

Sinn

SPEZIALUHREN ZU FRANKFURT AM MAIN

PILOT WATCHES

FOR PROFESSIONAL APPLICATIONS



DIN 8330 IS THE NEW STANDARD FOR PILOT WATCHES.

German DIN standards command a high level of respect both nationally and internationally, and represent the very highest level of quality. The new standard DIN 8330 Horology – Aviator watches, which came into force in March 2016, sets a new benchmark for safe, functional and reliable pilot watches. Watches certified in accordance with DIN 8330 are designed to fully assume the functions of the instruments for time measurement in aircraft and helicopters in the event of outages or suspected failures. This means that pilot watches must meet certain requirements in terms of **functionality and reliability, resistance to external stresses, safety and compatibility.**



103 Ti UTC IFR in a centrifuge to test G-force load. It is being tested with a load of six Gs.



Differential pressure testing in a vacuum desiccator: a DIN 8330-certified pilot watch like the **857 UTC VFR** has to be able to withstand several-thousandfold alternating pressure loads.

As a long-established manufacturer of pilot watches, Sinn Spezialuhren took the initiative and played a key role in promoting the development of a recognised DIN standard – the first new German watch standard in decades. It all started with the TESTAF technical standard for pilot watches developed by SINN in collaboration with the Department of Aerospace Technology at Aachen University of Applied Sciences which was presented to the public in 2012. Building on this standard – again on the initiative of SINN, and with the broad participation of the German watchmaking industry – the DIN 8330 Horology - Aviator watches was developed over a period of several years by users, testing institutes and scientists, and introduced in March 2016. Sinn Spezialuhren, Stowa, Glashütte Original, Aachen University of Applied Sciences, Lufthansa Cargo, Airbus Helicopters (formerly Eurocopter), DNV GL (formerly Germanischer Lloyd) and others were all involved in developing DIN 8330.

DIN 8330 defines what a pilot watch must be able to do and which stresses it must be able to withstand. This includes fast, clear readability of the dial both during the day and at night, the ability to operate the watch even while wearing pilot gloves and accuracy not only at room temperature but also at ranges of between -15°C and 55°C .

The DIN tests to determine physical resilience include not only a simple low-pressure test, but also a several-thousandfold pressure change cycle which simulates the stresses on the watch caused by changes in pressure during take-off and



Test facility for testing shock and impact resistance. The **103 Ti IFR** is being tested here.

landing of an aircraft in daily long-haul operation. Resistance to liquids typically found in aircraft (fuel, lubricants, cleaning fluid and de-icing fluid) not only guarantees safety during flight operations but also provides additional protection on the ground. A DIN-certified pilot watch must also be able to withstand clearly defined vibrations, impact and centrifugal force loads, temperature changes and, not least, magnetic fields. The complete watch must prove that it meets the requirements even when placed under these various physical stresses.

The safety features of a DIN-compliant pilot watch include a particularly secure strap fastening and the required compatibility

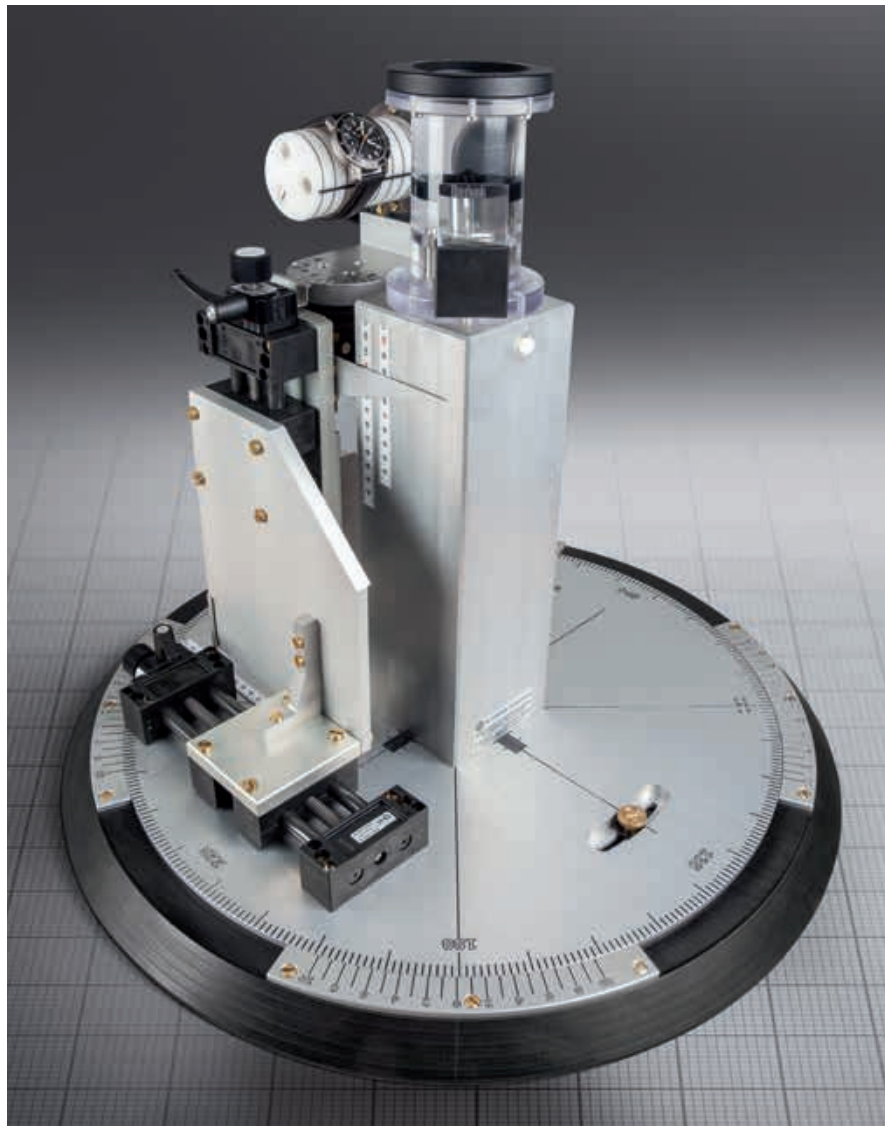
with night vision equipment. Light reflections that could distract or dazzle the pilot are minimised, and the possibility of any interference with the plane's avionics and emergency compass is eliminated as far as possible through tests at a specially developed test facility. All this means that watches certified in accordance with DIN 8330 not only ensure better safety in the air but also increased suitability for everyday use, going far beyond the shock-resistant and waterproof characteristics of standard watches.

Until now, there have not been any comparable regulations to define the requirements for wristwatches when it comes to meeting the relevant aeronautical specifications with a similar durability to comparable on-board instruments. The aim of DIN 8330 is for watches that conform to this standard to be recognised by regulatory authorities, manufacturers and aircraft operators as a replacement for malfunctioning on-board instruments. This would ensure objectively better safety in the air.

The TESTAF and DIN 8330 standards take the uncompromisingly high demands placed on aircraft and helicopter equipment and apply these to wristwatches.



Test facility for testing the safe fastening of the strap system.



The magnetic signature of a pilot watch certified according to DIN 8330 must not significantly divert the approved magnetic compasses in the aircraft through its physical proximity. The magnetic signature of a pilot watch is identified using a special test stand. First the test watch, in this case our **103 Ti IFR**, is demagnetised and then exposed to a homogeneous magnetic field of defined field strength. In the second stage of the test, the magnetic signature of the test watch is analysed using the test stand apparatus pictured.

Building on TESTAF, the DIN standard widens the pool of certifiable watches (mechanical watches are now eligible as well as quartz watches) and features more stringent test criteria for readability, vibration stresses and resistance to liquids commonly found in aircraft, among other things. The DIN standard also features a new requirement for pilot watches to be compatible with night vision equipment.

Thanks to the DIN 8330 standard, we hope that pilot watches will once again be defined as watches offering special functional and technical features. The special quality standards that apply to a DIN 8330-certified pilot watch can be seen at every stage of its manufacture, from the selection of high-quality materials to production processes where special care is always taken and ultra-narrow tolerances apply. The goal is achieved in an extensive, complex type-and-unit verification procedure and a certification process carried out by a neutral institution in accordance with DIN/ISO 17065 and 17067. Only then can the watch be furnished with the well-known DIN certification mark.

With its support for the TESTAF and DIN 8330 initiatives, Sinn Spezialuhren underlined its aspiration to create functional, high-quality and high-tech watches. For the technologically sophisticated German watchmaking industry, the new standard for pilot watches provides major impetus to maintain and expand its leading role in this segment among the international competition.





103 Ti UTC IFR: solid, expandable titanium bracelet with expandable folding safety clasp. ø 41 mm (Fig.: 1:1)



103 Ti IFR: black silicone strap. ø 41 mm (Fig.: 1:1)



The Hamburg-based company SEACOTEC confirms the certifications of **103 Ti UTC IFR** and **103 Ti IFR** in accordance with DIN 8330 by a conformity assessment body.



103 Ti UTC IFR – luminous. (Figures: 1:1)

103 Ti UTC IFR / 103 Ti IFR The pilot watch for professional applications.

Tested and certified in accordance with the German DIN 8330 Horology – Aviator watches

Case made of bead-blasted pure titanium

103 Ti UTC IFR: second time zone display on 12-hour basis

Ar-Dehumidifying Technology ensures greater functional reliability and freedom from fogging

Functionally reliable from -45°C up to $+80^{\circ}\text{C}$

Captive pilot's bezel with minute ratcheting

Sapphire crystal glass

Transparent back made of sapphire crystal glass

Pressure-resistant up to 20 bar

Resistant to low pressure

Uncompromisingly high standards must be met by aircraft and helicopter equipment in terms of functionality, reliability and safety. With DIN 8330, these uncompromisingly high standards are applied to wristwatches too. Various measures are taken to ensure that a DIN 8330-compliant pilot watch is not only a suitable all-round replacement for the on-board timekeeping instruments available to pilots, but is also capable of remaining unaffected by the physical stresses of flight, posing no risk potential for the crew or aircraft, and demonstrating compatibility with other on-board instruments.

With the development of the pilot watches 103 Ti UTC IFR and 103 Ti IFR, two of the world's first pilot watches certified in accordance with DIN 8330, we have succeeded in meeting precisely these requirements for flight operation in accordance with instrumental flight rules (IFR). This is supported by the installation of a range of our technologies:

Ar-Dehumidifying Technology ensures greater functional reliability and freedom from fogging as well as functional reliability at a temperature range of -45°C to $+80^{\circ}\text{C}$.

Another special feature is the captive pilot's bezel which is easy to operate even while wearing pilot gloves. The 103 Ti UTC IFR also has a second time zone display on 12-hour basis.





857 UTC VFR: case and stainless-steel bracelet with TEGIMENT Technology. Solid stainless-steel bracelet with expandable folding safety clasp. ø 43 mm (Fig.: 1:1)



857 UTC VFR: black silicone strap. ø 43 mm (Fig.: 1:1)



The Hamburg-based company SEACOTEC confirms the certification of **857 UTC VFR** in accordance with DIN 8330 by a conformity assessment body.



857 UTC VFR – luminous. (Figures: 1:1)

857 UTC VFR with a leather strap.

857 UTC VFR The pilot watch for professional applications.

Tested and certified in accordance with the German DIN 8330 Horology – Aviator watches

Case made of bead-blasted stainless steel

Case made with TEGIMENT Technology and therefore especially scratch-resistant

Second time zone display on 24-hour basis

Ar-Dehumidifying Technology ensures greater functional reliability and freedom from fogging

Functionally reliable from –45°C up to 80°C

Captive pilot's bezel with minute ratcheting

Sapphire crystal glass

Pressure-resistant up to 20 bar

Resistant to low pressure

Our pilot watch 857 UTC VFR has been tested and certified in accordance with DIN 8330 by neutral institutions in an extensive and complex type and unit verification process. It is one of the first pilot watches in the world to be distinguished by precisely defined functional and technical features which enable it to withstand vibrations, shock loads, centrifugal force loads, temperature changes and magnetic fields occurring in flight. This ensures that our pilot watch 857 UTC VFR can act as an all-round replacement for the on-board timekeeping instruments available to pilots under visual flight rules (VFR).

These extremely high quality standards are underlined by the installation of a range of our technologies. Functional reliability at a temperature range of –45°C to +80°C is guaranteed. The surface of the bead-blasted stainless-steel case has been hardened using TEGIMENT Technology to make it especially scratch-resistant. Ar-Dehumidifying Technology ensures greater functional reliability and freedom from fogging. The 857 UTC VFR is quick and easy to read during the day and at night. The captive pilot's bezel, which is used for setting time intervals, is attached to the watch and easy to operate even when wearing pilot gloves. Our pilot watch 857 UTC VFR also features a second time zone display on 24-hour basis.

Sinn

SPEZIALUHREN ZU FRANKFURT AM MAIN

Headquarters:

Im Földchen 5-7 · 60489 Frankfurt/Main
Phone +49 (0) 69 . 97 84 14-200 · Fax -201

Römerberg branch:

Römerberg 34 · 60311 Frankfurt/Main
Phone +49 (0) 69 . 97 84 14-650 · Fax -651

www.sinn.de · vertrieb@sinn.de



Inductor apparatus for test with cockpit-specific magnetic fields. Magnetic fields must not significantly influence the accuracy of professional pilot watches.