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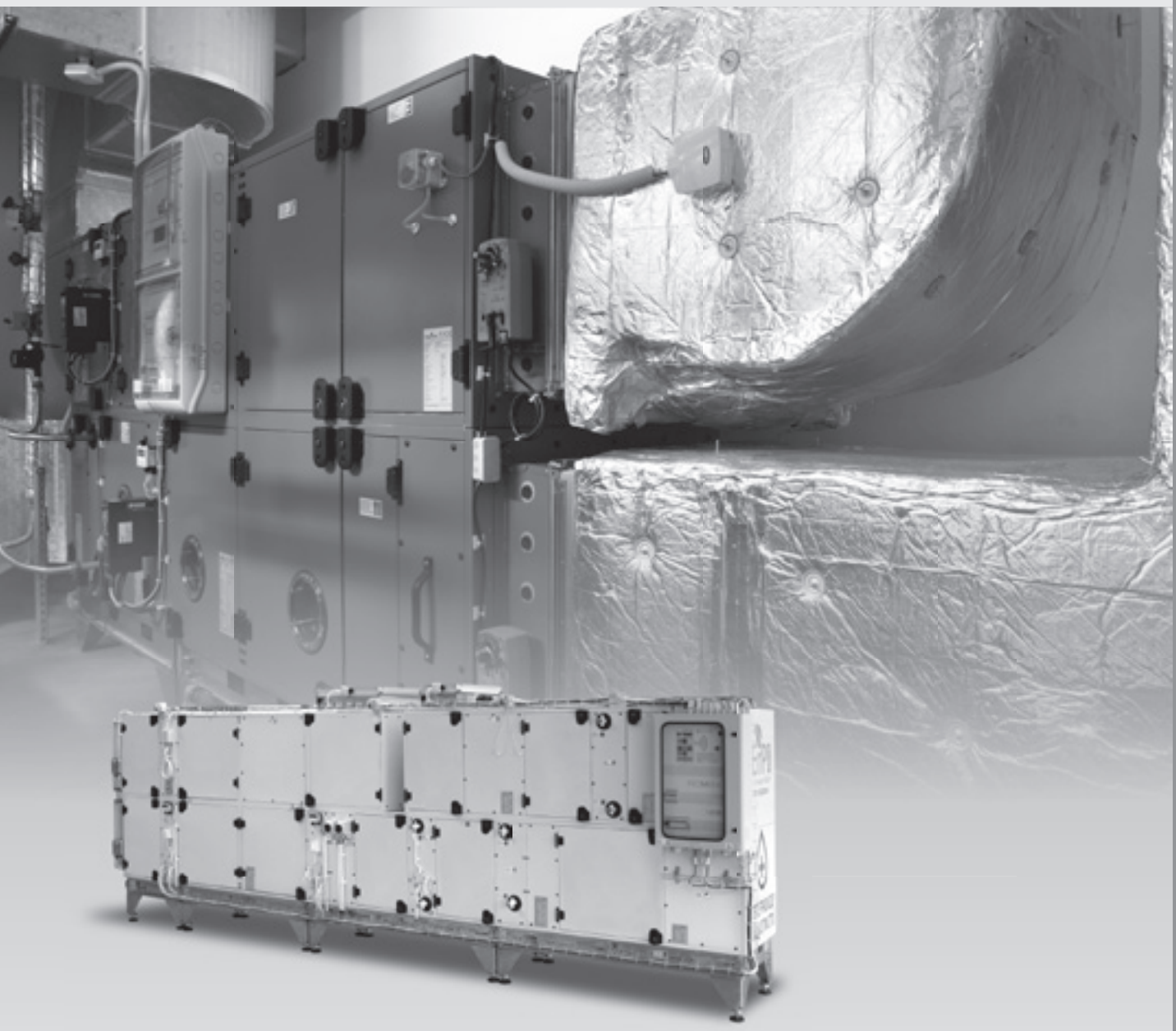

Basic Information on Cleaning of Air-handling Units

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Contents

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Definitions, Cleaning the Chambers of Air-handling Units

1. Introduction

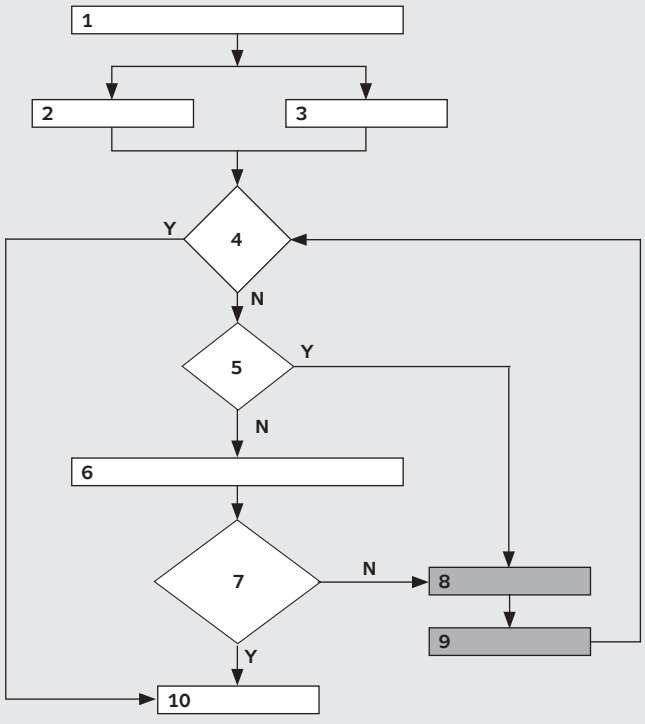
1.1 Definitions

These instructions comply with the principles of the standard ČSN EN 15780 – Ventilation in buildings – Air ducting – Air--handling equipment cleanliness, and focus only on the cleaning of air-handling units. They do not cover the design, selection or specification of the device or its parts. Neither do they define the level of cleanliness, checking, measuring, evaluation, etc. The device's user must perform these activities in accordance with the standard ČSN EN 15780, please see the figure #1 – indication of procedures to keep the air-handling equipment clean.

1.2 Responsilibilty

Keeping the air-handling units clean is the responsibility of the user. The frequency and scope of the cleaning must be clearly defined in the service regulations issued by the user. The air-handling unit cleaning methods described below will ensure a high level of cleanliness of the operated equipment is achieved and maintained.

Figure 1



Legend

1 Air-handling equipment cleanliness inspection and maintenance
2 Commissioning
3 Regular inspection
4 Visibly clean
5 Visibly dirty
6 Objective measuring
7 Acceptable level of cleanliness
8 Cleaning
9 Verification
10 Documentation
A = Yes
N = No

2. Glossary

2.1. Dry Cleaning

This is carried out using a dry cloth or by hand brushing and vacuuming with appropriate suction pressure.
Cleaning using compressed air (blowing) is used to clean assemblies pulled out from the unit and must always be performed outside the air-handling unit to prevent the dirt being blown into other places in the unit.

2.2. Wet Cleaning

This is carried out using a wet cloth or by hand brushing with a wet brush and vacuuming the droplets with appropriate suction pressure. Common cleaning agents with neutral PH can be used. Pressure water cleaning can be performed by water jetting using standard cleaning machines. This type of cleaning is only suitable for chambers equipped with a condensate drainage tray. This cleaning method is not suitable when cleaning other chambers. Chemical cleaning (disinfection) is performed by applying gaseous or liquid chemical agents (do not use dry agents) by hand washing (using a cloth), using a pressure washing device or a gas generator.

2.3. Suitability of Different Types of Cleaning (Dry, Wet or Disinfection)

Dry cleaning must be carried out in such a way that prevents damage especially to cemented connections and coated surfaces, without using abrasive cleaners. In case of damage, it is necessary to ensure the damaged surfaces and connections are repaired as soon as possible.
It is not possible to use this method of cleaning for soaking surfaces (splitter attenuators). Pressure water cleaning can only be done in chambers equipped with a condensate drainage tray. When performing wet cleaning, it is necessary to ensure safe disconnection of electrical parts from the power supply.
The chemical cleaning agents used during wet cleaning and disinfection must not erode the used materials.
Cleaning can only be performed when the inlet and outlet dampers are closed. We highly recommend having at least the inlet filter installed. If possible, cleaning should be performed when the unit is switched off.

3. Cleaning the Chambers of Air-handling Units

3.1. Cleaning the Filtration Chambers

3.1.1. Filter Inserts

Filter insert cleaning is forbidden – we strictly recommend replacing them. Filter replacement primarily depends on filter fouling, which is indicated by the final pressure loss, or it is performed at regular intervals along with regular cleaning of the unit. Filters should be replaced when pressure losses reach the limit values or when the hygiene time limit set by the operating instructions is exceeded. The filters must be replaced in the correct way using protective aids so that trapped dirt will not escape. Filter replacement can only be performed when the fan is switched off and the inlet and output dampers are closed. Fouled filter inserts must be disposed of in an environmentally-friendly way.
Grease filters can be washed in a solution of hot water and effective detergent or soda solution.

Cleaning the Chambers of Air-handling Units

3.1.2. Filter Inserts

The mounting frame is manufactured in two versions: sliding or fixed. With the sliding mounting frames of the XP04, XP06 and XP10 sizes, first loosen the fastening screw of the securing wedge and then remove the wedge by pulling it towards you. This will loosen the assembly and the filter frame and filtration inserts can then be removed from the unit. With the sliding frame of the XP 13, 17, 22 and 28 sizes, the filter frame can be removed from the unit directly by pulling it towards you. With fixed frames, the filtration inserts are replaced directly inside the chamber.

When cleaning the mounting frame, first carefully remove all sealing elements from the grooves. Properly clean all parts of the frame using the agents specified in this manual (to access the groove, a 9 x 9 mm brush is necessary). Wipe the sealing. With the fixed assembly, first carefully remove the sealing from the grooves and then it is possible to remove (see the figure) part of the mounting frame, if necessary.

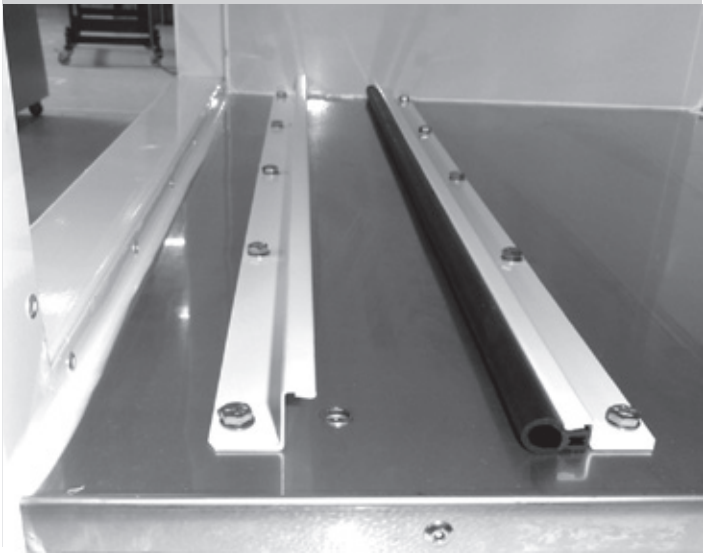
The filtration chamber and its parts must be wiped with a dry cloth and then brushed and vacuumed. Manual wet cleaning and disinfection can also be used. However, it is necessary to avoid contact of any liquid with the filtration textile.

Reinstall all the parts in the reverse sequence of steps. First fit clean sealing, new filtration inserts and then insert the assembly into the unit.

3.1.3 HEPA Filter Cleaning

Filters are located in a special chamber and fixed using threaded rods. First loosen the threaded rods and then remove the filters. When cleaning the assembly, be careful not to damage the vulcanised sealing on the frame. When fitting new filtration inserts, be careful as it is very fine filtration that depends greatly on the tightness of the entire assembly.

Figure 2 – Filtration assembly (mounting frame removed)



3.2 Humidifier Cleaning

Cleanliness of the humidifiers and their parts is crucial for proper hygiene as humidity significantly supports microorganism reproduction. Therefore, the humidifiers should be checked in the initial phase of the inspection. The humidification chamber and its parts must be wiped with a dry cloth and then brushed and vacuumed. After manual wet cleaning or pressure water cleaning, suitable disinfection is performed.

3.3 Heat Exchanger and Drop Eliminator Cleaning

Heat exchangers are primarily cleaned using dry cleaning methods, such as vacuuming or compressed air blowing. Blowing of heat exchangers and drop eliminators is always performed when the assemblies have been slid out of the unit so the dirt cannot be blown into other parts of the unit. Heat exchangers and chambers equipped with a condensate drainage tray can be much more effectively cleaned using pressure water cleaning. It is advisable to perform disinfection.

3.4 Condensate Tray and Condensate Drainage Cleaning

Doporučujeme mokré čištění a kartáčování s následnou aplikací desinfekčních prostředků. Sifony lze čistit běžnými mechanickými prostředky (čistící spirála, drát) nebo chemickými prostředky. Po vyčištění sifonů je nutné zkontrolovat těsnost jejich připojení a zajistit jejich zalití vodou.

3.5. Fan Cleaning

The fans and fan motors can be cleaned using dry cleaning methods: brushing, vacuuming or compressed air blowing. The fan chamber and its parts can be brushed and vacuumed. If compressed air is used for cleaning, it is necessary to slide the fan assembly out of the chamber so the dirt cannot be blown into other places in the unit. Manual wet cleaning and disinfection can also be used for the fan chamber. Nevertheless, it is important to disconnect all electrical parts from the power supply and prevent any water penetration into the motor and other electrical equipment (e.g., chamber lighting). When cleaning the fan chambers, it is necessary to avoid damage to the wiring and protection conductor interconnection!

3.6 Attenuator Cleaning

The attenuator chamber can be brushed and vacuumed once the splitters have been removed. Manual wet cleaning and disinfection can also be used, but only on the chamber walls, never on the attenuator's splitters. The splitters can be carefully vacuumed and if the splitter's cover layer (unwoven glass fibre) is damaged, it must be repaired or replaced.

3.7 Cleaning the Unit's Inner Walls

The unit's inner walls are cleaned using the dry cleaning methods, such as brushing, wiping with a cloth, vacuuming, or manual washing, including manual disinfection. Pressure water cleaning can only be used in chambers equipped with a condensate drainage. Otherwise, pressure water cleaning is not recommended. Disinfection is also possible.

3.8 Cleaning the unit's outer walls

If necessary, the unit's outer walls can be cleaned using the dry cleaning methods, such as brushing or wiping with a cloth, or manual washing (using a cloth). Disinfection of the outer walls is also possible.

3.9 Cleaning the Condensate Drainage Siphons

It is advisable to perform preventive cleaning using chemical agents as they can prevent build-up of deposits on siphons with a ball).

Recommended Cleaning and Disinfecting Agents

4. Recommended Cleaning and Disinfecting Agents

No.	Name	Manufacturer	Application	Dilution
1	CondenCide	Advanced	A cleaning and disinfecting agent for heat exchanger metal surfaces	1:4
2	Savo Original	Bochemie	Disinfecting mixture designed for disinfection of water and surfaces. It kills viruses and bacteria.	1:10
3	Domestos 24 H PLUS	Unilever	Fluid disinfecting and cleaning agent for multipurpose use.	1:10
4	Frosch	Werner&Mertz	Cleaning cream designed to remove all types of dirt from ceramic, enamel and stainless surfaces. It has neutral pH.	undiluted
5	Jar	Procter&Gamble	Washing-up liquid with degreasing properties	1:100
6	Coil cleaner	Wigam	Multipurpose detergent, cleaning agent for condensers and evaporators	1:10–1: 5
7	Savo razant	Bochemie	Cleaning of siphons. It prevents build-up of deposits	undiluted

1 2 3 4 5 6 7

The manufacturer does not recommend using cleaning and disinfecting agents containing more than 1 % of hydrogen peroxide. They will irreversibly erode the surface protection of the unit.

⚠ **Do not use abrasive cleaners!**

⚠ **A request for disinfection of air-handling equipment using methods and agents with corrosive effects must always be consulted with the Remak commercial representative.**

5. Unit Cleaning (Sanitation)

Cloth, brush, warm water, common pH neutral cleaning agents, compressed air and low-pressure water spraying.

Figure 3 – cleaning of AHUs inner and outer parts

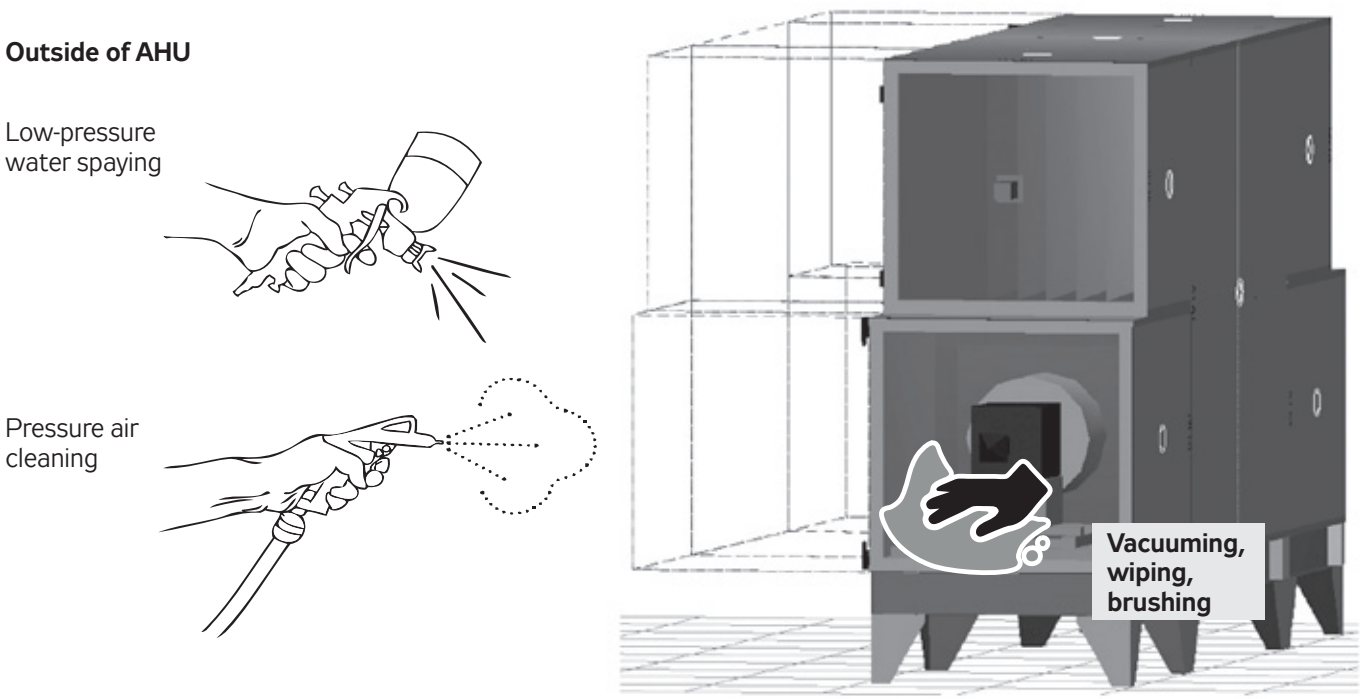
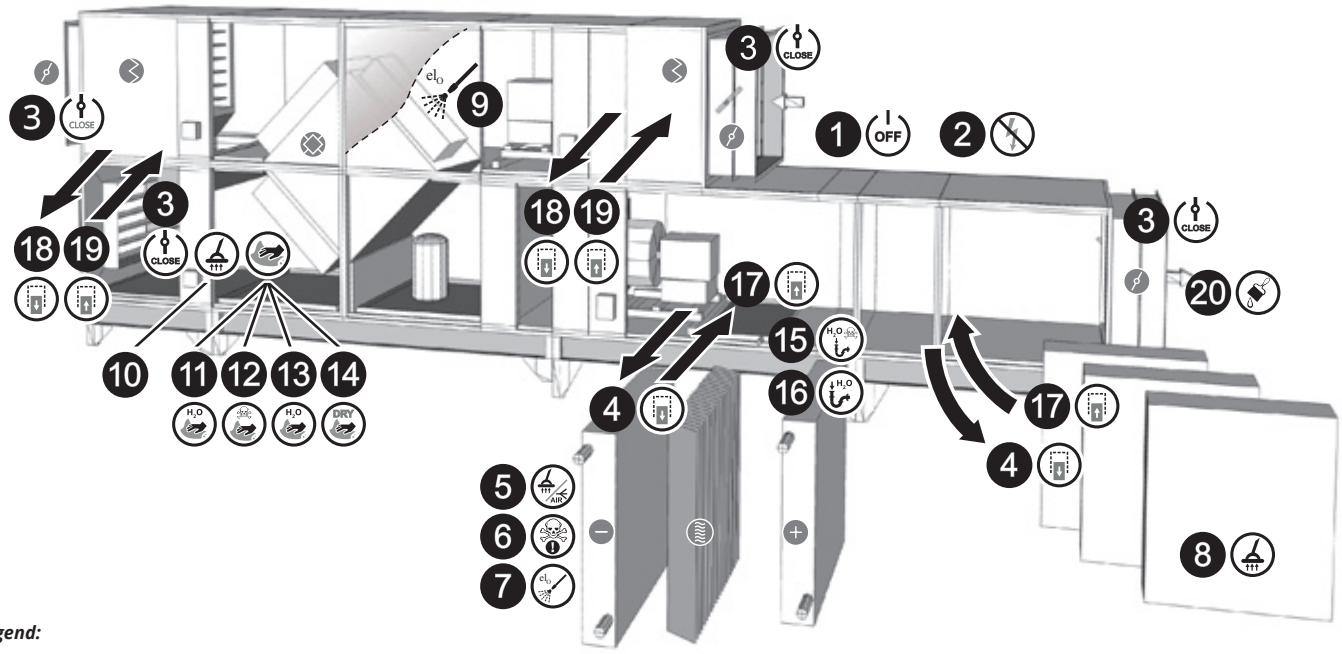


Figure 3 – recommended procedures and places for cleaning/sanitation



Legend:

1. Switch-off of the unit
2. Disconnection from the mains
3. Closing of the dampers
4. Removal of inserts (cooler/eliminator/heater)
5. Mechanical vacuuming/ blowing off of dirt
6. Chemical cleaning
7. Pressure water cleaning
8. Mechanical vacuuming of dirt
9. Inner cleaning of the cube using pressure water
10. Mechanical vacuuming of dirt
11. Manual cleaning (water)
12. Manual cleaning (chemical detergent)
13. Manual cleaning (water)
14. Drying (wipe dry)
15. Cleaning of the siphon (water + chemical agent)
16. Flooding the siphon (water)
17. Insertion of inserts (cooler/eliminator/heater)
18. Opening the door /removal of the filter assembly
19. Insertion of the filter assembly/ closing the door
20. Possible repairs of paint

Record of Performed Operations, Safety of Work, Work Aids

6. Record of Performed Operations

The written record should include namely the following data:

a) Site name, user
b) Date of execution of operation:
c) List of employees involved
d) Description of operation, work progress
e) Used equipment and tools
f) List of protective aids
g) Used cleaning agents
h) List of cleaned devices

7. Safety of Work

When cleaning the air-handling units, all the applicable safety rules must be followed. Including general safety measures as well as safety rules prescribed by the user of the equipment. Great emphasis is put on the following:

7.1. Personal Protective Equipment

- Working clothes (best overall)
- Safety work shoes
- Protective goggles
- Protective gloves
- Respirator

7.2. Workplace Safety

- Effective ventilation of the working area
- Working area lighting
- Order in the workplace

8. Work Aids

- Cleaning means (bucket of water, cloth, washing-up liquid)
- Pressure bottle with spray equipment (volume of approx. 10 l)
- Suitable disinfection agent
- Vacuum cleaner
- Hand tools
- Battery powered tools
- Work step-ladders and platforms

9. Standards Used

ČSN EN 15780, ČSN EN 13779, ČSN EN 13053

Warning

The manufacturer reserves the right to make changes and amend the documentation due to technical innovations and changes to legislation without prior notice.

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Always observe local laws and regulations.

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