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**OPERATIONAL MANUAL
for the
CERTIFICATION
of
VARIABLE REFRIGERANT FLOW SYSTEMS**

OM-15-2017

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I. PURPOSE

The purpose of this manual is to prescribe procedures for the operation of the Eurovent Certita Certification programme for Variable Refrigerant Flow systems (VRF) in accordance with the Certification Manual.

II. SCOPE

II.1 General

The Certification Programme for VRF applies to single module outdoor units used in cooling-only, heating-only and reversible Variable Refrigerant Flow systems and is divided in two sub-programmes:

- VRF1: Air-sourced VRF systems
- VRF2: Water-sourced VRF systems

It can be chosen to apply to one or another or both sub-programmes.

Heat recovery units are included in the scope but the heat recovery function is not certified.

High ambient systems are included in the scope as an option (because not sold on the European market) but tested under standard conditions as specified in Rating Standard RS 6/C/008.

Are excluded from the scope:

- Multiple module outdoor units
- VRF systems with data declared and published as combinations of outdoor(s) + indoor(s).

II.2 Certify all for outdoor units

The programme covers all VRF systems from standard production with a cooling and heating capacity in standard conditions as given in the table 1:

Table 1: Testing limits for certified units

Capacity	Maximum number of connected indoor units	
	Ducted horizontal	Cassette
≤ 20 kW (in both modes)	4	2
20 (in one mode) < P ≤ 50 kW (in both modes)	4	-
50 (in one mode) < P ≤ 100 kW (in both modes)	8	8

II.3 Requirements for indoor units

For each outdoor unit, the declaration of one range of cassette indoors units and one range of ducted indoor units is mandatory.

The indoor unit range must be clearly identified on the declaration list. Declaration of additional ranges of cassette or ducted indoor units is voluntary.

III. BASIC OUTLINE OF THE PROGRAMME

Participation in Eurovent Certita Certification programme for Variable Refrigerant Flow systems consists of the following:

III.1 Application

The Applicant, after signing the License Agreement, shall send to Eurovent Certita Certification all information required for the qualification according to the Rating Standard RS/6/C/008:

- *Declaration and combination files: form VRF-1A and VRF-1B (see APPENDIX B) with all models within the scope.*
- *Declaration of factories : form VRF-4 (see APPENDIX B.V)*

The Participant shall send the appropriate technical documentation (means “commercially available” as defined in Certification Manual. and/or public hyperlink) and Eurovent Certita Certification will check the accordance between the file of combination and this technical documentation.

III.2 Qualifying procedure

Eurovent Certita Certification proceeds to selection based on the declaration and combination files and requests to the selected units delivery to the laboratory. The independent laboratory staff proceeds to products performance testing on the selected units according to the procedure detailed in § IV.3.

In the meantime, an auditor appointed by Eurovent Certita Certification shall audit the manufacturing site chosen by Eurovent Certita Certification (see IV.6).

The certification is granted on condition that:

- *If the aforementioned checks prove all the ranges compliance with the requirements specified in Rating Standard RS/6/C/008,*
- *All the other requirements from the present Operational Manual are fulfilled,*
- *The audit has been performed by the auditor and is successful or the corrective actions plan is considered satisfactory,*
- *all fees have been settled.*

If not, the procedure for failure treatment shall be applied.

III.3 Repetition procedure

Every year, Eurovent Certita Certification checks whether the performance of the products still meet the requirements.

- *Repetition tests in independent laboratory shall be conducted annually in compliance with the Certification Schedule (see APPENDIX A)*
- *Units selected from regular production shall be tested in the independent laboratory selected by Eurovent Certita Certification.*

For the repetition procedure the certification is renewed at the date specified in the Certification Schedules (see APPENDIX A) on condition that:

- *The previous test campaign (N-1) has been successfully completed*
- *The audit scheduled during the previous campaign has been performed by the auditor and is successful or the corrective actions plan is considered satisfactory;*

- *The product delivery together with the technical datasheet and the payment have been completed*

The company receives than a renewed certificate and the display of data is maintained on the Eurovent Certified Performance (ECP) website. If not, failure treatment shall be applied.

III.4 Failure treatment

When the test results *or the audit results* fail to comply with the requirements of the relevant Eurovent Certita Certification Rating Standard the failure treatment shall be applied. (see IV.4 and IV.6e)

III.5 Complaint procedure

Under special conditions a complaint procedure may be carried out as described in the Certification Manual.

IV. OPERATION OF THE PROGRAMME

IV.1 Declaration of data

a. Rated performance data

All characteristics and performance items shall be expressed in SI Units. Maximum of 3 significant figures shall be used for Outdoor capacity, $EER_{outdoor}$, $COP_{outdoor}$ and 2 significant figures for Sound power level.

b. Certification forms

Submittal for certification of models shall be sent by e-mail to Eurovent Certita Certification as .xls or .xlsx file.

Form VRF-1A will be used for the declaration of:

- outdoor models and its range,
- the ranges of combinable indoor units,
- data
- and mounting.

Each possible combination (Outdoor unit +Indoor units' ranges) has to be declared in accordance with the scope of the programme (Table 1). The mounting type (cassette or ducted) of indoor units shall be identified on the declaration file.

For models submitted by a private brand manufacturer (BN), the form will be used to identify the corresponding model number of the original equipment manufacturer.

Form VRF-1B will be used for declaring all the combinations of indoor units for every specific outdoor unit.

VRF-1B form must be completed for each different declared performance of each outdoor unit that the manufacturer has chosen to specify.

This form will indicate the limited quantity of combinations possible for test.

Each combination is composed by one outdoor unit (and its declared values) and associated indoor units:

- of the same mounting type: ducted horizontal or cassettes, (4-way, round flow or multi flows), no mix is allowed.
- within the same mounting type (ducted or cassette) of the same indoor units range.
- If a system capacity ratio of $100 \pm 5\%$ can be reached : the number of indoors as described in Table 1 shall be used all with the same size of indoor units
- if a system capacity ratio of $100 \pm 5\%$ with the same size indoor units cannot be reached: sizes as similar as possible with the number of indoor units as close as possible but not more than the prescribed number in Table 1 shall be used to meet the system capacity ratio within $100 \pm 5\%$
- duct horizontal with $ESP_{nom} \geq 25 \text{ Pa}$

Eurovent Certita Certification will check that the indoor unit combinations defined by the manufacturer in VRF-1B are the possible ones from the strict application of the combination rules taking into account the declared ranges of indoor units from VRF-1A.

All the possible combinations coming from the indoor units series included in VRF-1A must be included in VRF-1B form. Indeed, VRF-1B cannot be a partial declaration from the indoor unit series of the ones included in VRF-1A.

Technical Data Sheet and Additional Information Form: for models selected for test, Form VRF-2 has to be completed with technical description of all components along with declared data. Form VRF-3 shall also be completed and sent to Eurovent Certita Certification with a procedure explaining how to start the unit and to reach the proper frequency of the motor and including a contact person the laboratory can reach in case of problem.

Reporting of test result: for models tested, Form VRF-5 is sent by Eurovent Certita Certification, showing the deviations between claimed and measured data.

Response form after failure: For models which failed the test, Form VRF-6 is sent by Eurovent Certita Certification, showing the list of products affected by the failed test.

c. Reporting of models

Certified ratings for certification and publication on the Eurovent Certified Performances website shall be given only for outdoor units. The range of indoor units and their mounting type shall also be published on the ECP website.

Optional devices or accessories which are used to obtain the ratings of the basic unit assembly and which affect the ratings shall be included in the certification data. Systems having coils with both horizontal and vertical orientation, when ratings are different, shall be certified to reflect the capacity and efficiency ratings for both positions.

Besides current models, the Participants shall provide Eurovent Certita Certification with the list of:

- new models,
- deleted models,
- obsolete models.

d. Basic model group

Each Participant declaration list will be grouped in Basic Model Groups (BMG). The basic model group shall be defined by single module Outdoor units which are essentially the same in terms a rated capacity (5%) and function (cooling/ heating/ heat recovery) and the same or comparable in terms of basic components, specifically: fans, coils, expansion devices, compressors and motors.

Single-phase and three-phase outdoor models can belong to the same BMG, but are two different models.

IV.2 Selection of units to be tested

Within the programme, tests may be conducted under the following procedures:

- Scheduled tests in qualifying procedure
- Scheduled tests in repetition procedure
- Penalty tests
- Complaint tests

a. Number of units to be tested

Eurovent Certita Certification shall select outdoor models on the basis of its evaluation of an Applicant's declaration to establish suitable criteria of types and sizes to be tested. The number of outdoor units to be tested each year per participant shall be as follows:

- 8% (rounded up, at least 1) of the number of the listed basic model groups for each subscribed sub-programmes (VRF1 / VRF2).

- Example:

15 BMG for Air-sourced units → 2 Units to test

4 BMG for Water-sourced units → 1 Unit to test

Indeed, 3 units to test: 2 Air-sourced units and 1 Water-sourced unit.

b. Number and type of indoor units to be tested

For each outdoor unit with a rated capacity ≤ 100 kW selected by Eurovent Certita Certification for test, Eurovent Certita Certification shall select also among the possible combination declared in the Form VRF-1B, indoor units references to supply for the test.

c. Tested points

Regular tests:

- Thermal performances *at rating standard conditions* of the outdoor unit
- Sound Power level of the outdoor unit
- Power input and airflow (only for ducted) for the indoor units

“After testing” verification on units:

- Weight
- Dimensions of the casing (L x l x h)
- Airflow (could be check before regular tests)
- Number of rows and lines of the indoor heat exchanger
- Refrigerant type and charge

These kinds of verification are carried out once per manufacturer. In case of failure, see *IV.4b*.

d. Acquisition of unit

Deadline for delivery of units to the laboratory together with the technical forms duly completed, the starting procedure and the order is given in the Certification Schedule (see *APPENDIX A*).

If units, technical forms, starting procedures and orders are not delivered within the time limits specified in the notification received from Eurovent Certita Certification, it is considered as non-application of procedures (see Certification Manual dedicated chapter).

e. Selection and Shipment

Selected units shall be obtained either from the Participant production line or a stocking point, and then delivered to the Laboratory. Following completion of the tests, the Participant shall arrange for the shipment of the model.

All units with a rated capacity ≤ 100 kW (in both modes) shall be tested in an independent laboratory (approved and under contract with Eurovent Certita Certification).

The Laboratory shall have the responsibility of un-crating, handling, testing and re-crating the unit for shipment.

A contact person shall be designated by the Participant to organise the shipment to the laboratory, the laboratory shall inform him when the test is completed.

All transport fees shall be covered by the participant. The laboratory shall not engage any transport fees.

A trial testing campaign for seasonal performances for cooling and heating modes is organized during 2017 campaign following decisions taken from all compliance committee meetings held in 2016. (cf.Minutes from 29 september 2016)

IV.3 Tests at the laboratory

a. General

Units shall be installed in the test facility in accordance with the Participant published installation instructions. The Participant will provide the laboratory/test agency with full information about the installation, including at least the following items:

- any adjustment of the fan speeds (change of connector, switches, etc.);

- any change of the settings for any part of the unit (for instance, switch for floor/ceiling mounting, switch for cooling only/heat pump unit, etc.);
- standard air flow rate referred to standard air (air density = 1,204 kg/m³) for ducted units;
- exact location of the refrigerant piping, and position of distributor(s);
- minimum refrigerant piping length between the outdoor unit and each indoor unit (as indicated in the installation manual);
- any other information necessary to the correct installation of the unit.

The laboratory/test agency shall install and check out the units. The procedures used shall be in accordance with the Participant installation, start-up and service instructions.

Prior to the test, the Laboratory personnel are only allowed to:

- Repair leaks
- Repair or replace items damaged by shipping or handling
- Assure correct refrigerant charge
- Assure correct fan speed(s) where adjustable speed fans are used

Only very simple reparations can be performed by the laboratory. For other repair, a technician of the Participant shall be also present.

If the unit cannot be repaired, it shall be replaced by the Participant within 8 weeks.

It is highly recommended that a technician of the Participant be present at the laboratory to check the installation of the sample before starting the tests. Participant personnel are allowed to attend the setting-up and the starting of the unit but not the test itself and are not permitted in the laboratory test room facility.

If the test establishes a failure of the unit to meet one or more of the requirements of the Standard, the Laboratory or the independent agency shall promptly notify Eurovent Certita Certification. Eurovent Certita Certification or the Laboratory shall immediately contact the Participant regarding any further actions desired by the participant.

If the participant representative is still in the vicinity of the testing facility he is allowed to attend the dismantling of the unit.

When the unit is tested in an independent laboratory, the Participant shall inform Eurovent Certita Certification if he wants to attend the start-up, and the laboratory shall inform the Participant about the date the unit will be installed. Participant may review test results immediately after the test.

b. Report of tests results

Upon completion of the tests on each unit, the Laboratory will render its complete report as pdf file to Eurovent Certita Certification. Eurovent Certita Certification will send a copy of the report together with test result (Form VRF-5), and re-rating proposal (Form VRF-6) to the Participant.

c. Recovery of the unit

The Participant shall notify Eurovent Certita Certification within 4 weeks after receiving the test report if he intends to recover the tested unit. In case he doesn't, Eurovent Certita Certification will order the laboratory to dispose of the units and

invoice the participant the disposal fee (the certificate of disposal shall be issued to the participant).

The laboratory will prepare the unit for recovery, using as far as possible the original packing materials. If refrigerant has to be recovered prior to the collection, due to transport regulations, this will be done and a certificate from an authorized intallator will be issued.

The Participant has to recover its unit within 8 weeks after receiving the corresponding test report.

IV.4 Failure treatment

a. Component failure

If any functional component is inoperative, or the unit is damaged and cannot be repaired and tested at the Laboratory, the unit is considered as a “component failure”. The complete test shall then be carried out on the repaired unit or the new unit from the same basic model group. The new unit shall then be delivered within 8 weeks.

b. “After testing” verification failure

If one or several features “after checking” of the first unit are failed, the test results are rejected for the unit, and one compliant unit shall be delivered within 8 weeks. If it fails again, then another selected model of the campaign is verified.

If two fail, all further models of the campaign are verified. Manufacturers will be charged for this additional task.

c. General

If the value found by testing in the independent laboratory differs from the declared value by more than the acceptable tolerance (see Eurovent Certita Certification Rating Standard 6/C/008), the Participant has 4 weeks after notification of failure to select one of the following alternatives:

- Re-rate the products in accordance with the re-rating rules.
- Ask for a second test on the same unit.
- Ask for a second test on another unit of the same model selected by Eurovent Certita Certification.

d. Re-rating rules

The tested outdoor units shall be re-rated according to the test results and the following rules:

- In case of failure on efficiency only or capacity only, the power input of the outdoor unit shall be recalculated for all models in the same basic model group.
- In case of failure on efficiency or capacity, the efficiency and or capacity for all models in the same basic model group and shall be rerated by the deviation.
- For the outdoor sound power level, the tested outdoor unit shall be re-rated in accordance with the test result but, in addition, all outdoors in the same basic model group shall be re-rated by the deviation value minus 1 dB.

e. Second test

The Participant can ask for a second test on the same combination. The Participant may review test results after the first test and the test set-up prior to the second test as described above. During this test the Participant may be present to witness, but is not allowed to participate or interfere.

- If the second test is performed on the same combination (without any modification on the outdoor and indoor unit(s), and not leaving the laboratory), the Participant can choose to repeat only:
 - ♦ All thermal and pressure measurements
 - or
 - ♦ All sound measurements
- If the Participant had shipped back the combination, the complete test shall be carried out.

f. Penalty tests

If, during the test of one combination, more than one deviation exceeds the tolerance (see Rating Standard), one penalty test is asked.

An additional unit will be selected for the next test campaign in case of high deviation (see Rating Standard).

Penalty tests following a qualifying procedure need to be defined before the certification is granted.

IV.5 Repeated failures along the test campaigns

This paragraph refers to Article 102 of the Certification Manual Edition 12th.

The rules regarding Mean Value of Failure (MVF) are described in APPENDIX C.

IV.6 Factory audits

a. Purpose

The purpose of the audit is to verify that the outdoor and indoor units produced by the manufacturer match the units supplied by the participants to the independent test lab for testing and to check if the declared values match the data published by the manufacturer.

For applicants, the audit shall be carried out during the qualifying procedure after all the elements for the tests (Technical Data Sheet) have been provided to Eurovent Certita Certification.

b. General

Manufacturer will declare to Eurovent Certita Certification which factory (ies) are involved in the production of VRF systems in the same time as manufacture provide the updated declaration list.

Based on that, Eurovent Certita Certification will determine the site for audit and advise the audit agency.

Note: for the auditors safety prior to factory audit, the participant must provide in advance safety provisions to the auditor i.e. Safety Risk Assessment, Safety Needs including Equipment, etc. If these are not provided or confirmed, then the audit will not take place until they have been provided.

An observer, bounded to the respect of confidentiality (this observer is chosen by Eurovent Certita Certification by standards and agreements which he has signed), can take part to the audit. The holder is systematically informed by Eurovent Certita Certification of the presence of this observer prior to the audit.

The audits shall be ordered by Eurovent Certita Certification. The audit costs shall be paid by the manufacturer to Eurovent Certita Certification.

Manufacturer will declare to Eurovent Certita Certification any change in relation with VRF systems production: New plants, transfer of production ... etc.

One factory will be verified per year per manufacturer.

Even if a factory produces just a part of declared units, a global checking of data can be done, when technically possible (example: link between manufacturer catalogue and Eurovent declaration).

The factory must have resources required to conduct the audit in English.

The audit shall be complete in one day.

If audits are not conducted within the time limitations specified in the notification received from Eurovent Certita Certification, it is considered as non-application of procedures.

The auditor will check the complain registers concerning the certified products.

c. Verification of physical data

- model number from nameplate;
- check exterior dimensions;
- check motor nominal capacity;
- check fan type (brand and model), material, power input, number of blades;
- Weight
- Dimensions of the casing (L x l x h)
- Airflow & Available pressure of indoor coil
- Number of rows and lines of the indoor heat exchanger
- Refrigerant type and charge
- Any physical parameter involved in the performances of the unit.

d. Audit Report and Audit Conclusions

Based on the findings the agency will report compliance or non-compliance and any evidence that may affect conclusions of the manufacturer's level of responsibility. The independent agency shall send an Audit Report to Eurovent

Certita Certification. Eurovent Certita Certification Technical Department shall communicate audit conclusions and report to the manufacturer.

In case of *non-conformity*, the manufacturer shall send within twenty working days after the transmission of the Audit Report any mitigating circumstances to Eurovent Certita Certification Technical Department. Then, the manufacturer shall receive the Audit Conclusions including whether or not the *non-conformity* is the manufacturer's responsibility.

Definitions

C = Critical *non-conformity*:

- that significantly affects the participation to the Certification Programme within Eurovent Certita Certification.
- that, while not jeopardizing a substantial participation in the Certification Program, gives evidence of *non-conformity* that must be solved to ensure that the products comply with the stated requirements.

NC= Non critical *non-conformity* :

Situation of a formal misalignment with little or no impact on Certification Program.

Audit *non-conformities*

The following audit *non-conformities* can be reported:

Critical non-conformities:

- Unrealistic declaration: The Manufacturer has no evidence of invoices (or other formal documents) from the previous year for the checked listed model. This *non-conformity* is not relevant for new products declared during the year of the audit.
- Discrepancies in BOM: One or more component(s) described in the production BOM don't match with declared Data of Record for a specific listed model checked.

Non critical non-conformities:

- Lack of documents: The Auditor requires clarification about one component described in the production BOM that the manufacturer doesn't have available to compare with declared Data of Record for a specific listed model checked.
- Lack of Eurovent Certita Certification evidence: The label used in Technical or Commercial documentation is not according to Certification Manual..
- If not solved from previous audit, a *non critical non-conformity* becomes a *critical non-conformity*.

e. **Failure treatment**

In case of *non-conformity*, Eurovent Certita Certification shall initiate the appropriate failure treatment procedures. The outcome of the failure treatment procedures may be that the *participant* is suspended *temporarily* from certification

The Audit failure treatment consists of the following:

- In case of *non critical non-conformity* or *critical non-conformity*, the manufacturer shall send Eurovent Certita Certification the corrected documentation or figures within 1 month.

Moreover, the participant is notified by Eurovent Certita about its loss of points according to § VIII.4 of Certification Manual.

- In case of violation of rules, the participant is suspended *temporarily*.

f. **Non-application of procedures**

In case of non-application of procedures, the Participant shall be notified by Eurovent Certita Certification that his company name and associated complete list of products will be withdrawn from the website, within one month, *during suspension period* (see Certification Manual for more details).

V. **PROMOTION OF THE PROGRAMME**

This section refers to section VI of the Certification Manual.

V.1 **By Eurovent Certita Certification**

The certified data of the certified products are published on our website: www.eurovent-certification.com.

Eurovent Certita Certification will supply, on request, to any interested party, the current status of any Participant or of any model (new, deleted or obsolete).

The following information pertaining to each model certified shall be published on the website for VRF:

- Name of Company
- Trade or brand name of model
- Model number or designation of the outdoor unit
- Name of indoor unit range(s)
- Total Outdoor cooling capacity at design condition
- Total Outdoor heating capacity at design condition
- Effective power input (cooling and heating) at design condition
- Outdoor EER and COP at full load conditions
- A-weighted outdoor side sound power
- A-weighted sound power radiated from the duct (ducted units)
- Refrigerant line
- Main Power Supply
- Refrigerant fluid.
- Mounting type

Performance data shall be given at the nominal fan speed.

By default, each participant of the present programme is also a participant of the European Heat Pumps (Euro HP) programme for all products certified under the present programme and falling under the scope of the Euro HP Operational Manual (OM-17-2016). European

Heat Pumps certification may however be limited by the participant to specific ranges or models, using the relevant Declaration list; it may also be refused by the participant for all his products, using a waiver to be signed and sent out to Eurovent Certita Certification.

V.2 By Participants

Please refer to the Certification Manual.

APPENDIX A. Certification schedule and timeframes

For each repetition test campaign (year n), the following schedule shall be applied:

Eurovent Certita Certification asks for up-date of product list	15/10/n-1
Participant confirms up-date of products list	31/10/n-1
Website updated (with list validated by Participant 1 week before)	30/11/n-1
Eurovent Certita Certification sends selection list for test	15/11/n-1
The Participant confirms selection list	30/11/n-1
<i>TDS + payment + starting procedure are completed + audit is scheduled</i>	15/03/n
<i>Delivery</i>	30/04/n (≤ 50 kW)
	31/05/n (> 50 kW)
Auditors undertakes manufacturing facility visits	Between 15/04/n and 30/09/n
Diploma for test campaign n are valid until	31/07/n+1
Eurovent Certita Certification sends the Audit report	One week after the visit
The Laboratory carries out all first tests by	30/11/n
Eurovent Certita Certification sends the test reports	5 days after reception of the laboratory report
The Participant can ask for a second test up to	one month after reception of the test results
Delivery + TDS + payment + starting procedure are completed for second test(s)	one month after the request for a second test
The Laboratory carries out all second tests	28/02/n+1

APPENDIX B. FORMS

B.I. Form VRF-1A: Declaration file by Original Equipment Manufacturer

	Label	Description	Unit
GENERIC	Product Number	(see Certification Manual)	-
	Master product number		
	Tested on		
	Rated on		
	Created on		
	Last update on		
	Status		
	Participant Name		
	Product Name		
	Trade Name		
	Type of product		
	Range Name		
BMG			
THERM	P _{Cout}	Outdoor Cooling Capacity	kW
	EER _{out}	Outdoor Energy Efficiency Ratio	-
	Ph _{out}	Outdoor Heating Capacity	kW
	COP _{out}	Outdoor Coefficient of Performance	-
SOUND	LwO env	A-weighted sound power level outdoor unit (non ducted)	dB(A)
	LwO duct	A-weighted sound power level outdoor unit (ducted)	dB(A)
GENERAL	Inverter	Inverter	-
	MPS	Main Power Supply Voltage (V) - Phase - Frequency (Hz)	-
	Refrigerant	Refrigerant. E.g.: R410A, R407C.	-
	Capacity Control	Fixed, Staged, variable	-
	Compressor Type	Scroll, Screw, Reciprocating, Centrifugal	-
	Compressor motor type	AC, AC Inv, DC inv..	-
	Outdoor Heat Exchanger Type	Plate, micro channel, finned tube...	-
	Outdoor Heat Exchanger Width	Outdoor Heat Exchanger Width	mm
	Outdoor Heat Exchanger Length	Outdoor Heat Exchanger Length	mm
	Outdoor Heat Exchanger Height	Outdoor Heat Exchanger Height	mm
	Outdoor unit Weight	Outdoor unit Weight	kg
	Nb of rows of the Outdoor HE	Nb of rows of the Outdoor Heat Exchanger	-
	Nb of lines of the Outdoor HE	Nb of lines of the Outdoor Heat Exchanger	-
	Range(s) of indoor units	Range name(s) of indoor units	-
	Mounting type of indoor unit	One mounting type for the indoor units [ducted or cassette]	-

B.II. Form VRF-1B: Example of Combination file by Original Equipment Manufacturer

	PC _{out}	EER _{out}	...	Indoor Unit combinations		Air flow	IU Dimensions
Outdoor Unit 1	X.X	Y.Y	...	1	2x CAS1-(size1) XYZ	A.A	D x D x D
				2	4x DUCT1-(size1) XYZ	B.B	E x E x E
			
				n	4x DUCTn-(size 2) XYZ	C.C	F x F x F
	X.X	Z.Z	...	...	...	...	...
Outdoor Unit 2	Q.Q	R.R	...	...	...	...	...
Outdoor Unit 3	...	...	...	...	...	...	...

B.III. Form VRF-2: Technical Data Sheet

Technical Data Sheet shows all information of Declaration file, to which will be added:

	Label	Description	Unit
GENERAL	Unit Length	Unit length	mm
	Unit Height	Unit height	mm
	Unit Width	Unit width	mm
	Total Charge	Total charge	kg
	Weight of the Outdoor Unit	Outdoor Unit weight	kg
	Attendance	According to OM-1 Chapter IV paragraph c rules [true/false]	-
	Compressor Manufacturer	Compressor manufacturer	-
	Compressor Model	Compressor model	-
	Contact Name	Contact name	-
	Contact Title	Contact title	-
	Expansion Device Location	Expansion device location [outdoor/indoor]	-
	Expansion Device Type	Expansion device type	-
	Heating Mode Minimum Temperature	Heating mode minimum temperature	°C
	Mounting of the Indoor Units	Mounting of the indoor units	-
	System capacity ratio	System capacity ratio	-
	Indoor 1 Name	Name	-
	Indoor 1 Heat Exchanger Type	Plate, micro channel, finned, shell- and-tube	-
	Indoor 1 Heat Exchanger Width	Indoor Heat Exchanger Width	mm
	Indoor 1 Heat Exchanger Length	Indoor Heat Exchanger Length	mm
	Indoor 1 Heat Exchanger Height	Indoor Heat Exchanger Height	mm
	Indoor 1 Heat Exchanger Weight	Indoor 1 Heat Exchanger weight	kg
	Indoor Coil 1 Air Flow	Air flow rate indoor coil	m ³ /s
	Indoor Coil 1 Available Static Pressure	Available pressure indoor coil	Pa
	Indoor Coil 1 Length	Indoor coil 1 length	mm
	Indoor Coil 1 Height	Indoor coil 1 height	mm
	Indoor Coil 1 Width	Indoor coil 1 width	mm
	Indoor Coil 1 Fan Motor Type	Fan motor type (DC INV, AC INV, AC LARGE SLIP)	-
	Indoor Coil 1 Fan Type	Fan type	-
	Indoor Coil 1 Fin Spacing	Fin spacing	-
	Indoor Coil 1 Fin Type	Fin type	-
	Indoor Coil 1 Number of Fan	Number of fans	-
Indoor Coil 1 Number of Circuit	Number of circuits	-	

Indoor Coil 1 Number of Row	Number of rows	-
Indoor Coil 1 Tube Pitch	Tube pitch	mm
Indoor Coil 1 Row Pitch	Row pitch	mm
Indoor Coil 1 Tube Outside Diameter	Tube outside diameter	mm
Indoor Coil 1 Tube Type	Tube type	-
Indoor Coil 1 Number of Rows	Indoor Coil 1 Number of Rows	-
Indoor Coil 1 Number of Lines	Indoor Coil 1 Number of Lines	-
Indoor 2 Name	Name	-
...		
Indoor Coil 2 Tube Type	Tube type	-
Indoor 3 Name	Name	
...		
Indoor Coil 3 Tube Type	Tube type	-
Indoor 4 Name	Name	-
...		
Indoor Coil 4 Tube Type	Tube type	-
Outdoor Coil Air Flow Rate	Air flow rate outdoor coil	m ³ /s
Outdoor Coil Available Static Pressure	Avialable Pressure outdoorcoil	Pa
Outdoor Coil Length	Coil length	mm
Outdoor Coil Height	Coil height	mm
Outdoor Coil Width	Coil width	mm
Outdoor Coil Fan Type	Fan type	-
Outdoor Coil Fin Spacing	Fin spacing	mm
Outdoor Coil Fin Type	Fin type	-
Outdoor Coil Number of Circuit	Number of circuits	-
Outdoor Coil Number of Fan	Number of fans	-
Outdoor Coil Number of Row	Number of rows	-
Outdoor Coil Tube Pitch	Tube pitch	mm
Outdoor Coil TRow Pitch	Row pitch	mm
Outdoor Coil Tube Outside Diameter	Tube outside diameter	mm
Outdoor Coil Water Flowrate Heat mode	Outdoor coil water flow rate heating mode	m ³ /s
Outdoor Coil Fan Motor Type	Outdoorcoil fan motor type	-
Outdoor Coil Tube Type	Outdoorcoil tube type	-
Refrigerant Line Outside Ø (liquid)	Refrigerant line outside diameter liquid (split system)	mm
Refrigerant Line Outside Ø (vapour)	Refrigerant line outside diameter vapour (split system)	mm
Remote Control Box	Remote control box [true/false]	-
Water Cooled Condenser Manufacturer	Manufacturer	-
Water Cooled Cond. Pump Included	Pump included [true/false]	-
Water Cooled Condenser Reference	Water cooled condenser reference	-
Water Cooled Condenser Type	Water cooled condenser type	-
Water Flow Rate Outdoor Coil at 30°C	Water flow rate outdoor coil at 30°C	m ³ /s
Water Flow Rate Outdoor Coil 30/35 °C	Water flow rate outdoor coil at 30/35 °C	m ³ /s

B.IV. Form VRF-3: Start Up Procedure Form

ADDITIONAL INFORMATION FORM

This form is to be completed for inverter AND non-inverter models.

Test Number	
Model	

1. Participant technical contact person

In order to be able to quickly solve starting-up problems, the laboratory needs to have data of a technical contact. Please fill the table below.

Name	
Telephone number	
E-mail address / fax number	

2. Fan speeds and compressor frequencies

The following data will help the laboratory to check that the unit is running in TEST MODE. It is highly recommended to fill the table below for inverter models.

	Model	Fan speed [rpm]		Compressor frequency [Hz]	
		Cooling	Heating	Cooling	Heating
Outdoor Unit					
Indoor Unit 1					
Indoor Unit 2					
Indoor Unit 3					
Indoor Unit 4					

3. Has the laboratory to apply a specific start-up procedure to achieve the rated capacities? (No test will be performed without answer to this question)

YES | NO

4. Start-up procedure for standard rating conditions

Note: Once frequencies and expansion valves opening are fixed, no further changes will be allowed until test completion.

If answer to clause 3 is YES, a detailed start-up procedure shall be attached to this form.

VERY IMPORTANT: If a start-up procedure is attached, it shall be drafted with enough details to ensure the laboratory personal will be able to set the unit at the first try. In particular, special care shall be given to the following items:

- Initial state of the following items (before starting the configuration):
 - wired/remote controller model status(ON or OFF)
 - appliance status (ON or OFF)
 - mode (cooling, heating, ventilation, auto, etc.)
 - room temperature range requirements (if yes, please specify clearly), temperature requirements cannot be closer than ± 2 K from the rating conditions.

In addition:

- Indicate if the remote controller shall be configured with the indoor unit(s) receiving or not the signals from the remote controller.
- When entering TEST MODE, indicate if the appliance will give a feedback (acoustic or visible) to acknowledge the setting.
- Indicate the louver position, and the method to reach it. If necessary, a drawing may be useful.
- For multisplit systems, please clearly specify if the starting procedure has to be performed for all indoor units at the same time, or in which order.

5. Time before beginning of the measurement period

Please note that the measurement period will begin 60 min (cooling mode) or 70 min (heating mode) after starting the unit. **This means that the unit shall be running in TEST MODE by that time.**

6. Default start-up procedure for standard rating conditions

When there are no details on start-up supplied with the units, the normal start-up procedure used by the laboratory will be as follows:

COOLING CAPACITY TESTING AND SOUND POWER DETERMINATION

Configuration of the remote controller:

- Mode: Cooling mode*
- Temperature set: Minimum allowed by remote controller without including special modes like LOW temperature function.
- Fan speed: Maximum allowed by remote controller without including special modes like TURBO mode.
- Louver: Maximum airflow position**

HEATING CAPACITY TESTING

Configuration of the remote controller:

- Mode: Heating mode*
- Temperature set: Maximum allowed by remote controller without including special modes like HIGH temperature function.
- Fan speed: Maximum allowed by remote controller without including special modes like TURBO mode.
- Louver: Maximum airflow position**

*Any other functions, like eco mode, display backlighting, ionizer, etc will be kept as default after inserting the batteries in the remote controller or switching the power on for wired remote controllers.

**The louver position for maximum airflow is only checked visually so there is a risk not to exactly be in the maximum airflow position.

Contacts in CEIS laboratory:

Ms Pilar Garcia – pgarcia@ceis.es

Mr Julio CONDE – jconde@ceis.es

B.V. Form VRF-4: Factory Declaration

PARTICIPANT / APPLICANT: name of company

	Name of the factory	Complete address	Country	Production (Outdoor unit / Indoor unit / Ranges / all products)	Already visited for other Eurvent certita Programme (NF PAC...)
1					
2					
3					
4					
5					
6					
7					

B.VI. Form VRF-5: Test result form

REPORTING OF TEST RESULT										
GENERIC		Test key: Created on: Last update on: Status:								
MANUFACTURER		Participant key: Participant name:								
MODEL		Model key: Model name: Product type: Serial number:								
TEST		Programme - Sub-programmes: Variable Refrigerant Flow System Date of reception of the unit: Date of reception of test report: Unit tested on:								
RESULT DETAILS										
					Measurement		MFV		High failure	
APPLICATION	Thermal	Measured	Declared	Deviation	Limit	Result	Limit	Result	Limit	Result
P _{cool} outdoor	kW				-0.08		0.12		0.12	
EER _{outdoor}	-				-0.10		0.12		0.12	
P _{heat} outdoor	kW				-0.05		0.12		0.12	
COP _{outdoor}	-				-0.08		0.12		0.12	
P _{cool} outdoor	kW									
P _{heat} outdoor	kW									
APPLICATION	Acoustic				Limit	Result	Limit	Result	Limit	Result
L _w env	dB(A)				0		3		3	
TEST CONCLUSION										
					Test		MFV		High failure	

B.VII. Form VRF-6: Re-rate form

PROPOSAL OF RERATE	
GENERIC	Rerate key: Created on: Last update on: Status:
MANUFACTURER	Participant key: Participant name:
TEST	Test key: Unit tested on:

APPLICATION Thermal

DECLARED												
Product key	Product name	Type of product	Range name	BMG	Perf 1.1	Perf 1.2	Perf 1.3	Perf 4.4				
RERATED												

APPLICATION Acoustic

DECLARED									
Product key	Product name	Type of product	Range name	BMG	Perf 2.1				
RERATED									

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LEGEND		
Code	Name	Component type
Perf. 1.1	EERoutdoor	Product type
Perf. 1.2	COPoutdoor	Product type
Perf. 1.3	Pacoutdoor	Product type
Perf. 1.4	Pahoutdoor	Product type
Perf. 2.1	LwO env	Component type

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APPENDIX C. Calculation method and implementation of MVF

C.I. General

Refer to Certification Manual.

Mean Value of Failure (MVF) is equal, for each manufacturer, to the ratio between the total number of measurements above the “High deviation limit” (see table below) and the total performed measurements in the considered years.

$$\text{MHFV} = \frac{\sum \text{Number of measurements failed with high deviation}}{\sum \text{Number of measurements performed}}$$

Mean High Failure Value Number of considered years Number of considered years

When there is a second test on a unit, then the first measurements are not taken into account.

A manufacturer is *suspended* from the Eurovent Certita Certification programme for one year if, for at least one considered characteristic, the mean value of MVF is higher than the limits.

Current failure treatment (re-rating and additional tests) still applies above the tolerance (see IV.4).

Test campaigns to be considered			Qualifying test campaign + first repetition test campaign or last three testing campaigns if available
Performance item	Tolerance	High deviation limit	Limits for being expelled z MHVF > ...
Pc	See RS 6/C/008		> 30 %
Ph			> 50 %
EER			> 30 %
COP			> 50 %
Lw			> 50 %

C.II. Notification of being *suspended*

A participant who is going to be *suspended* will receive a notification from Eurovent Certita Certification, with a possible additional selected unit to be tested. The purpose of this additional test is to give the participant the opportunity to comply with the limits. The response to Eurovent Certita Certification with confirmation of request for additional testing has to be done within 30 days after this notification, and the unit has to be delivered within 45 days after this notification.