

# Fully-integrated multiparameter analysis

Gallery discrete analyzer systems for beer,  
malt and cider analysis



# Consolidated testing. Consistent quality.

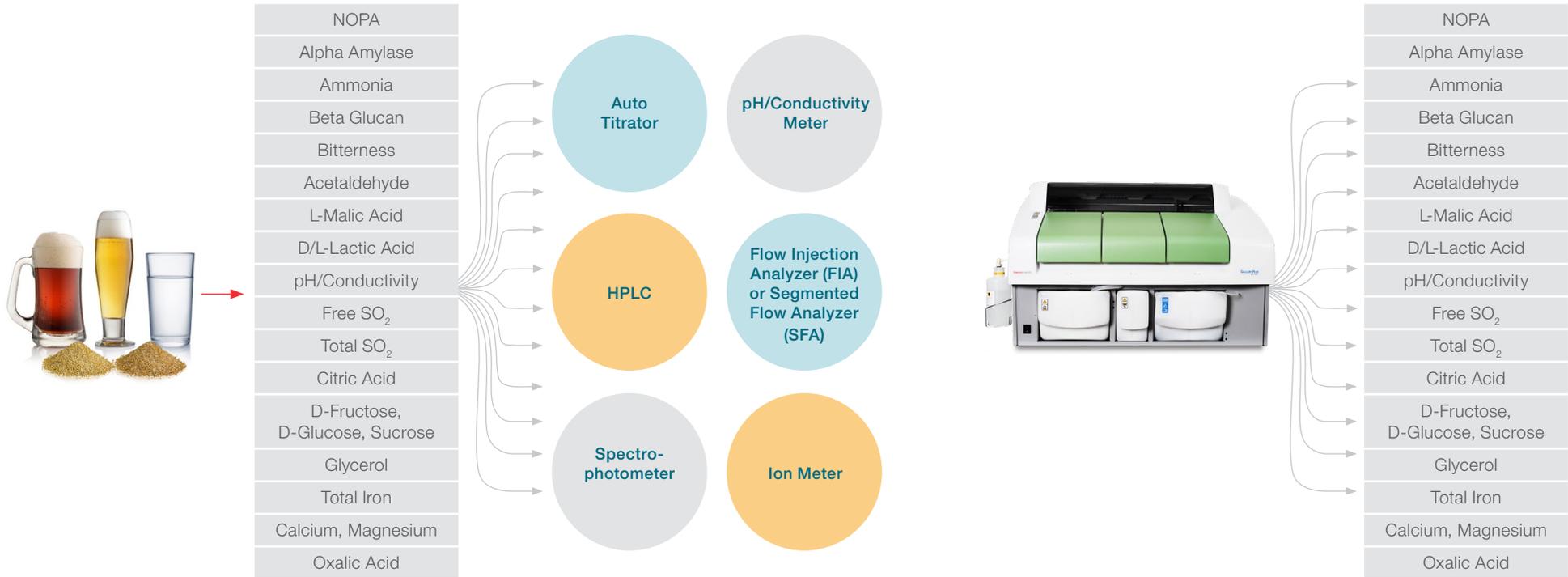
To achieve consistent quality and taste for beer and cider, laboratories must analyze multiple parameters—often requiring multiple automated instruments. Yet while each instrument offers precise and accurate results on its own, the entire process is not as fast or automated as it could be, which can impact your efficiency and throughput.

Why operate multiple analyzers, when you can do all your essential testing with one? With the liberating technology of Thermo Scientific™ Gallery discrete analyzers you can deliver reliable analyses for multiple parameters—like bitterness, acidity and sugar content—all from a single sample. This system's automated workflow and fast analysis work together to ensure high throughput and low cost-per-test. And because the instrument operates without manual intervention, your staff can enjoy walkaway productivity and focus on more strategic tasks in the lab. More testing, from fewer instruments and with fewer techs. Now that's smart.

For growing laboratories that perform routine brewing and malting analysis while experiencing increased demand for routine analytical services, Gallery discrete analyzers automate labor-intensive and time-consuming beer, cider, malt and wort testing. The discrete analyzer simultaneously automates the determination of analytes, like beta-glucan, NOPA and  $\text{SO}_2$ , from a single sample—offering fast sample turnaround and expanding your laboratory's analytical capabilities. Automated discrete analysis is also more flexible—able to perform many different reactions within a single instrument thus simultaneously analyzing multiple analytes—all managed by one technician. Furthermore, Gallery discrete analyzers are the only systems that use a completely disposable cuvette where the reaction occurs, ensuring the integrity of your results.

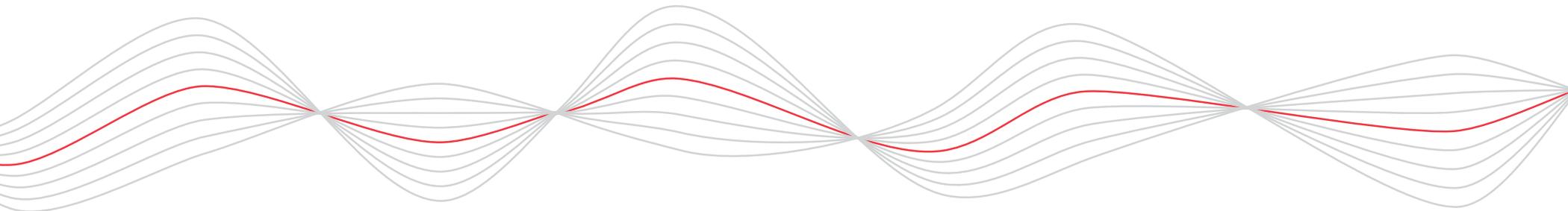


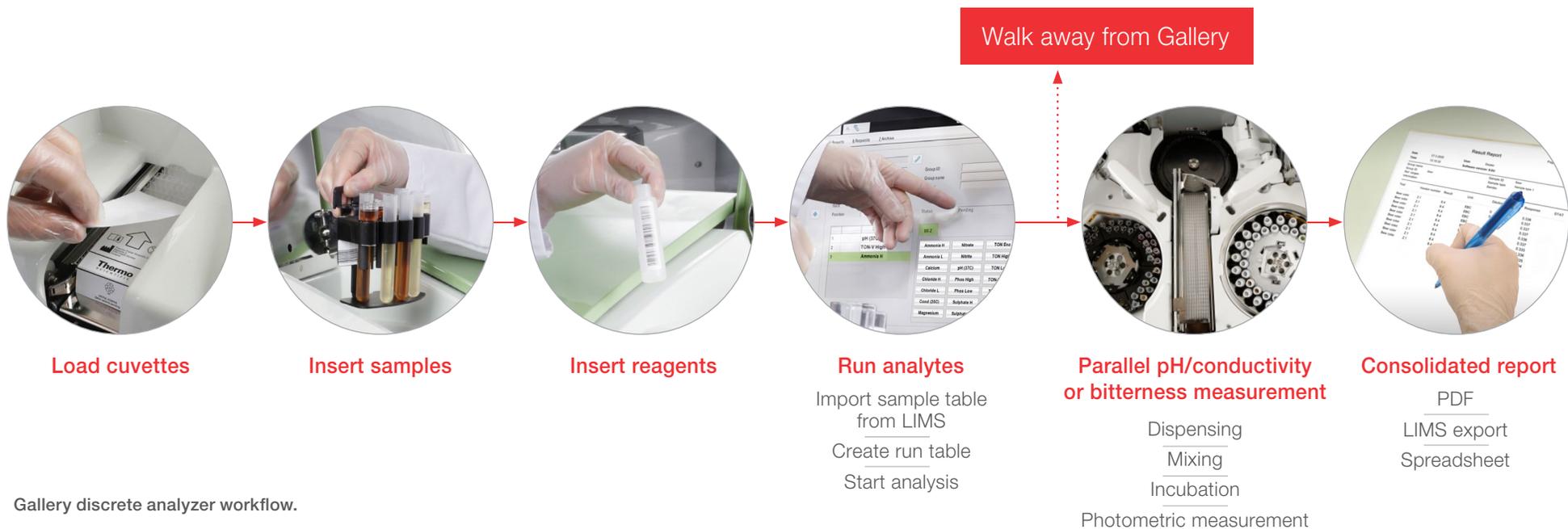
**Why operate multiple analyzers, when you can do all your essential testing with one?**



**Multiple Parameters – Multiple Instruments**

**Single Instrument – Multiple Parameters**





Gallery discrete analyzer workflow.

## Automated, multi-parameter analysis—full speed ahead

### What is the Gallery Discrete analyzer system?

Gallery and Gallery Plus discrete analyzers automate manual wet chemistry methods, photometric (colorimetric and enzymatic), and electrochemical (pH and conductivity) analysis, mimicking the operation of lab chemists, to provide fast, reproducible results in a compact, benchtop design. The discrete cell technology allows laboratories to measure multiple analytes simultaneously while reducing total analysis and operator time. Gallery discrete analyzer, with miniaturized components and unique low-volume cuvette design, accommodates small reagent volumes, minimizes reagent waste, and as a result, reduces analysis cost.

### Why automated discrete analyzer?

In the past, to measure some process critical parameters and ensure quality control, laboratories typically defaulted to one of two traditional wet chemistry methods—flow injection analysis or segmented flow analysis. Unfortunately, both methods are labor-intensive, deliver low throughput, consume a lot of reagent, contributing to more waste, and require highly skilled labor. There's a better way. Gallery and Gallery Plus discrete analyzers provide reliable analyses for multiple parameters—like bitterness, NOPA, Free and total SO<sub>2</sub> content—all from a single sample. Your staff can enjoy higher throughput, automated workflow and walkaway productivity, which drives positive results in your lab.

Whether measuring a few parameters on many samples or a large number of parameters on a few samples, Gallery discrete analyzer is the answer for improved response time and high throughput.

## Technology comparison

### Traditional Wet Chemistry

- mL reagents
- 50–100 mL samples per test
- Liters of waste generation
- Multiple instruments
- Labor intensive
- Sequential or batch
- Typically single or max 4 parameters per sample
- Higher cost per analysis
- Low throughput: 20–80 tests/hr



### Gallery Discrete Analyzer Platform

- 2–240  $\mu$ L reagents
- Max 300  $\mu$ L per test
- Few mL of waste
- Single platform
- Easy to operate
- Fully automated
- Parallel and batch
- Up to 20 parameters per sample
- Reduced cost per analysis
- High throughput 200–350 tests/hr
- Integrated barcode reader for samples and reagents

## Migrate from Flow Injection Analysis (FIA) or Segmented Flow Analysis (SFA)

If your lab still relies on traditional flow injection analysis or segmented flow analysis, the benefits of high-throughput, multi-parameter analysis are within reach. With Gallery and Gallery Plus discrete analyzers, you can put the power of technology to work for you—helping you deliver more results in less time. Plus, our technical consultants can optimize your methods from FIA to the Gallery platform to ensure complete success. Gallery discrete analyzers deliver reliable analyses for multiple parameters, within a single instrument requiring only one technician.



# Mastering beer analysis: multiple analytes from multiple samples

Although beer is typically brewed from just four basic ingredients (water, yeast, malt and hops), the diversity across the finished products is vast. For brewers, the compounds of interest range—from inorganic ions, organic acids and hop bittering principles that contribute to overall taste and bitterness—to proteins, carbohydrates and alcohols that are monitored to determine the extent of fermentation. Today's labs analyze beer to determine the concentration of added preservatives and colorants, in addition to ensuring manufacturing authenticity.

## Important malt and beer parameters

### Organic Acids

- Acetic Acid
- Citric Acid
- D-Gluconic Acid
- L-Glutamic Acid
- D-Isocitric Acid
- D-Lactic Acid
- Formic Acid\*
- L-Ascorbic Acid
- L-Lactic Acid
- L-Malic Acid
- Oxalic Acid
- Total Acids

### Titration Parameters

- Free and Total Sulfur Dioxide
- Titratable Acidity\*

### Process Critical Parameters

- Acetaldehyde
- Alpha-Amino Nitrogen (NOPA)
- Ammonia
- Beta Glucan
- Bitterness\*
- Ethanol
- Glycerol
- L-Asparagine
- Total Polyphenol\*
- Total Protein
- Urea

### Sugars

- D-Fructose
- D-Glucose
- Lactose
- Sucrose

## Important source water and waste water parameters

### Anions

- Chloride
- Fluoride
- Hexavalent Chromium
- Nitrate
- Nitrite
- Phosphate
- Sulfate
- Sulfide\*
- Thiocyanate\*

### Nutrients

- Free and Total Cyanide\*
- Nitrate
- Nitrite
- Phosphate
- Total Kjeldal Nitrogen (TKN)\*
- Total Oxidizable Nitrogen (TON)
- Total Phenol\*
- Total Phosphate\*

### Environmental Water Testing

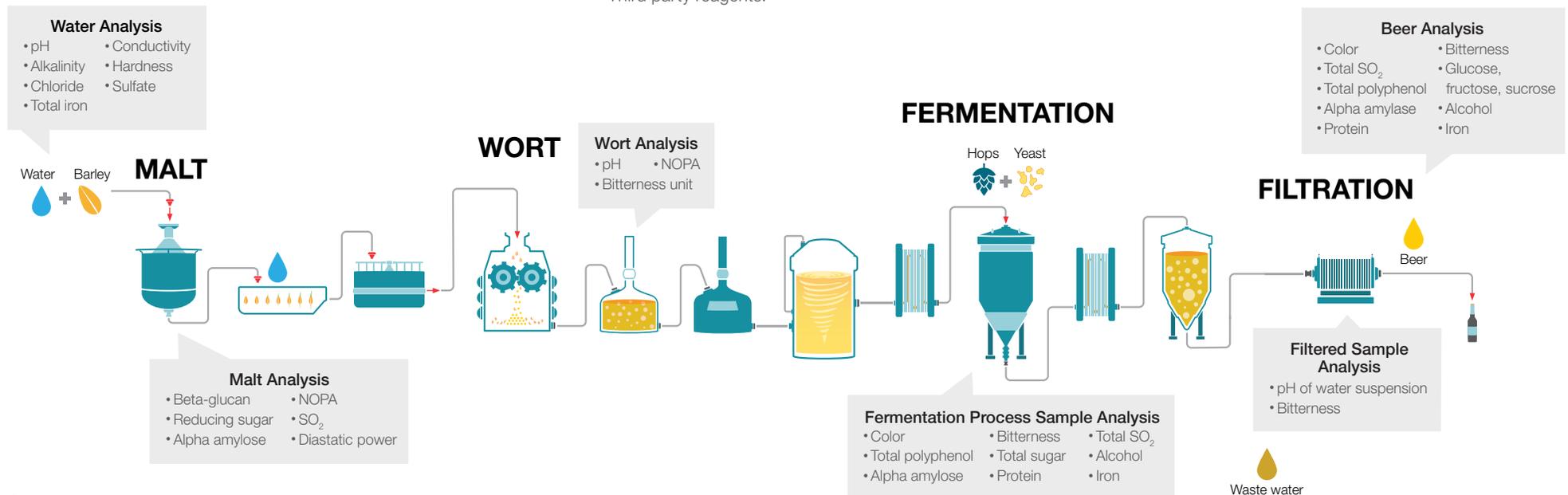
- Alkalinity
- Aluminum\*
- Boron\*
- Conductivity
- Manganese\*
- Molybdenum\*
- pH
- Total Hardness
- Total Iron
- Zinc\*

### Cations

- Ammonia
- Calcium
- Magnesium

\* Third party reagents.

## Beer production process



# Cider analysis made simple

The production of cider, hard ciders and vinegar from apples involves fermentation processes of three different products—the initial juice, the intermediary cider and the final vinegar. During production, many different strains of yeast or methods of fermentation can be used to influence the desired taste and quality of cider varieties, which provide bittersweet and bittersharp flavors. Other materials used in the production of some ciders include apple juice concentrate, added sugar, acid, coloring, yeast and preservatives.

## Parameters of interest

- Acetic acid
- Total acidity
- Lactic acid
- Malic acid
- Fermentable sugars
- Free sulphur dioxide
- Total sulphur dioxide
- Alcohol by volume (low-level)
- pH
- Glycerol



# Gallery discrete analyzers



## Gallery discrete analyzer

The Gallery discrete analyzer includes a combined sample and reagent disk for a maximum capacity of 90 samples and 30 reagents, with the ability to run up to 200 tests/hour.



## Gallery Plus discrete analyzer

The Gallery Plus discrete analyzer can accommodate 108 samples and 42 reagents in separate sample and reagent disks, with the capability to run up to 350 tests/hour.



### Gallery Plus Beermaster discrete analyzer

Dedicated for beer, malt, and wort analysis, the Gallery Plus Beermaster discrete analyzer automates labor-intensive and time-consuming bitterness tests. Gallery Plus Beermaster discrete analyzers can accommodate 108 samples and 42 reagents in separate sample and reagent disks, with the capability to run up to 350 tests/hour.



### Automated bitterness testing

The Bitterness unit (BCM), an integrated coated capillary column within the Gallery Plus Beermaster discrete analyzer, includes unique automated pretreatment and measurement for bitterness. The traditional manual test for bitterness is slow and laborious, and uses liquid-liquid extraction with isooctane, which must be disposed of properly. The system's bitterness module, on the other hand, uses 'green' solid-phase extraction ahead of a fully-automated testing protocol. During the automated process, the beer bittering substances are first extracted from interfering compounds present in the sample matrix, and then measured at 275 nm approximately eight bitterness tests per hour. With the BCM in use, the Gallery Plus Beermaster discrete analyzer can accommodate 72 samples. Your lab will increase efficiency in beer, malt, and wort quality control while saving significant time in sample pretreatment and analysis—ultimately improving lab productivity.

# Gallery discrete analyzer features and benefits



## Unique disposable Decacell

- The Decacells used are 10 independent reaction cells mounted together for truly discrete analysis
- No need for washing to prevent carryover
- No carry over—improved result reliability



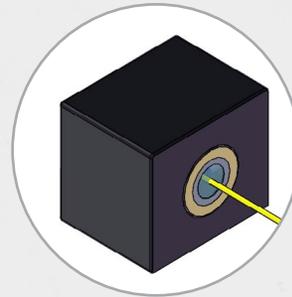
## High throughput analyzer

- Capable of performing up to 350 tests per hour
- Parallel pH and conductivity or bitterness testing
- True walkaway solution



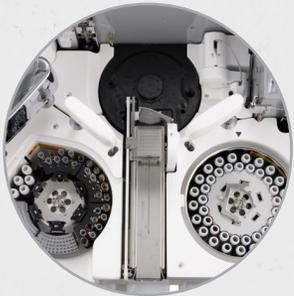
## Low volume cuvette

- Reduced sample and reagent consumption: 2–240  $\mu\text{L}$
- Lowest waste generation and disposal cost
- Reduced cost per analysis



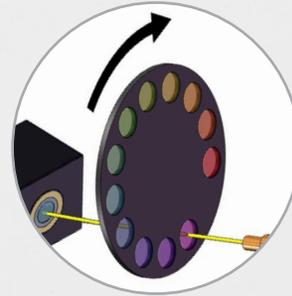
## Xenon source lamp

- Long-life Xenon lamp
- No frequent replacement
- Savings over lifetime of the instrument
- Sensitivity to the ppb level



## Fully-integrated multiparameter analyzer

- Capable of performing simultaneous, photometric (enzymatic, colorimetric), and electrochemistry (pH, Conductivity), measurements and/or bitterness measurements



## More filters—more chemistries

- 12 filter positions
- Up to 20 different chemical parameters per sample
- Wide wavelength coverage: 275, 340–880 nm



### Ease of use

- Workflow based operation—suitable for all users' levels
- Built-in barcode readers for samples and reagents—no manual errors; full traceability



### Auto analysis

- Automated calibration from single stock standard
- Automatic dilution of over range samples
- Auto start up and shutdown



### LIMS

- Bi-directional LIMS
- Easy sample table import and workflow optimization



### Robust analyzer

- Minimal moving parts—less maintenance
- Effective mixing and reproducible results
- Calibration curve stability



### Ready-to-use reagent kits

- More than 40 different chemistries
- Only  $\mu\text{L}$  consumption
- Bar-coded reagent vials provide easy and reliable identification:
  - Lot, expiration date, and vial size
  - Real-time reagent monitoring



### Flexible system

- Versatile to modify an existing method
- Can create your own method
- Up to 4 different reagent additions
- Easy FIA/SFA method transfer
- Variable incubation temperature from 25 °C–60 °C



### Electrochemistry unit (ECM)

- Integrated pH and conductivity analysis
- Parallel analysis:
  - pH Range: 2–12
  - Conductivity: 20  $\mu\text{S}/\text{cm}$ –112  $\text{mS}/\text{cm}$



### Bitterness unit (BCM)

- Fully-automated bitterness measurement
- Results in every 7 minutes

## Gallery discrete analyzers ordering table

		Gallery Discrete Analyzer	
		without ECM Unit	with ECM Unit
<b>Discrete analyzer</b>	Measurement method	Rapid, photometric analysis of multiple analytes for various applications	Rapid, photometric and electrochemical analysis of multiple analytes for various applications
	Cuvettes	Discrete disposable cuvettes	Discrete disposable cuvettes
<b>Performance</b>	Cuvettes capacity	On board capacity 360 measurement cells	On board capacity 360 measurement cells
	Cuvette cleaning	Disposable cuvettes, saves time, improves throughput, precision and accuracy	Disposable cuvettes, saves time, improves throughput, precision and accuracy
	Cross contamination	Minimal	Minimal
	Sample capacity	90 samples	90 samples
	Reagent capacity	30 positions	30 positions
	Reagents per test	Up to 4 reagents addition	Up to 4 reagents addition
	Tests/hour	200 tests/hour	200 tests/hour
	Parameters per sample	Up to 20 parameters	Up to 20 parameters
	<b>Samples &amp; reagents</b>	Sample volume	2–120 µL (possibility to extend up to 240 µL)
Reagent volume		2–240 µL	2–240 µL
Sample containers		0.5, 2.0 and 4.0 mL sample cups 5.0, 7.0 or 10.0 mL sample tubes	0.5, 2.0 and 4.0 mL sample cups 5.0, 7.0 or 10.0 mL sample tubes
<b>Technical information</b>	pH range	2–12	2–12
	Conductivity range	20 µS/cm–112 mS/cm	20 µS/cm–112 mS/cm
	Wavelength range	340 nm–880 nm	340 nm–880 nm
	Filter disc	12 position	12 position
	Linear range	0 to 3.5A	0 to 3.5A
	Resolution	0.001A	0.001A
	Source lamp	Long-life Xenon lamp	Long-life Xenon lamp
	Bitterness test	–	–
	Measurement temperature	Adjustable between 25 °C and 60 °C; Default setting at 37 °C	Adjustable between 25 °C and 60 °C; Default setting at 37 °C
<b>Auto analysis</b>	Automated calibration	✓	✓
	Auto dilution of over range samples	✓	✓
	Barcode reader for samples and reagents	✓	✓
	Auto start up & shutdown	✓	✓
	Urgent samples	Continuous access to samples, reagents, and cuvettes without interrupting the test cycle	Continuous access to samples, reagents, and cuvettes without interrupting the test cycle
<b>User interface</b>	Bi-directional LIMS	✓	✓
	Calibration	Factor, bias, linear, logit-log, spline, 2nd order and point-to-point	Factor, bias, linear, logit-log, spline, 2nd order and point-to-point
	QC check	Real-time QC program with multiple and variable rules; Control frequency user-definable	Real-time QC program with multiple and variable rules; Control frequency user-definable
	Out of limit	Results flagged	Results flagged
<b>Hardware</b>	Dimension	75 cm W × 70 cm D × 62 cm H (closed) 75 cm W × 70 cm D × 130 cm H (open)	75 cm W × 70 cm D × 62 cm H (closed) 75 cm W × 70 cm D × 130 cm H (open)
	Weight	85 kg (187 lbs)	85 kg (187 lbs)
	Part number*	MG9861 0001	MG9861 1001

\* Includes PC; optional monitor.

Gallery Plus Discrete Analyzer		Gallery Plus Beermaster Discrete Analyzer
without ECM Unit	with ECM Unit	with BCM Unit
Rapid, photometric analysis of multiple analytes for various applications	Rapid, photometric and electrochemical analysis of multiple analytes for various applications	Fast, efficient and fully automated colorimetric/photometric analyzer dedicated for beer, malt, and wort quality control and analysis
Discrete disposable cuvettes	Discrete disposable cuvettes	Discrete disposable cuvettes
On board capacity 360 measurement cells	On board capacity 360 measurement cells	On board capacity 360 measurement cells
Disposable cuvettes, saves time, improves throughput, precision and accuracy	Disposable cuvettes, saves time, improves throughput, precision and accuracy	Disposable cuvettes, saves time, improves throughput, precision and accuracy
Minimal	Minimal	Minimal
108 samples	108 samples	108 samples
42 positions	42 positions	42 positions
Up to 4 reagents addition	Up to 4 reagents addition	Up to 4 reagents addition
350 tests/hour	350 tests/hour	350 tests/hour (approx. 8 bitterness tests/hour with the BCM)
Up to 20 parameters	Up to 20 parameters	Up to 20 parameters
2–120 µL (possibility to extend up to 240 µL)	2–120 µL (possibility to extend up to 240 µL)	2–120 µL (possibility to extend up to 240 µL)
2–240 µL	2–240 µL	2–240 µL
0.5, 2.0 and 4.0 mL sample cups 5.0, 7.0 or 10.0 mL sample tubes	0.5, 2.0 and 4.0 mL sample cups 5.0, 7.0 or 10.0 mL sample tubes	0.5, 2.0 and 4.0 mL sample cups 5.0, 7.0 or 10.0 mL sample tubes
2–12	2–12	–
20 µS/cm–112 mS/cm	20 µS/cm–112 mS/cm	–
340 nm–880 nm	340 nm–880 nm	275, 340–880 nm
12 position	12 position	12 position
0 to 3.5A	0 to 3.5A	0 to 3.5A
0.001A	0.001A	0.001A
Long-life Xenon lamp	Long-life Xenon lamp	Long-life Xenon lamp
–	–	Automated bitterness measurement
Adjustable between 25 °C and 60 °C; Default setting at 37 °C	Adjustable between 25 °C and 60 °C; Default setting at 37 °C	Adjustable between 25 °C and 60 °C; Default setting at 37 °C
✓	✓	✓
✓	✓	✓
✓	✓	✓
✓	✓	✓
Continuous access to samples, reagents, and cuvettes without interrupting the test cycle	Continuous access to samples, reagents, and cuvettes without interrupting the test cycle	Continuous access to samples, reagents, and cuvettes without interrupting the test cycle
✓	✓	✓
Factor, bias, linear, logit-log, spline, 2nd order and point-to-point	Factor, bias, linear, logit-log, spline, 2nd order and point-to-point	Factor, bias, linear, logit-log, spline, 2nd order and point-to-point
Real-time QC program with multiple and variable rules; Control frequency user-definable	Real-time QC program with multiple and variable rules; Control frequency user-definable	Real-time QC program with multiple and variable rules; Control frequency user-definable
Results flagged	Results flagged	Results flagged
94 cm W × 70 cm D × 62 cm H (closed) 94 cm W × 70 cm D × 130 cm H (open)	94 cm W × 70 cm D × 62 cm H (closed) 94 cm W × 70 cm D × 130 cm H (open)	94 cm W × 70 cm D × 62 cm H (closed) 94 cm W × 70 cm D × 130 cm H (open)
110 kg (242 lbs)	110 kg (242 lbs)	110 kg (242 lbs)
MG9862 0001	MG9862 1001	MG9862 2001

# Gallery system reagents for brewing and malting analysis

Thermo Scientific™ Gallery™ system reagents for brewing and malting analysis save your technician's time by eliminating reagent preparation, thus reducing errors and ensuring confidence in the quality of results. Over 40 ready-to-use Gallery system reagents for beer, malt and cider analysis are available in barcoded vials, enabling identification data, such as lot and expiration date, to be read automatically by the barcode reader. Automated dilutions make it possible to apply methods for a wide range of analyte concentrations, with many test applications based on recommended international standard methods used across the world. Save time and reduce errors by simplifying your analysis with the Gallery system reagents for beer, malt and cider analysis.



## Ordering table

Catalog number	Description	Analyte	Sample matrix	Interference filter (nm) main/ side (alternative)	Test range mg/L	Method
984347	Acetaldehyde system reagents (250 tests)	Acetaldehyde	Food and beverage	340	2–500 mg/L	Enzymatic test with acetaldehyde dehydrogenase
984396	Acetaldehyde Standard (100 mg/L)	Acetaldehyde	Food and beverage	340	2–500 mg/L	Enzymatic test with acetaldehyde dehydrogenase
984318	Acetic Acid system reagents (300 tests)	Acetic Acid	Food and beverage	340	0.04–3.00 g/L	Enzymatic test with acetate kinase
984342	Alpha-Amino Nitrogen (NOPA) by system reagents (300 tests)	Alpha-Amino Nitrogen	Food and beverage	340/700 (750)	20–300 mg/L	Colorimetric test with OPA (o-Phthaldialdehyde)
984394	NOPA Standard for Alpha-Amino Nitrogen test (150 mg/L)	Alpha-Amino Nitrogen and NAC (N-acetylcysteine)	Food and beverage	340/700 (750)	20–300 mg/L	Colorimetric test with OPA (o-Phthaldialdehyde)
984320	Ammonia system reagents (300 tests)	Ammonia	Food and beverage	340	10–420 mg/L	Enzymatic test with glutamate dehydrogenase
984353	BC System liquid system reagents (360 tests)	Bitterness	Food and beverage	275	5–100 BU	Column extraction of bittering components from beer and wort and subsequent photometric determination
984354	BC Diluent system reagents (360 tests)	Bitterness	Food and beverage	275	5–100 BU	Column extraction of bittering components from beer and wort and subsequent photometric determination
984355	BC Eluent system reagents (360 tests)	Bitterness	Food and beverage	275	5–100 BU	Column extraction of bittering components from beer and wort and subsequent photometric determination
984361	Calcium system reagents (350 tests)	Calcium	Food and beverage	660	10–200 mg/L	Colorimetric test with Arsenazo III
984327	Citric Acid system reagents (250 tests)	Citric Acid	Food and beverage	340	15–5000 mg/L	Enzymatic test with citrate lyase
984300	Ethanol system reagents (300 tests)	Ethanol	Food and beverage	340	0.01–10 g/L	Enzymatic test with alcoholdehydrogenase
984384	Alcohol Standard (0.5 g/L) tests	Ethanol	Food and beverage	340	0.01–10 g/L	Enzymatic test with alcoholdehydrogenase

Catalog number	Description	Analyte	Sample matrix	Interference filter (nm) main/ side (alternative)	Test range mg/L	Method
984302	D-Fructose system reagents (300 tests)	D-Fructose	Food and beverage	340/600	0.7–200 g/L 5–500 mg/L	Enzymatic test with hexokinase, phosphoglucose isomerase and glucose-6-phosphate dehydrogenase
984380	Sugar Combination Standard for D-Fructose (0.500 g/L), D-Glucose (0.500 g/L), Sucrose (0.500 g/L), or total Glucose (0.760 g/L) tests	D-Fructose D-Glucose Sucrose	Food and beverage	340/600	—	Enzymatic test with hexokinase, phosphoglucose isomerase and glucose-6-phosphate dehydrogenase
984305	Beta-Glucan - High MW system reagents (350 tests)	Beta-Glucan	Food and beverage	405/600	15–500 mg/L	Novel colorimetric test
984383	Beta-Glucan Standard (500 mg/L) tests	Beta-Glucan	Food and beverage	405/600	15–500 mg/L	Novel colorimetric test
984304	D-Glucose system reagents (300 tests)	D-Glucose	Food and beverage	340/600	0.1–160 g/L 5–500 mg/L	Enzymatic test with hexokinase and glucose-6-phosphate dehydrogenase
984314	D-Glucose + D-Fructose system reagents (300 tests)	D-Glucose D-Fructose	Food and beverage	340/600	0.04–200 g/L	Enzymatic test with hexokinase, phosphoglucose isomerase and glucose-6-phosphate dehydrogenase
984317	D-Glucose + D-Fructose + Sucrose system reagents (300 tests)	D-Glucose D-Fructose Sucrose	Food and beverage	340/600	0.24–200 g/L	Enzymatic test with betafructosidase (Invertase), hexokinase, phosphoglucose isomerase and glucose-6-phosphate dehydrogenase
984316	Glycerol system reagents (300 tests)	Glycerol	Food and beverage	340	0.07–30 g/L	Enzymatic test with glycerokinase, ADP dependent hexokinase and glucose-6-phosphatedehydrogenase
984386	Glycerol Standard (0.21–0.2 g/L)	Glycerol	Food and beverage	340	0.07-30 g/L	Enzymatic test with glycerokinase, ADP dependent hexokinase and glucose-6-phosphatedehydrogenase
984326	Total Iron (Fe) system reagents (850 tests)	Iron	Food and beverage	600	0.03–5.5 mg/L	Colorimetric test with Ferene S
984306	D-Lactic Acid system reagents (300 tests)	D-Lactic Acid	Food and beverage	340	25–1600 mg/L	Enzymatic test with D-lactatedehydrogenase
984308	L-Lactic Acid system reagents (300 tests)	L-Lactic Acid	Food and beverage	340	20–1600 mg/L	Enzymatic test with L-lactatedehydrogenase
984382	Acid Combination Standard for D-Lactic acid (0.200 g/L), L-Malic acid (0.500 g/L), L Lactic acid (220 mg/L), and D-Lactic acid (220 mg/L) tests	D-Lactic Acid L-Lactic Acid L-Malic Acid	Food and beverage	340	—	Enzymatic test with L-lactatedehydrogenase
984358	Magnesium system reagents (350 tests)	Magnesium	Food and beverage	510	10–400 mg/L	Colorimetric test with Xylidyl Blue I
984310	L-Malic Acid system reagents (300 tests)	L-Malic Acid	Food and beverage	340/700 (750)	0.05–20 g/L	Enzymatic test with L-malatedehydrogenase and glutamate-oxalacetate-transaminase
984348	Oxalic Acid system reagents (250 tests)	Oxalic Acid	Food and beverage	600/700	2–100 mg/L	Enzymatic test with oxalate oxidase
984393	Oxalic Acid Standard (45 mg/L) tests	Oxalic Acid	Food and beverage	600/700	2–100 mg/L	Enzymatic test with oxalate oxidase
984349	pH (colorimetric) - (330 tests)	pH	Food and beverage	575/700	2–7.2 pH at 37 °C	Colorimetric test with pH indicator dyes
984331	ECM pH 4 Standard tests	pH	Food and beverage	575/700	2–7.2 pH at 7 °C	Colorimetric test with pH indicator dyes
984332	ECM pH 7 Standard tests	pH	Food and beverage	575/700	2–7.2 pH at 37 °C	Colorimetric test with pH indicator dyes
984634	Sulfur Dioxide system reagents (430 tests)	SO <sub>2</sub> Free	Food and beverage	575/750 (700)	2–150 mg/L	Colorimetric test with pararosaniline
984345	Sulfur Dioxide system reagents (300 tests)	SO <sub>2</sub> Total	Food and beverage	405/750 (700)	2–50 mg/L 20–300 mg/L	Colorimetric test with DTNB
984312	Sucrose (Total Glucose) system reagents (300 tests)	Sucrose	Food and beverage	340/600	0.1–100 g/L 15–500 mg/L	Enzymatic test with betafructosidase, hexokinase and glucose-6-phosphate dehydrogenase
984328	Proteins system reagents (450 tests)	Total Protein (Biuret)	Food and beverage	540/700	0.5–15 g/L	Colorimetric test with Biuret



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