BEN-BLEACH
A Benninger achievement is the synthesis of expert know-how and innovation

Engineering, innovation, quality and reliability have made Benninger successful for 150 years. Rugged design and Benninger manufacturing and know-how are part of the “traditions” which guarantee reliable and troublefree operation over many years. A high quality standard, flexibility and commercial efficiency are the result of continuous innovations. The BEN-BLEACH has also been built on this solid foundation.

Specific company characteristics, varying quality specifications and economic considerations require mature solutions. Benninger provides an answer geared to high commercial efficiency and quality.

You wish to produce economically! You are not looking for the cheapest machine, but for a high-performance system which permits you to completely cover your individual requirements most economically. In addition, you value comprehensive consulting and back-up services with regard to organization and engineering.
You wish to retain top product quality

After pretreatment the cloth must fulfill all the relevant requisites for further high quality treatment. It must satisfy the following criteria and be:

- Free from size (TEGEWA 7–8)
- Suitable for dyeing, printing or even full white
- Highly absorbent (less than 3 sec/cm)
- Completely husk free
- Minimum of fibre damage (high AMF)
- Optimum dye pick-up: uniform reproducibility over length and width
- Soft handle even after a strenuous pretreatment, that is exactly what your customer wants.

Benninger's answer to rising profits

Benninger offers a system which in its standard form is economically efficient in 90% of all applications. The secret of this successful concept lies in an ingenious module technology. Without abandoning the relevant fundamentals, adaptation is made to your specific requirements by means of minor modifications. The results are apparent to you in favourable procurement costs and substantially more economic pretreatment. This concept is backed up by comprehensive process knowledge.
Define your targets…

The variety in pretreatment processes demands individual solutions. Usually special designs are the rule. Now, however, Benninger have been successful in realizing a concept by which 90% of all applications can be covered with standardized modules with no extra cost involved. Close contact with customers and chemical suppliers, plus the total integration of Benninger machine technology, have made this project feasible.

BEN-BLEACH

The results-to-expenditure relationship of the BEN-BLEACH system for continuous pretreatment is measurable. In this system every component has been thought out down to the last detail. Here technological advances and economics go hand-in-hand. And you profit from the fact that logical basic module sections make even individual upgrading possible at any time.

Basic module 1: Desizing
With the INJECTA, the intensive washing system, all types of size from PVA to starch are removed without preswelling. Other relevant advantages are small space requirement and minimum water consumption. The system is also suitable for size recovery and partial flow waste disposal.

Basic module 2: Impregnating
In the IMPACTA the fabric is impregnated with chemicals for subsequent troublefree steaming process. The clever design ensures that a high liquor exchange is achieved. The chemicals are distributed immediately at the right place in the fabric.

Basic module 3: Steaming
In the REACTA steamer the chemicals react with the fibres themselves and the accompanying substances. The combination steamer with tight strand cloth run and plaiting on a roller bed permits reaction times of 1 to 60 minutes. An automatic steam conditioning and regulating station guarantees constant conditions and an airfree atmosphere. An absolute must for high pretreatment quality.

Basic module 4: Pre-washing
In the FORTRACTA impurities sticking to the fabric surface are removed. Fast reduction of chemical and dirt concentration is also taking place.

Basic module 5: Washing
In the EXTRACTA the accompanying substances, which have been made soluble by steaming, are washed out. The high washing effect of this machine is achieved through exact liquor segregation and counter-flow guidance. It has been designed for especially low power and water consumption. The TRIKOFLEX drum washing machine is utilised when fabrics exhibit high shrinkage potential.
In the application of Benninger technology the complete pretreatment with a steamer stage always consists of the following series of processes:

- INJECTA for desizing
- EXTRACTA for washing
- IMPACTA for impregnating
- REACTA a combination steamer with tight strand fabric guidance and roller bed plaiting
- FORTRACTA for pre-washing
- EXTRACTA/TRIKOFLEX for washing
With the description “la tour miracle” a Benninger customer hit the nail on the head. With this compliment he confirmed the exceptional performance of the Benninger INJECTA desizing machine. It removes all sizes, greases and waxes without preswelling.

A very natural washing process
The fabric is led through a shaft divided into two casings. Here it is subjected to high turbulence and temperatures of over 100°C. According to requirements, steam and/or water are applied on both sides. The cloth undergoes this washing process over the whole length of the casings. The substances to be washed out are dissolved in seconds. The dwelling time in heavily dirtied washing liquor is only a few seconds.

Cleanly and gently desized
Already when the cloth was sized great care was taken to treat the fibres gently.

Profit from these advantages
- No chemicals, only temperature, steam, water and turbulence
- Tension control by driving the upper deflection roll
- Dissolving in seconds
- No dwelling in size contaminated liquor
- Smallest space requirements (about half that of roller vat machines)

The cloth is treated with the same care in the INJECTA. Even water-insoluble sizes such as starch, greases, waxes and oils can be removed within a few seconds without preswelling.

Remarkable results
One single INJECTA machine produces the same results as several highly efficient conventional washing compartments. Ninety percent of sizes, greases and waxes are removed. That suffices to influence the subsequent process.
The world-renowned EXTRACTA washing principle is confirmed firstly by the very high washing effect with a low fresh water consumption for difficult to wash fabrics, and secondly, in the full accord of the results expected by way of calculations with those recorded in practical application. This brings increased safety in project planning and thus in investments. Models are available with single and double loop operation; with or without individual roller drive; with or without press rollers. The wide range of models available allows all requirements with regard to production, application area, fabric quality, process and commercial efficiency to be realized.
The IMPACTA masters all textile impregnation jobs. Controlled liquor pick-up and a unique chemical dosing method guarantee exact application of chemicals, for both high or minimum pick-up applications. High liquor exchange and fast penetration into the fibers gives optimum saturation of the fabric with the chemical liquor.

Better impregnation with controlled liquor pick-up

Penetration instead of addition
The turbulence in the liquor produces a high liquor exchange. The diffusion into the core of the fibers begins immediately and makes additional penetration time superfluous.

Low chemical consumption
Steam condenses on the surface of the fabric entering the bleaching steamer. Usually the physical carrying capacity of the fabric is exceeded, especially with maximum application. Thus “raining” can occur, that is, part of the surface liquor drips. In other impregnating processes in which penetration into the fabric core is not guaranteed as it is on the IMPACTA, a lot of chemicals are lost. With impregnation on the IMPACTA the losses are mainly condensate and not expensive chemicals.

Careful treatment during the whole impregnating process
There are no sharp-edged stripping bars or fixed squeeze lips which could damage the fabric. The fabric tension is held constant. Neither creases nor stripes are caused.

Controlled liquor application
The special nip on the IMPACTA guarantees controlled liquor pick-up independent of speed and fabric weight.

High liquor exchange through turbulent flow
The cloth web is guided through two narrow casings and causes the impregnation liquor to circulate in the fabric running direction. The liquor enters the unit in the middle of the cloth web and is drawn off at the side. This creates a horizontal circulation. In the narrow casings the fabric run causes an additional current in the fabric running direction. Hence an additional vertical circulation through both casings results.
Chemical metering station
The chemical station consists, for each chemical, of feed pump, inductive flow-meter and control valve. This means that the reproducibility of the chemical metering figures is ensured.

Metering of the chemicals in ml/kg based on the fabric throughput means that a defined quantity is added. The impregnation system is self-controlling. If more water is brought in with the fabric then the addition of water – controlled on level – is reduced.

The following is entered at the display:
- Fabric weight per running meter
- Initial filling (in liters according to total volume)
- Top up recipe (in ml/kg)

Profit from these advantages
- Exact quantity of chemicals on the fabric
- Penetration instead of addition
- Controlled liquor application

Simple operation
On the IMPACTA the operator does not need to know exactly how high the liquor exchange and the pick-up are. He simply adjusts the nip to the pick-up at which dripping is just avoided. In spite of that, impregnation remains constant.

At recipe and fabric changes the sharpening quantity is calculated and added. The automatic chemical metering system quickly acts correctly until equilibrium concentration is achieved again.

Water within the fabric is replaced by chemicals
Modular steamer
Proper cloth guiding and optimum reaction time for every duty

Crucially important to any continuous pretreatment range is the steamer. Here especially therefore, economy and flexibility must be combined in optimum fashion. The building block system devised by Benninger enables a steamer ideally suited to industrial requirements to be assembled for any duty from proven basic modules.

The overview above indicates the principal modules together with a number of possible combinations. But these are by no means all the possibilities; many other configurations can be obtained with the roller bed extendable at will. Single cloth run in the section with positive cloth guiding, etc. All steamers may be placed on the floor between the washing compartment, or above these to save space.
Controlled cloth guiding: Crease-free cloth run with constant tension in the length

Big roll diameters are essential if crease-less cloth run is to be assured (the Benninger steamer uses 193 and 159 mm), and short distances between the rolls (Benninger provides 1200 mm between the outer rolls, 840 mm between the inner ones).

Creasing may be caused also by roll drive with uneven torque. This fault does not occur on the steamers, as they are equipped with frequency-controlled intermediate drives.

Roller bed: Clean plaiting, reversing system and haul-off with pile monitoring

In plaiting as at haul-off, and at the transfer points of the roller bed, constant conditions defined as clearly as possible are to be aimed at. This has been achieved in the following way:

- A plaiter is employed having adjustable stroke length by frequency converter to accommodate the fabric. This design assures clean and regular plaiting with regard to both folding and pile height.

- For perfect pile transfer from top to bottom there are two swivelling rollers at the exit from the top roller bed, forming a passage between the roller beds corresponding to the pile geometry. The influence of the pile weight relative to the useful width and cloth quality can be compensated pneumatically via a counterpressure cylinder.

- Continuous haul-off always at the same point is assured by providing a sensing rake. Above all however it automatically monitors the steamer content, thereby assuring constant retention time even with stretching or shrinkage of the cloth.

Tight strand cloth guidance for crease-sensitive fabrics

These kinds of fabric can not be plaited. They are, therefore, guided full width over rollers. Setting up creates no problems. Single rollers in the roller bed are simply raised. They then serve as guide rollers.

- And finally optimum cloth guiding under unvarying conditions is assisted by the lubrication for life of all bearings, dispensing with any need for maintenance.
Combination steamer

Profit from these advantages
- Tight strand cloth guiding for crease-sensitive fabrics
- Crease-free cloth run for all other fabrics
- Automatic changeover by pressing a button
- Large roller diameter and small roller spacings
- Substantially lower setting-up times
- Modular construction for optimum layout
- Guaranteed airfree saturated steam atmosphere

Further features
- Steam turbulences can also lead to cloth run troubles. Benninger banishes these by controlled steam feed with injection via a regulating valve.
- The cloth is led into the steamer through a steam lock without contact, and brought at once to the reaction temperature.
The TRIKOFLEX system, ensuring low tension treatment of knitted, pile and woven fabrics, has set new standards in textile finishing.

Taylor-made versions
The flexible TRIKOFLEX modular system can be supplied in a variety of versions to suit the fabric and the application.

Incorporating a range of system improvements Benninger has now found the best way to meet increased market requirements. Extremely low tension fabric guidance ensures the best possible shrinkage values. Important factors are short fabric paths with a minimum of fabric deflection points via guide rollers and the grooved drum as well as additional helper drives.

The advantages at a glance
- Universal washing compartment for elastic and bi-elastic woven fabrics
- Optimum shrinkage results due to low tension fabric transport, short distances and large support surfaces
- Up to 40% higher washing effect is achieved by dual liquor circulation in separate chambers
- Double sided washing of dense fabrics
- Variable drive techniques
- Externally adjustable spray lines
Bleaching concepts

BEN-BLEACH Pretreatment plant for mono- and bi-elastic woven fabrics

BEN-BLEACH system: singeing, desizing, scouring and bleaching in one passage, CPB bleach possibility for full white fabric

BEN-BLEACH system: singeing, desizing, scouring and bleaching in one passage

BEN-BLEACH system: for desizing, scouring and bleaching of crease-sensitive fabrics
Invest without commitment to cloth or process!

There are still finishers in the enviable position of being able to process such prodigious yardages that specialised equipment pays off. However the great majority must live in a world where raw material quality, fabric range, processes, profitability assessment, etc. are changing with increasing speed.

A new plant ought therefore to operate as economically as possible not only for the first year but throughout its life. That is why equipment offering the greatest flexibility with optimum economy is the inescapable choice in most cases.

Pretreatment ranges are no exception to this. Benninger therefore supplies a variety of individual modules, which can be combined as needed on the building block principle. In this way ranges can be put together making full allowance for the specific requirements of the user whilst at the same time ensuring the flexibility so vital for the future.
The Swiss company Benninger has been the textile industry's leading partner across the globe for one hundred and fifty years with global branches and service representatives. Benninger develops and manufactures textile finishing and cord production ranges as well as providing complete system solutions. As the market leader Benninger will continue to rely on its comprehensive process know-how in order to be able to offer high-quality installations with excellent customer service.