

## Summary of the Industrial Ventilation, Filtration, and Dust Extraction System

Facility / Location	System Name	Brief System Description	Capacity
W-C01 Reception Gatehouse and Administrative Building	Air Handling Units (AHUs)	The installation of an air handling unit (AHU) on the building's roof is planned. Its primary function is ventilation and the prevention of outside air infiltration into the interior spaces. All rooms will be maintained under slight overpressure, except for the sanitary facilities.	Air supply: max 9,500 m <sup>3</sup> /h Air extraction flow: 6,000 m <sup>3</sup> /h
	Ventilation of the Central Laboratory	The central laboratory is planned to include 4 fume hoods, with an additional fume hood located in the smaller laboratory on the ground floor, in order to prevent the spread of unpleasant odors during experimental procedures. Each fume hood is equipped with a dedicated ventilation system, including an air purification filter and an exhaust outlet located on the roof.	5 x 1.000 m <sup>3</sup> /h
W-C02 Operativni centar	Ventilation of the Operations Center Building	Ventilation of the transformer rooms is provided by forced ventilation, with fan operation controlled via thermostats installed in each room. Ventilation of the diesel generator is ensured by a fan integrated within the generator itself (part of the diesel generator project), while exhaust air from the diesel generator's radiator is discharged through ventilation ducts. Rainproof louver grilles are installed on the building façade, while fresh air intake is provided from the opposite side of the building. Ventilation of the MCC room is achieved using exhaust fans positioned in the area of the frequency converters, with their operation controlled via the Building	Transformer room ventilation: 6 × 3,600 m <sup>3</sup> /h MCC room ventilation: 3 × 9,000 m <sup>3</sup> /h DCS room ventilation: 4,000 m <sup>3</sup> /h  Storage ventilation: 3,000 m <sup>3</sup> /h Toilet ventilation: 3 × 180 m <sup>3</sup> /h Men's locker room ventilation: 240 m <sup>3</sup> /h

		Management System (BMS). Ventilation of the DCS room is also carried out using an exhaust fan, with its operation controlled via the Building Management System (BMS).	
W-C04 Pump Station and Firefighting Station	Ventilation of the Pump Station and Firefighting Station Building	In the garage zone, the installation of a wall-mounted axial fan is planned. The fan will operate in on/off mode based on carbon monoxide (CO) concentration measurements within the space. Fresh air compensation is provided through the rolling door at the garage entrance.	Garage exhaust:: 6.000 m <sup>3</sup> /h System OD-1: 360 m <sup>3</sup> /h
W-C08 Waste Pre-treatment and Storage	Ventilation of the Area for Hazardous Waste Pre-treatment	The hazardous waste treatment line (delivered in IBC containers, drums, etc.) is of a closed type, and in order to achieve inertization, nitrogen (N <sub>2</sub> ) is dosed directly into the shredder chamber. Therefore, under normal operating conditions, no air emissions are expected, and the ventilation of this area is performed via a wall-mounted axial fan with gravity louver shutters.	3.500 m <sup>3</sup> /h
	Dust Extraction and Ventilation System for the Unloading and Pre-treatment Area of Hazardous and Non-hazardous Waste	Dust extraction and ventilation of the unloading and pre-treatment area for hazardous and non-hazardous waste is provided by W-C09 – Waste Pre-treatment Filtration System with Activated Carbon Filter. Extraction hoods are installed at the connection points on the equipment itself (primary shredder, belt conveyors, metal separator, secondary shredder). A branch duct for ventilation of the hall (i.e. the pre-treatment building) is also foreseen on the main extraction duct from these connection points.	24.000 m <sup>3</sup> /h
	Dust Extraction and Ventilation System for the Area with Storage Bunkers and Solid	Dust and odor removal, as well as prevention of their emission outside the waste storage bunker area, is achieved using the boiler unit fan. The quantity of gas extracted from the hall and directed	23-47.000 Nm <sup>3</sup> /h

	Waste Mixing Bunkers in Facility W-C08	toward the boiler depends on the required combustion air volume, which in turn is determined by the current capacity of the boiler unit and the characteristics of the waste.	
		Optionally: In cases when the boiler is not operational (due to maintenance, downtime, etc.), air extraction will be performed using a fan that directs the air to a bag filter system and an activated carbon filter. The removal of dust and unpleasant odors, as well as prevention of their emission outside the waste storage bunker area, will be ensured by this fan system, which channels the air through the bag filter and activated carbon filter unit (W-C09).	24.000 m <sup>3</sup> /h
	Ventilation System for the Sludge Waste Storage Area	Air from the sludge storage area will be extracted using the combustion air fan and directed to the boiler unit, in order to maintain the storage area under negative pressure and prevent the spread of unpleasant odors outside the facility.	2.000 m <sup>3</sup> /h
		Optionally: When the boiler unit is not operational, nitrogen (N <sub>2</sub> ) will be automatically introduced into the sludge waste reception bunker to ensure inertization of the space.	-
	Ventilation System for the Room with Storage Tanks for Flammable and Non-flammable Liquids  System OD-1	Ventilation of this area is provided through two ducts, equipped with corresponding air supply and exhaust elements. Air extraction is performed at both the ceiling and floor levels in a 50:50 ratio. Make-up air is supplied through an external rainproof louver.	7.595 m <sup>3</sup> /h

	Ventilation System for the Area with IBC Containers / Drums / Big Bags  Systems OD-2, OD-3 and OD-4	Ventilation of the area is provided via three axial wall-mounted exhaust fans with gravity louvers. Air extraction is also performed at ceiling and floor levels, in a ratio of approximately 50:50.	OD-2: 8.000 m <sup>3</sup> /h OD-3: 7.000 m <sup>3</sup> /h OD-4: 2.000 m <sup>3</sup> /h Total : 17.000 m <sup>3</sup> /h
	Ventilation of the Fire Water Pump Station, Stairwell, and Room for Oily and Bilge Water Tanks  Sistem OD-6	Make-up air is supplied through an external rainproof louver.	1.650 m <sup>3</sup> /h
	Ventilation of Shredder Safety Equipment Room and Stairwell OD-7 i SV-1	Mechanical ventilation is provided for the shredder safety equipment room and the stairwell.	OD-7: 600 m <sup>3</sup> /h SV-1: 600 m <sup>3</sup> /h Total: 1.200 m <sup>3</sup> /h
	Emergency Ventilation System for the MCC Room	After the fire has been extinguished, dampers open and fans are activated.	1.900 m <sup>3</sup> /h
W-C09 Waste Pre-treatment Filtration System and Activated Carbon Filter	Waste Pre-treatment Filtration System and Activated Carbon Filter	Bag Filter – “Pulse-jet” Type Filter surface area: 483 m <sup>2</sup> Pressure drop: 1,500 Pa (max 2,000 Pa)	24.000 m <sup>3</sup> /h
		Centrifugal Fan The unit is equipped with frequency control, flexible connections at the inlet and outlet, and is designed in explosion-proof (EX) execution.	24.000 m <sup>3</sup> /h

		Activated Carbon Filter Filled with activated carbon, volume of activated carbon: approximately 70 m³.	24.000 m³/h
		Dust Extraction System Ductwork (including hoods, branches, elbows, ducts, inspection openings, transition pieces, and similar components)	-
		Emitter H = 21.5 m	-
W-C11 Waste Thermal Treatment Plant	Ventilation of the Waste Thermal Treatment Plant Building	At the top of the eastern facade of the building, the installation of 24 fans is planned. Of these, 4 fans will operate continuously (with a total capacity of 50,000 m³/h), while the remaining fans will be activated in pairs of 4, based on temperature readings via thermostats—up to a maximum ambient temperature of 40 °C, at which point all fans will be in operation. Fan operation is controlled via the central Building Management System (BMS). Make-up air is supplied through external rainproof louvers located in the lower zone of the building's western facade.	24 x 12.500 m³/h Total: 300.000 m³/h
	Flue Gas Treatment System of the Boiler Unit	This system encompasses a series of processes through which the following are removed from the flue gases: <ul style="list-style-type: none"> <li>• particulate matter,</li> <li>• acidic compounds such as SO<sub>2</sub>, HCl, and HF (via absorption),</li> <li>• organic compounds such as PCDD/PCDF (via adsorption),</li> <li>• heavy metals and mercury (Hg) (via adsorption),</li> <li>• nitrogen oxides (NO<sub>x</sub>) (via reduction).</li> </ul>	

		<p><b><u>Dry Flue Gas Cleaning:</u></b>  <b>Bag Filters – The system includes 6 bag filter compartments.</b>  Removal of fly ash, i.e. particulate matter from flue gases, is carried out in the bag filters, which offer high dust removal efficiency (up to 99.99%).</p> <p><b>Activated Carbon Reactor</b> – The removal of heavy metals, mercury (Hg), and organic compounds such as dioxins and furans (PCDD/PCDF) from the flue gas stream is achieved by dosing activated carbon into the reactor.</p>	<p>Flue Gas Fan – First Stage (flue gas after bag filter): 95,000 m³/h</p> <p>Bag Filter Reactor – Flue Gas Flow Rate: 89,804 Nm³/h</p> <p>Fan for Pneumatic Transport of Activated Carbon  Activated Carbon Container: 2 × 8 kg/h</p>
		<p><b><u>Wet Flue Gas Cleaning</u></b>  Absorption of compounds such as SO<sub>2</sub>, HCl, and HF from the flue gas takes place in a scrubber system (wet gas cleaning) consisting of a two-stage scrubber unit:  I: HCl Scrubber System  II: SO<sub>2</sub> Scrubber System</p>	<p>HCl scrubber: 65,000 Nm³/h  SO<sub>2</sub> scrubber: 70,000 Nm³/h</p>
		<p><b><u>SCR System – Selective Catalytic Reduction of Nitrogen Oxides (NO<sub>x</sub>):</u></b>  Removal of nitrogen oxides is achieved by injecting an aqueous ammonia solution (ammonia water) into the flue gas duct downstream of the scrubber system and upstream of the catalyst, where the selective catalytic reduction (SCR) reaction takes place.</p>	<p><b>SCR Reactor with Catalysts:</b> 31,000–70,000 Nm³/h  <b>Flue Gas Fan – Second Stage (flue gas after SCR system):</b> 75,000 m³/h</p>

		W-C14 Stack : H=56 m	Flue Gas Flow Rate : 31.000-70.000 Nm <sup>3</sup> /h
W-C12 Stabilization and Solidification	Ventilation of the Stabilization and Solidification Facility	Optional: On the southwestern façade, three ATEX-protected fans are planned. These fans are activated in case the main ventilation system of the W-C12 facility (Solidification Filtration System) is shut down, in order to prevent any increase in hydrogen concentration in any part of the building. Make-up air is supplied via 10 external rainproof louvers.	3 x 5.000 m <sup>3</sup> /h. Total: 15.000 m <sup>3</sup> /h
	Equipment Dust Extraction Systems	Bag filter on the cement silo Bag filter on the mixer Bag filter on the weighing system of the cement silo Bag filter on the mixture weighing unit	Capacities are not defined at this stage of design and will be specified following the selection of equipment and its manufacturer in the next phase of the design process.
W-C16 Solidification Filtration System	Stabilization and Solidification Filtration System	Bag filter – “pulse-jet” type Filter surface area: 483 m <sup>2</sup> Pressure drop: 1,500 Pa (max 2,000 Pa)	25.000 m <sup>3</sup> /h
		Centrifugal fan Equipped with frequency regulation Flexible connections at inlet/outlet ATEX compliant, Class IIC T1	25.0 m <sup>3</sup> /h
		Ductwork elements, Includes ventilation ducts and dust extraction piping	-
		Emitter H = 21.5 m	25.000 m <sup>3</sup> /h
U-CO2 Maintenance Building and	Ventilation of the Maintenance Building and Auxiliary Systems Facility	The production/warehouse area is ventilated through roof domes. Ventilation of the sanitary facility is provided by a	120 m <sup>3</sup> /h

Auxiliary Systems Facility		mechanical ventilation system with exhaust directed to the building facade.	
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