Understanding the impacts of wet processing: Pre-treatment

This document introduces and highlights the key environmental impacts of common pre-treatment techniques as well as lower impact options.

It has been developed as part of the Sustainable Clothing Action Plan (SCAP). SCAP is a collaborative agreement to improve the environmental impact of clothing. See **wrap.org.uk/scap2020**

What is wet processing and why is it so impactful?

Wet processing refers to any process that uses liquid to pre-treat, dye, print or finish a product. This stage of the product lifecycle has a notable environmental impact using vast amounts of water, energy and often hazardous chemicals.

Natural fibres such as cotton, linen and wool contain impurities such as oils and waxes which affect the fibre's ability to absorb dyes.

Therefore a series of treatments are needed in order to 'prepare' the fibre for dyeing and further processing. These processes can vary, but commonly include scouring and bleaching.

Scouring

Conventional

Caustic Soda Treatments

Caustic soda (sodium hydroxide) treatments are very energy intensive, requiring high temperatures for a long period of time. Caustic soda is considered to be hazardous and if not handled properly can cause eye, skin and respiratory damage to workers.

Commonly used on: Cotton, linen, hemp, wool and other natural fibres.

Less impactful

Enzyme Scouring

Enzymes are proteins that can catalyse reactions. They are used in the textile industry as a substitute to chemicals. Scouring enzymes can, in some cases, be used to break apart the natural waxes and impurities in fibres. Many enzymes work within a broad range of temperatures and within a neutral pH range.

This means that they use less energy, less water and can be combined with other process steps leading to time savings.

Bleaching

Conventional

Chlorine bleach

Chlorine bleach is a harsh chemical process, which can lead to the production of absorbable organic halogens (AOX compounds). These are precursors to dioxins, a group of chemicals that are highly toxic, carcinogenic and disruptive to development and hormone systems in humans. Chlorine bleach has been largely replaced with hydrogen peroxide. Commonly used on: Cotton, linen, hemp, wool and other natural fibres.

Less impactful

Hydrogen Peroxide

Hydrogen peroxide is a chemical bleaching process. However, it does not present the same level of chemical and operational health & safety concerns of chlorine bleaching. Hydrogen peroxide is a widely available lower impact alternative.

Enzyme Bleaching

Enzymes are proteins that can catalyse reactions. They can be used in the bleaching process to remove colour. Enzymes can reduce or, in some cases, eliminate the need for chemicals. Enzyme bleaching will not achieve the same bright whites as chemical bleaching.

Combo Bleaching

To achieve a white base through bleaching, using a combination of enzymes and hydrogen peroxide would be a lower impact option. Reductions in water, energy and chemicals are still achieved.

Bleach Clean Up

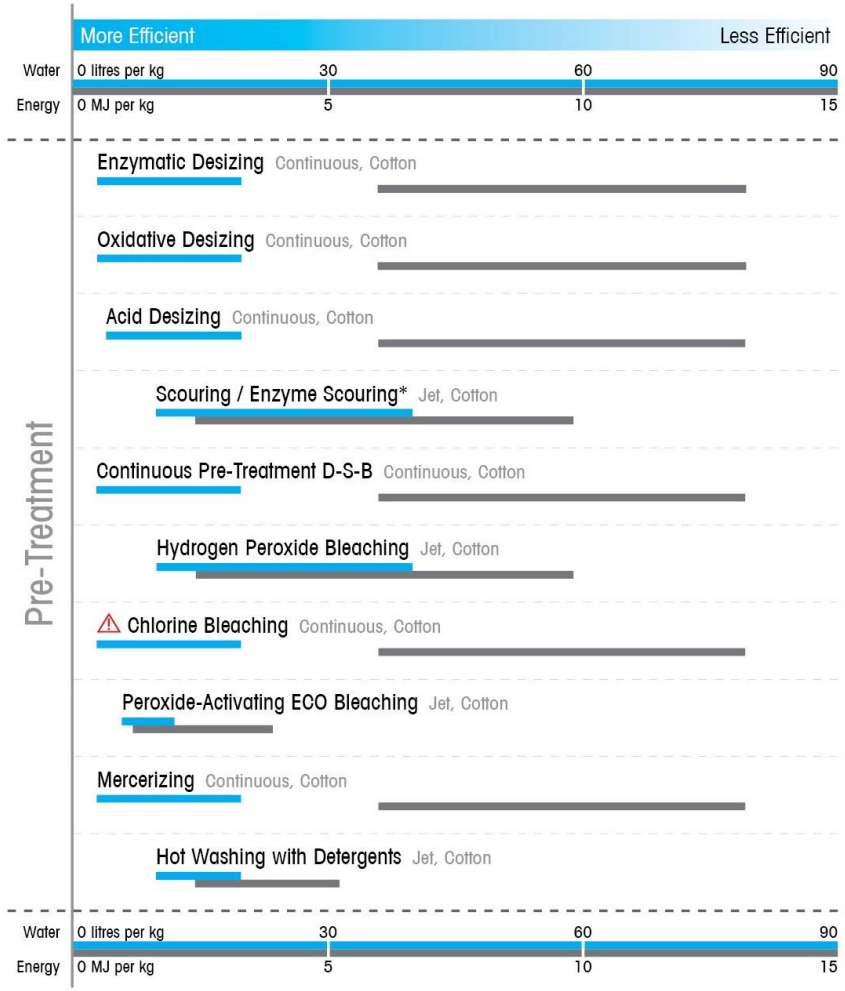
After bleaching with hydrogen peroxide, a rinse off process is needed to ensure that all the bleach is removed before dyeing. Enzymes can be used to break apart the hydrogen peroxide bleach in a very short time, leaving only oxygen and water. This reduces the amount of polluted water.

Wet Processing Benchmark

To better understand the quantitative impact of common pre-treatment processes, view MADE-BY's publicly available Wet Processing Benchmark.

The Benchmark helps brands and retailers understand the range of impact that common wet processing techniques have in terms of water and energy. It can also be used as a tool to help the viewer better understand their efficiency compared to industry averages.

made-by.org/benchmarks



WRAP's vision is a world where resources are used sustainably. It works in partnership with governments, businesses, trade bodies, local authorities, communities and individuals looking for practical advice to improve resource efficiency that delivers both economic and environmental benefits.

Our mission is to accelerate the move to a sustainable resource-efficient economy through:

- **re-inventing** how we design, produce and sell products;
- **re-thinking** how we use and consume products; and
- **re-defining** what is possible through recycling and re-use.