

SWEDEN TEXTILE WATER INITIATIVE

GUIDELINES

for Sustainable
Water Use In
the Production
and Manufacturing
Processes of Textiles and Leather
– Short Version



STWI members

Acne

HESTRA



NYBLOM KOLLÉN

DIDRIKSONS 1913
Grundsund SWEDEN

ICA



ellos



procurator

Filippa K

INDISKA

RGB Design



RNB RETAIL AND BRANDS
JC POLARN O. PYRET BROTHERS SISTERS

GANT

KappAhl



Gekås Ullared



gina tricot



LINDEX

stadium

MONKI WEEKDAY



HEMTEX



wesc

H&M

NILSON GROUP

DIN SKO / SKOPUNKTEN / NILSON SHOES / RADICAL SPORTS / JERNS

ÅHLÉNS



1 Preface

Since 2010, the Stockholm International Water Institute (SIWI) and the Swedish textile and leather sector, represented by 32 pioneering brands have been working together to understand and address water risks associated with textile and leather manufacturing processes in production countries.

The companies and SIWI launched the Swedish Textile Water Initiative (STWI) in 2010 as a learning process that has evolved through the past years towards a successful and pioneering partnership that continues to bear fruitful results on the ground. The partnership continues to show that increasing efficiency in resource use and pollution prevention creates a triple win: a win for business, a win for society and a win for the environment.

STWI continues to develop and improve its Guidelines for the Sustainable Use of Water in Manufacturing Processes, both for textiles and for leather. A key principle of these Guidelines is the value of prevention. Reducing water and chemical use early in the production process is cheaper and more productive than exclusive focus on wastewater treatment. It also means that substantial economic benefits are within easy reach for manufacturers that use water more wisely.

However, since the publishing of the STWI Guidelines in 2011, the issue of water scarcity has only been exacerbated; and the importance of disposing of water in a safe manner is increasing. These actions are being driven by local community actions, greater government enforcement of water related compliance in several parts of the globe, and pressure from global NGOs looking at this issue. That only increases the relevance and applicability of the STWI guidelines.

In this edition, published in September 2014, the guidelines are enhanced to increase their applicability to current challenges. This edition includes enhanced tools on guidelines application.

As SIWI and the STWI brands forge ahead in expanding their impact, we feel assured that the exciting journey we started in 2010 will continue at a steady pace towards the sustainable use of water resources in the textile and leather production sector.



Torgny Holmgren
Executive Director
Stockholm International Water Institute (SIWI)

2 Introduction





Objective

In a world with declining access to finite supplies of water and natural resources, the continuous success of all companies relies on their ability to transform to sustainable production to meet the expectations of the growing number of conscientious retailers and customers. The processes of textile and leather manufacturing are very water-intensive; the STWI Guidelines are focused on sustainable water use and are designed to support you on this journey.

There are two parts to the Guidelines. This document includes guidelines for textile production. A separate set of guidelines has also been produced for leather production. Both consist of a complete guideline document and a self-assessment questionnaire. Also available is this short version of the Guidelines, which summarizes the content of both the textile and leather documents. A library of extensive background information has also been produced. The short version is available to everyone, while the complete Guidelines and the self-assessment template are accessible to STWI members and their suppliers. Suppliers can also obtain access to documents from the library upon request to their buyer.

The STWI Guidelines have been produced during a four-year learning process by the Stockholm International Water Institute (SIWI) and representatives from all the STWI member companies: Acne, Åhléns, Boomerang, Didriksons, Ellos, Filippa K, Fjällräven, Gekås, Gina Tricot, Haglöfs, Hemtex, H&M, ICA, IKEA, Indiska, Intersport, KappAhl, KUS design, Lindex, Hestra, MQ, NilsonGroup, Nyblom Kollén, Odd Molly, RNB, Snickers workwear, Stadium, TPC Textile, Klättermusen and WeSC.

STWI would like to thank the following experts for their knowledge and support: Maria Jonstrup, Stefan Posner, and the entire cKinetics crew.

Scope

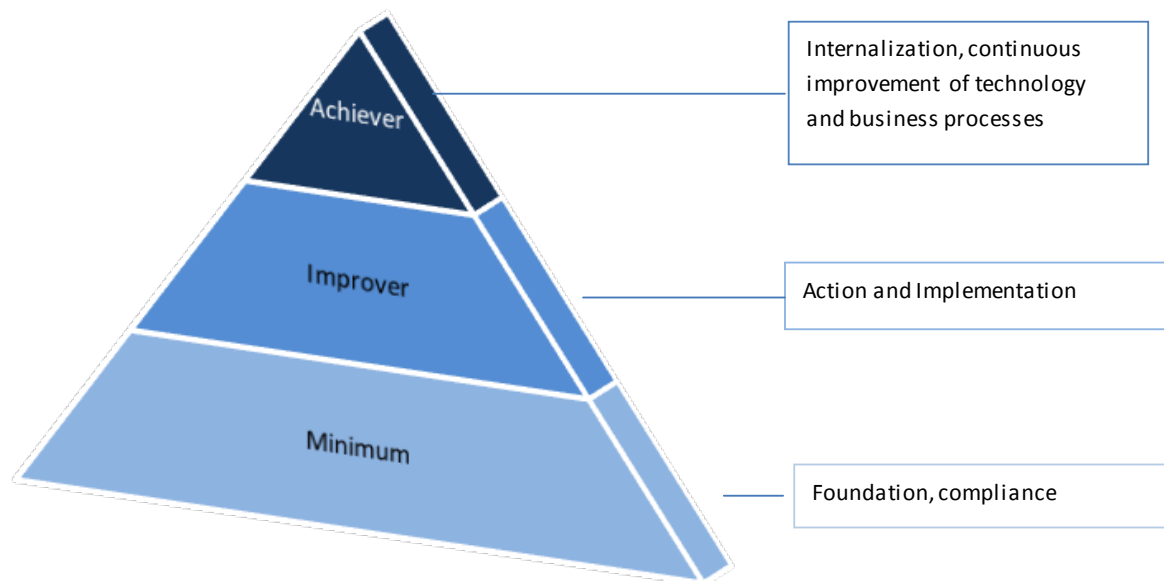
The Guidelines cover three areas: water efficiency, water pollution prevention, and wastewater. The purpose of water efficiency is to ensure that only the necessary amount of water is used in the factory, reducing the need for wastewater treatment as well as energy and water costs. The areas of water pollution prevention and wastewater aim to reduce negative health and environmental impacts from chemicals used in the production processes. It will also free up water resources and improve water quality for other water users.

The three levels of the Guidelines

- **Level 1 Minimum** is the minimum acceptable level for water management, which means that the supplier complies with legislation and has a general awareness about water issues. This is the first step towards sustainable water management. Where there are differences between the provisions of these Guidelines and national laws or other applicable standards, suppliers should adhere to the higher or more stringent requirements.
- **Level 2 Improver** A factory's environmental performance has exceeded legal requirements, working methodically with water and pollution prevention action plans.
- **Level 3 Achiever** Suppliers are leaders in the field of sustainable water usage in the textile/leather industry and use Best Available Techniques (BAT) for reducing water use, re-using water, and phasing out hazardous chemicals.



Fig. 1 illustrates the meaning of each level.



The purpose of the three level structure is to facilitate continuous improvements and to allow factories at all levels of water management to use the STWI Guidelines. At each level, and increasingly at Levels 2 and 3, you will see that the improvements you have made in water management also translate into financial gains. For example, cost-savings on water and energy will be achieved through more resource-effective production and contribute to a fast return on investments.

Management engagement and Sustainability policy

The companies that founded STWI are all committed to making a difference and contributing to a more sustainable world. The responsible and sustainable use of water is of paramount importance to that goal. This will be achieved only by companies that have an engaged management and trained employees where sustainability measures are fully integrated with daily operations.

In order to successfully apply the STWI Guidelines, it is important to:

1. Appoint a responsible person with a clear mandate and resources.
2. Conduct a self-assessment to establish a base line.
3. Measure the quantity and quality of water used.
4. Set clear targets and make a time-bound plan for achieving them.
5. Involve and engage employees at all levels.
6. Understand that this is a journey of continuous improvement.

Approach taken by these guidelines

The maturity of existing legislation in the field of water varies in different parts of our world. It is a minimum requirement that all local and national legislation is fully complied with and that the producer has a good and constructive dialogue with the local authorities. Global conventions regarding the use of chemicals, such as the Stockholm Convention on Persistent Organic Pollutants (POPs)¹, should also be followed. Where there are differences between the provisions of these Guidelines and national laws or other applicable standards, suppliers should adhere to the higher or more stringent requirements.

Sub-contractors and sub-suppliers

The STWI guidelines are being promoted by brands which believe in acting responsibly and want to do so through suppliers that they have a direct relationship with, i.e. Tier 1 manufacturers, who have the power to influence water use and chemical releases from direct operations in their own factories. Tier 1 manufacturers in turn are expected to initiate a dialogue with their suppliers (fabric and component suppliers), extend influence to their operations and improve the water situation even further up the supply chain. So the Guidelines are also a tool for the larger textile supply chain.

They are meant to enable manufacturers to navigate a journey that seeks to use water sustainably. Compliance is a bare minimum requirement; the aim is to drive water stewardship.

A common journey

We, the founding companies of STWI, expect our suppliers to fully implement the Guidelines in line with each of the buying companies' general terms and conditions. We are convinced that all our partners will see the benefit from implementing the Guidelines and will start a journey towards a smarter use of water, so contributing to a prosperous and sustainable future.

¹ Stockholm Convention, <http://chm.pops.int/Convention/ConventionText/tabid/2232/Default.aspx> (retrieved 12 April 2012)



“Management of water and waste water is extremely important in today’s resource constrained times. From a business standpoint, efficient utilization of water not only reduces the cost of resource consumption but also improves business sustainability.”

Nishant Maskara, Supplier to STWI Brands, India



“Treatment of waste water involves energy and chemicals. Hence, managing it is important from a compliance perspective as well as from a resource conservation perspective. Awareness of these aspects can not only give businesses economic benefits but also differentiation in a competitive market.”

Pramod Mehra, Supplier to STWI Brands, India



“Water availability is going to be the biggest threat to the processing industry in the future. However, this threat also presents an opportunity for the industry to improve their awareness on this matter and explore new technologies and practices for reducing water usage and waste water generation.”

Manish Gupta, India, Process House Owner, Supplier to STWI Brands

3 Water Efficiency





A reduction in the amount of water used in a factory will reduce the cost of water as well as of wastewater treatment. It will also make more water resources available for other local users, such as households and farmers. Reduced water use also saves energy because less water needs to be heated for various processes and less water needs to be treated after use.

Level 1: Minimum level

At this level the prime focus should be to correctly assess one's water withdrawal and to use it as a baseline.

- All applicable legal requirements should be followed and all necessary permits should be available and up-to-date.
- Drinking water for all factory personnel should be purified and should meet all parameters required by national legislation or WHO Guidelines.
- Management and production leaders should be educated so as to spread relevant knowledge within the factory.
- Analysis of the inflowing water should be conducted to ensure high quality of the water used for different processes.
- The total amount of water used and the total weight of leather/textiles produced should be measured regularly to permit continuous improvements.
- The factory should have clear routines for handling of water. Machinery checks (e.g. pumps, valves, level switches, etc.) and general maintenance should be carried out at regular intervals.
- Water flow measurement equipment should be used and the equipment should be calibrated and maintained regularly.
- The water usage data should be available on site, and should include water used domestically as well as for production.
- The focus of the plant should be broadened to consider how the site influences and interacts with the local environment and local communities.
- Rain water harvesting should be implemented at units where permitted by law.
- All employees should be educated about efficient water use. The training should be process- and machinery-specific.
- The amount of water used in different sub-processes should be measured at least monthly to allow continuous improvement. All data should be kept on site.
- A plan with clear goals for how the water used in the process can be reduced should be implemented. The plan should address the changes that are going to be made, with details of how and when they will be made.
- Water-saving equipment should be identified and installed to reduce the water used, and systems for water re-use should be identified and implemented.
- Formulae should be recorded and processes should be tested by adopting steps that reduce water, energy and chemical usage but yield the same end result.
- The water withdrawn and water usage data in every sub-process should be available on site. This should be checked against the production output to arrive at key performance indicators.

3.2 Level 2: Improver

At this level, environmental performance will have reached beyond legal requirements and factories will be working methodically with water efficiency action plans.



Photo: Renée Andersson, Indiska

² Document can be downloaded from World Health Organization: Guidelines for drinking-water quality http://www.who.int/water_sanitation_health/dwq/en/



Level 3: Achiever

At this level factories will take initiatives that go beyond what is obligated by law. Water efficiency is a part of the business plan and the supplier is proactive.

- The source of the inflowing water and the effects of water withdrawal on the surrounding area and the local community should be known. The factory should conduct a risk assessment of the effects of water withdrawal which can pose physical, regulatory and reputational risks.
- All employees should be educated about the environmental and community impact of extensive water withdrawal. All employees involved in purchasing, engineering and design of equipment or process should be continuously educated on investments in water-efficient equipment, chemicals and production processes.
- Water efficiency targets should be set based on improvement measures identified for water savings at the unit and their consequent saving potential. These should be reviewed at least annually to drive continuous improvement.
- The factory should strive to acquire new technical knowledge and implement Best Available Techniques (BAT) (for leather, see the European Commission reference document (BREF) on best available techniques for integrated pollution prevention and control in tanning of hides and skins , and for textiles see the document Best Available Techniques in Textile Industry).
- Leadership should take an active role in identifying and investing in solutions to reduce water withdrawal, and the factory should have an action plan for investments/cost savings for all wet processes.
- Data on water withdrawn and water usage data should be available on site and should be part of the business plan. The annual reduction in water withdrawal should be analysed and shared with buyers, shareholders and sub-contractors.

³ Documents can be downloaded from European Commission Joint Research Centre Institute for Prospective Technological Studies, Tanning of Hides and Skins: <http://eippcb.jrc.es/reference/tan.html> (retrieved 30 June 2014).

⁴ Documents can be downloaded from European Commission Joint Research Centre Institute for Prospective Technological Studies, Textiles Industry: <http://eippcb.jrc.es/reference/txt.html> (retrieved 30 June 2014)

4 Water pollution prevention





Chemicals can be hazardous for people working in the factory, for those wearing the garments, for the environment and for those living downstream of the factory. Reductions in the consumption of chemicals/auxiliaries, water and energy lead to better environmental performance by minimising the amount of solid waste as well as ecological loads in wastewater and air emissions. They also lead to reduced costs, better relations with neighbors and regulatory authorities, and better control of the product. So they make it possible to achieve the product requirements of customers while creating an improved work environment. The factory is recommended to have a chemical policy endorsed the top management and to buy dyes and chemicals from companies who can supply Material Safety Data Sheets (MSDS).

4.1 Level 1: Minimum level

- All applicable legal requirements should be followed and all necessary permits should be available and up-to-date.
- All employees should have appropriate education concerning the handling of chemicals and auxiliaries, especially in the case of hazardous substances.
- The individual STWI member's Restricted Substances Lists should be followed.
- The chemical consumption at the unit should be measured and monitored.
- All chemicals used and stored in the production unit should have an up-to-date MSDS available. The MSDS should be in the local language(s) and readily available to employees.

- A specific person should be appointed to be responsible for chemicals.
- Appropriate Personal Protection Equipment (PPE) such as gloves, safety goggles, masks, aprons, etc. should be used when working with chemicals.
- Appropriate emergency provision should be in place at the chemicals handling and storage areas according to risk assessment of the chemical and process and the recommendations in the MSDS.
- Measuring equipment and dispensing devices for chemicals should be calibrated. This ensures proper dosing, which also gives economic advantages. Any kind of surplus of applied chemicals should be avoided.
- Waste chemicals should be collected and disposed of in an environmentally sound manner, in accordance with current legislation and with the information in the MSDS.
- Chemical procurement and consumption data should be systematically recorded.

4.2 Level 2: Improver

The factory should have a plan available, containing clear goals and routines to improve chemical management and efficiency. The factory should have achieved a major part of the European Commission reference document (BREF) on best available techniques for integrated pollution prevention and control in the tanning of hides and skins⁵, or in the textiles industry⁶



Photo: Jean Scheijen, SXC

⁴ Documents can be downloaded from European Commission Joint Research Centre Institute for Prospective Technological Studies, Tanning of Hides and Skins: <http://eippcb.jrc.es/reference/tan.html> (retrieved 12 April 2012).

⁵ Documents can be downloaded from European Commission Joint Research Centre Institute for Prospective Technological Studies, Textiles Industry: <http://eippcb.jrc.es/reference/txt.html> (retrieved 12 April 2012).



- The factory should have initiated the replacement of hazardous chemicals with better alternatives.
- The diversity and amount of chemicals should be reduced by optimisation of the formulae used in production. Ongoing efforts should be made to ensure that the processes are done right first time (RFT).
- Systems for handling chemicals should be operational. Incoming dyes, chemicals and auxiliaries should be tested for strength and also to ensure that what has been received matches the requirement.
- Units should have an internal lab for checking the performance of processed. The factory should have started to substitute hazardous chemicals with better alternatives.
- The factory should keep track of and record the amount of chemical waste generated along with treatment and disposal methods adopted by the waste contractor. A reduction plan should also be in place.
- Data on key performance indicators on chemical usage should be tracked and available on site.

4.3 Level 3: Achiever

The factory should have achieved the requirements of the European Commission reference document (BREF) on best available techniques for integrated pollution prevention and control in the tanning of hides and skins⁶, or in textiles industry⁷.

- The factory should regularly revise chemicals used and replace harmful chemicals with less harmful ones.
- The environmental characteristics of the chemicals used should be known, such as chemical oxygen demand (COD), biological oxygen demand (BOD), aquatic toxicity, degree of biodegradation/bioelimination, content of nitrogen, phosphorous, sulphur, absorbable organic halides (AOX) compounds, kind and amount of volatile compounds, emission factors, and health and safety aspects.
- The facility should have a hazardous waste management plan.
- Units should publicly disclose data about the amount of discharge of hazardous chemicals from their facilities.



Photo: Renée Andersson, Indiska

⁶ See footnote 4

⁷ See footnote 5

5 Wastewater





The textile and leather industries are very water-intensive, which results in large amounts of wastewater being produced. To ensure efficient treatment and to reduce costs, “end-of-pipe” solutions need to be combined with cleaner production and efficient water use. An advanced approach to effluent management is to aim at zero discharge or water recycling. If the treated effluent is clean enough to use in factory processing it should not be discharged

Wastewater from the textile and leather industries is usually very complex. It is typically alkaline (high pH) and has high COD and BOD. Tanneries also usually have high concentrations of sulfides and chromium.

Sludge is an inevitable by-product in most wastewater treatment processes, but the amount of sludge produced depends on the type of treatment used. Proper sludge disposal is very important.

The wastewater from the factory can be treated in an effluent treatment plant (ETP) on-site or off-site. On-site ETPs are owned by the factory and located in direct connection to it. Off-site ETP is an umbrella term for common effluent treatment plants (CETP), municipal wastewater treatment plants, and publicly or privately owned treatment plants.

5.1 Level 1: Minimum level

- All applicable legal requirements should be followed and all necessary permits should be available and up-to-date.
- It should be known which recipient receives the treated wastewater (for instance lake, river, sea or wetland) and which water users are reliant on that recipient.
- To ensure that the ETP is run properly the operators need to be technically competent and well-trained.
- The factory should be connected to an ETP, which should be running continuously when the factory's wet processes are running. A wastewater emergency plan should also be available, to be used in the event of a wastewater treatment plant breakdown.
- During the peak season, production should not exceed the capacity of the ETP or its permits and licenses. The amount of wastewater should be measured daily and records kept on site. No waste water should be discharged in to the environment without being treated.
- The treated wastewater should be analysed by an external laboratory as required by law and the results should not exceed legal discharge limits. If guidance from the legislation is missing, at least pH, biological oxygen demand (BOD), chemical oxygen demand (COD), total suspended solids (TSS), total dissolved solids (TDS) and temperature should be analysed by a third party on at least a quarterly basis.

Minimum level for Off-site ETP

- Have a current and valid permit to discharge **wastewater to the off-site ETP from all applicable** governing agencies.
- Comply with all off-site ETP permit requirements.
- **Request and receive documentation of the off-site ETP's** compliance with local, state, provincial or federal discharge regulations.
- Measure and document the volume of discharged wastewater.
- Make sure that the capacity of the off-site ETP covers the needs of the factory.



Photo: Renée Andersson, Indiska



- pH, TDS, colour and temperature should be analysed on site daily. The records should be maintained at the site.
- The legal requirements on sludge management and disposal should be followed and the amount of sludge obtained should be measured at least weekly. This data should be maintained at the site.

5.2 Level 2: Improver

- The impact on the medium that receives the discharged wastewater should be evaluated. If the results indicate that the impact is unsustainable, additional water pollution prevention and wastewater treatment measures should be employed.
- The efficiency of the existing ETP should be evaluated and the treatment processes optimised to achieve best possible treatment of the wastewater.
- The factory is recommended to analyse the wastewater in a well-equipped in-house laboratory. At least parameters such as pH, TDS, colour and temperature should be analysed on a daily basis. Additional parameters such as BOD, COD, TSS and heavy metals should be monitored monthly.
- The quality of the treated water should be better than the requirements of the national legislation. Factories should also have an action plan for further improvement of water quality, and wastewater quality targets should be reviewed annually to drive continuous improvement.
- The supplier should have analysed the potential for re-using the wastewater after treatment and have an action plan for implementation of methods for wastewater re-use.
- The wastewater treatment processes should be run in an optimal way to reduce the amount of sludge produced, without compromising the quality of the treated water.
- The physico-chemical properties of the sludge should be analysed regularly. The analysis should, at a minimum, include: dry matter, metal and nutrient content.
- The sludge should be disposed of properly, for example being taken to an approved landfill or incineration plant or being accepted by a company/agency/authority licensed to handle sludge. The sludge should be sufficiently dewatered for the current management method.
- All testing data from external and in-house labs should be maintained at the site.

Level 3: Achiever

- Water pollution prevention and wastewater treatment measures should have been implemented so that the wastewater discharge to the recipient can be considered sustainable.
- The operators should receive regular certified education to continuously improve waste-



Photo: Renée Andersson, Indiska

⁴ Documents can be downloaded from European Commission Joint Research Centre Institute for Prospective Technological Studies, Tanning of Hides and Skins: <http://eippcb.jrc.es/reference/tan.html> (retrieved 12 April 2012).

⁵ Documents can be downloaded from European Commission Joint Research Centre Institute for Prospective Technological Studies, Textiles Industry: <http://eippcb.jrc.es/reference/txt.html> (retrieved 12 April 2012).



water treatment efficiency and sludge management. They should also be updated on best environmental practice (BEP)⁹.

- Factories should separate their wastewater streams. Separation of highly polluted water from relatively clean water results in a more effective treatment since it is possible to use optimal treatment methods instead of using one method to treat a mixture of wastewater with different characteristics. The clean streams can then be re-used with little or no treatment.
- The unit should conduct regular monitoring of the wastewater quality at all the stages of the treatment process to assess consistent quality of effluent water, and also during production peaks. The quality of the treated wastewater should exceed the legal requirements and it should be clean enough to be re-used within the factory.
- Technologies for separation of salt should be in use. The salt should also be re-used within the process to as high an extent as possible. Water that is recovered should be re-used in the process.
- Wastewater quality and volume improvement targets should be reviewed annually to drive continuous improvement. The treated wastewater should be clean enough to be re-used within the factory and the aim should be zero liquid discharge (only textile production).
- The quantities of sludge obtained should be minimised by using wastewater treatment technologies with low sludge production.
- External physico-chemical and eco-toxicological analysis of sludge quality should be done at least twice a year and include analysis of dry matter, metal and nutrient content.
- All in-house and external test reports should be saved and be available for review on site. The external test reports should also be saved and sent to customers upon request.
- Units should publicly disclose data on the quantity and quality of wastewater discharged from their facilities. This will help show the units' intention to be transparent and their willingness to improve external stakeholder engagement.



Photo: Renée Andersson, Indiska

About the Sweden Textile Water Initiative (STWI)

The Sweden Textile Water Initiative (STWI) started in 2010 as a joint project between Swedish textile and leather retail companies, and the Stockholm International Water Institute (SIWI). As of May 2012, 32 companies have joined STWI. The project focuses on water issues in the supply chains of textile and leather retailers with the aim of contributing to wiser water management, from thread and raw hide to product.

www.stwi.se

