

Europump

The Voice of the European Pump Industry

EUROPUMP Guideline

on the application of the Regulation (EU) 2019/1781 on Electric motor and Variable speed drive efficiency requirements clarifying the applicability to submersible and close-coupled motors.

Introduction: from Directive EuP to EC Motor Regulation

Directive 2009/125/EC Energy related Products – ErP (and the former version 2005/32/EC (Eco-design Directive for Energy-using Products – EuP) establish a framework for the setting of general eco-design requirements to be fulfilled by energy-using products in view of increasing the energy efficiency of the products and the level of protection of the environment.

Within the framework of the Directive, specific Regulations have been issued for the setting of design and energy efficiency requirements, applicable to the products included in the scope of the Directive. Amongst these, Regulation (EU) 2019/1781, which replaces EC 640/2009 EC, establishes eco-design requirements for Electric motors and Variable speed drives, in terms of energy efficiency levels. Regulation (EU) 2019/1781 increases the scope with several additional motor types and a wider power range. It also includes requirements for Variable speed drives.

Subject matter and scope

Regulation (EU) 2019/1781 is applicable to Electric motors, the type and size of which are defined in Article 2.1 (a): induction motors; rated for operation at 50 Hz, 60 Hz or 50/60 Hz sinusoidal voltage; single or three-phase, with 2, 4, 6 or 8 poles, rated voltage 50 – 1000 V, rated shaft power of 0,12 – 1000 kW (rating based on continuous duty).

Article 2.1 (b) in the regulation defines requirement on efficiency for Variable speed drives with 3-phase input, rated output voltage 100 – 1000 V and are rated for the motors in scope of the regulation.

Europump understanding is that:

- Submersible motors (installed wet or dry)
(Article 2.2 (e))
- Motors fully integrated into the pump unit (e.g. canned motor pump, wet running circulator motors)
(Article 2.2 (a))

are excluded from any efficiency requirements based on the regulation.

Article 2.2 (a) is setting very strong requirements for the definition of an integrated motor. It excludes motors driving a Canned Motor Pump. However, it does not exclude any special motor design for other, especially closed coupled, pump motors. Any special end-shield, the housing as part of the driven equipment or a special shaft is not sufficient to consider the motor as integrated.

Europump understanding is that an integrated motor is only excluded from requirement on efficiency if the motor fulfills all below bullet points:

- the energy performance cannot be tested independently from the product, even with the provision of a temporary end shield and drive-end bearing
- the motor must share common components (apart from connectors such as bolts) with the driven unit (for example, a shaft or housing)
- it shall not be designed in such a way that the motor can be separated in its entirety from the driven unit and operate independently
- the process of separation shall have the consequence of rendering the motor inoperative

Efficiency levels

International efficiency levels for motors are defined in standard IEC 60034-30-1:2014 based on test methods and limits of acceptance indicated under IEC 60034-2-1:2015. Efficiency levels IE2, IE3 and IE4 are listed in Annex I.1 of the Regulation.

Efficiency level IE2 for variable speed drive is specified in Annex I.3

Eco-design requirements and timetable

Eco-design requirements for Electric motors shall be applied in accordance to the following timetable:

Scope		Application dates and minimum efficiency requirements (2015 onwards)			
AC induction motors <= 1000 V		1 st Jan 2015	1 st Jan 2017	1 st Jul 2021	1 st Jul 2023 onwards
0.75-7.5 kW	3 phase, 2/4/6 pole	IE2 →	IE2+VSD/IE3 →	IE3 →	→
7.5-375 kW (*)	3 phase, 2/4/6 pole	IE2+VSD/IE3 →	→	IE3 →	→
(*) 75-200 kW	3 phase, 2/4/6 pole				↓ IE4 →
375-1000 kW	3 phase, 2/4/6 pole			IE3 →	→
0.75-1000 kW	3 phase, 8 pole			IE3 →	→
0.75-1000 kW	ATEX (excl. Ex eb)/non-integrated brake			IE3 →	→
0.12-1000 kW	Increased Safety Ex eb				IE2 →
0.12-1000 kW	1 phase				IE2 →
0.12-0.75 kW	3 phase			IE2 →	→
Variable speed drives		1 st Jan 2015	1 st Jan 2017	1 st Jul 2021	1 st Jul 2023 Onwards
0.12-1000 kW				IE2 →	→