TECHNICAL GUIDE

FLEC® material-emission testing

A practical guide to the emission cell, controlled air, specimen preparation, sampling, maintenance and reliable results.

Field and Laboratory Emission Cell

Laboratory • On-site • Quality control

Measure material emissions - where they matter.

ISO 16000-10 | ASTM D7143-24 | NT BUILD 438 / 484

FLEC-TG-001 | Revision 2.5 | 21 September 2026

From test question to result

Use this guide with the selected standard, the analytical laboratory protocol and the instructions for the actual equipment.

What this revision adds

- A practical leak-test and tube-installation sequence, illustrated with photographs from the 2016 operator manual.
- Expanded guidance on paint and carpet plates, field supports, recovery measurements, cleaning and protected storage.
- Clear separation of product capability, ISO requirements, worked examples and laboratory decisions.

Document basis and status

The detailed ISO requirements in this guide were checked against the supplied corrected ISO 16000-10:2006 text. Confirm the edition required by the test contract before use. The guide does not replace the complete standards or establish scheme acceptance.

The complete measurement chain

The material forms the lower wall of the cell. Clean, humidified air enters around the perimeter and flows across the surface towards the central sample outlets.

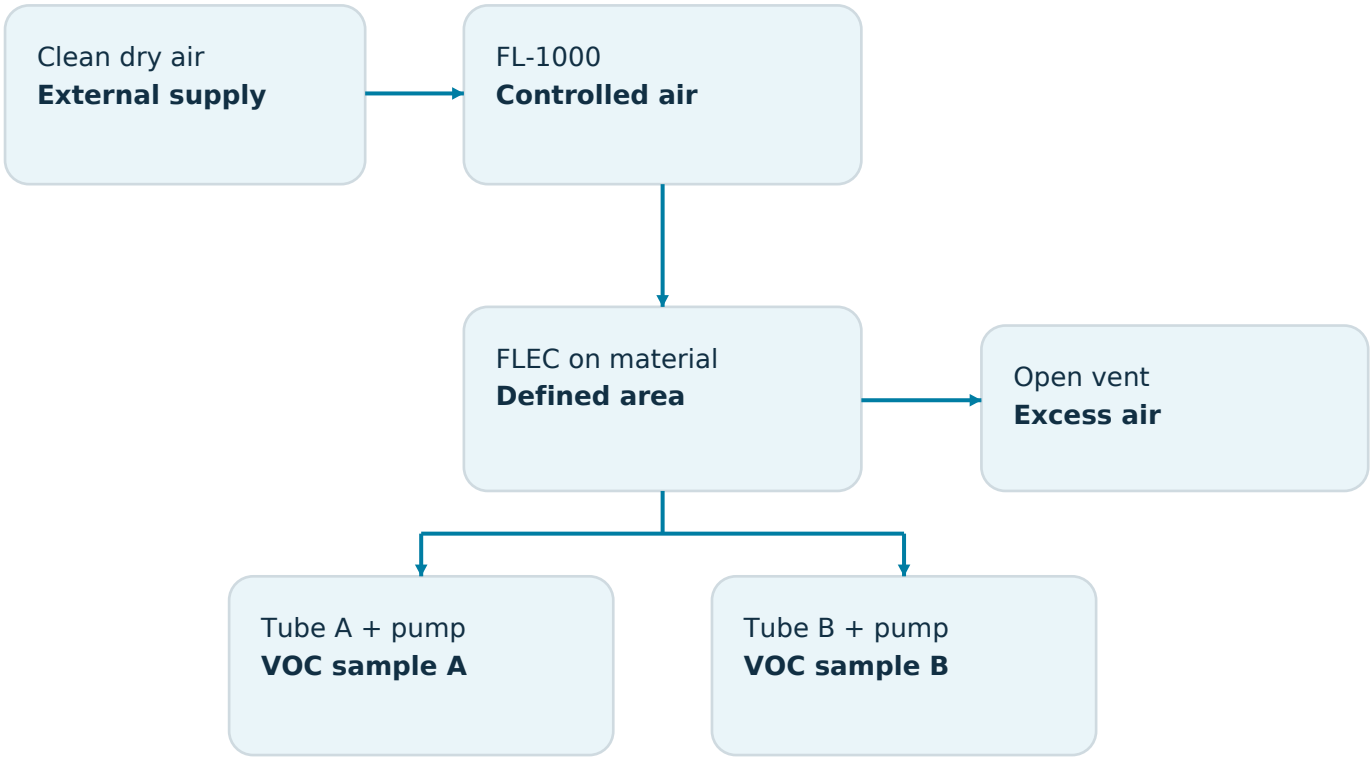


Figure 1. Functional layout for paired VOC sampling. Conceptual only; the actual cell has two sample outlets and a separate excess-air vent.

Define each part of the result

- The cell and specimen define the emission conditions; the laboratory identifies and quantifies compounds.
- Two matched sorbent tubes can provide duplicate VOC samples. A VOC tube and a DNPH cartridge measure different analytes and are not a duplicate pair.
- FLEC measures emissions from the exposed surface. It does not directly measure occupant exposure or automatically reproduce a chamber result.

Core relation

Area-specific emission rate = corrected outlet concentration × total cell airflow / exposed area.
The volume sampled through one tube is used for concentration; total cell airflow is used for emission rate.

FL-0001 geometry and flow

Record the actual exposed area and total inlet flow. A holder or reduced opening can change the area and the free volume used in calculations.

Weight	4 kg
Exposed area A	177 cm² = 0.0177 m²
Cell volume V	35 cm³ = 35 mL
Outside diameter	200 mm
Height	20 mm / 85 mm with fittings
Contact surfaces	Polished acid-resistant stainless steel

FL-0001 FLEC Cell

Flow / connection	Product data
Inlet flow	100-500 mL/min
Combined flow to sampling tubes	80-400 mL/min
Excess-air vent flow	20-100 mL/min
Surface air velocity	0.35-1.75 cm/s
Sample connections	Two 1/4 in outer-diameter tubes; suitable adapters for other dimensions

Derived operating points

Qin (mL/min)	n = Q / V (h⁻¹)	q = Q / A (m³/(m²·h))
100	171	0.339
300	514	1.017
500	857	1.695

Use calculated values for the chosen operating point

At 35 mL, the stated 100-500 mL/min inlet range gives approximately 171-857 air changes per hour. The catalogue range of 100-1000 h⁻¹ should not replace the calculated value for a specific Q and V. L = A/V ≈ 506 m²/m³. ISO 16000-10:2006 specifies surface air velocity of 0.003-0.3 m/s.

Supply clean, controlled air

The FL-1000 controls airflow and humidity. Verify the delivered conditions with independent, calibrated instruments at the complete setup.

External air	Clean, dry air; 2-10 bar
Total delivery range	0-500 mL/min
Per flow channel	0-250 mL/min
Humidity range	0-90 % RH
Humidifier / condenser	400 mL / 75 mL
Humid-air materials	Stainless steel, PFA and glass

How the air is conditioned

An interchangeable activated-charcoal filter removes trace organic contamination. A portion of the air is humidified; mixing it with the dry stream produces the required relative humidity. Use pure water without interfering VOCs and verify the actual outlet RH after stabilisation.

Connection / control	Specification
Air-supply connection	1/8 in Swagelok
Connection to the FLEC Cell	1/4 in Swagelok; PFA tubing
Pressure regulator	0-7 bar adjustment range
Humidifier safety valve	Opens above 1 bar; this is a safety function
Weight / overall dimensions	9.0 kg / 560 × 310 × 225 mm

Supply pressure is not cell pressure

The 2-10 bar specification applies to the upstream air supply. The FLEC operates only slightly above atmospheric pressure with excess air venting freely. Follow the FL-1000 operating instructions for regulator setting, filling and depressurisation; keep liquid water out of the cell and sampling lines.

Verify climate and background

Select the test setpoint from the method. Instrument capability, measured conditions and method tolerances are separate records.

23 ±2 °C
Temperature / tolerance

50 ±5 %
Relative humidity / tolerance

±5 %
Cell flow / set value

ISO 16000-10:2006 specifies 23 °C and 50 % RH for products used in Europe, with the tolerances above. Other application climates need a documented method basis. Keep the selected area-specific airflow constant.

Independent measurement

Parameter	Instrument accuracy	Measurement position / practice
Temperature	±1.0 °C	In the cell or at the air outlet
Relative humidity	±3 % RH	At the air outlet
Airflow	±3 %	Calibrated flow measurement; check before sampling

Background before each new test

- Place the cleaned cell on an inert, clean, flat glass or stainless-steel surface and run the selected air conditions.
- Measure the empty-cell background using the relevant analytical path. In the 2006 method, each target VOC must be below 2 µg/m³ and TVOC below 20 µg/m³.
- The supply air and humidifier water must not introduce interfering VOCs. A compliant numerical background can still be too large for the intended reporting limit.
- Record the blank result, air conditions, instrument IDs and calibration status before installing the specimen.

Keep the flow check representative

A temporary flow meter may add back pressure and reduce the measured flow. Use a low-pressure-drop meter suited to the range, and verify the assembled sample train rather than a pump alone.

Set the inlet and sampling flows

Sampling removes only part of the inlet air. Keep a positive excess flow through the vent during sampling.

ISO sampling-flow criterion

Sum of sample flows < 0.90 × inlet flow.
This is a sampling-flow allocation limit, separate from the leak-tightness criterion on page 8.

Practical example from the 2016 manual

250	100	100	50
Inlet / mL/min	Tube A / mL/min	Tube B / mL/min	Vent / mL/min

The tubes collect 200 mL/min in total, or 80 % of the inlet. The remaining 50 mL/min exits at the vent. The ISO sampling limit at this inlet flow is strictly below 225 mL/min. These values are a worked setup example, not a universal sampling prescription.

Before sampling	What to record
Set total inlet flow	Actual Qin at stable temperature and RH
Calibrate each pump	Actual tube or an equivalent tube with matching pressure drop
Confirm the sample budget	Qsample,A + Qsample,B and the remaining vent flow
Check leakage	Inlet vs complete outlet flow with no unmeasured open path
After assembling the final train	Vent open, tube direction correct, fittings tight, pumps initially off

Two analytical paths require a different plan

If one outlet feeds a VOC tube and the other a DNPH cartridge, validate each path separately. They measure different analytes and are not duplicates. Provide the required duplicate VOC samples using an accepted manifold or another defined procedure.

Flow units must share the same basis

Record whether the flow instrument reports actual or reference-condition volume. Compare inlet, outlet and sampled volume on a consistent temperature and pressure basis. A negative or unstable vent balance calls for investigation before sampling.

Leak-test the assembled cell

Check at the start of the emission test and after disturbing a seal or connection. Use a meter that adds minimal back pressure.

A Sample outlets closed

B Vent tube fitted for flow check

ISO criterion

<5 %

Relative difference between inlet flow and complete outlet flow.

Use the inlet as the reference when recording the balance in this guide.

1. **Prepare the seal**

   Inspect the O-ring and the specimen contact surface. Place the cell on the chosen flat surface without twisting or contamination.

2. **Create a defined outlet path**

   Keep pumps off and isolate the air supply while configuring the outlets. Close the sample outlets, fit the vent tube and meter, then restore the inlet flow. Measure all outlet air; alternatively sum every open outlet.

3. **Record and compare**

   After stabilisation, record Qin and Qout on the same basis. Relative difference = 100 × |Qin - Qout| / Qin. At Qin = 250 mL/min, Qout = 240 gives 4 %; 237.5 gives exactly 5 % and does not pass the strict criterion.

4. **Resolve a failed balance**

   Check surface flatness, O-ring seating, outlet stoppers, fittings and meter back pressure. Repeat the measurement after correction; do not compensate by merely increasing the supply.

Install the sample tubes correctly

Use the hardware sequence below for compatible 1/4 in sorbent tubes. Agree adapters and alternative media arrangements with the laboratory.

C Tubes positioned against the spacer

D Spacer replaced by the vent tube

1 Prepare the sampling train

Set and verify each pump flow with representative conditioned tubes. Switch the pumps off. Uncap the sample tubes immediately before use; keep the storage caps clean.

2 Orient and position the tubes

Connect each tube outlet to its pump. Fit the spacer and insert the sampling ends until they touch it. Check direction from the tube instructions; a groove is a legacy feature, not a universal marker.

3 Open the excess-air route

Remove the spacer and fit the vent tube. The legacy arrangement leaves an approximately 2 mm gap between the inner tube ends. Keep the vent uncapped during sampling.

4 Secure and start

Seat fittings gently and follow their tightening instructions; avoid crushing tubes or overtightening. Confirm stable inlet flow and an open vent, then start the pumps and record the start time.

5 Stop, cap and identify

At the specified end time, stop the pumps, disconnect the tubes and cap both ends immediately with clean, compatible storage caps. Label each tube and record duration, actual sample volume and laboratory storage requirements.

Keep the spacer and vent functions distinct

The tube spacer sets insertion depth; the vent tube provides the excess-air path. Do not start sampling with the spacer or a cap blocking that path. Sampling tubes are fitted at collection time, after conditioning or equilibration.

Match sampling to the compound

Agree target analytes, expected concentrations, required sample volumes, reporting limits and duplicate strategy before choosing the media.

VOC sampling

- Collect a measured outlet-air volume through a conditioned sorbent tube.
- Use thermal desorption with GC-MS or MS-FID as appropriate to the laboratory method.
- Confirm target-compound recovery, sample capacity and the permitted volume for the actual temperature and humidity.

Carbonyl sampling

- Use validated DNPH/HPLC methods for formaldehyde and applicable carbonyl compounds.
- Acrolein: Annex A uses sorbent tubes, thermal desorption and GC-MS; DNPH is not reliable for quantitative results.
- ISO 16000-3:2026 covers sampling and analysis, not the emission-cell generation method.
- Confirm background, ozone, humidity, flow and storage controls with the laboratory.

Sampling records that the laboratory needs

Record	Purpose
Medium ID, type and conditioning / batch	Trace each sample to its blank and analytical preparation
Direction and actual sample flow	Ensure the intended air volume passed through the active medium
Start, stop, elapsed material time	Keep sample duration separate from the age of the material
Sample volume and flow reference basis	Convert collected mass to outlet concentration
Caps, transport and storage conditions	Control contamination and losses before analysis

Duration follows the analytical objective

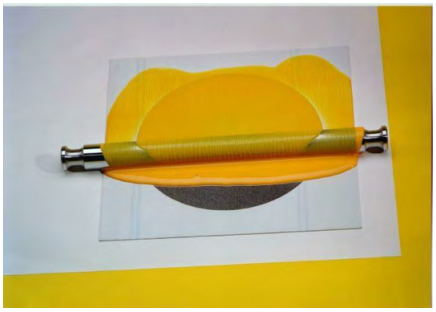
The 2016 manual describes collections of about 15-20 minutes as an example. Choose duration from the target mass, reporting limit, media capacity and safe sampling volume. The same period will not suit every tube, compound or concentration.

Do not subtract blanks twice

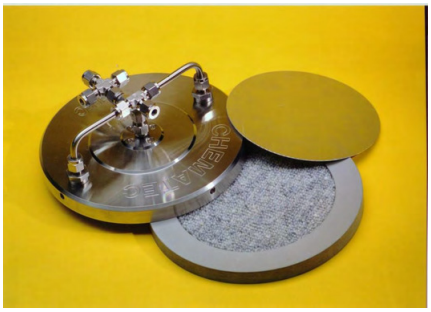
Ask the laboratory whether reported masses or concentrations already include media-blank correction. Apply cell-background correction separately, compound by compound, and keep the calculation traceable.

Prepare coatings, carpets and textiles

Keep the emitting face and exposed area well defined. Record substrate, amount applied, thickness, preparation time and conditioning history.



FL-0160 roller and FL-0161 coating plate



Carpet specimen and test plate

Paints and coatings

The FL-0161 plate uses laminated foil to define coating thickness and test area. Apply approximately 2 mL with the FL-0160 roller, then remove the foil. Record the actual application mass or amount per area; the approximate volume does not define the required coating load.

Define drying or curing from the chosen protocol; identify early wet-phase studies explicitly. Record application and cell-placement times separately. Use a substrate blank where its contribution could matter.

Carpets and flooring

Accessory	Function
FL-0150	Carpet / textile plate for samples up to 10 mm thick
FL-0152	Carpet / textile plate for samples up to 25 mm thick
FL-0151	1 mm adapters to raise the specimen face to the required level

Fit the specimen so its face is level with the base of the cell where required. Avoid unnecessary compression of the pile, gaps at the perimeter and unrecorded exposed cut edges. Check the seal on the assembled specimen rather than assuming a plate guarantees tightness.

Define the applicable test mode

State the actual specimen preparation and method basis, including the substrate, exposed area, application amount and conditioning history. The use of a test plate alone does not establish conformity with a test method.

Use Sub-Units for chamber mode

An adjustable lower chamber extends the specimen options. The assembled free volume, sample area and method must be defined for each test.

Base lowered

Base raised

Sub-Unit with FLEC

Parameter	FL-2001	FL-2002
Internal diameter	150 mm	152 mm
Chamber height adjustment	0-100 mm	0-100 mm
Weight	13.5 kg	13.5 kg
Overall dimensions	H 220 mm; OD 200 mm	H 220 mm; OD 200 mm
Typical distinction	General specimen chamber	152 mm ID; Petri-dish use

Set up and document the chamber

- Adjust the base height to suit the specimen and record the setting. Allow for the volume displaced by the specimen and holder.
- For dynamic headspace, define airflow and calculate with the actual free volume and the chosen result basis. For static headspace, use a separate validated procedure.
- Do not reuse the 35 mL direct-cell volume for a raised chamber. Record whether the result is area-, mass-, volume- or item-specific.
- Where heating is required, confirm the permitted temperature of the complete assembly, seals, tubing and specimen with the manufacturer.

Measure installed floors, walls and ceilings

The surface history, local conditions and seal are central to an on-site source investigation. Record the precise test location and orientation.

Practical field sequence

1. **Select representative positions**

   Document flooring or coating type, installation age, maintenance, cleaning, damage and suspect source areas. Photograph and identify each position; include a comparison area where useful.

2. **Prepare a stable support**

   Use the FL-0210 telescope kit and the correct wall or ceiling attachment. Support the cell securely and route tubing so it does not pull on the fittings or disturb the seal.

3. **Verify the actual conditions**

   Record room and surface conditions and the supplied-air flow and RH. Check that the O-ring sits uniformly on the tested surface, then perform the flow-balance check.

4. **Collect and protect the samples**

   Follow the defined conditioning period and sampling plan. Keep the vent free, identify field blanks and cap samples promptly. Record interruptions or movement of the cell.

Identify older support hardware

Legacy part	Description in the 2016 manual
FL-0200 / FL-0201	Telescope 2-3.5 m / additional 1 m extension
FL-0202 / FL-0204	Wall clamp / ceiling clamp
FL-0203	Pump clamp

These codes identify legacy components. Check the contents, reach and compatibility of the actual kit; do not assume every current FL-0210 package contains all older parts.

Report a source investigation as a source investigation

ISO 16000-10:2006 acknowledges on-site use but does not describe the on-site procedure. Use the specified field protocol, such as NT BUILD 484 where applicable, and state deviations. A surface result alone does not establish room-air exposure or a product-certification outcome.

Keep material age and sampling time separate

Define time zero in the test plan. Never reset the material clock when the sampling pumps are switched on.

Stage	Action and record
1. Define	Purpose, standard edition, analytes, exposed area, planned test times and acceptance limits.
2. Receive and prepare	Production, receipt, unpacking, application and preparation dates; storage and specimen history.
3. Clean and blank	Clean the cell and accessories; establish the empty-cell background.
4. Place and stabilise	Record cell-placement time; verify seal, flow, temperature and RH.
5. Sample	Fit media at collection time; record start and stop, actual flow, volume and deviations.
6. Review and report	Check blanks, duplicates and recovery; calculate results and document the method basis.

Timing under ISO 16000-10:2006

- Predefine sampling times and record sampling duration. The supplied 2006 text specifies duplicate air samples at 72 ±2 h and 28 ±2 days after the start of the test.
- If a specimen is removed during long-term testing, store it under the prescribed controlled conditions, prevent cross-contamination and document each removal. Reintroduce it at least 24 h before air sampling.
- Additional decay measurements may be useful; the 2006 text gives 1, 3, 7, 14, 28 and 56 days as an example. Short QC schedules require their own defined protocol.

A planning example

If the agreed test clock calls for collection to begin at 72 h, plan the required conditioning interval before that point. Record both the age of the specimen and the time the cell has been in place. A nominal 15-20 minute collection period from the old manual is not a universal requirement.

Specify conditioning and curing

The 2016 manual describes shorter equilibration for QC and longer periods for standard testing. Choose the period from the governing protocol and measured stability. Define the test objective before setting equilibration or curing requirements.

Clean, verify and protect the cell

A clean-looking cell can still contribute VOCs. Use background measurements to demonstrate readiness after cleaning or a high-emission sample.

1. **Inspect without contaminating**

   Handle with clean gloves and avoid touching the polished inner surface. Inspect the silicone O-ring for damage, particles, deformation and correct seating.

2. **Use a documented cleaning route**

   The supplied ISO 16000-10:2006 detergent route uses diluted alkaline detergent, two separate fresh distilled-water rinses, then non-denatured ethanol or another appropriate solvent. Use low-lint materials and avoid residues.

3. **Treat the seal and fittings separately**

   Remove the O-ring when needed for inspection and cleaning. Confirm the cleaning-agent and temperature compatibility of each component. Do not apply an unverified cell-cleaning treatment to pumps, media, seals or the air controller.

4. **Dry, reassemble and test the background**

   Allow the cleaned assembly to dry, reassemble correctly, and flush with clean air under the intended test conditions. Repeat the blank and tightness check before testing a specimen.

Thermal cleaning: use the documented limits

ISO 16000-10:2006 clause 11.2 describes 70-100 °C overnight in a vacuum oven. Use the applicable approved procedure and the permitted temperatures for the actual assembly.

Do not carry over the ambiguous higher-temperature print in the 2016 manual as an instruction. Avoid aggressive chloride-containing or chlorinating cleaners, and keep hydrochloric acid away from the polished stainless-steel surfaces. Remove solvent before thermal treatment.

Protected storage after verification

- Close the sample outlets and use the tube spacer / storage closures when the clean cell is not in use.
- Use a clean, low-emission protective bag or equivalent enclosure. The old manual suggests a Rilsan bag; verify that the selected packaging does not raise the background.
- Store dry, protect the sealing face and keep caps and fittings clean. Recheck the background if storage conditions or contamination history warrant it.

Keep QA/QC evidence with the result

A test result depends on the complete system: specimen handling, air generation, cell, sample media, laboratory analysis and records.

Control	Acceptance / evidence
Tightness	Inlet and complete outlet flow differ by less than 5 %.
Sample-flow allocation	Sum of sample flows is less than 90 % of inlet flow.
Cell background	Each target VOC <2 µg/m³ and TVOC <20 µg/m³ under the 2006 method; also suitable for the intended reporting limit.
Recovery	Toluene and n-dodecane on an inert surface; concentrations determined at 24 h; mean recovery greater than 80 % as specified in clause 6.6.
Duplicates	Matched replicate air samples at the method times; retain both concentrations and the precision assessment.
Environment	Independent temperature, RH and flow checks, with valid calibration and continuous records as needed.

The six record groups

Record group	Keep with the test
Sample	Receipt, storage, preparation, identity and disposition
Calibration	Flow, environmental instruments and analytical calibration
Maintenance	Repairs, cleaning, service, replacement seals and instrument status
Test	Cell configuration, sample location, run IDs, timing and deviations
Media	Tube / cartridge preparation, blank, batch and analytical QC
Data	Raw files, calculations, review, version and responsible person

A failed control needs a technical response

Investigate leakage, contamination, calibration or recovery before releasing affected results. Keep the original data and record the corrective action. Do not hide a failed control by averaging it with a passing result.

Measure recovery with a known source

The FL-0100 kit supports comparison of a measured evaporation rate with the concentration recovered at the cell outlet.

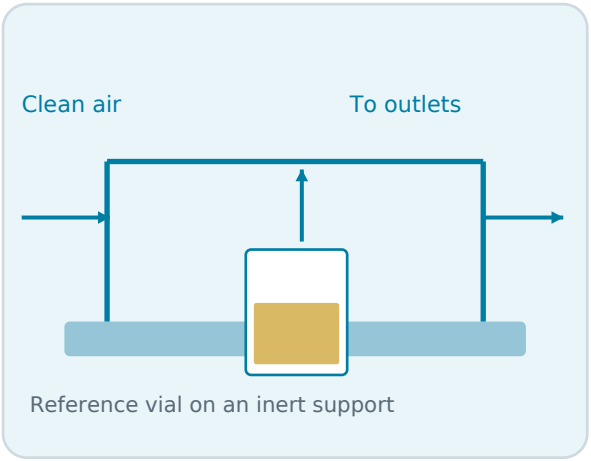


Figure 2. Conceptual recovery setup. The glass plate and vial position must follow the actual kit instructions.

rref = (mstart - mend) / Δt
Reference emission rate

Cexpected = rref / Qcell
Expected outlet concentration

1. **Establish the reference release**

   Place a known compound in the vial and weigh before and after exposure. Use the actual test flow, RH and temperature. Choose an interval and balance resolution that give a defensible mass-loss measurement.

2. **Use matching time windows**

   Position the vial and cell on the kit plate as instructed. Verify a stable reference release and determine the expected concentration for the period actually sampled. Do not compare a long-term average evaporation rate with an unrelated transient sample.

3. **Measure and compare**

   Collect and analyse the outlet sample with the selected method. Recovery (%) = 100 × background-corrected measured concentration / expected concentration. Keep reference generation independent of the analytical calibration.

Account for air that was not sampled

Only part of the cell outlet air reaches a tube. For a constant source:
Expected tube mass = rref × (Qtube / Qcell) × sample duration.
Use compatible time and flow units. Comparing total vial mass loss directly with mass on one or two tubes underestimates recovery because excess air also leaves through the vent.

Illustrative check: rref = 1.5 µg/h and Qcell = 0.015 m³/h give Cexpected = 100 µg/m³. A 100 mL/min tube sampled for 20 min collects 0.002 m³, so its expected mass is 0.200 µg. A corrected measured mass of 0.180 µg gives 90 % recovery. This example does not replace the 24 h ISO recovery assessment.

Calculate area-specific emission rates

Keep tube sample volume, total cell airflow and exposed material area distinct. Retain units and show every correction.

Calculation sequence

Cout = mcorr / Vsample
q = Qcell / A
qA = (Cout - Cbackground) × q

Step	Worked example
1. Sample volume	Tube flow 100 mL/min × 60 min = 6,000 mL = 0.006 m³
2. Outlet concentration	Corrected tube mass 0.606 µg / 0.006 m³ = 101 µg/m³
3. Area-specific airflow	Cell flow 300 mL/min = 0.018 m³/h; A = 0.0177 m²; q = 1.017 m³/(m²·h)
4. Background correction	Cout = 101 and Cbackground = 1 µg/m³; net concentration = 100 µg/m³
5. Emission rate	qA = 100 × 1.017 = 101.7 µg/(m²·h)

Flow conversion: 1 mL/min = 0.00006 m³/h. Use the measured empty-cell background obtained under matching conditions; the values in this example are illustrative.

Interpret the result on the stated basis

- Use the mean of valid duplicate concentrations where required by the method, after the applicable corrections. A VOC tube and a DNPH cartridge must not be averaged together.
- Subtract the cell background compound by compound. Specify the TVOC definition, response-factor basis and background rule.
- Do not subtract the same media blank twice, or subtract both inlet and empty-cell background if the latter already includes the inlet contribution.
- Report the measurement time, area, flow and conditions. Matched concentration alone does not show matched emissions when area-specific airflow differs.
- Include uncertainty contributions from mass, sampling volume, cell flow, exposed area, background, precision, recovery and specimen variability.

Resolve problems before releasing data

Change one cause at a time where practical. Record the observation, correction and repeat check in the test log.

Observation	Check first	Action / interpretation
Outlet flow too low	O-ring seating, specimen flatness, stopper and fitting seals; meter restriction	Repeat with a low-pressure-drop meter. Repair the seal and recheck the full balance.
No excess vent flow	Total pump withdrawal; blocked vent; spacer left in place	Stop sampling and restore the flow budget. Confirm the vent is free before restarting.
Pump flow changes	Tube resistance, kinked tubing, pump capacity and battery	Verify flow with the complete train. Follow the method rule for an invalid or changing sample volume.
High empty-cell background	Supply air, humidifier water, cell, seal, holder and storage bag	Isolate the source using appropriate blanks; clean or replace affected components, then recheck.
Poor recovery	Reference rate, calibration, leak balance, sampling fraction and surface sinks	Compare expected with measured concentration. Evaluate the entire chain, not just the cell.
Duplicates disagree	Sample volume, tube direction, capping, contamination and timing	Review each tube result and its records. Repeat when the agreed precision criterion is not met.
RH or temperature drifts	Stabilisation, water, mixing flows, room or surface conditions	Verify independently at the method positions. Stabilise and document any invalid interval.
Unexpectedly high or low emission	Area, sample age, holder volume, media capacity and units	Check the specimen history and calculation before interpreting a material difference.

Preserve the observation

Keep failed checks and original data in the record. The report should explain material deviations and their consequences rather than presenting a corrected value without its history.

Choose the method for the decision

State the receiving scheme or test purpose first. Cell, chamber and screening measurements do not automatically answer the same question.

Approach	Useful role	Conditions to establish
FLEC emission cell	A defined material surface; laboratory studies, on-site source investigation and repeatable QC comparisons.	Exposed area, air conditions, sealing, specimen history and the named cell / field method.
Emission test chamber	A representative specimen under the chamber protocol required by a label, regulation, contract or study.	Loading, specimen preparation, conditioning and acceptance under the particular program.
Microchamber or other rapid screening	Formulation ranking, troubleshooting or screening under a defined protocol.	Temperature, sample form, extraction conditions and any validated relationship to the reference method.

Applications for a controlled surface measurement

- Flooring and coverings: compare defined surfaces, formulations or production batches under matched conditions.
- Coatings and sealants: document substrate, applied amount, exposed area, drying or curing history and measurement age.
- Buildings: investigate installed surfaces while recording site conditions, surface history and the field protocol.
- Manufacturing: use a fixed baseline and a repeatable sampling plan for incoming material or production-line QC.
- Research: investigate emission decay, source differences and the effects of controlled test conditions.

Conformity depends on the complete accepted procedure

FLEC hardware capability does not by itself establish product certification. Use ISO 16000-10, ASTM D7143, NT BUILD 438 / 484 or another specified protocol in its applicable scope. Where a chamber method is required, substitution needs explicit acceptance from the receiving scheme.

Record enough to reproduce the test

Use this structure for the test report or attach it to a laboratory worksheet. Add the complete requirements of the selected method.

Record	Information to complete
Test identity	Test ID: _____ Date: _____ Responsible person / laboratory: _____
Method and purpose	Standard + edition / SOP: _____ Decision / application: _____
Material history	Product / batch / position: _____ Production, receipt, storage and preparation: _____
Time basis	Defined t = 0: _____ Application / unpacking: _____ Cell placed: _____
Configuration	Cell / holder IDs: _____ Orientation: _____ Exposed area A: _____ Free volume V: _____
Conditions	Qin: _____ Temperature: _____ RH: _____ Flow basis / calibration / air velocity: _____
Sample paths	Tube / cartridge IDs, media and flow direction; start / stop, flow, volume and transport / storage: _____
QC and results	Background, tightness, recovery, duplicates and uncertainty; individual compounds / TVOC and qA: _____
Review and release	Deviations / consequences: _____ Reviewer: _____ Report revision: _____

Before issuing the report

- Confirm that units, sample times, source area and calculations agree with the raw records.
- Include actual QC results, any departures from the protocol and the effect on interpretation.
- Name the test mode: direct laboratory surface, prepared plate, Sub-Unit chamber or on-site investigation.
- Link each result to the correct analytical method; distinguish a carbonyl result from the VOC / TVOC result.