

## I. FORESTRY

### Board and Particle-Based Products

The EHS Guidelines for Board and Particle-based Products apply to the manufacture of board and particle-based products such as particle-board, oriented strand board (OSB), medium density fiberboard (MDF), plywood and glued and laminated products. They also apply to plants that make board from other raw materials such as sugar cane bagasse, straw, and linen. Sawmilling and the manufacture of wood-based products such as furniture are addressed in the EHS Guidelines for Sawmilling and Manufactured Wood Products. Growing, harvesting, and transport of timber used in this sector is discussed in the EHS Guidelines on Forest Management.

### Forest Harvesting Operations

The EHS Guidelines for Forest Harvesting Operations include information relevant to the management of both plantation and natural forests, in temperate, boreal and tropical zones. Guidelines for timber processing industries can be found in the EHS Guidelines for Sawmilling and Manufactured Wood Products and the EHS Guidelines for Board and Particle-based Products.

### Sawmilling & Manufactured Wood Products

The EHS Guidelines for Sawmilling and Manufactured Wood Products include information relevant to projects and facilities such as furniture manufacturing, as well as plants manufacturing glue laminated boards and beams. It includes preservative treatment of timber and timber products. Plywood or other wood-derived board products are described in the EHS Guidelines for Board and Particle-Based Products, while growing, harvesting and transport of timber are included in the EHS Guidelines for Forest Management.

### Pulp and Paper Mills

The EHS Guideline for Pulp and Paper Mills includes information relevant to pulp and paper manufacturing facilities including wood-based chemical and mechanical pulping, recycled fiber pulping, and pulping based on non-wood raw materials such as bagasse, straw, and reed. It does not include production or collection of raw materials which are addressed in other relevant EHS Guidelines.

## II. INFRASTRUCTURE

### Ports, Harbors, and Terminals

The EHS Guidelines for Ports, Harbors, and Terminals are applicable to commercial ports, harbors, and terminals for cargo and passengers transfer. Shipping (including repair and maintenance of ships), fuel terminals, or railways are addressed in separate industry sector EHS Guidelines, specifically the EHS Guidelines for Shipping, Crude Oil and Petroleum Product Storage, Railways, respectively.

### Airports

The EHS Guidelines for Airports apply to the operation of commercial airports. The document does not include activities associated with aircraft operators including aircraft maintenance activities, which are covered by the EHS Guidelines for Airlines.

### Airlines

The EHS Guidelines for Airlines apply to activities typically conducted by passenger and cargo airline operators. The document is organized into two main areas, namely, flight operations, including loading and unloading of passengers and cargo, and aircraft maintenance, including engine services, accessory parts overhaul, aircraft washing, aircraft repainting, and testing.

## Gas Distribution Systems

The EHS Guidelines for Gas Distribution Systems include information relevant to the distribution of low pressure natural gas from the city gate to residential, commercial, and industrial users.

## Tourism and Hospitality Development

The EHS Guidelines for Tourism and Hospitality Development contain information relevant to tourism and hospitality facilities, including business and city hotels, resorts, ecolodges, and other accommodation and catering facilities. This document does not include the tourism travel sector nor does it apply to cruise ships or other ocean going activities.

## Railways

The EHS Guidelines for Railways are applicable to activities typically conducted by rail infrastructure operators dedicated to passenger and freight transport. The document is organized into two main areas, namely rail operations, covering construction and maintenance of rail infrastructure as well as operation of rolling stock, such as locomotives and rail cars; and, locomotive maintenance activities, including engine services, and other mechanical repair and maintenance of locomotives and railcars.

## Shipping

The EHS Guidelines for Shipping include information relevant to the operation and maintenance of ships used for the transport of bulk cargo, and goods. Cargo handling, vessel maintenance, and other in-port activities are covered under the EHS Guidelines for Ports and Harbors while issues specific to the transfer and storage of bulk fuels are covered in the EHS Guidelines for Crude Oil and Petroleum Product Terminals. The EHS Guidelines for Shipping apply to vessels operated with fossil fuels and do not address issues specific to nuclearpowered vessels.

## Toll Roads

The EHS Guidelines for Toll Roads include information relevant to construction, operation and maintenance of large, sealed road projects including associated bridges and overpasses.<sup>1</sup> Issues associated with the construction and operation of maintenance facilities are addressed in the General EHS Guidelines. Issues associated with sourcing of construction materials are presented in the EHS Guidelines for Construction Materials Extraction, while those related to vehicle service areas are included in the EHS Guidelines for Retail Petroleum.

## Telecommunications

The EHS Guidelines for Telecommunications are applicable to telecommunications infrastructure such as fixed line and wireless voice and data transmission infrastructure, including long distance terrestrial and submarine cables (e.g. fiber optic cables), as well as radio and television broadcasting, and associated telecommunications and broadcasting installations and equipment.<sup>2</sup>

## Retail Petroleum Networks

The EHS Guidelines for Retail Petroleum Networks include information relevant to retail petroleum networks primarily dedicated to the sale of petroleum-based automotive fuels, including Liquid Petroleum Gas (LPG) and Compressed Natural Gas (CNG), and which may provide limited vehicle repair and washing services. Guidance applicable to bulk storage and distribution of petroleum or petroleum-related products is presented in the EHS Guidelines for Crude Oil and Petroleum Product Terminals.

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<sup>1</sup> Elements of this Guideline document apply to smaller scale and / or unsealed road projects.

<sup>2</sup> Associated installations and equipment include cellular, micro wave, and other radio-based systems; satellite receivers; wire line and wireless receiving, transmitting, and switching stations, and related equipment such as masts and towers, cables and connectors, equipment housing such as shelters and cabinets, backup batteries, and auxiliary power units (generators).

## Crude Oil and Petroleum Product Terminals

The EHS Guidelines for Crude Oil and Petroleum Product Terminals include information relevant to land and shore-based petroleum storage terminals receiving and dispatching bulk shipments of crude oil, gasoline, middle distillates, aviation gas, lube oil, residual fuel oil, compressed natural gas (CNG), liquid petroleum gas (LPG), and specialty products from pipelines, tankers, railcars, and trucks for subsequent commercial distribution.

## Health Care Facilities

The EHS Guidelines for Health Care Facilities include information relevant to the management of EHS issues associated with health care facilities (HCF) which includes a diverse range of facilities and activities involving general hospitals and small inpatient primary care hospitals, as well as outpatient, assisted living, and hospice facilities. Ancillary facilities may include medical laboratories and research facilities, mortuary centers, and blood banks and collection services.

## Waste Management Facilities

The EHS Guidelines for Waste Management cover facilities or projects dedicated to the management of municipal solid waste and industrial waste, including waste collection and transport; waste receipt, unloading, processing, and storage; landfill disposal; physico-chemical and biological treatment; and incineration projects.<sup>3</sup> Industry-specific waste management activities applicable, for example, to medical waste, municipal sewage, cement kilns, and others are covered in the relevant industry-sector EHS Guidelines, as is the minimization and reuse of waste at the source.

<sup>3</sup> This document covers the most common commercial methods of waste management. It does not cover other activities such as the management of radioactive wastes, co-incineration at combustion plants, or deep well injection.

## Water and Sanitation

The EHS Guidelines for Water and Sanitation include information relevant to the operation and maintenance of (i) potable water treatment and distribution systems, and (ii) collection of sewage in centralized systems (such as piped sewer collection networks) or decentralized systems (such as septic tanks subsequently serviced by pump trucks) and treatment of collected sewage at centralized facilities.<sup>4</sup>

## III. AGRIBUSINESS/FOOD PRODUCTION

### Annual Crop Production

The EHS Guidelines for Annual Crop Production include information relevant to large-scale, commercial production of the main annual crops, including cereals, pulses, roots and tubers, oil-bearing crops, fiber crops, vegetables, and fodder crops in temperate, subtropical, and tropical regions. Plantation crops are addressed in the EHS Guidelines for Plantation Crop Production. Information applicable to the processing of crops is presented in the EHS Guidelines for Food and Beverage Processing.

### Aquaculture

The EHS Guidelines for Aquaculture provide information relevant to semi-intensive and intensive/super-intensive, commercial aquaculture production of the main aquatic species, including crustaceans, mollusks, seaweeds and finfish, located in developing countries in temperate and tropical regions.

<sup>4</sup> Pit latrines and other decentralized systems that do not require servicing and subsequent treatment of contents at centralized treatment facilities are not included in the scope of this document.

## Breweries

The EHS Guidelines for Breweries cover the production of beer, from raw material storage to dispatch of the filled bottles, cans, kegs or barrels. This Guideline does not cover malt production nor the production of non-alcoholic beverages and soft drinks.

## Dairy Processing

The EHS Guidelines for Dairy Processing facilities applies to the reception, storage, and industrial processing of raw milk and the handling and storage of processed milk and dairy products. This document does not cover farming activities or collection of raw milk from farmers, which are covered in the EHS Guidelines for Mammalian Livestock Production.

## Fish Processing

The EHS Guidelines for Fish Processing include information relevant to fish processing facilities, including the post-harvest processing of fish, crustaceans, gastropods, cephalopods, and bivalves (hereafter referred to as “fish products”), originating from sea or freshwater catch or from farming operations in fresh or salt water. This document does not cover primary fishery activities,<sup>5</sup> or the production of fish in aquaculture. The latter is covered in the EHS Guidelines for Aquaculture.

## Food and Beverage Processing

These guidelines cover the processing of meat,<sup>6</sup> vegetable, and fruit raw materials into value-added food and beverage<sup>7</sup> products for human consumption. Meat and poultry slaughtering and processing activities, from reception of the animals until the carcasses are

<sup>5</sup> Overexploitation of fish stocks is a significant global issue. It is not addressed in this document, however, before a fish processing plant is established, the raw material supply situation should be considered, particularly with respect to the sustainability of the resources that will be the main input. Annex B provides a brief discussion of sustainable fishing principles and good practices.

<sup>6</sup> Meat includes beef, pig, and poultry.

<sup>7</sup> Includes only the manufacturing of non-fermented beverages. Beer manufacturing is addressed in the EHS Guidelines for Breweries.

ready for sale or further processing, are covered in the EHS Guidelines for Meat Processing and the EHS Guidelines for Poultry Processing.

## Mammalian Livestock Production

The EHS Guidelines for Mammalian Livestock Production includes information relevant to cattle ranching and farming, dairy farming, and hog and pig farming. Sheep and goat farming operations, while not explicitly discussed, are similar to the operations included in this document, and the recommendations presented here are also generally applicable. This document does not address feed production, dairy processing, or meat processing, which are covered under other EHS Guidelines. For guidance on animal welfare, see the IFC Good Practice Note “Improving Animal Welfare in Livestock Operations.”<sup>8</sup>

## Meat Processing

The EHS Guidelines for Meat Processing include information relevant to meat processing, focusing on bovine and porcine slaughtering and processing from reception of the animals until the carcasses are ready for sale or further processing. This document pertains to facilities that provide simple processing of the by-products of meat slaughtering.<sup>9</sup> For guidance on animal welfare, see the IFC Good Practice Note “Improving Animal Welfare in Livestock Operations.”<sup>10</sup>

<sup>8</sup>

[http://www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/ifc+sustainability/learning+and+adapting/knowledge+products/publications/publications\\_gpn\\_animalwelfare\\_2014](http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/learning+and+adapting/knowledge+products/publications/publications_gpn_animalwelfare_2014)

<sup>9</sup> Livestock rearing is covered in the EHS Guidelines for Mammalian Livestock Production. Poultry is addressed in the EHS Guidelines for Poultry Production and Poultry Processing.

<sup>10</sup> Available at:

[http://www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/ifc+sustainability/learning+and+adapting/knowledge+products/publications/publications\\_gpn\\_animalwelfare\\_2014](http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/learning+and+adapting/knowledge+products/publications/publications_gpn_animalwelfare_2014)

## Perennial Crop Production

This document includes information relevant to large-scale plantation crops and outgrower systems and focuses on the primary production and harvesting through farming and plantation forestry of major multi-year food, fiber, energy, ornamental, and pharmaceutical crops, located in both temperate and tropical regions. It includes tree crops (such as olives, citrus, coffee, rubber, eucalypts, and cacao) as well as banana, sugarcane, and palm oil. It does not include the processing of raw materials into semi-finished and finished products. Annual crop production is addressed in the EHS Guidelines for Annual Crop Production. Annex A contains a description of industry activities for this sector.

## Poultry Processing

The EHS Guidelines for poultry processing include information relevant to processing of chickens, but can be applied to other similar types of poultry processing, such as turkey and ducks. These Guidelines cover process steps from the reception of live birds, slaughter, evisceration, and simple rendering. Poultry rearing is addressed in the EHS Guidelines for Poultry Production. For guidance on animal welfare, see the IFC Good Practice Note “Improving Animal Welfare in Livestock Operations.”<sup>11</sup>

## Poultry Production

The EHS Guidelines for Poultry Production include information relevant to intensive poultry (including ducks and turkeys)

<sup>11</sup> [http://www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/ifc+sustainability/learning+and+adapting/knowledge+products/publications/publications\\_gpn\\_animalwelfare\\_2014](http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/learning+and+adapting/knowledge+products/publications/publications_gpn_animalwelfare_2014)

<sup>12</sup> [http://www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/ifc+sustainability/learning+and+adapting/knowledge+products/publications/publications\\_gpn\\_animalwelfare\\_2014](http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/learning+and+adapting/knowledge+products/publications/publications_gpn_animalwelfare_2014). Integrated Pollution Prevention and Control. Reference Document on Best Available Techniques for Intensive Rearing of Poultry and Pigs. <http://eippcb.jrc.es/pages/FActivities.htm>

production. For guidance on animal welfare, see the IFC Good Practice Note “Improving Animal Welfare in Livestock Operations.”<sup>12</sup>

## Sugar Manufacturing

The EHS Guidelines for Sugar Manufacturing include information relevant to sugar manufacturing facilities. This document does not include agriculture and field activities, which are included in the EHS Guidelines for Plantation Crop Production.

## Vegetable Oil Processing

The EHS Guidelines for Vegetable Oil Production and Processing are applicable to facilities that extract and process oils and fats from a variety of seeds, grains, and nuts; these include canola, castor, cottonseed, mustard, olive, palm, palm-kernel, peanut (groundnut), rapeseed, safflower, sesame, soybean, and sunflower. Additionally covered are crude oil production and refining processes, from the preparation of raw materials to the bottling and packaging of final products for human or animal consumption. These EHS Guidelines do not however apply to the production of biofuels. Annex A contains a full description of industry activities for this sector. The production of oilseeds, beans, and oil palm fresh fruit bunches is covered by the EHS Guidelines for Annual Crop Production and the EHS Guidelines for Perennial Crop Production.

## IV. Chemicals

### Coal Processing

The EHS Guidelines for Coal Processing cover the processing of coal into gaseous or liquid chemicals, including fuels. They apply to the production of Synthetic Gas (SynGas) through various gasification processes and its subsequent conversion into liquid hydrocarbons (Fischer-Tropsch synthesis), methanol, or other oxygenated liquid products, as well as to the direct hydrogenation of coal into liquid hydrocarbons.

## Large Volume Petroleum-Based Organic Chemicals Manufacturing

The EHS Guidelines for Large Volume Petroleum-based Organic Chemical Manufacturing include information relevant to large volume petroleum-based organic chemicals (LVOC) projects and facilities.

## Large Volume Inorganic Compounds Manufacturing and Coal Tar Distillation

This EHS Guideline includes information relevant to chemical manufacturing projects and facilities, and covers the production of large volume inorganic compounds (LVIC), including ammonia, acids (nitric, hydrochloric, sulfuric, hydrofluoric, phosphoric acid), chlor-alkali (e.g. chlorine, caustic soda, soda ash, etc.), carbon black, and coal tar distillation (naphthalene, phenanthrene, anthracene).

## Natural Gas Processing

The EHS Guidelines for Natural Gas Processing cover production in gas to liquids (GTL) facilities including production of methanol, as well as common intermediate production of synthetic gas known as "Syn-gas", a mixture of carbon monoxide and hydrogen. Information on EHS issues related to storage tank farms is provided in the EHS Guidelines for Crude Oil and Petroleum Product Terminals.

## Nitrogenous Fertilizer Production

The EHS Guidelines for Nitrogenous Fertilizer Production include information relevant to facilities that produce ammoniabased nitrogenous fertilizers, including ammonia (NH<sub>3</sub>), urea, nitric acid (HNO<sub>3</sub>), ammonium nitrate, calcium ammonium nitrate (CAN), ammonium sulfate and mixed nitrogenous fertilizers, such as urea-ammonium sulfate (UAS) and urea ammonium nitrate (UAN) liquid fertilizers (28, 30 or 32 percent nitrogen (N)).

## Oleochemicals Manufacturing

The EHS Guidelines for Oleochemicals Manufacturing include information relevant to manufacturing facilities that produce fatty acids, glycerin, and biodiesel using fats and oils from vegetable or animal sources.

## Pesticide Manufacturing, Formulation, and Packaging

The EHS guidelines for pesticides manufacturing and formulation address the synthesis, optimization of the active ingredients, process development (manufacturing), the formulation and packaging of pesticides from these active ingredients. The main pesticide groups that are formulated include insecticides, herbicides, fungicides, acaricides (or miticides), nematocides and rodenticides.

## Petroleum Refining

The EHS Guidelines for Petroleum Refining cover processing operations from crude oil to finished liquid products, including liquefied petroleum gas (LPG), Mo-Gas (motor gasoline), kerosene, diesel oil, heating oil, fuel oil, bitumen, asphalt, sulfur, and intermediate products (e.g. propane / propylene mixtures, virgin naphtha, middle distillate and vacuum distillate) for the petrochemical industry. Further information on EHS issues related to storage tank farms is provided in the EHS Guidelines for Crude Oil and Petroleum Product Terminals.

## Petroleum-based Polymers Manufacturing

These guidelines are applicable to petroleum-based polymer manufacturing where monomers are polymerized and finished into pellets or granules for subsequent industrial use.<sup>13</sup>

<sup>13</sup> Elastomer manufacturing plants and fiber manufacturing plants are not included in the scope of this Guideline.

## Pharmaceuticals and Biotechnology Manufacturing

The EHS Guidelines for Pharmaceuticals and Biotechnology Manufacturing include information relevant to pharmaceuticals and biotechnology manufacturing facilities. They cover the production of active pharmaceutical ingredients and secondary processing, including intermediates, formulation, blending, and packaging, and related activities research, including biotechnology research and production.

## Phosphate Fertilizer Manufacturing

The EHS Guidelines for Phosphate Fertilizer Manufacturing includes information relevant to facilities that produce phosphoric acid, single superphosphate (SSP), triplesuperphosphate (TSP), and compound fertilizers (NPK).

## V. Mining

The EHS Guidelines for Mining are applicable to underground and open-pit mining, alluvial mining, solution mining, and marine dredging. Extraction of raw materials for construction products are addressed in the EHS Guidelines for Construction Materials Extraction.

## VI. Power

### Electric Power Transmission and Distribution

The EHS Guidelines for Electric Power Transmission and Distribution include information relevant to power transmission between a generation facility and a substation located within an electricity grid, in addition to power distribution from a substation to consumers located in residential, commercial, and industrial areas.

### Geothermal Power Generation

These EHS guidelines apply to Geothermal Power Generation. Please see the EHS Guidelines for Electric Power Transmission and Distribution for discussion of related transmission and distribution issues.

### Thermal Power Plants

This document includes information relevant to combustion processes fueled by gaseous, liquid and solid fossil fuels and biomass and designed to deliver electrical or mechanical power, steam, heat, or any combination of these, regardless of the fuel type (except for solid waste which is covered under a separate Guideline for Waste Management Facilities), with a total rated heat input capacity above 50 Megawatt thermal input (MWth) on Higher Heating Value (HHV) basis.<sup>14</sup> It applies to boilers, reciprocating engines, and combustion turbines in new and existing facilities. Annex A contains a detailed description of industry activities for this sector, and Annex B contains guidance for Environmental Assessment (EA) of thermal power projects. Emissions guidelines applicable to facilities with a total heat input capacity of less than 50 MWth are presented in Section 1.1 of the General EHS Guidelines. Depending on the characteristics of the project and its associated activities (i.e., fuel sourcing and evacuation of generated electricity), readers should also consult the EHS Guidelines for Mining and the EHS Guidelines for Electric Power Transmission and Distribution.

Decisions to invest in this sector by one or more members of the World Bank Group are made within the context of the World Bank Group strategy on climate change.

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<sup>14</sup> Total capacity applicable to a facility with multiple units.

## Wind Energy

The EHS Guidelines for wind energy include information relevant to environmental, health, and safety aspects of onshore and offshore wind energy facilities. It should be applied to wind energy facilities from the earliest feasibility assessments, as well as from the time of the environmental impact assessment, and continue to be applied throughout the construction and operational phases. Annex A contains a full description of industry activities for this sector. EHS issues associated with the construction and operation of transmission lines are addressed in the EHS Guidelines for Electric Transmission and Distribution.

## VII. Oil and Gas

### Liquefied Natural Gas Facilities

The EHS Guidelines for Liquefied Natural Gas (LNG) Facilities include information relevant to LNG base load liquefaction plants, transport by sea, and regasification and peak shaving terminals. For coastal LNG facilities including harbors, jetties and in general coastal facilities (e.g. coastal terminals marine supply bases, loading/offloading terminals), additional guidance is provided in the EHS Guidelines for Ports, Harbors, and Terminals. For EHS issues related to vessels, guidance is provided in the EHS Guidelines for Shipping. Issues related to LPG/Condensate production and storage in Liquefaction plant are not covered in this Guideline.

### Offshore Oil and Gas Development

The EHS Guidelines for Offshore Oil and Gas Development include information relevant to seismic exploration, exploratory and production drilling, development and production activities, offshore pipeline operations, offshore transportation, tanker loading and unloading, ancillary and support operations, and decommissioning. They also address potential onshore impacts that may result from offshore oil and gas activities.

## Onshore Oil and Gas Development

The EHS Guidelines for Onshore Oil and Gas Development include information relevant to seismic exploration; exploration and production drilling; development and production activities; transportation activities including pipelines; other facilities including pump stations, metering stations, pigging stations, compressor stations and storage facilities; ancillary and support operations; and decommissioning. For onshore oil and gas facilities located near the coast (e.g. coastal terminals marine supply bases, loading/offloading terminals), additional guidance is provided in the EHS Guidelines for Ports, Harbors, and Terminals.

## VIII. General Manufacturing

### Cement and Lime Manufacturing

The EHS Guidelines for cement and lime manufacturing include information relevant to cement and lime manufacturing projects. Extraction of raw materials, which is a common activity associated with cement manufacturing projects, is covered in the EHS Guidelines for Construction Materials Extraction.

### Ceramic Tile and Sanitary Ware Manufacturing

The EHS Guidelines for Ceramic Tile and Sanitary Ware Manufacturing include information relevant to ceramic tile and sanitary ware manufacturing projects and facilities. It does not include extraction of raw materials, which is included in the EHS Guidelines for Construction Materials Extraction.

## Construction Materials Extraction

This document includes information relevant to construction materials extraction activities such as aggregates, limestone, slates, sand, gravel, clay, gypsum, feldspar, silica sands, and quartzite, as well as to the extraction of dimension stone. It addresses stand-alone projects and extraction activities supporting construction, civil works, and cement projects. Although the construction materials extraction guidelines emphasize major and complex extraction schemes, the concepts are also applicable to small operations.

## Foundries

The EHS Guidelines for Foundries include information relevant to foundry projects and facilities casting ferrous (iron and steel) and nonferrous (primarily aluminum, copper, zinc, lead, tin, nickel, magnesium, and titanium) metals. Nonferrous metals are cast in combinations with each other or in combination with more than forty other elements to make a wide range of nonferrous alloys. These guidelines address sand casting, including the preparation and regeneration of molding sand, and the high- and low-pressure die casting of aluminum, zinc, and magnesium. In addition to these processes, this document includes consideration of Disamatic (DISA) technology. It does not cover further processing of the semifinished products.

## Glass Manufacturing

The EHS Guidelines for Glass Manufacturing include information relevant to glass manufacturing facilities. It does not include extraction of raw materials, which is addressed in the EHS Guidelines for Construction Materials Extraction.

## Integrated Steel Mills

The EHS Guidelines for Integrated Steel Mills include information relevant to the manufacture of pig iron and raw or low-alloy steel from iron ore and iron-based alloys. It is applicable to the manufacture of metallurgical coke; primary iron and steel production in Blast and Basic Oxygen furnaces (BF and BOF); scrap metal recycling in the electric arc furnace (EAF) process; the production of semifinished products; and hot and cold rolling activities. It does not include extraction of raw materials and further processing of the semifinished products into finished products. Guidance applicable to lime kilns, which may be present in integrated steel mills, is presented in the EHS Guidelines for Cement and Lime Manufacturing.

## Metal, Plastic, and Rubber Products

### Manufacturing

The EHS Guidelines for Metal, Plastic, and Rubber Products Manufacturing address material processing operations common to multiple industries engaged in the manufacture of metal, plastic, and rubber products. It does not include extraction or production of raw materials (metals, plastics, and rubber), metal casting, or synthesis of thermoplastic polymers or additives.

### Printing

The EHS Guidelines for Printing include information relevant to printing facilities and the main printing technologies including lithography / offset, gravure / rotogravure, flexography, screen, and letterpress printing. This document does not provide information applicable to plateless printing such as digital color printing machines for short runs up to DIN A3 size, or electrostatic, magnetic, and thermal devices.

## Semiconductors & Other Electronics

### Manufacturing

The EHS Guidelines for Semiconductors and Other Electronics Manufacturing include information relevant to semiconductors and other electronics manufacturing projects and facilities. It does not include information about the extraction of raw materials, assembly of general components, manufacturing of screens for the assembly of internal components within the plastic structure, or production of standard connectors.

## Base Metal Smelting and Refining

The EHS Guidelines for Smelting & Refining cover information relevant to base metal smelting and refining of lead, zinc, copper, nickel, and aluminum. It does not include the mining and concentration of the raw materials, which is covered in the EHS Guidelines for Mining.

## Tanning and Leather Finishing

The EHS Guidelines for Tanning and Leather Finishing include information relevant to tanning and leather finishing projects and facilities, and specifically to operations related to preliminary treatment of the raw hide, tanning processes, post-tanning processes, and finished products manufacturing. Aspects relevant to animal slaughtering are discussed in the EHS Guidelines for Meat Processing.

## Textile Manufacturing

The EHS Guidelines for Textile Manufacturing include information relevant to textile manufacturing projects and facilities for natural fibers, synthetic fibers (made entirely from chemicals), and regenerated fibers (made from natural materials by processing these materials to form a fiber structure). This document does not include polymer synthesis and natural raw materials production.