Standard Production Plant SPP

German technology
made in the USA
Proven and precise technology at its best

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. Its simple design ensures an easy operation with low space requirements, especially in height. Advanced mixing equipment guarantees a constant product quality. Options such as 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 e. g. 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.

For more information please visit www.ikausa.com
The IKA® Standard Production Plant is a highly modern, yet cost-efficient mixing plant for all basic operations requiring mixing and dispersing technology. IKA® Standard Production Plant is available in 8 sizes with volumes ranging from 25 liters up to 4,000 liters.

**Components**

**Vessel cover**
The Standard Production Plant is available with a lifting device for the vessel cover. The smaller plant sizes up to SPP 250 are manually operated. For the bigger sizes, an electrical spindle drive serves for the easy and comfortable opening of the cover.

**Dispersing machine**
High capacity dispersing machine guarantees high-quality stable emulsions and suspensions.

**Funnel**
For incorporation of solid and liquid ingredients.

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

**Circulation Loop**
Large dimensioned pipeline with 2-way butterfly valves and sanitary clamp connections.
**Scrapers**
The highly advanced design keeps the vessel’s inner surface free from scaling and ensures the best heat transfer between the product and double jacket.

**CIP-cleaning**
Three spray nozzles in the vessel lid ensure a thorough cleaning without dead spots or shadow areas. Sufficient pressure and outstanding throughput to feed the spray nozzles is supplied by the dispersing machine DBI. This eliminates the need for an additional CIP-pump.

**Inspection**
Two sight glasses and a light in the vessel cover illuminate the vessel and enable the observation of the process inside.

**Agitator design**
The Standard Production Plant is equipped with an anchor stirrer and flow breaker that can be used with a frequency converter, which is optionally available. The special design offers significant advantages for the handling of different viscosities. It is suitable for viscosities up to approximately 100,000 cps.

**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.

**Perfection in detail: Mixing plant in an economical and flexible design**
The DBI 2000 is the heart of the Standard Production Plant. Its innovative technical design enables better process data and reduced processing times at optimum dispersing quality over 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 has a stirring device that creates turbulence in the vessel. The special pump rotor operates with 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 homogeneous 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 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.

- 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 and discharge
- The innovative design ensures shorter processing times and optimum dispersing quality

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.

Patented design for challenging processes

The DBI 2000 can be also connected to a single stage unit type UTL 1000 as an alternative to the DBI.
### SPP | Technical data

<table>
<thead>
<tr>
<th>SPP</th>
<th>SPP 25</th>
<th>SPP 50</th>
<th>SPP 100</th>
<th>SPP 250</th>
<th>SPP 500</th>
<th>SPP 1000</th>
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<tbody>
<tr>
<td>Mixing vessel</td>
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<td>Min. usable volume [l]</td>
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<td>15</td>
<td>25</td>
<td>50</td>
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<td></td>
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<tr>
<td>Max. usable volume [l]</td>
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<td>50</td>
<td>100</td>
<td>250</td>
<td>150</td>
<td>300</td>
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<td>Agitator</td>
<td></td>
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<td></td>
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<td>Type</td>
<td>RFG-01</td>
<td>RFG-02</td>
<td>RFG-03</td>
<td>RFG-04</td>
<td>RFG-05</td>
<td>RFG-06</td>
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<td>Drive Power [kW]</td>
<td>0.37</td>
<td>0.55</td>
<td>0.75</td>
<td>1.1</td>
<td>1.5</td>
<td>3</td>
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<tr>
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<td>DBI 2000/4</td>
<td>DBI 2000/5</td>
<td>DBI 2000/5</td>
<td>DBI 2000/10</td>
<td>DBI 2000/10</td>
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<td>4</td>
<td>7.5</td>
<td>7.5</td>
<td>22</td>
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<td>Alternatively:</td>
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<td>Dispersing machine</td>
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</tr>
<tr>
<td>Type</td>
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<td>–</td>
<td>UTL 1000/10</td>
<td>UTL 1000/10</td>
<td>UTL 1000/10</td>
<td>UTL 1000/20</td>
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<tr>
<td>Drive Power [kW]</td>
<td>–</td>
<td>–</td>
<td>7.5</td>
<td>7.5</td>
<td>7.5</td>
<td>22</td>
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<tr>
<td>Dimensions (agitator)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Height (closed cover) [mm]</td>
<td>1,350</td>
<td>1,450</td>
<td>2,000</td>
<td>2,500</td>
<td>3,200</td>
<td>3,100</td>
</tr>
<tr>
<td>Height (open cover) [mm]</td>
<td>1,500</td>
<td>1,650</td>
<td>2,000</td>
<td>2,500</td>
<td>3,200</td>
<td>3,100</td>
</tr>
<tr>
<td>Width (open cover) [mm]</td>
<td>1,670</td>
<td>1,940</td>
<td>1,820</td>
<td>2,040</td>
<td>2,935</td>
<td></td>
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<tr>
<td>Depth [mm]</td>
<td>800</td>
<td>950</td>
<td>1,080</td>
<td>1,150</td>
<td>1,310</td>
<td>1,170</td>
</tr>
</tbody>
</table>

### DBI | Technical data

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended vessel size [l]</td>
<td>10 – 50</td>
<td>50 – 250</td>
<td>250 – 1,000</td>
<td>1,000 – 5,000</td>
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<tr>
<td>Motor power [kW]</td>
<td>4</td>
<td>7.5</td>
<td>22</td>
<td>45</td>
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<tr>
<td>Max. total flow rate dispersing [l/h]</td>
<td>2,000</td>
<td>5,000</td>
<td>20,000</td>
<td>45,000</td>
</tr>
<tr>
<td>Max. total flow rate pumping [l/h]</td>
<td>6,000</td>
<td>15,000</td>
<td>40,000</td>
<td>80,000</td>
</tr>
<tr>
<td>Max. viscosity final product [cps]</td>
<td>100,000</td>
<td>100,000</td>
<td>100,000</td>
<td>100,000</td>
</tr>
</tbody>
</table>

**Small minimum volume**
Approx. 30 % of maximum capacity
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-to-wet 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 enhanced 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.

In the event your additives require continuous agitation, supply funnels and side vessels can be equipped with stirrers.
SPP | Accessories

**Accessories**

- The complete plant can also be supplied in Ex-protected execution acc. to the 94/9 EG (ATEX 95) guidelines.

**IKA**

- Consistently high product quality
- Direct steam injection into the circulation loop available as an option

**Buffer tanks**

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

**Mobile or fixed side vessels**

2-3. For solids and liquids incorporation that can be delivered with different volumes.

**Direct steam injection**

- The complete plant can also be supplied in Ex-protected execution acc. to the 94/9 EG (ATEX 95) guidelines.
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 the full automatic program 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 values
- 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.
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 pasty conditions.

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

Cosmetics
- Creams
- Sun protection products
- Perfumes
- Shaving cream
- Decorative cosmetics
- Shampoos
- Body-care products

Beverages
- Fruit juices
- Vegetable juices
- Milkshakes
- Protein drinks
- Liqueurs
- Sugar solutions
- Flavors

Pharmaceutical industries
- Ointments
- Gels
- Eye drops
- Eye ointments
- Cough mixtures
- Infusion solutions
- Sugar-nuut solutions
- Suppository masses
- Coatings

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

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.
Typical applications for the Standard Production Plant

Sauces to suit every taste – based on this concept, IKA® application engineers have developed a versatile processing system 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. 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 rapidly able to satisfy. As the IKA® system can be used to prepare products with a wide viscosity range, it is ideal for the manufacturing of most types of sauces.

The SPP includes all components necessary for the preparation of excellent mayonnaise, ketchup, and sauces.

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Mayonnaise</th>
<th>Salad mayonnaise</th>
<th>Salad mayonnaise</th>
<th>Salad cream</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil</td>
<td>80 %</td>
<td>67 %</td>
<td>50 %</td>
<td>35 %</td>
</tr>
<tr>
<td>Egg yolk</td>
<td>6 %</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Sugar</td>
<td>2.6 %</td>
<td>2.6 %</td>
<td>2.6 %</td>
<td>2.6 %</td>
</tr>
<tr>
<td>Salt</td>
<td>1.3 %</td>
<td>1.3 %</td>
<td>1.3 %</td>
<td>1.3 %</td>
</tr>
<tr>
<td>Vinegar 10 %</td>
<td>3.5 %</td>
<td>3.5 %</td>
<td>3.5 %</td>
<td>3.5 %</td>
</tr>
<tr>
<td>Water</td>
<td>6.6 %</td>
<td>24.6 %</td>
<td>40.2 %</td>
<td>53.7 %</td>
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<tr>
<td>Stabilizer compound*</td>
<td>-</td>
<td>1.0 %</td>
<td>2.4 %</td>
<td>3.9 %</td>
</tr>
</tbody>
</table>

* Compound comprising emulsifiers, hydrocolloids and optionally starches

1,000 liters of mayonnaise in just 10 minutes!
Develop – Optimize – Scale-up

From laboratory to full production

When new products are developed, the processes are initially tested in pilot plants. Small scale trials are also used for changes in recipes or ingredients. 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 operations and provides an easy scale-up. Every size of the SPP produces the same constant product quality.
IKA introduces you to the next generation of laboratory scale process plants. The perfect simulation of the SPP system with the smallest sample amounts.

The magic PLANT is specifically designed to test process and product conditions in an accurate small-scale simulation. The next step is to transfer the manufacturing process to full-scale production. The magic PLANT system can be adapted to a wide range of applications and specific requirements, especially in the food, cosmetic, chemical and pharmaceutical industries.

One machine | multiple applications
The IKA® magic PLANT is an extremely versatile and multi-functional process plant. Depending on the application, the unit can easily be modified into three different configurations.

**magic PLANT basic**
- Adjustable speed drive for perfect agitation of liquids or suspensions
- Tiltable, double jacketed and insulated vessel
- Exchangeable stirrer tools e.g. anchor and propeller type
- Optional ULTRA-TURRAX® T 25 batch disperser

**magic PLANT inline**
- High shear inline disperser for high quality emulsions and suspensions
- Pipe loop with optional CIP wash
- Modular processing head for the simulation of various dispersing methods
- Adjusted tip speed up to 40 m/s for smallest particle sizes

**magic PLANT powder**
- Efficient and gentle mixing for free flowing solids
- Special powder agitator
- Inclined working position for better mixing and drying results
- Discharge by complete tilting of the vessel

**Advantages**
- Modular design with exchangeable tools
- Speed control
- Process simulation in the smallest scale

from laboratory to production
the three fields, in which the IKA®-Group combines tradition, innovation and the highest technical quality. IKA® – a big name for high quality products and services for the global market.

Pilot plants: magic PLANT >> LR 1000 control
The connection between laboratory and large-scale production.
IKA® offers more

**Vacuum Drying and Mixing**

For applications with particle size requirements in the nano range.

**Vertical, horizontal and continuous kneading**

**Inline Dispersing**

Inline powder wetting, wet milling and dispersing machines.

**IKA® Laboratory & Analytical Technology**

IKA® is indisputedly ranked first world-wide for laboratory technology. Numerous innovations prove the increasing dynamics of the company.

Magnetic stirrers, overhead stirrers, dispersers, shakers, mills, rotary evaporators, calorimeters, and laboratory reactors make up the laboratory and analytical equipment portfolio.

**Process Plants**

IKA® Master Plant with counter rotator for the highest viscosities.

**High Pressure Homogenizer**

For applications with particle size requirements in the nano range.

**Kneading**

Vertical, horizontal and continuous kneading.
IKA® offers more

The IKA® pilot plant consists of a vast array of different machines and plants as well as measuring and analytical devices. The pilot plant trials have influenced the concept and design of many of our machines and their tooling.

Searching for a suitable machine for your application?
In the IKA® pilot plant you can test several mixing systems with a variety of tools. Our chemical engineers look forward to assisting and advising you during and after the trials. This way, an optimal solution for your specific mixing task can be determined.

According to GMP guidelines, pharmaceutical companies are required to validate processes that influence product quality. The applied machines and plants are subjected to a severe qualification process. During this qualification it is tested and documented that the pre-specified functionality is achieved. As early as in the planning stages, IKA® machines and units are designed to be suitable for use in the pharmaceutical industry.

IKA® will provide the necessary documentation and, if desired, will conduct the design, installation and operation qualification together with you.

From the initial planning stages to final product realization, IKA® technology and services is with you each step of the way by offering a multitude of services:

> Designing complete production plants
> Performing test runs when developing new products
> Planning and implementation of mechanical, electrical and pneumatic installations
> Commissioning, including a processing test and training of the operating personnel
> Qualification

After project completion, our experienced engineers, electricians, chemists, application technicians, and assemblers will be available to assist you with:

> Technical advice for questions concerning operation, process, and maintenance of IKA® machines and plants
> Spare parts service
> Repair service
> Modification and upgrading

Services | First-rate quality from initial consultation to full scale production

Qualification

Pilot Plant | From idea to solution