APPLICATION REPORT

HELIUM GAS FLOW MONITORING

Semiconductor Industry

"Thanks to our portable FLUXUS® G601 gas flowmeter, it was easy to demonstrate with test measurements on-site that the best way to measure the flow of ultra-pure gases is from the outside of the pipe."

Arthur Foo,
Country Sales Manager Singapore, Flexim Instruments Asia

Measuring Task

Non-intrusive flow measurement of helium gas in the production of silicon wafers

Helium is one of the inert gases used in the manufacture of integrated circuit wafer chips in the semiconductor industry. With the increased price of helium gas, consumption monitoring is more important than ever for better management. A leading global semiconductor foundry has therefore given a priority to facility gas engineers to monitor usage, identify potential abnormalities and create possible improvement in cost management.

Helium gas is passed through gas purifiers before being channeled to the clean room. While the main header consists of an existing thermal mass flowmeter, there are no flowmeters at five of the eight distribution lines to each fab. Since these lines are not monitored, there is no way of providing gas management of individual fabs.

Process engineers therefore looked for an appropriate solution to retrofit the non-equipped lines with a flow measuring device. However, they were somewhat skeptical with regard to non-intrusive gas flow measurement. Confidence in clamp-on ultrasonic gas flow measuring technology is built on evidence of workability, stability, feasibility and performance by doing

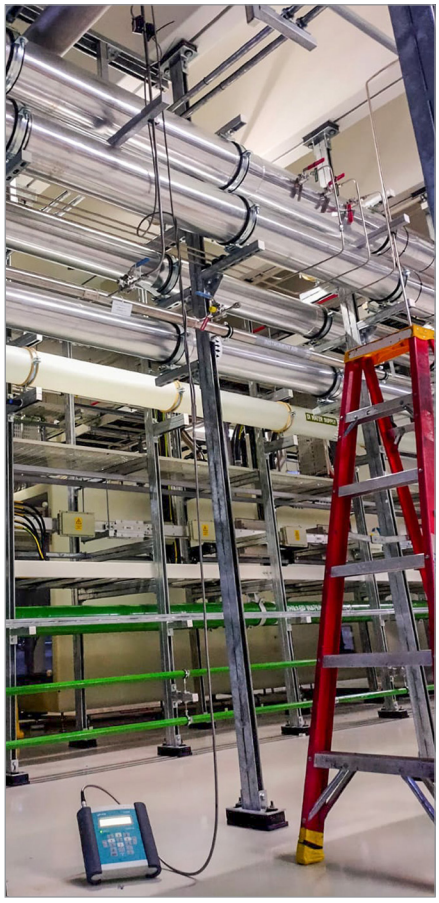
measurements on-site with the portable FLUXUS® G601.

After several tests carried out on-site which showed that readings conformed with those of the existing thermal mass flowmeter or Coriolis mass flowmeter, the engineers' confidence grew. Furthermore, close communication with the customer, dedication and high quality certainly helped in their decision to go for the non-intrusive ultrasonic flow measuring technology.

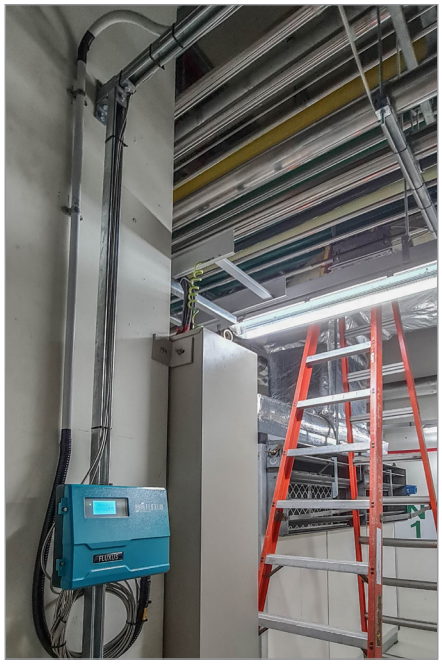
Solution

Convinced by the measuring performance of the user-friendly FLUXUS® G601, the maintenance department of the wafer plant initially bought a portable clamp-on ultrasonic gas flowmeter with a pair of P Lamb wave transducers for their own usage. After their own experience with the equipment, the plant's process engineers came to the conclusion that non-intrusive flow measurement is the ideal solution for this type of application; it never causes any interruption of supply and there is no risk of contaminating the highly pure media. A shutoff from the purifiers for the installation of inline meters would be very costly, as it results in a disruption of the manufacturing process. Due to the requirement for high purity helium, pipe modifications with cutting and welding work would also entail extensive flushing. Therefore, it was decided to purchase five stationary FLUXUS® G721CA ultrasonic gas flow measuring systems for monitoring helium consumption.

Quick delivery, fast installation executed by experienced technicians and the ease of tying the measurements into the BMS have resulted in a satisfied customer. The wafer plant now has a monitoring system for its helium consumption which reliably detects disturbances and allows for further process optimization.



Test measurements with the portable FLUXUS® G601 showed the perfect suitability of Flexim 's clamp-on ultrasonic technology for the measurement task.



A stationary FLUXUS® G721CA measuring transmitter during commissioning

Measuring Points and Instrumentation

Pipelines	OD 1” and 1.5”, WT 0.065”, stainless steel
Medium	purified helium gas
Pressure	100 to 115 psig
Measuring Device	1 portable ultrasonic FLUXUS® G601 gas flowmeter with 1 pair of clamp-on ultrasonic transducers type P (Lamb wave) 5 stationary ultrasonic FLUXUS® F721CA gas flowmeters with 5 pairs of clamp-on ultrasonic transducers type P (Lamb wave) mounted in Variofix L

Advantages

- Easy retrofitting without any disruption to production
- Contact-free measuring technology without any risk of contamination of the highly pure media
- Quality of the measurement can easily be checked by internal diagnostic tools and by direct comparison with the installed wetted gas flowmeters
- Excellent collaboration between the plant’s process engineers and Flexim ’s local sales and support team

For more information, visit
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