

TECHNICAL CERTIFICATION RULES OF THE EUROVENT CERTIFIED PERFORMANCE MARK



REFRIGERATED DISPLAY CABINETS

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(This version cancels and replaces any previous versions)

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The purpose of this Technical Certification Rules is to prescribe procedures for the operation of the Eurovent Certified Performance (ECP) certification programme for Refrigerated Display Cabinets (RDC), in accordance with the Certification Manual.

Modifications as against last version:

No.	Modifications	Section	Page
1	Introduction of Integral plug-in RDC in the scope as a sub-programme	all	all
2	Modification of Certify-all principle	I.1.2	5
3	Modification of audit process	III.1.31	17-19
4	Modification of surveillance and admission audit rules	III.2.1.1	23
5	Modification of the campaign calendar	Appendix C	34

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I. GENERAL INFORMATION

I.1 Scope

I.1.1 General

The programme scope covers Refrigerated Display Cabinets (RDC) intended to be used in retail applications and classified into the following sub-programmes :

- Remote Refrigerated Display Cabinets (RRDC) using R744 (CO2).
- Integral Refrigerated Display Cabinets (IRDC) equipped with air-cooled condensing unit (see §I.3.18.1) using natural refrigerants or blends with GWP lower or equal to 150.

The RDC programme covers:

- 100 pre-defined Basic Model Groups (BMG) in 5 categories of Remote Refrigerated Display Cabinets (RRDC), as specified in Table 1 (see also Appendix E).
- 100 pre-defined Basic Model Groups (BMG) in 5 categories of Integral Refrigerated Display Cabinets (IRDC), as specified in Table 2 (see also Appendix E).
- However, all the related models (see §I.3.22) are considered as certified excepting models out of the scope (see Certify-all principle §I.1.2).

Table 1 : Pre-defined categories and Basic Model Groups of RRDC to declare for certification

Category 1 (R/WD): RVC4, RVF4 (Semi-vertical and Verticals) with doors									
Height (bottom to top)	Width (back to front)	Frozen or chilled	Loading	Number of shelves	Shelves with lighting		Total	Multiply	To declare
≤1800	≤900	Frozen	whatever	whatever	N				
1800-2150	900-1000	Chilled							
>2150	>1000								
	3	3	2	1	1	1	18	2	36
Category 2 (R/O): RVC1, RVC2, RVC3 (Multideckers / Semiverticals open)									
Height (bottom to top)	Width (back to front)	Front height	Top width	Loading	Shelves with lighting	Night curt.	Total	Multiply	To declare
≤ 1800	≤ 900	≤ 250	> 700	All	N	Y if av.			
1800-2150	900-1000	250-440	≤ 700						
> 2150	> 1000	> 440							
	3	3	3	2	1	1	54	2	108
Category 3 (R/I): RHF3, RHF4, RHF5, RHF6, RHC3, RHC4, RHC5, RHC6 (Islands)									
External width	Front glass	Lid	Loading depth	T range	Shelves with lighting	Night curt.	Total	Multiply	To declare
≤ 1400	Y	Y	whatever	whatever	N	Y if av.			
1400-1700	N	N							
> 1700									
	3	2	2	1	1	1	12	2	24
Category 4 (R/SC): RHC1, RHC2, RHC3, RHF1 (Service counters)									
Display Width	Frozen or chilled	Superstructure				Total	Multiply	To declare	
≤ 930	Frozen	Traditional open							
> 930	Chilled	Traditional closed							
		Self-Service							
	2	2	3			12	2	24	
Category 5 (R/CF): RYF1, RYF2, RYF3, RYF4 (Combi freezers)									
Height	Front glass height	Lid	Light: no at the bottom	Frozen or chilled		Total	Multiply	To declare	
≤ 2150	whatever	Y	N	Frozen		4	2	8	
> 2150		N							
	2	1	2	1	1				

Table 2 : Pre-defined categories and Basic Model Groups of IRDC to declare for certification

Category 1 (I/WD): IVC4, IVF4 (Semi-vertical and Verticals) with doors

Height (bottom to top)	Width (back to front)	Frozen or chilled	Loading	Number of shelves	Shelves with lighting	Automatic self-contained defrost water removing system	Total	Multiply	To declare
≤1800	≤900	Frozen	whatever	whatever	N	Y if av.			
1800-2150	900-1000	Chilled							
>2150	>1000								
3	3	2	1	1	1		18	2	36

Category 2 (I/O): IVC1, IVC2, IVC3 (Multideckers / Semiverticals open)

Height (bottom to top)	Width (back to front)	Front height	Top width	Loading	Shelves with lighting	Automatic self-contained defrost water removing system	Night curt.	Total	Multiply	To declare
≤ 1800	≤ 900	≤ 250	> 700	All	N	Y if av.	Y if av.			
1800-2150	900-1000	250-440	≤ 700							
> 2150	> 1000	> 440								
3	3	3	2	1	1		1	54	2	108

Category 3 (I/I): IHF3, IHF4, IHF5, IHF6, IHC3, IHC4, IHC5, IHC6 (Islands)

External width	Front glass	Lid	Loading depth	T range	Shelves with lighting	Automatic self-contained defrost water removing system	Night curt.	Total	Multiply	To declare
≤ 1400	Y	Y	whatever	whatever	N	Y if av.	Y if av.			
1400-1700	N	N								
> 1700										
3	2	2	1	1	1		1	12	2	24

Category 4 (I/SC): IHC1, IHC2, IHC3, IHC7, IHC8, IHF1, IHF7 (Service counters)

Display Width	Frozen or chilled	Superstructure	Automatic self-contained defrost water removing system	Total	Multiply	To declare
≤ 930	Frozen	Traditional open				
> 930	Chilled	Traditional closed				
		Self-Service				
2	2	3		12	2	24

Category 5 (I/CF): IYF1, IYF2, IYF3, IYF4, IYM5, IYM 6, IYM 7 and IYM 8 (Combi freezers)

Height	Front glass height	Lid	Light: no at the bottom	Frozen or chilled	Automatic self-contained defrost water removing system	Total	Multiply	To declare
≤ 2150	whatever	Y	N	Frozen	Y if av.	4	2	8
> 2150		N						
2	1	2		1	1			

Total BMG for Integrals 100

In order to avoid increasing the number of BMG the following descriptive parameter was not added in the columns, but will have to be declared as extra information specific to plug-ins:

- End-wall type
 - Full glass
 - Half glass
 - Solid

Exclusions: Cabinets with wooden parts that affect performance are excluded. Cabinets operated with other fluids than those listed above are excluded too. Semi-plug-in RDC (see I.3.19) are excluded from the scope¹.

I.1.2 Certify-all principle

Whenever a company participates in one of the RDC sub-programmes, all RDC 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 sub-programme, shall be certified, in accordance with these Technical Certification Rules. This includes all models in modular ranges.

For the RRDC and IRDC sub-programmes, the certify-all requirement as defined in the Certification Manual is applicable only in EUROPEAN market with trade name choice.

I.2 Certified performances

The following performance items are certified:

- Warmest product temperature (laboratory conditions)
- Coldest (chilled) product temperature (laboratory conditions)
- Heat extraction (laboratory conditions) [kWh/24h]
- Evaporating temperature (laboratory conditions)
- Direct Electrical energy Consumption DEC [kWh/24h]
- Refrigeration Electrical energy Consumption REC [kWh/24h]
- Total Electrical energy Consumption TEC [kWh/24h]
- Total Display Area TDA [m²]
- Energy Efficiency Index EEI (laboratory conditions)
- M-package temperature

I.3 Definitions

In addition to the definitions specified in the Certification Manual, the following definitions apply in accordance with EN ISO 23953-1:2015. Definitions are given in the alphabetical order.

I.3.1 Annual Energy Consumption (AE)

According to regulation (EU) 2019/2024, the Annual Energy Consumption (AE) means the average daily energy consumption E_{daily} (see §I.3.7) multiplied by 365 (days per year) expressed in kilowatt hour per year [kWh/a] and rounded to two decimal places.

$$AE = 365 \times E_{daily}$$

I.3.2 Average Heat Extraction Rate ($\Phi_{24-deft}$ or HER_{avg})

The Average Heat Extraction Rate ($\Phi_{24-deft}$ or HER_{avg}) [kW/24h] is determined according to EN ISO 23953-2:2015 chapter 5.3.6.3.2, with a measurement interval of 20s according to chapter 5.3.1.7 of EN ISO 23953-2:2015

I.3.3 Basic Model Group (BMG)

100 Basic Model Groups have been defined in Table 1 and table 2 for Remote RDC and Integral RDC respectively. To fall into a BMG, a model has to present a configuration which fits the corresponding description (Example: A service counter with a display width below 930 mm, Frozen, Traditional open falls into BMG 85, see Appendix E).

¹ Semi-plug-ins will be introduced in the certification programme scope as soon as the upcoming revision of test standard EN ISO 23953-2, comprising specific testing provisions for this type of products, is published.

I.3.4 Cabinet classification

Designation given by the combination of climate class (see §I.3.6) and M-package temperature class (see §I.3.14). Classification in test room climate class 3: 3H2, 3H1, 3M2, 3M1, 3M0, 3L3, 3L2, 3L1.

I.3.5 Certified model

Model of the same BMG (see §I.3.3) as one listed model (see §I.3.13).

I.3.6 Climate class

Classification of the test room climate according to the dry bulb temperature and relative humidity. For the RDC programme all tests are conducted in test room climate class 3, which corresponds to a dry bulb temperature of +25°C and a relative humidity of 60% (see Table 3 from standard EN ISO 23953-2:2015).

I.3.7 Daily Energy Consumption (E_{daily})

According to regulation (EU) 2019/2024, the daily energy consumption E_{daily} is the energy consumption of the refrigerating appliance over a direct sales function over 24 hours, expressed in kWh/24h and rounded to three decimal places.

Note that E_{daily} is equivalent to TEC from EN ISO 23953 series (see §I.3.25).

I.3.8 Direct electrical Energy Consumption (DEC)

The Direct electrical Energy Consumption (DEC) characterizes the energy consumption of electrical components of the cabinet. DEC is obtained during the electrical energy consumption test with 12h lightning defined in EN ISO 23953-2:2015 chapter 5.3.5 and is expressed in [kWh/24h].

For Integral plug-in RDC (see §I.3.19), the DEC equals the TEC (see §I.3.25), as it includes the condensing unit energy consumption (see chapter 5.3.5.2 of EN ISO 23953-2:2015).

For Remote RDC, DEC shall be measured as per chapter 5.3.5.3 of EN ISO 23953-2:2015.

I.3.9 Energy Efficiency Index (EEI)

According to regulation (EU) 2019/2024, the Energy Efficiency Index (EEI) means an index number for the relative energy efficiency of a refrigeration appliance with a direct sales function expressed in percentage [%] and rounded to the first decimal place. It is the ratio of AE [in kWh/a] and the reference SAE [in kWh/a] and is calculated as

$$EEI = \frac{AE}{SAE}$$

with AE and SAE defined respectively in §I.3.1 and §I.3.24 (see also Appendix D).

I.3.10 Evaporating temperature (θ_{mrun} or Evap T)

The evaporating temperature (θ_{mrun} or Evap T) [°C] is determined according to EN ISO 23953-2:2015 chapter 5.3.6.3.

I.3.11 Global Warming Potential (GWP)

The Global Warming Potential (GWP) of a refrigerant is defined in regulation 517/2014 as the climatic warming potential of a greenhouse gas relative to that of carbon dioxide (CO₂), calculated in terms of the 100-year warming potential of one kilogram of a greenhouse gas relative to one kilogram of CO₂.

I.3.12 Internal fitting type

The internal fitting types that can be observed are the following:

- HNLS: Horizontal Non-Lighted Shelves & HLS: Horizontal Lighted Shelves
- TNLS: Tilted Non-Lighted Shelves & TLS: Tilted Lighted Shelves
- MNLS: Mirror and tilted Non-Lighted Shelves (available for vertical only)

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- MLS: Mirror and tilted Lighted Shelves (available for vertical only)
- HNL: Horizontal Non-Lighted
- HL: Horizontal Lighted

I.3.13 Listed model

Model on the declaration list and on the Eurovent Certified Performance website.

I.3.14 M-package temperature class

Classification of M-package temperature according to temperatures of warmest and coldest M-packages during the temperature test according to Table 1 of standard EN ISO 23953-2:2015. For cabinets with night covers and lighting the M-package temperature class is only based on the second test part b) of EN ISO 23953-2:2015 chapter 5.3.2.7.2 with 12 hours day and 12 hours night.

Table 3 : M-package temperature classes

Class		L1	L2	L3	M0	M1	M2	H1	H2
The lowest temperature θ_b of the coldest M-package equal to or higher than	[°C]	-	-	-	-1	-1	-1	-1	+1
The highest temperature θ_{ah} of the warmest M-package equal to or lower than	[°C]	-15	-12	-12	+4	+5	+7	+10	+10
The lowest temperature θ_{al} of the warmest M-package equal to or lower than	[°C]	-18	-18	-15		-	-	-	-

I.3.15 Non-certified model

Model which doesn't fall in a BMG (see §I.3.3).

I.3.16 Product category

Category of cabinets. Five (5) categories have been defined (see also Table 1 and table 2):

- semi-vertical and vertical with doors
- multideckers and semi-vertical open
- islands
- service counters
- combi freezers

I.3.17 Product family

Group of cabinets in accordance with the standard terminology (see 4 below).

Table 4 : Classification for product families (Source: Annex A of EN ISO 23953-1:2015 - informative)

Application	Positive Temperature		Negative Temperature	
To be used for	Chilled foodstuffs		Frozen, quick frozen foodstuffs and ice cream	
Horizontal	Chilled, serve-over counter open service access	HC1	Frozen, serve-over counter open service access	HF1
	Chilled, serve-over counter with integrated storage open service access	HC2		
	Chilled, open, wall site	HC3	Frozen, open, wall site	HF3
	Chilled, open, island	HC4	Frozen, open, island	HF4
	Chilled, glass lid, wall site	HC5	Frozen, glass lid, wall site	HF5
	Chilled, glass lid, island	HC6	Frozen, glass lid, island	HF6
	Chilled, serve-over counter closed service access	HC7	Frozen, serve-over counter closed service access	HF7
	Chilled, serve-over counter with integrated storage closed service access	HC8		

Vertical	Chilled, semi-vertical	VC1	Frozen, semi-vertical	VF1
	Chilled, multi-deck	VC2	Frozen, multi-deck	VF2
	Chilled, roll-in	VC3		
	Chilled, glass door	VC4	Frozen, glass door	VF4
Combined	Chilled, open top, open bottom	YC1	Frozen, open top, open bottom	YF1
	Chilled, open top, glass lid bottom	YC2	Frozen, open top, glass lid bottom	YF2
	Chilled, glass door top, open bottom	YC3	Frozen, glass door top, open bottom	YF3
	Chilled, glass door top, glass lid bottom	YC4	Frozen, glass door top, glass lid bottom	YF4
	Multi-temperature, open top, open bottom			YM5
	Multi-temperature, open top, glass lid bottom			YM6
	Multi-temperature, glass door top, open bottom			YM7
	Multi-temperature, glass door top, glass lid bottom			YM8
Codification:				
R = Remote condensing unit	V = Vertical			
I = Incorporated condensing unit	Y = Combined			
A = Assisted service	C = Chilled			
S = Self service	F = Frozen			
H = Horizontal	M = Multi-temperature			
EXAMPLE:	The general classification can be used as follows:		HC1, VF1, YM5, ...	
	When necessary, the classification can be more precise as follows:		RHC1A, IVF1S ...	

I.3.18 Refrigerated Display Cabinet (RDC)

Cabinet cooled by a refrigerating system which enables chilled and frozen foodstuff placed therein for display to be maintained within prescribed temperature limits.

I.3.19 Integral refrigerated Display Cabinets (IRDC)

Refrigerated Display Cabinets with incorporated condensing unit which can be referred to as self-contained units and more precisely

- “plug-in RDC” in case of an air-cooled condensing unit, this product type is covered by the IRDC sub-programme.
- “semi-plug-in RDC” in case of a liquid-cooled condensing unit (e.g. water-loop system), this product type is not covered by the present certification scheme (see I.1.1)

I.3.20 Remote Refrigerated Display Cabinet (RRDC)

Refrigerated Display Cabinet connected to a remote refrigerating unit.

I.3.21 Refrigeration Electrical energy Consumption (REC)

The refrigeration Electrical energy Consumption (REC) [kWh/24h] is calculated according to EN ISO 23953-2:2015 chapter 5.3.6.3.3, with the following formula:

$$REC_{RC} = (24 - t_{defst}) \times \Phi_{24-defst} \times \frac{T_c - T_{mrun}}{0.34 \times T_{mrun}}$$

with:

REC_{RC} [kWh/24h]: Refrigeration daily electrical energy consumption for remote cabinet (see §I.3.20) for compression-type refrigerating system.

t_{defst} [h]: Defrost time — time during defrost during which compressor is not running (or solenoid valve is closed) or secondary refrigerant is generally not circulating, within 24 h, but not considered as stopping time.

Φ_{24-defst} [kW]: Heat extraction rate during a whole day excepting defrost time (see §I.3.2)

T_c [K]: constant condensing temperature of T_c = 308,15 K

T_{mrun} [K]: arithmetic average of evaporator-saturated temperature obtained from the refrigerant pressure at cabinet outlet (in Pascals) by referring to table of saturation properties for refrigerant in use, during t_{run}

t_{run} [h]: Running time — time during which compressor is running (or solenoid valve is open) or secondary refrigerant is circulating (or solenoid valve is open), within 24 h.

t_{stop} [h]: Stopping time — time during which compressor is not running (or solenoid valve is closed) or secondary refrigerant is not circulating (or solenoid valve is closed), within 24h and excluding defrost time.

rounding all terms in the formula to the second decimal.

Example:

- $t_{defl} = 3.266$ h; rounded to: 3.27 h
 - $\Phi_{24-defl} = 3.325$ kW; rounded to: 3.33 kW
 - $T_c = 308.15$ K
 - $T_{mrun} = -11.4^\circ\text{C} = 261.75\text{K}$
- $REC_{RC} = 35.99$ kWh/24h

I.3.22 Related model

Model considered as certified even if it is not listed (see §I.3.13), and models that differ from the certified model due to the length.

I.3.23 Specific Daily Electrical Energy Consumption (SEC)

For Commercial Refrigerated Display Cabinets with incorporated air-cooled condensing unit (i.e. plug-in RDC), the Specific Daily Electrical Energy Consumption (SEC), expressed in [kWh/day.m²] must be calculated as follows and rounded to two decimal places:

$$SEC_{plug-in} = \frac{TEC_{plug-in}}{TDA}$$

With $TEC_{plug-in}$ and TDA determined as per §I.3.25 and §I.3.26 respectively.

I.3.24 Standard Annual Energy Consumption (SAE)

According to regulation (EU) 2019/2024 the Standard Annual Energy Consumption (SAE) means the reference annual energy consumption of a refrigeration appliance with a direct sales function expressed in kilowatt hour per year [kWh/a] with all compartments having the same temperature class and rounded to two decimal places.

$$SAE = (M + N \times Y) \times 365 \times C \times P$$

The parameters used in the calculation are defined in paragraphs I.3.24.1 to I.3.24.4.

I.3.24.1 'P' factor

According to regulation (EU) 2019/2024 means a correction factor that accounts for the differences between integral and remote (see §I.3.20) cabinets.

For integral supermarket cabinets $P=1.1$. For other refrigerating appliances with a direct sales function, the 'P' value = 1.00 according to regulation (EU) 2019/2024.

I.3.24.2 Temperature coefficient value 'C'

According to regulation (EU) 2019/2024 means a correction factor that accounts for the difference in operating temperature with values as set out in 5 and table 6.

I.3.24.3 Temperature coefficient values 'M' & 'N'

According to regulation (EU) 2019/2024 means modelling parameters that consider the total display area or volume-dependence of the energy use, with values as set out in table 5 and table 6.

I.3.24.4 'Y' parameter

According to regulation (EU) 2019/2024, 'Y' is the sum of the TDA (see §I.3.26) of all compartments of the same temperature class of the refrigerating appliance with a direct sales function, expressed in square meters (m²), and rounded to two decimal places.

Table 3: Temperature coefficient values for C, M & N [According to Annex III of regulation (EU) 2019/2024]

Geometry	M- package T° class	Value for C	Value for M	Value for N
Vertical, semi-vertical and combined supermarket refrigerator cabinets	M2	1.00	9.1	9.1
	H1/H2	0.82		
	M1	1.15		
Horizontal supermarket refrigerator cabinets	M2	1.00	3.7	3.5
	H1/H2	0.92		
	M1	1.08		
Vertical, semi-vertical and combined supermarket freezer cabinets	L1	1.00	7.5	19.3
	L2	0.90		
	L3	0.90		
Horizontal supermarket freezer cabinets	L1	1.00	4.0	10.3
	L2	0.92		
	L3	0.92		

Table 4: Temperature coefficient values for C, M & N for M0 class [According to recommendation Eurovent 14/6-2020]

Geometry	M- package T° class	Value for C	Value for M	Value for N
Vertical, semi-vertical and combined supermarket refrigerator cabinets	M0	1.30	9.1	9.1
Horizontal supermarket refrigerator cabinets	M0	1.13	3.7	3.5

1.3.25 Total daily electrical Energy Consumption (TEC)

For remote cabinets, the Total daily Energy Consumption (TEC) is the sum of REC and DEC ($TEC_{remote} = REC + DEC$), expressed in [kWh/day] and rounding all terms in the formula to the second decimal.

For Integral cabinets equipped with air-cooled condensing unit (plug-in RDC, see §1.3.19), REC is not defined so $TEC_{plug-in}$ is the summation of all electrical energy using components and it shall be measured as per chapter 5.3.5.2 of EN ISO 23953-2:2015:

$$TEC_{plug-in} = DEC = FEC + LEC + AEC + DFEC + PEC + CEC$$

with

FEC [kWh/day]: Fan Energy Consumption : energy consumed by fan motors, measured as per §D.3.2.1 of standard ISO EN 23953-2:2015.

LEC [kWh/day]: Lighting Energy Consumption: energy consumed by lights fitted in the refrigerated display cabinet, measured as per §D.3.2.2 of standard ISO EN 23953-2:2015.

AEC [kWh/day]: Anti-condensate Energy Consumption : Total Daily Energy Consumption used in condensate removal on the outside of the Commercial Refrigerated Display Cabinet, which typically includes condensate heater energy, measured as per §D.3.2.3 of standard ISO EN 23953-2:2015.

DFEC [kWh/day]: Defrost Energy Consumption : energy consumed by defrost heaters during defrost period, measured as per §D.3.2.4 of standard ISO EN 23953-2:2015.

PEC [kWh/day]: Condensate Evaporator Pan Energy Consumption : amount of heat energy required to change condensate from liquid to a vapor in the pan of an automatic water evacuation system of a cabinet with an incorporated condensing unit, measured as per §D.3.2.5 of standard ISO EN 23953-2:2015.

CEC [kWh/day]: Compressor Energy Consumption : energy consumed by the compressor of a condensing unit incorporated in a refrigerated display cabinet, measured as per §D.4.3 of standard ISO EN 23953-2:2015.

For Integral cabinets equipped with liquid-cooled condensing unit (semi-plug-in RDC, see §I.3.19), the TEC is the sum of the Direct Energy Consumption (DEC) and the Heat Removal Energy Consumption (HREC):

$$TEC_{\text{semi}} = DEC + HREC$$

with

H_{REC} [kWh/day]: Heat Removal Energy Consumption: energy consumption of the cooling system (Dry Cooler) and the pump(s), measured during the temperature test.

I.3.26 Total Display Area (TDA)

The Total Display Area (TDA) means the total visible foodstuffs and other items area including visible area through glazing and can be defined by the sum of horizontal and vertical projected surface areas of the net volume, expressed in square meters [m²]. It is calculated according to EN ISO 23953-2:2015 Annex A rounding all terms in the formula to the second decimal.

I.4 Contributors

The lists of contributors are given for information and may be modified by EUROVENT CERTITA CERTIFICATION whenever necessary.

I.4.1 Audit body

The audit functions are performed by the following body, called audit body:

EUROVENT CERTITA CERTIFICATION Ltd

Kemp House 152 City Road
EC1V 2NX London
United Kingdom
Tel : (+ 44) 789 671 1612
www.eurovent-certification.com

I.4.2 Independent laboratory / test body

When the checks carried out involve product tests, these are performed at the request of EUROVENT CERTITA CERTIFICATION by the following laboratories, known as Independent laboratory:

IMQ S.p.A.

Via Quintiliano,
43 -20138 Milano -Italy
(+39) 02 5073 330

II. REQUIREMENTS OF THE REFERENCE DOCUMENT

II.1 Reference documents

II.1.1 Applicable standards and regulations

The test procedure is detailed in the technical appendix and in the product and test standards.

The applicable standards and regulations are the following (non-exhaustive list):

EN ISO 23953-1: 2015: Refrigerated display cabinets - Part 1: Vocabulary

EN ISO 23953-2: 2015: Refrigerated display cabinets - Part 2: Classification, requirements and test conditions.

(EU) 2019/2024: Laying down eco-design requirements for refrigerating appliances with a direct sales function pursuant to Directive 2009/125/EC of the European Parliament and of the Council.

(EU) 2019/2018: European regulation setting a framework for energy labelling of refrigerating appliances with a direct sales function and supplementing Regulation (EU) 2017/1369.

Eurovent 4/16-2020: Interpretation of the Regulation (EU) 2019/2018 and of the Regulation (EU) 2019/2024.

II.1.2 Quality management systems standards

EN ISO 9001:2015, Quality management system – Requirements.

II.2 Marking

It is highly recommended that the participating company indicates participation in the EUROVENT CERTIFIED PERFORMANCE (ECP) programme for Refrigerated Display Cabinets as laid down in the Certification Manual.

II.2.1 Display of Eurovent Certified Performance mark on production units

In addition to the provisions laid down in the Certification Manual, the following requirements apply.

Each participant is entitled to display the Eurovent Certified Performance (ECP) mark on each production unit of models which have been certified by means of a sticker or by application directly on the nameplate.

The participant may affix the certification mark sticker at any location thereon satisfactory to him. The ECP mark may be applied as part of nameplate of certified products providing it meets the requirements stated in Certification Manual.

Whenever the participant applies the mark, the ECP mark shall conform to the design, minimum size and proportions as presented in the Certification Manual and include in the dedicated area (see Certification Manual) the short name (RRDC or IRDC) of the relevant sub-programme the product is certified for.

II.2.2 Display of Eurovent Certified Performance mark on technical documentation

In addition to the provisions laid down in the Certification Manual, the following requirements apply.

On a generic documentation without any technical data, the Eurovent Certified Performance mark can be used as defined in the Certification Manual.

On any public documentation carrying performance data these should be published in accordance with Eurovent Certified Performance website data. In other words, in order to display the Eurovent Certified Performance mark, published technical documentation shall include standard ratings. Mark is mandatory on quotations and in commercial literature.

On commercial documentation, if there are certified models in it, it is highly recommended to use the Eurovent Certified Performance mark.

On a commercial documentation which carries the Eurovent Certified Performance mark, each listed model shall carry a footnote “published on the Eurovent Certified Performance website.”

III. CERTIFICATION PROCESS

III.1 Admission procedure

III.1.1 Declaration of data

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

The Applicant, after signing the Certification Agreement, shall send to EUROVENT CERTITA CERTIFICATION all information required for the qualification:

- Declaration file RDC-1 with all models within the scope
- Relevant literature

III.1.1.1 Rated performance data

All characteristics shall be expressed in SI Units.

2 decimals shall be used for DEC, REC, TDA. TEC will be automatically calculated with 2 decimals. Efficiency = round (TEC/TDA,2) will be automatically calculated with 2 decimals and EEI = round (Eff/Effref,2) will be automatically calculated with 2 decimals (ex: 1.25).

When declared to Eurovent Certita Certification, performance shall be given in laboratory conditions. When published on Eurovent Certified Performance website and on Participant documentation, characteristics have to be displayed in one of the following ways:

- under laboratory conditions + under store conditions
- under laboratory conditions + the applicable coefficient
- only under store conditions.

Performance data (Evaporation temperature and Heat Extraction Rate) under store conditions have to be equal to performances in laboratory conditions (as declared) corrected by a coefficient function of the temperature, detailed in §A.3 .Definition of store conditions can be found in Annex B of EN ISO 23953-2:2015, they are reproduced in Table 5.

III.1.1.2 Certification forms

Submittal of all models and associated ratings shall be completed and sent to Eurovent Certita Certification as .xls or .xlsx files. The forms shall be sent by e-mail to EUROVENT CERTITA CERTIFICATION within the time limits specified in Certification Schedule (see Appendix C– Campaign schedule, if applicable).

Copies of the forms are part of these Technical Certification Rules (see Appendix B):

- Declaration file RDC-1 will be used
 - for manufacturing companies (Original Equipment Manufacturer – OEM) to declare ranges, Basic Model Groups (BMG), performance ratings, technical data and the following elements:
 - Bill of Material (BOM) for each declared unit
 - The lowest reachable temperature class when declaring performance data at class 3 (Example: when declaring a cabinet, if 3M1 has been declared, performances at 3M0 cannot be displayed on technical documentation)
 - Production sites
 - for Brand Name (BN) companies to identify the corresponding model's number of the original equipment manufacturer
- Technical data sheet RDC-2 will be used to complete technical description of all raw material or incoming goods for the units selected.
- Reporting of test result for tested models, is sent by Eurovent Certita Certification, showing the deviations between claimed and measured data.

III.1.2 Admissibility of the application

For each pre-defined BMG, the Applicant/Participant must declare a minimum of two models. He may show evidence that he doesn't have a model that matches one or more categories.

All models presented by the Applicant/Participant shall be listed together. It is not acceptable to modify values on previously tested or re-rated models or ranges.

III.1.3 Implementation of checking operations

In addition to the provisions laid down in the Certification Manual, the following requirements apply.

Eurovent Certita Certification selects one unit from the declaration list and requests the manufacturer to send the selected unit to the laboratory. The independent laboratory staff proceeds to products performance testing on the selected unit according to the procedure detailed in III.1.3.2.

In the meantime, an auditor appointed by Eurovent Certita Certification shall audit one (1) manufacturing site chosen by Eurovent Certita Certification (see III.1.3.1).

III.1.3.1 Initial admission audit

a) Purpose

The purpose of the audit is to verify that the applicant/participant produces Refrigerated Display Cabinets units in compliance with ECC certification rules and quality management requirements.

b) General

Eurovent Certita Certification shall notify the Applicant/Participant of the intent to audit a factory. This notification shall request a settled date of audit and the order.

The duration of the site audit is one day ,this duration can be adjusted in the case of carrying out a joint audit with other certifications.

One factory will be audited for the admission campaign.

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.

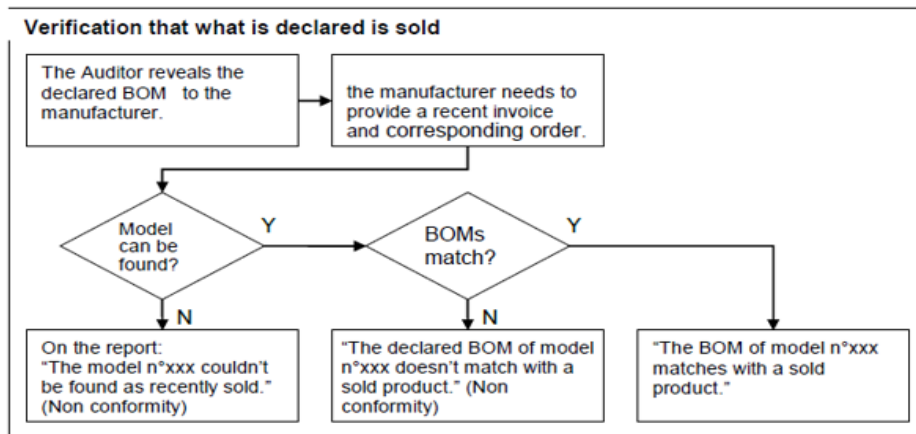
c) Audit requirements

The provisions of the Certification Manual apply.

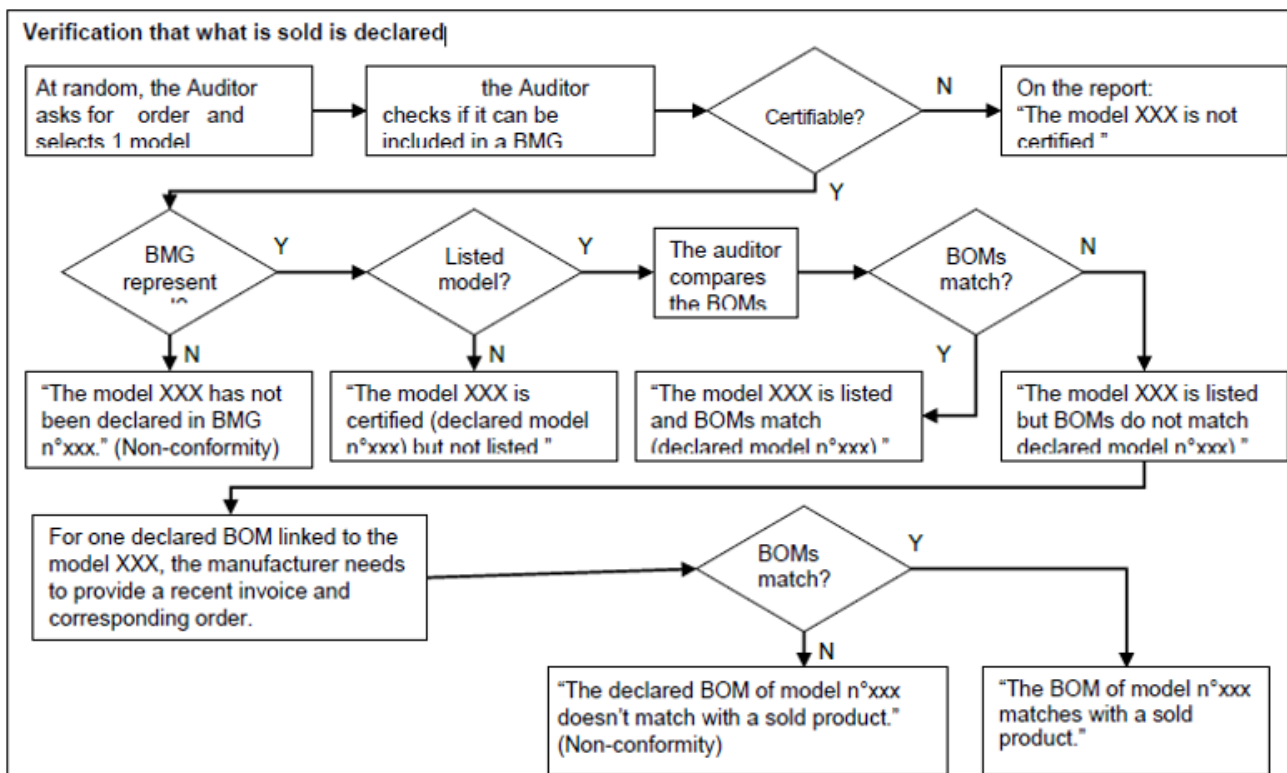
- During the audit, the auditor will:

- Select 1 unit from the declaration list to check that what is declared is sold
- Select 1 order from PA orders list to check that what is sold is declared

What is declared is sold :



What sold is declared:



For the selected product, the auditor checks if the model is:

- non-certified (could not have been declared because it doesn't fit with the BMGs)
- missing in the declaration (could have been declared but the BMG is empty in the declaration, it is a failure)
- certified and related (covered by a listed model)
- certified and listed (the product is presented with the same performances as a listed one).

When the model is listed, the BOMs are compared.

If the BOMs do not match, the manufacturer needs to provide a recent invoice and corresponding order that matches the BOM.

In the frame of comparison of BOMs, the Auditor can check the codes, the component orders, the “in/out register” of the store, the assembly lines.

When comparing the BOMs, if a discrepancy on the night cover or on the shelf lighting is found, it is not considered as non-conformity.

- The auditor will also perform a review of the quality management system:

- the suppliers and subcontractors are regularly evaluated and that the corresponding evaluations are recorded:

The manufacturer shall carry out an incoming goods inspection by sampling or any other evaluation over all the components involved in the assembly of the cabinets, in order to ensure their compliance with the technical specifications.

- All the inspections and tests carried out throughout the assembly process shall be validated and recorded
- the factory personnel are qualified to perform the specific tasks (example: Brazing/welding)
- every product traceability is ensured
- calibration of measuring devices is performed on a regular basis
- production non-conformities are recorded, and corrective actions initiated
- Inspection of final products (100% inspection):
- Customer complaints about certified products are registered and processed. Action plans must be recorded
- corrective actions plan from the last audit is completed or under implementation.
- check that the ECP mark is displayed on the units and on the documentation in compliance with the requirements (see II.2. Marking)

d) Audit report and failure treatment

Based on the findings, the auditor will report any non-conformity and any evidence that may affect the conclusions of the manufacturer's level of responsibility in the audit report to be signed on site with the factory representative.

Then, the auditor shall send the signed Audit Report to Eurovent Certita Certification. After checking the audit report, Eurovent Certita Certification shall communicate audit conclusions and report to the Applicant/Participant.

Classification of the non-conformities:

The classification of non-conformities criticality is performed by the lead auditor in agreement with the members of the audit team. It depends on the certification scope (and the corresponding certification rules).

The non-conformity is classified as **critical (C)** when, based on impartial evidences,

- there is a significant risk² to the product conformity regarding specified requirements

or,

- there is a significant risk² for the ability of management system to manage the conformity of the product regarding the specified requirements,

or,

- a specified requirement is systematically and repetitively unmet.

In other cases, the non-conformity is classified as **non-critical (NC)**.

² The explanation of the risk must be written for each nonconformity, in the nonconformities sheet.

In case of non-conformity, the audit failure treatment consists of the following:

- The manufacturer sends within one month the filled out corrective actions report previously provided by Eurovent Certita Certification. In this way, corrective actions are proposed to solve detected non-conformities and deadlines.
- The auditor analyses the corrective actions report and validates the corrective actions and their deadline or ask for further information.
- At the end of each proposed deadline, accepted by Eurovent Certita Certification, the manufacturer provides evidences of the implementation of the corrective actions.
- The auditor validates the corrective actions regarding the provided evidences.
- The audit is considered as positive when all corrective actions and their evidences are validated by the auditor. However, the actual implementation of the corrective actions can be conducted during the next audit.
- If Eurovent Certita Certification is not able to validate corrective actions and their evidences for critical non-conformities:
 - it can ask for an additional audit in order to check the implementation of corrective actions before the next yearly audit
 - the certification can be suspended until the solving of non-conformities

III.1.3.2 Selection of units to be tested

In addition to the provisions laid down in the Certification Manual, the following requirements apply: EUROVENT CERTITA CERTIFICATION shall select units to be tested based on its evaluation of the declaration file RDC-1 communicated by the Applicant/Participant.

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

- Scheduled tests in admission procedure
- Scheduled tests in surveillance procedure
- Penalty tests
- Complaint tests³

a) Number of units to be tested

The total number of units to be tested is defined as two (2):

*If an applicant joins both sub-programmes, the total number of units to be tested is two, one for RRDC and one for IRDC.

*If an applicant joins only one sub-programme the total number of units to be tested is two.

b) Selection and Shipment

Eurovent Certita Certification shall notify the Applicant/Participant of the intent to test specific models in accordance with the programme requirements. For each selected model, one unit shall be obtained from production lines, or any stocking point, and delivered by the Applicant/Participant to the laboratory within the certification schedule. Furthermore, no test will be ordered to the laboratory without prior payment to Eurovent Certita Certification.

The Applicant/Participant is responsible for the delivery of the units to the laboratory.

³ See challenge procedure in the Certification Manual

III.1.3.3 Tests at the independent laboratory

a) General

In addition to the provisions laid down in the Certification Manual, the following requirements apply. Before testing, the laboratory shall check the product against the information declared in the technical datasheet to ensure that the unit corresponds to the selection.

The laboratory shall not perform the test and contact EUROVENT CERTITA CERTIFICATION when:

- one of the information is not compliant with the technical datasheet (see technical appendix),
- one of the units appears damaged

EUROVENT CERTITA CERTIFICATION will contact the Applicant/Participant to give instructions regarding further actions.

In addition, the Applicant/Participant shall send to the independent laboratory:

- The specified model and internal fittings;
- Filled technical data sheet (TDS)
- All relevant installation and operation manuals;
- All the usual refrigeration engineer's tools or any type of condensing unit definition necessary for carrying out the test;
- Filled in BOM and attached drawings.

The Applicant/Participant shall ensure that a technician will manage on site for 5 days (10 days for frozen food cabinets):

- The receipt of the cabinet;
- The electrical and refrigeration installation and if necessary additional installation for defrost system (electric, pressure gas, etc.);
- For cabinets with remote condensing unit: the installation of the condensing unit in a separate climate room if not available in the laboratory;
- The settings to reach the expected M-package temperature classification;
- Assistance in loading the cabinet;
- The final adjustment of the superheat and settings;
- The final approval to begin recording test figures.

Manufacturer 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.

The Applicant shall organize the dismantling of the installation and the shipping of the model back to his premises.

b) Time limitation of acquisition and recovery of units

If the laboratory is unable to obtain the unit and the relevant documentation within the time limitations defined by Eurovent Certita Certification (see Appendix C), it is considered as non-application of procedures (see Certification Manual dedicated chapter).

The Applicant/Participant shall notify Eurovent Certita Certification within 4 weeks after receiving the test report if he intends to recover the tested unit. The Applicant/Participant shall choose scrapping YES or NO and complete it in the Technical Data Sheet for each tested model. In case he doesn't, Eurovent Certita Certification will order the laboratory to scrap of the units and invoice the Applicant/Participant the disposal fee (the certificate of disposal shall be issued to the Applicant/Participant).

The Applicant/Participant has to recover its unit within 6 weeks after receiving the corresponding test report.

c) Test conditions

The units shall be tested at the conditions as stated in Appendix A.

d) Test report and tests results

The test report shall comply with the provisions of standard EN ISO 23953-2:2015.

e) Failure treatment

When a unit fails to comply with the requirements of the Appendix A, failure treatment shall be applied. For each test, a performance item fails when the difference between the declared value and the measurement is not within the allowable acceptance criteria. A test fails when one or more performance(s) fail. In case of failure, Eurovent Certita Certification shall promptly notify the applicant/participant. The applicant/participant shall examine the reason(s) of the failure.

Initial test failure

Is considered as an initial test failure any situation where:

- the unit to be tested cannot be operated, or
- any functional component of the unit to be tested is out of order
- the unit to be tested, or any of its components is damaged, e.g. due to transportation.

In case of an initial test failure, the complete test shall then be carried out on the repaired unit or a new unit from the same model. The new unit shall be delivered within eight weeks from the notification of the failure.

Consequences of wrong unit delivery

Also, in case another cabinet than the one selected by Eurovent Certita Certification is sent to the independent laboratory and it cannot be changed in time (non-respect of the predefined test planning), the Applicant/Participant must pay the full test costs to the independent laboratory, even if the said cabinet is not tested.

General

If the value found by testing in the independent laboratory differs by more than the acceptance criteria (see §A.5), the Applicant/Participant will have four weeks from the notification of the failure to select one of the following alternatives:

- Re-rate the same commercial range in accordance with the re-rating rules within 8 weeks.
- 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. The new unit shall be delivered within six working weeks after reply.

Re-rating rules

The performance characteristics of the tested model shall be re-rated to the actual values obtained by testing in the same BMG, the same deviation percentage is applied for other models of the BMG with the same key components (Fans and evaporator(s)).

If test results are better than claimed values for more than the acceptance criteria, the Applicant/Participant may up-rate the performance of the tested model to the measured value in the test report under the conditions defined by the certification manual.

Second test

If the second test is unsuccessful, the Applicant/Participant shall re-rate according to the results from the second test and the re-rating rules.

Penalty test

For each failed unit, an additional test shall be scheduled for the next test campaign.

III.1.4 Evaluation and decision

In addition to the provisions laid down in the Certification Manual, the following requirements apply.

The certification is granted on condition that:

- The aforementioned checks prove all the ranges compliance with the requirements specified in Appendix A,
- All the other requirements from the present Technical Certification Rules 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.

The certification is granted for a given sub-programme so the success or failure for one sub-programme does not affect the decision for the other sub-programme. The manufacturer can only apply the marking (see §II.2) on certified products. If the admission is complete for one sub-programme (e.g. RRDC) but not for the other (e.g. IRDC) and that he wants to communicate about both certifications then he has to wait until he gets the certification for the other sub-programme too (IRDC in the example). Until then he can only communicate about the one which succeeded (RRDC in the example).

III.2 Surveillance procedure

In addition to the provisions laid down in the Certification Manual, the following requirements apply.

III.2.1 Implementation of surveillance operations

III.2.2 Surveillance audit

Maximum 2 factories per year will be audited whatever the number of declared plants.

A plant is audited when the sales volume of the products in the scope is equal to or greater than 10%.

Example:

Sales volumes year N-1: Plant 1: 5% Plant 2: 39% Plant 3: 12%

Plants to be audited in year N: Plant 2 & Plant 3

At the beginning of each certification campaign, ECC will ask the PA to send the sales volumes of all the declared plants (Form RDC-3), the project manager will choose which plants to be audited based on the sales volumes.

For the surveillance procedure, the surveillance audit follows the same rules as the admission audit (see III.1.3.1).

In case of force majeure (e.g. accidents, labour disputes, natural events, acts of war) which would not allow ECC to perform the audit, ECC can decide to perform a remote audit. The requirements of performing the remote audit are explained in the certification Manual.

III.2.2.1 Selection of units to be tested

For the surveillance procedure, Eurovent Certita Certification shall select units following the same rules as the admission procedure (see III.1.3.2).

The required number of units for scheduled tests is defined as two (2) units for the surveillance procedure (one unit every 6 months per participant).

III.2.2.2 Surveillance tests

The total yearly number of units to be tested (excluding the penalty tests) is defined as two (2):

*If a participant participates to both sub-programmes, the total number of units to be tested is two, one for RRDC and one for IRDC

*If a participant participates only to one sub-programme the total number of units to be tested is two.

III.2.2.3 Technical and commercial documentation check

The provisions of the Certification Manual apply.

III.2.3 Evaluation and decision

In addition to the provisions laid down in the Certification Manual, the following requirements apply.

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

Surveillance tests in independent laboratory shall be conducted annually in compliance with the Certification Schedule (see Appendix C).

Units selected from regular production shall be tested in the independent laboratory selected by Eurovent Certita Certification.

For the surveillance procedure the certification is renewed at the date specified in the Certification Schedules (see Appendix C) 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 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.3 Declaration of modifications

The provisions of the Certification Manual apply.

III.3.1 Changes concerning the participant

The provisions of the Certification Manual apply.

III.3.2 Changes concerning production entities

The provisions of the Certification Manual apply.

III.3.3 Changes concerning the quality organisation of the manufacturing and/or marketing process

The provisions of the Certification Manual apply.

III.3.4 Changes concerning the certified range

The provisions of the Certification Manual apply.

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III.3.5 Changes concerning the certified product

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

The applicant/participant shall inform Eurovent Certita Certification of any modification of the product portfolio by updating the declaration file (RDC-1). Non-compliance of the applicant/participant is considered as non-application of procedures (see Certification manual).

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

III.4 Suspension/cessation conditions

The provisions of the Certification Manual apply.

APPENDIX A. TECHNICAL APPENDIXES

A.1 Purpose

The purpose of these Technical appendixes is to establish definitions and specifications for testing and rating of Refrigerated Display Cabinets for the related Eurovent Certified Performance Programme, in accordance with these Technical Certification Rules.

A.2 Testing requirements

Verification of performance characteristics shall be carried out in accordance with the European Standard EN ISO 23953-2:2015.

- 1- The laboratory will check on receipt of the cabinet the content of the marking plate and the definition of the cabinet to verify that physical data are in accordance with the specifications given by Eurovent Certita Certification for this cabinet. If the marking plate or the definition of the cabinet is not in accordance with the specifications, the laboratory shall contact Eurovent Certita Certification.
- 2- The laboratory will perform tests according to EN ISO 23953:2015 parts 1 and 2

All tests have to be performed according to the general test conditions and procedures defined EN ISO 23953-2:2015 chapters 5.3.1 and 5.3.2. The acceptance criteria on power supply shall apply EN ISO 23953-2:2015 chapter 5.3.2.10 in relation to the nominal values which are given on the marking plate (230 V).

- The results of the yearly check of the empty test room according to EN ISO 23953-2:2015 chapter 5.3.1.2 must be sent to Eurovent Certita Certification.
- A loading cross section (as in EN ISO 23953-2:2015 chapter 5.3.2.3.3.2) could be proposed by the manufacturer and should be followed by the laboratory if it is in accordance with EN ISO 23953-2:2015 chapter 5.3.2.3 and if not, shall be submitted to Eurovent Certita Certification for decision
- Only the second test concerning lighting and night covers (EN ISO 23953-2:2015 chapter 5.3.2.7) will be performed to represent 12 hours day and 12 hours night. This means that in 5.3.2.7), the two § (a) are not considered, only (b).
- On models with lights, all lights must be lit.
- Chilled serve over counters with integrated storage closed service access must be tested with the storage unloaded, without any temperature check within this volume.
- All islands with air discharge in the middle and closed cabinets must be tested following EN ISO 23953-2:2015. Doors that are used for service, cleaning or loading of the cabinet only shall not be opened during the test of closed cabinets.
- Roll-in cabinets must be loaded for test according EN ISO 23953-2:2015 and the following specifications: If not otherwise stated in the manufacturer's manual or marked inside the cabinet, the packages and the wood shall be loaded on standard euro pallets (1200 x 800 x 144 mm) or if not applicable on a similar tray of the same height. The surface of the pallet should be covered by a sheet of plastic or carton so that the packages can be loaded properly. Metallic grids can be used to support the test package loading on M-package rows and the adjacent ones.
- Temperature test according to EN ISO 23953-2:2015 chapter 5.3.3, but without defrost check (§ 5.3.3.3).
- Water vapour condensation test according to EN ISO 23953-2:2015 chapter 5.3.4, but it shall only be reported and additionally documented by photographs if there is "R" zone running water.
- Electrical energy consumption test according to EN ISO 23953-2:2015 chapter 5.3.5.
- For Remote RDC, Heat extraction rate measurement according to EN ISO 23953-2:2015 chapter 5.3.6. Additionally, HER shall be provided separately for 12h at day and for 12h at night.
- Before applying EN ISO 23953-2:2015 chapter 5.3.2.7.b) concerning lighting and night covers, stable conditions must be reached with night cover ON, as defined in 5.3.2.5 and its

amendments (ISO 23953-2:2015). In addition, for open frozen cabinets fitted with lighting and night covers, stable conditions are reached with the cabinet continuously closed with light switch on continuously.

- The laboratory shall measure independently the consumption of the evaporation fan and the secondary (air curtain) fan.
 - When measuring DEC, the laboratory shall evaluate separately electrical box, controller, electronic expansion valve and night-blind motor.
- 3- The laboratory will check all dimensional characteristics specified in the declaration list with admitted tolerances and all components fitted in the cabinet as described in declaration list (see B.1).
 - 4- The laboratory will send the test report simultaneously to the manufacturer and to Eurovent Certita Certification within four weeks after completion of test.
 - 5- The laboratory will preserve all measurement data obtained with the data acquisition system (temperatures, pressures, flow etc.) for at least one year after completion of the test and provide them to the participant.

Running water is not accepted in the cabinet due to safety reasons. A decision on failure will be taken by Eurovent Certita Certification in accordance with the Programme Committee in case of running water use.

A.3 Rating requirements

In order to rate cabinets with options, the following approximations shall be used:

We always refer to **test room temperature class 3**.

Electrical defrost for chilled cabinets:

$$DEC_{total} \approx DEC_{declared} + DEC_{defrost}$$

Where:

$$DEC_{defrost} = 1/2 \text{ time the natural defrost x heat input from electrical defrost heater}$$

The natural defrost time can be available on the technical documentation, otherwise it can be found on the laboratory reports of the cabinet.

$$REC_{total} \approx REC_{declared}$$

Additional lighting inside the cabinet (ex: shelves):

$$DEC_{total} \approx DEC_{declared} + DEC_{extra \text{ inside light}}$$

Where:

$$DEC_{extra \text{ inside light}} = 12h \times P_{lamp} \times nb \text{ of lamps}$$

P_{lamp} does include the ballast or the transformer.

$$REC_{total} \approx REC_{declared} + DEC_{extra \text{ inside light}}$$

Alternative lighting inside the cabinet (ex: shelves):

$$DEC_{total} \approx DEC_{declared} + DEC_{alternative\ inside\ light}$$

Where:

$$DEC_{alternative\ inside\ light} = 12h \times (P_{alternative\ lamp} - P_{declared\ lamp}) \times nb\ of\ lamps$$

$$REC_{total} \approx REC_{declared} + DEC_{alternative\ inside\ light}$$

Additional lighting outside the cabinet (ex: canopy):

$$DEC_{total} \approx DEC_{declared} + DEC_{extra\ outside\ light}$$

Where:

$$DEC_{extra\ light} = 12h \times P_{additional\ lamp} \times nb\ of\ additional\ lamps$$

$$REC_{total} \approx REC_{declared}$$

Alternative lighting outside the cabinet (ex: canopy):

$$DEC_{total} \approx DEC_{declared} + DEC_{alternative\ outside\ light}$$

Where:

$$DEC_{alternative\ outside\ light} = 12h \times (P_{alternative\ lamp} - P_{declared\ lamp}) \times nb\ of\ lamps$$

$$REC_{total} \approx REC_{declared}$$

Cabinets without night blind:

$$DEC_{total} \approx DEC_{declared}$$

$$REC_{total} \approx 2 \times REC_{with\ no\ night\ blind\ 12h}$$

Internal fitting:

For internal fittings of open cabinets: $G/400 - 1 < \text{Number of shelves} < G/200 - 1$:

$$DEC_{total} \approx DEC_{declared}$$

$$REC_{total} \approx REC_{declared}$$

G is the display opening [mm].

It will be necessary to declare the open cabinet if the internal fitting is not compliant with the rule above.

The cabinets cannot be declared without shelf.

Regarding closed cabinets, number of shelves is free.

Shelves depth, mirror, tilted shelves, full loading or 100mm do not influence our calculation of DEC and REC.

Fan option:

$$DEC_{total} \approx DEC_{declared} + (\text{Power input}_{alternative\ fan} - \text{Power input}_{declared\ fan}) \times \text{running\ time\ of\ the\ fan}$$

$$REC_{total} \approx REC_{declared}$$

Additional anti-condensation heater:

$$DEC_{total} \approx DEC_{declared} + DEC_{anticondensation}$$

Where:

$$DEC_{anticondensation} = P_{anticondensation} \times \text{running time}$$

$$REC_{total} \approx REC_{declared}$$

The anti-condensation running time can be available on the technical documentation, otherwise it can be found on the laboratory reports of the cabinet.

Alternative anti-condensation heater:

$$DEC_{total} \approx DEC_{declared} + DEC_{anticondensation}$$

Where:

$$DEC_{anticondensation} = (P_{anticondensation\ optional} - P_{declared\ anticondensation}) \times \text{running time}$$

$$REC_{total} \approx REC_{declared}$$

Electrical box, controller, electronic expansion valve, night blind motor:

$$DEC_{total} \approx DEC_{declared}$$

$$REC_{total} \approx REC_{declared}$$

When published on the Eurovent Certita Certification website and in Participant documentation, characteristics shall be displayed in store conditions. Performances (Evaporating temperature and Heat Extraction Rate) in store conditions have to be equal to performances in laboratory conditions (as declared) corrected by a coefficient function of the temperature (T). Correction is detailed below, where α and β are given in Table 5:

$$EvapT_{storecond}(T) = EvapT_{labcond} + \alpha(T)$$

$$HER_{storecond}(T) = HER_{labcond} \times \beta(T)$$

Temperature is given on the Eurovent Certita Certification website between T_{min} and T_{max} with steps of 1°C.

The complete range of various climate conditions and various ways of loading in stores cannot be simulated in the laboratory. For these reasons, specific climate classes and loading are defined for tests in the laboratory to classify cabinets and to make comparisons.

For open refrigerated display cabinets, test results in laboratory cannot be directly transposed in stores.

Table 5: Definition of store conditions as per Annex B of EN ISO 23953-2:2015

23/04/2010

		ISO Temperature Class	Max. Product Temperature (°C)	Evaporation temperature to be added to	Heat Extraction Rate to be multiplied by	Evaporation temperature to be added to	Heat Extraction Rate to be multiplied by	
		DAY			NIGHT		DAY & NIGHT	
Semi-vertical vertical WITH doors (Category 1)	3M0	4				0	0,950	
	3M1	5				0	0,950	
	3M2	7				0	0,950	
	3H	10				0	0,950	
	3L1	-18				1,0	0,950	
	3L1	-15				2,0	0,925	
	3L2	-18				0,0	0,975	
	3L2	-15				1,0	0,950	
	3L3	-15				0,0	0,975	
Multideckers semi-vertical OPEN (Category 2)	3M0	2	0,0	0,900	0,0	1,000		
	3M0	3	0,5	0,850	0,5	0,988		
	3M0	4	1,0	0,800	1,0	0,975		
	3M1	3	0,5	0,900	0,5	1,000		
	3M1	4	1,0	0,850	1,0	0,975		
	3M1	5	1,5	0,800	1,5	0,950		
	3M2	5	1,5	0,800	1,5	0,950		
	3M2	6	2,0	0,750	2,0	0,925		
	3M2	7	2,5	0,700	2,5	0,900		
	3H	7	1,0	0,850	1,0	0,975		
	3H	8	1,5	0,800	1,5	0,950		
	3H	9	2,0	0,750	2,0	0,925		
3H	10	2,5	0,700	2,5	0,900			
Islands (Category 3) & Service Counters (Category 4)	3M0	2	0,0	1,000	0,0	1,000		
	3M0	3	0,5	0,950	0,5	0,988		
	3M0	4	1,0	0,900	1,0	0,975		
	3M1	3	0,0	1,000	0,0	1,000		
	3M1	4	0,5	0,950	0,5	0,975		
	3M1	5	1,0	0,900	1,0	0,950		
	3M2	5	1,0	0,950	0,5	1,000		
	3M2	6	1,5	0,900	1,0	0,975		
	3M2	7	2,0	0,850	1,5	0,950		
	3H	7	0,5	0,950	0,5	1,000		
	3H	8	1,0	0,900	1,0	0,975		
	3H	9	1,5	0,850	1,5	0,950		
	3H	10	2,0	0,800	2,0	0,925		
	3L1	-18	1,0	0,950	1,0	0,975		
	3L1	-15	2,0	0,900	2,0	0,950		
3L2	-18	0,0	1,000	0,0	1,000			
3L2	-15	1,0	0,950	1,0	0,975			
3L3	-15	0,0	1,000	0,0	1,000			
Combi Freezers (Category 5)	3L1	-18				1,0	0,950	
	3L1	-15				2,0	0,925	
	3L2	-18				0,0	0,975	
	3L2	-15				1,0	0,950	
	3L3	-15				0,0	0,975	

A.4 Certified performance items

The dimensional characteristics and performance items (see Table 6) shall be certified, in addition to warmest product temperature and performance under store conditions.

In Table 6 below, D means Declared only, D&P means Declared and Published, C&P means Calculated by Eurovent Certita Certification and Published.

Table 6: Data declared for certification, calculated for the purpose of certification and/or published

		R/O	R/WD	R/I	R/CF	R/SC	
General	Height	VV/m ²	D&P	D&P		D&P	
	Width	mm	D&P	D&P			
	Front height	mm	D&P				
	Top width	mm	D&P				
	Front glass height	mm			D&P	D&P	
	Ext width	mm			D&P		
	Loading depth	mm			D&P		
	Display width	mm				D&P	
	Lid				D&P	D&P	
	Light (true or false)			D	D		D&P
	Structure						D&P
	Internal storage						D&P
	TDA	m ²	D&P	D&P	D&P	D&P	D&P
	Cross-section	Display width type	mm				C&P
Ext width type		mm			C&P		
Front height type		mm	C&P				
Frozen or chilled				D&P	D&P	D&P	D&P
Height type		mm	C&P	C&P		C&P	
Top width type		mm	C&P				
Width type		mm	C&P	C&P			
Laboratory conditions	ISO T class		D&P	D&P	D&P	D&P	D&P
	DEC	kWh/day	D&P	D&P	D&P	D&P	D&P
	REC	kWh/day	D&P	D&P	D&P	D&P	D&P
	TEC	kWh/day	D&P	D&P	D&P	D&P	D&P
	Efficiency (lab)	%	C&P	C&P	C&P	C&P	C&P
	Energy efficiency class		C&P	C&P	C&P	C&P	C&P
	Efficiency reference		D&P	D&P	D&P	D&P	D&P
	Energy efficiency index		D&P	D&P	D&P	D&P	D&P
Bill of material	DimA	mm	D&P	D&P	D&P	D&P	D&P
	DimB	mm	D&P	D&P	D&P	D&P	D&P
	DimC	mm	D&P	D&P	D&P	D&P	D&P
	DimD	mm		D&P	D&P	D&P	
	DimE	mm	C&P	D&P		D&P	D&P
	DimF	mm		D&P			
	DimG	mm	D&P				
	DimH	mm	D&P			D&P	D&P
	DimI	mm				D&P	
	DimJ	mm				D&P	D&P
	Refrigerant		D&P	D&P	D&P	D&P	D&P
	Lighting type		D&P	D&P	D&P	D&P	D&P
	Glass door type		D&P	D&P	D&P	D&P	D&P
	Fan type		D&P	D&P	D&P	D&P	D&P
Length	mm	D&P	D&P	D&P	D&P	D&P	
ISO family		D&P	D&P	D&P	D&P	D&P	

A.5 Acceptance criteria

When tested in the laboratory the obtained performance data shall not differ from the claimed value by more than the acceptance criteria defined in the table below:

Performance item	Acceptance criteria for RRDC	Acceptance criteria for IRDC
Warmest product temperature (laboratory conditions)	+ 0.5 °C	+ 0.5 °C
Coldest (chilled) product temperature (laboratory conditions)	- 0.5 °C	- 0.5 °C
Heat extraction (laboratory conditions) [kWh/24h]	+ 10 %	/
Evaporating temperature (laboratory conditions)	- 1 °C	/
DEC [kWh/24h]	+ 5 %	+10%
REC [kWh/24h]	+ 10 %	/
TEC [kWh/24h]	+ 10 %	+10%
TDA [m ²]	- 3 %	- 3 %
Energy Efficiency Index EEI (laboratory condition)	failed if TEC is failed	failed if TEC is failed
Specific daily Electrical Energy Consumption	/	failed if TEC is failed
The measured M-package temperature class shall equal to or inside the claimed class, with an acceptance criterion of	+/- 0.5 °C	+/- 0.5 °C

APPENDIX B. FORMS

B.1 Form RDC-1: Product list declaration file

The form RDC-1 (declaration file) to be filled in shall be sent by Eurovent Certita Certification to:

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

A template will be available for information and upon request.

B.2 Form RDC-2: Technical Data Sheet (TDS)

The form RDC-2 (Technical Data Sheet) to be filled in shall be sent by Eurovent Certita Certification to applicants/participants who have returned the forms RDC-1 duly completed.

A template will be available for information and upon request.

B.3 Form RDC-3: Sales volume table

The form RDC-3 to be filled in shall be sent to Eurovent Certita Certification to participants.

A template will be available for information and upon request.

APPENDIX C. CAMPAIGN SCHEDULE

For surveillance campaigns, the following schedule shall be applied.

Testing rounds	1 st round	2 nd Round
Eurovent Certita Certification asks for the updating of product list before	01/12/n-1	
Participant confirms up-dating of products list before	01/01/n	
Eurovent Certita Certification sends selection list for testing before	31/01/n	
The Participant confirms selection list before + invoicing before	28/02/n	31/08/n
All payments are completed by the participant before	31/03/n	30/09/n
Delivery of the units + Technical data sheets before	30/04/n	14/10/n
The laboratory carries out all first tests* and send all test reports (*tests dates per default, the test schedule is agreed with the laboratory right after the selection)	01/05/n (3 weeks/test)	15/10/n (3 weeks/test)
Eurovent Certita Certification sends the test reports and results	2 weeks after reception of the test report from the laboratory	
The auditor audits the participant's production sites(s) before	30/06/n	
The auditor evaluates the correctives actions reports plan relevance (if any)	31/07/n	
All second tests (if applicable) are completed, and test reports sent to the participant before	30/11/n	
Eurovent Certita Certification sends the diploma if all requirements are fulfilled	15/12/n	
Diploma validity	31/12/n+1	

Table 7: Surveillance campaign schedule

Note: There may be an occasion for the 1st & 2nd round tests to be brought together to enhance the efficiency of testing for the test laboratory, however this must be agreed by Eurovent Certita Certification, the Applicant / Participant and the Test laboratory, this will be reflected in the test schedule sent to the laboratory & Applicant / Participant.

APPENDIX D. ECODESIGN AND ENERGY LABELLING FOR REFRIGERATED DISPLAY CABINETS

In December 2019, new EU regulations for commercial refrigerated display cabinets were published. The regulations introduce energy labelling (regulation 2019/2018) and Ecodesign requirements (regulation 2019/2024) for the energy consumption of appliances. The new rules become effective on 1 March 2021.

Table 8: Energy efficiency classes of refrigerating appliances with a direct sale function as per Table 1 from regulation 2019/2018

Energy Efficiency Class	EEI
A	EEI < 10
B	10 ≤ EEI < 20
C	20 ≤ EEI < 35
D	35 ≤ EEI < 50
E	50 ≤ EEI < 65
F	65 ≤ EEI < 80
G	EEI ≥ 80

The Energy Efficiency Index (EEI) used in the Energy Efficiency Class determination shall be determined in accordance with the regulation 2019/2018. The formula is given in §1.3.9.

According to regulation 2019/2024, the EEI for refrigerating appliances with a direct sales function shall not be above the following values:

- $EEI_{\max 2021}$ [%] = 100 from March 1st, 2021
- $EEI_{\max 2023}$ [%] = 80 from September 1st, 2023.

The verification tolerances for market surveillance purposes are given in Table 9 for information only⁴.

Table 9: Verification tolerances for measured parameters applicable to supermarket cabinets according to Annex V and Annex IX of regulation 2019/2018

Measured parameters	Verification tolerances
TDA	The determined value shall not be more than 3 % than the declared value.
E_{daily}	The determined value shall not be more than 10 % higher than the declared value
AE	The determined value shall not be more than 10 % higher than the declared value.

⁴ It can be noted that acceptance criteria used for the certification decision (see §A.5) are consistent with these verification tolerances.

APPENDIX E. LIST OF BMG

BMG n°	Category	Height type (bottom to top) [mm]	Width type (back to front) [mm]	Front height type [mm]	Top width type [mm]	External width type [mm]	Display width type [mm]	Front Glas type [Y/N/ <=300/>300]	Lid [Y/N]	Frozen or chilled	Superstructure	Shelves with lighting [Y/N]	Light [Y/N]
1	RVCA, RVF4 (Semi-vertical and Verticals) with doors	≤1800	≤900	-	-	-	-	-	-	Frozen	-	N	-
2		≤1800	≤900	-	-	-	-	-	-	Chilled	-	N	-
3		≤1800	900-1000	-	-	-	-	-	-	Frozen	-	N	-
4		≤1800	900-1000	-	-	-	-	-	-	Chilled	-	N	-
5		≤1800	>1000	-	-	-	-	-	-	Frozen	-	N	-
6		≤1800	>1000	-	-	-	-	-	-	Chilled	-	N	-
7		1800-2100	≤900	-	-	-	-	-	-	Frozen	-	N	-
8		1800-2100	≤900	-	-	-	-	-	-	Chilled	-	N	-
9		1800-2100	900-1000	-	-	-	-	-	-	Frozen	-	N	-
10		1800-2100	900-1000	-	-	-	-	-	-	Chilled	-	N	-
11		1800-2100	>1000	-	-	-	-	-	-	Frozen	-	N	-
12		1800-2100	>1000	-	-	-	-	-	-	Chilled	-	N	-
13		>2100	≤900	-	-	-	-	-	-	Frozen	-	N	-
14		>2100	≤900	-	-	-	-	-	-	Chilled	-	N	-
15		>2100	900-1000	-	-	-	-	-	-	Frozen	-	N	-
16		>2100	900-1000	-	-	-	-	-	-	Chilled	-	N	-
17		>2100	>1000	-	-	-	-	-	-	Frozen	-	N	-
18		>2100	>1000	-	-	-	-	-	-	Chilled	-	N	-
19	RVC1, RVC2, RVC3 (Multideckers / Semiverticals open)	≤1800	≤900	≤250	>700	-	-	-	-	-	-	N	-
20		≤1800	≤900	≤250	≤700	-	-	-	-	-	-	N	-
21		≤1800	≤900	250-450	>700	-	-	-	-	-	-	N	-
22		≤1800	≤900	250-450	≤700	-	-	-	-	-	-	N	-
23		≤1800	≤900	>450	>700	-	-	-	-	-	-	N	-
24		≤1800	≤900	>450	≤700	-	-	-	-	-	-	N	-
25		≤1800	900-1000	≤250	>700	-	-	-	-	-	-	N	-
26		≤1800	900-1000	≤250	≤700	-	-	-	-	-	-	N	-
27		≤1800	900-1000	250-450	>700	-	-	-	-	-	-	N	-
28		≤1800	900-1000	250-450	≤700	-	-	-	-	-	-	N	-
29		≤1800	900-1000	>450	>700	-	-	-	-	-	-	N	-
30		≤1800	900-1000	>450	≤700	-	-	-	-	-	-	N	-
31		≤1800	>1000	≤250	>700	-	-	-	-	-	-	N	-
32		≤1800	>1000	≤250	≤700	-	-	-	-	-	-	N	-
33		≤1800	>1000	250-450	>700	-	-	-	-	-	-	N	-
34		≤1800	>1000	250-450	≤700	-	-	-	-	-	-	N	-
35		≤1800	>1000	>450	>700	-	-	-	-	-	-	N	-
36		≤1800	>1000	>450	≤700	-	-	-	-	-	-	N	-
37		1800-2100	≤900	≤250	>700	-	-	-	-	-	-	N	-
38		1800-2100	≤900	≤250	≤700	-	-	-	-	-	-	N	-
39		1800-2100	≤900	250-450	>700	-	-	-	-	-	-	N	-
40		1800-2100	≤900	250-450	≤700	-	-	-	-	-	-	N	-
41		1800-2100	≤900	>450	>700	-	-	-	-	-	-	N	-
42		1800-2100	≤900	>450	≤700	-	-	-	-	-	-	N	-
43		1800-2100	900-1000	≤250	>700	-	-	-	-	-	-	N	-
44		1800-2100	900-1000	≤250	≤700	-	-	-	-	-	-	N	-
45		1800-2100	900-1000	250-450	>700	-	-	-	-	-	-	N	-
46		1800-2100	900-1000	250-450	≤700	-	-	-	-	-	-	N	-
47		1800-2100	900-1000	>450	>700	-	-	-	-	-	-	N	-
48		1800-2100	900-1000	>450	≤700	-	-	-	-	-	-	N	-
49		1800-2100	>1000	≤250	>700	-	-	-	-	-	-	N	-
50		1800-2100	>1000	≤250	≤700	-	-	-	-	-	-	N	-
51		1800-2100	>1000	250-450	>700	-	-	-	-	-	-	N	-
52		1800-2100	>1000	250-450	≤700	-	-	-	-	-	-	N	-
53	1800-2100	>1000	>450	>700	-	-	-	-	-	-	N	-	
54	1800-2100	>1000	>450	≤700	-	-	-	-	-	-	N	-	
55	>2100	≤900	≤250	>700	-	-	-	-	-	-	N	-	
56	>2100	≤900	≤250	≤700	-	-	-	-	-	-	N	-	
57	>2100	≤900	250-450	>700	-	-	-	-	-	-	N	-	
58	>2100	≤900	250-450	≤700	-	-	-	-	-	-	N	-	
59	>2100	≤900	>450	>700	-	-	-	-	-	-	N	-	
60	>2100	≤900	>450	≤700	-	-	-	-	-	-	N	-	
61	>2100	900-1000	≤250	>700	-	-	-	-	-	-	N	-	
62	>2100	900-1000	≤250	≤700	-	-	-	-	-	-	N	-	
63	>2100	900-1000	250-450	>700	-	-	-	-	-	-	N	-	
64	>2100	900-1000	250-450	≤700	-	-	-	-	-	-	N	-	
65	>2100	900-1000	>450	>700	-	-	-	-	-	-	N	-	
66	>2100	900-1000	>450	≤700	-	-	-	-	-	-	N	-	
67	>2100	>1000	≤250	>700	-	-	-	-	-	-	N	-	
68	>2100	>1000	≤250	≤700	-	-	-	-	-	-	N	-	
69	>2100	>1000	250-450	>700	-	-	-	-	-	-	N	-	
70	>2100	>1000	250-450	≤700	-	-	-	-	-	-	N	-	
71	>2100	>1000	>450	>700	-	-	-	-	-	-	N	-	
72	>2100	>1000	>450	≤700	-	-	-	-	-	-	N	-	
73	RHF3, RHF4, RHF5, RHF6, RHC3, RHC4, RHC5, RHC6 (Islands)	-	-	-	-	≤1400	-	Y	Y	-	-	N	-
74		-	-	-	-	≤1400	-	Y	N	-	-	N	-
75		-	-	-	-	≤1400	-	N	Y	-	-	N	-
76		-	-	-	-	≤1400	-	N	N	-	-	N	-
77		-	-	-	-	1400-1700	-	Y	Y	-	-	N	-
78		-	-	-	-	1400-1700	-	Y	N	-	-	N	-
79		-	-	-	-	1400-1700	-	N	Y	-	-	N	-
80		-	-	-	-	1400-1700	-	N	N	-	-	N	-
81		-	-	-	-	>1700	-	Y	Y	-	-	N	-
82		-	-	-	-	>1700	-	Y	N	-	-	N	-
83		-	-	-	-	>1700	-	N	Y	-	-	N	-
84		-	-	-	-	>1700	-	N	N	-	-	N	-
85	YF1, YF2, YF3, YF4 (Combi freezers)	-	-	-	-	≤930	-	-	-	Frozen	Traditional open	-	-
86		-	-	-	-	≤930	-	-	-	Frozen	Traditional closed	-	-
87		-	-	-	-	≤930	-	-	-	Frozen	Self-Service	-	-
88		-	-	-	-	≤930	-	-	-	Chilled	Traditional open	-	-
89		-	-	-	-	≤930	-	-	-	Chilled	Traditional closed	-	-
90		-	-	-	-	≤930	-	-	-	Chilled	Self-Service	-	-
91		-	-	-	-	>930	-	-	-	Frozen	Traditional open	-	-
92		-	-	-	-	>930	-	-	-	Frozen	Traditional closed	-	-
93		-	-	-	-	>930	-	-	-	Frozen	Self-Service	-	-
94		-	-	-	-	>930	-	-	-	Chilled	Traditional open	-	-
95		-	-	-	-	>930	-	-	-	Chilled	Traditional closed	-	-
96		-	-	-	-	>930	-	-	-	Chilled	Self-Service	-	-
97	-	≤2100	-	-	-	-	-	Y	-	Frozen	-	-	No at the bottom
98	-	≤2100	-	-	-	-	-	N	-	Frozen	-	-	No at the bottom
99	-	>2100	-	-	-	-	-	Y	-	Frozen	-	-	No at the bottom
100	-	>2100	-	-	-	-	-	N	-	Frozen	-	-	No at the bottom



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