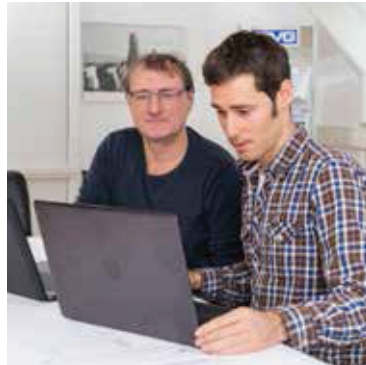




BAUER VERFAHRENSTECHNIK GMBH
BEST VALUE GUARANTEED





INNOVATION AND TOP QUALITY SINCE 1984

When Dr. Jochen Bauer formed an independent company from a former joint venture in 1984, his primary business was delivering innovative technologies within the area of starch processing to customers in the central European paper industry. Starting with only six employees, BVG has grown to become a worldwide producer of highly innovative and automated chemical handling systems that serves several industries with a main focus for the paper-manufacturing and paper-converting industry. Today, BVG (Bauer Verfahrenstechnik GmbH) generates approximately 15 million Euros annually with over 60 employees. Headquartered in Bavaria, BVG also has subsidiaries in the United States and China.

BEST VALUE GUARANTEED

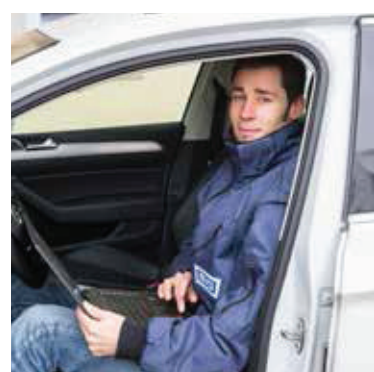


FASCINATING TECHNIQUE & TECHNOLOGY

Today, the family business at Lake Ammer (Greifenberg) near Munich is a full-line supplier of processing equipment, as well as a supplier of chemicals used in paper production. With up to 100 projects per year and over 750 customers, BVG has grown from its modest beginnings into a full service company capable of providing everything from starch cookers to chemical preparation plants up to coating kitchens.

A core component of BVG's business is "in situ" (on-site) technology, enabling relocation of processing. From external suppliers directly to the manufacturer with fully automatic plant solutions. This trend provides besides highest cost effectiveness new levels of product optimization as well as unique product features. On-site processing enables the mill to process economical commodity products that are widely available rather than products produced by a few suppliers only. Therefore pre-processing costs, costs for additional drying steps and transportation costs can be reduced as well. To give some examples:

- Native (pearl) starch instead of modified starch
- Dry pigment powder or even raw pigment instead of pigment slurry products
- Basic chemicals such as fatty acid and caustic soda instead of finished soap



WORLD LEADER IN STARCH PROECESSING PLANTS

The BVG team can source from an experience of more than 40 years with starch processing in several industries, such as the paper manufacturing and converting industry, the food and beverage Industry as well as others.

BVG has developed a complete infrastructure to produce turnkey systems that include everything from mechanical engineering to programming of DCS systems, as well as assembly, commissioning, and after sale support. Producing high quality and innovative products has enabled significant company growth over three decades, making BVG the world market leader in several technologies, especially in the field of in-situ starch processing.

Since its founding, BVG's mission is not only to deliver current state of the art technology, but to also develop new and innovative products. Our goal is to always deliver the best product at a fair price. We carry our guiding principal in our company's name: BVG - „**Best Value Guaranteed!**“

BEST VALUE GUARANTEED



INNOVATIVE STARCH PROCESSING

Many paper mills welcome the opportunity to turn over the entire process of handling starch into the hands of a professional partner and to focus entirely on the process of paper production. This was evident to Pratt Industries from the United States. After experiencing a BVG enzymatic starch conversion system in a new green-field project, Pratt Industries upgraded all other North American paper manufacturing sites by the Super ECC Technology.

FASCINATING TECHNOLOGY – ALSO PROVEN BY OUR CUSTOMERS

In 2007, Lee & Man bought four BVG „Super-ECC“ (native starch „Enzyme Continuous Conversion“) systems for their Guangdong, China paper mill (PM 8, 9, 10 and 11). They were so impressed by this equipment that they ordered three more systems (PM 4, 12, and 13) even before the first of the original four Super-ECCs was fully commissioned.

Today, Lee & Man has 15 BVG Super-ECC machines in production. Additionally, they employ a BVG „Super-Cat“ system which enables them to cationize 20,000 tons per year of native starch using a dry process right in the paper mill. By using native starch for both wet and dry end, Lee & Man realize significant production savings.



SUPER-ECC® TECHNOLOGY

The BVG Super-ECC system is a continuous enzymatic modification cooker for native (pearl) starch. ECC stands for E= Enzyme C= Continuous C= Conversion. The Super-ECC can modify any commercially available native starch (corn, wheat, potato, tapioca) to a precisely optimized final viscosity independently of temperature and solids, something impossible to do with pre-modified starch. These systems are primarily used to produce size press, film press, and coating color starch. The BVG Super-ECC system provides optimized molecular weight distribution through the use of our patented high turbulence reactor, producing paper quality that meets or exceeds even modified starch (ethylated/oxidized). Super-ECC systems are fully automated and do not require any additional manpower requirements over conventional cooker. Using modern secure communications technology, BVG can provide remote monitoring and troubleshooting as required. This innovation, and most importantly performance, is greatly appreciated by our customers.

„Compared to the existing plant from 1997 the Super-ECC plant allows a higher variance in several process parameters. It is possible to produce a degraded starch exactly for our needs. It was possible to achieve the same strength properties with a lower starch consistency. The specific starch demand and the costs could be reduced significantly.“

Papierfabrik Palm GmbH & Co. KG

BEST VALUE GUARANTEED



SUPER-JET TECHNOLOGY

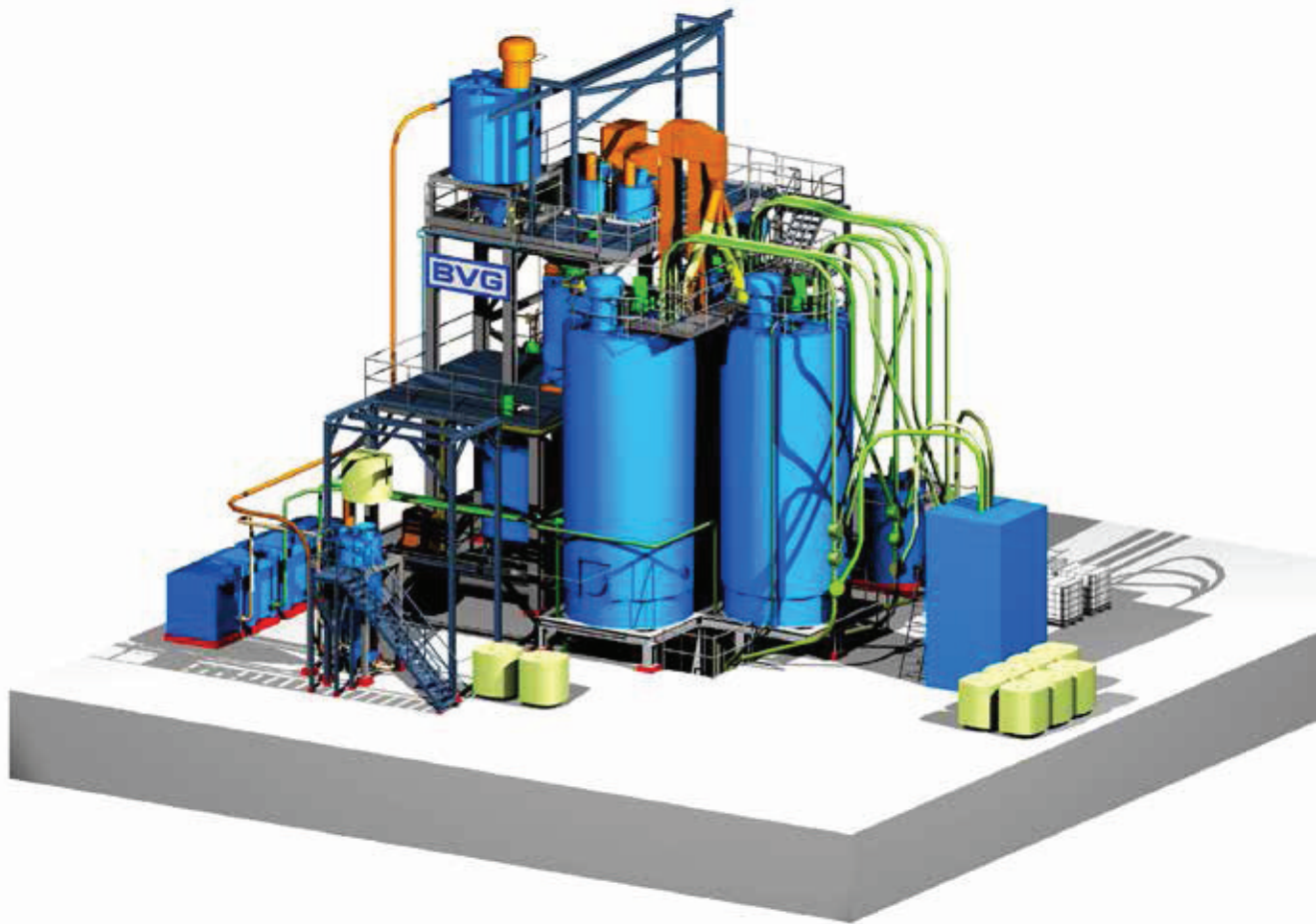
BVG's Super-Jet serves the purpose of continuous cooking of modified starch and starch derivatives. Modified starch is continuously made-down to slurry and then cooked. The Super-Jet includes post dilution to deliver cooked starch at the proper solids to your storage or run tanks. So far, more than 500 BVG Super-Jets have been sold worldwide.

TECHNOLOGICAL ADVANTAGES:

- Works with all modified starches
- Continuous system (minimal waste)
- Jet Cooking principal (optimal, efficient cooking)
- Pressure cooking at up to 130° C
- Completely dissolved starch
- Automatic regulation of starch concentration

TECHNICAL ADVANTAGES:

- Compact design
- High production performance
- Fully automated
- Clearly laid-out mode of operation
- Highly modern DCS System
- Remote service via secure modem or internet



SUPER-CAT TECHNOLOGY

Our BVG Super-Cat system provides in situ production of cationized starch from native starch. BVG Super-Cat can employ dry (Super-D-Cat) cationization or wet cationization (Super-W-Cat). Both technologies were developed in-house by BVG. The Super-CAT system provides remarkable savings over commercially produced cationized starch and is particularly attractive to large mills that consume high volumes of wet end starch. Beyond costs savings, the Super-CAT system provides the customer with the ability to optimize the starch by adjusting the degree of substitution in the cationized starch. Here, as with all of our products, BVG's goal is to reduce costs while improving product quality for our customers. As it does for our Super-ECC, using native starch moves the purchasing domain from specialty product to commodity, dramatically increasing opportunities for cost savings and broadening the supplier pool.

BEST VALUE GUARANTEED



COATING KITCHEN SUPER-SHEAR AND SUPER-C-SHEAR

When it comes to the production of coating colors, there are two primary processes. **BVG Super-Shear** is a conventional batch system in which coating color is produced discontinuously. The different components of coating color are measured by weight or through flow measurement and mixed according to a batch recipe.

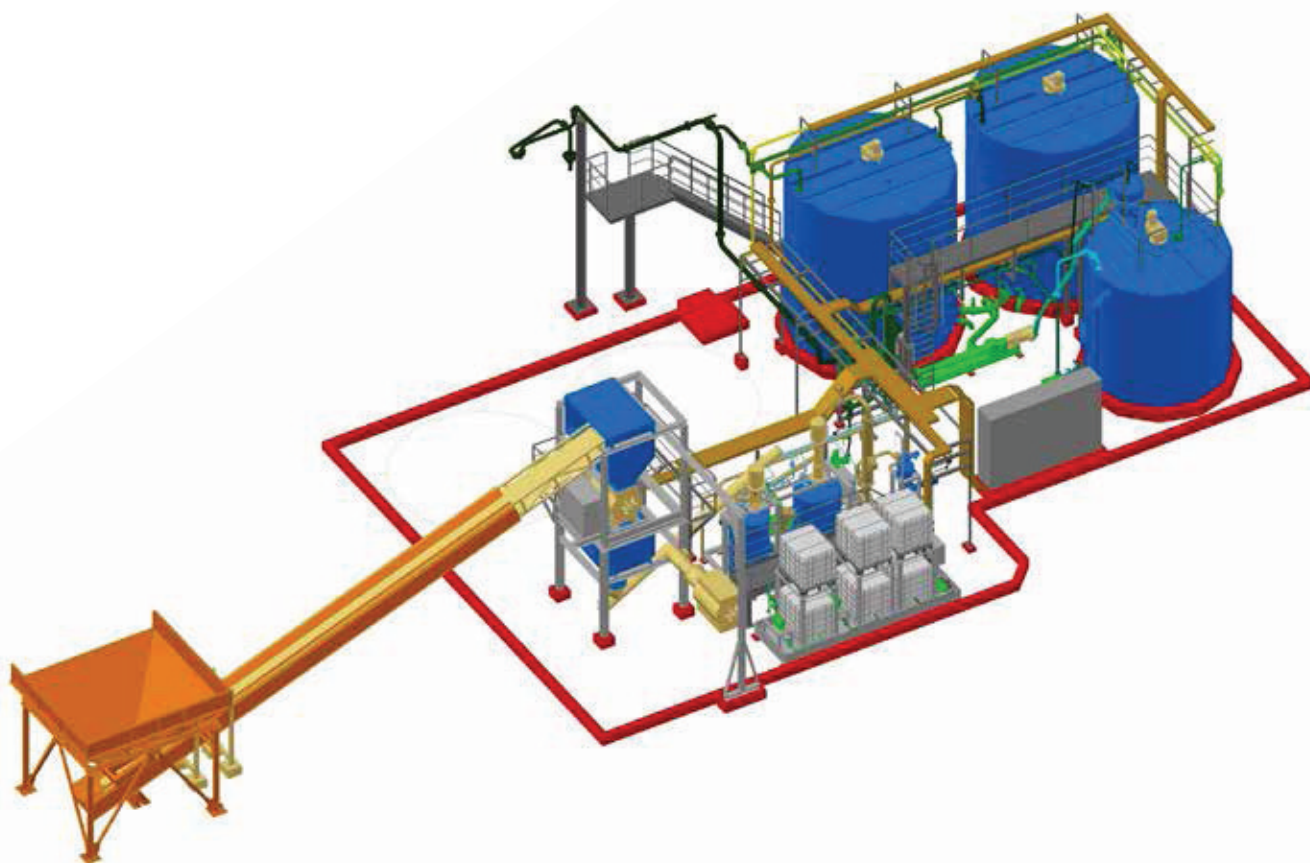
BVG Super-C-Shear is a continuous make down system. Metered addition and mixing of singular coating color components is done continuously. In 2010, the largest coating kitchen in the world went into production at JHPP in Hainan, China. BVG provided the turnkey engineering, manufacturing, DCS, installation, and commissioning of this system. This paper machine outperforms all benchmarks yet set in the paper industry. 6000 t/d of high value coated papers are produced on one machine. Per sheet, starch and 4 pigment coatings are used, adding up to 10 layers in total. So far, this has been the largest order in BVG's history. The coating kitchen's current capacity is 3000 t/d of coating color, however the mill could produce significantly more using the same equipment. In comparison to the originally proposed batch process, this BVG continuous coating kitchen offers manifold advantages which are crucial in a technical, technological and economic manner, such as:



-
- Constant solids and viscosity of coating color
 - Solids concentrations as high as 72%
 - Highly energy efficient extraction of coating color (approximately 90% reduction in power usage over similar batch coating kitchens)
 - Gentle mixing of single components leads to reduced demand in shear-sensitive ingredients (binders)
 - High flexibility of the equipment that can be reconfigured to expand capacity
 - Minimum Space demand

In packaging paper, the continuous coating kitchen BVG Super-C-Shear mixer also offers many advantages. When changing from uncoated grades such as testliners or corrugated material to coated materials, such as CWT-Liner, high flexibility is needed in order to keep loss of coating color as low as possible and to reduce energy costs. The BVG C-Super-Shear offers the highest possible reduction potential in this field.

BEST VALUE GUARANTEED



DISPERSING SYSTEMS

DISPERGATOR CHS

In today's changing paper making environment the trend of pigments is also moving to continuous dispersing and grinding. China is a leading consumer of these on-site technologies. With BVG's Dispergator CHS technology, pigments can be dispersed fully automatically, continuously, and very energy efficiently. Reference projects of BVG are in the area of 50-20.000 kg/h extraction capacity of the following products:

- | | | | |
|-----------------------|----------------|----------------------------------|--------------------|
| ■ Aluminium hydroxide | ■ Clay | ■ Pigments with fibers or blends | ■ Talcum |
| ■ Barium sulfate | ■ Earth colors | ■ Silicic acid | ■ Titanium dioxide |
| ■ Bentonite | ■ Fly ash | ■ Special polysaccharides | ■ and many others |
| ■ Chalk | ■ Kaolin | | |



ADVANTAGES OF THIS TECHNIQUE ARE THE FOLLOWING::

- High solid processing
- Regaining of rinsing water and coating color effluent
- No rinsing water necessary
- Maximum shear rate up to 30 m/s
- Forced mixing via inline aggregation
- Highest flexibility
- Minimum space demand (smaller footprint of continuous system)
- High production performance
- Online measurement of slurry concentration
- Fully automated operation mode
- Minimal maintenance effort
- Remote service

BEST VALUE GUARANTEED



CHEMICAL PREPARATION PLANTS:

BVG provides equipment to process and disburse a large variety of products, including but not limited to the following:

-
- | | | |
|--------------------------|-----------------------|--------------------|
| ■ Acids and bases | ■ Coatings | ■ Optical bleach |
| ■ Adhesives | ■ Coloring pigments | ■ Polyelectrolytes |
| ■ Aluminium sulfite | ■ Enzymes | ■ Polysaccharides |
| ■ ASA/AKD glue | ■ Fatty acid | ■ Polyacrylamides |
| ■ Binders | ■ Felt cleaning agent | ■ Polyvinylalcohol |
| ■ Biocide | ■ Fixing agents | ■ Process water |
| ■ Blackening | ■ Flour | ■ Salt |
| ■ Bleaching agents | ■ Glues | ■ Sizing agent |
| ■ Carboxymethylcellulose | ■ Guar | ■ Soap |
| ■ Chemical additives | ■ Hydro sulfite | ■ Sodium silicate |
| ■ Coagulant | ■ Hydrogen peroxide | ■ Surfactants |
| ■ Coating additives | ■ Inhibitors | ■ Synthetics |
| ■ Coating pigments | ■ Minerals | |



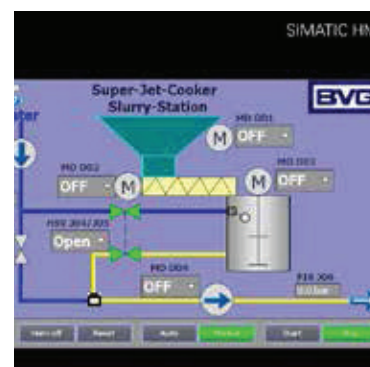
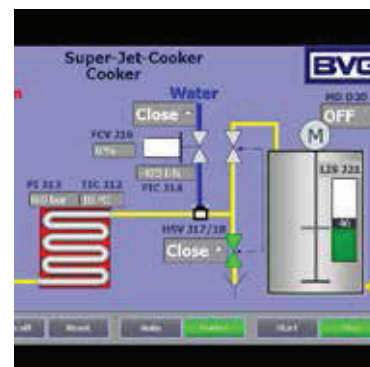
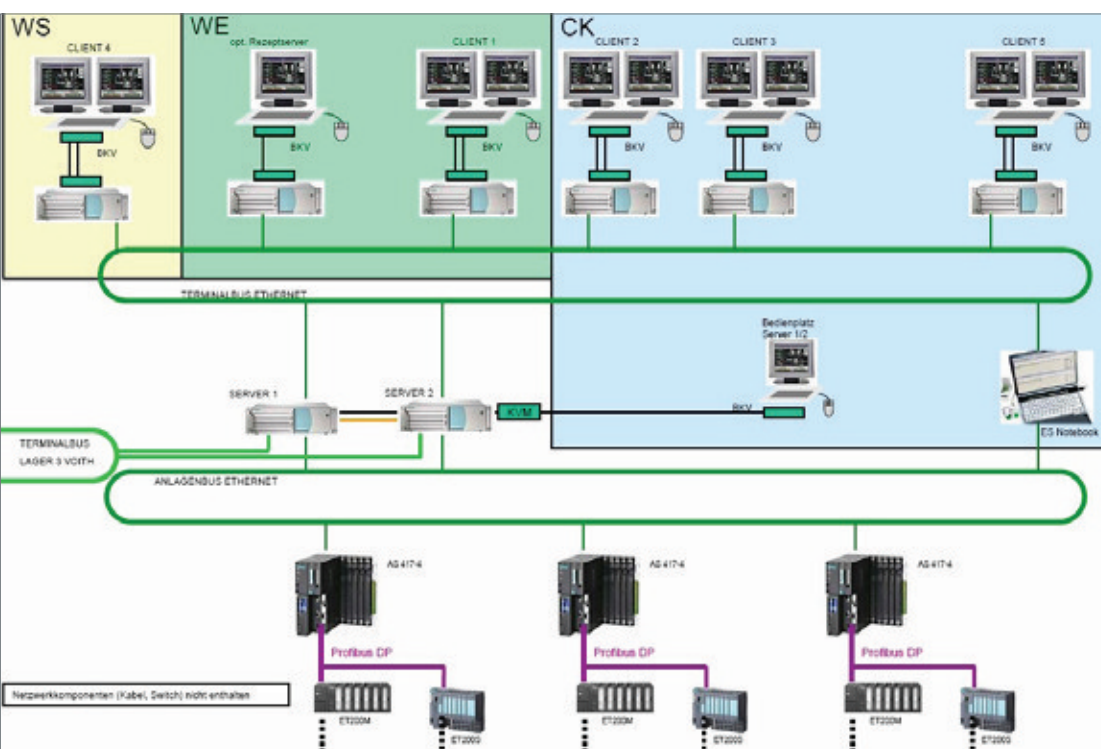
GLUE KITCHEN BVG SUPER GLUE

Starch is a crucial component for adhesives in the paper corrugating and converting industry. A challenging field with large starch volume requirements is the production of corrugated paper. To serve this customer need, BVG developed the Super-Glue process, which makes it possible to produce corrugated paper glue with very precise solids and final viscosities. The viscosity of the glue is produced, measured and fine-tuned during the production by an online viscometer at addition of alkali.

ADVANTAGES OF THE SUPER GLUE TECHNOLOGY:

- Automatic regulation of carrier viscosity
- Automatic regulation of final viscosity
- Reproducible quality of the glue
- Amount of glue is freely determinable
- Suitable for native maize, wheat, potato and tapioca starch
- Better apanage through less insertion of moist
- Mix of different recipes possible
- References of corrugated paper machines with $v = 400\text{m/min}$
- Fully-automated operation mode
- Easy to use
- Remote service
- Recipe manager
- Qualified plant construction
- Use of native starch
- Minimal use of glue

BEST VALUE GUARANTEED



SUCCESS THROUGH AUTOMATION

One key aspect of BVG's field of activity is process control. Right from the beginning (1984) a computer-programming department was employed to support our engineering department. The goal was to produce highly automated systems that reduced operating requirements of the customer and maintained the highest level of reliability. BVG was an early adopter of the Simatic S5 PLC system using the original PG 675 programmer. Today BVG systems are programmed with a wide variety of technologies depending on customer DCS. These include Siemens S7/ PCS 7, ABB, Alstohm, Rockwell Int., Emerson, Metso DNA, and others.

ADVANTAGES OF BVG'S AUTOMATION TECHNOLOGY:

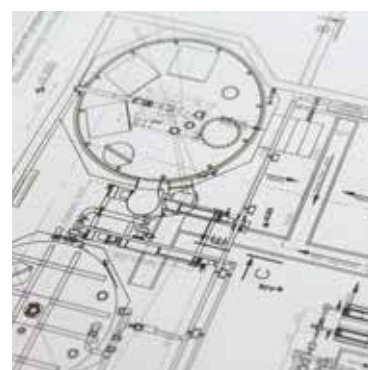
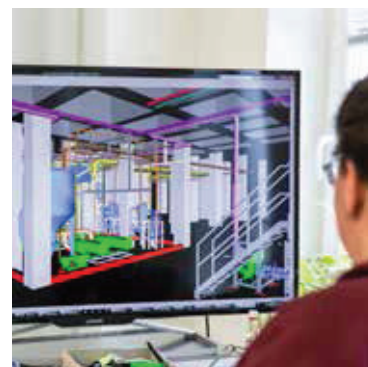
- Planning, development and implementation and commissioning one-stop
- Broad scope of controls and systems offered
- Long term experiences in the field of industrial automation
- High flexibility and individual solutions
- Long term maintenance and service of software
- Remote solution and online service possible for every application
- 24 hours emergency service



YOUR ONE-STOP PROVIDER OF **TURNKEY PROCESSING SYSTEMS**

As the leading full-service provider for processing solutions, BVG does not only implement the technology for the customer on-site, but also offers full-service after commissioning. This includes not only the delivery of your mechanical system, but also on-site installation including pipeline construction, wiring, and DCS integration. Following installation BVG provides our expertise to accomplish stress-free commissioning, including employee training. Once your system is commissioned and in full production BVG provides service and support to help you optimize your production and improve quality using our advanced technology.

BEST VALUE GUARANTEED



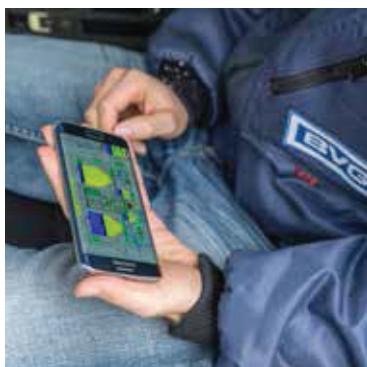
ENGINEERING PERFORMANCE

For large, complex projects, a wide range of supplier expertise is essential to achieve the full range of customer goals. BVG can provide any level of planning, management, purchasing, and constructing desired by the customer to insure the project runs smoothly and is in production as quickly and efficiently as possible.

Depending on your individual needs, BVG can provide full analysis of initial and operating costs, space requirements, environment considerations, energy requirements, etc. This enables the customer to evaluate all aspects of the proposed installation.

SERVICE UND SUPPORT

Technical Systems periodically require experienced support. BVG is always available, and when asked by our customers, we regularly manage their process controls and system optimization. In doing so, settings are evaluated and adjusted in order to ensure the highest product quality and yield while insuring safe and ecologically responsible operation. BVG service operations can be provided on-site as well as remotely via internet or cellular modem. This is especially beneficial during the first few months after commissioning, when mill personnel are developing expertise with a new system.



TRIAL SYSTEMS

Another service offered by BVG is a trial installation of full-production equipment with state of the art technology for lease. With a trial system new technologies can be tested and evaluated „on the sheet“ without obligation or a large capital investment. In most cases the cost savings and quality improvements achieved far outweigh the cost. In fact, many of our customers use savings generated by trial machines to pay for fully customized permanent systems, using the expertise they develop during the trial to develop a custom feature-set for the permanent system.

For instance, BVG has available full production Super-ECC starch systems for trial installation. This trial equipment makes it possible for mills to reduce the use of starch by 5-20 percent while meeting or exceeding paper quality requirements with no capital investment required. More importantly, using native starch provide tremendous savings over modified starch. As part of the lease agreement BVG provides our full service package, offering 24-hour-service, free spare parts, and delivery of optimized enzyme (BVG Superzyme). For paper mills this is a highly appreciated opportunity to evaluate new technology that saves them money, leaving the starch processing to an experienced partner while mill management focuses on the actual production of paper.

BEST VALUE GUARANTEED



PROCESS CHEMICALS

A complete solution requires not only expertise in your equipment, but also in your production materials, and chemicals. BVG offers its customers tailor-made solutions that include optimization of the process and customized chemicals for the respective application. BVG specializes in additives for modification of native starch, such as:

- BVG Superzyme (optimized enzyme for modification of native starch)
- BVG Super-Cat (cationization of native starch)
- BVG Super-Link (generating amphoteric native starch)
- BVG Super-Clean (special cleaning detergent)



Bauer
Verfahrenstechnik GmbH
Hauptstraße 8
86926 Greifenberg
Deutschland

phone: +49 / (0)8192 / 9305 - 0
fax: +49 / (0)8192 / 9305 - 20
e-mail: info@bvg-gr.de
Internet: www.bvg-gr.de

BVG, Inc.
7175 Bryhawke Circle
Charleston, South Carolina
29418
USA

phone: +1 / 843-991-9999
fax: +1 / 843-406-1849
e-mail: info@bvg-ch.com
Internet: www.bvg-ch.com

Qingdao BVG Import & Export
Co.Ltd
Room 403, Building 1,
No. 19 Zhangzhou er Road
Shinan District, Qingdao
China

phone: +86 / 159 6263 7793
Internet: www.bvg-ch.com