



**CD-01-2018**

Issued February 2018

CERTIFICATION DOCUMENT  
for the  
NEx CERTIFICATION  
of  
**Air Handling Unit**

# CD-01-2018

Issued February 2018

<b>Editing (date):</b>	Quentin LIEBENS	(07/01/2018)
<b>Checking (date):</b>	Jean FOURCROY	(10/01/2018)
<b>Consultation (date):</b>	CPPC	(15/02/2018)
<b>Approval (date):</b>	ECC	(15/02/2018)
<b>Comes into effect from:</b>		(15/02/2018)

Modifications as against last version:

No.	Modifications	Section	Page
-	Creation of the programme	all	all

This document is strictly reserved for use in the Certification Programmes of Eurovent Certita Certification. Reproduction or translation of any part of the document is forbidden without written permission from Eurovent Certita Certification.

Published by Eurovent Certita Certification  
48-50 rue de la Victoire  
75009 Paris, FRANCE

Tel: + 33 1 75 44 71 71  
E-mail: [q.liebens@eurovent-certification.com](mailto:q.liebens@eurovent-certification.com)

## TABLE OF CONTENTS

<b>SECTION 1. GENERAL INFORMATION .....</b>	<b>5</b>
1.1. Purpose .....	5
1.2. Scope .....	5
1.3. Certified characteristics .....	5
1.4. Definition .....	5
1.5. Contributors .....	5
<b>SECTION 2. CERTIFICATION REQUIREMENTS.....</b>	<b>6</b>
2.1. Reference documents .....	6
2.2. Requirements related to the services, the products and the components .....	6
2.2.1. Requirements related to the service .....	6
2.2.1.a. Products and components warranty .....	6
2.2.1.b. After Sale Service .....	6
2.2.1.c. BIM File .....	6
2.2.1.d. Delivery Time.....	7
2.2.2. Requirements related to the product.....	7
2.2.2.a. Product Inherent Availability .....	7
2.2.2.b. Product Durability .....	8
2.2.2.c. Recyclability.....	8
2.2.2.d. Transport, assembling and dismantling .....	8
2.2.2.e. Start-up, regular and long term maintenance feature .....	9
2.2.2.f. Minimum ECP thresholds or characteristics requirements .....	11
2.2.2.g. Controls .....	11
2.2.2.h. Production .....	12
2.2.3. Requirements related to the components .....	12
2.2.3.a. Components Certification .....	12
2.2.3.b. Components Durability .....	13
2.2.3.c. Components energy efficiency .....	13
2.2.3.d. Minimum performances/characteristics of components .....	13
2.2.4. Requirements related to the quality management .....	14
2.3. Marking.....	14
<b>SECTION 3. PROCESS OF CERTIFICATION .....</b>	<b>15</b>
3.1. Qualification process .....	15
3.1.1. Certification request .....	15
3.1.2. Initial audit .....	15
3.1.3. Qualification test.....	16
3.1.4. Software checking.....	16
3.1.5. Assessment and decisions .....	16
3.1.6. Qualification process for Brand Name (BN).....	16

3.2. Repetition process .....	16
3.2.1. Follow-up of the products and the performances .....	16
3.2.2. Repetition audits .....	17
3.2.3. Repetition tests .....	17
3.2.4. Software checking.....	17
3.2.5. Assessment and Decision.....	17
3.3. Statement of changes .....	17
3.3.1. Changes concerning the holder .....	17
3.3.2. Changes concerning production entities.....	17
3.3.3. Changes concerning the quality organization of the manufacturing and/or marketing process .....	17
3.3.4. Changes to the scope of certification: additional admission for a new model and/or new range .....	18
3.3.5. Qualification process for Brand Name (BN).....	18
3.4. Conditions for stopping marking or removal of the mark in the event of suspension, withdrawal or waiver ..	18
<b>APPENDIX A. ACCESS AND SPACE .....</b>	<b>19</b>
<b>APPENDIX B. LIST OF MINIMUM PROPERTIES TO INCLUDE IN BIM FILES .....</b>	<b>23</b>

## SECTION 1. GENERAL INFORMATION

### 1.1. Purpose

The purpose of this Certification Document (CD) is to set up the requirements and the procedures for the operation of the NEx certification scheme for Air Handling Units (AHU), in accordance with the Statement of Principle (SOP).

### 1.2. Scope

This certification scheme covers Air Handling Units (AHU), as stated in the Statement of Principle section I only product with a valid ECP certificate can be NEx certified, therefore the scope of the AHU programme stated in the OM-5 AHU (last version in force) applies for this certification scheme.

### 1.3. Certified characteristics

As a NEx certification scheme several characteristics related to the following elements are certified:

- Performances of the product and the key components
- Controls
- Services (warranty, after sale service, BIM file)
- Inherent availability
- Durability
- Installation and maintenance
- Recyclability

### 1.4. Definition

**Air Handling Unit:** A factory made encased assembly unit that consists of a fan or fans and other necessary equipment to perform one or more of the following functions: circulating, filtration, heating, cooling, heat recovery, humidifying, dehumidifying and mixing of air. The unit should be suitable to be used with ductwork.

**Model Box:** Construction envelope built according to specifications presented in manufacturer's literature, used to establish mechanical, thermal and acoustical performance according to the relevant EN standards.

**Real Unit:** Unit from the range of a specific size, used to establish complete performance for all the available functions of the Air Handling Unit, according to the relevant EN standards.

**Thermal transmittance** [ $W.m^{-2}.K^{-1}$ ]: The heat flow per area and temperature difference through the casing of the air handling unit.

**Filter bypass leakage** [%]: Air bypass around filter cells as a percentage of rated air volume flow.

**Acoustical insulation** [dB]: Sound insertion loss value of the Air Handling Unit.

**FCA:** "Free Carrier" means that the seller delivers the goods to the carrier or another person nominated by the buyer at the seller's premises or another named place. The parties are well advised to specify as clearly as possible the point within the named place of delivery, as the risk passes to the buyer at that point.

### 1.5. Contributors

Eurovent Certita Certification (ECC) is the main contributor of this certification scheme, the audits and the desk studies will be conducted by the ECC team or a qualified agency.

## SECTION 2. CERTIFICATION REQUIREMENTS

### 2.1. Reference documents

Every article listed in the Statement of Principle (last version in force) must be acknowledged, furthermore every requirement listed under section II of the SOP must be met.

### 2.2. Requirements related to the services, the products and the components

#### 2.2.1. Requirements related to the service

**Ser 1.** Every NEx certified AHU must comply with the requirements listed under the articles of the Statement of Principle (SOP) (latest version in force) section II.2 “Requirements related to the services”.

In accordance with the Article 14 of the SOP the following requirements cover and address with a dedicated paragraph the following key criteria:

- ⇒ Products and components warranty (a)
- ⇒ After sale services (b)

##### 2.2.1.a. Products and components warranty

**Ser 2.** As per article 11 of the Statement of Principle (SOP) (latest version in force) a minimum warranty of 5 years is mandatory for every NEx certified unit according to the following paragraph:

The applicant/participant shall warrant to its customer that its products are free from defects in material for a period of 60 months, counting from date of shipment (date of issuance of the transport document) of the goods, FCA manufacturer’s plant/site (Incoterms 2010), unless the defect has been fraudulently concealed or concerns a guarantee as to the quality of the product or work result or the acceptance of a purchasing risk has been agreed. This manufacturer’s warranty is limited to the delivery of parts free from defects, FCA manufacturer’s plant/site (Incoterms 2010). Costs for disassembling, pick up or assembling are not borne by the manufacturer within supplementary performance. The Customer has no claim to reimbursement of diagnosis expenditures. At the manufacturer’s request, the defect goods shall be shipped back to the manufacturer free of charge. Defects will not be acknowledged if the customer fails to comply with the manufacturer’s assembly, commissioning, operating and maintenance instructions, causes defects by inexpert modifications and/or uses the goods for other purposes than those intended by the contract.

Warranty document shall be available at least in English.

##### 2.2.1.b. After Sale Service

**Ser 3.** The applicant/participant shall provide the following after sale service:

- ⇒ 24h/7days emergency call available as a minimum in English as well as the headquarter language (e.g. if the headquarter is in France the service shall be available in French)
- ⇒ Service language in the language of the country where the unit is placed

**Ser 4.** Controls of the unit are part of the after sale service, the applicant/participant shall be able to update the parameters of the unit remotely (if no obstruction from the customer)

##### 2.2.1.c. BIM File

**Ser 5.** For all NEx-Certified Air Handling Units the manufacturer shall provide a 3D-model and technical data of the specific unit. Both must be prepared for using in BIM compatible design and facility management software. The technical parameters and the 3D-model must be provided within

one folder (at least in .rvt and .ifc format). Systems where the file of the 3D-model does not include the parameters listed in appendix B cannot fulfil this requirement even when the parameters are given as a printout or in an additional file.

The model must include the complete outer layer of the AHU. Doors must be visible and their position clearly defined as well as the delivery sections. Larger elements such as frequency convertors and repair switches must be included. Smaller elements such as hinges or pressure sets for measuring air side pressure drop can be excluded.

The model must give information about where the components are (symbols) and where the control system is placed to simplify the planning of maintenance.

Furthermore all elements for connecting the unit to the other elements in the building (ducts, water connections, connections for condensate) must be prepared for direct connection within the planning software. That means all connecting elements must have the relevant information like the form and the dimension.

The minimum properties to include in the BIM are listed in Appendix B. The title of each property must be clear so that during the audit it can be clearly checked which values from Appendix B is mean

#### 2.2.1.d. Delivery Time

**Ser 6.** Every NEx unit shall be able to be delivered within 8 weeks from the technical release. This information shall be clearly fixed on the offer of the unit.

If the manufacturer is in charge of the transport then he shall ensure that an acknowledgement of receipt is received for every NEx certified unit.

### 2.2.2. Requirements related to the product

**Pro 1.** Every NEx certified AHU must comply with the requirements listed under the articles of the Statement of Principle (latest version in force) section II.3 “Requirements related to the products”.

In accordance with the Article 27 of the SOP the following requirements cover and address with a dedicated paragraph the following key criteria:

- ⇒ Product inherent and/or operational availability (a)
- ⇒ Product durability (b)
- ⇒ Product recyclability (c)
- ⇒ Transport, assembling and dismantling (d)
- ⇒ Start-up, regular and long term maintenance feature (e)
- ⇒ Minimum ECP thresholds or characteristics requirements (f)
- ⇒ Product control (g)
- ⇒ Production and traceability requirements (h)

#### 2.2.2.a. Product Inherent Availability

**Pro 2.** Inherent availability as defined in the Statement of Principle (latest version in force) shall be calculated for the air movement only. Therefore only the fan, the motors and the controls (linked to the air movement only) of the Air Handling Unit shall be considered in the calculation of the inherent availability. The inherent availability shall be calculated as per the following formula:

$$A_i = \frac{MTBF}{MTBF + MTTR}$$

Where:

$A_i$  = Inherent Availability

MTBF = Mean Time Between Failure

MTTR = Mean Time To Repair

The inherent availability ( $A_i$ ) expressed in percentage (%) shall be of at least 99.9% for the air movement. This requirement comes into force on the 31<sup>st</sup> of December 2018.

It is considered that in the case of an AHU the manufacturer is not in charge of the maintenance, therefore it is not required for the applicant/participant to calculate the operating availability of its product. As a consequence of this statement the paragraph of the article 24 of the Statement of Principle (latest version in force) related to the operating availability is to be not considered for this Certification Scheme.

#### 2.2.2.b. Product Durability

**Pro 3.** The durability of a product is its ability to maintain its functions and performances over their life-cycle. Durability should be considered at design stage and more particularly:

- ⇒ Design for reliability and robustness: This guarantees that the product will not be easily broken or damaged
- ⇒ Design for repair and maintenance: The product repair must be simple in order to reduce the maintenance time and cost for the customer.

As a consequence of the above definition the NEx certified AHU must comply with all the requirements listed under section 2.2.2.

#### 2.2.2.c. Recyclability

**Pro 4.** The manufacturer shall provide to the customer an information document containing at least the following information related to the casing:

- ⇒ List of materials (type of material)
- ⇒ List of recyclable material
- ⇒ Percentage of each material out of the total weight of the casing (except if less than 1% of the total weight of casing)
- ⇒ Percentage of recyclable material

The information shall be in English and in the language of the country where the headquarter is located.

#### 2.2.2.d. Transport, assembling and dismantling

**Pro 5.** Flat packing (in panels or walls) delivery of units is not allowed.

In order to comply with restricted buildings accesses or transportation limits, units might be delivered in sections, blocks or sub-assemblies to be assembled together on site. In that case, the assembly method shall be explained in the IOM, furthermore the manufacturer shall offer as an option to its contractors a training to install NEx certified units as well as a leakage test on site.

**Pro 6.** Every component of the ventilation system shall be protected from potential damage and contamination after manufacture and this until the installation on site of the unit.

Procedure shall be included in the quality system of the manufacturer.



**Pro 7.** Every component shall be covered before shipment to avoid any dust infiltration. Manufacturer shall ensure that the components are in clean and dry conditions.

Procedure shall be included in the quality system of the manufacturer.

**Pro 8.** During the on-site storage every door, hatch and other type of openings (if applicable) shall be sealed.

Requirement must be included in the IOM (Installation and Operational Manual) of the product.

**Pro 9.** Manufacturer shall ensure that no residue remains within the air flow after manufacture.

Procedure shall be included in the quality system of the manufacturer.

**Pro 10.** Assembling and dismantling shall be clearly defined in the IOM of every NEx certified unit.

**Pro 11.** Final assembling of the AHU casing including frames, guides and profiles shall be chipless.

#### 2.2.2.e. Start-up, regular and long term maintenance feature

**Pro 12.** The design shall be such that a maintenance person can reach manually at any inner casing surface for:

⇒ Cleaning with a sponge, a mop or similar. No residue shall remain after cleaning.

⇒ Access to all components and relating fixing elements.

For the necessary IMC (Inspection Maintenance and Cleaning) works, any component (air filters, heat exchangers (energy recovery systems and coils, droplet separators, fans, humidifiers, dehumidifiers, silencers, water trays of humidifiers and condense trays of cooling sections or energy recovery systems) in the air stream shall be easily accessible (Requirement Pro 14 & Pro 15) (installed in the AHU) OR alternatively quickly removable (Requirement Pro 13).

In any case, sufficient space (Requirement Pro 16) shall be available in the AHU allowing proper IMC. The underlined notions are specified in the following requirements (Pro 13, Pro 14, Pro 15 & Pro 16).

**Pro 13.** Any component as defined under requirement Pro 12 shall be quickly removable.

A component designed for the purpose of IMC as "quickly removable" shall have a weight of maximum 25 kg.

Quickly removable means that after opening the access door or hatch, the component is directly removable within a short time.

Note: For that reason, a water or a refrigerant coil cannot be claimed as "quickly removable". It is not allowed, that other installations (cables, instruments ..... ) hinder the quick removal of the component.

**Pro 14.** Any component as defined under requirement Pro 12 shall be easily accessible:

AHU components require a quick and easy access to the unit inside through access openings. As access opening for IMC is accepted only a (quickly removable) hatch or a hinged door, according the following definition:

⇒ The opening of any access opening (door or hatch) shall be possible within 10 seconds.

⇒ For hatches (not hinged access doors) the maximum allowed weight is 25 kg and the maximum allowed width of the hatch is 600 mm (except for silencers). The hatches shall be equipped with handles for proper handling.

⇒ For minimum free opening width [OW as per Figure.1] and minimum free opening height [OH according Figure. 1] of the access opening, please refer to Appendix A: Access + Space

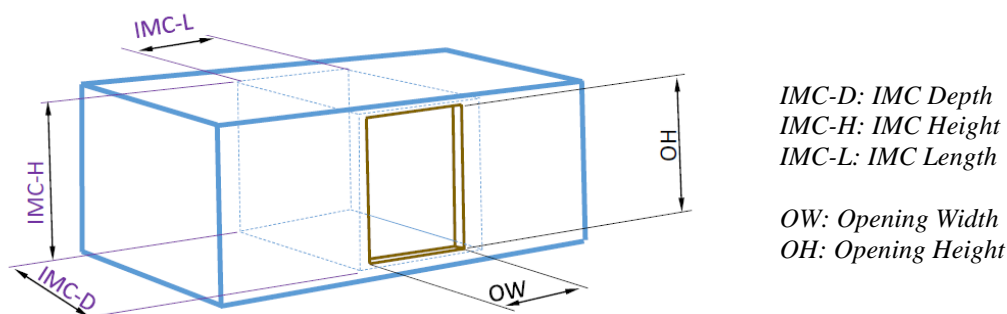


Figure 1: Opening Dimensions - IMC Dimensions

Note: Panels which shall be unscrewed for the access are not accepted. At access openings, no installations shall be fixed (cables, instruments....) which hinder the quick opening.

**Pro 15.** For any component defined under Pro 12, an easy access shall be ensured from both sides (upstream and downstream):

For components, which are quickly removable according to requirement Pro 13, the component itself is deemed to be accessible from both sides. Nevertheless, the relating guides or frames, the casing ranges directly upstream and downstream of the component and any instruments installed inside the chamber of the relating component shall also be accessible for these quickly removable components.

**Pro 16.** Sufficient space: To allow the necessary IMC work, sufficient space shall be available. The IMC space is considered sufficient if the minimum space requirements defined in appendix A "Access and Space" are satisfied.

Refer to appendix A for 'Access and Space' requirements.

**Pro 17.** Droplet separators downstream cooling coils shall be easily accessible and quickly removable or alternatively have an access door and plenum between cooling coils and droplet separator as defined in Appendix A "Access and Space". In case that there is no compliant space between cooling coil and droplet separator and the droplet separator itself is easily removable, the length (in air direction) of the removed droplet separator can be used as available length for IMC of the cooling coil.

**Pro 18.** For easy removal of droplet separators, these shall be side removable in parts with maximum weight of 25 kg and maximum width of 1000 mm.

**Pro 19.** Filter change shall be possible from the dirty air side or by side removal. The installed filter frame shall correspond to the filter class installed and the manufacturer shall be certified minimum for the installed filter bypass leakage. In any case the requirements for sufficient space and easy access for IMC shall be maintained.

**Pro 20.** Filter chambers shall be accessible for the IMC works. For unit heights >1600 mm; the access to both sides (upstream and downstream the filter) shall be possible. For that reason an additional access door on clean air side is mandatory.

**Pro 21.** During filter maintenance gasket shall be checked and changed if necessary. This must be included in the IOM.

### 2.2.2.f. Minimum ECP thresholds or characteristics requirements

**Pro 22.** Every NEx certified AHU must achieve, as a minimum, the following performances on the model box (symbolized by M on the list below):

- ⇒ Casing Strength (CS): D1(M) according to EN 1886:2007
- ⇒ Casing Air Leakage (CAL): L1(M) according to EN 1886:2007
- ⇒ Filter Bypass Leakage (FBL): F9(M) according to EN 1886:2007
- ⇒ Thermal Transmittance of the Casing (TT): T2 according to EN 1886:2007
- ⇒ Thermal Bridging Factor (TBF): TB2 according to EN 1886:2007

**Pro 23.** Every NEx certified AHU must achieve, as a minimum, the following performances on the real unit (symbolized by R on the list below):

- ⇒ Casing Strength (CS): D2(R) according to EN 1886:2007
- ⇒ Casing Air Leakage (CAL): L2(R) according to EN 1886:2007
- ⇒ Filter Bypass Leakage (FBL): F9(R) according to EN 1886:2007

**Pro 24.** Every NEx certified AHU must achieve an energy efficiency class (ECP) of A+ or A. The last version in force of the ECP energy efficiency calculation must be used.

**Pro 25.** Metallic material of the internal and external surfaces of the casing shall be corrosion resistant, it includes:

- ⇒ Inside panels / door metallic surface
- ⇒ Metallic parts which holds components (rails, holding constructions, etc.). Housings of the components (filter frame, coil frame, heat exchanger frame, fan frame)

The minimum corrosivity class for internal surfaces is C4 (as per ISO 12944:1998).

### 2.2.2.g. Controls

**Pro 26.** Controls includes controls of every components of the AHU (except: silencer, droplet eliminator, lights). Every NEx certified unit must be “plug-and-play”, meaning that an electrical cabinet is delivered by the manufacturer with unit to the customer.

Furthermore it shall be possible to link the NEx unit to the BMS of the building with standardized interfaces (e.g. Bacnet, Modbus, etc.).

The quality management system of the manufacturer shall state that a pre-check of the controls systems in the factory is mandatory.

**Pro 27.** The bus connection for the fans must be included in every NEx unit.

**Pro 28.** The software of the control system shall be the intellectual property of the AHU manufacturer.

**Pro 29.** Wiring (e.g. pre-wired, cable duct, etc.) must be PVC free and halogen free according to IEC 60754-1 and IEC 60754-2. Furthermore outdoor cables must be UV resistant according to ISO 4892-2:2013 for weatherproof units.

**Pro 30.** The design, the assembling and the commissioning of the electrical switchboard (external casing excluded) must be under the responsibility of the AHU manufacturer.

**Pro 31.** Every cable duct must be completely separated from the air stream and the connection between component and this duct must be as short as possible.

### 2.2.2.h. Production

**Pro 32.** The manufacturer shall ensure a minimum reproducibility of every NEx unit. The whole process from the quotation phase to delivery, including the purchasing and manufacturing process, the unit assembly, shall be the same for every manufactured unit (NEx unit or not) to guaranty a high standard quality of the factory and the consistency of every NEx unit.

The reproducibility during the manufacturing process will highly influence the quality of the outcome.

To ensure limited tolerances and best reproducibility of the unit, the following tolerances must be respected during the manufacturing process:

- Profiles manufacturing for casing and panels:
  - ⇒ Cut to length  $\pm 0.3\text{mm}$
  - ⇒ Positioning and manufacturing of holes and cut outs  $\pm 0.3\text{mm}$
- Sheet metal manufacturing
  - ⇒ Cut to size  $\pm 0.3\text{mm}$
  - ⇒ Positioning and manufacturing of holes and cut outs  $\pm 0.3\text{mm}$
  - ⇒ Bending (length  $\pm 0.30\text{mm}$  and angle  $\pm 0.40^\circ$ )
- Coating of casing metal parts
  - ⇒ In order to satisfy Pro 25, a measurement of 10 points must be taken. The average thickness must be equal or higher than the specified coating thickness (as declared by the manufacturer) and in no points less than 80% of the specified average value.

The AHU selection software shall be the data source for the production file in order to ensure a continuous information flow. It means that a 3D model shall be generated by the AHU selection software and the production of the unit shall be based on this 3D model.

### 2.2.3. Requirements related to the components

**Com 1.** Every NEx certified AHU must comply with the requirements listed under the articles of the Statement of Principle (SOP) (latest version in force) section II.4 “Requirements related to the components”.

In accordance with the Article 33 and 34 of the SOP the following requirements cover and address with a dedicated paragraph the following key criteria:

- ⇒ Components Certification (A)
- ⇒ Components Durability (B)
- ⇒ Energy efficiency (C)
- ⇒ Minimum performances/characteristics of components (D)

#### 2.2.3.a. Components Certification

**Com 2.** Every filter (ePM1 2.5 and 10) installed in the AHU must be ECP certified.

**Com 3.** The Heat Recovery System (HRS) of the AHU must be ECP certified.

If a manufacturer produce its own HRS for its own purposes then the HRS must be part of the certified AHU selection software (it is thus covered by the RU test). In this case the HRS doesn't need to be ECP certified in a separate HRS programme.

### 2.2.3.b. Components Durability

**Com 4.** The durability of a product is its ability to maintain its functions and performances over their life-cycle. Durability should be considered at design stage and more particularly:

- ⇒ Design for reliability and robustness: This guarantees that the product will not be easily broken or damaged
- ⇒ Design for repair and maintenance: The product repair must be simple in order reduce the maintenance time and cost for the customer.

As a consequence of the above definition the NEx certified AHU must comply with all the requirements listed under section 2.2.2 and 2.2.3.

### 2.2.3.c. Components energy efficiency

**Com 5.** Every filter installed in a NEx certified AHU must achieve an energy efficiency class (ECP) of A+ or A. The last version in force of the ECP energy efficiency calculation must be used.

**Com 6.** Every fan motors must achieve an efficiency class of IE4 (Super Premium Efficiency) in accordance with the IEC 60034-30-1:2014 standard.

### 2.2.3.d. Minimum performances/characteristics of components

**Com 7. Non-metallic materials:** For all non-metallic parts excluding paints but including sealants, gaskets, filters, etc. with surface in the air stream  $> 5 \text{ cm}^2$  (summed up surface per each part type). Proof by test reports from hygiene institute as per EN ISO 846:1997 shall be presented (Methods A and C). The maximum allowed growth rate for microorganisms according to Table 4 and 5 of ISO 846:1997 is 1.

**Com 8. Filters:** The outdoor air filter (first component) must be at least ISO ePM2.5 65%. In case of mixing the return air filter must be at least ISO ePM2.5 65%.The last filter stage in the supply side must be at least ISO ePM1 50%.

The extract air filter must be at least ISO ePM10 50%.

For all filters in scope of ISO 16890:2017 the difference between the initial fractional efficiency  $E_i$  of the untreated and unloaded filter element according to ISO 16890-1:2017 and the fractional efficiency  $E_{D,I}$  according to ISO 16890-1:2017 after an artificial conditioning step as described in ISO16890-4:2017 must be lower than 10% points.

**Com 9. Coils:** The frame of the coil must be in stainless steel with at least 18% Cr and 8% Ni (for instance EN steel 1.4301 - AISI 304) or aluminum (at least AlMg; in accordance with DIN 1946/4-6.5.1:2008).

A drain pan shall be installed wherever condense may occur.

**Com 10. Drain pans:** Drain pans of cooling coils, plate heat exchanger and the intake weatherproof unit shall be in stainless steel with at least 18% Cr and 8% Ni (for instance EN steel 1.4301 - AISI 304) or aluminum (at least AlMg; in accordance with DIN 1946/4-6.5.1:2008).

**Com 11.** All drain pans, condense trays and water tanks shall have a sufficient slope from any point of the bottom to the drain tube. The requirement is deemed to be fulfilled, if after filling them with  $5 \text{ l/m}^2$  water, minimum 95% has been drained off over a period of 10 minutes.

The following test will be carried out during the audits:

1. Fill the drain pan with  $5 \text{ l/m}^2$  of water by keeping the drain pan's evacuation closed.
2. For a period of maximum 10 minutes, empty the drain pan by opening the evacuation. The water must be collected in a bucket or other recipient.
3. Measure the amount of water collected in the bucket or other recipient.

4. Compare this measurement with the total of water initially used when the drain pan has been filled in order to establish the percentage of water drained off.

For weatherproof units a drain pan shall be installed up and downstream of the first filter of the outdoor stream.

**Com 12. Fans:** It is allowed to use belt driven fans only for a total static pressure (internal + external) greater than 1500 Pa.

**Com 13. Exhaust and outdoor air damper:** exhaust and outdoor air dampers must both achieve a minimum class 4 for closed blade leakage according to EN 1751:2014 and class C for damper frame leakage according to ISO 1751:2014

**Com 14. Louvres:** Louvres shall be installed inside the AHU in order to limit thermal bridging and air leakage.

#### 2.2.4. Requirements related to the quality management

**Qma 1.** Every company producing NEx units must be able to provide, as an option, a FAT (Factory Acceptance Test) equipment for the following minimum parameters:

- ⇒ Air leakage (external leakage and filter bypass leakage) according to EN 1886:2008
- ⇒ Casing Strength according to EN 1886:2008
- ⇒ Air flow/ESP pressure performance curve with power consumption and speed of the fan
- ⇒ Pressure drop of all components (air side pressure drop)
- ⇒ Calibration of the air flow measuring device in the fan (nozzle)

The figures listed in Pro 23 must be achieved (i.e. casing strength, air leakage, and filter bypass leakage).

A third party laboratory can participate to the FAT. The customer should have the opportunity to invite a representative of a third party laboratory accredited according to the ISO 17025:2005.

The measuring devices and protocols must be calibrated by a third party laboratory accredited according to the ISO 17025:2005. Every measuring device calibrated by a third party laboratory can be used by the manufacturer to calibrate other measuring devices used for the FAT test according the participant's internal procedure. A report proving that the measuring have been calibrated by a third party laboratory must be available.

**Qma 2.** NEx-certified manufacturers must at least perform real unit tests (factory acceptance tests) for three "air sides" per year in addition to the real unit test for ECP. That means minimum is either 3 UVUs, 1 UVU (Unidirectional Ventilation Unit) + 1 BVU (Bidirectional Ventilation Unit) or 2 BVUs.

The scope must be in accordance with Qma 1 of this Certification Document. The results and calibration certificates of used instruments must be presented during the audit.

Any air side must include at minimum one filter, one fan and one thermal component (e.g. Heat Exchanger, HRS).

### 2.3. Marking

Marking shall be in accordance with the section VII.3 of the Statement of Principles (latest version in force).

## SECTION 3. PROCESS OF CERTIFICATION

### 3.1. Qualification process

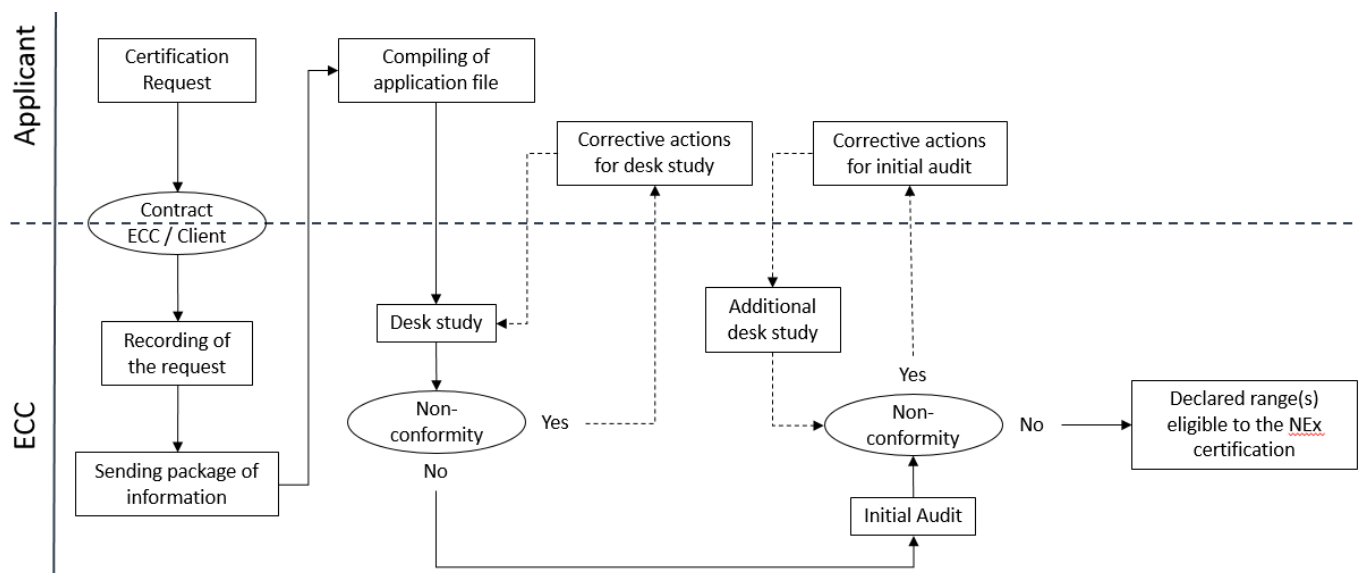


Figure 2: Qualification process

#### 3.1.1. Certification request

The Applicant, after signing the License Agreement, shall send to Eurovent Certita Certification all information required for the qualification according to this Certification Document and the Statement of Principle (latest version in force): Technical documents, software name and version, the software itself and relevant literature.

Eurovent Certita Certification will then proceed to a desk study to check the compliance of the declared range against the Statement of Principle (latest version in force) and this Certification Document. The desk study will be conducted as defined in the Statement of Principles section VI.2.

Any non-conformity flagged during the desk study shall result to a corrective action from the applicant, the non-conformities are then either resolved or remain unresolved until appropriate corrective actions are undertaken by the applicant. Any requirement considered as “visually checkable” can be checked during the initial audit, it is the responsibility of the applicant to decide if such requirements will be checked during the desk study or the initial audit.

A desk study is declared “passed” when all the requirements listed in the Statement of Principle (latest version in force) and this Certification Document are met, with the exception of the requirements reserved for the initial audit.

#### 3.1.2. Initial audit

Once the desk study is “passed” an initial audit is scheduled with the applicant. The initial audit shall be conducted as defined in the statement of principles (latest version in force) section VI.4.

During the initial audit the requirements not checked during the desk study must be checked. If after the initial audit all the requirements listed in the Statement of Principles (latest version in force) and this Certification Document are not checked an additional desk study must be conducted to validate the remaining requirements.

In case of force majeure (e.g. accidents, labour disputes, natural events, acts of war) which would not allow Eurovent Certita Certification to perform a factory audit Eurovent Certita Certification can decide to replace it by another mean of verification, to postpone it within a reasonable deadline or to cancel it.

### 3.1.3. Qualification test

Tests are made through the ECP certification, no additional tests are required for the NEx certification.

### 3.1.4. Software checking

Selection software shall comply with the requirements of the Statement of Principles (latest version in force) and this Certification Document.

### 3.1.5. Assessment and decisions

The desk study (and any additional desk studies) and the initial audit are declared “passed” when all the requirement listed in the Statement of Principles (latest version in force) and this Certification Document are met.

Once the declared range is certified eligible to the NEx certification the applicant is entitled to use the following text for its eligible range: “The products within this range are eligible to the NEx certification”.

### 3.1.6. Qualification process for Brand Name (BN)

For Brand Name (BN) companies, applicable steps of the requirements checking related to the services and audit procedure shall be conducted.

General conditions for a Brand Name to obtain the NEx certification are defined in the Statement of Principles (latest version in force) under section II.2.

## 3.2. Repetition process

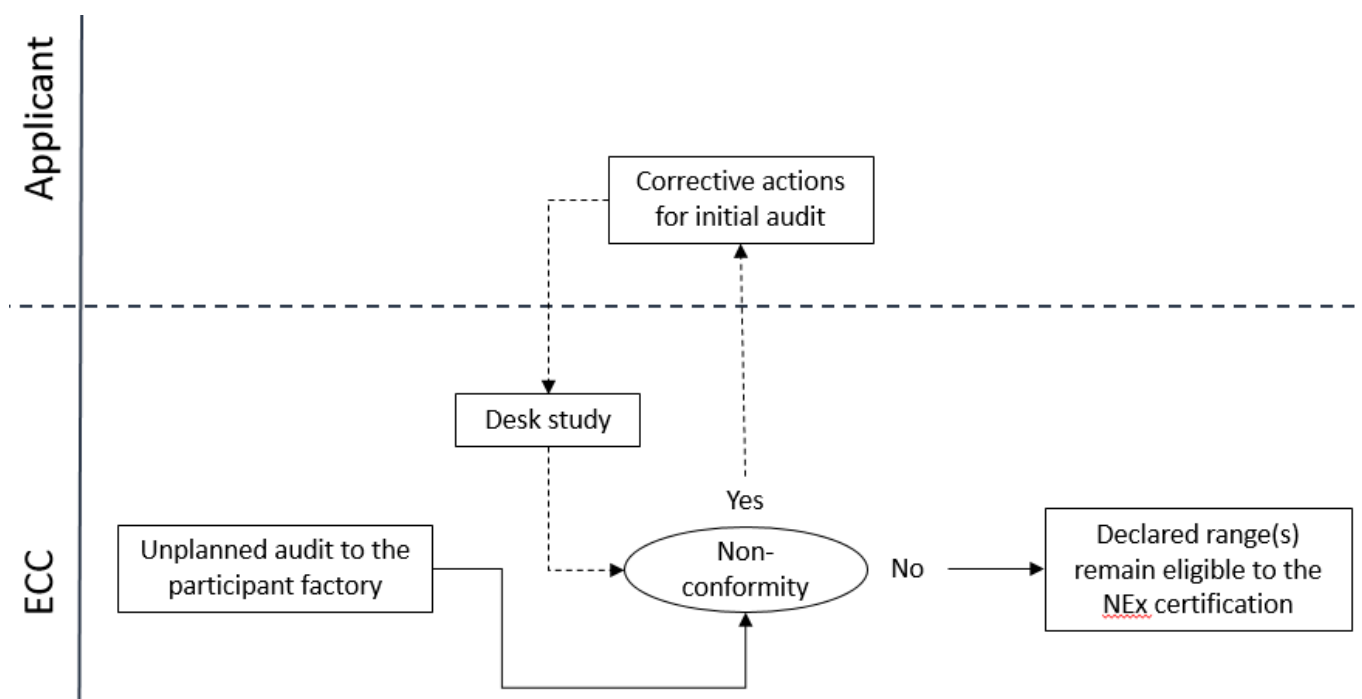


Figure 3: Repetition process

### 3.2.1. Follow-up of the products and the performances

The follow-up of the performances is made as part of the ECP certification.

Products follow-up is made through unplanned audits (one per year).



### **3.2.2. Repetition audits**

Repetition audits are unplanned. They will be conducted as defined in the statement of principles (latest version in force) section VI.4.

Based on the number and the nature of the non-conformities a desk study can be required by the auditor. Technical documents and/or relevant literature must be issued to Eurovent Certita Certification to resolve the non-conformities.

The same elements listed under section 3.1.2 for the initial audit will be checked for the repetition audit.

### **3.2.3. Repetition tests**

Tests are made through the ECP certification, no additional tests are required for the NEx certification.

### **3.2.4. Software checking**

Selection software shall comply with the requirements of the Statement of Principles (latest version in force) and this Certification Document.

### **3.2.5. Assessment and Decision**

The repetition audit (and the desk studies if any) is declared “passed” when all the requirement listed in the Statement of Principles (latest version in force) and this Certification Document are met.

## **3.3. Statement of changes**

### **3.3.1. Changes concerning the holder**

The holder shall notify Eurovent Certita Certification of any legal changes to the company or any change in the corporate name.

In case of merger, bankruptcy or takeover of the holder, all of the holder's rights to use the NEx mark cease automatically.

Eurovent Certita Certification is responsible for examining the terms of any new application for admission that might be made.

### **3.3.2. Changes concerning production entities**

Any transfer (total or partial) of the production entity(ies) of an NEx-certified product to a different production site brings about an immediate cessation of NEx marking by the holder on the transferred products in any form whatsoever.

The holder shall inform Eurovent Certita Certification of the new production procedures envisaged.

Based on the information sent by the holder, Eurovent Certita Certification will identify any checks to be performed on a case-by-case basis. These checks may include an audit of the new production site.

The certification renewal evaluation and decision procedures are identical to those for admission described in paragraph 3.1.

### **3.3.3. Changes concerning the quality organization of the manufacturing and/or marketing process**

The holder shall declare to Eurovent Certita Certification any change regarding its quality organization likely to have an impact on the compliance of the manufacturing and/or marketing with the requirements of the certification rules (changes to its facilities, quality plans, agent, etc.).

### **3.3.4. Changes to the scope of certification: additional admission for a new model and/or new range**

An additional admission application for the right to make a range eligible to the NEx mark can be made for a new or an existing range.

The certification evaluation and decision procedures are identical to those for admission described in paragraph 3.1.

In case of modification of the eligible range(s) refer to section VI.1 of the Statement of Principles (latest version in force).

### **3.3.5. Qualification process for Brand Name (BN)**

For Brand Name (BN) companies, applicable steps of the requirements checking related to the services and audit procedure shall be conducted annually.

## **3.4. Conditions for stopping marking or removal of the mark in the event of suspension, withdrawal or waiver**

The mark shall be removed when notification of the suspension or withdrawal of the right to use the mark is received.

All use of the NEx mark is prohibited when notification of the sanction decision is received.

The mark shall be removed in such a way that there is no ambiguity.

The holder shall completely remove or conceal the mark logo, or any reference to the mark, from all media.

Eurovent Certita Certification may check, by any convenient means, that the mark has been removed satisfactorily.

## APPENDIX A. ACCESS AND SPACE

This appendix must be used to support requirements Pro 14, Pro 16 and Pro 17.

**Free access opening width OW:** Free access opening width OW according to Figure 2 shall not be less than IMC-L minus 50 mm.

**Free access opening height OH:** Free access opening height OH according to Figure 2 shall be not less than IMC-H minus 80 mm. Only for units with IMC-H > 1.800mm OH shall have any value > 1.720 mm.

**IMC depth IMC-D:** IMC-D shall be the complete internal AHU width according Figure 2

**IMC height IMC-H:** IMC-H shall be the complete internal AHU height according Figure 2

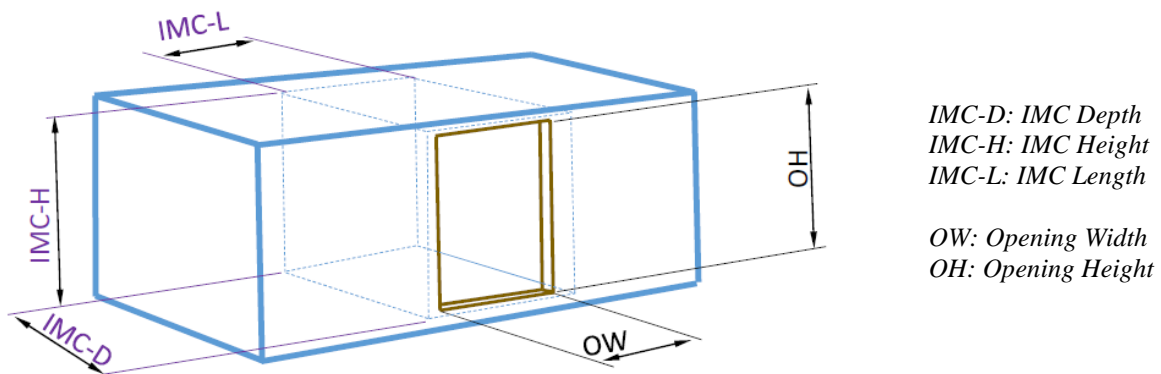
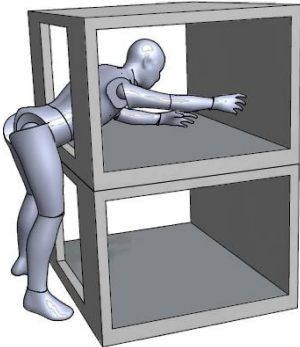
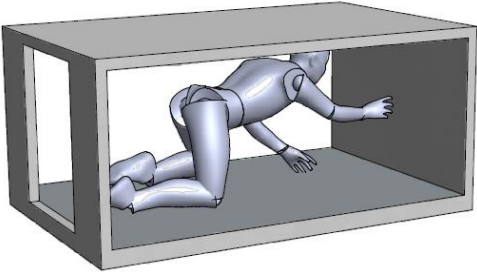


Figure 4: Opening Dimensions – IMC Dimensions

The following table must be used to support requirements Pro 14, Pro 16 and Pro 17. This table lists the requirements for Access + Space: assessment of unit size to requirements on access opening size and space requirements for IMC. A tolerance of 1% is accepted for section sizes.

AHU section size ( $\pm 1\%$ )				
Internal unit depth (= IMC-D) per air stream	Internal unit height (=IMC-H) per air stream	Designed type of IMC (after entering the unit, all relevant inner surfaces shall be reached with the hand)		Minimum IMC length IMC-L (For quickly removable components: including free space when component is removed)
< 800mm	> 300 mm and <1900 mm	Standing outside and <b>entering the unit with the arm or with arm plus the shoulder</b>		400 mm
$\leq 1000\text{mm}$	>400 mm and < 1900 mm			400 mm

<p>&lt;1300mm</p>	<p>&gt;550 mm and ≤1300 mm</p>	<p>Standing outside and <b>entering the unit with the upper part of the body.</b></p>		<p>550 mm</p>
<p>Any</p>	<p>&gt;600 mm and ≤800 mm</p>	<p>Entering the unit partially or with the full body by <b>crawling and working in lying position.</b></p>		<p>550 mm</p>

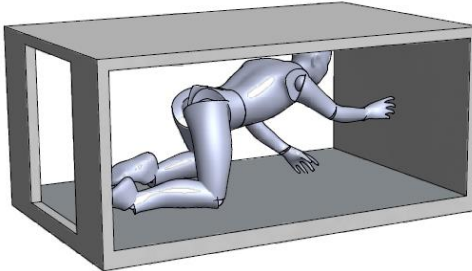
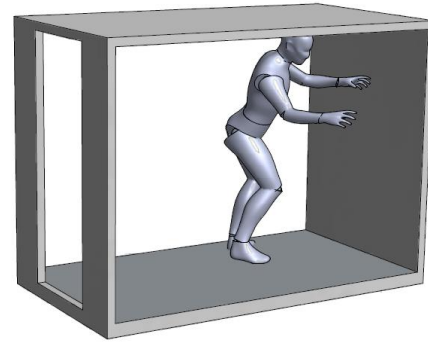
Any	>800 mm and <=1600 mm	Entering the unit by <b>crawling on the knees and working in sitting, kneeling or squatting position.</b>		550 mm
Any	>1600	Entering the unit <b>by access on the feet and working in standing or at least bended position.</b>		550 mm
<b>Other size combinations</b>		<b>Not Allowed</b>		

Table 1 : Access and Space requirements

## APPENDIX B. LIST OF MINIMUM PROPERTIES TO INCLUDE IN BIM FILES

As a minimum the following parameters must be included in the BIM file of a NEx certified unit.

<b>Group</b>	<b>Properties</b>
<b><i>General</i></b>	<ul style="list-style-type: none"> <li>Identification code</li> <li>Project name</li> <li>Manufacturer</li> <li>Range name</li> <li>Software Version</li> <li>Eurovent Energy Efficiency class</li> <li>Supply frequency</li> <li>Supply voltage</li> </ul>
<b><i>Certified Mechanical Characteristics</i></b>	<ul style="list-style-type: none"> <li>Casing Strength</li> <li>Casing Air Leakage</li> <li>Filter bypass leakage</li> <li>Thermal transmittance of the casing</li> <li>Thermal bridging factor</li> <li>Acoustical Insulation of casing</li> </ul>
<b><i>Certified Performance Characteristics</i></b>	<ul style="list-style-type: none"> <li>Air flow - Available static pressure - power input</li> <li>Octave band in-duct sound power level</li> <li>Airborne sound power level</li> <li>Heating capacity</li> <li>Cooling capacity</li> <li>Heat recovery efficiency for balanced air flow and dry condition</li> <li>Pressure loss on water side</li> </ul>
<b><i>Unit</i></b>	<ul style="list-style-type: none"> <li>Airflow ETA</li> <li>Airflow SUP</li> <li>Allowed ambient temperature range (min. and max.)</li> <li>Application (indoor use; outdoor use)</li> <li>External pressure ETA</li> <li>External pressure SUP</li> <li>LwA casing</li> <li>LwA EHA</li> <li>LwA ETA</li> <li>LwA ODA</li> <li>LwA SUP</li> <li>SFPv supply</li> <li>SFPv extract</li> <li>Velocity ETA</li> </ul>

Velocity SUP
Weight
Inlet sound power (total sound power in dB(A))
Outlet sound power (total sound power in dB(A))
Airborne sound power (total sound power in dB(A))

**HRS**

Total Thermal Capacity (summer condition)
Total Thermal Capacity (winter condition)
Type

**Compressor**

Capacity
Max. current
Medium

**Hydraulic unit**

Max. current
Power consumption

**Fan (supply & extract)**

Power consumption at nominal airflow
Nominal power

**Contact humidifier (supply & extract)**

Humidification
Water consumption

**High pressure humidifier (supply & extract)**

Humidification
Water consumption

**Steam humidifier**

Humidification
----------------

**Filters (supply and extract)**

Filter class
--------------

**Condenser**

Capacity
Condensing temperature

**Evaporator**

Evaporating temperature
Capacity

**Coils (Cooling & Heating)**

Capacity
Fluid mass flow
Inlet fluid temperature
Outlet fluid temperature
Pressure drop medium