

# AN ALLERGIC MATERIALS, WATCHING OUT FOR HUMAN HEALTH

Richard Mille has made composites one of the new standards in luxury. Some 20 years ago, they were among the most exotic novelties in watchmaking. Mastering the many challenges of using ultra-technical materials is an art, but also a science, especially when it comes to ensuring their absolute safety and comfort.

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PHOTOGRAPHY DIDIER GOURDON



Green Quartz TPT<sup>®</sup> is first reduced to a powder (in vial) before being dissolved into a liquid state for analysis



## REACH PERFECT

Gold and brass, used since the dawn of the Swiss mechanical watch manufactures, and more recently platinum have graced the wrists of millions of wearers since the wristwatch appeared in the late 19<sup>th</sup> century. The same cannot, of course, be said for titanium, ceramic or carbon (except of course in the form of diamonds), all extensively used by Richard Mille in designing the modern movements and cases of the collection. Before the brand, very few watchmakers ventured to mix traditional savoir-faire with today's technology. Convinced that perceived value is no longer expressed through weight, but through the technical challenge of successfully developing new materials and giving them an aesthetic and absolute character, Richard Mille has determined to ceaselessly push the boundaries of the discipline.

But because the brand has one foot in the 19<sup>th</sup> century and one in the 21<sup>st</sup>, it had to come up with the most viable solutions. Its research and development team cannot in good conscience machine and market a new composite, even one that appears technically spectacular on paper, without ensuring that there are no health risks. Most of these cutting-edge materials come from the largest and most advanced industries, fields that have shaped our era, like aerospace, medical devices and car racing, where they have demonstrated their benefits in terms of strength and lightness, resistance and durability. However, what can be used in these fields must in many cases be subjected to more specific laboratory tests in the case of the watch industry.

The brand has always been diligent where risks to public health are concerned, because a watch is in direct and permanent contact with the skin. Watches also withstand a lot of physical stressors such as UV rays,

Glass-bottled Quartz TPT® and  
Carbon TPT® samples ready to pass  
an exhaustive battery of tests





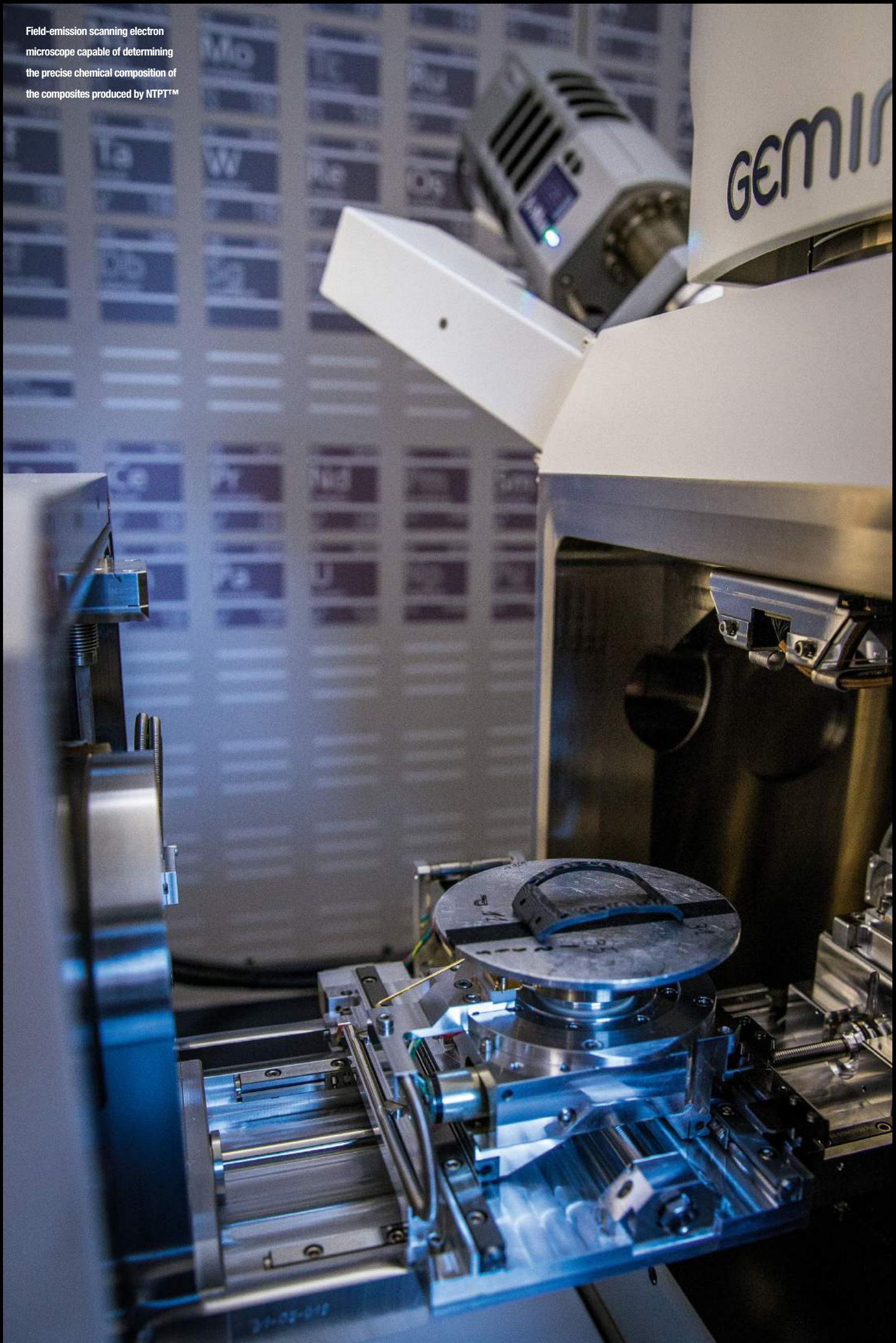
heat, moisture and even acidity from sweat. Their cases, if not rigorously tested, can cause severe skin reactions. This sanitary aspect is as important for the brand as the ergonomics of design, which are, of course, also a focus. From the beginning, the choice to work with grade 5 titanium cases made it possible to not only provide our customers with a product which is light on the wrist, but also to work with a biocompatible material that is perfectly tolerated by the body. Titanium provokes no reaction from the immune system. The same is true for ATZ and TZP ceramics, which are chemically inert materials. Heated to more than 1000 °C, the pigments Richard Mille employs in these materials do not present any hazards.

Such concern for health risks has not always been prominent in the watch industry. Some products used extensively for long periods had the potential to seriously affect health. To take but one example, we may consider the fluorescent materials used to make hands and dials glow in the dark. During the first half of the 20<sup>th</sup> century, watch manufacturers used radium-226. The substance had to be abandoned because of clear risks from radiation, though it was only banned in the 1960s. Still today, materials such as promethium-147 and

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Field-emission scanning electron microscope capable of determining the precise chemical composition of the composites produced by NTP™



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especially tritium are still used in the watch industry. Even encapsulated, radioactivity is always there. Rest assured, however, the Swiss Super-Luminova®, based on strontium aluminate, and all the pieces that make a Richard Mille watch are harmless!

In its quest to find relevant technical solutions, the brand has invested heavily in the development of ultra-technical materials for nearly two decades. This involves extensive laboratory testing to prove that a new material is safe for health under all conditions. Richard Mille never brings a new material to market unless it complies with REACH norms (Registration, Evaluation, Authorization and Restriction of Chemicals), regulations that apply to all chemical substances used in daily life, such as clothing, furniture and electrical appliances. Some tests required by the European Union are very demanding and require considerable human and financial investment. To pass all these tests, particularly for materials based on TPT® technology, the brand relies on an independent laboratory, Metallo-Tests SA, which is ISO / CES 17025 compliant. This standard qualifies them to produce subcontracted tests, calibration or inspection results in a fair and reliable manner. Metallo-Tests is fully able to meet the requirements of REACH and RoHS (Restriction of Hazardous Substances) as well as other customer requests. Based at La Chaux-de-Fonds, 20 minutes by car from the Richard Mille facilities, this laboratory employs a dozen young and dynamic individuals, recognised for their highly specialised skills; among them are chemistry PhDs, chemical engineers, material science engineers, metallurgists, laboratory technicians and metallurgical laboratory assistants. 'Richard Mille and NTPT™ work closely with Metallo-Tests to ensure that products have a hypoallergenic risk of zero, and are capable of withstanding any and all conditions,' says Aurèle Vuillemier, R&D manager at Richard Mille. 'One must never forget, a Richard Mille watch must be able to face all circumstances, even the most extreme.'

When a new TPT® composite is developed, safety is a key parameter from the beginning, starting with pigment selection, conducted by the material development team. After UV light resistance has been verified, pre-preproduction cases in the new Quartz TPT® are assembled. It is at this stage that the chemical substances are checked. Only then is the product validated by Richard Mille. The factory processes ensure that the quality achieved during the development stage is upheld at the level of series production. The certificate of conformity delivered with each watch is the guarantee of our commitment. At the manufacture, REACH tests are conducted on random samples, and the chemical analysis is

regularly repeated, typically once a year, to ensure continued safety.

The inspection concerns both fibres and resins. Concentrations of different substances listed by REACH are measured to ensure they fall within the REACH limits. At Metallo-Tests, very sensitive methods are applied with a very low detection limit. To give an idea of the order of magnitude, the laboratory would be able to identify traces of a lump of sugar dropped into Lake Geneva! Thanks to this complex and costly process, Richard Mille is able to ensure that all TPT® composites comply with worldwide legislation concerning chemical substances and do not contain any products at risk of producing skin allergies. With 5,300 watches made of TPT® composites produced and sold to date, only two cases of skin irritation due to the material itself have been reported. This represents 0.03% of the brand's global production. Such reactions are to be expected given the range of variation in the human skin. In fact, some people even have allergic reactions to gold, which is considered a noble metal (in the chemical sense) for its lack of reactivity.

Every day, Richard Mille is hard at work testing new composites and alloys, some of which were unknown a few years or months ago. In fact, the brand is often breaking new ground in laboratory research on various aspects of the components assembled in the movements. 'Either we make things well or we don't make them at all' is one of Richard Mille's personal and professional mottoes. Just as he hasn't waited for consumers to demand that the company behave responsibly, he likewise forges ahead in making sure that his watches are continuously perfected in terms of their safety for human health.