



## SWAN SCIENTIFIC LLP

ANALYTICAL SOLUTIONS

Pharma



Cosmetics



Food &  
Beverages



## Analytical Instruments

### OUR GLOBAL PARTNERS



 SHIMADZU

 VELP  
SCIENTIFICA

 Anton Paar

 DAIHAN  
Scientific  
YOUR PARTNER IN LABORATORY

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MEASUREMENT SOLUTIONS

 QUANTEK  
INSTRUMENTS  
Eingetragene Marke der Quantek Instrumente GmbH

 Wasserlab  
Sistemas de purificación de agua  
Water Purification Systems

### Total Organic Carbon (TOC) & Total Nitrogen (TN) Analyzer

- Shimadzu's TOC Analyzer is World Leader, based on 680°C Catalytic Combustion aided Oxidation / NDIR Detector.
- High performance due to Strongest Oxidation Performance & High Sensitivity.
- Fast, simple and detects low levels of organic compounds.
- Ultra wide range of 4 µg/L to 30,000 mg/L. Detection limit of 4 µg/L.
- Measures TOC in final rinse water / Clean-in-Place / Cleaning Validation.
- TOC analysis offers a simple method to measure water quality and provide insights into all organics present-from ingredient to production to waste water process.
- TOC provides a measure of absolute cleanliness being able to detect API, degradants, cleaning agents, and excipients.
- Tracking organic load variations in real time provides food and beverage manufacturers with a data driven decision making tool for QC, process monitoring and regulatory compliance.



#### TN Unit:

- Shimadzu's TN Unit is accessory of TOC Analyzer for TN analysis, Based on 720°C Catalytic thermal decomposition / Chemiluminescence methods.
- Wide range 5µg/L -10,000mg/L. Detection limit of 5 µg/L.
- There is no interference from metallic ions or bromine.
- Performs Simultaneous TOC and TN Measurements for the same sample.
- Useful for Measurement of total nitrogen (TN) for protein estimation in pharmaceutical vaccines ; Cleaning Validation of Food Production Equipment by TOC and TN Measurement ; TN and NOx Measurement for a Denitration System.



### Dumas Nitrogen Analyzer

- Versatile, cloud-enabled and fully automated combustion elemental analyzer for nitrogen determination.
- Uses Dumas method / Combustion with TCD Detector.
- This analysis system is dramatically faster, easier, and safer than a traditional Kjeldahl system.
- Range upto 200 mg N. Detection limit of 0.001 mg N.
- Fast analysis with results in 3-5min. The quick start and sleeping mode ensure fast operation set up.
- The 30-positions disc autosampler expandable with extra 3 discs ensures maximum productivity and uptime.
- The user-friendly DUMASoft™ software and VELP Hermes connection will deliver a new user experience and smart workflows.
- As per AOAC / AACC / ASBC / ISO / OIV Reference methods.
- For Nitrogen determination in fertilizers, soil, cellulose etc. ; Protein determination in cereal grains, oil seeds, animal feed, milk, milk products, flours, beer, wort, brewing grains, meat products etc.



### Kjeldahl Apparatus

- Measures Kjeldahl nitrogen TKN, proteins, ammoniacal nitrogen, nitric nitrogen, Devarda, phenols, TVBN & volatile acids, cyanides & alcohol content.
- Range : 0.04 - 220 mg N. Detection limit: > 0.015 mg N.
- Designed for high-throughput laboratories looking for precise and reproducible results.
- Fully automatic distillation and titration.
- Connect to autosampler for high sample throughput, maximum flexibility and unattended operation.
- Full range of sensors and safety systems.
- Software compliance with 21 CFR PART 11.
- As per AOAC / ISO Reference methods. AOAC recommended instrument.
- Used to determine organic nitrogen and protein contents in chemical substances and food samples viz., animal feed and pet food, beer, bread and baked products, milk, cereals, malt, meat, nuts, pasta, yeast, oil seeds, tomato paste, wines, alcohol etc.



### Solvent Extractor

- It can be used to separate a substance or a group of elements from solid and semi-solid samples.
- Extraction according to Randall method (consisting of immersion, washing and solvent recovery), faster than traditional Soxhlet method.
- Solvent recovery : from 50 to 75%.
- Rapid analysis with maximum precision or accuracy.
- Maximum reproducibility and highest flexibility.
- Accepts majority of solvents with high solvent recovery using Vaflon seals.
- Compatible with HU6 hydrolysis unit for total fat determination.
- Suitable for fat extraction and sample preparation.
- For the determination of the content of soluble products such as fats, detergents, plasticizers and pesticides in food, animal feeds, detergents, rubber and plastic formulas, pharmaceutical products, soil.



### Fiber Analyzer

- Crude and Detergent Fiber Determination, using pre-heated reagents as per Weende, Van Soest & other official methods.
- Total raw fiber extraction (as crude fiber (CF) using Weende technique, the classic procedure.
- Neutral & acid detergent fiber with NDF, ADF, Van Soest extractions. Most common measure for animal feed analysis.
- Acid detergent lignin extraction with ADL & Van Soest methods.
- Rapid, reliable results & high reproducibility.
- Same crucibles used for weighing, drying & washing – no loss of fiber ensured.
- Perform single or multiple extractions including boiling, rinsing and filtration steps.
- Applications: animal feed analysis, plant cell testing. (raw fiber (Weende, Wijstrom), neutral or acid detergent treatment fiber (Van Soest), lignin, cellulose, hemicellulose).



### Particle Size & Zeta Potential Analyzer

- Measures particle size, zeta potential, molecular mass, transmittance and refractive index of liquid dispersions and food suspensions.
- Based on dynamic light scattering (DLS) & electrophoretic light scattering (ELS) technologies.
- Particle size: 0.3nm to 10µm, Zeta potential: > ±1000 mV, Molecular mass: 980 Da to 20 MDa, Refractive index: 1.28 to 1.50.
- Particles in dispersion as well as peptides or macromolecules in solution can be determined.
- Particle size measurements via dynamic light scattering at three different measurement angles (side-, back-, or forward scattering).
- Software compliance with 21 CFR Part 11.
- USP <729>, <1430>.
- Enables optimization of formulation instructions & nutrient content for smaller particles in emulsions; Determines stability of suspension.



### Particle Size Analyzer

- Measures the particle size and particle size distribution of dry powders and liquid dispersions.
- Based on multi laser system and laser diffraction technology.
- Measuring range (dry): 0.1 µm to 2500 µm, Measuring range (wet): 0.04 µm to 2500 µm.
- Accurate and repeatable size distribution of powder particles.
- Software compliance with 21 CFR Part 11.
- USP <429>, <729>, <1430>.
- Used to characterize the particle size of larger food powders such as flour, coffee, or milk powders for checking the quality and processing behavior ; analyze a widest range of particles, from pharma raw materials to final formulations.



### Surface Area and Pore Analyzer

- Measures BET surface areas, micropores, and mesopores. Adsorbates: N<sub>2</sub>, Ar, Kr, CO<sub>2</sub>, O<sub>2</sub>, H<sub>2</sub> etc.
- Based on Vacuum Physisorption/Chemisorption technologies.
- Capable of measuring surface areas down to less than 0.01 m<sup>2</sup>/g and pore sizes down to 0.35 nm.
- Built-in sample preparation (vacuum degassing) stations.
- Active coolant level control for sensitivity, accuracy and reproducibility.
- Compliance with more than 20 ASTM, DIN, and ISO standard test methods.
- 21 CFR Part 11-compatible software features.
- USP <846> | Ph.Eur. 2.9.26 Compliant.
- To understand how the exposed surface area of pharmaceutical active and excipient powders affects their dissolution behavior and bioavailability.



### Density Meter for Solids

- Ultrapyc gas pycnometer measures density of solids / semi-solids, which is used to track purity or porosity.
- Based on gas pycnometry principle.
- TruPyc technology ensures accurate measurements for various sample amounts.
- PowderProtect mode eliminates the risk of instrument contamination by powders.
- Features built-in temperature control.
- Range: 1cc. Cell sizes: Nano cell (0.25 cm<sup>3</sup>), Meso cell (1.8 cm<sup>3</sup>), Micro cell (4.5 cm<sup>3</sup>), Small cell (10 cm<sup>3</sup>), Medium cell (50 cm<sup>3</sup>), Large cell (135 cm<sup>3</sup>).
- USP <699> | Ph.Eur. 2.9.23.
- Measure true & skeletal density of powders and tablets ; Measure true density to know textural properties for delivering food products with the exact mouth-feel customers have come to know and enjoy ; Measure density of cosmetics and personal care materials for formulation quality control and packaging of the final product.





### Density Meter for Liquids

- For density and concentration measurements of chemicals, pharmaceutical products, cosmetics, petroleum products, aromas, biofuels, and many more.
- Best-in-class U-tube technology with the Pulsed Excitation Method, viscosity correction, fastest measurement mode, and the bubble-detection feature FillingCheck™.
- Range: 0 g/cm<sup>3</sup> to 3 g/cm<sup>3</sup> ; Accuracy: 0.00005 g/cm<sup>3</sup>.
- Automated filling, measuring, and cleaning process using sample changers.
- Software compliance with 21 CFR Part 11.
- USP <841> | Ph.Eur. 2.2.5 | JP 17 2.56 | ChP 2020 (Vol IV) 0601.
- Measure sugar content in syrups, fruit juices, soft drinks ; alcohol content in spirits ; density of milk and dairy products ; density or concentration of preserving fluids ; extract content of tea and coffee mixtures, wine and beer ; Measure density and specific gravity of infusions and of raw materials used in drug production ; Control filling volume of sprays. Implement quality controls for finished creams, sprays, and raw materials.



### Rheometer

- Measure the viscoelastic properties of materials for material characterization.
- Based on multiple flow measurement methods and shear testing methods.
- Torque: 1nNm - 230mNm ; Angular deflection: 0.05μrad - ∞μrad.
- One rheometer, two drive units. Perform rheological tests with two torque transducers & drive units at once.
- Ready for DMA in torsion, tension, bending, compression, and more.
- Toolmaster™, the automatic tool recognition and configuration feature, ensures easy handling and error proofing.
- Powder Cells for the complete characterization of powder behavior: flowability, compressibility, permeability, fluidization properties, and many other parameters.
- Software compliance with 21 CFR Part 11.
- USP <912> , <1174> , <1911> , <1912> | Ph.Eur. 2.2.8, 2.2.10.
- Investigation of raw materials, formulations, and final products from QC to R&D.



### Rotational Rheometer

- Measures the dynamic viscosity ; Performs quick single-point determinations, flow curves, viscosity curves, yield point determinations, thixotrophy and temp tests to study rheological behaviour.
- Sample can be liquid-like emulsions to semi-solid lotions viz., from paints, coatings, and food samples like chocolate or dairy products to petrochemicals like motor oil or even asphalt.
- Based on Searle principle. It consists of a high-precision encoder and a highly dynamic EC motor.
- Torque: 0.20 to 75 mNm ; Shear stress: 0.5 to 30,000 Pa ; Shear rate: 10<sup>-2</sup> to 6,500 1/s ; Viscosity range: 1 to 10<sup>9</sup> mPas.
- Software compliance with 21 CFR Part 11.
- USP <912> , <1911> , <1912> | Ph. Eur. 2.2.8, 2.2.10.
- Determine the cohesion strength and flowability to assess the quality of raw materials as part of the incoming inspection or for the design of pumps in plant manufacturing. They can also be used during product manufacturing or processing to check the individual steps such as mixing, dispersing, etc.



### Viscosity Meter

- Ideal for measuring the viscosity of various liquid such as grease, painting, foodstuff, dope, paper making, cosmetics, chemical industry, capsule stickiness agent and medicines.
- Multi speed digital rotational viscometer. Range: 1-20,00,000 cP.
- LCD screen displays measured parameters.
- Included ASTM standard spindle-kit of 4 Ea. ; LV1 : 15~20K, LV2 : 50~100K, LV3 : 200~400K, LV4 : 1K~2M.
- With power safety, error message, sound alarm.
- Auto range function to determine the maximum viscosity with each spindle / speed combination.
- Applications: grease, paints, food, paper, cosmetics, chemical, capsule stickiness, medicines etc.



### Homogenizer

- The homogenizer with direct controller is useful for all dispersing and homogenizing procedures.
- High speed / high quality / low noise. : Max. 27,000 RPM (without load).
- Speed range: 2,000 ~ 27,000rpm (without load), Resolution: 10 rpm-control ; Working range 1 ~ 2,500ml.
- Designed for liquid and tissue samples. Speed & power control optimized for a sample.
- Patented jog-shuttle control system.
- High efficiency dispersing tool made of stainless-steel and PTFE.
- Dispersing tools and Rotars available for different volumes depending on the application.
- Useful for all dispersing & homogenizing applications.



## Automated Multipurpose Powder X-Ray Diffractometer

- Studying of purity, stability, percent crystallinity, investigating nanostructure and ageing of pharmaceutical powders, determining phase purity and degree of crystallinity, conducting stability studies of pharmaceutical powders under non ambient conditions, microstructural analysis (crystallite size, stress/ strain), amorphous phase quantification.
- Measurement radius: 360 mm or 400 mm ; Maximum usable angular range:  $-95^{\circ}$  to  $162.5^{\circ}$  (with all optics configurations).
- Sample stages for every application: Sample spinner stage, Capillary spinner, XY stage with autosampler, EVAC module for high-resolution XRD and SAXS, Non-ambient attachments.
- Highest safety as standard: Clearly visible X-ray warning lamps ; Interlock mechanisms for maximum user safety ; Compliance with the most stringent safety guidelines on X-ray, machinery, and electrical safety ; Maximum X-ray protection with a leakage X-ray dosage  $<0.1 \mu\text{Sv}$  according to EURATOM regulations.
- The XRDrive software allows you to exploit the full potential of XRDynamic 500 and the TruBeam™ concept.
- XRDanalysis is a next-generation software package for powder diffraction analysis that allows you to effortlessly perform phase identification/quantification and microstructure analysis for ambient and non-ambient experiments.
- Powder X-ray diffraction is an essential characterization technique for an almost infinitely wide spectrum of materials and applications. X-ray diffraction data reveal valuable information about the phase composition, crystal structure, and microstructure of samples. In addition to diffraction, X-ray scattering experiments can provide information about properties such as the nanostructure or the short-range order present in materials.
- All manner of measurement:
  - High Quality Powder Diffraction: Characterize even the most complex phase mixtures. Quantitative phase analysis and structure analysis are possible using the Rietveld method implemented in the XRDanalysis software.
  - Non-ambient diffraction: World leader in non-ambient diffraction. Measure sample properties which can drastically change with varying temperature, pressure, gas atmosphere, or humidity.
  - Small Angle X-ray Scattering (SAXS): SAXS data with the quality of a stand-alone line-focus SAXS instrument on a diffractometer can be obtained and is possible due to fully evacuated beam path and dedicated SAXS optics.
  - Pair Distribution Function (PDF) analysis: Perfectly suited to the measurement of not only crystalline samples, but also for amorphous materials using PDF analysis.



Sample spinner stage



Capillary spinner



XY stage with autosampler



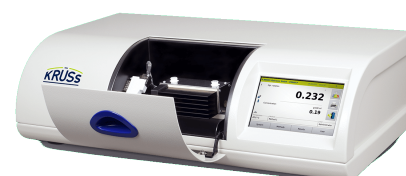
EVAC module for high resolution XRD &amp; SAXS



Non-ambient attachments

## Polarimeter

- Measure the compound's ability to rotate linear-polarized light.
- Measuring Range:  $\pm 90^{\circ}$  ;  $\pm 259^{\circ}\text{Z}$ .
- Accurate, homogenous, fast Peltier temperature control.
- Software compliance with 21 CFR Part 11.
- Compliance with USP / AOAC / ISO / ASTM / FDA standards.
- Determination of concentration of sugar as ingredient of pharmaceutical agents, Purity control and content determination, Determination of stereochemical composition and mutarotation, Characterisation of new synthetic substances, Monitoring of chemical processes during the production of optically active substances, Characterisation tests, Reaction kinetic analyses.



## Digital Refractometer

- Measure refractive index (RI) of a sample ; Measure concentrations of aqueous solutions such as gases, liquids, and translucent solids.
- Based on light refraction at boundary of different optical density media.
- Range: nD 1.3200–1.5800 ; 0–95 %Brix.
- With highly accurate internal Peltier temperature control.
- Compliance with USP / AOAC / ISO / ASTM / DIN standards.
- Determination of sugar concentration in juices, alcohol-free beverages, semi finished and end products ; Determination of the alcohol or extract content in beer, spices, wine or spirits ; Determination of the solids content in solutions ; Characterisation tests; Stability test; Identity test, purity control and concentration determination of raw materials ; Checking medicines for pharmacopeias ; Analysis of body secretions.



### Microbial Identification System

- Phenotypic identification of aerobic & anaerobic bacteria, yeast and filamentous fungi.
- Based on carbon source utilization technology which identifies microorganisms by producing a characteristic pattern from discrete test reactions performed within a 96 well microplate.
- 2,900 species of aerobic and anaerobic Bacteria, Yeasts, and Fungi can be identified.
- Software compliance with FDA's 21 CFR Part 11.
- Species level identification of food industry related E. coli, Klebsiella, Pseudomonas, Listeria, Salmonella, Clostridium botulinum, Aspergillus, Bacillus, Lactobacillus, Saccharomyces etc.
- Routine species level identification, detailed strain characterization such as finger printing and tracking strains that cause product contamination, comparison of non-pathogenic and pathogenic strains, gene and mutant characterization, cell line quality control, and bioprocess improvement.



### Rapid Sterility Test System

- Microbial contamination detection with ATP based bioluminescence assay.
- Rapid sterility test for pharmaceutical products in 72 hrs instead of 14 days.
- Rapid ATP based assay gives more sensitive results which can't be identified by turbidity.
- Growth based assay helps for further analysis of strain identification.
- More sensitive and reliable, hence ATP is the indication of live cells.
- 96 samples can be analysed in less than 20 minutes.
- For faster release of drug product by implementing corrective action sooner if product doesn't meet specifications, Allows for microbial ID to support OOS investigations, Applicable to wide range of products like injectable to non-injectables; Food samples ranging from dairy, soft drinks, beer, wine fruit juice, bakery, etc. can be analysed in 24-48 hrs; Cosmetics and toiletry items can also be analysed.



### Rapid Hygiene Monitoring Device

- Provides a simple rapid test method for monitoring degree of cleanliness, hygiene and risk.
- With ATP+ADP+AMP bioluminescence technology. Detects not only ATP, but also ADP & AMP, thus more reliable & sensitive.
- Easy-to-use, results within 10 seconds.
- Sanitation for food safety ; HACCP & GMPs validation.
- Prevents cross-contamination by verifying the cleaning process ; Can be used as on-site improvement tool ; Provides real-time feedback and facilitates long-term data analysis ; Rapidly verify sanitation processes on-site.



### Microbial Air Sampler

- Portable Microbial Air Samplers for active sampling to help comply with quality standards and QM GLP / GMP.
- Sequential / Interval / Simultaneous sampling. Delayed and remote start options.
- Volume of aspirating air : 100 / 180 / 200 LPM.
- Suitable for 55 rodiac plates, 90mm petri dishes and 110mm sterile closed system dishes.
- Bluetooth data transfer. Auto calibration & reminders. Programmable for compressed gas / air.
- Data integrity 21 CFR part 11 and GAMP compliance. IQ, OQ, PQ documents available.
- Used for quantitative determination of airborne contamination in cleanrooms and isolators. Pharmaceutical aseptic filling suites, clean rooms, biotechnology, fermentation, medical devices, cosmetics, IVF clinic, operating theatre, hospital pharmacies, blood banks, microbiological labs, healthcare ambient air monitoring, health authorities.



### Water Activity (ERH) Meter

- Innovative high-end laboratory analyzer for water activity (ERH) measurements.
- With Digital sensor technology. Non-destructive measurement. Up to four measurement probe inputs.
- Measuring Range - Temp:-40 to 85°C, ERH: 0 to 1aw, RH: 0 to 100 %RH.
- Easy measurement using touch screen. It can also be connected to the internet for remote control.
- Software compliance with 21 CFR Part 11. Documents (IQ/OQ) for the validation are also available.
- To determine microbial spoilage, chemical & physical stability ; Quality assurance of pharma products, food processing viz coffee, tobacco, grain storage, cheese, dairy, milk, dried meat, sausage, meat, seeds storage etc.



### Head Space Analyser (O<sub>2</sub> & CO<sub>2</sub>)

- Benchtop O<sub>2</sub> and CO<sub>2</sub> head space analyzer for measurement of many types of modified atmosphere (MAP).
- Principle: CO<sub>2</sub> - Solid State Infrared Detection , O<sub>2</sub> - Electro Chemical Detection.
- Range: CO<sub>2</sub> - 0 to 5000ppm ; O<sub>2</sub> - 0 to 100%.
- Analyzer sample probe is tipped with a particulate filter and luer fit syringe needle with side-port holes to prevent plugging. When the analyzer internal pump is activated, sample is drawn from the package through the probe and tubing and then to the oxygen sensor which gives results in 30 seconds.
- Headspace oxygen analysis in vials, blister packs, bottles, tubes, sealed containers, gas flushed packed foods, dairy products, desserts, snack foods etc. ; Testing the quality of nitrogen air cylinders / generators.





### Film Media for Microbial Analysis

- Sample, Incubate and Count easily.
- Distinguishable bright colored colonies.
- High correlation with plate count agar.
- Occupies only 5% space compared to traditional plates.
- Reduces waste compared to traditional analysis.
- For Aerobic bacteria, E.coli & coliform count, Staphylococcus aureus bacteria.



### Allergen Test Kit

- Rapid, easy and effective test for allergens.
- Proven to be more sensitive than others for heated, boiled and pre-packed foods.
- Based on Allergen-eye Immuno-chromatography test.
- Rapid and accurate on-site testing without expensive equipment. Results within 1 hour.
- High level of sensitivity - able to detect 2ppm of allergenic protein in a food sample.
- Tests available for egg, wheat, milk, buckwheat, peanut, soy, sesame, crustaceans.
- For Control of allergen cross contamination, verification of sanitation.



### Histamine Test Kit

- Certified method for histamine analysis.
- Histamine Rapid Test by Enzyme and Colorimetric reagent Method.
- Range: 0.4 - 6.0ppm.
- Certified AOAC Performance Test Method (PTM). Easy to use, results in 15minutes.
- No hazardous chemicals - such as strong acids or organic solvents.
- Additional accessories: tubes, vortex mixer, boiler, absorption spectrometer.
- For quantitative analysis of histamine in raw fish, frozen fish or canned tuna, fish sauce, bonito flakes etc.
- Alternate Swab Check method also available. No instrument needed. Results in 5 min with color chart. Range: 20-80ppm.



### High Quality Water Purification System

- It is able to produce three qualities of water from tap water: Type I Water (Ultrapure Water), Type II Water (Pure Water), Type III (Osmotized / RO Water ) from three independent dispensers.
- Methods: Type III water: pre-treatment, RO ; Type II water: Deionization, filter ; Type I water: Ultrapurification, Foto-oxidation, Polishing, UF, final filter.
- Highest technologies for production. Meets USP and ASTM standards.
- Continuous, Volume & Time control modes of water dispensing.
- Applications:
  - Ultrapure Water (Type I): Molecular Biology, Cell Culture, PCR, DNA sequencing, Monoclonal Antibody Production ;
  - Purified Water (Type II): Preparation of microbiological culture media, Preparation of reagents and buffers, RIA / ELISA, Atomic Absorption-Flame, Spectrophotometry ;
  - Osmotic Water (Type III): Feeding of autoclaves and cleaning equipment, Cleaning glassware material.



### Laminar Air Flow Clean Bench

- Provides an aseptic space to work with a product or specimen without contaminating it with microorganisms.
- Vertical air flow with 8 steps air velocity control. Air volume: 1,350 / 1,700 / 2,020 m<sup>3</sup>/h ; Air flow velocity: 0.3 ~ 0.6 m/s.
- Optimized air flow system for uniform air flow/velocity.
- Class 100 HEPA filter (with mesh guard) of size 0.3 micron and particle removal efficiency up to 99.97%.
- Dual UV lamp & florescent lamp. Tempered safety glass sliding door for protection from against UV.
- High performance, Easy to use touch controller.
- High-quality back-light LCD.
- Provides an aseptic work space for aseptic biopharmaceutical processing, biosafety & contamination control, cell culture & life science research, microbiology, food testing etc.



### Incubator

- Optimized air flow by forced-air mechanism.
- Temperature range: +5°C to +70°C. Capacity: 50 / 105 / 155 Liter.
- 3-Side heating mechanism : the best temp. uniformity & accuracy by high performance heating mechanism.
- Patented jog-dial control system. Digital LCD with back light.
- Digital fuzzy control system implementing superior temperature accuracy.
- Incubator temperature & incubator current protection ; Sensor error detection.
- Timer ; Alarms ; Storage functions.
- Application : microorganism culture, animal & plant cell culture, constant temp, germination, etc.



### Autoclave

- Steam sterilizers with patented special steam condensing mechanism.
- Temp. range: +5°C to +132°C ; Capacity: 47 / 60 / 80 / 100 Liter ; Max Pressure: 2 kgf/cm<sup>2</sup>.
- Top-loading type sterilizer for easy loading of large working volume.
- Innovative easy-to-use digital fuzzy-control autoclaves.
- Solid/liquid modes can be chosen considering a sample phase.
- Patented jog-dial control system. Digital LCD with back-light function. Digital timer. Alarms.
- Heat-protective lid cover, Electronic door lock sensing system, Automatic over pressure release valve.
- To decontaminate biological waste and sterilize media, instruments and lab ware. Ideal for biotechnology, clinical, environmental, medical and food Industry.



### Hot Air Oven

- The best temp. uniformity & accuracy by high performance heating mechanism : 3-side heating.
- Temperature range: +5°C to +250°C.
- Digital fuzzy control system implementing superior temperature accuracy.
- Optimized air flow by gravity convection mechanism.
- Patented jog-dial control system.
- CE certified. Alarm function. Storage function.
- Suitable for drying, baking, conditioning, curing, pre-heating and aging.



### Digital Muffle Furnace

- Exposed heating elements-type digital muffle furnace.
- Temperature range: +300°C to +1000°C.
- Patented jog-dial control system & digital LCD with back-light function.
- Ceramic fiber plate. 4-side heating. Short heat-up time.
- With digital PID control, timer, alarm, safety circuit.
- User's self-compensation function.
- For ash-determinations, enameling, fusions, precipitate drying.



### Multi Hot Plate Stirrer

- Systemized 3- and 6-hotplate stirrer with independent heating and stirring control.
- Ceramic coated plate-chemical/acid resistance.
- Maximum temperature : 350°C ; Speed: 80 ~ 1,500 rpm.
- Speed & control resolution 80 ~ 1,500 rpm, 5 rpm.
- Patented jog-shuttle control system. Digital timer. Storage function. Locking mode.
- Excellent for multi-use and wide range sample testing ; Widely used to heat substances such as chemicals, suspensions, liquids, and homogeneous mixtures in flasks and beakers.



### Heating Block / Dry Bath Incubator

- High-performance molded heater ensures best temperature accuracy. Range: -5°C to 95°C.
- Internal bath material (PPS) ensures best heat insulation. Rapid heat up time.
- Convenient integral timer for time-sensitive incubations.
- Peltier cooling system. Locking mode for safety.
- Patented jog-shuttle control system and digital LCD with back-light function.
- Storage function of temperature and timer setting values.
- Easily calibrated for accurate temperature control and display.
- Designed for enzyme reactions, inactivation of sera, incubation and other laboratory procedures.



### Digital Ultrasonic Cleaner

- Multi-frequency sonication body. HF-Frequency : 40kHz.
- Wide temperature range from ambient to 80°C.
- Microprocessor control : timer, temperature and output control.
- Maximum 60 minutes of cleaning time.
- Drain is mounted in the bottom.
- Degassing for very strong cleansing.
- Useful for cleaning to remove dirt, grease, waxes and oil from all lab instruments by ultrasonic frequency.

