

Cleaning Products Industry

Introduction

Cleaning products play an essential role in our daily lives. By safely and effectively removing soils, germs and other contaminants, they help us to stay healthy, care for our homes and possessions, and make our surroundings more pleasant.

Cleaning products industries are classified as industrial establishments as per decree 5243/2001. Various emissions can result from this industrial activity as described below. This factsheet intends on identifying the main hazardous wastes and develops ways for its management.

Process description

Cleaning products are prepared in four-step process using petroleum raw materials.

Chlorination & Alkylation: Chlorination and alkylation occur in agitated reactors fitted with cooling system and external reflux condensers to cool the liberated hydrogen chloride gas and reflux the entrained organic mist back to the reactor. The evolved hydrogen chloride and chlorine gases must pass through series of scrubbers to recover such gases.

Sulfonation: The third reaction takes place using H₂SO₄ 98%, SO₃ or oleum. In case of using sulfuric acid, excess acid is used to complete the reaction with heating by steam jacket to 80°C. Sulfonic acid produced from the third equation is then diluted with water to precipitate the sulfonic acid from reaction mixture and separated.

Neutralization: Process using sodium hydroxide to obtain the sodium salt AABSS. The latter is dried by spray drier to have fine granules or by drum dryer to obtain flakes. Some plants cancel step (1) and (2) and start from alkyl benzene produced in petroleum refinery.

Regulators

Generally synthetic detergents regulation is necessary for surfactants to do an efficient job of cleaning in a washing machine. This is often achieved by combining different types such as anionics with nonanionics or soaps as foam inhibitors.

Builders

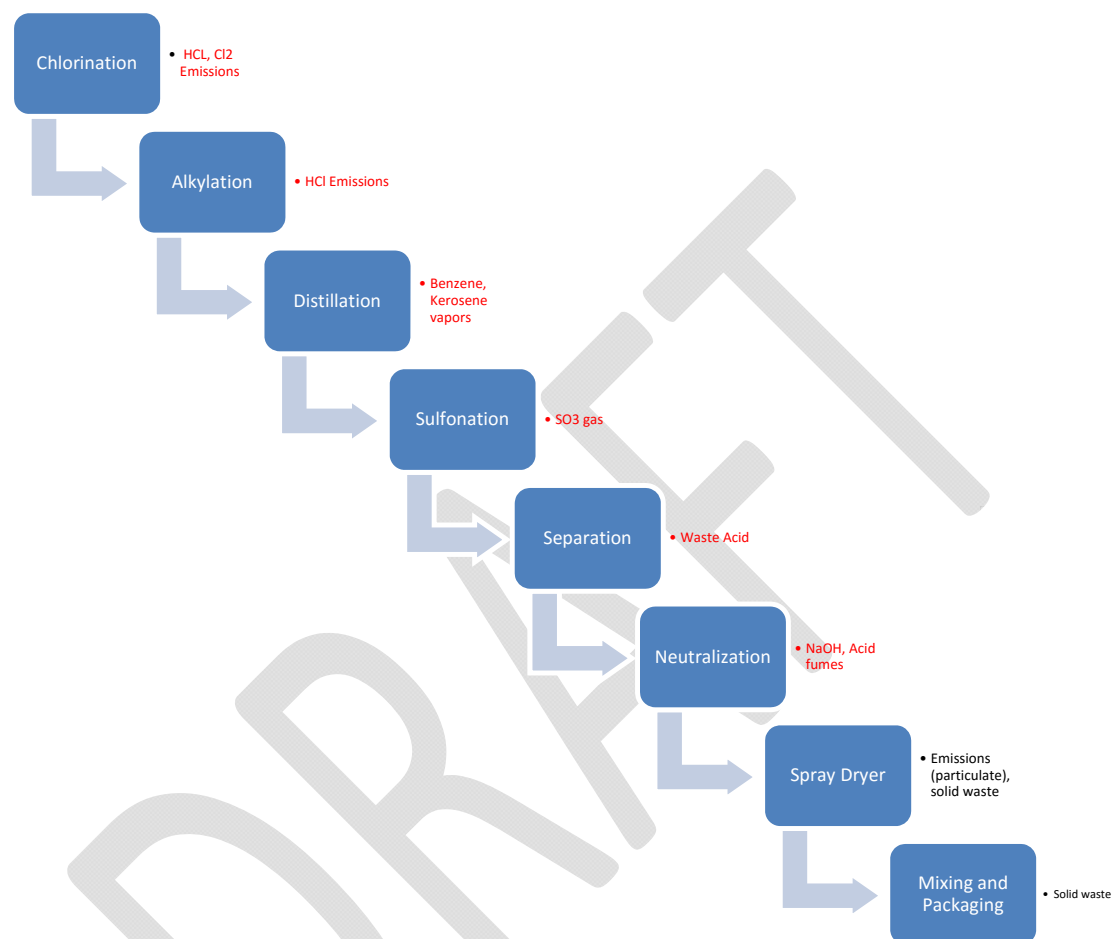
Also builders boost the detergents power. Complex phosphates such as sodium tripoly phosphate, have been used most extensively [30-50%]. These are water softeners prevent re-deposition of soil from the wash water on fibers.

Additives

Some additives (up to 3%) are used to add certain properties to the detergents such as sodium silicate, which acts as corrosion inhibitor to protect metal and washer parts. Carboxy methyl

cellulose has been used as an antiredeposition agent. Tarnish inhibitors carry on the work of corrosion inhibitor and extend protection to metals such as German silver. Fabric brighteners are fluorescent dyes. Enzymes are also added to reduce the stain, particularly those of a protein nature.

The common activities at cleaning product industries are outlined in the following chart.



References: UNIDO, MSCIPP, ERM studies.

Cleaning Product Industry Hazardous Waste Description and Management

Description of waste	Waste Code (EWC)	Waste Classification (Dangerous Goods Classification)	Basel Class.	Storage	Transport (UN-Code)	Treatment	HS-Code
Other organic solvent, washing liquids and other	070104*	3	A3140	3	1993	R1	3814

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mother liquors							
Aqueous washing liquids and other mother liquors	070601*	8	A4140	8B	1903	D10	28
Acids	110105*	8	A1060	8B	3264	D9	3204

European Waste Code (EWC) 070104*: Other organic solvent, washing liquids and other mother liquors

European Waste Code (EWC) 070601*: Aqueous washing liquids and other mother liquors

European Waste Code (EWC) 110105*: Acids

Waste Classification (Dangerous Goods Classification) 3: Flammable Liquids



Waste Classification (Dangerous Goods Classification) 8: Corrosives



Basel Classification A1060: Waste liquors, acids

Basel Classification A3140: Waste non-halogenated organic solvents

Basel Classification A4140: Waste consisting of or containing off specification or outdated chemicals

Transport Code (UN) 1903: Disinfectants, liquid, corrosive, n.o.s

Transport Code (UN) 1993: Flammable liquids, n.o.s.

Transport Code (UN) 3264: Corrosive liquid, acidic, inorganic, n.o.s.

D9: Physico chemical treatment facility (for example: evaporation, drying, calcination, neutralization, precipitation)

D10: Disposal on land (for example: incineration in a licensed rotary kiln with >1,050C)

R1: Use as a fuel.

Disposal Facilities**Recosoil (Baden-Württemberg, Lösemittelrecyclinganlage) - Recosoil Recycling GmbH**

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Metal industry

Introduction

The metal smelting and refining industry processes metal ores and scrap metal to obtain pure metals. The metal working industries process metals in order to manufacture machine components, machinery, instruments and tools which are needed by other industries as well as by the other different sectors of the economy. Various types of metals and alloys are used as starting materials, including rolled stock (bars, strips, light sections, sheets or tubes) and drawn stock (bars, light sections, tubes or wire). Metal industries are classified as industrial establishments as per decree 5243/2001. Various emissions can result from this industrial activity as described below. This factsheet intends on identifying the main resulting pollutants and specifically develops the ways for treatment of hazardous waste ones.

Process description

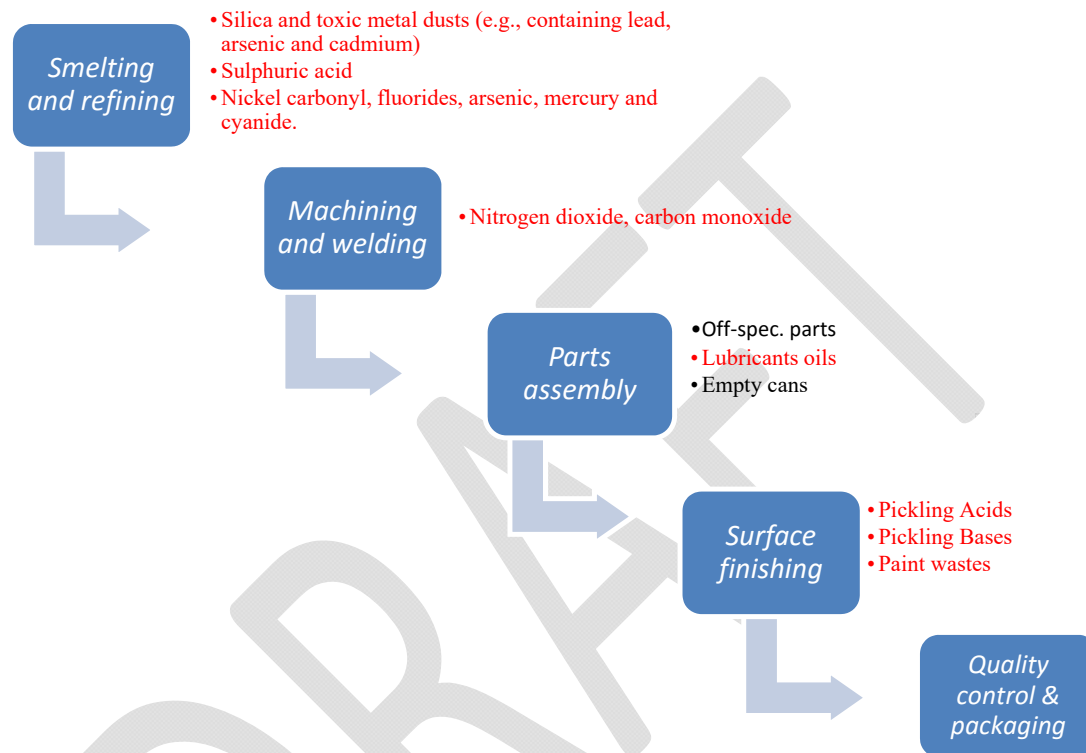
The following five production stages show the main steps of the metal process:

1. *Smelting and refining*: Two metal recovery technologies are generally used to produce refined metals, pyrometallurgical and hydrometallurgical. Pyrometallurgical processes use heat to separate desired metals from other materials. These processes use differences between oxidation potentials, melting points, vapour pressures, densities and/or miscibility of the ore components when melted. Hydrometallurgical technologies differ from pyrometallurgical processes in that the desired metals are separated from other materials using techniques that capitalize on differences between constituent solubilities and/or electrochemical properties while in aqueous solutions.
2. *Machining and welding*: Gas Metal Arc Welding (GMAW), by definition, is an arc welding process which produces the coalescence of metals by heating them with an arc between a continuously fed filler metal electrode and the work. The process uses shielding from an externally supplied gas to protect the molten weld pool.
3. *Parts assembly*: assembly include gluing, staking, forming, handle marking and decorating, such as hot stamping and roll transfer printing. Also perform secondary machining operations on metals and plastics.
4. *Surface finishing*: Metal finishing comprises a broad range of processes that are practiced by most industries which manufacture metal parts. Typically, manufacturers perform the finishing after a metal part has been formed. Finishing can be any operation that alters the surface of a workpiece to achieve a certain property. Common metal finishes include paint, galvanizing, lacquer, ceramic coatings, and other surface treatments. This manual mainly addresses the plating and surface treatment processes
5. *Quality control & packaging*: To specify the various physical and mechanical properties of the finished product, various tests, both destructive and nondestructive, are performed. Metallurgical, hardness, hardenability, tension,

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ductility, compression, fatigue, impact, wear, corrosion, creep, machinability, radiography, magnetic particle, ultrasonic, and eddy current are some of the major tests that are performed by quality control personnel.

The common activities and associated pollutants at metal facilities are outlined in the following chart. The hazardous wastes are highlighted in red.



References: UNIDO, MSCIPP, ERM studies. Typical example only.

Metal Industry Hazardous Waste Description and Management

Description of waste	Waste Code (EWC)	Waste Classification (Dangerous Goods Classification)	Basel Class.	Storage	Transport (UN-Code)	Treatment	HS-Code
Pickling acids	110105*	8	A1060	8B	3264	D9	3204
Pickling bases	110107*	8	A1060	8B	3262	D9	3204
Gases in pressure containers (including halons) containing dangerous substances	160504*	2.1	-	2A	1978	R1	7309
Separately collected electrolyte	160606*	8	A4090	8B	2796	D9	2811
Sulphuric acid and sulphurous acid	060101*	8	A4090	8B	1830	D9	2807
Inorganic chemicals consisting of or containing dangerous substances	160507*	various	A4140	various	various	D10	2846
Waste paint and varnish containing organic solvents or other dangerous substances	080111*	3	A4070	3	1263	D10	3208
Oily water from oil/water separators	130507*	9	A4060	12	3082	D9	27

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European Waste Code (EWC) 060101*: Sulphuric acid and sulphurous acid
European Waste Code (EWC) 080111*: Waste paint and varnish containing organic solvents or other dangerous substances
European Waste Code (EWC) 110105*: Pickling acids
European Waste Code (EWC) 110107*: Pickling bases
European Waste Code (EWC) 130507*: Oily water from oil/water separators
European Waste Code (EWC) 160504*: Gases in pressure containers (including halons) containing dangerous substances
European Waste Code (EWC) 160606*: Separately collected electrolyte
European Waste Code (EWC) 160507*: Discarded inorganic chemicals consisting of or containing dangerous substances

Waste Classification (Dangerous Goods Classification) 8: Corrosives



Waste Classification (Dangerous Goods Classification) 2.1: Flammable Gases



Waste Classification (Dangerous Goods Classification) 3: Flammable Liquids



Waste Classification (Dangerous Goods Classification) 9: Miscellaneous Dangerous Goods

Basel Classification A1060: Waste liquors from the pickling of metals

Basel Classification A4090: Waste acidic or basic solutions

Basel Classification A4140: Waste consisting of hazardous chemicals

Basel Classification A4070: Wastes from the production, formulation and use of inks, dyes, pigments, paints, lacquers, varnish

Basel Classification A4060: Waste oils/water, hydrocarbons/water mixtures, emulsions

Transport Code (UN) 1263: Paint-related materials including paint, lacquer, enamel, stain, shellac solutions, varnish, polish, liquid filler, and liquid lacquer base, or paint related material including paint thinning, drying, removing, or reducing compound

Transport Code (UN) 1830: Sulfuric acid with more than 51 percent acid

Transport Code (UN) 1978: Propane also Petroleum gases, liquified

Transport Code (UN) 2796: Battery fluid, acid or Sulfuric acid with not more than 51 percent acid

Transport Code (UN) 3082: Environmentally hazardous substance, liquid, n.o.s.

Transport Code (UN) 3262: Corrosive solid, basic, inorganic, n.o.s.

Transport Code (UN) 3264: Corrosive liquid, acidic, inorganic, n.o.s.

D9: Physico-chemical treatment facility (for example: evaporation, drying, calcination, neutralization, precipitation)

D10: Incineration on land.

R1: Use as a fuel.

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Oil Waste

Introduction

This factsheet intends on identifying the main resulting pollutants and specifically develops the ways for treatment of oily hazardous wastes that could result from different industrial establishments.

Process description

In Lebanon, there are no refineries or drilling activities. However, a significant amount of used oil is generated during the application of oil. For example, in mechanical workshops and maintenance activities at an industry.

Oily Hazardous Waste Description and Management

Description of waste	Waste Code (EWC)	Waste Classification (Dangerous Goods Classification)	Basel Class.	Storage	Transport (UN-Code)	Treatment	HS-Code
Mineral-based non-chlorinated engine, gear and lubricating oils	130205*	3	A3020	10	1993	D10	271099
Oily water from oil/water separators	130507*	9	A4060	12	3082	D9	27
Fuel oil and diesel	130701*	3	A3140	3	1202	R1	2710
Petrol	130702*	3	A3140	3	1203	R1	2710
Other tars	050108*	3	A3190	3	1999	D10	2706

European Waste Code (EWC) 050108*: Other tars

European Waste Code (EWC) 130205*: Mineral-based non-chlorinated engine, gear and lubricating oils

European Waste Code (EWC) 130507*: Oily water from oil/water separators

European Waste Code (EWC) 130701*: Fuel oil and diesel

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European Waste Code (EWC) 130702*: Petrol

Waste Classification (Dangerous Goods Classification) 9: Miscellaneous Dangerous Goods



Waste Classification (Dangerous Goods Classification) 3: Flammable Liquids



Basel Classification A3140: Waste non-halogenated organic solvents

Basel Classification A3190: Waste tarry residues (excluding asphalt cements) arising from refining, distillation and any pyrolytic treatment of organic materials

Basel Classification A4060: Waste oils/water, hydrocarbons/water mixtures, emulsions

Transport Code (UN) 1202: Gas oil or diesel fuel or heating oil, light

Transport Code (UN) 1203: Gasoline or petrol or motor spirit

Transport Code (UN) 1993: Flammable liquids, n.o.s

Transport Code (UN) 1999: Tars, liquid including road asphalt and oils, bitumen and cut backs

Transport Code (UN) 3082: Environmentally hazardous substance, liquid, n.o.s.

D9: Physico-chemical treatment facility (for example: evaporation, drying, calcination, neutralization, precipitation)

D10: Disposal on land (for example: incineration in a licensed rotary kiln with >1,050C)

R1: Use as a fuel

Disposal Facilities

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Point of Contact: Frau Anke Rieger, Tel: 03342 / 42 47 5 – 15, info@otto-und-leitel.de**ENTEK (Frostschutz, Kühlmittel) - ENTEK GmbH & Co. KG**

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Packaging Industry

Introduction

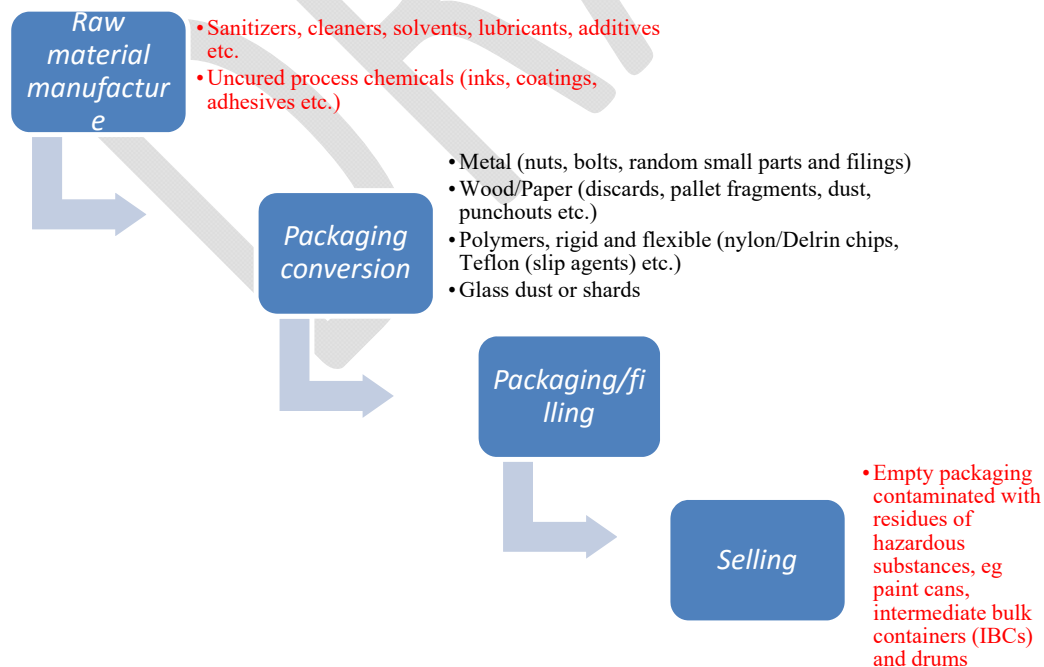
Packaging is a process adopted within many industries. Production of packaging materials is an industrial establishment and is classified according to 5243/2001. The classification of these industries depend on the types of materials produced. Various emissions can result from this industrial activity as described below. This factsheet intends on identifying the main resulting pollutants and specifically develops the ways for treatment of hazardous waste ones.

Process description

The following stages show the main steps of the production of packaging materials:

1. *Raw material manufacture*: Produce raw materials for packaging manufacture.
2. *Packaging conversion*: Convert raw materials into packaging.
3. *Packaging/filling*: Put goods into packaging or put packaging around goods.
4. *Selling*: Supply packaging to the end user (includes raw materials that will become packaging, for example, plastic pellets used to make bottles).

After usage of the packaging, residues of the product remain at the packaging. If the residues are hazardous, the packaging waste is classed as a hazardous waste.



References: UNIDO, MSCIPP, ERM studies. Typical example only.

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Packaging Industries Waste Description and Management Overview

Description of waste	Waste Code (EWC)	Waste Classification (Dangerous Goods Classification)	Basel Class.	Storage	Transport (UN-Code)	Treatment	HS-Code
Packaging containing residues of or contaminated by dangerous substances	150110*	9	A4130	various	3509	D10	TBD
inorganic chemicals consisting of or containing dangerous substances	160507*	various	A4140	various	various	D10	2846
Other organic solvent, washing liquids and other mother liquors	070104*	3	A3140	3	1993	R1	3814

European Waste Code (EWC) 150110*: Packaging containing residues of or contaminated by dangerous substances

European Waste Code (EWC) 070104*: Other organic solvent, washing liquids and other mother liquors

European Waste Code (EWC) 160507*: Discarded inorganic chemicals consisting of or containing dangerous substances

Waste Classification (Dangerous Goods Classification) 9: Miscellaneous Dangerous GoodsWaste Classification (Dangerous Goods Classification) 3: Flammable Liquids

Basel Classification A4130: Waste packages and containers

Basel Classification A3140: Waste non-halogenated organic solvents

Basel Classification A4140: Waste consisting of hazardous chemicals

Transport Code (UN) 3509: Packaging, discarded, empty, uncleaned

D10: Disposal on land (for example: incineration in a licensed rotary kiln with >1,050C)

R1: Use as a fuel.

Disposal Facilities**MEAB Schöneiche – Märkische Entsorgungsanlagen Betriebsgesellschaft mbH**

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Paint Industry

Introduction

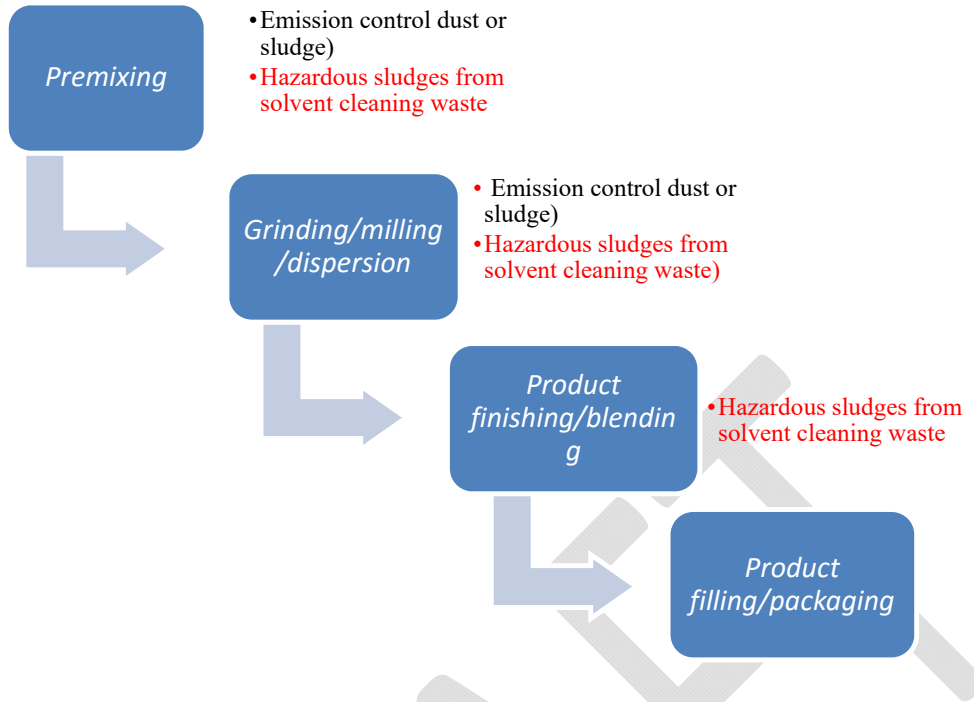
Paint industry are classified as industrial establishments as per decree 5243/2001. Various emissions can result from this industrial activity as described below. This factsheet intends on identifying the main resulting pollutants and specifically develops the ways for treatment of hazardous waste ones.

Process description

The production of paints is mainly a mixing process that consists of dispersing and stabilizing pigments, resins and solvents. Most paint manufacturing facilities formulate paint in batch operations. The figure below shows a typical process flow diagram of the paint manufacturing process. The four major steps involved in the manufacturing of paints and surface coatings are:

1. *Preassembly/premixing*: The liquid raw materials (e.g., resins, solvents, oils, alcohols, and/or water) are mixed in containers. Pigments and other solid raw materials are added to the liquids to form the viscous (thick) mill base.
2. *Grinding/milling/dispersion*: The mill base is processed further by milling to break up aggregations and agglomerates (clusters) of solids, producing a uniform dispersion of finely divided solid particles in the solvent. Milling consists of wetting, grinding, and dispersion. Wetting of the pigment particles with the solvent occurs by displacement of adsorbed contaminants (e.g., air, moisture and gases) from the surface of the particles. Grinding is the mechanical breakup of aggregations of solid particles into isolated primary particles. Dispersion is the movement of the particles into the solvent to form a stable mixture in which settling and re-aggregation of the solids is prevented or inhibited.
3. *Product finishing/blending*: Final product specifications are achieved in the product finishing step, by thinning, tinting and blending. Thinning, or let down, consists of diluting the milled dispersion with binder, solvents, and/or diluents to achieve desired product characteristics such as viscosity, drying time, etc.
4. *Product filling/packaging*: The final manufacturing step is product filling. The finished blend is transferred to holding tanks or hoppers and is pumped or gravity fed through filters to remove solid impurities such as dust, pigment agglomerates, gelled or skinned resin, etc. The filtered product then is transferred to pails, drums, tanks, or other containers for storage and shipment.

The common activities at paint in 3 districts are outlined in the following chart.



References: UNIDO, MSCIPP, ERM studies. Typical example only.

Paint Industry Hazardous Waste Description and Management

Description of waste	Waste Code (EWC)	Waste Classification (Dangerous Goods Classification)	Basel Class.	Storage	Transport (UN-Code)	Treatment	HS-Code
Waste paint and varnish containing organic solvents or other dangerous substances	080111*	3	A4070	3	1263	D10	3208
Sludges from paint or varnish containing organic solvents or other dangerous substances	080113*	3	A4070	3	1210	D10	3215

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Other organic solvent, washing liquids and other mother liquors	070104*	3	A3140	3	1993	R1	3814
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European Waste Code (EWC) 070104*: Other organic solvent, washing liquids and other mother liquors

European Waste Code (EWC) 080111*: Waste paint and varnish containing organic solvents or other dangerous substances

European Waste Code (EWC) 080113*: Sludges from paint or varnish containing organic solvents or other dangerous substances

Waste Classification (Dangerous Goods Classification) 3: Flammable Liquids



Basel Classification A4070: Wastes from the production, formulation and use of inks, dyes, pigments, paints, lacquers, varnish

Basel Classification A3140: Waste non-halogenated organic solvents

Transport Code (UN) 1210: Printing ink, flammable or Printing ink related material (including printing ink thinning or reducing compound), flammable

Transport Code (UN) 1263: Paint-related materials including paint, lacquer, enamel, stain, shellac solutions, varnish, polish, liquid filler, and liquid lacquer base, or paint related material including paint thinning, drying, removing, or reducing compound

Transport Code (UN) 1993: Flammable liquids, n.o.s.

D10: Disposal on land (for example: incineration in a licensed rotary kiln with >1,050C)

R1: Use as a fuel

Disposal Facilities

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Pesticide Industry

Introduction

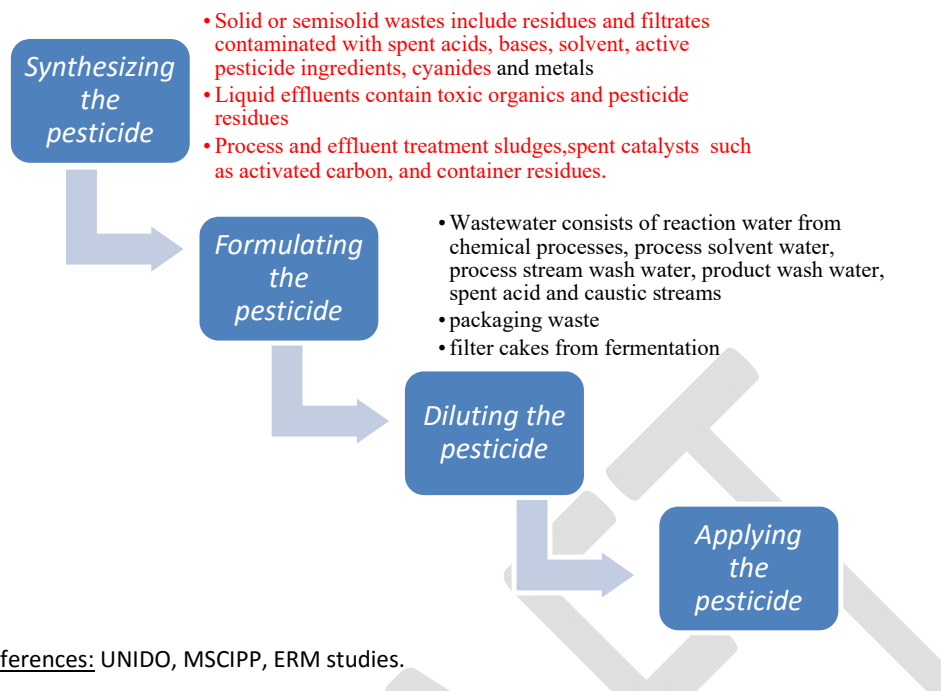
Pesticide industry is classified as industrial establishments as per decree 5243/2001. This factsheet intends on identifying the main resulting Hazardous pollutants and specifically develops the ways for its management.

Process description

Pesticide industry involves at least three activities:

1. *Synthesizing the pesticide:* When a new pesticide is first developed, it is manufactured on a small scale in a laboratory. If the substance proves viable, production begins in the factory. Batch or continuous manufacturing insures a high volume, perhaps as much as 500 kilograms per cycle. Synthesizing a pesticide is a complex chemical procedure that requires trained chemists and a large, sophisticated laboratory. The basic procedure entails altering an organic molecule to form a pesticide. This may involve any of a number of specific reagents and catalysts and often must take place in a controlled climate (within a certain temperature range, for example). Once synthesized, the active ingredient is packaged and sent to a formulator. Liquid insecticides can be shipped in tank trucks or 200-liter drums. Transport of the active ingredient follows all regulations for hazardous materials transportation.
2. *Formulating the pesticide:* A formulator accepts the active ingredient, measures out the proper amount, mixes it with carrier if it is to be a liquid pesticide or with inert powders or dry fertilizers if it is to be a dust pesticide, then bottles or packages it. Liquid pesticides are packaged in 200-liter drums if a large-scale farmer is the anticipated customer or 20-liter jugs for small-scale operations. Dry formulations can be packaged in 5 to 10 kilogram plastic or plastic-lined bags. An emulsified formulation is usually concentrated to render transport easier (the active ingredient typically makes up 50 percent of the emulsified concentrate), but granulated and dry pesticides are ready to use.
3. *Diluting the pesticide:* The pesticide might be stored a short time before it is requested. When it is ready for transport, the estimated necessary amount is sent to the farmer, who dilutes the emulsified concentrate to create the amount of pesticide desired. In most instances, the final product consists of only .5 to 1 percent of the original active ingredient. The pesticide is now ready to be applied.

The common activities in pesticide industry are outlined in the following chart.



Pesticide Industry Hazardous Waste Description and Management

Description of waste	Waste Code (EWC)	Waste Classification (Dangerous Goods Classification)	Basel Class.	Storage	Transport (UN-Code)	Treatment	HS-Code
Agrochemical waste containing dangerous substances	020108*	6.1	A4030	6.1C	2811	D10	3208
Agrochemical waste containing dangerous substances	020108*	5.1	A4030	5.1B	1942	R5	38249
Inorganic plant protection products, wood-preserving agents and	061301*	-	A4040	12	-	D9	32

other biocides							
Spent Acids	110105 *	8	A106 0	8B	3264	D9	3204
Spent Bases	110107 *	8	A106 0	8B	3262	D9	3204
inorganic chemicals consisting of or containing dangerous substances	160507 *	various	A414 0	various	various	D10	2846
Other organic solvent, washing liquids and other mother liquors	070104 *	3	A314 0	3	1993	R1	3814

European Waste Code (EWC) 020108*: Agrochemical waste containing dangerous substances

European Waste Code (EWC) 061301*: inorganic pesticides, biocides and wood preserving agents.

European Waste Code (EWC) 070104*: Other organic solvent, washing liquids and other mother liquors

European Waste Code (EWC) 110105*: Pickling acids

European Waste Code (EWC) 110107*: Pickling bases

European Waste Code (EWC) 160507*: Discarded inorganic chemicals consisting of or containing dangerous substances

Waste Classification (Dangerous Goods Classification) 3: Flammable Liquids



Waste Classification (Dangerous Goods Classification) 5.1: Oxidizing Substances



Waste Classification (Dangerous Goods Classification) 6.1: Toxic Substances



Waste Classification (Dangerous Goods Classification) 8: Corrosives



Basel Classification A1060: Waste liquors

Basel Classification A3140: Waste non-halogenated organic solvents

Basel Classification A4030: Wastes from the production, formulation and use of biocides and phytopharmaceuticals, including waste pesticides and herbicides which are off-specification, outdated or unfit for their originally intended use

Basel Classification A4040: Wastes from the manufacture, formulation and use of wood-preserving chemicals

Basel Classification A4140: Waste consisting of hazardous chemicals

Transport Code (UN) 1942: Ammonium nitrate, with not more than 0.2 percent of combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance

Transport Code (UN) 1993: Flammable liquids, n.o.s.

Transport Code (UN) 2811: Toxic solids, organic, not otherwise specified (n.o.s.)

Transport Code (UN) 3262: Corrosive solid, basic, inorganic, n.o.s.

Transport Code (UN) 3264: Corrosive liquid, acidic, inorganic, n.o.s.

D10: Disposal on land (for example: incineration in a licensed rotary kiln with >1,050C)

D9: Physico chemical treatment facility (for example: evaporation, drying, calcination, neutralization, precipitation)

R5: Recycling/reclamation of other inorganic material

Disposal Facilities

MEAB Schöneiche – Märkische Entsorgungsanlagen Betriebsgesellschaft mbH

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Printing Industry

Introduction

Printing industries are classified as industrial establishments as per decree 5243/2001. Printing operations use materials that may adversely affect air, water, and land: certain chemicals involved in printing volatilize, which contributes to air emissions from the facility and to smog formation; other chemicals may be discharged to drains and impact freshwater or marine ecosystems; and solid wastes contribute to the existing local and regional disposal problems. This factsheet intends on identifying the main hazardous wastes and specifically develops the ways for its management.

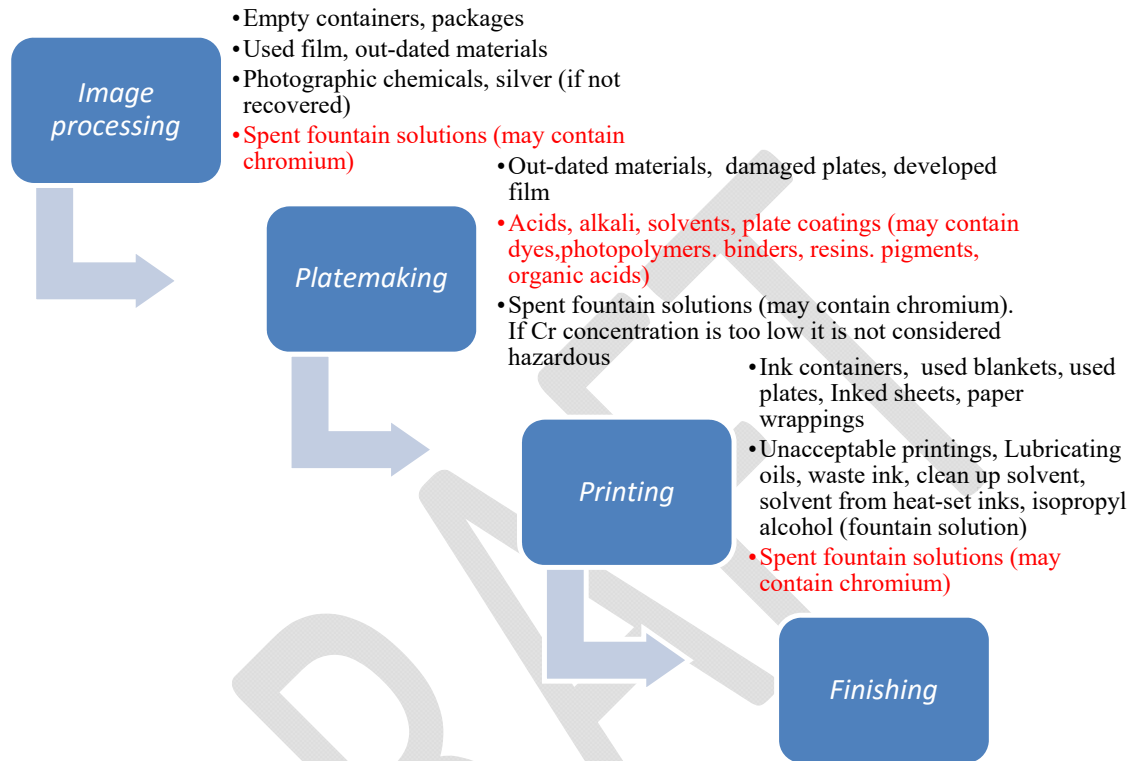
Process description

Printing begins with the preparation of artwork or copy, which is photographed to produce an image. A proof is made which will be used to compare with the printed product and make adjustments to the press. The photographic image is transferred to a plate. In the platemaking step, the image areas of the plate are made receptive to the ink. In the printing step, ink is applied to the plate, then transferred to a rubber blanket and then to the substrate. The substrate accepts the ink, reproducing the image. The substrate is then cut, folded, and bound to produce the final product. Printing can be divided into four separate steps:

1. *Image processing*: once the material is properly arranged, it is photographed to produce transparencies. If an image is to be printed as a full color reproduction, then color separations are made to provide a single-color image or record which can then be used to produce the single-color printing plate for lithography or the cylinder for gravure. Once the film has been developed, checked, and re-photographed (if necessary), it is sent on to the plate- or cylinder-making operation.
2. *Platemaking*: The printing process revolves around the intermediate image carrier, a plate or cylinder that accepts ink off a roller and transfers the image to the rubber blanket. The blanket, in turn, transfers it to the paper. Each printing process uses a different type of image carrier. The type of ink and press used, the number of impressions that can be printed, the speed with which they are printed, and the characteristics of the image are all determined by the type of image carrier. The four different types of image carriers generally used are manual, mechanical, electrostatic, and photomechanical
3. *Printing*: Once the plates are prepared, the actual printing can begin. The printing operations are generally the same for each of the major processes, with the exception of screen printing. The two common types of presses are sheet-fed presses and web presses. Sheet-fed presses can print up to 3 impressions per second. Web presses typically print at a rate of 1000 to 1600 feet per minute.
4. *Finishing*: the term "finishing" refers to final trimming, folding, collating, binding, laminating, and/or embossing operations. A variety of binding methods are used for

books, periodicals, and pamphlets. These include stitching (stapling), gluing, and mechanical binding. These finishing operations are frequently accomplished by an outside service organization.

The common activities at printing facilities are outlined in the following chart.



References: UNIDO, MSCIPP, ERM studies.

Printing Hazardous Waste Description and Management

Description of waste	Waste Code (EWC)	Waste Classification (Dangerous Goods Classification)	Basel Class.	Storage	Transport (UN-Code)	Treatment	HS-Code
Waste ink containing dangerous substances	080312*	3	A4070	3	1210	D10	32
Acids	110105*	8	A1060	8B	3264	D9	3204
Other organic solvent, washing liquids and other	070104*	3	A3140	3	1993	R1	3814

The content of this draft Fact Sheet has been compiled to the best of our knowledge. The fact sheet will be continuously updated based on consultation with concerned industries or relevant stakeholders.

mother liquors							
inorganic chemicals consisting of or containing dangerous substances	160507*	various	A4140	various	various	D10	2846

European Waste Code (EWC) 070104*: Other organic solvent, washing liquids and other mother liquors

European Waste Code (EWC) 080312*: Waste ink containing dangerous substances

European Waste Code (EWC) 110105*: Acids

European Waste Code (EWC) 160507*: Discarded inorganic chemicals consisting of or containing dangerous substances

Waste Classification (Dangerous Goods Classification) 3: Flammable Liquids



Waste Classification (Dangerous Goods Classification) 8: Corrosives



Basel Classification A1060: Waste liquors from the pickling of metals

Basel Classification A3140: Waste non-halogenated organic solvents

Basel Classification A4140: Waste consisting of hazardous chemicals

Basel Classification A4070: Wastes from the production, formulation and use of inks, dyes, pigments, paints, lacquers, varnish

Transport Code (UN) 1210: Printing ink, flammable or Printing ink related material (including printing ink thinning or reducing compound), flammable
Transport Code (UN) 1993: Flammable liquids, n.o.s.
Transport Code (UN) 3264: Corrosive liquid, acidic, inorganic, n.o.s.

D10: Disposal on land (for example: incineration in a licensed rotary kiln with >1,050C)
D9: Physico chemical treatment facility (for example: evaporation, drying, calcination, neutralization, precipitation)
R1: Use as a fuel

Disposal Facilities

Recosoil (Baden-Württemberg, Lösemittelrecyclinganlage) - Recosoil Recycling GmbH

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Tanning Industry

Introduction

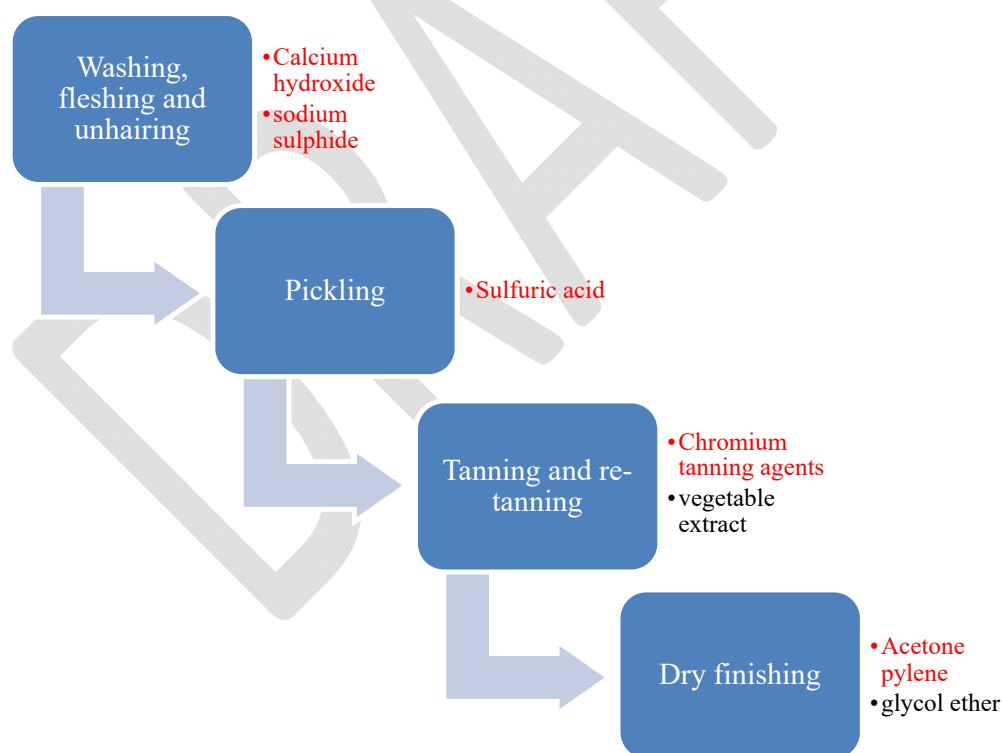
Tanneries are classified as industrial establishments as per decree 5243/2001. This factsheet intends on identifying the main resulting hazardous wastes and develops ways for its management.

Process description

The steps below show the main steps of the tanneries process:

1. *Washing, fleshing and un-hairing*: Hides are soaked and rinsed with fresh water.
2. *Pickling*: hides are neutralised in preparation for the tanning process.
3. *Tanning and re-tanning*: The leather is tanned with chrome dioxide in water.
4. *Finishing*: the tanned hides can be treated mechanically to enhance their quality.

The common activities at tanning industry are outlined in the following chart.



References: UNIDO, MSCIPP, ERM studies.

Tanning Industry Hazardous Waste Description and Management

Description of the waste	Waste Code (EWC)	Waste Classification (Dangerous Goods Classification)	Basel Class.	Storage	Transport (UN-Code)	Treatment	HS-Code
Degreasing wastes containing solvents without a liquid phase	040103* (040104)	3	A3150	3	1169	D10	3814
Acids	110105*	8	A1060	8B	3264	D9	3204
inorganic chemicals consisting of or containing dangerous substances	160507*	various	A4140	various	various	D10	2846

European Waste Code (EWC) 040103*: Degreasing wastes containing solvents without a liquid phase

European Waste Code (EWC) 040104: Chromium containing tanning agents. Not classified as hazardous waste for most of the generated waste qualities as the Cr concentration is low.

European Waste Code (EWC) 110105*: Acids

European Waste Code (EWC) 160507*: Inorganic chemicals consisting of or containing dangerous substances

Waste Classification (Dangerous Goods Classification) 3: Flammable Liquids

Waste Classification (Dangerous Goods Classification) 8: Corrosives

Basel Classification A1060: Waste liquors from the pickling of metals

Basel Classification A3150: Waste halogenated organic solvents

Basel Classification A4140: Waste consisting of hazardous chemicals

Transport Code (UN) 1169: Extracts, aromatic, liquid

Transport Code (UN) 3264: Corrosive liquid, acidic, inorganic, n.o.s.

D9: Physico chemical treatment facility (for example: evaporation, drying, calcination, neutralization, precipitation).

D10: Disposal on land (for example: incineration in a licensed rotary kiln with >1,050C)

Disposal Facilities**MEAB Schöneiche – Märkische Entsorgungsanlagen Betriebsgesellschaft mbH**

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Textile Industry

Introduction

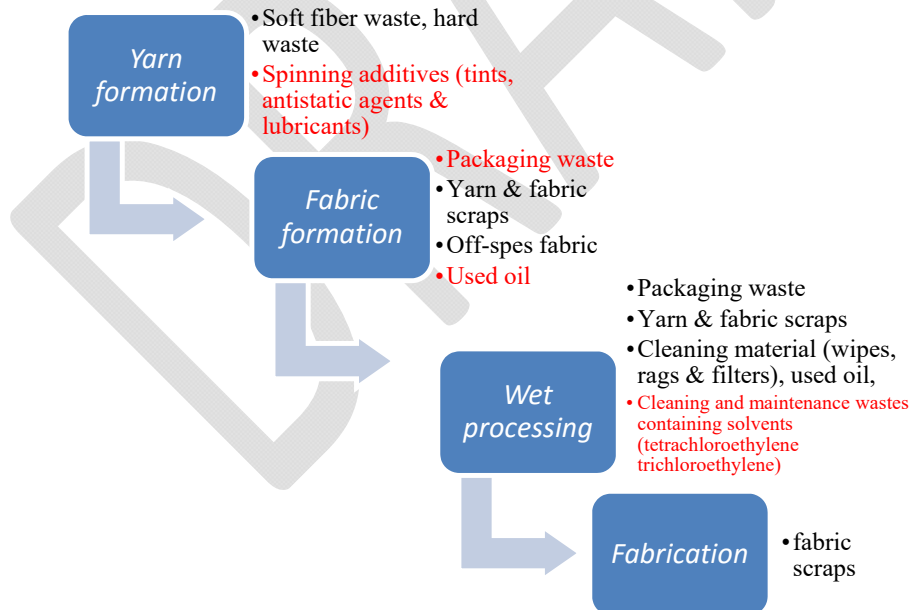
The textile industry is one of the oldest in the world and is classified as industrial establishment as per decree 5243/2001. This factsheet intends on identifying the main resulting hazardous wastes and develops ways for its management.

Process description

The following four production stages show the main steps of the textile process:

1. *Yarn formation*: textile fibers are converted into yarn by grouping and twisting operations used to bind them together.
2. *Fabric formation*: The major methods for fabric manufacture are weaving and knitting.
3. *Wet processing*: Wet processing enhances the appearance, durability, and serviceability of fabrics by converting undyed and unfinished goods, known as grey goods, into finished consumers' goods.
4. *Fabrication*: Finished cloth is fabricated into a variety of apparel and household and industrial products.

The common activities at textile industry is outlined in the following chart.



References: UNIDO, MSCIPP, ERM studies.

Textile Industry Hazardous Waste Description and Management

Description of the waste	Waste Code (EWC)	Waste Classification (Dangerous Goods Classification)	Basel Class.	Storage	Transport (UN-Code)	Treatment	HS-Code
Other organic solvents, washing liquids and mother liquors	070604*	8	A4140	8A	2209	D10	291211
Discarded inorganic chemicals consisting of or containing dangerous substances	160507*	various	A4140	various	various	D10	2846
Discarded organic chemicals consisting of or containing dangerous substances	160508*	various	A4140	various	various	D10	2928
Packaging containing residues of or contaminated by dangerous substances	150110*	9	A4130	various	3509	D10	TBD

European Waste Code (EWC) 070604*: Other organic solvents, washing liquids and mother liquors

European Waste Code (EWC) 150110*: Packaging containing residues of or contaminated by dangerous substances

European Waste Code (EWC) 160507*: Discarded inorganic chemicals consisting of or containing dangerous substances

European Waste Code (EWC) 160508*: Discarded organic chemicals consisting of or containing dangerous substances

The content of this draft Fact Sheet has been compiled to the best of our knowledge. The fact sheet will be continuously updated based on consultation with concerned industries or relevant stakeholders.

Waste Classification (Dangerous Goods Classification) 8: CorrosivesWaste Classification (Dangerous Goods Classification) 9: Miscellaneous Dangerous Goods

Basel Classification A4140: Waste consisting of or containing off specification or outdated chemicals

Basel Classification A4130: Waste packages and containers

Transport Code (UN) 2209: Formaldehyde, solutions, with not less than 25 percent formaldehyde

Code (UN) 3509: Packaging, discarded, empty, uncleaned

D10: Disposal on land (for example: incineration in a licensed rotary kiln with >1,050C)

Disposal Facilities**MEAB Schöneiche – Märkische Entsorgungsanlagen Betriebsgesellschaft mbH**

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