



PROCESS INSTRUMENTATION

SITRANS FC440 enhances purification process for leading global metal supplier

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During a field test at H.C. Starck in Goslar, Germany, the new SITRANS FC440 Coriolis flowmeter demonstrated exceptional stability and reliability in measuring the concentration of tungsten metal.

The customer

The H.C. Starck Group is a leading global supplier of refractory metals and technical ceramics. Headquartered in Goslar, Germany, H.C. Starck employs nearly 3,000 people in 12 state-of-the-art manufacturing facilities across Europe, North America and Asia. The company serves a diverse range of industries and is known for high-quality products used in metallurgy and metal processing, optics, electro-technology, electronics, welding, thermal spraying, advanced ceramics, catalysts, and batteries.

The H.C. Starck site in Goslar produces powder chemicals and compounds, including tungsten and tungsten alloys. Tungsten boasts the highest melting point of all refractory metals (3420 °C or 6188 °F) and a density nearly 20 times that of water. It also offers excellent resistance against corrosion. This characteristic robustness allows tungsten to serve many purposes, including conversion into tungsten carbide for drill bits, circular saws and other tools. Tungsten powder is also ideal for the formation of heavy metal alloys.

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The case at a glance

Region: Germany

Industry: Chemical

Customer: H.C. Starck

Challenge: Optimize purification of tungsten metal by providing accurate feed-forward process data to tungsten purification system

Product: SITRANS FC440 (1.0 Inch)

Main benefits:

- Real-time measurement of tungsten metal concentration
- Stable performance in dynamic flow, pressure and temperature conditions
- Digital signal for high speed, high integrity signal transmission

The challenge

To produce tungsten powder and products, H.C. Starck first sources solid tungsten from other industries. This unprocessed metal tends to be extremely brittle and difficult to work with, which is why it must be purified to 99.99% pure tungsten. Purification ensures that the final product will be malleable enough for use in metalworking while still retaining its distinctive hardness.

Once the sourced metal is reduced to sodium tungstate in dissolving tanks, it is passed through filter presses before being sent to an intermediate storage tank, where it awaits transfer to a purification header vessel. When one of the header vessels needs to be refilled, a downstream level controller starts a pump and the required quantity of sodium tungstate is transferred from the storage tank to the vessel.

To ensure that the purification process is as effective and time-efficient as possible, the purification system must receive real-time updates on the exact concentration (i.e. fraction) of tungsten within the fluid being transferred to the header vessel. For this reason, H.C. Starck required the installation of a flow meter to provide feed-forward process data to the purification system. The chosen meter needed to be capable of highly accurate density measurement despite the fluctuating flow, pressure and temperature conditions that result from 15 to 20 pump starts per day.

The solution

H.C. Starck is a longtime Siemens customer, having relied on the Simatic PCS7 process control system to automate their facilities for more than 15 years. The company has also installed multiple Siemens Process Instrumentation solutions on difficult applications throughout their facilities over the past decade.

H.C. Starck chose the SITRANS FC440 Coriolis flow meter which offers greater flexibility for installation even the tightest of spaces. Other benefits of particular interest to H.C. Starck include the meter's ability to measure density, volume and temperature in addition to mass flow, as well as its modular design for easy operation.

To perform the field test, a one inch SITRANS FC440 prototype meter was installed on a discharge line below an intermediate storage tank and adjacent to a transfer pump. The Coriolis meter was placed in series with a previously existing electromagnetic meter, which was designated as a reference point. The SITRANS FC440 was then subjected to a broad array of commissioning and operational assessments.



The results were highly satisfactory, with the SITRANS FC440 performing to expectations at a variety of tasks:

- Performance remained stable at zero flow, with a total deviation of only ± 1.5 kg/h (3.3 lb/h) over a temperature range of 1.6 °C (34.9 °F)
- Flow rate and density were reported reliably over the entire duration of a 104-minute trace, with no unexplained fluctuations or spikes in flow trend
- Reliability was demonstrated under dynamic conditions, with nearly instant response times to changes in flow rate caused by pump starts and stops
- Density readings were accurate to within 1 kg/tonne (2.2 lb/tonne) as compared to a laboratory reading
- Performance in fluctuating volume flow was excellent, with the flow signal following the dynamics of a reference reading reliably with no visible deviation
- The driver current demonstrated stability of greater than 2 significant digits at zero flow and deviations of less than 2 significant digits in conditions where pressure or temperature fluctuated

H.C. Starck was so encouraged by the early performance of the SITRANS FC440 that they have agreed to upgrade the prototype meter to a complete system and implement it as part of the overall tungsten purification process, including integration into their SIMATIC PCS7 process control system. According to Frank Reulecke, electrical project engineer, "We have always enjoyed a productive partnership with Siemens, so we are confident that this new instrumentation will be world-class. We look forward to seeing how the SITRANS FC440 will improve the efficiency of our business and, ultimately, our bottom line."

Legal Manufacturer

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Order No. PICS-00165-1024