



RS 6/C/008-2016

Published February 2016

RATING STANDARD
for the
CERTIFICATION
of
**VARIABLE REFRIGERANT FLOW
SYSTEMS**

RS 6/C/008-2016

Published February 2016

Supersedes RS 6/C/008-2013 (Dec 2013)

Editing (date):	Arnaud Lacourt	19 March 2015
Checking (date):	Jean FOURCROY	10 February 2016
Approval (date):	Compliance Committee for VRF	12 November 2015
Approval (date):	CPPC	20 January 2016
Comes into effect from:		18 February 2016

Modifications as against previous version

No.	Modifications	Section	Page
1	Removing of the mentions to Participant laboratory	V	8
2	Tolerances for additional verification by Lab	VII	7

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

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

Tel: +33 1 75 44 71 55
E-mail: a.lacourt@eurovent-certification.com

TABLE OF CONTENTS

I. PURPOSE	4
II. SCOPE	4
III. DEFINITIONS	4
IV. TESTING REQUIREMENTS	4
IV.1 Reference standard regarding thermal performances	4
IV.2 Additional requirements regarding thermal performances	4
IV.3 Testing conditions for thermal performances	5
IV.4 Reference standard regarding acoustical testing	5
IV.5 Additional requirements regarding acoustical testing - principles	5
V. RATING REQUIREMENTS	5
VI. CERTIFIED PERFORMANCE	6
VII. TOLERANCES	7

I. PURPOSE

The purpose of this standard is to establish definitions and specifications to be used in connection with the Eurovent Certita Certification programme for Variable Flow Refrigerant systems.

II. SCOPE

The scope of the programme is defined in OM-15.

III. DEFINITIONS

Definitions given in EN 14511-1:2013 and EN 14511-3:2013 Annex I apply.

IV. TESTING REQUIREMENTS

Standard ratings shall be established at the standard rating conditions specified in Section V. All standard ratings shall be verified by tests conducted in accordance with the following standards:

IV.1 Reference standard regarding thermal performances

Performance testing using the calorimeter room method: **EN 14511-3:2013** “Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling”.

Performance testing using the air enthalpy method: **EN 14511-3:2013** “Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling”

IV.2 Additional requirements regarding thermal performances

The tests shall be carried out at 230 V for one phase units and 400 V for three phase units, with the rated frequency of 50 Hz.

The indoor units shall be verified against the values claimed by the Participant, preferably prior to the installation:

- | | |
|---|--------|
| a) Indoor Power input | + 10 % |
| a) Indoor Airflow (only for ducted units) | + 10 % |

If one of the measurements is out of these tolerances, the laboratory will immediately contact the manufacturer and solution shall be found by the manufacturer within 4 weeks.

The periodic refrigerant recovery function of the VRF system shall be disabled during the tests.

As 5 m or even 7.5 m might be too short for some VRF systems, the length on the refrigerant piping between the outdoor and each indoor unit shall fulfil the requirements of the manufacturer (i.e. the length can be greater than 7.5 m if required in the installation manual of the VRF system).

IV.3 Testing conditions for thermal performances

Tests shall be carried out at the following testing conditions.

Table 1: Operating conditions for standard rating air cooled unit

	INDOOR UNIT		OUTDOOR UNIT	
	Air entering °C		Air entering °C	
	Dry bulb	Wet bulb	Dry bulb	Wet bulb
Cooling mode	27	19	35	24-
Heating mode	20	15 max	7	6
Sound	27	19	35	-

Table 2: Operating conditions for standard rating water cooled unit

	INDOOR UNIT		OUTDOOR UNIT	
	Air entering °C		Water °C	
	Dry bulb	Wet bulb	Inlet	Outlet
Cooling mode	27	19	30	35
Heating mode	20	15 max	10	7
Sound	27	19	30	35

IV.4 Reference standard regarding acoustical testing

EN 12102:2013 “Air conditioners, liquid chilling packages, heat pumps and dehumidifiers with electrically driven compressors for space heating and cooling - Measurement of airborne noise - Determination of the sound power level” with exception of the duct end correction method described in section 6.2.2 of this standard. Specifications concerning temperature conditions of units for acoustical testing are defined in *Table 1* and *Table 2*, to be performed in cooling mode.

IV.5 Additional requirements regarding acoustical testing - principles

Piping length shall be as close for the sound testing than for the cooling test. The VRF system shall be running in the same conditions of fan speed, water or air flow rates, compressor frequency, etc than during the measurement of the cooling capacity; this applies for the outdoor as well as for the indoor units.

Tests should be performed in a reverberation room (EN 12102 and EN ISO 3741) or anechoic chamber depending of the available facilities.

V. RATING REQUIREMENTS

Rating requirements are in accordance with **EN 14511-2013**.

Standard rating conditions in Table 1 and 2 shall be used.

The corrections of the total cooling capacity or heating capacity due to the power input of fans for indoor units with duct connection described in EN 14511-3 clause 4.1 shall not be carried out.

VI. CERTIFIED PERFORMANCE

The following performance items shall be verified by tests:

- a) Outdoor cooling capacity at standard conditions
- b) Outdoor Heating capacity at standard conditions
- c) Outdoor Energy Efficiency Ratio in cooling EER
- d) Outdoor Coefficient of Performances in heating COP
- e) A-weighted sound power level outdoor side (for non-ducted units) or A-weighted sound power level radiated from the outdoor side duct (for ducted units)

Note: All performance items are defined for a system capacity ratio equals to 100 %.

VII. TOLERANCES

When the connection ratio is below 1 the deviation on capacity is calculated with the following formula:

$$\text{Deviation} = \frac{\frac{\text{Measured capacity system}}{\text{Capacity ratio}} - \text{Declared capacity}}{\text{Declared capacity}}$$

When tested in the Eurovent Laboratory the characteristics obtained shall not differ from the values claimed in the Participant literature by more than:

		Tolerance from 2016	High deviation¹
Outdoor Capacity (cooling & heating)		-8 %	- 12 %
Outdoor Efficiency (EER, COP)		-10 %	-12 %
A-weighted sound power level		+ 2 dB(A)	+ 3 dB(A)

	Tolerance
<i>Weight</i>	5 %
<i>Dimensions of the casing (L x l x h)</i>	5 %
<i>Air flow</i>	10 %
<i>Number of rows and lines of the indoor heat exchanger</i>	0

¹ leading to penalty tests, see OM-15, § dedicated to Failure treatment, Penalty tests.