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## THE MATERIALS

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Since the 1980s, IWC has developed a unique specialisation in the processing of innovative case materials. The manufacturer is also using high tech materials in its new TOP GUN line – Ceratanium® as well as black and sand-coloured ceramic.

In 1980, IWC launched the IWC Porsche Design Titanchronograph (Ref. IW3700), the first wristwatch with a case made from titanium. This was followed in 1986 by the Da Vinci Perpetual Calendar (Ref. IW3755), the first watch in the world to have a case made from black zirconium oxide ceramic. These feats of engineering marked IWC's first steps into developing its own innovative case materials.

Each material has specific properties and different advantages. Stainless steel, for instance, is rust-proof and easy to process. Titanium is lightweight and unbreakable but difficult to process. Ceramic is not susceptible to wear and is so hard that it can only be scratched with a diamond. The search for a material that satisfies both the functional and aesthetic requirements of a watch is a key component of the engineering approach at IWC.

The Schaffhausen-based manufacturer is now taking its material innovations one step further: Ceratanium® (**ceramized titanium**) is a material developed by IWC that combines the outstanding advantages of titanium and ceramic in a groundbreaking new material. The base material, a special titanium alloy, is as lightweight and unbreakable as titanium. Its treated surface, however, is just as hard and scratch-resistant as ceramic.

The starting material for Ceratanium® is a special titanium alloy. The manufacturing process for this alloy involves multiple stages and is extremely complex, as the raw material must have an extremely high degree of purity. The blank is initially machined to give the various case components their final shape. This is followed by a furnace process. During this process, oxygen diffuses into the material, a phase transformation takes place and the surface of the metal becomes ceramic. With this special surface finish, the material not only takes on the typical properties of ceramic such as extreme hardness and scratch resistance, but also develops a striking, matte black colour. In contrast to conventional coating procedures used today such as DLC, which can separate from the carrier or flake off, the ceramic surface of Ceratanium® adheres permanently to the material. It therefore does not separate, even if the watch is somehow knocked.

As well as its optimum material properties, what characterises Ceratanium® is its matte black colour. It therefore also fulfilled customers' desire for a completely jet black look watch at the start of the five-year development process. For the first time, Ceratanium® will be used for a pilot's watch in the new TOP GUN collection and it will also be the first time IWC has used this material for an unlimited watch. In the Pilot's Watch Double Chronograph TOP GUN Ceratanium (Ref. IW371815), all case components, including accessories such as the chronograph push-buttons or the pin buckle, are made from Ceratanium®. This gives the watch a completely jet black design.

Cases made from black zirconium oxide ceramic have been one of the main identifying features of the TOP GUN Pilot's Watches since 2007. You could say that ceramic was predestined for use in watch cases. It has a velvety feel and doesn't get cold in winter. The greatest advantage of this material, which is also used in medical technology and aerospace, is that it is almost completely unsusceptible to wear and is extremely hard and scratch-resistant. IWC uses black zirconium oxide ceramic in its new TOP GUN line for the Pilot's Watch Chronograph TOP GUN (Ref. IW389101) and the Pilot's Watch Automatic TOP GUN (Ref. IW326901).

Polycrystalline powders such as silicates, aluminium oxide or silicon carbide form the basis of the technical ceramic used in watches. With the addition of various auxiliary materials, they are mixed to form a homogeneous mass, moulded into shape and fired in a furnace at high temperatures. During this sintering process, the auxiliary materials evaporate to form extremely stable ceramic bodies made up of countless microscopic particles. The challenge lies in the fact that the ceramic shrinks by around a third during the firing process. In order for the movement to fit precisely into the case while adhering to strict tolerances, this shrinkage must be taken into account during the design phase, as sintered ceramic is extremely difficult to process. A ceramic watch therefore requires a completely different design.

Over the years, IWC has continuously experimented with new ceramics and launched watch cases made from black boron carbide high-performance ceramic or brown silicon nitride ceramic. With the Pilot's Watch Chronograph TOP GUN Edition "Mojave Desert" (Ref. IW389103), the manufacturer presents a case with a sand-coloured ceramic for the first time. The striking material is inspired by the Mojave Desert, home to the Naval Air Weapons Station China Lake – the largest land area of the U.S. Navy. The colour, which perfectly matches the uniforms worn by Navy pilots, is the result of a combination of zirconium oxide with other metallic oxides. The challenge here is producing a consistent colour for all components of the case throughout the entire multi-stage manufacturing process.

*Ceratanium® is a trademark of IWC Schaffhausen, registered in numerous countries throughout the world.*

**IWC SCHAFFHAUSEN**

With a clear focus on technology and development, the Swiss watch manufacturer IWC Schaffhausen has been producing timepieces of lasting value since 1868. The company has gained an international reputation based on a passion for innovative solutions and technical ingenuity. One of the world's leading brands in the luxury watch segment, IWC crafts masterpieces of Haute Horlogerie at their finest, combining supreme precision with exclusive design. As an ecologically and socially responsible company, IWC is committed to sustainable production, supports institutions around the globe in their work with children and young people, and maintains partnerships with organisations dedicated to environmental protection.

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