Business Unit

Technology

Your partner of choice for complete solutions in the pharmaceutical and biotechnology industry





Business Line
Scientific Instrumentation

Think Asia. Think DKSH.

Business Unit Technology

DKSH is a leading provider of Market Expansion Services, proficient across various industries. As a total solution provider and system integrator, we serve our customers as a one-stop-shop and provide customized technology solutions. We do not only provide professional after-sales services, but also cover the entire product life cycle including installation and commissioning, final acceptance testing, production start-up support, training, maintenance, repair, spare parts and consumables supply as well as trade-ins. We operate as a trusted link between suppliers from Asia, Europe or America and customers in Asia, enabling suppliers to expand their markets.

Sales and services are our core competencies. Our sales, service and applications specialists are highly trained and dedicated to deliver complete, integrated laboratory solutions to our customers. Industry-specific expertise, in-depth process knowledge and complementary product-service portfolio enable us to stand out as a total solutions provider.

Business Line Scientific Instrumentation

Our Business Line Scientific Instrumentation provides Market Expansion Services for innovative manufacturers of high-end analytical and life science equipment. We supply a wide range of laboratory instruments, scientific equipment, life science products and consumables, to laboratories in the government, research, university, contract analysis and industrial sectors. We also provide applications support and service across all the sectors.

Your analytics partner from product development to quality assessment

Business Unit Technology provides a range of instruments and solutions to ensure our customers in the pharmaceutical sector can focus on their core competencies of research and production.

We understand the importance of safety, quality and accountability for a successful business in the pharmaceutical industry. Our scientific instruments ensure that you can meet all safety and compliance requirements in your laboratories and manufacturing.

Our comprehensive range of instrumentation products and highly skilled application and service support teams can assist you and your business in the following applications:

- Sample preparation
- Chemical characterization
- Physical characterization
- General laboratory equipment
- Water treatment solutions

We provide complete and integrated laboratory solutions to:

- Ensure quality and consistency of incoming ingredients
- Support understanding and control of biomolecular interactions
- Support of texture understanding and control
- Accelerate innovation and product development
- Predict shelflife
- Streamline quality control
- Reduce process downtime
- Optimize manufacturing process
- Increase productivity and yield

Market specific applications

With our profound market knowledge we are best positioned to serve our customers regarding their needs. We provide products and services to the following industries across Singapore.


Aeronautical


Automotive


Chemicals and cosmetics


Dies and molds


Healthcare and hospitals

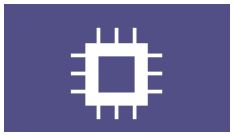

Metals, minerals and mining


Chemicals, oil and gas, plastics and polymers


Pharmaceuticals and biotechnology


Education and academics


Food and beverage


Semiconductors and electronics


Energy and environment

DKSH Technology Pte. Ltd. 625 Lorong 4 Toa Payoh #03-00, Singapore 319519
Phone +65 6274 1222, tec-marketing.sin@dksh.com, www.dksh.com.sg

Pharmaceutical and biotechnology analysis

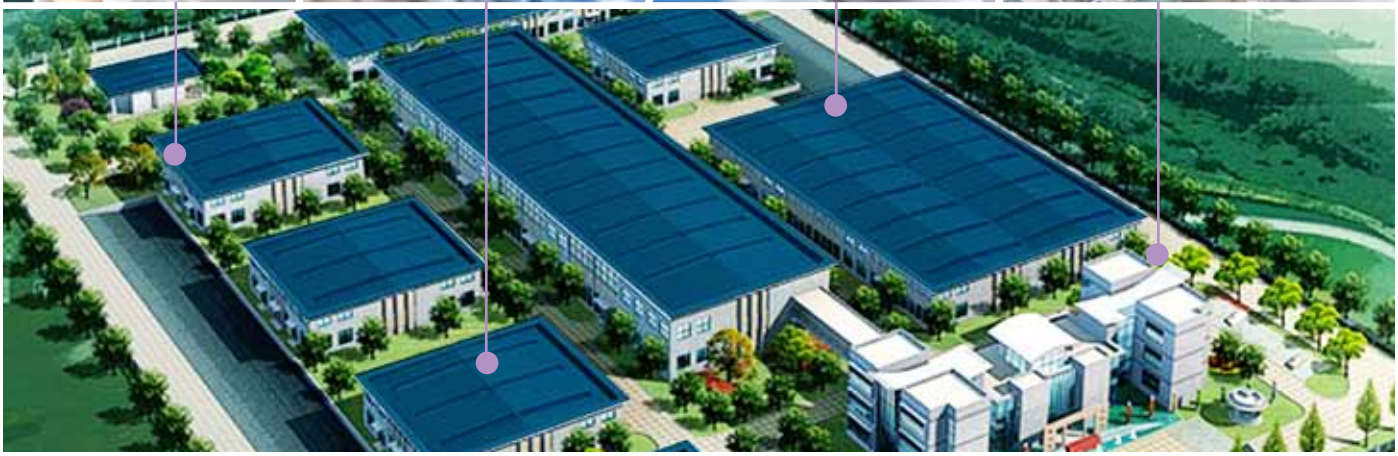
From drug development to quality control

In pharmaceutical industry, a keen understanding of formulations on a molecular level is necessary for both product development and compliant production. Quality management with a strong focus on safety and compliance is a key success factor in this industry.

Analyzing and monitoring the physical and chemical characteristics of a formulation is of central importance in product development and quality control. DKSH brings you a range of tools to help you understand your products better. Be it sample preparation, storage, or analytical testing, we provide tailored services including finding right equipment, installation, training and maintenance so you can focus on research, development and production to drive your business to even greater heights.

DKSH – your partner for efficient production processes

Discovery → Early development → Formulation development → Scaling



Enhance Operational quality and productivity of the entire facility

Increase Employee satisfaction and productivity

Reduce Operation costs

Achieve Continuous improvement

Meet Regulatory compliance

Maximize Your facility performance

DKSH Technology Pte. Ltd. 625 Lorong 4 Toa Payoh #03-00, Singapore 319519
Phone +65 6274 1222, tec-marketing.sin@dksh.com, www.dksh.com.sg

Sample preparation

Sample preparation is an essential part of laboratory processing and is often one of the most time consuming tasks in your laboratory. We provide a range of instruments for encapsulation of actives, temperature control of samples, water and gas production to support sample testing and deblistering of products as part of quality control. We provide a range of instruments. Regardless of your laboratory applications, we bring to you a variety of solutions that are efficient and reliable so you can focus on research and product development.

Inductively Coupled Plasma (ICP) sample fusion

ICP analysis has been revolutionary in trace metal/compound detection, but the sample preparation methods for ICP remain tedious. With sample fusion solutions, you can not only reduce the time spent on preparation, but also improve the precision and accuracy to produce results with higher repeatability.

Claisse LeNeo Fluxer

- Fully automated one-touch operation with ten ready to use preset functions that ensure high fusion success rates in preparing glass disks for XRF or solutions for Atomic Absorption (AA) and ICP analysis
- User-friendly touchscreen interface allowing the adjustment of all settings and fusion parameters to prepare a wide range of materials
- Automated safety door locks to prevent operator contact with high heat
- 3-in-1 sample preparation – prepares samples for AA and ICP analysis

Bioreactors and fermentors

Bioreactors and fermentors are staple equipment in pharmaceutical production processes. However, a pilot scale test is important in the product development stages so as to optimize the production process as well as final product properties. As the link between research and production, bioreactors play an extremely important role in ensuring a smooth transition which maximizes the value of your research efforts for a reasonable cost. We offer a range of bioreactors and fermentors suited specifically for laboratory use and options for requirements. Scaling up is easier than ever before.

Bioengineering Bioreactors

- Capable of processing both cell and microbial cultures with a single piece of equipment due to free configuration of gas lines
- Compact modular design to minimize footprint, yet ensure complete accessibility with a 180° rotation of the control tower
- Comprehensive bioprocess management software that includes complete process automation, recipe features, audit trails, access level management, batch reporting and other advanced features

DKSH Technology Pte. Ltd. 625 Lorong 4 Toa Payoh #03-00, Singapore 319519
Phone +65 6274 1222, tec-marketing.sin@dksh.com, www.dksh.com.sg

Gas generators

Almost every research laboratory requires a variety of gases, especially for analytical instruments such as the mass spectrometry machines. While gas cylinders seem like a simple solution, they can give rise to a separate set of complications including high costs, safety risks and additional administrative work. With on-site gas generators, we can ensure a customizable, reliable and continuous supply of gas to ensure your testing and production needs are protected.

Claind Industrial Nitrogen Generator

- Industrial gas generators for high purity nitrogen gas
- Oxygen analyzer included to keep nitrogen purity under control in real time – comes with custom nitrogen purity
- Generator enters automatic standby mode for reduced energy consumption once production flow exceeds consumptions
- Generator able to work unattended and autonomously 24 hours a day, 365 days a year without requiring surveillance or programming

Claind Industrial Plug and Play Nitrogen Generator

- Plug and play nitrogen generator base on pressure swing adsorption principle with Claind's patented "Fast Purity" technology – the most efficient and robust system on the market
- Standard production of 3.5 NL/min of nitrogen gas at 7 barg, requiring only one working day to produce the nitrogen contained in a cylinder
- System includes oil-free air compressor and air filtration system as well as basic or multi-channel mixer that when connected with CO2 cylinder can supply up to five different gases (pure N2, Pure CO2 and three mixtures of N2 + CO2)
- Nitrogen purity better than food grade E941
- 50 to 100 liter external tank for storage of produced nitrogen

Claind Analytical Gas Generators

- Comprising of hydrogen, nitrogen, zero air generators, as well as gas purifiers
- Flexible structures with independent modules to minimize footprint, allowing for greater flexibility in placement
- Variety of applications including but not limited to gas chromatography, LC-MS, TOC, ICP, ELSD, thermal analysis and sample preparation
- Pressure swing adsorption for delivery of high purity nitrogen from compressed air in minimal time

Deblistering Machine

The recovery of tablets and capsules from blister packs is required for various reasons, such as blister pack batch rejection due to incorrect printing, perforation, etc. To minimize wastage and contamination, it is necessary to return the product from rejected batches into the process or packaging line as fast as possible. With deblistering machines, not only is product recovery faster, saving valuable manpower and debottlenecking the production line, but recovery can also be performed in a safe, more hygienic manner. With a range of deblistering machines, we provide you with options to speed up or automate your deblistering processes.

Pharma Engineering Deblistering Machine

- Unique design using specially formulated stripfoil tape to strip lidding foil from the underside of the blister, avoiding application of pressure on product
- Process designed without specific deblistering tools, for flexibility to deblister a variety of packaging types and sizes with a high speed of up to 150 blister min
- Full cGMP compliance with minimal maintenance and easy cleaning

DKSH Technology Pte. Ltd. 625 Lorong 4 Toa Payoh #03-00, Singapore 319519
Phone +65 6274 1222, tec-marketing.sin@dksh.com, www.dksh.com.sg

Temperature Equipment
Temperature control can be essential for research and production processes, especially in the pharmaceutical industry when dealing with highly temperature-sensitive compounds such as enzymes and biomolecules. Besides maintaining constant temperatures, active heating or cooling can also accelerate production processes and with our range of instruments such improvements can be achieved with lowers cost and energy expenditure.

Lauda Temperature Equipment

- Laboratory thermostats, water baths and chillers with a wide range of applications ranging from preparation of biological and pharmaceutical samples to temperature control tasks in process reactors
- Able to provide a temperature constancy of up to ±0.005 °C across a wide temperature range of -150 to 400 °C, depending on the type of heat transfer liquid

Homogenizers/particle size reduction
Homogenizers are widely used in the pharmaceutical sector and are vital for improving the uniformity and stability of dispersions. By uniformly breaking down particles, homogenizers can improve polydispersity, emulsion stability and uniformity in cell disruption. These processes are essential to achieve an improved bioavailability, higher stability and easier downstream processing, especially in the case of sterile filtration. Our range of instruments covers a variety of techniques and specifications to cater to your application needs within the pharmaceutical industry.

Microfluidics LM20 High Shear Fluid Processor

- Converts pressure energy more efficiently into shear and impact forces, attaining targeted size reduction at lower peak pressure, which results in less sample temperature rise during processing
- Micro-channel architecture of each interaction chamber enables linear volumetric scale-up for larger capacity processing, guaranteeing process performance at pilot/production scales and minimizing additional development time
- Product stream accelerates to high velocities, creating shear rates that are orders of magnitudes greater than any other conventional method
- Emulsion applications – achieve stable emulsions in the submicron to nanometer range for optimized properties (e.g. diffusion, drug delivery and etc.)

Microfluidics Plug and Play Homogenizer

- Has been designed to reliably achieve continuous operating pressures up to 30,000 psi. This processor maximizes the energy-per-unit fluid volume, resulting in uniform submicron particles
- Capable of processing a wide-variety of fluids, including oil-in-water emulsions, solids-in-liquid suspensions and cell disruptions - of even the most difficult yeast and plant cells - in as few as one or two passes
- Recommended for stable nanodispersions, stable nanoemulsions, cell disruption, deagglomeration and microencapsulation in liposomes, polymers and oils

DKSH Technology Pte. Ltd. 625 Lorong 4 Toa Payoh #03-00, Singapore 319519
Phone +65 6274 1222, tec-marketing.sin@dksh.com, www.dksh.com.sg

Microfluidics Low Volume Homogenizer

- Designed to bring scalable high shear fluid processing to samples as small as 1 ml
- Operates at shear rates up to 12.25 million sec^{-1} at 2069 bar (30,000 psi) with near-total sample recovery for sample sizes from 1-6 ml
- Recommended for nanoencapsulations, nanoemulsions, nanosuspensions, deagglomeration and cell disruptions

Microfluidics Pilot/Production Scale Microfluidizer

- Mobile high shear fluid processor which achieves continuous operating pressures to 30,000 psi. Uses ultra high shear forces that reduce the particle size of active pharmaceutical ingredients to therapeutically relevant sizes, enabling production of drugs with improved stability and bioavailability
- Ideal for manufacturing batches necessary for phase two and three clinical trials
- Produces product flow rates up to 320 ml/min at 30,000 psi or 450 ml/min at 25,000 psi

Hielscher Versatile Homogenizer

- Wide range of homogenizers (50 to 400W) for homogenization of samples in beakers, test tubes or vials
- Provides exact reproducibility and linear scalability of the obtained results from bench-top to full production levels as no driving parameters are changed during scaling
- Requires little maintenance, is easy to set up and simple to clean and sanitize
- Outstanding Energy Efficiency due to very low heat-up in the transducer housing (overall energy efficiency of Hielscher's sonication devices is approx. 80-90% from the power plug into the liquid)
- At all power levels of up to 500W, it can be operated continuously for 24 hours per day (24/7)

Hielscher Ultrasonic Laboratory Devices

- Ultrasonic preparation devices for the purpose of homogenizing, cell extracting, degassing, hot water disinfection, disintegrating, deagglomerating and sonochemistry
- High flexibility leading to high adaptability to process requirements
- Sonotrodes constructed of titanium alloy, allow high amplitudes and rendering sonotrodes resistant to most chemicals
- Ultrasonic amplitude is adjustable from 20 – 100%. An alternatively to continuous operation, a cycle of intense sonication bursts can be programmed

DKSH Technology Pte. Ltd. 625 Lorong 4 Toa Payoh #03-00, Singapore 319519
Phone +65 6274 1222, tec-marketing.sin@dksh.com, www.dksh.com.sg

Water production
Deionized water is a staple in almost every laboratory. A reliable source of demineralized (DI) water can go a long way in streamlining your processes and increasing the cost-effectiveness of testing. With our demineralized (DI) water production systems, whether you prefer Type I, II or III, we bring the perfect water solutions to your laboratory.

Membrapure Deionized Water Production

- Reliable and compact systems to produce ASTM Type I grade water from municipal or potable water (Aquinity² range) or de-ionized water (Astacus² range)
- New systems with compact housing and a large touchscreen interface for smooth operation
- Upgrades available for detection of trace substances for high water purity with up to twelve months' trackable water quality values
- Aquinity systems equipped with a reverse osmosis and an optional electro-deionization cell to produce deionized water

Veolia Water Systems and Solutions

- Systems for production of a variety of quality water such as purified, highly purified, pyrogen-free water
- Systems compliant to CGMP requirements, GAMP validation control systems, FDA requirements, IPPC requirements and other codes
- Systems can be modified for a variety of applications including production of water for injection, storage, or distribution, and treatment of feedwater or wastewater

DKSH Technology Pte. Ltd. 625 Lorong 4 Toa Payoh #03-00, Singapore 319519
Phone +65 6274 1222, tec-marketing.sin@dksh.com, www.dksh.com.sg

Chemical characterization

The chemical characterization of products, including formulations is essential for a better understanding of the behavior of formulations, which in turn improves and broadens product development capabilities. With the wide range of instruments we offer, the customer can obtain a better understanding of the composition and behavior of the formulation as well as raw materials used for processing.

Biomolecular analyzers

Understanding biomolecular interactions and conformational changes is essential for the future of biomolecular research and product development. With a range of techniques such as electro-switchable nanolevers and calorimeters, our instruments are used to study the binding behavior and stability of biomolecules. With systems that look not only at kinetics but also at conformational changes and structural information on size, shape and position, a higher degree of depth and understanding can be brought into the research arena. As a result, applications of the system are highly varied and flexible, ranging for example, from confirmation of intended binding targets to development of stable biotherapeutics.

Malvern Isothermal Titration Microcalorimeter

- Isothermal Titration Calorimetry (ITC) microcalorimetry can deliver direct, label free and in-solution measurements of binding affinity and thermodynamic parameters from a single experiment
- It is an ideal system for laboratories with limited samples, with high sensitivity and low sample consumption
- Applications are varied, ranging from drug design to fundamental research such as the understanding and regulation of signal transduction pathways

Malvern Direct Scanning Microcalorimeter

- Differential Scanning Calorimetry (DSC) microcalorimetry for the characterization of intramolecular stability of macromolecules and complexes such as proteins, nucleic acids and lipids
- Studies molecules in their native state, quick to first result with minimal assay development, no labelling, no immobilization and no molecular weight limitations.
- High sensitivity for the screening of large numbers of samples at low concentrations to minimize valuable sample consumption
- Applications are varied, including determination of protein stability, thermodynamics of unfolding, antibody domain structure determination, characterization of membranes or lipids and measurement of ultra-tight molecular interactions

Amino acid analyzer

The pharmaceutical industry thrives on high standards of quality analysis. Ion-exchange liquid chromatography is commonly used for the characterization of biopharmaceutical products via compositional analysis. Protein and peptide analysis is not only important for quality control, but often is also useful for compositional analysis such as the detection and monitoring of metabolic disease. With our range of systems, we bring you instruments that can perform qualitative and quantitative analysis of up to 56 different amino acids and derivatives such as protein hydrolysates.

Biochrom 30+ Amino Acid Analyzer

- Designed for the analysis of proteins, peptides and protein hydrolysates for Quality Control and Compositional Analysis
- Applications vary from the bioscientific and pharmaceuticals to physiological and nutraceutical
- Accurate, reliable and fast testing with fully automated systems that cater to a wide range of samples

DKSH Technology Pte. Ltd. 625 Lorong 4 Toa Payoh #03-00, Singapore 319519
Phone +65 6274 1222, tec-marketing.sin@dksh.com, www.dksh.com.sg

Chromatography and sample separation
By controlling the molecular properties of components, formulators often with to manipulate the properties of the bulk solution. To understand and manipulate a sample's bulk properties, formulators often initially attempt to first measure and study the molecular properties and distribution. For example, the variations in oligomeric state or molecular weight of proteins can lead to distinctive differences in the activity of biopharmaceutical samples, impacting the final drug efficacy and safety. With our range of chromatography systems and accessories, we assist you to find the right technology to optimize your formulation for the desired product properties.

IDEX Chromatography Accessories

- Superior chromatographic column hardware, ranging from adaptors, tubing assemblies, injection loops and probes to sleeves. Also available are filters, frits, adaptors and backpressure regulators, as well as vacuum degassers for solvent preparation before chromatography
- Variety of pumps, valves and fluid control devices available for fluid manipulation. Manifolds and specialized tubing and fitting components are also available for system integration with the real world, in a variety of materials
- Features specialty high-performance polymers and a variety of materials, including high pressure and fluoropolymer tubing
- Also available in unique material formats such as biocompatible PEEK-lined stainless steel tubing

Leco Gas Chromatography Coupled with Mass Spectrometer

- The Pegasus HT GC-TOFMS system combines GC-TOFMS technology with advanced ChromaTOF software to provide an unparalleled increase in laboratory productivity
- Full-mass range spectral acquisition rates of up to 500 spectra/second allow for significant reduction in chromatographic analysis time. Dynamic Signal Tracking (DST) further enhances Pegasus HT's dynamic range, spectral integrity and overall system robustness
- Exclusive automated data processing capabilities minimize tedious manual manipulations and enhance data quality
- Completely automated qualitative sample characterization and quantitative analysis and/or inter-sample measurements can be completed in a fraction of the time required by manually-oriented processing systems

Skyray Liquid Chromatography

- Liquid chromatography system with excellent performance indices and high stability to enable easy and flexible analysis using a high performance pump coupled with a highly sensitive detector
- Wavelength range of 190-680 nm, with an indicated value error of less than 1 nm and wavelength repetitiveness better than 0.1 nm
- Enhanced sensitivity due to 23.8% improvement in signal to noise ratio

Skyray Gas Chromatography

- Multi-functional, easy-to-use, remote-controllable gas chromatograph for superior performance
- Large column oven to allow simultaneous accommodation of capillary and double-packed columns
- Option for up to three kinds of detectors: - flame ionization, thermo conductivity, and electron capture detectors
- High detector sensitivities, with sensitivity up to 5000 mV.mL/mg for thermal conductivity detector

DKSH Technology Pte. Ltd. 625 Lorong 4 Toa Payoh #03-00, Singapore 319519
Phone +65 6274 1222, tec-marketing.sin@dksh.com, www.dksh.com.sg

PostNova Multi Flow Field-Flow Fractionation (FFF) Universal Separator

- Most advanced FFF platform for separation of proteins, macromolecules and nanoparticles
- Based on the Flow FFF principle, uses a crossflow field as a driving force for the separation. Samples affected by this field are separated by dynamic diffusion on the basis of their molar mass or particle size
- Is completely integrated by the NovaFFF single software platform which runs the entire system from autosampler to detectors
- High flexibility as a universal separator for various kinds of analyte systems

Malvern Viscotek GPC/SEC Range and Multi-detector

- Analysis of molecular weight, molecular weight distribution, molecular size and structure of proteins and synthetic and natural polymers
- Absolute molecular weight of small polymers, protein stability and protein aggregation using Right Angle Light Scattering (RALS)
- Direct output of absolute molecular weight of polymers without extrapolation using Low angle Light Scattering (LALS)
- Copolymer composition using photodiode array UV detector
- Advanced GPC/SEC software capable of going from data to results in just two clicks

Compound analyzers

Be it research or production, pharmaceuticals are renowned for high compliance standards. Uniformity remains one suitable parameter to ensure standardization, be it for raw materials, intermediate or final products. While various methods of quality inspection have already been developed, our range of devices provides you with the option to perform an accurate, on-the-spot, non-destructive measurement of materials including active pharmaceutical ingredients, binders, colorants and others. With these instruments, it is easier to meet regulatory requirements with minimal disruption to research and production processes.

ASD NIR Spectrometers

- near-infrared (NIR) analyzers for rapid, non-destructive, precise measurements in industrial environments
- Process spectrometer ideal for continuous measurement of solids, powders and blended materials transported on conveyor systems
- Portable version delivering full-range spectral measurement available for field data collection

ASD Field Spectroradiometers

- Field spectroradiometers that deliver the fastest and most accurate spectral field measurements available from any commercial field-portable spectroradiometer
- Rapid, non-destructive measurement to predict quality properties and acts as batch control for raw materials or end products within tolerance specs
- Ensures out-of-spec ingredients are discarded ahead of production line to cut down on material and time inefficiencies

DKSH Technology Pte. Ltd. 625 Lorong 4 Toa Payoh #03-00, Singapore 319519
Phone +65 6274 1222, tec-marketing.sin@dksh.com, www.dksh.com.sg

Water analyzers
Water is not only essential in pharmaceutical production, but also plays a vital role in laboratory testing. With the stringent standards for quality in the pharmaceutical industry, a lot of time and effort is spent monitoring and checking quality of raw materials. Our range of online and offline TOC analyzers makes it easier to ensure quality of raw materials is upheld so as to ensure high quality of final products.

Membrapure Total Organic Carbon Analyzers

- Wide range of products for TOC analysis of different water qualities from ultrapure water in the pharmaceutical industry and in power plants to waste water from the production sites
- UV radiation is used as the oxidation method to guarantee high precision of the measured values, using either conductivity measurement or NDIR detection for TOC determination
- Designed for monitoring of process water as well as production of potable and ultrapure water

DKSH Technology Pte. Ltd. 625 Lorong 4 Toa Payoh #03-00, Singapore 319519
Phone +65 6274 1222, tec-marketing.sin@dksh.com, www.dksh.com.sg

Physical characterization

Physical characterization of formulations is essential to product development. With instruments to analyze particle size and distribution, not only can we attain a clearer understanding of the behavior of particle, but can further apply this understanding to optimize the bioavailability, stability and uniformity of formulations to design products with high efficacy. With our wide range of physical characterization instruments, we can help you find the right solution for your application.

Dispersion stability analysis
Shelflife is a particularly important parameter in the development of pharmaceutical formulations, largely due to strict compliance requirements in the pharmaceutical industry. Dispersion stability is an accurate means of shelf life measurement, but investigation of shelf life, especially for creams and liquids can require long waiting times to observe the product behaviour after stipulated time periods. With a range of instruments that measure shelf life directly for entire, undiluted samples, over the course of a few hours, we enable you to perform a quantitative stability analysis quickly and conveniently.

LUM LUMiSizer Dispersion Stability Analyzer

- Quick characterization of any demixing phenomena and consolidation and calculation of the velocity distribution in the centrifugal field as well as of particle size distribution
- Runs up to twelve samples simultaneously
- Accelerated phase separation 6-2300 times compared to gravity
- Particle size distribution 20 nm-100 µm
- Observation time is one second to 99 hours

LUM LUMiReader Dispersion and Stability Analyzer

- Specially designed particle size analyzer module for high resolution particle sizing and to allow measurement of the velocity distribution of separating particles without a need to know any material constants (i.e. viscosity, density)
- Contains an optical block and temperature control element for maximum flexibility and accuracy
- Accelerated phase separation ten times compared to gravity
- Particle size distribution 500 nm–300 µm
- Observation time from half of the second and above

LUM LUMiReader X-ray Dispersion and Stability Analyzer

- Designed to study dispersibility, stability, separation and consolidation phenomena for completely transparent to completely opaque emulsions, suspensions, sludges, slurries, foams and powders in real time
- No dilution required, regardless of concentration level
- Determine concentration gradients within phases and sediment
- Determine mean and space resolved packing sediment densities

DKSH Technology Pte. Ltd. 625 Lorong 4 Toa Payoh #03-00, Singapore 319519
Phone +65 6274 1222, tec-marketing.sin@dksh.com, www.dksh.com.sg

Particle size analysis
Characterization of formulations is essential to product development. Particle size can have a significant impact on the dissolution and absorption rates as well as bioavailability of pharmaceutical substances. Particle size is also an important parameter in testing uniformity and stability of a material. With a wide range of instruments available, it is significantly easier to obtain accurate, repeatable readings for particle size and distributions.

Malvern Mastersizer Range

- Highest data quality on every sample
- Particle size measurement of a broad range of sizes: from 10 nm to 3.5 mm, and excellent sub-micron resolution with rapid measurement time
- Provides an accurate, reproducible measurement for materials with broad particle size distributions
- Single dashboard interface that allows real-time optimization of each measurement, with edit-in-place report designer for customized data handling
- Samples can be presented as wet dispersions or dry powders

Malvern Zetasizer Range

Particle size
NIBS technology enables measurement of particles and molecules from 0.3 nm to 10 microns.

Zeta potential
M3-PALS technology enables accurat measurements of zeta potential in aqueous and non-aqueous dispersions.

Molecular weight
An avalanche-photodiode detector and fiber detection optics give the sensitivity and stability required for absolute molecular weight measurement.

Malvern Insitec Range (On-line Process Analyzer)

- Laser diffraction technique with a size range 0.1 µm – 1000 µm
- Patented high concentration sizing with correction for multiple scattering to deliver accurate, concentration-independent result
- Measurement of spray particle and spray droplet size distributions in real-time for more efficient product development of sprays and aerosols
- First principles measurement using Mie theory and needs no calibration

Malvern Spraytec for Aerosol and Droplets

- Accurate particle size measurement over an extremely wide 0.1-2000 microns range using just two lens systems
- Rapid measurements at acquisition rates of up to 10kHz capture the dynamics of any spray process in exceptional details
- A patented multiple scattering analysis ensures accurate measurements can be made at high concentrations
- Automated software and advanced analysis features ensure repeatable aerosol measurements can be made at high spray concentrations

DKSH Technology Pte. Ltd. 625 Lorong 4 Toa Payoh #03-00, Singapore 319519
Phone +65 6274 1222, tec-marketing.sin@dksh.com, www.dksh.com.sg

Particle imaging analysis

Particle characteristics play a significant part in directing the final product characteristics of biotherapeutics. With the stringent standards to be followed in pharmaceuticals, an accurate, repeatable method of measurement is vital for a better understanding of particle character and behavior. Particle size and shape distribution can influence particulate behavior such as the packing of particles, ultimately impacting the bulk density of the material. With particle characteristics in therapeutic formulations ultimately affecting drug efficacy and safety, a deep understanding of particulate character is essential in research as well as validation studies. With our range of instruments, we provide you with the tools so you can focus on product development and validation

Malvern Nanoparticle Tracking Particle Size Analyzer

- Suitable for measurement of particles within the 10-2000 nm range
- Simultaneous measurement of multiple characteristics to minimize cost, time and sample volume used
- On board temperature control with a temperature range from 5°C – 50°C
- Choice of multiple laser wavelengths to suit your desired application

Malvern Morphologi G3-ID Particle size analyzer

- The Morphologi G3-ID brings a significant additional capability to the Morphologi range of instruments particularly the ability to provide chemical identification of individual particles using Raman spectroscopy
- Measures particle size, shape and chemical identity in one platform – particle sizes from 1 µm to 1000 µm
- Fully automated raman chemical classification of thousands of particles
- Integrated dry powder dispersion option
- Simple operation from sample dispersion through size, shape and chemical analysis
- Powerful additional capability, ideal for research and development

Density meters

Material density is regularly measured and monitored in the pharmaceutical industry. Not only is density measurement an integral part of quality inspection, it also serves as a useful parameter in pharmaceutical research. Density measurement is a useful method for concentration measurement of APIs, proteins, solvents and other materials. Furthermore, it also provides useful information for the control of crystallization processes and characterization of the material porosity of solid drug substances. With our wide range of instruments, you have access to catering to all your application needs, including cGMP compliant machines.

Rudolph Research Analytical Density Meters

- Combine density, polarimeter and refractometer for simultaneous measurement
- High Resolution VideoView™ for on-screen bubbles detection with ten times magnification for easy measurement
- Offers density accuracy to 0.00005 g/cm3
- Direct and accurate means of °Brix determination, °Plato, °Balling, % Solids

DKSH Technology Pte. Ltd. 625 Lorong 4 Toa Payoh #03-00, Singapore 319519
Phone +65 6274 1222, tec-marketing.sin@dksh.com, www.dksh.com.sg

Rheology analysis

Rheology is an important concept in the pharmaceutical industry where the consistency, flow characteristic and viscosity can have a profound impact on drug administration as well as delivery. While characteristics such as ease of mixing, injection, or spreading of final products are difficult to measure, the rheology of formulations can be measured with relative ease using specific analytical instruments. With our range of rheometers, we provide you with solutions suitable for your application needs.

Malvern Kinexus Range

- Next generation rheometer redefines ease of use
- Unique rSpace software provides a user interface that offers total flexibility of test set-up for research and development
- Analyzes the rheology, flow and deformation properties of pharmaceutical materials
- Time and cost savings by reducing reliance on sensory testing and manual analysis
- Unique rSpace software provides a user interface that offers total flexibility of test setup for research and development
- "Plug and Play" functionality for all measuring systems and environmental control units

Malvern Rosand Capillary Rheometer RH2000

- Characterize rheology of materials by extrusion under high pressures and shear rates, under temperatures ranging from 5 to 500 °C allowing test correlation with real material processing conditions
- Maximum drive force (up to 20 kN) and maximum speed (up to 1200 mm/min) capabilities enable wide range of shear rates
- Rosand twin bore principle for direct measurement of die inlet pressure and determination of absolute viscosity
- Rigid one-beam cantilever frame design provides extreme mechanical strength and stiffness for compact bench-top unit
- Unique swivel head design gives easy access for sample loading and instrument cleaning

Malvern Rosand Capillary Rheometer RH7/10

- Characterize rheology of materials by extrusion under high pressures and shear rates, under temperatures ranging from 5 to 500 °C allowing test correlation with real material processing conditions
- High force range (up to 100kN) and wide dynamic speed range (>225,000:1) allow test correlation with real material processing condition
- Twin bore barrels as standard enable absolute shear viscosity measurements and simultaneous calculation of extensional (elongational) viscosity
- Range of optional barrel sizes and barrel materials to permit measurement of thermally-sensitive, chemically-aggressive or aqueous-based samples
- Wide range of high precision tungsten carbide dies as standard to cover all material and test types

FungiLab Rotational Viscometer

- Fast and accurate measurement of fluid viscosity using a unique glass ball technology
- 18 different speeds between 0.3-100 r.p.m available
- Variety of measuring ranges to choose from, starting from 1 to 106,000,000 cP
- Precision up to ±1% of full scale, with a repeatability within 0.2%

DKSH Technology Pte. Ltd. 625 Lorong 4 Toa Payoh #03-00, Singapore 319519
Phone +65 6274 1222, tec-marketing.sin@dksh.com, www.dksh.com.sg

Optical property analysis

Strict procedural controls are staples of the pharmaceutical industry, from raw material testing, through production to quality assurance. The refractive index of materials is an important quality parameter for pharmaceutical compliance. Refractive properties are useful in identifying pure substances, measuring the purity of substances and solutions, as well as determining the uniformity of compounded products. Refractometry of both liquids and solids is an important parameter for pharmaceuticals. Similarly, polarimetry, or optical rotation, a property unique to the medium through which light is passed, can be used to determine the purity of raw materials, or for quality control of blended materials. With our range of instruments, we can provide solutions for optical analysis to enhance your quality control processes.

Rudolph Research Analytical Refractometers

- Very fast measuring refractometer for the pharmaceutical and biotech industries, perfect for high throughput applications where temperature correction and a highly durable bench-top refractometer are required
- Shallow sample well for easier cleaning so as to reduce the problem of cross contamination between samples for accurate measurements
- Offers a sapphire prism for high mechanical and chemical durability

Rudolph Research Analytical Polarimeter

- Designed for today's FDA regulated analytical laboratories with electronic cooling and heating from 15 °C to 45 °C
- Comes with six standard wavelengths: 365 nm, 405 nm, 436 nm, 546 nm, 589 nm and 633 nm
- 21CFR Part 11 Compliance: electronic signature and secure local data storage

Rudolph Research Analytical Saccharimeter

- Developed and tested in conjunction with labs testing pharmaceutical grade sugars requiring precise temperature control with flow through cell type operation
- Ability to measure at two wavelengths: 589 nm and 880 nm in the NIR region
- Temperature probe with automatic temperature correction. Models available with TempTrol system for push-button temperature control with a system that accurately controls sample temperature within ±0.2 °C
- Quick and simple calibration

Surface energy analysis

As pharmaceutical sector grows, the need for sophisticated pharmaceutical drugs and delivery technologies increased. There is a high demand for new techniques to measure the physicochemical properties of pharmaceutical ingredients and formulations. With the iGC-SEA system, the difficult-to-measure physicochemical properties such as powder surface energies, polar surface functionalities, phase transition temperatures and various other properties have become more simplified to reach heighten accuracy.

Surface Measurement Systems Inverse Gas Chromatography Surface Energy Analyzer

- The world's only commercial instrument based on IGC principle, providing a wide range of injection concentrations with unparalleled accuracy and reproducibility
- Uses a gas phase technique for characterizing surface and bulk properties of powders, particulates, fibers, films and semi-solids
- Fully automated system that can be operated at different solvent vapor, flow rate, temperature, humidity and column conditions
- Surface energy values (dispersive and polar) correlate to several key solid properties including wetting, dispersibility, powder flowability, agglomeration, process-induced disorder, adhesion and cohesion, static charge, adsorption capacity and surface chemistry

DKSH Technology Pte. Ltd. 625 Lorong 4 Toa Payoh #03-00, Singapore 319519
Phone +65 6274 1222, tec-marketing.sin@dksh.com, www.dksh.com.sg

Vapor sorption analysis
The hydration state of crystalline surfaces is widely studied in the pharmaceutical industry as it can strongly impact the material's physicochemical properties. Different hydrate forms can also affect various properties such as material solubility, dissolution rate, flowability and compressibility. These material characteristics are essential throughout the drug development process chain, including storage, stability, processing and application performance.

Surface Measurement Systems Vapor Sorption Analyzer

- World leaders in water/vapor sorption (humidity) technology – water sorption properties of solids are critical factors in determining solid storage, stability, processing and application performance
- Accurate determination of sorption behavior using small samples down to 10 mg
- Capable of measuring changes in sample mass lower than one part in ten million
- Measures hygroscopicity of granules and powders

Surface Measurement Systems Vacuum Vapor/Gas Sorption Analyzer

- Capable of precise gravimetric measurement of gas and vapor adsorption and desorption under dynamic/static, isothermal, or isobaric conditions
- Only system to offer both static and dynamic sorption experiments, for multi-component mixtures with in-situ sample degassing up to 400 °C
- Fundamental drying and sorption studies of a variety of materials including nanoporous materials, composites, membranes, porous ceramics, activated carbons and pharmaceutical actives and processes

Surface Measurement Systems Vapor Pressure Analyzer

- Measures the vapor pressures of solids, liquids and oils using the Knudsen effusion method
- Capable of studying sample masses from 1–100 mg within the temperature range 20– 40 °C
- Measurement of vapor diffusion and pressure is useful to prevent accumulation of toxic compounds in the atmosphere

DKSH Technology Pte. Ltd. 625 Lorong 4 Toa Payoh #03-00, Singapore 319519
Phone +65 6274 1222, tec-marketing.sin@dksh.com, www.dksh.com.sg

General laboratory equipment

With our range of general laboratory equipment, we aim to make your everyday laboratory tasks more efficient and accurate so you can focus on the scientific techniques of research and product development to bring your products to new heights. From measurement purposes, mixing and centrifugation, to storage over a variety of temperatures, our range of equipment serves your every need.

Measurement, treatment and storage
A variety of tools are required for routine laboratory tasks such as measuring, heating, cooling, or storing. While your application requirements vary based on the physical and chemical state of your samples, we bring to you solutions for every need. From balances, micropipettes to ovens, incubators and freezers, we provide you with equipment to ensure the fundamentals are taken care of, so you can focus on the finer, complex techniques of product development and processing.

LabPRO Analytical Balance

- Quick and accurate ease of operations with precise measurements of up to 0.1mg readability
- Stable readings of measurement up to +/- 0.0001 (S.D) (mm) repeatability
- Dynamic temperature compensation accounts for changes in environment for accurate weighing
- Large backlit LCD screen for easy reading

LabPRO Micropipette

- Micropipette models for a range of volumes from 0.2 µl to 10000 µl designed for maximum accuracy and precision
- Completely autoclavable to ensure minimal sample contamination in tightly regulated environments
- Universal tip cone design for compatibility with major brands of micropipette tips

LabPRO Bottletop Dispenser

- Bottletop dispenser models for a range of volumes from 0.25 to 100 ml, designed for high chemical compatibility and smooth movement
- Designed with a recirculation valve for bubble free dispensing without any loss of reagent
- Adjustable dispensing nozzles with adaptors for fitting on a range of regular laboratory reagent bottles

Daihan Centrifuge

- Quiet operation with a high maximum speed of 13500 rpm
- Acceleration and braking times less than 15 seconds at maximum rotation speed
- Current Good Manufacturing Practice certified for use in pharmaceutical laboratories indicating high quality maintenance in production environment

DKSH Technology Pte. Ltd. 625 Lorong 4 Toa Payoh #03-00, Singapore 319519
Phone +65 6274 1222, tec-marketing.sin@dksh.com, www.dksh.com.sg

Daihan Autoclave

- Digital, fuzzy-control autoclave in a simpler and more ergonomic design
- Unique and innovative electronic safety door locking system and steam condensing mechanism for enhanced user safety
- Option for operation between liquid and solid cycle mode, with faster temperature decrease and steam release in solid cycle mode as opposed to liquid cycle mode

Daihan Incubator

- Wide range of incubators from force and gravitation convection, to low temperature, multi-room and shaking incubators
- Fitted with high performance heating mechanisms that are optimized respectively for capacity of chamber, power of heating element and air circulation type
- High stability of chamber temperature, with minimal fluctuation leading to high degrees of temperature accuracy and uniformity within chamber
- Optimization of fuzzy PID controller to minimize heat-up time upon start up and recovery time to set temperature upon opening and closing of door

Hermle Centrifuge

- Small, universal laboratory centrifuge covering a wide range of applications including clinical laboratory requirements
- Wide range of accessories including rotors for microtitreplates, high speed fixed angle rotors for reaction vessels and centrifuge tubes up to 50ml
- Swing out rotors with special adaptors for tissue culture tubes and common blood tubes

---

Refrigerators and freezers

While freezers are commonly used equipment, reliable freezing solutions are of utmost importance for smooth functioning of your laboratory and production. Whether you need to store your biological samples at highly stable temperatures, or need to store flammable, explosive chemicals, we offer reliable solutions from industry leaders.

Daihan Freezers

- Digital laboratory freezer with CFC-free refrigeration and fast-freezing system
- Temperature range from -35 to 10 °C with digital fuzzy control system
- Corrosion resistant 304 stainless steel chamber and shelves to ensure safety and prevent sample contamination

Kirsch Pharmaceutical Freezer and Fridge

- Extra thick insulation, made from high-quality, compression-moulded and environmentally friendly material
- Hermetically sealed with inlet and exhaust air flow through the ventilation slits at the front
- Warning functions with visual and audible alarm signals to warn in case of temperature deviations or power failure. For refrigerators, a safety device to prevent freezing is included

DKSH Technology Pte. Ltd. 625 Lorong 4 Toa Payoh #03-00, Singapore 319519
Phone +65 6274 1222, tec-marketing.sin@dksh.com, www.dksh.com.sg

Kirsch Explosion Proof Freezer and Fridge

- Laboratory freezers and refrigerators with explosion-proof interior, built according to the 94/9/EC (ATEX 95) directives
- Intrinsically safe supply of all electronic components and structural safety for all non-electrical components
- Available in numerous capacities with temperature ranges within 2–20 °C (for refrigerators) and -25 to -5 °C and -22 – -15 °C (for freezers)

Telstar Low Temperature Freezer

- Laboratory freezers with stainless steel interior and exterior
- Models with varied temperature range from -35 to -18 °C
- Automatic defrost cycle and melt water evaporation in heated tray
- 60 mm of non-CFC, foamed polyurethane insulation

Freeze Dryer
Lyophilisation has been an inherent part of pharmaceutical processes, be it for the purpose of increasing the shelf life of your injectables, the stabilization of Active pharmaceutical ingredients (APIs) and the production of tablets. With freeze dryers in various capacities, designed in accordance with the strictest GMP and regulatory standards, we have solutions for every production and research need.

Telstar Laboratory Freeze Dryer

- Especially designed for research and development phases freeze drying requirements – available range from small table-top units to sophisticated pilot equipment
- State-of-the-art control systems with a range of specially designed accessories
- Flexible usage with options for adapter manifolds and for the connection of different types of chambers

Telstar GMP Production Freeze Dryer

- Industrial freezer dryers for the elimination of solvent from solution without damaging or changing solute properties
- Factory acceptance testing of all freeze-dryers in simulated conditions closely replicating real life working conditions
- Series of products designed in accordance with strict good manufacturing practice and regulatory standards for performance in clinical trials, pilots, and small and large scale industrial drying
- Also available are robot systems for direct loading and unloading of bulk product onto shelves

DKSH Technology Pte. Ltd. 625 Lorong 4 Toa Payoh #03-00, Singapore 319519
Phone +65 6274 1222, tec-marketing.sin@dksh.com, www.dksh.com.sg

DKSH Technology Pte. Ltd.
625 Lorong 4 Toa Payoh #03-00, Singapore 319519
Phone +65 6274 1222, Fax +65 6273 1503
Email tec-marketing.sin@dksh.com, www.dksh.com.sg