Understanding the impacts of wet processing: Printing

This document introduces and highlights the key environmental impacts printing processing / 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**

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.

Printing occurs at either the fabric or garment level and adds further designs to the end product. Printing uses a surprising amount of water, energy and chemicals.

Chemical issues occur in the type of printing inks used with water pollution issues arising if the waste water is not properly treated. Energy issues linked with printing relate to the machinery used and the high temperatures needed to cure (set) the prints.

Conventional

PVC Plastisol Inks

PVC Plastisol is not biodegradable, meaning that it will not quickly degrade when landfilled. If incinerated it can release dioxin, which is a highly toxic compound. Plastisol can also contain carcinogenic chemicals called phthalates.

PVC plastisol therefore presents operational health & safety issues in production and incineration.

Less impactful

PVC-Free Inks

A range of plastisol inks that are PVC free are available within the market. These offer the best 'like for like' switch, without the chemical and operational health & safety issues related to PVC plastisol use.

PA/PU Water-Based Inks

Depending on the desired end result, water-based inks may be a suitable alternative to PVC plastisol inks. Water-based inks do not represent the same level of operational health & safety issues compared to plastisol as they do not contain PVC or phthalates.

Silicone-Based Inks

Silicone based inks also do not contain PVC, phthalates or solvents. Silicone inks do offer print stretchability. The ink also cures quickly at relatively low temperatures, saving energy.

Conventional

Discharge Inks

Rather than creating a print that sits on top of the garment, with discharge printing, the inks create a pattern by breaking down the original dye on the product to create a print that is embedded into the garment.

There are a number of hazardous chemicals that can be used in this process, such as potassium permanganate, formaldehyde and sodium chlorite.

Less impactful

Bio-Discharge Printing

An alternative printing approach could be to use bio-discharge printing. Bio-discharging uses alternative discharge agents such as enzymes to create a print pattern. Bio-discharge eliminates the usage of many of the hazardous chemicals present in the conventional printing approach.

Digital Printing

Digital printers look much like large scale paper printers, and offer users the ability to program in designs which are then printed onto the fabric.

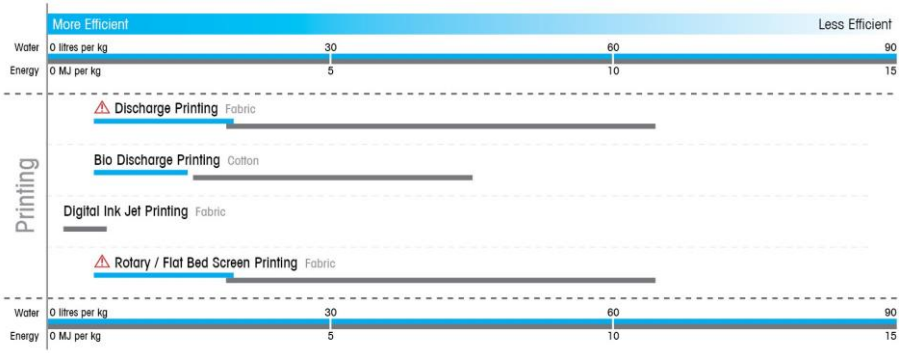
This process has a number of operational health & safety and environmental advantages, for example digital printing means that there are no screens to clean, reducing water usage and no wasted print pastes to dispose of.

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.