



KINEMATICA

Homogenizing perfected.



Swiss made dispersing solutions
for you. Since 1962.



«My patented invention of a device in the field of kinematic high frequency process engineering significantly changed the efficiency and quality in nearly every sector of the production and laboratory world.»

–

Peter Willems (Prof. Ing. Chem.)
Inventor and Founder of Kinematica



Dear Partner

-

Since our company's founding in 1962, innovation has been a cornerstone of Kinematica's development strategy.

Ever since our company's founder, Professor Willems, revolutionized the industry with his rotor / stator invention, Kinematica has continued perfecting the technique by customizing and engineering its solutions to fit the most demanding applications. Our commitment to state-of-the-art technology has remained intact and been renewed decade after decade by achieving a de facto standard in several industries today, where our products are helping thousands of end users around the world.

«Homogenizing perfected» has been and will continue to be the focus of our efforts, in addition to the deeper integration of the technologies for a «connected world» where quality and performance without compromise will continue to represent the commitment to our customers.

We look forward to having you be part of this exciting journey and sharing a bright future of mutual success.

On behalf of The Kinematica Group,
Yours Sincerely,

Christian, Andreas, Friedrich H. and Wolfgang Niens

Our story. Your added value.

Kinematica: from Switzerland to the world.

We have been leading in the field of dispersing and homogenizing processing both for laboratories and production plants since 1962. We partner with our customers by designing, developing, and producing customized solutions for the pharmaceutical, cosmetics, chemical, life science, and food industries. Our global scale of operations includes our subsidiaries in North America (New York), Europe (Freiburg), and Asia (Hong Kong), in addition to our long-term established partnerships in Russia, India, and Japan. Our corporate headquarters and manufacturing facilities in Lucerne (Switzerland) is where we leverage our extensive expertise for thousands of applications to design, develop, and offer the best fitting solution to meet your application or process needs. Focusing on the most demanding requirements is our daily challenge that the Kinematica Research & Development team undertakes with passion to generate added value for our customers.



23 YEARS

The long-term cooperation with prestigious organizations from around the world, such as ETH of Zurich, accounts for over 20 years of continuous innovation and a number of patent-pending solutions offering a unique value proposition to our customers.

+UR FOUNDATIONS.

SWISS PRECISION: EXPERTISE, INNOVATION AND QUALITY.

Quality without compromises, in-depth expertise, and continuous innovation are the founding core values of our way of working. Attention to details, transparency, and a genuine consultancy approach allows Kinematica to offer tailor-made solutions for every application – even the most difficult ones.

1962

Kinematica is founded in Lucerne by Prof. P. Willems on the basis of patents, trademarks, and his chemical-physical research institute.

1965

Kinematica expands its international footprint by offering its revolutionary solutions, such as the legendary POLYTRON® PT 10-35 in the U.S.A. and Japan. As of today, over 20 000 PT 10-35 are still estimated to be in service.

1988 / 1990

Kinematica introduces the first world's handheld homogenizer, the POLYTRON® PT 1200 C, to address laboratory operators' safety as the key priority; soon after the first ever digital display-equipped disperser is made available with the POLYTRON® PT 3000 / PT 6000 series.

95%

95% INCREASED PRODUCTIVITY

Our solutions are designed to dramatically enhance our customers' productivity for both in-line / continuous and batch manufacturing processes.

75

75 COUNTRIES

The number of countries reached by our operating companies and network of qualified partners: a genuine global footprint to better serve our customers, wherever they are.



100%

100% CUSTOMER SATISFACTION

A customer-centric approach guides the whole Kinematica team of professionals; aiming for a 100% satisfied customer base is our uncompromising goal.

64

OVER 60 EMPLOYEES

A lean organization structure allows our company to be agile and to quickly react to our customers' needs.

2000 / 2002

Kinematica introduces the MEGATRON® MT-FM high performance aeration equipment: the first ever homogenizer to provide stable foams with micro-bubble sizes. The powder-induction MEGATRON® MT-VP innovative 2-in-1 architecture is patented.

2005 / 2010

Kinematica launches the first membrane-equipped in-line homogenizer, the MEGATRON® MT-MM, to address applications requiring the narrow distribution of particles with the world's lowest energy input. The MEGATRON® MT-SHS, with shear rates up to 300 000 s⁻¹, is introduced.

2018

Kinematica paves the way to the new age of dispersing and homogenizing solutions for a connected world.

Our mission. Your solution.

Homogenizing perfected: for every industry.

Kinematica's broad portfolio of solutions can address almost every dispersing application for the pharmaceutical, cosmetic, chemical, food, and biotech industry. Innovative powder-induction systems, solutions for completely sterile environments, or fully-compliant ATEX architecture are just some examples of the broad portfolio that Kinematica can offer with true scalability from pilot-plant to large plant configurations.

Our state-of-the-art technology, in addition to a professional consulting and engineering suite of services, can address a variety of processes such as blending / mixing / stirring, emulsifying, deagglomerating, foaming, crushing, and homogenizing with particle size reduction from a few micrometers down to nanometers in size: the proprietary design and innovative geometry of our aggregates / generators can downsize and provide perfect statistical particle distribution for the finest emulsions / suspensions and foam dispersions.



PHARMA



CHEMICAL



COSMETICS



FOOD



LIFE SCIENCE





PHARMA



Pharmaceutical Industry CGMP guidelines are an integral part of Kinematica compliance with the highest of the world's regulatory standards. Complete safety to ensure low-risk product manufacturing in sterile environments as well, is part of Kinematica's long-lasting experience in supplying specialized solutions to the largest pharmaceutical companies around the world. Comprehensive expertise for seamless integration with quality control and other specialized clean-room systems can also be offered.



BENEFITS: EXECUTIVE OVERVIEW

- Highest results reproducibility for an extremely narrow particle size distribution in accordance to the most demanding specifications
- Fully controlled homogenizing with industry-leading shear rates of up to $300\,000\text{s}^{-1}$
- Full CIP / SIP compliance and comprehensive certification in accordance to the widest acknowledged standards by including highest class clean-room for complete sterile environments and zero-contamination

APPLICATIONS OVERVIEW

- Wet-milling of API
- Eye drops
- Sterile Emulsions for body injections
- Pharmaceutical Aerosol
- Vaccines
- Phytopharmaceuticals
- Micro-encapsulations
- Sterile Suspensions
- Infusion solutions
- Tablet coatings
- Ultrasound gel (contact gel)
- Ointments
- Crystallizing of pharmaceutical ingredients
- Liposomes



CHEMICAL



The Kinematica portfolio encompasses solutions specifically designed to fit the demanding needs of the chemical industry: from highly corrosive substances to aggressive and hazardous environments, the Kinematica homogenizing systems benefit from decades of experience and dozens of success stories where complete safety and high-resistance components were incorporated into our architectures and optimized to provide the highest performance over time. Our modular offering can scale-up from pilot-plant systems to huge mass-production sites.



BENEFITS: EXECUTIVE OVERVIEW

- A variety of high-end alloys to replace 316L stainless steel whenever applicable and/or required by highly aggressive environments (i.e. TDI)
- Seamless scalability to huge mass-production plants up to 250 000 l/h
- Single / multistage with single / multiple injectors

APPLICATIONS OVERVIEW

- Production of TDI / MDI
- Lubricants
- Mineral filler slurries
- Starch solutions
- Additives for building industries
- Metal oxide suspensions
- Paints and colors
- Textile fibers (SPANDEX)
- Polymer-Emulsions
- Liquid glues
- Binding agent
- Detergent agents



COSMETICS



The cosmetics industry is continuously evolving to accommodate new fashion trends and market demands, such as for high-performance makeup products. Kinematica leads the way in creating perfect emulsions with multi-stage encapsulation (oil-in-water or water-in-oil) to ensure the longest life-span of aromas such as in skin-care creams or the finest pigment distribution to achieve the brightest colors of a lotion. Fully-controlled particle distribution and their minimal size is provided to enhance product effectiveness (i.e. fastest skin absorption), but at the same time avoiding crossing into the limits established by the norms to comply with drugs & medical regulations.



BENEFITS: EXECUTIVE OVERVIEW

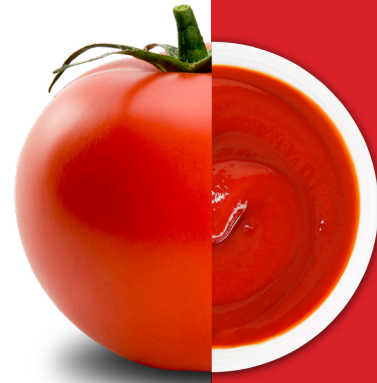
- Double or multi-stage oil-water encapsulation to achieve perfect and stable emulsions in addition to effective deagglomeration
- Flexible systems to support research and development into evolving / fine-tuning new products forms (i.e. foams vs. creams)
- Fully-controlled and narrow particle / droplet size distribution

APPLICATIONS OVERVIEW

- Face creams
- Sun creams
- Body lotions
- Hand creams
- Hair care products
- Shampoo
- Shower gels
- Deodorants
- Fragrances
- Toothpaste
- Natural cosmetics



FOOD



Kinematica offers true scalability for the food, feed, and beverage industry: from sample preparation trials to very large scale productions. Kinematica offers the highest in standards compliance, by including the 3A standard, with a broad range of solutions to address the optimization of raw material usage and the best emulsification processes. It's all you need to limit the use of artificial substances and to improve the final products' shelf life.



BENEFITS: EXECUTIVE OVERVIEW

- CIP / SIP for the highest hygiene standards compliancy and lowest OPEX
- Premium alloys from AISI Steel 316L (standard) and above
- Modular architecture for time-reducing / accelerating / controlling and multi-purpose applications system

APPLICATIONS OVERVIEW

- Dressings / Dips
- Soups
- Marinades
- Ketchup
- Vitamin drinks
- Smoothies
- Creme Cheese
- Mayonnaise
- Ice Cream Mix
- Gassing of Ice Cream
- Liquid flavors
- Praline fillings
- Mousse products
- Beverages
- Egg white & protein foams



LIFE SCIENCE



Whenever precision is required in sample preparation for a wide range of life science and biotech applications, the Kinematica solutions are there to support the laboratory managers' mission. Fast set-up, fully controlled heating to protect samples, and high throughput allows for effective management of continuous operations with a limited amount of time to maintain and a very high level of productivity.



BENEFITS: EXECUTIVE OVERVIEW

- Fast system set-up for a quick sample processing and high throughput
- Disposable aggregates available in sterilized packs (gamma-radiated) to avoid cross contamination
- Specialized aggregate geometry to accelerate processing to avoid excessive sample heating

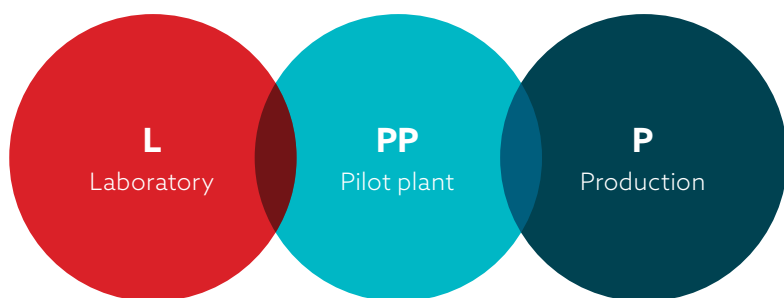
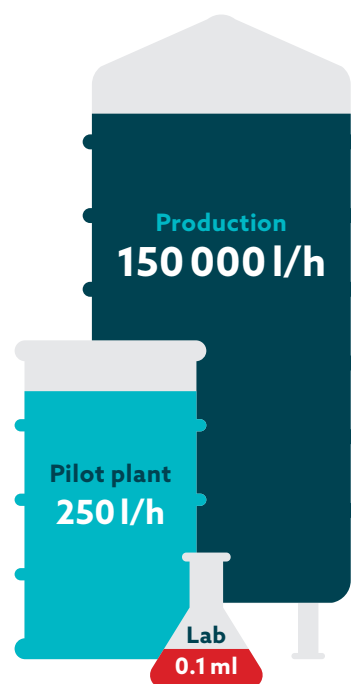
APPLICATIONS OVERVIEW

- Cell disruption
- DNA extractions
- Tissue samples
- Cell suspensions
- Sample preparation for analysis
- Biological synthesis
- Wastewater analysis
- Quality control (Food, Pharma)
- Plant extractions
- Homogenizing in cell culture plates

Our technology. Your solution.

The geometry that fits every application.

Kinematica's broad portfolio of dispersing and homogenizing systems are based on our rotor/stator technology invention. This dynamic mechanical system allows the processing of physical phases such as liquid-liquid, liquid-solid, or liquid-gaseous to produce finest dispersions, emulsions, suspensions, and foams. The rotor and stator build up the generator that is the core element where the selected geometry will process the physical phases. The choice of the best generator is a key factor of each application performance. Thanks to decades of experience, Kinematica can supply the industry with the broadest range of generators for a large variety of applications. Moreover, specialized generator geometries can be designed, engineered, and produced in close cooperation with our customers.



TRUE SCALABILITY

Our homogenizing devices are designed for use in the lab, for pilot plants, and eventually for mass-scale production: genuine scalability allowing working volumes between a few ml up to 250 000 l/h.

POLYTRON®

IMMERSION DISPERSERS

Dispersing and homogenizing equipment for batch processing in laboratories, pilots plants, and production.

BIOTRONA®

HIGHLY TURBULENT DYNAMIC IMMERSION MIXERS

High-performance mixing/stirring systems for medium to high viscosity fluids and highly solid content.

MEGATRON®

IN-LINE DISPERSERS

Multi-stage dispersing and homogenizing equipment for continuous and/or recirculating processing in production or pilot plants.

BATCH PROCESSING

Our immersion systems (POLYTRON®) are manufactured to seamlessly fit and serve batch/lot processing architectures. The Kinematica design and wide range of accessories allow for an ideal positioning of rotor/stator inside the batch vessel: as a result, the best performances can be achieved.



REACTRON®

MULTI-PURPOSE HIGHLY SCALABLE REACTORS

Customized, turn-key reactor systems for research, development, formulation testing, and pre-production assessment.

POLYMIX®

MULTI-PURPOSE STIRRING AND MILLING SYSTEMS

Sample preparation equipment range for high performance fluids mixing, dispersing, and wet/dry milling.

MICROTRON®

BOTTOM-MOUNTED HOMOGENIZERS / BLENDEERS

High-performance systems for effective blending and bottom-up batch homogenizing of cuttable materials.

Our innovation. Your productivity.

Rotor / stator: The principle.

Rotor and stator intermesh coaxially. Driven by a high-performance / high-speed motor, the rotor generates an under-pressure, which continuously sucks in the phases to be dispersed. The phases are then accelerated centrifugally and then reach the shear gap between rotor and stator. The product is subjected to extremely high deceleration-tangential and radial acceleration forces. The individual particles / droplets / bubbles are torn apart and thus reduced in size. This is called shearing. In this process, circumferential speeds (tip speeds) of up to 65 m/s can be reached. The particles / droplets are reduced further in size through additional cutting and crushing effects.

DISPERSING

HOMOGENIZING

EMULSIFYING

SUSPENDING

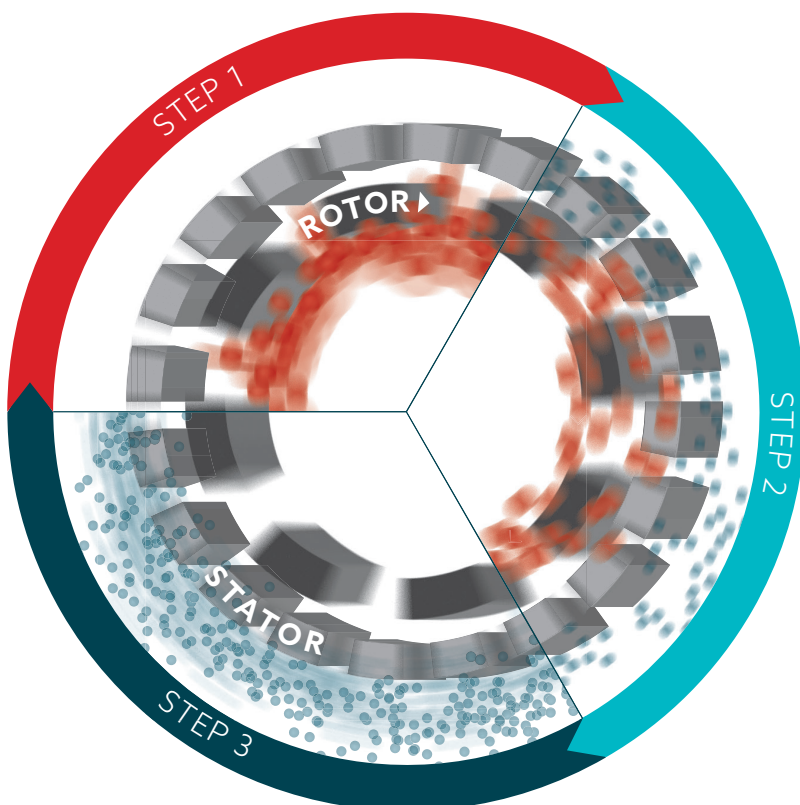
WET MILLING

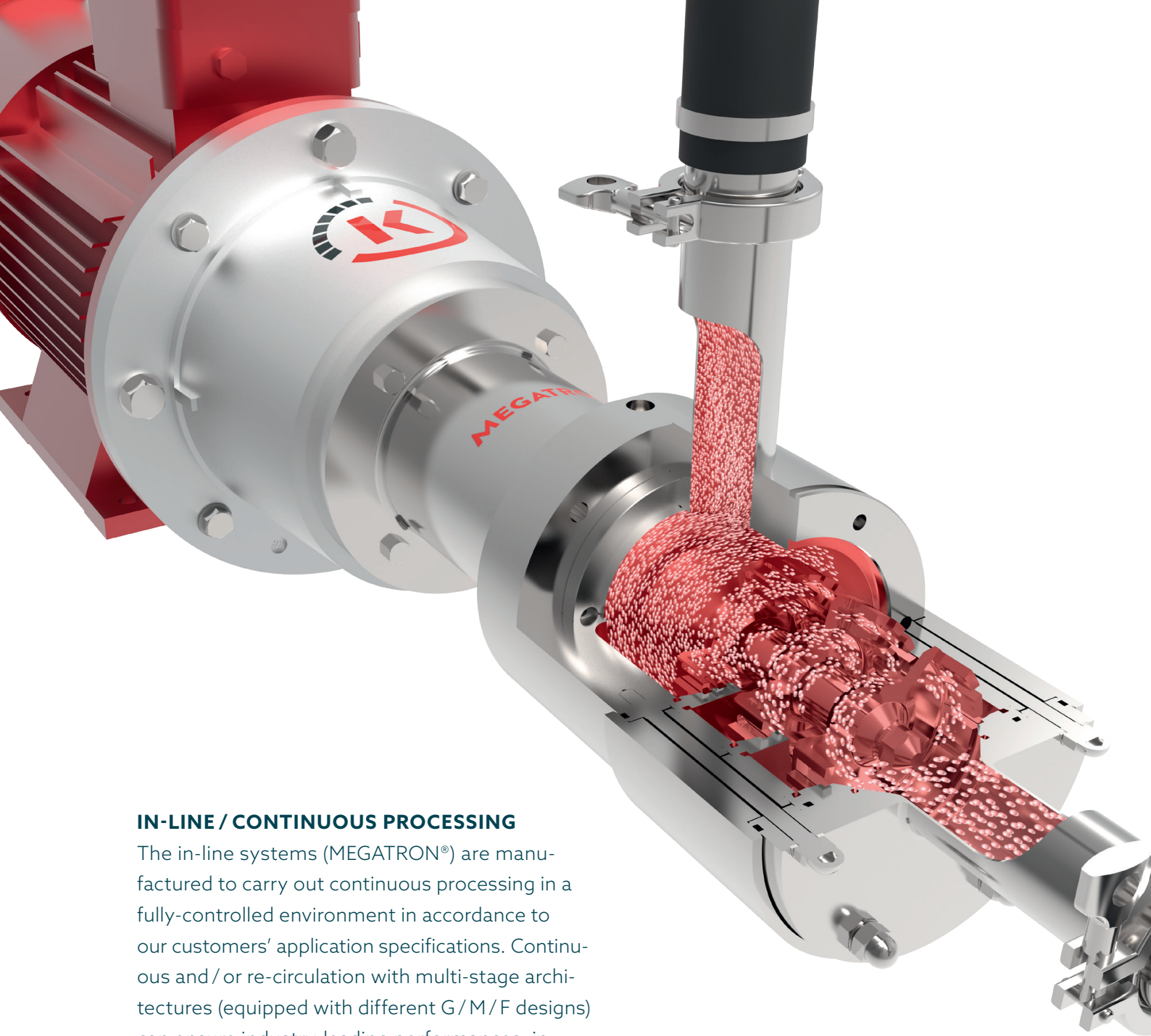
GASSING

SAMPLE PREPARATION

ACCELERATION OF

REACTIONS





IN-LINE / CONTINUOUS PROCESSING

The in-line systems (MEGATRON®) are manufactured to carry out continuous processing in a fully-controlled environment in accordance to our customers' application specifications. Continuous and / or re-circulation with multi-stage architectures (equipped with different G / M / F designs) can ensure industry-leading performances, in conjunction with the highest level of scalability and modular design to protect investments. A variety of architectures with horizontal (MT-H), vertical (MT-V), or bottom-mounted homogenizers (MICROTRON®) are available.

G = COARSE



M = MEDIUM



F = FINE



Our design. Your benefits.

The perfect solution for every industry.

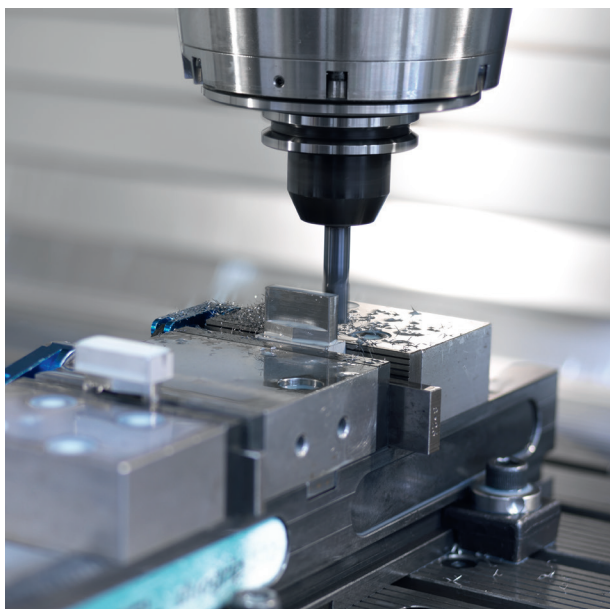
All the Kinematica products are designed by keeping the maximization of end-user benefits as a top priority. In addition to outstanding performance and quality without compromises, the Kinematica solutions are conceived for easy use and minimized servicing / maintenance activities to keep OPEX under control. All of the benefits are accompanied by the highest level of compliance with global standards and the most demanding certifications to meet all the industry requirements and hardest working conditions. Premium materials and accurate design allow Kinematica products to guarantee an industry-leading long life span to protect your investment.

A UNIQUE VALUE PROPOSITION.

THE KINEMATICA DISPERSING AGGREGATES: A DESIGN / GEOMETRY FOR EVERY NEED.

The Kinematica portfolio includes over 80 different and exchangeable POLYTRON® dispersing aggregates: the best generator for each specific homogenizing application can be selected. Optimized shear forces and cutting effects will allow for the processed medium to be treated at finest level in the shortest amount of time, thus making Kinematica the undisputed market leader in efficiency.





SWISS PRECISION. YOUR COMPLIANCY.

Our products conform to EU standards (e.g. CE, EMC). Production in accordance with ATEX, 3A, and GMP guidelines is also possible. Ultra-modern CNC production machines provide perfect quality in combination with high-quality raw materials that are refined in Switzerland, such as special stainless steel. Our hand-picked suppliers must comply with our high quality standards by means of certification. The highest performance and quality demands have ensured our business success for almost 50 years.



According to EMV guidelines / SIP / CIP / RoHS / GMP and Cleanroom compliant

Our passion. Your success.

Homogenizing perfected.

Perfecting the homogenizing process for the widest number of applications and industries is our mission. A mission that our people pursue every day with passion and dedication in every phase of our product development. The promise of uncompromised quality using premium materials along with the highest level of compliancy and safety come together with very easy servicing to keep operating expenses at a minimum and ensure industry-leading product durability to protect our customers' investments. Unparalleled performance in conjunction with the highest possible level of system personalization makes Kinematica the best choice for your specialized needs and long-lasting success in your industry. Guaranteed.



UNCOMPROMISING QUALITY

- Premium materials such as 316L (standard), Inconel, Hastelloy, Titan, SuperDuplex
- Single / double / cartridge mechanical seals for the highest degree of safety: zero-leakage and fully-certified solutions
- Superior drive system design: direct-driven, belt drive, and water-cooled



INDUSTRY-LEADING PERFORMANCES

- Tip speeds of up to 65 m/s and shear rates up to $300\,000\text{ s}^{-1}$
- Narrow and controlled particle / droplet size distributions down to $1\ \mu\text{m}$ with the highest reproducibility of the results
- Fastest homogenization for maximum processing efficiency for viscosities up to 50 000 mPa-s

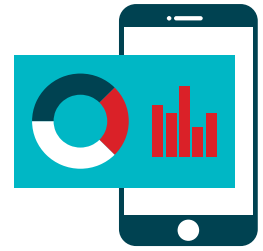


UNPARALLELED CHOICE AND SCALABILITY

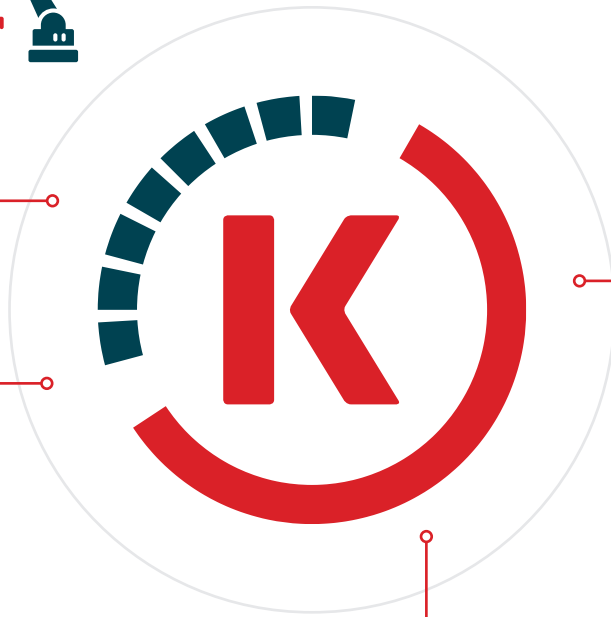
- More than 80 dispersing aggregates with proprietary geometries
- Throughputs from 5 l/min up to 250 000 l/h with single or multi-stage modular architectures
- Sterile and explosion-proofed areas system options (ATEX)



**SMART FACTORY /
PRODUCTION**



APP-CONTROL



**CLOUD BASED
SOLUTIONS**



**INTERNET
CONNECTION
(IOT)**



EASE-OF-USE

- Easy aggregate handling through quick-release unique proprietary coupling
- EC (Easy Clean) innovative design for CIP (Cleaning in Place) and / or SIP (Sterilization In Place)
- Wide digital displays for intuitive operations



INVESTEMENT PROTECTION

- Industry-leading component durability with the lowest OPEX and fastest ROI
- Rich suite of services (i.e. sample testing) for project pre-feasibility
- Competitive rent & buy models for pilot plants to serve as trial / pre-production development



CONNECTED TO THE WORLD

- Industry 4.0 compliancy roadmap to fit industrial internet standards (control-lable by web App)
- Ready to be integrated into Cloud-based services for data analytics
- Ready to be integrated into open platform architectures for smart production



THE KINEMATICA GROUP



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