Working document

with regard to ecodesign requirements for professional storage cabinets, blast cabinets, condensing units and process chillers

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products[1] and in particular Article 15(1) thereof,

After consulting the Ecodesign Consultation Forum,

Whereas:

(1) Under Directive 2009/125/EC ecodesign requirements should be set by the Commission for energy-related products representing significant volumes of sales and trade, having a significant environmental impact and presenting significant potential for improvement through design in terms of their environmental impact without entailing excessive costs.

(2) Article 16(1) of Directive 2009/125/EC provides, that in accordance with the criteria set out in Article 15, and after consulting the Ecodesign Consultation Forum, the Commission shall establish a working plan, setting out the indicative list of products which will be considered as priorities for the adoption of implementing measures for the following three years.

(3) The Commission has established the first Working Plan under Directive 2009/125/EC on 21 October 2008[2], covering the years 2009 to 2011, and which identifies refrigerating and freezing equipment, including professional storage cabinets, blast cabinets, condensing units and process chillers, as a priority for the adoption of implementing measures.

(4) The Commission has carried out a preparatory study on the technical, environmental and economic aspects of refrigerating and freezing equipment typically used in the Union, including professional storage cabinets, blast cabinets, condensing units and process chillers. The study was devised together with stakeholders and interested parties from the Union and third countries, and the results have been made publicly available.

(5) The fifth product of the refrigerating and freezing equipment lot, walk-in cold rooms, has been kept separate because of its unique characteristics within the group, and walk- in cold rooms are not currently being addressed by this Working Document. The appropriateness of setting ecodesign requirements for these products will be evaluated at the time of the Working Document review.

(6) The scope of this Working Document should not include process chillers intended to cool down and continuously maintain liquid at high temperature. These products should be included in the scope of a subsequent Working Document implementing Directive 2009/125/EC with regard to ecodesign requirements for air-conditioning

[1] OJ L 285, 31.10.2009, p. 10.
[2] (COM 2008 660)

systems, due to similar technical characteristics of process chillers operating at high temperature and air-conditioning chillers. Analogously, condensing units intended to maintain the temperature of indoor air inside a building in order to provide comfort cooling should not be included in the scope of this Working Document, and should be addressed by Working Documents related to air-conditioning appliances and systems. The consistency between the scopes of this Working Document and any other Working Document implementing Directive 2009/125/EC applicable to condensing units and process chillers should be reassessed when reviewing this Working Document.

(7) Condensing units intended to cool down and continuously maintain medium or low temperature in refrigerated spaces in order to provide cooling for foodstuff or other products should be included in the scope of this Working Document.

(8) The scope of this Working Document should include process chillers intended to cool down and continuously maintain liquid at medium or low temperature in order to provide cooling to a refrigerated appliance or system. This should include 'packaged' chillers which integrate the condenser, the coolant circuit hardware and other ancillary equipment; 'split' chillers which do not integrate the coolant circuit hardware; and chillers which only integrate the evaporator(s) and the compressor(s) and which are intended to be subsequently connected to a separate condensing unit or refrigeration system. This should include process chillers placed on the market in more than one assembly, provided that the separate assemblies are intended to be used together. This should not include process chillers which are assembled on site from separately purchased components.

(9) As regards professional storage cabinets, it is not appropriate to set ecodesign requirements for direct greenhouse gas emissions related to the use of refrigerants, as these account for not more than 5% of the combined direct and indirect emissions by professional storage cabinets covered by this Working Document. Moreover, the increasing use of low-global warming potential (GWP) refrigerants in the household refrigerator market sets a precedent that the professional storage cabinets sector could follow.

(10) As regards process chillers, it is not appropriate to set ecodesign requirements for direct greenhouse gas emissions related to the use of refrigerants, as these account for not more than 2% of the combined direct and indirect emissions by process chillers covered by this Working Document.

(11) As regards condensing units, non-proprietary technologies exist which lead to a reduction in the direct greenhouse gas emissions related to the use of refrigerants, through the use of refrigerants with reduced harmful impact on the environment. However, the cost-effectiveness and impact on energy efficiency of these technologies when applied to condensing units is largely unknown, as their diffusion is either non-existent or representing a negligible share of the market for condensing units.

(12) As refrigerants are addressed under Working Document (EC) No 842/2006 of the European Parliament and of the Council of 17 May 2006 on certain fluorinated greenhouse gases[3], and as a review of this Working Document has been proposed by the Commission on 7 November 2012[4], no specific requirements on refrigerants are set in this Working Document. However, a bonus is proposed under the ecodesign requirements for condensing units to steer the market towards the use of refrigerants

[3] OJ L 161, 14.6.2006, p.1.
[4] COM(2012) 643 final

with reduced harmful impact on the environment. The bonus will lead to lower minimum energy efficiency requirements for condensing units intended to be used with low-global warming potential (GWP) refrigerants.

(13) The environmental aspect of professional storage cabinets, blast cabinets, condensing units and process chillers that has been identified as significant for the purposes of this Working Document is energy consumption in the use phase.

(14) The preparatory study has shown that requirements regarding the other ecodesign parameters referred to in Annex I, Part 1 of Directive 2009/125/EC are not necessary in the case of professional storage cabinets, blast cabinets, condensing units and process chillers.

(15) Annual electricity consumption related to condensing units, process chillers and professional storage cabinets was estimated to have been 116,5 TWh (terawatt hour) in the Union in 2012, corresponding to 47 Mt CO_2 emissions. Unless specific measures are taken, annual energy consumption is expected to be 134,5 TWh in 2020 and 154,5 TWh in 2030, corresponding to 54,5 and 62,5 Mt CO_2 respectively. The combined effect of this Working Document, and of the Commission Delegated Working Document supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of storage cabinets, is expected to result in annual electricity savings of 6,3 TWh by 2020 and 15,6 TWh by 2030, if compared to what would happen if no measures were taken.

(16) The preparatory study shows that the use-phase energy consumption can be significantly reduced by applying cost-effective non-proprietary technologies which lead to a reduction in the combined costs of purchasing and operating these products.

(17) Ecodesign requirements should harmonise energy consumption requirements for process chillers throughout the Union, thus helping to make the Internal Market operate better and to improve the environmental performance of these products.

(18) The ecodesign requirements should not affect the functionality or affordability of professional storage cabinets, blast cabinets, condensing units and process chillers from the end-user's perspective and should not negatively affect health, safety or the environment.

(19) The ecodesign requirements should be introduced gradually to give manufacturers a sufficient timeframe to redesign their products subject to this Working Document. The timing should be such that cost impact for manufacturers is taken into account, while ensuring timely achievement of the objectives of this Working Document.

(20) Product parameters should be measured and calculated using reliable, accurate and reproducible methods which take into account recognised state-of-the-art measurement and calculation methods, including, where available, harmonised standards adopted by the European standardisation bodies under a request from the Commission, in accordance with the procedures laid down in the Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and Working Documents and of rules on Information Society services[5].

(21) In accordance with Article 8(2) of Directive 2009/125/EC, this Working Document specifies which conformity assessment procedures apply.

[5] OJ L 204, 21.7.1998, p. 37

(22) To facilitate compliance checks, manufacturers should provide information in the technical documentation referred to in Annexes IV and V to Directive 2009/125/EC insofar as that information relates to the requirements laid down in this Working Document.

(23) To further limit the environmental impact of professional storage cabinets, blast cabinets, condensing units and process chillers, manufacturers should provide information on disassembly, recycling and/or disposal.

(24) In addition to the legally binding requirements laid down in this Working Document, indicative benchmarks for best available technologies should be identified to ensure that information on the life-cycle environmental performance of professional storage cabinets, blast cabinets, condensing units and process chillers is widely available and easily accessible.

(25) The measures provided for in this Working Document are in accordance with the opinion of the Committee established by Article 19(1) of Directive 2009/125/EC.

HAS ADOPTED THIS WORKING DOCUMENT:

Chapter 1

Subject matter and scope

1. This Working Document establishes ecodesign requirements for the placing on the market of professional storage cabinets and blast cabinets. This Working Document shall apply to electric mains-operated blast cabinets, and electric mains-operated professional storage cabinets including those sold for the refrigeration of items other than foodstuffs.

2. This Working Document shall not apply to:

   (a) Professional storage cabinets that are primarily powered by energy sources other than electricity;

   (b) Professional storage cabinets operating with a remote condensing unit;

   (c) Open cabinets, when their openess is a fundamental requirement for their primary functionality, such as open top preparation tables and saladettes;

   (d) Cabinets specifically designed for carrying out food processing through, for example, heating in addition to foodstuffs refrigeration or storage of refrigerated or frozen foodstuffs such as bakery cabinets that chill, heat and humidify. The mere presence of one compartment, equivalent to less than 20% of the whole internal volume, specifically designed for carrying out food processing is not sufficient for exemption;

   (e) Cabinets specifically designed only for the purpose of thawing frozen foodstuff in a controlled manner; the mere presence of one compartment specifically designed for thawing frozen foods in a controlled manner is not sufficient for exemption;

   (f) Serve-over counters and other similar forms of cabinet primarily intended for display and sale of foodstuffs in addition to refrigeration and storage;

   (g) Cabinets specifically designed for the storage of medicines and scientific samples;

   (h) Cabinets that do not use a vapour compression refrigeration cycle such as absorption and thermoelectric based systems;

(i) Blast cabinets and blast rooms,with a capacity superior to 300 kg of foodstuff;

(j) Continuous-process blast equipment, such as equipment with a conveyor belt to feed foodstuff through;

(k) custom-made professional storage cabinets and blast cabinets, made on a one-off basis and not equivalent functionally or materially to other professional storage cabinets or blast cabinets;

3. This Working Document also establishes ecodesign requirements for the placing on the market of condensing units operating at low and medium temperature.

4. This Working Document shall not apply to:

(a) condensing units including an evaporator, which may be an integral evaporator, such as in "monoblock units", or a remote evaporator, such as in "split units";

(b) compressor packs or racks, which do not include a condenser;

(c) condensing units of which the condenser-side does not use air for heat transfer medium.

5. This Working Document also establishes ecodesign requirements for the placing on the market of process chillers intended to operate at low and medium temperature.

6. This Working Document shall not apply to:

(a) process chillers intended to operate at high temperature

(b) process chillers exclusively using evaporative condensing;

(c) process chillers assembled on site;

(d) process chillers using absorption technology.

Chapter 2
Definitions

1. In addition to the definitions set out in Article 2 of Directive 2009/125/EC, the following definitions shall apply for the purposes of this Working Document.

2. As regards the ecodesign requirements set for professional storage cabinets and blast cabinets:

(a) A 'professional storage cabinet' means an insulated refrigeration product integrating one or more compartments accessible via one or more doors or drawers, capable of continuously maintaining the temperature of foodstuffs within prescribed limits at chilled or frozen operating temperature, using a vapour compression cycle, and intended for the storage of foodstuff in non household environments but not for the display to and access by customers;

(b) A 'blast cabinet' is an insulated refrigeration product primarily intended to rapidly cool hot foodstuff down to below 10°C in the case of chilling and below -18°C in the case of freezing;

(c) 'foodstuffs' means food, ingredients, beverages, including wine, and other items primarily intended for consumption which require refrigeration at specified temperatures;

(d) 'built-in cabinet' means a fixed refrigerating appliance intended to be installed in a cabinet, in a prepared recess in a wall or similar location, and requiring furniture finishing;

(e) ‘roll-in cabinet’ means a cabinet including one unique compartment that allows wheeled racks of product to be wheeled in;

(f) ‘pass-through cabinet’ means a cabinet accessible from both sides;

(g) ‘static air cabinet’ means a storage cabinet without internal forced-air circulation, specifically designed to store temperature sensitive foodstuffs or to avoid a drying effect on foodstuffs stored without a sealed enclosure such as fresh fish; a single static air compartment within the cabinet is not sufficient to designate the cabinet as a static air cabinet;

(h) ‘heavy duty cabinet’ means a professional storage cabinet capable of continuously maintaining chilled or frozen operating temperature in ambient conditions corresponding to climate class 5, as detailed in Table 2 of Annex III;

(i) ‘open cabinet’ means a storage cabinet whose refrigerated enclosure can be reached from the outside without opening a door or a drawer;

(j) ‘saladette’ means a cabinet with one or more doors or drawer fronts in the vertical plane that has cut-outs in the top surface into which temporary storage bins can be inserted for easy-access storage of foodstuffs such as pizza toppings or salad items;

3. As regards the ecodesign requirements set for condensing units:

(a) ‘condensing unit’ means a product integrating at least one electrically driven compressor and one condenser, capable of cooling down and continuously maintaining low or medium temperature inside a refrigerated appliance or system, using a vapour compression cycle once connected to an evaporator and an expansion device;

(b) ‘low temperature’ means that the condensing unit is capable of delivering its rated cooling capacity at a saturated evaporating temperature of -35°C;

(c) ‘medium temperature’ means that the condensing unit is capable of delivering its rated cooling capacity at a saturated evaporating temperature of -10°C;

(d) ‘rated cooling capacity’ means the cooling capacity which the condensing unit allows the vapour compression cycle to reach, once connected to an evaporator and an expansion device, when operating at full load, and measured at standard rating conditions with the reference ambient temperature set at 32°C, expressed in kW;

4. As regards the ecodesign requirements set for process chillers:

(a) ‘process chiller’ means a product integrating at least one compressor and one evaporator, capable of cooling down and continuously maintaining the temperature of a liquid in order to provide cooling to a refrigerated appliance or system; it may or may not integrate the condenser, the coolant circuit hardware and other ancillary equipment;

(b) ‘low temperature’ means that the process chiller is capable of delivering its rated cooling capacity at an indoor heat exchanger outlet temperature of -25°C, at standard rating conditions;

(c) ‘medium temperature’ means that the process chiller is capable of delivering its rated cooling capacity at an indoor heat exchanger outlet temperature of -8°C, at standard rating conditions;

(d) ‘high temperature’ means that the process chiller is capable of delivering its rated cooling capacity at an indoor heat exchanger outlet temperature of 6°C, at standard rating conditions;

(e) ‘rated cooling capacity’ means the cooling capacity which the process chiller is capable to reach, when operating at full load, and measured at standard rating conditions with the reference ambient temperature at 35°C for air-cooled chillers and 30°C for water-cooled chillers, expressed in kW.

For the purposes of the Annexes, additional definitions are set out in Annex I.

Chapter 3

Ecodesign requirements and timetable

1. The ecodesign requirements for professional storage cabinets and blast cabinets are set out in Annex II.

2. The ecodesign requirements for condensing units are set out in Annex V.

3. The ecodesign requirements for process chillers are set out in Annex VII.

4. Ecodesign requirements shall apply in accordance with the following timetable:

(a) From 1 July 2015:

(1) professional storage cabinets shall comply with the requirements set out in Annex II, points 1(a)(i) and 2(a)

(2) heavy-duty cabinets shall comply with the requirements set out in Annex II, point 1(b);

(3) condensing units shall comply with the requirements set out in Annex V, points 1(a) and 2;

(4) process chillers shall comply with the requirements set out in Annex VII, points 1(a) and 2;

(b) From 1 July 2016:

(1) professional storage cabinets shall comply with requirements set out in Annex II, points 1(a)(ii);

(2) Blast cabinets shall comply with requirements set out in Annex II, point 2(b);

(c) From 1 July 2018:

(1) professional storage cabinets shall comply with requirements set out in Annex II, points 1(a)(iii);

(2) condensing units shall comply with the requirements set out in Annex V, points 1(b);

(3) process chillers shall comply with the requirements set out in Annex VII, points 1(b);

5. The following professional storage cabinets are exempted from the requirements set out in Annex II, with the exception of point 2.(a) iii):

(a) Built-in cabinets

(b) Roll-in and pass-through cabinets

(c) Static air cabinets.

6. Compliance with ecodesign requirements for professional storage cabinets and blast cabinets shall be measured and calculated in accordance with the methods set out in Annex III and Annex IV.

7. Compliance with ecodesign requirements for condensing units shall be measured and calculated in accordance with the methods set out in Annex VI.

8. Compliance with ecodesign requirements for process chillers shall be measured and calculated in accordance with the methods set out in Annex VIII.

Chapter 4
Conformity assessment

1. The conformity assessment procedure referred to in Article 8(2) of Directive 2009/125/EC shall be the internal design control set out in Annex IV to that Directive or the management system set out in Annex V to that Directive.

2. For the purposes of conformity assessment, the technical documentation shall contain the product information set out in point 2 of Annex II, point 2(b) of Annex V and point 2(b) of Annex VII to this Working Document.

Chapter 5
Verification procedure for market surveillance purposes

When performing the market surveillance checks referred to in Article 3(2) of Directive 2009/125/EC to ensure compliance with the requirements set out in Annex II, Annex V and Annex VII to this Working Document, the Member States' authorities shall apply the verification procedure set out in Annex IX, Annex X and Annex XI to this Working Document.

Chapter 6
Indicative Benchmarks

The indicative benchmarks for best-performing professional storage cabinets, condensing units and process chillers available on the market at the time of entry into force of this Working Document are set out in Annex XII.

Chapter 7
Review

The Commission shall review this Working Document in the light of technological progress and present the result of that review to the Ecodesign Consultation Forum:

1. no later than four years from the date of entry into force of this Working Document, for professional storage cabinets and blast cabinets. In particular, the review shall include an assessment of the appropriateness of introducing requirements on the cabinets listed in Art 3 (3).

2. no later than four years from the date of entry into force of this Working Document, for walk-in cold rooms. The review shall include an assessment of the appropriateness of introducing ecodesign requirements for these products.

3. no later than five years from the date of entry into force of this Working Document, for condensing units and process chillers. In particular, the review shall include:

   (a) the appropriateness of setting ecodesign requirements covering direct greenhouse gas emissions related to refrigerants;

(b) the appropriateness of setting ecodesign requirements for condensing units with a rated cooling capacity lower than 0.1 kW at low temperature and 0.2 kW at medium temperature and condensing units with a rated cooling capacity higher than 20 kW at low temperature and 50 kW at medium temperature;

(c) the appropriateness of setting ecodesign requirements for condensing units sold with an evaporator, compressor packs and racks which do not include a condenser, and condensing units which do not use air as heat transfer medium for the condenser;

(d) the appropriateness of setting ecodesign requirements for process chillers using evaporative condensing and process chillers using absorption technology.

Chapter 8

Amendment to Commission Working Document (EC) No 643/2009

Point (r) of ANNEX I of Commission Working Document (EC) No 643/2009 of 22 July 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for household refrigerating appliances shall read:

'chest freezer', means a food freezer in which the compartment(s) is accessible from the top of the appliance or which has both top-opening type and upright type compartments but where the gross volume of the top-opening type compartment(s) exceeds 75 % of the total gross volume of the appliance; this definitions applies also to chest freezers sold for non-household use.

Chapter 9

Entry into force

This Working Document shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

Chapter 8 of this Working Document shall apply from 1 July 2015.

This Working Document shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels,

For the Commission
The President

ANNEX I
Definitions applicable for Annexes II to XI

For the purposes of Annexes II to V the following definitions shall apply:

Definitions related to professional storage cabinets:

(1) a professional storage cabinet may include one or more partially or wholly transparent door(s) and/or drawers(s), as long as the total transparent area of the cabinet door(s) and/or drawers(s) is not more than 80% of the total door/drawer area

(2) ‘net volume means’ the volume containing foodstuffs within the load limit, minus the volume of shelves and any internal fittings;

(3) ‘gross storage volume’ means the volume within the inside walls of the cabinet or compartment, excluding internal fittings, doors or lids, if any, with these being closed;

(4) ‘chilled operating temperature’ means that the temperature of foodstuff stored in the cabinet is continuously maintained at a temperature comprised between -1°C and 5°C;

(5) ‘frozen operating temperature’ means that the temperature of foodstuff stored in the cabinet is continuously maintained at a temperature lower than -15°C;

(6) ‘multi-use’ means that a professional storage cabinet or separate compartment of the same cabinet may be set at different temperatures for chilled or frozen foodstuffs;

(7) “combined cabinet” means a storage professional cabinet including two or more compartments with different temperature(s) for the refrigeration and storage of foodstuffs;

(8) ‘refrigerator-freezer’ means a type of combined storage professional cabinet including at least one compartment exclusively intended for chilled operating temperature and one compartment exclusively intended for frozen operating temperature; a refrigerator-freezer is one specific type of combined cabinet;

(9) ‘vertical cabinet’ means a cabinet that has overall height equal or higher than 1050 mm with one or more vertical doors or drawers accessing the same compartment;

(10) ‘counter cabinet’ means a cabinet that has overall height lower than 1050 mm with one or more vertical doors or drawers accessing the same compartment;

(11) ‘light duty cabinet’ means a professional storage cabinet only capable of continuously maintaining chiller or frozen operating temperature in ambient conditions corresponding to climate class 3, as detailed in Table 2 of Annex III; if the cabinet is able to maintain temperature in ambient conditions corresponding to climate class 4 as detailed in Table 2 of Annex III, it shall not be considered a light duty cabinet.

(12) 'open cabinet' means a cabinet for which some or all of the stored contents are accessible without opening a door or drawer;

Definitions related to condensing units:

(13) ‘rated cooling capacity’ (P_A) means the cooling capacity which the condensing unit allows the vapour compression cycle to reach, once connected to an evaporator and an expansion device, when operating at full load, and measured

at standard rating conditions with the reference ambient temperature set at 32°C, expressed in kW at three decimal places

(14) 'rated power input' (D_A) means the electrical power input which is needed by the condensing unit to reach the rated cooling capacity, expressed in kW at three decimal places

(15) 'rated coefficient of performance' (COP_A) means the rated cooling capacity, expressed in kW, divided by the rated power input, expressed in kW, expressed at two decimal places

(16) 'seasonal energy performance ratio' (*SEPR*) is the efficiency ratio of a condensing unit for providing cooling at standard rating conditions, representative of the variations in load and ambient temperature throughout the year, and calculated as the ratio between the annual cooling demand and the annual electricity consumption, expressed at two decimal places

(17) 'annual cooling demand' means the sum of each bin-specific cooling demand multiplied by the correspond number of bin hours

(18) 'bin-specific cooling demand' means the cooling demand for every bin in the year, calculated as the rated cooling capacity multiplied by the part load ratio, expressed in kW at three decimal places

(19) 'part load' ($PR(T_j)$) means the refrigeration load at a specific ambient temperature, calculated as the full load multiplied by the part load ratio

(20) 'part load ratio' ($PL(T_{ref})$) means the ambient temperature minus 5 ºC divided by the reference ambient temperature minus 5 ºC, multiplied by 0.4 and added to 0.6 for medium, and multiplied by 0.2 and added to 0.8 for low temperature. For ambient temperatures higher than the reference ambient temperature, the part load ratio shall be 1. For ambient temperatures lower than 5°C, the part load ratio shall be 0.6 for medium temperature and 0.8 for low temperature.

(21) 'annual electricity consumption' is calculated as the sum of the ratios between each bin-specific cooling demand and the corresponding bin-specific coefficient of performance, multiplied by the corresponding number of bin hours

(22) 'ambient temperature' means the dry bulb air temperature, expressed in degrees Celsius

(23) 'bin' (bin_j) means a combination of an ambient temperature T_j and bin hours h_j, as set out in Annex VI, Table 6

(24) 'bin hours' (h_j) means the hours per year at which an ambient temperature occurs for each bin, as set out in Annex VI, Table 6

(25) 'reference ambient temperature' means the ambient temperature, expressed in degrees Celsius, at which the part load ratio is equal to 1. It shall be set at 32°C.

(26) 'bin-specific coefficient of performance' (COP_j) means the coefficient of performance for every bin in the year, derived from the part load, the declared cooling demand and declared coefficient of performance for specified bins and calculated for other bins by linear interpolation, corrected where necessary by the degradation coefficient

(27) ‘declared cooling demand’ means the cooling demand at a limited number of specified bins, and calculated as the rated cooling capacity multiplied by the corresponding part load ratio

(28) ‘declared coefficient of performance’ means the coefficient of performance at a limited number of specified bins, and calculated as the declared cooling capacity divided by the declared power input

(29) ‘declared cooling capacity’ means the cooling capacity which the unit delivers to meet the specific cooling demand at a limited number of specified bins, expressed in kW at three decimal places

(30) ‘declared power input’ means the electrical power input needed by the condensing unit to meet the declared cooling capacity, expressed in kW at three decimal places

(31) ‘degradation coefficient’ (*Cd*) means the measure of efficiency loss due to cycling of condensing units at part load. It is set at 0,25.

(32) ‘capacity control’ means the ability of a condensing unit to change its capacity by changing the volumetric flow rate of the refrigerant fluid needed to operate the refrigeration cycle, to be indicated as ‘fixed’ if the volumetric flow rate can only be changed by on/off cycling or ‘variable’ if the volumetric flow rate is changed or varied in series of two or more steps

Definitions related to process chillers:

(33) ‘rated cooling capacity’ (P_A) means the cooling capacity which the process chiller is capable to reach, when operating at full load, and measured at standard rating conditions with the reference ambient temperature at 35°C for air-cooled chillers and 30°C for water-cooled chillers, expressed in kW at three decimal places

(34) ‘rated power input’ (D_A) means the electrical power input which is needed by the process chiller to reach the rated cooling capacity, expressed in kW at three decimal places

(35) ‘rated energy efficiency ratio’ (EER_A) means the rated cooling capacity, expressed in kW, divided by the rated power input, expressed in kW, expressed at two decimal places

(36) ‘seasonal energy performance ratio’ (*SEPR*) is the efficiency ratio of a process chiller for providing cooling at standard rating conditions, representative of the variations in load and ambient temperature throughout the year, and calculated as the ratio between the annual cooling demand and the annual electricity consumption

(37) ‘annual cooling demand’ means the sum of each bin-specific cooling demand multiplied by the corresponding number of bin hours

(38) ‘bin-specific cooling demand’ means the rated cooling capacity multiplied by the part load ratio, for every bin in the year, expressed in kW at three decimal places

(39) ‘part load’ ($PR(T_j)$) means the cooling load at a specific ambient temperature, calculated as the full load multiplied by the part load ratio

(40) ‘part load ratio’ (P$L(T_{ref})$) means :

(a) for process chillers using air-cooled condensing, the ambient temperature minus 5 ºC divided by the reference ambient temperature minus 5 ºC. For ambient temperatures higher than the reference ambient temprature, the part load ratio shall be 1. For ambient temperatures lower than 5°C, the part load ratio shall be 0.8.

(b) for process chillers using water-cooled condensing, the ambient temperature minus 9°C divided by the reference ambient temperature minus 9°C. For ambient temperatures higher than the reference ambient temprature, the part load ratio shall be 1. For ambient temperatures lower than 9°C, the part load ratio shall be 0.8.

(41) 'annual electricity consumption' is calculated as the sum of the ratios between each bin-specific cooling demand and the corresponding bin-specific energy efficiency ratio, multiplied by the corresponding number of bin hours

(42) 'ambient temperature' means:

(a) for process chillers using air-cooled condensing, the air dry bulb temperature, expressed in degrees Celsius

(b) for process chillers using water-cooled condensing, the inlet temperature of water at the outdoor heat exchanger, expressed in degrees Celsisus

(43) 'bin' (bin_j) means a combination of an ambient temperature T_j and bin hours h_j, as set out in Annex VIII

(44) 'bin hours' (h_j) means the hours per year at which an ambient temperature occurs for each bin, as set out in Annex VIII

(45) 'reference ambient temperature' means the ambient temperature, expressed in degrees Celsius, at which the part load ratio is equal to 1. It shall be set at 35°C for air-cooled process chillers and 30°C for water-cooled process chillers.

(46) 'bin-specific energy efficiency ratio' (EER_j) means the energy efficiency ratio for every bin in the year, derived from the part load, the declared cooling demand and declared energy efficiency ratio for specified bins and calculated for other bins by linear interpolation, corrected where necessary by the degradation coefficient

(47) 'declared cooling demand' means the cooling demand at a limited number of specified bins, and calculated as the rated cooling capacity multiplied by the corresponding part load ratio

(48) 'declared energy efficiency ratio' means the energy efficiency ratio at a limited number of specified bins

(49) 'declared power input' means the electrical power input needed by the process chiller to meet the declared cooling capacity

(50) 'declared cooling capacity'means the cooling capacity delivered by the chiller to meet the declared cooling demand

(51) 'degradation coefficient' (Cc) means the measure of efficiency loss due to cycling of process chillers at part load; if Cc is not determined by measurement, then the default degradation coefficient is $Cc = 0{,}9$

(52) 'capacity control' means the ability of a process chiller to change its capacity by changing the volumetric flow rate of at least one of the fluids needed to operate the refrigeration cycle, to be indicated as 'fixed' if the volumetric flow

rate cannot be changed or 'variable' if the volumetric flow rate is changed or varied in series of two or more steps

Common definitions:

(53) 'global warming potential' (GWP) means the measure of how much 1 kg of the refrigerant applied in the vapour compression cycle is estimated to contribute to global warming, expressed in kg CO_2 equivalents over a 100-year time horizon;

(54) GWP values considered will be those set out in Annex I to Working Document (EC) No 842/2006;

(55) for fluorinated refrigerants, the GWP values shall be those published in the Third Assessment Report (TAR), adopted by the Intergovernmental Panel on Climate Change[6] (2007 IPCC GWP values for a 100-year period);

(56) for non-fluorinated gases, the GWP values are those published in the first IPCC assessment over a 100-year period;

(57) GWP values for mixtures of refrigerants shall be based on the formula stated in Annex I to Working Document (EC) No 842/2006;

(58) for refrigerants not included in the above references, the Report of the 2010 Assessment of the Montreal Protocol Scientific Assessment Panel[7] (SAP) and the IPCC UNEP 2010 report on Refrigeration, Air Conditioning and Heat Pumps, dated February 2011[8], or newer, shall be used as a references.

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6 IPCC Fourth Assessment Climate Change 2007, Report of the Intergovernmental Panel on Climate Change: http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml

7 http://ozone.unep.org/Assessment_Panels/SAP/Scientific_Assessment_2010/index.shtml

8 http://ozone.unep.org/teap/Reports/RTOC/

ANNEX II
Ecodesign requirements for professional storage cabinets and blast cabinets

1. Requirements for energy efficiency

(a) Professional storage cabinets within the scope of this Working Document, with the exception of heavy duty cabinets and refrigerator-freezers, shall comply with the following Energy Efficiency Index (EEI) limits:

i) From 1 July 2015: EEI < 125

ii) From 1 July 2016: EEI < 110

iii) From 1 July 2018: EEI < 100

The Energy Efficiency Index (EEI) of household refrigerating appliances is calculated in accordance with the procedure described in Annex IV.

(b) From 1 July 2015, heavy duty cabinets shall have an Energy Efficiency Index (EEI) lower than 125.

2. REQUIREMENTS FOR PRODUCT INFORMATION

(a) From 1 July 2015 the following product information on professional storage cabinets shall be provided, in the instruction booklet for installers and end-users, and in the free access websites of manufacturers, their authorised representatives and importers:

i) the category of the appliance, namely whether it is vertical or counter

ii) if applicable, whether the cabinet is heavy duty, light duty, static air, built-in, roll-in, or pass through

iii) the intended operating temperature(s) of the cabinet: chilled, frozen or multi-use

iv) the net storage volume, expressed in litres and rounded to one decimal place. For refrigerator-freezers, the net storage volume of compartments intended for chilled operating temperature, the net storage volume of compartments intended for frozen operating temperature, and the adjusted net volume, expressed in litres and rounded to one decimal place

v) The annual energy consumption of the cabinet, expressed in kWh per year, rounded to two decimal places

vi) The Energy Efficiency Index of the cabinet, rounded to two decimal places

vii) For light-duty cabinets, it shall be indicated that the cabinet is not intended for use in ambient temperatures higher than 25°C and therefore is not suitable for use in typical professional kitchens

viii) any specific precautions that shall be taken when the cabinet is installed, used and maintained in order to optimise its energy efficiency

ix) the type, name and Global Warming Potential (GWP) of the refrigerant fluid contained in the cabinet

x) the refrigerant charge, expressed in kg and rounded to two decimal places

xi) information relevant for disassembly, recycling and/or disposal at end-of-life

Table 1 - Information requirements for professional storage cabinets			
Model(s): [information identifying the model(s) to which the information relates]			
Intended use	**storage**		
Operating temperature(s)	chilled / frozen / multi-use		
Category	vertical/ counter		
(if applicable) heavy duty/ light duty/static air/built-in/ roll-in/pass-through			
Refrigerant fluid(s):[information identify the refrigerant fluid(s), inluding GWP]			
Item	**Symbol**	**Value**	**Unit**
Annual Energy Consumption	*AEC*	x,xx	kWh
Energy Efficiency Index	*EEI*	x,xx	
Net storage volume	V_N	**x,x**	**litre**
(if applicable)			
Chilled storage volume	V_{NRef}	x,x	litre
Frozen storage volume	V_{NFrz}	x,x	litre
Refrigerant charge		x,xx	kg
Contact details	Name and address of the manufacturer or its authorised representative.		

(b) From 1 July 2016 the following indicative product information on blast cabinets shall be provided in the instruction booklet for installers and end-users, and in the free access websites of manufacturers, their authorised representatives and importers:

i) Full load capacity of the cabinet expressed in kg of foodstuff, and rounded to two decimal places;

ii) The standard temperature cycle, meaning from which temperature in °C down to which temperature in °C the foodstuff is intended to be cooled and in how many minutes

iii) The Energy consumption, in kWh per kg of foodstuff per standard temperature cycle and rounded to three decimal places

iv) In the case of integral equipment, type, name and Global Warming Potential (GWP) of the refrigerant fluid contained in the cabinet and refrigerant charge (kg) rounded to two decimal places. In the case of equipment designed to be used with a remote condensing unit (not supplied with the blast cabinet itself), the intended refrigerant charge when used with a recommended condensing unit and the intended refrigerant fluid type, name and Global Warming Potential (GWP)

(c) the technical documentation for the purposes of conformity assessment pursuant to Chapter 4 shall contain the following elements:

i) elements specified in points (a) and (b) for professional storage cabinets and blast cabinets respectively

ii) Where the information included in the technical documentation file for a particular model has been obtained by calculation on the basis of design, or extrapolation from other equivalent refrigerating appliances, or both,

the documentation shall include details of such calculations or extrapolations, or both, and of tests undertaken by suppliers to verify the accuracy of the calculations undertaken. The information shall also include a list of all other equivalent models where the information was obtained on the same basis.

ANNEX III
Measurements and calculations for professional storage cabinets

(a) For the purposes of compliance and verification of compliance with the requirements of this Working Document, measurements and calculations shall be made using harmonised standards the reference numbers of which have been published for this purpose in the *Official Journal of the European Union*, or using other reliable, accurate and reproducible methods that take into account the generally recognised state-of-the-art methods. In the case of professional storage cabinets they shall meet the conditions and technical parameters set out in points b to e.

(b) For establishing the values of annual energy consumption and Energy Efficiency Index for professional storage cabinets, measurements shall be done using the following conditions:

i) The temperature of test packages shall be comprised between -1°C and 5°C for chilled cabinets and lower than -15°C for frozen cabinets

ii) The ambient conditions shall correspond to climate class 4 as detailed in Table 2, except for light-duty cabinets which shall be tested in ambient conditions corresponding to climate class 3, as detailed in Table 2

iii) If one or several compartment(s) is/are multi-use, it/they shall be tested at the lowest operating temperature at which it/they can be used

(c) The ambient conditions of the climate classes 3, 4 and 5 are shown in Table 2.

Table 2 – Ambient conditions of the climate classes 3, 4 and 5

3.	Test room climate class	4. 5.	Dry bulb temperature, °C	6.	Relative humidity, %	7.	Dew point, °C	Water vapour mass in dry air, g/kg	
8.	3	9.	25	10.	60	11.	16.7	12.	12.0
13.	4	14.	30	15.	55	16.	20.0	17.	14.8
18.	5	19.	40	20.	40	21.	23.9	22.	18.8

(d) The door opening protocol shall be as follows. For chilled professional storage cabinets and counter frozen professional storage cabinets, each door shall be opened for 2 minutes, and for 6 seconds, 6 times per hour, for a total of 12 hours; doors should be closed for 12 hours less 2 minutes. For vertical frozen professional storage cabinets, each door should be opened for 1 minute, and for 6 sec, 6 times per hour, for a total of 4 hours; both steps should be repeated once; doors should be closed for 12 hours less 2 minutes.

(e) The net storage volume (V_n) shall be calculated with the following formula:

Vn cabinets = base surface (h – (n 10))

where:

base surface means the surface of the shelf containing the maximum configuration of test packages

h means the space from the top surface of the shelf in the lowest position to the load limit line

n means the number of shelves used based on the loading scheme, not including the shelf at the lowest position

10 is a fixed value expressed in millimetres representing the thickness of the shelf.

For refrigerators-freezers, the net volume is replaced by the adjusted net volume:

- $Va = Vn,ref + Vn,frz \times 1.92$

Where:

- Vn,ref is the sum of the net volume of all chilled compartments in litres
- Vn,frz is the sum of the net volumes of all freezer compartments in litres
- The factor 1.92 is from a standard thermodynamic ratio which provides the volume of chilled compartment that consumes the same energy as a unit volume of the frozen compartment. It is calculated from the equation:

$(30 – (-18)) / (30 – 5)$

in which the ambient temperature is 30°C, the average frozen compartment temperature during test is -18°C and the average chilled compartment temperature during test is 5°C.

ANNEX IV

Method for calculating the Energy Efficiency Index for professional storage cabinets

For the calculation of the Energy Efficiency Index (EEI), of a professional storage cabinet model, the Annual Energy Consumption of the cabinet is compared to its Standard Annual Energy Consumption.

The Energy Efficiency Index (EEI) is calculated and rounded to the first decimal place, as:

- EEI = (AEC/SAEC) ×100

Where:

- AEC=E24h ×365

With AEC = Annual Energy Consumption of the cabinet in kWh/year

E24h = energy consumption of the cabinet over 24 hours

and

- SAEC= M × Vn +N

With SAEC = Standard Annual Energy Consumption of the cabinet in kWh/year

Vn = net volume of the appliance, which is the sum of net volumes of all compartments of the cabinet.

M and N are given in the Table 3.

Table 3 – M and N coefficient values

Category	Value for M	Value for N
Vertical Chilled	1.643	609
Vertical Frozen	4.928	1472
Counter Chilled	2.555	1790
Counter Frozen	5.840	2380

ANNEX V
Ecodesign requirements for condensing units

1. Requirements for energy efficiency

(a) From 1st of July 2015 onward, the coefficient of performance (*COP*) and the seasonal energy performance ratio (*SEPR*) of condensing units shall not fall below the following values:

Operating temperature	Rated capacity P_A	Applicable ratio	Value
Medium	0.2kW< P_A < 1kW	COP	1.2
	1kw< P_A < 5kW	COP	1.4
	5kW < P_A < 20kW	SEPR	2.25
	20kW < P_A < 50kW	SEPR	2.35
Low	0.1kW< P_A < 0.4kW	COP	0.75
	0.4kw< P_A < 2kW	COP	0.85
	2kW < P_A < 8kW	SEPR	1.5
	8W < P_A < 20kW	SEPR	1.6

(b) From 1st of July 2018 onward, the coefficient of performance (*COP*) and the seasonal energy performance ratio (*SEPR*) of condensing units shall not fall below the following values:

Operating temperature	Rated capacity P_A	Applicable ratio	Value
Medium	0.2kW< P_A < 1kW	COP	1.4
	1kw< P_A < 5kW	COP	1.6
	5kW < P_A <	SEPR	2.55

	20kW		
	20kW < P_A < 50kW	SEPR	2.65
Low	0.1kW< P_A < 0.4kW	COP	0.8
	0.4kw< P_A < 2kW	COP	0.95
	2kW < P_A < 8kW	SEPR	1.6
	8W < P_A < 20kW	SEPR	1.7

(c) For condensing units intended to be charged with a refrigerant fluid with a global warming potential lower than 150, COP and SEPR values can be lower than the values indicated in points 1(a) and 1(b) by a maximum of 10%

2. Requirements for product information

From 1st of July 2015 onward, the following product information on condensing units shall be provided:

(a) the instruction manuals for installers and end-users, and free access websites of manufacturers, their authorised representatives and importers shall contain the following elements:

- intended evaporating temperature, expressed in degree Celsius
- for condensing units with a rated cooling capacity lower than 5kW and 2kW for medium and low temperatures respectively:
  - the rated COP, at full load and 32°C ambient temperature, rounded to two decimal places, and rated cooling capacity and power input, expressed in kW and rounded to three decimal places;
  - the COP value, at full load and 25°C ambient temperature, rounded to two decimal places, and corresponding cooling capacity and power input, expressed in kW and rounded to three decimal places;
- for condensing units with a rated cooling capacity higher than 5kW and 2kW for medium and low temperatures respectivel:
  - the SEPR value, rounded to two decimal places
  - the annual electricity consumption, expressed in kWh per annum
  - the rated cooling capacity, rated power input and rated COP
  - the declared cooling capacity and declared power input, expressed in kW and rounded to three decimal places, and the COP value, rounded to two decimal places, at rating points B, C and D
- for condensing units intended for use at ambient temperature above 35°C, the COP value, at full load and 43°C ambient temperature, rounded to two decimal

places, and corresponding cooling capacity and power input, expressed in kW and rounded to three decimal places

– the type(s) and name(s) of refrigerant fluid(s) intended to be used with the condensing unit

– any specific precautions that shall be taken when the condensing unit is installed or maintained

– any specific precautions that shall be taken to optimise the efficiency of the condensing unit when it is integrated into another refrigeration appliance;

– information relevant for disassembly, recycling and/or disposal at end-of-life

(b) the technical documentation for the purposes of conformity assessment pursuant to Chapter 4 shall contain the following elements:

– the elements specified in point (a);

– where the information relating to a specific model has been obtained by calculation on the basis of design and/or extrapolation from other combinations, the details of such calculations and/or extrapolations, and of any tests undertaken to verify the accuracy of the calculations, including details of the mathematical model for calculating the performance of such combinations and details of the measurements taken to verify this model.

Table 4 - Information requirements for condensing units with a rated cooling capacity lower than 5kW and 2kW for medium and low operating temperatures respectively.

Model(s): [information identifying the model(s) to which the information relates]

Refrigerant fluid(s):[information identify the refrigerant fluid(s) intended to be used with the condensing unit]

Item	**Symbol**	**Value**		**Unit**
Evaporating temperature*	t	-10°C	-35°C	°c
Parameters at full load and ambient temperature 32°c				
Rated cooling capacity	P_A	x,xxx	x,xxx	kW
Rated power input	D_A	x,xxx	x,xxx	kW
Rated COP	COP_A	x,xx	x,xx	
Parameters at full load and ambient temperature 25°c				
Cooling capacity	P_2	x,xxx	x,xxx	kW
Power input	D_2	x,xxx	x,xxx	kW
COP	COP_2	x,xx	x,xx	
Parameters at full load and ambient temperature 43°c (if applicable)				
Cooling capacity	P_3	x,xxx	x,xxx	kW
Power input	D_3	x,xxx	x,xxx	kW
COP	COP_3	x,xx	x,xx	
Other items				

Capacity control		fixed/step/variable
Contact details	Name and address of the manufacturer or its authorised representative.	
* For condensing units intended to operate at only one evaporating temperature, one of the two columns related to “Value” can be deleted		

Table 5 - Information requirements for condensing units with a rated cooling capacity higher than 5kW and 2kW for medium and low operating temperatures respectively				
Model(s): [information identifying the model(s) to which the information relates]				
Refrigerant fluid(s):[information identify the refrigerant fluid(s) intended to be used with the condensing unit]				
Item	**Symbol**	**Value**		**Unit**
Evaporating temperature*	t	-10°C	-35°C	°c
Annual electricity consumption	Q	x	x	kWh/a
Seasonal Energy Performance Ratio	$SEPR$	x,xx	x,xx	
Parameters at full load and ambient temperature 32°c (Point A)				
Rated cooling capacity	P_A	x,xxx	x,xxx	kW
Rated power input	D_A	x,xxx	x,xxx	kW
Rated COP	$\boldsymbol{COP_A}$	**x,xx**	**x,xx**	
Parameters at part load and ambient temperature 25° (Point B)				
Declared cooling capacity	P_B	x,xxx	x,xxx	kW
Declared power input	D_B	x,xxx	x,xxx	kW
Declared COP	$\boldsymbol{COP_B}$	**x,xx**	**x,xx**	
Parameters at part load and ambient temperature 15°c (Point C)				
Declared cooling capacity	P_c	x,xxx	x,xxx	kW
Declared power input	D_c	x,xxx	x,xxx	kW
Declared COP	$\boldsymbol{COP_C}$	**x,xx**	**x,xx**	
Parameters at part load ambient temperature 5°c (Point D)				
Declared cooling capacity	P_D	x,xxx	x,xxx	kW
Declared power input	D_D	x,xxx	x,xxx	kW
Declared COP	$\boldsymbol{COP_D}$	**x,xx**	**x,xx**	
Parameters at full load and ambient temperature 43°c (if applicable)				
Cooling capacity	P_3	x,xxx	x,xxx	kW
Power input	D_3	x,xxx	x,xxx	kW
Declared COP	COP_3	x,xx	**x,xx**	
Other items				
Capacity control		fixed/step/variable		
Coefficient of degradation for fixed and staged capacity units*	Cd	0,25		
Contact details	Name and address of the manufacturer or its authorised			

	representative.
* For condensing units intended to operate at only one evaporating temperature, one of the two columns related to “Value” can be deleted	

ANNEX VI
Measurements and calculations for condensing units

1. For the purposes of compliance and verification of compliance with the requirements of this Working Document, measurements and calculations shall be made using harmonised standards[9] the reference numbers of which have been published for this purpose in the *Official Journal of the European Union*, or using other reliable, accurate and reproducible methods that take into account the generally recognised state-of-the-art methods. They shall meet the conditions and technical parameters set out in point 2.

2. For establishing the values of cooling capacity, power input, coefficient of performance and seasonal energy performance ratio, measurements shall be done using the following conditions:

(a) the reference ambient temperature at the outdoor heat exchanger (condenser) shall be 32°C

(b) the saturated evaporating temperature at the indoor heat exchanger (evaporator) shall be -35°C for low temperature and -10°C for medium temperature

(c) if applicable, the variations of the ambient temperature throughout the year, representative of average climate conditions in the European Union, and the corresponding number of hours when these temperatures occur, shall be as set out in Table 6

(d) if applicable, the effect of the degradation of energy efficiency caused by cycling depending on the type of capacity control of the condensing unit.

Table 6 - Variations of outdoor temperatures across the year under average climate conditions in Europe for condensing units

j	**T_j**	**h_j**
1	-19	0,08
2	-18	0,41
3	-17	0,65
4	-16	1,05
5	-15	1,74
6	-14	2,98
7	-13	3,79
8	-12	5,69
9	-11	8,94

[9] The draft transitional methods and the calculation tools, before harmonized standards will be available, can be found at the following internet address: http://ec.europa.eu/enterprise/policies/sustainable-business/ecodesign/product-groups/freezing/chillers/index_en.htm

10	-10	11,81
11	-9	17,29
12	-8	20,02
13	-7	28,73
14	-6	39,71
15	-5	56,61
16	-4	76,36
17	-3	106,07
18	-2	153,22
19	-1	203,41
20	0	247,98
21	1	282,01
22	2	275,91
23	3	300,61
24	4	310,77
25	5	336,48
26	6	350,48
27	7	363,49
28	8	368,91
29	9	371,63
30	10	377,32
31	11	376,53
32	12	386,42
33	13	389,84
34	14	384,45
35	15	370,45
36	16	344,96

37	17	328,02
38	18	305,36
39	19	261,87
40	20	223,90
41	21	196,31
42	22	163,04
43	23	141,78
44	24	121,93
45	25	104,46
46	26	85,77
47	27	71,54
48	28	56,57
49	29	43,35
50	30	31,02
51	31	20,21
52	32	11,85
53	33	8,17
54	34	3,83
55	35	2,09
56	36	1,21
57	37	0,52
58	38	0,40

ANNEX VII
Ecodesign requirements for process chillers

1. Requirements for energy efficiency

(a) From 1st of July 2015 onward, the seasonal energy performance ratio (*SEPR*) of process chillers shall not fall below the following values:

Heat transfer medium at the condensing side	Operating temperature	Rated cooling capacity P_A	Minimum SEPR value
Air	Medium	P_A < 300 kW	2.24
		P_A > 300 kW	2.8
	Low	P_A < 200 kW	1.48
		P_A > 200 kW	1.6
Water	Medium	P_A < 300 kW	2.86
		P_A > 300 kW	3.8
	Low	P_A < 200 kW	1.82
		P_A > 200 kW	2.1

(b) From 1st of July 2018 onward, the seasonal energy performance ratio (*SEPR*) of process chillers shall not fall below the following values:

Heat transfer medium at the condensing side	Operating temperature	Rated cooling capacity P_A	Minimum SEPR value
Air	Medium	P_A < 300 kW	2.58
		P_A > 300 kW	3.22
	Low	P_A < 200 kW	1.7
		P_A > 200 kW	1.84
Water	Medium	P_A < 300 kW	3.29
		P_A > 300 kW	4.37
	Low	P_A < 200 kW	2.09
		P_A > 200 kW	2.42

2. Requirements for product information

From 1st of July 2015 onward, the following product information on process chillers shall be provided:

(a) the instruction manuals for installers and end-users, and free access websites of manufacturers, their authorised representatives and importers shall contain the following elements:

- intended operating temperature, expressed in degree Celsius
- the type of condensing, either air-cooled or water-cooled
- the rated cooling capacity, rated power input, expressed in kW and rounded to three decimal places
- the rated energy efficiency ratio (EER_A), rounded to two decimal places
- declared cooling capacity and declared power input at rating points B, C and D, expressed in kW and rounded to three decimal places
- declared EER at rating points B, C, and D, rounded to two decimal places
- the SEPR value, rounded to two decimal places
- the annual electricity consumption, in kWh per annum
- type(s) and name(s) of the refrigerant fluid(s) intended to be used with the chiller
- any specific precautions that shall be taken when the process chiller is installed or maintained
- information relevant for disassembly, recycling and/or disposal at end-of-life

(b) the technical documentation for the purposes of conformity assessment pursuant to Chapter 4 shall contain the following elements:

- the elements specified in point (a);
- where the information relating to a specific model has been obtained by calculation on the basis of design and/or extrapolation from other combinations, the details of such calculations and/or extrapolations, and of any tests undertaken to verify the accuracy of the calculations, including details of the mathematical model for calculating the performance of such combinations and details of the measurements taken to verify this model;

Table 7 - Information requirements for process chillers

Model(s): [information identifying the model(s) to which the information relates]			
Type of condensing: [air-cooled / water-cooled]			
Refrigerant fluid(s):[information identifying the refrigerant fluid(s) intended to be used with the process chiller]			
Item	**Symbol**	**Value**	**Unit**
Operating temperature	*t*	x	°c
Seasonal Energy Performance Ratio	*SEPR*	x,xx	
Annual electricity consumption	*Q*	x	kWh/a

Parameters at full load and reference ambient temperature (Point A)			
Rated cooling capacity	P_A	x,xxx	kW
Rated power input	D_A	x,xxx	kW
Rated EER	$\boldsymbol{EER_A}$	**x,xx**	
Parameters at rating point B			
Declared cooling capacity	P_B	x,xxx	kW
Declared power input	D_B	x,xxx	kW
Declared EER	$\boldsymbol{EER_B}$	**x,xx**	
Parameters at rating point C			
Declared cooling capacity	P_c	x,xxx	kW
Declared power input	D_c	x,xxx	kW
Declared EER	$\boldsymbol{EER_C}$	**x,xx**	
Parameters rating point D			
Declared cooling capacity	P_D	x,xxx	kW
Declared power input	D_D	x,xxx	kW
Declared EER	$\boldsymbol{EER_D}$	**x,xx**	
Other items			
Capacity control		fixed/staged**/variable	
Coefficient of degradation for fixed and staged capacity units*	Cd	x,xx	
Contact details	Name and address of the manufacturer or its authorised representative.		

* If Cd is not determined by measurement then the default degradation coefficient is Cd = 0,9. If the default Cd value is chosen, then results from cycling tests are not required. Otherwise, the cooling cycling test value is required.

** For staged capacity units, two values divided by a slash ('/') will be declared in each box in the section referring to 'cooling capacity' and 'EER'

ANNEX VIII
Measurements and calculations for process chillers

1. For the purposes of compliance and verification of compliance with the requirements of this Working Document, measurements and calculations shall be made using harmonised standards[10] the reference numbers of which have been published for this purpose in the *Official Journal of the European Union*, or using other reliable, accurate and reproducible methods that take into account the generally recognised state-of-the-art methods. They shall meet the conditions and technical parameters set out in points 2 and 3.

2. For establishing the values of cooling capacity, power input, energy efficiency ratio and seasonal energy performance ratio, measurements shall be done using the following conditions:

(a) the reference ambient temperature at the outdoor heat exchanger shall be 35°C for air-cooled chillers and 30°C for water-cooled chillers

(b) the outlet temperature of the liquid at the indoor heat exchanger shall be -25°C for low temperature and -8°C for medium temperature

(c) the variations of the ambient temperature throughout the year, representative of average climate conditions in the European Union, and the corresponding number of hours when these temperatures occur, shall be as set out in Table 1

(d) the effect of the degradation of energy efficiency caused by cycling depending on the type of capacity control of the process chiller

3. For the average number of hours h_j by outdoor temperature T_j across the year under average climate conditions in Europe for process chillers, please refer to Table 6 in Annex VI.

[10] The draft transitional methods and the calculation tools, before harmonized standards will be available, can be found at the following internet address: http://ec.europa.eu/enterprise/policies/sustainable-business/ecodesign/product-groups/freezing/chillers/index_en.htm

ANNEX IX
Verification procedure for market surveillance purposes for professional storage cabinets

When performing the market surveillance checks referred to in Article 3(2) of Directive 2009/125/EC, the authorities of the Member States shall apply the following verification procedure for the requirements set out in Annex II:

1. The Member State authorities shall test one single unit per model.

2. The model shall be considered to comply with the applicable requirements set out in Annex II to this Working Document if:

(a) the declared values comply with the requirements set out in Annex II;

(b) the measured volume shall not be less than the rated value by more than 3%

(c) the measured value of the energy consumption shall not be greater than the rated value by more than 10 %

3. If the result referred to in point 2 is not achieved, the Member State authorities shall randomly select three additional units of the same model for testing and provide the information on the test results to the authorities of the other Member States and to the Commission within one month of testing.

4. The model shall be considered to comply with the applicable requirements set out in Annex II to this Working Document if:

(a) the declared values comply with the requirements set out in Annex II;

(b) the average of the three units for the measured volume shall not be less than the rated value by more than 3%

(c) the average of the three units for the measured value of the energy consumption shall not be greater than the rated value by more than 10 %

5. If the results referred to in point 4 are not achieved, the model and all other equivalent professional storage cabinet models shall be considered not to comply with this Working Document. The Member State authorities shall provide the test results and other relevant information to the authorities of the other Member States and to the Commission within one month of the decision being taken on the non-compliance of the model.

Member State authorities shall use the measurement and calculation methods set out in Annexes III and IV.

ANNEX X
Verification procedure for market surveillance purposes for condensing units

When performing the market surveillance checks referred to in Article 3(2) of Directive 2009/125/EC, the authorities of the Member States shall apply the following verification procedure for the requirements set out in Annex V:

1. The Member State authorities shall test one single unit per model and provide the information on the test results to the authorities of the other Member States.

2. The condensing unit model shall be considered to comply with the applicable requirements set out in Annex V to this Working Document if:

(a) the declared values comply with the requirements set out in Annex V;

(b) for condensing units with a rated cooling capacity higher than 2 kW at low temperature and 5 kW at medium temperature, the seasonal energy performance ratio (*SEPR*) is not more than 10% lower than the declared value with point A measured at the rated cooling capacity;

(c) for condensing units with a rated cooling capacity lower than 2 kW at low temperature and 5 kW at medium temperature, the rated coefficient of performance (COP_A) is not more than 10% lower than the declared value measured at the rated cooling capacity

3. If the result referred to in point 2 is not achieved, the Member State authorities shall randomly select three additional units of the same model for testing and provide the information on the test results to the authorities of the other Member States and to the Commission within one month of testing.

4. The condensing unit model shall be considered to comply with the applicable requirements set out in Annex V to this Working Document if:

(a) the declared values comply with the requirements set out in Annex V;

(b) for condensing units with a rated cooling capacity higher than 2 kW at low temperature and 5 kW at medium temperature, the average of the three units for seasonal performance energy ratio (*SEPR*) is not more than 10% lower than the declared value measured at the rated cooling capacity;

(c) for condensing units with a rated cooling capacity lower than 2 kW at low temperature and 5 kW at medium temperature, the average of the three units for the rated coefficient of performance (COP_A) is not more than 10% lower than the declared value measured at the rating cooling capcity

5. If the results referred to in point 4 are not achieved, the model shall be considered not to comply with this Working Document.

Member State authorities shall use the measurement and calculation methods set out in Annex VI.

ANNEX XI
Verification procedure for market surveillance purposes for process chillers

When performing the market surveillance checks referred to in Article 3(2) of Directive 2009/125/EC, the authorities of the Member States shall apply the following verification procedure for the requirements set out in Annex VII:

1. The Member State authorities shall test one single unit per model and provide the information on the test results to the authorities of the other Member States.

2. The process chiller model shall be considered to comply with the applicable requirements set out in Annex VII to this Working Document if:

(a) the declared values comply with the requirements set out in Annex VII;

(b) the seasonal energy performance ratio (*SEPR*) is not more than 6% lower than the declared value, with point A measured at the rated cooling capacity;

(c) the rated energy efficiency ratio (EER_A) is not more than 5 % lower than the declared value, measured at the rated cooling capacity.

3. If the result referred to in point 2 is not achieved, the Member State authorities shall randomly select three additional units of the same model for testing and provide the information on the test results to the authorities of the other Member States and to the Commission within one month of testing.

4. The process chiller model shall be considered to comply with the applicable requirements set out in Annex VII to this Working Document if:

(a) the declared values comply with the requirements set out in Annex VII;

(b) the average of the three units for seasonal performance energy ratio (*SEPR*) is not more than 6 % lower than the declared value, with point A measured at the rated cooling capacity;

(c) the average of the three units for the rated energy efficiency ratio (EER_A) is not more than 5 % lower than the declared value, measured at the rating cooling capacity.

5. If the results referred to in point 4 are not achieved, the model shall be considered not to comply with this Working Document.

Member State authorities shall use the measurement and calculation methods set out in Annex VIII.

ANNEX XII
Indicative Benchmarks referred to in Chapter 6

1. At the time of entry into force of this Working Document, the best available technology on the market for professional storage cabinets in terms of their Energy Efficiency Index (EEI) was identified as follows:

	net storage volume (litres)	Annual energy consumption	EEI
Chilled vertical	600	474.5	29.7
Chilled counter	300	547.5	21.4
Frozen vertical	600	1825	41.2
Frozen counter	200	1460	41.0

2. At the time of entry into force of this Working Document, the best available technology on the market for condensing units in terms of rated coefficient of performance and seasonal energy performance ratio, was identified as follows:

Operating temperature	Rated capacity P_A	Applicable ratio	Benchmark value
Medium	0.2kW< P_A < 1kW	COP	1.9
	1kw< P_A < 5kW	COP	2.3
	5kW < P_A < 20kW	SEPR	3.6
	20kW < P_A < 50kW	SEPR	3.5
Low	0.1kW< P_A < 0.4kW	COP	1.0
	0.4kw< P_A < 2kW	COP	1.3
	2kW < P_A < 8kW	SEPR	2.0
	8W < P_A < 20kW	SEPR	2.0

3. At the time of entry into force of this Working Document, the best available technology on the market for process chillers in terms of seasonal energy performance ratio, was identified as follows:

Heat transfer medium at the condensing side	Operating temperature	Rated cooling capacity P_A	Minimum SEPR value
Air	Medium	P_A < 300 kW	3.4
		P_A > 300 kW	3.7

	Low	$P_A < 200$ kW	1.9
		$P_A > 200$ kW	1.95
Water	Medium	$P_A < 300$ kW	4.3
		$P_A > 300$ kW	4.5
	Low	$P_A < 200$ kW	2.3
		$P_A > 200$ kW	2.7