



# Laboratory and pilot units

Mixing, Drying, Granulating, Coating

Packaging Technology



**BOSCH**

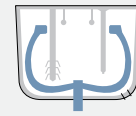
Invented for life



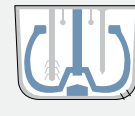
# From start to finish – **only the best**

Maintaining a leading position in process engineering means enhancing the efficiency and economy of processes. This starts with the fluid bed and high-shear mixer granulator systems for laboratory scale applications, which offer the equivalent performance and system features of our production sized equipment. Hüttlin continues this design similarity with the pilot-scale systems, thereby offering the best conditions for successful scale-up.

## Gentlewing high-shear granulation technology



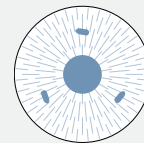
Bottom Drive



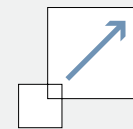
Top Drive

Z-shape  
impeller

## Diskjet fluid bed technology



Diskjet

NexStep  
software

- ← Gentlewing impeller and Diskjet process gas distributor plate with the bottom-mounted three-component nozzle for all system sizes
- ← Ideal for product transfer due to the modular design. Allowing the use of optional top spray nozzle and sieve bottoms as well as other models of impellers
- ← Accurate support during transfer from lab to production size with the innovative NexStep scale-up software

### Gentlewing

- ▶ Maximum mixing quality with minimum mechanical stress on the product
- ▶ Minimal wall caking due to very close clearances between the product vessel and Gentlewing
- ▶ Excellent discharge due to the Z-design of the Gentlewing impeller
- ▶ Effective drying without tilting or microwave technology

### SmartFlow

- ▶ Highly-efficient gas distribution over 360° leads to better drying homogeneity
- ▶ Shorter drying times due to continuous, effective strip gas feeding

### Discharge valve

- ▶ The discharge valve design enables uninterrupted discharge, as the discharge velocity is not controlled by means of the valve, but by extremely low impeller speed



## Exceeding expectations with innovative solutions

When it comes to extremely homogeneous mixing results, granules of the highest quality and top performance of production with short drying times, Hüttlin offers the right solution. With the Gentlewing bottom or top drive options, mixing and granulating enter new dimensions.

The Hüttlin high-shear mixer granulator with bottom drive is the best choice for typical granulation applications in combination with a fluid bed dryer.

The top-drive version satisfies the highest of demands. UltraClean, SmartFlow, heating and vacuum unit with solvent recovery allow to extend the HTG up to a SinglePot unit or a high-containment unit.



# Mycromix – Batch sizes ranging from 0.1 to 3.75 kg\*

- ▶ Bottom Drive
- ▶ Exchangeable container
- ▶ Gentlewing
- ▶ Chopper
- ▶ For organic processes – option



\* at density 0.5 kg/l

The smallest high-shear mixer granulator with bottom drive and manual control system. The ideal solution for all laboratories in combination with the Mycrolab.

<b>Mycromix</b>	
Container volume (litres)	0.5 / 1.0 / 2.5 / 5.0 / 10.0
Length (mm)	614
Width (mm)	632
Height (mm)	772
Electronic connection (kW)	2.5

Technical specifications are subject to change without notice



Left:  
Exchangeable  
Mycromix container

Right:  
Mycromix change  
mechanism



## Unymix SinglePot – Batch sizes ranging from 1 to 3.4 kg\*



- ▶ Top Drive
- ▶ SinglePot
- ▶ Gentlewing

\* at density 0.5 kg/l

The high-quality top drive concept is realized in this high-shear mixer granulator. Reliable data for production can be collected even with batch sizes up to 3 kg. Unilab, the multi-purpose laboratory fluid bed, complements this device.

<b>Unymix SinglePot</b>	
Container volume (litres)	9.0
Length (mm)	1050
Width (mm)	906
Height (mm)	1103
Exit height (mm)	430
Electronic connection (kW)	4

Technical specifications are subject to change without notice

Unymix container opened





# Pilotmix – Batch sizes ranging from 3.5 to 56 kg\*

Top or bottom drive: You decide which drive concept best meets your requirements. Either as a small production unit or as a step between laboratory and production, this product line offers all advantages and features that are otherwise only available in

production scale. This applies also to the new UltraClean CIP concept and the option of modular extension up to the SinglePot version. Another ideal feature is the inline solution with the Pilotlab as a dryer.

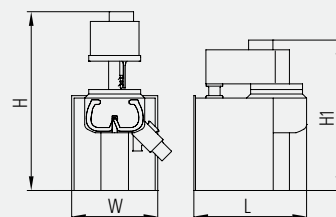
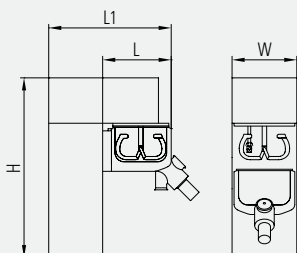
- ▶ Top Drive, Bottom Drive
- ▶ UltraClean design – option
- ▶ SinglePot – option for Top Drive



\* at density 0.5 kg/l

	25	75	100	150
<b>Pilotmix</b>	T	T	B	T
Nominal size	25	75	100	150
Total volume (litres)	25	75	100	150
Electronic connection (kW) P <sub>tot</sub> @50 Hz	8	13	13	16
Length L1 (mm)	1000	1450	-	1800
Length L (up to wall; mm)	530	715	1450	740
Width W (mm)	700	820	1100	820
Height H1 (mm)**	-	-	2200	-
Height H (mm)**	1800	2250	2540	2450

\*\* depending on discharge container respectively discharge unit; Technical specifications are subject to change without notice



Left:  
Pilotmix T

Right:  
Pilotmix B

# SinglePot – Drying kept simple

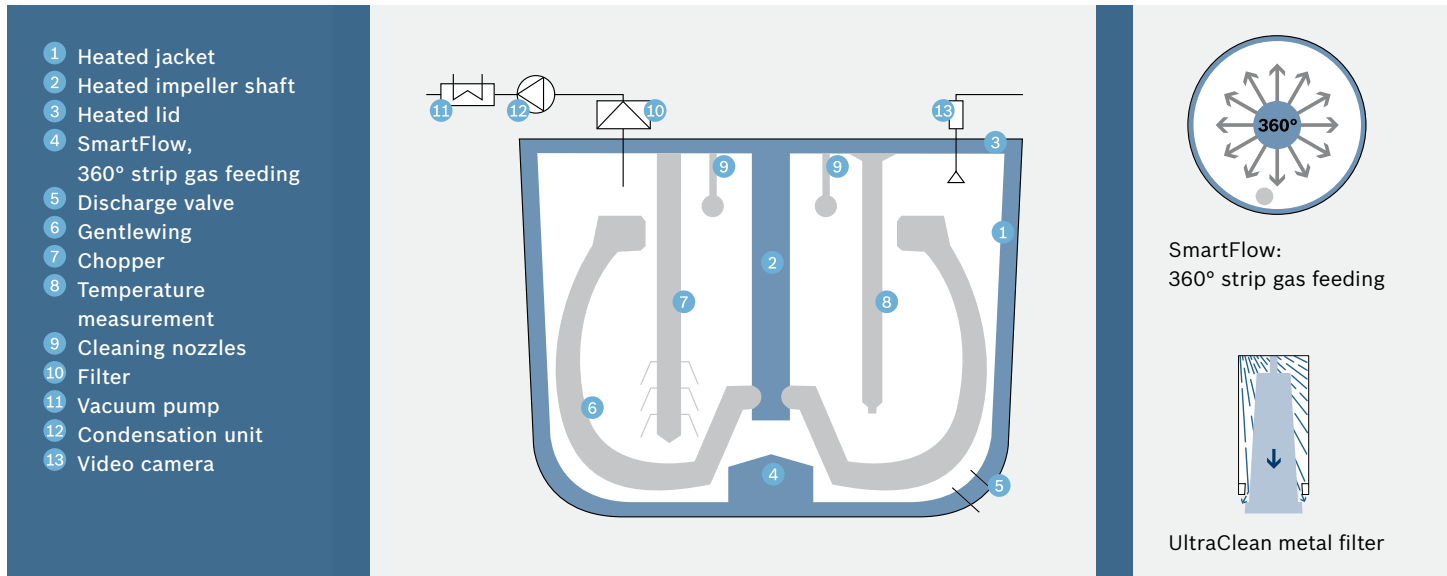
- ← Batch sizes ranging from 1 to 50 kg
- ← Top Drive
- ← SmartFlow
- ← Heating for product container, lid, filter, and optionally shaft
- ← UltraClean design – option
- ← Solvent recovery – option
- ← Containment design – option

The Hüttlin SinglePot high-shear mixer granulators combine all the advantages of the top-drive design with the specific features of SmartFlow, UltraClean, product heating and vacuum drying with solvent recovery system. This concept meets the highest demands regarding process times, process quality and handling.

The Gentlewing along with the SmartFlow continuous strip gas feeding system replaces expensive, high-maintenance

accessories such as tilting options or microwave technology with short drying times.

The wall installation enables true separation of the GMP and technical areas. All drives and supply lines can be serviced without having to enter the GMP area. Combined with the UltraClean (pat. pend.) concept, it provides a high-containment system which meets the very latest demands.



## SinglePot

- ▶ Excellent drying times without complicated concepts such as tilting or microwave technology
- ▶ Containment ready with only minimal additional features

## SmartFlow

- ▶ Highly efficient gas distribution over 360° for considerably higher drying homogeneity
- ▶ Shorter drying times due to continuous, effective strip gas feeding

## Discharge valve

- ▶ The discharge valve design enables uninterrupted discharge, as the discharge velocity is not controlled by means of the valve opening, but by extremely low impeller speed

## UltraClean (pat. pend.)

- ▶ The first CIP concept, which significantly reduces cleaning times and ensures highest cleaning

## UltraClean (pat. pend.) – This is how CIP works

- ← Top Drive, Bottom Drive, SinglePot
- ← Metal filter
- ← CIP Cleaning

CIP (Cleaning in Place) is only achieved in many of today’s systems at the price of extremely long cleaning times, mainly caused by the slow drainage of the cleaning medium through the fine metal filter mesh.

With UltraClean, Hüttlin offers a concept, which significantly reduces cleaning times while ensuring perfect cleaning

results. The newly developed metal filters with opening mechanism enable actual draining of the clean gas side and fast drying.

Combined with retractable cleaning system and the GMP-compliant design of all Hüttlin devices, the UltraClean version ensures fast and efficient CIP cleaning, which is also affordable.

## Product overview / dimensions

	High-shear mixing and granulation technology		Fluid bed technology
	Bottom Drive	Top Drive	Dryer, Granulator, Coater
<b>Lab</b>	Mycromix	Unymix	Mycrolab Unilab S Unilab M
<b>Pilot</b>	Pilotmix 75B *	Pilotmix 25T * Pilotmix 75T * Pilotmix 100T * Pilotmix 150T *	Unilab L * Pilotlab S * Pilotlab L *
<b>UltraClean</b>	Pilotmix 75B <sup>UltraClean</sup> * Pilotmix 100B <sup>UltraClean</sup> * Pilotmix 150B <sup>UltraClean</sup> *	Pilotmix 25T <sup>UltraClean</sup> * Pilotmix 75T <sup>UltraClean</sup> * Pilotmix 100T <sup>UltraClean</sup> * Pilotmix 150T <sup>UltraClean</sup> *	Pilotlab S <sup>UltraClean</sup> * Pilotlab L <sup>UltraClean</sup> *
<b>SinglePot</b>	SinglePot 10 SinglePot 25 SinglePot 75 SinglePot 150	SinglePot 10 <sup>UltraClean</sup> SinglePot 25 <sup>UltraClean</sup> SinglePot 75 <sup>UltraClean</sup> SinglePot 150 <sup>UltraClean</sup>	

\* Can be configured as a granulation line; Technical specifications are subject to change without notice







## Only a technological leader creates **innovative solutions**

The higher your requirements for drying, granulation and coating/layering are, the more you benefit from the Hüttlin fluid bed technology. The spraying system with the three-component nozzle generates homogeneous granules and excellent coating. The patented process gas distributor plate prevents adhesion of the product and offers the best conditions for reliable and reproducible processes.

### **Diskjet**

- ▶ Homogeneous airflow ensures optimum exchange of substance and energy, the tangential air outlet puts less strain on the filter system
- ▶ Best product mixing results due to controlled and uniform process air distribution
- ▶ Process times can be significantly reduced

### **Three-component nozzle**

- ▶ Extremely low spraying losses due to the spray nozzle arrangement
- ▶ Homogeneous granulates, after-treatment with a sieve mill is no longer necessary
- ▶ Excellent coating quality and gentle handling of the product during coating
- ▶ Very short granulation and coating times

### **Dynamic filter**

- ▶ Continuous filter cleaning speedily re-routes the particles to the process
- ▶ Various filter materials can be selected to suit the respective processes

### **NexStep**

- ▶ Process development and optimization in the laboratory scale and reliably applied in the production scale via NexStep
- ▶ Scale-up without intermediate steps

## Solidlab 1 – With fluid bed, coating and mixing module, batch sizes ranging from 0.05 to 2 kg\*

- ▶ Powder mixer:  
Mixing batches ranging from 0.05 to 2 kg
- ▶ Fluid bed:  
Diskjet with bottom spray (1 nozzle)
- ▶ Perforated drum coater (1 nozzle)
- ▶ Control CFR compatible



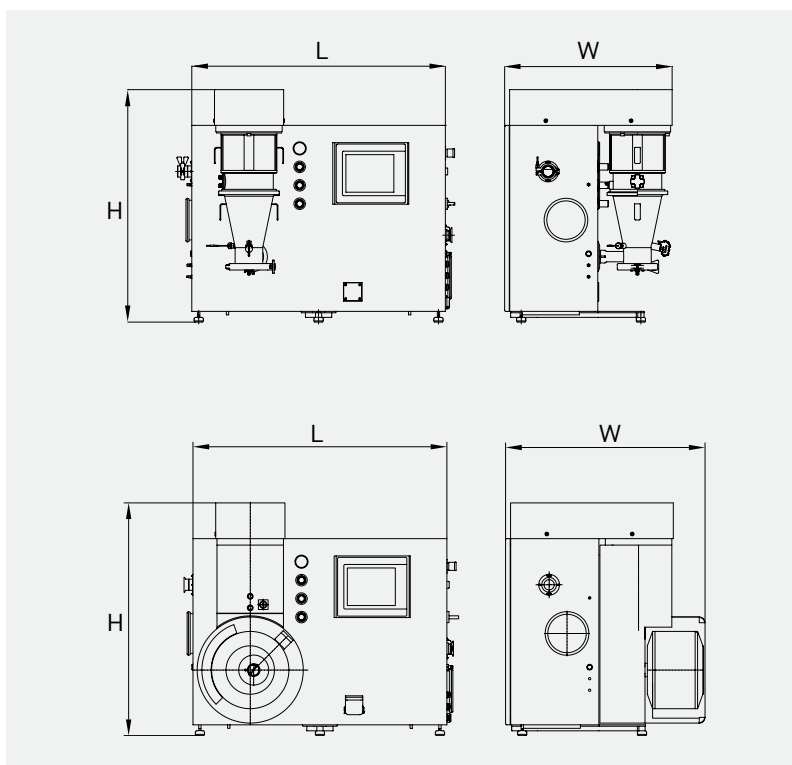
\* depending on density

The fluid bed has the same structure as a full-fledged production system. Optimum fresh air distribution and toroidal product movement, which is ensured by the Diskjet diffusion bottom, ensure that the fluidized bed is homogeneous. The bottom sprayer system with its process robust tri-material nozzle warrants optimum coatings. It can also be equipped with top spray and sift bottom.

The drum shaped coater has a fully perforated drum with a high amount of available perforated surface and guided air stream straight through the tablet bed and through a special exhaust air plenum chamber. Particular emphasis was placed

on the scale-up options of this system. The nozzle system can be set up to accommodate any batch size and warrants the absolutely consistent application of the spraying liquid. Consequently, users can count on short processing times paired with high yields and optimum quality.

The module for powder mixing consists of a square container, which is mounted in an eccentric manner in open drum form. This mixing principle can also be used to achieve very high mixing qualities even if small amounts of mixing ingredients are being used.



Top:  
Solidlab 1 with  
fluid bed

Bottom:  
Solidlab 1 with  
drum shaped  
coater insert

	Small container	Large container
<b>Solidlab 1</b>		
Container volume (liters)		
Fluid bed	3.8	5.2
Coater	3.5	7.0
Air stream (m <sup>3</sup> /h)	40	60
Differential pressure (Pa)	10 000	10 000
Heating capacity (kW)	2	2
Compr. air cons. (Nm <sup>3</sup> /h@6 bar)	65	65
Number of spray nozzles	1	1
Electric connection (kW)	2.1	2.1
Dimensions (L x W x H)	1000 x 824 x 1202	1000 x 824 x 1202
Weight (kg)		
Fluid bed	150	150
Coater	170	170

Technical specifications are subject to change without notice



Left:  
Drum shaped  
coater insert

Right:  
Insert opened

## Unilab – Batch sizes ranging from 0.2 to 12 kg\*

- ▶ Mobile unit with operating panel
- ▶ Process air equipment and circuit cabinet with integrated PLC for separate installation

\* at density 0.5 kg/l

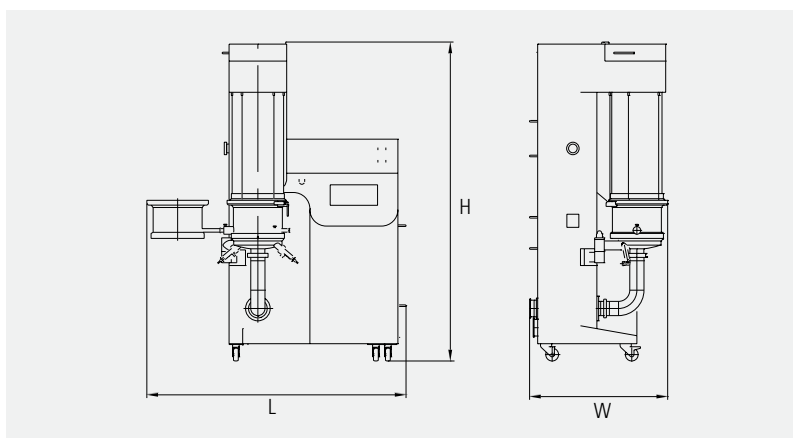


This multi-purpose laboratory device provides you with reliable and reproducible results. The unique NexStep scale-up software enables

scale-up to any production plant. The multi-purpose Unymix laboratory mixer/granulator complements this device.



- From left to right:
- ▶ Filling by suction
  - ▶ Open product container
  - ▶ Pneumatic discharging system



	Container S	Container M	Container L
<b>Unilab</b>			
Container volume (litres)	7.5	13.4	26.5
Air flow (m <sup>3</sup> /h)	300	450	450
Differential pressure (Pa)	12000	12000	12000
Heating capacity (kW)	18	18	18
Steam cons. (kg/h @ 3 bar)	36	36	36
Compr. air cons. (Nm <sup>3</sup> /h @ 6 bar)	55	55	55
Number of spray nozzles	2	2	2
Electric connection (kW)	30	30	30
Dimensions (swivelled out) L x W x H (mm)	1660 x 870 x 1990	1660 x 870 x 1990	1660 x 870 x 1990
Weight of Unilab (kg)	500	500	510
Weight of air handling (kg) incl. fan and controller	800	800	800

Technical specifications are subject to change without notice



## Pilotlab – Batch sizes ranging from 4 to 50 kg\*

The Pilotlab can be used as a small-size production unit or as an intermediate step from laboratory towards production. The reduction kit assures highest

flexibility to the Pilotlab, ranging from 4 to 50 kg. Another ideal feature is the inline solution with the Pilotmix high-shear mixer/granulator.

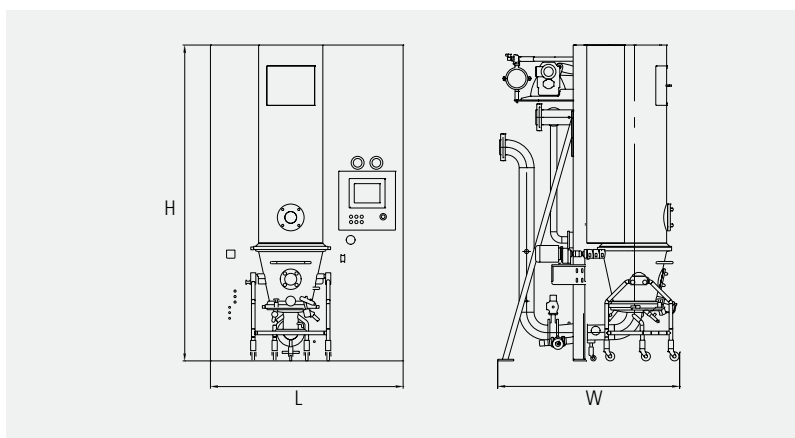
- ▶ 10 bar shock-resistant as standard
- ▶ Process air equipment and circuit cabinet with integrated PLC for separate installation

\* at density 0.5 kg/l



- From left to right:
- ▶ Dynamic filter lowered
  - ▶ Container can be swivelled
  - ▶ Pneumatic discharging system





	S	L
<b>Pilotlab</b>		
Container volume (litres)	75	100
Air flow (m <sup>3</sup> /h)	500	1000
Differential pressure (Pa)	16000	16000
Heating capacity (kW) ( $\Delta t_{\max} = 75^{\circ}\text{C}$ )	35	35
Steam cons. (kg/h @ 3 bar)	59	59
Compr. air cons. (Nm <sup>3</sup> /h @ 6 bar)	130	150
Number of spray nozzles	2	3
Electric connection (kW)	30	30
Dimensions (swivelled out) L x W x H (mm)	2000 x 1840 x 2950	2000 x 1840 x 2950
Weight of Pilotlab (kg)	1400	1400
Weight of air handling (kg)	555	550
Weight of fan (kg)	500	500
Weight of controller (kg)	380	380

Technical specifications are subject to change without notice



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