QUALIMETRIC · CALIBRATION SYSTEMS

System Flyer
Rev. C · 2026
Config: STD-NB

GasCatena

Gravimetric calibration-gas preparation, from weighing to a traceable certificate.

A web application for gravimetric calibration-gas preparation with a full GUM uncertainty budget, accreditation-scope check and traceable certificate — running in your browser, on your choice of computer, alongside your existing analytical balance.



01 THE SYSTEM

GasCatena turns your weighing bench into a source of **primary reference standards**. It prepares gravimetric calibration gas mixtures — the composition fixed by weighing, a primary method, rather than derived by comparison against another standard. Every cylinder you fill is therefore a reference standard in its own right, with a composition **traceable to the SI** through the gravimetric procedure (a calibrated balance and ISO 6976 molar masses) and a complete GUM uncertainty budget (k = 2), following ISO 6142 / ISO/IEC Guide 35.



GRAVIMETRIC MIXTURE
IN A 5 L CYLINDER

Every batch leaves the balance **audit-ready**. A full traceability certificate — PDF and structured data — documents the entire chain, from weighing and gas purity through molar mass, dilution and normalisation, propagated per the GUM and reported in line with EA-4/02. Each mixture is checked against your accreditation scope (CMC), and the ambient conditions are monitored against it, giving you the confidence to issue reference gases under an **ISO/IEC 17025-accredited** scope.

Best of all, you prepare exactly the standards you need **on demand and in-house** — cutting lead times, repeat orders and your dependence on external fill houses, while keeping full control over composition, cost and quality. A guided, step-by-step workflow sets each target from the real-gas law and enforces stability, weighing-direction and cooling checks, so results stay consistent and repeatable, operator after operator. The web application runs in your browser on your choice of computer and works alongside your existing analytical balance — so you are productive without investing in new metrology hardware.

02 WHAT IS INCLUDED

SOFTWARE

GasCatena application

The complete GasCatena application — guided preparation, GUM uncertainty budget, accreditation-scope check and traceable certificate — pre-installed, configured and verified.

SENSOR

Aura1 — T / p / RH module

Recommended on every system: its measured temperature, pressure and humidity feed the per-weighing air-buoyancy correction. Without it, the achievable uncertainty of the produced gases is higher.[1]

SERVICE

Install guide & one year support

Written installation and commissioning instructions plus twelve months of software support.

03 PLATFORM

RUNS ON

Your choice of computer

Runs on a compact **single-board computer (SBC)** for an embedded appliance, or on a standard **Windows, Linux or macOS** system — on-device and offline-capable, no cloud account required.

SOFTWARE

Browser-based web application

GasCatena is a **web application**, used through a standard web browser — touchscreen-operated at the bench, or with keyboard and mouse. It runs as a local service on the device; reachable from another device on the lab network if desired.

04 SOFTWARE CAPABILITIES

METROLOGY

Full uncertainty budget

Mixture composition with a complete GUM uncertainty budget, plus ISO 6976 calorific value, Wobbe index, density and compression factor — each with its own uncertainty.

BUOYANCY

Per-weighing buoyancy correction

With the Aura1 fitted, the measured ambient T / p / RH^2 correct every individual weighing for air buoyancy as a traceable input — lowering the weighing uncertainty and, in turn, the uncertainty of the final composition.[3]

PRESSURISATION

Cooling policy & residual term

After a large pressure step the cylinder warms and briefly reads low until it re-equilibrates. GasCatena enforces a configurable cooling wait and accounts for the small bias that remains afterwards as a dedicated uncertainty term on the pressurised balance component — independent of the gas.

WORKFLOW

Guided preparation

Step-by-step weighing with target pressure from the real-gas law, an expected reading per step, stability and weight-direction checks, and a configurable cooling-time policy after large pressure steps.

ACCREDITATION

Scope (CMC) check

Verifies every mixture against one or more accreditation scopes, and monitors the Aura's ambient readings against the scope limits — or your stricter internal specifications — for temperature, barometric pressure and relative humidity.

RECORDS

Traceable certificate

A full preparation record per batch as PDF and machine-readable **ISO 23219 XML** (composition, uncertainty and ISO 6976 properties), including a per-weighing ambient snapshot (P/T/RH) with in-/out-of-limit flags against the scope.

CATALOGUE

Lab data management

Base gases — pure and pre-mixture, with declared impurities — plus cylinders, balances with calibration history, and an ISO 6976 component library.

OPERATIONS

Roles & one-click backup

Role-based access (operator / manager / auditor / administrator), with the auditor read-only, and a single-click Excel export of all lab data for back-up and review.

05 SPECIFICATIONS

SOFTWARE	
Application	GasCatena — gravimetric calibration-gas preparation
Computation	Mixture preparation with uncertainty budget per ISO 6142 / ISO 6976 / Guide 35 framework
Interface	Browser-based web application, touch-operated (Streamlit)
Operation	Runs fully on-device · offline-capable · no cloud account required
Output	Preparation records and reports for documentation and archiving

UNCERTAINTY BUDGET	
Sources included	Weighing (balance certificate: readability + scale error, with before/after correlation) · purity of each parent gas · molar mass from atomic-weight uncertainties · dilution / blow-off step · normalisation
Additional terms	Configurable expanded relative contributions from process studies, combined linearly or in quadrature
Buoyancy correction	Per-weighing air-buoyancy correction from the Aura1's T / p / RH as a traceable input[2] — reduces the buoyancy contribution to the weighing and to the composition uncertainty[3] (Aura recommended on every system)
Method	GUM law of propagation of uncertainty · combined standard uncertainty · expanded $U = k \cdot u$, $k = 2$
Normalisation	ISO 14912 covariance propagation under the $\Sigma y = 1$ constraint, with a covariance matrix per result
Derived properties	ISO 6976 calorific value, density, Wobbe index and compression factor — each with its Annex B uncertainty
Reporting	Budget evaluated per the GUM (JCGM 100) and aligned with EA-4/02, suitable for ISO/IEC 17025 measurement-uncertainty reporting

PLATFORM & HARDWARE	
Runs on	A standard PC or a compact single-board computer, such as an NVIDIA Jetson — on-device and offline-capable
Operation	Touchscreen-operated (≥ 15"), with a lab-grade keyboard
Delivery	Delivered ready-to-run — installed on your chosen SBC or PC, or supplied pre-configured on request[5]

ENVIRONMENTAL MODULE — AURA1	
Measured	Pressure · temperature · relative humidity
Sensing	Humidity/temperature sensor supplied factory-calibrated, without a certificate; barometric pressure sensor calibrated as an option[2]
Interface	USB-C to the computer (MCP2221A USB-I²C bridge); digital temperature/humidity and pressure sensors on the module's internal I²C bus — read on demand by the application
Role	Traceable input to the per-weighing buoyancy correction · monitoring of ambient conditions against scope or internal limits · recommended on every system[1]

06 SERVICES & SUPPORT

Delivery INCLUDED

- Pre-installed, configured and function-tested before shipping
- Written installation and commissioning instructions
- Guided first start-up and verification of the station

Support 12 MONTHS

- Software updates and fixes for one year
- Remote assistance for setup and operating questions
- Extension and maintenance plans available on request

— NOTES

1. **Aura1 environmental module.** The Aura logs pressure, temperature and relative humidity throughout preparation and is recommended on every system: its readings are used as inputs to the per-weighing air-buoyancy correction, which lowers the buoyancy contribution to the weighing uncertainty and therefore to the uncertainty of the final composition. Without the Aura this correction cannot be applied and the achievable uncertainty is higher. The overall traceability of the certified composition rests on the gravimetric procedure and the analytical balance; the Aura's ambient measurements enter that result through the buoyancy correction. The Aura also monitors whether ambient conditions stay within the accreditation scope or your stricter internal specifications.
2. **Sensor calibration.** The humidity/temperature sensor is factory-calibrated but supplied without a calibration certificate. For the pressure reading to act as a traceable input to the buoyancy correction, the barometric pressure sensor must be calibrated; this is available as an option and the Aura can be supplied with a pre-calibrated pressure sensor.
3. **Buoyancy correction — current status.** The per-weighing air-buoyancy correction is computed and reported on every certificate and in the application. It is not yet applied to the *certified* uncertainty: following a reproduce-then-switch approach, it enters the certified budget only after accreditation validation (RvA). Until then the certified figures use the read mass and the established process-study term, so the uncertainty reduction described above is realised on completion of that validation.
4. **Balance.** An analytical balance is not included in the system and is connected from the customer's existing equipment.
5. **Configuration.** Compute platform (SBC or a Windows / Linux / macOS system), screen and peripherals are chosen per deployment. Specifications are indicative and subject to component availability.

IN DEVELOPMENT · EXPECTED EARLY 2027

Register interest

Qualimetric
Chemometrics · Metrology · Lab automation
Mill, Land van Cuijk · Netherlands
info@qualimetric.nl · nexchrom.nl/gascatena