

## New Key Comparison ahead

In the second half of 2023 a new combined EuReGa intercomparison and EURAMET Key Comparison will start. For the first time the new Closed Loop pigsar (CLP) facility will be used in this comparison, which is the third facility in the EU to achieve 25000 m<sup>3</sup>/h and 60 bar. Also, the comparison will be conducted with a new set of DN600 meters: a new ultrasonic meter and a turbine gasmeter that was refurbished this year. Both meters range up to 25000 m<sup>3</sup>/h, which will expand the range of the harmonised cubic meter. All measurements will be performed in the second half of 2023. In addition to the 8, 20 and 60 bar measurements, measurements with atmospheric air will be performed to characterise the meters for use with the PTB turbine meter model [1]. The data processing will be done similar to a recent internal Chinese high-pressure intercomparison in which PTB also participated [2]. The new features will make the intercomparison exiting.

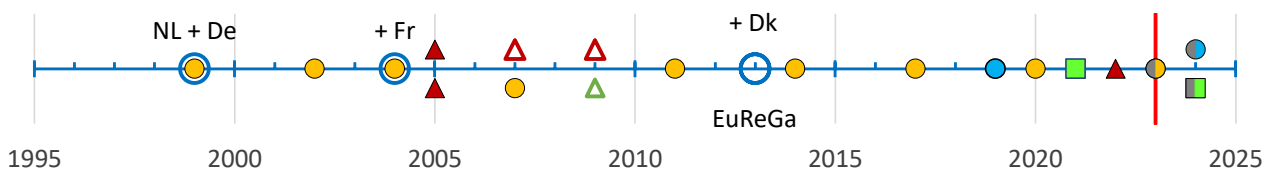


Figure 1: Updated timeline of intercomparisons using turbine gasmeters for high-pressure natural gas. The yellow dots indicate harmonisation intercomparisons, the solid red triangles BIPM key comparisons, the open red triangles subsequent bilateral comparisons, the green triangle a EURAMET bilateral comparison, the green squares EURAMET key comparisons and the blue dots the primary standards' intercomparison. Symbols marked with grey indicate planned intercomparisons. The big blue circles mark the dates at which the labs joined the harmonisation consortium. In 2013 the cooperation was renewed under the EuReGa label.

## EURAMET Key Comparison 2021

The acronym of the intercomparison is EURAMET.M.FF-K5.2021: Technical Protocol for the harmonization intercomparison of high-pressure gas flow standards. One of the prerequisites of key comparisons is that the measurement data will be made available in the report. However, during the intercomparison more than 3000 calibration points are collected. After data reduction there are still more than 500 records, which will require more pages than the rest of the report. For this reason,

the data will be published in csv (comma separated values) format on the BIPM website. A link to this file will be included in the report.

## Hybrid comparison

The bilateral comparison of the piston provers of FORCE and VSL is in its final stage. This comparison is a so-called hybrid comparison as a third party, in this case PTB, reviews the process. A flow chart of this process is schematically depicted in Figure 2. The draft report is ready and is being commented by the participants and reviewer.

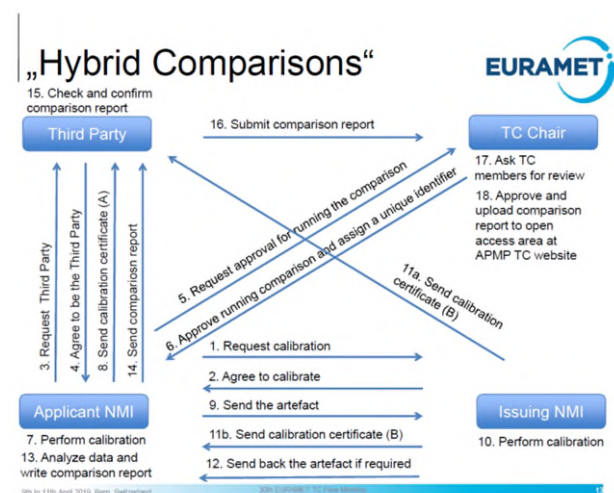


Figure 2: Flow chart of a hybrid comparison.

## Secretariat from PTB to FORCE

On the 13<sup>th</sup> of December the EuReGa secretariat was formally transferred from PTB to FORCE Technology. The new secretary is Kurt Rasmussen. Kurt Rasmussen has been employed at FORCE Technology by more than 25 years with activities within testing and calibration of gas-meters.

From January the Assembly of Representatives consists of Erik Smits (VSL), Julia Hornig (PTB), Henri Foulon (LNE-LADG), Lars Hedemann Hilligsøe (FORCE Technology).

The Team of Experts consists of Bodo Mickan, Thomas Lorenz, Jos van der Grinten (PTB), Detlef Vieth (pigsar), Christophe Windenberger, Abderrahim Ouerdani (LNE-LADG), Fares Ben Rayana, (RICE/GRTgaz), Jesper Busk (FORCE Technology), Menne Schakel, Marcel Workamp (VSL), Roy van Hartingsveldt, Mijndert van der Beek (Euroloop) and Kurt Rasmussen (FORCE Technology, Secretary).

## Outlook

For next year the following activities have been planned, which is graphically displayed in Figure 1.

- In 2024 a primary intercomparison of all primary standards of EuReGa participants will take place. Césame and PTB will use three sonic nozzles. FORCE, VSL and PTB will use piston provers to calibrate a dual piston rotary gasmeter. As the sonic nozzles will be calibrated using PTB's piston prover all labs can be compared.
- The acceptance tests of the new 24" ultrasonic meter and the refurbished 24" turbine meter will be ready before the 2023 intercomparison.

## Conclusion

With the successful completion of the harmonisation exercise, its upgrade to EURAMET key comparisons and the settlement of the EuReGa governance, EuReGa looks back at a successful period. In addition, EuReGa has many plans for the years to come.

## References

- [1] Jos G.M. van der Grinten, Arnthor Gunnarsson, Mijndert van der Beek and Bodo Mickan (2019): [An intercomparison between primary high-pressure gas flow standards with sub-permille uncertainties](#), 35<sup>th</sup> International North Sea Flow Measurement Workshop, Tønsberg, Norway, 22 - 24 October 2019, Reprinted in Cal Lab: The International Journal of Metrology, [vol 27\(4\), 2020](#), pp 28-35.
- [2] Mengna Li, Bodo Mickan, Chunhui Li, Jia Ren, Yan Wu, Ming Xu (2022): The comparison of the gas flow secondary standard facilities at high pressure, Flomeko 2022, 1 - 4 November 2022, Chongqing, China