPECTRUM OF INNOVATIVE SOLUTIONS

We see ourselves as a partner in the development of high-performance ceramic solutions, which give our customers added value and ensure their technological advantages. Our team advise comprehensive on the selection of ceramic materials, product design and project execution - from the development stage over the prototype fabrication to the serial.

PARTNER OF A POWERFUL COMMUNITY

Founded in 1863 in Mannheim as brickyard, known as “Deutsche Steinzeug” and later as “Friedrichsfeld GmbH”, the business area Ceramics continued its successful development. Since September 2019, we are part of the KYOCERA Corporation, a world-leading ceramic and technology company.

KYOCERA Fineceramics Solutions GmbH
Steinzeugstraße 92
68229 Mannheim / Germany
Tel.: +49 (0) 621 - 405 47 400
E-Mail: info@kyocera-solutions.de
www.kyocera-solutions.de

European Headquarters:

KYOCERA Europe GmbH
Fritz-Mueller-Strasse 27
73730 Esslingen / Germany
Tel.: +49 (0)711 - 93 93 4-0
E-Mail: info.fc@kyocera.de
www.kyocera.eu