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All Is Revealed

Skeleton watches enter the 21st Century with cutting-edge, from-the-ground-up technology that heightens the drama of their see-through construction

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Roger Dubuis Excalibur Spider Skeleton Flying Tourbillon

The spectacle of seeing into the works of a watch has enticed enthusiasts since André Charles Caron, clockmaker to France's Louis XV, came up with the skeleton, or open-worked, concept in the mid-18th century. Now, this genre that exalts the purest expression of the micromechanical art form is being transformed with modern technology and high-tech materials to yield some of the airiest, edgiest watches we've ever seen from major brands and small independent producers alike.

A major breakthrough with modern skeletonization reverses the design process. For centuries, creating a skeleton watch was a delicate affair that involved cutting away all but the most essential elements required for the watch movement to function, but not so much that the movement's stability was compromised. Plates and bridges were pared down to expose the wheels and gears. Curvilinear forms created a latticework that was embellished with frilly engraving. Today's skeletons, by contrast, are designed and built from scratch using computer technology that calculates for maximum visual impact with plenty of light flowing through spans of clear crystal. These minimalist movements, enhanced with modern materials, are robust enough to power a sport watch, something that would have been unheard of decades ago.

Laying a movement bare in such a way invites heightened scrutiny of the quality of the finishing of every component, the telltale sign of exceptional craftsmanship in any watch. If the finishing and decoration is not up to snuff, it will show. Today's preference for straight, sharp lines and contemporary finishes make hiding even tiny imperfections a daunting prospect.

When Roger Dubuis set out to design a modern skeleton for 2008, the brand had a slight advantage. All of its watches are produced to the exacting standards of the Geneva Seal, which requires specific finishing techniques for components whether or not they are seen.

Having declared 2015 "year of the skeleton," the Geneva brand introduced a range of Excalibur skeleton models. One is powered by a new automatic movement that incorporates the brand's signature star-shaped framework and a spinning open-worked micro-rotor. According to Gregory Bruttin, the brand's director of movement development, the wheel of a motorcycle inspired the star motif, but the distinctive architecture also resembles a spiderweb, one of nature's most resilient structures. "We wanted the thinnest possible bridges with maximum resistance," he says. "Before, the watchmaker would cut away to have the smallest bridge, while the modern skeleton is designed by an engineer who calculates the optimal resistance for the materials. It's the reason why it's possible now to put a skeleton in a sport watch." Dubuis's complicated Excalibur Spider collection expands the skeletonization to the case, hands and flange of a sporty flying tourbillon (\$159,000) and a double flying tourbillon (\$298,500) in a titanium and black DLC case with red aluminum accents.

As Cartier demonstrates with its ethereal Rotonde de Cartier Astrotourbillon Skeleton (price upon request), maximizing negative space creates the captivating effect that the movement is floating in the middle of the case. The brand's watchmaking visionary Carole Forestier-Kasapi conceived the novel mechanism. "It's a reinterpretation of a very classical, very old complication," she said when the Astrotourbillon launched in 2010. "I wanted to create a magic tourbillon." The Astrotourbillon indeed presents a mesmerizing creative expression of the regulating mechanism by separating the elongated carriage from the movement and placing it above the dial where the balance does double duty as a second hand, completing a full revolution every minute. The skeleton version intensifies that sense of awe by dispensing with the dial altogether, suspending the movement in full view between clear crystal plates and anchoring it with the brand's hallmark Roman numerals 12 and 6 at the top and bottom.

The Astrotourbillon movement was also the brand's first commercial mechanism to incorporate carbon crystal, a synthetic diamond material developed for Cartier's breakthrough ID One and ID Two concept watches. Used for the tourbillon bridge, escape wheel and palette fork, carbon crystal allows the escapement to function without the need for lubricants, making it one of modern watchmaking's greatest technological advancements.

Hysek also took a minimalist turn with a new version of its IO Skeleton Tourbillon (\$104,900), which has been downsized to 45 mm and embellished with a golden sunburst on the clear case back that accentuates the light play throughout the watch. The Roman-numeral hour markers appear on the sapphire crystal for a streamlined effect. Another version goes clearer with engraved numerals on the reverse of the crystal. Pared down to its essence with only 164 components, the manual-winding HW14 calibre's asymmetrical layout with the barrel at 7 o'clock and the tourbillon at 11 o'clock is a brand signature.

Conversely taking a more-is-more approach, Blancpain pairs two historic regulators—a flying tourbillon and a flying carousel—in the L-evolution Tourbillon Carrousel (\$373,130). The limited edition of 50 pieces is a brawny, futuristic update to 2013's classical Tourbillon Carrousel with a tweaked movement that has been open-worked with multiple layers. The asymmetric bridges and baseplate are treated with a frosted finish and NAC coating, turning them dark using a galvanic process. The two regulators, each powered by its own barrel, have a shared purpose of limiting the effect of gravity on timekeeping performance. Two differentials serve to average the devices' running rates and track the power reserves visible through the case backs. The dense 47.40-mm platinum case gives the watch the heft to match its hard-edged Terminator-style personality and presents an aggressive new face for a brand that is typically reserved.

A newcomer to the Swiss watch scene, Manufacture Royale is a small watchmaker that took the name of a long-defunct watchmaking atelier founded in 1770 by the French philosopher and literary figure Voltaire. Reborn in 2010, the boutique house blends traditional and modern aesthetics in three collections with a dedication to fine finishing. When cloaked in a black PVD finish with the movement parts coated in black ruthenium, the steel Androgyne Origine (\$67,800) flying tourbillon exudes a hip steam-punk vibe, thanks to its unusual 52-part case that combines round and square forms with articulated lugs that flex to hug the wrist.

SWISS COMPLICATION

The Eiffel Tower's graphic latticework comes to mind when taking in the cutaway angles of the cage-like, 46-mm case of Graff's MasterGraff Structural Tourbillon Skeleton, available in full black titanium or titanium coated with black or chocolate DLC and combined with rose gold (prices upon request). The British jewelry house famed for its magnificent diamonds is another new player in the watch realm. It launched its watch collection in 2009, partnering with such Swiss movement specialists as MHC Manufacture Haute Complication and Concepto to produce proprietary Graff mechanisms. The new Graff Calibre 6 skeletonized, hand-wound, tourbillon movement is at the heart of the MasterGraff Structural Tourbillon Skeleton. There is also a diamond version, glittering with more than 20 carats in a distinctive, patented Invisible Structure Setting.

Romain Jerome took on the challenge of creating a minimalist movement structure with maximum white space for its first skeleton, the Skylab. The watch has been upsized this year to a whopping 48 mm, with a thinner case for comfort. The five-layer skeleton movement was designed to be evocative of the '70s-era space station. The brand has established a practice of incorporating esoteric materials from surprising sources (past examples have included moon dust and metal from the *Titanic*). Now, the PVD-coated steel Speed Metal version (\$20,950) has a bezel containing steel from the Apollo 11 spacecraft.

The use of exotic high-tech materials, many derived from Formula One racing and aerospace industries, has been a hallmark of Richard Mille's oeuvre since he launched his namesake brand in 2001. A founding father of the modern skeleton watch, Mille's entire lineup is skeletonized with the exception of a single model. Several recent designs incorporate NTPT (North Thin Ply Technology) carbon, a remarkably strong and light composite utilized in the sails of America's Cup racing yachts, F1 racecars and aircraft. The material is composed of multiple thin layers of carbon fibers impregnated with resin. It exhibits characteristic undulating patterns that result from a weaving process that alternates the direction of the fiber's weave. This multidirectional weaving endows it with strength and rigidity throughout. The varying patterns ensure that each watch is one of a kind. Last year, Richard Mille used the material for the case of a special-edition RM 022 Tourbillon Aerodyne Dual Time Black Carbon (\$480,000), which is limited to 10 pieces exclusively available in the brand's U.S. boutiques. Introduced in 2010, the RM 022 movement also stands out with its use of an orthorhombic titanium aluminide alloy. The honeycomb-patterned material, prominent on the movement's baseplate, was originally developed for the production of supersonic aircraft wings.

Forged carbon, another superlight material borrowed from the aerospace industry, was Bell & Ross's choice for a new case to lighten up 2014's BR-X1, a sporty square chronograph named for the Bell X-1, the experimental rocket-powered American plane, which first broke the sound barrier in 1947. The BR-X1 Carbon Forgé (\$23,000) showcases the skeletonized chronograph movement in a monobloc, forged-carbon case that is nonporous, water resistant and distinguished by a variable marbled pattern that makes each of the 250 pieces unique. Forged carbon is produced through a patented process that compresses the carbon fibers with a thermosetting resin at high temperatures in a steel mold. In a nod to its namesake, the chronograph's upper bridge is shaped like an X and coated with black DLC, while the chronograph's minute timer features an ultralight aluminum disc evoking the spinning blades of a turbine. The central second counter displays quarters of seconds allowing you to calculate speed using the tachymeter scale that encircles the dial.

Bulgari's striking Tourbillon Saphir Ultranero is another black beauty that has undergone an avant-garde facelift this year. Since the model launched in 2011, there have been several incarnations of this limited edition that pairs the GG 8000 classical tourbillon mechanism in an oversize, crystal-intensive case. This year's model (\$198,000 and limited to 30 pieces) is reinterpreted in jet-black DLC-coated titanium, which provides a supporting structure for panes of sapphire crystal on all sides. But what truly enlivens this see-through tourbillon is the use of glow-in-the-dark bright green SuperLuminova for the dot hour markers, the open-worked hands and vertical micro-tubes that surround the drum-like 53-mm case. Visible screws around the exterior secure the case. "As a collector's item, it has the freedom to be extremely daring, expressing a masculine creativity that is surprisingly powerful," says Guido Terreni, managing director of Bulgari Watches. "It is built around the idea of a complete see-through watch, from the top, from the bottom and from the side to give an extraordinary feeling of lightness. Its look in the dark is the final touch that excites whoever is exposed to it."

By contrast, Hublot's Classic Fusion Tourbillon Titanium Vitrail (\$103,000) radiates color with natural light, much like Marc Chagall's vivid stained-glass windows in Zurich's Fraumünster church. Hublot's watchmakers use a Swiss-made, high-tech glass that filters different frequencies of light to create a miniature stained-glass window within the confines of the 45-mm, black-ceramic or titanium case. The slivers of durable glass are precisely laser cut to the nearest micron and fitted into the framework's 15 tiny openings. Hublot promises countless possibilities for customization. Not only do choices include 10 different colors, each in several shades, but the technique can be applied with such materials as ceramic, gemstones and even slivers of wood. Still, the translucent stained-glass window dial offers a novel altar for worshipping the HUB6017 skeleton tourbillon movement with its 251 components, merging artistry and technology in a spectacle that epitomizes the ingenuity of next-generation skeletons.

Laurie Kahle writes frequently for Cigar Aficionado on watches and travel.

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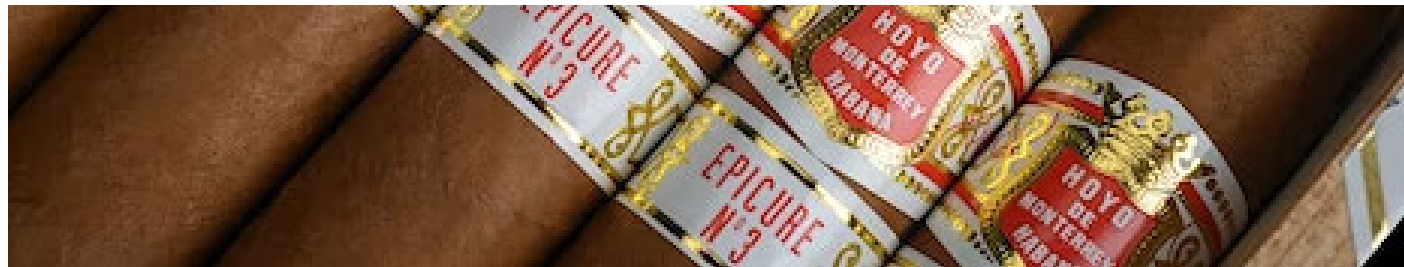
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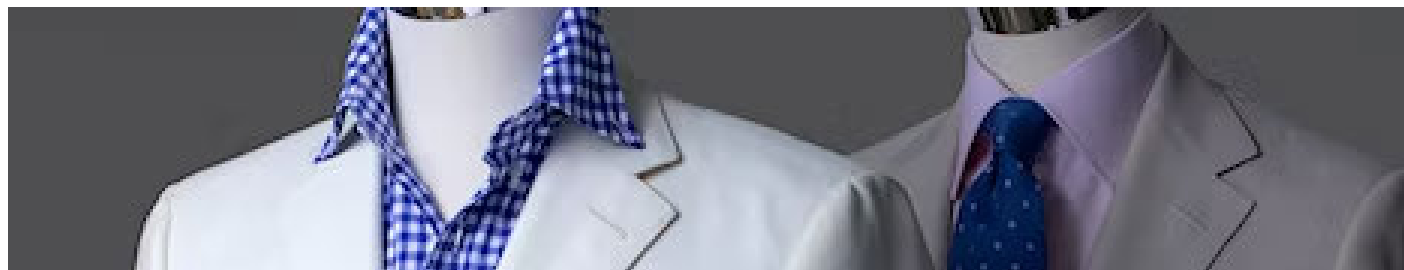
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