TECHNICAL SOLUTIONS
industrial technology

Food & Beverage Labs

A Laboratory Solutions Suite by Technical Solutions

Project-by-project laboratory design, equipment integration, validation, and lifecycle support for food and beverage testing operations.

Configurable laboratory solutions for regulatory, industrial, public-sector, and quality-control environments.

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A Project-by-Project Laboratory Solution

Food and beverage laboratories are operational systems, not equipment lists.

A laboratory succeeds only when every part of the system works together: samples, rooms, utilities, instruments, data, people, quality systems and support.

Technical Solutions approaches Food & Beverage Labs as an integrated laboratory solution, beginning with the client's test menu, regulatory role, site conditions and long-term operating model.

- The scope begins with the client's test menu and regulatory role.
- The layout follows sample flow, contamination control, safety and maintenance access.
- The equipment list follows validated methods, throughput, reliability and supportability.
- The operating model includes documentation, training, maintenance, consumables and expansion.

Technical Solutions Laboratory Solutions

A family of configurable laboratory suites for public, industrial, regulatory, educational and technical testing environments.

Laboratory Solutions is organized as a suite-based offering.
Each suite represents a laboratory sector,
but every project is configured individually.

Our Laboratory Solutions suites include:

1.
Food & Beverage Labs

2.
Forensic Science & Public Safety Labs

3.
Construction Materials & Geotechnical Labs

4.
Environmental & Agricultural Testing Labs

Suite-based for clarity, Project-by-project for accuracy.
Engineering-led for reliability.

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Our Laboratory Solutions Suites

Specialized laboratory suites, delivered according to each project scope.

Food & Beverage Labs

Food safety, beverage quality, microbiology, nutrition, contaminants, additives, allergens, authenticity and chain-of-custody workflows.

Forensic Science & Public Safety Labs

Secure environments for evidence handling, forensic analysis, toxicology, DNA workflows, drug analysis and controlled access.

Construction Materials & Geotechnical Labs

Concrete, asphalt, cement, aggregates, soils, compaction, geotechnical testing and infrastructure QA/QC.

Environmental & Agricultural Testing Labs

Water, wastewater, soil, irrigation, fertilizers, crop testing, environmental monitoring and agricultural quality programs.

Why Food & Beverage Labs Is Not a Fixed Package

The correct laboratory scope depends on the client's mandate, not a pre-made catalogue.

A beverage manufacturer, a national food-control authority, a municipal inspection laboratory and a food-import testing center may all require food and beverage testing. They will not require the same laboratory.

Food & Beverage Labs is delivered project by project. Technical Solutions begins by defining what the laboratory must do, then designs the laboratory around that requirement.

Client Mandate

1

Factory QC lab: routine release testing and rapid decisions.

2

Government food-safety lab: sample receiving, chain of custody and regulatory reporting.

3

Beverage chemistry lab: pH, Brix, acidity, density, color, turbidity and stability support.

4

National testing facility: integrated chemistry, microbiology, molecular testing, digital systems and expansion zones.

Who Food & Beverage Labs Supports

Laboratories for regulatory control, industrial quality, public health and production confidence.

Food & Beverage Labs is relevant wherever food and beverage samples must be tested, documented, reported and defended. The solution can support both new laboratories and modernization of existing laboratories.

Typical clients and use cases:

- Government food-control and inspection authorities
- Dairy, grain, oil, meat, fish, fruit, juice, bottled-water and soft-drink testing environments

- Municipal or regional public health laboratories
- Food import, export, customs and border-inspection laboratories
- Food and beverage manufacturing QC laboratories
- Research, university and training laboratories with applied food and beverage programs

Engineering-Led Laboratory Delivery

Technical Solutions starts with the requirement, not the product catalogue.

Technical Solutions is the accountable laboratory integrator: define the technical requirement, translate it into rooms, utilities, instruments, data systems and support plans, then coordinate delivery through installation, commissioning, training and lifecycle support.

- **Requirements first:** test menu, throughput, user needs, sample flow and quality expectations.
- **Design before procurement:** rooms, utilities, furniture, instruments, data systems and support plans.
- **Integration before handover:** verify the laboratory environment, not only individual assets.
- **Support after delivery:** training, documentation, spare parts, consumables, calibration, maintenance and upgrades.

What Food & Beverage Labs Can Include

A configurable scope covering the laboratory environment, testing technologies, quality systems and operating support.

Food & Beverage Labs can be configured for chemistry, microbiology, molecular testing, instrumental analysis, nutrition, contaminants, product quality, packaging-related testing, sample handling and reporting.

- **Advisory and planning:** regulatory mapping, scope definition, test menu, equipment master list, room data sheets, workflow planning and safety-risk assessment.

- **Laboratory environment:** furniture, fume hoods, biosafety cabinets, clean benches, storage, gases, water, HVAC, electrical, drainage, BMS/EMS and IT/security.

- **Testing capability:** food microbiology, beverage chemistry, nutrition, contaminants, additives, allergens, authenticity, adulteration and packaging support.

- **Operational readiness:** commissioning, qualification, validation, calibration, SOP support, training, maintenance, consumables and expansion support.

Food & Beverage Labs

The Food & Beverage Labs Delivery Path

A clear route from need definition to sustained laboratory operation.

Each phase produces a practical output: scope definition, room data sheets, utility matrices, equipment specifications, procurement logic, installation evidence, training records and support plans.

1

1. Discovery and advisory:

understand the client's mandate, sample types, risks and operating context.

2

2. Laboratory planning:

define workflows, zoning, room data sheets, equipment, utilities and safety strategy.

3

3. Technology selection:

select instruments, furniture, safety systems, digital tools and consumables.

4

4. Procurement and integration:

coordinate delivery, installation, documentation and utility interfaces.

5

5. Commissioning and readiness:

verify installation, qualify equipment, train users and prepare handover evidence.

6

6. Lifecycle support:

maintenance, consumables, calibration coordination, troubleshooting, audits and expansion.

Discovery, Regulatory Mapping, and Test-Menu Planning

The test menu defines the laboratory.
The laboratory should not define the test menu.

Food and beverage laboratories must be scoped around the decisions they support: release, rejection, compliance, investigation, import clearance, outbreak response, process control, supplier approval, product development or public reporting.

Technical Solutions can support a practical test-menu roadmap that identifies immediate requirements, future phases, specialized instruments, reference standards, trained analysts, controlled environments, gases, water systems, LIMS workflows and validation needs.

SAMPLE MATRIX

- Water
- Juice
- Milk
- Oils
- Grains
- Meat
- Fish
- Prepared Foods
- Raw Materials
- Packaging
- Swabs
- Environmental Samples

Representative sampling and integrity maintain reliability from the start.

TEST-MENU MAPPING ROADMAP

1. **Map sample types:** water, juice, milk, oils, grains, meat, fish, prepared foods, raw materials, packaging, swabs and environmental samples.
2. **Map decisions:** release, compliance, investigation, import/export, process control and reporting.
3. **Map method requirements:** equipment, consumables, reference materials, sample preparation, data handling and validation.
4. **Map operational assumptions:** throughput, staffing, storage, turnaround time and escalation path.

Sample Receiving, Chain of Custody, and Retention

Reliable results begin before analysis starts.

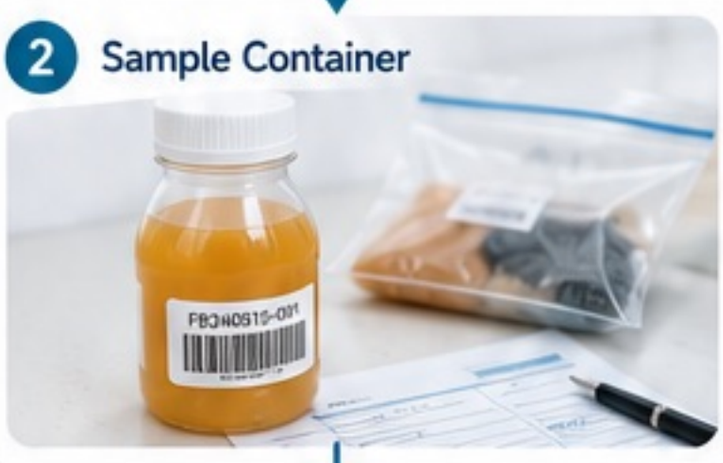
Sample receiving controls how samples enter the laboratory, how they are registered, labeled, stored, routed to methods and preserved under custody. Weak sample control can compromise even the most advanced analytical system.

Food & Beverage Labs can include dedicated sample reception, barcode labeling, condition checks, sample photographs, temperature recording, custody forms, LIMS accessioning, sample splitting, sample retention, secure storage, cold storage, rejected-sample workflow and disposal records.

- **Registration:** sample ID, source, date/time, matrix, condition, container, quantity and requested test menu.
- **Control:** barcode labels, chain-of-custody forms, access permissions, handover logs and storage instructions.
- **Storage:** ambient, refrigerated, frozen, retained samples, reference-standard stores and hazardous sample segregation.
- **Routing:** microbiology, chemistry, instrumental analysis, molecular testing, outsourcing, retention or disposal.

1 Barcode Label

2 Sample Container



3 Digital Accessioning

4 Cold Storage

5 Retained Sample Cabinet

Secure Access Control

Restricted access by authorized personnel only.

All access is logged and auditable.

Sample Arrival → Condition Check → Sample Photograph → Temperature Recording → Custody Form → LIMS Accessioning → Sample Splitting → Routing / Storage

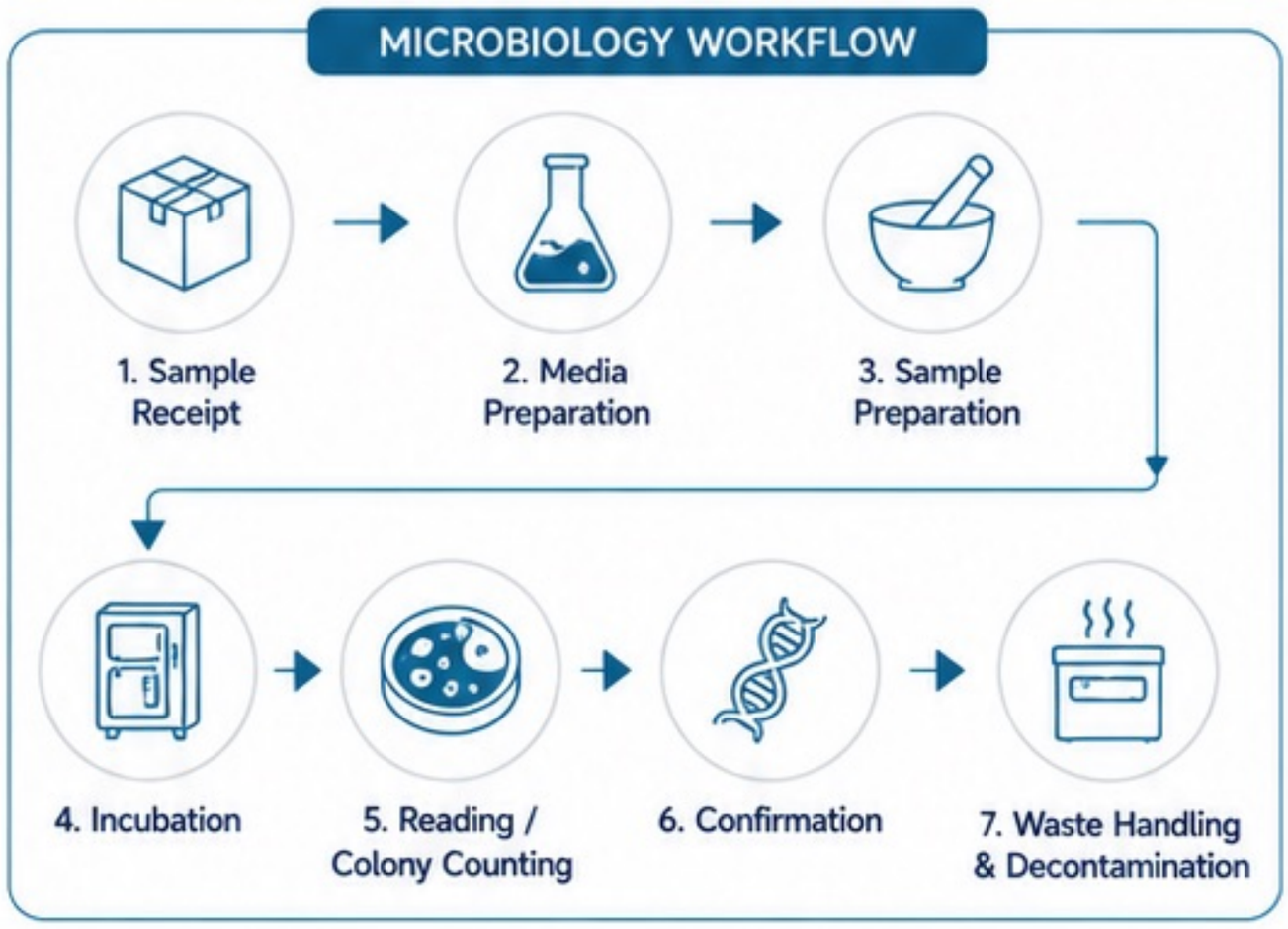
Food Microbiology Laboratories

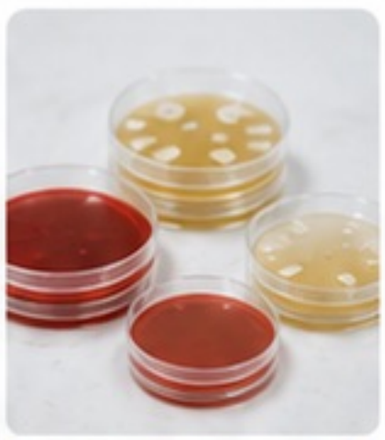
Controlled workflows for microbial quality, safety, hygiene and confirmation testing.

Food microbiology laboratories require separation of sample receipt, media preparation, sample preparation, incubation, reading, confirmation, waste handling and decontamination. The room layout must control contamination risks while keeping routine work efficient.

Food & Beverage Labs can configure microbiology areas for raw materials, finished products, environmental swabs, production water and hygiene monitoring.

- **Core zones:** sample preparation, media preparation, incubation, colony counting, confirmation, waste/autoclave and controlled storage.
- **Typical targets:** total viable counts, coliforms, E. coli, Salmonella, Listeria, yeasts and molds, Enterobacteriaceae, spoilage indicators and hygiene markers.
- **Equipment families:** biosafety cabinets, incubators, autoclaves, colony counters, microscopes, homogenizers, membrane filtration and anaerobic systems.
- **Support items:** culture media, plates, sterile consumables, disinfectants, reference strains, environmental monitoring kits and waste workflows.





Molecular and Rapid Food-Safety Testing

PCR, qPCR, immunoassay and rapid workflows for faster confirmation and higher throughput.

Molecular and rapid testing can reduce time to decision, improve confirmation workflows and support outbreak response or high-throughput screening. These methods require contamination control, segregated preparation areas, validated kits or methods, trained operators, appropriate consumables and data traceability.

Food & Beverage Labs can include PCR and qPCR systems, DNA/RNA extraction, ELISA readers and washers, microplate incubators and shakers, lateral-flow readers, PCR workstations, pipettes and secure result-management workflows.

PCR / qPCR Systems

DNA / RNA Extraction

ELISA Readers & Washers

Microplate Incubators & Shakers

Lateral-Flow Readers

- **PCR zoning:** reagent preparation, sample preparation, amplification and post-amplification handling.
- **Rapid targets:** pathogen detection, species identification, authenticity markers, allergens, toxins and contamination indicators.
- **System support:** method setup, kit selection, SOPs, training, controls and interpretation workflows.
- **Digital support:** electronic worksheets, run templates, barcode matching, audit trails and result transfer.

PCR CONTAMINATION-CONTROL ZONING

1 Reagent Preparation

- Prepare master mixes
- Aliquot reagents
- No sample or template DNA

2 Sample Preparation

- Add samples
- Extract DNA/RNA
- Prepare templates

3 Amplification (PCR / qPCR)

- Amplify targets
- Closed-tube amplification
- No post-PCR materials

4 Post-Amplification Handling

- Analyze products
- Electrophoresis or detection
- Interpretation

Physical separation of areas

Dedicated airflow and filtration

Unidirectional workflow

Routine cleaning and decontamination

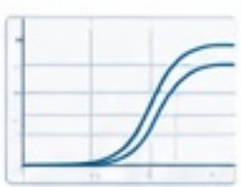
Controls and monitoring at each step

Sample Received

Nucleic Acid Extraction

Template Preparation

PCR / qPCR Run



Data Analysis

Result Reporting & Traceability

Beverage Chemistry and Quality Laboratories

Routine and advanced testing for water, juices, dairy drinks, soft drinks and other beverage products.

Beverage laboratories often require fast, repeatable measurements for production release, formulation control, shelf-life evaluation, supplier checks and regulatory compliance.

Food & Beverage Labs can configure beverage chemistry areas with wet chemistry benches, analytical balances, pH/conductivity meters, titrators, Karl Fischer or moisture systems, refractometers, density meters, colorimeters, turbidity meters, water activity systems, incubators, stability support and instrument data systems.

REFRACTOMETER
Brix, Refractive Index

DENSITY METER
Density, Specific Gravity

pH METER
pH, Conductivity, Temperature

TITRATION SYSTEM
Acidity, Alkalinity, Chloride, Others

COLORIMETER
Color, Absorbance, Transmittance

TURBIDITY METER
Turbidity, Clarity (NTU)

- **Beverage QC:** Brix, acidity, pH, density, refractive index, color, turbidity, conductivity, moisture, water activity and sensory-support measurements.
- **Advanced chemistry:** ion chromatography, UV-Vis, HPLC/UPLC, GC or GC-MS where required.
- **Support systems:** DI/ultrapure water, analytical balances, certified standards, reference materials, pipettes and glassware washers.
- **Operational logic:** protect sensitive instruments from heat, humidity, vibration and chemical fumes.

BEVERAGE QUALITY DASHBOARD

Key Quality Parameters

Parameter	Result	Unit	Status
Brix	12.5	°Bx	✓
pH	3.52	pH	✓
Acidity (as citric acid)	0.38	%	✓
Density	0.9982	g/cm³	✓
Turbidity	0.32	NTU	✓
Color (Pt-Co)	15.2	Pt-Co	✓
Conductivity	213	µS/cm	✓
Water Activity (aw)	0.985	aw	✓

Batch Summary

128 Samples · 124 Passed · 1 Warning · 3 Failed

Trend Overview

QC Status

Real-Time Data Capture · Instrument Data Integration · Electronic Records & Audit Trails · Alerts & Escalations (E-mail / SMS) · Regulatory Reporting

Nutrition and Proximate Analysis

Protein, fat, fiber, moisture, ash, energy and composition testing for food and feed matrices.

Nutrition and proximate analysis supports food labeling, quality assurance, product development, feed evaluation and regulatory control. These workflows often require sample homogenization, drying, digestion, extraction, controlled weighing and careful data calculation.

Food & Beverage Labs can include Kjeldahl or Dumas protein workflows, Soxhlet or accelerated solvent extraction, fiber analysis, moisture analysis, drying ovens, muffle furnaces, bomb calorimetry, fat analysis, balances, water activity and sample-preparation tools.

- **Protein:** Kjeldahl digestion/distillation/titration or Dumas nitrogen combustion.
- **Fat:** Soxhlet, solvent extraction, accelerated extraction or application-specific fat analyzers.
- **Fiber and ash:** fiber analyzers, muffle furnaces, drying ovens, crucibles and controlled weighing.
- **Moisture and water activity:** moisture analyzers, ovens, Karl Fischer where appropriate and water-activity meters.
- **Sample preparation:** mills, grinders, homogenizers, weighing, extraction, digestion, filtration and storage.

NUTRITION ANALYSIS WORKFLOW

1. Sample Receipt
2. Sample Preparation
3. Analysis Process
4. Calculation & QA
5. Reporting

Sample Mills & Grinders

Digestion Systems

Distillation Systems

Solvent Extraction

Drying Ovens

Muffle Furnaces

Bomb Calorimeter

Fat Analyzers

Analytical Balances

Water Activity Meters

PROTEIN | FAT | FIBER | MOISTURE | ASH | ENERGY | COMPOSITION

Contaminants, Residues, and Trace Analysis

Advanced analytical capability for high-impact food-safety decisions.

Some laboratories must test beyond routine quality parameters. They may need to detect pesticide residues, mycotoxins, veterinary drug residues, heavy metals, process contaminants, solvent residues, additives, adulterants or other regulated analytes at low levels.

Food & Beverage Labs can be configured with advanced instrumental analysis, sample preparation, reference materials, data systems and utility support according to project scope.

Chromatography

HPLC / UHPLC

Gas Chromatography

GC / GC-MS

Mass Spectrometry

LC-MS/MS / GC-MS/MS

Elemental Analysis

ICP-MS / ICP-OES / AAS

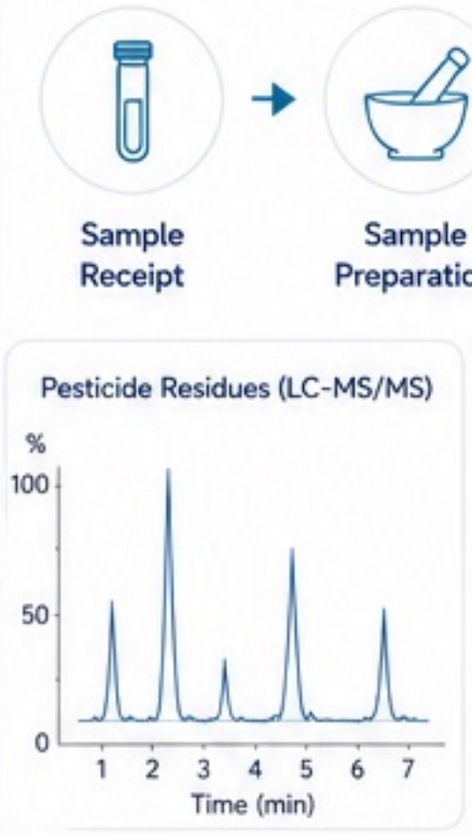
Sample Preparation

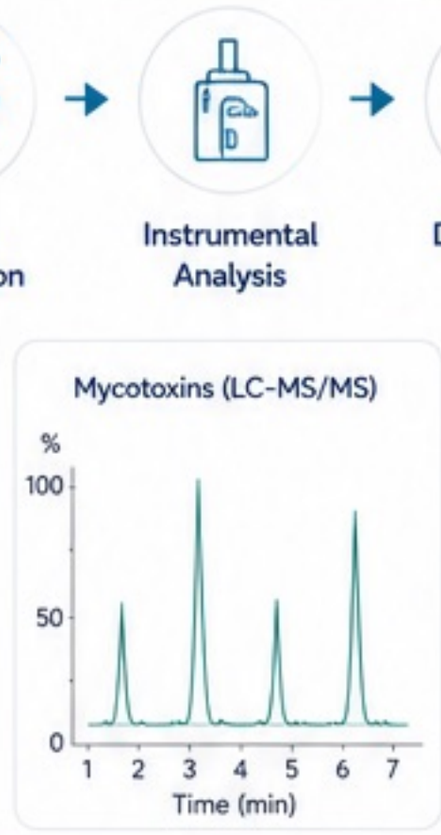
Extraction / Digestion

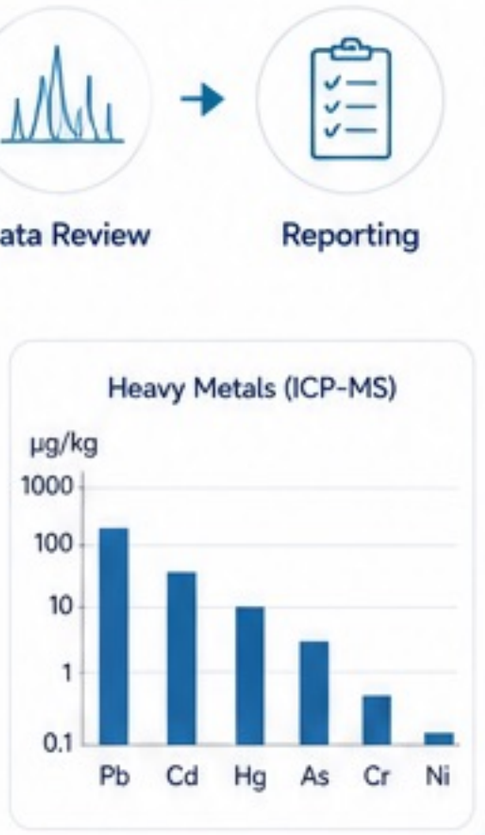
- **Organic residues:** pesticides, toxins, residues, additives, contaminants and adulterants using HPLC/UHPLC, LC-MS/MS, GC, GC-MS or GC-MS/MS.
- **Elemental analysis:** heavy metals and elemental impurities using ICP-MS, ICP-OES, AAS, microwave digestion and certified reference materials.
- **Sample preparation:** QuEChERS, SPE, centrifugation, evaporation, filtration, digestion, homogenization and matrix-matched standards.
- **Infrastructure:** clean power, temperature/ humidity control, gases, pump exhaust, solvent ventilation, waste segregation and data workstations.

ADVANCED ANALYTICAL WORKFLOW AND RESULTS

Sample Receipt → Sample Preparation → Instrumental Analysis → Data Review → Reporting







Clean Power & UPS | Temperature / Humidity Control | Laboratory Gases | Pump Exhaust & Ventilation | Waste Segregation | Data Workstations

Additives, Allergens, Authenticity, and Adulteration

Testing workflows that protect consumers, brands and regulatory decisions.

Food and beverage testing increasingly asks what is present, what is absent and whether the product matches its declared identity. A project may include additives, preservatives, allergens, species identification, geographic authenticity, composition claims or adulteration screening.

Food & Beverage Labs can configure wet chemistry, chromatography, spectroscopy, immunoassay, PCR/ qPCR, NIR/Raman/FTIR, refractometry, density, polarimetry and data-library workflows.

Additives and preservatives

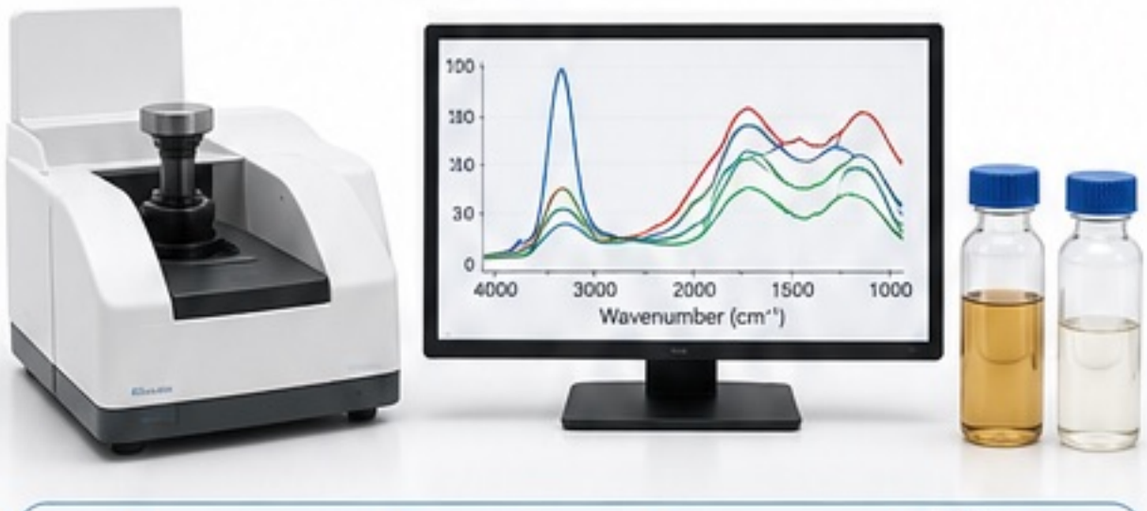
- HPLC/UPLC, UV-Vis, titration, ion chromatography or validated rapid methods.

Allergens

- ELISA, lateral flow, PCR/qPCR, sample extraction and contamination-control procedures.

Authenticity and adulteration

- FTIR, NIR, Raman, HPLC/GC, density, refractometry, polarimetry and spectral libraries.



Workflow support

- reference materials, method validation, control samples, LIMS templates and data review rules.

Packaging and Food-Contact Material Support

Testing and preparation workflows for packaging, containers, closures and product-contact materials.

Packaging can affect product safety, shelf life, traceability and regulatory compliance. Depending on the mandate, Food & Beverage Labs can include workflows for packaging checks, migration support, extraction, sample preparation, stability storage and documentation.

Packaging-related testing may require balances, ovens, chambers, GC or GC-MS workflows, UV-Vis, FTIR/ATR, mechanical inspection tools, sample preparation, temperature-controlled storage and controlled documentation.

- **Physical checks:** thickness, seal integrity support, visual inspection, balance checks, dimensional checks and sample storage.

- **Chemical support:** extraction, digestion, solvent handling, GC/GC-MS, HPLC, UV-Vis, FTIR/ATR and reference-standard control.

- **Shelf-life support:** stability chambers, refrigerators, freezers, data loggers, mapping and environmental monitoring.

- **Documentation:** lot traceability, sample retention, test records, change control and report templates.

PACKAGING TESTING TOOLS AND TECHNOLOGIES

FTIR / ATR
Material identification and screening

GC / GC-MS
Volatile compounds and migration support

UV-Vis
Quantitative analysis and screening

Analytical Balance
Weighing for extraction, migration and QC

Mechanical Tools
Seal integrity, force, thickness and tension

Ovens & Chambers
Drying, conditioning and stability support

COMMON PACKAGING AND FOOD-CONTACT MATERIALS

Plastics

Glass

Metals

Paper & Board

Flexible Films

Closures & Seals

Adjacent Modules When the Mandate Expands

Food & Beverage Labs can connect with other Laboratory Solutions suites or modules when the client requires a wider scope.

Some public authorities and institutions combine food, beverage, water, agriculture, environmental and drug-control responsibilities. The project can stay focused on Food & Beverage Labs while preserving expansion logic for future modules.

Adjacent modules can be added during the same project or phased over time. This avoids overbuilding the first phase while preserving utility capacity, digital architecture and room planning.

Environmental & Agricultural Testing

water, wastewater, soil, irrigation, fertilizers, crops, residues and environmental monitoring.

Forensic Science & Public Safety

evidence receiving, secure storage, toxicology, drug analysis, trace evidence, DNA workflows and controlled access.

Food & Beverage Labs

Core laboratory for food safety, beverage quality, nutrition, contaminants, additives, authenticity, packaging, microbiology and chemistry.

Pharmaceutical & Drug QC

HPLC/UPLC assay and impurities, GC residual solvents, dissolution, disintegration, stability, raw-material identity, sterility and endotoxin where required.

Construction Materials & Geotechnical

concrete, cement, asphalt, aggregates, soils, compaction and infrastructure QA/QC.

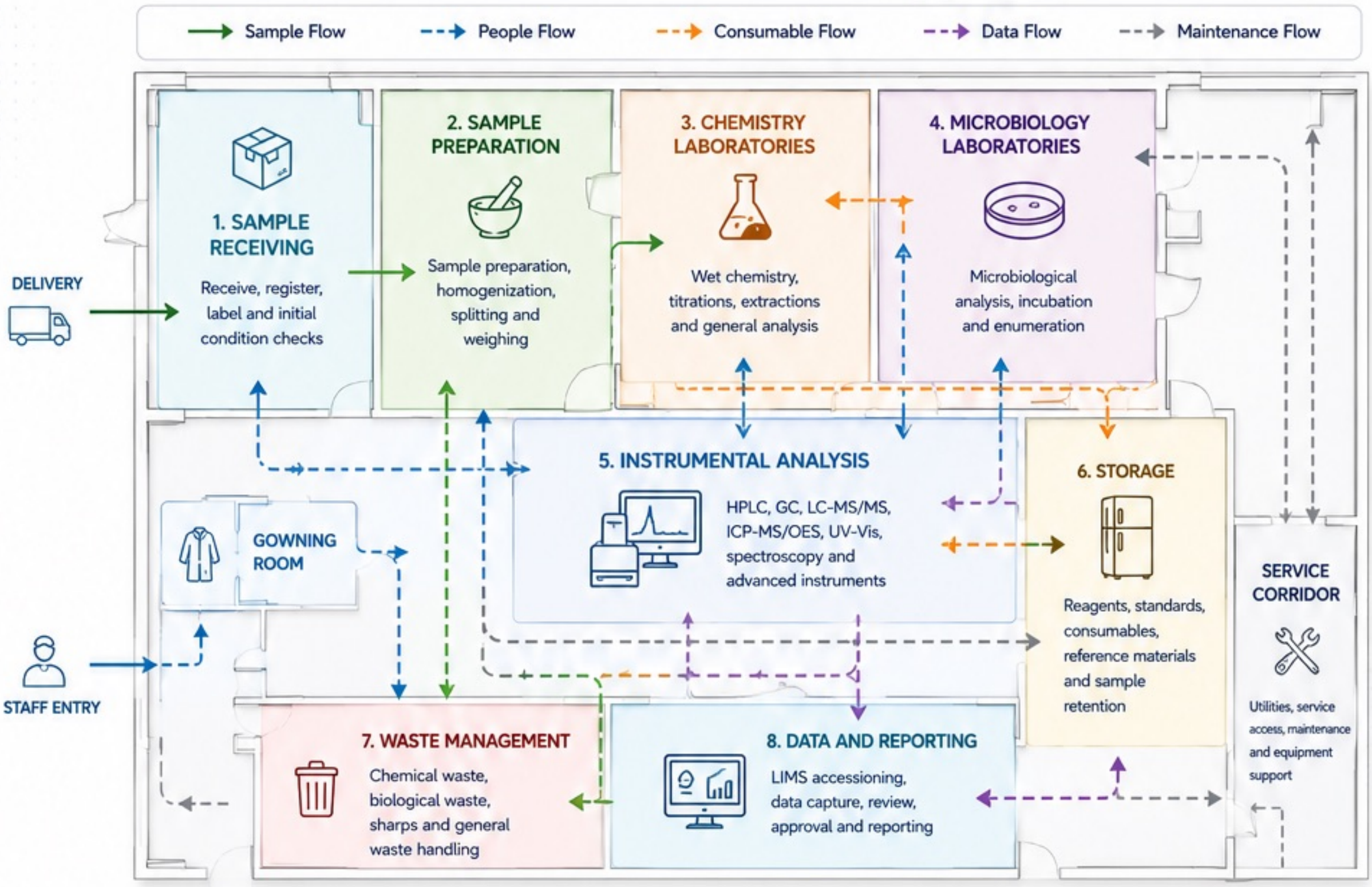
- Modular architecture supports phased expansion based on mandate, budget and operational priorities.
- Preserve utility capacity, digital architecture and room planning for smooth future integration.
- Shared infrastructure and systems reduce duplication and improve operational efficiency across modules.
- Unified digital systems, data governance and reporting across all laboratory mandates.

Laboratory Workflow and Zoning

A good laboratory layout protects sample integrity, analyst safety and operational efficiency.

Workflow planning supports the movement of samples, people, consumables, waste, data and equipment maintenance without creating unnecessary cross-contamination, delays or safety risks.

Technical Solutions can develop workflow maps, zoning diagrams, adjacency plans and room data sheets that define each room's function, equipment, utilities, storage, access controls, contamination risks and maintenance requirements.



Sample flow:
- receive, register, label, split, prepare, analyze, review, retain and dispose.

People flow:
- staff entry, gowning where needed, restricted access, visitor control and training visibility.

Consumable flow:
- media, reagents, standards, gases, clean glassware, sterile consumables and waste materials.

Data flow:
- LIMS accessioning, instrument data capture, review, approval, reporting, retention and backups.

Maintenance flow:
- service panels, filters, pumps, gases, emergency shutoffs and calibration points.

Protect sample integrity

Ensure analyst safety

Improve operational efficiency

Support data integrity

Enable scalable expansion

Maintain regulatory compliance

Room Data Sheets and Equipment Master Lists

Turning requirements into buildable, procurable and verifiable scope.

Room data sheets and equipment master lists convert the laboratory requirement into a practical implementation package. They help every stakeholder understand what each room is for, what equipment it contains, what utilities are required and how the laboratory will be verified.

This step is especially important because instruments may require dedicated circuits, clean power, gases, exhaust, water quality, drainage, temperature/humidity control, data connections, vibration control or safety systems.

ROOM DATA SHEET (EXAMPLE)

Room Name	Wet Chemistry Lab 1
Function	Wet chemical analysis and sample preparation
Users	Analysts, Supervisors
Sample Flow	From Sample Prep → To Instruments
Risk Level	Medium
Furniture	Bench, sink, cabinets, reagent storage, fume hood
Access Control	Authorized staff only, access card
Utilities	Power, UPS, DI water, drainage, gases, exhaust, data
Cleaning Requirements	Daily cleaning, chemical-safe surfaces
Environmental Conditions	22 ± 2 °C, 45–60% RH, 10–15 ACH
Notes	Fume hood required. Chemical handling area.

- **Room data sheets:** room name, function, users, sample flow, risk level, furniture, utilities, environmental conditions, access control and cleaning requirements.

EQUIPMENT MASTER LIST (EXAMPLE)

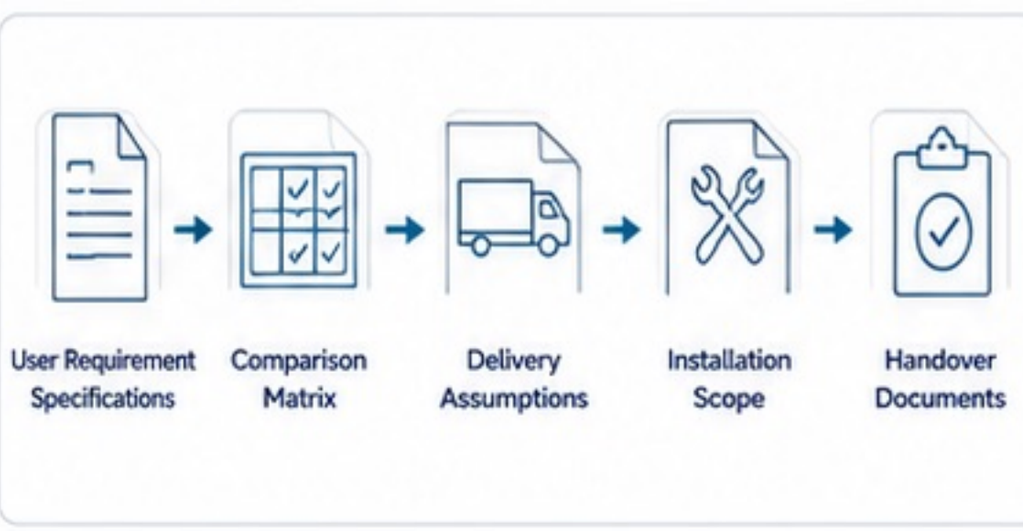
	Asset Category	Method Purpose	Specifications	Quantity	Utilities	Accessories / Consumables	Software	Service Plan	Validation Status
	HPLC System	Quantitative analysis	Gradient, UV/DAD, Autosampler	1	Power, UPS, DI Water, Data	Columns, Vials, Filters, Solvents	CDS, Control PC	Preventive Maintenance	IQ/OQ/PQ Required
	GC-MS/MS	Residue analysis	Triple Quadrupole, EI/CI Source	1	Power, UPS, Gas, Exhaust, Data	Columns, Vials, Standards	MS Software, Control PC	Preventive Maintenance	IQ/OQ/PQ Required
	Analytical Balance	Weighing	0.1 mg Readability, Internal Cal.	2	Power, Level Surface	Calibration Weights	Balance App	Annual Calibration	Calibrated

- **Utility matrix:** power, UPS, gases, water, drainage, exhaust, HVAC, data, monitoring and safety requirements.

UTILITY MATRIX (EXAMPLE)

Power	UPS	Gases	Water (DI/RO)	Drainage	Exhaust	HVAC	Data	Monitoring	Safety
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

- **Procurement pack:** user requirement specifications, comparison matrix, delivery assumptions, installation scope and handover documents.



Laboratory Furniture, Safety, and Containment

A safe laboratory depends on the right benches, storage, exhaust, containment and emergency systems.

Laboratory furniture affects workflow, chemical resistance, cleanability, ergonomics, utility access, safety and maintenance. Fume hoods, biosafety cabinets, balance tables, chemical cabinets, flammable storage, acid/base storage, eyewash stations and safety showers must be coordinated with the laboratory layout and utilities.

Technical Solutions can coordinate furniture and safety with utilities so that benches, service spines, fume hoods, BSCs, water outlets, gas outlets, electrical points, data points, vacuum, drainage and emergency systems work together.

CHEMICAL AREAS

- Fume hoods, solvent hoods and acid hoods
- Resistant worktops and service access
- Storage cabinets and flammable storage
- Spill response and waste segregation

MICROBIOLOGY AREAS

- Biosafety cabinets and clean benches
- Autoclave support
- Disinfectant storage and safety cabinets
- Biohazard waste containers

INSTRUMENT AREAS

- Balance tables and anti-vibration logic
- Service access and clean power
- Data outlets and network connectivity
- Temperature/humidity control support

STORAGE AREAS

- Reagents, standards and retained samples
- Consumables, glassware and media
- PPE and safety supplies
- Gas cylinders and secure storage

SAFE DESIGN
Protect people, samples and assets.

BUILT TO LAST
Durable materials for demanding laboratories.

INTEGRATED UTILITIES
Power, data, gas, water and vacuum working together.

COMPLIANT BY DESIGN
Support safety, regulatory and quality systems.

Cleanrooms and Controlled Environments

Controlled spaces for sterility, microbiology, sensitive preparation and high-integrity workflows where required.

Not every Food & Beverage Labs project needs a cleanroom, but some projects require controlled environments. Sterility-related work, high-integrity microbiology, sensitive molecular preparation or contamination-sensitive sample handling may require special controls.

Controlled environments should be coordinated with HVAC, pressure cascade, temperature, humidity, filtration, monitoring, cleaning, operator movement, sample flow and certification.

GOWNING ROOM

Gowns · Gloves · Masks

PASS BOX

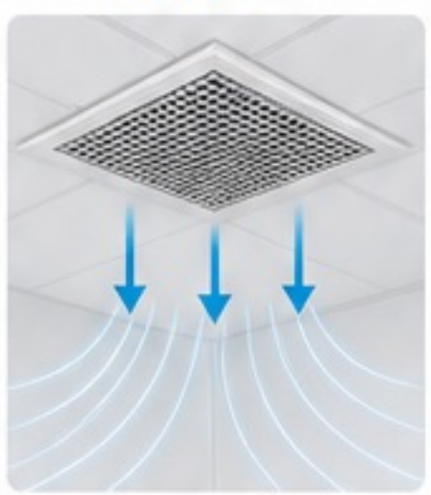
Material transfer without entry

PRESSURE CASCADE

ISO 7 Cleanroom (+) → ISO 8 Buffer (0) → ISO 8+ Corridor (−)

Positive to negative pressure from clean to less clean areas prevents contamination.

HEPA FILTRATION & AIRFLOW



HEPA filters provide clean, controlled, directional airflow.

ENVIRONMENTAL MONITORING

Continuous monitoring of critical cleanroom parameters.

ENVIRONMENTAL MONITORING DASHBOARD (EXAMPLE)

Temperature 22.3 °C ✓	Humidity 45.6 %RH ✓	Differential Pressure +12 Pa ✓
Particle Count ISO 7 ✓	Air Changes 25 ACH ✓	HEPA Status OK ✓

All parameters within acceptable limits

Controlled-environment elements:
ISO-classified zones where needed, gowning rooms, pass boxes, pressure cascades, HEPA filtration, environmental monitoring and certification support.

Microbiology support:
BSC placement, incubator zones, autoclave routing, air/surface monitoring and waste transfer.

Sterility/endotoxin modules:
Isolators or BSCs, membrane filtration, endotoxin readers, particle counters, active air samplers and sterile sampling accessories where required.

Lifecycle support:
annual certification, sensor calibration, filter maintenance, pressure verification and environmental trend records.

Protects product and sample integrity · Supports operator and public safety · Enables regulatory compliance · Ensures consistent high-quality results · Supports certification and audit readiness

Laboratory Infrastructure Integration

Reliable analytical results depend on stable utilities, safe environments and maintainable technical systems.

Food & Beverage Labs requires more than instruments. The infrastructure layer includes electrical systems, UPS, emergency power, HVAC, ventilation, exhaust, cleanroom HVAC where needed, water systems, drainage, gases, waste, BMS/EMS, IT, security and environmental monitoring.

Technical Solutions coordinates these non-civil technical systems so that the laboratory environment supports analytical reliability, sample integrity, operator safety, data security and long-term maintainability.

ELECTRICAL

- Electrical: load schedules, dedicated circuits, clean power, UPS, surge protection, grounding and emergency power.

HVAC AND VENTILATION

- HVAC and ventilation: laboratory ventilation, fume hood exhaust, make-up air, cleanroom HVAC, HEPA filtration and heat-load removal.

WATER AND WASTE

- Water and waste: RO, DI, ultrapure water, sinks, safety showers, drainage and waste routing.

GASES AND MONITORING

- Gases and monitoring: nitrogen, helium, argon, hydrogen, zero air, compressed air, CO2, BMS/EMS and alarm escalation.

Safe environments | Analytical reliability | Sample integrity | Operator safety | Data security | Long-term maintainability

Electrical Systems, Clean Power, and Critical Loads

Sensitive instruments and critical storage require power design that fits laboratory reality.

Food and beverage laboratories may include high-value analytical instruments, freezers, incubators, stability chambers, biosafety cabinets, autoclaves, servers, monitoring systems and access-control equipment. Electrical planning should be based on real load, criticality and uptime requirements.

Technical Solutions applies engineering discipline to laboratory circuits, grounding, UPS, emergency power, equipment isolators and power-quality verification.

POWER QUALITY & PROTECTION

- Clean power for sensitive analytical performance.
- Surge protection on all critical circuits.
- Proper grounding and earthing for all equipment.
- Power-quality verification and documentation.

ENVIRONMENTAL MONITORING SERVER

- Environmental data collection
- Alarm management
- Trend analysis and reporting
- UPS-backed for reliability
- Secure data storage

DEDICATED CIRCUITS

Dedicated circuits for LC-MS/MS, GC-MS/MS, ICP-MS/OES, HPLC/UHPLC, stability chambers, freezers, biosafety cabinets, autoclaves and servers.

UPS PROTECTION

UPS protection for critical instruments, LIMS infrastructure, environmental monitoring, sample refrigerators/freezers and stability chambers where required.

EMERGENCY POWER

Emergency power for critical storage, containment, monitoring, access control and essential ventilation systems.

SAFETY & RELIABILITY

Grounding, earthing, surge protection, labeled panels, equipment isolators, shutdown points and power-quality verification.

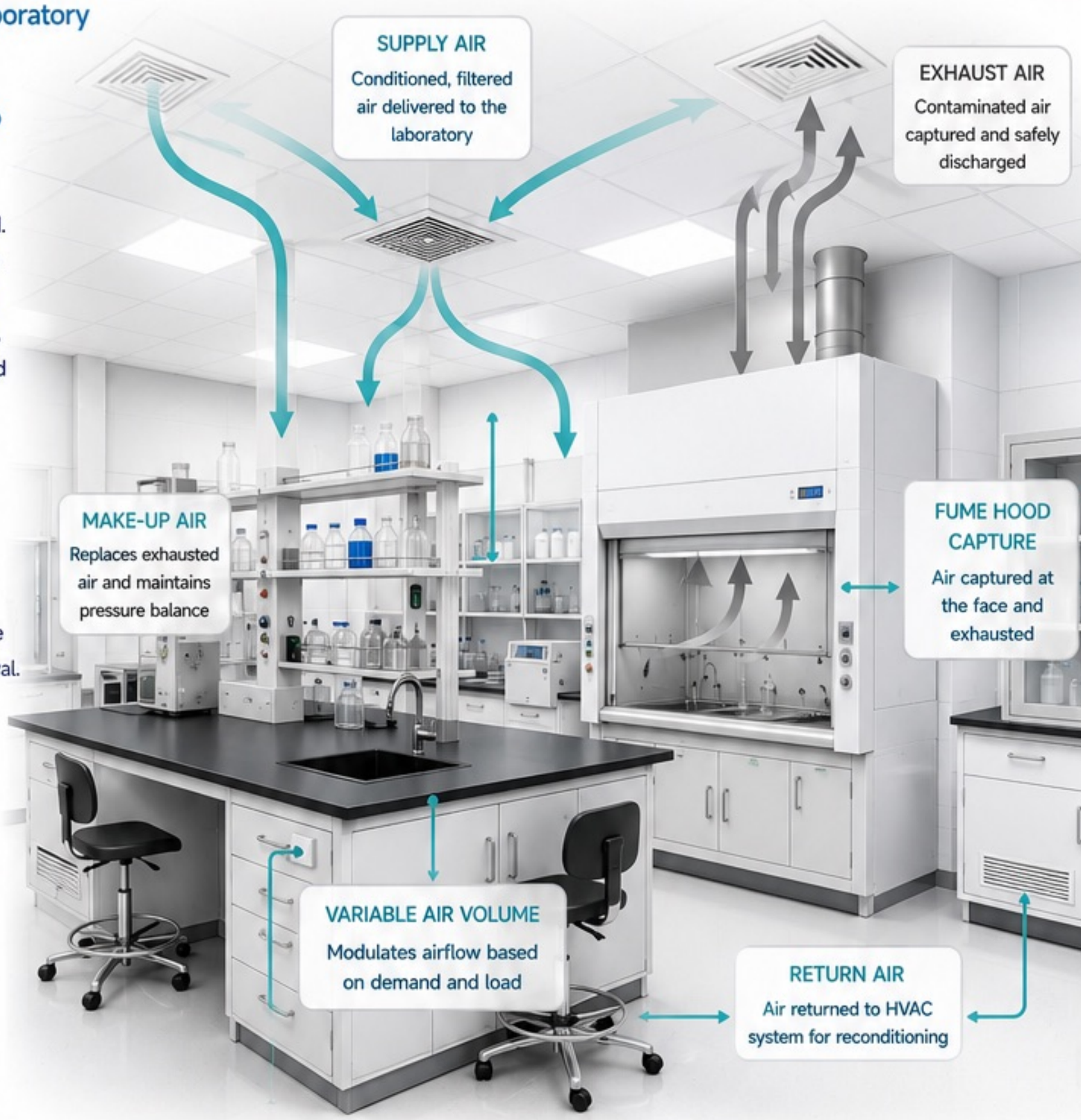
HVAC, Ventilation, and Exhaust

TEMPERATURE	HUMIDITY	PRESSURE	FILTRATION
22 ± 2 °C	40 – 60 %RH	Room +/–	HEPA H13+

Airflow, heat removal, humidity control and exhaust strategy are central to laboratory safety and performance.

Laboratory ventilation must be designed according to the risks of the work performed. Food and beverage laboratories may include wet chemistry, acids, solvents, microbiology, molecular workflows, incubators, autoclaves, refrigerators, freezers, stability chambers and heat-generating analytical instruments.

Food & Beverage Labs can include general laboratory ventilation, fume hood exhaust, make-up air, variable air volume controls, cleanroom HVAC, HEPA filtration where required, pressure relationships, temperature control, humidity control and heat-load removal.



- SUPPLY AIR (CLEAN, CONDITIONED)
- EXHAUST AIR (CONTAMINATED)

FUME HOOD SYSTEMS

- Face velocity and capture efficiency
- Exhaust routing and discharge
- Make-up air and balance
- Controls and sash behavior
- Alarm logic and monitoring
- Certification and performance

INSTRUMENT AREAS

- Temperature/humidity stability
- Heat-load removal
- Pump exhaust management
- Solvent vapor management
- Airflow considerations
- Equipment placement strategy

MICROBIOLOGY AND CONTROLLED AREAS

- Pressure relationships
- BSC placement and airflow
- HEPA filtration where required
- Environmental monitoring
- Cleanroom support where needed
- Cross-contamination control

STORAGE AREAS

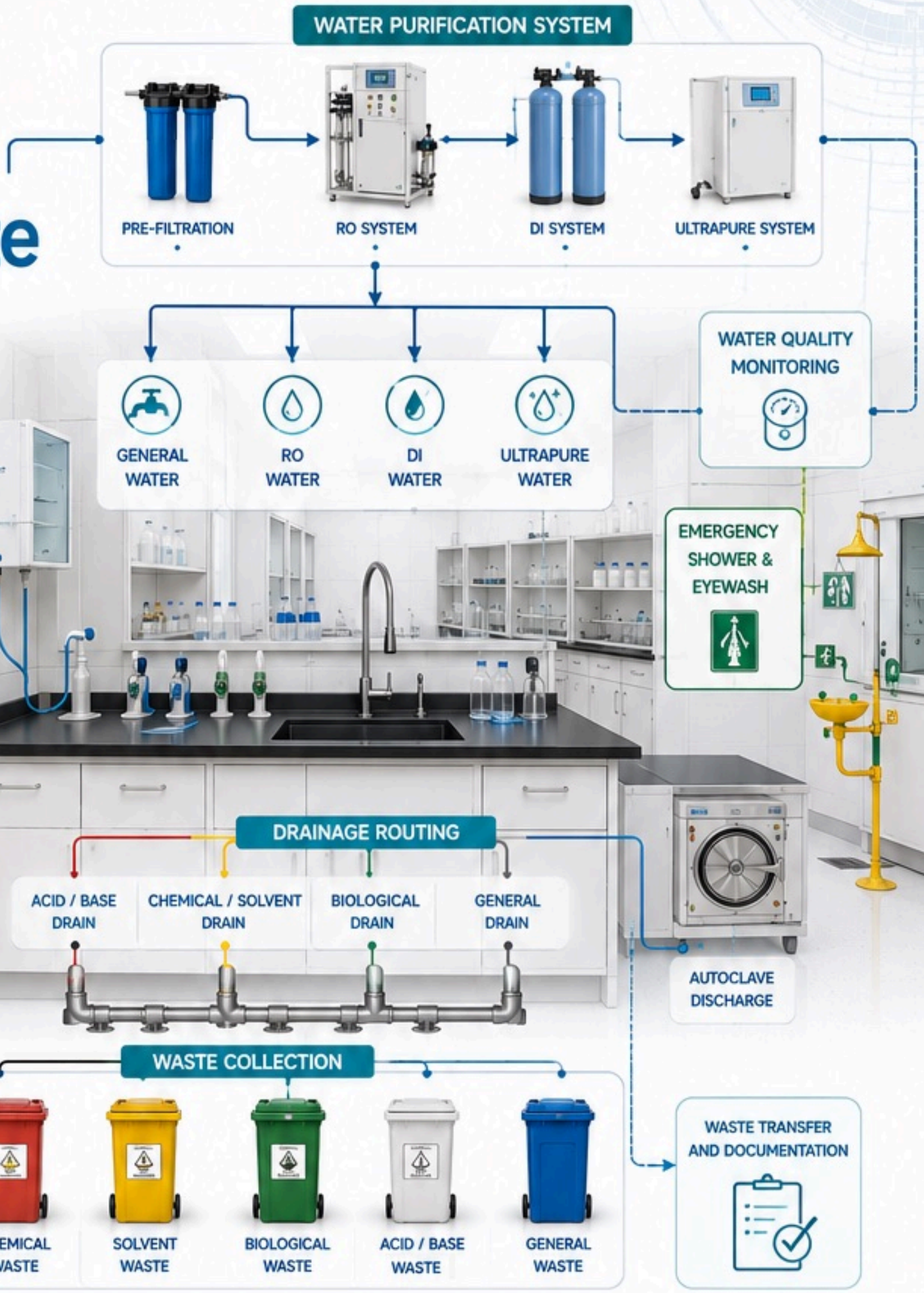
- Controlled temperature
- Reagents and standards
- Samples and retained samples
- Freezers, refrigerators
- Stability chambers and storage
- Monitoring and alarm integration

Water Systems, Drainage, and Laboratory Waste

Water quality and waste routing must match the methods being performed.

Food and beverage laboratories require different water grades for washing, reagent preparation, microbiology, wet chemistry, instrument rinsing, chromatography, elemental analysis and ultrapure applications.

Drainage and waste are equally important. Chemical waste, solvent waste, biological waste, autoclave discharge, acid/base waste, sample waste and general laboratory waste should be planned as part of the laboratory system.



WATER

- Potable, RO, DI, ultrapure water
- Purified-water interfaces
- Point-of-use outlets
- Water-quality monitoring
- Maintenance access

WET CHEMISTRY

- Sinks and reagent water
- Eyewash and safety shower supply
- Backflow prevention
- Spill response

MICROBIOLOGY

- Media preparation water
- Autoclave discharge management
- Biological waste routing
- Disinfectant workflows

WASTE

- Chemical, solvent, biological waste
- Acid/base, sample retention/disposal
- Labeled containers
- Documented waste transfer

Protects sample integrity | Ensures operator safety | Supports regulatory compliance | Improves operational efficiency | Enables long-term sustainability

Laboratory Gases and Gas Safety

Gas systems must be specified with the instruments, not discovered after installation.

Analytical instruments may require nitrogen, helium, argon, hydrogen, zero air, compressed air, CO_2 or specialized gases. Gas systems influence safety, operating cost, maintenance, uptime and analytical performance.

Food & Beverage Labs can coordinate centralized or local gas supply according to project scope. Gas safety and ventilation must be coordinated with the laboratory risk assessment.

VENTILATION COORDINATION | PRESSURE MONITORING | LEAK TESTING | LABELING & IDENTIFICATION | COMPLIANCE & DOCUMENTATION

GAS TYPES

- Gas types: nitrogen, helium, argon, hydrogen, zero air, compressed air, CO_2 and specialty gases where required.

SUPPLY OPTIONS

- Supply options: cylinder systems, centralized manifolds, gas generators, local generators, regulators, gas panels and point-of-use outlets.

SAFETY

- Safety: cylinder cages, restraints, flashback arrestors where required, leak testing, gas detection, labeling, emergency shutoff and ventilation coordination.

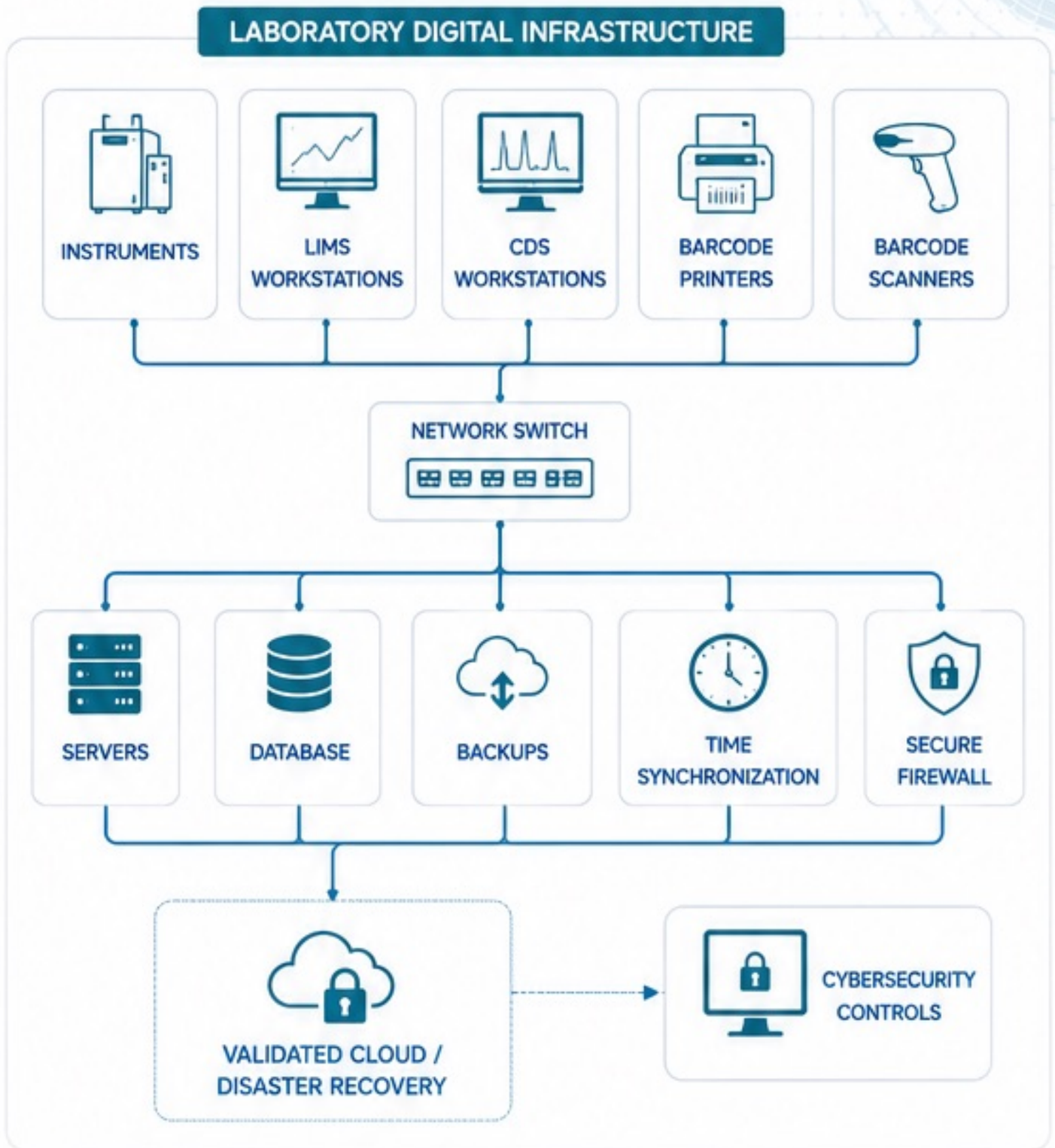
LIFECYCLE

- Lifecycle: gas consumption estimates, supplier contracts, spares, generator maintenance, filter changes, calibration and downtime planning.

ELV, IT, Security, BMS, and Environmental Monitoring

Laboratory data, critical storage and controlled environments need reliable monitoring and secure infrastructure.

Food & Beverage Labs can include instrument data connections, LIMS workstations, CDS workstations, barcode printers, barcode scanners, servers, backups, time synchronization, access control, CCTV, freezer monitoring, refrigerator monitoring, chamber monitoring, cleanroom pressure monitoring, humidity monitoring and alarm escalation.



The laboratory should not depend on isolated computers, paper logs, uncontrolled USB transfer or unmonitored critical storage.


LIMS / CDS WORKSTATIONS


ACCESS CONTROL


CCTV MONITORING

FREEZER / REFRIGERATOR ALERTS

NETWORK AND DATA

- Instrument data points, workstations, servers or validated cloud.
- Secure backups and disaster recovery.
- Time synchronization and cybersecurity controls.

SECURITY

- Access control for sample receiving, retained samples, chemical stores, standards, data rooms and restricted analytical zones.

BMS / EMS

- Temperature, humidity, differential pressure, particle monitoring.
- Freezer alarms, refrigerator alarms, chamber monitoring and reports.

DATA INTEGRITY

- User access controls and audit logs.
- Electronic records and electronic signatures.
- Record-retention policies where required.

Analytical Equipment Ecosystem

Equipment is selected according to method, matrix, throughput, budget, supportability and accreditation needs.

Food & Beverage Labs can include a wide range of equipment families. The final equipment list is built from the agreed test menu and laboratory scope. Technical Solutions can prepare user requirement specifications, datasheets, comparison matrices, tender-ready technical specifications, utility matrices and validation requirements for each major equipment family.

Routine testing: balances, pH/conductivity, density, refractometry, UV-Vis, titration, Karl Fischer, water activity, moisture, color, turbidity and viscosity.

Nutrition/proximate: Kjeldahl, Dumas, Soxhlet, fiber, drying ovens, muffle furnaces, fat analyzers and sample preparation.

Microbiology/molecular: BSCs, incubators, autoclaves, colony counters, qPCR, ELISA, extraction systems and pipettes.

Advanced analysis: HPLC/UHPLC, GC/GC-MS, LC-MS/MS, GC-MS/MS, ICP-MS/OES/AAS, IC, FTIR/NIR/Raman and TOC where required.

Support: columns, vials, standards, CRMs, gases, media, reagents, kits, filters, glassware, spare parts and service contracts.

ROUTINE TESTING

NUTRITION / PROXIMATE

3 MICROBIOLOGY / MOLECULAR

ADVANCED ANALYSIS

SUPPORT

Chromatography, Mass Spectrometry, and Elemental Analysis

High-sensitivity platforms for residues, contaminants, authenticity and regulatory decisions.

Advanced instrumental analysis can be the backbone of a government or high-capability food and beverage laboratory. These platforms support contaminants, residues, additives, impurities, volatile compounds, elemental analysis, trace metals and complex matrix testing.

They require more than instrument purchase: utilities, clean power, gases, exhaust, temperature/humidity control, water quality, validated data systems, columns, standards, CRMs, sample preparation, maintenance contracts, application training and qualified analysts.

Trace Analysis Results

Analyte	Conc. (µg/L)	LOD (µg/L)
Pb	0.45	0.01
Cd	0.12	0.005
As	0.28	0.01
Hg	0.05	0.002

1. CHROMATOGRAPHY

- Chromatography: HPLC/UHPLC, GC, headspace, autosamplers, columns, vials, CDS and standards.

2. MASS SPECTROMETRY

- Mass spectrometry: LC-MS/MS, GC-MS/MS, nitrogen generators, pump exhaust, data workstations, isotope-labeled standards and service contracts.

3. ELEMENTAL ANALYSIS

- Elemental analysis: ICP-MS, ICP-OES, AAS, microwave digestion, trace-metal clean hoods, ultrapure water, argon gas supply and reference materials.

4. ION AND WATER CHEMISTRY

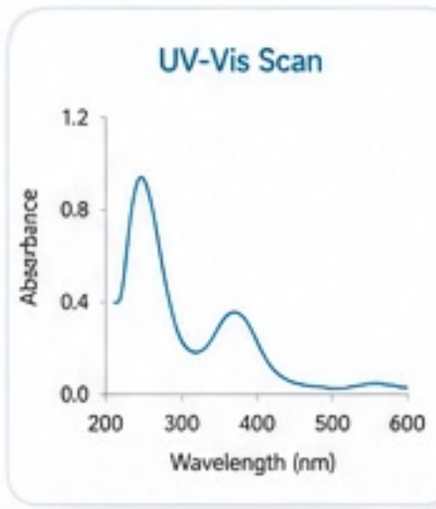
- Ion and water chemistry: ion chromatography, TOC where required, conductivity, pH and confirmation workflows.

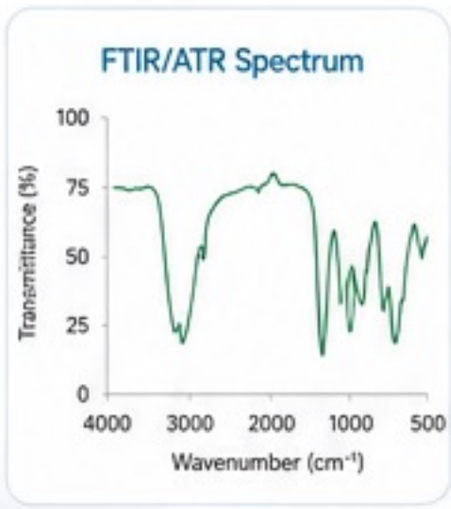
Wet Chemistry, Spectroscopy, and Rapid Identity

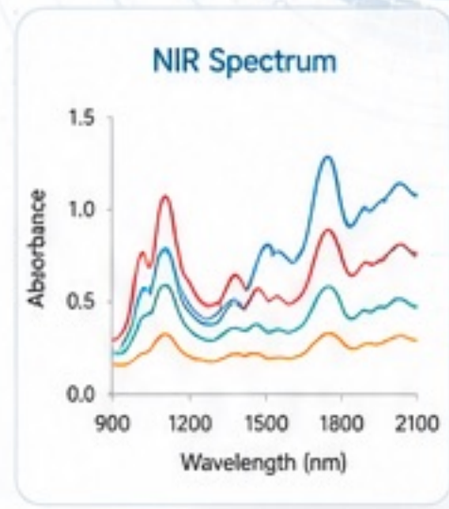
Reliable routine measurements for daily food and beverage quality decisions.

Routine wet chemistry and spectroscopy often produce many daily quality decisions. These tools are used for pH, conductivity, acidity, alkalinity, moisture, water activity, Brix, density, refractive index, color, turbidity, viscosity, identity, composition and rapid screening.

Food & Beverage Labs can combine manual and automated workflows according to throughput. Automation may support routine titration, Karl Fischer, sample handling, data capture and report consistency.







Routine Analysis Results

Parameter	Result	Unit	Method
pH	4.21	–	Electrode
Titratable Acidity	0.36	%	Titration
Brix	12.5	°Bx	Refractometry
Density	1.012	g/mL	Density Meter
Water Activity	0.956	aw	Water Activity
Moisture	3.21	%	Moisture Analyzer
Color (L*)	85.7	–	Colorimetry
Turbidity	2.35	NTU	Turbidimetry

1. WET CHEMISTRY

- pH meters, ISE meters, conductivity meters
- Autotitrators, Karl Fischer titrators, moisture analyzers
- Water activity meters, viscometers, colorimeters, turbidity meters
- Hotplates, stirrers and accessories

2. SPECTROSCOPY

- UV-Vis, FTIR/ATR, NIR, Raman, fluorescence
- Spectral libraries and reference materials
- Rapid identity and composition screening

3. PHYSICAL PROPERTY ANALYSIS

- Polarimeters, refractometers, density meters
- Moisture and thermal analysis where relevant
- Brix, refractive index, density, viscosity and texture analysis

4. DIGITAL LAYER

- Instrument software and templates
- Audit trails and electronic records
- Data integrity and permissions
- LIMS transfer and report consistency

Accurate measurements | Reliable daily decisions | Higher throughput with automation | Consistent quality and compliance | Secure data and traceability

TECHNICAL SOLUTIONS
industrial technology

Microbiology, Molecular, and Immunoassay Equipment

Equipment, consumables, contamination control and method support for biological testing workflows.

Biological testing areas require careful equipment selection because methods depend on sterility, contamination control, incubation stability, operator technique, validated consumables and waste handling.

Food & Beverage Labs can integrate microbiology, molecular and immunoassay equipment within a workflow that supports reliable results and safe operation.

1. MICROBIOLOGY


BSCs


Incubators


Refrigerated Incubators


Autoclaves


Colony Counters


Media Preparators


Homogenizers


Microscopes


Membrane Filtration


Anaerobic Systems


Consumables (plates, tubes, tips, media, swabs, filters, bags, reagents)

2. MOLECULAR


PCR Systems


qPCR Systems


DNA/RNA Extraction


PCR Workstations


Pipettes


Centrifuges


Cold Storage


Contamination-Control Consumables

Run Documentation
SOPs, batch records, reaction logs, QC data and audit trails.

3. IMMUNOASSAY


ELISA Readers


ELISA Washers


Microplate Incubators


Microplate Shakers


Lateral-Flow Readers


Kits and Controls

4. STERILITY / ENDOTOXIN (WHERE REQUIRED)


Isolators / BSCs


Membrane Filtration Units


Endotoxin Readers


Particle Counters


Air Samplers


Sterile Sampling Accessories and Consumables

CONTAMINATION CONTROL
Segregated work areas, airflow management, validated consumables and best practices.

WORKFLOW INTEGRATION
Equipment and consumables aligned to methods, sample types and throughput.

DATA INTEGRITY
Traceable documentation, electronic records and secure data systems.

METHOD SUPPORT
Method setup, verification, troubleshooting, training and application support.

Sample Preparation, Core Support, Stability, and Cold Chain

Behind every result is a preparation, storage and support system.

Food and beverage samples often require grinding, homogenization, extraction, centrifugation, filtration, evaporation, digestion, dilution, incubation, freezing, drying, washing or controlled storage before analysis.

The support equipment must be matched to the matrix, method, throughput and contamination risk.

- Sample preparation: homogenizers, grinders, mills, centrifuges, SPE, QuEChERS, nitrogen evaporators, vortex mixers, ultrasonic baths, digestion systems and sample containers.
- Core lab support: analytical balances, microbalances, top-loading balances, pipettes, pipette calibration systems, glassware washers, drying cabinets, water systems, vacuum pumps, carts, desiccators and consumable storage.
- Cold chain: refrigerators, -20°C freezers, -80°C freezers, ultra-low freezers, stability chambers, walk-in stability, mapping, data loggers, alarms and backup power.
- Service support: preventive maintenance, calibration, spare parts, consumables and training for support equipment as well as major instruments.

1. SAMPLE PREPARATION

Homogenizers

Grinders & Mills

Centrifuges

SPE Manifolds

QuEChERS Kits

Nitrogen Evaporators

Vortex Mixers

Ultrasonic Baths

Digestion Systems

Sample Containers

2. CORE LAB SUPPORT

Analytical Balances

Microbalances

Top-Loading Balances

Pipettes

Pipette Calibration Systems

Glassware Washers

Drying Cabinets

Water Systems

Vacuum Pumps

Lab Carts

Desiccators

Consumable Storage

3. COLD CHAIN & STABILITY

Refrigerators

-20°C Freezers

-80°C Freezers

Ultra-Low Freezers (-80°C and below)

Stability Chambers

Walk-In Stability Chambers

Mapping & Data Loggers

Alarms & Backup Power Systems

4. SERVICE SUPPORT

- Preventive Maintenance
- Calibration Services
- Spare Parts Supply
- Consumables Supply
- Training & User Support

TECHNICAL SOLUTIONS
industrial technology

Digital Laboratory Systems

Traceable workflows, connected instruments, secure records and audit-ready data.

Modern food and beverage laboratories rely on digital systems to manage sample registration, test assignments, instrument data, worksheets, results, review, certificates of analysis, regulatory reports, inventory, documents, training, equipment and quality records.

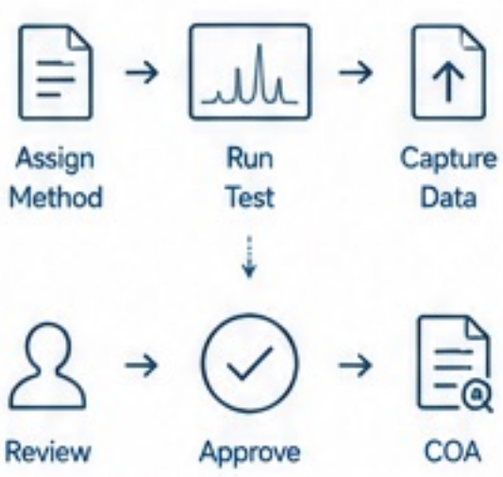
Food & Beverage Labs can include LIMS, chromatography data systems, ELN, SDMS, eQMS, barcode printers, barcode scanners, secure servers or validated cloud environments, backups, disaster recovery, cybersecurity, audit trails, electronic signatures and reporting tools.

1 SAMPLE FLOW

registration, barcode, chain of custody, splitting, retention, routing and disposal.

2 TESTING FLOW

method assignment, worksheets, instrument connectivity, raw-data capture, review, approval and certificate of analysis.

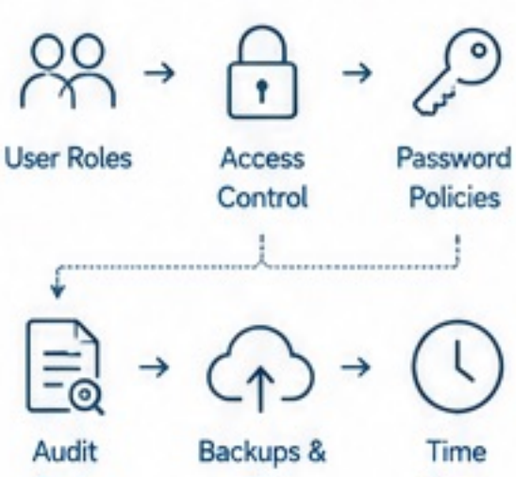


3 QUALITY FLOW

SOPs, document control, CAPA, deviations, training matrix, calibration, maintenance records and audits.

4 SECURITY FLOW

user roles, access control, password policies, audit trails, backups, disaster recovery and time synchronization.



CONNECTED INSTRUMENTS

Real-time status, data capture and instrument dashboards.

BARCODE & TRACKING

End-to-end traceability from sample receipt to final report.

SECURE PLATFORM

Validated servers or secure cloud with redundancy and encryption.

AUDIT TRAILS

Audit Trail

User	Action	Record	Date / Time
jdoe	Created	FB-24-0001	08 May 2024 09:14
asmith	Edited	Result ID 125	08 May 2024 10:02
rpatel	Reviewed	Result ID 125	08 May 2024 11:10
qjones	Approved	Result ID 125	08 May 2024 11:28

Complete history of actions, reviews, approvals and changes.

E-SIGNATURES

Approved By
Jane Smith
Quality Manager
08 May 2024 11:28
E-Signature

Electronic signatures for approvals and compliance.

CERTIFICATES & REPORTS

CERTIFICATE OF ANALYSIS
Sample ID FB-24-0001
Matrix Juice
Date 08 May 2024

Automated reports, certificates and regulatory submissions.

Quality and Accreditation Readiness

Laboratory credibility depends on controlled methods, competent staff, traceable records and defensible results.

Food & Beverage Labs can support the client's journey toward inspection readiness or ISO/IEC 17025 accreditation readiness. This does not mean promising accreditation automatically. It means designing the laboratory, documentation, training, equipment records and operating controls so the client has a stronger foundation for audits and improvement.

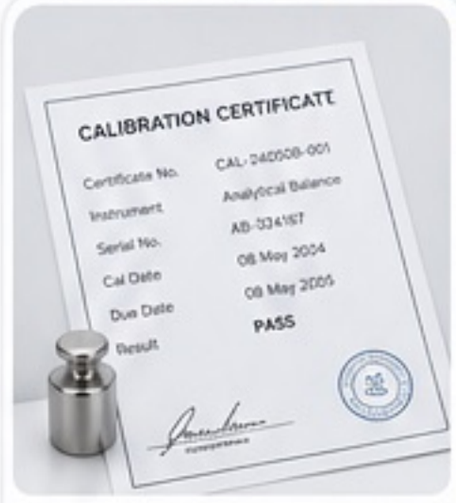
The quality system should connect to how the laboratory actually works: sample receipt, methods, instruments, calibration, maintenance, staff competence, data review and reporting.

DOCUMENT CONTROL

Controlled documents, SOPs and forms with version control and approval workflow.

AUDITS & COMPLIANCE

Internal audits, management review and compliance checks drive continual improvement.



CALIBRATION CONTROL

Traceable calibration with certificates, due-date tracking and instrument history.

PROFICIENCY TESTING

Proficiency testing plans and performance review to confirm accuracy and competence.

STAFF COMPETENCE

Training matrix, competency assessment and continuous development of laboratory personnel.

QUALITY DASHBOARD

Real-time dashboards for quality KPIs, CAPA status, tasks and audit readiness.

- Quality manual, SOPs, forms, equipment records, calibration records, maintenance records, training matrix and document control.

Document Control

Document	Type	Version	Status	Effective Date
Quality Manual	QM	3.0	Approved	01 May 2024
SOP-001 Sample Receipt	SOP	4.1	Approved	12 May 2024
SOP-005 Equipment Calibration	SOP	3.2	Approved	10 May 2024
Form-017 Calibration Record	Form	2.0	Approved	08 May 2024
WI-022 Data Review	WI	1.2	Approved	05 May 2024

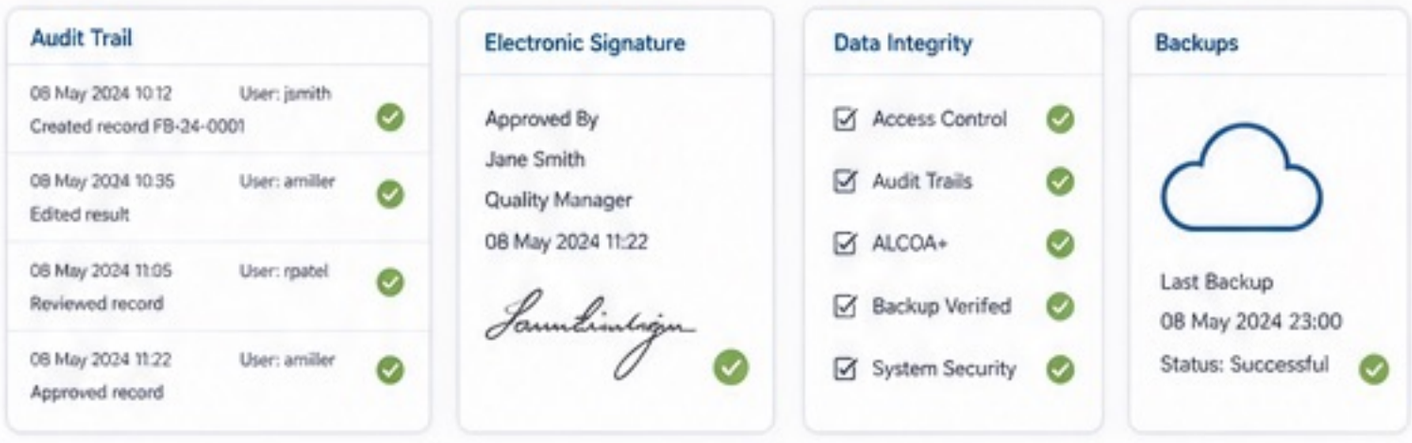
- Method validation and verification templates, uncertainty support where needed, proficiency testing plans and reference-material control.

Method Validation Summary

Parameter	Result	Status
Accuracy	98.6 %	Pass
Precision (RSD)	2.1 %	Pass
Linearity (R^2)	0.9991	Pass
LOD	0.005 mg/kg	Pass
LOQ	0.015 mg/kg	Pass
Uncertainty	5.2 %	Acceptable

- CAPA, deviations, complaints, nonconforming work, internal audits, management review and continual improvement.

- Digital support for audit trails, electronic records, electronic signatures, secure backups and data integrity reviews.



Commissioning, Qualification, and Validation

Handover should include evidence that the laboratory can operate as intended.

A laboratory is not ready simply because equipment has arrived. It must be installed, connected, configured, checked, qualified, calibrated, mapped, certified, documented and accepted.

Commissioning should address both individual assets and the system as a whole. Instruments must operate correctly. Utilities must support them. Data systems must record and protect results. Environmental monitoring must alarm and trend. Users must know how to operate safely.

INSTALLATION CHECKLIST

- ☑ Equipment received and inspected
- ☑ Location and layout verified
- ☑ Utilities connected (power, gases, water, ventilation)
- ☑ Connections leak tested
- ☑ Function tests completed
- ☑ Safety features verified
- ☑ Documentation and manuals
- ☑ Training completed
- ☑ Handover documentation

CALIBRATION CERTIFICATE

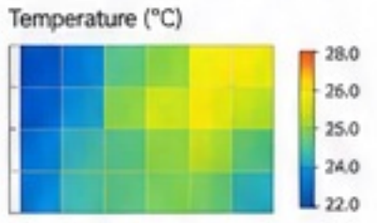
Certificate No.	CAL-240508-1785
Instrument	Analytical Balance
Model	AB-220
Serial No.	B220-45871
Cal Date	08 May 2024
Due Date	08 May 2025
Result	Pass

Authorized Signatory

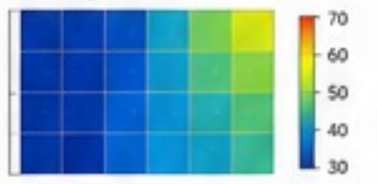
ENVIRONMENTAL MAPPING

Stability Chamber Mapping (25°C / 60% RH)

Temperature (°C)



Humidity (% RH)



Mapping Date: 07 May 2024
Status: Pass

COMMISSIONING AND VALIDATION PROCESS

1. **INSTALLATION**
Delivery, placement, utility connection, configuration

2. **VERIFICATION**
Installation verification, utility verification, safety checks

3. **QUALIFICATION**
IQ / OQ / PQ coordination and execution

4. **CALIBRATION AND CERTIFICATION**
Calibration, functional tests, certification

5. **SYSTEM CHECKS**
Data systems, monitoring, alarms, interfaces and workflows

6. **ACCEPTANCE**
Review, documentation, approval and handover

PROJECT-LEVEL CHECKS

- Factory acceptance testing where required
- Site acceptance testing
- Installation verification
- Utility verification
- Handover records

EQUIPMENT QUALIFICATION

- IQ / OQ / PQ coordination
- Calibration and certification
- Software configuration
- Asset registers and serial tracking

FACILITY / SAFETY CERTIFICATION

- Cleanroom certification
- Fume hood certification
- Biosafety cabinet certification
- Pressure cascade checks
- Monitoring verification

SPECIAL VALIDATION

- Stability chamber mapping
- Autoclave validation
- Computerized system validation
- Method validation or verification
- Data integrity checks

HOOD / BSC CERTIFICATION

- Face velocity testing
- Airflow and containment
- HEPA integrity testing
- Certification report and labels

VALIDATED DATA SYSTEMS

- User access and roles
- Audit trails and logs
- Electronic signatures
- Backups and recovery
- Data integrity reviews

PROJECT-LEVEL CHECKS

- Factory acceptance testing where required
- Site acceptance testing
- Installation verification
- Utility verification and handover records

EQUIPMENT QUALIFICATION

- IQ/OQ/PQ coordination
- Calibration and certification
- Software configuration
- Asset registers

FACILITY / SAFETY CERTIFICATION

- Cleanroom certification
- Fume hood certification
- Biosafety cabinet certification
- Pressure cascade and monitoring

SPECIAL VALIDATION

- Stability chamber mapping
- Autoclave validation
- Computerized system validation
- Data integrity checks

Training and Operational Readiness

A laboratory becomes valuable when the client team can use it safely, correctly and consistently.

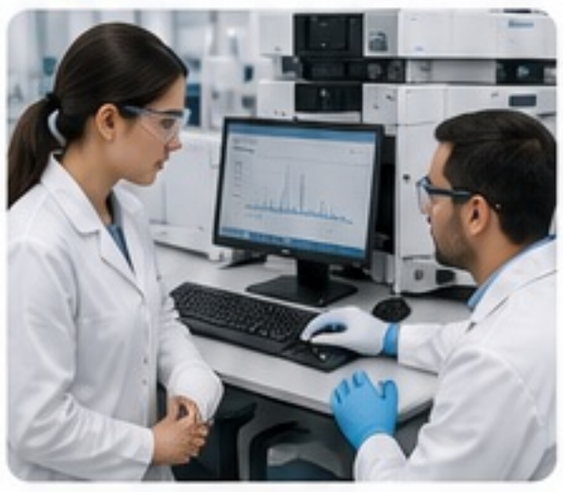
Training should be planned as part of the project, not left as a final-day demonstration. Food & Beverage Labs can include user training, supervisor training, quality training, safety training, equipment familiarization, basic troubleshooting, software use and daily operating routines.

The goal is to transfer practical capability: how to receive samples, follow SOPs, use instruments, protect data, respond to alarms, manage consumables and escalate problems.

Digital Training Dashboard

SOP and Job Aid Example

1. USER TRAINING



- Sample preparation
- Instrument operation
- Routine checks
- Software use
- Troubleshooting
- Result review

2. QUALITY TRAINING

- SOPs and forms
- Chain of custody
- Record control
- Method verification
- Deviations and CAPA
- Audits and data integrity

3. SAFETY TRAINING

- Chemical safety
- Biosafety and BSC use
- Gases and cylinder safety
- Waste management
- Fume hood use
- Emergency showers/eyewash
- Spill response and PPE

4. MAINTENANCE AWARENESS

- Daily checks
- Cleaning and filter changes
- Freezer alarms
- Calibration due dates
- Stock control
- Escalation path

SAFETY FIRST | FOLLOW SOPs | PROTECT DATA | MANAGE WASTE | RESPOND TO ALARMS | TEAMWORK

Lifecycle Support, Maintenance, and Expansion

Technical Solutions remains involved after handover so the laboratory can keep operating.

The value of a laboratory depends on its ability to operate over time. Instruments require preventive maintenance, consumables, calibration, software updates, spare parts, method troubleshooting, user refreshers and sometimes scope expansion.

Food & Beverage Labs can include preventive maintenance plans, corrective maintenance coordination, warranty management, service-level agreements, calibration coordination, reference materials, consumables, spare parts, annual reviews, refresher training, data integrity reviews and expansion support.

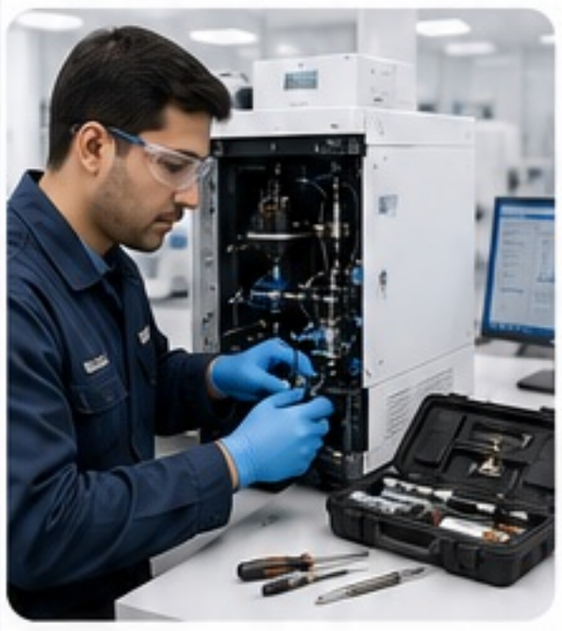
PLANNED SERVICE
On-time preventive maintenance visits
COMPLETED

UPTIME
98%
Instrument uptime (rolling 12 months)

RESPONSE TIME
24h
Average response time within SLA

SUPPORT PARTNER
Long-term partner for your laboratory
ACTIVE

1. SERVICE



- Preventive maintenance
- Corrective maintenance
- Warranty handling
- Service visits
- Troubleshooting
- Upgrade planning

Reliable support keeps instruments performing at their best.

2. CONSUMABLES

- Columns, vials, filters
- Media, reagents, standards
- Reference materials, kits
- Gases, pipette tips, plates
- Spare parts

Quality consumables and spare parts reduce downtime and improve results.

3. CALIBRATION/ CERTIFICATION

- Balances, pipettes, pH meters
- Temperature sensors, freezers
- Chambers, BSCs, fume hoods
- Autoclaves and monitoring sensors

Traceable calibration and certification support reliable and compliant results.

4. EXPANSION

- New methods
- Additional rooms
- Upgraded equipment
- Digital systems
- New sample types
- Accreditation-scope expansion

Plan, implement and scale to meet future requirements with confidence.

Selected Partner & Supplier Ecosystem

Showcased separately; configured according to each Food & Beverage Labs project scope.

Strategic Partners

JANSEN CLEANROOMS & LABS

TECNAL

Aligned for quality, performance and long-term success

Supplier & Manufacturer Ecosystem

- Tecnal
- Laben
- Bioway
- Dynamica Scientific
- Hanon Instruments
- BIOBASE
- Metrohm
- Bio-Rad
- Eppendorf
- Sartorius
- METTLER TOLEDO

Trusted suppliers

Proven solutions

Better results

Partner logos, product images and manufacturer visuals should be inserted only after permission is confirmed or approved assets are supplied. Additional approved OEMs may be added when specialized high-end categories are required by a project.

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TURNKEY SOLUTIONS | QUALITY & COMPLIANCE | TECHNOLOGY & INNOVATION | LIFECYCLE SUPPORT

EXPERT TEAM | RELIABLE PARTNERS | SUSTAINABLE GROWTH | RESULTS THAT MATTER