Horological machine n°9 ‘flow’

Aerodynamic horology

In the post-war years of the late 1940s and 1950s, aerodynamic principles were just beginning to take root in the field of automotive design. The boxy, carriage-like shapes of previous decades were melting into something more streamlined. At the same time, curvilinear forms became more prominent, carrying the immediate promise of power and speed. The sophisticated computer modelling and wind-tunnel technology we have today were far-off dreams at that time – designers were guided more by their aesthetic sense than by any scientific precepts.

The result was some of the most beautiful man-made objects ever created, epitomised by automobiles like the Mercedes-Benz W196 and 1948 Buick Streamliner. Other industries followed, notably that of aviation, producing aircraft such as the sleek-bodied, snub-nosed De Havilland Venom that patrolled Swiss airspace for 30 years.

Presenting Horological Machine N°9 ‘Flow’, inspired by the dynamic profiles of automotive and aviation mid-century design.

Reminiscent of a jet engine, a highly complex titanium case in alternating polished and satin finishes encloses an equally complex manual winding movement, developed fully in house. Independent twin balance wheels beat at a leisurely 2.5Hz (18,000bph) on each flank of Horological Machine N°9, visible under elongated domes of sapphire crystal. A third pane of sapphire crystal on the central body reveals the gearbox of the HM9 engine: a planetary differential that averages the output of both balance wheels to provide one stable reading of the time.

Sitting perpendicular to the rest of the HM9 engine is the dial indicating hours and minutes, driven by conical gears that ensure precise engagement even when motion is put through a 90° planar translation. The winding and setting crown is located on the rear of the central body, its deep fluting providing ergonomic grip as well as aesthetic coherence with the overall design.

Two satin-finished air scoops are mounted alongside the pods containing the oscillating balance wheels, evoking the raised vents that allow continuous airflow to high-performance motor engines.

HM9 Flow treads the path first opened by the HM4 Thunderbolt and subsequently by the HM6 Space Pirate, utilising a geometrically complex combination of milled sapphire crystal and grade 5 titanium case elements. However, HM9 goes beyond its predecessors, redefining what was thought to be possible in case design – illustrated for example by a patented three-dimensional gasket ensuring water resistance.

**Horological Machine N°9 ‘Flow’ debuts in two titanium editions limited to 33 pieces each:**

**- the ‘Air’ edition comes with a dark movement and aviator-style dial;**

**- the ‘Road’ edition has a rose gold plated movement and a classic speedometer-style dial.**

# HM9 Flow in detail

## At the outer limits of design

A lifetime car aficionado, MB&F founder Maximilian Büsser first channelled the visual cues of the mid 20th century in the 2014 HM6 Space Pirate, particularly in its “Streamliner” SV editions. Now in 2018, MB&F goes even further and presents one of its most ambitious designs yet.

Horological Machine N°9 ‘Flow’ is audacious in its design, not simply because of its unconventional form, but because of the extremes to which it takes this form. Mould-breaking, transgressive case shapes are nothing new to the MB&F Horological Machine collection, but HM9 has rejected all limits. Its extreme curves and acute angles required new manufacturing standards and techniques to obtain a complete milled and finished case.

Horological Machine N°9 ‘Flow’ was not designed with current manufacturing techniques in mind. Its curves are too pronounced and its finishing requirements too strict.

When the MB&F team first brought the HM9 designs to their manufacturing partners, the response was quick and unambiguous: these designs could not be realised. Other cases, such as the undulating shell of the HM6 Space Pirate, were geometrically complex, but their maximum height differential (the vertical distance between contiguous points) remained within 5mm. With HM9, that differential doubled, creating radical curves that give the case its highly tactile presence.

These steep curves are paired with slim bands of mirror polish and wider swaths of satin finish, raising issues when finishing tools of fixed diameter (say 10mm or more) had to somehow navigate the narrow channels of the case exterior. Adjusting the placement of different finishes in order to accommodate the finishing tools was not an option, as this would have diminished the full-volumed aesthetic of HM9.

The dramatic geometry of Horological Machine N°9 ‘Flow’ could only be supported by equally dramatic contrasts of finished surface, so manufacturing conventions evolved to meet the demands of HM9.

Because of the proportions of the curves on the HM9 case, it was essential to control the overall size. Horological Machine N°9 ‘Flow’ measures 57mm at its widest point and requires a highly compact yet robust engine. Perhaps the most interesting aspect of HM9 is how its exuberant, expressive design is possible only because of the restraint and spatial efficiency of its engine.

The wide-to-narrow alternating arrangement of the three primary volumes of the HM9 case made it impossible to install the movement by conventional means, within a case with limited transverse symmetry. It was necessary to divide the case along two axes and devise an unprecedented three-dimensional gasket for water resistance. This patented innovation is completely novel in its execution throughout the watchmaking industry.

## About the HM9 engine

The result of three years of development, the HM9 engine was created entirely in-house, with the accumulated experience that came with MB&F’s 13 years in existence (in 2018) and previous 14 different movements.

Long-time MB&F collectors and fans will recognise the mechanical pedigree of the HM9 engine. Its double-balance with differential is descended from the similar system in Legacy Machine N°2, albeit in vastly different aesthetic form. Whereas LM2 emphasised design purity and the hallucinatory effect of its suspended oscillators, HM9 is exultant in its celebration of expressive design.

The twin balance wheels of the HM9 engine feed two sets of chronometric data to a central differential for an averaged reading. The balances are individually impulsed and spatially separated to ensure that they beat at their own independent cadences of 2.5Hz (18,000bph) each. This is important to ensure a meaningful average, just as how a statistically robust mathematical average should be derived from discrete points of information.

Two balances beating within the same movement will inevitably bring up discussions of resonance, the mechanical phenomenon that describes linked oscillators in a state of mutual harmonic excitation. As with the LM2 engine, HM9 deliberately avoids inducing the resonance effect. Its purpose in including two balance wheels is to obtain discrete sets of chronometric data that can be translated by a differential to produce one stable averaged reading. This purpose would be defeated by two balances oscillating perfectly in phase, giving the same chronometric data at every point.

HM9 further calls out the MB&F Legacy Machine collection with the curved arms anchoring its balances, their polished steel finish contrasting vividly with the movement bridges. There are two versions of the HM9 engine, one with a dark NAC coating and another in matte rose gold coating.

# HM9 Flow – Technical specs

**Two launch editions of Horological Machine N°9 ‘Flow’ in grade-5 titanium, limited to 33 pieces each:**

**- Road edition with rose gold plated movement and speedometer-type dial;**

**- Air edition with darkened NAC movement and aviation-style dial.**

### Engine

Manual-winding in-house movement

Two fully independent balance wheels with planetary differential

Frequency: 2.5Hz (18,000bph)

Single barrel with 45-hour power reserve

301 components, 44 jewels

Hours and minutes on vertical dial display

### Case

Grade-5 titanium

Dimensions: 57mm x 47mm x 23mm

43 components

Water resistant to 3ATM (30m); assembled in three segments with patented three-dimensional gasket

### Sapphire crystals

Five sapphire crystals treated with anti-reflective coating

### Strap and buckle

Hand-stitched brown calf-leather strap with custom-designed titanium folding buckle

# Friends responsible for HM9 Flow

*Concept:* Maximilian Büsser / MB&F

*Design:* Eric Giroud / Through the Looking Glass

*Technical and production management:* Serge Kriknoff / MB&F

*R&D:* Guillaume Thévenin, Ruben Martinez and Simon Brette/ MB&F

*Movement development:* Guillaume Thévenin / MB&F

*Case:* Aurélien Bouchet / AB Product

*Sapphire crystals:* Sylvain Stoller / Novo Crystal

*Anti-refection treatment for sapphire crystals*: ECONORM

*Precision turning of wheels, pinions and axes:* Rodrigue Baume / Horlofab, Paul André tendon / BANDI, Jean-François Mojon / CHRONODE, AZUREA, ATOKALPA

*Springs:* Alain Pellet / Elefil Swiss

*Balance wheels:*  ATOKALPA

*Balance spring*: Stefan Schwab / Schwab-Feller

*Plates and bridges:* Benjamin Signoud / AMECAP

*Hand-finishing of movement components:* Jacques-Adrien Rochat and Denis Garcia / C.-L. Rochat

*Hands:* Pierre Chillier, Isabelle Chillier and Marcos Zamora / Fiedler

*Three-dimensional gasket* :  A. AUBRY

*Buckle:* Dominique Mainier / G&F Châtelain

*Crowns*: Aurélien Bouchet / AB Product

*Dials (discs for hours - minutes):* Hassan Chaïba and Virginie Duval / Les Ateliers d’Hermès Horlogers,

*Movement assembly:* Didier Dumas, Georges Veisy, Anne Guiter, Emmanuel Maitre and Henri Porteboeuf / MB&F

*In-house machining:* Alain Lemarchand and Jean-Baptiste Prétot / MB&F

*Quality control:* Cyril Fallet / MB&F

*After-Sales Service:* Thomas Imberti / MB&F

*Strap:* Olivier Purnot / Camille Fournet

*Presentation box:* Julien Berthon / ATS Atelier Luxe

*Logistics and production:* David Lamy, Isabel Ortega and Raphaël Buisine / MB&F

*Marketing & Communication:* Charris Yadigaroglou, Virginie Toral and Juliette Duru / MB&F

*M.A.D.Gallery:* Hervé Estienne / MB&F

*Sales:* Rizza Naluz, Stéphanie Rea, Thibault Verdonckt and Jean-Marc Bories / MB&F

*Graphic design:* Samuel Pasquier / MB&F, Adrien Schulz and Gilles Bondallaz / Z+Z

*Watch photography:* Maarten van der Ende

*Portrait photography:* Régis Golay / Federal

*Webmasters:* Stéphane Balet / Nord Magnétique, Victor Rodriguez and Mathias Muntz / Nimeo

*Film:* Marc-André Deschoux / MAD LUX

*Texts*: Suzanne Wong / REVOLUTION Switzerland

MB&F – Genesis of a Concept Laboratory

In 2015, MB&F celebrated its 10th anniversary – and what a decade it was for the world’s first ever horological concept laboratory: 10 years of hyper-creativity; 11 remarkable calibres forming the base of the critically acclaimed Horological Machines and Legacy Machines for which MB&F has become renowned.

After 15 years managing prestigious watch brands, Maximilian Büsser resigned from his Managing Director position at Harry Winston in 2005 to create MB&F – Maximilian Büsser & Friends. MB&F is an artistic and micro-engineering laboratory dedicated to designing and crafting small series of radical concept watches by bringing together talented horological professionals that Büsser both respects and enjoys working with.

In 2007, MB&F unveiled its first Horological Machine, HM1. HM1’s sculptured, three-dimensional case and beautifully finished engine (movement) set the standard for the idiosyncratic Horological Machines that have followed: HM2, HM3, HM4, HM5, HM6, HM7, HM8 and HMX – all Machines that tell the time, rather than Machines to tell the time.

In 2011, MB&F launched its round-cased Legacy Machine collection. These more classical pieces – classical for MB&F, that is – pay tribute to nineteenth-century watchmaking excellence by reinterpreting complications from the great horological innovators of yesteryear to create contemporary objets d'art. LM1 and LM2 were followed by LM101, the first MB&F Machine to feature a movement developed entirely in-house. The year 2015 saw the launch of Legacy Machine Perpetual featuring a fully integrated perpetual calendar. LM SE was launched in 2017. MB&F generally alternates between launching contemporary, resolutely unconventional Horological Machines and historically inspired Legacy Machines.

As well as Horological and Legacy Machines, MB&F has created space-age MusicMachines (1, 2 and 3) in collaboration with music box specialist Reuge; and with L’Epée 1839, unusual clocks in the form of a space station (Starfleet Machine), a rocket (Destination Moon), a spider (Arachnophobia), an octopus (Octopod) and three robot clocks (Melchior, Sherman, and Balthazar) – as well as a mechanical weather station (The Fifth Element). In 2016, MB&F and Caran d’Ache created a mechanical rocket-pen called Astrograph.

And there have been distinguished accolades reminding us of the innovative nature of MB&F’s journey so far. To name a few, there have been no less than 4 Grand Prix awards from the famous Grand Prix d'Horlogerie de Genève: in 2016, LM Perpetual won the Grand Prix for Best Calendar Watch; in 2012, Legacy Machine No.1 was awarded the Public Prize (voted for by horology fans) and the Best Men’s Watch Prize (voted for by the professional jury). In 2010, MB&F won Best Concept and Design Watch for the HM4 Thunderbolt. In 2015 MB&F received a Red Dot: Best of the Best award – the top prize at the international Red Dot Awards – for the HM6 Space Pirate.