

ON SITE



Swiss: Where clocks keep up with the times

[I]n Northwest Switzerland, the Jura Mountains run along the border to France. This rural area has always been sparsely populated; in many places one still can find traditional farming culture where humans and livestock share the same roof in whitewashed farmhouses. A perfect place for hikers to rest and to enjoy nature. And yet, this secluded area is also home to a world-famous industry: Swiss watches.

The meager Jurassic soil and the harsh mountain climate have never made agriculture easy here, so farmers from the region have always sought additional ways to make it through the long winter months. To this end, in the 18th century, peasants from the small village of La Chaux-de-Fonds started making clock parts in their homes. This new cottage industry flourished and quickly attracted more workers; the town subsequently grew – and adapted to the needs of the watchmakers. A new city plan was drawn up in 1794: the roads were made wide and ran in a south-westerly direction, in order to provide as much sunlight as possible to the workers at their benches.

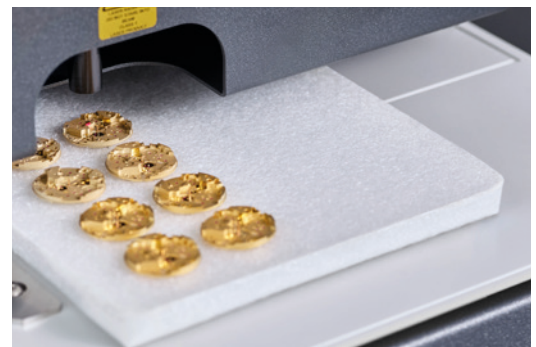
Due to this synthesis of urban planning and the needs of the watch industry, today La Chaux-de-Fonds is a UNESCO World Heritage Site. Some of the world's most renowned watchmakers have emerged from this small, remote village and come to dominate the luxury watch market.

Elegant shine: from the hands to the band

To be worthy of a luxury watch, not only does a clockwork have to be precise, it also has to look valuable and exude quality. This is why many watch components require functional coatings that are also decorative.

Thus, alongside the watchmakers, several electroplating companies also call the Jura Mountains home. Saulcy Traitement de Surface SA (STS) is one such company that has located a branch in La Chaux-de-Fonds. Founded in 2006, for the past 10 years STS has been a preferred partner when it comes to fine coatings on watch components. With its rack plating and bulk processing techniques, STS has made a name for itself among watch manufacturers. So that it can respond quickly to customer requests, besides its subsidiary in La Chaux-de-Fonds, STS also has operations in two other centers of watchmaking: Le Sentier and Develier.

In modern clockworks, not only does precision count but also their aesthetics



Because it enables automated serial testing, the XDAL can also be used to analyze batches of samples with high precision

From the watch plates to the hands, STS finishes a wide variety of watch components; the orders are correspondingly diverse. To meet these requirements, not only must the electroplating itself be extremely versatile, but also the quality assurance processes. "At STS, we galvanize components for the very best watchmakers in the world," said Frédéric Saulcy, CEO of STS: "The quality demands are commensurately high. For carrying out the 80 to 90 different measuring tasks that we're always faced with, we find the flexible Fischer instruments to be the ideal solution."

Quality assurance: from the electrolyte to the finished part

The biggest challenge in coating watch components are the tight production tolerances on already very thin layers. Especially in the movement, the delicate pieces have to fit together absolutely perfectly. Too-thick layers would generate more friction and make the watch inaccurate.

Plus, expensive raw materials such as gold and rhodium must be used as efficiently as possible. Therefore, STS often applies multi-layer coatings with a total thickness of less than a micrometer, for example, 0.05 µm rhodium on 0.1 µm gold and 0.5 µm nickel. The base material of the parts is frequently a copper alloy such as brass.

At all three locations, STS analyzes these sophisticated coatings with the FISCHERSCOPE XDAL 237 devices. Because the flexible X-ray fluorescence systems are equipped with silicon PIN detectors, they can measure very thin layers. Besides producing a good resolution of the thicknesses, the PIN detector can also reliably distinguish between very similar elements. Using the WinFTM software, the XDAL 237 dependably differentiates between the copper signal coming

from the base material and the nickel signal in the coating system.

"A watch has a lot of tiny parts. For components like pinions, we like to use Fischer's XULM," Saulcy confirms. This X-ray sys-



Frédéric Saulcy, CEO of Saulcy Traitement de surface

“ Swiss watches, coatings from STS and Fischer measuring instruments are a perfect match because each one is focused on the best quality. ”



tem performs precise analyses of minuscule parts with measuring spots just 0.05 mm in size. Another one of its strengths lies in analyzing the contents of the galvanic bath. Besides the classic measurement functions, WinFTM also does fundamental parameter analysis; that means it can determine the bath composition without standards. "The XULM saves us a lot of time on bath analyses because the device doesn't have to be re-calibrated for every new bath," says Saulcy.

From the Jura to the world

"With the help of Fischer, we've enhanced our in-house quality assurance so much that we've even begun accepting orders to analyze baths for other coaters," Saulcy explains. STS maintains one of Switzerland's leading laboratories for the analysis of galvanic baths. In addition to X-ray fluorescence measurements, STS also offers inspections of the coated parts: microscopic, chemical and mechanical.

However, the high quality assurance standards enable more than just optimization of existing processes; at STS, six chemical engineers are also currently at work developing new baths and coatings. For example, treatments such as Ruthenium Noir and the NAC finish were both developed by STS. With modern surface refinements like these, STS is contributing to the unique reputation that Swiss watches enjoy worldwide.

All the clock components are bought together on the watch plate. Here, the tiny parts must fit perfectly so that the movement works smoothly

