Information about the

Ecodesign Regulations

(EU) 2019/1781 for Motors and Drives and (EU) 2021/341 (Amendment)

from CAPIEL and CEMEP

Please be aware this information cannot replace the Regulations (EU) 2019/1781 and (EU) 2021/341 (Amendment). In case of conflict between this information and the regulations, the regulations (EU) 2019/1781 and (EU) 2021/341 (Amendment) take precedence.

1. Introduction

CEMEP the European Committee of Manufacturers of Electric Machines and Power Electronic, and CAPIEL the European Coordinating Committee of Manufacturers of Electrical Switchgear and Controlgear, are committed to meeting or exceeding the requirements of all European Union (EU) legislation which seeks to protect and improve the environment. Probably the most significant contribution CAPIEL and CEMEP member companies can make, is through optimising the energy efficiency of Motor and Drive Systems. Many studies indicate correct Motor and Power Drive Systems design is essential to maximise performance and minimise motor losses (e.g. EuP Lot 30: Electric Motors and Drives, Task 3, Anibal de Almeida, Hugh Falkner, João Fong, April 2014).

- Energy efficient systems are those which are perfectly matched to their applications. Good guidelines for designing an efficient system are “IEC 61800-9-1” and “IEC 61800-9-2”.
- Power Drive Systems (PDS) consist of one or more of the following components:
    - A Motor that converts electrical power into mechanical power. A device for controlling the motors from the power grid, which usually is either a Variable Speed Drive (VSD), a soft-starter, or a contactor/overload combination. Traditionally applications with a fixed speed do not require a drive, only a contactor for switching the motor on and off or a soft starter for a soft motor start-up. However, in some cases, energy consumption can be lowered by decoupling the speed of the load, e.g. a pump, from the line frequency by using a converter or a gearbox.

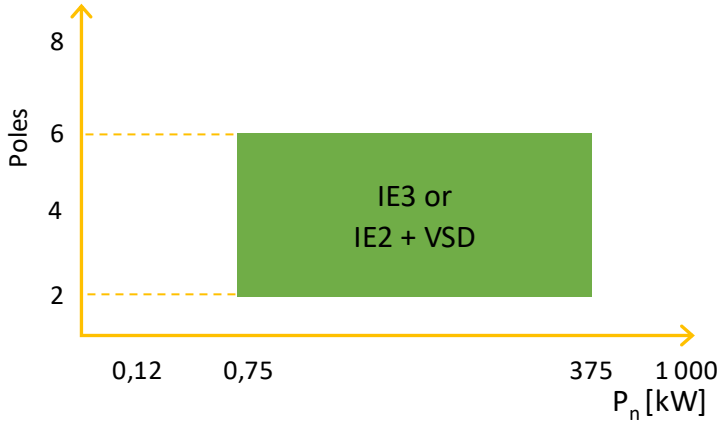
The Ecodesign Directive 2009/125/EC establishes, across the EU, a framework for setting eco-design requirements for energy-related products. It is a key instrument of EU policy for improving the energy efficiency and other aspects of the environmental performance of products placed on the market.

Requirements for the eco-design of electric motors and the use of variable speed drives were set out in Regulation “(EC) 640/2009” on 22nd July 2009 and in its amendment Regulation “(EU) 4/2014” on 6th January 2014. This regulation was superseded on 25th October 2019 by Regulation “(EU) 2019/1781”, which sets out new statutory requirements for motors and drives and its amendment Regulation (EU) 2021/341 from 23rd of February 2021. Until the new requirements take effect, those of the existing Regulation “(EC) 640/2009” and the Regulation “(EU) 4/2014” continue to apply.

The intent of this document from CEMEP and CAPIEL is to provide information to all stakeholders about the new Ecodesign Regulations (EU) 2019/1781 for motors and drives and (EU) 2021/341 (Amendment). However, this information <u>cannot</u> replace the regulations. In case of conflict between this information and the regulations, the regulations (EU) 2019/1781and (EU) 2021/341 (Amendment) take precedence.

2. Overview of the Regulations

2.1 Regulation (EC) 640/2009 (valid until 30th June 2021; requirements for motors only)



Picture 1: Regulation from 1 January 2017 until 30th June 2021

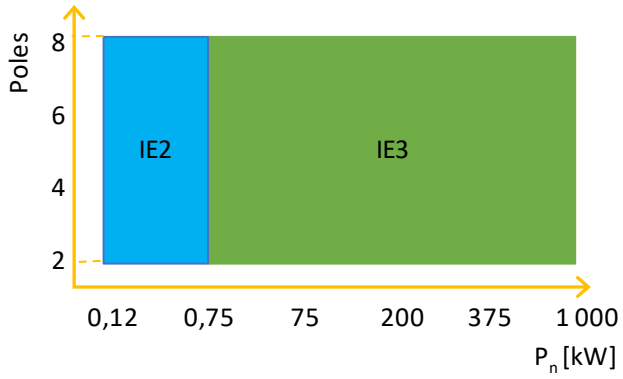
Applies to:	**Major exemptions from these efficiency requirements**[1]
Induction motors (single speed, 3-phase 50 Hz or 50/60 Hz, induction motor rated for continuous duty, with rated voltage of up to 1000 V).	• Motors specified to operate exclusively in potentially explosive atmospheres as defined in Directive 2014/34/EU. • Brake Motors (as defined in the Regulation) • Submersible motors (as defined in the Regulation)
Does not apply to:	
This regulation does not apply requirements on the VSD.	

Table 1 applies - exemptions

[1] Other exemptions are:
(a) motors specified to operate wholly immersed in a liquid;
(b) motors completely integrated into a product (for example gear, pump, fan or compressor) of which the energy performance cannot be tested independently from the product;
(c) motors specified to operate exclusively:
(i) at altitudes exceeding 4 000 meters above sea-level;
(ii) where ambient air temperatures exceed 60 °C;
(iii) in maximum operating temperature above 400 °C;
(iv) where ambient air temperatures are less than – 30 °C for any motor or less than 0 °C for a motor with water cooling;
(v) where the water coolant temperature at the inlet to a product is less than 0 °C or exceeding 32°C

2.2 New Regulation (EU) 2019/1781

2.2.01 Motors - Step 1: Starting 1st July 2021



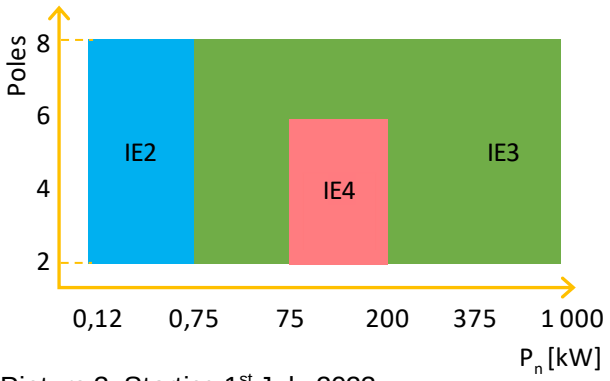
Picture 2: Starting 1st July 2021

Applies to:	**Major exemptions from these efficiency requirements**
3-phase induction motors • rated for operation on 50 Hz, 60 Hz or 50/60 Hz supplies and • rated for continuous duty i.e. duty class S1, S3≥80%, S6≥80% The following types of motor will have efficiency requirements for the first time: • pole numbers: 8-poles • Motors for explosive atmospheres Ex ec, Ex tb, Ex tc, Ex db Ex db eb and Ex dc, • brake motors[2], • Totally Enclosed Air Over (TEAO) motors. "to note": The option of IE2 + VSD is no longer applicable.	• Mining Motors[1)] • ATEX motors Ex eb covered by Directive 2014/34/EU (for explosive atmospheres) • Totally Enclosed Non-Ventilated (TENV) motors
Does not apply to:	
• Motors with brushes, commutators, slip rings or other electrical connections to the rotor, often described as multi-speed motors. • High-Voltage Motors (define > 1000V)	

Table 2 applies – exemptions

[1] Group I Mining motors (suggest: as defined in Annex I, point 1 of Directive 2014/34/EU
[2] With the exception of motors with an integrated brake which forms an integral part of the inner motor construction and can neither be removed nor powered by a separate power source during the testing of the motor efficiency;

2.2.02 Motors - Step 2: Starting 1st July 2023

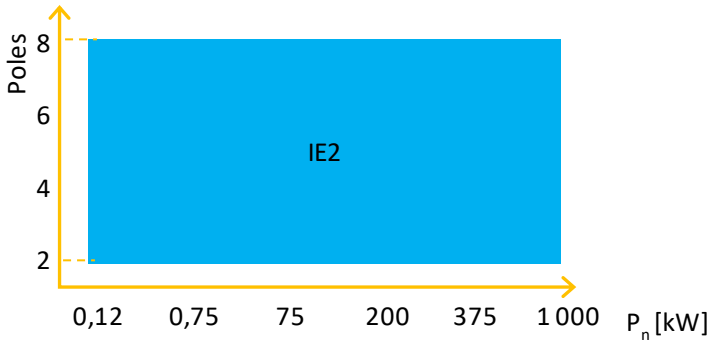


Picture 3: Starting 1st July 2023

Applies to	**Major exemptions from these efficiency requirements**
3-phase induction motors: • rated for operation on 50 Hz, 60 Hz or 50/60 Hz supplies and • rated for continuous duty i.e. duty class S1, S3≥80%, S6≥80% • pole numbers: 2-, 4-, 6- and 8-poles • Motors for explosive atmospheres1) Ex ec, Ex tb, Ex tc, Ex db, Ex db eb and Ex dc, • brake motors[2)], • Totally Enclosed Air Over (TEAO) motors. "to note" IE4 for 3-phase will become mandatory only for 2-, 4- and 6-poles single speed motors between 75 to 200 kW which are not brake motors, Ex eb increased safety motors, or other explosion-protected motors.	• Mining Motors[1)] • Totally Enclosed Non-Ventilated (TENV) motors
Does not apply to	
• Motors with brushes, commutators, slip rings or other electrical connections to the rotor, often described as multi-speed motors. • High-Voltage Motors (define > 1 000V)	

Table 3 applies - exemptions

[1] Group I Mining motors as defined in Annex I, point 1 of Directive 2014/34/EU
[2] With the exception of motors with an integrated brake which forms an integral part of the inner motor construction and can neither be removed nor powered by a separate power source during the testing of the motor efficiency



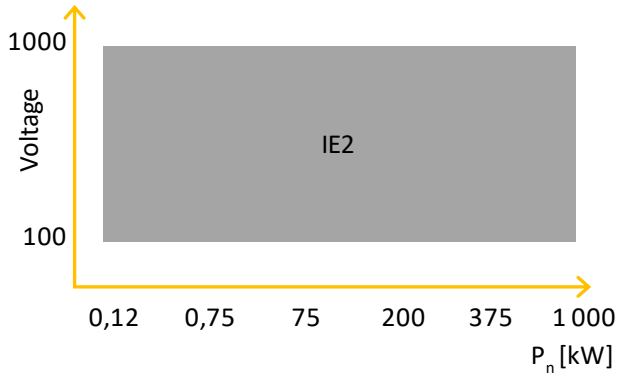
Picture 4: Starting 1st July 2023

Applies to	**Major exemptions from these efficiency requirements**
The following motors rated for operation on 50 Hz, 60 Hz or 50/60 Hz supplies: • 1-phase motors • Ex eb motors for explosive atmospheres	• Mining Motors [1)] • Totally Enclosed Non-Ventilated (TENV) motors
Does not apply to	
• Motors with brushes, commutators, slip rings or other electrical connections to the rotor, often described as multi-speed motors. • High-Voltage Motors (define > 1 000V)	

Table 4 applies - exemptions

[1] Group I Mining motors as defined in Annex I, point 1 of Directive 2014/34/EU

2.2.03 Variable Speed Drives: Starting 1st July 2021



Picture 5: Starting 1st July 2021

Applies to	Major exemptions from these efficiency requirements
• The regulation covers 3-phase variable speed drives from 0,12 kW ≤ Pn ≤ 1 000 kW	**LV AC Drives:** • Regenerative drives (active front end, AFE) • Low-harmonic drives (THD < 10%) • Multiple AC-output drives • 1-phase drives

Table 5 applies - exemptions

2.3 Timelines

Ecodesign		Year and minimum efficiency requirements (2017 onward)		
Induction motor ≥ 50 V and ≤ 1 000V		**Until 30 June 2021**	**From 1 July 2021**	**From 1 July 2023**
≥ 0,12 … < 0,75 kW	3-phase, 2/4/6 pole	-	IE2[1]	
	3-phase, 8 pole	-	IE2[1]	
≥ 0,75 … < 7,5 kW	3-phase, 2/4/6 pole	IE2 + VSD; IE3	IE3[1]	
	3-phase, 8 pole	-	IE3[1]	
≥ 7,5 ... < 75 kW	3-phase, 2/4/6 pole	IE2 + VSD; IE3	IE3[1]	
	3-phase, 8 pole	-	IE3[1]	
≥ 75 … ≤ 200 kW	3-phase, 2/4/6 pole	IE2 + VSD; IE3	IE3[1]	IE4[2]
	3-phase, 8 pole	-	IE3[1]	
> 200 …≤ 375 kW	3-phase, 2/4/6 pole	IE2 + VSD; IE3	IE3[1]	
	3-phase, 8 pole	-	IE3[1]	
> 375 … ≤ 1 000 kW	3-phase, 2/4/6 pole	-	IE3[1]	
	3-phase, 8 pole	-	IE3[1]	
≥ 0,12 … ≤ 1 000 kW	motors for explosive atmospheres Ex eb, 2/4/6/8 pole	-		IE2
≥ 0,12 kW …	1-phase, 2/4/6/8 pole	-		IE2
High voltage motors, Direct current motors, Group I Mining Motors, pole changing motors, Totally Enclosed Non Ventilated (TENV) motors, Servo motors		Excluded		
[1] Including: Brake motors; motors for explosive atmospheres Ex ec, Ex tb, Ex tc, Ex db and Ex dc; Motors rated for duty class: S1, S3 ≥ 80%, S6 ≥ 80% and Totally Enclosed Air Over (TEAO) motors;				
[2] Exemption: ATEX motors regarding 2014/34/EU (for explosive atmospheres), Brake Motors				
Variable Speed Drives ≥ 100V and ≤ 1 000V		**Until 30 June 2021**	**From 1 July 2021**	**From 1 July 2023**
≥ 0,12 … ≤ 1 000 kW		-	IE2 [3]	
Regenerative drives		-	Excluded	
Low harmonic drives (THD < 10%)		-	Excluded	
1-phase drives		-	Excluded	
AC drives with multiple AC outputs		-	Excluded	
High voltage drives; Direct current drives		-	Excluded	
[3] IE classification similar to IEC 61800-9-2				

Table 6 timelines

3. Questions and Answers

The intention of this chapter is to anticipate some frequently asked questions regarding the new Ecodesign Regulations (EU) 2019/1781 for motors and drives and (EU) 2021/341 (Amendment). It should be noted that these are offered without prejudice as guidance only. In case of conflict between this guide and the regulations, the regulations (EU) 2019/1781 and (EU) 2021/341 take precedence.

In the interests of clarity, the questions and answers are divided into four subject areas:

(1) Scope of the Regulation
(2) Exemptions
(3) Installation & Environment
(4) Miscellaneous

References to regulation (EU) 2019/1781
In some answers, the point to regulation is dropped, to get a better and easier wording.

References to required documentation in regulation (EU) 2019/1781
In some answers, there is a note to the required documentation. The regulation defines for motors and drives up to 13 items that must be provided to the market, for products in and outside of the scope.

The (EU) 2021/341 is amending the regulation (EU) 2019/1781 to clarify the requirements and correct a few mistakes. However, it does not exist on its own.

3.1. Scope

No	Question	Answer
Q1.1	Which types of motor are affected?	Until 30th June 2021 ○ Three-phase 50 Hz or 50/60 Hz induction motors; normal term: three-phase induction motors From 1th July 2021 onwards ○ Three-phase 50 Hz, 60 Hz or 50/60 Hz induction motors; normal term: three-phase induction motors From 1th July 2023 onwards In addition to provisions that apply from 1th July 2021 onwards: ○ Single-phase 50 Hz, 60 Hz or 50/60 Hz induction motors; normal term: AC motors, motor with a capacitor
Q1.2	When is the definition of direct on-line (DOL) operation?	A motor is rated for DOL operation if the criteria of Q1.3 are not fulfilled.

No	Question	Answer
Q 1.3	What is the definition for a "Variable Speed Drive only motor"?	VSD only motor" is a wording used for motors that are exclusively specified to operate with a variable speed drive. They are not rated for continuous duty direct on-line operation. Often these motors are of different technology than induction, such as Synchronous reluctance, permanent magnet type. However, induction motors can also be designed with special winding having different field weakening point to be driven with VSD only.
	Are so called "VSD only motors" included in the scope of the new Regulation?	No, VSD only motors both induction type and other technologies are not included in the scope of the new Regulation as they are specifically designed and specified for operation exclusively with a variable speed drive and are not rated for continuous duty direct on-line operation. VSD-duty only- approach, is visible on products and product documentation which clearly distinguish the product from those that are for continuous duty direct on-line operation.
Q 1.4	IE2 + VSD option is ceased, but can I still continue to buy standard IE2 induction motors if these are restamped for S9 (VSD) duty only?	Restamping S9 (VSD) duty only does not exempt the motor according to CEMEP interpretation. This would be a circumvention of the Regulation, that CEMEP doesn't support.
Q1.5	Which motor ratings are affected?	The timeline differs depending on the motor ratings. (for details see Chapter 2.3 Timeline)
Q1.6	Are servo motors affected?	Servo motors which require a drive for operation and cannot be operated direct on-line are ***not*** covered by the scope of the regulation, neither regulation (EC) 640/2009, nor the new regulation (EU) 2019/1781.
Q1.7	Are reluctance motors/synchronous reluctance motors affected?	No. The regulation (EU) 2019/1781 only covers induction motors and no other technology.
Q1.8	Are High Voltage motors affected?	No. The regulation (EU) 2019/1781 does not cover motors above 1000 V.
Q1.9	Are DC motors affected?	No. Only single-phase and three-phase AC induction motors are covered by the regulation. Commutator motors are not covered.

No	Question	Answer
Q1.10	Are electronic commutation motors (EC motors) affected?	No. The regulation only covers single-phase and three-phase AC induction motors. Motors with electronic commutation are not covered.
Q1.11	Are brake motors affected?	Until 30th June 2021 ○ All brake motors are exempted. From 1st July 2021 onwards ○ Brake motors so designed that the efficiency of the motor can be determined independently of the brake are no longer exempted.
Q1.12	Are geared motors affected?	Geared motors sharing a common gear housing with the motor and that cannot be separated to determine the efficiency of the motor alone are exempted from the efficiency requirements This exemption is given in regulation (EU) 2019/1781 Article 2 point (2) (a).
Q1.13	Which motor pole numbers are covered by the regulation?	Until 30th June 2021 ○ 2-pole, 4-pole, 6-pole From 1st July 2021 onwards ○ 2-pole, 4-pole, 6-pole and 8-pole For further details see Chapter 2.3 Timeline (The approximate speed of the motor is determined by the number of poles and the frequency of the AC voltage supplied to the motor.)
Q.1.14	Is there an exemption for motors that are covered by the regulation when they are operated with a drive?	Until 30th June 2021 ○ If a motor affected by Regulation (EC) 640/2009 does not comply with IE3 but does comply with IE2, it can be sold, provided it is equipped with a variable speed drive. This requirement must be marked on the motor (IE2+VSD). From 1th July 2021 onwards ○ The motor must comply with the appropriate efficiency requirements given in regulation (EU) 2019/1781. Motors are not excluded due to the use of a variable speed drive. - An inverter duty motor per IEC TS 60034-25 is exempt because it is not rated for direct-on-line-operation.

No	Question	Answer
Q1.15	Does my variable speed drive have to be marked with an IE-Class?	Until 30th June 2021 ○ IE-Class Marking not required From 1st July 2021 onwards ○ Must be marked and comply with efficiency level of class IE2 when all the following conditions are met: ▪ Three-phase AC input ▪ Only one three-phase AC voltage output at the drive ▪ One three-phase motor at the drive output and effective motor rating as described in Chapter 2.3 Timeline ▪ A rated voltage of between 100 V and 1 000 V (AC) ○ Certain VSDs listed in Article 2(3) of regulation (EU) 2019/1781 are exempted from most of the requirements of the regulation, including the efficiency requirement. See Q2.17, Q2.18, Q2.19 and Q2.20.
Q1.16	What does IE2 for a variable speed drive (VSD) mean?	The VSD must meet IE2 efficiency level. This means that the power losses at 90% rated motor stator frequency and 100% rated torque-producing current must be at least 25% below the values of Table 6 of Annex I of regulation (EU) 2019/1781. (This table is headed: Reference VSD losses and test load displacement factor for the IE class determination of VSDs)
Q1.17	My manufacturer describes his drive as a servo drive. Is the servo drive also affected?	The IE-Class Minimum requirement of IE2 efficiency level must be adhered to if the VSD is designed to be used with both induction motors and with servo motors (see Q1.12). If the drive is **not** rated to operate with induction motors, marking is **not** required.
Q1.18	What requirements on document persist even if the VSD is out of scope or exempt from the regulation?	The manufacturer must state the reason for the exemption of the requirements in its technical and customer documentation (Annex I 4 (11). For products not in scope, the regulation does not lay out any information requirements. A list of typical products not in the scope are: • multiple AC output drives • 1ph drives • Integrated drives • DC drives • Traction drives • Drives above 1.000V

No	Question	Answer
Q1.19	My motor does not have a standard rated voltage such as 400 V. Instead, the rating plate states 335 V (for example). Is it also affected?	Yes. The regulation covers motors with rated voltages from 50 to 1 000 V.
Q1.20	My motor does not have a standard frequency rating such as 50 Hz. Instead, the rating plate states 65 Hz (for example). Is it also affected?	No. The regulation (EU) 2019/1781 covers motors with rated frequency (50 Hz, 60 Hz, 50/60Hz) only. In addition, there can be no IE-class marking on the rating plate (according to regulation / IEC 60034-30-1).
Q1.21	Do differences exist between single-phase motors according to their starting and/or running capacitors?	No. The regulation makes no distinction between types of single-phase motors according to the number, function and size of the capacitors. All types must be at least IE2; even motors without capacitors must be IE2. (See also Q1.1).
Q1.22	My motor has a non-standard power rating. What does this mean for the new regulation?	If a motor's rating differs from the standard values, the minimum required energy efficiency value must be calculated by interpolation for 50Hz and for 60Hz values below explained rules are applied. For 50 Hz motors, by interpolation with use of the coefficients (A/B/C/D) of Table 4 in (EU) 2019/ 1781 Annex I for ratings between 0,12 and 0,55 kW and those of Table 5 in Annex I for ratings between 0,75 and 200 kW. Linear interpolation is performed for ratings between 0,55 and 0,75 kW. For 60Hz motors, to determine the minimum efficiency of 60 Hz motors at a rated power not provided in (EU)2021/341 Annex II, Tables 3a, 3b or 3c the following rule shall be used: 1) The efficiency of a rated power at or above the midpoint between two consecutive values from the tables shall be the highest of the two efficiencies. 2) The efficiency of a rated power below the midpoint between two consecutive values from the tables shall be the lowest of the two efficiencies.

No	Question	Answer
Q1.23	Are hybrids such as LSPM (line start permanent magnet) motors, which still have a squirrel cage as well as permanent magnets, covered by the regulation?	No. The regulation covers only induction motors. No other technology is covered.
Q1.24	Are motors intended for standstill operation on-line covered by the regulation?	No, these motors are not sold with a power rating. These only have a torque rating at 0 min^{-1} The absence of a rated output power on the rating plate does not, of itself, exclude the motor from the regulation. However, certain motors of this type are excluded from this regulation. For example: ○ Some motors, known as "torque motors" are rated with a torque at zero speed only. If a motor is only rated at zero speed, the output power will be zero. ○ Some other torque motors have a high torque at zero speed and a limited duty cycle when rotating. If this motor does not have a "continuous duty operation" the motor is excluded Reference to regulation (EU) 2019/1781: "Continuous duty" is defined by Article 3(5),
Q 1.25	What do the dates indicated in the Regulation correspond to?	The dates indicated in the Ecodesign Regulation (EU) 2019/1781(for example 1st July 2021 or 1st July 2023 for electric motors) correspond to the date when the motor will be first placed on the European Economic Area (EEA). Motors are considered to be placed on the EEA if they have been transferred by the manufacturer or the importer to another economic operator in the EEA (e.g. distributors) before that date and they can then be resold, put into service and used after the deadlines of 1st July 2021 or 1st July 2023. For example, motors compliant to previous Regulation 640/2009 (EC) that have been placed on the EEA for the first time before 1st July 2021 can continue to be sold even after that deadline. Placing on the market is considered not to take place where a product is in the stocks of the manufacturer (or the authorized representative established in the Union e.g. manufacturers Sales Unit) *See the "Blue Guide", especially sections 2.2 and 2.3*

No	Question	Answer
Q 1.26	How can I design an efficient motor system?	Guidelines for designing an efficient motor system can be found in the standard IEC 61800-9-1 which addresses the extended product approach.
Q 1.27	Are motor starters covered by the regulation?	No. Motor starters such as direct-on-line, star-delta and soft-starters are not included.
Q 1.28	Are so-called “marine motors” affected by the new regulation?	Yes. If the power rating and number of poles are within the scope, then motors must comply with the regulation. Only motors designed specifically for the traction of electric vehicles are out of the scope. see Article 2 (2) (o), regulation (EU) 2019/1781
Q 1.29	The Ecodesign framework Directive 125/2009 states in Article 1 (3): ‘This guideline does not apply to means of transport people or goods.’ Why is my motor still affected?	The statement in this Article 1 (3) is still valid. Furthermore Annex VII (1) says: In particular, the following must be specified in an implementing measure: 1. the exact definition of the product type(s) it covers; (EU) 2019 / 1781 is now exactly the required implementing measure and the Article 2 (2) states the motor for which these rules shall not apply, among other in (o): (o) motors designed specifically for the traction of electric vehicles. Additionally, in the FAQ document on Ecodesign Directive 2009/125/EC is mentioned that the Ecodesign Directive 2009/125/EC itself doesn’t exempt any products from its scope, this is done in the implementing measures. In the implementing measure, Regulation EU 2019/1781 of the Ecodesign Directive2009/125/EC the Marine motors are not listed as exempted products. However, in the Ecodesign Directive2009/125/EC is stated that motors specifically design for means of transport for persons or goods are exempted. Therefore, these products that are specifically constructed only for application in means of transport (including mobile homes and caravans) and no other applications are exempted from ecodesign regulations.”

No	Question	Answer
		"Article 1 (3) of the Ecodesign Directive stipulates that the Directive does not apply to means of transport for persons or Furthermore, in the FAQ document published by ADCO it is stated: - "the Ecodesign regulations do not specifically mention whether components of and appliances for means of transport fall under their scope, but the Ecodesign Directive specifies in its Article 1(3) that the Directive does not apply to goods. It follows that an implementing Regulation should not apply to products that are designed only for use in a means of transport for persons or goods (for example, electric motors designed only for use on a ship). **However, if the same product is designed for use in a means of transport for persons or goods and for a non-transport use, it should comply with all relevant requirements of the applicable implementing measure** (for example, standard electric motors designed for use in conveyor belts on ships and for use in conveyor belts in manufacturing assembly lines)"
Q 1.30	Does the regulation address the system approach or any other load profile aspects?	No, the system approach is not addressed in the regulation The regulation (EU) 2019/1781 is particularly focusing on single components and not on their possible combinations in applications. However, there are requirements of providing energy efficiency data for motors and drives at different operating points.
Q 1.31	The nameplate of my motor states 87Hz. Is it affected?	If the nameplate states beside the 87 Hz also ratings which are covered by the regulation (50 Hz, 60 Hz, 50/60Hz) the answer is yes. Otherwise it's not included.
Q 1.32	My motor is only rated at 60Hz. Does the regulation apply?	Yes, with the amendment regulation (EU) 2021/341 the requirement for 60Hz – motors are more in-line with the standard EN 60034-30-1 see Annex II (1) (a). Nevertheless, a 60Hz Motor for use in the EU must fulfill not only the efficiency regulation. There are a lot of other directives which have to be fulfilled to be able to carry the CE-mark on the nameplate (see Q1.35).

No	Question	Answer
Q 1.33	Which datasets are required on a nameplate of a 50/60Hz motor?	There are several 50/60 Hz datasets common on the market, sometimes with two some with three sets. Following a short case study of three views to a 4 –pole motors: case 1 50 Hz, 15,0 kW, IE3 – 92,1 % 60 Hz, 15,0 kW, IE3 – 93,0 % case 2 50 Hz, 15,0 kW, IE3 – 92,1 % 60 Hz, 15,0 kW, IE3 – 93,0 % 60 Hz, 17,3 kW, IE2 – 92,4 % (% from 18,5 kW, see interpolation Q1.19) case 3 50 Hz, 15,0 kW, IE3 – 92,1 % 60 Hz, 17,3 kW, IE2 – 92,4 % (% from 18,5 kW, see interpolation Q 1.19) All three case are in line with the regulation and the amendment. Even when case 3 looks like to be noncompliant, the (increased) power of 60Hz must be reduced to the power of 50Hz to determine if the requested IE3 value at 60Hz is reached. But this is not required to be stated on the nameplate. The case 3 marking of 60Hz is not recommended. Even though it is compliant with the regulation, questions of customer / market surveillance can arise.
Q 1.34	My motor is named with a voltage range. Must the efficiency values and IE-Class be stated for each single voltage?	According to IEC 60034-30-1 ch.5.1.2 The rated efficiency shall be determined at rated power PN, rated voltage UN and rated frequency fN. Motors rated for an extended voltage tolerance (for example 400 V ± 10 % according to IEC 60038) shall be assigned a single rated efficiency, i.e. the extended tolerance shall be disregarded. Motors with rated voltage/frequency combinations of the same magnetic flux and power, for example 230 V/400 V (delta/star) or 230 V/460 V (double-star/star), shall have only one rated efficiency and efficiency class (IE code). Motors with more than one rated voltage/frequency/power combination should be assigned a rated efficiency and a rated efficiency-class (IE code) for each rated voltage/frequency/power combination. However, as a minimum the lowest efficiency value and the associated IE code (of all rated voltage/frequency/power combinations) shall always be printed on the rating plate. It is the decision of the motor manufacturer for which voltage of the named voltage range he will publish the required product information for motors in accordance to regulation (EU) 2019/1781 Annex I (2). The motor manufacturer will name the chosen voltage in (8).

No	Question	Answer
Q1.35	I understood from my motor supplier that if the motor is not fulfilling the efficiency requirements of the new Regulation it cannot be CE-marked and therefore not sold within the EEA. Are there other requirements that the motor must fulfill to be CE-marked or is this only a matter of efficiency?	Yes, there are other requirements related to the use of CE-mark. Basically, the CE mark can only be fixed on motors and products when it fulfills the requirement of all relevant European directives and regulations to the product. The assessment for a product shall be done by the manufacturer and is generally done by applying harmonized EN standards. After compiling a technical documentation including tests, calculations, risk assessment etc. the CE mark shall be affixed on products. There are four relevant EU Directives, each of them separately requiring the CE mark: - For 'standard' electric motors three of them apply: Directive 2014/35/EU (LVD), Directive 2009/125/EC (Ecodesign) with the motor specific Regulation 2019/1781 and the amending Regulation (EU) 2021/341 and the Directive 2011/65/EU with the amending annexes. For motors intended for the potentially explosive atmospheres the Directive 2014/34/EU (ATEX) replaces the Directive 2014/35/EU (LVD) whereas some parts of the Machinery Directive 2006/42/EC also apply.
Q 1.36	The title of the regulation is related to glandless circulators. In the German version the wording is even more strict in this regards ("im Hinblick auf"). Does this mean the regulation applies to these type of pumps only and not to motors and VSD in general?	Main focus of the regulation are motors and VSDs. Mentioning the glandless circulators in the title does not mean that the regulation applies to them only. The scope describes clearly the addressed motor and VSD types. Only article 11 is for glandless circulators.
Q. 1.37	In the regulation (EU) 2019/1781 (English version) Article 2 Scope (1) it is written in (a) (v): This regulation applies to products that are rated for direct on-line operation. However, In the German version it is written in Article 2 Scope (1) (a) (v): "direkt für den Betrieb am öffentlichen Stromnetz bestimmt sind."	"Direct on-line operation" is absolutely clear, it means a motor runs directly on the network, regardless it is a public or an industrial network. The German translation is not correct because it means: "for use on public network" In the opinion of CEMEP it is a translation error that should be corrected in the German translation into "sind bemessen für den direkten Betrieb am Netz".

Table 7 Questions and Answers: Scope

3.2. Defined exemptions

No	Question	Answer
Q2.1	My motor is listed in the list of exempted motors in Article 2(2) of regulation (EU) 2019/1781. What does this mean?	If the motor is one of the types listed in Article 2(2), then it is exempt from the efficiency requirements and most of the information requirements. However, if this exempt motor is in the scope of the regulation according to Article 2(1)(a), the motor will need to be CE marked according to the Ecodesign Directive 2009/125/EC and regulation (EU) 2019/1781. The following information will have to be displayed in the four places listed at the beginning of section 2 of Annex I of the regulation: (3) manufacturer's name or trademark, commercial registration number and address; (4) product's model identifier; (12) if the motor is considered exempt from efficiency requirement in accordance with Article 2(2) of this Regulation, the specific reason why it is considered exempt.
Q2.2	My VSD is listed in the list of exempted VSDs in Article 2(3) of regulation (EU) 2019/1781. What does this mean?	If the VSD is one of the types listed in Article 2(3), then it is exempt from the efficiency requirements and most of the information requirements. However, if this exempt VSD is in the scope of the regulation according to Article 2(1)(b), the VSD will need to be CE marked according to the Ecodesign Directive 2009/125/EC and regulation (EU) 2019/1781. The following information will have to be displayed in the four places listed at the beginning of section 4 of Annex I of the regulation: (3) manufacturer's name or trademark, commercial registration number and address; (4) product's model identifier; (11) if the VSD is considered exempt from the efficiency requirements in accordance with Article 2(3) of this regulation the specific reason why it is considered exempt.

No	Question	Answer
Q2.3	Are my non-ventilated motors exempt?	Until 30th June 2021 ○ Motors in continuous duty operation without cooling systems are exempt from the regulation. From 1st July 2021 onwards ○ Only non-ventilated motors of the type TENV (totally enclosed non ventilated) are exempt. This exemption does not apply to other types of non-ventilated motor. **Note:** What is TENV? TENV is the usual market abbreviation for non-ventilated motors in direct connection with a high degree of enclosure and a totally closed housing in North American. Totally Enclosed Non Ventilated motors are specifically designed without their own fan and the cooling is taking place through heat dissipation only
Q2.4	Are motors affected which are cooled by an external fan (not included in the motor)?	Until 30th June 2021 ○ All motors that are cooled by the airflow of the fan (TEAO, totally enclosed air over) are exempt since this cooling method is not an integrated cooling system of the motor. From 1st July 2021 onwards ○ All motors in the scope of the regulation that are cooled by the airflow of an external fan (TEAO, totally enclosed air over) must meet the requirements. (see chapter 2.3. timeline)
Q2.5	How are explosion-protected motors affected?	Until 30th June 2021 ○ The efficiency requirements do not apply to any motor covered by the ATEX Directive 2014/34/EU. From 1st July 2021 onwards ○ Motors for potentially explosive atmospheres: - flame-proof motors (Ex db / Zone 1, Ex dc / Zone 2) - increased safety motors (Ex ec / Zone 2) - motors with dust ignition protection (Ex tb / Zone 21, Ex tc /Zone 22) covered by the ATEX Directive 2014/34/EU with the following specifications are affected: - Three-phase ≥ 0,12 kW and < 0,75 kW: at least IE2 - Three-phase ≥ 0,75 kW and ≤ 1 000 kW: at least IE3

No	Question	Answer
		From 1st July 2023 onwards In addition to the rules applicable from 1 July 2021 onwards: o Motors for potentially explosive atmospheres: - Increased safety motors (Ex eb / Zone 1) covered by the ATEX Directive 2014/34/EU with the following specifications are affected: Three-phase ≥ 0,12 kW and ≤1 000 kW: at least IE2 Reference to Regulation (EC) 640/2009: o Article 1(2) states that the regulation does not apply to certain motors except as regards some of the information requirements of Annex I. Reference to Ecodesign Regulation (EU) 2019/1781: o the timeline for Ex eb motors is given in point 1(b)(i) of Annex I; other explosion-protected motors is given in points 1(a)) of ey are exempted from IE4 efficiency level by point 1(b)(ii).
Q2.6	My motor is liquid cooled. What do I need to consider?	The temperature at the inlet to the motor determines whether the Ecodesign Regulation/electric motors applies to the motor. Motors specifically designed for cooling media below 0 °C or over +32 °C are not affected. Otherwise, they must satisfy the requirements.
Q2.7	My motors are used in periodic duty, not in continuous duty. Does the regulation still apply?	When a motor is rated for other duty types and is also marked as such but may nevertheless be operated at rated power in continuous duty the regulation applies. Reference to regulation (EU) 2019/1781: 'continuous duty' is defined by Article 3(5), then see Article 2(1)(a)(iv)
Q2.8	My motors are completely immersed in a liquid. Does the regulation apply?	Motors specifically designed and specified to operate wholly immersed in a liquid are exempt from the efficiency requirements. It is even exempted when a dry use is possible. Reference to regulation (EU) 2019/1781: Article 2(2)(e) Note: Important is that they are designed to operate immersed in a liquid (Special sealing and protection)!
Q2.9	I manufacture motors with a large number of poles. What do I need to do?	The regulation does not apply to motors with 10 or more poles.

No	Question	Answer
Q2.10	My motors have two or more stated speeds for one frequency. Does the regulation still apply?	Yes. The regulation applies, but various types of motor that have more than one rated speed for the same supply frequency are exempt from the efficiency requirements. Reference to regulation (EU) 2019/1781: Article 2(2)(n) exempts the following type of motor from the efficiency requirements: (n) multi-speed motors, i.e. motors with multiple windings or with a switchable winding, providing a different number of poles and speeds.
Q2.11	My motors have two or more stated speeds for one frequency, but only not in a pole changing design of the motor. Does the regulation still apply?	If a motor achieves multiple speeds for the one supply frequency via brushes, commutators, slip rings or electrical connections to the rotor, it is excluded from the regulation. Examples such as 2/4 pole motors Reference to regulation (EU) 2019/1781: ○ Article 2(1)(a) only includes induction motors "without brushes, commutators, slip rings or electrical connections to the rotor" into the scope of the regulation. Therefore, these motors are excluded. ○ Article 2(2)(k) exempts "motors with mechanical commutators" from the efficiency requirements.
Q2.12	My motor shares a housing with a variable speed drive. Before now, the regulation did not apply to this type of motor. Will this still be the case in the future?	The regulation does not apply, to motors with an integrated variable speed drive (compact drives) where it's energy performance cannot be tested independently of the variable speed drive.
Q2.13	I use motors in nuclear engineering. What do I need to consider in the future?	If a motor is specifically qualified for the safety of nuclear installations, it is exempted from the efficiency requirements of the regulation. Reference to regulation (EU) 2019/1781: ○ Article 2(2)(f) exempts motors specifically qualified for the safety of nuclear installations from the efficiency requirements ○ Article 2(2)(f) refers to Article 3 of Council Directive 2009/71/Euratom, which defines 'nuclear safety'. Reference to required documents: ○ Even when these motors are exempt, the information required by points (3), (4) and (12) of section 2 of Annex I must be published.

No	Question	Answer
Q2.14	I use cordless or battery-operated motors. Do I need to consider anything?	No. The regulation does not apply to motors in cordless or battery-operated equipment e.g. driverless transport systems.
Q2.15	Are the motors in tools such as drills, grinders, saws, etc. affected?	No, the regulation does not apply to motors in hand-held equipment where the weight is supported by hand during operation.
Q2.16	Does the regulation apply to motors for electric vehicles?	The regulation does not apply to motors designed specifically for the traction of electric vehicles.
Q2.17	My motor shares a housing with a variable speed drive. Which IE-class must be shown?	If parts of the product (VSD or motor) can be tested individually their class must be stated on the product.
Q2.18	I use variable speed drives in nuclear engineering. What do I need to consider in the future?	If a VSD is specifically qualified for the safety of nuclear installations, it is exempted from the efficiency requirements of the regulation. Reference to regulation (EU) 2019/1781: o Article 2(3)(b) exempts VSDs specifically qualified for the safety of nuclear installations from the efficiency requirements o Article 2(3)(b) refers to Article 3 of Council Directive 2009/71/Euratom, which defines 'nuclear safety'.
Q2.19	My variable speed drive is a regenerative drive. Do I need to do anything?	Regenerative drives are exempted from the requirement to publish the efficiency or losses; Article 2 (3) (c) Reference to required documents: Even when these drives are exempt, the information required by points (3), (4) and (11) of section 4 of Annex I must be published
Q2.20	The variable speed drive that I use does not have a simple input rectifier. Instead, it controls the input variables so that sinusoidal current flows to the system. Is marking required?	Drives with sinusoidal input current are exempted from the requirement to meet a particular efficiency level and from the requirement to publish the efficiency (or losses). Simple variable speed drives with a six-pulse bridge connection in the input generate a pulsating current on the grid side and these drives are not exempted from the regulation; Article 2 (3) (d) Reference to required documents: Even when drives are exempted, the information required by points (3), (4) and (11) of section 4 of Annex I must be published

No	Question	Answer
Q2.21	The motor is integrated into the machine/installation in a way that prevents it from being separated in order to be tested. Before now, the regulation did not apply in this case. Will this still be the case in the future?	Yes. When the motor cannot be separated, the requirements for demonstration of the energy efficiency do not apply. Motor is of integrated type if all the bullet points apply: • Whose 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); • 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.
Q2.22	The rating plate of my motor does not state the power, only torque values. This means that the regulation does not apply to the motor, am I right?	The absence of a rated output power on the rating plate does not, of itself, exclude the motor from the regulation. However, certain motors of this type are excluded from this regulation. For example: ○ Some motors, known as “torque motors” are rated with a torque at zero speed only. If a motor is only rated at zero speed, the output power will be zero. ○ Some other torque motors have a high torque at zero speed and a limited duty cycle when rotating. If this motor does not have a “continuous duty operation” the motor is excluded Reference of regulation (EU) 2019/1781: output power is less than 0,12 kW see Article 2(1)(a)(iii), “cd” as defined by Article 3(5) of the regulation then see Article 2(1)(a)(iv).
Q2.23	What is the intention of the exemption “VSDs consisting of single cabinet”?	The aim of this exemption is to avoid double regulation on already conformity assessd VSD (marked on the nameplate), which are installed in an additional housing (cabinet) due to application requirements. However, a VSD not already in conformity with this regulation and / or built up from diode input module(s) and one AC output has to be conformity assessed and be in conformance with this regulation.

Table 8 Questions and Answers: Defined exemptions

3.3. Ambient conditions

No	Question	Answer
Q3.1	My motors are intended for warm/hot ambient temperatures. Are they affected?	○ On motors marked with a temperature range (min. … max.), both the minimum and the maximum must be greater than +60 °C in order for the motor to be exempt from the efficiency requirements. For example: +65 °C … +95°C ○ On motors marked with only one temperature value, this temperature must be greater than +60 °C in order to be exempt from the efficiency requirements. For example: +65 °C
Q3.2	My motors are intended for use in cold stores. Are they affected?	○ On motors marked with a temperature range (min. … max.), both the minimum and the maximum must be lower than -30 °C in order for the motor to be exempt from the efficiency requirements. For example: -55 °C … -35 °C ○ On motors marked with only one temperature value, this temperature must be lower than -30 °C in order for the motor to be exempt from the efficiency requirements. For example:-40°C
Q3.3	How must the elevation of installation be considered?	Until 30th June 2021 and From 1st July 2021 onwards ○ The efficiency requirements apply not for motors, which specifically designed and specified to operate exclusively at altitudes exceeding 4 000 meters above sea-level. For elevations below this, the requirements must be met; at higher elevations, motors are exempted from the efficiency requirements. Drives: There is no exemption regarding elevation. <u>Reference to required documents:</u> Even when motors above 4 000m are exempted, the information required by points (3), (4) and (12) of section 2 of Annex I must be published.
Q3.4	My motors have a maximum operating temperature of 300 °C or 400 °C. Are they covered by the regulation?	Yes. Only motors specifically designed and specified to operate exclusively with a maximum operating temperature above 400 °C are exempt from the efficiency requirements; for lower maximum operating temperatures, the efficiency requirements apply.
Q3.5	My motor is designed for extremely high atmospheric humidity. Is it exempted from the regulation?	No. Resistance to atmospheric humidity does not result in exemption from the regulation (EU) 2019/1781.
Q3.6	My motor is operated in a chamber with a substantially reduced atmospheric pressure, but not in a vacuum. Is it exempted from the regulation?	No. Use at low atmospheric pressure alone does not result in an exemption. The motor may however be designed exclusively for these specific conditions and be sold in this form only to you. If this is the case, the answer to Q4.3 applies.

Table 9 Questions and Answers: Ambient conditions

3.4. Miscellaneous

No	Question	Answer
Q4.1	My manufacturer is not allowed to supply me with a substitute motor when a motor develops a fault. Has anything changed in this respect?	Until 30th June 2021 ○ Only motors that are in use may be repaired. From 1st July 2021 onwards Until 30 June 2029 ○ In addition to the repair of motors in use, identical replacement motors may be supplied if the original motors were placed on the market before 1 July 2021 regarding motor of Article 1 (1) a, or before 1 July 2023 regarding motor of Article 1 (1) b. These motors must be specifically marketed as such (e.g. Motor to be used exclusively as spare part for…). A statement that the motor may only be used as a replacement part must be applied to the motor or its packaging and included in the documentation Reference of regulation (EU) 2019/1781: Article 2 (2) (m) + Information requirements in annex I (2)
Q4.2	My supplier has his own documentation for the product according to Ecodesign Regulation (EC) 640/2009. Will this requirement exist in Ecodesign Regulation (EU) 2019/1781?	Yes, this form of documentation will continue to exist. It has been extended to cover 13 elements. When motors are not covered by the regulation, this fact must also be documented, together with the reason why the regulation does not apply to the motor. Variable speed drives must also be documented similarly, with 11 elements. The documentation for motors and variable speed drives is be provided by the manufacturer, the importer or the authorized representative (e.g. Dealer).
Q 4.3	According to the regulation Annex I (2) and (4) the manufacturers for motors and VSD have to provide 11 information in a certain order in the 4 mentioned documentation types. The manufacturer provides only some data and a link / QR code. Is this acceptable?	Yes, the Amendment (EU) 2021/341 allows to provide the information via an internet link supplied with the product. However, IE class / losses in IE definition point must be provided on or near to the nameplate in any case. The order is just mandatory for technical documentation, which is the technical file for the conformity declaration and not e.g. the user manual.
Q4.4	Do certain degrees of ingress protection or protection of enclosures result in exemption from the regulation?	No. The regulation (EU) 2019/1781 does not contain any arrangements for exemption owing to a degree of ingress protection or protection of enclosures. Likewise, the terms "open" or "fully enclosed" commonly used in the US are not a distinguishing characteristic in the EU, and both of these motor types must meet the requirements.

No	Question	Answer
Q4.5	When is a CE mark applied to the motor, and when not?	A CE mark means that the product meets all applicable EU legislation. It may be applied to motors only when the manufacturer has completed the necessary conformity procedure in accordance with all(!) applicable EU Directives and Regulations and is able to prove that this has taken place. Ask for manufacturers Declaration of Conformity for details to ensure right interpretation.
Q4.6	How can I check whether the drive satisfies the rules currently in force?	Firstly, a check is required to determine whether the CE mark is present and it must be checked that the information in the EU declaration of conformity is up to date and states the current directives and regulations. Secondly, It must be checked if the energy efficiency values stated on the rating plate are consistent with the required values in the table in the regulation. Regarding the information see Q 4.7 and Q 4.8
Q4.7	How can I check/measure the information stated by my motor supplier?	The regulation (EU) 2019/1781 states in (1) of Annex II that the summation of losses method must be used for three-phase motors and the direct measurement method for single-phase motors. Both methods are described in IEC 60034-2-1. This is followed by calculation and determining of the total losses and classification. Determination of losses in the 7 load points shall be done by measurements or calculations according standards or other reliable, accurate and reproducible methods. For verification of compliance, only measurements shall be used, e.g. input/output method.
Q4.8	How can I check/measure the information stated by my variable speed drive supplier?	The article (2) in Annex II of the regulation states that three permissible methods are available to the manufacturer for determining the losses: ○ Direct method ○ Calorimetric method ○ Single loss determination method Note: Controlling the efficiency in the field will be difficult as the defined load conditions must be met, and the measurement devices must have a certain accuracy.
Q4.9	My motor supplier offers different variants of the same motor type. On which variant is the energy Efficiency determined?	When auxiliary equipment is used that does not form an integral part of the basic motor design, such as shaft seals, external fans, mechanical brakes, reverse running stops, unidirectional bearings, rotary encoders, tachogenerators, etc., the energy efficiency is determined in accordance with the standard on the basic motor with original cooling, without the auxiliary equipment fitted. The above paragraph also applies to drives fitted to the motors.

No	Question	Answer
Q4.10	What about enforcement?	Member States are responsible for checking that products placed on the EU market do comply with all applicable product legislation, including eco design. In each Member State, appointed market surveillance authority (MSA) is in charge of this.
Q4.11	What about tolerances of efficiency values?	The efficiency value must be guaranteed by the manufacturers. Using the tolerances is only allowed by market surveillance to assess the test results and determine compliance or not.
Q4.12	Are motors exclusively marketed and sold for export outside the EEA (no end-use inside the EEA) also covered by this regulation?	No, Motors which are sold with the intention to be exported outside the EEA, e.g. after integration into a machine, are never made available on the EEA market (Blue Guide 2.2) Therefor they are never placed on the market and due to this there is not the requirement to CE mark those products, so the regulation does not apply. However, it is important that the complete value chain within the EEA ensures that the motor is never put into service, except for test runs, inside the EEA. It is highly recommended to also inform on this matter on all business-related correspondence.
Q4.13	In Annex 1, chapter 3, table 6 first column the apparent output power of the VSD is given in (kVA). For which operating point the apparent output power should be considered here?	The apparent output power in table 6 first column is the rated apparent output power.

Table 10 Questions and Answers: Miscellaneous

4. Worldwide efficiency regulations for Motors and Drives

4.1 Motors

The following table shows an overview of several countries (in alphabetic order) with efficiency regulations for motors and if and how the efficiency marking is to be done.

Country	IE	Phases kW	No. of poles	From	To	Key exceptions	Efficiency: Certificate or registration or …	Efficiency: Logo or sticker or …
Argentina	1	1~: 0,12…7,5	2, 4, 6, 8	21 Dec. 2017		Installed motors All non-S1 motors Converter motors (IEC 60034-25)	Certificate	Sticker
	1	3~: 0,75…30	2, 4, 6, 8			Installed motors Converter motors (IEC 60034-25)	Certificate	Sticker
Australia	2	3~: 0,73…185	2, 4, 6, 8	10 July 2019	31. Dec. 2022	S2 motors Converter motors Integral Gear motors	Only product registration by type designation	Neither Logo nor sticker
	2	3~: 0,12…0,73	2, 4, 6, 8	1. Jan. 2023				
	3	3~: 0,73…375	2, 4, 6, 8	1. Jan. 2023				
Brazil	3	3~: 0,12…370	2, 4, 6 8	1 Sep. 2019		All non S1, all Non S3<80%	product registration by type designation and location of manufacturing	Logo + No.
Canada	3	3~: 0,75…185	8	28 June 2017		All non-S1 motors Converter only motors	Certificate	Logo
	3	3~: 0,75…260	6				Certificate	Logo
	3	3~: 0,75…375	2, 4				Certificate	Logo
China	2	3~: 0,75…375	2, 4, 6	1 Oct. 2016 [1]	31 May 2021	All non-S1 motors Converter motors Non-ventilated motors Special motors for specific machine requirements	product registration by type designation and location of manufacturing + Certificate	Sticker with QR-Code
	3 [2]	3~: 0,12…<0,75	2, 4, 6, 8	1 June 2021			Must be in line with the standard GB18613:2020; but no registration	none
	3 [2]	3~: 0,75…375	2, 4, 6, 8				product registration by type designation and location of manufacturing + Certificate	Sticker [4] with QR-Code
	3 [2]	3~: >375…1000	2, 4, 6, 8				Must be in line with the standard GB18613:2020; but no registration	none
	# [3]	1~: 0,12…3,7 0,12…2,2	2, 4, 6 2, 4, 6			with starting cap. with running cap.		
	1 [3]	1~: 0,25…3,7	2, 4			with start.+run. cap.		

1) China introduced the GB18613 at September 1st, 2012, updated it to October 1st 2016 with new stickers including a QR-code,

2) updated May 29, 2020 with in force to June 1, 2021 with new grade system, but marking only mandatory from 0,75 until 375 kW

3) own table for 1~motors with starting or running capacitor unequal to IE-classes from IEC 60034-30-1, but for 1~motors with parallel starting and running capacitor the table are equal to IE-classes from IEC 60034-30-1

4) The China Energy Label regulation is in process

Country	IE	Phases kW	No. of poles	From	To	Key exceptions	Efficiency: Certificate or registration or …	Efficiency: Logo or sticker or …
Chile	1	3~: 0,75…375	2, 4, 6	1 Jan. 2011		All non-S1 motors Converter motors Brake motors	Certificate	Sticker
Columbia	2	3~: 0,18…7,49	2, 4, 6, 8	31 Aug. 2018			Certificate	Sticker
	2	3~: 7,5…373	2, 4, 6, 8	31 Aug. 2018	30 Aug. 2020		Certificate	Sticker
	3	3~: 7,5…373	2, 4, 6, 8	31 Aug. 2020			Certificate	Sticker
Egypt	-	-	-	-	30. Apr. 2022	-	none	none
	3	3~: 0,75…375	2, 4, 6, 8	1 May 2022		tbd	tbd	tbd
EU	2+ VSD or 3	3~: 0.75…375	2, 4, 6	1 Jan 2017	30 Jun 2021	Integral products Brake motor explosive atmospheres	producer self declaration	Logo (CE-mark)
	2	1~: 0,12…	2, 4, 6, 8	1 Jul 2023		TENV non S1, S3<80%, S6 <80% above +60°C below -30°C	producer self declaration	Logo (CE-mark)
	2	3~: 0,12…<0,75	2, 4, 6, 8	1 Jul 2021			producer self declaration	Logo (CE-mark)
	3	3~: 0,75…<75	2, 4, 6, 8	1 Jul 2021			producer self declaration	Logo (CE-mark)
	3	3~: 75…200	2, 4, 6, 8	1 Jul 2021	30 June 2023		producer self declaration	Logo (CE-mark)
	3	3~: >200…1 000	2, 4, 6, 8	1 Jul 2021			producer self declaration	Logo (CE-mark)
	4	3~: 75…200	2, 4, 6	1 Jul 2023		Brake motor explosive atmospheres	producer self declaration	Logo (CE-mark)
Ecuador	2	3~: 0,75…375	2, 4, 6, 8	23 Nov. 2018			Certificate	Sticker
EAEU [4)]	2	3~: 0,75 – 375	2, 4, 6	1 Sep 2022	31 Aug. 2024	Integral products Brake motor, above 4000m above +60°C below -30°C below 0°C watercooled explosive atmospheres	Certificate	Logo
	2	3~: 0,75...7,49	2, 4, 6	1 Sep 2024	31 Aug. 2026		Certificate	Logo
	2+ VSD or 3	3~: 7,5…375	2, 4, 6	1 Sep 2024	31 Aug. 2026		Certificate	Logo
	2+ VSD or 3	3~: 0,75… 375	2, 4, 6	1 Sep 2026			Certificate	Logo

5) Eurasian Economic Union (EAEU): Armenia, Belarus, Kazakhstan, Kyrgyzstan, Russia

Country	IE	Phases kW	No. of poles	From	To	Key exceptions	Efficiency: Certificate or registration or …	Efficiency: Logo or sticker or …
India	2	3~: 0,12…1000	2, 4, 6, 8	4 Feb. 2019		All non S1 motors redirected to S1	product registration and certificate by type designation and location of manufacturing	Logo
Japan	3	3~: 0,75…375	2, 4, 6	1 April 2015		All non-S1 motors Converter motors Ex motors	Only product registration by type designation	Neither Logo nor sticker
Mexico	3	3~: 0,75…375	2, 4, 6, 8	19 Dec. 2010		All non-S1 motors Geared motors	product registration by type designation and location of manufacturing	Logo + No.
New Zealand	2	3~: 0,73…185	2, 4, 6, 8	10 July 2019		S2 motors Converter motors Integral Gear motors	Only product registration by type designation	Neither Logo nor sticker
	2	3~: 0,12…73	2, 4, 6, 8	1. Jan. 2023				
	3	3~: 0,73…375	2, 4, 6, 8	1. Jan. 2023				
Peru	3(=A) 2(=B 1(=C)	3~: 0,75…375	IEC: 2,4,6 NEMA. 2,4,6,8	3 Dec. 2019		[no minimum efficiency is defined, but marking is required]	Certificate	Sticker
Saudi Arabia	3	3~: 0,75…375	2, 4, 6	1 Jan. 2017		Brake motors explosive atmospheres	product registration by type designation and location of manufacturing	Neither Logo nor sticker Part Number on Nameplate
Singapore	3	3~: 0,75…375	2, 4 ,6	1 Oct 2018		Non S1, S3>80%, S6, S9	Only product registration by type designation	Neither Logo nor sticker
South Korea	3	3~: 0,75…375	4, 6	1 Oct. 2018		S2 motors Converter motors Non-ventilated motors	product registration by type designation and location of manufacturing	Sticker
		3~: 0,75…200	2,8					
Switzerland	2+ VSD or 3	3~: 0,75…375	2, 4, 6	1 Jan. 2017	30 Jun 2021	Integral products Brake motor explosive atmospheres	producer self declaration	Logo (CE-mark)
	2	1~: 0,12…	2, 4, 6, 8	1 Jul 2023		TENV non S1, S3<80%, S6 <80% above +60°C below -30°C	producer self declaration	Logo (CE-mark)
	2	3~: 0,12…<0,75	2, 4, 6, 8	1 Jul 2021			producer self declaration	Logo (CE-mark)
	3	3~: 0,75…<75	2, 4, 6, 8	1 Jul 2021			producer self declaration	Logo (CE-mark)
	3	3~: 75…200	2, 4, 6, 8	1 Jul 2021	30 June 2023		producer self declaration	Logo (CE-mark)
	3	3~: >200…1 000	2, 4, 6, 8	1 Jul 2021			producer self declaration	Logo (CE-mark)
	4	3~: 75…200	2, 4, 6	1 Jul 2023		Brake motor explosive atmospheres	producer self declaration	Logo (CE-mark)
Taiwan	3	3~: 0,75…200	2, 4, 6, 8	1 Jul 2016			Certificate (?)	Sticker (?)
Turkey	The requirements a like the EU-regulation (see above)							

Country	IE	Phases kW	No. of poles	From	To	Key exceptions	Efficiency: Certificate or registration or …	Efficiency: Logo or sticker or …
Ukraine	-	-			14 Sep. 2021	-	-	-
	2+ VSD or 3	3~: 0,75…375	2, 4, 6	15 Sep. 2021		Integral products Brake motors explosive atmospheres	Certificate	Logo
United Kingdom	2+ VSD or 3	3~: 0,75…375	2, 4, 6	1 Jan. 2017	30 July 2021	Integral products Brake motor explosive atmospheres	producer self declaration	Logo (UKCA-mark)
	2	1~: 0,12…	2, 4, 6, 8	1 Aug. 2023		TENV non S1, S3<80%, S6 <80% above +60°C below -30°C	producer self declaration	Logo (UKCA-mark)
	2	3~: 0,12…<0,75	2, 4, 6, 8	1 Aug. 2021			producer self declaration	Logo (UKCA-mark)
	3	3~: 0,75…<75	2, 4, 6, 8	1Aug. 2021			producer self declaration	Logo (UKCA-mark)
	3	3~: 75…200	2, 4, 6, 8	1 Aug. 2021	30 July2023		producer self declaration	Logo (UKCA-mark)
	3	3~: >200…1 000	2, 4, 6, 8	1 Aug. 2021			producer self declaration	Logo (UKCA-mark)
	4	3~: 75…200	2, 4, 6	1 Aug. 2023		Brake motor explosive atmospheres	producer self declaration	Logo (UKCA-mark))
USA	3	3~: 0,75…185	8	1 June 2016		All non-S1 motors Converter motors	Certificate	Logo
	3	3~: 0,75…260	6	1 June 2016			Certificate	Logo
	3	3~: 0,75…375	2, 4	1 June 2016			Certificate	Logo

Table 11 Worldwide efficiency regulations for Motors

4.2 Worldwide regulations permanent magnet Motors

The following table shows an overview of those countries (in alphabetic order) with efficiency regulations for permanent magnet synchron motors and if and how the efficiency marking is to be done.

Country	IE	Phases kW	Speed rpm	From	To	Key exceptions	Efficiency: Certificate or registration or …	Efficiency: Logo or sticker or …
China	-	-	-	-	30 June 2020	-	-	-
	#[6)]	3~: 0,55…90	500 … 3.000	1 July 2020		nominal speed > 3.000 rpm	product registration by type designation and location of manufacturing + Certificate	Sticker with QR-Code

Table 12 Worldwide efficiency regulations for PM Motors

[6]) own value required, Grade 3 – Grade 1, different in comprehension to IEC TS 60034-30-2

4.3 Worldwide regulations line start permanent magnet Motors

The following table shows an overview of those countries (in alphabetic order) with efficiency regulations for line start permanent magnet synchron motors and if and how the efficiency marking is to be done.

Country	IE	Phases kW	No. of poles	From	To	Key exceptions	Efficiency: Certificate or registration or …	Efficiency: Logo or sticker or …
China	-	-	-	-	30 June 2020	-	-	-
	2 [7]	3~: 0,55…375	2, 4, 6, 8, 10, 12, 16	1 July 2020		< 0,55 kW Un > 1.140 V	product registration by type designation and location of manufacturing + Certificate	Sticker with QR-Code

Table 13 Worldwide efficiency regulations for LS PM Motors

[7]) Grade 3 (=IE2), Grade2 (=IE3), Grade 1 (=IE4), small differences in comprehension to IEC 60034-30-2

4.4 Worldwide regulations permanent magnet for elevators

The following table shows an overview of those countries (in alphabetic order) with efficiency regulations of permanent magnet synchron motors for elevators and if and how the efficiency marking is to be done.

Country	IE	Phases kW	Speed	From	To	Key exceptions	Efficiency: Certificate or registration or …	Efficiency: Logo or sticker or …
China	-	-	-	-	30 June 2020	-	-	-
	# [8]	3~:	<=100 >100 >140 >180 >250 >400 >750	1 July 2020			product registration by type designation and location of manufacturing + Certificate	Sticker with QR-Code

Table 14 Worldwide efficiency regulations for elevator PM Motors

[8]) own value required, Grade 3 – Grade 1, different in comprehension to IEC TS 60034-30-2

4.5 Worldwide regulations Drives

The following table shows an overview of those countries (in alphabetic order) with efficiency regulations for drives and if and how the efficiency marking is to be done.

Country	IE	Phases kW	f_{max} Hz	From	To	Key exceptions	Efficiency: Certificate or registration or …	Efficiency: Logo or sticker or …
EU	2	3~: 0,12…1 000	599	1 Jul 2021		Multi axis Active front end	producer self declaration	Logo (CE-mark)

Table 15 Worldwide efficiency regulations for Drives

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