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Plant Engineering

Water Management in Textile Manufacturing

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Water Management

Textile Industry works hard to achieve a balance between environmental protection and economic development. Water resources and the environment have become key issues of concern in textile manufacturing. To assist Textile Mills avoiding waste water and burden in their ETP management LoopTEC is a reliable and profound partner in designing chemical recycling processes to build long-lasting, collaborative solutions to environmental challenges.

In general, textile processing has a very high consumption of water and energy, and a large amount of wastewater discharge.

Due to the various processing steps, such as de-sizing, bleaching, dyeing or finishing in aqueous solutions, the water consumption and chemicals used will differ.

For many global brands sourcing their textiles, water management – which in this case refers to conservation, usage efficiency and recycling, wastewater treatment and discharge – is one area of their supply chains where they exert a fair amount of control and influence.

Positive Market Aspects

An environment production of textiles is in many cases an important and deciding factor of the product sale. Many customers will already today only order fabric which has been produced under consideration to ecologic aspects.

Sizing agents recovery plants built by LOOPTEC will fulfil economic conditions as well as ecological requirements.

CSR that can be seen

Enhancing Working conditions

Enhancing ETP efficiency

Enhancing weaving efficiency

Cost reduction

Energy reduction

Company's Brand Image

Local environmental regulations

Cost-Effectiveness

The advantages and savings achieved by using LOOPTEC recycling plants will lead to a short return of investment period.

Government Regulations

Wherever your production is located water must be protected by fulfilling the government requirements. When LOOPTEC size recovery plants are used these requirements can be met easily and the advantages of this technology become even more significant.

Environmentally friendly manufacturing

This is an area where technological advances offer significant savings in resources and remarkable local environmental benefits. In textile processing, dyeing and finishing have the largest water, energy and chemicals requirements and therefore offer the greatest scope for reductions and improvements.

Advances in making textile manufacturing more environmentally friendly have not been limited to improvements in dyestuffs and equipment.

LoopTEC plants that are most advanced in reducing water, energy and chemicals pursue a combination of options including high-efficiency management practices, process control, special processes, and treatment and recycling of effluent streams containing valuable energy and ready to re-use-chemicals.

By cleaning effluent streams instead of draining them there are many advantages. Recycling of chemicals proved as excellent instrument for reducing productions cost and minimizing effluent problems.

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By separating water and chemicals of the effluent there are many advantages in various processes along the manufacturing chain:

- **Hot water is redirected to the washing boxes**
- **Re-usable chemicals are redirected to the application section**
- **Energy demand is reduced**

A cycling rate of 80 % of the initially used sizing agents is characteristic for a well designed cycling plant. A remarkable reduction of energy cost and an extremely low need of fresh water and much lower waste water BOD are some of the ecological benefits of this solution. Additionally an increased weaving mill efficiency and a dust reduction can be expected.

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Desizing

Factory View

Today, a unique opportunity exists to meet the enormous challenge of coordinating environmental and public health objectives, and the general treatment of water as a common property resource. LoopTEC is addressing this challenge via tailor made chemical recycling plants fitting into existing finishing processes.

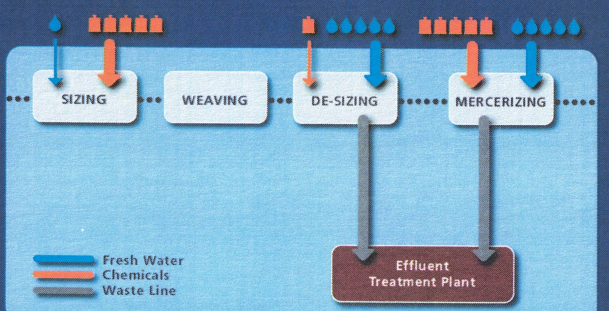
The goal is to create a mutual project management and ensure corporate strategies for effective manufacturing to address both natural resource and corporate requirements.

Planning

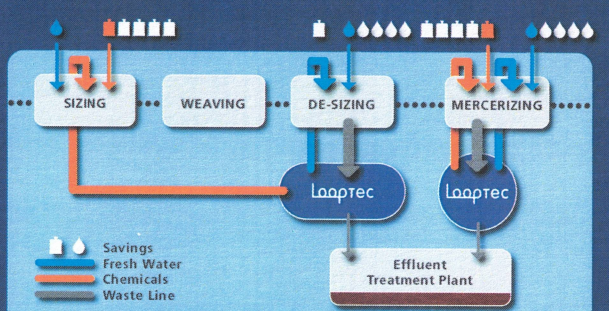
We are a consultant and active partner for modification of size recipes, for the evaluation of sizing agents and for the pre-treatment processes. We have the know how to consult you at any time in technical and economical aspects.

The adjustment of proven chemical combinations for a recyclable sizing recipe can be done a good cooperation between manufacturing management and LoopTEC technical consulting staff.

Water and Chemicals Processing – without Recycling



Water and Chemicals Processing – with LoopTEC Recycling



This table shows a comparison of thread break values (warp and weft) for a weaving mill using a size blend of PVA and acrylic size (ratio 70:30), which has been recovered with a ultrafiltration unit for years, versus the old size formula, prior to recovery, with c. 65% modified starch and 35% PVA.

Type of Size:	Starch + PVA without recovery	PVA + Acrylic (CE) with recovery
Case 1: Ne 20/1		
Warp thread breaks	5.3	2.4
Weft thread breaks	2.8	1.2
Total thread breaks/CMP	8.1	**3.6**
Case 2: Ne 8/1		
Warp thread breaks	3.9	1.5
Weft thread breaks	2.6	1.3
Total thread breaks/CMP	6.5	**2.8**

Thread breaks per 100,000 picks (CMP)

Economy and Ecology

LOOPTEC Size Recovery Plants prove that economical and ecological benefits can be reached simultaneously. The size recovery is a most favourable opportunity for textile companies to increase profitability of production and at the same time takes care of ecological aspects.

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The following reasons verify this statement:

- **Recycling rate of 80 % of the initially used sizing agent**
- **Reduction of costs for sizing agents**
- **Increased weaving mill performance due to less yarn breaks**
- **Increase of high quality fabric percentage**
- **Dust Level reduction in the weaving mill**
- **Significant lower thread breaks**
- **No enzymatic or oxidative pre-treatment for the desizing is necessary**
- **Remarkable reduction of vapour for the pre-treatment stages**
- **Extremely low demand of fresh water and lower waste water discharge**
- **Reduction of pollution load in the effluent by app 50 – 60 %**
- **Significant reduction of the sludge production in the treatment plant**
- **Improved performance of the existing biological treatment stage**
- **Much lower BOD in aeration tanks**

Mercerizing

Recycling of caustic soda out of the mercerizing wash box effluent streams means savings in neutralisation, purchasing of caustic soda, less water and energy demand. Re-concentration of the effluent stream containing weak lye can be done by evaporation or membranes which are not degraded by the pH and temperature of the caustic liquid. The result of the recycling process is highly pure caustic and a required concentration that can be re-used or looped to the mercerizing process nearly endless.

Indigo

To address the specific manufacturing requirements in Denim a highly efficient Indigo recycling system for reusable Indigo will be announced in the next few months.

Finishing Chemicals

Generally effluent from washing boxes can be recycled. The decision which process is efficient to be recycled depends on the recipe used and the volume of effluent. We kindly assist with an economic an technical white paper.

About us.

Our customers get highly efficient recovery plants fitting exactly to the manufacturing processes existing.

As engineers the demands of our customers and their manufacturing processes are the groundings for any design. Adding the experiences of many projects developed by our team members LoopTEC can offer you a unique and efficient solution in preserving the ecological resources.

We are Engineers.

LoopTEC designs and delivers custom tailored chemical filtration and recovery plants for the textile producing industry mainly. There are nearly 60 plants delivered in the last 20 years from the designer of these plants who joined our company in 2010. High recovery rates for the reusable chemicals and the reusable water are the main reasons to invest in these plants.

LoopTEC can work out tailor-made solutions for customers because we have the know-how and technology to produce recycling plants in the required high temperature environment of the textile industry effluents used for recovery.

Quality in plant design means a long lifetime of the plants and can be seen in plants built years and years ago which are working efficiently since.

Customers benefit from our process expertise, knowledge of the industrial production chain requirements and from the innovative technology tailored to the individual process demands.

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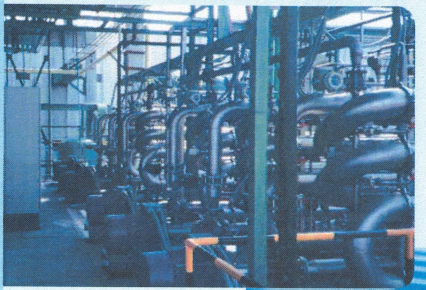

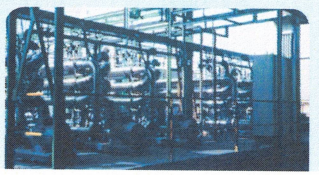

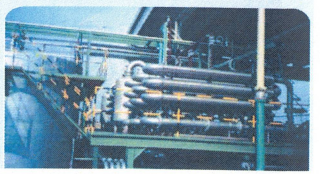

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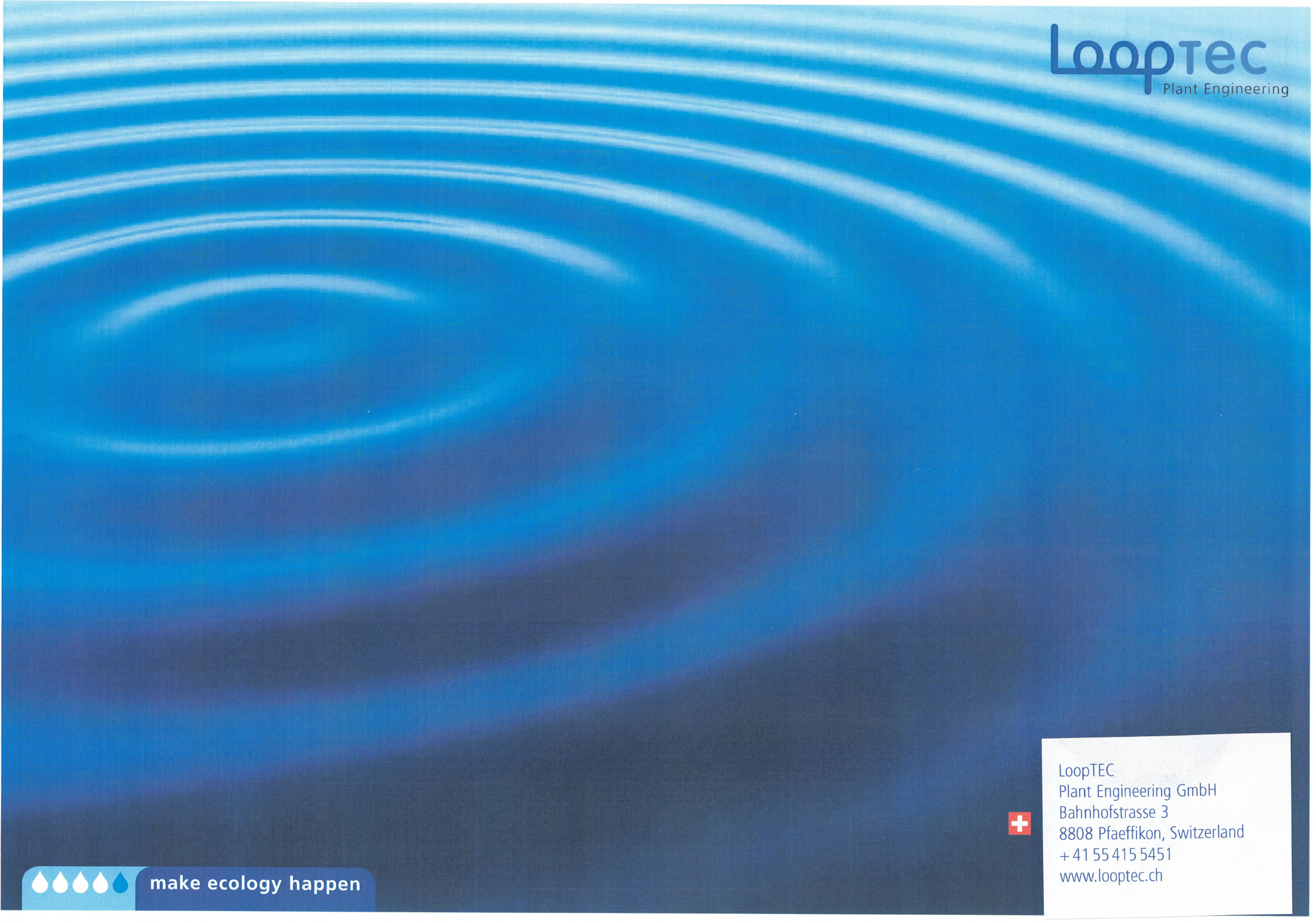

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DyStar

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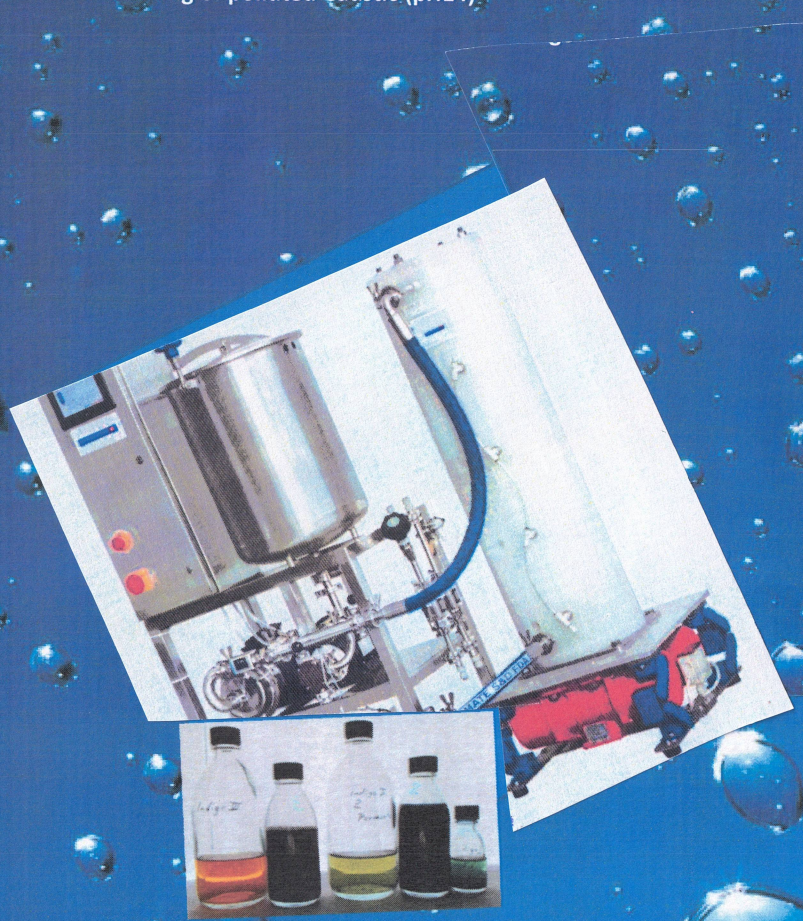
a common development

DyStar

Mobile test system available with following functions

- Cleaning of wash water for re-using
- Filtration of dyebath and/or overflow for regaining of Indigo
- cleaning of polluted Caustic (pH14)



Wash water re-using, Indigo recycling on Denim Dyeing ranges

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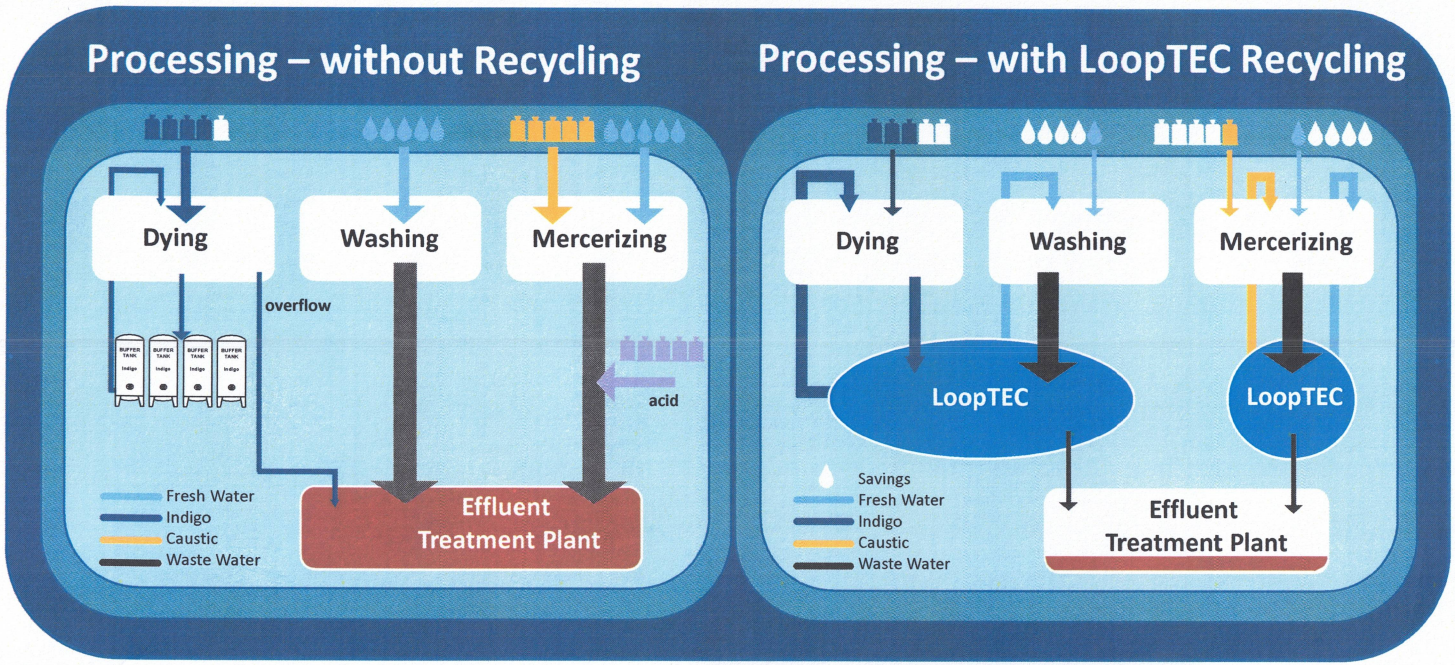
Wash water re-using, Indigo recycling

- Cleaning of wash water
- Recycling of dyestuff of the wash water
- enrich of ox. Indigo from the overflow or dye bath
- Cleaning of polluted Indigo dyestuff (such as Sulphur Black)



Caustic Soda (NaOH) recycling

Water and caustic soda (NaOH) can cleaned and concentrated. Caustic soda is responsible for at least 99 % of the salt burden in the ETP. LoopTEC recommends the concentration and reuse of the caustic soda. This method reduces costs of manufacturing.
The effluent can be separated and 100% of the caustic soda can be recycled and reused in a LoopTEC recycling plant. As result almost no effluent reaches the ETP from this section because it is looped into reusable caustic liquid and reusable water.

Advantages

- 85% of the required washing water demand is already saved
- 99.998% of the indigo contained in the wash water can be absorbed
- 99% of the wash water is dropped out and can be used again
- 96 % of the salt shares which may be present in the dye bath are excreted (96% of the liquids are excreted)
- The Indigo can be concentrated up to a content of 10%
- The dye liquor is universally applicable for different charges
- It is possible to purify the concentrated dyeing liquor from the sulphur black particles and other impurities
- The high-purity concentrated indigo dyeing liquor is available for reuse after cleaning

Advantages

- 95 % less water consumption from this process
- 95 % Reduction of Caustic demand
- 95 % less acids for neutralisation
- 95 % less effluent volume
- 75 % energy savings
- 98 % salt effluent avoided