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it's all about innovation

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Present implementation:
Condensing units, proces chillers (LT, MT) and professional storage cabinets

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Agenda:

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1. Background
2. The products
3. The regulation
4. How tough is the regulation?
5. Is the industry ready?
6. Product development as a result
7. Challenges in market surveillance
8. What will the happen in the coming years?

1. Background

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Preliminary study started 2009.

Covered:

- Professional storage cabinets
- Blast cabinets
- Walk-in cold rooms (WICR)
- Process chillers
- Remote condensing units

3 stakeholder meetings. Contribution from industry, NGOs and member states.

3rd stakeholder meeting October 2010. Final report May 2011.

Lack of data for products, including condensing units and chillers

Further work needed.

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Consultation Forum meeting January 2012.

Commission and consultant took over:

- New data collected and analyzed in 2012.
- ”informal meetings” in 2012
- Most process chillers of HT type (80%).
- Development of draft ecodesign criteria and labelling system (storage cabinets)
- No test standard for blast cabinets and WICR

2013: Draft regulation published. Exclusion of WICR and HT process chillers

Regulary Commity meeting April 2014: Adoption of Regulation

2. The products

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Professional refrigerated storage cabinets.

Blast cabinets

Condensing units

Process chillers (LT and MT)

Professional Storage Cabinets:

- Integrated refrigeration system, electrical driven
- Freezers and refrigerators
- For foodstuffs and animal feed
- Upright cabinets and counters
- Internal fan

Blast cabinets:

For fast cooling of (warm) food

Up to 300 kg foodstuff

Only information about load capacity, standard temperature cycle, and kWh/kg foodstuff and info about the refrigerant.

Condensing units:

Up to 20 kW (LT) and 50 kW (MT)

Air cooled

Process Chillers:

LT and MT (not HT)

Water- and air cooled

Walk-in cold rooms: expected to be regulated after revision in 2020.

3. The regulation

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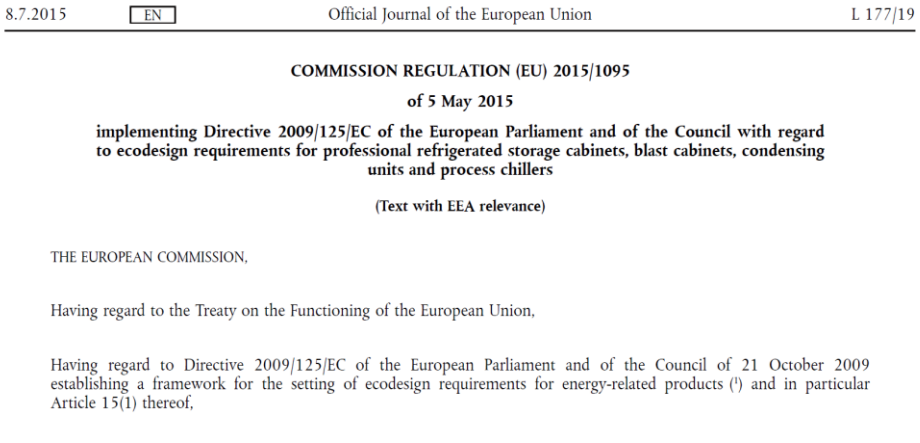
The regulation: Published May 5th 2015, and the ecodesign-criteria went into force July 1st 2016.

Energy labelling scheme for professional service cabinets went into force July 1st 2016.



8.7.2015 EN Official Journal of the European Union L 177/19

COMMISSION REGULATION (EU) 2015/1095

of 5 May 2015

implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for professional refrigerated storage cabinets, blast cabinets, condensing units and process chillers

(Text with EEA relevance)

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,

L 177/2 EN Official Journal of the European Union 8.7.2015

REGULATIONS

COMMISSION DELEGATED REGULATION (EU) 2015/1094

of 5 May 2015

supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to the energy labelling of professional refrigerated storage cabinets

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

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

Having regard to Directive 2010/30/EU of the European Parliament and of the Council on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products (1), and in particular Article 10 thereof,

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Professional Storage Cabinets

Upright cabinets and counters.

Cabinets for foodstuff and animal feed

Does not apply for the following products:

- Appliances not powered by electricity
- Appliances cooled by remote refrigeration system
- Appliances without a compression refrigeration system
- Open cabinets
- Sales cabinets (commercial refrigeration cabinets)
- Cabinets with static cooling
- Roll-in
- Chest freezers
- Custom-made cabinets made on a one-off basis according to individual customer specification and not equivalent to other cabinets

…Professional storage cabinets

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Professional storage cabinets

Ecodesign + energy labelling

Test after EN16825, Climate Class 4 (+30 C, 55 % RH), with door openings

EEI: Energy consumption / net-volumen

Ecodesign-criteria:

- From 1. July 2016: EEI< 115
- From 1. Jan. 2018: EEI< 95
- From 1. July 2019: EEI< 85

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

EEI (Energy Efficiency Index):

EEI = (AEC/SAEC)*100%

AEC=E24h*365 (yearly energy consumption according to test)

SAEC=M*Vn + N (yearly standard energy consumption)

…Professional storage cabinets

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Energy efficiency classes of professional refrigerated storage cabinets

Energy efficiency class	EEI
A+++	EEI < 5
A++	5 ≤ EEI < 10
A+	10 ≤ EEI < 15
A	15 ≤ EEI < 25
B	25 ≤ EEI < 35
C	35 ≤ EEI < 50
D	50 ≤ EEI < 75
E	75 ≤ EEI < 85
F	85 ≤ EEI < 95
G	95 ≤ EEI < 115

…professional storage cabinets

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Energy label, July 2016 and July 2019.

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Condensing units:

Apply to:

- Units with one or more compressors
- Units up to 50 kW (MT) and 20 kW (LT)
- Air cooled units

Does not apply to:

- HT (AC, +5 C)
- Monoblok
- Water cooled units
- Units with separate compressor.

…Condensing units

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Energy efficiency measured in COP and SEPR.

SEPR:

- **SEPR** is the seasonal energy performance ratio of a condensing unit. It is calculated from the COP of the condensing unit at **4 different ambient temperatures and cooling loads**, called **rating points**.

- Test after prEN13215 (test method also described in the regulation)
- Test SEPR calculated from test data (spreadsheet)

…Condensing units

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Ecodesign-criteria, 1. July 2016:

(a) From 1 July 2016, 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	0,2 kW≤ P_A ≤ 1 kW	COP	1,20
	1 kW< P_A ≤ 5 kW	COP	1,40
	5 kW < P_A ≤ 20 kW	SEPR	2,25
	20 kW < P_A ≤ 50 kW	SEPR	2,35
Low	0,1 kW≤ P_A ≤ 0,4 kW	COP	0,75
	0,4 kW< P_A ≤ 2 kW	COP	0,85
	2 kW < P_A ≤ 8kW	SEPR	1,50
	8 kW < P_A ≤ 20 kW	SEPR	1,60

…Condensing units

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Ecodesign criteria, step 2 (1. July 2018)

(b) From 1 July 2018, 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	0,2 kW≤ P_A ≤ 1kW	COP	1,40
	1 kW< P_A ≤ 5 kW	COP	1,60
	5 kW < P_A ≤ 20 kW	SEPR	2,55
	20 kW < P_A ≤ 50 kW	SEPR	2,65
Low	0,1 kW≤ P_A ≤ 0,4 kW	COP	0,80
	0,4 kW< P_A ≤ 2 kW	COP	0,95
	2 kW < P_A ≤ 8 kW	SEPR	1,60
	8 kW < P_A ≤ 20 kW	SEPR	1,70

…Condensing units

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IF GWP < 150:

- Bonus: 15 % from July 2016
- Bonus: 10 % from July 2018

Information about test results etc. must be available at free homepage

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LT and MT process chillers:

LT: Capacity for delivery of cold liquid at -25 C

MT: Capacity for delivery of cold liquid at -8 C.

Cover air cooled – and water cooled chillers

Does not apply to:

- Custom made process chillers assembled on site, made on a one-off basis
- Absorption coolers.
- HT process-chillers and comfort chillers

…LT and MT process chillers

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(10% bonus for GWP<150)

(a) From 1 July 2016, 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	$P_A \leq 300$ kW	2,24
		$P_A > 300$ kW	2,80
	Low	$P_A \leq 200$ kW	1,48
		$P_A > 200$ kW	1,60
Water	Medium	$P_A \leq 300$ kW	2,86
		$P_A > 300$ kW	3,80
	Low	$P_A \leq 200$ kW	1,82
		$P_A > 200$ kW	2,10

…LT and MT process chillers

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(10% bonus for GWP<150)

(b) From 1 July 2018, 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	$P_A \leq 300$ kW	2,58
		$P_A > 300$ kW	3,22
	Low	$P_A \leq 200$ kW	1,70
		$P_A > 200$ kW	1,84
Water	Medium	$P_A \leq 300$ kW	3,29
		$P_A > 300$ kW	4,37
	Low	$P_A \leq 200$ kW	2,09
		$P_A > 200$ kW	2,42

How tough is the regulation?

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Food storage cabinets:

Ecodesign-criteria will ban the worse units. But with a little effort; - the cabinets can fulfil criteria.

The upper energy classes will be difficult to reach; - especially for upright freezers.

Condensing units:

Tough – but realistic.

Process chillers:

No experience at DTI.

JCI: ”We are ready”!

Other: “Tough”

4. Is the industry ready?

Should be! Regulation under way for many years!

Authorities have informed industry.

All big manufacturers have been working with improvements of products.

Two examples:

DK manufacturer (GRAM) of professional service cabinets:

Working with DTI on improvement of upright cabinets 2011-2014.

Gram working with DTI on improvement of refrigerated counters 2015 – (ongoing).

Goal: improvement of energy class.

Co-funding: DEA.

…Is the industry ready?

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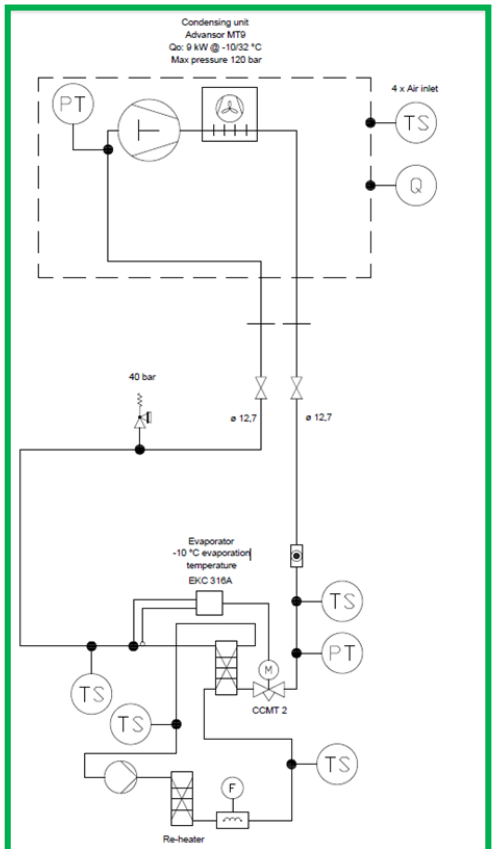
Example: Advansor condensing unit (CO2):

Improvement of existing unit (9 kW MT). Ongoing project.

Improvement of components and system.

Co-funding with Elforsk, DTI, Danfoss and Advansor



5. Challenge in market surveillance

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Several labs in EU accredited to test professional storage cabinets, including DTI (Taastrup).

Test are ”easy” to do. Includes door openings. All products can be tested. Price is modest.

No obstacles.

(Video).

DTI is building test lab for condensing units.

Will be ready in March 2017.

All products can be tested. Price will be modest.

No obstacles.

…Challenge in market surveillance

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Small chillers can be tested at DTI (up to 35 kW)

Medium size and big chillers will be an obstacle.

Other labs might be able to test big chillers, but:

- It would be expensive to test
- It would be expensive for the manufacturer to deliver since big chillers are produced by orders
- Special problem with air cooled (big) chillers, they need a huge climate chamber!

It would be fine if an alternative monitoring system for big chillers could be developed in EU.

Test at manufacturers lab?

6. What will happen in coming years?

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Customers will ask for efficient products.

Better cooling machines will be marketed and manufactured
More efficient components will be developed and marketed.
Energy efficiency will improve.

More data will be available at the time for revision of the regulation.