



TESTAF  
Technischer Standard  
Fliegeruhren



**EZM9 TESTAF**  
EINSATZZEITMESSER



*Sinn*


SPEZIALUHREN ZU FRANKFURT AM MAIN





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## DEAR CUSTOMER,

We know from numerous conversations that the people who buy our watches do so out of conviction. This includes people with a pronounced affinity to technology who are fascinated, for example, by the solutions we have devised for protection from magnetic fields and scratch resistance. Some of our customers, such as divers, pilots and the German GSG 9 special police unit, rely on their watches in their respective careers because their lives depends on it.

They all swear by the performance, resilience and durability, as well as the quality and precision of our watches. That is why the world's largest classification society DNV GL (formerly Germanischer Lloyd, Hamburg) regularly tests and certifies the water and pressure resistance of our diving watches.

We have selected pilot's watches tested and certified to the technical standard for pilot's watches (TESTAF) by Aachen University of Applied Sciences. The TESTAF ensures that a pilot's watch meets all timekeeping requirements during flight operations in accordance with visual and/or instrumental flight regulations and is suitable for professional use. Functionality is our top priority and ultimately determines the design. Only the technical features that are really needed can be found on our watches. Because we believe that products have to speak for themselves.

The basic question that we ask ourselves is: which innovative technologies and materials can be employed for our craft and provide solutions for rendering our watches even more practical for everyday use? It is often worth indulging in a little lateral thinking to see what is going on in other industrial sectors or fields of science. We repeatedly go to the limits of physical resources to upgrade our watches – with the aim of making what's good even better. Most of our best developments are yet to come!

I am delighted that you have decided to buy a SINN timepiece and hope that it will continue to give you pleasure for many years to come.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'L. Schmidt', with a stylized flourish at the end.

Lothar Schmidt

## FOREWORD AACHEN UNIVERSITY OF APPLIED SCIENCES DEPARTMENT OF AEROSPACE TECHNOLOGY



Aviation, in all its forms, combines emotion and technical excellence like almost no other mode of transport. It's not just pilots who have always demonstrated their connection to flying by wearing a special timepiece – the pilot's watch.

In the early days of aviation, the pilot's watch was one of the primary navigation instruments alongside the aviation map and a compass. Charles Lindberg would rather have gone without a radio than a second timepiece on his legendary transatlantic flight. To this day, most flight procedures in instrument flying carry a corresponding time stamp.

"Pilot's watch" is however not a protected term. It is often used for purely design-oriented models, which hardly do justice to the technical requirements for a flight instrument. It was therefore natural for the Department of Aeronautics and Astronautics at the Aachen University of Applied Sciences, as one of the leading educational and research facilities for aviation, to take on the development of a test standard based on the official certification procedure for general aviation. A considerable

number of pilots, airline companies and engineers were involved in creating the requirements and the development of the extensive test procedures.

TESTAF, the technical standard for the pilot's watch, was officially presented to the public in the autumn of 2012, in the deliveries hangar of the Airbus Helicopter company (formerly Eurocopter) in Donauwörth. The advisory board set up for this purpose, consisting of recognised experts in aviation and the watch industry, will ensure the future continuous updating and technical advancement of the contents and test procedures.

The team at Sinn Spezialuhren, led by Lothar Schmidt, of course immediately took on this challenge and met all requirements with flying colours after an intensive development phase. You hold the result in your hands today, the TESTAF-certified pilot's watch – a very special timepiece.

Sincerely

A stylized, handwritten signature in black ink, appearing to read 'Janser', with a large, sweeping loop at the top and a sharp point at the bottom.

Prof. Dr.-Ing. Frank Janser

## SINN SPEZIALUHREN ZU FRANKFURT AM MAIN

It was back in 1961 that pilot and blind-flying instructor Helmut Sinn founded the company. Since then, we have been committed to producing high-specification mechanical watches. In 1994, the graduate engineer Lothar Schmidt took over the company. This marked the beginning of a new era for the SINN brand, because the new owner took a decisive step towards more innovation. Under his leadership, new technologies and materials were introduced, thus providing the crucial incentives for our company's evolution and gradual emergence as an insider's tip for lovers of fine watches. Today, our name stands for technical innovations – much to the delight of both the trade and our customers alike.





## Advancements in endurance testing

Take, for example, the absolutely condensation-free, anti-reflective, german submarine steel diving watch – made possible by HYDRO Technology. Other examples include a chronometer chronograph fashioned from a 22-carat gold alloy that is as hard as stainless steel and a chronometer with a magnetic resistance of up to 80,000 A/m. There are also watches with a clockwork mechanism optimally protected from aging by an inert gas and integrated dehumidifying capsule. The list would not be complete without mentioning the development of mission timers (Einsatzzeitmesser or EZM in German) for firefighters, for special police units and border patrol guards as well as Temperature Resistance Technology to keep mechanical watches performing at temperatures ranging from  $-45^{\circ}\text{C}$  to  $+80^{\circ}\text{C}$ . This technology has proven its worth in the EZM 10 TESTAF model, for example, used as part of the official approvals procedure for Airbus Helicopter's (formerly Eurocopter) EC 145 T2 high-performance helicopter. Hot and cold climate tests and high-altitude experiments were carried out in the deserts of the USA, the Rocky Mountains and the frozen wastes of Canada. The watch was worn unprotected, outside the pilot's overall, during cold climate tests at temperatures reaching  $-45^{\circ}\text{C}$ .



## **Innovations and certifications**

The world's largest classification society for maritime safety DNV GL (formerly Germanischer Lloyd, Hamburg), has been testing our diving watches for pressure and water resistance since 2005. As part of DNV GL's official certification process, our diving watches have been treated as part of diving equipment since 2006 and tested and certified in accordance with European diving equipment standards. This is unparalleled in the watch industry.

We have had selected pilot's watches tested and certified to the technical standard for pilot's watches (TESTAF) by Aachen University of Applied Sciences since 2012. The TESTAF, the result of a research project at the initiative of Sinn Spezialuhren, ensures that a pilot's watch meets all timekeeping requirements during flight operations in accordance with visual and/or instrumental flight regulations and is suitable for professional use.

DIAPAL is one of our most important technological developments, with oiling no longer needed for the most important functions in the watch thanks to the materials we select. This technology was first used in 2001. With the aid of TEGIMENT Technology, we achieve greatly increased scratch resistance through surface hardening.

## Ongoing advancement in technology and quality

Our top priority has always been to develop watches that offer superior performance – both in daily and in professional use. Which is why our engineers are working continually to identify which innovative methods, materials and technologies are best suited for optimising our watches. Each new development has to first undergo rigorous practical tests before being incorporated. And no watch leaves our workshops before it has been subjected to thorough checking and fine adjustment by our master watchmakers.

## Workshop modifications and hand-engraving

From the robust case and the polished crystal through to elaborate refinements: we make sure that each and every detail of our watches is fit for purpose. The same applies to our workshop modifications. Only the perfect interaction of all components and technologies ensures that our watches can meet all their design specifications in full. Take for example the SZ02 calibre of our U1000 diving chronograph. The 60-minute scale of the stopwatch minute counter is much simpler and more intuitive to read than the 30-minute scale commonly found on other watches. The hand-engraving represents a highly personal form of refinement. If required, our specially trained engraver can etch a name, initials, monograms or symbols onto the rotor, movement bridge and case back.



## THE WORLD'S FIRST, TESTAF-CERTIFIED TIMEPIECE



**TESTAF**  
Technischer Standard  
Fliegeruhren

**In a research project lasting four years, the Faculty of Aerospace Technology of the Aachen University of Applied Sciences (FH) and Sinn Spezialuhren have developed a technical standard for pilots' watches (TESTAF). TESTAF ensures that a pilot's watch meets all of the time measurement requirements for flights operated under visual flight rules (VFR) and/or instrumental flight rules (IFR). The EZM 10 TESTAF, the 103 Ti TESTAF, 103 Ti UTC TESTAF and the 857 UTC TESTAF were the first SINN watches to undergo and pass the strict test procedures.**

For these watches to meet all the test criteria, we had to make various adjustments to them. The watches then passed all of the tests with flying colours. This means that they are suitable for professional use as a pilot's watch – a fact that is documented by a certificate and the TESTAF seal of quality on the face of the watch.

What are the distinguishing features of a professional pilot's watch? To provide a universally valid answer to this question, it was necessary to formulate a norm or standard, which did not exist for pilots' watches until today. And so in 2008, engineer Lothar Schmidt, managing director and owner of Sinn Spezialuhren, took the initiative to close this research gap together with engineering professor Frank Janser of the Aachen University of Applied Sciences.

TESTAF now provides the answers. For example, a pilot's watch must withstand rapid temperature changes and changes in ambient pressure up to 0.044 bar – equivalent to an altitude of about 21,300 metres.

A pilot's watch is thus subjected to several thousand pressure change cycles in order to simulate the actual stress conditions on a pilot's wrist. Besides being water-resistant, the watch must also be resistant to common aviation fluids such as fuels, hydraulic fluids and cleaning and de-icing agents. It is also important that the magnetic field of the pilot's watch itself does not interfere with the avionics such as the aircraft's emergency compass. It may not dazzle the pilot or produce unnecessary reflections. The watch must also be resistant to shocks and vibrations and be perfectly readable in the dark.

The list of technical and functional specifications describe precisely and unambiguously the time measurement requirements during flight in the following categories.

### **1. Functionality**

- Required functions during flights operating under visual and/or instrument flight rules
- Readability in daylight and in darkness
- Good operability
- Accuracy and power reserve

### **2. Resistance to external stress**

- Absolute and cyclical ambient pressure changes
- Operative temperature range and rapid temperature change
- Shock and impact resistance, G-forces and vibration
- Resistance to water and other aviation fluids
- Effects of magnetic fields on the watch

### **3. Safety and compatibility with other instruments**

- Effects of the watch's magnetic signature on avionics
- Avoidance of reflections and dazzle
- Appropriate form
- Secure strap fastening

**A description and photos of the tests can be found at [www.testaf.org](http://www.testaf.org).**



Differential pressure test: The EZM 10 must withstand alternating ambient pressure levels.



Dynamic G-force test on the 103 Ti Ar.



A pilot's watch such as the EZM 10 must have no magnetic influence on the emergency compass.



Simm  
CHRONO

55 50 45 40 35 30 25 20 15 10 5





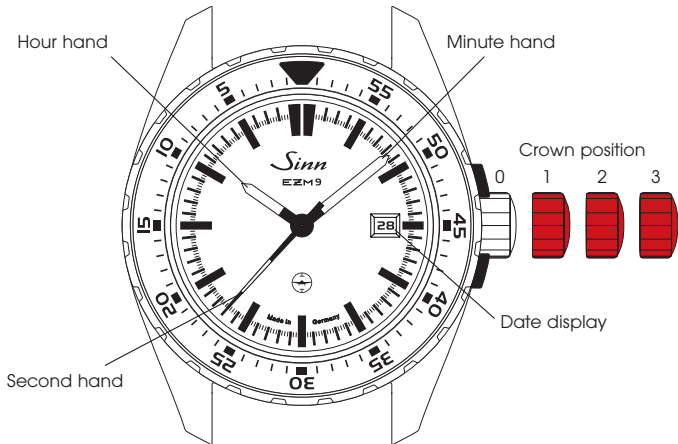
## EZM 9 TESTAF

**Designed as instruments for professional use, our pilot watches must satisfy extremely high requirements when it comes to reliability and performance. In order to satisfy these requirements, this mission timer was tested and certified by Aachen University of Applied Sciences in accordance with the technical standard for pilot watches (Technischer Standard Fliegeruhren – TESTAF).**

This ensures that the EZM 9 TESTAF is qualified for professional use as a pilot watch to the highest level and is evidenced with a certificate and the TESTAF quality seal on the dial.

Other features increasing the application quality of this timepiece include the case, which is made of high-strength titanium. This particularly lightweight, extremely high-strength material offers great wearer comfort due to its non-allergenic properties. The surface of the case has also been hardened using TEGIMENT Technology, making it especially scratch-resistant. Additional Ar-Dehumidifying Technology guarantees enhanced functional reliability and freedom from fogging, while Temperature Resistance Technology ensures functional reliability from  $-45^{\circ}\text{C}$  up to  $+80^{\circ}\text{C}$ . Another special feature is the pilot's bezel. This has a captive connection to the case and boasts a bezel insert made of high-quality sapphire crystal glass.

# INSTRUCTIONS FOR USE



### **Winding the watch (crown position 1)**

The crown is screwable (crown position 0). To loosen the crown, turn it *counter-clockwise* (crown position 1). The movement is wound by turning the crown *clockwise*. About 40 winds of the crown are generally enough to ensure reliable functionality. Under normal circumstances, simply wearing the watch every day should suffice to keep the self-winding mechanism wound. The power reserve allows you to take off your watch overnight without having to re-wind it.

### **Time adjustment (crown position 3)**

In crown position 3, the motion is paused. This helps you to set the watch precisely. Please make sure the date changes at midnight and not at midday. Just move the hands forward until the date changes. Afterwards you attempt to set the time. We recommend moving the hands past the desired minute marker and then adjusting it backwards. The movement restarts as soon as the crown is no longer in position 3.

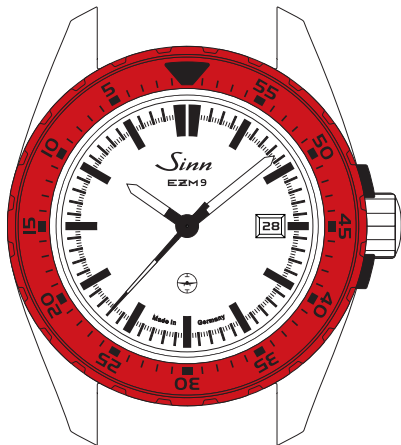
### **Quickset date adjustment (crown position 2)**

Set the crown in position 2 and turn it *clockwise* until the correct date appears in the date display window.

**Please take care to fasten the crown after making adjustments.**

## Using the pilot's bezel to measure time

The pilot's bezel can be moved manually in both directions. The triangle glows in the dark. It can be used in a number of ways, including to measure important lengths of time. For example, you can set the marking to the beginning of the time span to be measured, or you can use it to indicate the end of a given span of time.





## ADJUSTING THE LENGTH OF THE WATCH STRAPS

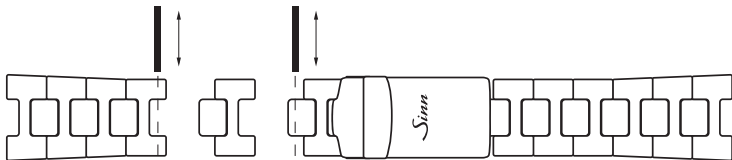
If you don't know how to shorten or lengthen the solid bracelet, please contact your SINN dealer or the watchmakers in our customer service department in Frankfurt am Main. Our customer service employees are also happy to help you over the telephone.

### Adjusting the length of the solid bracelet

Determine the relative lengths of the two sides before adjusting the length of the bracelet. To ensure maximum comfort, both sides of the bracelet should contain the same number of links. If this is not possible, the top bracelet strap (above the 12 on the clock) should be longer.

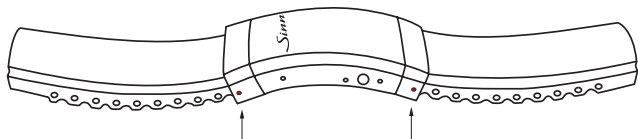
It is not necessary to detach the solid bracelet from the watch or the clasp.

1. Loosen the screws on the side of the bracelet link which is to be removed or added.
2. Remove the superfluous bracelet link or insert a new one.
3. Before screwing tight, add a small drop (no more!) of thread-locker (AN 302-42 medium-tight) to the thread of the bracelet screw.

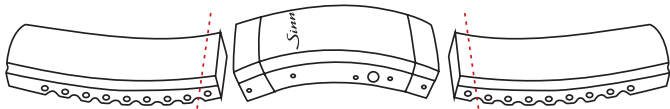


## Adjusting the length of the silicone strap

1. Release the silicone band from the clasp. To do so, use the pointed end of the band replacement tool to push the spring bar out of the fastener. The other side of the spring bar can be removed while the fastener is open, enabling you to remove the silicone band.



2. Using a knife or scissors, cut the silicone band in the middle between two metal pins. You should shorten the band symmetrically and little by little, starting from the clasp, until you have reached the desired length. Test the length from time to time before proceeding. Shortening both ends by the length of one metal pin results in a total difference of 10 mm in the length of the strap; shortening one end reduces the length by 5 mm.



3. Remove the first metal pin and replace it with the spring bar. Then reattach the clasp to the band.

# Ar-DEHUMIDIFYING TECHNOLOGY

## Indication colours of the drying capsule



Pale blue

Up to 25%  
saturation



Light blue

Up to 50%  
saturation



Medium blue

Up to 75%  
saturation



Dark blue

Up to 100%  
saturation



Initial condition



Drying capsule  
saturated

The colour scale for the Ar-Dehumidifying Technology: the capsule continues to absorb moisture until the darkest colouration is reached.



### **Perfect freedom from fogging**

All watches in this series are water-resistant as per DIN 8310. But even with watertight instruments, the air enclosed in the case contains water in a gaseous state. And air can also penetrate the seals. When the water vapour in the case condenses into liquid, the instruments are impossible to read. To prevent this from happening, we have developed the Ar-Dehumidifying Technology. The combination of a special drying capsule, EDR seals (**extreme diffusion reduction**) and a filling of protective gas guarantee that the crystal remains free from fogging, even in difficult conditions.

### **Longer service intervals**

The sophisticated Ar-Dehumidifying Technology considerably slows the aging process of the watch's inner workings and keeps the movement functioning properly for longer. That is why we issue a three-year warranty on all our watches featuring Ar-Dehumidifying Technology. When the drying capsule is saturated, as indicated by a deep blue colour (refer to picture on the left side), we recommend you have it exchanged so you can continue to enjoy all the advantages of the Ar-Dehumidifying Technology (enhanced reliability, longer intervals between maintenance).



Luminous

## TECHNICAL DETAILS

### Mechanical movement

- Calibre SW 200-1
- Self-winding mechanism
- Hand adjustment with stop-second function
- 26 bearing jewels
- 28,800 semi-oscillations per hour
- Shock resistant as per DIN 8308
- Anti-magnetic as per DIN 8309

### Functions

- Hours, minutes, seconds
- Date display
- Pilot's bezel with luminescent key mark

### Watch case

- Titanium, bead-blasted
- Integrated crown protection made with Black Hard Coating
- Captive bezel sapphire glass insert
- Crown screwable
- Sapphire crystal glass in front
- Case back screw-fastened
- Band lug width 22 mm
- Case diameter 44 mm

### SINN Technologies

- Ar-Dehumidifying Technology enhances functional reliability and freedom from fogging
- TEGIMENT Technology and therefore especially scratch-resistant
- Temperature resistance technology, therefore functionally reliable at temperatures from  $-45^{\circ}\text{C}$  up to  $+80^{\circ}\text{C}$

### Tests and Certification

- Tested and certified to the Technical Standard for Pilot's Watches (TESTAF) by the Aachen University of Applied Sciences
- Low pressure resistant
- Water- and pressure resistant up to 20 bar (= 200 m underwater depth)
- Water-resistant as per DIN 8310

# SERVICE

## **General advice**

To preserve the water resistance for as long as possible, the watch should be rinsed whenever it has been in contact with seawater, chemicals, etc. If your watch is frequently worn in water or underwater, we recommend having its water resistance checked at yearly intervals.

The watch is designed to withstand high levels of mechanical wear and tear and is shock resistant as per DIN 8308. Nevertheless, it goes without saying that continual mechanical stress in the form of impacts or vibration will affect its durability.

Care should therefore be taken to protect your watch from unnecessary wear and tear. It is only possible to judge how well the watch keeps time after it has been in operation for approximately eight weeks, since it takes that long for the working mechanism to become adjusted, especially in view of the fact that everybody has different lifestyles and habits. In the event of any excessive deviation, please keep a day-to-day record of its timekeeping over a period of about one week, for example.

## **Does your SINN watch need an inspection, repair, retrofitting or reconditioning?**

If possible, please use our service order form. For information about our service order form, please refer to the section entitled "Customer Service" on our website [www.sinn.de/en](http://www.sinn.de/en) and to the section entitled "Repairs" in our general terms and conditions of business at [www.sinn.de/en](http://www.sinn.de/en). We would be happy to send you a copy of the general terms and conditions.

Our international partners generally offer on-site service. However, should they be unable to provide a certain service, they will organise the safe dispatch and return of the SINN watch to our manufactory in Germany. Please be aware that our partners will wait until they have a sufficient number of SINN watches before they post a shipment, in order to keep transport costs and customs duties to a minimum. This will increase the processing time.

Alternatively, you can send your SINN watch to us directly. You will be required to cover the postage costs for the delivery and return shipment, which vary depending on the country. For insurance reasons, we strongly recommend sending us any return goods by registered parcel post. We regret that we are unable to accept deliveries with unpaid postage!

In case you have a chance to drop off your watch directly at our office in Frankfurt am Main we look forward to your visit. Please make a note of our opening times.

**Send your SINN watch by insured post to:**

Sinn Spezialuhren GmbH  
Kundendienst  
Im Földchen 5-7  
60489 Frankfurt am Main  
Germany

**Do you have any questions?**

Our employees will be pleased to advise you.  
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E-mail: kundendienst@sinn.de

# Sinn

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Technische Änderungen vorbehalten.  
Technical specifications are subject to changes.

