



Calibration- Metrology

Measurement technology

R Evolution
in Gas Generators
and Calibrators

The meaning of calibration.

The calibration word is used for various meanings. In LNI Swissgas world, calibration refers to a measurement technology.

Calibration is used to link the gas analysers, sensors, monitors and GC to the primary standards. The LNI Swissgas calibration systems allow to check or adjust the different gas monitors with the lowest uncertainty. Uncertainty of the testing device is minimized.

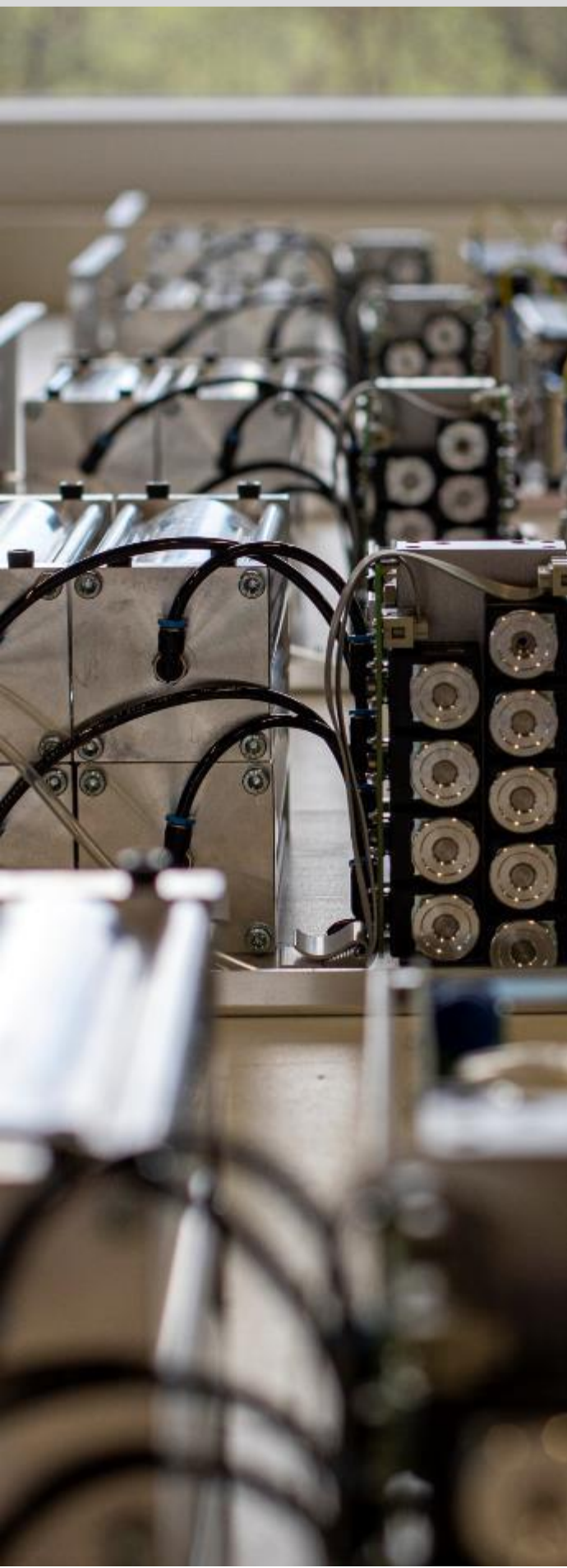


Why calibrating devices?

Calibration of gas analysers and gas sensors is necessary to link them to the national standards and evaluate the accuracy of the gas detection. Calibration is needed to measure and control with precision emissions of industries, laboratory equipments, power plants but also to evaluate the pollutants present in the air. Thus, calibration is required to prevent the deterioration of measurement devices and to keep them accurate and precise, to comply with regulations, as well as for safety reasons and for environment purposes.



LNI Swissgas and calibration



Over 30 years of experience in gas calibration systems production

LNI Swissgas is a multinational reference in manufacturing premium gas mixers and gas calibrators for analytical, industrial and environmental application.

Gas calibration systems

Our gas calibration systems are produced in Versoix, Switzerland. LNI's premium gas mixers and calibrators are designed with passion and precision and include exclusive features adopting the latest technologies.

LNI Swissgas calibration types

LNI Swissgas devices are built in accordance with the **ISO 6145** standards about the dynamic dilution system, **state of the art and well recognized** methods of metrology, a must for LNI Swissgas. The principle of this technique is the dilution of a gas by a complementary gas like nitrogen or air. It shows many **benefits:**

LNI Swissgas methods used to perform calibration and linearization of gaz analyser and gas sensors through dynamic dilution system are:

- **Critical orifices** : Sonic nozzles
- **Thermal MFC**: Mass flow controllers
- **Permeation tubes**.

Costs reduction

Gas Cylinders removal

Flexibility

Generates any concentration quickly

Convenience

Automatisation of concentration sequences

LNI's Sonic nozzle systems



ISO 6145 – Part 6: Critical flow orifices

The principle of Sonic Nozzle systems, Used for our range of Sonimix 2106, Sonimix 2130, 3022 and 4001

Sonic nozzle

A sonic nozzle works according the principle of critical flow. A sonic nozzle is a very small Venturi tube (convergent-divergent) where specific inlet-outlet pressure conditions generate a shock wave at the minimal section and where the gas reaches the local speed of sound. At this stage the flow is independent of downstream conditions. A very high precision pressure regulator is used at the gas inlet of stream to maintain a very stable mass flow rate.

Sonimix 2106

Sonimix 2130

Sonimix 3022

Sonimix 4001

LNI's Sonic nozzle systems

The sonic nozzle technology provides additional unique benefits to our gas mixers:

Metrological performances*

Flow uncertainty of each channel below 0.2% of flow rate and 0.6% on generated concentration

Long term stability

Mechanical setup very simple, the stability last for several years

Constant Flow rate

Not affected by downstream pressure or pressure disturbances.

No warm up time

Working conditions and full specifications are reached immediately

Best accuracy

Simple mechanical setup.
No electronic signal measurement or flow regulation are needed
Silconert coating possible
Auto Diagnostic option

Low maintenance

Minimal number of mechanical and electronical parts

LNI's MFC systems



ISO 6145 – Part 7: Thermal MFC

The principle of MFC systems, used for our range of Sonimix 7100 and Sonimix 7050, 6000C1, 6000C2.

Thermal MFC

Mass Flow Controller (MFC) allow to control the flow of a specific gas through thermal heating properties. A sensing tube is installed into the gas flow channel which is equipped with a heater temperature sensors. As the gas flows through the tube, it is heated by the heating element and the temperature sensors detect the heat differences at the entry and exit. The gas loses heat at the exit and MFCs generate an electrical signal by detecting the heat differences .

Sonimix 7100

Sonimix 7050.

Sonimix 6000C1

Sonimix 6000C2

Application

The sonic nozzle technology and the MFCs principles are integrated in our gas mixers and gas calibrators range and provides big advantages compared with low concentration gas cylinders: better stability, accuracy and less expensive gas consumption. They are used for a wide range of applications such as calibration of instrumentation for ambient air and emission monitoring, engine emission in the automotive industry, specialty gases and R&D laboratories.



Application

In addition, LNI Swissgas is **ISO 17025** accredited and complete calibration process and report are provided not only for new devices but across it's whole lifetime.



LNI's permeation tubes

Permeation tubes

Permeation tubes are small containers filled with a pure chemical compound in a two-phase equilibrium between its gas phase and liquid phase.

Containers are in suitable inert polymeric material and at a constant temperature; the device emits the compound through permeable wall with a constant rate. The permeate is mixed with a carrier gas at a controlled flow rate to obtain a known mixture used as reference in gas testing equipment.



Permeation tubes application

A wide range of permeation rates can be made, normally from 20ng/min to max 10'000 ng/min, and accurate, stable concentrations range from ppb to low ppm. Permeation tubes are ideal devices in generation of calibration gas standard for:

- air quality analyzers and gas analyzers;
- FTIR;
- gas chromatograph;
- GC-MS;
- Ion Mobility Spectrometer.

LNI Swissgas SA (Switzerland)

Route des Fayards 243,
1290 Versoix
Tel. +41 22 979 37 24
Mail: info@lni-swissgas.com

LNI Swissgas Srl (Italy)

Via E.Mattei, 9
35038 Torreglia (PD)
Tel. +39 (0)2 89954237
Mail: italy@lni-swissgas.eu

LNI Swissgas (France)

7 rue le Bouvier,
92340 Bourg-La-Reine
Tel. +33 1 86 26 10 28
Mail: info@lni-swissgas.eu

LNI Swissgas GmbH (Germany)

Felix-Wankel-Str. 27
59174 Kamen
Tel. +49 2307 26161 45
Mail: info@lni-swissgas.de

LNI Swissgas Pte Ltd (SEA)

2 Gambas Crescent #06-19 Nordcom II
Singapore 757044
Tel +65 6258 1275
Mail: sales@lni-swissgas.sg

LNI Swissgas (China)

Tel. +86 13651822814
Tel. +852 94019625 (HKG)
Mail: Stanley.wong@lni-swissgas.eu

LNI Swissgas LLC (USA)

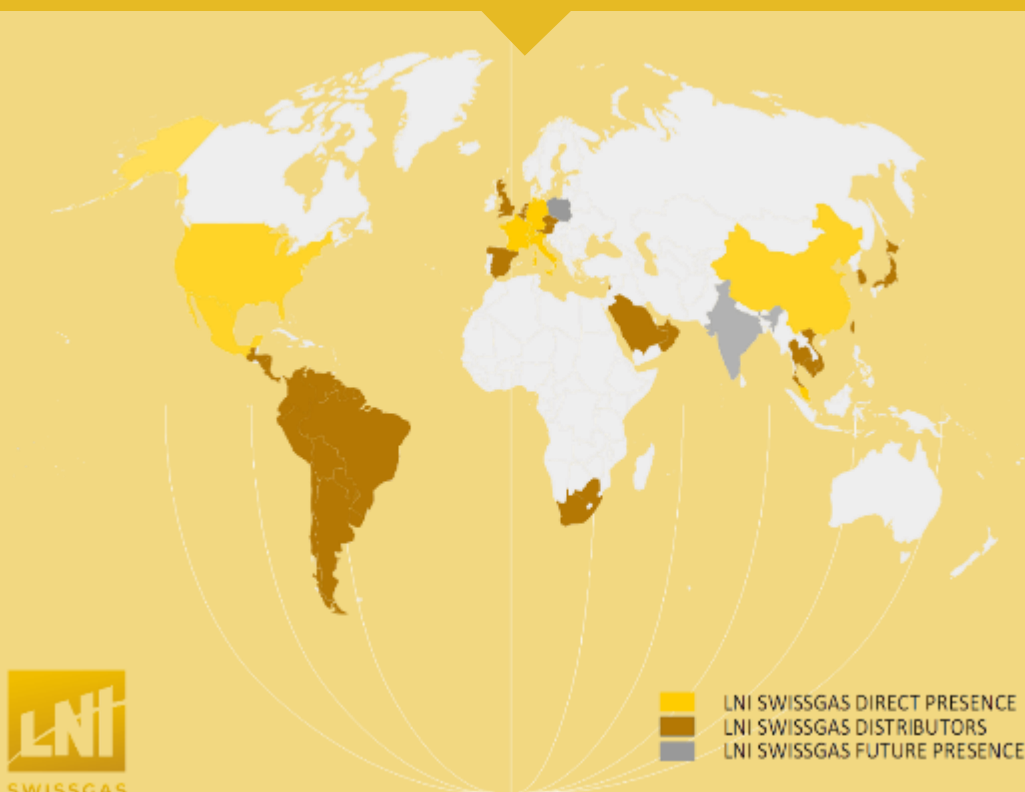
Boston MA 02129
Mail: info@LNISwissgasus.com

LNI Swissgas LATAM

Bldv. Nuevo Hidalgo #1123, Local 212
Fraccionamiento Los Cedros
C.P. 42185 Mineral de la Reforma,
Hidalgo, México
Tel: +52 1 771 240 9268
Mail: antonio.cruz@lni-swissgas.eu

www.lni-swissgas.eu

CONTACT US!



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