



OM-2-2017

Published May 2017

**OPERATIONAL MANUAL
for the
CERTIFICATION
of
HEAT EXCHANGERS**

OM-2-2017

Published May 2017

Supersedes OM-2-2016 (April 2016)

Editing (date):	Véronique NOËL	7 March 2017
Checking (date):	Jean FOURCROY	3 May 2017
Approval (date):	Compliance Committee HE CPPC	7 March 2017 18 April 2017
Comes into effect from:		May 2017

Modifications as against last version:

No.	Modifications	Section	Page
1	Clarification of the scope regarding Dry Coolers: liquids that are covered	II	4
2	Clarification concerning the declaration	IV.1 b	6
3	Clarification of the definition of n (number of selected units)	IV.2 a	6
4	Clarification of the test conditions for Dx Air Coolers	IV.2 c	7
5	Amendment to the provision for the penalty tests	IV.2 a. and IV.5 g	7 and 10
6	Update and clarification of the failure treatment	IV.5 a, b and e	8 and 9
7	Modification of the provision if more than one third failure during the qualifying procedure	IV.5 e	9
8	Introduction of high failure for acoustic performances +3 dB(A)	IV.5 g	10
9	Update of the list of certified data published on ECP website	V.1	10
10	Editorial modifications	Appendix A Appendix D.1	12 14
11	Update of the templates for the declaration list	Appendix F	16
12	Removal of the test results form	Appendix F.IV. Form HE-5	20

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Published by Eurovent Certita Certification SAS
48-50 rue de la Victoire - 75009 Paris, France
Tel: +33 1 75 44 71 71
E-mail: v.noel@eurovent-certification.com

TABLE OF CONTENTS

I. PURPOSE	4
II. SCOPE	4
III. BASIC OUTLINE OF THE PROGRAMME	5
III.1 Application	5
III.2 Qualifying procedure	5
III.3 Repetition procedure	5
III.4 Failure treatment	5
III.5 Complaint procedure	5
IV. OPERATION OF THE PROGRAMME	5
IV.1 Declaration of data	5
a. Rated performance data	5
b. Certification forms	6
IV.2 Selection of units and conditions to be tested	6
a. Number of tests	6
b. Modularity	7
c. Test conditions for Dx Air Coolers	7
IV.3 Delivery of units	7
a. Connection for Dry coolers	7
b. Specifications regarding variable speed fans	7
c. Time limitation of acquisition of unit	7
IV.4 Tests at the laboratory	8
a. General	8
b. Report of tests results	8
IV.5 Failure treatment	8
a. Reasons of failure	8
b. Component failure	8
c. <i>Dimensions and number of fins</i>	9
d. General	9
e. Unit failure	9
f. Re-rating procedure	9
g. Penalty tests	10
V. PROMOTION OF THE PROGRAMME	10
V.1 By Eurovent Certita Certification	10
V.2 By Participants	11
a. Display of certification symbol on literature, software and advertising	11
b. Display of certification symbol on production units	11
APPENDIX A. CAMPAIGN SCHEDULE	12
APPENDIX B. CAPACITY LIMITS OF LABORATORY	12
APPENDIX C. MODULARITY	12
APPENDIX D. EUROVENT CERTIFIED PERFORMANCE MARK AND ENERGY EFFICIENCY LABEL	14
D.I. Eurovent Certified Performance mark	14
D.II. Eurovent Certified Performance energy efficiency label	14
APPENDIX E. REPEATED TREATMENT OF FAILURES	15
APPENDIX F. FORMS	16
F.I. Form HE-0: Declaration file for certification	16
F.II. Form HE-3: Technical form for unit to be tested (technical data sheet)	18
F.III. Form HE-5: Test rerate form (example: Dry coolers)	19

I. PURPOSE

The purpose of this manual is to prescribe procedures for the operation of the programme for Heat Exchangers, in accordance with the Certification Manual.

II. SCOPE

The programme for Heat Exchangers applies to 3 types of products using axial flow fans in the following groups:

- Direct Expansion Forced Convection Unit Air Coolers for Refrigeration, designated as “Dx Air Coolers”;
- Forced Convection Air Cooled Condensers for Refrigeration, designated as “Air Cooled Condensers”;
- Forced Convection Air Cooled Liquid Coolers, designated as “Dry Coolers”.

The programme for Heat Exchangers is applicable to Dx Air Coolers and Air Cooled Condensers using the refrigerants that are listed below:

R404A
R134a
R507A
R407A
R407C
R407F

The programme for Heat Exchangers is applicable to Dry Coolers using the liquids that are listed below:

<i>Water</i>
<i>Water + Ethylene Glycol from 34 %</i>

The following products are excluded from the programme:

- Products using centrifugal type fans
- Product ranges of Dx Air Coolers with maximum standard capacity SC2 below 1.5 kW
- Product ranges of Air Cooled Condensers with maximum standard capacity under TD1 15 K is below 2.0 kW
- Liquid sub-coolers
- Units working at 60 Hz
- Cooling and Heating Coils are subject of another specific certification programme (OM-9 and RS 7/C/005) so they are excluded from the scope of the programme for Heat Exchangers.

“Certify-all” requirement: Whenever a company participates in the programme for Heat Exchangers, all standard Dx Air Coolers, Air Cooled Condensers, Dry Coolers, promoted by the applicant/participant to end-users, specifiers, trading companies, contractors by means of paper or electronic catalogue, price list or selection software within the scope of the programme, shall be certified, in accordance with the relevant Rating Standard. This includes all models in modular ranges. In the case of Heat Exchangers, certify-all requirement as defined in the Certification Manual is applicable not only to the European market but worldwide.

III. BASIC OUTLINE OF THE PROGRAMME

Participation in the programme consists of the following:

III.1 Application

After signing the License Agreement, the Applicant has to submit a declaration list with all models that comply with the Rating Standards 7/C/008.

III.2 Qualifying procedure

When the declaration file is completed, units selected by Eurovent Certita Certification shall be tested in an Independent Laboratory selected by Eurovent Certita Certification. If the tests show conformity with the relevant Rating Standards, certification is granted until delivery deadline of next testing campaign + 3 months. The performance of the qualifying tests shall be completed within maximum 3 years: one group of Heat Exchangers tested per year, in liaison with the annual testing campaign. At the end of each year of testing, a diploma will be issued for (the) tested groups of Heat Exchangers.

III.3 Repetition procedure

Every year, Eurovent Certita Certification checks whether the performances of the products still fulfil the requirements, in accordance with the campaign schedule (Appendix A). Units selected from regular production shall be tested in the independent laboratory selected by Eurovent Certita Certification.

The certification is maintained on condition that:

- The previous test campaign (N-1) has been successfully completed;
- The product delivery together with the technical data sheet have been completed.

III.4 Failure treatment

When the test results fail to comply with the requirements of the Rating Standard, the failure treatment shall be applied.

III.5 Complaint procedure

Under special conditions a complaint procedure may be carried out as described in the Certification Manual for the Eurovent Certified Performance mark.

IV. OPERATION OF THE PROGRAMME

IV.1 Declaration of data

ISO 9001 certificates: Applicants/participants shall send to Eurovent Certita Certification their ISO 9001 certificate if they hold it.

a. Rated performance data

All characteristics and performance items shall be expressed in SI Units. Maximum of 5 significant digits shall be used for air flow. 3 significant digits shall be used for capacity, energy efficiency, pressure drop, power input and surface area. 2 significant digits shall be used for sound power.

For AC fans, star configuration shall be declared in the columns for low speed and delta in the columns for high speed.

Electronic fans and electronic regulation: EC fans shall be declared either:

- with the same air flow conditions as the equivalent model using an AC fan
- as a different model with a different air flow and capacity

b. Certification forms

Submittal for certification of models shall be sent by e-mail to Eurovent Certita Certification as an .xls or .xlsx file (copies of the forms are part of this manual, see APPENDIX F):

Form HE-0 will be used for declaration of ranges, models and data. 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.

Technical Datasheet: for models selected for test, Form HE-3 has to be completed with technical description of all components along with declared data.

The Applicant/Participant shall declare only products that are within the scope of the present certification programme.

IV.2 Selection of units and conditions to be tested

a. Number of tests

For the qualifying procedure, Eurovent Certita Certification shall select, at random, units to be tested, on the basis of their evaluation of the Applicant's declaration, in order to cover various options submitted (geometries, fins, materials). The following formula shall be applied for each product group:

$$n = \min (n_{\max}; \max (x ; y))$$

where n is the number of selected units to be tested for each group and n_{\max} is the maximum number of units to be tested for each group:

- $n_{\max} = 10$ for Dx Air Coolers,
- $n_{\max} = 8$ for Air Cooled Condensers,
- $n_{\max} = 6$ for Dry Coolers.

$$x = 1 + \sum_{i=1}^{N_{\text{geometries}}} \{1 + 0.25 \times [\delta_{\text{fin}(i)} - 1]\} + \delta_{\text{fin material}} + \delta_{\text{refrigerant}}$$

$$\text{or } x = 1 + 0.75 \times N_{\text{geometries}} + \sum_i^N \{0.25 \times \delta_{\text{fin}(i)}\} + \delta_{\text{fin material}} + \delta_{\text{refrigerant}}$$

$$y = 0.3 + 0.2 \times \Delta_{\text{fans}}$$

(rounded up to the nearest integer)

$N_{\text{geometries}}$ is the total number of geometries in each product group

$\delta_{\text{fin}(i)}$ is the number of fin variations of each geometry i

Δ_{fans} is the total number of different fans

A geometry reference is defined by equal:

- ◆ Tube size (diameter)
- ◆ Tube pitch height
- ◆ Tube depth
- ◆ Tube type
- ◆ Tube configuration
- ◆ Fin shape

A fin reference is defined by equal fin spacing (and fin thickness).

$\delta_{\text{fin material}}$ is the number of variations for fin material

$\delta_{\text{refrigerant}}$ is the number of variations for refrigerant where the coefficient used is above standard correction factor

A fan reference is defined by equal:

- ◆ Fan manufacturer
- ◆ Fan diameter
- ◆ Number of blades
- ◆ Fan pitch
- ◆ Motor manufacturer
- ◆ Main Power Supply
- ◆ Fan guard

On the number of units selected, there will be $\min(x ; n_{\max})$ measures on capacity and $\min(y ; n_{\max})$ measures on airflow and noise.

Example is given in APPENDIX F.

For the repetition procedure, Eurovent Certita Certification shall, each year, randomly select from each product group one unit to be tested.

For the penalty tests, Eurovent Certita Certification shall select units, *ideally* from the range which failed.

b. Modularity

If Eurovent Certita Certification selects a unit with a higher capacity than the capacity of the laboratory (see APPENDIX B), the manufacturer could provide a non-standard testable unit from the modular range (see APPENDIX C and RS 7/C/008 III. DEFINITIONS).

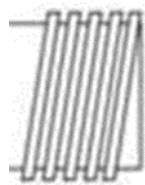
c. Test conditions for Dx Air Coolers

For Dx Air Coolers covering various applications, selected products shall be tested under one condition among one of the declared standard conditions for the products (SC1, SC2, SC3 and SC4) according to EN 328:2014 Standard.

IV.3 Delivery of units

a. Connection for Dry coolers

For dry coolers, the piping connection needs to be in outer thread (not flanges) of any “inch” dimension (see drawing of outer thread below).



b. Specifications regarding variable speed fans

Units equipped with variable speed fans shall be directly delivered as plug-in units either with the right controller or present at the factory in the motor at the right speed.

c. Time limitation of acquisition of unit

The deadline for delivery of units to the laboratory together with the duly filled in technical forms and orders shall be decided by Eurovent Certita Certification in accordance with the Compliance Committee (see APPENDIX A).

If units, technical forms and orders are not delivered within the time limitations, it is considered as non-respect of procedures (see dedicated chapter in Certification Manual).

IV.4 Tests at the laboratory

a. General

Tests shall be performed at the independent laboratory selected by Eurovent Certita Certification.

The laboratory personnel shall install and check out the units. The manufacturer shall provide the laboratory with full information about the installation. Units shall be installed in the test facility in accordance with the manufacturer's published installation instructions. The procedures used shall be in accordance with the manufacturer's installation start-up and service instructions.

The laboratory shall have the responsibility of un-crating, handling, testing and re-crating the unit for shipment. The laboratory personnel shall be allowed to make only the following corrections to the test sample, prior to the tests, in agreement with the manufacturer:

- 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

If the unit is not repairable, it shall be replaced by the Participant within four working weeks after the notification (see IV.5.a "Component failure").

No manufacturer's personnel shall be allowed in the laboratory test facility for the first test of a selected model. The manufacturer may review the test set-up prior to a second test of the selected model. During this second test the manufacturer may be present to witness, but not participate or interfere with the test.

The manufacturer has to recover his products maximum five working weeks after receiving all test reports. If the units are not recovered after this delay, the laboratory will destroy them and invoice the manufacturer.

b. Report of tests results

Upon completion of the tests on each unit, the laboratory will send the complete report as a .pdf file to Eurovent Certita Certification.

Eurovent Certita Certification will forward a copy of the report together with reporting result (Form HE-4) and re-rating test result (Form HE-5) to the applicant/participant (see APPENDIX F).

IV.5 Failure treatment

a. Reasons of failure

The applicant/participant shall examine the reasons of the failure. *For that purpose, when necessary, it is possible to preliminary collect the unit.*

b. Component failure

Whenever a functional component is inoperative, or the unit is damaged and cannot be repaired at the laboratory, the failure is considered as "Component Failure". A damage that has intervened during transportation, but cannot be noticed before the realisation of the test, can also be considered as a component failure, *provided that the Participant/Applicant provides Eurovent Certita Certification with evidence that the damage happened during the transportation.*

A further unit shall then be delivered within 4 working weeks for testing.
In case of component failure, there isn't any penalty test.

c. Dimensions and number of fins

In case the dimensions and number of fins of the delivered product, which are checked *preliminary to the performances tests*, are not correct, it is considered as a “Component failure”. *The verification of the dimensions and number of fins is considered as an indirect check of the surface area.*

d. General

If during a test, one or more of the requirements of the test standard cannot be met, the laboratory shall promptly notify Eurovent Certita Certification. Eurovent Certita Certification shall take a decision in agreement with the manufacturer and inform the laboratory for further actions.

e. Unit failure

For each test, a performance item fails when the difference between the declared value and the measurement differs by more than the allowable tolerance (see Rating Standard).

A test fails when one or more performance items fail.

For each failed test, the manufacturer has four working weeks from the notification of failure to choose between one of the two following alternatives:

- (1) Re-rate all products in accordance with test results following the re-rating procedure described below. Penalty tests will be required as described below.
- (2) Ask for a second test on the same unit (already tested and kept in the laboratory). If the second test is unsuccessful, the Participant/*Applicant* shall re-rate all products in line with the second test results according to the re-rating procedure and penalty tests will be required. The manufacturer can ask for a second test on a new unit (same model), in specific cases, after analysis of the non-conformity and implementation of actions if applicable. When the second test is carried out on another unit than the one already tested, then penalty tests will be required, *whatever the result of the second test is.*

After acceptance of re-rating, the company shall sign a declaration stating that he will modify the electronic catalogue and the paper versions within four working weeks.

During the qualification procedure, if more than one third of the required number of capacity, air volume or noise measurements fails, *the penalty tests will be required within the qualifying procedure, after application of the rerating procedure when applicable. The number of penalty tests per type of products can't be higher than n_{max} (see IV.2, a).*

f. Re-rating procedure

Air flow: In case of failure, all products in the same *module* (same fan, same coil, same number of rows, and same type of fins, fin spacing and finned length) shall be re-rated by the deviation found for the tested model.

Sound power level: In case of failure, all products (Dry Coolers and Condensers) using the same fan shall be re-rated by the deviation found for the tested model.

Capacity: In case of failure, all products in the same *module* (same fan, same coil, same number of rows, and same type of fins, fin spacing and finned length) shall be re-rated.

For Air cooled condensers and dry coolers, units of the *module* shall be re-rated by the deviation found for the tested model.

If a DX air coolers is tested and capacity fails, then capacities at all the declared SC's of the units of the Module shall be re-rated by deviation found for the tested model.

Fan power: In case of failure on fan power, all products using the same fan shall be re-rated by the deviation found for the tested model.

Pressure drop: In case of failure on pressure drop, only the tested model shall be re-rated to the measured one.

For a given performance, in case of different deviations for products having same component and module, the products are re-rated by the highest deviation.

g. Penalty tests

In case of established failure, units for penalty tests (*full tests*) have to be *ideally* selected from the range which failed, as follows:

- Two units in case of failure on capacity
- One unit in case of failure on fan power *or* liquid pressure drop
- One unit in case of high failure (1.5 x tolerance) on air volume flow *or sound performances* (+3 dB(A))

The additional penalty tests shall be performed during the following repetition test campaign.

V. PROMOTION OF THE PROGRAMME

V.1 By Eurovent Certita Certification

The certified data of the certified products are published on the Eurovent Certified Performance website: www.eurovent-certification.com. For each certified model the following information shall be published:

- Name of Company
- Trade or brand name of model
- Model number(s) or designation(s)
- Nominal capacity
- *Airflow*
- Fan power input
- Energy efficiency *ratio and class*
- *Fin spacing*
- *Number of fans*
- Liquid side pressure drop for Dry Coolers
- A-weighted sound pressure level at 10 m distance for Condensers and Dry Coolers
- A-weighted sound power level for Condensers and Dry Coolers
- External surface area
- Refrigerant fluid.

Performance data shall be given at the nominal fan speed.

V.2 By Participants

The participating company shall indicate participation in the programme by displaying the appropriate Eurovent Certified Performance mark on all specification sheets and in other literature and software carrying ratings, or claiming certification, of certified models (see Certification Manual).

a. Display of certification symbol on literature, software and advertising

Use of the Eurovent Certified Performance mark is described in Certification Manual. The following completes the description in the programme for Heat Exchangers.

When publishing ratings, a Participant shall include at least the certified performance in the standard rating conditions, as specified in the relevant Rating Standard.

b. Display of certification symbol on production units

Each Participant Company is entitled to display the Eurovent Certified Performance mark on units of models which have been certified. The Participant may also display the Eurovent Certified Performance symbol on each certified unit by application of:

- Eurovent Certified Performance mark, or
- Eurovent Certified Performance energy efficiency label.

No data or other marking shall be added to the label. The Participant may affix the certification symbol at any location thereon satisfactory to him. The Eurovent Certified Performance mark may be applied as part of the nameplate of a certified model.

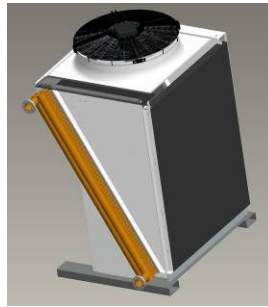


Figure 4: Unit with only one coil and one fan

- 2) In case of V unit and two rows of unseparate fans (Figure 1 and Figure 3), the test could be done by connecting only one coil and both fans.

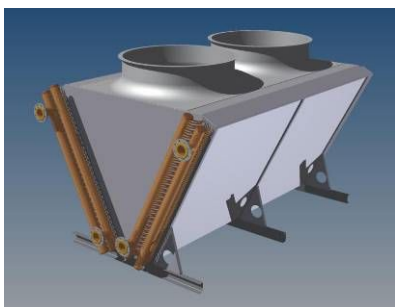


Figure 5: Unit with two coil blocks

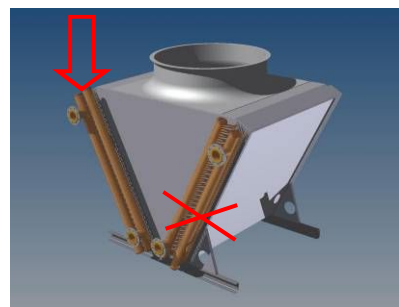


Figure 6: Test with one coil block

- 3) In case of V unit of two coil blocks and one row of fans (Figure 1 and Figure 5), the test could be done by connecting only one coil block (Figure 6).

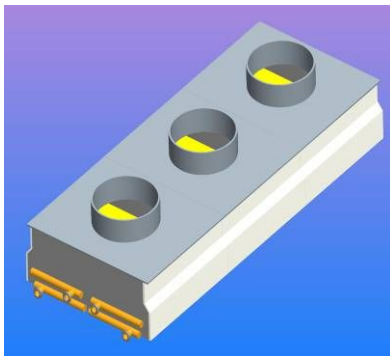


Figure 7: Unit of a module with multiple unseparate fans

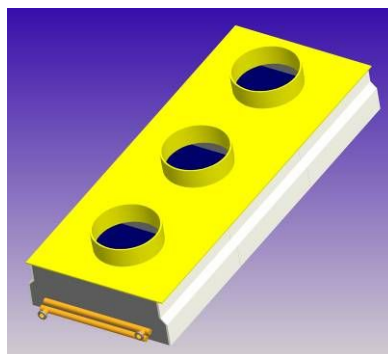


Figure 8: Unit of a module with multiple unseparate fans

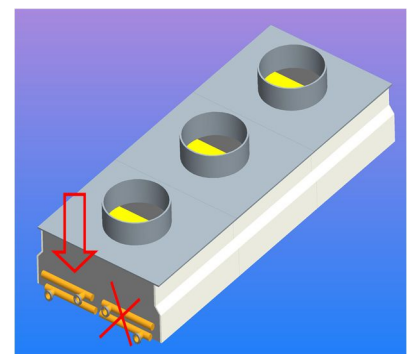


Figure 9: Unit with a symmetrically split coil

- 4) In case of a product having two identical circuits in the same casing (Figure 7), the test could be done by connecting only one circuit section and all fans (Figure 9).
- 5) In case of a module with multiple unseparate fans (Figure 8), a non-standard unit could be provided with a symmetrically split coil (Figure 9): the test could be done by connecting only one circuit section and all fans.
- 6) If none of the above descriptions are applicable, then the heat flux method can be used referring to the same tube, fin, rows and configurations in other certified ranges.

APPENDIX D. EUROVENT CERTIFIED PERFORMANCE MARK AND ENERGY EFFICIENCY LABEL

D.I. Eurovent Certified Performance mark

The acceptable colour combinations for the Eurovent Certified Performance mark (“EPC mark” used below) are green Pantone N° 341 on white or black on white. Any size of mark may be used, if proportions are respected.

The mark shall also include “CERTIFY-ALL” and the name of the relevant *type(s) of products that are certified*: “AIR COOLED CONDENSER“, “DX AIR COOLERS“ and/or “AIR COOLED CONDENSERS“. When *all types of products are certified*, the Participant have the possibility to use the logo without anything mentioned in the green part.

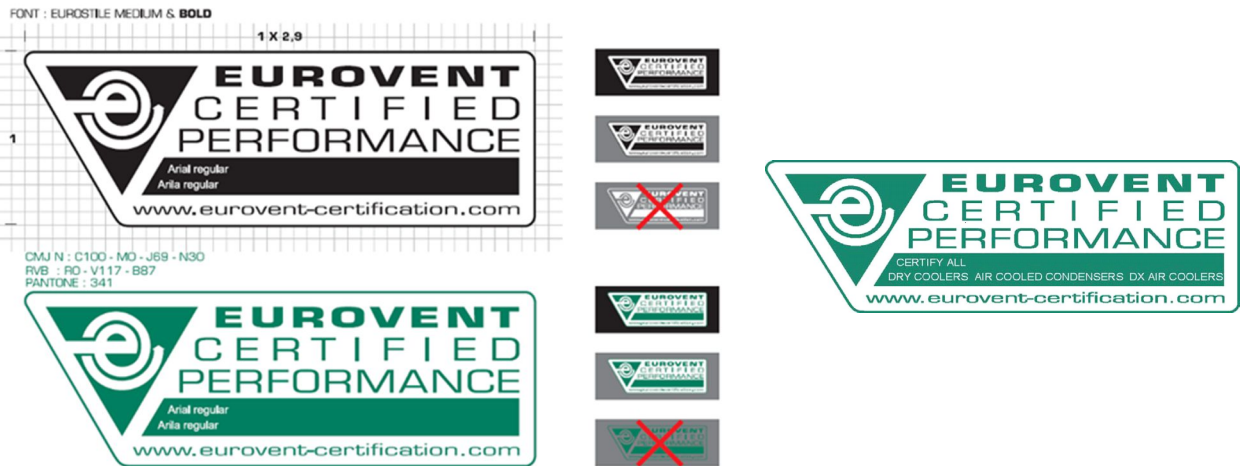


Figure 10: ECP mark specifications and ECP mark for Heat Exchangers

D.II. Eurovent Certified Performance energy efficiency label

See specifications in Certification Manual ed. 13, dedicated Appendix. Example is provided below.

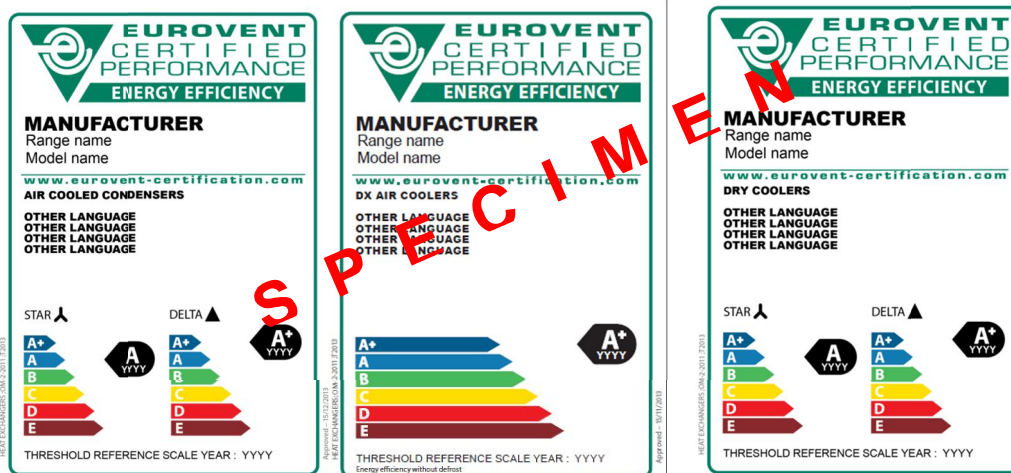


Figure 11: ECP Energy efficiency labels

When presented on catalogues, the label for DX air coolers shall be accompanied with the following statement “Energy efficiency class does not take into account the cooler defrost”.

APPENDIX E. REPEATED TREATMENT OF FAILURES

Mean Failure Value (MFV), as defined in Certification Manual, is restricted to failure on capacity for each Heat Exchanger, and considers three years if possible. According to this definition, failure is considered only once even if there are two measurements on the same unit.

$$MFV_{\text{capacity}} = \frac{\sum \text{Number of tested units which fail on capacity}}{\sum \text{Number of tested units}} \times \frac{\text{Number of considered years}}{\text{Number of considered years}}$$

Example: Manufacturer λ had in 3 years a total of 9 machines tested, 3 condensers, 3 coolers, 3 dry coolers with the following test results.

Year	Capacity 1	Capacity 2	Capacity 3	Capacity 4
2008	PASSED	PASSED		
	PASSED			
	PASSED			
2009	PASSED	PASSED		
	PASSED			
	PASSED			
2010	FAILED	FAILED		
	PASSED			
	FAILED			

Then $MFV = \frac{0+0+2}{3+3+3} = \frac{2}{9} = 22\%$, and $MFV \neq \frac{3}{12} = 25\%$

Year	Capacity 1	Capacity 2	Capacity 3	Capacity 4
2008	PASSED	PASSED		
	PASSED			
2009	PASSED	PASSED		
	FAILED			
2010	FAILED	FAILED		
	PASSED			
	PASSED			
	PASSED			

Then $MFV = \frac{0+1+1}{2+2+4} = \frac{2}{8} = 25\%$

MFV threshold is defined since end of 2010 testing campaign at 30%.

APPENDIX F. FORMS

F.I. Form HE-0: Declaration file for certification

empty if new product, otherwise, ECC product number from		If your product is certified by another manufacturer, report here the ECC product number from is list		Tested rerated, created, last update = ECC history of the		HE (COND, COOL, DCOOL,GCOOL,CCOOL) - 2016 New, Certified Deleted or Obsolete		Trade name or Brand		Use : COND/COND for Air Cooled Condensers or COOL/COOL for Dx Air Coolers or DCOOL/DCOOL for Dry Coolers or		Fill in the "Modularity" the name for different products with same module	
Product Number	Master product number	Tested On	Rerated on	Created on	Last update on	Status	Participant Name	Product Name	Trade Name	Type of product	Range Name	Modularity	

(see also Certification Manual 13, dedicated appendix on update of lists)

Very Low Speed, SC1		Very Low Speed, SC2		Very Low Speed, SC3		Very Low Speed, SC4		Very Low Speed, SC15		Very Low Speed, SC10		Very Low Speed, Standard					Low Speed, SC1		Low Speed, SC2		Low Speed, SC3		Low Speed, SC4		Low Speed, SC15		Low Speed, SC10		Low Speed, Standard				
Pc wet @ SC1	Pc wet @ SC2	Pc wet @ SC3	Pc wet @ SC4	Pc dry @ SC15	Pc dry @ SC10	Pe	Qv	DPw	Lp @ 10m	Lw	Pc wet @ SC1	Pc wet @ SC2	Pc wet @ SC3	Pc wet @ SC4	Pc dry @ SC15	Pc dry @ SC10	Pe	Qv	DPw	Lp @ 10m	Lw	Pc wet @ SC1	Pc wet @ SC2	Pc wet @ SC3	Pc wet @ SC4	Pc dry @ SC15	Pc dry @ SC10	Pe	Qv	DPw	Lp @ 10m	Lw	
kW	kW	kW	kW	kW	kW	W	m³/h	kPa	dB(A)	dB(A)	kW	kW	kW	kW	kW	kW	W	m³/h	kPa	dB(A)	dB(A)	kW	kW	kW	kW	kW	kW	W	m³/h	kPa	dB(A)	dB(A)	
Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	

Medium Speed, SC1		Medium Speed, SC2		Medium Speed, SC3		Medium Speed, SC4		Medium Speed, SC15		Medium Speed, SC10		Medium Speed, Standard					High Speed, SC1		High Speed, SC2		High Speed, SC3		High Speed, SC4		High Speed, SC15		High Speed, SC10		High Speed, Standard				
Pc wet @ SC1	Pc wet @ SC2	Pc wet @ SC3	Pc wet @ SC4	Pc dry @ SC15	Pc dry @ SC10	Pe	Qv	DPw	Lp @ 10m	Lw	Pc wet @ SC1	Pc wet @ SC2	Pc wet @ SC3	Pc wet @ SC4	Pc dry @ SC15	Pc dry @ SC10	Pe	Qv	DPw	Lp @ 10m	Lw	Pc wet @ SC1	Pc wet @ SC2	Pc wet @ SC3	Pc wet @ SC4	Pc dry @ SC15	Pc dry @ SC10	Pe	Qv	DPw	Lp @ 10m	Lw	
kW	kW	kW	kW	kW	kW	W	m³/h	kPa	dB(A)	dB(A)	kW	kW	kW	kW	kW	kW	W	m³/h	kPa	dB(A)	dB(A)	kW	kW	kW	kW	kW	kW	W	m³/h	kPa	dB(A)	dB(A)	
Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	

Very High Speed, SC1		Very High Speed, SC2		Very High Speed, SC3		Very High Speed, SC4		Very High Speed, SC15		Very High Speed, SC10		Very High Speed, Standard					Generic		Generic										COMPONENTS		
Pc wet @ SC1	Pc wet @ SC2	Pc wet @ SC3	Pc wet @ SC4	Pc dry @ SC15	Pc dry @ SC10	Pe	Qv	DPw	Lp @ 10m	Lw	Ext. surface	No. of circuits	Tube deep	Tube height	Refrigerant	Other Refrig	Other Refrig	Other Refrig	No. of fans	No. of coils	Finned length	Fin Spacing	1-FAN REFERENCE	2-GEOMETRY REFERENCE	3-FIN REFERENCE						
kW	kW	kW	kW	kW	kW	W	m³/h	kPa	dB(A)	dB(A)	m²	Integer	Decimal	Decimal	String	String	String	String	Integer	Integer	Decimal	Decimal	Each component needs to be described in sheet "component export" (see table below)	Each component needs to be described in sheet "component export" (see table below)	Each component needs to be described in sheet "component export" (see table below)						
Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Decimal	Integer	Decimal	Decimal	String	String	String	String	Integer	Integer	Decimal	Decimal									

GENERIC		Very Low Speed, Standard		Low Speed, Standard		Medium Speed, Standard		High Speed, Standard		Very High Speed, Standard		Fan information					Geometry					Fin information								
Name	Type	Fan speed	Fan speed	Fan speed	Fan speed	Fan speed	Fan speed	Fan speed	Fan speed	Fan speed	Fan speed	Fan manufacturer	Fan d	No. of blades	Fan pitch	Motor manufacturer	MPS	Fan guard	Tube size (d) or Profile height (MC)	Tube configuration or Profile width (MC)	Pitch height	Pitch depth	Tube type	Fin shape	Tube material	Fin spacing	Fin thickness	Fin material	Fin surface	r value
You cannot use two lines with same name	FAN or GEOMETRY or FIN; one line per item																													Join a drawing each time r is different from 1

Example of number of units to be tested in the qualifying procedure:

For Dx air coolers with 4 different geometries with 1, 4, 8, and 16 fin variations each, 6 different fans, there will be:

$$x = 1 + 0.75 \times 4 + 0.25 \times 1 + 0.25 \times 4 + 0.25 \times 8 + 0.25 \times 16 = 11.25 > n_{\max}$$

$$y = 0.3 + 0.2 \times 6 = 1.5$$

10 selected units, 10 measures on capacity and 2 measures on air flow and noise.

F.II. Form HE-3: Technical form for unit to be tested (technical data sheet)

TECHNICAL DATA SHEET

Participant name					
Product name		Range name			
Product number		Test number			
SPEED AND CONDITION			Type of product		
		WET	DRY		
Standard Capacity	PC Wet /Dry 1			kW	SC1 FOR COOL
Standard Capacity	PC Wet/ Dry 2			kW	SC2 FOR COOL
Standard Capacity	PC Wet/ Dry 3			kW	SC3 FOR COOL
Standard Capacity	PC Wet/ Dry 4			kW	SC4 FOR COOL
Standard Capacity	PCDRY 10/15			kW	at dry condition DT10/DT15 FOR COND
Standard Capacity	PDRY 15			kW	at dry condition DT15 FOR DCOOL
Liquid Pressure Drop				Kpa	
Standard Air Flow Rate				m ³ /h	
Total nominal Fan Power				W	
Sound power level				dB(A)	
Sound pressure level				dB(A)	
TECHNICAL CHARACTERISTICS OF THE PRODUCT	Generic (GENERIC)	No. of circuits			
		Tube deep			
		Tube height			
		Refrigerant			
		No. of fans			
		External Surface			m ²
		Finned length			mm
	Fan information (FAN)	Fan manufacturer			
		Fan d			mm
		No. of blades			
		Fan pitch			
		Motor manufacturer			
		MPS			
		Fan guard			
	Geometry (GEOMETRY)	Tube size (d) or Profile height (MC)			mm
		Tube configuration or Profile width (MC)			
		Pitch height			mm
		Pitch depth			mm
		Tube type			
		Fin shape			
		Tube material			
	Fin information (FIN)	Fin spacing			mm
		Fin thickness			mm
		Fin material			
		r- Deformation ratio			
		Fin surface			m ²
		Variable speed			true/false
		Wiring connection for AC fans			star/delta
TDS	Fan type [axial, centrifugal, tangential]				
	Fin type [flat, corrugated, louvered, wavy]				
	Air flow direction				
	Coil Height			mm	
	Coil Length			mm	
	Coil Depth			mm	
	Tube diameter outside the coil*			mm	
	Total number of fins				
	Inlet connection			mm	
	Outlet connection			mm	
	Internal volume			dm ³	
	Net weight			kg	
	Outdoor height			mm	
	Outdoor Length			mm	
Outdoor depth			mm		

F.III.Form HE-5: Test rerate form (example: Dry coolers)

CERTIFICATION PROGRAMME FOR HEAT EXCHANGERS

RESPONSE FORM AFTER FAILURE ON TESTED UNIT

This response form shall be sent back by *e-mail* to Eurovent Certita Certification within one month maximum.
 Without news from you within this delay, we will rerate performances and our website will be automatically updated with rerated performances.
 Our e-mail: technical@eurovent-certification.com

Date: _____ Your name: _____ Signature: _____

According to the document OM-2, you are asked to select one of the following alternatives:

- Ask for a second test on the unit already tested.**
- Ask for a second test, i.e. on another unit of the same model selected by Eurovent Certita Certification.**
- Rerate all products in the basic model group in line with test results, as follows :**

Code arti	Trade name	Participant	Code Dis	Code Eurovent	RANGE	Fluide	Appli cation	Model	CapSC1	R1	Cap SC2

Cap SC3	Cap SC4	Drop	Nb Fan	Fan code	Power	ABS	Phase	Star	Volts	Fan Speed	Airflow

Fin Code	Surface	Lw	Lp	Certified	Cap année	Air Flow Année	Sound Test	Date Maj	Note