IKA

designed to work perfectly

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COST-EFFICIENT BATCH MIXING PLANT

Standard Production Plant SPP

Standard Production Plant SPP

/// Cost-efficient batch mixing plant

The approved "Standard Production Plant" SPP is the IKA solution for the processing of emulsions and suspensions in many fields of application. It is available in 8 sizes ranging from 25 to 4,000 liters capacity.

The SPP is an innovative and highly advanced, yet cost efficient mixing plant used for all standard process operations such as mixing, stirring, homogenizing and dispersing. Due to its unique geometry, the plant is easy to operate and can be placed even in rooms with low ceiling height. Advanced mixing equipment guarantees a constant product quality. Options like vacuum degassing, double jacket for heating or cooling and ports for the additive incorporation and sampling make the SPP an ideal machine for the complete product manufacturing sequence.

Flexible and easy to customize to the specific application, the SPP can be used for cosmetic creams and lotions in the cosmetic and pharma industry, for mayonnaise or dressings in the food industry, for suspensions and emulsions in the chemical industry as well as for production of paints and lacquers.

SPP Components

/// Mixing plant in an economical and flexible design

Small minimum volume: approx. 30 % of maximum capacity!

1 Vessel cover
The Standard Production Plant is available with tilting devices for the vessel cover. The smaller plant sizes up to SPP 100 are manually operated. For the bigger sizes an electrical spindle drive serves for the easy and comfortable opening of the cover.

2 Funnel
Open or closed hoppers for the incorporation of solid and liquid ingredients.

3 Dispersing machine
High capacity dispersing machine guaratees high quality and stable emulsions and suspensions.

4 Circulation Loop
Increased diameter pipeline with 2-way butterfly valves and clamp connections.

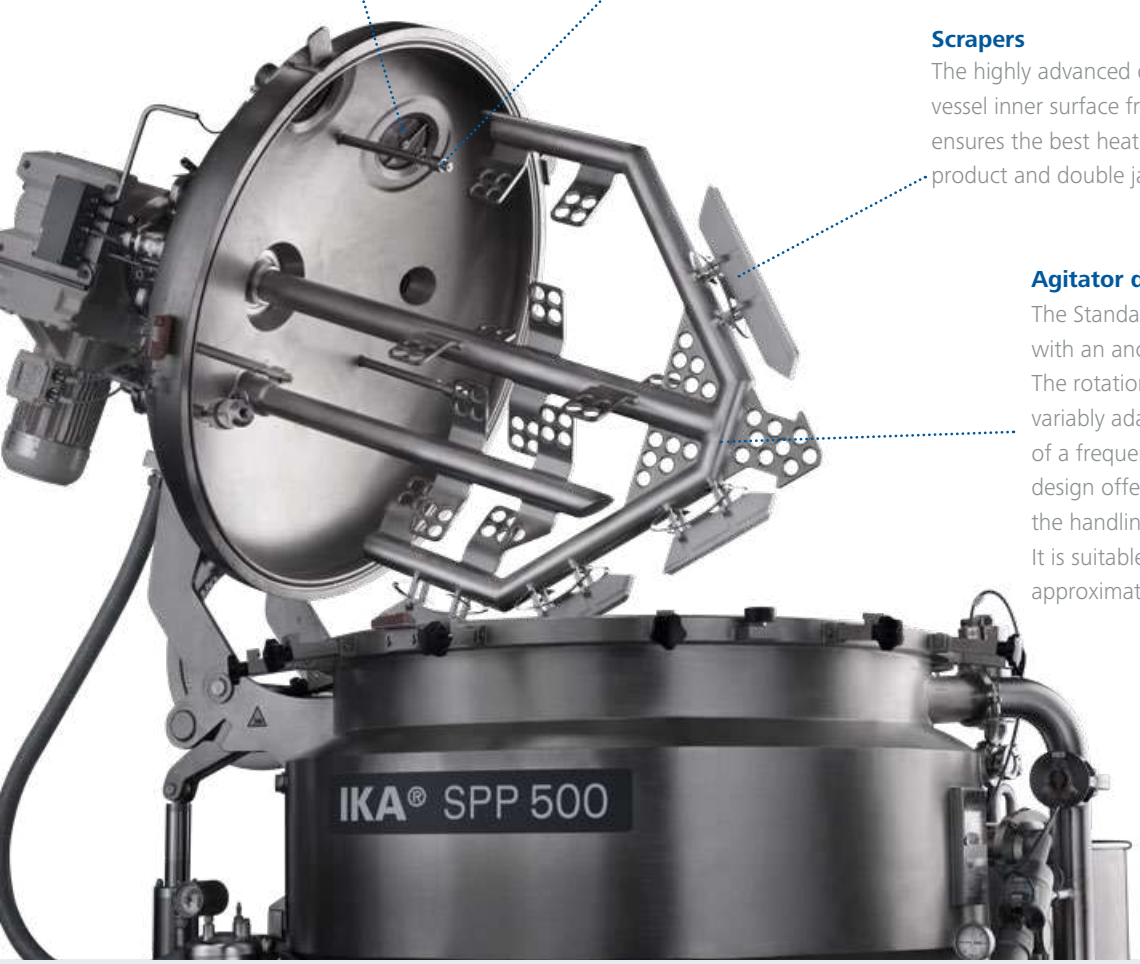
5 Mixing vessel
The unique shape with the conical bottom ensures complete discharge of the final product.

Inspection
Two sight glasses with mounted vessel lamp make it possible to observe the process in the mixing vessel.

CIP-cleaning
Three spray nozzles in the vessel lid ensure a thorough cleaning without dead spots or shadow areas. Sufficient pressure and high throughput, to feed the spray nozzles, is supplied by the dispersing machine DBI. There is no need for an additional CIP pump.

Scrapers
The highly advanced design keeps the vessel inner surface free from scaling and ensures the best heat transfer between product and double jacket.

Agitator design
The Standard Production Plant is equipped with an anchor stirrer and flow breaker. The rotational speed can optionally be variably adapted to the process by means of a frequency converter. The special design offers significant advantages for the handling of different viscosities. It is suitable for viscosities up to approximately 100,000 mPas.



Compact Design
Due to its unique vessel geometry the IKA Standard Production Plant is distinguished by its extremely low constructional height. Additionally, the unit is very compact and suitable for sites with limited space availability. As an option the vessel cover can be opened by means of a simple and oil free tilting device, thus enabling easy access to the vessel inner parts for all maintenance work or visual checks with a minimum space requirement.

Inline Disperser DBI 2000

/// High shear mixing and dispersing machine

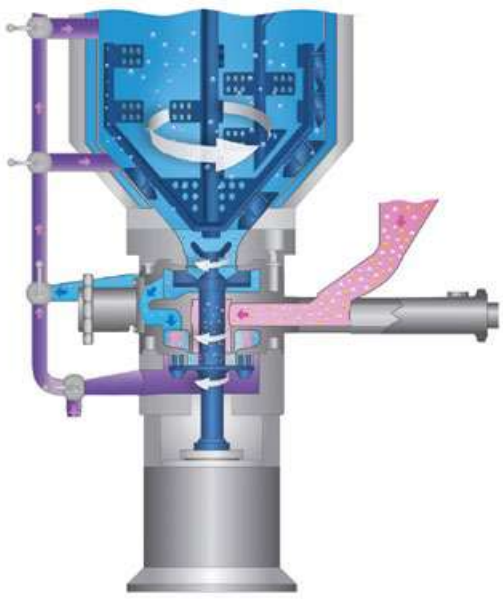
The DBI 2000 is the heart of the Standard Production Plant. Its innovative technical concept enables better process data and reduced processing times at optimum dispersing quality in a wide viscosity range.

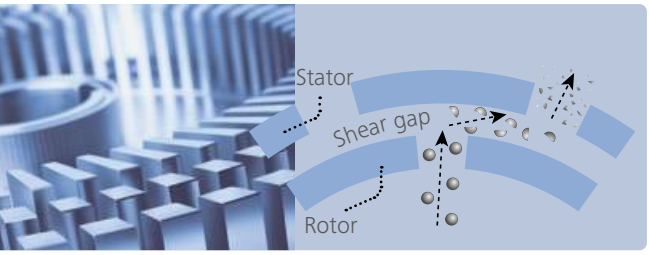
The high shear mixing and dispersing machine DBI 2000 is designed for the batch operation with a recirculating loop. It is directly flange connected to the vessel outlet with a big cross section and pumps the product back into the vessel. The DBI 2000 enables suction, pumping, dispersing and self-cleaning under CIP conditions.

The machine has a patented two-stage design. Depending on the process requirement the operator can select whether to use only the upper or both stages. The first stage of the DBI 2000 is equipped with a mixing blade that creates turbulence in the vessel outlet. The special pump rotor produces high circulation capacities, even for high viscosity products. The second stage of the dispersing machine DBI 2000 is equipped with a rotor-stator combination that ensures homogenous results and a narrow particle size distribution. Using vacuum, additives are directly fed into this high turbulence dispersing area, which eliminates the disadvantages of conventional mixing processes.

Patented design for challenging processes

The DBI 2000 can also be integrated in an existing system or process to replace older and inefficient inline machines. Our engineers would be pleased to advise on this possibility.





Rotor-Stator-System: The best in dispersing technology

Patented pump and dispersion unit

This unique system combines high flow circulation, even particle size reduction and effective homogenization. Solid and liquid additives are fed directly into the dispersion chamber, which prevents lump formation and promotes rapid processing. During cleaning in place (CIP) the DBI pump stage supplies cleaning fluid in a high flow rate to the self-rotating spray nozzles and other system components.

Advantages

> Free selection pumping only or additional high shear dispersing
> Direct feeding of solid and liquid additives
> Effective dispersing with exchangeable tool designs
> No additional pumps required for product circulation, CIP or discharge
> The innovative design ensures shorter processing times and optimum dispersing quality

The budget homogenizer

For more simple homogenizing and dispersing tasks the SPP can be also connected to a single stage unit type **UTL 1000** as an alternative to the DBI.

Customization:
IKA plants & accessories are adapted to your requirements

SPP: Accessories

/// Dosing of additives

Optional dosing funnels

Various dosing funnels are available in different forms and sizes. They enable separate feeding of solid and liquid additives directly into the dispersing chamber for easy wetting of difficult ingredients. Due to its high flow rate the DBI 2000 creates a vacuum which sucks in the funnel content. For difficult conditions the function can be boosted with additional vacuum in the vessel. This advanced feeding method prevents floating of powders on the liquid surface and eliminates buildup on the vessel walls and agitator shaft.

Supply funnels as well as side vessels can be equipped with stirrers, in the event your additives require premixing.

Mobile or fixed side vessels

for solids and liquids incorporation that can be delivered with different volumes.

Buffer tanks

available with or without agitator, double jacket and temperature control function for storage of your intermediate or final product.

Formation of lumps is reliably prevented by direct feeding of the additives into the dispersing chamber.

The complete plant can also be supplied in Ex-protected execution acc. to the **2014/34/EU ATEX guidelines**

/// Direct steam injection into the circulation loop is available as an option

SPP Control system

/// Electronic control unit

The electronic control unit is designed to meet customer requirements. It can be a version with the simple on/ off button or another version, up to the most advanced PLC-Version with full visualization and touch screen. Manual operation or a fully automatic recipe control system are the choices for operating the machine.

Typical control functions are as follows:

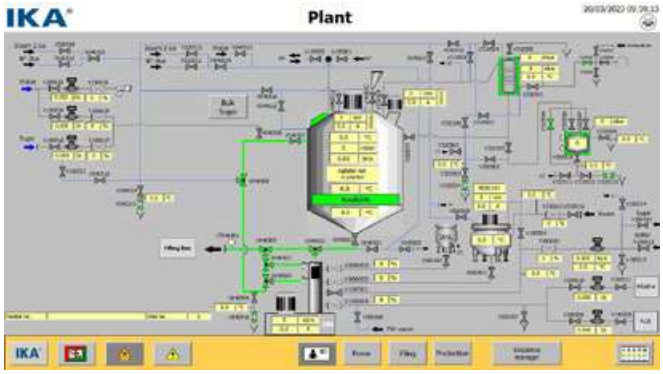
> Display of all set and actual values
> Setting and monitoring of limit value
> Recipe management system
> Process data storage and display (trend indicator)
> Safety interlocks

Manage and save your recipes

The recipe management system uses a flow diagram, where the individual process stages can be selected as a sequence and parameter set step by step. Afterwards the complete process can be stored as a recipe and recalled for the next production.

Advantages

> Fully automated, user-friendly operation
> Stirrer and dispersion device with speed control



SPP - Products and Industries

/// Typical applications for the Standard Production Plant

This SPP mixing plant can be used for the production of solutions, emulsions and suspensions in many applications. Due to its advanced design it can handle products that range from low viscosity up to a paste like condition.

Depending on its execution the IKA Standard Production Plant can be used for the manufacturing of cosmetic cream and lotions, for mayonnaise or dressings in the food industry as well as for suspensions and emulsions in the chemical industry or for production of paints and lacquers.

Based on our long experience with many applications IKA is your competent partner for processing plants. In order to select the best configuration for your specific application, our test facility is staffed with experienced application engineers. It is equipped with a wide range of laboratory and pilot equipment to qualify the appropriate equipment for applications.

Cosmetics

> Creams
> Sun protection products
> Perfumes
> Shaving cream
> Decorative cosmetics
> Shampoo
> Body-care products
> Conditioners
> Hand washing paste
> Liquid soap
> Tooth paste
> Collagen suspensions
> Carbopol emulsions

Beverages

> Fruit juices
> Vegetable juices
> Milkshakes
> Protein drinks
> Liqueurs
> Sugar solutions
> Flavours

Food

> Sauces
> Dressings
> Mayonnaise
> Ketchup
> Liquid spices
> Spread cheese
> Ready meals
> Baby food
> Jams
> Pet food
> Starch solutions
> Alginate

Pharmaceutical industries

> Ointments
> Gels
> Eye drops
> Eye ointments
> Cough mixtures
> Infusion solutions
> Sugar/salt solutions
> Suppository masses
> Coatings
> Lotions
> Paraffin emulsions
> Lipid emulsions
> Antiseptics
> Serums
> Vaccines

Chemical Industry

> Cleaning agents
> Polishing agents
> Sliding agents
> Lubricants
> Hotmelt adhesives
> Corrosion protection agents
> Wax emulsions
> Ceramic suspensions
> Polymer emulsions
> Silicone emulsions
> TiO2 suspensions
> Colloidal solutions
> Catalyst suspensions
> Impregnating agents
> Pesticides
> Fungicides

SPP - Application example

/// Mayonnaise production

Sauces to suit every taste – based on this concept, IKA application engineers have developed a versatile processing plant for the production of a range of different sauces, such as mayonnaise or ketchup. Mayonnaise is a popular condiment that consists of oil, water and egg yolk. Different countries have various recipe requirements for the designation of a product such as mayonnaise. In the EU member states, mayonnaise must have a total fat content of at least 70 % and an egg yolk content of at least 5 %. Under German delicatessen industry guidelines, salad mayonnaise must have an oil content of at least 50 %. Variations available on the market include mustard mayonnaise, tomato mayonnaise, as well as remoulades and various low calorie salad creams and dressings.

All such sauces are oil-in-water emulsions. An appropriate quantity of hydrophilic emulsifier must be added to prevent the phases from separating.

In the case of mayonnaise type sauces, egg yolk, milk protein or vegetarian emulsifiers are generally used for this purpose. The emulsion is stabilized and the viscosity of the final product is adjusted using hydrocolloids and starches. A properly balanced recipe produces the desired mouthfeel and optimum structure.

The incorporation of additives is not sufficient to produce a high quality emulsion. Most importantly, the oil phase must be broken down into very fine droplets — just one of the requirements the IKA process is able to satisfy very rapidly. As the IKA plant can be used to prepare products with a wide viscosity range, it is ideal for manufacturing most types of sauces.

The SPP includes all components necessary for the preparation of excellent mayonnaise, ketchup and sauces. **For example, the SPP 500 can produce 500 liters of mayonnaise in just 5 minutes - this includes the addition of raw materials, emulsification and product discharge!**

REPEATEDLY CONFIRMED

The SPP is an excellent plant for the production of mayonnaise, ketchup and many other products!

SPP - Scale-up

/// Develop – Optimize – Scale-up
from laboratory to production scale

When new products are developed the processes are initially tested in laboratory equipment. Trials in small scale are also used for changes in recipes or ingredients. The magic PLANT is specifically designed to test process and product conditions in an accurate small-scale simulation. Once a satisfactory product is obtained at the pilot scale, the next step is to transfer the manufacturing process to the full-scale production. For reliable scale-up to production sizes, pilot plants with a capacity of 25 l (SPP 25) or 50 l (SPP 50) are the ideal choice.

The use of the same plant design and dispersion principle ensures identical operation and provides an easy scale-up. Every size of the SPP produces the same constant product quality.

magic PLANT: The most versatile laboratory reactor

IKA magic PLANT is the ideal laboratory scale process plant. This system is used for batch mixing, homogenizing, emulsifying and suspending for capacities of up to 2 liters. Independent from the product — the magic PLANT delivers a seamless process transition from product development to production.

Advantages

> Modular design with exchangeable tools
> Speed control
> Process simulation in smallest scale

SCALE-UP

Simplified scale-up by identical dispersing parameters for all sizes

Standard Production Plant

/// Technical Data

Technical Data	SPP 25	SPP 50	SPP 100	SPP 250	SPP 500	SPP 1000	SPP 2000
Mixing vessel							
Min. useable volume [l]	8	15	30	75	150	300	600
Max. useable volume [l]	25	50	100	250	500	1.000	2,000
Agitator							
Type	RFG-01	RFG-02	RFG-03	RFG-04	RFG-05	RFG-06	RFG-07
Anchor Stirrer [rpm]	22 bis 66	18 bis 54	14 bis 43	11 bis 32	8 bis 26	7 bis 20	6 bis 17
Drive power [kW]	0,37	0,55	0,75	1,1	1,5	3	4
Dispersing machine							
Type	DBI 2000/4	DBI 2000/4	DBI 2000/5	DBI 2000/5	DBI 2000/10	DBI 2000/10	DBI 2000/20
Drive power [kW]	4	4	7,5	7,5	22	22	45
Alternatively:							
Dispersing machine							
Type	–	–	UTL 1000/10	UTL 1000/10	UTL 1000/10	UTL 1000/20	UTL 1000/20
Drive power [kW]	–	–	7,5	7,5	7,5	22	22
Dimensions (Agitator)							
Height (closed cover) [mm]	1.350	1.450	1.750	2.000	2.800	3.100	3.750
Height (open cover) [mm]	1.500	1.650	2.000	2.500	3.200	3.800	4.625
Width (open cover) [mm]	1.070	1.340	1.370	1.820	2.080	2.935	3.500
Depth [mm]	800	950	1.080	1.150	1.350	1.770	2.200

SPP 25

SPP 250

SPP 500

DBI Technical Data	DBI 2000/4	DBI 2000/5	DBI 2000/10	DBI 2000/20
Recommended vessel size [l]	10 – 50	50 – 250	250 – 1.000	1.000 – 5.000
Motor Power [kW]	4	7.5	22	45
Max. Total flow rate dispersing [l/h]	2,000	5.000	20.000	45.000
Max. Total flow rate pumping [l/h]	6.000	15.000	40.000	80.000
Max. viscosity final product [mPas]	100.000	100.000	100.000	100.000

SPP 4000
1,200
4,000
RFG-08
4 bis 13
7,5
DBI 2000/20
45
UTL 1000/20
22
4.260
–
2.600
2.600

SPP 4000

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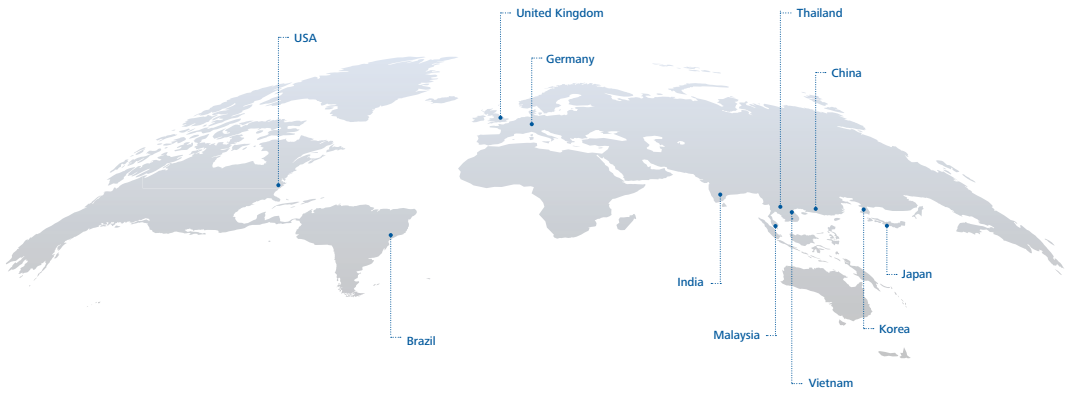

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