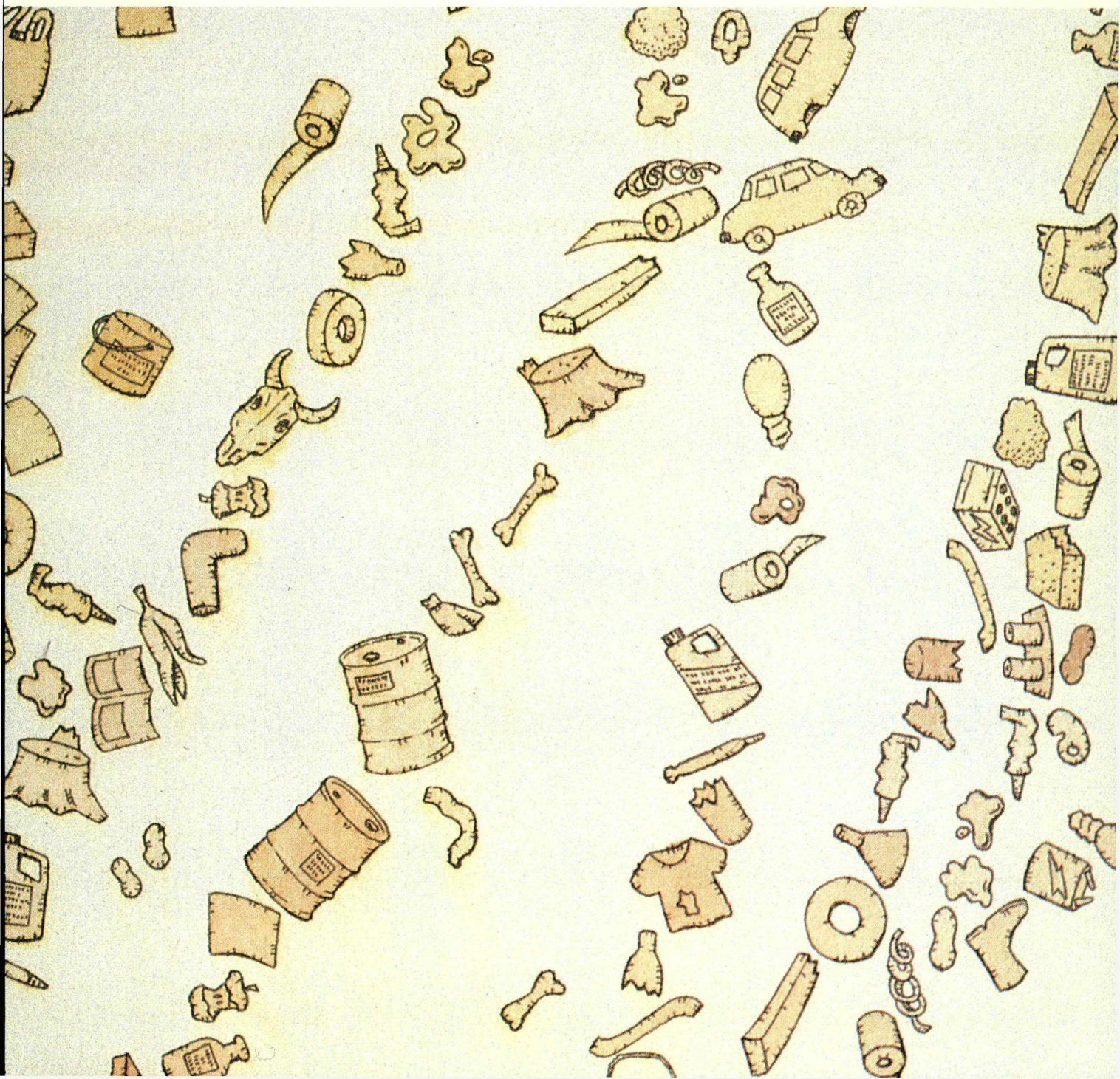


Guide to Waste Classification





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Guide to Waste Classification

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Foreword

This *Guide to Waste Classification* is an information package on main waste categories by industry. It has been produced jointly by Statistics Finland and the Waste Monitoring Project of the Finnish Ministry of the Environment. It explains the sources and types of waste that are produced in the processes and activities of different industries. A clear need for this type of handbook has become obvious during efforts to improve data production quality.

The specific users of this Guide include the Environmental Administration, producers of statistics and representatives of industries responding to survey inquiries. The Guide makes classifying waste in different data collection systems easier and gives a conversion key between the statistical classification of waste and the categories of waste and hazardous waste laid down in the Waste Act.

The classification of waste in the Guide is based on a Ministry of the Environment decision

(867/1996) for a Catalogue of Waste and Hazardous Waste, the Waste Classification (132/92) of Statistics Finland, and version 1 of the Substance Oriented Aggregated Waste Classification of the European Union's Proposal for a Council Regulation on Waste Management Statistics. The general principles adopted in the application of the Catalogue of Waste and Hazardous Waste (867/1996) are based on the preliminary outlines of the Ministry of the Environment. These principles may have to be reviewed later on the basis of experiences gained while applying the classification.

The author of the process descriptions by industry in this handbook was Senior Statistician Johanna Hentunen from Statistics Finland. The listings of waste and classification programs were compiled by Planning Officer Maila Puolamaa, also from Statistics Finland.

Helsinki, June 1999

Kaija Hovi

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1. Introduction

The Ministry of the Environment decision on cataloguing the most common wastes and hazardous wastes (867/1996) took effect in Finland at the beginning of 1997. Compiled to meet the requirements of this decision, the MOE waste and hazardous waste catalogue (Annex 1) is based on the corresponding EU acts: the Commission's decision 94/3/EU regarding the European Waste Catalogue (EWC) and the Council's decision 94/904/EU regarding the European Hazardous Waste Catalogue. The MOE catalogue is similar to the EWC in that it consists of examples of different types of wastes classified into different categories. Neither catalogue is exhaustive, nor are the objects and materials listed necessarily always wastes.

In Finland the main use of the MOE catalogue is as a reference document for the authorities responsible for waste control and management. Companies requiring an environmental permit are advised to use the codes given in the catalogue when filling applications and annual reports for the authorities. The MOE catalogue is also used by the authorities responsible for compiling and processing statistics on waste production. In the future, however, it is expected that waste statistics will be compiled in accordance with the new classification that is currently under preparation on the basis of the European Waste Catalogue (EWCSTAT). So far the waste statistics in Finland have been compiled on the basis of Statistics Finland's waste classification (Statistics Finland memo 132/1992).

The MOE waste and hazardous waste catalogue involves some problems of interpretation. One source of difficulty is the structure of the catalogue, with some of the main classes categorized by industry and others by type of waste. As a consequence there may be several item headings in the catalogue that are applicable to a certain waste. Another problem stems from the different level of accuracy of different item headings: in some industries the classification is very crude, in others highly detailed.

The main purpose of this publication is to clear up these problems of interpretation in the MOE waste and hazardous waste catalogue and to suggest ways in which the classifications could be harmonized. Some recommendations are also made with regard to the classification of wastes in accordance with the draft version of EWCSTAT and Statistics Finland's waste classification.

Chapter 2 of this report outlines the general principles regarding the application of the MOE waste and hazardous waste catalogue. The purpose is to provide a background for the more detailed classification recommendations set out in Chapter 3.

Chapter 3 describes the process of waste formation in different industries. These brief descriptions aim to provide a general picture of the origins of different types of waste. The Tables in Chapter 3 list the types of waste that are typically generated in different industries or operations and offer recommendations with regard to how they should be classified in accordance with the MOE waste and hazardous waste catalogue, the draft version of EWCSTAT and Statistics Finland's waste classification. The waste lists presented in these Tables are clustered according to industry, operation (e.g. maintenance) or type of waste (e.g. packaging waste). The lists are not exhaustive: the industry or operation concerned may also generate other types of waste that have to be classified on a case-by-case basis. In this classification it has not been possible to take into account all the factors that in each individual case influence the classification of wastes. Indeed, the classification of waste must always be based on consideration of that particular case, following the general principles laid down in the classifications proposed as far as possible.

On the basis of the lists presented in the Tables in Chapter 3, it is not possible conclusively to say whether a material generated in a certain industry or operation should be regarded as a waste. In some cases a material mentioned in the Tables may also be a raw material or an end-product, or it can be regarded as waste water rather than waste. The final decision on whether a material is defined as a waste must be made on a case-by-case basis according to the definition set out in the Waste Act (1072/93). Section 3 of this Act defines waste as an object or material that the holder has removed, shall remove or is obliged to remove from use.

The data present in the Tables on the definition and classification of hazardous wastes are also intended to provide examples rather than a conclusive list. The codes given in the hazardous waste column indicate whether the item heading proposed on the basis of the MOE list of waste and hazardous waste is listed as a hazardous waste in the MOE decision (867/1996) or in the European hazardous waste

catalogue (94/904/EU). In other words the hazardous waste classification may change if there is reason to classify the waste differently than suggested in the guidelines here. According to section 3a of the Waste

Act the Regional Environment Centres may in individual cases deviate from the MOE decision in deciding on the classification of a hazardous waste.

2. Principles of application of the Ministry of the Environment's waste and hazardous waste directory

2.1 General outline

Wastes are classed in the Ministry of the Environment's waste and hazardous waste directory mainly according to the way in which they are formed, i.e. according to the business sector and activity. Similar types of waste originating from different business sectors may thus be relegated to different categories in the directory. In this publication, several category reference numbers have been given to certain types of waste (e.g. 130201–03) when a more precise definition of the waste reference number would require determining the characteristics of the waste.

Wastes typical of a business sector are primarily classed according to the business sector but preferably not, however, into the business sector-specific categories for wastes not otherwise specified (so-called xx xx 99 categories). Appendix 3 shows what business sectors are included in each main group in the waste and hazardous waste directory.

If a waste does not have its own category in the business sector-specific directory, the waste is classed according to its formation process or type of waste. The most important formation processes are inorganic (06) and organic (07) chemical processes, painting and varnishing (08), photography (09), heat treatment processes (10), surface treatment (11), metal and plastic forming and machining (12), packaging (15), construction (17), health care and veterinary medicine (18), and raw water and wastewater treatment (19).

Industrial maintenance wastes are relegated on the basis of the type of waste mainly to category 13 (oils), 14 (solvents) and 16 (e.g. batteries and accumulators and equipment scrap).

Production rejects, i.e. so-called non-marketable products, are generally placed, with the exception of machinery and equipment and paints, varnishes, adhesives, etc., in category 16 03. Raw material chemicals are classed in category 16 05, unless the business sector has a category annexing the wastes. Product laboratory wastes are classed according to the business sector, but other laboratory chemicals come under category 16 05 and experimental animals under category 18 02 02–03.

The solvents (14), oils (13) (except edible fats and oils), scrap and chemical wastes (16), and paints, varnishes, printing inks and adhesives (08) from several business sectors are classed according to their material (and in some cases their activity and material). It should be noted that, due to deficiencies in the waste and hazardous waste directory, fluorescent tubes and other mercury-containing equipment from industry, service activities and households are always placed in category 20 01 21.

Below we give guidelines for applying the classification, firstly according to the business sector, and secondly according to the activity.

2.2 Business sector-specific guidelines

Agriculture and forestry

Agriculture and forestry wastes are generally assigned to category 02 01, but packaging (15 01), wiping cloths (15 02), machinery and equipment scrap (16 01–02), batteries and accumulators (16 06) and oils (13) and solvents (14) are categorized according to the type of waste. Horticultural growing medium waste comes under category 02 01 99. Similarly, hoses and protective plastics are relegated to category 02 01 04. Building waste is placed according to type in category 17.

Mining activities

Mining wastes are classed in categories 01 01–05, but

machinery and equipment scrap (16 01–02), batteries and accumulators (16 06), oils (13), solvents (14) and packaging (15 01) are classed according to the waste type.

Food industry

Food industry wastes are generally assigned to categories 02 02 – 02 07. Wastes from the manufacturing of feed of animal origin belong to category 02 02 when they are mixed with feed of vegetable origin. Wastes from yeast and mould processing, and also margarine manufacturing, come under category 02 03.

Textile and leather industry

Wastes from the textile and leather industry are relegated to categories 04 01 – 04 02. Leather waste from the ready made clothing industry is classed as 04 01 and similarly textile waste from the leather industry as 04 02.

Forest industry

(excl. wooden house manufacturing)

Wastes from the mechanical and chemical forest industry (excl. wooden house and wooden furniture manufacturing) are relegated to categories 03 01 – 03 03. However, the pulp industry's chemical cycling wastes are placed in category 06 and machine felts and wires in category 15 02 01. Bark waste from the chemical forest industry is assigned to category 03 03 01, but wood wastes come under categories 03 01 02 – 03.

Chemical industry

Wastes from the inorganic chemical industry are placed in category 06, and organic chemicals in categories 07 and 08. It should be noted that when inorganic chemicals are used in organic chemical processes, the inorganic acids, alkalis and inorganic salts are classed as 06. Filtration cakes and catalysts from organic processes are placed in category 07.

Plastics and plastic product industry

Wastes from the manufacturing of plastics are relegated to category 07 02, but undifferentiated raw material and additive wastes, as well as resin wastes, are classed as 16 05 02–03. Plastic wastes from the plastics industry are placed, however, in category 16 02 07.

Construction product industry

Wastes from heat treatment processes in the construction product industry come under categories 10 12 – 10 13, but wastes from wooden house manufacturing are classed as 03 01. Non-marketable products from the prefabricated element industry, and the mineral wool and glasswool wastes arising during their manufacturing, are placed in category 10 13 03 and wooden moulds in category 10 13 99. Other wastes from construction product manufacturing are relegated to category 16 03, unless a specific class for them is included under the specific business sector.

Metal industry (incl. work shops)

Wastes from heat treatment processes (excl. hot rolling, welding, oxygen cutting and soldering) in the metal industry, i.e. base metal and machinery,

equipment and vehicle manufacturing, are assigned to categories 10 02 – 10 10. Wastes from metal shaping and working (including hot rolling, welding, oxygen cutting and soldering) are classed as category 12. Surface treatment and hydrometallurgical wastes come under category 11.

Energy production

Wastes from heat treatment processes in energy production are classed as 10 01, raw water manufacturing wastes as 19 09, and maintenance wastes, according to their nature, as 13, 14 and 16.

Water supply Wastes from the treatment of raw water (incl. cooling waters) for drinking water and industrial use are relegated to category 19 09. Sand filtration material from raw water is placed in category 19 09 99.

House building, soil and water construction

See under activity 'Construction'.

Machinery and equipment repair shops

Wastes from machinery and equipment repair shops are mainly classed according to their waste material. Machinery and equipment scrap comes under categories 16 01–02, batteries and accumulators under category 16 06, oils under category 13, cotton waste under category 15 02, paints, varnishes and adhesives under category 08, solvents under category 14, battery acids under category 16 06, and other chemical wastes under category 16 05.

Commerce and services

Vehicle and wholesale trade wastes, together with wastes from the kind of service activities which owing to their quality or quantity deviate from waste from household sources, are classed according to their waste material. Packaging is classed under category 15 01, machinery and equipment scrap under category 16 01–02, batteries and accumulators under category 16 06, and oils under category 13. Wastes from photographic services are relegated to category 09. Food and office wastes are placed in category 20.

Wastes from the retail trade and service activities are classed in the same way as the equivalent municipal wastes, if their quantity or quality does not essentially differ from wastes arising from day-to-day living.

Hospitals

Special waste from hospitals is placed in category 18 and waste equivalent to municipal waste in category 20. Laboratory and maintenance waste is classed according to its type as follows: chemical wastes to category 16 05, machinery and equipment scrap to category 16 01–02, batteries and accumulators to category 16 06, oils to category 13, protective clothing to category 15 02, and packaging to category 15 01.

Households

Wastes collected separately from households are placed in category 20 01. Mixed waste comes under category 20 03 01. (Mixed waste means the kind of household waste the components of which are not collected separately in compliance with the municipal waste management regulations.) The municipal waste residue for incineration (RDF) is placed in class 20 03 01 as mixed waste. Household renovation waste is assigned to category 17 and packaging waste (except for glass) to category 15 01. Glass waste goes to category 20 01 02.

Large-sized metal scrap is placed in category 20 01 06, and metal packaging in category 15 01 04.

Non-hazardous batteries and accumulators come under category 20 01 20 and hazardous ones under class 20 01 20 01. Batteries and accumulators from vehicles are assigned to category 16 06 01, however. Obsolete CFC containing refrigeration equipment is relegated to category 20 01 23, whereas electronics equipment goes into category 20 01 24.

Acid wastes from households are put in category 20 01 14 and alkali wastes in category 20 01 15, solvent wastes in category 20 01 13, and paints, varnishes, adhesives and equivalent waste in category 20 01 12.

Oil waste from households is considered to belong to category 20 01 09 01. Oil waste collected at service stations is put in category 13.

Wastewater treatment plants and waste management

Wastes from wastewater treatment are classed as category 19 08, unless the wastewater treatment wastes are specified in the business sector categories. Wastes from wastewater treatment and waste management maintenance are classed as category 13 (oil), 14 (solvents) and 16 (machinery and equipment scrap). Laboratory wastes are assigned to category 16 05.

2.3 Activity-specific guidelines

Packaging wastes

Packaging is defined under EU directive (92/62/EC) and the Council of State's decision proposal for packaging and packaging wastes as a product intended for the storage and protection of goods and for making it possible for the latter to be handled and transported from the producer to the consumer or user, and facilitating its display. Disposable products intended for the same purpose are also considered as packaging. Packaging waste means a packaging or packaging material whose possessor has either discarded it, or intends to discard it, or is obliged to remove it from circulation, with the exception of production waste. No final guidelines to the interpretation of the definition of packaging and packaging wastes have as yet been established either in the EU or in Finland. Thus, the preliminary classification recommendations given here may later be reviewed and more precisely defined.

In accordance with the preliminary guidelines, packaging wastes are placed primarily on the basis of their material in one of the categories 15 01 01 - 15 01 06. Filling material is also considered as packaging waste, as are also hoops, string, cord and ropes, and the packaging material wastes raising from the packing of goods. On the other hand, packaging reject consignments arising in the manufacturing of packaging materials are not regarded as packaging wastes and are assigned to category 16 03.

Under the category of mixed packaging (15 01 06) come glass, textile and fibreglass packaging, but not household glass containers, which are placed in category 20 01 02. Composition packaging (packaging made from a sandwich material) is defined by the commission's decision (97/138/EU) as packaging made of different materials which cannot be separated by hand and no component of which exceeds the percentage by weight defined separately. No final guidelines have as yet been established for interpreting this definition. Up to the point where such guidelines are established it is recommended that packaging board for liquids be included as composition packaging in category 15 01 05.

Construction wastes

Construction and demolition wastes, including household renovation waste, is classed as category 17. Metal cable wastes among construction waste are placed in category 17 04 08 and metal machining wastes in accordance with their material in category 17 04. Fibreglass optical fibre waste goes to category

17 02 03, flat glass waste to category 17 02 02, surplus soil to 17 05 01, glass and mineral wool insulation waste from building to class 17 06 02. Machinery and equipment waste is relegated in accordance with its type to one of the categories 16 02 01–05, paints to category 08 01, paint thinners to category 07 01, and adhesives and sealants to category 08 04. Kiln discharge wastes from heat treatment processes are assigned to category 10. Polluted soil is included in category 17 05 01 01.

Photographic wastes

Photographic wastes, i.e. wastes from the photographic industry, commercial photographic laboratories, X-ray laboratories, etc., are placed in category 9. Photographic chemicals from small scale amateur photography come under category 20 01 17.

Filtration materials

Filtration materials from the organic chemical industry are classed by business sector in category 07, oil refining filtration material in category 05, active carbon from chlorine manufacturing in category 06 07 02 and other inorganic chemical industry active carbon in category 06 13 02. Filtration material from raw water production is classed as category 19 09, filtration material from wastewater treatment as category 19 08, and other filtration materials as category 15 02.

Wastes comparable to household wastes

Domestic wastes, with the exception of vehicles, batteries and accumulators, and packaging (excluding glass), are put in category 20. Food waste collected separately from industrial and service activities which can be regarded as equivalent to so-called daily life activities, together with newspaper, magazine and office paper waste is relegated to category 20 01. Mixed waste from different activities is placed in category 20 03 01. (Mixed waste means the kind of municipal waste the components of which are not collected separately in compliance with the municipal waste management regulations.)

2.4 Guidelines specific to waste type

Below we give the main guidelines for the placing of the most common types of waste in the different categories of the waste and hazardous waste directory. The guidelines are based on the classification of the materials, and the form of the waste has not been treated separately unless there is some special reason for this. Thus, sludge wastes are placed in the same category as the equivalent solid wastes.

Plant and animal wastes

Plant and animal wastes (incl. dung and laboratory culturing media) from primary production and the food industry come under categories 02 01–07. Plant and animal waste production in other business sectors are put into the business sector-specific disposal categories with filtration materials, however, coming under category 15 02. Leather, hide and similar wastes from machinery and equipment manufacturing are relegated to category 16 02 08.

Food wastes

Food wastes from elsewhere than the food industry are placed in category 20, and from the food industry in categories 02 02 – 02 07. Grease separation waste from the food industry is assigned according to the business sector to categories 02 02 – 02 07, but kitchen grease separation waste to category 20 01 09.

Fibre, yarn and textile wastes (excl. leather)

Fibre, yarn and textile wastes (excl. leather) from the textile and leather industry are assigned to category 04, from other sectors of industry according to their origin or purpose as either cutting wastes (16 02 08), packaging (15 01 06) or filter materials (15 02 01), etc. The latter group covers air protection fibre filters, machine felts and wires in pulp formation, textile cords, and wiping rags, in addition to used protective clothing. Cord, string and sacks are packaging wastes and are classed as category 15 01. Household clothing and textile wastes are assigned to categories 20 01 10–11.

Wood wastes

Wood waste from the forest industry, wooden houses, furniture and wooden product manufacturing (incl. preservative containing wood waste) is placed in category 03 01. Wood waste from other business sectors is relegated to either construction wastes (17

02 01), cutting wastes (16 02 08), or the business sector specific disposal classes (e.g. slaughter house cutter chips 02 20 99, concrete industry wooden formwork 10 13 99). Creosote containing railway sleepers are assigned to category 17 02 01.

Paper

Paper waste from industrial offices, etc., is put in category 20 01 01 and industrial production reject in 160302. Paper waste typical for a certain business sector is relegated to the disposal category for the business sector, for example greaseproof paper from the food industry to category 02 03 99, pattern paper from the textile industry to 04 02 99, waxpaper from the plastics industry to 07 02 99, and waxpaper from the plywood industry to 03 01 99.

Ashes and slags

Ash from combustion plants is relegated to category 10, ash from a plant specialized in incinerating municipal waste to class 19 01, and ash from the incineration of hazardous waste to category 19 98. Small amounts of wastes from thermal power plants using recycled fuel as well as other ash from energy production are classed as category 10 01. Ashes from various kinds of heat treatment processes come under category 10. Ashes from smoking processes in food industry are classed in category 02 02 99.

Chemical wastes

Chemical wastes are primarily classified according to their business sector. If the business sector has no special class, inorganic chemical wastes are relegated to category 86, organic salts and acid and alkaline wastes to category 07 01 and other chemical product wastes to category 16 05. Unspecified raw material wastes from the chemical industry are included in categories 16 05 02 – 16 05 02 01 or 16 05 03 – 16 05 03 01. Mixed laboratory waste is relegated to category 16 05 03 01.

Acid wastes from the surface treatment of metals are classed as 11 01, from other branches of industry as category 06 01 and from households as category 20 01 14. Alkali wastes are correspondingly classed under categories 11 01, 06 02 and 20 01 15.

Salts used in wood preserving agents are relegated to category 03 02, other inorganic pesticides to category 06 13 01, and organic pesticides to category 16 05 02 01.

Salts are assigned as follows:

- salts used as colour pigments in plastic, paper, etc., to category 16 05 02 - 03
- metal salts used for wood preserving to category 03 02
- salts used as catalysts primarily as catalysts (categories 06 07, 06 12, 05 03, 07 02 – 07 07, 10 01, 19 01, 19 98)
- tempering salts to category 11 03
- sludge following surface treatment to category 19 02 01
- cyanide containing salts from tempering to category 11 03, otherwise to category 06 03 11
- all arsenical salts to category 06 04 03
- all mercurial salts to category 06 04 04
- all other hazardous heavy metal salts, like cadmium, tin, lead, nickel, zinc and copper salts to category 06 04 05
- earth alkali metals like sodium, potassium and calcium salts to category 06 03, earth alkali metal oxides, hydroxides and permanganates to category 06 03 99, other metal oxides to category 06 04 01 and hydroxides to category 06 04 99.

Oil wastes

Oil wastes from different business sectors (with the exception of oil from refining (05)) are relegated to category 13, oily emulsions from metal and plastic machining, however, to category 12 01 and oil wastes from emptied transport and storage tanks to category 16 07. Oil wastes from agriculture and forestry are assigned to category 13. Hydraulic oils come under category 13 01, engine, gearbox and lube oils under category 13 02, and insulating and heat exchange oils (incl. tempering oil waste and all other categories of machining oil waste except for metal and plastic) under category 13 03. Vehicle antifreeze (glycol) is placed in category 13 03 04. Oil filters go into category 13 06 01.

Oil separator sludges from service stations and so on are placed in category 13 05 (surface emulsion to 13 05 05, bottom sludge to 13 05 02), from the oil industry in category 05 01 01 and from wastewater treatment plants in category 19 08 03. Other mineral oil/water mixtures and fuel oil are assigned to category 13 06 01. Waste oils from oil refining are relegated to category 05, waste oil from maintenance activities to 13 and oily soils to category 17 05 01 01.

Solvent wastes

Solvent wastes from industry are classified primarily by business sector, i.e. extraction waste from the vegetable oil industry go to category 02 03, cleaning

waste from the leather and textile industry to category 14 02, solvent wastes from the chemical industry to categories 07 01 – 07 07, and solvent wastes from the metal industry to category 14 01.

Wastes from industrial solvent use are placed in category 07 01, if the directory does not annex solvent wastes under the particular business sector. Solvent wastes from machinery maintenance are put in category 14 01.

Resins

Wastes from resins used as raw material chemicals are assigned to categories 16 03 02 00–01, resin oil waste arising as an intermediate product in the organic chemical industry to category 07 01 08, and resin adhesives and sealing compounds to category 08 04.

Paint, varnish, adhesive and printing ink waste

Paint, varnish, adhesive and printing ink waste, etc., (incl. reject products during manufacturing) from industry and services is assigned to category 08, and printing powder cartridges to category 08 03 09. With the exception of reject products and some process wastes, wastes from the manufacturing of such products are relegated to categories 07 01 or 07 02 (solvents, etc.) and 15 02 (filter materials).

Plastic wastes

Plastics machining and forming wastes from machinery, equipment and furniture manufacturing come under category 12 01 05, whereas plastics cutting wastes from different sectors fall into category 16 02 08. Plastic wastes from the plastic product industry are assigned, however, to category 16 02 07.

Fibreglass, glass and mineral wool

Glass and mineral wool filter material waste is relegated to category 15 02, woven fibreglass materials to category 04 02 09, greenhouse fibreglass growing medium to 02 01 99, and other fibreglass, glass and mineral wool products to category 16 02 08.

Metal slag, scale and dust

Metal slag, scale and dust are primarily classified according to how they arise. Wastes from various kinds of heat treatment processes (e.g. smelting, casting, hot dipping) are placed in category 10, hydrometallurgical and tempering wastes in category 11, shaping and machining wastes in category 12, and metal coating wastes in category 11. It should,

however, be noted that wastes from e.g. cold and hot rolling of metals, oxygen cutting, welding and soldering come under category 12.

Metal coating slag, scale and dust is classified on the basis of its treatment stage as follows:

- the oxidized layer on a metal object for surface coating, or rolling scale shot blasting or (flame) brushing waste is assigned to category 12, but the equivalent waste from chemical acid cleaning to category 11.
- waste from surface coating baths or solvents (incl. electrolytic coating) is relegated to category 11 and sediments and sludges from the separation of sediments from the above solvents to category 19 02 01.
- hot dipping wastes (e.g. zinc, tin, lead and aluminium coating) are relegated to categories 10 05, 10 08, 10 04 and 10 03.
- rolling wastes from hot dipped metal plates are assigned to category 12.

Slag and dust (as also gas treatment wastes and oven discharge wastes) from metal manufacturing, casting and smelting are placed in category 10, but wastes forming due to mechanical joining of metal pieces go to category 12 01 and mechanical surface coating wastes to category 12 02.

Metal waste

Metal shavings and pieces arising during metal working and shaping are relegated to category 12 01, metal-containing machinery and equipment (incl. reject waste from machinery and equipment manufacturing) together with scrap from their components to categories 16 02 01–05, and metal packaging to 15 01 04 00–01. Metal wastes from construction are placed in category 17 04. Municipal metal wastes (except for packaging) go to category 20.

Batteries and accumulators

Lead batteries and accumulators from households and those from industry and services are assigned to category 16 06 01. Other batteries and accumulators

from households are placed in category 20 01, the non-hazardous ones going to category 20 01 20 and the hazardous ones to 20 01 20 01. Other batteries and accumulators from industry and services are included in category 16 06, mercury batteries in category 16 06 03, alkaline batteries in category 16 06 04, mixed heavy metal batteries in category 16 06 05 01, and other batteries in category 16 06 05.

Machinery and equipment scrap

Reject products from machinery and equipment manufacturing are assigned to categories 16 02 01–05. Reject circuit cards, and other equipment wastes, from the electronics industry are relegated to category 16 02 02, PCB condensers to 16 02 01, other condensers to 16 02 05, electronics equipments to 16 02 02, refrigeration equipments containing CFCs to 16 02 03, and other equipments and scrap to 16 02 05. Equipment components, like drive belts, sanding bands, and roller rubbers are put into category 16 02 05 intended for equipment wastes.

Scrap vehicles

Scrap vehicles from households, and industry and services are relegated to category 16 01. Scrap boats and bicycles are also placed in category 16 01.

Wastewater sludge

Industrial wastewaters are primarily classified according to business sector. Unless the sludge is specified under the particular business sector, it is assigned to category 19 08 04. Sludge from municipal sewage works is placed in category 19 08 05. Sludges are classified on the basis of the stabilization method employed into the following sub-categories:

19 08 05 A	non-stabilized sludge
19 08 05 B	rotted sludge
19 08 05 C	digested sludge
19 08 05 D	lime stabilized sludge
19 08 05 E	thermally treated sludge
19 08 05 F	sludge treated by some other method for reducing pathogens

3. Waste arising and classification by business sectors

Industrial classification

Waste producing activities are examined following the Standard Industrial Classification 1995 (SIC-95) (Statistics Finland 1993: Standard Industrial Classification 1995, Handbooks 4, Helsinki 1993). Principally SIC-95 follows the structure and code system of EC's industrial classification (NACE Rev. 1) down to 4-digit level. The titles of the classes do not always describe all the activities belonging in the class. The selection of the activities described in this manual was intended to do so that all the essential activities in waste arising would be examined.

Tables in the manual

The most important wastes arising from each activity are presented in form of tables except for some exceptions. Each table presents the principal wastes from the actual production or manufacturing and wastes arising from the production supporting laboratory or from water, air and environment pollution control activities. The wastes arising from cleaning activities are classified as production wastes when regular cleaning (for example lye washing) is necessary for product manufacturing. In addition tables include some typical wastes from maintenance and service for the business sector examined. Otherwise wastes from maintenance likewise packaging wastes are dealt separately in the end of the manual. Biological waste and other waste comparable to municipal waste, like office and refectory waste, are not included in the tables by business sectors. Those wastes are dealt with in the last section of the manual (Municipal wastes).

The column titles mean the following:

P	The most common productional origin of the waste. The origin of the waste is described by following codes:
1	The production process
4	Production supporting laboratory
5	Cleaning

10	Environment pollution control (soil, water or air pollution control)
16	Maintenance waste; typical for the business sector
Type of waste Classification	The common name of the waste Waste classification according to waste and hazardous waste catalog by the decision of (<i>ME</i>) the Ministry of Environment (867/1996) (Annex 1).
Classification	Waste classification according to the Annex of the waste statistics regulation draft of (<i>EWSTAT</i>) EC's waste statistics suggestion. (Annex 2).
Classification	Waste classification according to Statistics Finland's waste classification (Waste (<i>Statistics</i>) Classification, Memo NR 132, Statistics Finland 1992).
H-waste	Markings in this column presents if the classification code of waste in the (<i>ME</i>) "Classification (<i>ME</i>)" column is classified by the decision of the Ministry of Environment (867/1996) as hazardous waste. Marking means that all the waste classes presented in the row are classified as hazardous waste. Marking (*) means that only some waste classes in the row are classified as hazardous waste. Notice the remark of the hazardous waste classification presented in section 1.
H-waste	This column presents comparable data to the "H-waste (<i>ME</i>)" column from so called (<i>EC</i>) European hazardous waste catalog according to the EC's regulation 94/904/EC. All the hazardous wastes included in the EC's hazardous waste catalog are also classified as hazardous waste in the decision of the Ministry of Environment 867/1996.

01

*Agriculture, hunting and services associated**Farming and animal husbandry*

Waste arising in farming is mostly plant waste, plastics (bale wrappers, fertilizer sacks, AIV-plastics) and waste arising from servicing of farming machinery and appliances. Animal husbandry produces mainly manure, sludge, and animal urine. Artificial

insemination and medication of cattle causes so called insemination pipes and injectors and also antibiotics. The most important wastes from farming are shown in Table 1.

Table 1. Wastes arising from farming and animal husbandry

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	AIV-liquids	020105	03.11	35200	*	*
1	Batteries	160601-05	08.51	25500/33103	(*)	(*)
1	Disinfectants	02105	03.11	33900	*	*
1	Animal medicines	180204	03.12	39201	*	(*)
1	Carcasses	020102	10.11	11400		
1	Hydraulic oils	130101-07	01.32	34104	*	*
1	Brake fluids	130108	01.32	34104		
1	Engine parts, metal scrap	160205	08.12	25202		
1	Fabric sifter	150201	07.63	17100		
1	Manure and liquid manure	020106	09.00	11500		
1	Glass	150106	13.41	21405		
1	Luminous tubes	200121	08.53	21415	*	*
1	Lead batteries	160601	08.51	25626	*	*
1	Milking rags	020199	07.63	17100		
1	Engine, transmission and lubrication oils	130201-03	01.32	34103	*	*
1	Plastic containers and tubes	150102	07.42	37148		
1	Plastic packages	150102	07.41	37100		
1	Plastic injectors	020199	07.42	37100		
1	Bale plastics	020105	07.42	37100		
1	Litters	020106	09.00	11500		
1	Washing and cleaning sludges	020101	10.12	33800		
1	Deteriorated fodder	020103	10.12	16100		
1	Grease tubes	160502	07.42	37100		
1	Tires	160103	07.31	37502		
1	Broken machines	160205	08.12	25215		
1	Plastic coverings	020105	07.41	37100		
1	Household waste	200301	11.11	51101		
1	Pesticides	020105	0311/03.31	39100	*	*
1	Urine	020106	09.00	11509		

Horticulture

In horticulture arises especially large amount of plant waste, for example stems of cucumbers and tomatoes. Cultivated plants are usually grown on glass wool or peat, which have to be changed occasionally. Pesticides and disinfectants are used in gardens not

only directly in plant disease and pest prevention, but they are also used in regular cleaning of watering mains and water tanks. The most important wastes from horticulture are shown in Table 2.

Table 2. Wastes arising from horticulture

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Aluminium scrap	120104	06.23	25615		
1	Disinfectants	020105	03.11	33900	*	*
1	Plant waste	020103	03.11	21415		
1	Engine parts, metal scrap	160205	08.12	25202		
1	Fertilizer sacks, plastic	150102	07.41	37100		
1	Glass wool foundings	020199	13.41	21508		
1	Iron and steel scrap	120102	06.12	25202		
1	Plastic coverings	020105	07.41	37100		
1	High-power lamps	200121	08.53	21415	*	*
1	Pesticides	020105	0311/03.31	39100	*	*
1	Peat growing medium	020199	13.41	11104		

131 and 132 Mining of iron ores and other metal ores

Ores are mined from open cast and underground mines. The work methods used in mining are drilling, blasting and ordinary mechanical excavating. Ore rock is either concentrated into ore concentrate at the mine or it is transported by rail to an ore concentrating plant elsewhere.

The quarried ore rock is crushed and fine ground into grains. Fine-grained ore is foamed and to extract iron from it can be used for example magnet. Oxide ores (for example iron oxides) are concentrated with ferro-silica and water. The host rock floats in the solution of ferro-silica and water but ores sink. Sulphide ore are concentrated by foaming (Figure 1) when the surface

of the mineral is made hydrophobic with foaming chemicals. The mineral is extracted from other sludge with air bubbles. The concentrate treatments vary with metals and concentrates quality.

Most of the waste produced by mines consists of waste host rock and loose soil, which are later used for filling in the mine. In connection with concentrating, concentrate sludge and concentrate grit is formed. Mining wastewaters are formed from run-off water and water used for ore concentrating. The most important wastes from iron and other metal ore mining and concentrating are shown in table 3.

Figure 1. Sulphide ore concentrating with grinding and foaming

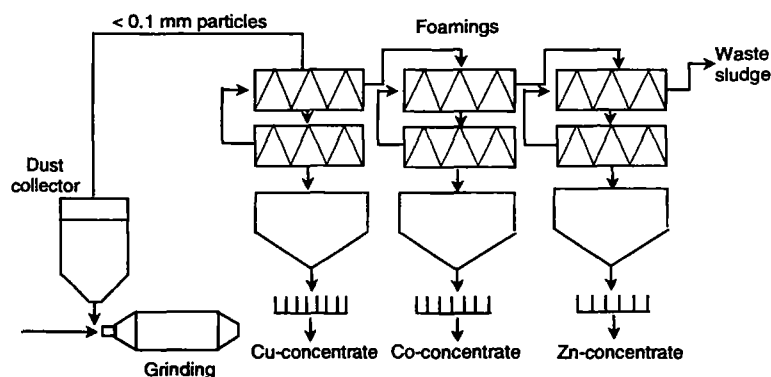


Table 3. Iron and other metal ore mining wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Jarosite slag	110202	01.24	21835	*	*
1	Soil and soakage compound waste containing oil	15020101	02.14	34408	*	
1	Ore concentrating sludge	010201	13.22	21840		
1	Blast-furnace slag	100202	13.33	21102		
1	Transformers and condensers	160201	08.12	25208	*	*
1	Alumina brick and pulp waste	100206	13.42	21202		
1	Host rock	010101	13.21	21705		
1	Surplus soil, mineral	010101	13.21	21701		
5	Washing sludges from oil tanks	160706	02.22	34802	*	*

14

Mining of other minerals

141 Stone quarrying

In stone quarrying, the largest waste group is made up of surface soil and waste stone. These quarrying wastes are generally left at the quarry, where they are used for landscaping the area. Waste stone can also be crushed

into chippings. Other noteworthy wastes from this activity are metal wastes from drilling and crushing. The most important wastes from quarrying activities are shown in Table 4.

Table 4. Wastes from stone quarrying.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Waste stone	010102	13.21	99998		
1	Waste stone and cutting waste	010406	13.21	21703		
1	Calcium and magnesium hydroxide	010405	13.21	31221		
1	Stone sludge	010499	13.22	21801		
1	Metal waste	160205	08.12	99998		
1	Surface soil	010102	13.21	99998		
1	Drill bits	160205	08.12	99998		
1	Drilling rods	160205	08.12	99998		
1	Scrap iron and steel	160205	08.12	25201		
1	Separation waste	010405	13.21	99998		
1	Host rock	010102	13.21	21705		
5	Cleaning towels and cleaning wool hazardous	15020101	07.63	17119	*	
10	Limestone dust	010403	13.31	21632		
10	Calcium and magnesium oxides, filter dust	010403	13.21	31201		

142 Quarrying of sand and clay

In the quarrying of sand, gravel and clay, as in stone quarrying, most of the waste consists of surface soil and stone. When quarrying sand and gravel, the product is often sieved at the quarry. Stone crushing may also form part of this process. In this case scrap

iron and steel from sieves and conveyors, as well as scrap steel from wearing parts in the crusher, are formed. The most important wastes from sand and gravel quarrying are shown in Table 5.

Table 5. Wastes from sand and gravel quarrying.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Stone dust	010403	13.31	21631		
1	Metal waste	160205	08.12	99998		
1	Peroxides	060199	01.24	31101	*	*
1	Surface soil	010102	13.21	99998		
1	Scrap iron and steel, clean	160205	08.12	25201		
1	Host rock	010102	13.21	99998		
5	Cleaning towels and cleaning wool	150201	07.63	17118		
5	Cleaning wool containing mineral oil	15020101	07.63	34411	*	

143 Quarrying of chemical minerals

Chemical minerals like apatite and calcium phosphate are quarried from open cast mines from which the material is transported to the concentrating plant (see apatite concentration diagram on p. 64 fig. 13). Wastes forming during this activity are similar to those from

ore mining (host rock, concentrating sludge, concentrating grit, wastewaters). In open cast mining an extremely large amount of water is formed, because surface and wastewaters are able to wash across the quarry.

15

Manufacturing of food and drinks

151 Slaughterhouse and meat processing and meat preserving treatment

The work stages in slaughtering activities are shown in Figure 2. The most important wastes arising in slaughtering activities are listed in Table 6.

Figure 2. Stages in slaughtering

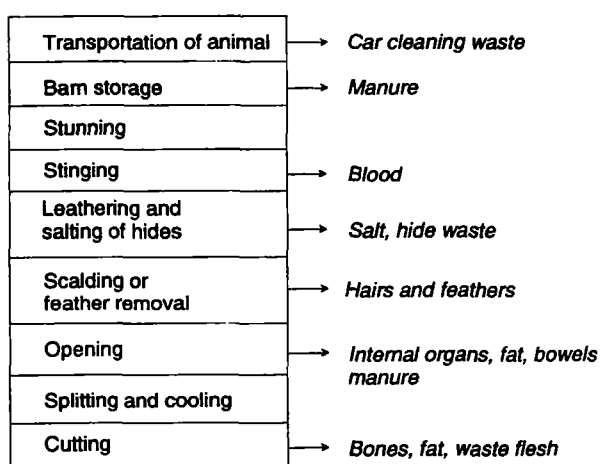


Table 6. Wastes from meat and poultry slaughtering.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Animal parts, not refineable	020202	10.11	11402		
1	Manure	020299	09.00	11500		
1	Animal tissue waste	020202	10.11	13201		
1	Feathers	020202	10.11	11310		
1	Membranes, tendons, hide pieces	020202	10.11	11303		
1	Hair removal waste	020202	10.11	17501		
1	Flesh and leather waste	020202	10.11	12101		
1	Bone waste	020202	10.11	11301		
1	Sodium chloride, waste salt	060305	01.24	31401		
1	Horns, hooves, bristles, heads	020202	10.11	11304		
1	Smoking tar	020299	13.32	13212		
1	Internal organs	020202	10.11	11308		
1	Bowels	020202	10.11	11307		
1	Infectious waste	180202	05.20	11403	*	*
1	Slaughtering waste	020202	10.11	11300		
1	Blood	020202	10.11	11306		
1	Urine	020299	09.00	11509		
4	Bacteria cultures, sterilized	020299	10.12	11216		
4	Laboratory chemicals	16050201-0301	03.14	39701	*	

Table 6 (continue)

5	Alkaline washing sludge	060299	01.24	33806	*	*
5	Acid washing liquid	060199	01.24	33501	*	*
5	Acid washing sludge	060199	01.24	33805	*	*
5	Cleaning towels and cleaning wool	150201	07.63	17118		
5	Cleaning towels and cleaning wool, hazardous	15020101	07.63	17118	*	
5	Cleaning waste, for example flesh	020203	10.11	12101		
10	Preliminary sedimentation sludge	020204	12.12	57303		
10	Ingredient extracted by sand filter	020204	13.21	21601		
10	Wastewater sludge	020204	12.12	57304		
10	Bottom sludge from wells	020204	12.40	12520		
10	Chemical sedimentation sludge	020204	12.12	57305		
10	Grease extraction waste	020204	12.40	13301		
10	Mesh screening waste	020204	12.12	57301		
10	Surface emulsions from oil extractors	130505	02.22	34801	*	*
10	Bottom sludges from oil extractors	130502	02.22	34801	*	*

Sausage manufacturing

Sausages are divided according to their method of manufacturing into cooked sausage, salami and uncooked sausage. In the manufacturing of cooked sausages, sausage in its skin is cured by smoking and boiling, after which the sausages are cooled in cold water. Salami is not boiled. Sausages are mainly made

from pork and beef and carcass parts (skin, ears, etc.). Other ingredients used in manufacturing include water (cooked and uncooked sausage), milk powder, potato flour and additives. The most commonly used food additives are nitrate and nitrite, ascorbic acid, phosphates and salt. The main wastes arising during sausage manufacturing are shown in Table 7.

Table 7. Wastes arising in sausage manufacturing.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Food manufacturing waste	020203	10.11	12101		
1	Animal tissue waste	020202	10.11	13201		
1	Raw dough waste from bakeries	020203	10.22	12101		
1	Incorrect products from bakeries	020203	10.22	12103		
1	Meat and sausage waste	020203	10.11	12101		
1	Natural bowel waste	020202	10.11	11405		
1	Bone waste	020202	10.11	11301		
1	Sausage wastes	020203	10.11	12101		
1	Sausage pulp	020203	10.11	12101		
1	Pie waste	020203	10.22	12101		
1	Tar residue waste	020299	11.11	34605		
1	Spoiled food	020203	10.22	12106		
1	Bottom ash from wood burning	020299	13.32	21315		
1	Vegetal tar	020299	13.32	34609		
1	Bowel	020202	10.11	11307		
1	Blood	020202	10.11	11306		
1	Inferior products	020203	10.22	12103		
4	Bacteria cultures, sterilized	020299	10.12	11216		
4	Laboratory chemicals	16050201-0301	03.14	39701	*	*
4	Perchloroethylene	070103	01.11	35111	*	*

Table 6 (continue)

5	Alkaline washing sludges	060299	01.24	33806	*	*
5	Acidic washing sludges	060199	01.24	33805	*	*
5	Flesh and leather pieces	020202	10.11	11305		
5	Cleaning towels and cleaning wool	150201	07.63	17118		
10	Preliminary sedimentation sludge	020204	12.12	57303		
10	Ingredient extracted by sand filter	020204	13.21	21601		
10	Wastewater sludge	020204	12.12	57304		
10	Bottom sludge from drainage	020204	12.40	12520		
10	Chemical sedimentation sludge	020204	12.12	57305		
10	Grease extraction waste	020204	12.40	13301		
10	Mesh screening waste	020204	12.12	57301		
10	Surface emulsions from oil extractors	130505	02.22	34801	*	*
10	Bottom sludges from oil extractors	130502	02.22	34801	*	*

152 Fish and fish product processing and preserving

After catching, fish are slaughtered by stunning and bloodletting. The filleted fish is washed and stored in ice. The fish is then processed and preserved, by deep

freezing salting, smoking or as semi-preserves. The most important wastes from fish and fish product manufacturing are shown in Table 8.

Table 8. Wastes from fish and fish product manufacturing.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Food manufacturing waste	020203	10.22	12101		
1	Fish and crawfish waste	020202	10.11	11311		
1	Bottom ash from wood burning	020299	13.32	21315		
1	Vegetal tar	020299	13.32	34609		
1	Herring tub leek	020203	10.22	12102		
5	Fat waste	020202	10.22	13201		
10	Fatty washing sludge	020204	10.22	13510		

153 Fruit, berry and vegetable processing and preserving

1531 Potato processing and preserving

The most important work stages in the processing of potatoes, as of many other vegetables and root vegetables, are mull separation, washing, sieving (stones and small potatoes separately), peeling, further processing (dicing, slicing, etc.), deep freezing, boiling, drying, stewing, pasteurization, canning or packing and sterilization.

Vegetable peeling takes place using either steam or

so-called carborundum peeling. Peeling waste arising in steam peeling is separated from the wastewater by sedimentation and it can be used as animal feed. Peeling waste from carborundum peeling is very fine and sieving is required for its separation. Carborundum waste cannot be used as animal feed but it can be e.g. composted. The most important wastes arising from potato processing are shown in Table 9.

Table 9. Potato processing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Beet and potato waste	020301	10.12	11205		
1	Vegetable and animal oil waste	020304	10.22	13101		
1	Stone waste	020301	13.21	21703		
1	Peeling waste	020301	10.22	12101		
1	Soil and sand waste	020301	13.22	21802		
1	Mull waste	020301	13.21	11101		
1	Potato waste	020304	10.22	12106		
1	Potato mash	020304	10.22	14301		
1	Flume water sludge	020301	10.22	14506		
4	Laboratory chemicals	16050201-0301	03.14	39701		
10	Preliminary sedimentation sludge	020305	12.12	57303		
10	Wastewater sludge	020305	12.12	57304		
10	Chemical sedimentation sludge	020305	12.12	57305		
10	Mesh screen waste	020305	12.12	57301		

1532 Fruit and vegetable juice manufacturing (including berry juice manufacturing)

The work stages in fruit, vegetable and berry juice manufacturing are pressing, clearing, evaporation, mixing (addition of preservatives, sugar and water), pasteurization and packaging. The largest amount of waste comprises berry pressing waste, together with centrifuging waste arising during clearing, and

filtration waste. Wastewaters forming during manufacturing are subjected to screening, sedimentation, and flotation, before being released to the sewer. The main wastes arising from juice manufacturing are shown in Table 10.

Table 10. Fruit, vegetable and berry juice manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Berry cleaning	020704	10.22	12304		
1	Berry pressing	020701	10.12	11201		
1	Berry mash	020701	10.12	11208		
1	Berry sludge	020704	10.22	12501		
1	Inferior products	020704	10.22	12103		
4	Rinse waters	020799	10.12	11216		
4	Washwaters	16050201-0301	03.14	39701		

154 Vegetable and animal oil and fat manufacturing

1542 Purified oil and fat manufacturing

Vegetable oils

In plants oil is generally stored in their seeds, from which it can be separated by pressing the heated seeds. The oil is separated out by extraction of the seed pressings, after which it is refined i.e. purified. Wastes from vegetable oil manufacturing are shown in Table 11.

Animal fats

As a by-product of slaughtering, cattle and swine fats are obtained which are separated out from animal tissue by melting. The purified animal fats are used for frying and margarine manufacturing. The wastes arising from animal fat manufacturing are shown in Table 11.

Table 11. Purified oil and fat manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Vegetable oil processing sludges	020304	10.22	13501		
1	Nickel catalyst	06120200-01	03.14	39802		
1	Fatty acid centrifuging waste	020304	10.22	13502	(*)	
1	Bleaching earth	150201	13.41	21605		
10	Wastewater sludge	020305	10.22	13503		

1543 Manufacturing of margarine and equivalent edible fats

Margarine is an emulsion of fat and water. The fat component consists of a mixture of two or more oils and a fat. Margarines contain a number of fat soluble additives, in addition to a water constituent, which is most often fat-free milk. The vegetable oil used in the

manufacturing of margarines has to be hardened. Hardening takes place by hydrogenating the fatty acids, most of the double bonds in the fatty acids then becoming satisfied. The hardened oil has to be purified before use in margarine manufacturing. The most important wastes arising from margarine manufacturing are shown in Table 12.

Table 12. Margarine manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Animal tissue waste	020304	10.21	12102		
1	Vegetable and animal oil waste	020304	10.22	13101		
1	Lecithin sludge	020304	10.22	13103		
1	Nickel catalyst	06120200-01	03.14	39802	(*)	
1	Spoiled oils and fats	020304	10.22	13102		
1	Bleaching earth	150201	13.41	21605		
4	Hexane	070104	01.12	35206	*	*
4	Chlorinated phenol, other halogenated solvents	070103	01.11	35135	*	*
10	Wastewater sludge	020305	12.12	57306		

155 Dairy product manufacturing

Dairy product manufacturing comprises liquid milk products, butter, flour, ice cream, and cheese manufacturing. Wastes arising during the manufacturing of dairy products are shown in Table 13.

Liquid milk product manufacturing

Stages in the manufacturing of liquid milk products are standardization (adjustment of fat content), separation (separation of the fat constituent), homogenization (splitting of fat globules), pasteurization, curdling (curdled products), and packaging.

Butter manufacturing

Stages in the manufacturing of butter are cream standardization, pasteurization, curdling, churning and packaging. In conjunction with the churning of butter, buttermilk or churn milk is formed as a by-product. Buttermilk is used as animal feed, and milk is made into powdered milk for manufacturing animal feed.

Manufacturing of powders

For the manufacturing of milk powders pasteurized milk is used which is evaporated and dried. The dried milk is sieved, mixed and packed. Sieving waste and

the milk burnt in drying are used in the manufacture of animal feed.

Ice cream manufacturing

The starting point in ice cream manufacturing is cream, milk, butter or vegetable fat, and sugar. In addition, emulsifiers and thickeners are added to the mixture. The mix is pasteurized, homogenized, flavored and matured, whisked and finally packaged. Before storage, ice cream is cold hardened.

Cheese manufacturing

The work stages in cheese manufacturing are milk standardization, pasteurization (not in the case of Emmental cheese), renneting, the addition of a microbial culture, cutting of the mixture, cooking, pressing, salting, cellar storage and packaging. At the culture addition stage, cheese waste and a non-marketable product become separated out. In conjunction with cooking and pressing, whey is separated out. Cheese waste and whey are generally used for animal feed. Products from the non-marketable products are used as raw material for processed cheeses.

Table 13. Wastes from dairy product manufacturing

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Non- marketable flour	020501	10.22	12103		
1	Fluxing agent	020501	10.21	12103		
1	Whey	020501	10.21	13303		
1	Cheese waste	020501	10.21	13303		
1	Cheese rind waste	020501	10.21	13303		
1	Milk waste	020501	10.21	12104		
1	Waste wax	020501	10.21	13202		
1	Buttermilk	020501	10.21	12104		
1	Centrifuging waste	020501	10.21	13502		
1	Milk fat waste	020501	10.21	12101		
1	Egg shells	020501	10.21	12101		
1	Curd whey	020501	10.21	13303		
4	Bacteria cultures	020599	10.22	11216		
5	Alkalis	060201-99	01.22	33906	*	*
5	Acids	060101-99	01.21	33110	*	*
5	Mould controlling agents	16050301	03.31	39111	*	
5	Solvent waste, non-halogen	070104	01.12	35193	*	*
10	Fat extraction waste	020502	12.40	13301		

156 Mill product and starch manufacturing

1561 Mill product manufacturing

Mill product manufacturing begins with grain cleaning. Cleaning comprises sieving, grading, brushing and stone separation. Grain to be milled into flour is coarse ground and the coat of the grain removed. The sieved material is then ground further into flour and packed. When manufacturing flakes, the husk is removed from the cleaned grain and dust is

separated off. After dust removal the flour is sieved and heated with steam, after which the flakes are pressed, dried and packaged. The grain husks and dust formed in connection with mill product manufacturing can be used in the manufacturing of animal feed. During grain and flour storage pesticides are used to control pests. The most important wastes arising from mill product manufacturing are shown in Table 14.

Table 14. Mill product manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Mull	020301	13.21	11101		
1	Straws, weed	020301	10.12	11201		
1	Grain cleaning waste	020301	10.12	11203		
5	Flour waste	020304	10.22	12101		
5	Pesticide waste	16050201-0301	03.11	39111	*	

1562 Starch manufacturing

Starch is made from grain, potatoes and other plant material. The most important wastes arising from its manufacture are shown in Table 15.

Table 15. Starch manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Active carbon waste	150201	02.11	21610		
1	Galactol	020304	10.22	14125		
1	Acid washing sludges	060199	01.24	33805	*	*
1	Beet and potato waste	020301	10.12	11205		
1	Mull	020301	13.21	11101		
1	Mull and washing sludge	020301	13.22	12520		
1	Ni-catalyst waste	06120200-01	03.14	39802	(*)	
1	Potato mash	020304	10.22	14301		
1	Bleaching earth	150201	13.41	21605		
1	Grain cleaning waste	020301	10.12	11203		
1	Inferior products	020304	10.22	12101		
4	Non-halogenated solvents	070104	01.12	35200	*	*
4	Laboratory chemicals	16050201-0301	03.14	39701	*	
10	Presedimentation sludge	020305	12.12	57303		
10	Wastewater sludge	020305	12.12	57304		

158 Other food manufacturing

1581 Soft bread and fresh confectionery manufacturing

The wastes listed in Table 16 are the ones mainly formed in the manufacturing of soft bread, buns and doughnuts.

1583 Sugar manufacturing

In Finland, sugar is obtained from sugar beet. The sugar is isolated from the washed and slice beet by extraction in hot water. The extract contains other substances in addition to sugar and to remove these the

juice is purified and concentrated to allow the sugar to crystallize. The crystallized sugar is separated from the solution by centrifuging. The main wastes from sugar manufacturing are shown in Table 17.

Table 17. Soft bread and fresh confectionery manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Yeast waste and sludge	020601	10.22	12503		
1	Jams and berries	020601	10.22	12102		
1	Flour and dough waste	020601	10.22	12101		
1	Beet and potato waste	020601	10.12	11205		
1	Waste bread	020601	10.22	12103		
1	Egg shells	020601	10.22	12101		
1	Vegetable and animal fats	020601	10.22	13202		
1	Vegetable and animal oil waste	020601	10.22	13101		
1	Bakery products	020601	10.22	12103		
1	Baking paper	020699	07.23	19312		
1	Egg mash	020601	10.22	12102		
1	Potato waste	020601	10.12	11205		
1	Sour milk waste	020601	10.22	12102		
5	Washing lye	060202	01.22	33302	*	*
10	Fat extraction waste	020603	12.40	13301		

Table 18. Sugar manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Formalin	070104	01.12	35236	*	*
1	Lime sludge	020402	13.41	21819		
1	Soil and sand waste	020401	13.22	21802		
1	Molasses sediment	020499	10.22	14101		
1	Mull	020401	13.21	11101		
1	Bleaching earth	150201	13.41	21605		
1	Grain cleaning waste	020499	10.12	11203		
4	Laboratory chemicals	16050201-0301	03.14	39701	*	
10	Wastewater sludge	020403	12.12	57304		
10	Mesh screen waste	020403	12.12	57301		

1584 Cocoa and chocolate manufacturing

Cocoa manufacturing starts with the roasting of the raw beans, the coats of the beans then becoming detached, taking their bitter flavour with them. The roasted beans are crushed in a mill, the coats separated out and the kernel of the beans ground into cocoa. The cocoa mass contains over 50 % fat in the form of cocoa butter and it is used as a raw material for making chocolate. When making cocoa, some of the fat is extracted in a hot press. The remainder is ground into fine grains, cocoa powder.

Chocolate is a mixture of cocoa mass and sugar to which cocoa butter, flavorings and milk or milk powder (milk chocolate) are often also added. The most important wastes arising from cocoa and chocolate manufacturing are shown in Table 18.

1586 Tea and coffee manufacturing

Tea is not actually refined in Finland. The so-called Finnish teas are tea qualities that are blended and packed in Finland. Coffee is imported as raw coffee packed in jute sacks. Before roasting, impurities are extracted from this raw coffee and various coffee qualities are blended. The coffee beans are roasted in a machine in which the beans are constantly in motion and are roasted by hot air. Roasting is curtailed with a current of cold air. During roasting, water vapour, carbon dioxide and other gases evaporate off. The roasted coffee is purified of its final impurities and imperfect beans, before being ground and packed in vacuum packs. Waste formed in coffee manufacturing consists mainly of the coats of the beans and purification waste.

Table 18. Cocoa and chocolate manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Cocoa wastes	020601	10.22	12303		
1	Caramel waste	020601	10.22	12103		
1	Maize starch waste	020601	10.22	14304		
1	Almond and nut shell waste	020601	10.12	11210		
1	Methanol	070104	01.12	35220	*	*
1	Fat waste	020601	10.22	13101		
1	Sugar waste	020601	10.22	12101		
1	Chocolate waste	020601	10.22	12101		
1	Inferior products	020601	10.22	12104		
4	Laboratory chemicals	16050201-0301	03.14	39701	*	
10	Fat extraction waste	020603	12.40	13301		

159 Drinks manufacturing

1591 Distilled alcoholic beverage manufacturing

Ethyl alcohol forms during a fermentation reaction involving sugar, this being accomplished by yeast. Strong alcoholic drinks are made by distilling wines and mash produced by fermentation. The raw material for the mash is often grain or starch flour. Alcohol distillation can either be carried out such that the aromatic substances in the fermentation material are

carried over into the distillate (cognac and whisky distilling), or so that the alcohol is distilled into a strong spirit that is as pure as possible and from which alcoholic beverages (e.g. vodkas and gins) are made by diluting and flavouring the spirit. The wastes arising from alcoholic beverage manufacturing are shown in Table 19.

Table 19. Distilled alcoholic beverage manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Label paper waste	020799	07.23	19315		
1	Yeast waste	020704	10.22	12307		
1	Flavoring waste	020701	10.12	11211		
1	Mash waste	020704	10.12	12305		
1	Bottom distillates	020702	02.12	35305		
1	Sulphite distiller's grain	020704	10.12	12309		
1	Grain dust	020701	10.12	11203		
4	Laboratory chemicals	16050201-0301	03.14	39701	*	
5	Lye waste	060202	01.22	33301		
10	Wastewater sludge	020705	12.12	57306		
10	Mesh screen waste	020705	12.12	57301		

1593 Wine manufacturing

Wines are made from grapes, berries, fruit and vegetables with the aid of alcoholic fermentation. For strong wines alcohol is added to supplement that

produced during the fermentation stage. The wastes arising from wine manufacturing are shown in Table 20.

Table 20. Wine manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Fruit mash	020704	10.12	12304		
1	Yeast waste	020704	10.22	12307		
1	Berry pressing waste	020704	10.22	12304		
1	Flavouring waste	020701	10.12	11211		
5	Lye waste	060202	01.22	33301		
10	Wastewater sludge	020705	12.12	57306		
10	Bleaching earth sludge	150201	13.41	21810		

1596 Beer manufacturing

Beer is a beverage made from malt, hops, water and brewer's yeast. Beer manufacturing can be divided into four work stages: malting, wort manufacturing and cooking, fermentation and secondary processing. Malts are made from barley grains which are germinated to break down the starch and proteins present in them. When suitably germinated, the malt is dried, bringing a halt to germination. In the making of wort, the malts are crushed and eluted in water. Undissolved malts are

sieved out of the so-called mash to produce wort, an aqueous solution which is then conducted to a boiling tank. The wort is boiled and hops are added, after which it is filtered, cooled and conducted to the fermentation tanks together with the yeast. The fermented beer is clarified by filters and generally also pasteurized. The filtered and pasteurized beer is canned or bottled. Table 21 shows the most important wastes arising from beer manufacturing.

1598 Mineral water and soft drinks manufacturing

Mineral water is made from drinking water by the addition of salts. The water is carbonated at the correct temperature and pressure, after which it is bottled. Sweet soft drinks can be either carbonated or non-carbonated. They are made from juices together

with aromatic substances. The sweetening of soft drinks is accomplished using either sugar or additives like aspartame. Acidity is increased using organic acids and, for example, phosphoric acid.

Table 21. Beer manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Mercury chloride	060404	01.24	31416	*	*
1	Label paper waste	020799	07.23	19315		
1	Yeast waste	020704	10.22	12307		
1	Yeast sludge	020704	10.22	12503		
1	Malt mash	020704	10.22	12305		
1	Malt mash sludge	020704	10.22	12502		
1	Malt dust	020701	10.12	11203		
1	Cellulose filters	150201	07.23	19111		
1	Bleaching earth sludge	150201	13.41	21810		
1	Grain cleaning waste	020701	10.12	11203		
1	Inferior products	020704	10.22	12104		
4	Laboratory chemicals	16050201-0301	03.14	39701	*	
5	Ammonia	060203	01.22	33304	*	*
5	Detergent and washing agent waste	160502-03	03.14	39400	(*)	
5	Alkaline washing agents and sludges	060299	01.24	33806	*	*

17

Textile manufacturing

171 Textile fibre manufacturing

1711, 1712 and 1713

Cotton and wool fibre manufacturing

In the manufacturing of cotton and wool fibres there are four basic work stages: cleaning, carding, combing and spinning. In addition to conventional cleaning, wool is washed before carding in order to remove most of the wool grease. The spun yarn can be bleached or

dyed. The gloss on cotton yarn or cloth can be enhanced by mercerizing, i.e. by treating it with caustic soda or ammonia. Wool is often finished by the Superwash method that makes mechanical washing of the product possible. In this method the scaly surface of the wool is coated with a layer of resin. The most important wastes arising from cotton and wool fibre manufacturing are shown in Table 22.

Table 22. Cotton and wool fibre manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Lye waste	060202	01.22	33302	*	*
1	Cloth, fibre and sprun yarn waste	040208	07.63	17100		
1	Other natural fibre waste	040201/040205	07.63	17103		
1	Perchloroethylene	140201	01.11	35111	*	*
1	Washing agent waste	160502-03	03.14	39400	(*)	
1	Polyolefin waste (plastic soles)	040299	07.42	37109		
1	Cotton fibre waste	040201/040205	07.63	17102		
1	Miscellaneous rags	040208	07.63	17116		
1	Textile dyeing sludge	040211-12	03.13	36802	(*)	(*)
1	Wool fibre waste	040202/040206	07.63	17101		
1	Wool washing sludge	040210	01.24	17401		
1	Pigment waste	040213	03.13	36200		
5	Cleaning towels and cleaning wool**	15020101	07.63	17119	*	

** containing mineral oil

172 Cloth weaving

For weaving cloth, yarns and yarn mixtures made of natural and artificial fibres are used. Waste formed during weaving is almost entirely in the form of cloth and yarn refuse wool. The characteristics of the woven cloth are improved during finishing (section 173).

173 Textile finishing

Textiles are finished by dyeing (also carried out on yarns and fibres), printing, bleaching, and by numerous other chemical treatments, which alter the product's characteristics in the desired direction.

Printing and dyeing

Film printing is most commonly used for printing cloth. In film printing, a pattern is made from a polyester net for the colours to be printed. The printing ink passes through the holes in the net on to the cloth. The inks used are synthetic compounds which may contain e.g. acids and alkalis, pigments, metals, azo-compounds and sulphur. For dyeing the same synthetic dyes are used as in printing, as well as e.g.

urea. The cloth is dyed in a continuously operating dyeing machine, the dyeing process comprising several treatment stages. Wastes arising during dyeing treatment are dye washes and sediments, together with the washwaters from the different treatment stages. The most important wastes arising from printing and dyeing are shown in Table 23.

Table 23. Cloth printing and dyeing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Alkalis	060201-99	01.22	33300	*	*
1	Acetic acid	070104	01.12	33201	*	*
1	Acids	060101-99	01.21	33200	*	*
1	Lye	060202	01.22	33302	*	*
1	Organic solvents, halogenated	070103	01.11	35111	*	*
1	Organic solvents, non-halogenated	070104	01.12	35200	*	*
1	Peracetic acid	140202	01.12	33202	*	*
1	Perchloroethylene	140201	01.11	35111	*	*
1	Washing sludges	040210-12	01.24	36802	(*)	(*)
1	Potash	060301	01.22	31232		
1	Soda	060301	01.22	31231		
1	Hydrogen peroxide	060199	01.21	33109	*	*
1	Pigment waste	040213	03.13	36200	*	
1	Dye sludges	040211-12	03.13	36802	(*)	(*)

In the cleaning treatment, intermediate agents contained in the raw material or added during manufacturing, together with the impurities arising during manufacturing, are removed. The product is bleached using an oxygenating chemical like hydrogen peroxide.

The product's appearance is improved by steaming, calendaring or mangling, napping, as well as by cutting and burning (fibre ends poking up out of the cloth are burned or melted with a flame).

The static electricity in the cloth is reduced using antistatic and rinsing substances. The cloth can be made water repellent by the absorption of paraffins,

silicones or fluorine plastics. The smoothness of the cloth can be enhanced by saturating the fibres with artificial resin. The cloth can be made dirt repellent by attaching silicone or fluorine compounds to it with the help of resins. In fire proofing, chemicals are added to the cloth which reduce its susceptibility to ignite. In antimicrobial treatment, pesticides for eliminating microbes, fungi and moulds are used. The wool can also be treated with a substance against clothes moths. The wastes possibly arising from cloth treatments are shown in Table 24.

Table 24. Cloth finishing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Acetic acid	070104	01.12	33201	*	*
1	Lye	060202	01.22	33302	*	*
1	Other alkalis	060201-99	01.22	33300	*	*
1	Other acids	060101-99	01.21	33200	*	*
1	Organic solvents, halogenated	140201	01.11	35111	*	*
1	Organic solvents, non-halogenated	140202	01.12	35200	*	*
1	Peracetic acid	140202	01.12	33202	*	*
1	Perchloroethylene	140201	01.11	35111	*	*
1	Pesticide waste	16050201-0301	03.11	36802	*	*
1	Washing agent waste	160502-03	03.14	39400	(*)	(*)
1	Washing sludges	040211-12	01.24	36802	(*)	(*)
1	Hydrogen peroxide	060199	01.21	33109	*	*

175 Other textile product manufacturing

In other textile product manufacturing, the same kinds of wastes as described in the previous section are mainly formed. The textile dyes and solvents used are the same, as are also the methods. The highest proportion of manufacturing wastes consists of cloth, fibre and yarn waste. The quality of these depends on the product being manufactured. Most commonly they

are cotton, wool, cellulose fibre, viscose fibre, polyester, nylon, polyamide and polyacrylic fibre. Glues, resins and polypropylene are also used in conjunction with artificial fibre manufacturing. When manufacturing e.g. socks, synthetic elastines are mixed with the wool raw material.

176 Tricot knitted product manufacturing

The textile waste arising during the manufacturing of tricot knitted products consists of polyester and polyacrylic fibre. Additionally, resin acrylate is used

for manufacturing these products. For dyeing and printing, complex and reaction dyes are used in particular.

18

Clothes manufacturing; fur fashioning

181 Leather clothes manufacturing

Leather manufacturing

Leather clothes are manufactured in the same way as other articles of clothing, so that in addition to leather cutting waste, textile, thread and cotton wool wastes

are also formed. The most important wastes arising from leather clothes manufacturing are shown in Table 25.

Table 25. Leather clothes manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Alkalis	060201-99	01.22	33300	*	*
1	Acids	060101-99	01.21	33200	*	*
1	Pattern paper waste	040199	07.23	19300		
1	Chrome and bark thinner chips	040108	07.64	17505		
1	Spun yam waste	040208	07.63	17110		
1	Leather processing waste	040108	07.64	17507		
1	Textile waste	040205-08	07.63	17111		
1	Wad waste	040207	07.63	17100		
1	Hide and leather waste	040108	07.64	17504		
1	Pigment waste	160502-03	03.13	36200	(*)	

182 Clothes and costume manufacturing

Clothes and costume manufacturing can be divided into three main work stages, which are pattern tracing, cutting and sewing. Waste arising during pattern tracing consists mainly of paper. During cutting, cloth waste is formed the quality of which depends on the product being manufactured. Sewing wastes comprise

cloth and thread wastes. In addition to cloth and thread materials, e.g. cotton wool, padding, plastic, rubber and metal wastes also form depending on the product being made. The most important wastes arising from clothing and costume manufacturing are shown in Table 26.

Table 26. Clothes and costume manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Alkalis	060201-99	01.22	33300	*	*
1	Acids	060101-99	01.21	33200	*	*
1	Pattern paper waste	040299	07.23	19300		
1	Cloth, fibre and spun yarn waste	040208	07.63	17100		
1	Rubber waste	040299	07.32	37500		
1	Spun yarn waste	040205-08	07.63	17110		
1	Leather processing waste	040108	07.64	17507		
1	Cotton fibre waste	040201/040205	07.63	17102		
1	Synthetic fibre waste	040203/040207	07.63	17100		
1	Textile washing sludges	040211-12	01.24	17405	(*)	(*)
1	Wad waste	040207	07.63	17100		
1	Wool fibre waste	040202/040206	07.63	17101		
1	Hide and leather waste	040108	07.64	17504		
1	Pigment waste	040213	03.13	35200	*	

183 Fur conditioning; fur product manufacturing

Pelts preserved for conditioning are soaked and the flesh on them scraped off. The pelt is washed and pickled, which cures and dyes it. The dyed fur is dried and softened. Finishing may include protecting the

product against microbes. The usual cutting, textile and thread wastes arise in fur manufacturing. The most important wastes arising from fur conditioning and fur manufacturing are shown in Table 27.

Table 27. Fur conditioning and fur product manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Animal fat waste, incl. solvents	040103	01.14	13201	*	*
1	Pattern paper waste	040199	07.23	19300		
1	Scraping flesh	040101	10.11	17502		
1	Liming waste	040102	10.11	21819		
1	Cloth waste	040205-08	07.63	17100		
1	Hair waste	040101	10.11	17501		
1	Sludges containing chromium (III)	040106	02.13	33703		
1	Fibre and spun yarn waste	040205-08	07.63	17100		
1	Leather processing waste	040108	07.64	17507		
1	Leather and fur waste, barked	040108	07.64	17510		
1	Barking solution	040104-05	02.13	33539		
1	Washing sludges	040107	01.24	33806		
1	Pigment waste	160502-03	03.13	36200	(*)	

19 Tanning and other leather manufacturing; bag and footwear manufacturing

191 Tanning and other leather manufacturing

Leather is made from animal hides that have been preserved by salting. The preserved hides are washed and soaked. The hairs and epidermis are removed chemically, after which the hide is limed. The underling tissue of the limed hide, or untanned leather, is removed by scraping and the hide split parallel to the surface into two parts. The hide is treated with acid and alkali (lime removal) before curing, in which enzymes are used to alter the fibrous structure of the hide. The pH of the untanned leather is reduced by acids ready

for chrome tanning. Chrome tanning is carried out using chrome salts which become chemically bound to the hide material. Boot and shoe lining leather and covering leather are tanned using plant extracts instead of chromium salts. The tanned hide, or tanned leather, is finished and possibly dyed, and then greased. Additionally, the finished leather is dried and softened mechanically. The most important wastes arising from tanning and other leather manufacturing are shown in Table 28.

Table 28. Wastes arising from tanning and other leather manufacturing

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Animal tissue waste, cont. solvents	040103	01.14	13201	*	*
1	Split glue leather waste	040101	07.64	17503		
1	Non-halogenated organic solvents	070104	01.12	35200	*	*
1	Waste acids	060101-99	01.21	33100	*	*
1	Chrome thinning chips	040108	07.64	17505		
1	Chromic leather	040108	07.64	17505		
1	Fleshing waste	040101	10.11	17502		
1	Formic acid	070104	01.12	33203	*	*
1	Grinding waste of leather	040108	07.64	17507		
1	Leather chips	040108	07.64	17507		
1	Sodium chloride	060304	01.23	31401		
1	Tanning sludge, containing chromium	040106	02.13	33703		
1	Tanning solutions	040104-05	02.13	33539		
1	Washing sludges	040106-07	01.24	33806		
1	Trimming waste	040101	10.11	17501		
1	Pigment waste	160502-03	03.13	36200	(*)	
1	Pigment sludge	040106-07	02.21	33806		

192 Bag manufacturing

The main work stages in bag manufacturing are the cutting of the leather or other textile raw material, sewing and gluing. Aside from leather and fabrics, bags also often contain plastic and metal components, as well as supports and wooden structures conferring

rigidity. In this case, the main wastes are plywood and chipboard wastes, plastic and metal wastes, together with glues, printing dyes, solvents and oils and fats (product finishing), in addition to the leather and fabric wastes.

193 Footwear manufacturing

The work stages in footwear manufacturing from the standpoint of raw material cutting, gluing and sewing, are the same as in bag manufacturing. In footwear manufacturing, rubber waste, not only in the form of scraps and strips, but also as grinding waste and

sawdust, also arises. The wood and metal waste occurring during manufacturing comes not only from the raw materials, but also from the making of models and moulds. The most important boot and shoe industry wastes are shown in Table 29.

Table 29. Footwear manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Acetone	140202	01.12	35200	*	*
1	Non-halogenated organic solvents	140202	01.12	35200	*	*
1	Grinding dust	040108	07.64	17507		
1	Roughening sludge	040106-07	02.21	33806		
1	Rubber waste	040199	11.32	37100		
1	Rubber sludges and emulsions	16050300-01	03.31	37805	(*)	
1	Rubber glues	080401-04	03.13	36600	(*)	(*)
1	Paint and lacquer waste, hardened	080105	03.13	36500		
1	Paint and lacquer waste, cont. solvents	080101-02	03.13	36500	*	*
1	Other cloth waste	040205-08	07.53	17100		
1	Leather cutting waste	040108	07.64	17507		
1	Softeners	16050300-01	03.31	37324	(*)	
1	Polyurethane	160208	07.42	37130		
1	Wood waste	160208	07.53	18104		
1	Sawdust	160208	07.34	18100		
1	Zinc turning chips	120103	06.26	25511		
1	Superlon	040207	07.42	37100		
1	Wool felt	040206	07.63	17100		
1	Cloth for lining	040205-08	07.63	17100		
1	Lining nappa	040108	07.64	17507		

Sawmilling and wood products manufacturing

201 Wood sawing, planing and impregnating

Sawing and planing

Wood sawing consists of three main stages: barking, sawing and protection against decay. If the logs have to be stored for a long time before sawing, they are stored e.g. in water, thereby preventing decay. After mechanical barking and sawing, the sawn wood is generally submerged in or sprayed with preservative to prevent blue stain, and then dried. For blue stain suppression these days organic salts are used which may also contain halide, sulphur and cyano groups.

Waste forming during barking is compressed and used as a fuel or soil improvement material. Sawing waste is chipped, after which the waste can be burned or used as a raw material for pulp. Shavings formed during planing can also be either burned or used as a raw material for making pulp. The most important wastes arising from sawing and planing activities are shown in Table 30.

Table 30. Sawing and planing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistical)	H. waste (ME)	H. waste (EC)
1	Inorganic wood preserving agent	030204	03.13	31509	*	*
1	Logging residuals	030199	10.32	18101		
1	Bark sludges from hatchery vats	030101	07.53	18501		
1	Bark waste	030101	07.53	18102		
1	Organic wood preserving agents, non-halogenated	030201	03.13	39111	*	*
1	Surface boards, wood strips	030103	07.52	18103		
1	Fly-ash and dust from wood burning	10019901	13.32	21305		
1	Bottom ash from wood burning	100101	13.32	21315		
1	Wood processing waste, lumber	030103	07.52	18100		
1	Iron and steel scrap, unclean	160205	08.11	25202		
1	Cuttings, dust and chips	030102	07.52	18100		
1	Blue stain suppression salt waste	030204	01.24	31509	*	*
1	Thinners	070104	01.12	35215	*	*
5	Cleaning wool, containing mineral oil	15020101	07.63	34411	*	*
16	Drilling, cutting and grinding oils, processing oils	120106-07	01.32	34105	*	*
16	Drilling, cutting and grinding oil emulsions	120108-09	02.22	34302	*	*
16	Iron and steel processing waste	120101-02	06.11-12	25102		

Impregnation

For preserving wood, heavy metal salts are most frequently used. The most generally used metals are chromium, arsenic and copper. In certain circumstances the heavy metal is replaced by barium. Creosote obtained from coal tar is used for

impregnating poles and railway sleepers. Impregnation takes place using a high pressure or vacuum method, ensuring that the preservative penetrates well down inside the wood. The most important wastes arising from wood preserving are shown in Table 31.

Table 31. Wood preserving wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Alkyd resin waste (putty waste)	080402	03.13	36609	*	*
1	Arsenic impregnant	030204	01.21	31216	*	*
1	Boric acid	060199	01.21	33110	*	*
1	Ethanol	070104	01.12	35221	*	*
1	Phenolformaldehyde resin waste	08040300-01	03.13	36605	(*)	
1	Creosote waste	030201	03.13	34604	*	*
1	Chromium(VI) oxides and hydroxides	030204	01.24	31208	*	*
1	Gluey water	08040800-01	03.13	36906	(*)	
1	Solvent benzene	070104	01.12	35208	*	*
1	Organic impregnants	030201	03.13	39111	*	*
1	Printing ink waste	080301-04	03.13	36300	(*)	(*)
1	Wood waste	030103	07.53	18100		
1	Thinners	070104	01.12	35215	*	*
1	Urea and melamineformaldehyde resin waste	08040300-01	03.13	36607	(*)	
5	Cleaning wool, containing mineral oil	15020101	07.63	34411	*	
10	Surface emulsions from oil extractors	130505	02.22	34801	*	*
10	Bottom sludges from oil extractors	130502	02.22	34801	*	*

Other sawmill products processing

In addition to planing and impregnation, sawmill products are also processed using scarf joints and gluing. Scarf jointing is used to produce especially long sawn goods. In this method, the ends of a plank or board are cut into a set of finger-like shapes, enabling two ends to be joined together by gluing. For gluing,

glues containing phenol, and especially phenol resorcinol resin glue, are used. Load-bearing structures are made by gluing several layers of scarf-jointed wood on top of each other. In the manufacturing of scarf-jointed and laminated batten materials, wood shavings and glue waste are mainly formed.

202 Plywood and other wooden board manufacturing

Plywood manufacturing

Plywood is made by gluing wood veneers on top of each other. The veneers are made from logs by peeling. Before peeling, the raw logs are submerged in water, barked and cut to length. Knots are removed from the veneers and the holes then patched with normal wood. Glues used in plywood manufacturing include phenol and resorcinol resin glues, as well as urea resin glues. The glued veneers are compressed into board (plywood) on a hot press, which hardens the glue. The edges of the plywood are finished by sanding. Basic plywood can be secondarily treated by machining and coating. Common secondary processing operations are painting and varnishing,

phenol resin coating, plastic laminating, covering with broadleaf wood veneers, and impregnation with preservative. The most important wastes arising from plywood manufacturing are shown in Table 32.

Chipboard manufacturing

Chipboard (particleboard) is board made of wood chips and glue. The chips are joined together using glue, high pressure and heat. The chipboard manufacturing process is illustrated in Figure 3.

Figure 3. Chipboard manufacturing process.

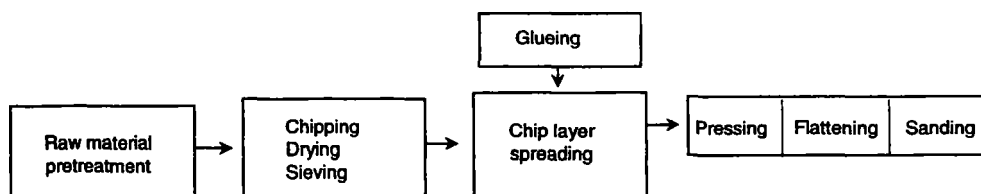


Table 32. Plywood manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Phenol-melamine resin waste	08040300-01	03.13	36606	(*)	
1	Phenolformaldehyde resin waste	08040300-01	03.13	36605	(*)	
1	Bark sludges from hatchery vats	030101	07.53	18501		
1	Abrasive band waste	160205	13.41	21708		
1	Powder paint waste	080104	03.13	36610		
1	Xylenes	070104	01.12	35212	*	*
1	Bark waste	030101	07.53	18102		
1	Impregnated wood waste	030103	07.53	18310		
1	Gluey water	08040800-01	03.13	36906	(*)	
1	Paint sediment	080105	03.13	36501		
1	Wood processing waste	030103	07.52	18104		
1	Lumber	030103	07.53	18110		
1	Sulphuric acid	060101	01.21	33102	*	*
1	Sawdust and chips	030102	07.52	18100		
1	Thinners	070104	01.12	35215	*	*
1	Pesticide waste	030201-04	13.11	391	*	*
1	Urea and melamineformaldehyde resin waste	08040300-01	03.13	36607	(*)	
1	Plywood and other wood plates	030103	07.53	18313		
4	Laboratory chemicals	16050201-0301	03.14	39701	*	
4	Toluene	070104	01.12	35211	*	*
5	Iron and steel scrap, unclean	160205	08.11	25202		
10	Wastes from sand removal	190802	13.21	21601		
10	Wastewater sludge	190804	07.53	57306		
10	Fly-ash and dust from wood burning	10019901	13.32	21305		
16	Processing waste from non-ferrous metals	120103-04	06.26	25501		
16	Paint sludge	08010800-01	03.13	36501	(*)	
16	Drilling, cutting and grinding oil emulsions	120108-09	02.22	34302	*	*

Fibre board manufacturing

As a raw material the fibre board (hardboard) industry uses wood chips which are softened by hot steam under high pressure. The softened chips are ground into fibres, which are then passed as an aqueous sludge into a wet board machine. A web is formed from the sludge in the wet board machine and this is then cut into boards. The boards are dried in a hot press. The

porous fibre boards are dried in an air stream without pressing. In contrast to plywood and chipboard, fibre board retains the material constituents of the wood. However, various kinds of additives can be used in manufacturing for altering the characteristics of the board. The wastes arising from fibre board manufacturing are shown in Table 34.

Table 33. Chipboard manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Alkyd resin waste (putty waste)	080402	03.13	36609	*	*
1	Aluminium sulphate	060303	01.24	31505		
1	Alkalis, alkaline solutions	060299	01.22	33310	*	*
1	Phenol-melamine resin waste	08040300-01	03.13	36606	(*)	
1	Phenolformaldehyde resin waste	08040300-01	03.13	36605	(*)	
1	Bark sludges from hatchery vats	030101	07.53	18501		
1	Abrasive band waste	160205	13.41	21708		
1	Bark waste	030101	07.53	18102		
1	Chipboard waste	030103	07.53	18300		
1	Gluey water	08040800-01	03.13	36906	(*)	
1	Water containing paint and lacquer	08011000-01	03.13	36905	(*)	
1	Washing benzine	070104	01.12	35214	*	*
1	Washing lye	060202	01.22	33302	*	*
1	Surface boards, wood strips, wood processing waste	030103	07.52	18100		
1	Sawing and grinding dust	030102	07.52	18301		
1	Urea and melamineformaldehyde resin waste	08040300-01	03.13	36607	(*)	
1	Old aluminium plate and profile scrap	160205	06.23	25617		
4	Mercury iodide	060404	01.24	31918	*	*
4	Alkalis	060201-99	01.22	33301	*	*
4	Acids	060101-99	01.21	33102	*	*
4	Organic salt waste	070108	01.24	32520	*	*
4	Organic solvents, non- halogenated	070104	01.12	35211	*	*
10	Wastewater sludge	190804	07.53	57306		
16	Drilling, cutting and grinding oil emulsions	120108-09	02.22	34302	*	*
16	Drilling, cutting and grinding oils	120106-07	01.32	34105	*	*

Table 34. Fibre board (hardboard) manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Phenolformaldehyde resin waste	08040300-01	03.13	36605	(*)	
1	Waste fibre	030199	07.53	18501		
1	Fibre boards	030103	07.53	18313		
1	Isocyanate paint and lacquer waste	080102-03	03.13	36522	(*)	(*)
1	Water-dilutable paint waste	080103	03.13	36507		
1	Paint sediment	080105	03.13	36521		
1	Sawing and grinding dust	030102	07.52	18301		

203 Constructional joinery manufacturing

Constructional joinery products include doors, windows, wooden furnishings, and wooden detached houses. The work methods used include mechanical machining of the material (processed or basic sawn

goods, wooden boards), gluing and compacting, surface treating, and coating with veneers. The most important wastes arising from constructional joinery are shown in Table 35.

Table 35. Constructional joinery product manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Acryl lacquer waste	080102	03.13	37309	*	*
1	Aluminium plate and profile waste	120103-04	06.23	25616		
1	Acetone	070104	01.12	35240	*	*
1	Butyl acetate	070104	01.12	35247	*	*
1	Phenolformaldehyde resin waste	08040300-01	03.13	36605	(*)	
1	Phtalate softeners	16050300-01	03.14	37325	(*)	
1	Logging residuals	030199	10.32	18101		
1	Non-halogenated organic solvents	070104	01.12	352	*	*
1	Bark sludges from hatchery vats	030101	07.53	18501		
1	Gypsum waste	160208	13.41	21710		
1	Xylenes	070104	01.12	35212	*	*
1	Bark waste	030101	07.53	18102		
1	Impregnated wood waste	030103	07.53	18310		
1	Glass and rock wool waste	160208	07.13	21411		
1	Glass waste	160208	07.13	21405		
1	Fibre glass filters, containing paint	15020100-01	07.13	21411	(*)	
1	Solvent benzene	070104	01.12	35208	*	*
1	Isocyanate paint and lacquer waste	080102-03	03.13	36522	(*)	(*)
1	Water-dilutable paint and lacquer waste	080103	03.13	365		
1	Halogenated paint waste, containing solvents	080101	03.13	36503	*	*
1	Non-halogenated paint waste, containing solvents	080102	03.13	36505	*	*
1	Water-dilutable paint waste	080103	03.13	36507		
1	Paint sludge	08010800-01	03.13	36501	(*)	
1	Paint dust	080109	03.13	36501		
1	Paint sediment	080105	03.13	36501		
1	Mineral and chemical pulp wool waste	160208	13.41	21508		
1	Mineral fibre filter cloths	150201	13.31	21627		
1	Surface boards, wood strips, wood processing waste	030103	07.52	18103		
1	Polyester resin waste	08040300-01	03.13	36603	(*)	
1	Polyethylene coatings and sacks	160208	07.42	37101		
1	Polyol	070104	01.12	35227	*	*
1	Polyurethane waste	160208	07.42	37130		
1	Polyurethane glue, solid	080404	03.13	36619		
1	Drilling, cutting and grinding oils	120106-07	01.32	34105	(*)	(*)
1	Wood preserving agent waste	030201-04	03.13	21208	*	*
1	Wood preserving chemicals	030201-04	03.13	31909	*	*
1	Rotten lumber	030103	07.53	18110		
1	Iron and steel processing waste	120101-02	08.11	25201		
1	Iron and steel scrap, unclean	160205	08.11	25202		
1	Sawdust and chips	030102	07.52	18100		

Table 35 (continue)

1	Thinners	070104	01.12	35215	*	*
1	Trichloroethane	070103	01.11	35105	*	*
1	Urea and melamineformaldehyde resin waste	08040300-01	03.13	36607	(*)	
1	Plywood and other wood plates	030103	07.53	18300		
5	Cleaning towels and wool, cont. hazardous waste	15020101	07.63	17119	*	
10	Bottom ash from wood burning	100101	13.32	21315		
16	Barrel bottom waste, containing mineral oil	160706	02.12	34405	*	*

204 Wooden packaging manufacturing

From the perspective of the basic methods used, wooden packaging manufacturing is similar to constructional joinery product manufacturing. The materials used are lumber and wooden boards. The

wastes arising during manufacturing do not differ from those occurring in construction joinery product making.

Chemical methods:
pulp manufacturing using the sulphate method

Chemical pulp manufacturing is illustrated in Figure 4. The raw material is barked, chipped and screened before cooking. Water may be used in conjunction with barking. The alkaline cooking liquor (NaOH, Na_2S) is generally absorbed into the chips before the

actual cooking. The pulp produced by cooking is washed, after which the black liquor (spent liquor) remaining is separated off. The black liquor is regenerated into cooking liquor. Knots, rubbish and fibre bundles (so-called reject) are removed from the pulp and the latter is then usually bleached. Bleaching water contains organic compounds of various kinds, chiefly the breakdown products of lignin.

Figure 4. Sulphate pulp manufacturing

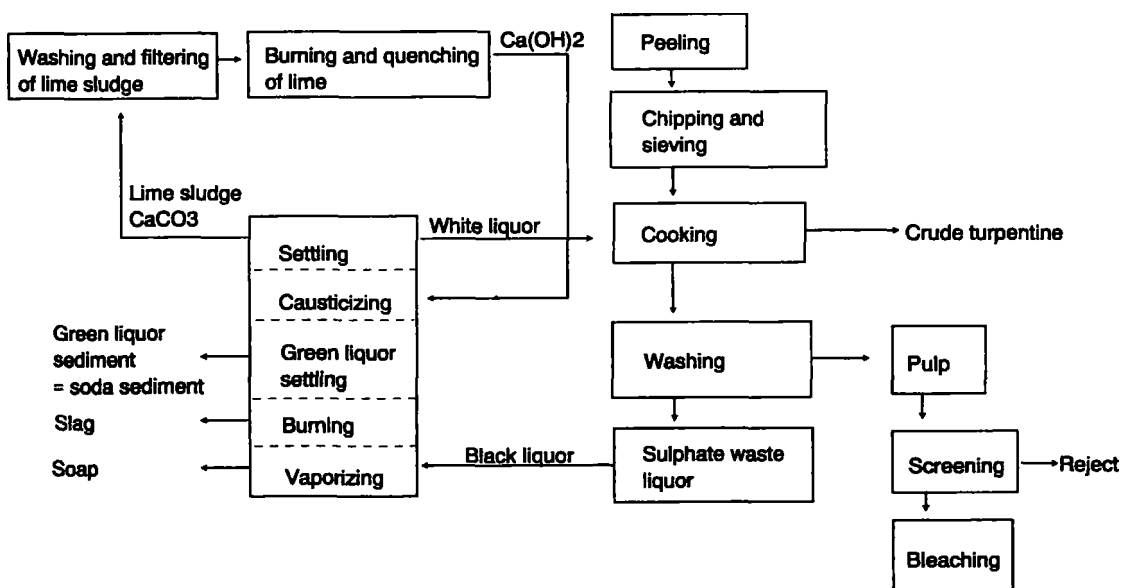


Table 36. Pulp production process wastes

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Sand from log processing	030399	13.21	21701		
1	Ingredient extracted by sand filter	03039901	13.21	21601		
1	Limestone sand	060301	13.41	21706		
1	Limestone sludge	030306	13.41	21819		
1	Calcium sulphate	060303	01.24	31504		
1	Machinery felt, plastic machine wire	150201	07.63	17109		
1	Bark waste	030301	07.53	18102		
1	Bark sludge	030301	07.53	18501		
1	Caustic sludge	060301	01.24	31201		
1	Sodium sulphate	060303	01.24	31501		
1	Offset-printing inks	080301-04	03.13	36301	(*)	(*)
1	Surface boards, wood strips	030103	07.52	18103		
1	Sawdust and chips	030102	07.52	18105		
1	Fibre waste from cellulose	03039901	07.53	19102		
1	Green liquor sediment	030302	01.24	31231		
4	Alkalis, alkaline solutions	060201-99	01.22	33310	*	*
4	Acids, acid solutions	060101-99	01.21	33110	*	*
4	Laboratory chemicals	16050201-0301	03.14	39701	*	*
4	Non-halogenated organic solvents	070104	01.12	35240	*	*
4	Halogenated organic solvents	070103	01.11	35101	*	*
10	Wastewater sludge	03039901	12.12	57306		
10	Miscellaneous sludge	03039901	12.12	57306		
10	Mesh screening waste	03039901	12.12	57301		
16	Chlorinated phenoxy acid	030202	03.11	39105	*	*
16	Drilling, cutting and grinding oil emulsions	120108-09	02.22	34302	*	*
16	Drilling, cutting and grinding oils	120106-07	01.32	34105	*	*

Mechanical pulp manufacturing

Mechanical pulps are made by grinding or refining the wood raw material. When making chemical groundwood pulp, the ground wood is softened with a chemical treatment and heat (steam). In the production of mechanical pulps, there is no caustic soda sediment or other sediment or slag associated with caustic soda treatment. The most important

wastes are barking waste (and wastewater from the barking plant, if wet barking is used), shives and fibre waste, wastewaters from bleaching, washing, heating and cooling, and the sludges formed during wastewater treatment (preliminary settlement sludge and biosludge).

2112 Paper and board manufacturing

Paper and board are made by feeding slush pulp or stock into a paper machine (Figure 5). Slush pulp can

be manufactured from pulp, thermo-mechanical pulp, or paper and board, produced on the premises. Often the slush pulp is a mixture of these products.

Figure 5. Paper and board manufacturing.

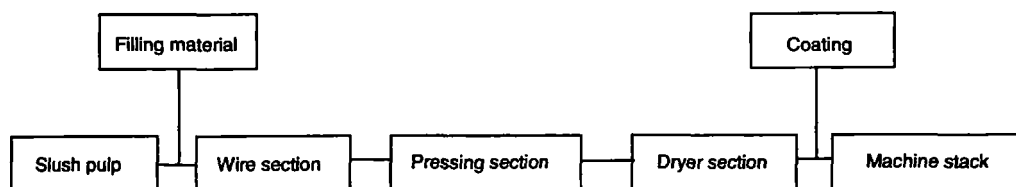


Table 37. Wastes arising from paper and board manufacturing.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Aluminum oxide	030306	01.24	31225		
1	Asbestos paper	16020600-01	13.12	21511	(*)	
1	Ditionite paste	030306	01.24	21803		
1	Flexo printing inks	080301-04	03.13	36310	(*)	(*)
1	Formaline	070104	01.12	35236	*	*
1	Glycerol	070104	01.12	35226	*	*
1	Acids, acid solutions	060199	01.21	33110	*	*
1	Acid pigments	16050300-01	03.13	36201	(*)	
1	Paperboard and cardboard out-throws	160302	07.23	19511		
1	Crosses	160302	07.23	19315		
1	Lime sludge	030306	13.41	21819		
1	Kaolin	030306	13.22	31323		
1	Xylenes	070104	01.12	35212	*	*
1	Bark waste	030301	07.53	18102		
1	Bark sludge	030301	07.53	18501		
1	Used sockets	150101	07.23	19509		
1	Glue waste	08040301-03	03.13	37405	(*)	
1	Non-halogenated sludges, cont. solvents	070104	01.14	35408	*	*
1	Caustic sludge	060301	01.24	31231		
1	Other coating waste	030306	07.42	37100		
1	Offset printing inks	080301-04	03.13	36301	(*)	(*)
1	Non-halogenated organic solvents	070104	01.12	352	*	*
1	Paste sludge	030306	13.22	21803		
1	Surface board, wood strips	030103	07.52	18103		
1	Polyamide fibre waste: wires	150201	07.63	17106		
1	Polyester fibre waste: drying felts	150201	07.63	17107		
1	Polyethylene	030306	07.42	37101		
1	Polypropylene waste: pressing felts	150201	07.42	37104		
1	Wood processing waste	030103	07.52	18104		
1	Wood preserving agents	030201-04	03.13	39109	*	*
1	Sludges cont. wood, knot pulp	030399	07.53	18501		
1	Rotten lumber	030103	07.53	18110		
1	Iron and steel scrap, unclean	160205	08.11	25202		
1	Sawdust and chips	030102	07.52	18100		
1	De-inking waste	030305	07.23	19103		
1	Silicon plastics waste	030306	07.42	37135		
1	Styrene butadiene latex waste	030306	07.42	37112		

Table 37 (continue)

1	Talcum sludge	030306	13.41	21821		
1	Urea and melamineformaldehyde resin waste	08040300-01	03.13	36607	(*)	
1	Waxes	030306	10.22	13202		
1	White spirit	070104	01.12	35216	*	*
4	Laboratory chemicals	16050201-0301	03.14	39701	*	
4	Washing lye	060202	01.22	33302	*	*
4	Nitric acid	060105	01.21	33101	*	*
5	Cleaning towels and cleaning wool	150201	07.63	17119		
5	Cleaning towels and cleaning wool, cont. mineral oil	15020101	07.63	34411		
5	Thinners	070104	01.12	35215	*	*
10	Presedimentation sludge	03039901	12.12	57303		
10	Wastewater sludge	03039901	12.12	57304		
10	Sodium hydroxide	060202	01.22	33301		
10	Sodium chloride	060305	01.24	31401		
10	Sulphuric acid	060101	01.21	33102	*	*
10	Miscellaneous sludge	03039901	07.23	57306		
10	Fibre sludge from cellulose	03039901	07.53	19102		
10	Hydrochloric acid	060102	01.21	33104	*	*
16	Copper processing waste	120103-04	06.24	25604		
16	Barrel bottom waste from mineral oil	160706	02.12	34405	*	*
16	Drilling, cutting and grinding oil emulsions	120108-09	02.22	34302	*	*
16	Drilling, cutting and grinding oils, processing oils	120106-07	01.32	34105	*	*
16	Steel processing waste	120101-02	06.11-12	25612		

212 Paper and board product manufacturing

Paper and board manufacturing is described in Figure 4. Wastes from paper and board products manufacturing are shown in Table 38.

Table 38. Wastes arising from paper and board products manufacturing.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Aluminium scrap	160205	06.23	25615		
1	Ammonium	060203	01.22	33304	*	*
1	Borax	060399	01.24	31203		
1	Ethanol	070104	01.12	35221	*	*
1	Ethyl acetate	070104	01.12	35246	*	*
1	Flexo printing inks	080301-04	03.13	36310	(*)	(*)
1	Formaline	070104	01.12	35236	*	*
1	Kaolin	030306	13.22	31323		
1	Rubber waste	160205	07.32	37501		
1	Copper processing waste	120103-04	06.24	25601		
1	Gluey water	08040800-01	03.13	36906	(*)	
1	Glue waste, cont. solvents, halogenous	080401	03.13	36616	*	*
1	Glue sludges	080405-07	03.13	36810	(*)	(*)
1	Sodium hydroxide, washing lye	060202	01.22	33301	*	*
1	Offset printing inks	080301-04	03.13	36301	(*)	(*)
1	Organic solvents, non-halogenated	070104	01.12	35200	*	*
1	Perchloroethylene	070103	01.11	35111	*	*
1	Cleaning towels and wool	150201	07.63	17118		
1	Cleaning towels and wool, cont. hazardous waste	15020101	07.63	17119	*	
1	Iron and steel scrap, unclean	160205	08.11	25202		
1	Resorcinol	070104	01.12	35235	*	*
1	Photogravure printing inks	080301-04	03.13	36305	(*)	(*)
1	Toluene	070104	01.12	35211	*	*
1	Trichloroethane	070103	01.11	35105	*	*
1	Starch waste	030306	10.22	14306		
1	Waxes	030306	10.22	13202		
1	Plywood and other wood plates	030103	07.53	18313		
1	White spirit	070104	01.12	35216	*	*
5	Alkaline washing sludges	060299	01.24	33806	*	*
16	Iron and steel processing waste	120101-02	06.11-12	25102		

Publishing, printing and sound, picture and data record copying

222 Printing and activities serving printing

The most common printing methods in Finland are the offset method, flexographic printing method and silk screen printing method. The most common of these is the offset printing method, which is used for e.g. all newspaper printing.

Process work

Material for process work arrives in the form of photographs, films and text. Pictures in analog form are converted to digital form by scanning. Process products are films from which the printing plates are made (offset and flexographic printing), or printing screens (silk screen printing). The films used for process work are light sensitive, the sensitive emulsion usually consisting of silver halide. During

Process work for printing needs is similar irrespective of the printing method used. A process chart for offset printing and its associated process work is shown in figure 6.

development the halide is converted into metallic silver. Unexposed silver is removed from the film with fixer containing thiosulphate, recovered and sold for recycling. After developing and fixing, the film is washed in water and it is then ready for producing a printing surface. Wastes forming during process work are shown in Table 39.

Table 39. Wastes from process work.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Ammonia	060203	01.22	33304	*	*
1	Lay-out sheets	090199	07.42	37404		
1	Ethanol	070104	01.12	35221	*	*
1	Film waste	090107-08	03.14	37146		
1	Silver chloride	090106	01.24	31410	*	*
1	Developers	090101-03	01.21/01.22	33541	*	*
1	Fixing agents	090104	01.23	33547	*	*
1	Printer colour cassettes	080309	08.53	37149		

Printing by the offset method

The offset method (figure 6) is Finland's most common printing technique, and e.g. all the newspapers are printed by this method. Offset methods are divided into wet and dry offset printing methods. In the wet printing method the rubberized fabric on the impression rollers and rollers is wetted with an aqueous solution of isopropanol. Offset printing is

divided into sheet and roll printing, the latter being further divided into cold and hot printing. In hot printing the printed product is dried in a kiln, the organic substances given off by the product then being conducted to a gas incinerator.

The printing plates used in offset printing are an aluminium alloy on which the pictures to be printed are developed. As printing inks e.g. alkyd- and acrylic-based inks are used to which other substances are added to adjust the viscosity and drying characteristics of the ink. For cleaning rollers, plates, rubberized fabric and ink baths, both aromatic and aliphatic organic solvents are used. Cleaning results in

a variable amount of cleaning rag waste (in some printing houses cleaning is automatic). The most important wastes are shown in Table 40.

In the finishing of printed products, coatings may be applied in the form of adhesives and varnishes. Trimming and book binding and gluing are also forms of finishing.

Figure 6. Offset printing and process chart.

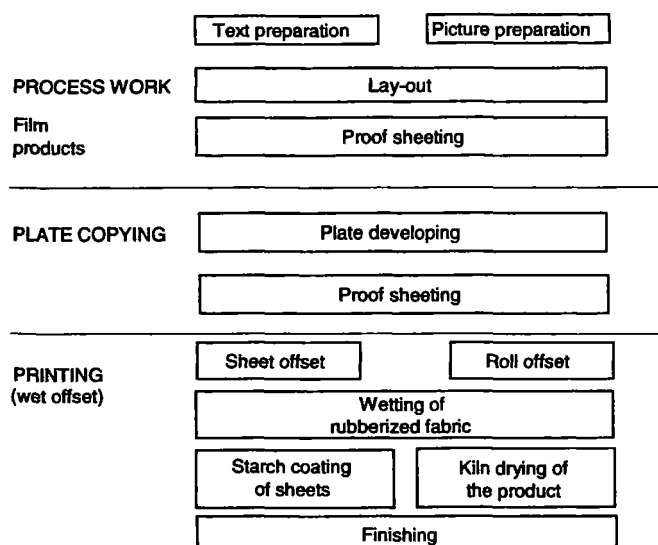


Table 40. Offset printing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Aluminium plate and profile waste	160205	06.23	25616		
1	Ammonia	060203	01.22	33304	*	*
1	Lay-out sheets	090199	07.42	37404		
1	Detergent and washing agent waste	160502-03	03.14	39400	(*)	
1	Ethyl acetate	070104	01.12	35246	*	*
1	Film waste	090107-08	03.14	37146		
1	Isopropanol	070104	01.12	35223	*	*
1	Developers	090101-03	01.21/01.22	33541	*	*
1	Fixing agents	090104	01.23	33547	*	*
1	Rubber waste	160205	07.32	37501		
1	Laboratory chemicals	16050201-0301	03.14	39701	*	
1	Non-halogen lacquer waste, cont. solvents	080102	03.13	36511	*	*
1	Gluey water	08040800-01	03.13	36906	(*)	
1	Offset printing inks	080301-04	03.13	36301	(*)	(*)
1	Non-halogen organic solvents	070104	01.12	35200	*	*

Table 40 (continue)

1	Printing ink sludge	080305-07	03.13	36807	(*)	(*)
1	Waste paper, scrap	160302	07.23	19304		
1	Cleaning towels and wool	150201	07.63	17118		
1	Cleaning towels and wool, cont. hazardous waste	15020101	07.63	17119	*	
1	Printer colour cassettes	080309	08.53	37149		
5	Ethanol	070104	01.12	35221	*	*
5	Halogenated organic solvents	070103	01.11	35100	*	*
5	Solvent benzene	070104	01.12	35208	*	*
5	Non-halogen sludges cont. solvents	080306	01.14	35408	*	*
5	Propanol	070104	01.12	35222	*	*
5	White spirit	070104	01.12	35216	*	*

Printing by the flexographic method and photogravure method

Printing by the flexographic printing and photogravure methods is based on differences in the height of the printing paper surface and no other substances are necessary apart from the printing ink. In flexographic printing the printing surface can be made by exposing a photopolymer material to light through the register film or by casting the printing plate from rubber. Printing plates are also made from rubber cylinders by

a laser technique. In photogravure printing, the printing surface is a copper cylinder on which the pictures and text are transcribed, either by engraving or by etching with chemicals. The prepared surface is chromed to withstand printing, and after printing the chrome and copper coatings are detached from the cylinder. The cylinder is recoated with copper for further use. As in offset printing, a good deal of solvent wastes of various kinds are formed with these methods from cleaning the printing machines and printing surfaces. The most important wastes are shown in Table 41.

Table 41. Flexographic printing and photogravure printing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Bating baths	11010401	01.24	33517	*	
1	Ethyl acetate	070104	01.12	35246	*	*
1	Film waste	090107-08	07.42	37146		
1	Flexographic printing ink	080301-04	03.13	36310	(*)	(*)
1	Photopolymer waste	16050300-01	07.42	37404	(*)	
1	Developers	090101-03	01.21/01.22	33541	*	*
1	Fixing agents	090104	01.23	33547	*	*
1	Rubber waste	160205	07.32	37501		
1	Rubberizing agent	160503	07.32	37805		
1	Copper scrap	120103-04	06.24	25601		
1	Laboratory chemicals	16050201-0301	03.14	39701	*	
1	Non-halogen lacquer waste, cont. solvents	080102	03.13	36511	*	*
1	Gluey water	08040800-01	03.13	36906	(*)	
1	Non-halogen glue waste, cont. solvents	080402	03.13	36618	*	*
1	Solvents, cont. chrome(VI)	110103	01.24	33507	*	*
1	Plastics waste, scrap	160302	07.42	37100		
1	Organic non-halogenated solvents	070104	01.12	35200	*	*
1	Cleaning towels and wool	150201	07.63	17118		
1	Cleaning towels and, cont. hazardous waste	15020101	07.63	17119	*	
1	Iron chloride solution	11010400-01	01.24	33511	(*)	

Table 41 (continue)

1	Photogravure printing inks	080301-04	03.13	36305	(*)	(*)
5	Ethanol	070104	01.12	35221	*	*
5	Halogenated organic solvents	070103	01.11	35100	*	*
5	Solvent benzene	070104	01.12	35208	*	*
5	Non-halogen sludges, cont. solvents	070104	01.14	35408	*	*
5	Thinners	070104	01.12	35215	*	*
5	Toluene	070104	01.12	35211	*	*

Printing by the silk screen method

In silk screen printing, the printing surface can be made either by direct exposure or by an indirect exposure technique. With the direct exposure technique, the image on the film is transferred to a printing screen over which a light sensitive emulsion has been spread. The emulsion is exposed using ultraviolet light. After development, the unexposed emulsion is removed by washing. In indirect exposure, the film is exposed and developed, after which the unexposed parts are washed out and the exposed film

fixed to the printing screen. During printing, the ink passes through the holes in the screen on to the printing surface below. The light sensitive film emulsion is removed from the screen with an alkaline paste. For cleaning off the printing inks, the same kinds of solvents are used as in offset, flexographic and photogravure printing. The most important wastes arising from silk screen printing are shown in Table 42.

Table 42. Silk screen printing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Film emulsion waste	16050300-01	03.14	37404	(*)	
1	Developers	090101-03	01.21/01.22	33541	*	*
1	Fixing agents	090104	01.23	33547	*	*
1	Non-halogen lacquer waste, cont. solvents	080102	03.13	36511	*	*
1	Gluey water	08040800-01	03.13	36906	(*)	
1	Non-halogen glues, cont. solvents	080402	03.13	36618	*	*
1	Plastic stickers	160302	07.42	37121		
1	Organic non-halogenated solvents	070104	01.12	35200	*	*
1	Type plates	160205	06.23	25616		
1	Cleaning towels and wool	150201	07.63	17118		
1	Cleaning towels and wool, cont. hazardous waste	15020101	07.63	17119	*	
1	Silk screen printing ink waste	080301-04	03.13	36300	(*)	(*)
5	Organic halogenated solvents	070103	01.11	35100	*	*
5	Thinners	070104	01.12	35215	*	*

Coke and oil product manufacturing

231 Coke manufacturing

Coke is made by dry distilling coal at high temperature. Coke from the distilling furnace is dried with nitrogen gas and sieved. Hot coke gas is cooled by spraying with water and passed through an

electrostatic precipitator to a by-product plant. Ammonia (sulphur removal), benzene and tar are manufactured as by-products. Wastes from coke manufacturing are shown in Table 43.

Table 43. Coke manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Asphalt	050602	02.11	34607		
1	Acid tars	050601	02.11	34608	*	*
1	Waste from cooling columns	050604	12.12	57201		
1	Other tars	050603	02.11	34608	*	*
1	Refinery sludge, oily	050101	02.21	57304	*	*
1	Filter dust	050699	13.31	21206		

Benzene is made by scrubbing coke gas in a tar oil scrubber, after which it is treated by vapour distillation. The benzene separated off during

distillation is recovered by decanting. The wastes arising during coke gas manufacturing are shown in Table 44.

Table 44. Coke gas refining wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Catalyst waste (Cr-Ni ammonia manuf.)	05030201	03.14	31900	*	
1	Refinery sludge	050101	02.21	57304	*	*
1	Filter dust	050699	13.31	21206		

232 Oil product manufacturing

23201 Oil refining

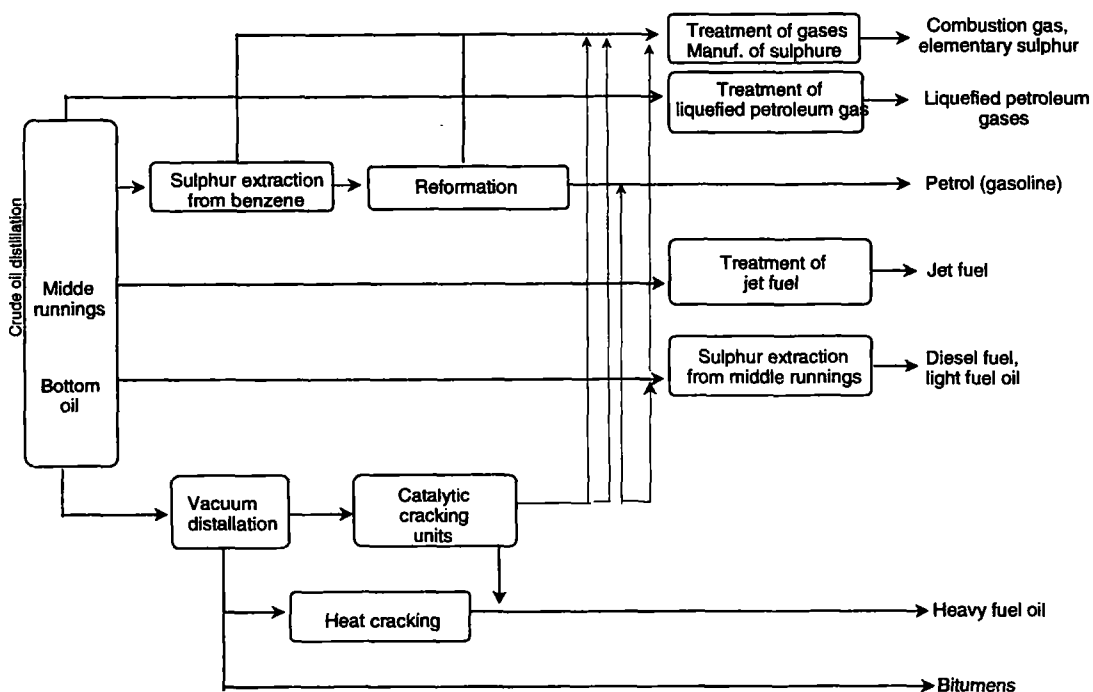
Oil refining is shown in principle in Figure 7. The refining process can be divided into four main operations:

- Crude oil distillation to fractions (gases, petroleum, gas oils and bottom oils).
- Sulphur removal, etc., to improve the characteristics of the fractions.
- Reformulation

- Cracking

Before distillation, salts, solid impurities and water are extracted from the crude oil. Gases evolved during crude oil distillation are the so-called combustion gases (fuel gases) methane and ethane (sulphur is separated from these for the production of elemental sulphur), and the so-called liquid gases, propane and butane.

Figure 7. Crude oil refining



Petrol manufacturing

The main components of petroleum spirit are paraffin, olefinic and aromatic hydrocarbons. In addition, oxygen containing components like methyltertiarybutylether (MTBE) are frequently used in manufacturing. MTBE is made from isobutene and methanol.

Petrol is separated out from the top of the distillation column. After distillation, sulphur is extracted at high pressure and a temperature of 300°C, with the aid of a molybdenum oxide sulphide catalyst. After sulphur extraction, the petrol is reformulated, i.e. its octane rating is raised by reactions in which naphthalene aromatisation, ring formation, naphthalene isomerisation, benzene formation, paraffin isomerisation (branching) and hydrogen cracking take place. As catalysts for the various reactions, noble metals absorbed by aluminium oxide are used. Reformulation produces not only high octane petrols, but also hydrogen and liquid gases, which are recovered during the process. During manufacturing, several additives are added to the petrol. The most important of these are anti-oxidation chemicals, dyes, detergents (against carbonization) and lead alkyls.

High octane petrol components, **alkylates**, are manufactured by butylene and butane alkylation. Alkylates are used particularly in the making of unleaded petrol.

Petroleum manufacturing

Petroleum is obtained from the middle distillate during distillation, the vacuum distillate during hot catalyst cracking and hydrogen cracking, and from the middle distillate (gasoil) sulphur extraction unit. Sulphur is extracted from the paraffin, for use as e.g. a component of aviation fuel. In connection with the mixing of aviation fuel, an anti-oxidation chemical for preventing oxidation reactions from taking place during storage, dyes and furfural to enable the product to be identified, together with anti-corrosion chemicals and stabilizers to improve the product's storage durability, are added.

Diesel and heating oil manufacturing at oil refineries

Diesel oil and light heating oil are obtained directly from the middle distillate in crude oil distillation, as well as from catalytic cracking.

Sulphur is removed from the distillate and dyes and furfural are added to the products to facilitate identification. Resistance to storage and transportation is improved in the same way as for aviation fuel. In addition, a pour point reducer is added to diesel oil to prevent the crystallization of heavy paraffins and a cetane rating raiser to improve the oil's ignition sensitivity.

Liquid gas manufacturing at oil refineries

Liquid gas (propane and butane) is obtained at oil refineries directly from crude oil distillation and the catalytic cracking units. The cracked hydrocarbons in the cracking units are separated out by distillation into product components. Aromatic substances are added to the finished liquid gas to facilitate gas leak detection. Ethylene is recovered from the liquid gases.

Liquid gas sulphur removal takes place during a two-stage wash. In the first stage, hydrogen sulphide is absorbed into an amine solution, and in the second stage mercaptan is extracted by a caustic soda solution. Hydrogen sulphide is recovered from the amine solution and sent to the sulphur manufacturing plant. The regenerated amine solution is passed back into the process. It is also possible to recycle the caustic soda in the sulphur extraction process.

Petroleum crude bitumen manufacturing

Distilled bitumens are manufactured from the bottom products of crude oil distillation by vacuum distillation. Vacuum distillation takes place at reduced pressure. Distilled bitumen is obtained from the bottom products of distillation. **Blown bitumen** is made in blower columns from soft bitumen or from a mixture of bitumen and blown oil from vacuum distillation. In blowing, hot air is forced through the bitumen, altering the latter's structure. Gases and steam are given off during blowing and these are conducted to a scrubber. Oils condensing in the scrubber are recovered, as are the gases, before water goes to the treatment plant. The blowing gases are burned.

Table 45. Oil refining wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Activated carbon waste, hazardous	050199	02.22	21619	*	*
1	Acid alkyl sludges	050104	02.22	34800	*	*
1	Acid tars	050107	02.11	34608	*	*
1	Catalyst waste	050301-02	03.14	31900	(*)	(*)
1	Lye waste	060202	01.22	33301	*	*
1	Non-halogenated solvent waste	070104	01.12	35200	*	*
1	Other tars	050108	02.11	34608	*	*
1	Sulphur containing wastes	050501	01.24	24800		
1	Filtering clay	050401	02.22	21709	*	*
1	Salts (salt removal sludges)	050102	02.22	34800	*	*
1	Bottom sludge from containers	050103	02.22	34800	*	*
1	Ash and slag (from burning sludges)	100101	13.32	21300		
1	Leaked oil	050105	01.32	34100	*	*

23209 Lubricant and other oil product manufacturing

Lubricating oil (lube oil) is made from basic oil, which may be synthetic or mineral-based. High class

lubricating oils are made using synthetic polyalphaolefines as the basic oil, from a water free isoparaffin mixture. The manufacturing of the final product consists of mixing a basic oil, or oils, with additives. The wastes arising from lubricant manufacturing are shown in Table 46.

Table 46. Lubricant manufacturing wastes

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Hydraulic oils	130101-07	01.32	34104	*	*
1	Non-halogenated solvents	070104	01.12	35200	*	*
1	Motor oils	130201-03	01.32	34100	*	*
1	Cleaning towels, cont. hazardous waste	15020101	07.63	171119	*	
1	Miscellaneous oil	130601	01.32	34100	*	*
1	Processing oil	130106-07	01.32	34302	*	*
1	Oily waste	130601	01.32	34100	*	*
1	Surface sludge from oil extraction	130505	02.22	34801	*	*
1	Bottom sludge from oil extraction	130502	02.22	34801	*	*

241 Basic chemicals manufacturing

2411 Industrial gas manufacturing

Nitrogen and oxygen manufacturing from the air: the air is liquefied and distilled into fractions. In the process gases are left which are passed back into the atmosphere.

Hydrogen manufacturing by the electrolysis of water: a direct current is passed into a potassium hydroxide solution by means of electrodes, the electric current splitting the water into hydrogen and oxygen. Hydrogen is evolved at the cathode and oxygen at the anode. The hydrogen obtained is scrubbed and dried before compression.

Carbon dioxide production in conjunction with alcoholic fermentation: carbon dioxide forming during fermentation is passed via a potassium permanganate bath into a compressor, after which the gas is scrubbed and dried. Condensation water and air are removed from the process. The gas obtained is liquefied by cooling it to a temperature of -30°C .

Nitrous oxide manufacturing from ammonium nitrate: ammonium nitrate is melted and water and ammonium phosphate are added to it. When the

solution is heated, the ammonium nitrate breaks down into water and nitrous oxide. The water is removed by cooling and the nitrous oxide is scrubbed with a solution of caustic soda and sulphuric acid.

2412 Dye and pigment manufacturing

Pigments: Titanium dioxide manufacturing by the sulphate method

The main raw materials in titanium dioxide manufacturing (Figure 8) are various kinds of ilmenites (TiFeO_3) and slags, together with sulphuric acid, in which the ilmenites and possible slags are dissolved. Considerable quantities of ferrosulphates and so-called waste mud from the raw materials arise during manufacturing. In addition, lead sulphate becomes concentrated, this being a hazardous waste. Most of the waste acids in the process are concentrated and returned to the process.

Figure 8. Titanium dioxide manufacturing

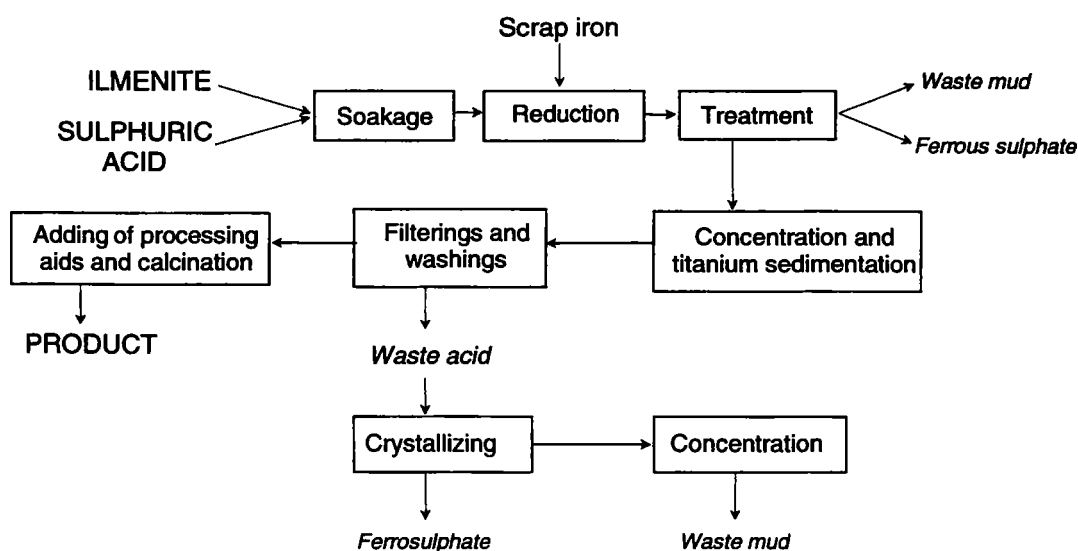


Table 47. Wastes formed in the titanium dioxide production process.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Waste cont. elementary sulphur	060601	13.41	21715		
1	Non-halogenated organic solvents	070304	01.12	35200	*	*
1	Waste mud	060199	01.24	21825	*	*
1	Sediment from waste sulphuric acid	060199	01.24	31501	*	*
1	Waste sulphuric acid	060101	01.21	33102	*	*
1	gypsum waste	061101	13.41	57305		
1	Lead sulphate	060405	01.24	31510	*	*
1	Iron and steel scrap	160205	08.11	25202		
1	Iron sulphate	060303	01.24	31507		
1	Titanium dioxide waste	160301	13.41	21705		
4	Laboratory chemicals	16050201-0301	03.14	39701	*	

2413 Manufacturing of other inorganic basic chemicals

Sulphuric acid manufacturing

Sulphuric acid is manufactured from sulphur dioxide gas by contact catalysis (double contact method). The sulphur dioxide required is obtained by calcinating (roasting) different kinds of mineral concentrates or pyrites (e.g. sulphur pyrites). During calcination, a

large amount of dust is formed, which is extracted with an electrostatic precipitator and by washing. The cleaned sulphur dioxide is dried and passed to a contact apparatus in which sulphur dioxide is oxidised to sulphur trioxide with a vanadium pentoxide catalyst. The sulphur trioxide obtained from the contact apparatus is dissolved in sulphuric acid ($\text{SO}_3 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_4$). The manufacturing process and the wastes formed during it are shown in Figure 9 and Table 48.

Figure 9. Sulphuric acid manufacturing by the double contact method

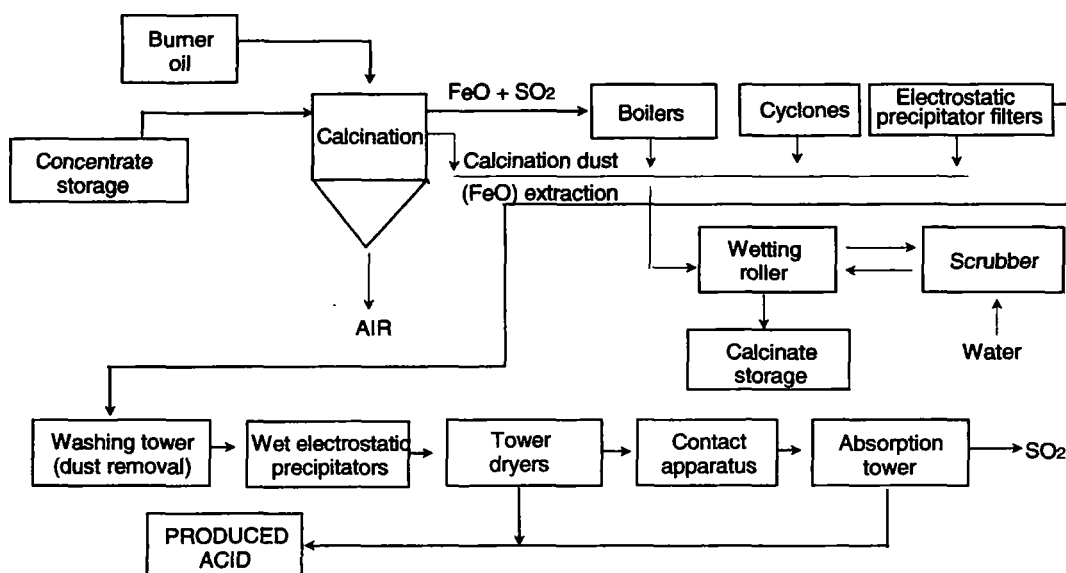


Table 48. Wastes arising in sulphuric acid manufacturing.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Soil and sand sludge	010202	13.21	21802		
1	Non-halogenated organic solvents	070104	01.12	35242	*	*
1	Calciate	060699	03.14	39806		
1	Concentrating sand	010202	13.21	21705		
1	Host stone	010102	13.21	21705		
1	Filtering cloth	150201	07.63	17120		
1	Vanadium pentoxide catalyst	06120200-01	03.14	33101	(*)	
4	Laboratory chemicals	16050201-0301	03.14	39701	*	
10	Wastes cont. elementary sulphur	060601	01.24	21823		

Chlorine and sodium hydroxide manufacturing (and hydrochloric acid manufacturing)

It is possible to manufacture chlorine, hydrogen and sodium hydroxide (caustic soda) electrochemically with the aid of diaphragm cells from common salt, electricity and water. The chlorine formed can be liquefied or burned with hydrogen and dissolved in water to make hydrochloric acid.

Phosphoric acid manufacturing

Phosphoric acid is manufactured by the dihydrate method, in which raw phosphorus obtained from apatite (the apatite concentration process is illustrated in Figure 13) is dissolved in sulphuric acid and the gypsum waste formed is separated off by filtration. The manufacturing process is shown in Figure 10. Some of the gypsum is used as a raw material for gypsum pigment manufacturing. As a side product of manufacturing, silicon tetrafluoride and hydrogen fluoride are formed. Waste acid from gypsum washing is returned to the process, as are the other waste acids formed during the process. The most important waste fractions are shown in Table 50.

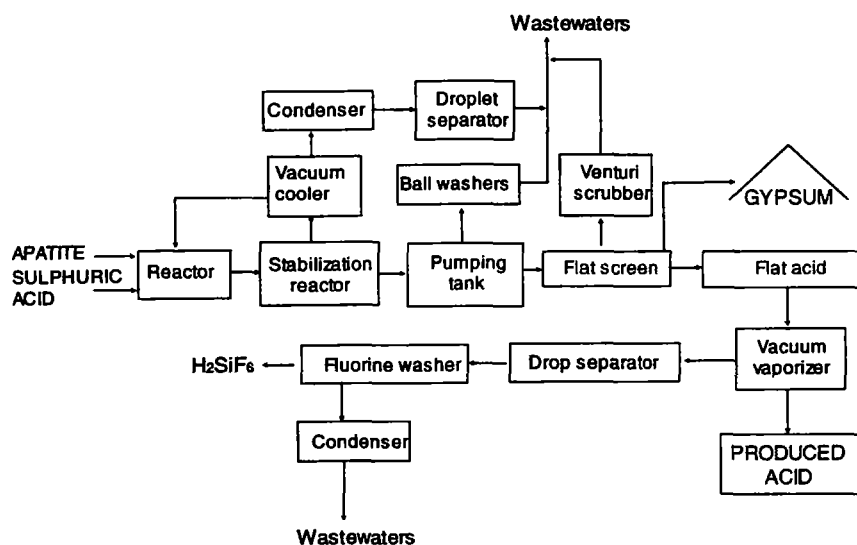
Table 49. Chlorine and sodium hydroxide manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Filtering cloths	15020100-01	07.63	17120	(*)	
10	Activated carbon sludge	060702	02.11	21610	*	*

Table 50. Wastes formed in the manufacturing of phosphoric acid.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Gypsum waste, moist	060901	13.41	21710		
1	Gypsum sludge	060901	13.41	21711		
10	Chemical sedimentation sludge	06050100-01	02.21	57305	(*)	

Figure 10. Phosphoric acid manufacturing



Potassium sulphate and calcium chloride manufacturing

Potassium sulphate is manufactured out of sulphuric acid and potassium chloride. Reaction products of these are potassium sulphate and hydrochloric acid. Hydrochloric acid can be used further to manufacture calcium chloride. Calcium chloride, water and carbon dioxide are produced when hydrochloric acid reacts with calcium carbonate. Produced calcium chloride solution is acidic, then it is neutralized, filtered, crystallized and dried. Both potassium sulphate and calcium chloride manufacturing arise large amounts of salt waste.

2414 Manufacturing of other organic basic chemicals

Hydrocarbon manufacturing; ethylene, propylene, butadiene, and benzene manufacturing

The starting point of manufacturing is the cracking of hydrocarbon products from oil refineries at a temperature of around 800°C. The end part of the process is the isolation of substances formed during cracking. In the first stage pyrolysis fuel oil is distilled out which is sent to a power plant for combustion, and pyrolysis benzene, from which benzene is produced by hydro-dealkylation. Light hydrocarbons separated out during the first distillation are pressurised and the acidic products scrubbed out with caustic soda, forming waste caustic soda. Ethylene is separated off by cold distillation from 3- and 4-carbon atom hydrocarbons, which are conducted to propylene and butadiene manufacturing processes.

Table 51. Hydrocarbon manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Carbon-oil compounds	070108	02.13	39702	*	
1	Sodium nitrite solution	060399	01.24	31301		
1	Sodium silicate	060399	01.24	31321		
1	Washing lye	060202	01.22	33301	*	
1	Non-halogen washing solvent	070104	01.12	35505	*	

Phenol and acetone manufacturing

Phenol and acetone are manufactured from cumene, i.e. isopropylbenzene, which is obtained from benzene by alkylation (Figure 11). Benzene alkylation takes place when benzene reacts in acidic conditions with propylene under the influence of an AlCl_3 catalyst. After alkylation, the solution is washed with water and neutralised with NaOH . This produces **nitrogen salts** (concentrated, can be sold as a water treatment chemical), together with other **wastewaters**, which are then filtered through activated carbon and sent to a

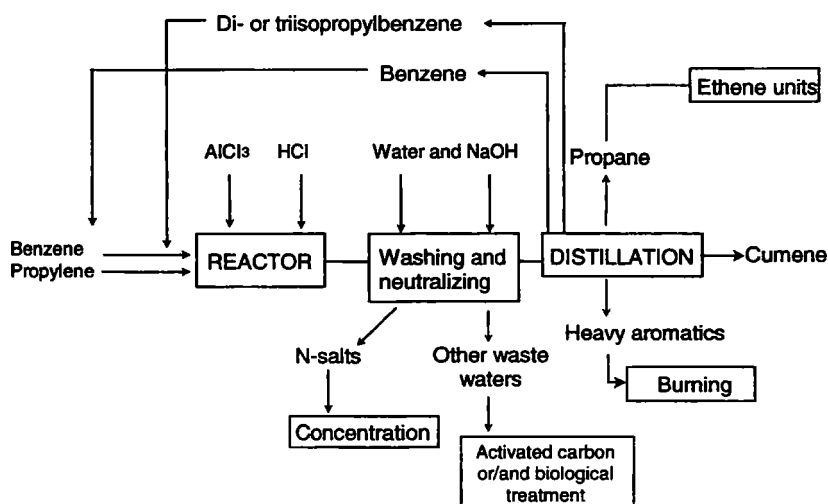
biological treatment plant. The solution is then distilled, which produces propane for feeding into the ethane unit, cumene for phenol manufacturing, and **heavy aromatics**, which are incinerated.

In the phenol plant the cumene is oxidised to cumene hydroperoxide, which is further split into phenol and acetone. As by-products of the reaction arises acetophenone, methane and phenyldimethylcarbinol, from which methylstyrene is made.

Table 52. Phenol and acetone manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Drying pulp	070110	02.13	21619	*	*
1	Non-halogen solvent compounds	070104	01.12	35405	*	*
1	Washing lye	060202	01.22	33302	*	*
1	Non-halogen washing solvent	070104	01.12	35505	*	*
1	Heavy aromatics, distillation waste	070108	02.12	35305	*	*
5	Phenolic sludge	07010201	02.22	34820	*	

Figure 11. Cumene manufacturing from benzene and propylene



Turpentine, pine oil and sitosterol manufacturing

Raw turpentine (turps) is recovered from the vapour in the digester at a pulp mill in connection with aeration or expansion. Caustic soda is separated out from the vapour, which is then condensed. The

condensed raw turpentine is distilled under different conditions to produce the desired quality. The sulphur-containing remaining predistillate is incinerated.

Table 53. Turpentine manufacturing wastes

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	First runnings	070108	02.12	35240	*	*
1	Non-halogen solvent compounds	070104	01.12	35405	*	*
5	Halogenated organic solvents	070103	01.11	35193	*	*

Pine oil is made from pine soap, which is obtained by concentrating the black liquor produced in connection with sulphate pulp cooking. In the pine oil manufacturing process oil-containing fatty and resin acids are converted into acid form using sulphuric acid

or waste acid from chlorine dioxide manufacturing. The raw pine oil is decanted or extracted with a separator from the acidic fluid, which is neutralised and sent to the pulp mill's soda boiler plant.

Table 54. Pine oil manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Resin oil	070108	02.13	36602	*	*
1	Hexane waste	070108	02.13	35206	*	*
1	Lignin, fibres etc. soap sullages	070199	02.13	21405		
1	Pine oil waste	070108	02.13	36601	*	*
1	Bottom residues from pine oil tanks	160705	02.12	13212	*	*
1	Neutral substance waste (sterols, alcohols, etc.)	070199	02.12	31501		
1	Parcelling liquid, sulphuric acid	060101	01.22	33102	*	*
1	Mixed soap	070108	02.13	13211	*	*
5	Pine pitch	070108	02.13	13305	*	*

Sitosterol is manufactured in Finland in connection with sulphate pulp cooking from birch and mixed liquid soap. Sitosterol is isolated from the soap by CSR extraction, in conjunction with which a neutral substance is obtained which is suitable as a raw material for sterol extraction. The neutralising agent is extracted, after which the sterol fraction is crystallised.

A **methanol fraction** forms in association with crystallisation and filtration. Some of the methanol is returned to the process, while some is removed as waste. **Neutralising agent waste** can be recycled as a raw material for other industrial processes.

Formic acid and acetic acid manufacturing

Formic acid is used in the dyeing and finishing of textiles and hides, in the pharmaceutical industry and for preserving animal feed. Formic acid is manufactured from carbon monoxide and methanol, which react together to form methyl formate. Methyl formate hydrolyses in the presence of water to form formic acid and methanol. **Acetic acid** can be manufactured from a neutral ammonium sulphate method using pulp mill's waste liquor, which contains acetic acid. Acetic acid is removed from the waste liquor by extraction.

Aldehyde manufacturing

Aldehydes are most commonly made by oxidising the correspondent alcohols. Formaldehyde, the industrially most important aldehyde, is made by oxidising methanol with air and a catalyst. Gaseous formaldehyde, as also acetaldehyde (a raw material for the synthesis of acetic acid), are stored and transported as either an aqueous solution (*formaldehyde*) or as solid trimers or polymers. The actual aldehyde is obtained by heating the aqueous solution or polymer.

2415 Fertiliser and nitrogen compound manufacturing

Nitric acid manufacturing

Nitric acid is manufactured by oxidizing ammonia. The ammonia raw material is vaporised and air mixed with it. The ammonia is then oxidized to nitrogen monoxide. For oxidation platinum-rhodium metal is used as a catalyst at a high temperature of around 900°C. When the temperature is lowered (condensation), the nitrogen monoxide is oxidized by the air to nitrogen dioxide, which dissolves in water to form nitric acid. In the acid manufacturing process, nitrogen oxides are formed as flue gases which are treated with ammonia (vanadium pentoxide catalyst). Water and nitrogen are formed by the reaction, the nitrogen being released into the atmosphere.

Ammonia manufacturing

Ammonia is made from water and atmospheric nitrogen. The hydrogen required is generally obtained from natural gas or hydrocarbons from oil products. The nitrogen/water mixture is compressed to a high pressure and passed into a reactor, where the gases under the influence of a catalyst (iron oxide) react to form ammonia. The final product is stored and

transported either liquefied or as a concentrated aqueous solution.

N-, PO₄- and K-fertilizer manufacturing

In addition to urea, **nitrogen fertilizers** are manufactured in Finland from Oulu saltpetre. The raw materials used are ammonia, nitric acid and dolomitic limestone. Coating oils and talc are used as finishing constituents. Gaseous ammonia and nitric acid react in the neutralisation reaction to give ammonium nitrate melt. The ammonium nitrate melt, dolomite powder and the fertilizer dust that returns from the process, are passed to the granulator. The grains are dried, sieved, cooled and surface treated.

The constituents for manufacturing **mixed fertilizer**, or Nitrogen-Phosphate-Potassium fertilizer, are **raw phosphate** (apatite) and **nitric acid**. The apatite concentrating steps are shown in Figure 12. The main stages in the manufacturing of mixed fertilizers are illustrated below in Figure 13. The most important wastes arising during the manufacturing process are shown in Table 55.

Figure 12. Mixed fertilizer manufacturing process, the raw material additions and the compounds formed by the additives affecting the process included

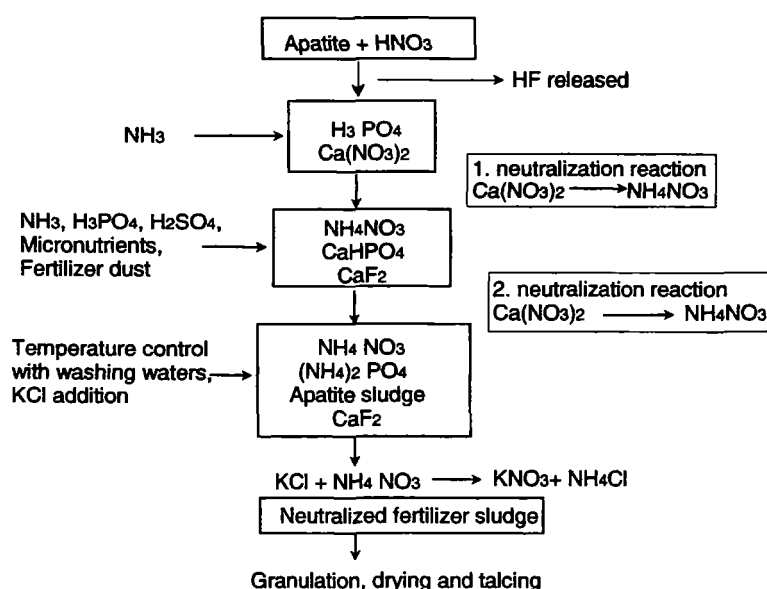
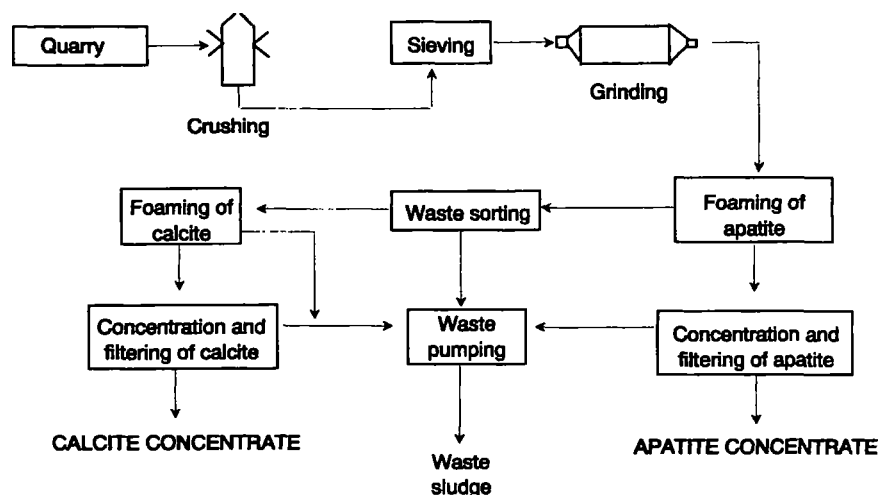


Table 55. Wastes arising during mixed fertiliser manufacturing.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Catalyst waste	061201-02	03.14	21843	(*)	
1	Copper chloride	060305	01.24	31413		
1	Fertilizer sludge	061001	03.14	21813		
1	Non-halogenated organic solvents	070104	01.12	35219	*	*
4	Laboratory waste	16050201-0301	03.14	39701	*	
5	Cleaning towels and wool, cont. hazardous waste	15020101	07.63	34411	*	
10	Chemical sedimentation sludge	06050100-01	02.21	57305	(*)	

Figure 13. Apatite concentrating.



Urea manufacturing

The urea manufacturing process is based on a reaction between ammonia and carbon dioxide in conditions of high temperature and pressure. Excess ammonia is used in manufacturing, making it necessary to extract the excess ammonia from the urea solution and feed it back into the reactor. Ammonium carbamate also forms during the process; this is separated from the product and fed back into the process.

2416 Plastics manufacturing

Polyolefine plastics

PE-LD, or low density polyethylene, is made from ethylene the pressure of which is raised in stages up to more than 200 bars. The high pressure ethylene is conducted to an autoclave reactor, to which peroxide is added as an initiator. Initiation starts the polymerisation of the ethylene and this produces a

great deal of heat. The ethylene remaining in the reactor is separated by lowering the pressure. The polyethylene produced is passed into an extruder (molten plastic is extruded through a flat nozzle with a narrow hole in it on to a moving web), and additives are added at the same time. The plastics is then cut, aerated and mixed. During mixing, the basic plastics can be stained with e.g. titanium oxide, **PE-HD** plastic, i.e. high density polyethylene, is not manufactured in Finland. The manufacturing process is a so-called low pressure process in which chromium or Ziegler-Natta catalysts are used together with aluminium alkyl compounds.

PP, i.e. **polypropylene**, is manufactured by polymerising propylene. The propylene used as a raw material is purified and pumped into a reactor, to which solid titanium and liquid triethylaluminium are fed as catalysts, together with a donor which regulates the product's stereo chemistry. For the manufacturing, two reactors in line are used into which hydrogen is fed separately to regulate the product's mole mass.

Figure 14. Polypropylene manufacturing

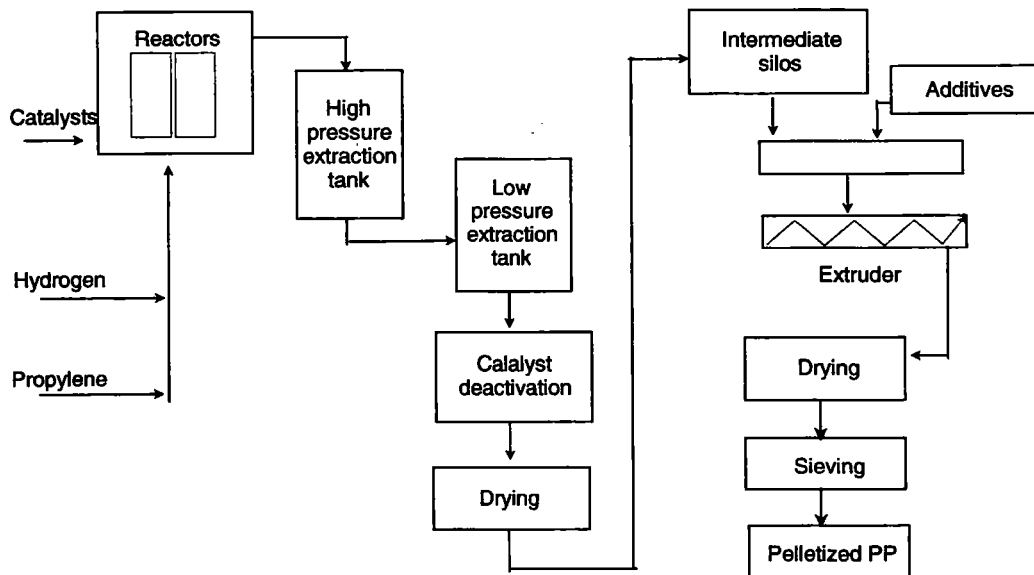


Table 56. Olefine plastics manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Extruder waste	16050300-01	07.42	37401	(*)	
1	Extruder boxwaste	16050300-01	07.42	37402	(*)	
1	Catalyst waste	07020600-01	03.14	398	(*)	
1	Non-halogen solvent compounds	070204	01.12	35405	*	*
1	Plastic dispersions	16050300-01	07.42	37404	(*)	
1	Sodium chloride	060305	01.24	31401		
1	Washing lye	060202	01.22	33302	*	*
1	Non-halogen washing solvent	070204	01.12	35505	*	*
1	Polypropylene. throw-out product	160302	07.42	37103		
1	Drying waste from polypropylene	070299	07.42	37100		
10	Wastewater sludge	070202	02.21	57304		

Polyvinylchloride plastics or PVCs

The raw material for polyvinyl chloride is vinyl chloride. Vinyl chloride is a gaseous, carcinogenic compound. In Finland, the so-called suspension polymerisation method is employed for the manufacturing of PVC in which the liquefied vinyl chloride is dispersed in water using e.g. polyvinyl

alcohol. Polymerisation takes place in small droplets protected by the polyvinyl alcohol. Organic peroxide or peroxide carbonate from the solutions acts as an initiator for monomer vinyl chloride. After the polymerisation reaction, the pressure of the mixture is reduced and gases and monomers are removed. The polymer is then dried and bagged.

Table 57. PVC manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Extuder waste	16050300-01	07.42	37403	(*)	
1	Non-halogen solvent compounds	070204	01.12	35405	*	*
1	Halogenated solvent compounds	00070203	01.11	35193	*	*
1	Plastic dispersions	16050300-01	07.42	37404	(*)	
10	Wastewater sludge	070202	02.21	57304		
10	Chemical sedimentation sludge	070202	02.21	57305		

Styrene plastics

There are three styrene plastic qualities: cellular PS (insulations), knock-proof PS (food packaging, household requisites, casings) and transparent PS (drinking glasses, hospital requisites, lighting, reflectors).

Styrene plastics are manufactured from styrene by the suspension polymerisation method (as for PVC). Rubber is used as a reinforcement in knock-proof polystyrene manufacturing. In the manufacturing of cellular polystyrene, pentane is added to the mixture to give the plastic a foam-like structure.

Polyester resins

The common polyester resins are mainly orthophthalic resins, whereas special polyester resins are made from e.g. halogenated compounds. Polyesters are generally used with a reinforcement (reinforced plastic). The most widely used reinforcement material is fibreglass (e.g. fibreglass boats).

Polyester is a liquid product, the manufacturing of which takes place in three stages:

1. A linear polyester is manufactured by condensing di- or polyhydric alcohols and bivalent or polyvalent carboxyl acids. This leads to the formation of acid-alcohol chains.
2. The linear polyester is dissolved in styrene.
3. Chemicals are added to the resin and the latter is stabilised.

Table 58. Styrene plastic manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Styrene waste	070204	01.12	35213	*	*
1	Styrene monomer waste	16050300-01	03.14	37304	(*)	
1	Photogravure inks	080301-04	03.13	36305	(*)	(*)
1	Toluene waste	070204	01.12	35211	*	*
10	Silica gel	070210	13.31	21621	*	*

Table 59. Polyester resin manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Polyester resin waste	16030201	03.13	36603	*	
1	Styrene waste	070204	01.12	35213	*	*
4	Laboratory waste	16050201-0301	03.14	39701	*	
10	Silica gel	070209-10	13.31	21621	*	*

Latexes

Styrenebutadiene latexes are used for coating printing papers and packaging boards in pigment coating. S/B latex is a milk-like fluid whose properties are regulated by the quantity of raw materials (styrene and butadiene) used and by surface-active additives.

S/B latexes are manufactured by the emulsion polymerisation process in which, in addition to the raw materials, additives, an initiator, and water are added to the reactor. Wastewaters are formed (styrene, butadiene, additives) at all stages of the process, i.e. polymerisation, gas stripping and filtration. During stripping, the gases removed from the process are sent to a flue gas treatment plant.

Table 60. Latex manufacturing wastes

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Butylacrylate solution	070204	01.12	25119	*	*
1	Latex waste	16050300-01	03.14	37800	(*)	
1	Halogenated organic solvents	070203	01.11	35193	*	*
1	Non-halogenated organic solvents	070204	01.12	35405	*	*
1	Styrene monomer	16050300-01	03.14	35213	(*)	

Adhesive resins

Adhesive resins are formaldehyde-based products in the manufacturing of which phenol, resorcinol, urea and melamine polymers are used. Formaldehyde for manufacturing is in aqueous solution (formalin). Resin is also delivered to the buyer in aqueous solution. The hardener (to initiate the interrupted polymerisation reaction) and additives have to be mixed with the resin to produce the desired adhesive. Adhesive resins are mainly used by the plywood, chipboard and wooden construction industries.

Adhesive resin manufacturing is divided into two processes, the formalin process and the resin process:

1. In the formalin process, formalin is manufactured from methanol. For the reaction, either silver or a metal oxide can be used as a catalyst.
2. In the resin process, the first stage is the addition of a methyl group to phenol, urea, melamine or resorcinol. This addition takes place when these substances react with formaldehyde. The reaction product obtained is condensed to the desired size and the product's dry matter content raised by evaporation. Water evaporated from the solution is replaced by a solvent.

Table 61. Adhesive resin manufacturing wastes

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Acryl resorcinol	16050301	01.12	35219	*	
1	Butanol waste	070204	01.12	35224	*	*
1	Phenolformaldehyde resin waste	16030200-01	03.13	36605	(*)	
1	Phenol waste	0700204	01.12	35230	*	*
1	Formaline waste	070204	01.12	35236	*	*
1	Resin waste	16050300-01	03.13	36600	(*)	
1	Cleaning towels and wool, cont. hazardous waste	15020101	07.63	34411	*	

242 Pesticide and other agricultural chemical manufacturing

The chemical reactions used for manufacturing pesticides and agricultural chemicals require the use of suitable organic (halogenated and non-halogenated) solvents. Organic solvent wastes forming during production most frequently occur due to distillation or

extraction, the dissolving of the initial constituents, filtration and the conversion of the solid product into crystalliser form. The solvent wastes forming during the processes are generally incinerated and the flue gases are then treated by scrubbers and filters.

Table 62. Pesticide manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Non-halogenated, solvent containing glues	080402	03.13	36618	*	*
1	Throw-out products of organic pesticides	16030201	03.11	39110	*	
1	Old pesticides, insecticides	16050201	03.11	39111	*	
4	Laboratory chemicals	16050201-0301	03.14	39701	*	
5	Organic mercury compounds	16050301	01.24	32111	*	
5	Washing sludges from oil tanks	160706	02.22	34802	*	*

243 Paint, varnish, printing ink, etc. manufacturing

The main constituents of **paint** are a **binder or binder mixture** (latex, acrylate or acryl, alkyd resin, amino-resin, bitumen, epoxy resin or epoxy ester, phenol resin and other resins, silicates and silicon emulsions, oils and polyurethane) and **pigments** (colour pigments, anti-corrosion pigments and secondary pigments). A solvent or dispersion intermediate agent is used as additives, together with various kinds of secondary agents.

As solvents, both aliphatic and aromatic organic compounds are employed, including alcohols, ketones, xylene and mixtures like white spirits. Auxiliary compounds may be e.g. UV absorbers, fungicides, membrane formers, etc.

Varnishes are mainly made from the same kinds of raw materials as paints. However, no pigments are used in them. The manufacturing process for both paints and varnishes mainly comprises the pulverising and mixing of constituents at various stages in the manufacturing process.

Printing inks are made using dyes, binders, solvents and additives. The dyes are usually organic or inorganic pigments, which are pulverised into the binder. In printing ink manufacturing, organic solvents like azo, kinone and indulin dyes are used. Here, too, the manufacturing stages consist mainly of pulverising substances and mixing.

Table 63. Paint, varnish and printing ink manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Formaline	070304	01.12	35236	*	*
1	Hardened paint	080105	03.13	36504		
1	Xylenes	070304	01.12	35212	*	*
1	Solvent benzene	070304	01.12	35208	*	*
1	Non-halogen sludges, cont. solvents	070304	01.14	35408	*	*
1	Non-halogen and non-sulphuric solvent compounds	070304	01.12	35293	*	*
1	Halogen paint waste	080101	03.13	36503	*	*
1	Non-halogen paint waste	080102	03.13	36505	*	*

Table 63 (continue)

1	Water-dilutable paint waste	080103	03.13	36507		
1	Paint dust	080109	03.13	36501		
1	Organic non-halogenated solvents	070304	01.12	35200	*	*
1	Printing ink waste	080301-04	03.13	36310	(*)	(*)
1	Washing benzine	070304	01.12	35214	*	*
1	Polyester resin waste	16050300-01	03.13	36606	(*)	
1	Fixing agent waste	16050300-01	03.13	35200	(*)	
1	Filter materials	150201	07.63	17106		
1	Hazardous filter material	15020101	07.63	37104	*	
1	Toluene	070104	01.12	35211	*	*
1	Colouring pigments	160502-03	03.13	36300	(*)	
5	Heavy metallic solvent compounds	070304	01.12	35294	*	*
5	Water containing paint and lacquer	08011000-01	03.13	36905	(*)	

244 Pharmaceutical chemical, plant extract and pharmaceutical product manufacturing

Pharmaceutical manufacturing consists of the manufacturing of active ingredients for medicines by extraction from natural products, by fermentation, or by chemical synthesis. Raw materials include solvents,

starch, lactose and many chemical compounds used for synthesis. Solvents are used in reactions, extractions, crystallisation, washes and purification.

Table 64. Wastes arising in the pharmaceutical industry.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Activated carbon	070509-10	02.11	21619	*	*
1	Acetone	070504	01.12	35240	*	*
1	Azides	060399	01.24	31105	(*)	
1	Dichloromethane	070503	01.11	35101	*	*
1	Epichlorohydrin	070503	01.11	35191	*	*
1	Ethanol	070504	01.12	35221	*	*
1	Pharmaceutical products manufacturing waste	070508	03.12	39209	*	*
1	Halogenated organic solvents	070503	01.11	35100	*	*
1	Potassium chloride	060305	01.24	31402		
1	Test animals' dung	070599	09.00	11500		
1	Fibre and yarn waste	160302	07.63	17110		
1	Halogen containing cool-cleaning agents	070503	01.11	35192	*	*
1	Halogen containing glue waste	080401	03.13	36616	*	*
1	Halogen containing solvent sludges	070503	01.13	35404	*	*
1	Halogen solvent compounds	070503	01.11	35193	*	*
1	Non-halogenated solvent compounds	070504	01.12	35292	*	*
1	Medicine waste	16030201	03.12	39202-3	*	
1	Medicinal plant waste	070507-08	10.12	11214	*	*
1	Methylene chloride	070503	01.11	35101	*	*
1	Plastic waste from packaging manufacture	070599	07.72	37104		
1	Sodium hydroxide	060202	01.22	33301	*	*
1	Sodium chloride	060305	01.24	31401		
1	Organic mercury compounds	16050301	01.24	32111	*	

Table 64 (continue)

1	Sulphuric acid	060101	01.21	33102	*	*
1	Sugar waste	070599	10.22	14103		
1	Salt sludges	060305	13.41	21800		
1	Toluene	070504	01.12	35211	*	*
1	Bleaching earth	070509-10	13.41	21605	*	*
1	Deteriorated medicines	16030201	03.12	39201	*	
1	Wad, antiseptic dressing etc. manufacturing waste	160208	07.63	17103		
1	Hydrogen peroxide	060199	01.21	33109	*	*
1	Viscose fibre waste	160208	07.63	17104		
4	Ammonium sulphate	060303	01.24	31503		
4	Bacteria cultures	070599	10.12	11216		
4	Acetic acid	070504	01.21	33201	*	*
4	Formaline	070504	01.12	35236	*	*
4	Chlorides, bromides, fluorides and iodides	060304-05	01.24	31400		
4	Test animal waste	180203	04.20-30	41101		
4	Test animal waste, infectious	180202	05.30	11403	*	*
4	Laboratory chemicals	16050201-0301	03.14	39701	*	
4	Halogenated solvent emulsions	070503	01.13	35401	*	*
4	Non-halogenated solvent emulsions	070504	01.14	35405	*	*
4	Other salts of carboxylic acids	070508	01.24	32520	*	*
4	Sodium, calcium and potassium phosphate waste	060307	01.24	31301		
4	Sodium azide	060399	01.24	31105		
4	Body parts and organs, blood products	18010200-01	05.10	53103		(*)
16	Latex waste (hoses)	160205	07.42	37401		

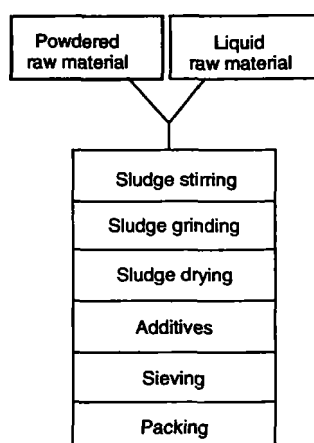
245 Detergent, cosmetic and toilet product manufacturing

Detergent manufacturing

The most important constituent of detergents is a tenside, i.e. a surface active agent. The hydrophobe part of the tenside is generally an aliphatic or aromatic hydrocarbon. The hydrophile constituent is a partially charged functional group. The tensides, which have an

unbranched carbon ring, are more favourable for the environment. Aside from the tensides, detergents also contain compounds for regulating the hardness of the washwater. The main outlines of the detergent manufacturing process are shown in Figure 15. Process wastes are listed in Table 65.

Figure 15. General manufacturing process for detergents



Soap manufacturing

Soap is made from a fatty acid mixture with the aid of caustic soda. The fatty acid mixture and caustic soda react in a neutralisation column, in which the so-called saponification reaction (neutralisation reaction) takes place. Water is separated out of the soap mix by NaCl. Water isolated from the mix contains common salt, alkali, a small amount of soap, and the impurities contained in the raw materials. The soap mix is dried and pressed through a vice. Perfumes, dyes and other additives are added to the soap, after which the latter is pressed into slabs, shaped and packaged. The wastes arising from soap manufacturing are shown in Table 65.

Table 65. Detergent, soap and hygiene product manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Detergent and washing agent waste	160302/160503	03.14	39400	(*)	
1	Diethyl ether	070604	01.12	35250	*	*
1	Non-ion active compound waste	160502-03	03.14	39403	(*)	
1	Alkalis, alkaline compounds	060201-99	01.22	33310	*	*
1	Ethanol	070604	01.12	35221	*	*
1	Ethyl acetate	070604	01.12	35246	*	*
1	Hypochlorite	060299	01.24	31102	*	*
1	Isopropanol	070604	01.12	35223	*	*
1	Manufacturing waste from cosmetic products	070699/070608	03.14	39302	(*)	(*)
1	Cosmetics, throw-out products	160302	03.14	39301		
1	Other aliphatic hydrocarbons	070604	01.12	35209	*	*
1	Organic non-halogenated solvents	070604	01.12	35200	*	*
1	Waste from fatty acid derivatives	070608	10.22	13204	*	*
1	Wax emulsion waste	070699	03.14	13302		
1	Hydrogen peroxide	060199	01.21	33109	*	*
1	White spirit	070604	01.12	35216	*	*
4	Inorganic acids	060101-99	01.21	33100	*	*
4	Fumaric acid	070604	01.21	33205	*	*
4	Chloroform	070603	01.11	35102	*	*
4	Laboratory chemicals	16050201-0301	03.14	39701	*	
4	Non-halogen, non-sulphuric solvent compounds	070604	01.12	35293	*	*

246 Other chemical product manufacturing

Explosive manufacturing

An explosive must contain a fuel (ignitable chemical group) which when it burns causes the rapid disintegration of an oxidizer. In disintegrating, the oxidiser releases energy. In many explosives, both the fuel and the oxidant are in the same molecule.

Cellulose nitrate gunpowder, the gunpowder commonly used in firearms and rockets, is made by passing ethanol through cellulose nitrate. The next stage is the addition of ether, which produces gunpowder suitable for mechanical treatment. The mixture is dried and pressed into strips. The solvent vapour is recovered by active carbon. The strips are

cut into grains which are surface treated before being coated with graphite.

Dynamite contains the cellulose nitrate referred to above, explosive oil (a glycerol trinitrate and glycol nitrate mixture), dinitrotoluene, ammonium nitrate, sodium nitrate and powdered wood. Explosive oil is manufactured by nitrifying glycerol, glycol and diglycol with the aid of nitric and sulphuric acid. This process produces a large amount of **waste acid**, some of which is regenerated. The product is neutralised with sodium carbonate and washed, giving rise to **wastewater**. Dynamite is made by mixing cellulose nitrate, explosive oil, dinitrotoluene, nitrates and additives. The product is loaded into a waxed paper cartridge or plastic bag.

Table 66. Explosive manufacturing wastes

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Fumaric acid	070704	01.12	33205	*	*
1	Powder paint waste	080104	03.13	36617		
1	Gunpowder waste	160403	03.21	39502	*	*
1	Potassium hydroxide	060299	01.22	33303	*	*
1	Glue, putty and resin waste	080401-03	03.13	36600	(*)	(*)
1	Non-halogenated solvent compounds	070704	01.12	35292	*	*
1	Organic non-halogenated solvents	070704	01.12	35200	*	*
4	Laboratory chemicals	16050201-0301	03.14	39701	*	

Adhesive and glue manufacturing

Adhesive resins are dealt with in section 2416. This section deals only with the smaller glues intended for industrial and consumer use. These comprise water dispersion glues, solvent-based adhesives (cements), hot-melt adhesives and reaction adhesives. The manufacturing of these consists mainly of mechanical mixing. Adhesives are composed of binders, fillers, softeners, thickening or thinning agents, and

other substances. The binder is dissolved in a suitable solvent. For water dispersion glues water is the solvent, whereas in solvent-based adhesives organic solvents are used. In solvent-based adhesives the binder is either polychloroprene or polyurethane. Hot-melt adhesives are products where gluing is carried out with the adhesive in a molten condition. Upon cooling, the hot-melt adhesive forms a bond. This kind of adhesive is used in the furniture, joinery and packaging industries.

Table 67. Glue and adhesive manufacturing wastes

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Dispersion colour waste	080301-04	03.13	36205	(*)	(*)
1	Resin oil	080402	03.13	36602	*	*
1	Glue, putty and resin waste	080401-03	03.13	36600	(*)	(*)
1	Glue, putty and resin waste, hardened	080404	03.13	36600		
1	Pine resin glues	080402	03.13	36601	*	*
1	Sodium hydroxide	060202	01.22	33301	*	*
1	Urea and melamineformaldehyde resin waste	08040300-01	03.13	36607	(*)	
4	Barrel bottom waste, cont., mineral oil	160706	02.12	34405	*	*

247 Artificial fibre manufacturing

Viscose fibres are manufactured from cellulose by chemical processing. The process is shown in the chart

in Figure 16. The most important wastes arising during the production process are shown in Table 68.

Figure 16. Viscose fibre manufacturing from cellulose

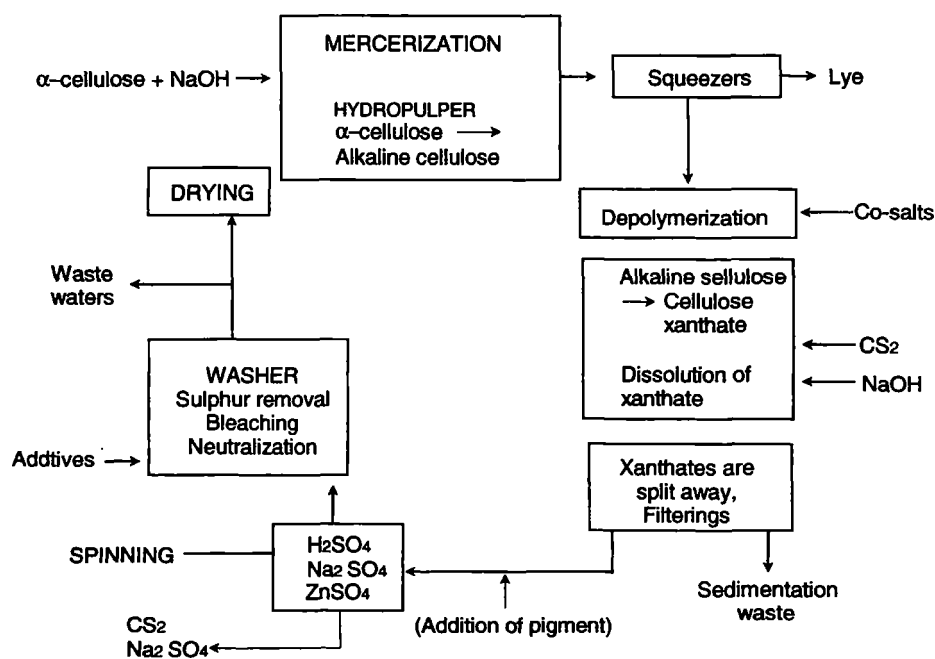


Table 68. Wastes from viscose fibre manufacturing.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Inorganic alkalis	060201-99	01.22	33310	*	*
1	Inorganic acids	060101-99	01.21	33110	*	*
1	Inorganic salts	060301-99	01.23-24	33500		
1	Lye waste	060202	01.22	33301	*	*
1	Sodium sulfate	060303	01.22	31501		
1	Non-halogenated organic solvents	070704	01.12	35200	*	*
1	Ash from wastewater sludge burning	100101	13.32	21300		
1	Filtering waste from viscose	070799	02.13	33800		

Rubber and plastic product manufacturing

2511 Rubber tire manufacturing

For coating vehicle tires, rubber mixtures are generally used which contain styrene-butadiene, natural rubber and polybutadiene. Tire manufacturing starts with the mixing of the required rubber mixtures. The various components and surfaces of the tire are made

separately, after which they are assembled. After assembly the tire is painted and baked. Then the tire is stretched. The most important wastes arising from tire manufacturing are shown in Table 69.

Table 69. Tire manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Billet waste	160205	08.11	37501		
1	Water-dilutable billet paint waste	080103	03.13	36506		
1	Caoutchouc solutions	160503	07.32	37804		
1	Rubber waste	160208	07.32	37501		
1	Rubber sludges	160503	03.31	37805		
1	Rubber glues	160503	03.13	36615		
1	Rubber mixing waste	160503	03.31	37501		
1	Rubberized metal wire	160205	08.11	37504		
1	Metal cord waste	120101-04	06.26	37504		
1	Frying pillow scrap	160205	07.32	37501		
1	Tire waste, throw-out products	160302	07.32	37502		
1	Scrap cable	160205	08.11	37504		
1	Inner tube waste	160302/160208	07.32/07.63	37501		
1	Textile cord waste	160208	07.32	17111		

2513 Other rubber product manufacturing

As the raw material for rubber products various types of elastomers are used depending on the product's purpose. The most commonly use elastomers are natural rubber and styrene-butadiene rubber (general rubbers), polychloropene rubber and ethylene-propylenepolymer rubber (weather and ozone resistant rubbers), nitrile rubber (oil resistant rubbers), and fluorine and silicone rubber (heat resistant rubbers). A wide variety of additives are used in the rubber mixture to improve the properties of the rubber.

In the manufacturing of rubber products the raw materials are mixed into a soft mass which is then made into long strips or sheets. The rubber is forced into die blocks, which are heated (vulcanisation). The vulcanised product is removed from the die and finished.

Hoses are made by alternately winding rubber and a reinforcement material around a steel pole. The hose formed around the pole is vulcanised in a kiln, after which the ready hose is unwound from the pole. The wastes arising from rubber product manufacturing are shown in Table 70.

Table 70. Other rubber products manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Aluminium chips and dust	120103	06.23	25510		
1	Aluminium plate and profile scrap, new alloyed	120103-04	06.23	25616		
1	Epoxy-resin waste	160208	07.42	37139		
1	Powder paint waste	080104	03.13	36615		
1	Cloth and knitted good waste	160208	07.63	17111		
1	Rubber waste	160208	07.32	37501		
1	Copper scrap	120103-04	06.24	25601		
1	Solvent containing sludges, halogenous	070203	01.13	35404	*	*
1	Solvent containing sludges, non-halogenous	070204	01.14	35408	*	*
1	Oily soil and soakage mass waste	130601	01.32	34408	*	
1	Paint residues	080105	03.13	36504		
1	Brass scrap	120103-04	06.26	25602		
1	Washing benzenes	070204	01.12	35214	*	*
1	Polyamide fibre waste	160208	07.63	17106		
1	Polyester fibre waste	160208	07.63	17107		
1	Polyurethane waste	160208	07.42	37130		
1	Chips from rounding off iron and steel	120101	08.11	25202		
1	Iron and steel scrap	160205	08.11	25201		
1	Tin bronze, lead tin bronze, red metal scrap	120103-04	06.26	25603		
1	Tin scrap	120103-04	06.26	25632		
1	Toluene	070204	01.12	35211	*	*
1	Trichloroethane	070203	01.11	35105	*	*
5	Cleaning towel and wool, cont. hazardous waste	15020101	07.63	17119		
10	Rubber sludges and emulsions	070202	07.32	37805		
10	Dust from exhaust air cleaning	070210	13.31	21634	*	*

252 Plastic product manufacturing

In plastic product manufacturing the most commonly employed work methods are extrusion and injection moulding. In injection moulding the molten plastic is injected into a steel die, where it hardens into the finished product. Products manufactured by injection moulding include various kinds of structural components and units. In extrusion the molten plastic is blown through a spout into a continuous tube, moulding or film. This method is used to make e.g. sheets for further shaping, and plastic bags. PE films can also be made by blowing. The blowing method enables not only films, but also bottles and canisters, to be made. Dies are used for forming against which the molten plastic is pressed. Various kinds of softeners to improve the malleability of the molten plastic may be added in both the extrusion and injection moulding methods. Plastic products are further processed using

forming and coating methods of various kinds. In processing, not only heating, but also stains, glues, varnishes, hardeners, solvents and detergents, may be used.

Thermal insulation materials are made from EPS plastic (Styrox). The plastic material is expanded with the aid of steam into blanks or blocks, which are then cut into sheets. Cutting waste is generally returned to the start of the process. Containers are also made from EPS plastic by expanding the plastic against dies with the help of steam.

A considerable proportion of the wastes from plastic product manufacturing consists of plastic waste from extraneous material and left-overs from cutting and shaping. Raw material waste, as well as part of the cutting wastes, are often returned to the process. The most important wastes are shown in Table 71.

Table 71. Plastic product manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Aluminium foil	120103-04	06.26	25616		
1	Aluminium chips and dust	120103	06.26	25510		
1	Aluminium foundings	160205	06.23	25618		
1	Butyl acetate	070204	01.12	35247	*	*
1	Dichloromethane	070203	01.11	35101	*	*
1	Alkaline washing sludges	060299	01.24	33806	*	*
1	Epoxy resins	16050300-01	03.13	36610	(*)	
1	Ethanol waste	070204	01.12	35221	*	*
1	Ethyl acetate	070204	01.12	35246	*	*
1	Phenol-melamine resin waste	16050300-01	03.13	36606	(*)	
1	Phenol formaldehyde resin waste	16050300-01	03.13	36605	(*)	
1	Phtalate softeners	16050300-01	03.31	37325	(*)	
1	Non-halogenated organic solvents	070204	01.12	35200	*	*
1	Ion-exchange resin, cont. hazardous waste	15020101	07.23	37145	*	
1	Isopropanol	070204	01.12	35223	*	*
1	Isocyanate waste	16050301	03.01	37315	*	
1	Sludges containing precious metals	11010401	01.21	33710	*	
1	Powder paint waste	080104	03.13	36617		
1	Cloth and knitted good waste	160208	07.42	17111		
1	Ceramic plates	160208	11.32	21425		
1	Chrome(III)oxide and hydroxide	190201	03.31	31207	*	*
1	Copper scrap	120103-04	06.26	25601		
1	Glues, cont. solvents, halogenous	080401	03.13	36616	*	*
1	Non-halogenated solvent containing sludges	070204	01.14	35408	*	*
1	Non-halogenous paint waste	080102	03.13	36505	*	*
1	Paint sludge	080106-08	03.13	36501	(*)	(*)
1	Paint pigment waste	16050301	03.31	36400	*	
1	Metal moulds	070299	06.26	25201		
1	Methyl chloride	070203	01.11	35112	*	*
1	Methyl methacrylate monomer waste	16050300-01	03.31	37310	(*)	
1	Plastic waste	160207	07.42	37100		
1	Plastic sludges and emulsions	160503	03.31	374050	(*)	
1	Other aliphatic hydrocarbons	070204	01.12	35209	*	*
1	Sludges cont. nickel	11010401	01.21	33707	*	
1	Organic lead compounds	16050301	03.31	32113	*	
1	Printing ink waste	080301-04	03.13	36300	(*)	(*)
1	Softeners	16050300-01	03.31	37324	(*)	
1	Perchloroethylene	070203	01.11	35111	*	*
1	Washing lye	060202	01.22	33302	*	*
1	Polyester wad waste	160207	07.42	17107		
1	Polyol	070204	01.12	35227	*	*
1	Heavy metal hydroxide sludge	190201	01.24	33705	*	*
1	Fatty acid derivatives waste (colourants)	16050301	03.13	13204	*	
1	Iron and steel processing waste	120101-02	06.11-12	25102		
1	Iron and steel scrap	160205	08.12	25202		
1	Thinners	070204	01.12	35215	*	*
1	Toluene	070204	01.12	35211	*	*
1	Trichloroethane	070203	01.11	35105	*	*
1	Urea and melamine-formaldehyde resin waste	16050300-01	03.13	36607	(*)	

Table 71 (continue)

1	Cast iron scrap	160205	08.12	25206		
1	Old aluminium plate and profile scrap	160205	08.12	25617		
4	Xylenes	070204	01.12	35212	*	*
4	Laboratory chemicals	16050201-0301	03.14	39701	*	
4	Nitric acid	060105	01.21	33101	*	*
5	Sodium hydroxide	060202	01.22	33301	*	*
5	Cleaning towels and cleaning wool	150201	07.23	17118		
5	Cleaning towels, cont. hazardous waste	15020101	07.23	17118	*	
10	Chemical sedimentation sludge	07020200-01	02.21	57305	(*)	
10	Soil and soakage pulp waste, oily	15020101	07.23	34408	*	

Reinforced plastic product manufacturing

Reinforced plastic is a combination of materials consisting of a fibre reinforcement bound with plastic. The plastic materials used in reinforced plastic are polyester, epoxy resins, furan resins, and other resin plastics. The products are made by hand by laminating (wetting of reinforcement with resin) and spraying,

and by pressing, casting and winding. In the casting method wood, hard plastic, reinforced plastic and steel are used as the die material. Hardeners and accelerators are mixed with the resin. The products are surface treated with resin, paint and varnish. The most important wastes arising during manufacturing are shown in Table 72.

Table 72. Reinforced plastic manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Acetone	070204	01.12	35240	*	*
1	Fibreglass waste	160208	07.42	21410		
1	Halogenous, solvent containing glue waste	080401	03.13	36614	*	*
1	Non-halogenous solvent containing sludges	070204	01.12	35408	*	*
1	Reinforced plastic products	160207	07.42	37150		
1	Non-halogenous, solvent containing paint waste	080102	03.13	36505	*	*
1	Paint sludge	080106-08	03.13	36501	(*)	(*)
1	Paint pigment waste	16050301	03.31	36400	*	
1	Metal moulds	070299	06-26	25201		
1	Polyester resin waste	16050300-01	03.13	36603	(*)	
1	Styrene	070204	01.12	35213	*	*
1	Styrene acrylonitrile waste	160207	07.42	37114		
1	Photogravure ink	080301-04	03.13	36305	(*)	(*)
1	Thinners	070204	01.12	35215	*	*
1	Toluene	070204	01.12	35211	*	*
1	Trichloroethane	070203	01.11	35105	*	*
4	Acids	060101-99	01.21	33101	*	*
10	Soil and soakage pulp waste, cont. oils	15020101	07.23	34408	*	

Non-metallic mineral product manufacturing

261 Glass and glass product manufacturing

All types of glass manufactured in Finland, i.e. soda-lime glass, glass wool, silicate wool, household glass, lead glass and fibreglass, are amorphous solid materials formed by silicate glasses, silica and other oxides (e.g. Al_2O_3 , Fe_2O_3 , MgO , CaO , Na_2O , K_2O , SO_3 and B_2O_3). In addition, inorganic dyes, inorganic compounds producing an opal finish, and sulphates, nitrates and halogen clearing agents, are used in manufacturing. The raw materials are melted in an oil, natural gas or electric kiln to a temperature of around $1500^\circ C$. The manufacturing methods for the various glasses differ from one another mainly in regard to their forming, cooling and finishing methods. **Packaging glass** is made by blowing into a mould, after which the surface of the glass can be treated with titanium or tin. The inside surface of packaging glass is often treated with ammonium sulphate. **Plate glass** is

made by drawing it horizontally across the surface of a tin bath. The cooled glass is washed, broken off and cut. **Household and art glass** is made by blowing, either by hand or mechanically. **Glass wool** is made by crystallising glass in a special centrifuge. A binder, generally phenol formaldehyde resin, is sprayed on to the fibres and this hardens in a kiln. **Rock wool** is a special fibre made from molten glass. It is obtained by melting mineral material and coke in layers. Fibre formation is achieved by centrifuging and air blowing. **Fibreglass** is manufactured by drawing the fibre through a platinum nozzle. During drawing, the fibre is coated with chemicals in an aqueous solution. The most important wastes arising from glass product manufacturing are shown in Table 73.

Table 73. Glass product manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Aluminium chips and dust	120103	06.23	25510		
1	Aluminium plate and profile scrap	120103-04	06.23	25616		
1	Non-iron metallic processing waste	120103-04	06.26	25501		
1	Insulation glass waste	101102	07.13	36625		
1	Non-halogenated organic solvents	070104	01.12	35200	*	*
1	Isopropanol	070104	01.12	35223	*	*
1	Putty waste	080401-04	03.13	36625	(*)	(*)
1	Lamination waste	101103	13.41	37103		
1	Laminated glass	101102	07.13	21401		
1	Glass and rock wool waste	101103	07.13	21411		
1	Glass grinding sludge	101199	13.41	21830		
1	Glass waste	101102	07.13	21400		
1	Fibreglass waste	101103	07.42	21410		
1	Non-halogenous solvent compounds	070104	01.12	35292	*	*
1	Water-dilutable paint waste	080103	03.13	36507		
1	Paint sludges	080106-08	03.13	36805	(*)	(*)
1	Metal moulds	101199	06.26	25201		
1	Metal residuals, cont. heavy metals	060405	01.24	21846	*	*
1	Sodium and calcium carbonate	060301	01.24	31231		
1	Silicic acid and quartz waste	101101	13.42	21420		
1	Polyurethane waste	160208	07.42	37130		
1	Polyvinyl acetal waste	160208	07.42	37117		
1	Iron and steel processing waste	120101-02	06.11-12	25102		
1	Toluene	070104	01.12	35211	*	*
4	Laboratory chemicals	16050201-0301	03.14	39701	*	*
16	Barrel bottom waste, cont. mineral oils	160706	02.12	34405	*	*

262 Ceramic product manufacturing with the exception of non-fire resistant product manufacturing for construction purposes

The main components of ceramics are divided into plastic raw materials (clay and kaolin) and non-plastic raw materials (quartz, feldspar, dolomite, wollastonite and bauxite). Aside from the main components, peptisizing alkalis, i.e. soda and water-glass, are used in ceramics products. During manufacturing, the raw materials are mixed with water into a soft mass and the mixture is then ground finer. The iron particles in the sludge are extracted with a magnet. Glazes are made from feldspar and quartz. Dolomites and wollastonites

are added to the glaze to prevent melting. Zinc oxide and borosilicate can also be used to prevent the glaze from melting. For opal glazes, zirconium silicon oxide or titanium oxide are used. Heavy metals are used for staining glazes. Other additives include carboxymethyl cellulose glue, aniline dyes, and ceramic printing inks. The products are made by forming, casting, lathe cutting and compression. The products are dried and fired. The most important wastes arising during manufacturing are shown in Table 74.

Table 74. Wastes arising during ceramic product manufacturing.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Waste ceramic	160301	13.11	21425		
1	Waste clay	101201	13.21	21700		
1	Plaster moulds	101206	13.41	21710		
1	Iron and steel scrap	160205	08.11	25202		
1	Alumina brick and mass waste	101207	13.42	21202		
1	Clay slip	101201	13.22	21803		
1	Clay mass waste	101201	13.21	21709		

263 Ceramic tile manufacturing

Clay and stone are used as raw materials for tile manufacturing. Softened clay and ground stone materials are mixed, after which the mixture is screened and dried into a so-called moulding powder. The tiles are formed in a press, after which they are

fired and possibly glazed. Glazing takes place in a glazing kiln in which patterns can also be put on the tiles by silk screen printing.

Table 75. Wastes from ceramic tile manufacturing.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Ceramic waste	160301	13.11	21425		
1	Metal moulds	101206	06.26	25202		
1	Iron and steel scrap	160205	08.11	25202		
1	Clay slip	101201	13.22	21803		
1	Colouring pigments	16050200-01	03.31	31207	(*)	

264 Brick and other construction ceramic manufacturing

Fired bricks are generally made from glacial clay, the plasticity of which is adjusted by adding sand or brick dust to it. Sawdust, manganese dioxide, titanium dioxide or lime can also be added to the soft clay. Brick manufacturing starts with the separation of the stone from the clay raw material, after which the clay mixture is mixed and temporarily stored. Before forming, the mixture is warmed and pressed. The formed bricks are dried and fired.

Limestone bricks (white bricks) are made from sand, burnt lime, water and colour pigments. The raw materials are mixed and the lime slaked with water or steam. The bricks are pressed into shape in a hydraulic press. Hardening takes place in a steam autoclave. Waste from brick production consists mainly of brick waste and wastewater forming at certain stages in manufacturing (compression and drying).

265 Cement, lime and gypsum manufacturing

2651 Cement manufacturing

Cement is made from limestone to which e.g. iron oxide (rolling scale) and aluminium oxide (fly ash) are added. The ground raw materials are sintered in a rotary kiln (with coal as fuel), forming a calcium compound, so-called cement clinker. The clinker is ground in a ball crusher into cement, to which additives and gypsum are added. The most generally used additives are iron smelting slag, limestone and fly ash.

burned either in the type of rotary kiln used in cement manufacturing or in a special vertical kiln. After burning, the lime is cooled and either screened or ground to a powder, and partially slaked. In slaking, an equivalent, or larger, amount of water is used. Where an equivalent amount of water is used, the slaking is known as dry quenching. Lime produced by dry quenching is finer-grained than that produced using more water.

In lime manufacturing, the chief waste is electrostatic precipitator dust, burnt lime, and wash and slaking water.

2652 Lime manufacturing

Lime, or calcium oxide, is made by burning limestone. When the calcium oxide reacts with water, slaked lime, or calcium hydroxide, is formed. Limestone is

2653 Gypsum manufacturing

See phosphoric acid manufacturing, Figure 10.

266 Concrete, cement and gypsum products manufacturing

The most common wastes arising from concrete and gypsum products manufacturing are shown in Table 76. In Table 77 are shown separately industry's wastes, which arise from manufacturing products out of cement, lime and plaster (most of the waste from manufacturing these products are classified in class

101300). Partition between Tables 76 and 77 is not entirely unambiguous. Wastes from both Tables can arise in manufacturing these products, depending on the quality of manufactured product.

Table 76. Wastes from concrete and gypsum products manufacturing

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Aluminium plate and profile waste	120103-04	06.23	25616		
1	Bitumen emulsion	16050301	02.22	34306	*	
1	Ethanol	070104	01.12	35221	*	*
1	Fly-ash and dust from carbon	100102	13.32	21301		
1	Isocyanate waste	16050301	03.14	37315	*	
1	Isocyanate sludges	08040301	01.14	37406	*	
1	Mineral wool dust	101203	13.41	21508		
1	Ashes, slag and fly-ash	100101	13.32	213		
1	Sulpho soaps and sulphonate waste	16050300-01	03.14	39402	(*)	
1	Brick, plaster and element waste	160301	13.11	21506		
1	Cast iron scrap	160205	08.11	25206		
1	Colouring pigments	16050200-01	03.31	31207	(*)	
4	Sodium sulphate	060303	01.24	31501		
4	Halogenated organic solvents	070103	01.11	35102	*	*
5	Cleaning towels and wool	150201	07.63	17118		
5	Cleaning towels and wool, cont. hazardous waste	15020101	07.63	17118	*	*
10	Wastewater sludge	190804	12.12	21804		
10	Fly-ash and dust from light fuel oil	100104	13.32	21303	*	*
10	Soil and soakage mass waste, hazardous	15020101	02.14	34408	*	
10	Filtering cloths, mineral fibre	160201	13.31	21627		
10	Sulphur removal gypsum	100105	13.32	21321		

Table 77. Wastes from cement, lime and plaster products manufacturing

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Phenolformaldehyde resin waste	16050300-01	03.13	36605	(*)	
1	Acid colours	16050300-01	03.13	36201	(*)	
1	Resin waste	16050300-01	03.13	36603	(*)	
1	Limestone dust	101306	13.31	21632		
1	Gypsum waste	101304	13.41	21710		
1	Sawing and grinding waste from stones	010406	13.22	21801		
1	Fibre cement plate waste	101303	13.11	21500		
1	Glue and resin sludges	080405-08	03.13	36800	(*)	(*)
1	Non-halogenous, solvent containing sludges	070104	01.14	35408	*	*
1	Paint and lacquer containing waters	08011000-01	03.13	36905	(*)	
1	Polyurethane waste, element manufacturing	101303	13.11	37130		
1	Throw-outs of construction products**	160301	13.41	21502		
1	Melted glassy stone	101399	13.11	21703		
1	Kraft paper (concreting bed)	101399	07.23	19306		
1	Colour, paint and lacquer sludges	080106-08	03.13	36800	(*)	(*)
1	Colouring pigments	16050201	03.31	31207	(*)	

** excl. composite materials

Base metal manufacturing

271 Iron and steel manufacturing

Ore concentrate manufacturing: The mined ore is crushed and ground into granules. The granular ore is floated and the iron extracted with a magnet. In connection with ore cleaning, a large amount of sludge forms (fine stone particles during ore cleaning and water used during separation) and so-called concentrate sand, which is generally stored on site (a mine's "lakes").

Iron and steel are manufactured from iron ore concentrate to which the desired amount of coal is added to improve the product's characteristics. The manufacturing process is shown in Figure 17. The cleaned and sintered ore concentrate is fed into a smelter to which coke and lime are added. The iron oxides in the ore are reduced by the coal to raw iron. By burning coal, the desired heat is produced inside the smelter. The lime binds the impurities in the ore into slag. Raw iron from the smelter can be cast into

ingots and the desired iron products can be made from the latter through the use of heat and alloys at the foundry.

When making steel, the raw iron is put in a converter in which the excess coal is burned off. Secondary cleaning and the addition of additives takes place in a ladle, after which the molten steel is cast and rolled. After rolling, the treatment may continue in the form of drawing, forging, casting, or heat treatment of various kinds.

Iron and steel products are manufactured as plates and long strips which are pickled (corrosion treatment with concentrated acid). In addition, the product can be coated after forming with e.g. another metal, plastic or paint. The wastes arising from iron and steel manufacturing are shown in Table 78.

Figure 17. Steel manufacturing from iron ore concentrate and coal.

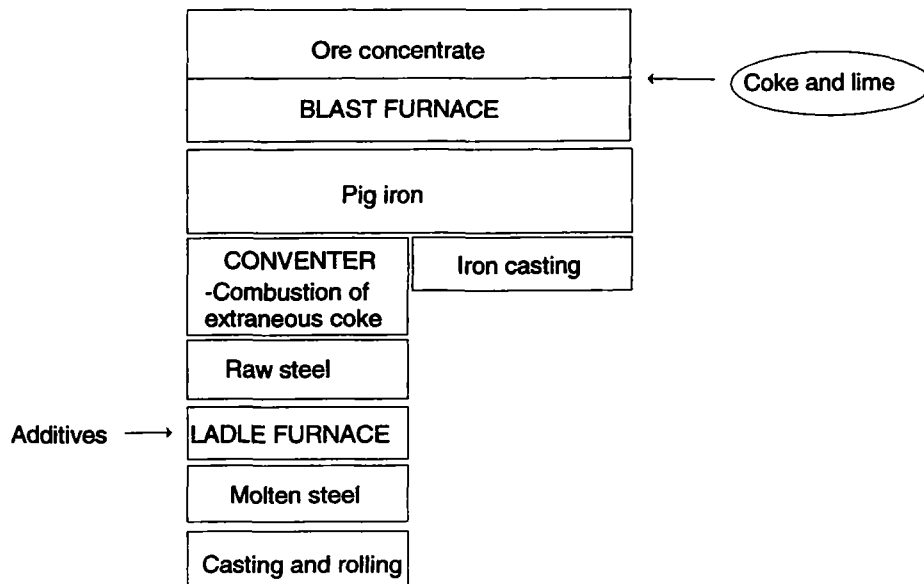


Table 78 Iron and steel manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Acids, acid compounds	110105-06	01.21	33110	*	*
1	Oxide scale	120199	13.33	21104		
1	Grinding agent waste	120299	13.41	21708		
1	Foundry sand	100901-02	13.42	21212		
1	Non-halogenous, solvent containing paint waste	080102	03.13	36505	*	*
1	Blast-furnace gas sludge	100204	13.31	21842		
1	Blast-furnace slag	100202	13.33	21102		
1	Blast-furnace dust	100203	13.33	21301		
1	Brass processing waste	120103-04	06.26	25602		
1	Metal hydroxide sludges	190201	01.24	31229	*	*
1	Mineral oil- water- emulsions	130505	02.22	34901	*	*
1	Other non-ferrous metal processing waste	120103-04	06.26	25501		
1	Surface treatment sludges, heavy metallic	110103-04	01.24	33902	*	*
1	Drilling, cutting and grinding oil emulsions	120108-09	02.22	34302	*	*
1	Drilling, cutting and grinding oils	120106-07	01.32	24105	*	*
1	Iron and steel processing waste	120101-02	06.11-12	25612		
1	Iron chloride	060305	01.24	31412		
1	Alumina brick and mass waste	100206	13.42	21202		
1	Steel chips	120101	06.11-12	25507		
1	Steel scrap	160205	08.42	25600		
1	Steel works slag	100202	13.33	21103		
1	Furnace waste	100206	13.42	21206		
1	Rolling mill practice waste	120111	13.41	21845	*	*
1	Roll scale / iron oxide (scale removal)	120199	13.33	21130		
1	Oil waste, acid	130601	01.32	34108	*	*
1	Washing sludges from oil tanks	160706	02.22	34802	*	*
4	Laboratory chemicals	16050201-0301	03.14	39701	*	*
4	Sludges, containing metallic salts	11010401	01.24	33509	*	*
5	Paint residuals	080105	03.13	36502		
10	Phtalate softeners	16050300-01	03.14	37325	(*)	
10	Wastes from sand removal	190802	13.22	21802		
10	Sludges from Wastewater treatment	190804	01.24	57304		
10	Wastewater sludge	190804	02.21	57305		
10	Chemical sedimentation sludge	190804	02.21	57305		
10	Gypsum waste	100203	13.41	21710		
10	Sulphur removal slag	100203	13.31	21321		
10	Filtering sand	190899	13.21	21701		
10	Filtering dust	100203	13.31	21130		
16	Waste from mineral oil treatment	130601	01.32	344	*	*

272 Piping manufacturing

Piping can be manufactured from cast iron or cast steel by hot or cold rolling, as well as by hot and cold drawing. Piping made by rolling and drawing is seamless. Seamed piping is made from ribbon obtained from the steelworks or by welding plate. The manufacturing processes consist of strip cutting,

coarsening of the welding surfaces, welding, cleaning (solvents, alkalis and acids) and cold forming, and surface treatments. Surface treatment is used to protect the surfaces of the products against corrosion. Surface coatings include plastic, paint and varnish.

Table 79. Piping manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Processing waste from non-ferrous metals	120103-04	06.26	25501		
1	Acids, acid compounds	110105-06	01.21	33110	*	*
1	Oxide scale	120199	13.33	21103		
1	Grinding dust, iron-bearing	120299	13.33	21130		
1	Welding slag	120113	01.24	31205		
1	Lacquer waste, cont. solvents, non-halogen	080102	03.13	36511	*	*
1	Halogenous paint waste	080101	03.13	36503	*	*
1	Paint residuals	080105	03.13	36501		
1	Grinding sludges from metals	120202	01.24	25805		
1	Pickling acids	110105	01.21	33101	*	*
1	Washing tank residues	120302	02.22	34205	*	*
1	Surface treatment sludges	110101-04	01.24	33700	(*)	(*)
1	Flame cutting slag	120199	13.33	21103		
1	Drilling, cutting and grinding oil emulsions	120108-09	02.22	34302	*	*
1	Drilling, cutting and grinding oils	120106-07	01.32	34105	*	*
1	Iron and steel processing waste	120101-02	06.11-12	25102		
1	Zinc containing sludges	11010401	01.24	33705	*	*
1	Synthetic coolants and lubricants	120110	02.22	34301	*	*
1	Steel chips	120112	03.32	34203	*	*
1	Wax chips and waste	120112	01.32	34203	*	*
1	Roll scale / iron oxide	120199	13.33	21130		
1	Washing sludges from oil tanks	160706	02.22	34802	*	*
5	Alkaline washing sludges	060299	01.24	33806	*	*
5	Cleaning towels and wool	150201	07.63	17119		
5	Cleaning towels and wool, cont. hazardous waste	15020101	07.63	17119	*	*
5	Oil and fuel filters	130601	02.22	34409	*	*
10	Phthalate softeners	16050300-01	03.14	37325	(*)	
10	Gypsum waste	100203	13.41	21710		
10	Heavy metal hydroxide sludge	190201	01.24	33700	*	*
10	Surface emulsions from oil extractors	130505	02.22	34801	*	*
10	Bottom sludges from oil extractors	130502	02.22	34801	*	*

273 Other iron and steel initial processing, iron alloy manufacturing

By using iron alloys it is possible to appreciably improve the properties of steel and iron products. Alloy materials used with iron include silicon, manganese, nickel, chromium and vanadium.

Chromium makes the steel stainless. Generally, stainless steel also contains nickel.

Alloys are made in the same way as ordinary steel or cast iron. The alloy materials are generally added to the iron concentrate at the sintering stage.

274 Manufacturing of metals other than iron metals

2741 Precious metal manufacturing

In **gold ore** concentrating, the pulverised ore is foamed chemically. The isolated foam concentrate, which contains an abundance of other metals (some of these, like tellurium and bismuth being undesirable) are cleaned and the gold separated by electrolysis. The isolated gold is mixed with copper and the mixture is then transported away for further processing. Concentrate containing large amounts of tellurium and bismuth is not processed in Finland. Instead, an effort is made to sell it.

2742 Aluminium manufacturing

Aluminium is made from bauxite by first converting this to aluminium oxide and then freeing the aluminium by electrolysis. Aluminium is also manufactured from scrap aluminium, large amounts of energy then being saved during production. In Finland, aluminium is made from scrap and aluminium processing waste. Raw material scrap is crushed and graded. The isolated aluminium is melted and the necessary alloy substances are added. The ready made aluminium is cast into ingots. The wastes arising during aluminium manufacturing are shown in Table 80.

Table 80. Aluminium manufacturing wastes (manufacturing from scrap aluminium).

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Black slags from aluminium melting	100309	13.32	21114	*	*
1	Salt slags from aluminium melting	100308	01.24	21114	*	*
1	Alumina	100305	13.41	21205		
1	Furnace waste	100307	13.42	21206	*	*
10	Sand filtering residuals	190804	02.14	21602		
10	Gas washing sludges	100314	13.31	21825		
10	Filtering dust	100311	13.31	21634		

2743 Zinc manufacturing

Zinc manufacturing comprises zinc concentrate calcination, dissolving and cleaning of the calcinate, electrolytic production of zinc and casting. The manufacturing wastes are shown in Table 81.

Table 81. Zinc manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Jarosite sludge	110202	01.24	21835	*	*
1	Gypsum sediment	101099	13.41	21711		
1	Slags	100502	13.42	21206	*	*
1	Zinc slag	100501	13.32	21112	*	*
1	Furnace waste	100507	13.42	21206		
10	Gas treatment sludges	100506	13.31	21825	*	*
10	Fly-ash, filtering dust	100503	13.31	21206	*	*

2744 Copper manufacturing

Copper concentrate is treated by the flash smelting method. The stages in the process are illustrated in Figure 18. The heat energy necessary for the flash smelting process is obtained from the combustion of the iron and sulphur contained in the concentrate. Concentrate combustion takes place in two successive smelters, a flash smelter and a converter. Scrap copper is added separately to the converter. Raw copper from the converter is conducted to an anode kiln in which it

is cast into plate-like anodes. The anode plates are then placed in electrolyte baths, where seeding plates of pure copper act as the cathodes. During electrolysis the copper is deposited in layers on the seeding plates. Electrolytic copper is smelted and cast into blanks of the desired shape, from which copper products are made by further treatment (rolling, drawing, etc., cold and hot forming methods).

Figure 18. Copper manufacturing using the flash smelting process.

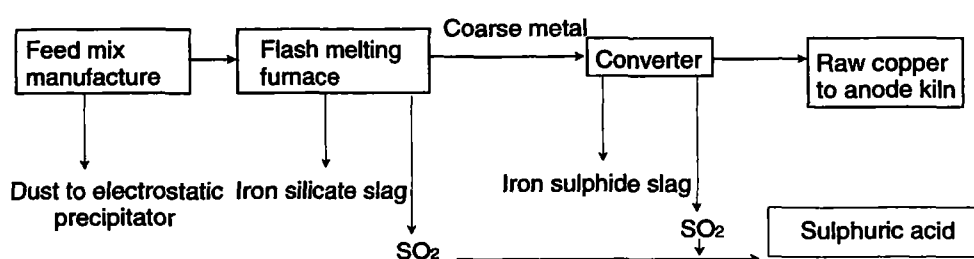


Table 82. Copper manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Anode and flame furnace slag	100601-02	13.32	21111		
1	Acid solution	110106	01.21	33110	*	*
1	Copper chloride solution	11010401	01.24	33510	*	
1	Copper slag	100601-02	13.32	21107		
1	Hydrometallurgical sludges of copper	110201	01.24	33704	*	
1	Copper processing waste	120103-04	06.24	25601		
1	Baths, cont. metallic salts	11010401	01.24	33504	*	
1	Ore concentrating sludge	010201	13.22	21840		
1	Mineral oil - water -emulsions	130505	02.22	34901	*	*
1	Surface treatment sludges	110101-04	01.21	33700	(*)	(*)
1	Drilling, cutting and grinding oil emulsions	120108-09	02.22	34302	*	*
1	Drilling, cutting and grinding oils	120106-07	01.32	34105	*	*
1	Iron and steel processing waste	120101-02	06.11-12	25102		
1	Iron and steel scrap	160205	08.11	25201		
1	Silicate skillet waste	100608	13.42	21201		
1	Nitric acid waste	110106	01.21	33101	*	*
1	Rolling mill practice sludge	120111	01.32	21846	*	*
1	Roller scale	120199	13.32	21130		
4	Laboratory chemicals	16050201-0301	03.14	39700	*	
5	Cleaning towels and wool, cont. hazardous waste	15020101	07.63	34411	*	
10	Metal hydroxide sludge	190201	01.24	337	*	*

275 Metal casting

As its raw material, the foundry industry uses ready-made metal or metal alloy ingots, or scrap metal, which are melted down at the foundry and recast in moulds. Before casting, additives can be added to the

molten metal, if desired. The mould is usually made of sand containing binders. The moulds are generally formed using wooden models.

Table 83. Foundry industry wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Inorganic acids	060101-99	01.21	33110	*	*
1	Furan resin waste	16050300-01	03.13	36608	(*)	
1	Resin hardener	16050300-01	03.13	37330	(*)	
1	Sand blasting waste	120201	13.42	21214		
1	Cupola furnace slag	100903	13.33	21101		
1	Sawdust from mould shop	160208	07.52	18104		
1	Drilling, cutting and grinding oil emulsions	120108-09	02.22	34302	*	*
1	Raw material scrap	160205	06.11-12	25202		
1	Iron and steel processing waste	120101	08.11	25102		
1	Iron and steel scrap	160205	08.11	25202		
1	Melting skillets	100999	13.11	21425		
1	Electric furnace slag	100903	13.32	21110		
1	Brick and mass waste, furnace waste	100206	13.42	21200		
1	Foundry sand, quartz based	100901-02	13.42	21211		
1	Foundry sludge	100999	13.31	21841		
4	Laboratory and chemical waste	16050201-0301	03.14	39700	*	
10	Wastes from sand extraction	190802	13.22	21802		
10	Scrubber sludge	100204	13.31	21826		
10	Dust from exhaust air cleaning	10090400-01	13.31	21634	(*)	
10	Metal dust from foundry furnace	10090400-01	13.33	21130	(*)	

Metal product manufacturing excluding machinery and equipment

Several different kinds of work methods are used in metal product manufacturing. Some of these methods are described under base metal manufacturing.

281 Metal structure manufacturing

Perhaps the most comprehensive array of work methods is used in metal structure manufacturing. The methods depend on the quality of the structure and its purpose. Supporting structures, beams and pillars are made by **casting**. Cast and **rolled** products are treated, according to their eventual purpose, by **forging**, **welding**, **turning on a lathe** and **surface treating**. **Rods and wires** (e.g. reinforcement rods) are subjected, after hot rolling, to **drawing**. In steel plate manufacturing, both **hot rolling** (coarse plates) and **cold rolling** (thin plates) are used. Cold rolled plates

are then generally subjected to **annealing**, after which they are often **hot dip galvanized**.

Casting and rolling

Wastes from these work methods are shown in the tables in sections 271 and 275.

Welding and turning

A feature typical of welding and turning is the production of a variety of metal wastes. These wastes arise during the cutting of the workpiece (sheet cutting), the scarification and cleaning of the welding surfaces, and in the actual welding and turning work (swarf and fragments). The wastes formed during cleaning (grease and rust extraction) are dealt with in section 285. Other welding and turning wastes are shown in table 84.

Table 84. Welding and turning wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Aluminium chips and dust	120103	06.23	25510		
1	Aluminium plate and profile scrap	120103-04	06.23	25616		
1	Non-ferrous metal processing waste	120103-04	06.26	25501		
1	Sand blasting waste	120201	13.33	21130		
1	Grinding agent waste	120299	13.41	21708		
1	Welding slag	120113	06.26	31205		
1	Powder paint waste	080104	03.13	36501		
1	Scarifying waste and grinding dust	120299	13.33	21130		
1	Copper waste	120103-04	06.24	25601		
1	Glue sludges	080405-07	03.13	36810	(*)	(*)
1	Paint wastes, cont. solvents, halogenous	080101	03.13	36503	*	*
1	Paint wastes, cont. solvents, non-halogenous	080102	03.13	36505	*	*
1	Paint sludges	080106-08	03.13	36805	(*)	(*)
1	Paint dust	080109	03.13	36501		
1	Paint residuals	080105	03.13	36501		
1	Brass scrap	120103-04	06.26	25602		
1	Plastic pieces	120105	07.42	37141		
1	Sodium hydroxide	060202	01.22	33301	*	*
1	Sodium hydroxide, cont. sodium cyanate	110101-02	01.24	33525	*	*
1	Pickling acids	110105	01.21	33110	*	*
1	Heavy metallic washing sludge	110103-04	01.24	33902	(*)	(*)
1	Heavy metallic washing sludge, cont., cyanide	110101-02	01.24	33901	*	*

Table 84 (continue)

1	Polyurethane waste	120105	07.42	37130		
1	Polyvinyl chloride waste	120105	07.42	37121		
1	Drilling, cutting and grinding oils	120106-07	01.32	34105	*	*
1	Iron and steel processing waste	120101-02	06.11-12	25102		
1	Zinc scrap, coated	120103-04	06.26	25624		
1	Zinc dust	100504	13.32	21125		
1	Steel abrasive waste	120201	13.42	21214		
1	Tin bronze, lead tin bronze, red metal scrap	120103-04	06.26	25603		
1	Roll scale	120199	13.33	21130		
4	Isocyanate waste	16050301	03.14	37315	*	
5	Cleaning towels and wool	150201	07.63	17118		
5	Cleaning towels and wool, cont. hazardous waste	15020101	07.63	34411	*	
10	Wastes from sand removal	190802	13.22	21811		
10	Metal hydroxide sludges	190201	01.24	21225	*	*
10	Surface emulsions from oil extractors	130505	02.22	34801	*	*
10	Bottom sludges from oil extractors	130502	02.22	34801	*	*

Forging and pressing

The wastes arising during forging are dealt with in section 284.

Hot dip galvanising is dealt with under coatings in section 285.

282 Metal tank, central heating boiler, radiator and water heater manufacturing

283 Steam boiler manufacturing with the exception of central heating equipment

The typical manufacturing method for these products (both section 282 and section 283) is **welding**, the wastes for which are listed in the previous chapter (Table 84). In the manufacturing of tanks, boilers and water heaters, steel plate is used which is formed and

welded. Waste forms in the pretreatment and cleaning of welding surfaces (grease and rust extraction). The products are **surface coated** according to their purpose (plastic, paint, metal coating, etc.). Surface treatment is dealt with in section 285.

284 Forging, pressing and die cutting; powder metallurgy

White hot metal which is hammered or pressed is used for forging. In many cases, moulds are used as an aid to forging. The wastes arising in forging come from heating (ash, slag) and mould making. The normal oil,

lubricant and solvent wastes are also formed. Wastes arising during die cutting (punching) consist of metal fragments, shavings and dust, in addition to solvents and acids used for cleaning the metal.

285 Metal working and coating

By applying surface treatments an attempt is made to improve a metal product's appearance and characteristics. Surface treatment can also act as a pretreatment for paint application. Coatings used

include metals and their oxides or phosphates, as well as plastics and paint.

Before coating, the metal is cleaned of grease, wax and oil with caustic soda or organic solvent, and rust extraction is carried out which consists of pickling in concentrated acid (HCl, H₂SO₄, H₂PO₄). After this, the actual surface treatment is applied.

Metal coating

Metal coating can be achieved by electrolysis, by immersion in molten metal, by a chemical redox reaction, or by phosphating. For coating aluminium a special electrolytic process, called anodising, is used.

In this method, the surface layer of the metal is changed into a coating. By means of secondary treatments, the product's corrosion resistance is further improved and the metal is given the desired colour. Colour can be achieved by chroming (passivation) or painting.

Paints used for coating purposes are zinc, chrome, nickel, copper, aluminium oxide, and zinc and iron phosphate. For coating zinc, so-called hot dip galvanising is commonly used. Wastes from hot dip galvanising are shown in Table 85.

Table 85. Wastes arising in hot dip galvanising.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Alkalis, alkali solutions	110107	01.22	33310	*	*
1	Acids, acid solutions	110105-06	01.21	33110	*	*
1	Sand blasting waste	120201	13.42	21214		
1	Grinding agent waste	120299	13.41	21708		
1	Grinding dust, ferrous	120299	13.33	21130		
1	Hard zinc	110401	6.26	25621		
1	Washing sludge, heavy metallic	110103-04	01.24	33905	*	(*)
1	Washing sludges, alkalic	110107	01.24	33806	*	*
1	Flame cutting slag	120199	13.32	21130		
1	Iron zinc	110401	13.32	21112		
1	Zinc waste and dust	120103-04	6.26	25511		
1	Zinc sludges	11010401	01.24	33705	*	
1	Zinc ash	100504	13.32	21125		
5	Cleaning towels, cont. hazardous waste	15020101	7.63	17119	*	
10	Heavy metal hydroxide sludge	1910201	01.24	33700	*	*
10	Zinc hydroxide residuals	190201	01.24	33705	*	*
10	Surface emulsions from oil extractors	130505	02.22	34801	*	*
10	Bottom sludges from oil extractors	130502	02.22	34801	*	*

Metal coating with plastic

For plastic coating metals, the plastic, e.g. polyethylene, is spread as a film on to the heated metal surface, which prior to coating has been dried and cleaned. After coating, the metal is cooled with water and e.g. the ends of pipes are brushed and the edges of

the coating are compacted. With a multi-layered thin film a non-porous coating on the metal is obtained. Polyethylene coated steel piping is used for e.g. oil and gas pipelines, as well as for water and sewer systems.

Table 86. Wastes arising in other metal surface treatments.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Aluminium plate and profile scrap	120103-04	06.23	25616		
1	Alumina	100305	13.41	31205		
1	Ammonium and iron chloride	110104	01.24	31415		
1	Alkalis, alkali compounds	110107	01.22	33310	*	*
1	Alkaline washing sludges	110107	01.24	33806	*	*
1	Phosphating sludges	110108	01.24	33105	*	*
1	Acids, acid compounds	110105-06	01.21	33110	*	*
1	Acid pickling solutions	110105	01.21	33104	*	*
1	Sand blasting waste	120201	13.42	21214		
1	Grinding dust, ferrous	120299	13.33	21130		
1	Powder paint	080104	03.13	36501		
1	Hardening salt waste	110301	01.24	31701	*	*
1	Hard zinc	110401	06.26	25621		
1	Chrome(VI) sludges	110103	01.24	33702	*	*
1	Copper scrap	120103-04	06.24	25601		
1	Paint and lacquer waste	080101-04	03.13	36500	(*)	(*)
1	Paint residuals	080105	03.13	36504		
1	Brass scrap	120103-04	06.26	25602		
1	Mineral oils	130201-03	01.32	34103	*	*
1	Sodium and calcium carbonate	060301	01.24	31231		
1	Sodium hydroxide	110107	01.22	33301	*	*
1	Heavy metallic washing sludge	110103-04	01.24	33906	(*)	(*)
1	Flame cutting slag	120199	13.32	21130		
1	Drilling, cutting and grinding oil emulsions	120108-09	02.22	34302	*	*
1	Iron and steel processing waste	120101-02	06.11-12	25102		
1	Iron and steel scrap	160205	08.11	25202		
1	Zinc sludges	11010401	01.24	33705	*	*
1	Filtering paper	15020100-01	01.24	33707	(*)	
1	Cyanide sludges	110101-02	01.24	33701	*	*
1	Barrel bottom waste, cont. mineral oil	160706	02.12	34405	*	*
5	Cleaning towels, cont. hazardous waste	15020101	07.63	17119	*	
10	Heavy metal hydroxide sludge	190201	01.24	33700	*	*
10	Zinc hydroxide residual	190201	01.24	33705	*	*
10	Surface emulsions from oil extractors	130505	02.22	34801	*	*
10	Bottom sludges from oil extractors	130502	02.22	34801	*	*

286 Eating utensil, scissors, and other cutting implement manufacturing

Eating utensils are made by **casting** from stainless steel. In scissors and eating utensil manufacturing, the ready-machined implement is treated by **tempering (annealing)**, making the products extremely hard and strong. In tempering, a steel implement is heated to a

high temperature and then rapidly cooled by immersion in e.g. oil. After tempering, the implement is reheated to a lower temperature and then permitted to cool slowly. The most important wastes arising from manufacturing are shown in Table 87.

Table 87. Eating utensil, scissors, and other cutting implement manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Aluminium chips and dust	120103	06.23	25510		
1	Aluminium plate and profile scrap	120103-04	06.23	25616		
1	Non-ferrous metals processing waste	120103-04	06.26	25501		
1	Alkaline washing sludges	110107	01.24	33806	*	*
1	Bating baths	11010401	01.24	33517	*	
1	Acids, acid compounds	110105-06	01.21	33110	*	*
1	Sand blasting waste	120201	13.42	21214		
1	Grinding dust	120299	13.32-33	21130		
1	Powder paint waste	080104	03.13	36501		
1	Fibre and knitted goods waste	160208	07.63	17111		
1	Hardening salt waste, cont. cyanide	110301	01.24	31701	*	*
1	Polishing blankets and disks	150201	070.63	17122		
1	Polishing wax	120112	01.32	34203	*	*
1	Chrome(VI) sludges and baths	110103	01.24	33702	*	*
1	Fibre and textile filters	150201	07.63	17120		
1	Rubber waste	160208	07.32	37501		
1	Copper scrap	120103-04	06.24	25601		
1	Cyanide baths	110101-02	01.24	33502	*	*
1	Embossing electrolyte	110106	01.21	33110	*	*
1	Brass slag	100802	13.32	21111		
1	Brass scrap	120103-04	06.26	25602		
1	Plastic pieces	120105	07.42	37113		
1	Non-chlorinated transformer and heat transmission oils	130303	01.32	34106	*	*
1	Leather grinding waste and dust	160208	07.64	17508		
1	Leather and fur waste, barked	160208	07.64	17510		
1	Nickel slag	100802	13.32	21108		
1	Nickel sludges	11010401	01.24	33707	*	
1	Drilling, cutting and grinding oil emulsions	120108-09	02.22	34302	*	*
1	Drilling, cutting and grinding oils	120106-07	01.32	34105	*	*
1	Iron and steel processing waste	120101-02	06.11-12	25102		
1	Iron and steel scrap	160205	08.11	25202		
1	Zinc slag	100502	13.32	21112	*	*
1	Zinc sludges	11010401	01.24	33705	*	
1	Zinc scrub, coated	120103-04	06.26	25624		
1	Filtering paper	15020100-01	01.24	33707	(*)	
1	Cyanide sludges	110101-02	01.24	33701	*	*
1	Synthetic coolants and lubricants	120110	01.32	34301	*	*
1	Steel processing waste	120101-02	06.11-12	25600		
1	Nickel silver	120103-04	06.21	25633		
5	Lubricating grease waste	120112	01.32	34202	*	*
5	Paint residual	080105	03.13	36501		
5	Cleaning towels and wool	150201	07.63	17118		
10	Cleaning towels and wool, cont. hazardous waste	15020101	07.63	17118	*	
10	Coolant solutions	130304	01.24	33527	*	*
10	Metal grinding sludges	120202	01.24	25805		
10	Other sludges from metal sedimentation	190201	01.24	31207	*	*
10	Heavy metal hydroxide sludge	190201	01.24	33700	*	*
10	Surface emulsions from oil extractors	130505	02.22	34801	*	*
10	Bottom sludges from oil extractors	13502	02.22	34801	*	*

287 Other metal product manufacturing

Metal packaging manufacturing

Tin containers, e.g. tin cans, are made from tin-coated steel sheet. The products are also surface treated according to their purpose (varnishing, plastic-coating, etc.). Many kinds of metal containers, like aerosols and

tubes, are made of aluminium. The most important wastes arising from metal container manufacturing are shown in Table 88.

Table 88. Metal container manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Aluminium waste	120103-04	06.23	25600		
1	Copper scrap	120103-04	06.24	25601		
1	Lye waste	060202	01.22	33301	*	*
1	Tin plate scrap	120101-02	06.32	25600		
1	Paint and lacquer waste, hardened	080105	03.13	36510		
1	Paints and lacquers, cont. solvents	080101-02	03.13	36500	*	*
1	Water based paints and lacquers	080103	03.13	36507		
1	Plastic crush	120105	07.42	37100		
1	Halogenated organic solvents	140102	01.11	35100	*	*
1	Non-halogenated organic solvents	140103	01.12	35200	*	*
1	Drilling, cutting and grinding oil emulsions	120108-09	02.22	34302	*	*
1	Drilling, cutting and grinding oils	120106-07	01.32	34105	*	*
1	Iron and steel scrap (apparatus scrap)	160205	08.11	25202		
1	Rounding chips from non-ferrous metals	120103	06.26	25501		
1	Rounding chips from ferrous metals	120101	06.11	25600		
1	Wax waste	120112	01.32	34203	*	*

Nail, screw and bolt manufacturing

Nails are made from e.g. rod wire (rod iron), steel wire, and zinc wire. The work stages consist of rod wire scale removal, wire drawing, bending and other forming. The finished products can be surface treated by e.g. hot dip or electrolytic galvanising. Nails can

also be painted. Solvent, oil and machining wastes are typical metal industry wastes. In the manufacturing of screws and threaded bolts, in contrast to nail making, cutting waste is formed. The most important wastes are shown in Table 89.

Table 89. Nail, screw and bolt manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Aluminium plate and profile scrap	120103-04	06.23	25616		
1	Non-ferrous metals processing waste	120103-04	06.26	25501		
1	Acids, acid compounds	110105-06	01.21	33110	*	*
1	Iron scale	120199	06.11-12	25102		
1	Sand blasting waste	120201	13.42	21214		
1	Grinding sludge	120202	02.22	24809		
1	Powder paint waste	080104	03.13	36501		
1	Joint liquid	110106	01.21	33110		
1	Hard zinc	110401	06.26	25621		
1	Chrome(VI) sludges	110103	01.24	33702	*	*
1	Copper filing and rounding waste	120103	06.24	25601		
1	Lacquer waste, cont. solvents, non-halogen	080102	03.13	36511	*	*
1	Paint and lacquer waste	080101-04	03.13	36500	(*)	(*)
1	Paint dust	080109	03.13	36501		
1	Paint residuals	080105	03.13	36501		
1	Brass scrap	120103-04	06.26	25602		
1	Grinding sludges of metal	120202	01.24	25805		
1	Plastic dispersions	16050300-01	07.42	37404	(*)	
1	Plastic pieces	120105	07.42	37113		
1	Plastic crush	120105	07.42	37321		
1	Sodium hydroxide	060202	01.22	33301	*	*
1	Nickel sludges	11010401	01.24	33707	*	
1	Paraffine wax	120112	01.32	13202	*	*
1	Washing lye	110107	01.22	33302	*	*
1	Drilling, cutting and grinding oil emulsions	120108-09	02.22	34302	*	*
1	Drilling, cutting and grinding oils	120106-07	01.32	34105	*	*
1	Alkaline grease extraction baths	110107	01.24	33526	*	*
1	Iron and steel processing waste	120101-02	06.11-12	25102		
1	Iron and steel scrap	160205	08.11	25202		
1	Soap powder waste	160503	03.14	39400		
1	Zinc, ammonium and iron chloride	11010400-01	01.244	31415	(*)	
1	Zinc waste and dust	120103-04	06.26	25511		
1	Zinc slag	100502	13.32	21112	*	*
1	Zinc sludges	11010401	01.24	33705	*	
1	Zinc scrap, coated	120103-04	06.26	25624		
1	Zinc ash	100504	13.32	21125		
1	Steel processing waste	120101-02	06.11-12	25600		
1	Tin bronze, lead tin bronze, red metal scrap	120103-04	06.26	25603		
1	Rod wire scale	120199	13.33	21130		
5	Cleaning towels and wool	150201	07.63	17118		
5	Cleaning towels and wool, cont. hazardous waste	15020101	07.63	17118	*	
10	Wastewater sludge	190804	01.24	33806		
10	Heavy metal hydroxide sludge	190201	01.24	33700	*	*
10	Zinc hydroxide residuals	190201	01.24	33705	*	*

Machinery and equipment manufacturing

This chapter covers the following sectors:

- 291 Power machinery manufacturing
- 292 Manufacturing of other machinery intended for general use
- 293 Agricultural and forestry machinery manufacturing
- 294 Machine tool manufacturing
- 295 Other special machinery manufacturing (e.g. paper machines)
- 296 Weapons and ammunition manufacturing (see explosives manufacturing)

- 297 Other unclassified household appliance manufacturing

In the manufacturing of machinery and equipment work methods typical to the metal industry are employed: casting, turning on a lathe, cutting, grinding, pickling, coating, etc. Numerous kinds of hazardous wastes and metal wastes arise during manufacturing. The most important wastes arising from machinery and equipment manufacturing are shown in Tables 90 and 91.

Table 90. Machinery and equipment manufacturing metal wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Aluminium slag	101003	13.32	21114		
1	Aluminium chips and dust	120103	06.23	25510		
1	Aluminium plate and profile scrap	120103-04	06.23	25616		
1	Aluminium cast	160205	06.23	25618		
1	Non-ferrous metals processing waste	120103-04	06.26	25501		
1	Electronics scrap	160202	08.22	25636		
1	Household equipment scrap	160202	08.53	25616		
1	Copper scrap	120103-04	06.24	25601		
1	Lead scrap	120103-04	06.25	25513		
1	Brass scrap	120103-04	06.26	25519		
1	Brass slag	100802	13.32	21111		
1	Grinding sludges of metals	120202	01.24	25805		
1	Transformers, condensers	160205	08.11	25207		
1	Bronze slag	100802	13.32	21111		
1	Iron and steel processing waste	120101-02	06.11-12	25600		
1	Iron and steel scrap	160205	08.11	25202		
1	Zinc processing waste	120103-04	06.26	25620		
1	Tin slag	100802	13.32	21113		
1	Tin bronze, lead tin bronze, red metal scrap	120103-04	06.26	25603		

Table 91. Other wastes from machinery and equipment manufacturing.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Ammonia	060203	01.22	33304	*	*
1	Asbestos mass	160204/160206	13.12	21514	*	
1	Enamel sludge	080202	13.41	21831		
1	Alkalis, alkali compounds	110107	01.22	33310	*	*
1	Alkaline washing sludges	110107	01.24	33806	*	*
1	Phenol formaldehyde resin waste	16050300-01	03.13	36605	(*)	
1	Phosphating sludge	110108	01.24	21850	*	*
1	Acids, acid compounds	110105-06	01.21	33110	*	*
1	Heavy metallic acid solutions	110105-06	01.21	33111	*	*
1	Sand blasting waste	120201	13.42	21214		
1	Grinding agent waste	120299	13.41	21708		
1	Grinding sludge	120202	02.22	34809		
1	Grinding dust, ferrous	120299	13.33	21130		
1	Welding slag	120113	13.33	21103		
1	Honing oil	120106-107	02.22	34303	*	*
1	Hydraulic turbine oils	130102-03	01.32	34104	*	*
1	Isocyanate waste	16050301	03.14	37315	*	
1	Isocyanate sludges	08040701	01.14	37406	*	
1	Powder paint waste	080104	03.13	36619		
1	Soldering pewter waste	120199	06.26	25505		
1	Foundry sand	100901-02	13.42	21212		
		101001-02				
1	Two-component paint and lacquer waste	080102-03	03.13	36522	(*)	(*)
1	Limestone sludge	100204	13.41	21819		
1	Fabric and knitted goods waste	160208	07.63	17111		
1	Hardening salt waste, cont. cyanide	110301	01.24	31708	*	*
1	Bottom ash from light fuel oil	100101	13.32	21313		
1	Chrome(VI) sludges	110103	01.24	33702	*	*
1	Rubber waste	160208	07.32	37501		
1	Copper sludges	11010401	01.24	33704	*	
1	Cyanide baths	110101-02	01.24	33502	*	*
1	Glass fibre waste	160208	07.42	21410		
1	Glass blowing waste	120201	13.42	21214		
1	Glue waste, cont. solvents, halogenous	080401	03.13	36616	*	*
1	Glue sludges	080405-07	03.13	36810	(*)	(*)
1	Chrome(VI) solutions	110103	01.24	33507	*	*
1	Metallic salt solutions	11010401	01.24	22509	*	
1	Heavy metallic solutions	11010401	01.24	33508	*	
1	Lead slag	100402	13.32	21111	*	*
1	Lead dust	100405	13.32	21127	*	*
1	Paint and lacquer waste	080101-04	03.13	36500	(*)	(*)
1	Paint sludges	080106-08	03.13	36805	(*)	(*)
1	Paint dust	080109	03.13	36501		
1	Paint residuals	080105	03.13	36501		
1	Mineral based cleaning soil and mass	15020100-01	13.31	21621	(*)	
1	Plastic pieces	120105	07.42	37125		
1	Black finishing liquid, cont. sodium nitrate and nitrite	060308	01.24	31311		
1	Sodium and calcium carbonate	060301	01.24	31231		
1	Printing ink waste	080301-04	03.13	36300	(*)	(*)
1	Washing lye (other than from surface treatment)	060202	01.22	33302	*	*

Table 91 (continue)

1	Flame cutting slag	120199	13.33	21103		
1	Drilling, cutting and grinding oil emulsions	120108-09	02.22	34302	*	*
1	Drilling, cutting and grinding oils	120106-07	01.32	34105	*	*
1	Alkaline grease extraction baths	110107	01.24	33526	*	*
1	Turnip rape oil based lubricating oils	130202	10.22	13104	*	*
1	Explosives and ammunition waste	160401-03	03.21	39502		
1	Filter cloths	150201	07.63	17120		
1	Protection lead	160205	06.25	25513		
1	Cyanide sludges	110101-02	01.24	33701	*	*
1	Synthetic coolants and lubricants	120110	02.22	34301	*	*
1	Pesticide waste	16050301	03.11	39100	*	
1	Wax chips and waste	120112	01.32	34203	*	*
1	Foundry sand, quartz based	100901-02 101001-02	13.42	21211		
1	Foundry sludge	100999/101099	13.31	21841		
1	Bleaching earth	150201	13.41	21605		
1	Bleaching earth, cont. hazardous waste	15020101	02.14	21609	*	
4	Ammonia	060203	01.22	33304	*	*
4	Mercury chloride	060404	01.24	31416	*	*
4	Laboratory and chemical waste	16050201-0301	03.14	39700	*	
5	Asbestos dust	16020601	13.12	21510	*	
5	Detergent and washing agent waste	160502-03	03.14	39400	(*)	
5	Organic sulphate waste	16050300-01	03.14	39401	*	
5	Bottom ash from wood burning	100101	13.32	21315		
5	Cleaning towels and wool	150201	07.63	17118		
5	Cleaning towels and wool, cont. hazardous waste	15020101	07.63	17119	*	
10	Ingredient extracted by sand filter	190802	13.21	21601		
10	Calcium phosphate residual	190201	01.24	33526	*	*
10	Soil and soakage mass waste, oily	15020101	02.14	34408	*	
10	Dust from exhaust air cleaning	100203	13.31	21634		
10	Fly-ash and dust from heavy fuel oil	100104	13.32	21302	*	*
10	Heavy metal hydroxide sludge	190201	01.24	33700	*	*
10	Filters, cont. hazardous waste	15020101	07.63	17120	*	
10	Cyanide sludges	110101-02	01.24	33701	*	*
10	Surface emulsions from oil extractions	130505	02.22	34801	*	*
10	Bottom sludges from oil extractions	130502	02.22	34801	*	*
16	Washing sludges from oil tanks	160706	02.22	34802	*	*

Office machine and computer manufacturing

Office machine and computer manufacturing largely consists of assembling and joining (usually by soldering) ready-made components, e.g. circuit cards and other components. The assembled components are washed with solvent and the parts are normally surface treated with varnish. Powder paints are generally used

for painting the casings. The most important wastes arising from computer and office machine manufacturing are shown in Table 92. The general features of the manufacturing process for computer and office machines are shown in Figure 19.

Figure 19. Office machine and computer (and other electronics) assembly.

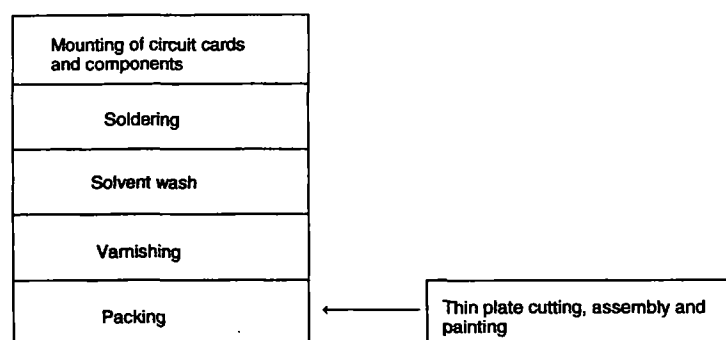


Table 92. Office machine and computer manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Aluminium plate and profile scrap	120103-04	06.23	25616		
1	Acetone	140303	01.12	35240	*	*
1	Electronics scrap	160202	08.22	25636		
1	Epoxy lacquer waste, hardened	080105	03.13	36511		
1	Isopropanol	140303	01.12	35223	*	*
1	Powder paint waste	080104	03.13	36501		
1	Soldering pewter waste	120199	06.26	25505		
1	Xylene	140303	01.12	35212	*	*
1	Copper scrap	120103-04	06.24	25601		
1	Glue waste, hardened	080404	03.13	36617		
1	Paint residuals	080105	03.13	36502		
1	Sodium hydroxide	060202	01.22	33301	*	*
1	Polyurethane waste	120101	07.42	37130		
1	Iron and steel processing waste	120101-02	06.11-12	25600		
1	Iron and steel scrap	160205	08.11	25201		
1	Sawdust, cont. isocyanate	15020101	03.14	37315	*	
1	Cellular polystyrene waste	120105	07.42	37111		
1	Tin waste	100802	06.26	25505		
1	Toluene	140303	01.12	35211	*	*
1	Trichloroethane	140302	01.11	35105	*	*
5	Cleaning towels and wool	150201	07.63	17118		
5	Cleaning towels and wool, cont. hazardous waste	15020101	07.63	17119	*	
16	Drilling, cutting and grinding oils	120106-07	01.32	34105	*	*

Other electrical appliance and equipment manufacturing

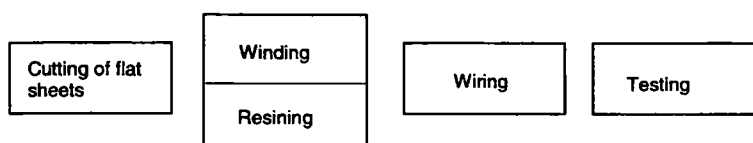
311 Electric motor, generator and transformer manufacturing

The basic components of electric motors and generators are iron or steel chassis constructions and various components, such as coils, transformers, resistors, condensers, conductors, circuit cards, and so on, connected with electronics. Electric motor and generator manufacturing consists to a large extent of assembling such components. In conjunction with manufacturing, iron and steel components, as well as other metal components, can be machined, e.g. on a lathe. Condenser, circuit card and other electronic component manufacturing are dealt with in section 321.

Transformer manufacturing

The basic constituent of a transformer is a coil made of copper wire. In coil manufacturing, copper wire is wound round a metal or plastic core. When a plastic core is used, the core is reinforced. The finished coil is varnished (resin). A transformer has two coils in the same core. The principle of coil manufacturing is shown in Figure 20.

Figure 20. Principle of transformer manufacturing



The most important wastes arising during electric motor, generator and transformer manufacturing are shown in tables 93 and 94.

Table 93. Metal wastes from electric motor, generator and transformer manufacturing.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Aluminium chips and dust	120103	06.23	25510		
1	Aluminium scrap	120103-04	06.23	25615		
1	Electronics scrap	160202	08.22	25636		
1	Welding slag	120113	13.32	21114		
1	Soldering pewter	120199	06.26	25505		
1	Cables	160208	06.24	25601		
1	Copper scrap	120103-04	06.24	25601		
1	Brass scrap	120103-04	06.26	25602		
1	Transformers and condensers	160205	08.11	25207		
1	Iron and steel processing waste	120101-02	06.11-12	25102		
1	Zinc sludges	11010401	01.24	33705	*	
1	Electric motors, throw-out products	160205	08.12	25619		
1	Electric motors, used	160205	08.11	25210		
1	Tin bronze, lead tin bronze, red metal scrap	120103-04	06.26	25603		
1	Nickel silver	120103-04	06.21	25633		
1	Cast iron scrap	160205	08.11	25206		
10	Heavy metal hydroxide sludge	190201	01.24	33702	*	*

Table 94. Other wastes from electric motor, generator and transformer manufacturing.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Alkyd resin waste, impregnation lacquer	080101-03	03.13	36609	(*)	(*)
1	Acetone	140303	01.12	35240	*	*
1	Flux	140303	01.12	33104	*	*
1	Phosphating sludge	110108	01.24	21850	*	*
1	Isopropanol	140303	01.12	35223	*	*
1	Chlorotene	140302	01.11	35102	*	*
1	Xylenes	140303	01.12	352012	*	*
1	Baths, cont. sulphides	11010401	01.24	33505	*	
1	Glass and rock wool waste	160208	07.13	21411		
1	Paint and lacquer waters	08011000-01	03.13	36905	(*)	
1	Water-dilutable paint waste	080103	03.13	36507		
1	Paint dust	080109	03.13	36501		
1	Paint residuals	080105	03.13	36501		
1	Paints and lacquers, cont. solvents, halogenous	080101	03.13	36503	*	*
1	Paints and lacquers, cont. solvents, non-halogenous	080102	03.13	36511	*	*
1	Plastic pieces	120105	07.42	37131		
1	Polyester resin waste	16050300-01	03.13	36603	(*)	
1	Drilling, cutting and grinding oil emulsions	120108-09	02.22	34302	*	*
1	Drilling, cutting and grinding oils	120106-07	01.32	34105	*	*
1	Thinner	140303	01.12	35208	*	*
1	Trichloroethane	140302	01.11	35105	*	*
4	Laboratory chemicals	16050201-0301	03.14	39701	*	
5	Inorganic alkalis, alkaline washing liquids	060201-99	01.22	33300	*	*
5	Cleaning towels and wool	150201	07.63	17118		
5	Cleaning towels and wool, cont. hazardous waste	15020101	07.63	17119	*	

313 Insulated wire and cable manufacturing

The most commonly used conductor in cables is copper or a copper and aluminium alloy, but other metals are also used. Cables are made (by winding) from metal wire on to which a rubber or plastic

insulating material is sprayed or extruded. The most important wastes arising from wire and cable manufacturing are shown in Table 95.

Table 95. Insulated wire and cable manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Aluminium scrap	120103-04	06.23	25615		
1	Aluminium cast	160205	06.23	25618		
1	Acetone	140303	01.12	35240	*	*
1	Acids, acid compounds	110105-06	01.21	33110	*	*
1	Cable vaseline	130301-05	01.32	34203	*	*
1	Copper scrap	120103-04	06.24	25601		
1	Lead stabilizer	16050201	03.14	37300	*	
1	Water-dilutable paint waste	080103	03.13	36507		
1	Paint residuals	080105	03.13	25510		
1	Paints and lacquer, cont. solvents, halogenous	080101	03.13	36503	*	*
1	Paints and lacquer, cont. solvents, non-halogenous	080102	03.13	36511	*	*
1	Brass scrap	120103-04	06.26	25602		
1	Grinding sludges of metal	120202	01.24	25805		
1	Mineral oil based greases and waxes	130305	01.32	34200	*	*
1	Plastic waste	120105	07.42	37141		
1	Drilling, cutting and grinding oil emulsions	120108-09	02.22	34302	*	*
1	Drilling, cutting and grinding oils	120106-07	01.32	34105	*	*
1	PVC-softeners	16050300-01	03.14	37320	(*)	
1	Cleaning towels and wool	150201	07.63	17118		
1	Iron and steel scrap	160205	08.11	25201		
1	Cyclohexane	140303	01.12	35209	*	*
1	Steel wire	120102	06.11-12	25201		
1	Tin sludge	11010401	01.24	25803	*	
1	Toluene	140303	01.12	35211	*	*
1	Optical cable, throw-out product (fibreglass)	160301	07.42	21410		
1	Drawing emulsion	120108-09	02.22	34302	*	*
1	Colouring waste	16050300-01	03.13	36200	(*)	
1	Oil absorbing rags, oily	160601	02.22	17119	*	
4	Laboratory chemicals	16050201-0301	03.14	39701	*	

314 Dry and wet cell battery manufacturing

The stages in the manufacturing of lead acid batteries are shown in Figure 21. The most important wastes arising from manufacturing are shown in Table 96.

Figure 21. Lead acid battery manufacturing.

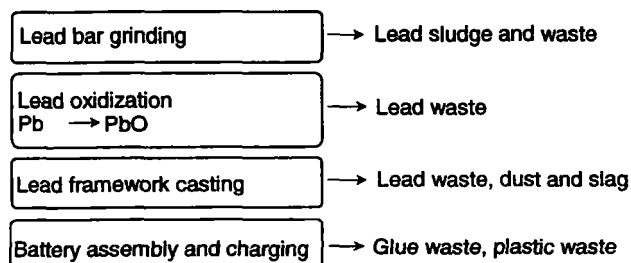


Table 96. Lead acid battery manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Battery casings and lids	160205	08.53	37100		
1	Anodic lead	110203	06.25	25625		
1	Hardened glues and lining compound	080404	03.13	36610		
1	Hose filters	150201	13.31	21628		
1	Lead sludge	11010401	01.22	25804	*	
1	Water-dilutable paint waste	080103	03.13	36507		
1	Paints and lacquers, cont. solvents, halogenous	080101	03.13	36503	*	*
1	Washing lye	060202	01.22	33302	*	*

Radio, television and data communications equipment manufacturing

321 Electronic circuit and other electronic component manufacturing

Electronic circuits or circuit cards are made by surface mounting or by soldering components to a card. In electronic equipment manufacturing these circuit cards and other components are mounted and soldered together.

Circuit card manufacturing

The circuit card manufacturing process is illustrated in Figure 22. The most important wastes arising during manufacturing are shown in Table 97.

Figure 22. Circuit card manufacturing.

The most commonly used base material is copper-plated epoxy fibreglass laminate and other copper-plated laminated boards. The soldering fluid coating is printed on to 1-sided cards by the silk screen printing technique.

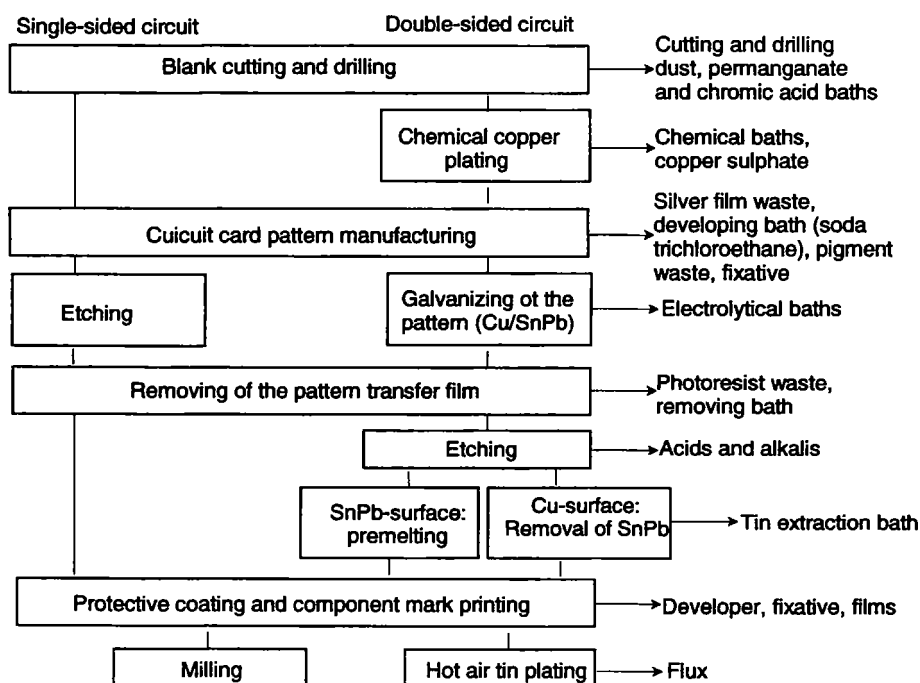


Table 97. Circuit card manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Acrylic plastic waste	160503	07.42	37125		
1	Alkaline silvering/gold plating baths	110101-02	01.24	33522	*	*
1	Aluminium chips and dust	120103	06.23	25510		
1	Aluminium plate waste	160205	06.23	25616		
1	Acetone	140303	01.12	35240	*	*
1	Electronics scrap	160202	08.22	25636		
1	Epoxy resin	16050300-01	03.13	36610	(*)	
1	Epoxy glassfibre waste	160208	07.42	21410		
1	Ethanol	140303	01.12	35221	*	*
1	Flux	140303	01.12	35223	*	*
1	Silver film waste	090107	03.14	37149		
1	Fixatives	090104	01.21	33547	*	*
1	Fat extraction baths	140301-03	01.11/01.12	33526	*	*
1	Sifter washing solvents	140302-03	01.11/01.12	35208	*	*
1	Silk washing solvents	140302-03	01.11/01.12	35212	*	*
1	Tin removal bath	11010401	01.24	25803	*	
1	Pigment waste (inorganic)	16050200-01	03.13	36300	(*)	
1	Pigment waste (organic)	16050300-01	03.13	36300	(*)	
1	CHEMICAL COPPERING WASTE					
1	Acetone (fat extraction)	140303	01.12	35240	*	*
1	Alkalis, alkali compounds (neutralizing baths)	110107	01.22	33310	*	*
1	Acids	110105-06	01.21	33110	*	*
1	Acid coppering solution	11010401	01.24	33516	*	
1	Chlorinated hydrocarbon	140302	01.11	35100	*	*
1	Chromic acid	110106	01.21	33106	*	*
1	Xylene (fat extraction)	140303	01.12	35212	*	*
1	Copper sulphate (coppering bath)	11040401	01.24	31508	*	
1	Nickel catalysts	06120200-01	03.14	39802	(*)	
1	Palladium bath	11010400-01	01.24	39806	(*)	
1	Pernanganate bath	11010400-01	01.24	31200	(*)	
1	Fat extraction solvents	140101-05	01.24	33526	*	*
1	Hydrogen peroxide	110106	01.21	31101	*	*
1	COPPER SURFACE OXIDATION WASTE					
1	Potassium hydroxide	110107	01.22	33303	*	*
1	Sodium hydroxide	110107	01.22	33302	*	*
1	Sodium chlorite	110107	01.22	33310	*	*
1	DEVELOPING BATHS					
1	Potassium, sodium and calcium carbonate	090101	01.24	31200	*	*
1	Trichloroethane	090103	01.11	35105	*	*
1	GALVANIZING WASTE					
1	Isopropanol (fat extraction)	140303	01.12	35223	*	*
1	Gold plating waste	11010401	01.24	33522	*	
1	Sodium sulphate	110107	01.24	31501	*	*
1	Sulphuric acid baths	110106	01.21	33102	*	*
1	Cyanide waters	110101-02	01.23	33901	*	*
1	Tin-lead waste	11010401	06.26	25513	*	
1	PHOTORESIST WASTE					
1	Acryl monomer waste (photoresist waste)	16050300-01	03.13	37309	(*)	(*)
1	Acetone	140303	01.12	35240	*	*
1	Developing waste from photoresist	16050300-01	01.23	33540	(*)	

Table 97 (continue)

1	Xylene	140303	01.12	35212	*	*
1	Cellosolve	140303	01.12	35208	*	*
1	Cellosolve acetate	140303	01.12	35249	*	*
1	Toluene	140303	01.12	35211	*	*
ETCHING BATHS						
1	Ammonium copper chloride (etching waste)	110107	01.24	31413	*	*
1	Hydrofluoric acid waste	110106	01.21	33110	*	*
1	Phosphoric acid	110106	01.21	33105	*	*
1	Metal hydroxide sludge	190201	01.24	33702	*	*
1	Sulphuric acid	110106	01.21	33102	*	*
1	Hydrochloric acid (etching)	110106	01.21	33104	*	*
1	Nitric acid	110106	01.21	33101	*	*

Component board manufacturing

In component board manufacturing, electronic components are assembled and soldered on to a circuit board. Before soldering, the circuit boards are treated with flux, which is generally a resin dissolved in isopropanol. Fluxing is followed by a solvent wash

and varnishing. The manufacturing of various components from circuit cards follows the same principles that are shown in Figure 19 (office machine and computer manufacturing).

Table 98. Component board manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Acetone	140303	01.12	35240	*	*
1	Flux	140303	01.12	35223	*	*
1	Isopropanol	140303	01.12	35223	*	*
1	Soldering pewter	120199	13.32	21113		
1	Two-component paint and lacquer waste	080102-03	03.13	36522	(*)	(*)
1	Xylene	140303	01.12	35212	*	*
1	Copper scrap	120103-04	06.24	25601		
1	Lacquer waste, cont. solvents, non-halogenous	080102	03.13	36511	*	*
1	Glue waste	080401-04	03.13	36600	(*)	(*)

Microcircuit manufacturing

The industrial manufacturing of microcircuits is called the semi-conductor industry. A microcircuit, or so-called integrated circuit, is made from a semi-conductor material which in Finland is generally silicon. The main steps in the microcircuit

manufacturing process are shown in Figure 23. The most important wastes arising during the process are shown in Table 99. The wastes arising from the production of the deionized water needed for microcircuit production are shown in Table 100.

Figure 23. Microcircuit manufacturing process.

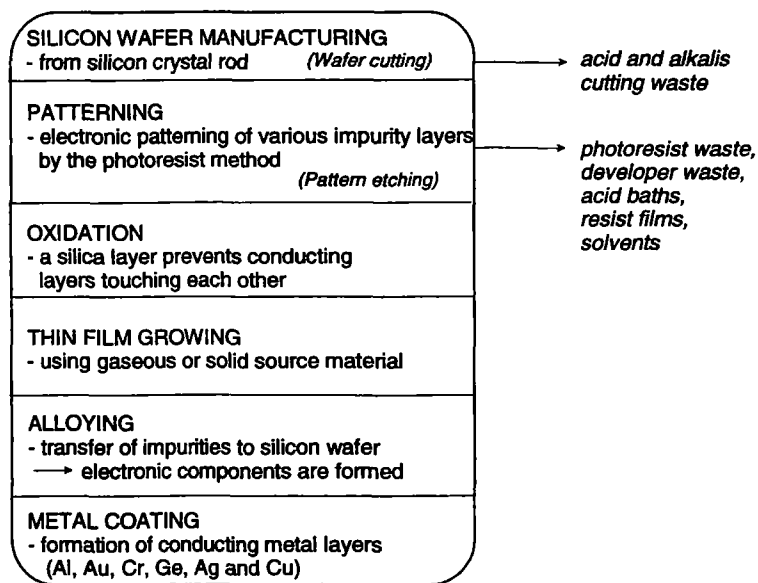


Table 99. Microcircuit manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Ammonium solution	110107	01.22	33304	*	*
1	Phosphoric acid	110106	01.21	33105	*	*
1	Gold plating waste	110101-02	01.22	33522	*	*
1	Mask waste (sodium glass)	16050300-01	13.41	31321	(*)	
1	Silicon wafer pieces	160208	13.41	21420		
1	Sulphuric acid	110106	01.21	33102	*	*
1	Citric acid waste	110106	01.21	33110	*	*
1	Hydrochloric acid	110106	01.21	33104	*	*
1	Blocks of metal	120101-02	06.11-12	25102		
1	Nitric acid	110106	01.21	33101	*	*
1	Hydrogen peroxide	110106	01.21	31101	*	*
10	Air filter waste	150201	07.63	17120		
<i>PHOTORESIST WASTE</i>						
1	Acryl monomer waste (photoresist waste)	16050300-01	03.13	37309	(*)	(*)
1	Acetone	140303	01.12	35240	*	*
1	Developing waste from photoresist	16050300-01	01.23	33540	(*)	
1	Xylene	140303	01.12	35212	*	*
1	Cellosolve	140303	01.12	35208	*	*
1	Cellosolve acetate	140303	01.12	35249	*	*
1	Toluene	140303	01.12	35211	*	*
<i>ETCHING BATHS</i>						
1	Ammonium fluoride	110107	01.24	31431	*	*
1	Acetic acid waste	110106	01.21	33201	*	*
1	Hydrofluoric acid waste (etching)	110106	01.21	33110	*	*
1	Phosphoric acid	110106	01.21	33105	*	*
1	Metal hydroxide waste	190201	01.24	33702	*	*
1	Nitric acid	110106	01.21	33101	*	*
<i>RESIST COATING STRIPPING WASTE</i>						
1	Aromatic hydrocarbons	140303	01.12	35200	*	*
1	Chlorinated hydrocarbons	140302	01.11	35100	*	*
1	Resist coating waste	16050300-01	03.13	37105	(*)	
1	Sulphuric acid waste	110106	01.21	33102	*	*
<i>CLEANING SOLVENTS</i>						
1	Acetone	140303	01.12	35240	*	*
1	CFC-compounds	140301	01.11	35107	*	*
1	Ethanol	140303	01.12	35221	*	*
1	Ethylene glycol	140303	01.12	35255	*	*
1	Isopropanol	140303	01.12	35223	*	*
1	Xylene	140303	01.12	35212	*	*
1	Methylene chloride	140302	01.11	35101	*	*
1	Tetraethylene chloride	140302	01.11	35111	*	*
1	Trichloroethane	140302	01.11	35105	*	*
1	Trichloroethylene	140302	01.11	35111	*	*

Table 100. Deionized water manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Activated carbon waste	190904	02.13-14	21610		
1	Bacteria filters	190999	13.21	37105		
1	Ion resins, cont. hazardous waste	190905	03.14	37145	*	
1	Filtering sand	190999	13.21	21811		

Condenser manufacturing

The most common form of condenser is the plate condenser. A plate, which may be of e.g. paper or plastic, acting as an insulator in a condenser, is often wound into a roll to save space. In ceramic condensers the insulation is often made into a tubular shape. Two aluminium foils frequently act as the electrodes. A metal electrode can also be vaporised directly on to the surface of the insulating material (metal-paper condensers and metal-coated plastic film condensers). Polystyrene, polyethyleneterephthalate, polytetrafluorethylene, polycarbonate and polypropylene. The general principles of paper and plastic insulated condenser manufacturing are shown in Figure 24.

Wastes from the manufacturing of these condensers are shown in Table 101.

In addition to plastic and paper construction condensers, oxide ceramics (ceramics condensers), mica sheets (mica condensers), and aluminium oxide (electrolyte condensers) are used as insulating materials. In ceramic condensers, the electrode is a silver, palladium or platinum coating on the surface of the ceramic plate. The term electrolyte condenser (electrolytic capacitor) comes from the electrolytic fluid contained in the condensers; this is generally an acid electrolyte.

Figure 24. Paper and plastic insulated condenser manufacturing.

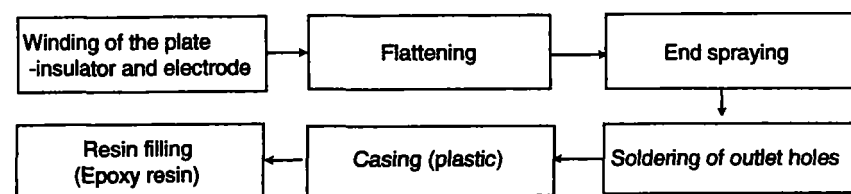


Table 101. Paper and plastic insulated condenser manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Aluminium strip	120103-04	06.23	25616		
1	Epoxy resin	160500300-01	03.13	36610	(*)	
1	Grinding sludges and dust of metals	120202	06.32	25805		
1	Methylene chloride	140302	01.11	35101	*	*
1	Copper processing waste	120103-04	06.24	25601		

Resistor manufacturing

Metal alloys are the most commonly used resistor materials. Wire resistors or metal film resistor materials are made from resistor metals like copper, nickel, chrome and manganese alloys. Wire resistors are made by winding resistor wire round a ceramic core. The wire is protected by varnishing, enamelling, glazing or cementing. Metal film resistors consist of a ceramic core on to which a thin nickel-chrome film is sublimated. A spiral groove is cut into the film to provide the desired resistance. Carbon film resistors are similar to metal film resistors; the metal film resistor is replaced by a carbon film produced by cracking. Damp cores are pressed

on to the ends of the resistor core and connection wires are welded to these. Bulk resistors are made from a carbon quartz mixture which forms the core of the resistor. Conductors are mounted at the ends of the mass rod and the construction protected with insulating compound and protective varnish. Colloid film resistors are made from a ceramic core which is coated with a colloidal layer.

A **potentiometer** is a resistor in which the resistance can be adjusted as high as desired. In the potentiometer there is a resistor tube along which an adjustable dummy contact can slide. The constructional materials of potentiometers are similar to those of the resistors described above (metal wires, ceramic cores, carbon structures, and so on.)

Vehicle manufacturing

341 Car manufacturing

The basic construction of a car consists of a body, chassis and engine. Other components are accessories attached to the body, which include bumpers, lights and radiator grill, and the upholstery, dashboard and electrical equipment in the interior. Cars are made on production lines by assembling ready-made parts and

entire assemblies. Wastes arising from car manufacturing itself are not taken to include those occurring in the production of the body, engine and components. These wastes are dealt with in sections 342 and 343.

342 Car body and caravan manufacturing

Car body manufacturing

Car bodies are manufactured from traditional thin sheet steel, aluminium alloy (light metal), or the increasingly common fibreglass and plastic materials. For the body of a single car, both traditional steel and alternative lighter materials are frequently used (e.g. engine compartment hood and boot lids are often made lighter).

When steel or aluminium alloys are used, the body has to be protected against corrosion. Nowadays protection is generally achieved by tin-plating or galvanizing, and by the use of special anti-corrosion materials under the

paint. Traditional rust prevention by undersealing is now generally used only in the case of used vehicles.

Car body manufacturing consists of four main production stages: sheet material cutting, surface treatment (metals), painting, and body component assembly. Joints can be protected with a synthetic plastic or rubber material, or by adhesives. Surface treatment methods have been dealt with earlier in section 285. Figure 25 shows the coating order for car painting. Table 102 gives the different types of top coat. The main wastes arising from car body manufacturing are shown in Table 103.

Figure 25. Car paint coats.

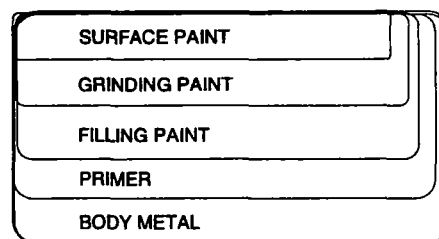


Table 102. Types of car paint top coat.

Type of paint	Characteristics
Synthetic paints	Single component paints, with turpentine (turps) or benzene as solvents
Cellulose paints	Solvent is thinners
Artificial resin paints	Two-component, to be thinned before use
Metallic paints	Binder includes aluminium flakes. Metallic paint surface is covered by clear varnish.
Thermoplastic acrylic paint	Paint is acrylic plastic which softens when heated.
Pearlescent intensifier paint	Mixed with the paint there is a pearlescent intensifier. Paint surface is covered with clear varnish.

Caravan manufacturing

Figure 26. Caravan manufacturing

The main stages in the caravan manufacturing process are shown in Figure 26. The most important wastes arising from caravan manufacturing are shown in Table 103.

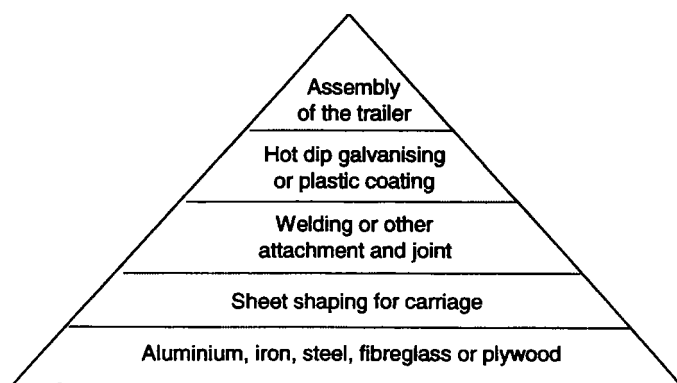


Table 103. Car body and caravan manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Aluminium chips and dust	120103	06.23	25510		
1	Aluminium plate and profile scrap	120103-04	06.23	25616		
1	Alkalis	110107	01.22	33300	*	*
1	Epoxy resin waste	16050300-01	03.13	36610	(*)	
1	Phosphatizing sludge	110108	01.24	21850	*	*
1	Acid waste	110108	01.24	21850	*	*
1	Sand blasting waste	120201	13.42	21214		
1	Powdery paints	080104	03.13	36501		
1	Flood lubrication oils, turbine oils	130202	01.32	34104	*	*
1	Chrome steel	120101-02	06.11-12	25612		
1	Copper scrap	120104	06.24	25601		
1	Glassfibre waste	160208	07.42	21410		
1	Paint and lacquer waste, hardened	080105	03.13	36510		
1	Water-dilutable paint waste	080103	03.13	36507		
1	Paint dust	080109	03.13	36501		
1	Paint residuals	080105	03.13	36501		
1	Paint and lacquer, cont. solvents, halogenous	080101	03.13	36500	*	*
1	Paint and lacquer, cont. solvents, non-halogenous	080102	03.13	36500	*	*
1	Grinding sludges of metals	120202	06.32	25805		
1	Plastic waste	120105	07.42	37125		
SURFACE TREATMENT WASTE OF METALS						
1	Activated carbon filters, cont. hazardous waste	15020101	02.13	21619	*	
1	Paint sludge	080106-08	03.13	36506	(*)	(*)
1	Paint dust and residuals (from filters)	15020100-01	03.13	36501	(*)	
1	Organic solvents, non-halogenous	140103	01.11	35208	*	*
1	Cleaning sediments from washer	11010401	01.24	33806	*	
1	Drilling, cutting and grinding oils	120106-07	01.32	34105	*	*
1	Iron and steel processing waste	120101-02	06.11-12	25102		
1	Iron and steel scrap	160205	08.11	25202		
1	Anticorrosive agent	130601	01.32	34301	*	*
10	Zinc coating sludge	11010401	01.24	33705	*	
10	Barrel bottom sludge, cont. mineral oil	160706	02.12	34405	*	*
10	Nitric acid solutions and other pickling solutions	110105	01.21	33101	*	*

343 Car part and engine manufacturing

The following work stages are involved in the manufacturing of metal parts from the different metal raw materials: casting, drawing, pressing, folding, bending, cutting, grinding, welding, turning and drilling. These work methods are dealt with in the

section on the metal industry. In car and engine components various kinds of steel alloys are used, as well as other metal alloys in accordance with their purpose. Table 104 shows the most important metal alloys used and their purposes.

Table 104. Car and engine component metal raw materials.

Metal alloy	Part
Carbon steel alloy (incl. Si, Mn, Cr and V)	Springs
Case hardening steels	Gearing, axles, journal bearings.
Aluminium alloys (light metals)	Flywheel casings, cylinder heads engine blocks, rear axles, pistons, etc.
Zinc	Body galvanizing
Tin	Metal component coating
Copper-zinc alloys (brasses)	Journal bearings
Copper-tin alloys	Electrical equipment springs and journal bearings
Copper-aluminium alloys	Worm gearing
Magnesium alloys	Sumps, gearbox casings
Lead-tin-antimony or tin-copper-antimony	Bearings
Lead bronze alloy	Bearings

Many car and body parts are manufactured from plastic and fibreglass materials. Table 105 shows the most important plastic raw materials for cars.

Table 105. Car part plastic raw materials.

Plastic material	Part
Phenol plastics	Distributors, etc., electrical equipment
Polyester plastics	Sealing, body materials (fibreglass)
Polyvinylchloride (PVC)	Upholstery, chassis protection, dashboards
Polypropylene (PP)	Bumpers, tubing, films, electronic equipment
Polyethylene (PE)	Liquid tanks
Polycarbonate (PC)	Bumpers, headlamp housings, grills
Polyamide (PA)	Engine parts, bearings, gearing
Acrylonitrilebutadienestyrene (ABS)	grills, dashboards

The most important wastes arising from car part and engine manufacturing are shown in Table 106.

Table 106. Car part and engine manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Aluminium chips and dust	120103	06.23	25510		
1	Aluminium plate and profile waste	120103-04	06.23	25616		
1	Ammonia	110107	01.22	33301	*	*
1	Non-ferrous metals processing waste	120103-04	06.26	25501		
1	Acidic pickling solutions	110105	01.21	33102	*	*
1	HD-polyethylene waste	120105	07.42	37103		
1	Blasting sand	120201	13.21	21214		
1	Powder paint waste	080104	03.13	37130		
1	Soldering pewter	120199	13.32	21113		
1	Cell scrap (coolers)	160205	08.53	25600		
1	Flood lubrication oils, turbine oils	130202	01.32	34104	*	*
1	Copper scrap	120103-04	06.24	25601		
1	Fibreglass waste	160208	07.42	21410		
1	Reinforced plastic waste	120105	07.42	37150		
1	Filtering cloths from painting cupboard	15020100-01	07.63	21627	(*)	
1	Paint and lacquer waste, hardened	080105	03.13	36502		
1	Water-dilutable paint waste	080103	03.13	36507		
1	Paint sludge	080106-08	03.13	36805	(*)	(*)
1	Paints and lacquers, cont. solvents, non-halogenous	080102	03.13	36500	*	*
1	Brass scrap	120103-04	06.26	25602		
1	Grinding sludge of metals	120202	06.32	25805		
1	Diluents (non-halogenated solvents)	070104	01.12	35208	*	*
1	Anti-freeze	130304	01.12	35208	*	*
1	Drilling, cutting and grinding oil emulsions	120108-09	02.22	34302	*	*
1	Drilling, cutting and grinding oils	120106-07	01.32	34105	*	*
1	Iron and steel processing waste	120101-02	06.11-12	25102		
1	Iron and steel scrap	160205	08.11	25201		
1	Zinc sludges (zinc phosphatizing)	110108	01.24	33705	*	
1	Tin slag, soldering pewter	120199	13.32	21113		
1	Toluene (surface treatment, fat extraction)	140103	01.12	35210	*	*
10	Dust from exhaust air cleaning	120199	13.31	21634		
10	Peat, cont. hazardous waste	15020101	10.00	11103	*	*
10	Surface emulsions from oil extractors	130505	01.32	34801	*	*
10	Bottom sludges from oil extractors	130502	01.32	34801	*	*
10	Oil absorbing rugs, oily	160601	02.22	17119	*	
10	Laboratory chemicals	16050201-0301	03.14	39701	*	

Manufacture of other transport equipment

351 Building and repairing of ships and boats

Building of ships

In building of steel structured ships the working methods are the usual metal industry methods which are dealt with earlier in section 28. The most common working methods are welding of structures and surface treatment. The body of the ship is usually protected with epoxy-paint. The building process consists of four stages: processing of bodyplates to elements, joining

the elements (welding), surface treatment and protection (corrosion prevention, grinding and painting), assembly of machinery, equipment and power transmission and furnishing. The most important wastes arising from ship building and repairing are shown in Table 107.

Table 107. Ship building and repairing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Aluminium chips and dust	120103	06.23	25510		
1	Aluminium plate and profile waste	120103-04	06.23	25616		
1	Acetone	140103	01.12	35240	*	*
1	Non-ferrous metals processing waste	120103-04	06.26	25501		
1	Special copper scrap	120103-04	06.24	25604		
1	Sand blasting slag	120201	13.21	21214		
1	Grinding tape waste	120299	13.41	21708		
1	Grinding dust, ferrous	120299	13.33	21130		
1	Welding slag, flame cutting slag	120113	13.33	21103		
1	Putty waste	080401-04	03.13	36625	(*)	(*)
1	Hardeners	16050300-01	03.14	37330	(*)	
1	Rubber waste	160208	07.32	37501		
1	Copper scrap	120103-04	06.24	25601		
1	Glassfibre waste	160208	07.42	21410		
1	Chipboards	160208	07.53	18313		
1	Solvent waste, non-halogenous	140103	01.12	35208	*	*
1	Reinforced plastic products	120105	07.42	37150		
1	Paint and lacquer waste, hardened	080105	03.13	36510		
1	Paint and lacquer waste, cont. solvents	080101-02	03.13	36500	*	*
1	Water-dilutable paint waste	080103	03.13	36507		
1	Paint residuals	080105	03.13	36502		
1	Brass scrap	120103-04	06.26	25602		
1	Nickel slag (blasting sand)	120201	06.26	21108		
1	Washing sludge, heavy metallic	110103-04	01.24	33902	(*)	(*)
1	Bilge water	130401-03	02.12	34901	*	*
1	Polyester resin waste	16050300-01	03.13	36603	(*)	
1	Polyurethane waste	160208	07.42	37130		
1	Drilling, cutting and grinding oil emulsions	120108-09	02.22	34302	*	*

Table 107 (continue)

1	Drilling, cutting and grinding oils	120106-07	01.32	34105	*	*
1	Iron and steel processing waste	120101-02	06.11-12	25102		
1	Iron and steel scrap	160205	08.11	25202		
1	Fixatives of X-ray films	090104	01.23	33547	*	*
1	X-ray films	090107-08	03.14	37149		
1	Electric motors, aluminium covered	160205	08.12	25619		
1	Tin bronze, lead tin bronze	120103-04	06.26	25603		
1	Thinners	140103	01.12	35208	*	*
1	Upholstery textiles	160208	07.63	37121		
5	Cleaning towels and wool, cont. hazardous waste	15020101	07.63	17119	*	*
5	Washing sludges from oil tanks	160706	02.22	34802	*	*

Building of pleasure and sporting boats

Glass fibre boats are manufactured from polyester resin, in which glass fibre is used as reinforcement. Most commonly used plastic material in boat building is polyester resin plastic reinforced with glass fibre, because of its suitability for body material and also for many other parts, for example mast material. In addition reinforced plastic body of a boat can be

coated with surface resin or styrene plastic (lamination and spraying). Boats can also be manufactured from ABS-plates (acrylonitrile butadiene-styrene): warmed plastic plates are moulded with under- or over-pressure to desired product. The most important wastes arising from building of pleasure and sporting boats are shown in Table 108.

Table 108. Building of pleasure and sporting boats wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Acetone	140103	01.12	35240	*	*
1	Insulation plastics	120105	07.42	37100		
1	Putty waste	080401-04	03.13	36625	(*)	(*)
1	Hardeners	16050300-01	03.14	37330	(*)	
1	Glassfibre waste	160208	07.42	21410		
1	Chipboards	160208	07.53	18313		
1	Solvent waste, non-halogenous	140103	01.12	35208	*	*
1	Reinforced plastic products	120105	07.42	37150		
1	Paint and lacquer waste, hardened	080105	03.13	36510		
1	Paint and lacquer waste, cont. solvents	080101-02	03.13	36500	*	*
1	Water-dilutable paint waste	080103	03.13	36507		
1	Paint residuals	080105	03.13	36502		
1	Brass scrap	120103-04	06.26	25602		
1	Polyester resin waste	16050300-01	03.13	36603	(*)	
1	Polyurethane	160208	03.14	37130		
1	Iron and steel processing waste	120101-02	06.11-12	25102		
1	Iron and steel scrap	160205	08.11	25202		
1	Sawdust and chips	160208	07.53	18100		
1	Styrene (lamination)	070204	01.12	35213	*	*
1	Thinners (cleaning)	140103	01.12	35208	*	*
1	Upholstery textiles	160208	07.63	37121		

352 Manufacture of railway and tramway locomotives and rolling stock

The manufacturing of railway and tramway locomotives and rolling stock is traditional engine works activity, which principle is presented roughly in Figure 27. Manufacturing is principally jointing metallic elements and components by welding. The most important wastes arising from railway and tramway locomotives and rolling stock manufacturing are shown in Table 109.

Figure 27. Railway and tramway locomotives and rolling stock manufacturing general principle

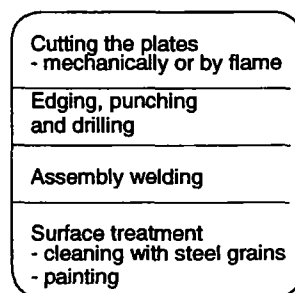


Table 109. Railway and tramway locomotives and rolling stock manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Aluminium chips and dust	120103	06.23	25510		
1	Aluminium plate and profile scrap	120103-04	06.23	25616		
1	Aluminium casts	160205	06.23	25618		
1	Non-ferrous metals processing waste	120103-04	06.26	25501		
1	Sand blasting slag	120201	13.21	21214		
1	Grinding dust, ferrous	120299	13.33	21130		
1	Welding slag, flame cutting slag	120113	13.33	21103		
1	Coolant solvents	130304	01.24	33524	*	*
1	Potassium hydroxide (battery lye)	160606	01.22	33303	*	*
1	Copper scrap	120103-04	06.24	25604		
1	Glass waste	160208	07.13	21405		
1	Glassfibre waste	160208	07.42	21410		
1	Chipboards	160208	07.53	18313		
1	Paint sludges	080405-07	03.13	36810	(*)	(*)
1	Solvent waste, non-halogenous	140103	01.12	35208	*	*
1	Reinforced plastic products	120105	07.42	37150		
1	Paint and lacquer waste, hardened	080105	03.13	36510		
1	Paint and lacquer waste, cont. isocyanide	080102-03	03.13	36522	(*)	(*)
1	Paint and lacquer waste, cont. solvents	080101-02	03.13	36500	*	*
1	Paint sludges	080106-08	03.13	36805	(*)	(*)
1	Paint residuals	080105	03.13	36502		
1	Brass scrap	120103-04	06.26	25602		
1	Transformers and condensers	160201	08.11	25208	*	*
1	Nickel slag, blasting sand	120201	13.32	21108		
1	Drilling, cutting and grinding oil emulsions	120108-09	02.22	34302	*	*
1	Drilling, cutting and grinding oils	120106-07	01.32	34105	*	*
1	Cleaning towels and wool, cont. hazardous waste	15020101	07.63	17119	*	*
1	Alkaline fat extraction baths	110107	01.24	33526	*	*
1	Iron and steel processing waste	120101-02	06.11-12	25102		
1	Iron and steel scrap	160205	08.11	25202		
1	Sawdust and chips	160208	07.53	18100		

Table 109 (continue)

1	Tin bronze, lead tin bronze, red metal scrap	120103-04	06.26	25603		
1	Thinner (diluent)	140103	01.12	35208	*	*
1	Cast iron scrap	160205	08.11	25206		
1	Old aluminium plate and profile scrap	160205	06.23	25617		
5	Asbestos and asbestos cement dust	16020601	13.12	21510	*	
5	Soil and soakage mass, cont. mineral oil	15020101	02.14	34408	*	
5	Washing sludges from oil tanks	160706	02.22	34802	*	*
10	Wastewater sludge	190804	01.24	57305		
10	Surface emulsion from oil extractors	130505	01.32	34801	*	*
10	Bottom sludges from oil extractors	130502	01.32	34801	*	*

353 Manufacture of aircraft and spacecraft

Special metals, such as titan and cobolt, are used in the aircraft and spacecraft manufacturing because of aircrafts' special requirements. Manufacturing methods are principally the same as in manufacturing

vehicles. The most important wastes arising from aircraft and spacecraft manufacturing are shown in Table 110.

Table 110. Aircraft and spacecraft manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Aluminium plate and profile scrap	120103-04	06.23	25616		
1	Alumina (from alumina blower)	120299	01.24	31205		
1	Non-ferrous metals processing waste	120103-04	06.26	25501		
1	Epoxy resin	16050300-01	03.13	36610	(*)	
1	Epoxy-plastics waste	120105	07.42	37139		
1	Inorganic acids	110105-06	01.21	33100	*	*
1	Phenol	070104	01.12	35230	*	*
1	Sand blasting waste	120201	13.21	21130		
1	Powder paint waste	080104	03.13	36610		
1	Cobalt scrap	120103-04	08.53	25600		
1	Glass waste	160208	07.13	21401		
1	Glues and resins, cont. solvents, halogenous	080401	03.13	36616	*	*
1	Glues and resins, cont. solvents, non-halogenous	080402	03.13	36618	*	*
1	Solvents, cont. chromium (VI) (surface treatment)	110103	01.24	33507	*	*
1	Paint and lacquer waste, cont. solvents	080101-02	03.13	36500	*	*
1	Paint residuals	080105	03.13	36502		
1	Waste from mineral oil treatment	130601	01.32	34400	*	*
1	Engine, gearing and drive gear oils	130201-03	01.31	34103	*	*
1	Plastic grain blasting waste	120299	07.42	37131		
1	Washing sludge, heavy metallic	110103-04	01.24	33902	*	*
1	Drilling, cutting and grinding oil emulsions	120108-09	02.22	34302	*	*
1	Heavy metal hydroxide sludge	190201	01.24	337	*	*
1	Iron and steel processing waste	120101-02	06.11-12	25102		
1	Iron and steel scrap, unclean	160205	08.11	25202		

Table 110 (continue)

1	Dust from steel ball blower	120299	06.11-12	21214		
1	Titanium scrap	120103-04	06.26	25630		
1	Trichloroethylene (fat extraction)	140102	01.11	35110	*	*
4	Laboratory chemicals	16050201-0301	03.14	39701	*	
10	Surface emulsion from oil extractors	130505	01.32	34801	*	*
10	Bottom sludges from oil extractors	130502	01.32	34801	*	*
16	Tires	160103	07.31	37502		

354 Manufacture of motorcycles and bicycles

Body material of motorcycles and bicycles is steel and aluminium compound. The body is shaped from ready-made pipes which are surface treated by zinc phosphation. Hoops, dirt boards and carriers are usually manufactured from aluminium, which is coated with chromenickel compound. The general principle of manufacturing motorcycles and bicycles is presented in Figure 28. Mopeds and motorcycles contain also plastic parts such as reinforced plastic cappings. The most important wastes arising from motorcycles and bicycles manufacturing are shown in Table 111.

Figure 28. Motorcycles and bicycles manufacturing general principle

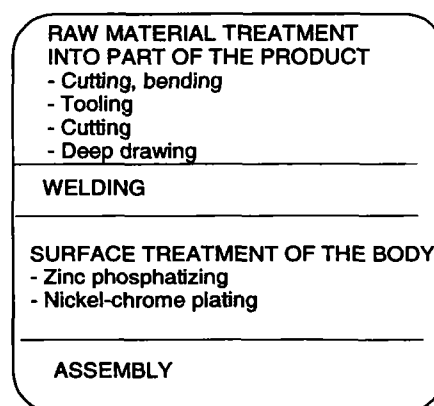


Table 111. Motorcycles and bicycles manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Aluminium scrap	120103-04	06.23	25616		
1	Phosphating sludge (zinc phosphating)	110108	01.24	21850	*	*
1	Copper scrap	120103-04	21850			
1	Paints and lacquers, cont. solvents, non-halogenous	080102	03.13	36505	*	*
1	Engine, gearing and drive gear oils	130201-03	01.31	34103	*	*
1	Drilling, cutting and grinding oil emulsions	120108-09	02.22	34302	*	*
1	Wheel greases	130203	01.32	34202	*	*
1	Iron and steel processing waste	120101-02	06.11-12	25102		
1	Iron and steel scrap	160205	08.11	25202		
1	Trichloroethane (fat extraction)	140102	01.11	35106	*	*
1	Pigment and lacquer sludges	080106-08	03.13	36807	(*)	(*)
10	Surface emulsion from oil extractors	130505	01.32	34801	*	*
10	Bottom sludges from oil extractors	130502	01.32	34801	*	*

361 Manufacture of furniture

Manufacture of traditional wood furniture has been replaced by manufacture of cupboards, racks, tables and chairs from different kinds of wood boards. Bent furniture (for example chairs) are manufactured by so called lamination method: glued plywood strips are pressed to desired shape and dried to shape preserving billets. Billets are cut, sawn, ground and drilled like in

ordinary carpentry industry. Steel tables, chairs and furniture bodies are manufactured by bending steel pipes. Flat parts are cut and polished. For example chairs can be manufactured from ABS-plastics by bending warmed plate. The most important wastes arising from furniture manufacturing are shown in Table 112.

Table 112. Furniture manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Acryl-resin wastes	120105	07.42	37125		
1	Aluminium slag (from aluminium melting)	101003	13.32	21114		
1	Aluminium plate and profile scrap	120103-04	06.23	25616		
1	Old aluminium plate and profile scrap	160205	06.23	25617		
1	Phenol melamine resin waste	08040300-01	03.13	36606	(*)	
1	Phosphatizing sludge	110108	01.24	21850	*	*
1	Abrasive waste	120299	13.41	21708		
1	Powder paint waste	080104	03.13	36610		
1	Fabric and knitted goods waste	160208	07.63	17111		
1	Sludges cont. chromium (VI)	110103	01.24	33702	*	*
1	Bark residue	030101	07.53	18102		
1	Glass waste, clear	160208	07.13	21401		
1	Gluey waters	08040800-01	03.13	36906	(*)	
1	Glue sludges	080405-07	03.13	36810	(*)	(*)
1	Glues, cont. solvents, halogenous	080401	03.13	36616	*	*
1	Solutions, cont. chromium (VI)	110103	01.24	33507	*	*
1	Paints and lacquers, cont. isocyanate	080102-03	03.13	36522	(*)	(*)
1	Paints and lacquers, cont. solvents	080101-02	03.13	36500	*	*
1	Paint and lacquer sludges	080106-08	03.13	36805	(*)	(*)
1	Paint and lacquer waters	08011000-01	03.13	36905	(*)	
1	Paint dust	080109	03.13	36501		
1	Paint residuals	080105	03.13	36208		
1	Brass scrap	120103-04	06.26	25602		
1	Plastic waste	120105	07.42	37100		
1	Plastic sheet laminate waste	120105	07.42	37147		
1	Leather and fur waste, barked	160208	07.64	17510		
1	Nickel sludges	11010401	01.24	33707	*	
1	Washing solvents, thinner	140103	01.12	35208	*	*
1	Surface boards, strips, rotten lumber	030103	07.52	18100		
1	Polyester wad	160208	07.32	17107		
1	Drilling, cutting and grinding oil emulsions	120108-09	02.22	34302	*	*
1	Drilling, cutting and grinding oils	12106-07	01.32	34105	*	*

Table 112 (continue)

1	Wood processing waste	030103	07.52	18104		
1	Cleaning towels and wool	150201	07.63	17118		
1	Cleaning towels and wool, cont. hazardous waste	15020101	07.63	17119	*	
1	Heavy metal hydroxide sludge	190201	01.24	33702	*	*
1	Iron and steel processing waste	120101-02	06.11-12	25102		
1	Iron and steel scrap	160205	08.11	25202		
1	Sawdust and chips	030102	07.52	18100		
1	Urea and melamine formaldehyde resin waste	08040300-01	03.13	36607	(*)	
1	Plywood and other wood plates	030103	07.53	18300		
1	Hide and skin waste	160208	07.64	17504		
10	Filters cont. paints and lacquer	15020100-01	03.13	36502	(*)	
10	Surface emulsion from oil extractors	130505	01.32	34801	*	*
10	Bottom sludges from oil extractors	130502	01.32	348 ⁰¹	*	*

362 Manufacture of jewellery and related articles

Jewellery is manufactured from metal billets or wires by shaping or by casting. Billets are manufactured by ironing metal plates. Manufacturing is roughly divided into shaping the jewel or article (cutting, bending, carving, soldering and casting), cleaning and polishing, coating (coating with more noble metal) and lacquer

finishing (bronze articles). In casting jewels, articles, and coins gypsum or plastic molds are used. Polishing of articles is usually done by corroding or with mechanic polishing disks. The most important wastes arising from jewellery and related articles manufacturing are shown in Table 113.

Table 113. Jewellery and related articles manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Alkaline silvering and gold plating baths	101101-02	01.24	33522	*	*
1	CFC-solvent	140101	01.11	35107	*	*
1	Epoxy resin waste	16050300-01	03.13	37139	(*)	
1	Special copper scrap	120103-04	06.24	25604		
1	Acids, acid compounds	110105-06	01.21	33110	*	*
1	Abrasive waste	120299	13.41	21708		
1	Grinding dust, non-ferrous	120299	13.32	21131		
1	Silver waste	120104	06.26	25633		
1	Sludges cont. precious metals	11010401	01.24	33710	*	
1	Gypsum waste	100799	13.41	21710		
1	Gypsum sludge	100799	13.41	21817		
1	Coin waste	160301	06.24	25604		
1	Gold plating baths	11010401	01.24	33522	*	
1	Baths, cont. cyanide	110101-02	01.24	33502	*	*
1	Lacquers, cont. solvents, non-halogenous	080102	03.13	36511	*	*
1	Brass scrap	120103-04	06.26	25602		
1	Grinding sludges of metals	120202	06.26	25805		
1	Other metals processing waste	120103-04	06.26	25501		
1	Nonyl phenol	140103	01.12	35230	*	*
1	Washing sludge, cont. cyanide	110102	01.24	33901	*	*
1	Platinum waste	120104	06.26	25600		
1	Drilling, cutting and grinding oil emulsions	120108-09	02.22	34302	*	*

Table 113 (continue)

1	Cotton fibre waste (polishing wheel)	150201	07.63	17102		
1	Iron and steel scrap	160205	08.11	25201		
1	Sulphuric acid	110106	01.21	33102	*	*
1	Zinc chloride solution (pickling bath)	110105	01.24	33513	*	*
1	Sludges cont. zinc	11010401	01.24	33705	*	
1	Sludges cont. cyanide	110101-02	01.24	33701	*	*
1	Tin bronze, lead tin bronze, red metal scrap	120103-04	06.26	25603		
1	Thinner	140103	01.12	35208	*	*
1	Trichloroethylene	140102	01.11	35110	*	*
1	Nickel silver	120103-04	06.21	25633		

363 Manufacture of musical instruments

Manufacturing musical instruments is diversified, usually handiwork. The most important wastes arising

from musical instruments manufacturing are shown in Table 114.

Table 114. Musical instruments manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Aluminium plate and profile waste	120103-04	06.23	25616		
1	Acetone	140103	01.12	35240	*	*
1	Ethanol	140103	01.12	35222	*	*
1	Copper scrap	120103-04	06.24	25601		
1	Solvent benzene	140103	01.12	35216	*	*
1	Paint and lacquer waste, cont. solvents	080101-02	03.13	36500		
1	Brass scrap	120103-04	06.26	25602		
1	Sawdust	160208	07.53	18104		
1	Synthetic coolants and lubricants	130304	02.22	34301	*	*
1	Thinners, other non-halogenated diluents	070104	01.12	35200	*	*

364 Manufacture of sports goods

Different sports goods are manufactured by bending metal pipes and ABS-plates (for example exercise equipment), by rounding off, by cutting off, by glueing, by bending (lamination technique) and by harrowing wood or wood plates (for example baseball bats and ice hockey sticks), by sewing leather, artificial leather and textile materials (baseball gloves, body protectors, gloves and so on) and by laminating resins and glass

fibre (skis, ski sticks, windsurfers and so on). The production methods are not typical in this branch of industry, but like in furniture and musical instruments manufacturing, production methods are typical depending on the product material. The most important wastes arising from sports goods manufacturing are shown in Table 115.

365 Manufacture of games and toys

Manufacturing games and toys is as diversified as manufacturing sports goods. The most important

wastes arising from games and toys manufacturing are shown in Table 116.

Table 115. Sports goods manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	New aluminium plate and profile waste, alloys	120103-04	06.23	25616		
1	Acetone	140103	01.12	35240	*	*
1	Non-ferrous metals processing waste	120103-04	06.26	25501		
1	Epoxy resins	16050300-01	03.13	37139	(*)	
1	Potassium cyanide	110101-02	01.24	31705	*	*
1	Fabric and knitted goods waste	160208	07.63	17111		
1	Hardened glues and lining compounds	080404	03.13	36610		
1	Rubber waste	160205	07.32	37501		
1	Copper scrap	120103-04	06.24	25601		
1	Glassfibre waste	160208	07.42	21410		
1	Waters cont. glues and resins	08040800-01	03.13	36900	(*)	
1	Glue sludges	080405-07	03.13	36810	(*)	(*)
1	Glues	080401-04	03.13	36600	(*)	(*)
1	Reinforced plastic waste	120105	07.42	37150		
1	Paint and lacquer waste, hardened	080105	03.13	36504		
1	Paints and lacquers, cont. solvents, halogenous	080101	03.13	36503	*	*
1	Paints and lacquers, cont. solvents, non-halogenous	080102	03.13	36505	*	*
1	Brass scrap	120103-04	06.26	25602		
1	Methylene chloride	140102	01.11	35101	*	*
1	Leather waste	160208	07.64	17504		
1	Washing sludge, cont. cyanide and heavy metals	110101	01.24	33901	*	*
1	Wood chips	160208	07.53	18104		
1	Heavy metal hydroxide sludge	190201	01.24	33701	*	*
1	Iron and steel processing waste	120101-02	06.11-12	25102		
1	Iron and steel scrap	160205	08.11	25202		
1	Nickel silver	120103-04	06.21	25633		
1	Cast iron scrap	160205	08.11	25206		
1	Old aluminium plate and profile scrap	160205	06.23	25617		
10	Sludges cont. cyanide	110101-02	01.24	33701	*	*

Table 116. Games and toys manufacturing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Non-ferrous metals processing waste	120103-04	06.26	25501		
1	Glues	080401-04	03.13	06600	(*)	(*)
1	Reinforced plastic products, plastic waste	120105	07.42	37100		
1	Paint and lacquer waste, hardened	080105	03.13	36502		
1	Paints and lacquers, cont. solvents	080101-02	03.13	36500	*	*
1	Leather and artificial leather	160208	07.64	17504		
1	Diluents, non-halogenous	070104	01.12	35208	*	*
1	Polyester wad	160208	07.63	17107		
1	Wood waste	160208	07.53	18104		
1	Iron and steel processing waste	120101-02	06.11-12	25201		
1	Iron and steel scrap, unclean	160205	08.11	25202		
1	Textile waste	160208	07.63	17111		
1	Foam plastics	120105	07.42	37110		

371 Recycling of metal waste and scrap

Demolishing and crushing of scrap vehicles

First in demolishing scrap vehicles harmful liquids and oils and parts that contain harmful substances are recovered. Reusable engine and transmission parts are recovered, likewise reusable body and cabin parts. In the demolition plant the cars from which engines and batteries are removed are crushed and metal parts are separated with magnet. The actual wastes arising in the scrap vehicle recycling are mainly batteries, waste oils, greases, liquids, glass and cleaning towels and solvents from cleaning engine parts. The most

important wastes arising from scrap vehicle disassembly and demolishing are shown in Table 117.

Demolishing and sorting of domestic appliances and instruments

The main wastes arising in recycling domestic appliances and chemicals used in manufacturing them are different non-recyclable rubber, plastic and synthetic fibre parts. From recycled refrigerators and freezers the CFC-compounds are recovered.

Table 117. Scrap vehicles demolishing and crushing wastes.

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Fluff from car chopping	160105	11.31	37100		
1	Brake fluids	130108	01.32	34100	*	*
1	Coolants	130304	01.32	34100	*	*
1	Catalysers	160101-02	08.52	25200		
1	Glass waste	160199	07.13	21400		
1	Engine, transmission and lubrication oil waste	130201-03	01.31	34100	*	*
1	Organic halogenated solvents	070103	01.11	35100	*	*
1	Organic non-halogenated solvents	070104	01.12	35200	*	*
1	Cleaning towels and wool, cont. hazardous waste	15020101	07.63	17119	*	
1	Ferrous metal scrap and engine parts	160205	08.12	25100		
1	Tires	160103	07.31	37502		
1	Scrap vehicles	160104	08.31	25215		
1	Scrap batteries	160601-05	08.51	25500/25600	(*)	(*)
1	Oil and fuel filters	130601	02.22	34409	*	*
10	Surface emulsion from oil extractors	130505	01.32	34801	*	*
10	Bottom sludge from oil extractors	130502	01.32	34801	*	*
10	Oil absorption masses and rugs	130601	02.22	34408	*	*

372 Other waste and scrap recycling

Glass recycling

In glass recycling, the glasses of different colours are separated, crushed and washed before melting. In glass separation arises plastic and metal wastes, which are from the original glass products (corks, necks etc.). In glass washing arises washing waters and sand and other contaminant containing sludges.

Demolition waste crushing and sorting into a "second" raw material

Part of demolition waste is disposed of in landfills, for example non-combustible wood, wood plates, insulators, plastic materials and some metals. The left over wastes from demolition waste sorting are shown in Table 118.

Table 118. Demolition waste sorting wastes

Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
Waste containing asbestos	17010500-01	13.12	21500	(*)	
Insulating material containing asbestos	170601	07.13	21500	*	*
Asphalt, not containing tar	170302	13.13	34607		
Concrete	170101	13.11	34100		
Non-ferrous metals, excl. tin	170401-04	06.22-25	25600		
Insulation materials, non-asbestos	170602	13.14	21411		
Cables, metallic	170408	06.23	25600		
Roofing felt	170303	13.13	34607		
Gypsum based building materials	170104	13.11	21710		
Tiles and ceramics	170103	13.14	21425		
Glass waste	170202	07.13	21405		
Glassfibre cables	170203	07.42	21410		
Soil and dredging mass	170501-02	13.21/13.30	21701-02	(*)	
Plastics	170203	07.42	37100		
Miscellaneous waste arising from demolition	170701	13.11	21500		
Demolition wood, wood plates, sawdust, etc.	170201	07.53	18113		
Iron and steel waste	170405	06.11	25202		
Miscellaneous metal waste	170407	06.26	25600		
Tar containing asphalt	170301	13.13	34607		
Brickstone waste	170102	13.11	21506		
Tin waste	170406	06.26	25505		

Electricity, gas, steam and hot water supply

Energy production wastes

Energy production wastes arise mainly from burning of energy raw materials, coal, oil, peat, wood chips, sludges and wastes. Energy is produced into electric energy, and also into heat in their own units or in energy stations which are located with other branch of industry (for example energy production in forest industry). The most important wastes in energy production are bottom ash and slag from boilers and fly-ash from flue gas cleaning. The combustion process is described in Figure 29. Currently efforts are being

made to rise the utilization level of the solid wastes from energy production higher. Bottom ash from boiler, fly-ash from electrostatic precipitator and products from chemical removal of sulphur (calcium sulphite) and also mixtures of them are used increasingly in constructions, building products manufacture and forest fertilization. The principle of treatment of flue gases is presented later on. The most important wastes arising from energy production are shown in Table 119.

Figure 29. Energy production by the combustion process

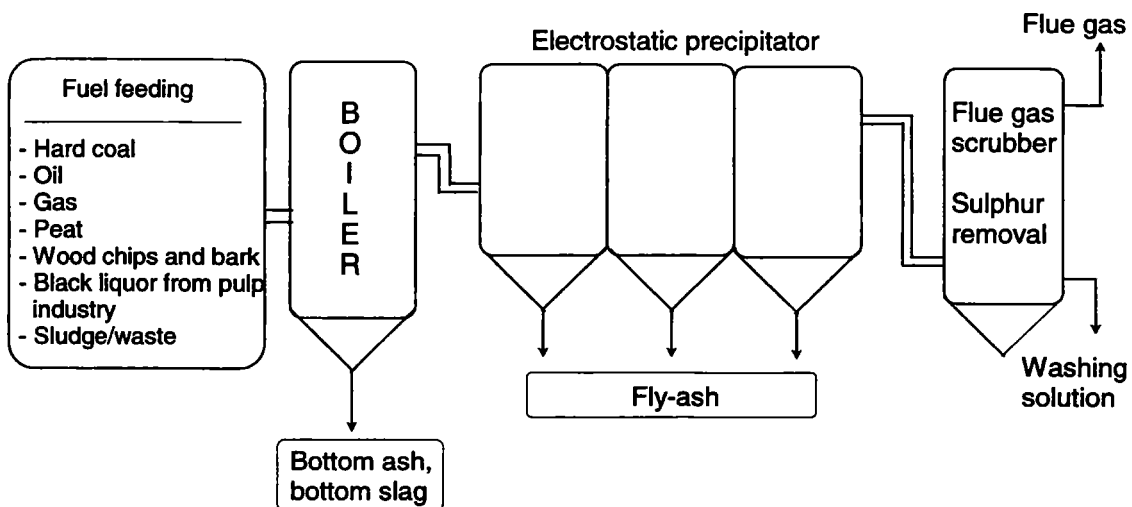


Table 119. Energy production wastes

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Activated carbon, cont. hazardous waste	15020101	13.31	21619	*	
1	Aluminium sulphate	060303	01.24	31505		
1	Ammonia	060203	01.22	33304	*	*
1	Catalysts	10011000-01	03.14	39800	(*)	
1	Scale (waste carbon)	100199	13.32	21327		
1	Bottom dust and slag from boiler	100101	13.32	21300		
1	Fly-ash from coal burning	100102	13.32	21301		
1	Fly-ash from fuel oil burning	100104	13.32	31202-03	*	*
1	Fly-ash from wood burning	10019901	13.32	21305		
1	Fly-ash from peat burning	100103	13.32	21304		
1	Mineral sludges (waste coal)	100199	13.21	21800		
1	Transformers and condensers (cont. PCB)	160201	08.12	25208	*	*
1	Sodium phosphate	060307	01.24	31301		
1	Sodium hydroxide	060202	01.22	33301	*	*
1	Sodium chloride	060305	01.24	31401		
1	Sodium sulphate (Glauber's salt waste)	060303	01.24	31501		
1	Organic solvents, halogenated	070103	01.11	35100	*	*
1	Organic solvents, non-halogenated	070104	01.12	35200	*	*
1	Washing sludges (sulphur removal)	100107	13.22	21826		
1	Bottom ash from heavy fuel oil burning	10010101	13.32	21312	*	
	Construction sand	100199	13.21	21501		
1	Desulphurization product (calcium sulphite)	100105	13.31	21321		
1	Sulphuric acid	100109	01.21	33102	*	*
1	Hydrochloric acid	060102	01.21	33104	*	*
1	Furnace lining	100112	13.42	21200		
1	Water softening sludge	190903	01.24	55101		
1	Water preparing and cleaning sludge	190902	12.20	55106		
5	Washing sludges (boiler cleaning)	10011100-01	13.22	21826	(*)	
10	Soil and soakage mass waste	15020100-01	02.22	34408	(*)	
10	Filters	15020100-01	07.63	17120	(*)	

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Collection, purification and distribution of water

410 Collection, purification and distribution of water

The manufacturing process of drinking water depends on the quality of raw water and also on the network into which water is pumped. When using surface water as raw water, the problem is often the organic substance in the water, mostly humus. In Finland it is typical that raw water contains high levels of iron and manganese and also high level of carbon dioxide dissolved into water. Humus, iron and manganese are removed by chemical sedimentation. Carbon dioxide can be removed by aeration, alkalizing masses, lye or soda. Before the drinking water is delivered into the

pipings, water is disinfected. The effect of the disinfection has to last as long as the water is in the piping, which causes requirements to disinfection technique. For the time being the most common technique to prevent microbiological aftergrowth is chlorination of drinking water. The aim is to decrease the amount of chlorine used by alternative disinfection techniques, for example ozonization. The general production technique of household water is presented in Figure 30. The most important wastes arising from production are shown in Table 120.

Figure 30. Household water manufacturing principle

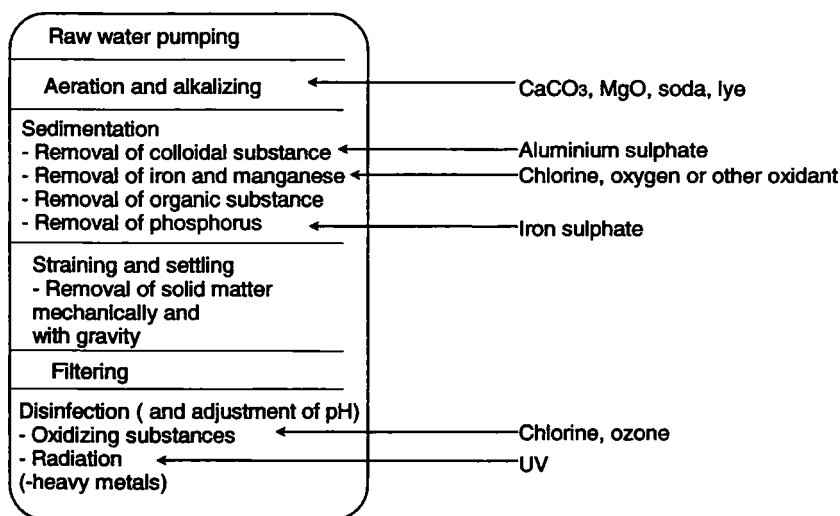


Table 120. Household water production wastes

Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
Disinfectant waste	160502-03	03.31	31100	(*)	
Prefiltering, percolating and mesh screening waste	190101	13.21	37201		
Ion exchanger regeneration waste	190906	01.24	33310/33110		
Ion-exchange resins	190905	03.14	37144		
Chemical sedimentation sludge	190202	12.20	55100		
Used activated carbon	190904	02.11	21610		
Sludges from sedimentation	190202	12.20	21811		
Sludges from water softening	190903	01.24	55101		

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Construction

There are three main ways how wastes arise from construction: earthmoving work, building material waste and demolition waste (demolition is dealt with separately in section 372). The largest amount of waste arise from earthmoving. On the other hand the purpose is to use the moved soil as efficiently as possibly in other building sites as filling earth. As material losses arise for example mould plywood and crude boards, bitumen felt and tiles which are used in roof building, concrete, stones and plaster, insulators and floor mats

and plastic tiles. Most of the wastes from construction is wood, stone or metal material which is either utilized (wood and metal), delivered to landfills or used as filling earth (stone and brickstone material). Despite the effective utilization, still most of the waste is delivered to landfills. Mixed waste is also delivered to landfills, which may contain for example plastics, unclean wood and chipboards and other wood plates. The most important wastes arising from construction are shown in Table 121.

Table 121. Construction wastes

Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
Concrete	170101	13.11	21503		
Powder paint waste	080104	03.13	36501		
Cables, glassfibric	170203	07.42	21410		
Cables, metallic	170408	06.23	25600		
Gypsum plates	170104	13.11	21710		
Machine and appliance scrap	160201-05	08.12	25200/25600		
Tiles and ceramics	170103	13.11	21425		
Glass waste	170202	07.13	21405		
Glues and lining compounds	080401-04	03.13	36600	(*)	(*)
Solvents (diluent), non-halogenated	070104	01.12	35200	*	*
Soil	17050100-01	13.21/13.30	21701-02	(*)	
Paints and lacquers, hardened	080105	03.13	36502		
Paints and lacquers, cont. solvents, non-halogenous	080102	03.13	36505	*	*
Paints and lacquers, cont. solvents, halogenated	080101	03.13	36503	*	*
Metal waste	170104-07	06.22-26	25600		
Mineral wool	170602	13.14	21508		
Engine, transmission and lubricating oil waste	130201-03	01.31	34100	*	*
Plastic waste	170203	07.42	37100		
Other wood waste	170201	07.53	18113		
Organic halogenated solvents	070103	01.11	35100	*	*
Lumber	170201	07.53	18113		
Miscellaneous construction waste	170701	13.11	21500		
Brickstone	170102	13.11	21506		

Sales, repairing and servicing of motor vehicles and retail sale of fuel

Service station activity

Table 122. Service station activity wastes

Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
Batteries	160601-05	08.51	25500/25600	(*)	(*)
Alkalis and alkali compounds	050201-99	01.22	33300	*	*
Acids and acid compounds	060101-99	01.21	33100	*	*
Hydraulic oil waste	130101-07	01.32	34100	*	*
Brake fluids	130108	01.32	34100	*	*
Hardened glues, putty and resins	080404	03.13	36600		
Lacquer waste, hardened	080105	03.13	36510		
Glass waste	200102	07.12	21405		
Glues and lining compounds, cont. solvents	08040102	03.13	36600	*	*
Fluorescent tubes and other waste cont. mercury	200121	08.53	21415	*	*
Water suspensions cont. paints and lacquers	08011001	03.13	25500	(*)	
Solid waste from paint and lacquer removing	080109	03.13	36500		
Sludges from paint and lacquer removing, cont. solvents	080106-07	03.13	36800	*	*
Paints and lacquers, cont. solvents	080101-02	03.13	36500	*	*
Water-dilutable paints and lacquers	080103	03.13	36500		
Metal scrap	160205	06.32	25200/25600		
Engine, transmission and lubricating oil waste	130201-03	01.31	34100	*	*
Plastic wrappers	150102	07.42	37100		
Plastic bottles and containers	150102	07.42	37100		
Organic halogenated solvents	070103	01.11	35100	*	*
Organic non- halogenated solvents	070104/140103	01.12	35200	*	*
Paper and board waste	200101	07.21	19315		
Wood waste	200107	07.53	181100		
Cleaning towels and wool, oily	15020101	07.63	17119	*	
Cleaning towels and wool	150201	07.63	17119		
Scrap tires	160103	07.31	37502		
Miscellaneous municipal waste	20030111.11	51102			
Protective clothing	150201	07.63	17111		
Surface emulsions from oil extractors	130505	01.32	34801	*	*
Bottom sludges from oil extractors	130502	01.32	34801	*	*
Oil absorption masses and rags	130601	02.22	34408	*	*
Oil filters	130601	01.32	34409	*	*

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Whole sale and commission trade, except of motor vehicles and motorcycles

Wastes from whole sale and retail trade are very much alike. Classification used in branch 52 can be used in whole sale activity.

52

Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods

Most of the waste arising from trade is different packaging waste. Largest amount of packaging waste accrues from cardboard boxes and plastic packing materials. In the classification of plastics, creates expanded polystyrene its own special group. Expanded polystyrene is used among other things, as carrying pallets, shock-absorber and padding (for example granules, plates and pieces). Wood waste produced by trade is mainly from pallets and packing boxes. Glass packages are mainly deposit bottles. The most

important hazardous wastes from trade are waste oils and oil containing solid wastes (from warehouse transport equipment), batteries, dry-cell batteries, fluorescent tubes, paints, lacquers and glues. Daily consumer goods stores produce in addition biological waste, which may contain not only spoiled products, but also meat, fish and vegetable clearing waste or store's own kitchen or bakery waste. The most important wastes arising from trading activity are shown in Table 123.

Table 123. Retail trade wastes

Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
Batteries	20012000-01	08.51	25500/25600	(*)	
Organic compostable waste	200108	10.20	12105		
Composite packages	15010500-01	99.99	51102	(*)	
Glass waste	200102	07.21	21405		
Solvents	200113	01.11-12	35000	*	*
Fluorescent tubes	200121	08.53	21415	*	*
Paint, lacquer, glue and resin waste	200112	03.13	36500/36600	*	*
Metal packages	15010400-01	06.31	25502	(*)	
Plastic packages	15010200-01	07.41	37100	(*)	
Paper and cardboard packages	15010100-01	07.21	19300	(*)	
Wood packages	15010300-01	07.51	18111	(*)	
Broken machines and appliances	160205	08.12	25200/25600		
Miscellaneous packages	15010600-01	11.21	51102	(*)	
Miscellaneous municipal waste	200301	11.11	51102		

Hotels and restaurants

Hotels and restaurants produce not only biological waste, but also large amounts of different metal, cardboard, plastic and glass packaging waste and office

and other waste paper. Large amount of glass packages are returnable bottles. Metal waste comes from preserve cans and beverages (bottle caps).

Table 124. Wastes from hotels and restaurants

Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
Organic compostable waste	200108	10.24	12105		
Composite packages	15010500-01	99.99	51102	(*)	
Glass waste	200102	07.12	21405		
Fluorescent tubes	200121	08.53	21415		
Paint, lacquer, glue and resin waste	200112	03.13	36500/36600	*	*
Metal packages	15010400-01	06.31	25502	(*)	
Plastic packages	15010200-01	07.41	37100	(*)	
Paper and board (recycled paper)	200101	07.21	19315		
Paper and cardboard packages	15010100-01	07.21	19300	(*)	
Wood packages	15010300-01	07.51	18111	(*)	
Fat extraction waste	200109	10.12	13301		
Broken machines and appliances	160205	08.12	25200/25600		
Miscellaneous packages	15010600-01	11.21	51102	(*)	
Miscellaneous municipal waste	200301	11.11	51102		
Textile waste	200111	07.63	17111		

Other business activities

7481 Photographic activities

In photographic companies arises not only packaging waste, but also film, album paper, developing and fixative wastes and solvents.

Table 125. Wastes from photographic companies

Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
Film and celluloid waste	090107-08	03.14	37146		
Adhesive paper of films	090107-08	07.23	19307		
Silver chloride	090106	01.24	31410	*	*
Developing baths	090101-03	01.21/01.22	33540	*	*
Cleaning solutions of development tanks	090101-03	01.24	33543	*	*
Stop baths	090199	01.24	33542		
Fixatives	090104	01.23	33547	*	*
Nickel silver	090106	06.21	25633	*	*
Bleaching baths	090105	01.21	33544	*	*

851 Human health activities

Over 90 % of waste arising from health service activities is normal municipal waste (see section Municipal wastes, p. 145). Large amount of normal municipal waste is miscellaneous waste, which is highly plastic containing and so far utilization has not been possible (non-recyclable paper, plastic packings, disposable goods, bandaging materials and diapers, bags containing liquids, etc.) In addition arises hazardous waste and activity related, special treatment requiring waste. Special waste treatment requiring wastes are recogniz-

able biological waste or ethical waste (sensing organs, limbs, embryos, etc.), pricking and slashing waste and possible infectious waste. In addition part of the waste arising from health service activities requires privacy protection, which needs to be taken into consideration when delivering waste out of place of business. This kind of waste can be for example patient papers, x-rays and films and patient information containing sample tubes. The most important wastes arising from health service activities are shown in Table 126.

Table 126. Wastes from health service activities

Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
Mercury alloy waste	18019901	06.26	25520	*	
Mercury waste	200121	08.53	31416	*	*
Developments and fixatives	090101-04	01.21-23	33500	*	*
Machines and appliances, metal scrap	160205	08.12	25200		
Office paper	200101	07.21	19300		
Discarded chemicals	180105	03.14	25200/25600	*	
Discarded medicine	180105	03.12	39111	*	
Glass waste (laboratory equipment etc.)	180104	07.12	21405		
Fluorescent tubes	200121	08.53	21415	*	*
Lead waste	180199	06.25	25625		
Plastic waste	180104	11.11	37100		
Paper towels etc.	180104	07.21	19300		
Food waste from restaurants	200108	10.24	12105		
Scrap batteries	160601-05	08.51	25500/25600	(*)	(*)
Body parts and organs (incl. blood products)	180105	05.10	11402		
Body parts, organs, blood; infectious	18010201	05.10	11403	*	
Dictation tapes, discs etc.	200301	11.11	53105		
Miscellaneous health service waste	180104	05.10	53105		
Infectious waste	180103	05.10	53103	*	*
Textiles	180104	07.61	17111		
Photographic films and papers, cont. silver	090107	03.14	37146		
Pricking and slashing waste	180101	05.10	53106		
Pricking and slashing waste, infectious	18010101	05.10	53106	*	

853. Social work activities

In providing social services, like nursing homes, day care centers and different institution services, arises wastes which are similar to household wastes and especially waste paper and board arise in bureaus (office paper, magazines, newspapers,

cardboard packages). Part of waste paper is to be privacy protected. Wastes arising from kitchens which are situated with bureaus and old people's homes are similar to wastes from restaurants.

90001 Treatment of liquid waste

The most common and most economic municipal wastewater treatment technique is biological treatment of wastewater aerobically (activated sludge technique). Wastewater can also be treated anaerobically (digestion), but in case of municipal wastewaters it is very rare. Chemical techniques are used aside with these techniques. All treatment techniques include also mechanical treatment of the water which comes to the treatment plant (screening, sand removal). Wastes arising from wastewater treatment are shown table 127. The following paragraphs present the most common treatment techniques.

Biological treatment of wastewater by activated sludge technique

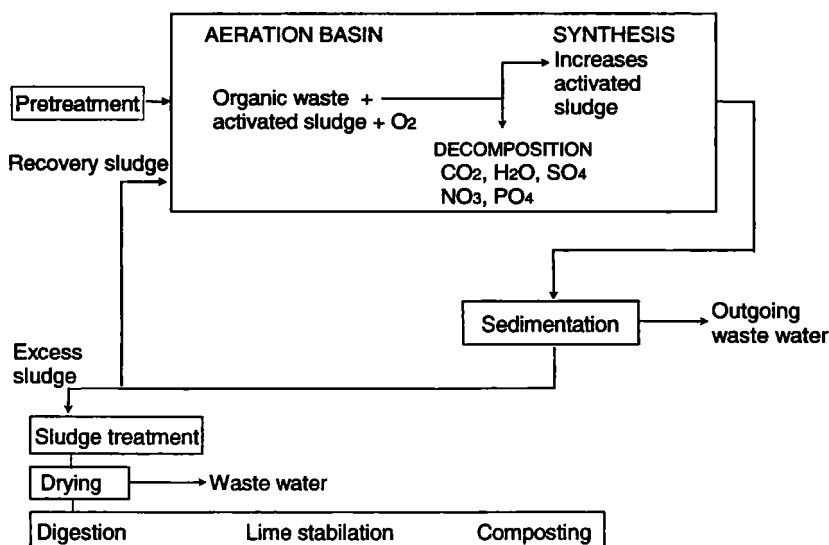
Biological treatment of wastewater by activated sludge technique is based on microbiological decomposition of organic impurities in wastewater in aerobic conditions. Activated sludge consists of different micro-organisms: bacteria, algae and protozoon and solid matter which is stuck to them. Microbes of activated sludge use the organic matter of wastewater as nutrient and so split the impurities into form that is less harmful to natural waters. Decomposition takes place in aerator basin, in which new activated sludge is

formed continuously. From the aerator basin the wastewater and the sludge are led to clarification, where the sludge sinks to the bottom of the basin. From the clarification basin the water is led either directly or through chemical after-treatment into water system. The main principle of biological treatment is presented in Figure 31.

Phosphor and nitrogen removal from wastewaters

Biological treatment does not remove efficiently phosphoric compounds (removal efficiency is about 20-30%) from wastewater. The most common method to phosphoric removal is chemical sedimentation. In biological treatment plants it is done the same way. Sedimentation can be done before or after the aeration. Most metals precipitate phosphates, therefore iron and aluminium sulphate are most commonly used in sedimentation of the phosphates in wastewater. Nitrogen in wastewaters is principally in the form of ammonia nitrogen which is harmful for fish and in the treatment is transformed into nitrate nitrogen. Nitrification takes place microbiologically with assistance of nitrogen compound oxidizing bacteria in the wastewater. Oxidation efficiency is largely dependent on the oxygen content and pH-value of the water.

Figure 31. The principle of biological treatment of wastewater. Pretreatment includes screening (removal of coarse substance by filtering), sand removal and pre-aeration.



Biological treatment of wastewater causes substantial amounts of excess sludge, which consists of cell mass produced by activated sludge and combined solid matter of wastewater. The sludge is very nutrient containing and depending on the quality of the wastewater the sludge can also contain different organic impurities (from industrial processes) or metals and other inorganic compounds. The after-treatment techniques of the sludge are drying, digestion (produces energy as methane), lime stabilization and composting. The composted sludge can be used as soil conditioner.

Anaerobic treatment of wastewater

Anaerobic wastewater treatment processes are used especially in forest industry, food industry and textile industry. In these techniques the decomposition of the organic matter in wastewater is based on methane fermentation, i.e. the process produces methane which can be burned for energy production. As advantages compared to activated sludge technique are the smaller space occupation and the amount of energy needed and also small amount of sludge produced. Usually anaerobic treatment takes place in a pond or alternatively in different kinds of reactors. There are also anaerobic wastewater filters in use.

Table 127. Wastes from municipal wastewater treatment

Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
Wastewater sludge from industry when sludges are not mentioned in branch of industry in question					
Biological treatment waste	190804	12.12	57304		
Presedimentation sludge	190804	12.12	57303		
Wastes from sand removal	190802	13.21	21601		
Chemical sedimentation sludge	190804	12.12	57305		
Saturated or used ion-exchange resins	190806	03.14	37145	*	*
Solutions or sludges from ion-exchange regeneration	190807	01.24	33110/33310	*	*
Fat and oil compounds (from oil extraction)	190803	02.22	34300	*	*
Mesh screen waste	190801	11.12	57201		
MUNICIPAL WASTEWATER SLUDGE					
Wastes from sand removal	190802	13.21	21601		
Wastewater sludge, not stabilized	190805A	12.11	57304		
Wastewater sludge, lime stabilized	190805D	12.11	57304		
Wastewater sludge, aerobically decomposed	190805B	12.11	57304		
Wastewater sludge, otherwise treated	190805F	12.11	57304		
Wastewater sludge, digested	190805C	12.11	57304		
Wastewater sludge, thermally treated	190805E	12.11	57304		
Fat and oil compounds (from oil extraction)	190803	02.22	34300	*	*
Mesh screen waste	190801	11.12	57201		

90002 Treatment of solid waste

Hazardous waste management

In Finland there were 74 hazardous waste utilizing or treating disposal plants in year 1996. Most of them

treat oily waste. Other plants are batteries, mercury containing waste, mercury alloy, development and fixative waste, pesticide and cleaning solvent waste treating plants. Wastes arising from these plants' activities are not dealt with in this manual.

Air pollution control in the industry

Wastes arising from air pollution control activities are shown in tables by branch of industry. In the following is presented the general principles of air pollution control methods and how the most important wastes generally arise from the treatment.

Activated carbon filtering of organic impurities

Activated carbon filtering is effective treatment technique for air which contains gaseous organic compounds. Activated carbon binds to its surface organic compounds, which can be removed from the carbon mass by a suitable solvent. From filtering and treatment of filters arise waste as used carbon masses and as washing and extraction solutions.

Mechanical treatment of flue gases by filtering

The finest particles can not be separated by mechanical filtering of flue gases, although good results are achieved with new filters. In filters different textile fibres are used, which hole and pore size determine the removal efficiency of the filter. The particle material attaching to the surface of the filter usually improves the filtering efficiency. Filters have to be cleaned and changed from time to time. Some filtering materials' service life is restricted by their shredding sensitivity.

Flue gas treatment with cyclone and electrostatic precipitator

Solid and over 5 micrometer particles are removed from flue gases by cyclone separation. Because of low removal efficiency, the technique is suitable mainly in energy production and in cellulose and paper industry as pre-extractor of particles from soda recovery units, from lime sludge reburning kilns and from solid fuel auxiliary boiler. The function of cyclones is based on collision of particles to the wall of the cyclone and consequent flowing into the receivers.

Electrostatic precipitators contain a special "charging wire" which causes the electrical charging of the flue gas particles. Charged particles are gathered on the gathering plate of the precipitator by the effect of electrical forces. Gathering plates are shaken from time to time and the gathered particle mass (fly-ash) flows to the bottom of the filter. Good treatment result is achieved with this technique, but it requires further treatment as sulphur removal and possibly also as other kind of flue gas cleaning. There are three basic types of electrostatic precipitators: dry, semi-dry and wet. In the wet technique the dust gathering plates are rinsed with water and dust containing liquid fraction flows to the bottom of the precipitator. Electrostatic precipitators are used not only in energy production but also in pulp mills for treatment of particulates from soda recovery boilers and auxiliary boilers.

Flue gas treatment by washing

Venturi washer, spray tower, packed tower and tray tower are so called wet dust collectors. Gas particles are separated in washers when they get contacted with the washing water or liquid. In a venturi washer gas and liquid streams flow to the same direction, therefore the washer requires a tank or drop separator as an adjoint piece. In a spray tower gas and liquid flow to the opposite directions. Separation of the particles is based on the agglomeration of gas particles and liquid drops. Packed tower and tray tower are also based on gas particles absorption into water. Contact surface of gas and liquid can be increased with packed tower and tray tower. The system is counterflowed, that is the gas flows upwards while the liquid streams downwards from the top of the washer. If flue gas contains sulphur compounds (coal and oil burning, ore concentrating, manufacture of sulphuric acid, paper and pulp industry) sodium based alkalis or oxygenated white lye are used as washing liquid. In energy production also calcium carbonate is commonly used for sulphur removal, and calcium sulphate obtained as sulphur removal product. Chlorine and chlorine dioxide gases (paper and pulp industry) are washed with caustic soda liquor, white lye or alkaline phase washing solution from bleaching.

Thermic and catalytic oxidation of flue gases

Thermic oxidation of flue gases means burning sulphurous organic compounds (especially methylmerktan) at high temperature. Gases can be burned in a separate afterburner or they can be directed into an appliance designed for burning some other

fuels, for example soda recovery boiler or lime sludge reburning kiln (paper and pulp industry). Catalytic oxidation requires considerably lower temperature than thermic oxidation. In catalytic oxidation sulphurous impurities are decomposed with catalyst metal. Catalytic oxidation is principally used for prevention of odour emissions from sulphate pulp mills.

Packages from industrial activity and service and maintenance

9803 Packaging waste from industrial activity

Packaging waste arose from industrial activity in year 1992 about 100.000 tonnes and approximately half of this amount was from food and paper industry. About half of the packaging waste was paper and paperboard waste. Other packaging waste arose principally from wooden pallets, glass packages, metal packages and sheets, sacks and vats of plastics. The most commonly used material of plastic packages is polyethylene plastic. In Table 128 is shown the most important packaging wastes. In the following chapters are described typical packaging wastes for various industrial activities.

Packaging waste from food, beverage and tobacco manufacturing

Large amount of paper, paperboard and cardboard waste is typical for food manufacturing (excluding beverage industries). One considerable producer of packaging waste in this sector is dairy industry. In food manufacturing sector, dairy industry also produces considerable amount of plastics waste, which arise most after paper and paperboard waste. A special feature of packaging waste in coffee manufacture is the large amount of jute bags, in which the coffee is imported from producer country, and also large amount of wooden pallets. Most of the waste arising from beverage industries is naturally glass waste, however part of it being deposit bottles.

Packaging waste from textile, clothing and leather and leather products manufacture

From textile and leather products manufacture arise mainly paper, paperboard and plastics packaging waste. Glass packages are barely used in these branches of industries. Paper and paperboard waste arise among other things from sockets of fabric rolls, paper wrappers, paper bags and cardboard boxes. Plastics waste arise from plastic wrappers and especially from plastic vats and containers (fabric colouring and printing, leather barking and colouring). Metal waste is mainly from printing ink cans and solvent containers.

Lumber and wood products manufacture

Packaging waste arising from lumber and wood products manufacture is mostly from packaging board and paper. Tar paper, cardboard and plastic covers are used as sawn wood coverings. Usually sawn wood is packed into bundles, which are bound with metallic cable ties or with wires. In lumber and wood products manufacture wooden packaging waste arise considerably smaller amount than paper, cardboard, metal or plastic waste. Practically no glass waste arises at all. From sawn wood manufacture arises metal waste not only from cable ties but also from impregnating substance barrels (content is hazardous waste). From manufacture of builders carpentry and joinery arise metal waste as paint, lacquer and impregnating substance barrels.

Manufacture of pulp, paper and paper products

Quantitatively large amount of packaging waste arises from pulp and paper industry compared to other industries. Main part of the waste is paper and board waste and also metal waste. Paper and board waste consist of wrapping papers, boxes and sockets. Metallic hoops and wires make up significant part of metal waste. Small amount of plastics waste arises compared to paper waste. Significant amounts of wood waste arises as pallets and wooden packages.

Packaging waste from coke and refined petroleum products manufacturing

There arises no packaging waste at all from coke manufacturing. Also from petroleum products manufacturing arises comparatively small amounts of packaging waste. Most of this packaging waste is plastic. Significant part of metal waste is broken gas bottles.

Manufacture of chemicals, chemical products and artificial fibres

Like in any other industry, most of the packaging waste arising from chemical industry is also paper and paperboard. Chemical raw materials are transported in metal barrels and containers and also in plastic vats and

containers, from which arise large amount of wood waste as pallets when chemicals are moved. Wood, metal and plastics waste amounts are approximately the same. Some chemicals are stored in glass containers, therefore glass waste arises also, although about half of the amount of metal or plastics waste. Plastic waste arises not only from vats and containers but also from plastic bags and wrappers.

Packaging waste from rubber and plastic products manufacturing

Packaging waste arising from rubber and plastic products manufacturing is mostly paper and paperboard. Also plastic wrappers and containers amount to a large quantity whereas only small amounts of metal waste and hardly no glass at all is produced. Wood waste is from broken pallets, boxes and miscellaneous wood strips.

Manufacture of non-metallic mineral products

Significant part of packaging waste from non-metallic mineral products manufacturing are different kinds of sacks. Sack waste is not only plastic, but also paper and fabric. Very small amounts of plastic waste arises compared to paper, paperboard and wood waste (pallets). Only small amounts of metal waste and practically no glass waste arise.

Manufacture of basic metals and fabricated metal products

Manufacture of basic metals and fabricated metal products arises significantly small amount of packaging

waste compared to the large amount of production. Waste arises as paper and paperboard packages, wood packages and metal containers and vats. Plastic packaging waste is mainly from plastic wrappers.

Packaging waste from machinery, equipment and electrical equipment manufacturing

Like in manufacture of basic metals and fabricated metal products, only small amounts of packaging waste arises compared to the amount of production in manufacture of machinery and equipment. In case of machinery and equipment almost all of the packaging waste is wood, paper and paperboard. Packaging waste of metal or plastic arises only small amounts. Also from electrical equipment manufacturing arises principally wood, paper and paperboard waste. Plastic packaging waste arise more than from machinery and equipment manufacturing. Plastic packages are mainly wrappers and paddings of products. Metal packaging waste arises only small amounts from electrical equipment manufacturing.

Packaging waste from transport equipment manufacturing

Compared to other branches of industries, manufacture of transport equipment arises only small amounts of packaging waste. Packaging waste is quite uniformly distributed with wood, paper, paperboard and plastic. Metal packages arise the smallest amount of packaging waste and hardly no glass waste at all arises.

Table 128. Packaging waste from industrial activity

Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
Aluminium foil	150104	06.22	25504		
Aluminium packages	150104	06.22	25616		
Bitumen and tar paper	150101	07.21	19313		
Jute bags	150106	07.61	17103		
Waste cardboard and paperboard	150101	07.21	19500		
Fabric and knitted good waste	150106	07.61	17111		
Paperboard, plastic coated	150105	07.23	19508		
Paperboard sockets, brown corrugated board	150101	07.21	19501		
Thermoplastic strips and sheets	150102	07.41	37142		
Composite packages	150105	99.99	51102		
Pallets, wooden	150103	07.53	18110		
Glass waste	150106	07.11	21400		
Glass waste, cont. hazardous waste	15010601	07.13	21407		

Table 128 (continue)

Reinforced plastic products	150102	07.41	37150	
Metal packages and containers	150104	06.31	25502	
Metal packages and containers, cont. hazardous waste	15010401	06.31	25104	*
Plastic vats, bottles and cans	150102	07.41	37148	
Plastic packages and containers, cont. hazardous waste	15010201	07.42	37149	*
Plastic reel stands	150102	07.41	37141	
Plastic sacks and wrappers	150102	07.42	37104	
Liquid packaging board	150103	07.23	19508	
Paper packages	150101	07.21	19300	
Sawdust and chips (padding material)	150103	07.53	18300	
Wood packages	150103	07.53	18311	
PVC-foam insulation waste	150102	07.41	37122	
Iron wire	150104	06.13	25201	
Synthetical fibre sacks	150106	07.61	17109	
Steel gas bottles, empty	150104	06.13	25211	
Pesticide containers, metallic	15010401	06.31	25104	*
Hoop iron	150104	06.13	25202	

9806 Wastes from service and maintenance of industry

Maintenance of cars, forklifts and other transport equipment

Service of cars, forklifts, tractors and cranes used in industrial plants arise normal motor vehicle servicing waste: lubricating oils, hydraulic oils, transmission oils, oil filters, greases, solvents and cleaning wool. In repair shops arise also among other things oil and grease

extraction sludges and also absorption masses or rags. The most common wastes arising from maintenance and service of transport equipment are shown in Table 129.

Table 129. Wastes from car, forklift and other transport equipment maintenance

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Alkaline washing solvents	060102-99	01.22	33310	*	*
1	Hydraulic oil waste	130101-07	01.32	34100	*	*
1	Brake fluids	130108	01.32	34100	*	*
1	Coolants	130304	01.32	33527	*	*
1	Catalyzers	160101-02	08.52	25200		
1	Used tires	160103	07.31	37502		
1	Engine, transmission and lubricating oil waste	130201-03	01.31	34100	*	*
1	Organic solvents, halogenated	140102	01.11	35100	*	*
1	Organic solvents, non-halogenated	140103	01.12	35200	*	*
1	Cleaning towels and wool, cont. hazardous waste	15020101	07.63	17119	*	
1	Scrap batteries	160601-05	08.51	25500/25600	(*)	(*)
1	Oil and fuel filters	130301	02.22	34409	*	*
10	Surface emulsion from oil extractors	130505	01.32	34801	*	*
10	Bottom sludge from oil extractors	130502	01.32	34801	*	*
10	Oil absorption masses and rags	130601	02.22	34408	*	*

Maintenance of machinery and appliances

From machinery and appliances maintenance similar waste arise than from transport equipment maintenance. Arising solvent waste can be divergent because of special requirements of the machine or the

process (for example washing the equipment with microbe growth preventing detergent or solvent). Wastes arising from maintenance of machinery and appliances.

Table 130. Wastes arising from machinery and appliances maintenance

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Non-ferrous metal waste	160205	08.53	25600		
1	Alkalis and alkaline compounds	060201-99	01.22	33310	*	*
1	Insulation and heat transfer oil waste	130301-05	01.32	34106	*	*
1	Halogenated organic solvents	140102	01.11	35100	*	*
1	Non-halogenated organic solvents	140103	01.12	35200	*	*
1	Acids and acid compounds	060101-99	01.21	33110	*	*
1	Hydraulic oil waste	130101-07	01.32	34100	*	*
1	Cables	160205	08.53	25600		
1	Rubber belts	160205	08.53	37501		
1	Engine, transmission and lubricating oil waste	130201-03	01.31	34100	*	*
1	Plastic scrap	160208	08.53	37100		
1	Cleaning towels and wool, cont. hazardous waste	15020101	07.63	17119	*	
1	Iron and steel scrap	160205	08.53	25200		
1	Scrap batteries	160601-05	08.51	25500/25600	(*)	(*)
10	Surface emulsion from oil extractors	130505	01.32	34801	*	*
10	Bottom sludge from oil extractors	130502	01.32	34801	*	*
10	Oil absorption masses and rags	130601	02.22	34408	*	*

Service, cleaning and maintenance of work places, tanks and pipages

Service, cleaning and maintenance of work places, tanks and pipages is very important in high hygiene demanding production. This kind of production can be for example food, medicine and chemical industries. A specific feature for food industry is substantial use of chlorine disinfectants and washing lye. Also acids are

used for cleaning in food industry. In chemical industry comparatively large amount of sediments arise from cleaning of containers and sewers. On the other hand for example the maintenance and cleaning of printing machines in printing industry causes substantial amounts of dirty rags, washing solvents and printing ink waste. The most common wastes arising from service, cleaning and maintenance of work places, tanks and pipages are shown in Table 131.

Table 131. Wastes from service, cleaning, maintenance of work places, tanks and pipages

p	Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
1	Asbestos plates	17010500-01	13.12	21513	(*)	(*)
1	Non-ferrous metal scrap	160205	08.53	25600		
1	Mercury vapour lamps	200121	08.53	21416	*	*
1	Alkalis and alkaline compounds	060201-99	01.22	33310	*	*
1	Halogenated organic solvents	070103	01.11	35100	*	*
1	Non-halogenated organic solvents	070104	01.12	35200	*	*
1	Acids and acid compounds	060101-99	01.21	33110	*	*
1	Chlorates, chlorites and chlorides	060304	01.23	31102-04		
1	Fluorescent tubes	200121	08.53	21415	*	*
1	Washing agents, detergents	160502-03	03.14	13505	(*)	
1	Cleaning towels	15020100-01	07.63	17119	(*)	
1	Wood waste	170201	07.53	18100		
1	Dust and garbage	200301	11.22	51102		
1	Iron and steel scrap	160205	08.53	25200		
1	Storage tank washing wastes, cont. chemicals	160705	03.14	33800	*	*
1	Storage tank washing wastes, others	160799	11.22	51102		
1	Storage tank washing wastes, cont. oils	160706	02.22	34800	*	*

Industry unknown - Municipal wastes

Municipal waste consists of, according to Waste Act 10 §, waste that arises from habitation (household waste) and from industries and service activities, in condition that quantity and quality of the waste can be regarded equal to household waste. Wastes from some service activities are dealt with earlier. Most of the waste produced by trade, offices and services can be regarded as municipal waste. Wastes from small industries are typical to each branch of industry (see presentations by branch of industry), but quantities are smaller (quantities are regarded equal to household waste). In addition in small industries, as also in trade and

services, arise waste which can be clearly regarded equal to household waste.

Household waste

A little less than half of municipal waste is household waste. According to calculatory estimation households produced waste total of 856 000 tonnes in year 1994. More than two thirds of this amount was compostable organic waste and paper. The most important wastes from households are shown in Table 132.

Table 132. Household wastes

Type of waste	Classification (ME)	Classification (EWCSTAT)	Classification (Statistics)	H. waste (ME)	H. waste (EC)
Aerosols	200122	03.14	51102		
Batteries	20012000-01	08.51	25500/25600	(*)	
Organic compostable waste	200108	10.23	12105		
CFC-compounds cont. appliances	200123	08.53	51102		
Electronic appliances	200124	08.22	25636		
Alkalis	200115	01.22	33300	*	
Acids	200114	01.21	33100	*	
Composite packages	15010500-01	99.99	51102	(*)	
Glass waste	200102	07.12	21405		
Solvents	200113	01.11-12	35000	*	*
Fluorescent lamps, other mercury cont. waste	200121	08.53	21415	*	*
Paint, lacquer, glue and resin waste	200112	03.13	36500/36600	*	*
Metal packages	15010400-01	06.31	25502	(*)	
Plastic packages	15010200-01	07.41	37100	(*)	
Paper and board (recycled paper)	200101	07.21	19315		
Paper and cardboard packages	15010100-01	07.21	19300	(*)	
Washing and cleaning agents	200116	03.14	39400		
Wood	200107	07.53	18100		
Wood packages	15010300-01	07.51	18111	(*)	
Gardening waste	200201-03	10.31/13.21	11201		
Broken machines and appliances	160205	08.12	25200/25600		
Septic tank sludges	200304	12.40	57101		
Miscellaneous packages	15010600-01	11.21	51102	(*)	
Miscellaneous municipal waste	200301	11.11	51102		
Textiles	200111	07.63	17111		
Pesticides	200119	03.11	39100	*	*
Clothing	200110	07.62	17113		
Photographic chemicals	200117	01.22	33500	*	*
Oil and grease	20010900-01	10.21-22	34100/34200	(*)	

No. 867

**Ministry of the Environment Decision
on the list of the most common wastes and of hazardous wastes**

Issued in Helsinki on November 14, 1996

Under section 75, subparagraph 1, of the Waste Act (1072/1993) issued on December 3, 1993 the Ministry of the Environment has issued the following Decision:

Section 1

The annex to this Decision is confirmed as the list of the most common wastes and of hazardous wastes.

Section 2

This Decision comes into force on January 1, 1997.

Helsinki, November 14, 1996

Minister of the Environment *Pekka Haavisto*

Senior adviser Riitta Levenen

List Of The Most Common Wastes And Of Hazardous Wastes

Introduction

The listed waste items, excluding certain supplementary entries¹, are based on the European Waste Catalogue (Commission Decision 94/3/EY).

The list contains examples of wastes. It does not include all wastes, nor are the objects or substances listed always waste. Objects or substances are waste when they meet the criteria laid down in section 3, paragraph 1, subparagraph 1, of the Waste Act (1072/1993).

Wastes among the listed entries marked with an asterisk (*) are hazardous waste, unless otherwise decided in individual cases by the regional environment centre under section 3a, paragraph 2, subparagraph 1, of the Waste Decree (1390/1993). The concept 'hazardous substance' refers to substances listed in annex 3 of the Waste Decree.

The list comprises waste items grouped under three, or sometimes four, heading levels. An individual entry should not be considered separately from its higher-level headings.

¹ Entries with eight-digit identification numbers and six-digit entries whose identification number includes the figure 98.

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- 01 00 00 Waste resulting from exploration, mining, dressing and further treatment of minerals and quarrying
- 02 00 00 Waste from agricultural, horticultural, hunting, fishing and aquaculture primary production, food preparation and processing
- 03 00 00 Wastes from mechanical wood industry and the production of paper, cardboard, pulp, panels and furniture
- 04 00 00 Wastes from the leather and textile industries
- 05 00 00 Wastes from petroleum refining, natural gas purification and pyrolytic treatment of coal
- 06 00 00 Wastes from inorganic chemical processes
- 07 00 00 Wastes from organic chemical processes
- 08 00 00 Wastes from the manufacture, formulation, supply and use (MFSU) of coatings, (paints, varnishes and vitreous enamels), adhesive, sealants and printing inks
- 09 00 00 Wastes from the photographic industry
- 10 00 00 Inorganic wastes from thermal processes
- 11 00 00 Inorganic waste with metals from metal treatment and the coating of metals and from non-ferrous hydrometallurgy
- 12 00 00 Wastes from shaping and surface treatment of metals and plastics
- 13 00 00 Oil wastes and other liquid wastes of comparable nature (except edible oils, 05 00 00 and 12 00 00)
- 14 00 00 Wastes from organic substances employed as solvents (except 07 00 00 and 08 00 00)
- 15 00 00 Packaging; absorbents, wiping cloths, filter materials and protective clothing not otherwise specified
- 16 00 00 Wastes not otherwise specified in the catalogue
- 17 00 00 Construction and demolition waste (including road construction)
- 18 00 00 Wastes from human or animal health care and/or related research (excluding kitchen and restaurant wastes which do not arise from immediate health care)
- 19 00 00 Wastes from waste treatment facilities, off-site waste water treatment plants and the water industry
- 20 00 00 Household wastes and comparable waste from industrial, service or other operations (municipal wastes) including separately collected fractions

01 00 00	WASTE RESULTING FROM EXPLORATION, MINING, DRESSING AND FURTHER TREATMENT OF MINERALS AND QUARRY	
01 01 00	waste from mineral excavation	01 04 00 waste from further physical and chemical processing of other minerals
01 01 01	waste from mineral metaliferous excavation	01 04 01 waste gravel and crushed rocks
01 01 02	waste from mineral excavation of other minerals	01 04 02 waste sand and clays
		01 04 03 dusty and powdery waste
		01 04 04 waste from potash and rock salt processing
01 02 00	waste from mineral dressing	01 04 05 waste from washing and cleaning of minerals
01 02 01	waste from the dressing of metaliferous minerals	01 04 06 waste from stone cutting and sawing
01 02 02	waste from the dressing of other minerals	01 04 99 wastes not otherwise specified
01 03 00	waste from further physical and chemical processing of metaliferous minerals	01 05 00 drilling muds and other drilling wastes
01 03 01	tailings	01 05 01 oil-containing drilling muds and wastes
01 03 02	dusty and powdery waste	01 05 02 barite-containing drilling muds and wastes
01 03 03	red mud from the alumina production	01 05 03 chloride-containing drilling muds and wastes
01 03 99	wastes not otherwise specified	01 05 04 fresh-water drilling muds and wastes
		01 05 99 wastes not otherwise specified
02 00 00	WASTE FROM AGRICULTURAL, HORTICULTURAL, HUNTING, FISHING AND AQUACULTURE PRIMARY PRODUCTION, FOOD PREPARATION AND PROCESSING	
02 01 00	primary production waste	processing of fruit, vegetables, cereals, edible oils, cocoa, coffee, tea, conserves and tobacco
02 01 01	sludges from washing and cleaning	02 03 01 sludges from washing, cleaning, peeling, centrifuging and separation
02 01 02	animal tissue waste	02 03 02 wastes from preserving agents
02 01 03	plant tissue waste	02 03 03 wastes from solvent extraction
02 01 04	waste plastics (excluding packaging)	02 03 04 materials unsuitable for consumption or processing
*02 01 05	agrochemical wastes	02 03 05 sludges from on-site effluent treatment
02 01 06	animal feces, urine and manure (including spoiled straw) and effluent collected separately and treated off-site	02 03 99 wastes not otherwise specified
02 01 07	waste from forestry exploitation	
02 01 99	wastes not otherwise specified	
02 02 00	wastes from the preparation and processing of meat, fish and other foods of animal origin	02 04 00 wastes from sugar processing
02 02 01	sludges from washing and cleaning	02 04 01 soil from cleaning and washing beet
02 02 02	animal tissue waste	02 04 02 off specification calcium carbonate
02 02 03	materials unsuitable for consumption or processing	02 04 03 sludges from on-site effluent treatment
02 02 04	sludges from on-site effluent treatment	02 04 99 wastes not otherwise specified
02 02 99	wastes not otherwise specified	02 05 00 wastes from the dairy products industry
02 03 00	wastes from preparation and	02 05 01 materials unsuitable for consumption or processing
		02 05 02 sludges from on-site effluent treatment

02 05 99	wastes not otherwise specified	02 07 00	wastes from the production of alcoholic and non-alcoholic beverages (excluding coffee, tea and cocoa)
02 06 00	wastes from the baking and confectionery industry		
02 06 01	materials unsuitable for consumption or processing	02 07 01	wastes from washing, cleaning and mechanical reduction (such as cutting and grinding) of the raw material
02 06 02	wastes from preserving agents		
02 06 03	sludges from on-site effluent treatment	02 07 02	wastes from spirits distillation
02 06 99	wastes not otherwise specified	02 07 03	waste from chemical treatment
		02 07 04	materials unsuitable for consumption or processing
		02 07 05	sludges from on-site effluent treatment
		02 07 99	wastes not otherwise specified

03 00 00 **WASTES FROM MECHANICAL WOOD INDUSTRY AND THE PRODUCTION OF PAPER, CARDBOARD, PULP, PANELS AND FURNITURE**

03 01 00	wastes from mechanical forest industry and the production of panels and furniture	03 03 00	wastes from pulp, paper and cardboard production and processing
03 01 01	waste bark and cork	03 03 01	bark
03 01 02	sawdust	03 03 02	green liquor sludge (from black liquor treatment)
03 01 03	shavings, cuttings, and spoiled timber, particle board and veneer	03 03 03	bleaching sludges from hypochlorite and chlorine processes
03 01 99	wastes not otherwise specified	03 03 04	bleaching sludges from other leaching processes
03 02 00	wood preservation waste	03 03 05	de-inking sludges from paper recycling
*03 02 01	non-halogenated organic wood preservatives	03 03 06	fibre, coating and filler rejects
*03 02 02	organochlorinated wood preservatives	03 03 07	rejects from sorting of paper and cardboard
*03 02 03	organometallic wood preservatives	03 03 99	wastes not otherwise specified
*03 02 04	inorganic wood preservatives	03 03 99 01	sludges from on-site effluent treatment

04 00 00 **WASTES FROM THE LEATHER AND TEXTILE INDUSTRIES**

04 01 00	wastes from the leather industry	04 01 99	wastes not otherwise specified
04 01 01	fleshings and lime split waste		
04 01 02	liming waste	04 02 00	wastes from textile industry
*04 01 03	degreasing wastes containing solvents without a liquid phase	04 02 01	wastes from unprocessed textile fibres and other natural fibrous substances mainly of vegetable origin
04 01 04	tanning liquor containing chromium	04 02 02	wastes from unprocessed textile fibres mainly of animal origin
04 01 05	tanning liquor free of chromium	04 02 03	wastes from unprocessed textile fibres mainly artificial or synthetic
04 01 06	sludges containing chromium	04 02 04	wastes from unprocessed mixed textile fibres before spinning and weaving
04 01 07	sludges free of chromium		
04 01 08	waste tanned leather (blue sheetings, shavings, cuttings, buffing dust) containing chromium		
04 01 09	wastes from dressing and finishing		

04 02 05	wastes from processed textile fibres mainly of vegetable origin	04 02 10	organic matter from natural products (e.g. grease, wax)
04 02 06	wastes from processed textile fibres mainly of animal origin	*04 02 11	halogenated wastes from dressing and finishing
04 02 07	wastes from processed textile fibres mainly of artificial or synthetic origin	04 02 12	non-halogenated wastes from dressing and finishing
04 02 08	wastes from processed mixed textile fibres	*04 02 13	dye stuffs and pigments
04 02 09	wastes from composite materials (impregnated textile, elastomer, plastomer)	04 02 99	wastes not otherwise specified

05 00 00 WASTES FROM PETROLEUM REFINING, NATURAL GAS PURIFICATION AND PYROLYTIC TREATMENT OF COAL

05 01 00	Oily sludges and solid wastes	05 04 00	spent filter clays
*05 01 01	sludges from on-site effluent treatment	*05 04 01	spent filter clays
*05 01 02	desalter sludges	05 05 00	oil desulphurisation waste
*05 01 03	tank bottom sludges	05 05 01	waste containing sulphur
*05 01 04	acid alkyl sludges	05 05 99	wastes not otherwise specified
*05 01 05	oil spills	05 06 00	waste from the pyrolytic treatment of coal
*05 01 06	sludges from plant, equipment and maintenance operations	*05 06 01	acid tars
*05 01 07	acid tars	05 06 02	asphalt
*05 01 08	other tars	*05 06 03	other tars
*05 01 99	wastes not otherwise specified	05 06 04	waste from cooling columns
05 02 00	non oily sludges and solid wastes	05 06 99	wastes not otherwise specified
05 02 01	boiler feedwater sludges	05 07 00	wastes from natural gas purification
05 02 02	waste from cooling columns	*05 07 01	sludges containing mercury
05 02 99	wastes not otherwise specified	05 07 02	wastes containing sulphur
05 03 00	spent catalysts	05 07 99	wastes not otherwise specified
05 03 01	spent precious metal catalysts	05 08 00	wastes from oil regeneration
*05 03 01 01	spent precious metal catalysts containing hazardous substances	*05 08 01	spent filter clays
05 03 02	other spent catalysts	*05 08 02	acid tars
*05 03 02 01	other spent catalysts containing hazardous substances	*05 08 03	other tars
		*05 08 04	aqueous liquid waste from oil regeneration
		05 08 99	wastes not otherwise specified

06 00 00 WASTES FROM INORGANIC CHEMICAL PROCESSES

06 01 00	waste acidic solutions	06 02 00	waste alkaline solutions
*06 01 01	sulphuric acid and sulphurous acid	*06 02 01	calcium hydroxide
*06 01 02	hydrochloric acid	*06 02 02	sodium hydroxide
*06 01 03	hydrofluoric acid	*06 02 03	ammonia
*06 01 04	phosphoric and phosphorous acid	*06 02 99	wastes not otherwise specified
*06 01 05	nitric acid and nitrous acid		
*06 01 99	wastes not otherwise specified		

06 03 00	waste salts and their solutions	06 07 00	wastes from halogen chemical processes
06 03 01	carbonates (except 02 04 02)	*06 07 01	wastes containing asbestos from electrolysis
06 03 02	saline solutions containing sulphates, sulphites or sulphides	*06 07 02	activated carbon from chlorine production
06 03 03	solid salts containing sulphates, sulphites or sulphides	06 07 99	wastes not otherwise specified
06 03 04	saline solutions containing chlorides, fluorides and halides	06 08 00	wastes from production of silicon and silicon derivatives
06 03 05	solid salts containing chlorides, fluorides and other halogenated solid salts	06 08 01	wastes from production of silicon and silicon derivatives
06 03 06	saline solutions containing phosphates and related solid salts	06 09 00	wastes from phosphorus chemical processes
06 03 07	phosphates and related solid salts	06 09 01	phosphogypsum
06 03 08	saline solutions containing nitrates and related compounds	06 09 02	phosphorous slag
06 03 09	solid salts containing nitrides (nitrometallic)	06 09 99	wastes not otherwise specified
06 03 10	solid salts containing ammonium salts and solutions containing cyanides	06 10 00	wastes from nitrogen chemical processes and fertilizer manufacture
*06 03 11	salts and solutions containing organic compounds	06 10 01	waste from nitrogen chemical processes and fertilizer manufacture
06 03 12	wastes not otherwise specified	06 11 00	wastes from the manufacturing of inorganic pigments and opacifiers
06 04 00	metal-containing wastes	06 11 01	gypsum from titanium dioxide production
06 04 01	metallic oxides	06 11 99	wastes not otherwise specified
*06 04 02	metallic salts (except 06 03 00)	06 12 00	wastes from production, use and regeneration of catalysts
*06 04 03	wastes containing arsenic	06 12 01	spent precious metal catalysts
*06 04 04	wastes containing mercury	*06 12 01 01	spent precious metal catalysts containing hazardous substances
*06 04 05	wastes containing other heavy metals	06 12 02	other spent catalysts
06 04 99	wastes not otherwise specified	*06 12 02 01	other spent catalysts containing hazardous substances
06 05 00	sludges from on-site effluent treatment	06 13 00	wastes from other inorganic chemical processes
06 05 01	sludges from on-site effluent treatment	*06 13 01	inorganic pesticides, wood preserving agents and other biocides
*06 05 01 01	sludges from on-site effluent treatment containing hazardous substances	*06 13 02	spent activated carbon (except 06 07 02)
06 06 00	wastes from sulphur chemical processes (production and transformation) and desulphurisation processes	06 13 03	carbon black
06 06 01	waste containing sulphur	06 13 99	wastes not otherwise specified
06 06 99	wastes not otherwise specified		
07 00 00	WASTES FROM ORGANIC CHEMICAL PROCESSES		
07 01 00	waste from the manufacture, formulation, supply and use (MFSU) of basic organic chemicals		liquors
*07 01 01	aqueous washing liquids and mother	07 01 02	sludges from on-site effluent treatment

*07 01 02 01	sludges from on-site effluent treatment containing hazardous substances	07 03 00	waste from the MFSU of organic dyes and pigments (excluding 06 11 00)
*07 01 03	organic halogenated solvents, washing liquids and mother liquors	*07 03 01	aqueous washing liquids and mother liquors
*07 01 04	other organic solvents, washing liquids and mother liquors	07 03 02	sludges from on-site effluent treatment
07 01 05	spent precious metal catalysts	*07 03 02 01	sludges from on-site effluent treatment containing hazardous substances
*07 01 05 01	spent precious metal catalysts containing hazardous substances	*07 03 03	organic halogenated solvents, washing liquids and mother liquors
07 01 06	other spent catalysts	*07 03 04	other organic solvents, washing liquids and mother liquors
*07 01 06 01	other spent catalysts containing hazardous substances	07 03 05	spent precious metal catalysts
*07 01 07	halogenated still bottoms and reaction residues	*07 03 05 01	spent precious metal catalysts containing hazardous substances
*07 01 08	other still bottoms and reaction residues	07 03 06	other spent catalysts
*07 01 09	halogenated filter cakes and spent absorbents	*07 03 06 01	other spent catalysts containing hazardous substances
*07 01 10	other filter cakes and spent absorbents	*07 03 07	halogenated still bottoms and reaction residues
07 01 99	wastes not otherwise specified	*07 03 08	other still bottoms and reaction residues
07 02 00	waste from the MFSU of plastics, synthetic rubber and man-made fibres	*07 03 09	halogenated filter cakes and spent absorbents
*07 02 01	aqueous washing liquids and mother liquors	*07 03 10	other filter cakes and spent absorbents
07 02 02	sludges from on-site effluent treatment	07 03 99	wastes not otherwise specified
*07 02 02 01	sludges from on-site effluent treatment containing hazardous substances	07 04 00	waste from the MFSU of organic pesticides (except 02 01 05)
*07 02 03	organic halogenated solvents, washing liquids and mother liquors	*07 04 01	aqueous washing liquids and mother liquors
*07 02 04	other organic solvents, washing liquids and mother liquors	07 04 02	sludges from on-site effluent treatment
07 02 05	spent precious metal catalysts	*07 04 02 01	sludges from on-site effluent treatment containing hazardous substances
*07 02 05 01	spent precious metal catalysts containing hazardous substances	*07 04 03	organic halogenated solvents, washing liquids and mother liquors
07 02 06	other spent catalysts	*07 04 04	other organic solvents, washing liquids and mother liquors
*07 02 06 01	other spent catalysts containing hazardous substances	07 04 05	spent precious metal catalysts
*07 02 07	halogenated still bottoms and reaction residues	*07 04 05 01	spent precious metal catalysts containing hazardous substances
*07 02 08	other still bottoms and reaction residues	07 04 06	other spent catalysts
*07 02 09	halogenated filter cakes and spent absorbents	*07 04 06 01	other spent catalysts containing hazardous substances
*07 02 10	other filter cakes and spent absorbents	*07 04 07	halogenated still bottoms and reaction residues
07 02 99	wastes not otherwise specified	*07 04 08	other still bottoms and reaction residues
		*07 04 09	halogenated filter cakes and spent absorbents
		*07 04 10	other filter cakes and spent absorbents
		07 04 99	wastes not otherwise specified

07 05 00	waste from the MFSU of pharm- aceuticals		
*07 05 01	aqueous washing liquids and mother liquors	07 06 06	containing hazardous substances other spent catalysts
07 05 02	sludges from on-site effluent treatment	*07 06 06 01	other spent catalysts containing hazardous substances
*07 05 02 01	sludges from on-site effluent treatment containing hazardous substances	*07 06 07	halogenated still bottoms and reaction residues
*07 05 03	organic halogenated solvents, washing liquids and mother liquors	*07 06 08	other still bottoms and reaction residues
*07 05 04	other organic solvents, washing liquids and mother liquors	*07 06 09	halogenated filter cakes and spent absorbents
07 05 05	spent precious metal catalysts	*07 06 10	other filter cakes and spent absorbents
*07 05 05 01	spent precious metal catalysts containing hazardous substances	07 06 99	wastes not otherwise specified
07 05 06	other spent catalysts	07 07 00	waste from the MFSU of fine chemicals and chemical products not otherwise specified
*07 05 06 01	other spent catalysts containing hazardous substances	*07 07 01	aqueous washing liquids and mother liquors
*07 05 07	halogenated still bottoms and reaction residues	07 07 02	sludges from on site effluent treatment
*07 05 08	other still bottoms and reaction residues	*07 07 02 01	sludges from on-site effluent treatment containing hazardous substances
*07 05 09	halogenated filter cakes and spent absorbents	*07 07 03	organic halogenated solvents, washing liquids and mother liquors
*07 05 10	other filter cakes and spent absorbents	*07 07 04	other organic solvents, washing liquids and mother liquors
07 05 99	wastes not otherwise specified	07 07 05	spent precious metal catalysts
07 06 00	waste from the MFSU of fats, grease, soaps, detergents disinfectants and cosmetics	*07 07 05 01	spent precious metal catalysts containing hazardous substances
*07 06 01	aqueous washing liquids and mother liquors	07 07 06	other spent catalysts
07 06 02	sludges from on-site effluent treatment	*07 07 06 01	other spent catalysts containing hazardous substances
*07 06 02 01	sludges from on-site effluent treatment containing hazardous substances	*07 07 07	halogenated still bottoms and reaction residues
*07 06 03	organic halogenated solvents, washing liquids and mother liquors	*07 07 08	other still bottoms and reaction residues
*07 06 04	other organic solvents, washing liquids and mother liquors	*07 07 09	halogenated filter cakes and spent absorbents
07 06 05	spent precious metal catalysts	*07 07 10	other filter cakes and spent absorbents
07 06 05 01	spent precious metal catalysts	07 07 99	wastes not otherwise specified
08 00 00	WASTES FROM THE MANUFACTURE, FORMULATION, SUPPLY AND USE (MFSU) OF COATINGS (PAINTS, VARNISHES AND VITREOUS ENAMELS), ADHESIVE, SEALANTS AND PRINTING INKS		
08 01 00	wastes from MFSU of paint and varnish		non-halogenated solvents
*08 01 01	waste paints and varnish containing halogenated solvents	08 01 03	waste from water-based paints and varnishes
*08 01 02	waste paints and varnish containing	08 01 04	powder paints
		08 01 05	hardened paints and varnishes

*08 01 06	sludges from paint or varnish removal containing halogenated solvents	*08 03 05	ink sludges containing halogenated solvents
*08 01 07	sludges from paint or varnish removal containing non-halogenated solvents	*08 03 06	ink sludges containing non-halogenated solvents
08 01 08	aqueous sludges containing paint or varnish	08 03 07	aqueous sludges containing ink
*08 01 08 01	aqueous sludges containing paint or varnish and which contain halogenated or non-halogenated solvents	08 03 08	aqueous liquid waste containing ink
08 01 09	waste from paint or varnish removal (except 08 01 06 and 08 01 07)	08 03 09	waste printing toner (including cartridges)
08 01 10	aqueous suspensions containing paint or varnish	08 03 99	wastes not otherwise specified
*08 01 10 01	aqueous suspensions containing paint or varnish and which contain halogenated or non-halogenated solvents	08 04 00	wastes from MFSU of adhesives and sealants (including waterproofing products)
08 01 99	wastes not otherwise specified	*08 04 01	waste adhesives and sealants containing halogenated solvents
08 02 00	wastes from MFSU of other coating (including ceramic materials)	*08 04 02	waste adhesives and sealants containing non-halogenated solvents
08 02 01	waste coating powders	08 04 03	wastes from water-based adhesives and sealants
08 02 02	aqueous sludges containing ceramic materials	*08 04 03 01	wastes from water-based adhesives and sealants containing hazardous substances
08 02 03	aqueous suspensions containing ceramic materials	08 04 04	hardened adhesives and sealants
08 02 99	wastes not otherwise specified	*08 04 05	adhesives and sealants sludges containing halogenated solvents
08 03 00	waste from MFSU of printing inks	*08 04 06	adhesives and sealants sludges containing non-halogenated solvents
*08 03 01	waste ink containing halogenated solvents	08 04 07	aqueous sludges containing adhesives and sealants
*08 03 02	waste ink containing non-halogenated solvents	*08 04 07 01	aqueous sludges containing adhesives and sealants and which contain hazardous substances
08 03 03	waste from water-based ink	08 04 08	aqueous liquid wastes containing adhesives and sealants
08 03 04	dried ink	*08 04 08 01	aqueous liquid wastes containing adhesives and sealants and which contain hazardous substances
		08 04 99	wastes not otherwise specified
09 00 00	WASTES FROM THE PHOTOGRAPHIC INDUSTRY		
09 01 00	wastes from photographic industry	09 01 07	photographic film and paper containing silver or silver compounds
*09 01 01	water based developer and activator solutions	09 01 08	photographic film and paper free of silver or silver compounds
*09 01 02	water based offset plate developer solutions	09 01 09	single-use cameras with batteries
*09 01 03	solvent based developer solutions	*09 01 09 01	single-use cameras with batteries referred to in 16 06 03, 16 06 04 01 or 16 06 05 01
*09 01 04	fixer solutions	09 01 10	single use cameras without batteries
*09 01 05	bleach solutions and bleach fixer solutions	09 01 99	wastes not otherwise specified
*09 01 06	waste containing silver from on-site treatment of photographic waste		

10 00 00 INORGANIC WASTES FROM THERMAL PROCESSES

10 01 00	wastes from power station and other combustion plants (except 19 00 00)	*10 03 09	black drosses from secondary smelting
10 01 01	bottom ash	*10 03 10	waste from treatment of salt slags and black drosses treatment
*10 01 01 01	bottom ash from the use of heavy fuel oil	10 03 11	flue gas dust
10 01 02	coal fly ash	10 03 12	other particulates and dust (including ball mill dust)
10 01 03	peat fly ash	10 03 13	solid waste from gas treatment
*10 01 04	oil fly ash	10 03 14	sludges from gas treatment
10 01 05	calcium based reaction wastes from flue gas desulphurisation in solid form	10 03 99	wastes not otherwise specified
10 01 06	other solid wastes from gas treatment	10 04 00	wastes from lead thermal metallurgy
10 01 07	calcium based reaction wastes from flue gas desulphurisation in sludge form	*10 04 01	slags (first and second smelting)
10 01 08	other sludges from gas treatment	*10 04 02	dross and skimmings (first and second smelting)
*10 01 09	sulphuric acid	*10 04 03	calcium arsenate
10 01 10	spent catalysts e.g. from removal of NOx	*10 04 04	flue gas dust
*10 01 10 01	spent catalysts e.g. from removal of NOx containing hazardous substances	*10 04 05	other particulates and dust
10 01 11	aqueous sludges from boiler cleansing	*10 04 06	solid waste from gas treatment
*10 01 11 01	aqueous sludges from boiler cleansing using heavy fuel oil	*10 04 07	sludges from gas treatment
10 01 12	spent linings and refractories	10 04 08	spent linings and refractories
10 01 99	wastes not otherwise specified	10 04 99	wastes not otherwise specified
10 01 99 01	fly ash from combustion of wood-based fuel	10 05 00	wastes from zinc thermal metallurgy
10 02 00	wastes from the iron and steel industry	*10 05 01	slags (first and second smelting)
10 02 01	waste from the processing of slag	*10 05 02	dross and skimmings (first and second smelting)
10 02 02	unprocessed slag	*10 05 03	flue gas dust
10 02 03	solid wastes from gas treatment	10 05 04	other particulates and dust
10 02 04	sludges from gas treatment	*10 05 05	solid waste from gas treatment
10 02 05	other sludges	*10 05 06	sludges from gas treatment
10 02 06	spent linings and refractories	10 05 07	spent linings and refractories
10 02 99	wastes not otherwise specified	10 05 99	wastes not otherwise specified
10 03 00	wastes from aluminium thermal metallurgy	10 06 00	wastes from copper thermal metallurgy
*10 03 01	tars and other carbon-containing wastes from anode manufacture	10 06 01	slags (first and second smelting)
10 03 02	anode scraps	10 06 02	dross and skimmings (first and second smelting)
*10 03 03	skimmings	*10 06 03	flue gas dust
*10 03 04	primary smelting slags/white drosses	10 06 04	other particulates and dust
10 03 05	alumina dust	*10 06 05	waste from electrolytic refining
10 03 06	used carbon strips and fireproof materials from electrolysis	*10 06 06	solid waste from gas treatment
*10 03 07	spent pot linings	*10 06 07	sludges from gas treatment
*10 03 08	salt slags from secondary smelting	10 06 08	spent linings and refractories
		10 06 99	wastes not otherwise specified

10 07 00	wastes from silver, gold and platinum thermal metallurgy	10 11 00	wastes from manufacture of glass and glass products
10 07 01	slags (first and second smelting)	10 11 01	waste preparation mixture before thermal processing
10 07 02	dross and skimmings (first and second smelting)	10 11 02	waste glass
10 07 03	solid waste from gas treatment	10 11 03	waste glass-based fibrous materials
10 07 04	other particulates and dust	10 11 04	flue gas dust
10 07 05	sludges from gas treatment	10 11 05	other particulates and dust
10 07 06	spent linings and refractories	10 11 06	solid waste from gas treatment
10 07 99	wastes not otherwise specified	10 11 07	sludges from gas treatment
10 08 00	wastes from other non-ferrous thermal metallurgy	10 11 08	spent linings and refractories
10 08 01	slags (first and second smelting)	10 11 99	wastes not otherwise specified
10 08 02	dross and skimmings (first and second smelting)	10 12 00	wastes from manufacture of ceramic goods, bricks, tiles and constructions products
*10 08 03	flue gas dust	10 12 01	waste preparation mixture before thermal processing
10 08 04	other particulates and dust	10 12 02	flue gas dust
*10 08 05	solid waste from gas treatment	10 12 03	other particulates and dust
*10 08 06	sludges from gas treatment	10 12 04	solid waste from gas treatment
10 08 07	spent linings and refractories	10 12 05	sludges from gas treatment
10 08 99	wastes not otherwise specified	10 12 06	discarded moulds
10 09 00	wastes from casting of ferrous pieces	10 12 07	spent linings and refractories
10 09 01	casting cores and moulds containing organic binders which have not undergone pouring	10 12 99	wastes not otherwise specified
10 09 02	casting cores and moulds containing organic binders which have undergone pouring	10 13 00	wastes from manufacture of cement, lime and plaster and articles and products made from them
10 09 03	furnace slag	10 13 01	waste preparation mixture before thermal processing
10 09 04	furnace dust	10 13 02	wastes from asbestos-cement manufacture ²
*10 09 04 01	furnace dust containing heavy metals	10 13 03	wastes from other cement-based composite materials
10 09 99	wastes not otherwise specified	10 13 04	waste from calcination and hydration of lime
10 10 00	wastes from casting of non-ferrous pieces	10 13 05	solid waste from gas treatment
10 10 01	casting cores and moulds containing organic binders which have not undergone pouring	10 13 06	other particulates and dust
10 10 02	casting cores and moulds containing organic binders which have undergone pouring	10 13 07	sludges from gas treatment
10 10 03	furnace slag	10 13 08	spent linings and refractories
10 10 04	furnace dust	10 13 99	wastes not otherwise specified
*10 10 04 01	furnace dust containing heavy metals		
10 10 99	wastes not otherwise specified		

²

The production of asbest cement is prohibited by the Council of State Decision 852/92 from January 1, 1993.

11 00 00	INORGANIC WASTE WITH METALS FROM METAL TREATMENT AND THE COATING OF METALS AND FROM NON-FERROUS HYDRO-METALLURGY	
11 01 00	liquid wastes and sludges from metal treatment and coating of metals (eg. galvanic processes, zinc coating processes, pickling processes, etching, phosphatizing, alkaline degreasing)	11 02 00 wastes and sludges from non-ferrous hydrometallurgical processes
*11 01 01	cyanidic (alkaline) wastes containing heavy metals other than chromium	*11 02 01 sludges from copper hydrometallurgy
*11 01 02	cyanidic (alkaline) wastes which do not contain heavy metals	*11 02 02 sludges from zinc hydrometallurgy (including jarosite, goethite)
*11 01 03	cyanide-free wastes containing chromium	11 02 03 wastes from the production of anodes for aqueous electrolytical processes
11 01 04	cyanide-free wastes not containing chromium	11 02 04 sludges not otherwise specified
*11 01 04 01	wastes containing other heavy metals than chromium	11 03 00 sludges and solids from tempering processes
*11 01 05	acidic pickling solutions	*11 03 01 wastes containing cyanide
*11 01 06	acids not otherwise specified	*11 03 02 other wastes
*11 01 07	alkalis not otherwise specified	11 04 00 other inorganic wastes with metals not otherwise specified
*11 01 08	phosphatizing sludges	11 04 01 other inorganic wastes with metals not otherwise specified
12 00 00	WASTES FROM SHAPING AND SURFACE TREATMENT OF METALS AND PLASTICS	
12 01 00	wastes from shaping (including forging, welding, pressing, drawing, turning, cutting and filing)	*12 01 12 spent waxes and fats
12 01 01	ferrous metal filings and turnings	12 01 13 welding wastes
12 01 02	other ferrous metals particles	12 01 99 wastes not otherwise specified
12 01 03	non-ferrous metal filings and turnings	12 02 00 wastes from mechanical surface treatment processes (blasting, grinding, honing, lapping, polishing)
12 01 04	other non-ferrous metal particules	12 02 01 spent blasting grit
12 01 05	plastics particles	12 02 02 sludges from grinding, honing and lapping
*12 01 06	waste machining oils containing halogens (not emulsioned)	12 02 03 polishing sludges
*12 01 07	waste machining oils free of halogens (not emulsioned)	12 02 99 wastes not otherwise specified
*12 01 08	waste machining emulsions containing halogens	12 03 00 wastes from water and steam degreasing processes (except 11 00 00)
*12 01 09	waste machining emulsions free of halogens	*12 03 01 aqueous washing liquids
*12 01 10	synthetic machining oils	*12 03 02 steam degreasing wastes
*12 01 11	machining sludges	

13 00 00	OIL WASTES AND OTHER LIQUID WASTES OF COMPARABLE NATURE (except edible oils, 05 00 00 and 12 00 00)		
13 01 00	waste hydraulic oils and brake fluids	*13 03 02	other chlorinated insulating and heat transmission oils and other chlorinated liquids
*13 01 01	hydraulic oils, containing PCBs or PCTs	*13 03 03	non-chlorinated insulating and heat transmission oils and other non-chlorinated liquids
*13 01 02	other chlorinated hydraulic oils (not emulsions)	*13 03 04	synthetic insulating and heat transmission oils and other synthetic liquids
*13 01 03	non chlorinated hydraulic oils (not emulsions)	*13 03 05	mineral insulating and heat transmission oils
*13 01 04	chlorinated emulsions		
*13 01 05	non chlorinated emulsions	13 04 00	bilge oils
*13 01 06	hydraulic oils containing only mineral oil	*13 04 01	bilge oils from inland navigation
*13 01 07	other hydraulic oils	*13 04 02	bilge oils from jetty sewers
*13 01 08	brake fluids	*13 04 03	bilge oils from other navigation
13 02 00	waste engine, gear and lubricating oils	13 05 00	oil/water separator contents
*13 02 01	chlorinated engine, gear and lubricating oils	*13 05 01	oil/water separator solids
*13 02 02	non-chlorinated engine, gear and lubricating oils	*13 05 02	oil/water separator sludges
*13 02 03	other engine, gear and lubricating oils	*13 05 03	interceptor sludges
		*13 05 04	desalter sludges or emulsions
		*13 05 05	other emulsions
13 03 00	waste insulating and heat transmission oils and other liquids	13 06 00	oil waste not otherwise specified
*13 03 01	insulating or heat transmission oils and other liquids containing PCBs or PCTs	*13 06 01	oil waste not otherwise specified
14 00 00	WASTES FROM ORGANIC SUBSTANCES EMPLOYED AS SOLVENTS (except 07 00 00 and 08 00 00)		
14 01 00	wastes from metal degreasing and machinery maintenance	*14 02 01	halogenated solvents and solvent mixes
*14 01 01	chlorofluorocarbons	*14 02 02	solvent mixes or organic liquids free of halogenated solvents
*14 01 02	other halogenated solvents and solvent mixes	*14 02 03	sludges or solid wastes containing halogenated solvents
*14 01 03	other solvents and solvent mixes	*14 02 04	sludges or solid wastes containing other solvents
*14 01 04	aqueous solvent mixes containing halogens		
*14 01 05	aqueous solvent mixes free of halogens	14 03 00	wastes from the electronic industry
*14 01 06	sludges or solid wastes containing halogenated solvents	*14 03 01	chlorofluorocarbons
*14 01 07	sludges or solid wastes free of halogenated solvents	*14 03 02	other halogenated solvents
		*14 03 03	solvents and solvent mixes free of halogenated solvents
		*14 03 04	sludges or solid wastes containing halogenated solvents
14 02 00	wastes from textile cleaning and degreasing of natural products	*14 03 05	sludges or solid wastes containing other solvents

14 04 00	wastes from coolants and foam/ aerosol propellents	14 05 00	wastes from solvent and coolant reco very (still bottoms)
*14 04 01	chlorofluorocarbons	*14 05 01	chlorofluorocarbons
*14 04 02	other halogenated solvents and solvent mixes	*14 05 02	halogenated solvents and solvent mixes
*14 04 03	other solvents and solvent mixes	*14 05 03	other solvents and solvent mixes
*14 04 04	sludges or solid wastes containing halogenated solvents	*14 05 04	sludges containing halogenated solvents
*14 04 05	sludges or solid wastes containing other solvents	*14 05 05	sludges containing other solvents

**15 00 00 PACKAGING, ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND
PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED**

15 01 00	packaging	*15 01 05 01	composite packaging containing residues of hazardous substances
15 01 01	paper and cardboard packaging	15 01 06	mixed packaging
*15 01 01 01	paper and cardboard packaging containing residues of hazardous substances	*15 01 06 01	mixed packaging containing residues of hazardous substances
15 01 02	plastic packaging	15 02 00	absorbents, filter materials, wiping cloths and protective clothing
*15 01 02 01	plastic packaging containing residues of hazardous substances	15 02 01	absorbents, filter materials, wiping cloths, protective clothing
15 01 03	wooden packaging	*15 02 01 01	absorbents, filter materials, wiping cloths and protective clothing containing hazardous substances
*15 01 03 01	wooden packaging containing residues of hazardous substances		
15 01 04	metallic packaging		
*15 01 04 01	metallic packaging containing residues of hazardous substances		
15 01 05	composite packaging		

16 00 00 WASTES NOT OTHERWISE SPECIFIED IN THE CATALOGUE

16 01 00	end of life vehicles	16 02 06	wastes from the asbestos processing industry
16 01 01	catalysts removed from vehicles containing precious metals	*16 02 06 01	wastes from the asbestos processing industry which may form asbestos dust
16 01 02	other catalysts removed from vehicles	16 02 07	waste from the plastic convertor industry
16 01 03	used tyres	16 02 08	shredder residues
16 01 04	discarded vehicles	16 03 00	off-specification batches (consisting of products not fulfilling the specifications)
16 01 05	light fraction from automobile shredding	16 03 01	inorganic off-specification batches
16 01 99	wastes not otherwise specified	*16 03 01 01	inorganic off-specification batches containing hazardous substances
16 02 00	discarded equipment and shredder residues	16 03 02	organic off-specification batches
*16 02 01	transformers and capacitors containing PCB or PCTs	*16 03 02 01	organic off-specification batches containing hazardous substances
16 02 02	other discarded electronic equipment (e.g. printed circuit boards)		
16 02 03	equipment containing chlorofluoro carbons		
*16 02 04	discarded equipment containing free asbestos		
16 02 05	other discarded equipment		

16 04 00	waste explosives³	16 06 05	other batteries and accumulators
*16 04 01	waste ammunition	*16 06 05 01	other batteries and accumulators containing more than 25 mg of mercury per cell, 0,025 per cent by weight of cadmium or 0,4 per cent by weight of lead
*16 04 02	fireworks waste		
*16 04 03	other waste explosives		
16 05 00	chemicals and gases in containers	*16 06 06	electrolyte from batteries and accumulators
16 05 01	industrial gases in high pressure cylinders, LPG containers and industrial aerosol containers (including halons)	16 07 00	waste from transport and storage tank cleaning (except 05 00 00 and 12 00 00)
*16 05 01 01	industrial gases in high pressure cylinders, LPG containers and industrial aerosol containers (including halons) containing hazardous substances	*16 07 01	waste from marine transport tank cleaning, containing chemicals
16 05 02	other waste containing inorganic chemicals, e.g. lab chemicals not otherwise specified, fire extinguishing powders	*16 07 02	waste from marine transport tank cleaning, containing oil
*16 05 02 01	wastes containing hazardous inorganic chemicals	*16 07 03	waste from railway and road transport tank cleaning containing oil
16 05 03	other waste containing organic chemicals, e.g. lab chemicals not otherwise specified	*16 07 04	waste from railway and road transport tank cleaning containing chemicals
*16 05 03 01	wastes containing hazardous organic chemicals	*16 07 05	waste from storage tank cleaning, containing chemicals
		*16 07 06	waste from storage tank cleaning, containing oil
16 06 00	batteries and accumulators	16 07 07	solid wastes from ship cargoes
*16 06 01	lead batteries	16 07 99	waste not otherwise specified
*16 06 02	Ni-Cd batteries		
*16 06 03	mercury dry cells		
16 06 04	alkaline batteries		
*16 06 04 01	alkaline batteries containing more than 0,025 weight per cent of mercury		

³ The Waste Act shall not apply to the waste explosives referred to in the Act on Potentially Explosive Substances (263/53).

17 00 00	CONSTRUCTION AND DEMOLITION WASTE (INCLUDING ROAD CONSTRUCTION)	
17 01 00	concrete, bricks, tiles, ceramics, and gypsum based materials	
17 01 01	concrete	17 04 04 zinc
17 01 02	bricks	17 04 05 iron and steel
17 01 03	tiles and ceramics	17 04 06 tin
17 01 04	gypsum based construction materials	17 04 07 mixed metals
17 01 05	asbestos based construction materials	17 04 08 cables
*17 01 05 01	asbestos based construction materials which may form asbestos dust	17 05 00 soil and dredging spoil
		17 05 01 soil and stones
17 02 00	wood, glass and plastic	*17 05 01 01 soil and stones containing hazardous substances
17 02 01	wood	17 05 02 dredging spoil
17 02 02	glass	*17 05 02 01 dredging spoil containing hazardous substances
17 02 03	plastic	
17 03 00	asphalt, tar and tarred products	17 06 00 insulation materials
17 03 01	asphalt containing tar	*17 06 01 insulation materials containing asbestos
17 03 02	asphalt (not containing tar)	17 06 02 other insulation materials
17 03 03	tar and tar products	
17 04 00	metals (including their alloys)	17 07 00 mixed construction and demolition waste
17 04 01	copper, bronze, brass	17 07 01 mixed construction and demolition waste
17 04 02	aluminium	
17 04 03	lead	
18 00 00	WASTES FROM HUMAN OR ANIMAL HEALTH CARE AND/OR RELATED RESEARCH (excluding kitchen and restaurant wastes which do not arise from immediate health care)	
18 01 00	waste from natal care, diagnosis, treatment or prevention of disease in humans	(e.g. dressings, plaster casts, linen, disposable clothing, diapers)
18 01 01	sharps	*18 01 05 discarded chemicals and medicines
*18 01 01 01	sharps whose collection and disposal is subject to special requirements in view of the prevention of infection	18 01 99 waste not otherwise specified
18 01 02	body parts and organs including blood bags and blood preserves	*18 01 99 01 amalgam waste
*18 01 02 01	body parts and organs including blood bags and blood preserves whose collection and disposal is subject to special requirements in view of the prevention of infection	18 02 00 waste from research, diagnosis, treatment or prevention of disease involving animals
*18 01 03	other wastes whose collection and disposal is subject to special requirements in view of the prevention of infection	18 02 01 sharps
18 01 04	wastes whose collection and disposal is not subject to special requirements in view of the prevention of infection	*18 02 01 01 sharps whose collection and disposal is subject to special requirements in view of the prevention of infection
19 00 00	WASTES FROM WASTE TREATMENT FACILITIES, OFF-SITE WASTE WATER	*18 02 02 other wastes whose collection and disposal is subject to special requirements in view of the prevention of infection
		18 02 03 wastes whose collection and disposal is not subject to special requirements in view of the prevention of infection
		*18 02 04 discarded chemicals and medicines

TREATMENT PLANTS AND THE WATER INDUSTRY

19 01 00	wastes from incineration or pyrolysis of municipal wastes	19 05 99	wastes not otherwise specified
19 01 01	bottom ash and slag	19 06 00	wastes from anaerobic treatment of wastes
19 01 02	ferrous materials removed from bottom ash	19 06 01	anaerobic treatment sludges of municipal and similar wastes
*19 01 03	fly ash	19 06 02	anaerobic treatment sludges of animal and vegetal wastes
*19 01 04	boiler dust	19 06 99	wastes not otherwise specified
*19 01 05	filter cake from gas treatment	19 07 00	landfill leachate
*19 01 06	aqueous liquid waste from flue gas treatment and other aqueous liquid wastes	19 07 01	landfill leachate
*19 01 07	solid waste from flue gas treatment	19 08 00	wastes from waste water treatment plants not otherwise specified
19 01 08	pyrolysis wastes	19 08 01	screenings
19 01 09	spent catalysts e.g. from NO _x removal	19 08 02	wastes from desanding
*19 01 09 01	spent catalysts e.g. from NO _x removal, containing hazardous substances	*19 08 03	grease and oil mixture from oil/waste water separation
*19 01 10	spent activated carbon from flue gas treatment	19 08 04	sludges from the treatment of industrial waste
19 01 99	wastes not otherwise specified	19 08 05	sludges from treatment of urban waste water
19 02 00	wastes from specific physico/chemical treatments of industrial wastes (e.g. dechromatation, decyanidation, neutralisation)	*19 08 06	saturated or spent ion exchange resins
*19 02 01	metal hydroxide sludges and other sludges from metal insolubilisation treatment	*19 08 07	solutions and sludges from regeneration of ion exchangers
19 02 02	premixed wastes for final disposal	19 08 99	wastes not otherwise specified
19 03 00	stabilized/solidified wastes	19 09 00	wastes from the preparation of drinking water or water for industrial use
19 03 01	wastes stabilized/solidified with hydraulic binders	19 09 01	solid wastes from primary filtration and screening
19 03 02	wastes stabilized/solidified with organic binders	19 09 02	sludges from water clarification
19 03 03	wastes stabilized by biological treatment	19 09 03	sludges from decarbonation
19 04 00	vitriified wastes and wastes from vitrification	19 09 04	spent activated carbon
19 04 01	vitriified wastes	19 09 05	saturated or spent ion exchange resins
*19 04 02	fly ash and other flue gas treatment wastes	19 09 06	solutions and sludges from regeneration of ion exchangers
*19 04 03	non-vitriified solid phase	19 09 99	wastes not otherwise specified
19 04 04	aqueous liquid waste from vitriified waste tempering	19 98 00	wastes from incineration, pyrolysis and other thermal treatment of hazardous wastes
19 05 00	wastes from aerobic treatment of solid wastes	19 98 01	bottom ash and slag
19 05 01	non-composted fraction of municipal and similar wastes	19 98 02	ferrous materials removed from bottom ash
19 05 02	non-composted fraction of animal and vegetable wastes	*19 98 03	fly ash
19 05 03	off specification compost	*19 98 04	boiler dust
		*19 98 05	filter cake from flue gas treatment
		*19 98 06	aqueous liquid waste from flue gas treatment and other aqueous liquid wastes

*19 98 07	solid waste from gas treatment		removal containing hazardous
19 98 08	pyrolysis wastes		substances
19 98 09	spent catalysts e.g. from NO _x	*19 98 10	spent activated carbon from flue gas
	removal		treatment
		19 98 99	wastes not otherwise specified
*19 98 09 01	spent catalysts e.g. from NO _x		

20 00 00 HOUSEHOLD WASTES AND COMPARABLE WASTE FROM INDUSTRIAL, SERVICE OR OTHER OPERATIONS (MUNICIPAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS

20 01 00	separately collected fractions	20 01 20	batteries and accumulators
20 01 01	paper and cardboard	*20 01 20 01	batteries and accumulators referred to in 16 06 01 - 16 06 03 and 16 06 04 01 and 16 06 05 01
20 01 02	glass		
20 01 03	small plastics	*20 01 21	fluorescent tubes and other mercury containing waste
20 01 04	other plastics	20 01 22	aerosols
20 01 05	small metals (cans etc.)	20 01 23	equipment containing chlorofluorocarbons
20 01 06	other metals	20 01 24	electronic equipment (e.g. printed circuit boards)
20 01 07	wood		
20 01 08	organic compostable kitchen waste (including frying oil and kitchen waste from canteens and restaurants)		
20 01 09	oil and fat	20 02 00	garden and park waste (including cemetery waste)
*20 01 09 01	oil and fat excluding edible oils and fats	20 02 01	compostable wastes
20 01 10	clothes	20 02 02	soil and stones
20 01 11	textiles	20 02 03	other non-compostable wastes
*20 01 12	paint, varnish, inks, adhesives and resins		
*20 01 13	solvents	20 03 00	other municipal waste
*20 01 14	acids	20 03 01	mixed municipal waste
*20 01 15	alkalines	20 03 02	waste from markets
20 01 16	detergents	20 03 03	street cleaning residues
*20 01 17	photo chemicals	20 03 04	septic tank sludge
*20 01 18	medicines	20 03 05	end of life vehicles
*20 01 19	pesticides		

Data sources and methods:

This classification guide is based on the material collected from establishments: questionnaire "Wastes from Manufacturing and Related Industries 1992", Statistics Finland publications/Environment, 7/1995. Establishments in different activities filled waste type names and proposals for classification (ME) to data collecting forms. Forms contained questions concerning waste management. Answers were checked and possible further information was asked prior to final acceptance of answers, including waste classification proposals. The above mentioned questionnaire was sent to establishments in certain activity if the number of employees was at least five. Some smaller establishments were included, if estab-

lishment's gross value of industrial production was at the same level as in bigger ones. Classification (EWCSTAT), classification (Statistics) and H. waste (EC) codes were added afterwards by Statistics Finland. Classification (ME) contains some waste classes added (entries with eight-digit codes and six-digit entries including the figure 98) to EWC because of the importance of these classes to waste management.

Main types of activities in the study and accepted answers (proportion of establishments which returned acceptable answers):

<i>Activity according NACE Rev. 1</i>	<i>Gross value of industrial production (FIM*1 000 000)</i>	<i>Coverage %</i>	<i>Total amount of establishments</i>	<i>Coverage %</i>
10 - 41 Industrial activities	292 602	84	6599	54
10 - 14 Mining and quarrying	2 962	64	175	48
15 - 37 Manufacturing				
15 - 16 Manufacture of food products; beverages and tobacco	48 313	81	764	52
17 - 18 Manufacture of textiles and textile products	5 094	62	382	47
19 Manufacture of leather and leather products	1 058	63	86	44
20 Manufacture of wood and wood products	13 316	78	508	57
21 Manufacture of pulp, paper and paper products	43 022	98	157	77
22 Publishing, printing and reproduction of recorded media	15 327	60	672	37
23 - 24 Manufacture of coke, refined petroleum products, chemicals etc.	27 518	94	204	80
25 Manufacture of rubber and plastic products	5 901	74	259	55
26 Manufacture of other non-metallic mineral products	6 770	73	375	52
27 Manufacture of basic metals and fabricated metal products	21 020	98	97	72
28 - 29 Manufacture of fabricated metal products	32 410	73	1353	50
30 - 33 Manufacture of electrical and optical equipment	19 777	84	407	57
34 - 35 Manufacture of transport equipment	10 754	72	197	49
36 - 37 Manufacturing n.e.c. (furniture, jewellery, sports goods etc.)	4 771	67	437	47
40 - 41 Electricity, gas and water supply	34 590	90	526	77
90 Sewage and refuse disposal, sanitation and similar activities	1 045	41	255	20

Wastes from different activities and Classification ME:

Ministry of the Environment Decision on the list of the most common wastes and of hazardous wastes (867/1996) = "Classification ME" is based on EWC. The classification comprises waste items grouped

under three, or sometimes four, heading levels. Different headings include wastes from following NA-CE activities:

- 01 00 00 WASTE RESULTING FROM EXPLORATION, MINING, DRESSING AND FURTHER TREATMENT OF MINERALS AND QUARRY**
- 7310 Research and experimental development on natural sciences and engineering (except research and development on medical sciences, engineering and technology)
 - 10 – 14 Mining and quarrying
 - 267 Cutting, shaping and finishing of stone
 - 268 Manufacture of other non-metallic mineral products
- 02 01 00 primary production waste**
- 01 Agriculture, hunting and related service activities
 - 02 Forestry, logging and related service activities (except logging)
 - 05 Fishing, operation of fish hatcheries and fish farms; service activities incidental to fishing
- 02 02 00 wastes from the preparation and processing of meat, fish and other foods of animal origin**
- 151 Production, processing and preserving of meat and meat products
 - 152 Processing and preserving of fish and fish products
 - 157 Manufacture of prepared animal feeds (of animal origin)
- 02 03 00 wastes from preparation and processing of fruit, vegetables, cereals, edible oils, cocoa, coffee, tea, conserves and tobacco**
- 153 Processing and preserving of fruit and vegetables
 - 154 Manufacture of vegetable and animal oils and fats
 - 156 Manufacture of grain mill products, starches and starch products
 - 157 Manufacture of prepared animal feeds (of plant kingdom origin)
 - 1584 Manufacture of cocoa; chocolate and sugar confectionery except m. of cocoa
 - 1585 Manufacture of macaroni, noodles, couscous and similar farinaceous products
 - 1586 Processing of tea and coffee
 - 1587 Manufacture of condiments and seasonings
 - 1588 Manufacture of homogenised food preparations and dietetic food
 - 1589 Manufacture of other food products n.e.c.
- 02 04 00 wastes from sugar processing**
- 1583 Manufacture of sugar
- 02 05 00 wastes from the dairy products industry**
- 155 Manufacture of dairy products
- 02 06 00 wastes from the baking and confectionery industry**
- 1581 Manufacture of bread; manufacture of fresh pastry goods and cakes
 - 1582 Manufacture of rusks and biscuits; manufacture of preserved pastry goods and cakes
 - 1584 Manufacture of cocoa; chocolate and sugar confectionery except m. of chocolate and sugar confectionery

02 07 00	wastes from the production of alcoholic and non-alcoholic beverages (excluding coffee, tea and cocoa)
159	Manufacture of beverages
1532	Manufacture of fruit and vegetable juice
03 01 00	wastes from mechanical forest industry and the production of panels and furniture
20	Manufacture of wood and of products of wood and cork, except furniture; m. of articles of straw and plaiting materials
361	Manufacture of (wood)furniture
03 02 00	wood preservation waste
	Not NACE classified
03 03 00	wastes from pulp, paper and cardboard production and processing
21	Manufacture of pulp, paper and paper products
04 01 00	wastes from the leather industry
181	Manufacture of leather clothes
183	Dressing and dyeing of fur; manufacture of articles of fur
19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear except rubber boots
04 02 00	wastes from textile industry
17	Manufacture of textiles
182	Manufacture of other wearing apparel and accessories
183	Dressing and dyeing of artificial fur; manufacture of articles of fur
05 00 00	WASTES FROM PETROLEUM REFINING, NATURAL GAS PURIFICATION AND PYROLYTIC TREATMENT OF COAL
231	Manufacture of coke oven products
232	Manufacture of refined petroleum products
06 00 00	WASTES FROM INORGANIC CHEMICAL PROCESSES
2411	Manufacture of industrial gases
2412	Manufacture of dyes and pigments (except m. of organic dyes and pigments)
2413	Manufacture of other inorganic basic chemicals
2415	Manufacture of fertilizers and nitrogen compounds
	All NACE's Inorganic chemicals if not somewhere else specified
07 01 00	waste from the manufacture, formulation, supply and use (MFSU) of basic organic chemicals
2414	Manufacture of other organic basic chemicals (including wood tar and charcoal)
07 02 00	waste from the MFSU of plastics, synthetic rubber and man-made fibres
2416	Manufacture of plastics in primary forms
2417	Manufacture of synthetic rubber in primary forms
247	Manufacture of man-made fibres
25	Manufacture of rubber and plastic products (except shaping and surface treatment of plastics)
07 03 00	waste from the MFSU of organic dyes and pigments (excluding 06 11 00)
2412	Manufacture of dyes and pigments (except m. of inorganic dyes and pigments)
07 04 00	waste from the MFSU of organic pesticides (except 02 01 05)
242	Manufacture of pesticides and other agro-chemical products

07 05 00	waste from the MFSU of pharmaceuticals
244	Manufacture of pharmaceuticals, medicinal chemicals and botanical products
07 06 00	waste from the MFSU of fats, grease, soaps, detergents disinfectants and cosmetics
245	Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations
07 07 00	waste from the MFSU of fine chemicals and chemical products not otherwise specified
2466	Manufacture of other chemical products n.e.c.
08 01 00	wastes from MFSU of paint and varnish
243	Manufacture of paints, varnishes and similar coatings, printing ink and mastics (except m. of printing ink, mastics and ceramic materials)
08 02 00	wastes from MFSU of other coating (including ceramic materials)
243	Manufacture of paints, varnishes and similar coatings, printing ink and mastics (except m. of paints, varnishes, printing ink and mastics)
08 03 00	waste from MFSU of printing inks
243	Manufacture of paints, varnishes and similar coatings, printing ink and mastics (except m. of paints, varnishes and similar coatings and mastics)
222	Printing and service activities related to printing (only wastes containing printing ink and dyes)
08 04 00	wastes from MFSU of adhesives and sealants (including waterproofing products)
243	Manufacture of paints, varnishes and similar coatings, printing ink and mastics (only m. of mastics)
2462	Manufacture of glues and gelatine
09 00 00	WASTES FROM THE PHOTOGRAPHIC INDUSTRY
22	Publishing, printing and reproduction of recorded media
7481	Photographic activities
851	Human health activities
852	Veterinary activities
10 01 00	wastes from power station and other combustion plants (except 19 00 00)
40	Electricity, gas, steam and hot water supply (only power stations and other combustion plants)
10 02 00	wastes from the iron and steel industry
271	Manufacture of basic iron and steel and of ferro-alloys (ECSC)
272	Manufacture of tubes
2735	Other first processing of iron and steel n.e.c.; production of non ECSC ferro-alloys
10 03 00	wastes from aluminium thermal metallurgy
2742	Aluminium production (only thermal metallurgy)
10 04 00	wastes from lead thermal metallurgy
2743	Lead, zinc and tin production (only thermal metallurgy)
10 05 00	wastes from zinc thermal metallurgy
2743	Lead, zinc and tin production (except lead and tin production) (only thermal metallurgy)
10 06 00	wastes from copper thermal metallurgy
2744	Copper production (only thermal metallurgy)

- 10 07 00** **wastes from silver, gold and platinum thermal metallurgy**
2741 Precious metals production (only thermal metallurgy)

- 10 08 00** **wastes from other non-ferrous thermal metallurgy**
2745 Other non-ferrous metal production (only thermal metallurgy)
2743 Lead, zinc and tin production (except zinc production) (only thermal metallurgy)

- 10 09 00** **wastes from casting of ferrous pieces**
2751 Casting of iron
2752 Casting of steel

- 10 10 00** **wastes from casting of non-ferrous pieces**
2753 Casting of light metals
2754 Casting of other non-ferrous metals

- 10 11 00** **wastes from manufacture of glass and glass products**
261 Manufacture of glass and glass products

- 10 12 00** **wastes from manufacture of ceramic goods, bricks, tiles and constructions products**
262 Manufacture of non-refractory ceramic goods other than for construction purposes;
 manufacture of refractory ceramic products
263 Manufacture of ceramic tiles and flags
264 Manufacture of bricks, tiles and construction products, in baked clay
267 Cutting, shaping and finishing of stone
268 Manufacture of other non-metallic mineral products

- 10 13 00** **wastes from manufacture of cement, lime and plaster and articles and products made**
from **them**
265 Manufacture of cement, lime and plaster
266 Manufacture of articles of concrete, plaster and cement

- 11 01 00** **liquid wastes and sludges from metal treatment and coating of metals**
 (eg. galvanic processes, zinc coating processes, pickling processes, etching, phosphatizing,
 alkaline degreasing)
27 – 35 Manufacture of basic metals and fabricated metal products, m. of machinery and equipment
 n.e.c., m. of electrical and optical equipment and m. of transport equipment (only liquid wastes
 and sludges) (except metal degreasing)

- 11 02 00** **wastes and sludges from non-ferrous hydrometallurgical processes**
2743 Lead, zinc and tin production (only hydrometallurgical processes)
2744 Copper production (only hydrometallurgical processes)
2745 Other non-ferrous metal production (only hydrometallurgical processes)

- 11 03 00** **sludges and solids from tempering processes**
 Not NACE classified (mainly some wastes from 27 - 35)

- 11 04 00** **other inorganic wastes with metals not otherwise specified**
 Not NACE classified

- 12 00 00 WASTES FROM SHAPING AND SURFACE TREATMENT OF METALS AND PLASTICS**
- 25 Manufacture of rubber and plastic products (only shaping and surface treatment of plastics)
 - 28 – 36 Manufacture of fabricated metal products (except m. of machinery and equipment), m. of machinery and equipment n.e.c., m. of electrical and optical equipment, m. of transport equipment and m. of furniture; manufacturing n.e.c. (only shaping and surface treatment of metals and plastics)
- 13 00 00 OIL WASTES AND OTHER LIQUID WASTES OF COMPARABLE NATURE (except edible oils, 05 00 00 and 12 00 00)**
- All NACE classes
- 14 01 00 wastes from metal degreasing and machinery maintenance**
- 27 – 35 Manufacture of basic metals and fabricated metal products, m. of machinery and equipment n.e.c., m. of electrical and optical equipment and m. of transport equipment (only metal degreasing)
- All NACE classes (machinery maintenance)
- 14 02 00 wastes from textile cleaning and degreasing of natural products**
- 17 – 19 Manufacture of textiles and textile products and manufacture of leather and leather products (only cleaning and degreasing)
- 14 03 00 wastes from the electronic industry**
- 30 – 33 Manufacture of electrical and optical equipment (only wastes from organic substances employed as solvents except wastes from metal degreasing)
- 14 04 00 – 20 03 05**
- Not NACE classified

Nro 1	Koulutusluokitus 1997 Liite 1, ISCED 1997 SUOMALAINEN SOVELTAMISOPAS Koulutusluokituksen ja Unescon kansainvälisen koulutusluokituksen ISCED 1997:n välinen koodiavain Liite 2, OPETUSHALLINNON KOULUTUSALA- JA -ASTELOUKITUS Koulutusluokituksen ja opetushallinnon koulutusala-, opintoala- ja koulutusasteluokituksen välinen koodiavain Liite 3, KOULUTUSKODIMUUTOKSET 1998 Liite 4. KOULUTUSLUOKITUKSEN MUUNNOSAVAIN 1997 Vuoden 1997:n tilanteen mukaan uudistetun koulutusluokituksen ja uudistusta edeltäneen luokituksen vastaavuusavain	11. uusittu laitos	1999
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Nro 5	Institutionaalinen sektoriluokitus 1996 <i>Den institutionella sektorindelningen 1996</i> Classification of institutional sectors 1996		1995
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Nro	11	Pääasiallisen toiminnan luokitus Pääasiallisen toimeentulolähteen luokitus <i>Klassificering av befolkningen efter huvudsaklig verksamhet</i> <i>Klassificering av befolkningen efter huvudsaklig inkomstkälla</i> Classification of the Population by Type of Activity Classification of the Population by Main Source of Livelihood		1980
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		Alueluokitukset Valtiot ja maat 1998 <i>Regionala indelningar</i> <i>Stater och länder 1998</i> Regional Classifications Countries 1998		1998
Nro	14	Ammattiluokitus 1997 Classification of Occupations 1997	uusittu laitos revised edition	1997
		Ammattiluokitus 1997 Liite 1, HAKEMISTO Liite 2, AMMATILUOKITUSTEN 1987 JA 1997 VÄLISET MUUNNOSAVAIMET		1998
		Liite 3, TIIVISTELMÄ <i>Yrkesklassificeringen 1997</i> <i>Bilaga 3, SAMMANDRAG</i> Classification of Occupations 1997 Annex 3, SUMMARY		1999 1998
Nro	15	Kotitaloustavaroiden ja -palvelusten luokitus <i>Klassificering av hushållsvaror och -tjänster</i> Classification of Household Goods and Services		1982
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Nro	18	Demografiset ja sosiaaliset perusluokitukset Ikä, sukupuoli, siviilisääty, kieli, kansalaisuus, uskontokunta <i>Demografiska och sociala grundklassificeringar</i> <i>Ålder, kön, civilstånd, språk, nationalitet, trossamfund</i> Demographic and Social Basic Classifications Age, Sex, Marital Status, Language, Nationality, Religion		1983
Nro	19	Kotitalous-, asuntokunta- ja perheluokitukset <i>Klassificeringars av hushåll, bostadshushåll och familjer</i> Classifications of Households, Household-Dwelling Units, and families		1983
Nro	20	Suomen ympäristötiedostot		1996

Nro	21	Aineellisten varojen luokitukset Kiinteä pääoma, varastovarot, muut aineelliset varat <i>Klassificeringar av materiella tillgångar</i> <i>Fast kapital, lagerkapital, övriga materiella tillgångar</i> Classifications of Tangible Assets Fixed Capital, Inventories, Other Tangible Assets	1985
Nro	22	Ikäluokitukset Ohjeita ikäluokituksen käytöstä <i>Åldersklassificeringar</i> Riktlinjer för användning av åldersklassificeringar	1986
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Abstract
The purpose of this guide is to serve as a tool in Environmental Administration as well as in producing statistics and waste accounting. In the guide, typical wastes from processes and functions of different economic activities are presented, and recommendations are made for application of the Ministry of Environment Catalogue of Waste and Hazardous Waste, version 1 of the Substance Oriented Aggregated Waste Classification of the European Union's Proposal for a Council Regulation on Waste Management Statistics, and the waste classification of Statistics Finland.

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