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#

# Introduction

## Purpose of the document

System Description H09 HVAC is a description and rationale of the expected operations of the HVAC system in the H09 building and is part of the technical baseline. It is a platform for stakeholder consensus to ensure the system that is built is operationally feasible. This is a sub document of the System Description H09 building [1]. Generic requirements, regulations, system functionality, and design parameters for HVAC systems at ESS are defined in Site Infrastructure System Description [2]. Specific system requirements for H09 HVAC are listed in a requirement document [3].

After the introduction, chapter 2 defines the purpose of the system. Chapter 3 describes the context of the system and interfaces to other systems and organisations from a black box perspective. Chapter 4 describes the architecture of the system and conceptual solutions

## Definitions, acronyms and abbreviations

|  |  |
| --- | --- |
| **Abbreviation** | **Explanation of abbreviation** |
| HVAC | Heating, Ventilation, Air Conditioning |
| H01 | Central Utility Building |
| H09 | Waste building |
| D05 | Electrical Substation |
| CF | Conventional Facilities (organisation) |
| ES&H | Environment Safety and Health Division (organisation) |
| AD | Accelerator Division (organisation) |
| TD | Target Division (organisation) |
| ICS | Integrated Control System (organisation) |
| NSS | Neutron Scattering Source (organisation) |
| Admin | ESS Administration (organisation) responsible for Security and Logistics |
| PAS | Process Air System |
| PSS | Personal Safety System |
| CWL | Cooling Water Low temp |
| CW | Cooling water system, Secondary |
| DHL | District Heating Low temp |
| WW | Waste water system |
| HWS | Heating water system, Secondary |
| SW | Storm water system |
| WWR | Waste water system, risk |
| RWWS | Radiological waste water system |
| W | Domestic cold-water system |
| HW | Domestic hot-water system |
| HWC | Domestic hot-water system, circulation |
| AHS | Air Handling System |
| AHU | Air Handling Unit |
| CAS | Circulation Air System |
| CIU | Circulation Air Unit |
| CAVEAU | Constant Air VolumeExtract Air Unit |
| VAV | Variable Air Volume |
| RH | Relative Humidity |

##  References

|  |  |
| --- | --- |
| [1]  | “ESS-0047239, DM--SD-TBSIDDH09-System Description H09 Waste Building”. |
| [2]  | “ESS-0043389, DM--SD-TBSIDD----Site Infrastructure System Description HVAC”. |
| [3]  | ESS-0082489, DM--SR-TBSIDDH09-System Requirements H09 HVAC.  |
| [4]  | ESS-0190272, DM--ID-TBSIDDH09-Connections to Earthwork systems H09.  |
| [5]  | ESS-0145196, VS0052B--8-H09---001 Flow chart Domestic Water System.  |
| [6]  | ESS-0185517, DM--ID-TBSIDDH09-Drains and thresholds in H09.  |
| [7]  | ESS-0145191, VS0053BB-8-H09---001 Flow chart Conventional Waste Water System.  |
| [8]  | ESS-0181792, QU--PR-DEPDGDAU--ES and H review part 1 of H09 PD.  |
| [9]  | ESS-0145190, VS0053BB-8-H09---002 Flow chart Radiological Waste Water System.  |
| [10]  | ESS-0145192, VS0055C--8-H09---001 Flow chart Cooling Water System.  |
| [11]  | ESS-0145195, VS0056B--8-H09---001 Flow chart Heating Water System.  |
| [12]  | ESS-0145189, V00-57---8-H09---001 Flow chart Conventional Ventilation System.  |
| [13]  | ESS-0145194, V00-57---8-H09---002 Flow chart Radiological Ventilation System.  |
| [14]  | “ESS-0002381, Fire Safety Strategy Report”. |
| [15]  | ESS-0145193, SP0054B--8-H09---001 Flow chart Sprinkler System.  |

# System Purpose

The H09 HVAC consists of systems with the following purposes:

|  |  |
| --- | --- |
| Domestic Water System | Provide the building with potable water and media to the Cooling Water System and the Heating Water System. |
| Waste Water System | Carries away Waste Water with no risk of radiological contamination to A Site wide systems. Waste Water with risk of radiological contamination will stay within waste building for checking/cleaning before it is released to a site wide waste water system. |
| Storm Water System | Carries away Storm Water to A Site wide systems. Prevents external flooding. |
| Cooling Water System | Ensure air temperature and humidity of supply air via cooling coils. Provide rooms with need of extra cooling with cooling devices. |
| Heating Water System | Ensure air temperature of supply air via heating coils. Provides rooms with need of heating with heaters. Preheats Domestic Water for the use of hot Potable water. |
| Ventilation System | Ensure cooling via air. Ensure air quality in the building. It also ensures the correct pressure difference between different rooms and removes hazardous substances. |
| Fire extinguishing system | Provide fire hydrants with water. Provide the building with a Sprinkler System. |

# Concepts of operation

## System Stakeholders

|  |  |  |
| --- | --- | --- |
| **Stakeholder** | **Stakeholder group** | **Representing stakeholder** |
| CF | Operators | Facility management provider |
| Regulators | Environmental courtRäddningstjänstenMiljö och hälsovårdsmyndighetenArbetsmiljöverketLunds KommunInsurance provider |
| Interfacing system | C&M, Process, Structure |
| ES&H | Users | Räddningstjänsten |
| Regulators  | SSMRäddningstjänstenArbetsmiljöverket |

## Operational Scenarios

See System Description H09 Waste Building [1].

## Context & interfacing systems

**Figure 1: Interface diagram H09 HVAC**

|  |  |
| --- | --- |
| A Site Wide | Domestic Water and Sprinkler Water is supplied. Waste Water and Storm Water is taken care of. |
| H09 Control and monitoring | All H09 HVAC equipments are powered and controlled from the cabinets. |
| H09 Process | H09 HVAC receives CWL and DHL for Cooling Water and Heating Water systems. H09 Process receives Radiological Waste Water from H09 HVAC. H09 HVAC connects H09 Process tanks with ventilation. |
| H09 Electrical system | Grounding connecting at the bonding rails placed at control cabinets and around the buildings. |
| H09 Structure | Provides spaces and mechanical support for HVAC equipment. Important climate function which works in synergy with HVAC to fulfil indoor climate requirements.Provides embankment in the Sprinkler room. |
| D05 HVAC | D05 HVAC provides extract air ventilation for the Culvert between H09 and D05. Supply air ventilation for this Culvert is provided by H09 HVAC. |
| H09 Solid waste management | Suplying interfaces for waste water and local C2-ventilation to be connected to future machines for decontamination. |

### Design Parameters

For outdoor design temperature, standard rooms etc, see Site Infrastructure System Description HVAC [2].

For indoor room temperatures in Controlled and Supervised areas required by ES&H min/max

H09.090.1000 Culvert 10°C/-

H09.090.1001 Basement 10°C/-

H09.090.1002 Stair 10°C/-

H09.100.1001 Grouting room 18°C/-

H09.100.1002 Purification room 18°C/-

H09.100.1003 RRS (LSC) 18°C/-

H09.100.1004 Pump room 18°C/-

H09.100.1005 Stair 18°C/-

H09.100.1006 Cleaning room 18°C/-

H09.100.1007 Tank room 18°C/-

H09.100.1008 Low intermediate level 18°C/-

H09.100.1009 Overhead Crane hall 18°C/-

H09.100.1012 Chem Lab 20°C/24°C

H09.100.1013 Chemicals 20°C/-

H09.100.1014 Water sampling 20°C/-

H09.100.1015 Rad Lab 20°C/24°C

H09.100.1016 Barrier area 20°C/-

H09.100.1017 Storage 20°C/-

H09.100.1018 Shower 20°C/-

H09.100.1019 Nuclide characterization 18°C/-

H09.100.1020 Maintenance workshop 18°C/-

H09.100.1021 Decontamination 18°C/-

H09.100.1022 Hot works 18°C/-

H09.100.1023 Sorting room 18°C/-

H09.110.1002 Cementation 18°C/-

H09.110.1003 Purification room 18°C/-

H09.115.1003 Stack monitoring room 18°C/-

Interface with process - Design system temperatures, see Site Infrastructure System Description HVAC [2].

### Applicable standards

See Site Infrastructure System Description HVAC [2]

SS-ISO\_17873\_2011 Nuclear facilities – Criteria for the design and operation of ventilation systems for nuclear installations other than nuclear reactors

### Environmental, Health, Safety and Security

See Site Infrastructure System Description HVAC [2]

See System Description H09 Waste Building [1]

There will be alarms that sets of in case of risk for accidents occur due to system failures. Following is specific for H09.

* Pressure difference between rooms of different classification drops
* Low velocity over hatch in fume hoods
* Drain pump failure in sump pits
* High water level in sump pits

### Ra**d**iological safety important system parts

* Radiological Waste Water system
* Radiological Ventilation

# System characteristics

 Figure 2: Functional breakdown of H09 HVAC

The H09 HVAC consists of the following systems:

* Domestic Water System
	+ Potable Water System
	+ Non Potable Water System
* Waste Water System
	+ Conventional Waste Water System
	+ Radiological Waste Water System
* Storm Water System
* Cooling Water System
* Heating Water System
* Ventilation System
	+ Conventional Ventilation System
	+ Process Ventilation System
	+ Radiological Ventilation System
* Fire Extinguishing System
	+ Sprinkler System

## Domestic Water System

### Potable Water System

Incoming domestic water (W) will be provided to building H09. There will be plant equipment installed in the level 100 HVAC room where the hot potable water (HW) will be produced. The hot water will be provided with hot water circulation (HWC).

Domestic water will be connected to all sanitary units, coffee machines, dishwashers, showers, and other water taps.

The Chemical laboratory will have a safety shower and eyewash.

Insulation in controlled areas shall be of non-burning material and be provided with aluminum surface cover.

All water taps and shall be of type low flush to minimize the amount of waste water production and in controlled areas they shall be it ALARA.

Connection to Earthwork according to DM--ID-TBSIDDH09-Connections to Earthwork systems H09 [4].

See VS0052B--8-H09---001 [5].

### Non Potable Water System

A separate system for laboratory equipment will be provided. The system is equipped with backflow protection level BA according to SS-EN 1717. The equipment in the laboratories will not be provided by HVAC. HVAC will deliver a system that can be connected above the suspended ceiling within the room.

Insulation in controlled areas shall be of non-burning material and be provided with aluminum surface cover.

See VS0052B--8-H09---001 [5].

## Waste Water System

### Conventional Waste Water System

There will be a conventional waste water system (WW) installed in the building. All waste water from toilets, sinks, cooling coils, FCUs safety valves, backflow modules etc. in uncontrolled areas will be connected to this system.

Principal location of channel drains, floor drains, waste water connections, thresholds and gaps under doors required to fulfil the requirements for Waste water system and handling of fire extinguishing water see DM--ID-TBSIDDH09-Drains and thresholds in H09 [6]

From the H09.110.1002 Cementation the waste water will run to a sedimentation basin in ground. The sedimentation basin will have no outlet pipe but the water will be pumped out of the basin with a portable pump into a portable tank for further transportation to a suitable location.
The sedimentation basin will be provided with a sensor that controls the water level and sends a signal to the control system when emptying of the basin is required.

There will be a shut off valve on the system placed in ground outside the building. The valve is not part of H09 HVAC but the function is to have the possibility to close off the conventional waste water system in case of fire extinguishing water in the building.

Connection to Earthwork according to DM--ID-TBSIDDH09-Connections to Earthwork systems H09 [4].

See VS0053BB-8-H09---001 [7].

### Radiological Waste Water System

All waste water from the controlled areas will be connected to the radiological waste water system (RWWS). The radiological waste water system will be connected to the H09 Process Radiological Waste Water System for control and treatment of the waste water. The interface is in H09.090.1001 Basement on level 90.

Radiological waste water pipes cannot be casted in or placed in ground from H09.100.1001 Grouting room, H09.100.1002 Purification room, H09.100.1006 Cleaning room, H09. 100.1012 Chem lab, H09.100.1015 Rad lab, H09.100.1021 Decontamination room and H09.110.1003 Purification room L2. Channel drains and floor drains can be casted in and the connecting pipes mounted visible in the level below where possible. Exception in H09.100.1021 Decontamination where the Radiological waste water pipe from the slop basin can be casted in.

In H09.100.1002 Purification room, H09.110.1003 Purification room L2, H09.100.1006 Cleaning room and H09. 100.1012 Chem lab there will be a channel in the structure and a sump with a drain pump that pumps the radiological waste water to a level that allows the radiological waste water to run in visible pipe work to the tank in H09.090.1001 Basement.
From the H09.100.1015 Rad lab there will be no waste water at all.

In H09.100.1002 Purification room there will be two channel drains. One is placed in the centre of the room to handle spillage on the floor. This channel drain will be without a water lock. The outlet of the channel drain will be in H09.090.1001 Basement where it will be connected by Process and diverted to either a resin tank or to H09-TA012, or to totally shut the connection via a valve. The other channel drain will work as a water barrier to prevent water from floating out of the room on the floor. This channel drain will be connected to the rest of the Radiological waste water system in H09.090.1001 Basement.

From room H09.100.1001 Grouting room, H09.100.1020 Maintainance workshop, H09.100.1021 Decontamination room and H09.100.1023 Sorting there will be a channel in the structure and a sump without a permanent drain pump. If water is detected in the sump pit a temporary pump will be used to pump the radiological waste water to a suitable part of the radiological waste water system depending on the content in the waste water.

In H09.100.1003 RRS (LSC) there will be a channel drain without a water lock. The outlet of the channel drain will be in H09.090.1001 Basement where it will be connected by Process and diverted either to a resin tank or to H09-TA012, or to be totally shut.

There will be drains and thresholds to ensure that no fire extinguishing water can leave the buildings controlled areas to the outside or from controlled to uncontrolled areas.
In the H09.100.1009 Overhead crane hall there will be channel drains in front of the gates and doors to the outside to prevent fire extinguishing water from floating out from the building.
In the H09.100.1016 Barrier area there will be channel drains to prevent fire extinguishing water from floating from the controlled to the uncontrolled areas.
In the H09.115.1002 Controlled HVAC room there will be a threshold to prevent fire extinguishing water from floating from the controlled HVAC room to H09.115.1001 Uncontrolled HVAC.
The door between H09.115.1003 Stack monitoring room and H09.115.1002 Controlled HVAC room shall have a gap under the door and no threshold so that fire extinguishing water can float freely on the floor.
The door in the H09.100.1009 Overhead crane hall wall into the H09.115.1002 Controlled HVAC room shall have a gap under the door and no threshold so that fire extinguishing water can float freely from the Controlled HVAC room out to the Overhead crane hall.

In the H09.100.1007 Tank room there will be a channel in the structure and a sump with a drain pump that pumps the radiological waste water to a level that allows the radiological waste water to run to the H09.090.1001 Basement on level 90. In case a tank in H09.100.1007 Tank room breaks the drain pump in the sump will stop to avoid eventual waste water from one of the tanks in H09.100.1007 Tank room to end up in the tank in H09.090.1001 Basement but stay within H09.100.1007 Tank room.

There shall be a sump pit in H09.090.1001 Basement where Process will place a drain pump. This sum pit shall be placed as far away from the ion resin tank as possible in order to minimize radiation to workers during maintenance etc.

In H09.090.1000 Culvert there will be sump pit without a permanent drain pump. If water is detected in the sump pit a temporary pump will be used to pump the radiological waste water to a suitable part of the radiological waste water system depending of the content in the waste water.

All sump pits will be provided with sensors to control if water occurs in the sumps.

Channel drains generally will have steel grids with classification L15 except for the ones at the gates in H09.100.1009 Overhead crane hall that will be M125.

Radiological waste water system design is based on QU--PR-DEPDGDAU--ES and H review part 1 of H09 PD [8]

Principal location of channel drains, floor drains, waste water connections, thresholds and gaps under doors required to fulfil the requirements for Waste water system and handling of fire extinguishing water see DM--ID-TBSIDDH09-Drains and thresholds in H09 [6]

See VS0053BB-8-H09---002 [9].

## Storm Water System

All roofs are dewatered by outdoor storm water systems (SW) and connected to A Site wide Storm Water System.

## Cooling Water System

There will be heat exchangers installed in the level 100 HVAC room which provides 10°C cooling water (CW) for all HVAC cooling systems in the building.

There will be several sub cooling systems for AHUs in order to provide the required cooling for each AHU.

There will be a fan coil unit installed in the Comms room connected to the 10°C cooling system.

Insulation in controlled areas shall be of non-burning material and be provided with aluminum surface cover.

Design system temperatures, see Site Infrastructure System Description HVAC [2].

See VS0055C--8-H09---001 [10].

## Heating Water System

There will be heat exchangers installed in the level 100 HVAC room which provides 50°C heating water (HWS) for all HVAC heating systems in the building.

There will be several sub heating systems for AHUs in order to provide the required heating for each AHU.

There will be a sub heating system for radiators. Radiators will be installed in all rooms requiring heating throughout the buildings.

Radiator valves in rooms with cooling units or demand-controlled VAV shall have electrical actuators. In other rooms the radiator valves shall have mechanical thermostats.

Insulation in controlled areas shall be of non-burning material and be provided with aluminum surface cover.

Design system temperatures, see Site Infrastructure System Description HVAC [2].

See VS0056B--8-H09---001 [11].

## Ventilation System

### Conventional Ventilation System

+H09=57B:AHS01

The system for offices, conference rooms etc. will have an AHU located in the uncontrolled HVAC room on the second floor. The AHU will be provided with rotating heat exchanger with high heat recovery efficiency.
The purpose of the ventilation systems are to meet the hygiene and temperature requirements. The system will be a VAV system. The supply air will generally be supplied as mixed.

The uncontrolled areas will be provided with ventilation to meet the hygiene requirements in all rooms and handle internal and external heat loads in H09.100.1069 Office, H09.100.1068 Control room and H09.100.1070 Staff room. It shall also handle pollutants and heat from equipment, for example from the kitchen equipment.

In general, the ventilation systems in the building shall be of type VAV that shall be demand-controlled. There shall be sensors for presence, pollutants, temperature and the airflows shall be controlled individually on room level. The air handling units shall work together with the demand-controlled VAV-system and adapt the pressure in the system to ensure minimum energy use.
When there is a heating demand in the room radiators will turn on when the airflow is at minimum so that the heating system and the VAV system works in sequence.

In case of fire the AHU will shut down and fire dampers will close.

See V00-57---8-H09---001 [12].

### Process ventilation system

+H09=57C:PAS01

There will be a ventilation system installed, serving the Cementation room on level 110. The system will be of type exhaust air system with untreated fresh air from outdoor.
The exhaust will be connected to a chemical hood together with the room ventilation.
The system will run continuously.

See V00-57---8-H09---001 [12].

### Radiological Ventilation System (System design is not yet final due to missing information)

+H09=57C:PAS02 and +H09=57C:PAS03

There will be a separate ventilation system serving the rooms in the controlled areas and supply air to the Culvert which is a supervised area.

There will be a stack outside the building connected to the building where all exhaust air from controlled areas will be released at high level. In the stack there will also be measuring equipment. Stack and measuring equipment is not part of HVAC. HVAC shall provide a measuring cross in the stack that can be connected for measuring of the air flow.

The design of the ventilation system will be according to SS-ISO\_17873\_2011 Nuclear facilities – Criteria for the design and operation of ventilation systems for nuclear installations other than nuclear reactors.

Areas with Ventilation/Room classification Blue are classified C1 and will have 2 air changes per hour. These areas shall have 50Pa negative pressure compared to unclassified areas and outdoor.

Areas with Ventilation/Room classification Yellow are classified C2 and will have 2 air changes per hour. These areas shall have 50Pa negative pressure compared to Blue areas.

Areas with Ventilation/Room classification Red are classified C2 and will have 5 air changes per hour. These areas shall have 70Pa negative pressure compared to Blue areas.

There will be one EAU located in the controlled HVAC room on the second floor serving the rooms with C1 classification. The EAU will have F9 filter, heat recovery coil for liquid connected heat recovery, fan and dampers. The filters will be of type bag in-bag out. The exhaust from the EAU will be routed to the stack.

There will be one EAU located in the controlled HVAC room on the second floor serving the rooms with C2 classification. The EAU will have F9 filter, HEPA filter, fan and dampers. The filters will be of type bag in-bag out. The exhaust from the EAU will be routed to the stack.

There will be one SAU located in the uncontrolled HVAC room on the second floor serving all rooms in controlled areas and the Culvert which is a supervised area. The SAU will have F9 filter, heat recovery coil for liquid connected heat recovery, two heating coils, cooling coil, fan and dampers. The heat recovery will be liquid connected to the EAU serving the C1 classified areas to eliminate the risk of spreading contaminated air through the ventilation but still reuse energy from the exhaust air. The cooling coil will be used booth for cooling of supply air and dehumidification. Therefore a second heating coil will be installed for reheating after dehumidification.

The SAU will have heating coils and cooling coils to provide a constant supply air temperature of 20 degrees.
The relative humidity in the supply air will be controlled so that the relative humidity in the extract air from the C2 classified areas stays below 70% for protection of the HEPA filters.

Chemical cupboards and fume hoods in H09.100.1012 Chemical Lab H09.100.1013 Chemicals and H09.100.1004 Pump room is not part of the SI HVAC but connected to the ventilation system. The position meter for the sash in the fume hood and the airflow alarm which warns users when sufficient airflow is not achieved through fume hoods is part of SI HVAC. Position meter and airflow alarm shall be compatible with dampers serving fume hoods.

In H09.100.1012 Chemical Lab and H09.100.1004 Pump room there will be a separate extract air diffuser so the air flow in each room can be increased to handle larger parts of the heat loads in the room even though the fume hoods are closed. The airflow from the fume hoods are prioritized so the airflow from the extract air diffuser will be decreased if the airflows to the fume hoods are increased.
It will also be controlled that the designed maximum airflow from the room can´t be exceeded.
When there is a heating demand in the room radiators will turn on when the airflow is at minimum. Minimum airflow is depending on what is required for fume hoods and overhead fume hoods.

In each fume hood there will be a position meter that measures how much the fume hood is open. Each fume hood has a damper that controls the air flow so that the front air velocity becomes minimum 0,5 m/s in the hatch opening. The airflows from all extract air dampers are summed and a damper in the supply air controls that the required amount of air is supplied.

Each fume hood will be provided with scrubber. The scrubber is not part of CF scope but the system needs to handle an additional pressure drop of 500Pa over the scrubber.

In the H09.100.1007 Tank room with Ventilation/Room classification Blue, there will be 7 ventilated tanks. These tanks will be connected with pipes that will be routed into the Purification room on second floor with Ventilation/Room classification Red, where the tank vent pipes will be connected to the C2 classified extract air system via a pull switch.

In H09.090.1001 Basement there will be 2 ventilated tanks. The tanks will be connected with pipes that will be connected to the C2 classified extract air system via a pull switch.

In H09.100.1002 Purification room there will be 2 ventilated resin tanks. These tanks will be connected with pipes that will be connected to the C2 classified extract air system via a pull switch.

In H09.100.1001 Grouting room the extract air system will be provided with a separate pull switch in addition to the conventional extract air grille for possible future connection by the users. Local filtration before connection to the extract air system will be provided by the users and are not in CF scope.

In the H09.100.1009 Overhead crane hall there will be large gates to the outdoor environment. In order to ensure that these are not opened when radiological hazardous work is ongoing in the hall there will be a system inside the hall that needs to be activated before the gates can be opened. When the system is activated the ventilation system serving the Overhead crane hall will no longer keep the negative pressure in the room compared to outdoor and unclassified areas. Also in order to open the gates the internal doors from Overhead crane hall to adjacent rooms must be closed. This will be controlled with an automatic function.
In the H09.115.1002 HVAC Controlled there will be air gaps under the towards H09.100.1009 Overhead crane hall so that fire extinguishing water can run out on the floor. The gap will be provided with some kind of cover that minimizes air leakage between the rooms when gates to the outside H09.100.1009 Overhead crane hall are opened so that the negative pressure in H09.115.1002 HVAC Controlled can be maintained.

In the Overhead crane hall there will be an area dedicated for fork lift charging. Since this is an area within the large hall no special ventilation is needed.

In the H09.100.1016 Barrier area there will be an interlock function between the door towards the controlled corridor and the doors towards H09.100.1061 Changing room 1 and H09.100.1066 Changing room 2. This is to avoid puncturing the pressure difference between the controlled and uncontrolled areas.

In case of fire the ventilation system will run until a critical temperature occurs. Then the fire dampers will close. The fans will keep running to maintain dynamic barrier from the fire compartments that are not exposed to fire. The system will need to be simulated when it is designed in detail.

Insulation in controlled areas shall be of non-burning material and be provided with aluminium surface cover.

The Culvert between H09 and D05 will be provided with supply air from this system. Extract air will be provided from D05.

See V00-57---8-H09---002 [13].

## Fire extinguishing system

### Sprinkler system

Water sprinkler system shall be installed to control fire in H09. The system shall be connected to wet system alarm check valves in sprinkler valve room in building on level 100.

H09 will be provided with a complete automatic water sprinkler system according to SS EN 12845 with Supplement according to SBF 120: 8.

Functional overview:

Sprinkler classification of occupantion, H09 office area

Hazard classification: OH1

Water density: 5mm/min

Design area: 72 m²

Duration: 60 min

According to Fire Safety Strategy Report [14]

Sprinkler classification of occupantion, H09 Waste Building

Hazard classification: HHS

Water density: XXXmm/min To be determined

Design area: XXX m² To be determined

Duration: 90 min

According to Fire Safety Strategy Report [14]

Water source:

Water source based on their own water reservoirs located in a separate building directly connected to the pumping unit center that provides a ring feeder for the entire ESS. Water pipe that supplies the H09 building is connected to this ring feeding.

Sections:

Section 1 Wet pipe.

Sprinkler protected areas:

H09 Entire building, booth office areas and waste handling areas and technical plant rooms.

Connection to Earthwork according to DM--ID-TBSIDDH09-Connections to Earthwork systems H09 [4].

See SP0054B--8-H09---001 [15].

# Risks

Fire Safety Strategy Report [14].

Document Revision history

Review comments to this document are made in [ESS-0155069](https://chess.esss.lu.se/enovia/link/ESS-0155069/21308.51166.53504.48279/valid)

| Version | Reason for revision | Date |
| --- | --- | --- |
| 1.0 | New document | 2017-09-29 |
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