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Introduction to ecodesign and energy labelling

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Conference: Refrigeration in the supermarket sector
Date / Initials: 8-9´th. november 2017 / EVF

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it's all about innovation

What is Ecodesign and Energy labelling?

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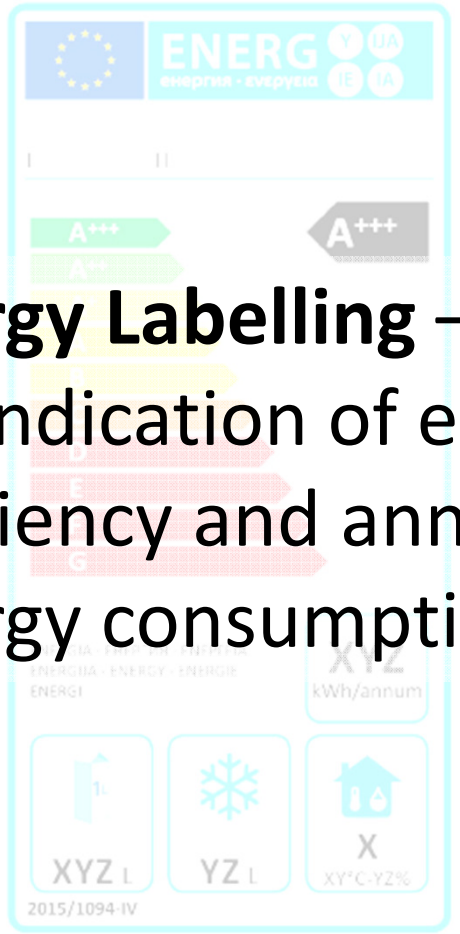
REQUIREMENTS FOR ENERGY EFFICIENCY

Professional refrigerated storage cabinets with [illegible] Regulation, with the exception of heavy-duty cabinets and refrigerated [illegible] comply with the following energy efficiency index (EEI) limits:

From 1 January 2018: EEI < 95

From 1 July 2019: EEI < 85

Ecodesign – i.a. Minimum energy efficiency requirements



Energy Labelling – i.a. Indication of energy efficiency and annual energy consumption

Ecodesign and Energy Labelling - A push-pull tool

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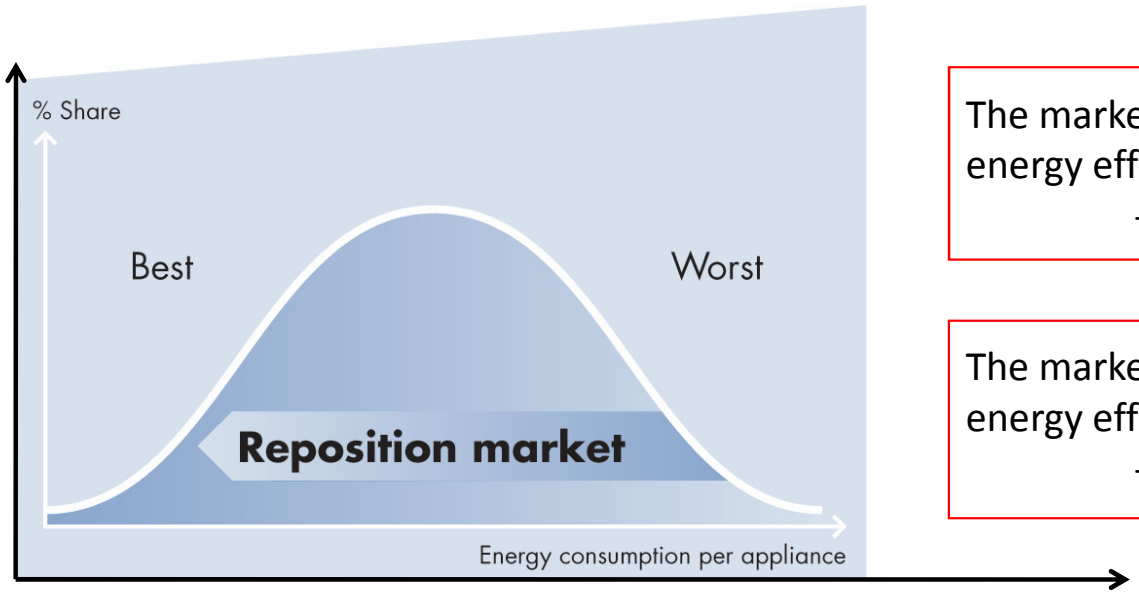

The market are pushed towards higher energy efficiency through requirements
-> Ecodesign

The market is pulled towards higher energy efficiency due to market demand
-> Energy Labelling

Source: Danish Energy Agency

Why Ecodesign and Energy labelling?

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Reduction of energy consumption

- An effective tool for improving the energy efficiency of products.
- Eliminate the least performing products from the market
- Significantly contributing to the EU's 2020 energy efficiency objective

Market benefit

- Pushing industrial competitiveness and innovation
- Free movement of products within the internal market
- Harmonized standards
- Ease of market surveilance

A world of Directives and Regulations

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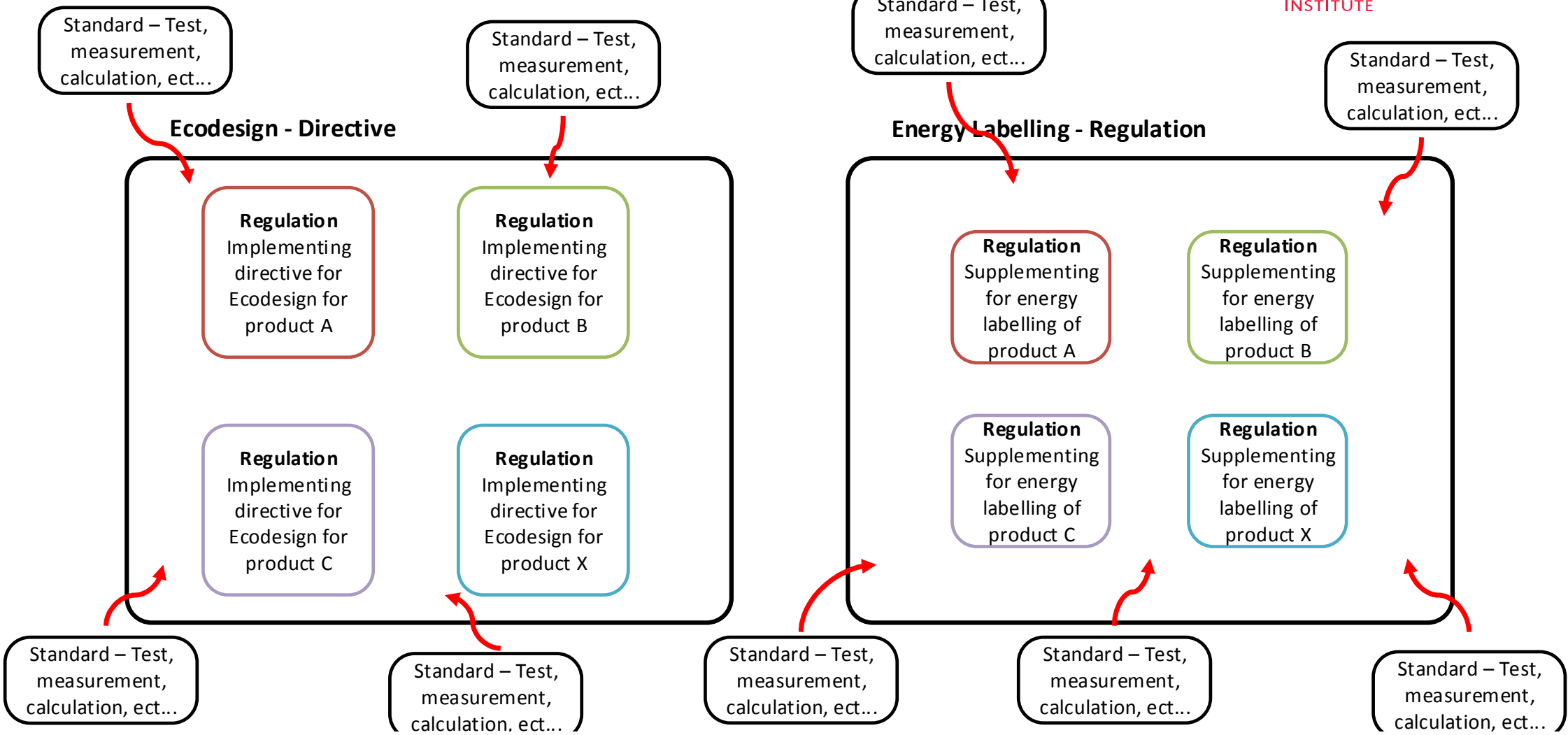

Quality of documentation and data

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- To a large extend self declaration
- Content of product information, instruction booklets, technical documentation and free access websites regulated through regulations and shall be provided.
- Data must be validated through test

Ecodesign and Energy Labelling impact

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- Worst products removed from the market
- Energy efficiency is becoming a competitive parameter
- Information will (shall) be available
- Common language and reference for energy efficiency
- Knowledge – information available for installer and end consumer

Which (relevant) products are covered by ecodesign and / or energy labelling?

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Product	Ecodesign?	Energy Labelling?
Household refrigeration	yes	yes
Wine coolers and mini-bars	yes	yes
Professional storage cabinets	yes	yes
Blast-chillers	(yes)	no
Condensing-units	yes	no
Chillers for industrial processes, LT + MT	yes	no
Chillers for industrial processes, HT	01-01-2018	no
A/C for large buildings, chillers for A/C	01-01-2018	no
Commercial display cabinets	No earlier than 2019	
Walk-in cold storage	Might be introduced when revising regulation (EU) 2015/1095 (aprox. 4-5 years)	

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Condensing Units

Condensing units (CDU)

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- Ecodesign per 1'st of july 2016
- The requirements raised again d. 1/7 2018
- Medium and low temperature regulated
- High temperature application not regulated
- Upper limit of 50 kW
- No exceptions - <u>all products must be tested</u>
- No energy label

Picture of a CDU in test at DTI

Condensing units

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- Different minimum energy efficiency requirements for different effect ranges
- Different means for measuring minimum energy efficiency for different effect ranges

Requirements for energy efficiency from 1´st of July 2016

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

Static test: full load, one test point

Dynamic test: Simulates operation carateristics throughout the year. MINOR REVOLUTION

”Historic” indsight

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<u>Back in 2015:</u> CO_2 CDU’s were accused of having to low energy efficiency to cope with the upcoming ecodesign energy efficiency requirements.

Tests were conducted…

The regulation were delayed. 2016 and 2019 are the right years

CDU Unit Approximately 9 kW nominal	SEPR	Modulating	EXV needed	Sound level	Comment
	-	-	-	dB(A)	-
Limit 2015	2,25				ECO Design criteria
Limit 2018	2,55				ECO Design criteria
XXS MT9 CO2	**2,65**	**X**	**X**	**45**	**Lab Tested**
XXS MT9 CO2	3,07	X	X	45	Calculated/ potential for optimising
OM-45	2,87		X	46	Price optimized on/ off
OM-45 FSC	2,22			46	d.o. with standard fan speed control setting
ZXDE-060E	3,28	X		41	High end product modulating digital scroll
ZXME-060E	3,49		X	41	High end on/ off

<u>Today (some examples):</u>

Advansor XXS MT9 DY100: SEPR = 3,5

Copeland ZXME060E (R449A): SEPR = 3,73

How to test

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- Test of CDU's are done according to EN 13215 and EN 13771

- LT (Low temperature application -35 °C)
- MT (Medium temperature application -10 °C)

- SEPR calculated according to regulation 2015/1095 of 5'th of may 2015

Experience from the tests conducted

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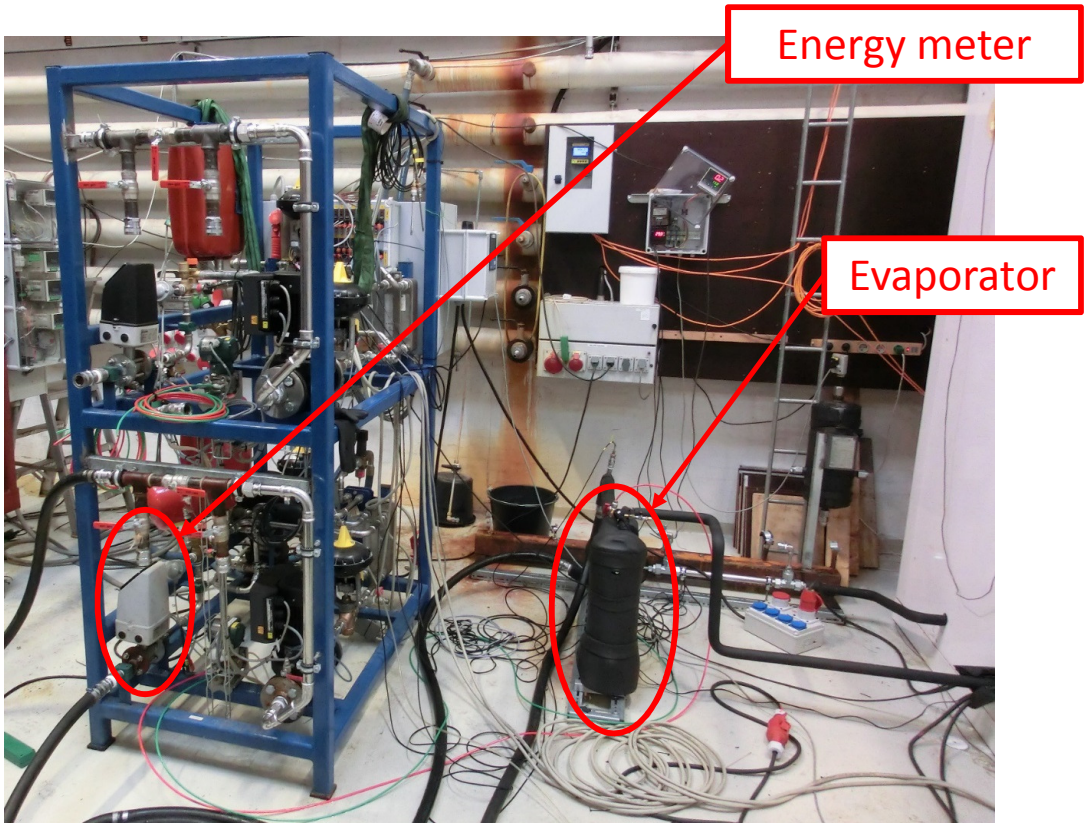
The test:

- Test is relatively complicated
- The test rig needs to cover many refrigerants
- Not many tests have been conducted

The results:

- The “picture” from 2015 have not changed – most products are well above the Ecodesign minimum requirements



Part of CDU test rig at DTI

Experience from the tests conducted

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- As the minimum requirements are introduced to exclude from the market the worst performing CDUs, it seems adequate.

- By no means the best approach to use the minimum energy efficiency requirement as a guide for the purchase of CDUs.

- It makes sense for the manufacturers to develop their product to perform better in terms of SEPR value.

- The test reflects “real” conditions, load and climatic situations in the market

  → However! SEPR is measured in a laboratory and should never be expected in the “real” world.

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Professional Storage Cabinets

Refrigerators, freezers and other refrigerated storage cabinets used i.e. in a restaurant kitchen

Professional Storage Cabinets

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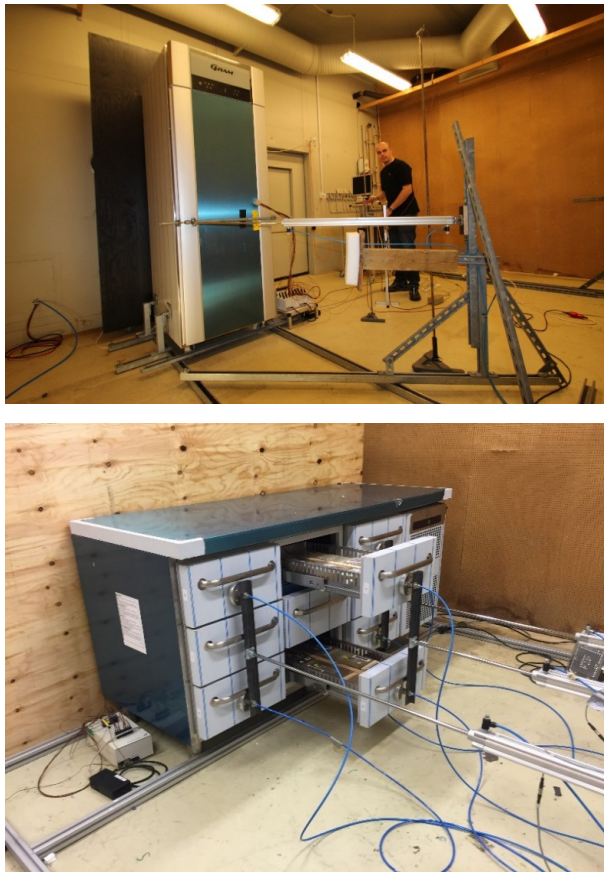
- Ecodesign and energy labelling per 1'st of july 2016
- The requirements raised again d. 1/1 2018 and again in 1/7 2019
- There is no upper limit for products covered - volume indirectly setting an upper limit
- Excluded: "Custom-made professional refrigerated storage cabinets made on a one-off basis according to individual customer specification"



Professional refrigerated storage cabinets in test at DTI

Professional Storage Cabinets

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- Similar energy label as we know it from household refrigeration.
- Excluded: "Custom-made professional refrigerated storage cabinets made on a one-off basis according to individual customer specification"

Per 1/7 2016

Per 1/7 2019

- May be used now!

How to test

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- Test of professional refrigerated storage cabinets are done according to EN 16825 (a variant of EN 23953)

- Tested according to climate class 4

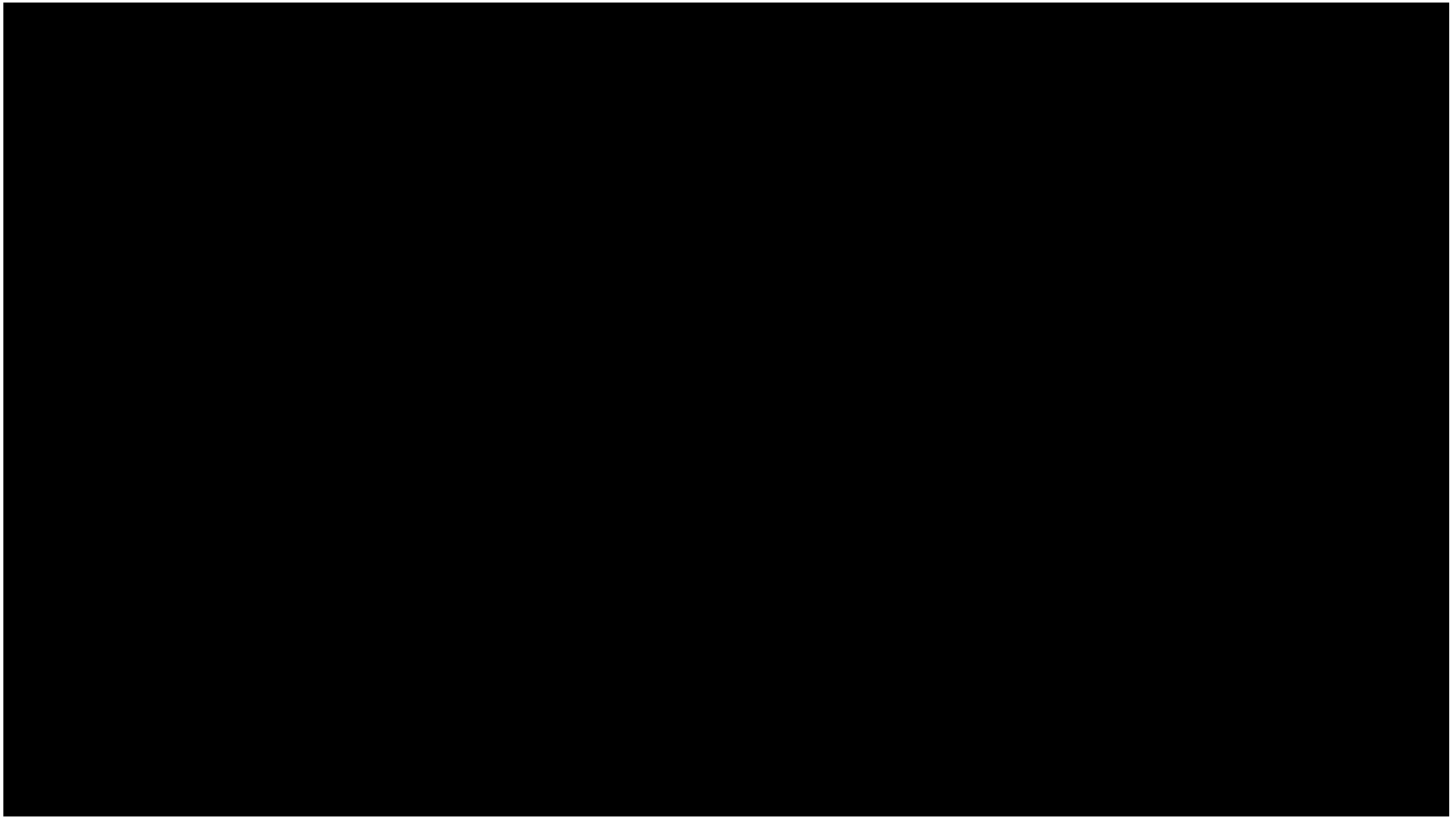
  Temperature: +30 °C

  Humidity: 55 RH

  Air infiltration: Door opening sequences

- EEI calculated according to regulation 2015/1095 of 5'th of may 2015

How to test



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Experience from the tests conducted

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What was tested?

- Four professional refrigerated storage cabinets – Chilled operating temperature (≥ -1 °C , ≤ 5 °C)
- Four professional refrigerated storage cabinets – frozen operating temperature (≤ -15 °C)

Important to keep in mind:

- Test conducted in connection with market surveillance
- A (relatively) new product category to be included within ecodesign and energy labelling

What did we see?

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Professional refrigerated storage cabinets – Chilled operating temperature:

Appliance	Volume Pass?	Temperature Pass?	Energy Pass?	Energy label indicated by manufacturer	True energy label	Comments
A	Yes	Yes	Yes	E	D	Overall pass √
B	No	No	(Yes)	D	(D)	Temperature fail
C	No	No	No	C	E	
D	Yes	No	No	C	N/A	Energy consumption 3,4 times indicated by manufacturer

What did we see?

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Professional refrigerated storage cabinets – Frozen operating temperature:

Appliance	Volume Pass?	Temperature Pass?	Energy Pass?	Energy label indicated by manufacturer	True energy label	Comments
E	Yes	No	(Yes)	G	(G)	Temperature fail
F	Yes	No	(Yes)	D	(D)	Temperature fail
G	Yes	No	(Yes)	D	(D)	Temperature fail
H	Yes	Yes	Yes	E	E	Overall pass √

Some thoughts on the results…

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- Product category regulated since 1´st of July 2016 – What was "the picture" before the regulation?
- Minimum efficiency demand raised by 17,4% 1´st of January 2018
- Products are (most often) used in i.e. kitchens under strict temperature quality control
- This product category carries a lot of similarities to commercial display cabinets