

# Ceramic: a high-performance material with enormous potential for design appeal

Ceramic components are used increasingly in the design of equipment and machines. These components often go unnoticed, working somewhere in the background. While understated, ceramic is not only extremely rugged but also visually attractive. It stands out as the elite choice, when it comes to demand for design appeal. One example of such a component is a pushbutton ceramic switch made by Swiss company SCHURTER.



MSM 19 CS ceramic pushbutton switches

Today, ceramics are used in technical applications virtually everywhere. They are used in the construction of machines to protect against wear of the machine parts, as in press molds and cutting inserts; they can be found in home plumbing devices, such as bearings and shafts for hot-water circulating pumps; you will find them in automotive applications too, as is illustrated by their application in the disk brakes of high-performance luxury cars.

These examples illustrate that ceramic materials are in high demand when it comes to requirements for indestructibility. They exhibit particular resistance to the most varied power loads. They offer great mechanical stability, even at high temperatures, excellent resistance to acids and chemical bases, as well

as a high degree of hardness and wear resistance. These qualities are coupled with further advantages such as relative low weight, also the ability to withstand thermal shock and high electrical resistance.

Based on these advantages, ceramics used in technical applications are experiencing continual growth. This trend is based not only on the emergence of new markets, such as medical and energy technologies, but also because of the increasing demands on material properties in many other application areas. It is common today to expect that machines and systems will provide a long service life, which makes low-wear ceramic components ever more popular.

As varied as today's application areas are, they all have one thing in common: ceramic is working somewhere in the background. The background, however, needn't be the only area for technical ceramics to be used. Ceramics can also be very attractive from a visual standpoint. In fact, they are known for providing creative and exceptional design appeal coupled with functionality.

The Swiss component and systems manufacturer, SCHURTER, is taking advantage of these features and has developed a ceramic actuator. The matte, white material on its own is visually attractive. In addition, SCHURTER uses translucent

ceramics, which allows the actuator to be back-lighted, achieving uniform lighting across its entire surface. These flat, soft glowing lamps ultimately turn a switch into a true designer object.

The ceramic switches, with diameters of 19 mm and 22 mm, are available with a momentary switching or latching option. Standard and customized lettering or symbols can be placed on the illuminated surfaces, and inscriptions can either appear brighter or darker depending on the desired visual effect in their surroundings. Together with an exact actuation and a clicking sound, the changing colors give users a distinctly clear feedback. The inscription holds up well against scratching and common cleaning agents because it is applied directly on the ceramic with a laser.

These switches and pushbuttons are also rugged due to their front structure; their impact strength meets Protection Class IK07, making them vandal-proof. In addition, they meet the requirements of Protection Class IP69K and withstand high-pressure cleaning without suffering any damage. They stand up easily to the frequent use of cleaning agents, just as well as environmental influences. Added to this ruggedness, the switches are manufactured in Switzerland, a country known for its high expectations for quality. For instance, every switch is individually tested.

Their qualities shine especially where the demands on design and functionality are both equally high. This is why ceramic actuators are used to start motors in yachts, just as they are in bridge controls. When combined with a special steel alloy, a ceramic switch becomes corrosion-resistant and impervious to salt spray.



Customer-specific application of a ceramic pushbutton switch (source: KLAFS GmbH & Co. KG)

Because design appeal, together with rugged performance, is becoming increasingly important, is becoming increasingly important as a differentiating feature, the potential application areas are countless. They range from pushbuttons for lights and doorbells at home entryways to sanitary systems; from transportation vehicles to medical equipment and every kind of machine in between.

The ceramic actuator from SCHURTER is available in standard or customer-specific versions. In addition, ready-to-mount customer-specific electro-mechanics can be supplied, as well as sub-systems that incorporate not just the switches but additional electronic circuitry. In this way, SCHURTER is able to offer complete electronic manufacturing services (EMS).

The actuators from SCHURTER illustrate that ceramics for technical applications can be used in a wide range of areas, but they also point out the challenges this material brings with it. Processing ceramic is fundamentally different than doing so with metals or plastics. Consider that these other materials take their final

shape only at the end of the process. Ceramic, however, takes shape during the production of the material. This means that once ceramic has been fired, practically nothing about its shape can be changed due to its hardness. In addition, ceramic typically undergoes shrinkage due to the sintering process; the compression of the structure during sintering leads to a reduction in volume of as much as 30 percent.

An absolute prerequisite for the manufacturing of ceramic components is thus the mastery of ceramics manufacturing. This, in turn, also opens up an opportunity. SCHURTER, for instance, has been able to patent the use of ceramics for ceramic actuators.

Further information:  
[schurter.com/components/switches/metal-line-switches](http://schurter.com/components/switches/metal-line-switches)



## Company

SCHURTER continues to be a progressive innovator and manufacturer of electronic and electrical components worldwide. Our products ensure safe and clean supply of power, while making equipment easy to use. We offer a broad range of standard products including circuit protection, connectors, switches, EMC products and input systems, as well as electronic manufacturing services. Moreover, SCHURTER is ready to work with our customers to meet their application specific requirements, not covered in our standard range.

You can rely on SCHURTER's global network of companies and partners to guarantee a high level of local service and product delivery.

**SCHURTER Incorporated**  
 447 Aviation Boulevard  
 Santa Rosa, CA 95403  
 T: 707 636 3000  
 F: 707 636 3033  
[info@schurterinc.com](mailto:info@schurterinc.com)  
[www.schurterinc.com](http://www.schurterinc.com)