



History of the mb-microtec / traser H3 military watch

Excellent readability in the dark, proven in action in the first gulf war

Benefits of mb-microtec illumination

Use of tritium gas light sources offers a series of benefits in addition to optimal insulation of the radioactive material. The light sources are self-illuminating, in other words, they are independent of a battery and do not depend on charging by means of daylight. **Their luminescence is almost one hundred times that of watches with traditional tritium phosphorescent paint.** The hands and markings are so bright in fact, that soldiers in the field at night should wear a cover over the watch in order to avoid being identified as a target. The extraordinary brightness of this light system is guaranteed for 10 years but lasts over 20 years.

The light system consists of sealed, tritium-filled glass tubes, whose inside walls are coated with a phosphorescent substance. The electrons emitted by the small quantity of gas in the tube excite the substance to give off a cold light. Green is the favored color, as the human eye is most sensitive around these wavelengths but other colors are possible. Today, the terms "mb-microtec illumination" or "mb-microtec GTLS" (gaseous tritium light source) are also used to describe this ultimate lighting system.

Since 1989 the American army has specified the use of tritium gas light sources for military watches to insure that they can be read by the troops in the dark. Among the best known and popular models are the SandY (Stocker & Yale) P 5900 Type 3 and the SandY P 6500 Type 6, both developed by mb-microtec. The light sources for these Swiss made watches are also produced in Switzerland by mb-microtec, then, the only company in the world which manufactured these light elements (GTLS) in miniature format. But still, quite a few obstacles had to be overcome before the first watches could be supplied to the troops.

Once upon a time ...

The security officer on duty in the New Cumberland Army Depot, Pennsylvania, could hardly believe his eyes when he saw the measurements being registered on the 12th of April 1988. The geiger counter in one of the storage halls had shown considerably increased activity. The cause of the contamination was quickly found: the SandY 184 military watches in the hall were emitting an unusually high dose of radioactivity. The hands and markings on the dial were coated with **traditional tritium phosphorescent paint**. In some watches, the readings were up to one hundred times more than what was registered in the past and had been considered safe. The large stock of watches in New Cumberland Army Depot was therefore a security and health risk. The officer immediately informed the relevant military authorities in the Department of Defense.

The solution

Thomas Chleboski, Head of the Standardization and Specifications section in the army, acted immediately and deleted the supplier Stocker & Yale from the Qualified Product List QPL-46374 the list which states which companies are qualified to supply wrist watches to the U.S. Army.

The news was quite a shock for Jim Bickman, President and CEO of Stocker & Yale in Beverly, Massachusetts, as his company had profited from several lucrative orders for SandY 184 in the previous four years. But Jim Bickman had an idea as to how a real solution could finally be found for the problem of radioactivity in watches. For several years, his company had been supplying the army with compasses where a small glass tube filled with tritium gas was used for illumination. The tritium gas light sources produced by the Swiss company mb-microtec with the help of a special laser, were **proven not to release any measurable radiation** whatsoever. Could this groundbreaking lighting technology not also be used for watches?

Maybe but in any case, in order to make this possible, the MIL-W-4637 specification relating to the manufacture of military wrist watches would have to be changed. "So, I decided to convince the relevant departments in the U.S. Army to create new specifications for military watches. Not only that but I wrote the first draft myself," remembers Jim Bickman. That was the hour in which a completely new generation of military wrist watches was born.



Use of GTLS (gaseous tritium light source)

On May 31 1989 the new MIL-W-46374E officially entered into force in the USA. **This standard not only brought about the change from tritium illuminated paint to light sources with gaseous tritium.** In connection with the use of the new light system, the dial and the hands of the military watch were completely redesigned. New on the dial was also the symbol for radioactivity, as well as the marking H3. Very strict requirements had to be fulfilled with regard to the tritium gas enclosed in the glass tubes. The light elements of a watch were (in total) not allowed to contain more than 25 millie curies of H3. **The resulting exposure to the wearer of such a watch would be less (by a factor of 30 thousand) than random, daily exposure from natural and unavoidable sources that we are all exposed to** and no radioactivity whatsoever might be measured on the surface of the watch.

Development of prototypes for qualification tests

So, according to the new regulations, military watches should in the future be equipped with this technology. But a few months were to pass before this stage was reached. Before a supplier is even allowed to tender for a military contract, he has to submit qualification samples of finished watches, which are then subjected to a series of extremely rigorous tests by the Department of Defense. Only when these tests have been successfully completed is the product included on the Qualified Product List. Therefore development of such qualification samples is work done without any guarantee that an order will follow.

Intensive cooperation between America and Switzerland

mb-microtec, the only manufacturer of these tiny tritium light elements in the world, also signaled great interest in launching such a watch for the military. The two companies, (mb-microtec and Stocker & Yale) which had been business partners for many years, quickly reached agreement to produce some prototypes of watches using this new technology.

In the second half of 1989 therefore, work proceeded at a quick pace on the development of the necessary qualification samples of watch models SandY 490 Type 1, Type 2 and **SandY 5900 Type 3** which had to fulfill both, the strict requirements of the U.S. Nuclear Regulatory Commission (NRC) and also the new military specification. Finally, the prototypes were successfully tested in 1990 and accepted in 1991, as military equipment by the Department of Defense.

Type 1 and 2 are models with a plastic housing and mechanical movements which had to be accurate up to a few seconds per day. Type 1 also had to have at least 15 jewels. The type 3 was a battery-driven quartz watch with much greater accuracy, only allowing deviations of a few seconds a month.

(These watches were the first analog timepieces ever to incorporate this mb-microtec H3-illumination technology and later came to be well known under the “ traser H3 “ brand name.)

The start of a Marathon

But the competition was close behind. The Marathon Watch Company Ltd. In Canada was also seeking qualification for one of its products within the framework of the MIL-W-46374E specification. In the same way as Stocker & Yale, Marathon had already been supplying the U.S. Army for many years. The Canadians also had their military watches manufactured in Switzerland, at the beginning by Gallet S.A. and later in their own company in La Chaux-de-Fonds. In autumn 1989 Gallet ordered tritium light sources for Marathon watches from mb-microtec and inquired what adhesive was most suited for fixing them to the hands of a watch. However, the delivery of the light sources was only received in February 1990, as Gallet did not yet have a license for the processing of light sources with gaseous tritium.

The first gulf war suddenly created demand

The first gulf war broke out in January 1991, and the US army suddenly needed larger numbers of watches for the troops stationed in the gulf. Which one of the by then two qualified manufacturers was in a position to supply the new military watches first and in the necessary quantities? There followed a neck-and-neck race between Stocker & Yale and it's Canadian competitor Marathon. Marathon crossed the finish line first and secured the first order for 60'000 watches. Marathon had offered earlier delivery than its American competitor. "I tried to fight the decision and pointed out that the delivery date was not realistic ", commented Jim Bickman. But in vain, Marathon retained the order. Naturally, the light sources for these first watches supplied to the troops, came from mb-microtec.

Navigator Type 6 – the watch for special units

In October 1991, the manufacturing specification for military watches was again updated by the authorities. MIL-W-46374F now allowed production of watch model Type 6 equipped with mb-microtec H3 technology. A wrist watch of this type had to fulfill additional requirements with regard to altitude, magnetic field protection as well as salt spray and perspiration resistance. In addition, the watch had to withstand the low air pressure at 35'000 feet for at least 60 minutes without sustaining any damage. Its magnetic protection rating was raised from 15.5 to 125 +/-1 Gauss. This means that the antimagnetic watch will not cause mines to detonate. Stocker & Yale and their Swiss partner mb-microtec qualified with the P 6500 Type 6 Navigator, a quartz watch with a black polyester housing and rotating GMT bezel.

That watch and also the P 5900 Type 3 military watch continue to be manufactured under the new specification. As of 1991 Stocker & Yale was able to secure smaller orders from the army; first for 500 units of the P 5900 Type 3 and later for larger volumes of up to 10,000 watches per order. Finally in 1994 came the first order for 14'000 units of the P 6500 Type 6 Navigator, which were issued to American troops the following year. It then became part of the standard equipment of special units such as the Army Rangers, Army Special Forces («Green Berets»), Navy SEALs (Sea, Air, Land), and EOD (Explosives Ordnance Demolition) Teams. In 1999 and 2000 further orders were placed for this classic watch. The Navigator Type 6 was and is very popular with the troops and is also one of the most desirable collector's items for those who collect military memorabilia. It is particularly popular with collectors who like to actually wear the watches themselves.

The Swiss company mb-microtec has relaunched the classic Navigator Type 6 watch this year and in addition, offers a host of attractive civilian watches geared toward the professional and sportive public under the “ traser H3 ” brand name.

The P 5900 Type 3 was the first military watch from Stocker & Yale / mb-microtec which was equipped with mb-microtec H3-illumination.



P 5900 Type 3

P 6500 Type 6 Navigator



The P 6500 Type 6 Navigator from mb-microtec is the "King" of military watches. It's nighttime illumination cannot be bettered.

The Navigator is generally worn by special units such as the Army Rangers, Army Special Forces (Green Berets), Navy SEAL (Sea, Air, Land), and EOD (Explosives Ordnance Demolition) Teams.