

# Cannabis Applications



**KINEMATICA**  
Homogenizing perfected.

# KINEMATICA & CANNABIS

Today's most innovative cannabis processors are incorporating more cutting-edge technology every year. Kinematica process technology is in the forefront of new product development, process improvement and scale up, as well as our traditional role in laboratory analysis. Extraction, winterization, dispersing active ingredients, powder induction, emulsification, and micro-encapsulation are all processes which have benefited from our technology. The most ingenious creations in the laboratory or pilot plant are of little use if they cannot be turned into commercially sized volumes.

Kinematica has the equipment and expertise to scale up any of our lab and pilot plant units to large scale production. Kinematica is your key to better cannabis and cannabinoid processing and analysis.

## Your Kinematica keys to success:

### **More models to choose from:**

Largest selection of models of homogenizers with over 80 generators from which to choose

**More methods of processing:** both inline and batch, with special generator configurations

**More shear:** with the highest speeds and tightest gap between rotor and stator, our units can generate shear rates up to 300,000 sec<sup>-1</sup>

**More experience:** Polytron® homogenizers for cannabis applications are referenced in hundreds of patents and papers dating back more than 30 years

Our Polymix® MFC 90 D hammer/blade mill for dry milling samples

**Strict confidentiality:** Your IP will not be shared with anyone else

**More scalability:** Both batch and inline units are available in laboratory, pilot plant and large-scale production units. The most complete range, by far

Special models for maceration, powder induction, reactor systems and explosion proof applications

Custom configuration available

Swiss craftsmanship backed by a 2-year warranty and complete US based service and support team

# Powder Induction / Mixing / Dispersing / Homogenizing

Our POLYTRON® and BIOTRONA® batch processors



## PROBLEMS WE SOLVE

- Incomplete mixing
- Agglomerations and lumps
- Inconsistent quality
- Lengthy mix times



## PRODUCTS WE PERFECT

- Emulsions for edibles
- CBD in water emulsion (*pictured at right*)
- Cannabinoid dispersions
- Tinctures
- Topicals



## INGREDIENTS WE MASTER

- Gum Arabic
- Cellulose gums
- Surfactants
- Carrier Oils
- Flavors



## RANGE OF PRODUCTS

### **POLYTRON®** SERIES PT

#### **FOR BATCH EMULSIONS / SUSPENSIONS**

- Dispersing of CBD oils in MCT, addition of terpenes.
- Sample preparation for quality analysis
- Wet milling and dispersing of solids, fibers, stringy materials, tissues, cells into fluids and polymers
- Supports extraction process. i.e, winterization
- Breaking up of tablets for QC
- And much more.

### **MEGATRON®** SERIES MT (-V/-VP/-FM)

#### **FOR FINEST INLINE EMULSIONS / SUSPENSIONS / DISPERSIONS**

- Dispersing and mixing of coarse solids into liquid
- Producing of finest emulsions and suspensions with finest droplet and particle sizes
- Intensive mixing
- Gassing of fluids
- Special versions for foam production (MT-FM)
- Special versions for powder induction (MT-VP)
- And much more.

### **REACTRON®** SERIES RT

#### **COMPLETE DISPERSING PROCESS SYSTEMS**

- Producing cremes, lotions, emulsions
- Pharmaceutical or cosmetical products
- Wet milling and dispersing of solids, fibers, stringy materials, tissues, cells into fluids and polymers
- Extracting enzymes from bio masses
- And much more.

### **POLYMIX®** SERIES PX

#### **FOR DRY MILLING**

- Dry milling / grinding of dried, non-fatty, hard and brittle (cereals, beans, bones, stone..) or stringy and ductile (wood, straw, fibres) products (PX-MFC)
- And much more.

### **MICROTRON®** SERIES MB

#### **FOR MIXING AND HOMOGENIZING**

- Mixing, dispersing, homogenizing, emulsifying and size reduction of cuttable materials
- And much more.

# POLYTRON®

## Laboratory Homogenizers

No one offers a wider selection of rotor/stator homogenizers for the laboratory than Kinematica. The larger laboratory size units, which are widely used for tinctures and oil/water emulsion are also ideal for formulating new products in the R&D lab. Pictured below is our popular PT 10-35 GT model, which combines versatility and power at an economical price

### POLYTRON® homogenizers features:

- Quick coupling for the dispersing aggregates
- Powerful and safe drive systems
- High speed levels / extreme high tip speeds
- Intelligent regulations and / or controllers
- Digital displays or readable scales
- Long working life

80

Choose from over 80 different and exchangeable POLYTRON® dispersing generators optimized for each specific homogenizing application.



The efficiency of POLYTRON® dispersing generators is unrivalled.



Solid 316L stainless steel and an Easy Clean design ensures dependable performance and a long life.



# POLYTRON®

## Production Size Batch Homogenizers

Processes and products created with our laboratory homogenizers can be scaled up to production sized units capable of processing batches up to 10,000 liters.

These units are particularly well suited for dispersing crude into ethanol. A wide variety of sizes and configurations for your toughest mixing, dispersing and homogenizing tasks is available. Permanent mounting or mobile stands for maximum versatility. Bottom mount units are also available.

See following pages for our Reactron reactor systems.



# POLYTRON®

## Advanced Rotor/Stator Technology

**POLYTRON® PT** machines are batch homogenizing processors. The dispersing aggregate of the machine are immersed in a processing vessel and the product is processed by the rotor/stator dispersing generator.

**KINEMATICA** offers **POLYTRON®** pilot plant and production machines with a broad choice of different drive systems, shaft lengths, dispersing generators, stands and processing tanks for different applications and working volumes from a few liters up to several thousand liters.



### PTG G-TYPE

Standard generator, rotor and stator with one teeth row each.

- Dispersing, mixing and size reduction of coarse solids into liquid
- Extractions
- Mixing of fluids
- Crushing of lumps
- Intensive mixing



### PTG M-TYPE

Standard generator, rotor and stator with one or two teeth rows each.

- Producing of emulsions and suspensions with medium droplet and particle sizes
- Wet milling of medium sized solids
- Extractions
- Acceleration of reactions
- Intensive mixing
- Crushing of lumps
- Intensive mixing



### PTG F-TYPE

Standard generator, rotor and stator with one or two teeth rows each

- Producing of emulsions and suspensions with fine droplet and particle sizes
- Wet milling of fine solids
- Cell pulping
- Extractions
- Accelerating of reactions
- Fassing of fluids
- De-agglomerations



### PTG BIOTRONA®-TYPE

Flash blender model, blade rotor and stator with inclined slots

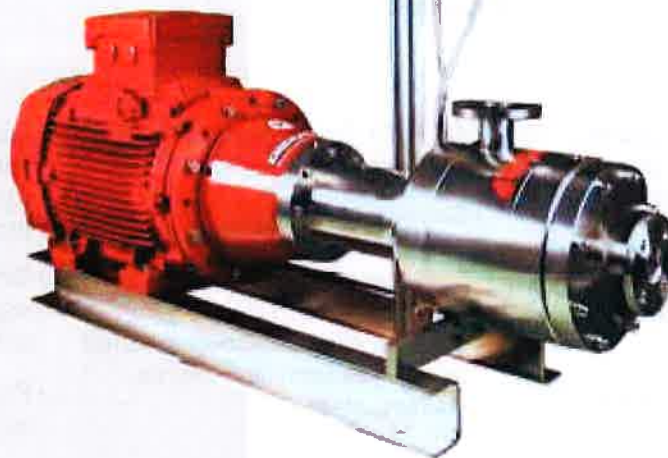
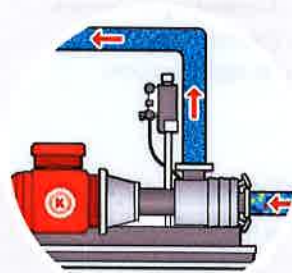
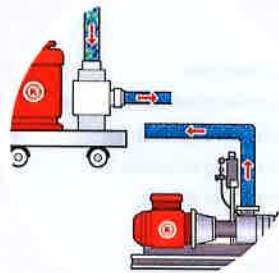
- High turbulent mixing with low shear forces
- Fast dissolving and suspending of solids also at higher viscosities

- Working volumes up to approx. 50 liters (pilot plant) and up to approx. 10'000 liters (production)
- Powerful drive systems including speed regulation Standard and special shaft lengths available in CIP design
- Available with mechanical seal systems for pressure and vacuum applications
- ATEX (EX-Proof) versions can be supplied
- Dispersing generators for wide range of working volumes and homogenizing performance; also BIOTRONA® flash blender and dissolver available Product wetted parts made from high alloyed stainless steel
- Clamp, flange or customer specific vessel connection can be supplied to connect the machine to the process vessel
- Different stand models - also moveable with electric, pneumatic or hydraulic stroke deliverable
- Process control can be designed and supplied

# MEGATRON®

## Inline Dispenser/ Homogenizers

In addition to our inline membrane, foaming and powder induction units, our standard Megatron series offers a wide variety of sizes, configurations and dispersing heads. We offer laboratory and pilot plant sizes as well as production units. Superior design and Swiss workmanship ensure trouble free operation.





# MEGATRON®

## Inline Dispenser/Homogenizers for Powder Induction

MEGATRON® MT-VPC / VPR series are in-line processors combining in a two-stage working chamber an effective powder induction stage with a homogenizing / suspending stage

- MT-VP series are specially designed for powder induction of light to heavy powders and making finest suspensions
- Maximum generated vacuum at the powder induction is approx. 25 mbar
- Pressure up to 6 bar standard, higher possible
- Temperature up to 90 °C standard, higher possible



# REACTRON®

## Complete Dispersing Systems

KINEMATICA offers also a range of complete homogenizing and mixing plants for different applications in the chemical, pharmaceutical, cosmetic and food industry – known under the brand name REACTRON®. REACTRON® systems are designed to customers' specifications and consist normally of the following components: processing tank with POLYMIX® stirring system for macro mixing, POLYTRON® / MEGATRON® homogenizing system for down sizing and micro mixing, piping, process control and further specific equipment like vacuum pumps, heating / cooling thermostats. REACTRON® systems are available for batch and semi-batch operation with volumes starting with 1 liter up to several 100 liters. They can be designed and manufactured according to customer and application specifications, incl. pressure / vacuum, CIP / SIP, clean room design and ATEX regulations.

### SOME APPLICATION EXAMPLES:

- Producing of creams, lotions, emulsions
- Pharmaceutical or cosmetic products
- Dispersing of fine solids into a liquid or molten phase
- Suspending of additives and solid polymers in mineral oils
- Producing of dairy products and diet food
- Polymerisations
- Extracting of enzymes from bio masses
- And many more





— REACTRON® RT 2 —



— REACTRON® RT 15 —



— REACTRON® RT 40 —

Model / Series	Process vessel (**) working volume	Suitable POLYTRON® Batch Homogenizer (*)	Suitable MEGATRON® Inline Homogenizer (*)	Suitable POLYMIX® Stirrer (*)
RT 1	1 l	PT 2500 E	MT 3100 S	PX-MT / PX-HT
RT 2	2 l	PT 10-35 GT	MT 3100 S	PX-MT / PX-HT
RT 5	5 l	PT 3100 D	MT 3100 S	PX-MT / PX-HT
RT 10	10 l	PT 3100 D	MT 3100 S	PX-MT / PX-HT
RT 15	15 l	PT 6100 D, PT 7100, PT-D 36-60	MT 3100 S / MT 5100 S	PX-MT / PX-HT
RT 40	40 l	PT(-C) 60	MT(-V) 45	PX-RW 0.35
RT 50	50 l	PT(-C) 80	MT(-V) 65	PX-RW 0.35
RT 100	100 l	PT(-C) 80	MT(-V) 65	PX-RW 0.55
RT 500	500 l	PT(-C) 120	MT(-V) 65	PX-RW 0.75
RT 1000	1'000 l	PT(-C) 160	MT(-V) 95	PX-RW 1.5

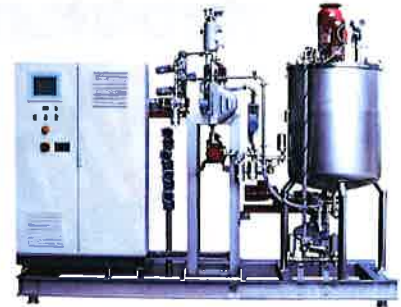
(\*) The cited products shall only be understood as reference. The choice of the suitable Batch or In-line Homogenizer and the Stirrer depends also on the product specifications, customer specifications and the environmental and process conditions.

(\*\*) Process vessel can be made from different materials including stainless steel 304, 316L, 316Ti, borosilicate glass or made from specific material on request. Material of construction depends also on product specifications, customer specifications and the environmental and process conditions.

— REACTRON® RT 200 —


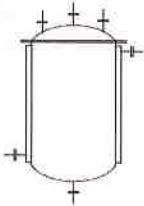
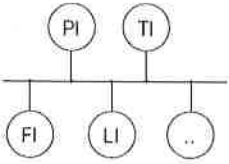
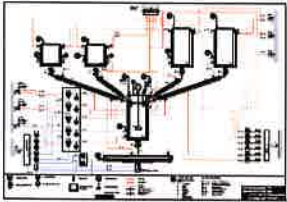
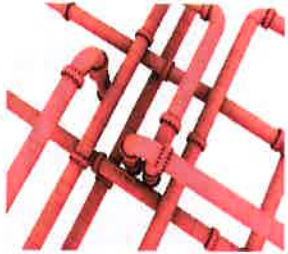


— REACTRON® RT 500 —



# KINEMATICA

## Systems and Services

POLYMIX® Stirrers	
	<ul style="list-style-type: none"><li>• POLYMIX® range of stirrers can be used for stirring and macromixing tasks in combination with a REACTRON® process vessel</li><li>• Different stirrer designs / sizes are available, like anchor stirrer, propeller stirrer, dissolver</li></ul>
Process Vessels	
	<ul style="list-style-type: none"><li>• Process vessels as well as premixing tanks can be designed to customer and product specifications</li><li>• Multi-wall vessels with double jacket and isolation can be supplied</li><li>• Lifting column for vessel cover can be supplied</li></ul>
Measuring Devices	
	<ul style="list-style-type: none"><li>• All necessary measuring devices for temperature, pressure, level, throughput, pH, viscosity, etc. can be supplied</li></ul>
PID	
	<ul style="list-style-type: none"><li>• KINEMATICA provides complete engineering services</li></ul>
Installation	
	<ul style="list-style-type: none"><li>• KINEMATICA provides complete installation services</li></ul>

# KINEMATICA

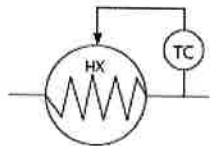
## Systems and Services

### Process Control



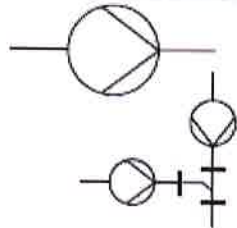
Complete process control for manual, half-automatic and automatic operation can be engineered and supplied – SPS control systems can be supplied

### Tempering



It is often necessary to control the temperature; suitable tempering devices can be supplied

### Pumping / Injecting



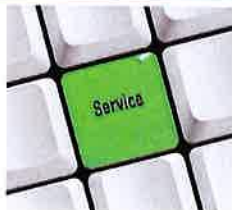
It is often necessary to pump different components between vessels and to feed the homogenizers; suitable pumping devices as well as injectors can be supplied

### DOCU / IQ / OQ



KINEMATICA provides complete documentation services including IQ / OQ

### Service



KINEMATICA provides complete after sales services



## 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 life science 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

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