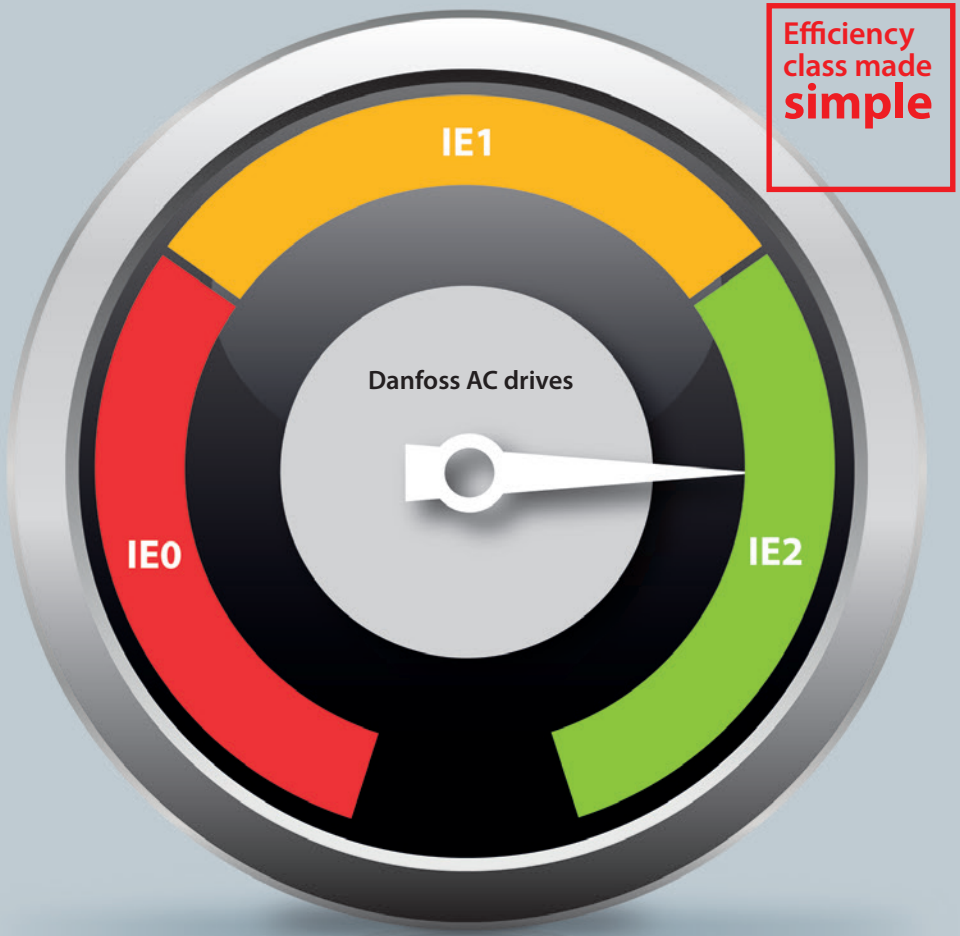
ENGINEERING TOMORROW

Ten things you need to know about Ecodesign

Your Ecodesign questions, answered



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1. What is the Ecodesign directive?

The Ecodesign Directive* is the legislative framework that sets mandatory requirements on all energy-related products in the domestic, commercial and industrial sectors throughout the European Union.

Similar legislative requirements apply in North America and Australia.

**full title Ecodesign Directive for Energy Related Products (ErP) 2009/125/EC*

2. What are the Ecodesign requirements for electrical motors?

The minimum energy efficiency limit for the majority of motors is class IE3. The requirements will increase over time. The option of using IE2 motor + VSD will be removed in 2021. From this date the motor must fulfill efficiency class IE3. In 2023, IE4 will become mandatory for 75-200 kW motors.

Motor part load losses for VSD operation must be provided starting 01.07.2022.

For detailed timeline see point 8.

3. Which standards deal with energy efficiency of drives and power drive systems?

The international product standard IEC61800-9 deals with the energy efficiency of drives and power drive systems (PDS). A PDS is also known as motor+ drive system. It specifies the classification of drives and power drive systems, and the determination of partial load efficiency.

4. Does Ecodesign affect motor + power drive systems?

The IEC61800-9-2 standard defining the IE classes for drives also defines the IES class for motor + drive systems. The "S" is added to indicate that the class is related to the power drive system (PDS).

Although the greatest potential for energy savings exists at system level, minimum efficiency requirements for PDS are not in the scope of the Ecodesign Directive, so far.

5. What impact does Ecodesign have on my business?

At the very least, the Ecodesign Directive positively impacts your energy consumption. The main goal of the Directive is to improve the energy efficiency of products throughout the EU, and you should be able to see this as soon as you start using products that comply with the directive.

6. How do I classify a power drive system when the components are sourced separately?

Combining drive IE and motor IE class directly to a PDS IES class is not possible. Instead, to determine the IES class, simply add the losses of the motor at nominal load (100 % speed and 100 % torque) to the losses of the drive at nominal load (100 % frequency and 100 % load). Compare the sum to the reference value for the IES class, given in the IEC 61800-9-2 standard, and you will get the corresponding IES class.

When using Danfoss drives you can simply use the ecoSmart tool (see point 10) to determine the IES class. It is easy to do business with Danfoss!

7. How are the Minimum Efficiency Performance Standard (MEPS) regulations updated?

Requirements for minimum efficiency performance are set in Europe as a consequence of the implementation of the Ecodesign Directive for Energy Related Products (ErP) 2009/125/EC. The regulation (Commission Regulation (EU) 2019/1781 of 1 October 2019) is introduced step-by-step and the requirements gradually intensify over time, as the product-specific regulations are updated.

8. What is the timeline for implementation of the European MEPS* regulations?

Year of enforcement	Minimum Efficency Performance Standard in Europe			
	Motors [1], [2]		VSD	
	Class	Power range	Class	Power range
2017	IE3/IE2 + VSD[3]	3~ 0.75-375 kW	No requirement	0.12-1000 kW
2021	IE2 IE3	3~ 0.12-0.75 kW 3~ 0.75-1000 kW	IE2	0.12-1000 kW
2023	IE2	1~ ≥0.12 kW	IE2	0.12-1000 kW
	IE3	3~ 0.75-75 + 200-1000 kW		
	IE4	3~ 75-200 kW		

**Minimum Efficiency Performance Standards*

[1] For 3-phase motors, 2/4/6 poles and from 2021 also 8 poles. MEPS for 1-phase motors and increased safety 3~ Ex eb motors is IE2 from 2023. IE4 applies for 2,4 and 6 pole motors only.

[2] Motor part load losses for VSD operation must be provided starting 01.07.2022

[3] IE2 + VSD is allowed as alternative to IE3 motors

Efficiency classification **explained**

9. How are drives and motors classified?

Motors, drives, and power drive systems (PDS) are classified in energy efficiency classes. The standards used for classifications are different, as is the number of efficiency classes.

Equipment type	Standard defining classification
Motors for sinusoidal power supply	International standard IEC 60034-30-1, harmonized in Europe as EN 60034-30-1
Motors supplied from a drive	IE technical specification: IEC TS 60034-30-2
Drives and power drive systems	IEC EN 61800-9-2

Motor

IEC 60034-30-1
– Motors: Fixed speed (direct-on-line DOL)
– Classes: IE1– IE4

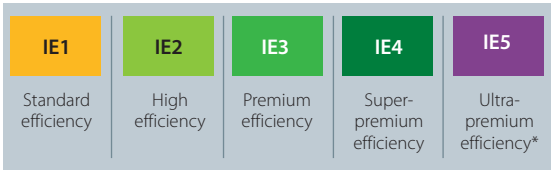
IEC 60030-30-2*
– Motors: Variable speed operation
– Classes: IE1– IE5

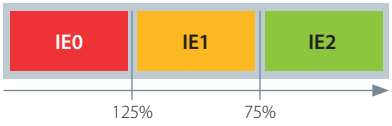
Drive

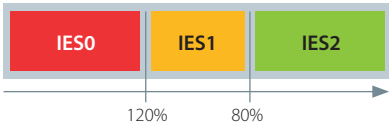
IEC61800-9-2
– Classes: IE0 – IE2

Power drive system (PDS)

– Classes: IES0 – IES2







Energy efficiency classifications for motors, drives and power drive systems (PDS).

10. Where do I look up part load loss data? How do I determine efficiency class?

Use the efficiency calculation tool MyDrive® ecoSmart™ to:

- Look up part load data as defined in IEC 61800-9-2, for AC drives from Danfoss
- Select a motor from the integrated database or specify a generic one
- Calculate efficiency class and part-load efficiency for drives and drive + motor combinations
- Create a report documenting part load loss data and IE or IES efficiency class

How does it work? Just enter the nameplate data. Then enter any application-specific part load points. MyDrive® ecoSmart calculates the efficiency class and part load data, and creates a report in pdf format which you can use as documentation.

MyDrive® ecoSmart™ is available online, offline and as an app.

MyDrive® ecoSmart™ app:

ANDROID APP ON Google play

Download on the App Store

MyDrive® ecoSmart™ online tool:
http://ecosmart.danfoss.com

Still have **questions?**

Contact your local Danfoss representative, or use the links and codes below:

Click on the links to learn more:

- Ecodesign directive: https://www.danfoss.com/en/about-danfoss/our-businesses/drives/knowledge-center/energy-efficiency-directive/
- Motor independence – what's in it for you?: http://danfoss.ipapercms.dk/Drives/DD/Global/SalesPromotion/Articles/uk/thought-leadership/motor-independence/

Ecodesign Directive
Visit the site and watch the video

Danfoss drives are compatible with all kinds of motor technologies
Visit the site and watch the video

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