

# PT 3100 D

*Digital High-End  
Benchtop  
Homogenizer  
with PC interface*

*Homogenizing  
and Mixing  
Technology for  
the Laboratory*

**DISPERSING**

**HOMOGENIZING**

**EMULSIFYING**

**SUSPENDING**

**WET MILLING**

**MIXING**



**KINEMATICA.CH**

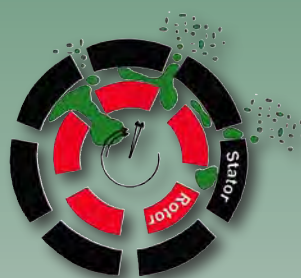
Dispersing and Mixing Technology

The new designed **POLYTRON® PT 3100 D** benchtop lab homogenizer is the successor of the well-known PT 3100. The **PT 3100 D** is equipped with a completely new regulation and control system and a new designed user interface with keyboard and informational LCD display. A standard port for PC-connection together with the new free-to-use KINEMATICA software for automatic control and a connection port for a temperature probe the new **PT 3100 D** is the most advanced benchtop lab homogenizer and a worthy successor of the PT 3100.

Further outstanding features:

- 60 % more power with rated power 1200 Watt
- integrated overheating, overload, blocking protection
- integrated digital speed controller with closed loop - constant speed independent from load changes
- variable speed up to 30'000 rpm and tip speeds up to approx. 30 m/s (depending on the chosen dispersing generator and product properties)
- informational digital display for different process parameters, messages, etc.
- three different operation modes: standard mode, time mode, automatic mode
- quiet drive system approx. 73 dB (A) (without load, at 30'000 rpm)
- new quick coupling for low noise operation, existing dispersing aggregates from PT 3100 line applicable
- great choice of dispersing aggregates for different applications and working volumes from 0.1 ml up to 10'000 ml

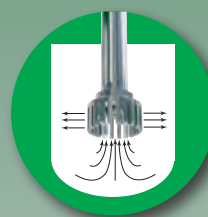
## Principle of process



Rotor / Stator principle



POLYTRON® batch principle



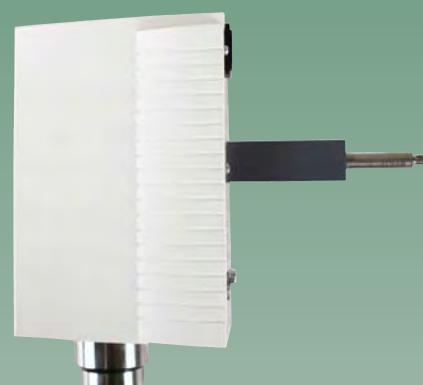
The Rotor/Stator principle for dispersing and homogenizing equipment, originally invented by KINEMATICA, has become the worldwide accepted standard for homogenizing and dispersing a solid or fluid or gaseous phase into a fluid phase.

The dispersing aggregates of the **POLYTRON®** and **BIOTRONA®** batch dispersing systems are directly immersed into the medium.

The product will be processed by the rotor/stator dispersing generator at the tip of the dispersing aggregate.

**POLYTRON®** Rotor/Stator homogenizers successfully process emulsions, suspensions and foams by reducing the size of solid particles, droplets and gas bubbles to a few microns or less. Small and large amounts of product are being dispersed in a more economical, faster and better way than with any other device.

## Technical Data



Motor power, type	1200 W (input) / 800 W (output), Universal motor
Speed control	integrated digital speed controller with closed loop - constant speed independent from load changes; user interface with LCD and keyboard
Soft Start	Yes
Supply Voltage	230V / 100-120V, 50/60 Hz
Speed at Dispersing Rotor max.	30'000 rpm
Direction of rotation	clockwise, seen from above
Noise emission (w/o load)	≤ 73 dB (A) at 30'000 rpm ≤ 66 dB (A) at 25'000 rpm
Ambient temperature	0 - 40°C
Relative humidity	95% max.
Standards	Manufactured acc. to EN / IEC 61010, 61326-1 for EMC & SAFETY
Protection class	IP 20
Max. period of continuous operation	depending on load & speed, 100% duty time is possible
Dimensions (drive only)	240 x 130 x 265 mm (LxWxH)
Weight (drive only)	3.8 kg

### NEW Power drive unit

- Rated Power: 1200 W (60 % more power than previous PT 3100)
- Speeds up to 30'000 rpm
- Low noise level  $\leq 73$  dB(A) (drive only, at 30'000 rpm)
- Integrated digital speed controller with closed loop – constant speed independent from load changes, accuracy at 1% (FS)

### NEW User Interface

- New user interface with informational LCD display and keyboard for speed adjustment, programming and monitoring
- Start / Stop push buttons
- Push button for viewing drive & process parameters on the display:
  - Set/Target speed [TS, rpm]
  - Actual speed [AS, rpm]
  - Power consumption [Pin, W]
  - Power at the shaft [Pout, W]
  - Torque at the shaft [M, Ncm]
  - Motor current [I, A]
  - Voltage at mains supply [U, V]
  - Product temperature (temperature at plugged in Pt100 probe) [TP, °C]
  - Temperature of internal digital control system [Tc, °C]
  - Counter total operating time [Oh, h]

### NEW Extended features

- PC Software and PC connecting cable are in the scope of supply
- Possibility to plug in a Pt100 temperature probe (optional) at the backside and using the display as temperature indication
- Memory Function: The last entered speed and time value will be saved after turning off

### NEW Safety

- Integrated overheating protection with message on display and acoustic signal
- Integrated overload protection with message on display and acoustic signal
- Integrated blocking protection with message on display and acoustic signal
- Designed and proofed according to safety & EMC standards for laboratory equipment IEC/EN 61010-2-51 / 61326-1

### NEW Operation Modes

- Three different operation modes can be chosen:
- STANDARD-MODE for manual operation
- TIMER-MODE for automatic speed / time operation and shut down
- AUTO-MODE for remote operation using a Windows® PC with the provided User-Interface Software (see further below) with possibility of data logging into EXCEL®-sheets

### NEW Quick Coupling

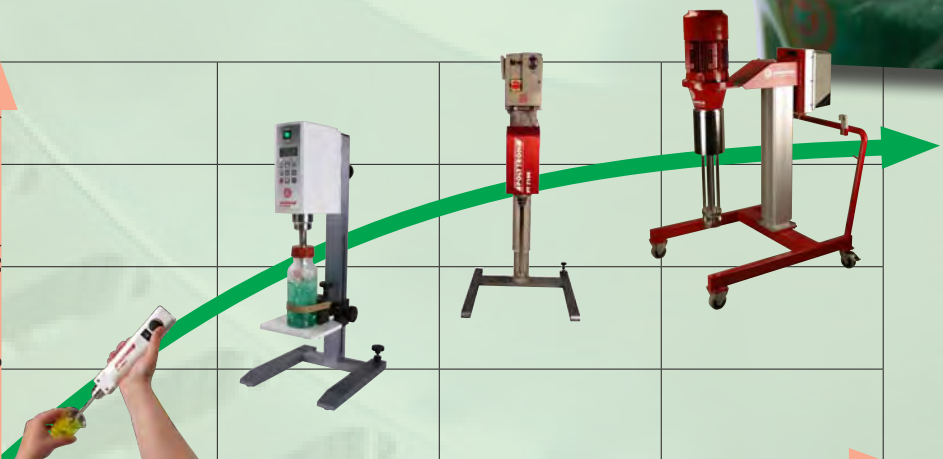
- New quick coupling (type F) for easy, fast and safe coupling of POLYTRON® dispersing aggregates
- The new quick coupling is optimized for low-noise operation
- Existing dispersing aggregates from previous PT 3100 / 6100 line applicable
- Existing dispersing aggregates from previous PT 10-35 (PT-K) line applicable using the PT-DA / PTA adapter



### Scale-up

- The POLYTRON® PT 3100 D is a medium sized lab benchtop homogenizer suitable for working volumes up to 10 liters .
- KINEMATICA offers a complete series of batch working homogenizers suitable for volumes from 0.1 ml up to 10'000 liters.
- The test results obtained with the laboratory unit PT 3100 D can be used as a reliable data source for a scale-up step to the larger POLYTRON® pilot plant and production machines.

Working Volume [l] (0.001-10'000)



Size of POLYTRON® Batch Homogenizer



# POLYTRON® Dispersing Aggregates

## POLYTRON® Dispersing Aggregates – unrivalled

Up to the present the efficiency of POLYTRON® dispersing aggregates **remain unequalled**. Thanks to the optimized shear forces and bounce effects (mechanical forces) the processed medium will be treated at **finest level** in **shortest time**.

The optimal aggregate for the dispersing application can be chosen from **over 40 different**, interchangeable POLYTRON® dispersing aggregates.

POLYTRON® dispersing aggregates for the PT 3100 D have shafts with **double bearings** as standard and are made from **high quality** stainless steel (1.4435, V4A, 316L). Dispersing aggregates up to a diameter of 20 mm have **additional saw teeth** and a **safety ring** to protect the teeth from bending also at highest load like hard samples.

For specific applications KINEMATICA offers customer tailored solutions. Elaborated rotor/stator geometries are a **speciality of KINEMATICA**.

## Dispersing Aggregates for system PT 3100 D

For the system POLYTRON® PT 3100 D basically all dispersing aggregates from system POLYTRON® PT 3100 can be adapted. Below please find a choice of the most common used dispersing aggregates. With the optional available PT-DA/PTA-Adapter it is also possible to use all existing dispersing aggregates of the former system POLYTRON® PT 10-35 (PT-K). Other sizes, geometries, materials, coatings on request.







## Simple and safe cleaning

POLYTRON® dispersing aggregates are available as EC (Easy Clean) aggregates as standard. In this design, a combination of two slide bearings made of high quality plastic with excellent mechanical properties and best chemical resistance or a combination of a slide bearing (tungsten carbide/bronze) with a high performance stainless steel ball bearing is used. POLYTRON® dispersing aggregates in the EC version can be disassembled in a few steps, are easily cleaned or can be sterilized / autoclaved by any standard method.

## Dispersing Generator - at the head of a POLYTRON® Dispersing Aggregate

POLYTRON® dispersing generators (consisting of a rotor and a stator) are mounted at the head of a dispersing aggregate and are available in many designs, geometries and sizes. Next to single (../2.. - meaning rotor and stator with one teeth row each) and multiple teeth rows (../4.. - two teeth rows each, ../6.. - three teeth rows each) for different achievable size distributions, a variety of special designs and geometries can be chosen to get the best result for the desired application.

## Dispersing Aggregates (selection)

Model	PT-DA 05/2EC-B078	PT-DA 07/2EC-B101	PT-DA 12/2EC-B154	PT-DA 20/2EC-B193	PT-DA 20/2MEC-B193	PT-DA 20/2WEC-B193
	<ul style="list-style-type: none"> <li>standard model</li> <li>rotor/stator with one teeth row each</li> </ul>	<ul style="list-style-type: none"> <li>standard model</li> <li>rotor/stator with one teeth row each</li> </ul>	<ul style="list-style-type: none"> <li>standard model</li> <li>rotor/stator with one teeth row each</li> </ul>	<ul style="list-style-type: none"> <li>standard model</li> <li>rotor/stator with one teeth row each</li> </ul>	<ul style="list-style-type: none"> <li>M-generator model</li> <li>rotor/stator with one teeth row each</li> </ul>	<ul style="list-style-type: none"> <li>W-generator model</li> <li>rotor/stator with one teeth row each</li> </ul>
Ident-No.	11030010	11030026	11030047	11030075	11030077	11030080
Rotor / Stator-Ø	3 / 5.5 mm	5 / 7.5 mm	9 / 12 mm	15 / 20 mm	15 / 20 mm	15 / 20 mm
Speed (max)	30'000 rpm	30'000 rpm	30'000 rpm	28'000 rpm	28'000 rpm	28'000 rpm
Tip Speed (max)	5 m/s	8 m/s	14 m/s	22 m/s	22 m/s	22 m/s
Working Volume (based upon water)	0.1 - 5 ml	0.3 - 10 ml	3 - 250 ml	20 - 2000 ml	20 - 2000 ml	20 - 2000 ml
Applications	<ul style="list-style-type: none"> <li>dispersing of smallest plant, human or animal pieces</li> <li>dissolving of solids</li> <li>extractions</li> </ul>	<ul style="list-style-type: none"> <li>dispersing of cells and tissues in a small amount of liquid</li> <li>dissolving of solids</li> <li>extractions</li> </ul>	<ul style="list-style-type: none"> <li>dispersing of plant, human or animal tissues, resins and pigments</li> <li>dissolving of solids</li> <li>extractions</li> <li>producing of suspensions and emulsions</li> </ul>	<ul style="list-style-type: none"> <li>dispersing of plant, human or animal tissues, resins and pigments</li> <li>dissolving of solids</li> <li>extractions</li> <li>producing of suspensions and emulsions</li> </ul>	<ul style="list-style-type: none"> <li>dispersing and mixing of particles up to 10 mm in size</li> <li>sample preparation for extraction and solution of organic material</li> <li>intensive mixing</li> <li>rotor with knives facilitate the processing of larger cell tissue samples or particles</li> </ul>	<ul style="list-style-type: none"> <li>dispersing of fibrous, stringy and brittle samples (e.g. flesh)</li> </ul>
						

POLYTRON® Dispersing Aggregates

G-generator - working under vacuum/pressure

These special versions are made for working under pressure and vacuum due to the incorporated mechanical seal inside the generator head. Absolutely gas-tight is the other advantage of a mechanical seal. No additional air or gas phase will be mixed into the product – this is very important regarding e.g. emulsions.



M-generator - for pre-cutting coarse material

Dispersing aggregates in M-version have a rotor with a pair of knives. They help dispersing larger and/or tougher samples by precutting the material.



Z-generator - for hard and brittle material

Pills, capsules and hard large grains are broken open and dispersed by the Z-generators in a short time. The special effect is caused by the unique geometry of the generator teeth.



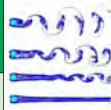
W-generator - for fibrous and stringy material

The preparation of hard and brittle, partially tough and fibrous samples for analysis is often tedious and time consuming work, creating high demands for the user and the equipment. Frozen kernels of grain for example, or field beans, are extremely hard and abrasive; the connective tissue of meat, on the other hand, is very fibrous and tough. The new geometry of the W-generators has solved these problems.



BIOTRONA® generator - High turbulence

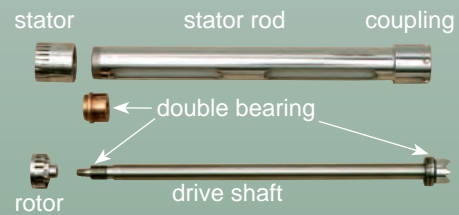
The BIOTRONA® flash blender is designed for special jobs. Thanks to the extremely high turbulence and low shear forces it is excellently suited for fast suspending and dispersing of solids also at higher viscosity.



All POLYTRON® PT-DA dispersing aggregates with coupling type B can be connected to the new quick coupling



All POLYTRON® PTA dispersing aggregates (coupling type A) can be connected by using the optional PT-DA/PTA adapter



disassembled POLYTRON® Dispersing Aggregate



the optional PT-DA / PTA Adapter allows also to connect PTA dispersing aggregates (coupling type A) to the PT 3100 D

PT-DA 30/2ZEC-B250	PT-DA 30/4 TiN EC-B250	PT-DA 36/2EC-B250	PT-DA 36/2WEC-B250	PT-DA 36/4EC-B273	PT-DA 36/4G-B250	PT-DA 36/2BEC-B250
<ul style="list-style-type: none"><li>• Z-generator model</li><li>• rotor/stator with one teeth row each</li></ul>	<ul style="list-style-type: none"><li>• Special TiN model</li><li>• rotor/stator with two teeth rows each, TiN coated</li></ul>	<ul style="list-style-type: none"><li>• standard model</li><li>• rotor/stator with one teeth row each</li></ul>	<ul style="list-style-type: none"><li>• W-generator model</li><li>• rotor/stator with one teeth row each</li></ul>	<ul style="list-style-type: none"><li>• standard model</li><li>• rotor/stator with two teeth rows each</li></ul>	<ul style="list-style-type: none"><li>• G-generator model</li><li>• rotor/stator with two teeth rows each</li></ul>	<ul style="list-style-type: none"><li>• BIOTRONA® model</li><li>• blade rotor and stator with inclined slots</li></ul>
11030112	on request	11030144	11030141	11030147	11030148	12030021
22 / 30 mm	26 / 30 mm	26 / 35 mm	26 / 35 mm	30 / 35 mm	30 / 35 mm	28 / 35 mm
25'000 rpm	22'000 rpm	22'000 rpm	22'000 rpm	19'000 rpm	18'000 rpm	22'000 rpm
29 m/s	30 m/s	30 m/s	30 m/s	30 m/s	28 m/s	38 m/s
100 - 4000 ml	200 - 4000 ml	200 - 4000 ml	200 - 4000 ml	200 - 4500 ml	200 - 4500 ml	500 - 10'000 ml
<ul style="list-style-type: none"><li>• breaking open and dispersing of pills, capsules and hard large grains</li></ul>	<ul style="list-style-type: none"><li>• making fine emulsions and suspensions</li><li>• mixes and reduces highly intensive solids into fluids</li><li>• gasses solutions</li><li>• separates fibres and cellular material into very small particles</li><li>• extractions</li><li>• applications with abrasive components</li></ul>	<ul style="list-style-type: none"><li>• dispersing and mixing of particles up to 15 mm in size</li><li>• sample preparation for extraction and solution of organic material</li><li>• intensive mixing</li></ul>	<ul style="list-style-type: none"><li>• dispersing of fibrous, stringy and brittle samples (e.g. flesh)</li></ul>	<ul style="list-style-type: none"><li>• making fine emulsions and suspensions</li><li>• mixes and reduces highly intensive solids into fluids</li><li>• gasses solutions</li><li>• separates fibres and cellular material into very small particles</li><li>• extractions</li></ul>	<ul style="list-style-type: none"><li>• working under pressure / vacuum</li><li>• making finest emulsions and suspensions</li><li>• mixes and reduces highly intensive solids into fluids</li><li>• gasses solutions</li><li>• separates fibres and cellular material into very small particles</li><li>• extractions</li><li>• prevents foam</li></ul>	<ul style="list-style-type: none"><li>• high turbulent mixing with low shear forces</li><li>• fast dissolving and suspending of solids also at higher viscosity</li></ul>



# Remote Operation of the POLYTRON® PT 3100 D

## Connections



On the back of the PT 3100 D there are connecting ports for:

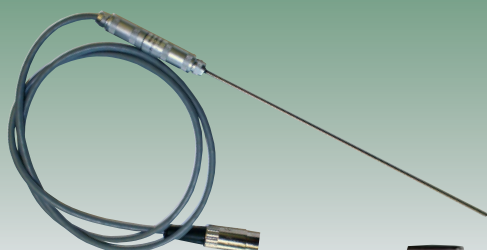
- RS232 interface for remote control via the included interface cable and KINEMATICA software
- the connection of the optional Pt100 temperature probe

## User Interface Software



- Suitable for PC's using MS-Windows 98, ME, 2000, XP, (Vista)
- Possibility of data logging into MS-Excel-sheets for every parameter
- Free programmable Speed-Time-Profiles for automatic operation
- Free programmable temperature limits for use as stopping criteria for avoiding overheating of the product
- Graphical parameter visualization in time-based diagram
- Written parameter visualization in text boxes
- Drive health and status is displayed

## Temp. probe



- Pt 100 temperature probe for temperature range 0 - 120°C
- Temperature is indicated on the display
- If temperature probe is used together with the software, temperature is indicated also on the User Interface, temperature limits can be programmed using the software and temperature will be logged





# Further Equipment & Order information

## Drive Unit



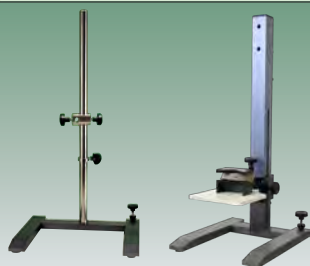
Order No.	Description	
11010120	PT-MR 3100 D, 230V (CH)	Package includes Drive Unit with power supply cable, PC software on CD and RS232 connection cable
11010121	PT-MR 3100 D, 230V (EU)	
11010122	PT-MR 3100 D, 230V (UK)	
11010123	PT-MR 3100 D, 100-120V	
11020050	Temperature probe for PT 3100 D	
11035001	PT-DA / PTA Adapter	

## Dispersing Aggregates



Order Code	Description	Rotor-Ø / Stator-Ø	Coupling Type	Shaft length	new name
Ø 5mm Dispersing Aggregates					
11030010	PT-DA 3005/2EC	3/5.5 mm	B	73 mm	PT-DA 05/2EC-B073
Ø 7mm Dispersing Aggregates					
11030026	PT-DA 3007/2EC	5/7.5 mm	B	98 mm	PT-DA 07/2EC-B098
Ø 12mm Dispersing Aggregates					
11030047	PT-DA 3012/2EC	9/12 mm	B	154 mm	PT-DA 12/2EC-B154
11030049	PT-DA 3012/2MEC	9/12 mm	B	154 mm	PT-DA 12/2MEC-B154
11030061	PT-DA 3012/2WEC	9/12 mm	B	154 mm	PT-DA 12/2WEC-B154
Ø 20mm Dispersing Aggregates					
11030075	PT-DA 3020/2EC	15/20 mm	B	193 mm	PT-DA 20/2EC-B193
11030077	PT-DA 3020/2MEC	15/20 mm	B	193 mm	PT-DA 20/2MEC-B193
11030080	PT-DA 3020/2WEC	15/20 mm	B	193 mm	PT-DA 20/2WEC-B193
Ø 30mm Dispersing Aggregates					
11030101	PT-DA 3030/2EC	22/30 mm	B	250 mm	PT-DA 30/2EC-B250
11030104	PT-DA 3030/2MEC	22/30 mm	B	250 mm	PT-DA 30/2MEC-B250
11030110	PT-DA 3030/2WEC	22/30 mm	B	250 mm	PT-DA 30/2WEC-B250
11030102	PT-DA 3030/2G	22/30 mm	B	250 mm	PT-DA 30/2G-B250
11030112	PT-DA 3030/2ZEC	22/30 mm	B	250 mm	PT-DA 30/2ZEC-B250
11030114	PT-DA 3030/4EC	26/30 mm	B	250 mm	PT-DA 30/4EC-B250
11030115	PT-DA 3030/4G	26/30 mm	B	250 mm	PT-DA 30/4G-B250
Ø 36mm Dispersing Aggregates					
11030144	PT-DA 6036/2EC	26/35 mm	B	250 mm	PT-DA 36/2EC-B250
11030145	PT-DA 6036/2MEC	26/35 mm	B	250 mm	PT-DA 36/2MEC-B250
11030141	PT-DA 6036/2WEC	26/35 mm	B	250 mm	PT-DA 36/2WEC-B250
11030146	PT-DA 6036/2G	26/35 mm	B	273 mm	PT-DA 36/2G-B250
11030147	PT-DA 6036/4EC	30/35 mm	B	250 mm	PT-DA 36/4EC-B250
11030148	PT-DA 6036/4G	30/35 mm	B	273 mm	PT-DA 36/4G-B250
12030021	PT-BIA 6036 EC	28/35 mm	B	250 mm	PT-DA 36/BEC-B250

## Stands



Three different stands are available for ease of work and for carrying:

- The practical PT-ST 3001 of anodized aluminum with its stable H foot and a PTFE coated work table which can be adjusted in height and swung out (on the right).
- The user friendly PT-ST 6002, a telescopic stand with pneumatic springs and 300 mm stroke.
- The economical PT-ST 6003 stand with H foot, a column, two cross sleeves and a vessel holder, all made of stainless steel (on the left)

Order No.	Description
11040025	PT-ST 3001
11040031	PT-ST 6002
11040033	PT-ST 6003

## Dispersing Vessels



### The suitable dispersing vessel

The following overview should help you to find the correct working vessel for your application. We will be pleased to provide you with further information on other vessels and about special designs as well.

Description	Order No.	Dim. (mm) Ø / H	Working Vol.	Model		
GS 15	11050010	30 / 150	35 ml	Clover leaf shaped	Borosilicate glass	top open w/o cover
GS 25	11050011	55 / 150	150 ml			
GS 40	11050012	80 / 200	500 ml			
GS 50	11050013	90 / 250	1000 ml			
GS 60	11050014	100 / 300	1300 ml			
GS 15 K	11050020	30 / 150	35 ml			with screw cap
GS 25 K	11050021	55 / 150	150 ml			glas inlet:
GS 40 K	11050022	80 / 200	500 ml			GS 15K Ø 9 mm
GS 50 K	11050023	90 / 250	1000 ml			GS 25K Ø 25 mm
GS 60 K	11050024	100 / 300	1300 ml			GS 40/50/60K Ø 40 mm
GS 15 KL 7.5	11050030	30 / 150	35 ml	Cylindrical	V2A stainless steel	with screw cap tapered fitting 7.5, 12, 20 or 25 mm glas inlet (as above)
GS 25 KL 12	11050031	55 / 150	150 ml			
GS 25 KL 20	11050032	55 / 150	150 ml			
GS 40 KL 25	11050034	80 / 200	500 ml			
GS 50 KL 25	11050036	90 / 250	1000 ml			
GS 60 KL 25	11050038	100 / 300	1300 ml			
GS 100	11050050	155 / 200	3000 ml			top open with cover
GS 100 Z	11050060	100 / 150	900 ml			
GS 130 Z	11050061	125 / 170	2000 ml			
GS 155 Z	11050062	175 / 190	3500 ml			top open w/o cover

# HOMOGENIZING AND MIXING TECHNOLOGY

**POLYTRON®**  
DISPERSING AND MIXING TECHNOLOGY BY KINEMATICA

**BIOTRONA®**  
DISPERSING AND MIXING TECHNOLOGY BY KINEMATICA

**POLYMIX®**  
DISPERSING AND MIXING TECHNOLOGY BY KINEMATICA

**MEGATRON®**  
DISPERSING AND MIXING TECHNOLOGY BY KINEMATICA

**REACTRON®**  
DISPERSING AND MIXING TECHNOLOGY BY KINEMATICA

A wide range of products with the finest solution for every application, matched by the superior quality of all components make KINEMATICA a world leader for Dispersing and Mixing technology.

## With Keen Eyes ...

Development knows no rest at KINEMATICA. Our systems are constantly upgraded to reflect the state-of-the-art technology and the needs of the market. KINEMATICA has always had a keen eye for major advances, as proven by various patents. The rotor/stator principle for dispersing technology was conceived and developed at KINEMATICA and has become the world standard.

## ... For Your Needs

Applications for Dispersing/Homogenizing Technology are always on the increase. KINEMATICA continually creates new areas of processing applications based on innovations. We do not neglect the human factor as it is exemplified by the safe and comfortable operation and noise reduction of our high-speed systems.

Please, get in touch with us, our local appointed agent or your preferred dealer. We will be pleased to supply more details or arrange a personal demonstration of our POLYTRON® and MEGATRON® systems.

## Headquarters



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Dispersing and Mixing Technology

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**MEGATRON®**  
DISPERSING AND MIXING TECHNOLOGY BY KINEMATICA

Dispersing Technology in the Laboratory  
System MEGATRON® MT 3000 - In-line Homogenizer, HighEnd Line



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Dispersing and Mixing Technology

**POLYTRON®**  
**BIOTRONA®**  
**MEGATRON®**  
**REACTRON®**  
**POLYMIX®**

Dispersing Technology for Laboratory and Pilot Plant  
Batch- and In-line-Dispersing equipment



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Dispersing Technology in the Laboratory



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**POLYMIX®**

Homogenizing and Dispersing Technology  
In-line- und Batch-Prozessoren for Pilot Plant- and Production



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