bluesign® CRITERIA for production sites ANNEX: Textile Manufacturer

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Contents

1 Scope

Comprehensive requirements for companies with production sites are described in the *bluesign® CRITERIA for production sites*.

This document defines additional provisions for textile manufacturing.

2 Definitions

For the purpose of this document textile manufacturing encompasses manufacturing and processing of yarns (e.g. secondary spinning, twisting), manufacturing of raw fabrics (e.g. weaving, knitting, non-woven, tufting, braiding), and textile finishing (e.g. pre-treatment, dyeing, printing, finishing, coating, laminating).

For fiber manufacturing, see *bluesign® CRITERIA for fiber manufacturing*

For a comprehensive list of terms and abbreviations, please refer to the document *bluesign® glossary*.

3 Best Available Techniques

A textile manufacturer shall be aware of Best Available Techniques that are relevant for the industry (see for example: http://eippcb.jrc.ec.europa.eu/reference/BREF/txt_bref_0703.pdf).

Concerning machine safety, the ISO 11111-1 to -7 series shall be observed.

4 Industry-specific requirements

4.1 General requirements

- Chemicals management and chemicals change management are of highest priority (see *Guideline – Chemicals management and chemicals change management at manufacturers*)
- The goal shall be to replace solvent-based processes by water-based systems
- White spirit printing is not permitted
- Low emission pigment printing shall be used
- Digital printing shall be regarded as BAT
- After-chrome dyeing with Cr VI shall be phased out immediately
- Water consumption: Long-term goal for finishing mills: < 100 L/kg_{tex}
  Short-term goal for finishing mills: < 150 L/ kg_{tex}
  The system partner shall create a strategic plan for how and when to reach these goals.
- Emission factor COD: The goal for COD emissions per kg of fabric in finishing mills (raw wastewater) is: < 120 g COD/kg_{tex}
  The system partner shall calculate the actual emission factor in a reliable way and create a strategic plan for how and when to reach the goal (for companies having a cotton desizing step, an individual goal for the emission factor should be defined)
- Detailed statistics on water consumption shall be kept
- Zero Liquid Discharge (ZLD): ZLD shall be a long-term goal, especially in regions subject to water scarcity. Concentrate from ZLD systems shall not be discharged to the environment or water bodies, but instead responsibly treated as solid waste

4.2 Input stream management

Especially for chemical products and materials that are not supplied by bluesign® SYSTEM PARTNERS, appropriate input stream management including random testing, is required (see *Guidance Sheet - Input stream management of non-chemical raw materials/intermediates at manufacturers*).

Common fiber-related concerns, such as APEO content in fiber lubricants and sizing agents, antimony content in polyester or pesticide content in raw cotton, shall be addressed by means of supply chain management (defined purchase conditions, random testing, etc.).

Non-bluesign® APPROVED textile input from third parties that is pretreated, dyed (as loose stock, yarn or fabric), printed, finished, coated, laminated or bonded cannot be tolerated for use in bluesign® APPROVED textile articles.

Using chlorinated wool for bluesign® APPROVED material or placing chlorinated wool as bluesign® APPROVED fibers on the market is not allowed.

Currently and until adequate bluesign® APPROVED equivalents are available, the following non-bluesign® APPROVED materials can be tolerated on discretion of BLUESIGN. Precondition is an appropriate input stream management by the manufacturer:

- Raw fibers, raw yarns and raw fabrics (pretreated wool (e.g. scoured raw wool), linen and silk (e.g. degummed silk) which are further processed by the textile manufacturer
- Dope-dyed/ solution dyed fibers
- Membranes

Toleration of specialty fibers (e.g. functional fibers or fibers made from non-conventional monomers) is at discretion of BLUESIGN.

4.3 Water emissions

4.3.1 General aspects

The amount of residual liquors from semi-continual or continual dyeing and/or finishing and the amount of residual printing and coating pastes shall be minimized (documentation of amounts, disposal and plan for reduction).

Separate discharge of these liquors may be necessary to ensure efficient wastewater treatment.

Residual liquors from finishing processes that include fluorocarbons, flame retardants and antimicrobial active substances shall not be discharged to the wastewater; effective and controlled disposal for these liquors shall be implemented with the least possible impact on humans and the environment.

- EDTA (CAS 60-00-4), DTPA (CAS 67-43-6) and phosphonates (see BSSL) shall not be used for process water softening purposes
- Not used residual chemicals, auxiliaries and dyestuffs shall not be discharged to the wastewater
- Cooling water shall be re-used as process water. Direct discharge of cooling water shall be well-founded
- Where the textile manufacturer is able to influence the type and amounts of sizing agents, the manufacturer shall use only readily bio-eliminable sizing agents in the lowest required amounts
- Hypochlorite is banned as a bleaching agent at the entire production site. Chlorite bleaching is banned with the exception of extra white synthetics. Generally, bluesign® SYSTEM PARTNERS are obliged to search for chlorine-free alternatives. Under certain conditions hypochlorite can be accepted for the following processes:

  - ☐ Linen bleaching
  - ☐ Stripping agent for color repair
  - ☐ Machine cleaning
  - ☐ Decolorization of wastewater
  - ☐ Freshwater purification

- It is recommended to determine the consumption of chemicals and energy for the WWTP separately
- It is recommended to separate wastewater streams by contamination and temperature to allow for efficient treatment of wastewater, recovery of energy and recycling of water and chemicals
- Permanganate often used by spray application in denim laundries shall be phased out

4.3.2 Direct wastewater discharge

The limit values and sampling requirements for direct wastewater discharge are compiled in Table 4.1.

The approach described here is valid for manufacturers of textiles with a wastewater volume > 5 m³/day. For sites with a smaller wastewater volume, an individual approach will be defined together with the bluesign® SYSTEM PARTNER.

Parameter	Method	Unit	Foundational	Progressive	Measuring/Sampling interval treated WW
Wastewater flow		m³/h	**-**	-	continually
Persistent foam	Visual inspection	-	**Must not be visible**	Must not be visible	daily
pH	DIN 38404-C5 ISO 10523 USEPA 150.1 GB/T 6920	-	**6-9**	6-9	continually
Temperature	DIN 38404-C4 USEPA 170.1 GB/T 13195	°C	**Δ15° or max. 35° C**	Δ10° or 30° C	continually
Conductivity		mS/m	**-**	-	continually
COD	DIN 38409-41 ISO 6060 USEPA 410.4 APHA 5220D GB/T 11914 validated cuvette methods (e.g. according to ISO 15705) can be used alternatively	mg/L	**150**	80	daily
TOC*	DIN EN 1484	mg/L	**-**	-	daily
BOD_5	DIN EN 1899-1 ISO 5815-1/-2 USEPA 405.1 APHA 5210B HJ 505	mg/L	**30**	15	weekly
TSS	DIN EN 872 ISO 11923 USEPA 160.2 GB/T 11901	mg/L	**50**	15	daily
Color	ISO 7887-B	m^{-1}	**7 (436 nm; yellow)** **5 (525 nm; red)** **3 (620 nm; blue)**	5 (436 nm; yellow) 3 (525 nm; red) 2 (620 nm; blue)	daily
Ammonium nitrogen (NH_4-N)	DIN 38406-5 ISO 11732, ISO 7150 USEPA 350.1 APHA 4500 NH_3N HJ 535, HJ 536	mg/L	**10**	1	weekly
Nitrogen (total)	DIN EN 12260 (TNb) ISO 5663, ISO 29441 USEPA 351.2 APHA 4500 P-J, APHA 4200 N-C HJ 636, GB 11891	mg/L	**20**	10	weekly
Phosphorous (total)	ISO 11885, ISO 6878 USEPA 365.4 APHA 4500 P-J GB/T 11893	mg/L	**3**	0.5	6 months
AOX	ISO 9562 USEPA 1650 HJ/T 83-2001	mg/L	**5**	1	6 months
Sulfite	ISO 10304-3 USEPA 377.1	mg/L	**2**	0.5	6 months
Sulfide	DIN 38405-26 ISO 10530 APHA 4500-S2-D GB/T 16489	mg/L	**0.5**	0.05	6 months
Oil and grease	ISO 9377-2 USEPA 1664 HJ 637	mg/L	**10**	2	6 months
Phenol	ISO 14402 APHA 5530 B, C&D HJ 503	mg/L	**0.5**	0.01	6 months
Coliforms**	ISO 9308-1 USEPA 9132 GB/T 5750.12	bacteria/100ml	**400**	100	6 months
Cyanide	ISO 6703-1, 2&3 USEPA 335.2 APHA 4500-CN	mg/L	**0.2**	0.1	6 months
APEO (NPEO, OPEO, NP and OP)***	ISO 18857-1, ISO 18857-2, ISO 18254-1 ASTM D7742-11	µg/L	**5****	5**	6 months **raw WW

Parameter	Method	Unit	Foundational	Progressive	Measuring/Sampling interval treated WW
Metals					
Antimony**	ISO 11885 USEPA 200.7, USEPA 200.8 USEPA 6010c, USEPA 6020a GB 7475, HJ 700	mg/L	**0.1**	0.05	6 months
Arsenic	ISO 11885 USEPA 200.7, USEPA 200.8 USEPA 6010c, USEPA 6020a GB 7475, HJ 700	mg/L	**0.05**	0.01	6 months
Cadmium	ISO 11885 USEPA 200.7, USEPA 200.8 USEPA 6010c, USEPA 6020a GB 7475, HJ 700	mg/L	**0.1**	0.05	6 months
Chromium (total)	ISO 11885 USEPA 200.7, USEPA 200.8 USEPA 6010c, USEPA 6020a GB 7475, HJ 700	mg/L	**0.2**	0.1	6 months
Chromium (VI)	DIN 38405-D24 ISO 18412 USEPA 218.6 GB 7467	mg/L	**0.05**	0.005	6 months
Cobalt	ISO 11885 USEPA 200.7, USEPA 200.8 USEPA 6010c, USEPA 6020a HJ 700	mg/L	**0.05**	0.02	6 months
Copper	ISO 11885 USEPA 200.7, USEPA 200.8 USEPA 6010c, USEPA 6020a GB 7475, HJ 700	mg/L	**1**	0.5	6 months
Lead	ISO 11885 USEPA 200.7, USEPA 200.8 USEPA 6010c, USEPA 6020a GB 7475, HJ 700	mg/L	**0.1**	0.05	6 months
Mercury	ISO 12846, ISO 17852 USEPA 200.7, USEPA 200.8 USEPA 6010c, USEPA 6020a HJ 597	mg/L	**0.01**	0.005	6 months
Nickel	ISO 11885 USEPA 200.7, USEPA 200.8 USEPA 6010c, USEPA 6020a GB 11907, HJ 700	mg/L	**0.2**	0.1	6 months
Silver	ISO 11885 USEPA 200.7, USEPA 200.8 USEPA 6010c, USEPA 6020a GB 11907, HJ 700	mg/L	**0.1**	0.05	6 months
Tin	ISO 11885	mg/L	**2.0**	1.5	6 months
Zinc	ISO 11885 USEPA 200.7, USEPA 200.8 USEPA 6010c, USEPA 6020a	mg/L	**2.0**	1.0	6 months

Table 4.1: Limit values for direct discharge to the aquatic body
* TOC: Relationship to COD must be defined
** Coliforms: Coliforms are only to be measured if wastewater contains domestic sewage. Values are valid only if treated water is used for irrigation or is discharged to a receiving water body which is used for drinking water supply. Disinfection to reduce coliforms shall be carried out by UV, ozone or membrane technique. Chlorination shall be avoided.
*** APEO: to be measured in the raw/untreated wastewater
**** Antimony: For polyester processing only data collection

Furthermore the following requirements for direct discharge are valid:

- Testing of incoming water is recommended to be conducted from time to time to identify potential contaminants
- In order to monitor the efficiency of the wastewater treatment plant, it is recommended that the relevant parameters are measured not only in the treated (clean) stream but also in the untreated (raw) wastewater.
- Regarding COD/TOC elimination, the efficiency of the wastewater treatment steps prior to direct discharge to the aquatic body shall be 85 % or higher.
- The above-mentioned levels are defined as follows:
  - Foundational: minimum requirement for a bluesign® SYSTEM PARTNER
  - Progressive: shall serve as guidance and shall be the goal in case of major modifications of a WWTP or if a WWTP is newly built
- Δ = difference in temperature between the wastewater and the receiving water body.

- Sampling shall be conducted according to ISO 5667- 13:2011 (Parts 1, 3, 10, 13 and 15), "*Water Quality Sampling Guidance for the preservation and handling of water samples,*" either by qualified lab personnel or the by the external lab which conducts the related analysis under representative conditions (i.e. not after production breaks, heavy rainfall etc.).
- The system partner shall define a sampling/measuring plan to ensure analyses are conducted at regular intervals.
- Sampling intervals as listed in Table 4.1 shall be observed; sampling intervals depend on the dimensions and complexity of the plant as well as on the findings. The sampling plan shall include regular third-party measurements by an accredited laboratory.
- A full measuring campaign shall be conducted at least two times per year with one of the following sampling methods:
  - Composite sampling (preferred): composite sampling should be performed for no less than six hours, with no more than one hour between discrete samples. Each discrete sample shall be of equal volume. Sampling using calibrated autosamplers is preferred.
  - Qualified spot sampling: should be performed over two hours with samples taken at regular intervals of 15 minutes using an automatic composite sampler;
    or
    a minimum of five samples should be taken during a maximum of two hours, with at least two minutes between discrete samples.
- Compliance is present if four out of the five last measurements meet the above listed limits.
- Sulphate concentration should be monitored at regular intervals; concrete corrosion (e.g. of WWTP basins) can occur above 600 mg/L.

National or local requirements that are stronger or more detailed than the bluesign® CRITERIA, will supersede the limit values specified above.

4.4 Indirect wastewater discharge

For indirect discharge of wastewater (final treatment, e.g. in an industrial park wastewater treatment plant), the *bluesign® CRITERIA for production sites* shall be applied.

Furthermore, the following measurements shall be conducted before discharge to third party treatment.

Parameter	Method	Unit	goal	Measuring/Sampling interval
Wastewater flow		m^3/h	-	continually
APEO (NPEO, OPEO, NP and OP)	ISO 18857-1, ISO 18857-2, ISO 18254-1 ASTM D7742-11	µg/L	**5**	6 months
Metals				
Antimony	ISO 11885 USEPA 200.7, USEPA 200.8 USEPA 6010c, USEPA 6020a GB 7475, HJ 700	mg/L	**0.1**	6 months
Arsenic	ISO 11885 USEPA 200.7, USEPA 200.8 USEPA 6010c, USEPA 6020a GB 7475, HJ 700	mg/L	**0.05**	6 months
Cadmium	ISO 11885 USEPA 200.7, USEPA 200.8 USEPA 6010c, USEPA 6020a GB 7475, HJ 700	mg/L	**0.1**	6 months
Chromium (total)	ISO 11885 USEPA 200.7, USEPA 200.8 USEPA 6010c, USEPA 6020a GB 7475, HJ 700	mg/L	**0.2**	6 months
Chromium (VI)	DIN 38405-D24, ISO 18412 USEPA 218.6 GB 7467	mg/L	**0.05**	6 months
Cobalt	ISO 11885 USEPA 200.7, USEPA 200.8 USEPA 6010c, USEPA 6020a HJ 700	mg/L	**0.05**	6 months
Copper	ISO 11885 USEPA 200.7, USEPA 200.8 USEPA 6010c, USEPA 6020a GB 7475, HJ 700	mg/L	**1**	6 months
Lead	ISO 11885, USEPA 200.7, USEPA 200.8 USEPA 6010c, USEPA 6020a GB 7475, HJ 700	mg/L	**0.1**	6 months

Parameter	Method	Unit	goal	Measuring/Sampling interval
Mercury	ISO 12846, ISO 17852 USEPA 200.7, USEPA 200.8 USEPA 6010c, USEPA 6020a HJ 597	mg/L	**0.01**	6 months
Nickel	ISO 11885 USEPA 200.7, USEPA 200.8 USEPA 6010c, USEPA 6020a GB 11907, HJ 700	mg/L	**0.2**	6 months
Silver	ISO 11885 USEPA 200.7, USEPA 200.8 USEPA 6010c, USEPA 6020a GB 11907, HJ 700	mg/L	**0.1**	6 months
Tin	ISO 11885	mg/L	**2.0**	6 months
Zinc	ISO 11885 USEPA 200.7, USEPA 200.8 USEPA 6010c, USEPA 6020a	mg/L	**2.0**	6 months

Table 4.2: Wastewater sampling intervals and goals for indirect discharge

If the parameters are not detected in three consecutive measurements, the measuring plan can be adapted to avoid unnecessary testing.

4.5 Air emissions

4.5.1 General

Air emissions in textile finishing can be caused by:

- A textile raw material itself, if it is thermally stressed (preparation agents, monomers (epsilon-caprolactam from polyamide 6, etc.), fiber solvents can be released)
- Auxiliaries and chemicals used in finishing and coating processes
- Auxiliaries and chemicals used in dyeing processes, which are temporarily fixed on the textile and released during thermal processes (drying, heat-setting)
- Direct heated stenters; incomplete combustion of the burning gas leads to methane and formaldehyde emissions
- Emissions from singeing of fabrics
- Emissions from power generation (boiler house)

4.5.2 Process emissions

For finishing and heat setting processes, the emission factor concept shall be applied (see *Guidance Sheet – Air emission management – textile finishing*).

The aim of the concept is to minimize the air pollution potential of the applied textile auxiliaries and thus minimize emissions to air. A further aim of the concept is to obtain better transparency, knowledge, and control of the emissions associated with textile finishing.

Normally, emissions are regulated by mass concentrations (mg substance per m³ off-gas) and mass flows (g substance per h). The emission factor concept defines substance emission factors and textile substrate-based emission factors.

The following limit values are defined by the emission factor concept:

- TOC
  - ☐ mass flow: 0.8 kg TOC/h
  - or
  - ☐ emission factor: 0.8 g TOC/kg textile
- Organic substances listed in *Guidance Sheet - Air emissions management - textile finishing:*
  - ☐ mass flow: 0.1 kg substance/h
  - or
  - ☐ emission factor: 0.4 g substance/kg textile

If off-gas emissions exceed the limit values stated above or if neighborhood complaints arise or if the production site is located within a nature protection area, suitable off-gas cleaning shall be installed. However, process integrated optimization should always have priority. If raw fixation (heat-setting of synthetic textile materials prior to washing) or fixation of polyamide 6 or polyacrylonitrile (or blends with elastane) plays a significant role (greater 20% of production volume at stenters), it is to be expected that an off-gas cleaning device is essential.

System partners shall aim at applying the BAT of washing the synthetic textile materials prior to thermal treatment.

For finishing processes at stenters an air/textile ratio of 20 Nm^3/kg textile shall be the goal.

For singeing a dust emission lower than 20 mg/Nm^3 shall be the goal.

For VOC relevant processes see *bluesign® CRITERIA for production sites – Annex: VOC management.*

Regular maintenance and cleaning of dryers and stenters (especially burners for direct heating) is strongly recommended to ensure proper function and reduce emissions (e.g. methane in gas fired direct heated stenters) and the risk of cross contamination.

4.5.3 Emissions from the boiler house

See *bluesign® CRITERIA for production sites.*

4.6 Quality assurance of finished product

Additionally, a textile manufacturer shall establish and maintain appropriate quality control of finished products. Parameters such as pH and fastness properties, as well as the relevant BSSL substances, shall be part of a testing program, especially if compliance with the *bluesign® SYSTEM SUBSTANCES LIST (BSSL) - Consumer safety limits* depends not only on the raw materials and intermediates used but also on the process conditions and control (e.g. residual solvent content in solvent coating).

5 Verification of compliance

BLUESIGN verifies compliance with the bluesign® CRITERIA by means of a bluesign® COMPANY ASSESSMENT including an on-site inspection. Key-figures regarding environmental performance and chemicals management shall be reported annually to BLUESIGN. Re-assessments shall be carried out no later than every three years.

6 Validity

This document comes into effect from 2020-03. It replaces the *bluesign® CRITERIA for production sites - ANNEX: Textile manufacturer* version 2.0.
For all companies that signed an agreement for an assessment or for a bluesign® SYSTEM PARTNERSHIP before 2020-03 the adapted and newly introduced requirements are binding after a transition period of one year from the date of release.
This document is subject to revisions. Details on the revision procedure for regular and unscheduled revisions are compiled in the *bluesign® SYSTEM* document.

7 Other applicable documents

The following documents complement the document at hand:

- *bluesign® SYSTEM*
- *bluesign® glossary*
- *bluesign® CRITERIA for production sites*
- *bluesign® CRITERIA for production sites – Annex: Exclusion criteria*
- *bluesign® CRITERIA for production sites – Annex: Rating of production sites*
- *bluesign® SYSTEM BLACK LIMITS (BSBL) – Threshold limits for chemical substances in chemical products*
- *bluesign® SYSTEM SUBSTANCES LIST (BSSL) – Consumer safety limits*

Current versions are available for download at www.bluesign.com/criteria.