
TIME AND TIDE WAIT FOR NO MAN

But now, at least, you can have them both on your wrist. The tides are a timelessly fascinating spectacle: twice a day, the waves retreat from the shore before inexorably rising again. The Portugieser Yacht Club Moon & Tide features a tide display that keeps you informed about the next high water. It is possible thanks to a special wheel train that translates the rhythm of the hours into the constantly shifting chronological sequence of high and low water.

The rhythm of the tides is as old as the Earth itself. As the tide ebbs, water retreats from the coast until it reaches low tide. At that point, the sea reverts to a flood tide until it reaches high water. In the Wadden Sea, an area of wetlands between Denmark, Germany and the Netherlands, the constant rhythm of the tides has created a level of biological diversity among the highest on Earth. But ebb and flow are also of vital importance for shipping. When sailing close to the coast, a skipper must keep his eye on tide tables to avoid running aground. This is the reason why the study of tides is an integral part of any nautical training.

THE MOON ATTRACTS WATER, WHILE THE ROTATION OF THE EARTH DISPERSES IT

The Greek mariner Pytheas recognized the link between this natural phenomenon and the moon as early as the fourth century BCE. It is particularly noticeable at the coasts that the moon visible at high tide is almost at the same place in the sky again at the next but one high tide. In 1609, the German astronomer Johannes Kepler first outlined a theory according to which the moon attracts the water in the oceans and thus causes the tides.

Indeed, the tides are caused by a complex interplay of gravitational and centrifugal forces between the Earth, the moon and the sun. On the side of the Earth facing the moon, the moon's gravitational pull attracts the water, creating a bulge that causes the tides. But a similar bulge of water also forms on the side of the Earth facing away from the moon. This is caused by the centrifugal forces that arise due to the rotation of the Earth: Rather like the clothes in a spin dryer, the masses of water are pushed outwards by these centrifugal forces.

THE TIME OF HIGH TIDE SHIFTS CONTINUOUSLY

The Earth rotates on its own axis once every 24 hours and, within that period, moves under the two bulges of high tide and two areas of ebb tide. For human beings, who do not notice the rotation of the Earth, this gives the impression that the water is receding from the coasts and then rising again. But why does high tide occur at a different time each day? During the time it takes the Earth to complete a rotation, the moon progresses a little bit further. So, on Earth it takes 24 hours and 48 minutes for the moon to be in the same position. The time between two high tides, then, is always exactly 12 hours and 24 minutes. If, for example, it is high tide at midnight, the next ones will occur at 12.24 and 0.48, respectively.

A REDUCING GEAR TRACKS THE TIDES

The tide display on the Portugieser Yacht Club Moon & Tide now shows the slightly shifting times for high tide on the dial. During the 12 hours and 24 minutes between two high tides, the display rotates by around 24 minutes on the 12-hour scale. The energy required to turn it is channelled by the basic movement's hour pinion. The challenge facing the designers was to convert the rapid hourly rhythm into the much more leisurely rotation of the tidal disc. A reducing gear comprising three precisely calculated cogs slows the rotation to the point where the tidal disc rotates around its axis once in exactly 14.76 days. The tidal display module is integrated into the 82835 calibre and contains just 49 individual parts.

IN 100 YEARS, THE DISPLAY WILL BE JUST 10 MINUTES OUT

Because the display rotates continuously, it always shows the approximate time of the next high tide. If the arrow points to 12 o'clock at 10 o'clock in the morning, the next high tide will be a little later than 12 o'clock because, in the next two hours, the tidal disc will also move a little further. On the opposite side you can also read the approximate time for the next low tide. The exact times for high and low tide depend on the longitude. As a result, the display needs to be calibrated once using the tide tables for a specific location, such as New York, Lisbon or Sydney. According to this, the deviation is theoretically only 10 minutes in 100 years. The display works reliably on all coasts with two equally strong high and low tides per day.

THE MOON PHASE DISPLAY ALSO SHOWS SPRING AND NEAP TIDES

Another special feature of the Portugieser Yacht Club Moon & Tide is the double moon phase display. It has been extended to include a special inscription and also provides information about the strength of the current tides. At full and new moon, the Earth, moon and sun are in a direct line. In this constellation, the tidal forces are cumulative and generate a spring tide – a particularly strong high tide. At half-moon, however, the sun and moon are at right angles to each other. The result of this is a weaker high tide, or “neap tide”. Exactly how high the water rises depends on the geographical location and the exact physical nature of the coast. While the tidal swell on the open sea is only about 30 centimetres, the sea level during high tide rises by up to 20 metres in the Canadian Bay of Fundy. So, anyone in charge of a boat would be well advised to take a look at the dial of their Portugieser Yacht Club Moon & Tide.

IWC SCHAFFHAUSEN

In 1868, the American watchmaker and entrepreneur Florentine Ariosto Jones travelled from Boston to Switzerland and founded the 'International Watch Company' in Schaffhausen. His visionary dream was to combine advanced American manufacturing methods with the craftsmanship of Swiss watchmakers to make the best pocket watches of his time. In doing so, he not only laid the foundation for IWC's unique engineering approach but also established the centralised production of mechanical watches in Switzerland.

Over its 150 year history, IWC Schaffhausen has developed a reputation for creating functional complications, especially chronographs and calendars, which are ingenious, robust, and easy for customers to use. A pioneer in the use of titanium and ceramics, IWC today specialises in highly engineered technical watch cases manufactured from advanced materials, such as titanium-aluminide and Ceratanium®. Preferring the principle of "form follows function" over decoration, the Swiss watch manufacturer's timeless creations embody their owners' dreams and ambitions as they journey through life.

IWC sources materials responsibly and takes action to minimise its impact on the environment, creating intrinsically sustainable timepieces that are built to last for generations. The company prides itself in training its own future watchmakers and engineers, as well as offering an excellent working environment for all employees. IWC also partners with organisations that work globally to support children and young people.

DOWNLOADS

Photos of Portugieser Yacht Club Moon & Tide models are available at press.iwc.com

FURTHER INFORMATION

IWC Schaffhausen
Public Relations department
Email press-iwc@iwc.com
Website press.iwc.com

INTERNET AND SOCIAL MEDIA

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