
A HIGH-TECH MATERIAL FOR THE WRIST

Lighter and harder than steel, fully scratch-resistant and with a mirror-like surface that is pleasantly smooth to the touch: This unique combination of properties makes ceramic the perfect material for watch cases. IWC is a pioneer in the field and has continually expanded the range of ceramics used over the years. The colored ceramic used for the TOP GUN Pilot's Watches is based on a combination of zirconium oxide and other metallic oxides.

Extremely durable, more lightweight than steel and with a hardness and scratch resistance that is only surpassed by diamonds: Thanks to these unique properties, ceramic is an excellent choice for the case of a mechanical watch. Of course, fragile porcelain isn't used for this purpose but instead specially developed engineering ceramics. These inorganic, non-metallic materials are highly resistant to physical or chemical influences. Even temperatures of over 1000 degrees Celsius cannot harm them. Outside of watchmaking, the range of applications for technical ceramics includes capacitors and dental implants and even extends to components for aircraft turbines and high-performance engines.

IWC WAS A PIONEER IN THE FIELD OF CERAMICS

IWC pioneered the use of ceramics for watch cases more than 30 years ago. In 1986, the Manufacture launched the Da Vinci Perpetual Calendar Chronograph (Ref. IW3755) in an innovative case made of black zirconium oxide ceramic. Later, brown silicon nitride ceramic for the Pilot's Watch Chronograph Edition "The Last Flight" (Ref. 3880, 2015) and black boron carbide ceramic for the Ingenieur Automatic Edition "AMG GT" (Ref. IW324602, 2015), the hardest type of ceramic, were also used. In recent years, this high-tech material has been incorporated into the Pilot's Watches range, mainly for TOP GUN models. These performance-oriented timepieces are engineered for daily use in the tight

confines of a jet cockpit and during long deployments on aircraft carriers. High resistance to scratches and corrosion are essential requirements, making ceramic a perfect material choice.

Technical ceramics are characterised by the purity of their raw materials and their highly complex manufacturing processes. The raw materials are polycrystalline powders – mostly minerals such as silicates, aluminium oxide or silicon carbide. They are mixed with several additives into a homogeneous mass, shaped and then treated in a furnace process at high temperatures. During this process, known as sintering, the auxiliary materials are volatilised, leaving behind extremely stable ceramic bodies consisting of countless microscopic grains.

A COMPLEX MANUFACTURING PROCESS

The production of ceramic cases for mechanical watches is a true feat of engineering. One challenge lies in the fact that ceramic shrinks by about a third during the sintering process. To ensure that the movement later fits precisely into the case, this shrinkage must be factored in as early as the design phase. Unlike metals, whose properties are clearly defined and finalised before machining, ceramics are influenced by the individual stages within the manufacturing process. As a result, different sintering methods, together with the chosen grain size and sintering temperature, can lead to end products with significantly different properties from the same basic materials.

**COMPREHENSIVE EXPERIENCE
WITH COLORS**

IWC has also experimented with different ceramic colors right from the start. As early as the 1980s, the company produced small series or prototypes in white, blue, green and even pink ceramic. The production of colored ceramic cases is a particularly demanding exercise. The sand-colored case of the Big Pilot's Watch TOP GUN Edition "Mojave Desert", the white case of the Pilot's Watch Chronograph TOP GUN Edition "Lake Tahoe" and the dark green case of the Pilot's Watch Chronograph TOP GUN Edition "Woodland" are each the result of unique formulas and sophisticated manufacturing processes.

One of many challenges is creating the final color shade, which is determined in close cooperation with engineers during countless tests to find optimal pigment mixtures for the color batches. An additional challenge comes from the fact that the final color must be precisely matched with other watch components, such as the dial or the bracelet.

To give the ceramic its color, zirconium oxide is combined with other metallic oxides. The raw materials and mixing ratio are different for each color shade. In addition, the manufacturing process and its specific conditions have to be adapted to the colored ceramic and its components – for example, the temperature and duration of the sintering process. Colored ceramics also place significantly higher demands on the purity of the raw materials. Whether sand-colored, white or dark green: Every colored ceramic case from Schaffhausen incorporates expert knowledge acquired over decades and the most refined engineering skills.

IWC SCHAFFHAUSEN

In 1868, the American watchmaker and entrepreneur Florentine Ariosto Jones travelled from Boston to Switzerland and founded the 'International Watch Company' in Schaffhausen. His visionary dream was to combine advanced American manufacturing methods with the craftsmanship of Swiss watchmakers to make the best pocket watches of his time. In doing so, he not only laid the foundation for IWC's unique engineering approach but also established the centralised production of mechanical watches in Switzerland.

Over its 150 year history, IWC Schaffhausen has developed a reputation for creating functional complications, especially chronographs and calendars, which are ingenious, robust, and easy for customers to use. A pioneer in the use of titanium and ceramics, IWC today specialises in highly engineered technical watch cases manufactured from advanced materials, such as titanium-aluminide and Ceratanium®. Preferring the principle of "form follows function" over decoration, the Swiss watch manufacturer's timeless creations embody their owners' dreams and ambitions as they journey through life.

IWC sources materials responsibly and takes action to minimise its impact on the environment, creating intrinsically sustainable timepieces that are built to last for generations. The company prides itself in training its own future watchmakers and engineers, as well as offering an excellent working environment for all employees. IWC also partners with organisations that work globally to support children and young people.

DOWNLOADS

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