

**CLEAN FACTORY APPROACH:  
ROOT CAUSE ANALYSIS TOWARD THE REPLACEMENT OF  
PRODUCTS CONTAINING APEOS**

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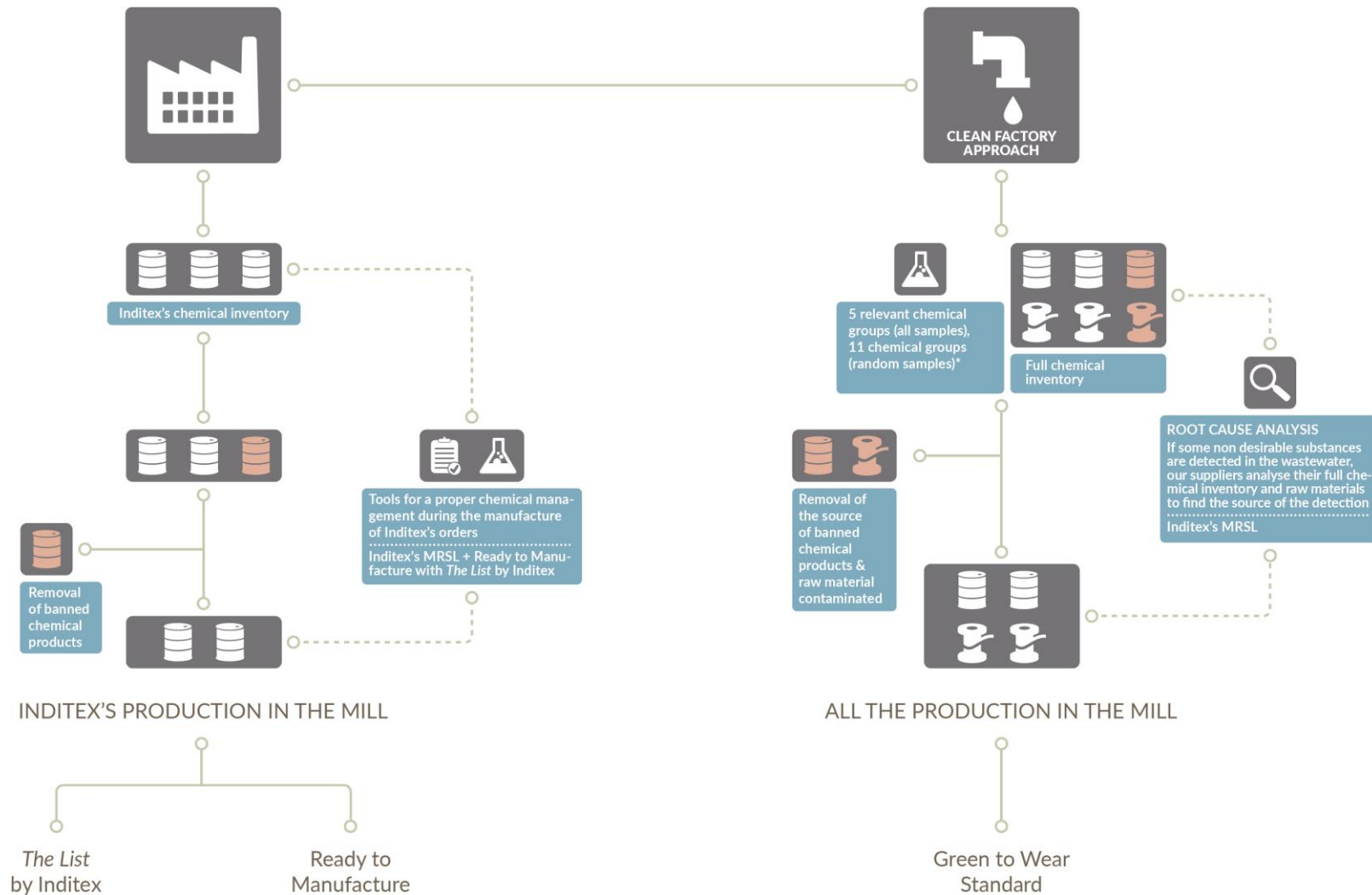
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## 2. HOW TO ACHIEVE ZERO DISCHARGE IN 2020

Our commitment regarding the use of chemicals during the manufacture of our products is expressed in the following instructions, which suppliers of wet processes must comply with:

- Compliance with the Manufacturing Restricted Substances List (MRSL).
- Proper management of chemical products during the manufacturing process using the Ready to Manufacture program. The List by Inditex as relevant instrument to guarantee the compliance. *(The mill collaborates by sharing Inditex's chemical inventory, being trained to implement good practices in the chemical management and being audited to ensure they are putting into practice this "best practices guide").*
- Responsible environmental performance according to the **Green to Wear** Standard of environmental sustainability. (Our auditing teams have access to the whole chemical inventory of the mill and ensure that the mill meets the MRSL. Throughout the "before treatment" samples, we are also checking that the mill is not using banned chemical products in their whole production and that they are aligned with our clean factory approach).



*\*For more information, please consult the report issued by the University of La Coruña*

### **3. CLEAN FACTORY APPROACH**

To achieve zero discharge, it is especially important to provide wet process mills with tools that allow them to avoid potential sources of contamination and ensure that its production processes are free of undesirable chemicals.

Our standards **Ready to Manufacture** and **Green to Wear** follows the philosophy of "**Clean Factory**" based on not only improving the chemistry used for our own production lines but the whole factory environmental and chemical management. The Green to Wear also includes the collection of waste water samples to analyse the discharge of the factory. This waste water sample is carried out without notifying the factory and whether they are producing for us or not. We also perform a root cause analysis in case of contamination.

Inditex creates incentives to promote the continuing improvement philosophy ranking the suppliers in different grades (A, B, C & D) and giving them business incentives to improve.

Our standard is available in several languages and developed in simple language to facilitate its implementation in the supply chain.

### **4. CASE STUDY ON APEOs**

As part of our APEOs elimination policy, in Inditex we have developed investigations of potential APEOs contamination in the wet process mills as the presence of APEOs cannot be relied in the Material Safety Data Sheet (MSDS). We perform the following steps:

1. A technical audit to ensure the implementation of the **Ready to Manufacture (RTM)**.
2. Analysis of **waste water samples** to check correct operation of waste water treatment systems and compliance with the **Manufacturing Restricted Substances List (MRSL)**.
3. A technical audit to evaluate the environmental performance of the mill according to the **Green to Wear Standard**.

If APEOs are detected in the waste water sample, a root cause analysis is conducted to check the mill Chemical Inventory and their respective MSDS. Chemical products likely to contain APEOs are selected and samples are taken to

be tested by an accredited lab. If the selected products contain APEOs, the mill has to eliminate them from their Chemical Inventory.

#### **4.1 Case study on APEOs – DTC 1**

In the framework of our project “**Capacity Building in the Supply Chain**”, aimed to guarantee more sustainable products and achieve zero discharge in 2020, we evaluated the mill **DTC 1**.

After performing a technical audit to ensure the implementation of the **RTM**; a waste water sample was taken to check waste water treatments and the **compliance with the Manufacturing Restricted Substances List (MRSL)**. Also we performed an audit according to the **Green to Wear** standard.

After testing, APEOs were detected in the waste water sample: **NP** (Nonylphenol) and **NPEOs** (Nonylphenoethoxylates).

#### **APs and APEOs**

Test results of APs and APEOs are as below.

<b>APs and APEOs</b>	<b>I001</b>
OP	ND
NP	<b>0.0188</b>
OPEOs	ND
NPEOs	<b>0.486</b>

As result of this detection, a root case analysis of the factory was made. As the presence of APEOs cannot be relied in the Material Safety Data Sheet (MSDS), a detailed audit of the facility was made to check the mill’s chemical inventory and to select chemical products likely to contain APEOs.

Samples of the selected chemical products were taken to be tested by an accredited laboratory. Four chemical products and one fabric samples have been collected:

- I001)** Soaping agent
- I002)** Chemical additive
- I003)** Softener agent
- I004)** Fulling agent
- I005)** Raw wool fibres.



APEOs were detected in three chemical products. NP and NPEOs were detected in the **(I002)** Chemical additive, NP was detected in the **(I003)** Softener agent and NPEOs were detected in the **(I004)** Fulling agent. Qualitative and quantitative results are included in the following tables:

TEST REQUESTED	I001	I002	I003	I004	I005
APs and APEOs	o	•	•	•	o

SAMPLE ANALYTES	I001 (ppm)	I002 (ppm)	I003 (ppm)	I004 (ppm)	I005 (ppm)
OP (Octylphenol)	ND	ND	ND	ND	ND
NP (Nonylphenol)	ND	0,228	0,228	ND	ND
OPEOs (Octylphenoethoxylates)	ND	ND	ND	ND	ND
NPEOs (Nonylphenoethoxylates)	ND	44,2	706	0,248	ND

Test method used:

- For raw materials: Solvent extraction and analysis by Liquid Chromatograph Mass Spectrometer (LC-MS)
- For auxiliary chemicals: With reference to ASTM International Standard ASTM D7065

**CONCLUSION:** After successfully identified the chemical products containing APEOs, a proper chemical inventory management through the **Ready to Manufacture** has been putting in place to eliminate the chemical products containing APEOs.

#### **4.2 Case study on APEOs – DTC 2**

In the framework of our project “**Capacity Building in the Supply Chain**”, aimed to guarantee more sustainable products and achieve zero discharge in 2020, we evaluate the mill **DTC 2**.

After performing a technical audit to ensure the implementation of the **RTM**; a waste water sample was taken to check waste water treatments and the **compliance with the Manufacturing Restricted Substances List (MRSL)**. Also we performed an audit according to the **Green to Wear** standard. After testing, APEOs were detected in the wastewater sample: NP (Nonylphenol).

##### APs and APEOs

Test results of APs and APEOs are as below.

<b>APs and APEOs</b>	<b>I001</b>
OP	ND
NP	<b>0.00108</b>
OPEOs	ND
NPEOs	ND

As result of this detection, a root case analysis of the factory was made. As the presence of APEOs cannot be relied in the Material Safety Data Sheet (MSDS), a detailed audit of the facility was made to check the mill’s chemical inventory and to select chemical products likely to contain APEOs.

Samples of the selected chemical products were taken to be tested by an accredited laboratory. Six chemical products and two fabric samples have been collected:

- I001)** White powder (chelating-dispersing agent)
- I002)** White paste
- I003)** Milky powder (softener)
- I004)** Transparent liquid (nonionic wetting agent)
- I005)** Pale yellow liquid (soaping agent)
- I006)** Transparent paste (soaping oil)
- I007)** Cotton/elastane blended woven fabric (before washing)
- I008)** Cotton/elastane blended woven fabric (after washing).





APEOs were detected in only one sample. NPEOs were detected in the **(I005)** Pale yellow liquid (soaping agent). Qualitative and quantitative results are included in the following tables:

TEST REQUESTED	I001	I002	I003	I004	I005	I006	I007	I008
APs and APEOs	o	o	o	o	•	o	o	o

	I001 (ppm)	I002 (ppm)	I003 (ppm)	I004 (ppm)	I005 (ppm)	I006 (ppm)	I007 (ppm)	I008 (ppm)
<b>OP (Octylphenol)</b>	ND	ND	ND	ND	ND	ND	ND	ND
<b>NP (Nonylphenol)</b>	ND	ND	ND	ND	ND	ND	ND	ND
<b>OPEOs (Octylphenoethoxylates)</b>	ND	ND	ND	ND	ND	ND	ND	ND
<b>NPEOs (Nonylphenoethoxylates)</b>	ND	ND	ND	ND	5,11	ND	ND	ND

Test method used:

- For raw materials: Solvent extraction and analysis by Liquid Chromatograph Mass Spectrometer (LC-MS)
- For auxiliary chemicals: With reference to ASTM International Standard ASTM D7065

**CONCLUSION:** After successfully identified the chemical products containing APEOs, a proper chemical inventory management through the **Ready to Manufacture** has been putting in place to eliminate the chemicals products containing APEOs.