TECHNICAL CERTIFICATION RULES OF THE EUROVENT CERTIFIED PERFORMANCE MARK

FAN COIL UNITS

Identification: ECP FCU

Revision 1 – 01/2024

(This version cancels and replaces any previous versions)

Approbation date: 10/01/2024

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The purpose of these Technical Certification Rules is to prescribe procedures for the operation of the Eurovent Certified Performance (ECP) certification program for Fan Coil Units (FCU), in accordance with the current version of the Certification Manual.

Modifications as against last version :

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I. GENERAL INFORMATION

I.1. Scope

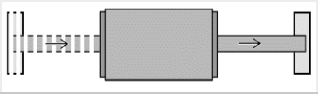
I.1.1. General

The program scope covers fan coil units using chilled water, or chilled water and hot water, for which it is possible to select at least 3 different speeds on the unit (variable speed units are included). Units running at 60Hz and District Cooling units are covered by the scope.
The FCU certification program is divided into two sub-programs, with scopes defines as follows:

- **Non-ducted units.** For this sub-program, performances are tested and certified only at 0 Pa. In accordance with EN 1397:2021, the aeraulic test is optional for units falling under this scope. Technically this sub-program includes units without any duct, and units with a duct if they meet all the following criteria:
  - Air flow rate ≤ 0.7m3/s (2520 m3/h)
  - Published external static duct pressure ≤ 40 Pa

- **Ducted units.** For this sub-program, performances are tested and certified with an external static pressure of 50 Pa for the Medium Speed in reference conditions (standard air). For other speeds, the duct resistance between the unit and the testing chamber will not be adjusted during the aeraulic test, and the static pressure into the testing chamber will remain 0 Pa. Thus, the external static pressure will change accordingly, and not as a setpoint. This sub-program includes ducted units if they meet all the following criteria:
  - Total cooling capacity and Heating capacity ≤ 30 kW
  - Air flow rate ≤ 1 m^3/s (3600 m^3/h)
  - Available static pressure ≤ 300 Pa
  - Direct driven motor
  - Unit with fan, coil and filter at inlet (filter can be mounted separately)
  - No heat recovery
  - No double skin

Table 1: Scope of Non-Ducted and Ducted sub-programs

Installation	Non-Ducted	"Ducted"	Ducted
Eurovent sub-program	**Non-Ducted** 	**Non-Ducted** 	**Ducted** 
Static pressure Published in the participant's catalogue	0 Pa	< 40Pa	>40 Pa
Static pressure at which Performances are certified by ECC	0 Pa	0 Pa	50 Pa at medium speed

Heating only units are not covered by the programme scope. Units that cannot be included in any of the Sub-programs described above, because one or more criteria is not met, are not covered by the program scope.

I.1.2. Certify-all principle

Provisions given in the Certification Manual apply. In this programme, the Certify-all principle applies to the European market as defined in the CM.
Whenever a company participates in the programme for Fan Coil Units, all fan coil units that are promoted by the applicant/participant to end-users, specifiers, trading companies, contractors by means of paper or electronic catalogue, price list or software within the scope of the programme, shall be certified, in accordance with these Technical Certification Rules. This includes all models in modular

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ranges. Units running at 60 Hz and District Cooling units are excluded from the Certify-all principle, therefore their certification is optional.

I.2. Certified performances

Following performances at standard conditions and only at the three speeds declared by the manufacturer shall be published on ECC website (www.eurovent-certification.com):

a. Certified performances for non-ducted sub-program

- Thermal performances
  - Total cooling capacity (Pc)
  - Sensible cooling capacity (Ps)
  - Heating capacity[1] (Ph)
  - Water pressure drop in cooling and heating[1] (Dpc and Dph)
  - Unit power input in cooling and heating[1] (Pec and Peh)
  - FCEER and FCCOP[1]
- Acoustic performances
  - A-weighted sound power level (Lw)
- Aeraulic performances (OPTIONAL)
  - Air flow rate (Qv)

b. Certified performances for ducted sub-program

- Thermal performances
  - Total cooling capacity (Pc)
  - Sensible cooling capacity (Ps)
  - Heating capacity[1] (Ph)
  - Water pressure drop in cooling and heating[1] (Dpc and Dph)
  - Unit power input in cooling and heating[1] (Pec and Peh)
  - FCEER and FCCOP[1]
- Acoustic performances
  - A-weighted sound power level inlet+radiated ($Lw\ inlet + rad$)
  - A-weighted sound power level outlet ($Lw\ outlet$)
- Aeraulic performances
  - Air flow rate (Qv)
  - Available static pressure (ESP)

c. Other items displayed on ECC website

- Name of the participant
- Diploma number of the Participant
- Trade or brand name of model
- Model reference(s)
- Software name and version when the software is certified
- Energy Efficiency Class[1]
- Voltage and RPM at the Low, Medium and High speed (mandatory only for variable speed FCU)
- Mounting base and optional mounting(s)
- Speed type of the fan (variable speed / non-variable speed)
- Main Power Supply
- Designations of the certified speeds (Low, Medium and High speed)

[1] Heating items are certified for and only for units with a function « heating by hot water ».

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I.3. Definitions and acronyms

In addition to the definitions specified in the CM, the following definitions apply:

Fan Coil Unit (FCU)	Factory made assembly which provides the functions of cooling and/or heating air using chilled or hot water with air flow to the room ensured by one or more electrically driven fans. Fan Coil Units may be of: - the cabinet style, within a room, for free air delivery, or of the chassis style, concealed within the building structure with minimal ducting appropriately connected to the inlet and/or outlet of the unit (non-ducted) - the chassis style, concealed within the building structure with ducting appropriately connected to the inlet and/or outlet of the unit (ducted) The principal components are: • one or more heat exchangers, • one or more fans with electric motors, • an appropriate enclosure, • condensed water collecting facilities when cooling, • air filter • discharge plenum (ducted units)
Model type for FCU	There are 8 model types for Fan Coil Units. Certified performances and test conditions depend on the model type. • FC/2/C: non-ducted unit, 2 pipes, cooling only • FC/2/H: non-ducted unit, 2 pipes, cooling and heating • FC/2/DC: non-ducted unit, 2 pipes, district cooling • FC/4/H: non-ducted unit, 4 pipes, cooling and heating • FCP/2/C: ducted unit, 2 pipes, cooling only • FCP/2/H: ducted unit, 2 pipes, cooling and heating • FCP/2/DC: ducted unit, 2 pipes, district cooling • FCP/4/H: ducted unit, 4 pipes, cooling and heating
Total cooling capacity [kW]	Pc in ECC lists and website. Total heat energy removed from the air by the unit which is the sum of the sensible and latent cooling capacities. The total cooling capacity is determined as the cooling capacity measured on the water side minus the unit power input (net value).
Sensible cooling capacity [kW]	Ps in ECC lists and website. Heat which is removed from the air by means of a dry-bulb temperature drop.
Heating capacity [kW]	Ph in ECC lists and website. Total heat added to the air by the unit. The heating capacity is determined as the heating capacity measured on the water side plus the unit power input.
Unit power input [W]	Pec (cooling mode) and Peh (heating mode) in ECC lists and website. Electric power absorbed by the unit.
Low, Medium and High speed	Speeds published as available on the unit with the corresponding motor control device.

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FCEER and FCCOP

Based on the definition of Low, Medium and High speed, the Fan Coil Energy Efficiency Ratio (FCEER) and the Fan Coil Coefficient of Performance (FCCOP) are defined as follows:

Equation 1 : FCEER

$$FCEER = \frac{5\% \cdot Pc_{high} + 30\% \cdot Pc_{med} + 65\% \cdot Pc_{low}}{5\% \cdot Pe(c)_{high} + 30\% \cdot Pe(c)_{med} + 65\% \cdot Pe(c)_{low}}$$

Equation 2 : FCCOP

$$FCCOP = \frac{5\% \cdot Ph_{high} + 25\% \cdot Ph_{med} + 70\% \cdot Ph_{low}}{5\% \cdot Pe(h)_{high} + 25\% \cdot Pe(h)_{med} + 70\% \cdot Pe(h)_{low}}$$

Where Pc and Ph respectively stand for the total cooling capacity at standard condition and the heating capacity at standard condition.

Where $Pe(c)$ and $Pe(h)$ respectively stand for the unit power input at standard cooling condition and unit power input at standard heating condition and must be expressed in the same unit as Pc and Ph.

Energy Efficiency Class

Energy Efficiency Classes (A to E) in cooling or heating are respectively based on FCEER and FCCOP in accordance with below tables:

Table 2: Energy Efficiency Classes in cooling and heating for non-ducted FCU

Class	Cooling mode	Heating mode
A	FCEER>=185	FCCOP>=265
B	185>FCEER>=120	265>FCCOP>=160
C	120>FCEER>=80	160>FCCOP>=100
D	80>FCEER>=55	100>FCCOP>=70
E	55>FCEER	70>FCCOP

Table 3: Energy Efficiency Classes in cooling and heating for ducted FCU

Class	Cooling mode	Heating mode
A	FCEER>=85	FCCOP>=85
B	85>FCEER>=60	85>FCCOP>=60
C	60>FCEER>=40	60>FCCOP>=40
D	40>FCEER>=25	40>FCCOP>=25
E	25>FCEER	25>FCCOP

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Water pressure drop [kPa]	Dpc (cooling mode) and Dph (heating mode) in ECC lists and website. Negative pressure difference measured between the outlet and inlet connections of the water circuit of the unit.
Sound power level [dB]	Ps in ECC lists and website. Total sound power radiated by the Fan Coil Unit.
A-weighted sound power level [dB(A)]	Lw for non-ducted units, $Lw\ inlet + rad$ and $Lw\ outlet$ for ducted units in ECC lists and website. A single figure on a specific scale which can be related to the subjective assessment of the loudness of a noise.
Air flow rate [m^3/h]	Qv in ECC lists and website Volume air flow through the unit at standard conditions
Available static pressure [Pa]	ESP in ECC lists and website. The available air static pressure at the discharge of the air way cross section of the unit.
RPM [min^{-1}]	Revolution Per Minute: motor rotation speed for dry coils
Main Power Supply (MPS)	Description of the main power supply. For single phase FCUs running at 50 or 60Hz: 230-1-50 or 230-1-60
Basic Model Group (BMG)	Each Applicant/Participant's declaration list will be grouped by basic model. Several units can be in the same BMG only if they belong to the same Model type. The basic model groups (BMG) shall be defined by: - Units which are essentially the same in terms of thermal performance and function, and the same in terms of basic components, specifically fans, coils and motors. - Twin units (see definition below) Each model shall be declared separately in the list, but possibly with the same BMG number. The number of tests for each manufacturer will be calculated based on the BMG count, and not on the number of separate models (10 units within 10 BMG imply as many tests as 100 units within 10 BMG).
Twin units	Twin units (or twin models) use the same components, but the following can differ: 1) One twin has a Fixed speed motor (Multi-speed motor) while the other twin has a Variable speed motor 2) One twin runs at 50 Hz while the other runs at 60 Hz
BN	Brand Name company – see CM.
MVF	Mean Value of Failure – see CM and *III.2.4.a*
TDS	Technical Data Sheet – see CM
ECC	Eurovent Certita Certification
ECP	Eurovent Certified Performance
CM	Certification Manual. Reference document for ECP. Download the last version on www.eurovent-certification.com

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I.4. Contributors

The lists of contributors are given for information and may be modified by ECC whenever it is necessary.

I.4.1. Independent laboratory / test body

When the checks carried out involve product tests, these are performed at the request of ECC by the following laboratories, known as independent laboratories:

Laboratory	Delivery address	Contact and official address	Specifications
CETIAT	Domaine scientifique de la Doua 54 avenue Niels Bohr 69100 Villeurbanne FRANCE	Domaine scientifique de la Doua 54 avenue Niels Bohr 69100 Villeurbanne FRANCE +33 4 72 44 49 00 certif-FCU@cetiat.fr	Monday to Friday 8:30 am-12:30 pm 2 pm-4:30 pm **Non-ducted units ONLY**
IMQ S.p.A	IMQ S.p.A. Local Unit Udine HVACR Testing Via Jacopo Linussio, 1 33020 Amaro (UD) ITALY	Via Quintiliano, 43 20138 Milano ITALY +39 4 33 46 86 07 clima@img.it	Monday to Friday 8 am-12:30 pm 2 pm-5:30 pm **Non-ducted units** **Ducted units**
TÜV SÜD	TÜV SÜD Industrie Service GmbH IS-TAK-MUC\ FC Mr. B. Ulrich / Mr. T. Busler Geiselbullacher Strasse 2 82140 Olching / GERMANY	TÜV SÜD Industrie Service GmbH Center of Competence for refrigeration and air-conditioning Ridlerstrasse 65 80339 München GERMANY +49 8142 44 61 -536 / -535 klima@tuvsud.com	Monday to Friday 8:30 am to 11 am and Monday to Thursday 1:30 pm to 3:30 pm **Non-ducted units ONLY**

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II. REQUIREMENTS OF THE REFERENCE DOCUMENTS

II.1. Reference documents

II.1.1. Product and test standards

The test procedure is detailed in the applicable product and test standards:

- **EN 1397:2021** "Heat exchangers - Hydronic room fan coil units – Test procedures for establishing the performance".

- **EN 16583:2022** "Heat exchangers - Hydronic room fan coils units – Determination of the sound power level"

II.1.2. Specific technical requirements

The test procedure for Fan Coil Units is detailed in the product and test standards and in *Appendix A.* The manufacturer will declare certified performances of his models (see *I.2)* to ECC at 3 chosen speeds, that will be referred to as low, medium, and high speed. For each model tested in an independent laboratory, ECC will select one speed, and one application rating condition compliant with the Model type.

II.2. Specific requirements and quality management

Production requirements

Production identification and traceability:

The participant shall use suitable means to identify the products by a unique identification code (the minimum traceable information: production plant, N° of lot, components), and the retention of documented information (records) necessary to enable traceability.

Quality management requirements

Use of mark logo

The participant shall respect the marking requirements of the CM and of the Technical certification rules if the logo is used on its products and/or services and all the relative documentations

Production instruction documentation

The applicant/participant shall ensure the availability of documented information that defines:

- the characteristics of the products to be produced and/or the activities to be performed
- the results to be achieved when appropriate

Management of customer claims

Customer claim and their treatment related to certified products shall be done, recorded and maintained available.

II.3. Marking

It is highly recommended that the participating company indicates participation in the ECP programme for Fan Coil Units by the following means.

In addition to the provisions laid down in the CM, the following requirements apply:

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II.3.1. Display of ECP logo on production units

Each Participant is entitled to display the ECP Mark on his certified units. The Participant may display this Mark in two ways:

- By using the relevant ECP Mark.
- By applying the Mark directly on the nameplate.

a. Regulations regarding the Displaying of the ECP Mark

No data or other marking shall be added to the Mark.
The participant may put the Mark where he wants to.

b. Nameplates

The ECP Mark may be applied as part of the nameplate of a certified model, under the following regulations:

- The ECP Mark applied as part of the nameplate shall comply with the design approved for the symbol (specification for which will be supplied by ECC) in all respects, including design, dimensions, letter size and style, and colour
- The acceptable colour combinations consist of green Pantone No. 341. on white or black on white

II.3.2. Display of ECP logo on technical documentation

The provisions of the CM apply.

a. Published ratings

A published rating is a statement of the values of the certified performance characteristics at the stated rating conditions. As used herein, the term "published rating" includes the rating of all performance characteristics shown on the unit or published in specifications, advertising, or other literature controlled by the Participant, at stated rating conditions.

b. Inclusion of standard ratings

Published ratings shall include ECC standard ratings. ECC standard ratings shall be clearly identified as such. Non ECC standard ratings shall be consistent with ECC standard ratings. ECC is entitled to ask for evidence of consistency if needed.

c. Control of documentation

This section refers to the corresponding section of the CM.
In case of rerate, the deadline to update websites and electronic literature is 6 months. No deadline is set for printed catalogues; however, next versions of printed catalogues have to be updated according to the rerated performances.

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III. CERTIFICATION PROCESS

III.1. Admission procedure

III.1.1. Admissibility of the application and application steps

In addition to the provisions laid down in the CM, the following requirements apply:
The Applicant, after signing the Certification Agreement, shall send to ECC all information required for the qualification: software name and version, the software itself, declaration file and relevant literature. The Applicant shall proceed with the Declaration of data as described in *III.2.1*.

This TCR is applicable for all applicants signing their certification agreement after the approbation date indicated in the first page. Otherwise previous TCR will apply for the admission campaign.

Manufacturing Companies (OEMs) shall proceed with the Implementation of Checking operations described in *III.2.2* (test of selected units in independent laboratories). For the admission campaign, Applicants shall send the units to their convenience, from the day they have been informed of selected models. The earlier selected units are sent, the faster will be the certification process. Once the units have been tested, ECC proceeds with the Software audit as described in *III*.2.3: if one or several units have failed the tests, the Selection Tool must be up-to-date and display the “rerates” for these models.

Brand Name companies (BN) shall give to ECC access to the Selection Tool as they proceed with the Declaration of data. ECC proceeds with the Software audit as described in *III*.2.3. As mentioned in the CM, the application file shall include a correspondence list for the products and/or selection tool signed by both the OEM and the BN.

Provided that tests (if applicable) are finished, that the Selection tool has been found conform (after multiple checks if necessary) and that all certification fees are paid, the Certification Committee will study the application and deliver a certificate to the Applicant, who will become Participant.

III.2. Surveillance procedure

The provisions of the CM apply.

III.2.1. Declaration of data

Applicants and Participants are responsible of the compliance between declared models and the scope of certification.

All characteristics and performances shall be expressed in SI units. Capacities shall be expressed with 2 decimals; water pressure drops with 1 decimal and control voltages with 2 decimals. Integers shall be used for unit power inputs, sound power levels, air flow rates, available static pressures, and rotation speeds. Declared sound power levels (SPL) shall be equal or higher than 29 dB(A): lower SPL cannot be measured due to background noise.

FCEER and FCCOP (2 decimals) declaration is not required; they will be automatically calculated once all the required data has been declared. The same applies for Energy Efficiency Class (from A to E).

Submittal of data shall be made by filling in the relevant forms:

- The Excel declaration file will be used as a basis to display certified models and their performances on our website www.eurovent-certification.com. In this regard:
    - **Manufacturing companies** (OEM) shall declare each model to be certified and their range, BMG, performance ratings, and other mandatory technical data. After declaration by the OEM, each model declared will have a dedicated identification number. For each model, the manufacturer must also fill some confidential information: factory code (code written on the nameplate and referring to the manufacturing factory), factory city and factory country. When one certified model is

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made in several factories, a separator shall be used in the dedicated cells to distinguish the different factories.

- **Brand Name companies** (BN) shall declare each model to be certified and their range. Brand Name companies shall contact their certified OEM(s) and require the identification number of the "master model" in the OEM's list. Filling this number will allow to copy performance ratings and other mandatory technical data from the reference model.

- One technical data sheet (TDS, Excel file) will be sent to the manufacturer by their customer manager every time a model is selected for tests. It will already be filled with the characteristics and performances declared for the model, as well as with some information only related to the test: selected fan speed and application rating condition, selected manufacturing factory when several are possible. The manufacturer will complete the technical description of incoming goods: serial number of the unit, details about its raw materials and components, performances linked to the selected application rating (at all 3 declared speeds); and send the filled TDS back to his customer manager who will forward it to the relevant laboratory.
- The "Selection tool declaration" gives an overview of all the Selection tools (name, version…) to be certified. In case of multiple selection tools, this file is essential to let ECC know in which Selection tool each range/model can be found.

III.2.2. Implementation of checking operations: tests in independent laboratories

The provisions of the CM apply.
Since OEMs are already responsible for testing their models, certified BN models are not concerned by tests in independent laboratories. ECC is responsible for keeping the published performances of BN models in line with those from the corresponding OEM master models.

III.2.2.1. Selection of units to test

In addition to the provisions laid down in the CM, the following requirements apply:

ECC shall select units to be tested based on its evaluation of the declaration filled by the manufacturer. Different models and/or different configurations from previous tests shall be selected when it is possible, and the number of non-ducted and ducted units selected for test shall be proportional to the number of basic model groups (BMG) listed respectively as non-ducted and ducted.

The actual number of units to be tested for each manufacturer shall be established as follows : this number will be proportional to the sum of declared BMG (including both non-ducted and ducted units), in an amount equal to 17%, and with a minimum of one unit.

Equation 3 : Size of the selection for tests

$$\boldsymbol{Selection\ size = Max\{1\ ;Integer\ part\ of\ [(17\% \cdot BMG) + 0,5]\}}$$

For each Participant, pending penalty tests add to the calculated selection. Participants who have gone through at least 2 testing campaigns qualify for the Mean Value of Failure (MVF) calculation. Depending on the result, the selection coefficient in Equation 3 can be lowered from 17% to 13%. Detailed conditions are described in *III.2.4.a*

If manufacturers add new models to their declaration list out of the regular schedule, ECC is entitled to update the selection for the current campaign with a sample of those new models.

III.2.2.2. Tests at the independent laboratory

In addition to the provisions laid down in the CM, the following requirements apply:

The samples necessary for carrying out the tests shall be sent by the manufacturer to the indicated laboratories. Shipment and possible customs clearance will be fully supervised and paid by the

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manufacturer. It is required that manufacturers inform the laboratory at least one week in advance of any incoming delivery.

a. Time limitation of acquisition and recovery of units

The provisions of the CM apply.

For the surveillance campaign, Participants shall respect the campaign schedule (see *Appendix E*). If delivery deadlines chosen by ECC cannot be met, the Participant shall inform ECC within the shortest delay. Penalties will apply in accordance with the Suspension/cessation conditions mentioned in the Certification Manual.

Manufacturers indicate in each technical data sheet (TDS) if they want to recover the tested unit or if they want the unit to be scrapped by the laboratory. When all tests done in a same laboratory are finished, the laboratory shall inform the manufacturer of the availability of samples for recovery. The manufacturer will imperatively inform the laboratory of the pick-up date within 6 weeks from the reception of the last test report/informative email by the laboratory.

If some test results are contested, the manufacturer shall not pick-up the concerned units before the contestation is resolved. These specific units may then be picked up on a different date.

b. Test conditions

The tests shall be conducted accordingly with the specific technical requirements at the conditions stated in *Appendix A*.

The laboratory staff shall install and check out test units. The procedures shall be in accordance with the Manufacturer's installation and service instructions.

The laboratory shall not perform the test and contact ECC if:

- one of the information is not compliant with the technical datasheet
- one of the units or its components appear damaged or cannot be operated
- the elements provided by the manufacturer don’t allow to make the test in conformity with the relevant standards
- any obvious disfunction was found out during the previous test (for instance, during aeraulic or acoustic testing, before thermal testing)
- the RPM or voltage control deviation found during the first test of a variable speed unit was out of tolerance (see *A.II.2*)

For each test associated with testing costs, the laboratory shall deliver a test report. If a disfunction prevented full operation of the test, an e-mail describing promptly the failure – and including the measured performance values – can be accepted as test report.

c. Test results and rerating of performances

The test is PASSED if all the deviations between claimed and measured data are within the acceptance criteria (see *A.V*). Otherwise, the test is FAILED.

Within 2 weeks from the delivery of the test report by the laboratory , ECC will send to the manufacturer a notification including the result of the test (PASSED or FAILED), the full Laboratory report, and the Reporting of test result, featuring result details (deviation of each performance), test conclusion (MVF, penalty tests), and a proposal of rerate. If these results are not challenged by the manufacturer within one month from their reception, they will be considered as accepted, and definitive.

Accordingly with the deviation thresholds defined in Appendix A (*A.V*) of these TCR, performance deviations leading to a failed result can be sorted into 3 levels, each having the following consequences:

- Level 1 deviation (Acceptance criteria): When results have been accepted, the declaration list and published certified item performances are immediately updated by ECC. The manufacturer must correct within 6 months his technical documentation and software, to change claimed performance values by rerated values.

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- Level 2 deviation (Intermediate): Provisions of Level 1 deviation apply. Additionally, all the performance deviations over the Intermediate threshold will be recorded during 3 years as part of the MVF (see *III.2.4.a*).
- Level 3 deviation (High deviation): Provisions of Level 1 and Level 2 deviations apply. Additionally, for each model with at least one High deviation, one penalty test will be added to the following test campaign, increasing the regular selection size.

d. Rerating rules

Only the tested product shall be rerated according to the test results.

All declared speeds shall be rerated with the same measured deviation if there is a failure on one of the following performances (at standard rating conditions or application rating conditions):

- Total cooling capacity
- Sensible cooling capacity
- Heating capacity
- Water pressure drops (cooling and heating)
- unit power input (cooling and heating)

If the air flow rate is tested, the declared unit powers input for low, medium, and high speed at standard rating and application rating conditions shall be compared to those measured during the air flow test and not the thermal test.

Deviations and rerated values for the water pressure drops must be corrected using the two following formulas:

Equation 4: Correction of the water pressure drop deviation

$$Dp_{deviation} = \frac{\left\{ Dp_{measured} \times \left(\frac{Qm_{declared}}{Qm_{measured}} \right)^{1,8} - Dp_{declared} \right\}}{Dp_{declared}}$$

Equation 5: Rerate of the water pressure drop

$$Dp_{rerated} = Dp_{measured} \times \left(\frac{Qm_{declared}}{Qm_{measured}} \right)^{1,8}$$

With Dp the water pressure drop and Q_m the mass water flow rate.
Note: in cooling mode Q_m is replaced by (Total cooling capacity + unit power input) in the above equations. In heating mode Q_m is replaced by (Heating capacity – unit power input).

Air flow rates and sound power levels shall be rerated according to the test results.

e. Failure treatment: Initial test failure

In the case of an initial test failure, as described in the CM, ECC will contact the manufacturer, who will choose within 2 weeks maximum to either:

- Proceed with the test anyways, if the sample can be operated
- Send another unit no later than 8 weeks after 1st email from ECC regarding this subject.
- Ask the laboratory to repair the unit (see III.2.2.2.f)

Any initial test failure should be resolved by the manufacturer in 8 weeks maximum (2 weeks maximum to choose one of the above options and 6 weeks maximum to deliver the unit or the component required to repair the unit) after 1st email from ECC to warn him of the situation. If not, it will be considered as a non-delivery of unit and provision indicated in the CM will apply.

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f. Correction and reparation of the unit by the laboratory

The laboratory staff shall be allowed to make only the following corrections to the test sample:

- Repair leaks (on air and water)
- Repair or replace spare parts damaged by shipping or handling. Replacement of a main spare part (coil, fan, motor fan) by the laboratory will be considered as a whole fan coil unit replacement, therefore a penalty test will be added to the manufacturer's next campaign
- Assure correct fan speed(s) where adjustable speed fans are used

Laboratories should never been considered responsible of any units' dysfunction after a reparation.

When there is a visible damage, or when the results lead the manufacturer to think of a quality issue with some of the spare parts, the manufacturer will have to send a request to ECC, describing the instructions to repair the sample. Upon approval by the laboratory and by ECC, the manufacturer will have to send the relevant spare parts within six weeks and no later than 8 weeks after 1st email from ECC regarding this initial test failure.

g. Failure treatment: second test on the same sample

In case of failure, the manufacturer can require a second test on the same sample. The manufacturer then has to choose only one test category to run again: sound test OR thermal test OR air flow rate test. For this test category, results from the second test (rerates, MVF, penalty test) will be taken as a reference over the results from the first test.

For instance, the request of a second test on the same sample can be justified when:

- The manufacturer realized that his instructions were not relevant
- The manufacturer has asked the laboratory to correct or repair the unit after the first test
- The manufacturer thinks that his unit can perform better and doubts the test conditions (in this case he can require to attend to the setup of the unit – see *III.2.2.2.i*)

h. Failure treatment: second test on a new sample

After analysis of the failure, the manufacturer can require a 2nd test on a new sample (same model but different unit). If this request is accepted by ECC, the new sample must be sent within 4 weeks to the laboratory and the whole testing programme (thermal test, sound test, air flow rate if applicable) will be done again. Results from the second test only will be taken as a reference, thus the rerates, MVF and penalty test from the first test will not apply.
As mentioned in the CM, if one or more second tests on a new sample are done during the testing campaign N, 1 penalty test will be added to the regular selection for campaign N+1.

i. Attendance of the participant to the setup of the unit

Under request, manufacturers will be allowed to participate to the installation of their sample(s) in the laboratory or to follow it remotely. The laboratory shall organize the physical/online meeting and make available all the devices and documents (webcam, series of pictures) to convince the manufacturer that the sample has been properly installed. Attendance to the test itself is not allowed.

III.2.3. Implementation of checking operations: Software audit

Each year, upon ECC request, Participants deliver their selection tool declaration and software, with relevant credentials (see deadline 15 from *Appendix E.II*).
The name and version of the participant's certified software will be published on www.eurovent-certification.com. The name and version of all the selection tools will be written on the participant's certificate.

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III.2.3.1. Selection of units to check

a. Admission campaign for manufacturers

ECC shall wait until the manufacturer has accepted the results of his admission campaign tests and validated his final declaration file to ask for the selection tool declaration and the software. If performances from tested units were rerated, or if performances from non-tested units were adjusted, the manufacturer shall ensure that they were updated in his software before he delivers all required Selection tool material to ECC.
ECC shall check at least the models for which a sample has been tested during the admission campaign. ECC is entitled to check other models.

b. Surveillance campaign for manufacturers

For campaign N, ECC shall check at least the models whose performances have been rerated during the campaign N-1. If during the campaign N-1 the software audit could not be done because of the certification schedule, ECC shall check as well the models whose performances have been rerated during the campaign N-2. ECC is entitled to check other models.
ECC also checks that the “certify-all” is respected.

c. Admission and surveillance campaign for BN companies

ECC shall check at least the models whose OEM’s master models’ performances have been rerated during the previous surveillance campaign. ECC is entitled to check other models.
ECC also checks that the “certify-all” is respected.

III.2.3.2. Requirements for certified selection tools

Software requirements are developed in *Appendix B* of these Technical certification rules.

III.2.3.3. Failure treatment

If the selection tool fails the first check, it can be corrected and validated by a second check. If the second check is failed, it can be validated by a 3rd check, and so on. This failure treatment process was a transitional one and will end at the end of 2024 campaign.

All participants shall have a certified software at the end of 2025 campaign.
Penalty that will be applied to participants that will not have a certified software at the end of 2025 campaign will be determined in 2024 and published in the next TCR.

For participants, non-delivery of the software upon request will be penalized as indicated in the CM (suspension/cessation conditions). If a selection tool is found not compliant, its previous certified version (when applicable) will be withdrawn from www.eurovent-certification.com, and from the participant’s certificate. Therefore, a certified manufacturer may not have any certified selection tool for a temporary period.

When it is relevant because of the calendar, the re-check for a campaign N can be done simultaneously with the first check for the campaign N+1.

For re-checks (2nd check, 3rd check, …), the checker from ECC will decide if a complete check must be implemented again or not, based on the non-compliances found during the previous check. At least, non-compliances from the previous software audit shall be checked.

III.2.3.4. Update of the published software at Participant’s request

If their selection tool is certified, participants can require an update of the published software out of the software checking schedule. If the version changes, ECC can decide to update the published version without a Software audit. This decision will be taken upon analysis of either the embedded version management device, or the log file(s) describing all modifications made between the published versions and the current version.

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If the software name changed, or if the log file indicates that non-conformities could be introduced in the last version, a software audit must be done before the new software/version is certified and published. If the Participant's campaign has progressed enough to allow it, the date of upcoming software audit (campaign N+1) will be advanced. Otherwise, the software audit will consist in a repetition of the regular software checking (campaign).

III.2.4. Evaluation and decision

In addition to the provisions laid down in the CM, the following requirements apply:

For the admission procedure of OEM companies, the certification is granted if :

- All selected units have been delivered to the laboratory with their technical data sheets, tests have been done by the laboratory and tests results (i.e. rerates and penalty tests) have been accepted by the participant
- All fees have been settled
- The software has been delivered and validated by ECC (through multiple checks if needed)

For the admission procedure of BN companies, the certification is granted if :

- All corresponding OEM(s) have valid certificates
- All fees have been settled
- The software has been delivered and validated by ECC (through multiple checks if needed)

For the surveillance procedure of OEMs, the certification is renewed at the date specified in the certification schedule (*Appendix E*) if:

- The previous surveillance campaign (N-1) has been completed
- All selected units have been delivered to the laboratory with their technical data sheets
- All tests have been ordered
- The software has been delivered (upon request)
- Participant's MVF as defined below is lower than 30%

For Brand Name companies, the certification is renewed at the date specified in the certification schedule (see *Appendix E*) if:

- All the corresponding OEM(s) meet above requirements
- The software has been delivered (upon request)

a. Mean Value of Failure (MVF)

The mean value of failure (MVF) is equal, for one or several tests, to the ratio between total number of deviations measured above the " Intermediate Deviation threshold" and total number of measured performances for which an intermediate Deviation threshold is defined (see *Table 4*). The Reporting of test results sent to the manufacturer after a test shows the MVF for this test.

Equation 6 : Definition of the Mean Value Failure

$$\boldsymbol{MV = \frac{\sum Measurement\ failed\ by\ more\ than\ the\ intermediate\ \ Deviation\ threshold}{\sum Measurement\ performed\ for\ which\ \ an\ intermediate\ Deviation\ threshold\ is\ defined}}$$

- MVF perquisite**:** If the MVF is equal or lesser than 5%, the selection coefficient for the upcoming test campaign will be 13% instead of 17%.

Equation 7 : Size of the reduced selection for tests

$$\boldsymbol{Selection\ size = Max\{1\ ; Integer\ part\ of\ [(13\% \cdot BMG) + 0,5]\}}$$

- MVF penalty: A Manufacturer is suspended from the Programme for one campaign if the mean value of failure MVF is higher than 30%.

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Each year, ECC calculates the MVF of manufacturers over the last 3 years, taking into consideration a maximum of 3 test campaigns (the last 3). MVF perquisites/penalties for the upcoming campaign apply only if at least 2 test campaigns can be taken into consideration for the MVF calculation.

The following performances are considered:

- Sensible cooling capacity (Ps), total cooling capacity (Pc), and heating capacity (Ph) at the tested speed and at standard and application rating conditions
- Sound power levels for non-ducted (Lw) and ducted units ($Lw\ inlet + radiated$ and $Lw\ oultet$) at all 3 tested speeds

Table 4: Performance with intermediate or high deviation thresholds

Performance	Tolerance (Re-rating process)		Intermediate Deviation threshold (MVF calculation)		High Deviation threshold (Penalty test)	
	Fixed speed	**Variable speed**	**Fixed speed**	**Variable speed**	**Fixed speed**	**Variable speed**
Ps standard rating	< - 8 %	< - 10 %	**< - 13 %**	**< - 15 %**	-	
Pc standard rating	< - 7 %	< - 9 %	**< - 12 %**	**< - 14 %**	< - 17 %	< - 19 %
Ph standard rating	< - 7 %	< - 9 %	**< - 12 %**	**< - 14 %**	< - 17 %	< - 19 %
Ps application rating	< - 8 %	< - 10 %	**< - 18 %**	**< - 20 %**		
Pc application rating	< - 7 %	< - 9 %	**< - 17 %**	**< - 19 %**		
Ph application rating	< - 7 %	< - 9 %	**< - 17 %**	**< - 19 %**		
Lw (non-ducted)	> + 2 dB(A)		**> + 3 dB(A)**		> + 4 dB(A)	
Lw inlet+radiated (ducted)	> + 2 dB(A)		**> + 3 dB(A)**			
Lw outlet (ducted)	> + 2 dB(A)		**> + 3 dB(A)**			

When there is a second test on one unit, then for each performance, only the last test result is considered for the MVF calculation.

b. Penalty tests

Penalty tests are assigned to a manufacturer under the following conditions:

- x unit(s) tested during the campaign N failed the test with at least one Level 3 deviation, as defined in Table 7 (x penalty tests to do during campaign N+1)
- The manufacturer asked to do y second tests on a new unit during campaign N (max.1 penalty test to do during campaign N+1)

Therefore, the total number of penalty tests to assume for upcoming campaign is (x + {0 or 1}).

c. Impact of MVF and penalty tests for applicants, suspended manufacturers, expelled manufacturers

For applicants, MVF and penalty tests from the admission campaign are recorded normally and affect the next campaigns. Penalty tests will add to the first surveillance campaign selection, while MVF will be effective only after the first surveillance campaign. ECC is entitled to ask that recorded penalty tests are done before the admission in the programme.

For manufacturers who are excluded from the programme during a defined period (suspension), pending penalty tests add to the next selection. When unsuspended, the effective MVF of the participant is calculated only for test campaigns that happened during the last 3 years. Therefore, MVF effects apply if there are at least 2 test campaigns to consider over the last 3 years. For manufacturers who leave the programme (expelled) and re-join within 3 years, the same rules apply.

III.3. Declaration of modifications

The provisions of the CM apply.

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III.3.1. Changes concerning the participant

The provisions of the CM apply.

III.3.2. Changes concerning production entities

The provisions of the CM apply: the manufacturer will declare to ECC any change in relation with FCU production, new plants, transfer of production, etc.

III.3.3. Additional admission for a new model and/or new range

The provisions of the CM apply:

Since the Certify-all applies, participants may have to declare new models out of the regular schedule. Upon validation of the declaration by ECC, the new models will be listed as “New” on www.eurovent-certification.com.

As mentioned in the CM, Brand Name companies who want to introduce models not certified by another participant shall take responsibility for the surveillance procedure (as described in *III.2*). In this case, these new models cannot be certified before the first surveillance campaign is fully completed.

III.3.4. Changes concerning the certified product

In addition to the provisions laid down in the CM, the following requirements apply:

The applicant/participant shall inform ECC of any modification of the declared models by updating their declaration and sending the updated selection software together with the software update record sheet. Non-compliance of the applicant/participant is considered as non-application of procedures.

ECC decides whether the modification is significant for the certified performance data or not. In the case of significant modifications ECC is entitled to request adequate tests to check the influence on performance data. This test shall not be considered as a repetition one.

III.3.5. Temporary or permanent cessation of production of a certified product

The provisions of the CM apply.

III.3.6. Suspension/cessation conditions

The provisions of the CM apply.

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APPENDIX A. *TESTING PROCEDURE FOR FAN COIL UNITS*

A.I. Purpose

The purpose of this appendix is to establish definitions and specifications for testing and rating of Fan Coil Units (FCU) for the related Programme.

A.II. Testing requirements

1) General

All tests shall be carried out at 230V, with the rated frequency of 50Hz or 60Hz, depending on the manufacturer's declaration. Electric heaters, if provided with the sample, shall be turned off during the tests. All tests shall be carried out with the fitted air filter supplied by the manufacturer. It is also the manufacturer's responsibility to give all instructions necessary to setup the unit, among which: wiring diagram, fixed opening of the flaps (by default, the FCU will be tested with maximum opening), distance between casing and the floor for floor mounted FCUs (when feet are not included).

The thermal test must be performed according to **EN 1397:2021** "Heat exchangers – Hydronic room fan coil units – Test procedures for establishing the performance". In order to reduce the impact of condensation on successive cooling tests, the standard cooling condition shall be tested before any other cooling condition.

The air flow rate test must be performed according to **EN 1397:2021** "Heat exchangers – Hydronic room fan coil units – Test procedures for establishing the performance". It shall be carried out at ambient conditions without water flow.

The sound power test must be performed according to **EN 16583:2022** "Heat exchangers – Hydronic room fan coil units – Determination of the sound power level". It shall be carried out at ambient conditions without water flow. When the supply of a casing is optional, the test shall be carried out without the casing. Uncertainty of 1 dB(A) will be considered. Duct end correction mentioned in this standard is not included in the sound power levels certified by ECC.

For ducted models, the following procedure must be applied :

The air density (ρ_2) should be determined at the beginning of the acoustic test.

Then, the external static pressure should be calculated and adjusted at each speed. The calculation is as follows :

- Test at medium speed (Med) with ESP = 50 Pa in standard conditions
  - $ESP_{2\_Med} = \frac{\rho_2}{\rho_{Std}} \times ESP_{Std} = \frac{\rho_2}{\rho_1} \times ESP_{1\_Med}$
- Test at high speed (High) with external static pressure equivalent to ESP_{1_High} at the aeraulic test conditions
  - $ESP_{2\_High} = \frac{\rho_2}{\rho_1} \times ESP_{1\_High}$
- Test at low speed (Low) with external static pressure equivalent to ESP_{1_Low} at the aeraulic test conditions
  - $ESP_{2\_Low} = \frac{\rho_2}{\rho_1} \times ESP_{1\_Low}$
- ρ_1 : Air density measured during the aeraulic test
- ESP_{1_Med} : External static pressure calculated during the aeraulic test at medium speed

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- ESP_{1_Low} : External static pressure calculated during the aeraulic test at low speed
- ESP_{1_High} : External static pressure calculated during the aeraulic test at high speed

Variable speed units shall be tested in accordance with the special procedure described below.

2) Variable speed units: additional testing requirements

Standard and Application Ratings shall be established at the conditions specified in *A.III* of this appendix. Standard and Application Ratings shall be verified by tests in accordance with the following specifications:

- When he declares the model, the manufacturer selects 3 speeds among the variable fan speed functioning range so called Low, Medium and High speed. The manufacturer declares the performances at these 3 speeds as it is usually done for multi-speed fans.
- The manufacturer shall provide to the selected laboratory all instructions to implement the right settings allowing to run the fan at declared speeds. The laboratory shall preferably use its own controls. The control voltage used during the measurements shall be reported in the test report for thermal, airflow and acoustic tests. The allowed tolerance on the control voltage is 0.5%. When the FCU has a controller, the laboratory shall include its consumption in the unit power input values.
- The laboratory shall always begin a complete test with a test in dry battery (sound power test or air flow rate test). Aside from that, the thermal, air flow rate and sound power tests shall be performed with the usual test procedures.
- For partial second test on the same unit the laboratory shall set the same control voltages as for the first complete test.
- Only one Initial test failure due to deviation of the fan rotation speed and/or control voltage is allowed per model.
- In order to approach better the different FCU technologies, before each complete test, the manufacturer chooses in the TDS one of the two preparatory procedures to apply for the first test in dry battery (sound power test or air flow rate test):

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.I. Procedure 1: The laboratory sets the declared control voltages for each speed with its own control or sets the speeds using the controller (see *Figure 1* below).

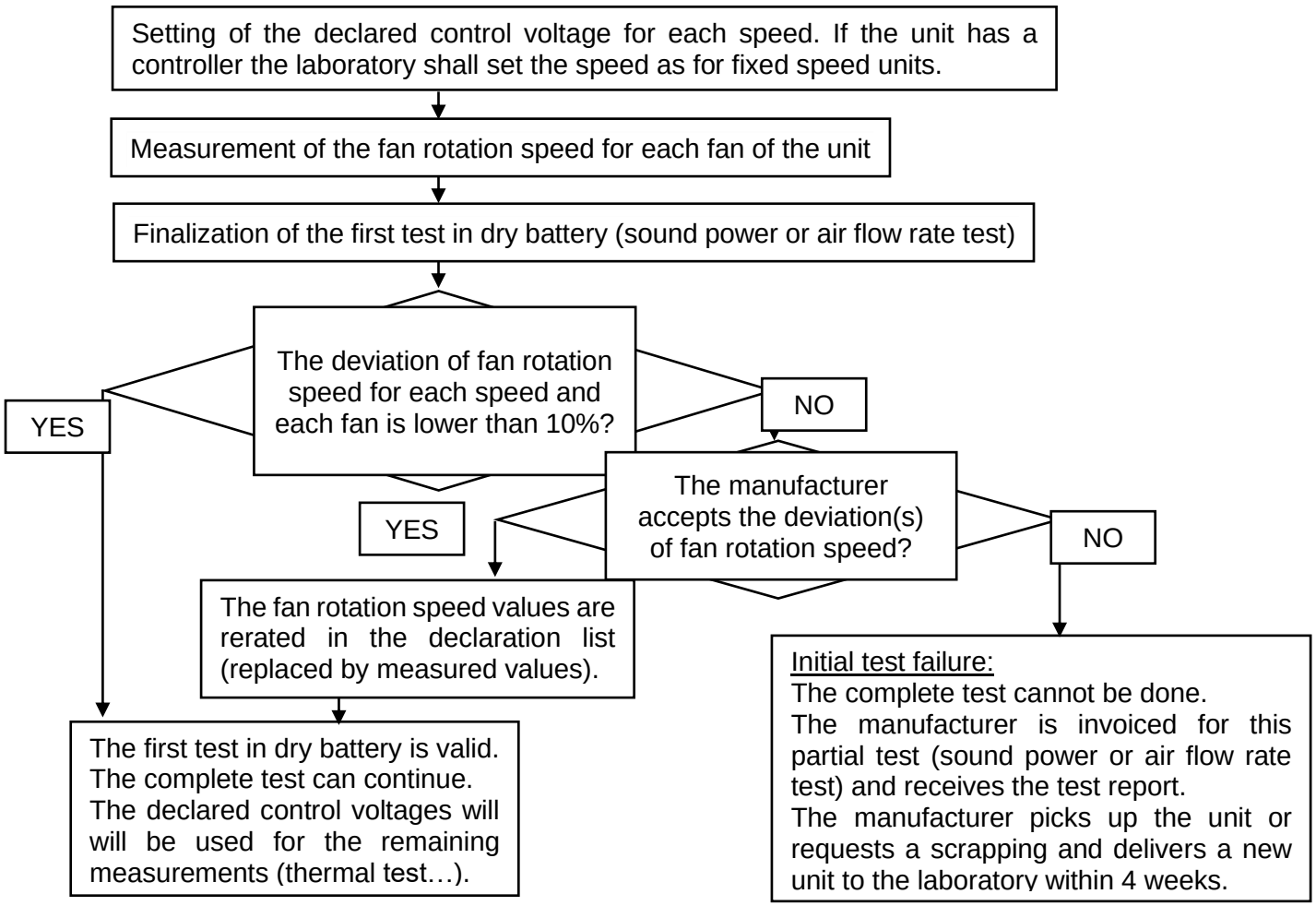

Figure 1: Preparatory procedure 1 (Voltage setting)

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.II. Procedure 2: Control voltages for each speed are adjusted to match with the declared fan rotation speed (see *Figure 2* below). This procedure is not compatible with setting by a controller.

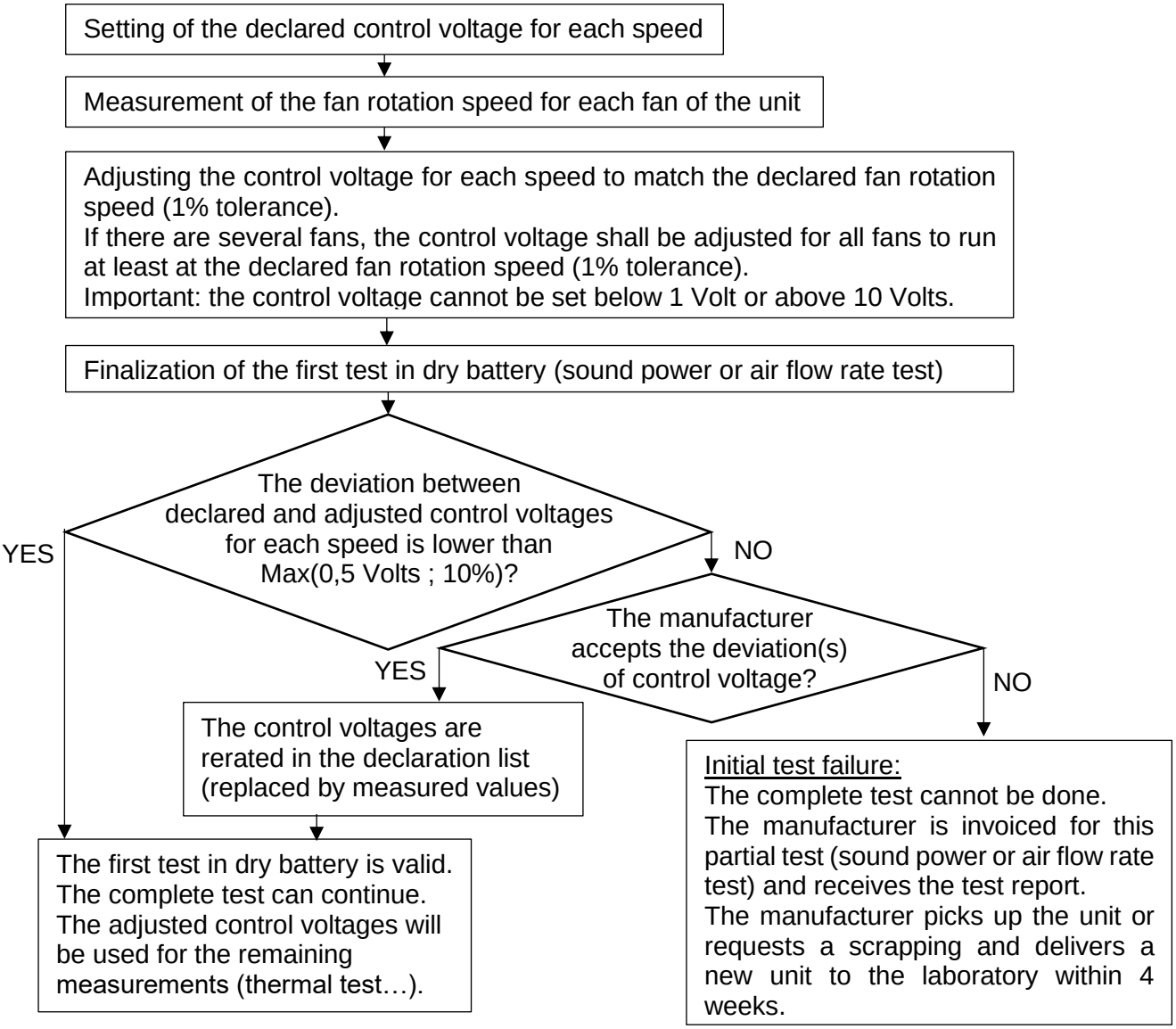

Figure 2: Preparatory procedure 2 (RPM setting)

A.III. Rating requirements

If aeraulic performances are declared, they shall be verified by tests at all the declared speeds (declaration is mandatory for the Ducted sub-programme and optional for the Non-Ducted sub-programme).
Acoustic performances shall be verified by tests at all the declared speeds.
Thermal performances shall be verified by tests carried out in all the relevant Standard Rating condition(s), and in one Application Rating condition selected by ECC, only at the speed selected by ECC. Thermal performances declared at non-selected speeds will be evaluated based on the results of tests at the selected speed. They are subject to rerates in accordance with the rerating rules (*III.2.2.2.d*).

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For cooling tests, the following Standard and Application (non-standard) Rating conditions apply:

Table 5: Standard and Application Rating conditions for cooling tests

	Cooling		District cooling	
	Water temperature [inlet temperature / outlet temperature]	Air temperature [inlet dry bulb (inlet wet bulb)]	Water temperature [inlet temperature / outlet temperature]	Air temperature [inlet dry bulb (inlet wet bulb)]
Standard rating condition	7°C / 12°C	27°C (19°C)	5.5°C / 14.5°C	24°C (18°C)
Application rating condition 1	10°C / 15°C	27°C (19°C)	9°C / 18°C	26°C (18.6°C)
Application rating condition 2	7°C / 12°C	25°C (17.9°C)		
Application rating condition 3	14°C / 18°C	26°C (18°C)		

Note: underlined conditions are in accordance with EN 1397:2021

For heating tests, the following Standard and Application (non-standard) Rating conditions apply:

Table 6: Standard and Application Rating conditions for heating tests

	Heating (4 pipes)		Heating (2 pipes)	
	Water temperature [inlet temperature / outlet temperature]	Air temperature [inlet dry bulb (inlet wet bulb)]	Water temperature [inlet temperature / outlet temperature]	Air temperature [inlet dry bulb (inlet wet bulb)]
Standard rating condition	65°C / 55°C	20°C (15°C max)	45°C / 40°C	20°C (15°C max)
Application rating condition 1	70°C / 60°C	20°C (15°C max)	50°C / *	20°C (15°C max)

* = Same water flow as in cooling for standard rating (the outlet water temperature is not fixed)
Note: underlined conditions are in accordance with EN 1397:2021

For each unit to be tested, the manufacturer will fill a TDS sent by ECC. In addition to the mandatory data already declared by the manufacturer, the TDS contains functional characteristics of the unit, and performances at Low, Medium and High speed in the selected Application Rating condition. The model description and serial number of the sample filled in the TDS will be checked by the laboratory before the test begins.

A.IV. Certified Performance Items

The certified performance items are listed in *I.2*

A.V. Acceptance criteria

The different deviation levels are explained in *III.2.2.2.c*.
The application of penalties when measured deviations are over the thresholds is explained in *III.2.4*.
The *Table 7* below describes the deviation thresholds defined for FCUs:

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Table 7: Table of tolerances, intermediate and high deviation thresholds

		Performance		Acceptance criteria (Level 1)	Intermediate (Level 2)	High deviation (Level 3)
Thermal performances	**Standard Rating condition (Ducted and Non-ducted)**	Sensible capacity	*Fixed speed*	-8%	-13%	
			Variable speed	-10%	-15%	
		Total cooling capacity	*Fixed speed*	-7%	-12%	-17%
			Variable speed	-9%	-14%	-19%
		Heating capacity	*Fixed speed*	-7%	-12%	-17%
			Variable speed	-9%	-14%	-19%
		Unit power input		Max(+10%;+1W)		
		Water pressure drop		Max(+20%;+1kPa)		
	Application Rating condition (Ducted and Non-ducted)	Sensible capacity	*Fixed speed*	-8%	-18%	
			Variable speed	-10%	-20%	
		Total cooling capacity	*Fixed speed*	-7%	-17%	
			Variable speed	-9%	-19%	
		Heating capacity	*Fixed speed*	-7%	-17%	
			Variable speed	-9%	-19%	
		Unit power input		Max(+10%;+1W)		
		Water pressure drop		Max(+20%;+1kPa)		
Acoustic performances	**Non-ducted**	A-weighted sound power level		+2 dB(A)	+3 dB(A)	+4 dB(A)
	Ducted	A-weighted sound power level (inlet + radiated)		+2 dB(A)	+3 dB(A)	
		A-weighted sound power level (outlet)		+2 dB(A)	+3 dB(A)	
Aeraulic performances	**Non-ducted**	Air flow rate		-10%		
	Ducted	Air flow rate		-10%		
		External static pressure		0 Pa at Medium speed and -5 Pa at other speeds		

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APPENDIX B. *SOFTWARE AUDIT*

B.I. General requirements

Selection tool requirements as defined in articles from the Appendix E of the CM apply, unless below specifications for the FCU programme say otherwise.

Since the certify-all applies for FCU, all the products brands present on the commercial documentation must be listed on the manufacturer's software. If some units are available in the selection tools but out of the programme scope, a clear statement shall be visible on their printouts.

- ➔ The use of multiple selection tools is allowed, but all models from a same range shall be included in a single selection tool, and each certified product (except products with a "Deleted" status) shall be included in at least one selection tool. Moreover, the identification of the product(s) in the printout shall be possible without ambiguity.
- ➔ For "New" models, the use of non-digital selection tools is allowed up to 10 months after the declaration.

The ECP mark cannot be used in a selection tool before this selection tool is certified by ECC, unless the selection tool and its printouts are not available at all for customers. The FCU programme committee did not decide to make the ECP mark mandatory on the printouts but is use in accordance with the certification manual is recommended.

- ➔ Applicants/participants shall mention on each page of the printout the following sentence: "The certified performances, conditions and the certification of the software have to be verified in www.eurovent-certification.com"

The software shall be able to calculate at least all the certified performances at Low, Medium and High speed under standard and application rating conditions defined in Appendix A (*A.III*). For each model, it must be possible to display all these certified performances in one printout (for at least one selected speed and testing condition).

- ➔ Other performance values and characteristics are authorized as soon as operating conditions are fully specified jointly. Specifically, if more speeds than the 3 declared speeds are available on the unit, it is recommended to include other speeds in the selection tool.
- ➔ For non-ducted units, the initial declaration of the air flow rate as a performance is optional, and consequently aeraulic tests are done only if the air flow rate is declared. Therefore, depending on the manufacturer's declaration this performance can be certified or not. If the software shows non-certified air flow rate, it must be mentioned in the printout.

When applicants have failed results for their FCU tests, they must update their software and apply the rerates before their admission is validated. When participants have failed results for their FCU tests, they must update their software and apply the rerates within 6 months.

B.II. Input and output data of the software

The following inputs and/or outputs must be available in the selection tool and displayed in the printouts:

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Table 8: Mandatory input and output data in the software

Mandatory input data	Mandatory data in input or in output	Mandatory output data
The operating conditions: - Air dry bulb temperature - Air wet bulb temperature OR relative humidity - Inlet water temperature - Outlet water temperature or Difference between inlet and outlet temperature or Water flow rate	- Name of the selected model(s) - Speed(s) designation (ex: L|M|H, 1|2|3, 1V|6V|10V,…) - Air wet bulb temperature	The certified performances related to input data: - Sensible capacity, Total cooling capacity and/or Heating capacity - Unit power input - Water pressure drop in cooling and/or heating - Certified sound power level(s) - Air volume flow if certified - External static pressure for ducted units

B.III. Acceptance criteria for the software

When performances are in input, ECC shall only set declared values (no tolerance). When performances are in output, ECC shall check if their values comply with the requirements below:

Table 9: Tolerances for performances displayed as output in the software

Checked performances	Deviation tolerances for performances as outputs	
Sensible capacity	Fixed speed	+8% *(Checked value ≤ 1,08 Declared value)*
	Variable speed	+10% *(Checked value ≤ 1,10 Declared value)*
Total Cooling and Heating capacity	Fixed speed	+7% *(Checked value ≤ 1,07 Declared value)*
	Variable speed	+9% *(Checked value ≤ 1,09 Declared value)*
Unit power input in cooling and heating	- Max (10%;1W) *Checked value ≥ Min (Declared value – 1 W ; 0,90 Declared value)*	
Water pressure drop in cooling and heating[2]	- Max (20%;1kPa) *Checked value x (Declared Q_m/Checked Q_m)^{1,8} ≥ Min (Declared value – 1 kPa ; 0,80 Declared value)*	
A-Weighted sound power level	- 2 dB(A) *Checked value ≥ Declared value – 2 dB(A)*	
Air volume flow	+10% *Checked value ≤ 1,10 Declared value*	
External static pressure at Low and High speeds	+5 Pa *Checked value ≤ Declared value + 5 Pa*	
External static pressure at Medium speed	+/-1 Pa *49 Pa ≤ Checked value ≤ 51 Pa*	
Control voltage	+/- Max (10%;0,5 Volt) *Min (Declared value – 0,5 Volts ; 0,90 Declared value)* *≤ Checked value ≤* *Max (Declared value + 0,5 Volts ; 1,10 Declared value)* The Checked value shall be higher than 1 Volt and lower than 10 Volt	

[2] The mass flow rate Qm is calculated as follows: *Total Cooling capacity* + *Unit power input* in cooling mode
Heating capacity – *Unit power input* in heating mode

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APPENDIX C. *FORMS*

C.I. Forms FCU-1 : Declaration file

The form FCU-1 (declaration file) to be filled in shall be sent by ECC to:

- applicants who have signed the license agreement,
- participants on an annual basis before the deadline specified in the Certification schedule.

Table 10 : Submittal for certification – Non-ducted Fan Coil Units

GENERIC	**Model Number**		
	Master model number		Model number of the master model in the relevant OEM's declaration list (for brand name models only)
	Status		- New - Certified - Deleted - Obsolete - DVP
	Participant Name		
	Model Name		
	Trade Name		
	Type of model		- FC/2/C - FC/2/DC - FC/2/H - FC/4/H
	Range Name		
	BMG		
PERFORMANCES OF THE MODEL	RPM Low, Med and High	[RPM]	Mandatory for variable speed units[3]
	Voltage Low, Med and High	[V]	Mandatory for variable speed units[3]
	Sensible capacity	[kW]	Mandatory for standard condition, optional for up to 3 non-standard conditions
	Total cooling capacity	[kW]	Mandatory for standard condition, optional for up to 3 non-standard conditions
	Unit power input in cooling mode	[W]	Mandatory for standard condition, optional for up to 3 non-standard conditions
	Water pressure drop in cooling mode	[kPa]	Mandatory for standard condition, optional for up to 3 non-standard conditions
	Heating capacity	[kW]	Mandatory for standard condition, optional for up to 3 non-standard conditions
	Unit power input in heating mode	[W]	Mandatory for standard condition, optional for up to 3 non-standard conditions
	Water pressure drop in heating mode	[kPa]	Mandatory for standard condition, optional for up to 3 non-standard conditions
	Airflow rate	[m3/h]	
	A-weighted sound power level	[dB(A)]	
TECHNICAL CHARACTERISTICS OF THE MODEL	Variable speed fan		- True - False
	Mounting base		- High wall - Floor mounted - Built-in-vertical - Cassette - Ceiling suspended - Built-in-horizontal
	Mounting option		Same as above – several choices are possible
	Main power supply		- 230-1-50 - 230-1-60
	Designation of speeds L|M|H		- 1|2|3 - R1|R2|R3 -A|C|F - 1V|4V|9V - 10%|40%|90% - 200|350|420 *(RPM)*
FACTORY	Factory code	-	Code related to the factory and visible on the nameplate: - ABC123 - ABC123 / DEF456
	Factory city	-	- Paris - Paris / Milano - …
	Factory country	-	- France - France / Italy - …

[3] For models using a controller, it's enough to declare only the RPM or only the voltage

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C.II. Form FCU-2 : Technical datasheet (TDS)

The form FCU-2 (Technical Data Sheet) to be filled in shall be sent by ECC to applicants/participants who have returned the form FCU-1 duly completed.

A template will be available for information and upon request.

C.III. Form FCU-3 : Software update record sheet

The form FCU-3 (Software update record sheet) shall be submitted by the Participant to inform ECC for the new software version certification. In case the ECC certified performances are affected with any of the modifications, the declarations shall be updated and submitted before the release of the new software.

A template will be available for information and upon request.

C.IV. Form FCU-4 : Test report result sheet

The form FCU-4 (Test report result sheet) shall be sent by ECC to applicants/participants together with the test report.

A template will be available for information and upon request.

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APPENDIX D. *EUROVENT CERTIFIED PERFORMANCE ENERGY EFFICIENCY LABEL FOR FAN COIL UNITS*

The provisions of the CM apply.
It is not mandatory to use the Eurovent Certified Performance energy efficiency labels, however it is highly recommended. High resolution files of these labels are available in the participant's restricted area on www.eurovent-certification.com, along with strict layout specifications.

Figure 3: Specimen of the FCU Energy Efficiency Labels – FOR CONSULTATION ONLY

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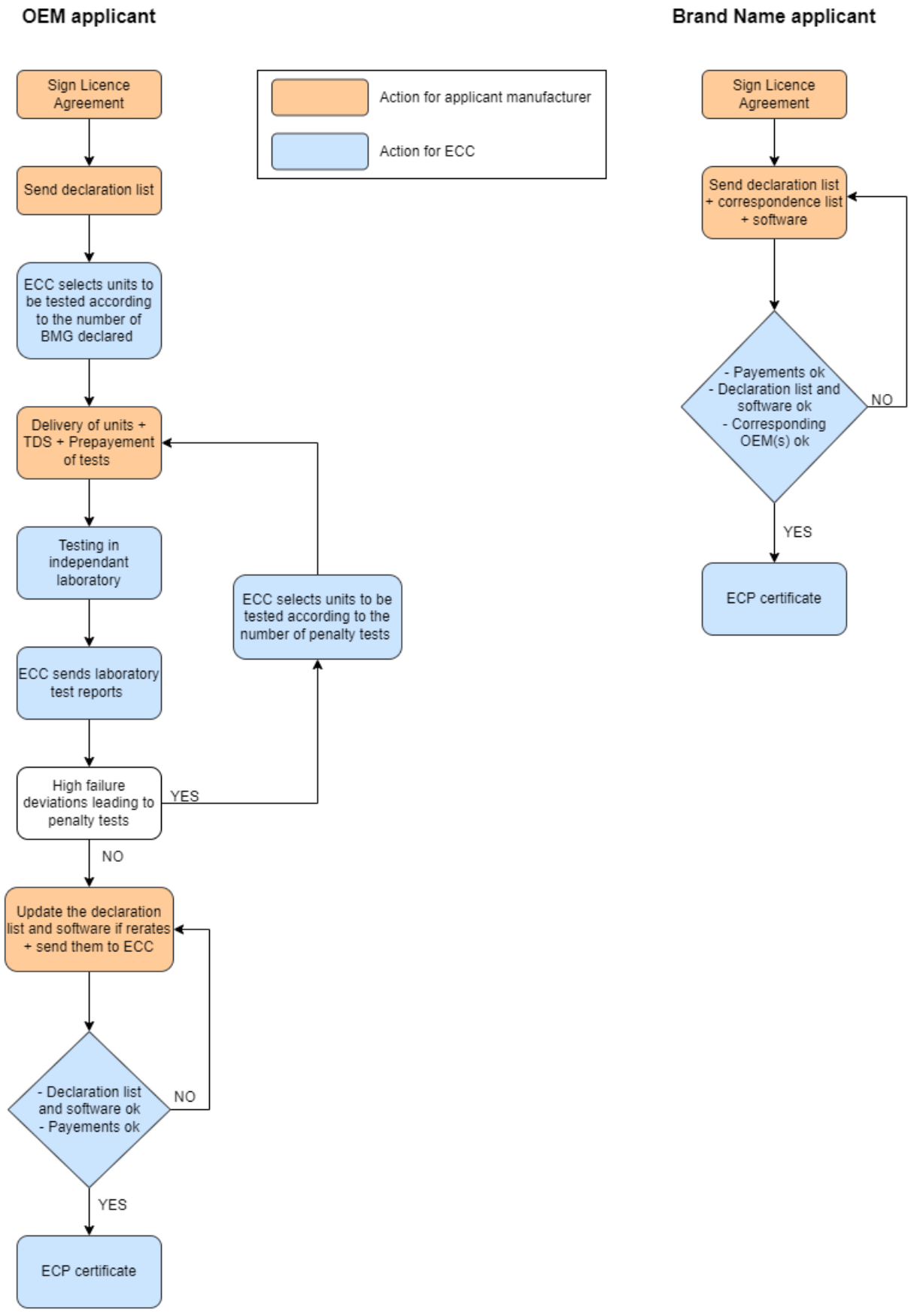
APPENDIX E. *CERTIFICATION PROCESS AND CAMPAIGN SCHEDULE*

E.I. Certification Procedures : Qualification



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E.II. Surveillance campaign schedule for OEM

1	Eurovent Certita Certification asks for up-date of product list	31/01/n
2	Participant confirms up-date of products list	28/02/n
3	Eurovent Certita Certification send the selection list for tests with the category in which each unit belongs. The difference between the two categories is the deadline of delivery.	31/03/n
4	The Participant confirms the selection list	15/04/n (1)
5	Delivery for the first category: Delivery of units + submittal form + order from Participant are completed	15/07/n (2)
6	Delivery for the second category: Delivery of units + submittal form + order from Participant are completed	15/09/n (2)
7	The Laboratory carries out all first tests for the first category	15/11/n (3)
8	The Laboratory carries out all first tests for the second category	31/01/n+1 (4)
9	Eurovent Certita Certification sends the test reports	2 weeks after reception of the laboratory report
10	The Participant can ask for a second test up to	1 month after reception of the results
11	Eurovent Certita Certification sends selection list for 2nd test(s)	-
12	Delivery + submittal form + order from Participant are completed for second test(s)	1 month after the answer of the participant
13	The Laboratory carries out all second tests for the first category	15/02/n+1 (5)
14	The Laboratory carries out all second tests for the second category	31/03/n+1 (5)
15	Delivery of the software (which includes rerates from the campaign n) + order from the participant are completed → ECC starts to check all the selection tools	31/08/n+1
16	ECC finishes to check all the selection tools	30/11/n+1
17	Diploma for test campaign n are valid until	15/12/n+1

E.III. Surveillance campaign schedule for Brand Names

1	Eurovent Certita Certification asks for up-date of product list	28/02/n
2	Participant confirms up-date of products list	31/03/n
3	Delivery of the software (which includes rerates from the campaign n) + order from the participant are completed → ECC starts to check all the selection tools	30/09/n+1
4	ECC finishes to check all the selection tools	15/12/n+1
5	Diploma for test campaign n are valid until	15/12/n+1

(1) Or two weeks after reception of the selection whichever is the latest.
(2) Or three months and a half after reception of the selection whichever is the latest.
(3) Or one month after step 5 is completed whichever is the latest.
(4) Or one month after step 6 is completed whichever is the latest.
(5) Or one month after step 12 is completed whichever is the latest.

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Performances on line
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