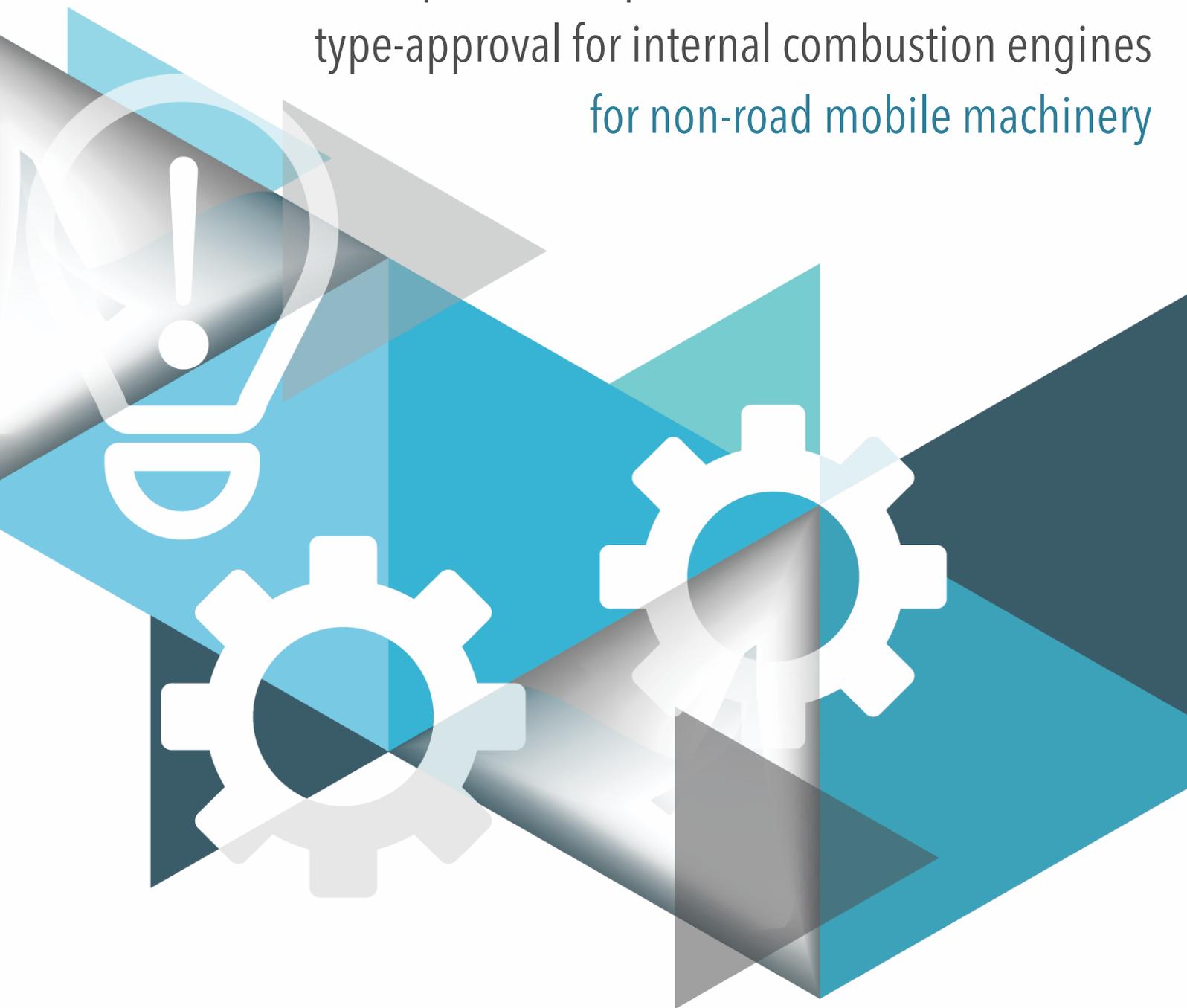


FREQUENTLY ASKED QUESTIONS

EU Regulation 2016/1628:

Requirements relating to gaseous and
particulate pollutant emission limits and
type-approval for internal combustion engines
for non-road mobile machinery



April 2017

CEMA



CECE
COMMITTEE FOR EUROPEAN
CONSTRUCTION EQUIPMENT



EGMF
European Garden Machinery Federation

EUnited
Municipal + European Association
Equipment of Municipal
Manufacturers



EUROMOT

FREQUENTLY ASKED QUESTIONS

on EU Regulation 2016/1628: Requirements relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for non-road mobile machinery

for construction, agricultural, materials handling, garden machinery, municipal equipment sectors and generator sets

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INTRODUCTION

The purpose of this frequently asked questions (hereinafter 'FAQ') document is to contribute to a clear understanding of the Regulation (EU) 2016/1628 (hereafter referred to as 'the regulation') and the relevant supplementing legislation:

- a) Commission Delegated Regulation (EU)2017/654 with regard to technical and general requirements relating to emission limits and type-approval for internal combustion engines for non-road mobile machinery
- b) Commission Delegated Regulation (EU)2017/655 on monitoring of gaseous pollutant emissions from in-service combustion engines installed in non-road mobile machinery
- c) Commission Implementing Regulation (EU)2017/656 on administrative requirements relating to emission limits and type-approval for internal combustion engines for non-road mobile machinery.

This regulation:

- concerns emission limits and type approval procedures for engines installed or intended to be installed in non-road mobile machinery
- it is also applicable to non-road mobile machinery where these engines are fitted
- entered into force on 6 October 2016 and is applicable from 1 January 2017

This FAQ:

- is intended to provide answers to key questions that are likely to be asked by users of the regulations, focusing especially on relevant provisions and obligations for the machine manufacturer (original equipment manufacturer (OEM)), importers and distributors
- does not cover the type-approval of the engine

In short, the questions included in this FAQ will cover the following issues:



Scope



Engine categories



Type-approval and application dates



Transition scheme



Emission limits



Obligations for OEMs, importers and distributors



Marking and statement of conformity requirements



Separate shipment



Components and systems not provided by the engine manufacturer



Replacement engines provision



Other exemptions



Penalties



In-service monitoring



Generating sets



Constant speed engines



Second-hand machines



Market fuels

DISCLAIMER

This FAQ document (hereinafter 'FAQ') reflects the common view of the associations¹ involved in the drafting, as regards the legal provisions of Regulation and its supplementary legislation, and it must not be considered or intended as a legally binding text for any reason whatsoever.

This FAQ shall be intended as a living document; its content could be modified or updated by the associations involved, based on updates of the legislation, and according to their understanding on the matter.

The associations accept no responsibility for the recommendations, advice, statements and conclusions expressed or implied in this FAQ and give no warranty, representation or assurance with respect to the accuracy or validity of the same.

Only the text of the Regulation and of the relevant supplementing legislation is authentic in law. Accordingly, in case of discrepancies between the content and interpretation of this FAQ and the text of the legislation (Regulation and the relevant supplementing legislation), the legislation shall be applied.

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1.1

What is in the scope of the Regulation (EU) 2016/1628?

Regulation 2016/1628 Article 2 (1)

The regulation applies to engines of any power, any ignition system and any fuel, irrespective if they are variable or constant speed, which are installed or intended to be installed in non-road mobile machinery unless excluded from the scope of the regulation. This regulation also applies to the non-road mobile machinery to which these engines are fitted to the extent that engine exhaust emissions are concerned.

1.2

What is non-road mobile machinery?

Regulation 2016/1628 Article 3 (1)

Non-road mobile machinery is defined in the regulation as: "any mobile machine, transportable equipment or vehicle with or without bodywork or wheels, not intended for the transport of passengers or goods on roads, and includes machinery installed on the chassis of vehicles intended for the transport of passengers or goods on roads".

1.3

What is an engine?

Regulation 2016/1628 Article 3 (7)

An internal combustion engine is the assembly of components and systems that takes chemical energy from fuel and converts it to mechanical energy at an output shaft using an internal combustion process. For the purpose of the regulation it includes the emission control system, which is those parts including but not limited to exhaust gas re-circulation (EGR) or exhaust gas after-treatment systems, used to reduce the pollutant emissions in order to comply with the emission limits. Gas turbines are not considered an engine according to this regulation.

1.4

What is not part of an engine?

Regulation 2016/1628 Article 3 (7), questions 8.1 and 8.2

Any component or system falling outside the definition of an engine. Accessories and engine driven auxiliaries that are not part of the type-approved configuration are also out of scope of the regulation.

In most cases the cooling system is not part of the engine. The engine coolant radiator, oil cooler, charge air cooler (where required) and associated cooling fan(s) are normally part of the machine cooling system. The intake system supplying the engine with fresh filtered air is not part of the engine, and except for any exhaust gas after-treatment system or other emission control system, neither is the exhaust system part of the engine. Similarly, the fuel storage tank and any storage tank required for other consumable fluids, such as urea, are not part of the engine.

This does not preclude the supply of these components or systems by the engine manufacturer, especially when integrated with part of the engine emission control system. Where components or systems relevant to emissions are not part of the engine and are not supplied by the engine manufacturer, installation instructions must be supplied to, and followed by, the OEM, to ensure the installed engine is in conformity with the type-approval (see also question 5.2).

1.5

Which engines are excluded from the scope of the regulation?

[Regulation 2016/1628 Article 2 \(2\)](#)

The regulation excludes engines used for:

- the propulsion of vehicles referred to in Directive 2007/46/EC on motor vehicles and their trailers
- the propulsion of agricultural and forestry vehicles (tractors) as defined in the Regulation (EU) No 167/2013
- the propulsion of vehicles referred to Regulation 168/2013 on two- or three-wheel vehicles and quadricycles
- stationary machinery
- sea-going vessels requiring a valid maritime navigation or safety certificate
- craft as defined in Directive 2016/1629 on technical requirements for inland waterway vessels and not falling within the scope of the Regulation 2016/1628
- the propulsion or auxiliary purposes of inland waterway vessels of a net power of less than 19 kW
- watercraft as defined in the Directive 2013/53/EU on recreational craft and personal watercraft
- aircraft as defined in Regulation 1321/2014
- recreational vehicles, except snowmobiles, all-terrain vehicles and side-by-side vehicles;
- vehicles and machinery exclusively used or intended to be exclusively used in competitions
- hand-carried portable fire-fighting pumps as defined and covered by the European standard EN 14466 on portable fire-fighting pumps
- reduced-scale models or reduced-scale replicas of vehicles or machinery manufactured, for recreational purposes, to a smaller scale than the original and having a net power of less than 19 kW

1.6

Which engines are in scope but subject to exemptions to the regulation?

Regulation 2016/1628 Articles 34, 35, 58, Regulation 2017/654 Annex X, XI & XII and Regulation 2017/CCC Annex II, III, IV & V, questions 7.1-7.10; 10.1-10.3

The regulation includes exemptions for the following engines:

- Those for export to third countries
- Those for use by the armed forces²
- Those exclusively use for replacing engines already installed in machines (Replacement engines)
- Those for field testing that have not been EU type-approved
- Those for machines intended to operate in potentially explosive atmospheres
- Those engines intended for installation in non-road mobile machinery that is exclusively used for the launch and recovery of lifeboats operated by a national rescue service.
- Those engine types or engine families that incorporate new technologies or new concepts and that, as a result of those new technologies or new concepts, are incompatible with one or more requirements of this regulation
- Those engines shipped to the OEM without their after-treatment system (separate shipment)

Although the subject of exemptions all the above cases require the engine manufacturer to apply specific markings to the engine and in certain cases it is still necessary for the engine manufacturer to first conduct additional procedures such as notifying an approval authority or obtaining a special purpose engine type-approval depending upon the requirements for each type of exemption.

1.7

Does this regulation apply to engines and machines for export outside the EU?

Regulation 2016/1628 Articles 32 (2) (a), 34 (1), question 10.3

Specific engine markings are required, but other requirements of this regulation do not apply.

1.8

What are the engine categories?

Regulation 2016/1628 Article 4

A number of engine categories that are in the scope of the regulation are defined. These are:

A. **Category NRE**

- Engines for non-road mobile machinery intended and suited to move, or to be moved, by road or otherwise that are not included in any other category – including both variable and

² Fire services, civil defence services, forces responsible for maintaining public order and emergency medical services shall not be considered to be part of the armed forces.

constant speed engines

- All compression-ignition (CI)³ engines with a reference power less than 56 kW
- CI engines and spark-ignition (SI)⁴ engines with a reference power greater than or equal to 56 kW
- Engines with reference power less than 560 kW used instead of Stage V engine of categories IWP, IWA, RLL or RLR

B. Category NRG

- Engines with reference power above 560 kW exclusively used in generating sets

C. Category NRS

- SI engines with a reference power less than 56 kW

D. Category NRSh

- SI engines with a reference power less than 19 kW, exclusively used in hand-held machinery

E. Category IWP

- Engines used or intended to be used for the direct or indirect propulsion of inland waterway vessels with a reference power above 19 kW

F. Category IWA

- Auxiliary engines exclusively used in inland waterway vessels and having a reference power of more than 19 kW

G. Category RLL

- Engines exclusively used or intended to be used for the propulsion of locomotives

H. Category RLR

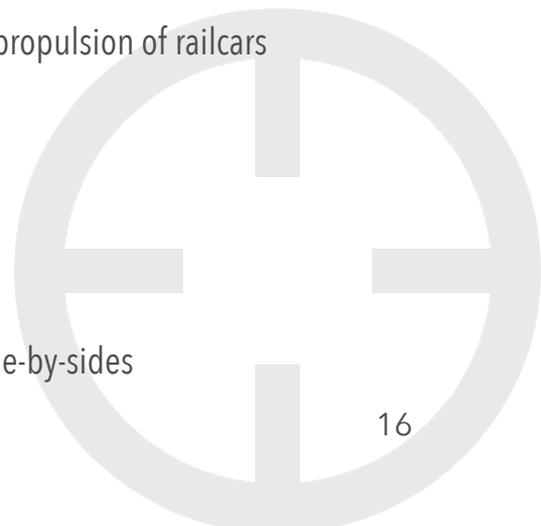
- Engines exclusively used or intended to be used for the propulsion of railcars

I. Category SMB

- SI engines exclusively for use in snowmobiles

J. Category ATS

- SI engines exclusively used in all-terrain vehicles and side-by-sides



1.9

Which engine categories are in the scope of this FAQ?

The applicable engine categories which this FAQ will focus on are:

- Category NRE
- Category NRS
- Category NRSh
- Category NRG

1.10

What engines covered by this FAQ are newly in scope?

[Regulation 2016/1628 Articles 2 \(1\), 4 & Annex I](#)

The engines newly in scope belong to the following categories:

- CI engines of category NRE below 19 kW
- CI engines of category NRE above 560 kW
- SI engines of category NRS between 19 kW and 56 kW
- SI engines of category NRE above 56 kW
- Generating set engines of category NRG above 560 kW

The scope of the regulation expanded from only regulating liquid-fuelled engines to also including gaseous-fuelled engines.

1.11

What power determines the emission category of an engine?

[Regulation 2016/1628 Articles 3 \(25\), \(26\), \(27\) and \(28\) & Annex I](#)

The power that determines the emission category of the engine is called the reference power. The reference power for variable speed engines is the maximum power, defined as the highest value of the net engine power on the nominal full-load power curve for the engine type, i.e. maximum power according to Regulation ECE R120 which is equivalent to ISO 14396. In the case there is more than one power curve it is the highest curve that must be used, irrespective of any commercial power description used by the OEM.

For most constant speed engine (sub-)categories the reference power is the rated power declared by the manufacturer. In this case the maximum power may not exceed the rated power by more than 12.5%.

1.12

How does this regulation affect agricultural & forestry tractors?

[Regulation 2016/1628 Article 2 \(2\)\(b\)](#) and [Regulation 167/2013 Articles 3 \(8\) & 19 \(3\)](#)

The regulation does not directly apply to agricultural and forestry tractors as they are out of the scope of Regulation 2016/1628. However, the same rules apply indirectly.

In Regulation 167/2013 on the approval of agricultural and forestry vehicles it is stipulated that the exhaust emission requirements set in Directive 97/68/EC (preceding legislation) apply for tractors as well. The reference to Directive 97/68/EC automatically changed to a reference to Regulation 2016/1628. Corresponding amendments will be made to the supplementing legislation of Regulation 167/2013.

1.13

Are there any special provisions for narrow tracked or high clearance tractors in this regulation?

[Regulation 2016/1628 Articles 63, 3 \(32\)](#), [Regulation 167/2013 Articles 2, 19 \(3\)](#)
and [Regulation 2015/96](#)

The regulation does not directly apply to agricultural and forestry tractors as they are out of the scope of Regulation 2016/1628. However, for narrow tracked and high clearance tractors (category T2, C2 & T4.1 vehicles) within the power range between 56 kW and 130 kW the regulation amends Regulation 167/2013 allowing Stage IIIB engines to be considered as transition engines as defined in 2016/1628.

1.14

What is the difference between a mobile and stationary machine?

[Regulation 2016/1628 Article 3 \(36 & 37\)](#)

The regulation describes stationary machinery as: "machinery that is intended to be permanently installed in one location for its first use and is not intended to be moved, by road or otherwise, except during shipment from the place of manufacture to the place of first installation". Where permanently installed means: "bolted, or otherwise effectively fixed so that it cannot be removed without the use of tools or equipment, to a foundation or an alternative constraint intended to cause the engine to operate in one single location in a building, structure, facility or installation".

All other machinery is considered mobile.



2.1

What is 'making available' of an engine or machine?

Regulation 2016/1628 Article 3 (47)

The regulation defines making available on the market as: "any supply of an engine or non-road mobile machinery for distribution or use on the Union market in the course of a commercial activity, whether in return for payment or free of charge".

Such supply includes any offer for distribution, consumption or use on the Union market which could result in actual supply, e.g. an invitation to purchase, advertising campaigns. This requires the individual engine or machine, as applicable, to be physically present within the EU (cleared customs for imported engines/machines).

A further explanation can be found in the Blue Guide³ of the European Commission, where making available is further explained in detail in article 2.2.

2.2

What is 'placing on the market' of an engine or machine?

Regulation 2016/1628 Article 3 (48)

In the regulation placing on the market is defined as: "the first making available on the Union market of an engine or non-road mobile machinery".

The operation is reserved for either a manufacturer or an importer, i.e. the manufacturer and the importer are the only economic operators who place products on the market.

An engine or machine is not placed on the market until the individual unit is physically available within the EU for distribution or use. This means, at a minimum, it must be complete and ready to be shipped from a factory within the EU or cleared customs into the EU, and, most importantly, there must additionally be an offer or an agreement for the transfer of ownership or possession, i.e. it must be sold or at least offered for sale.

In line with the Blue Guide of the European Commission, where the engine or machine is within the EU in the stocks of the manufacturer (or the authorised representative established in the Union) or the importer, the engine is only considered placed on the market where the product is made available, that is, when it is being supplied for distribution, consumption or use (see question 2.1 for the interpretation of 'being supplied').

A further explanation can be found in the Blue Guide of the European Commission, where placing on the market is further explained in detail in article 2.3.

2.3

What is the production date of an engine?

[Regulation 2016/1628 Article 3 \(30\)](#)

The regulation defines the engine production date as: "the date, expressed as the month and year, on which the engine passes the final check, after it has left the production line, and is ready to be delivered or to be put into stock."

2.4

What is the production date of a machine?

[Regulation 2016/1628 Article 3 \(33\)](#)

The regulation defines the machine production date as: "the month and year indicated on the statutory marking of the machine or, in the absence of a statutory marking, the month and year in which it passes the final check after it has left the production line."

2.5

When must production of engines other than Stage V stop?

[Regulation 2016/1628 Article 3 \(32\) and chapter 9 of this FAQ](#)

- 31 December 2018 for engines below 56 kW and above 130 kW ($<56 \text{ kW}$ and $\geq 130 \text{ kW}$)
- 31 December 2019 for engines between 56 kW and 130 kW ($56 \text{ kW} \leq P < 130 \text{ kW}$)

The above dates also apply to engines which were not previously regulated .

There are special provisions for replacement engines.

2.6

When may type-approval for Stage V engines first be issued?

[Regulation 2016/1628 Article 65](#)

Type approval may be issued when the supplementing legislation of the regulation enters into force: 13 April 2017.

2.7

What is the last date that a type-approval of an engine other than Stage V can be issued?

[Regulation 2016/1628 Articles 18 \(2\), 22 \(3\), 58 \(2 & 4\) & Annex III](#)

- 31 December 2017 for engines below 56 kW and above 130 kW ($<56 \text{ kW}$ and $\geq 130 \text{ kW}$)
- 31 December 2018 for engines between 56 kW and 130 kW ($56 \text{ kW} \leq P < 130 \text{ kW}$)

2.8

What is the last date engines other than Stage V may be placed on the market?

[Regulation 2016/1628 Article 58 \(2 & 4\) and chapters 3 & 9 of this FAQ](#)

- 31 December 2018 for engines below 56 kW and above 130 kW ($<56 \text{ kW}$ and $\geq 130 \text{ kW}$)
- 31 December 2019 for engines between 56 kW and 130 kW ($56 \text{ kW} \leq P < 130 \text{ kW}$)

For transition engines and replacement engines special provisions apply.

2.9

What is the last date machines in which engines other than Stage V are installed may be placed on the market?

[Regulation 2016/1628 Article 58 \(5\)](#)

With the exception of machines in which transition engines are installed the machine must be placed on the market no later than:

- 31 December 2018 for engines below 56 kW and above 130 kW ($<56 \text{ kW}$ and $\geq 130 \text{ kW}$)
- 31 December 2019 for engines between 56 kW and 130 kW ($56 \text{ kW} \leq P < 130 \text{ kW}$)

This includes machines in which Directive 97/68/EC flexibility and sell-off engines are installed.

2.10

If there is a stock of machines with an engine of an emission stage prior to Stage V installed and that machine has already been placed on the EU market, is there a time limit by which these machines must be sold?

[Regulation 2016/1628 Article 3 \(48\)](#)

No, there are no restrictions.

2.11

If an engine or a machine is at a distributor within the EU, has it already been placed on the market?

[Regulation 2016/1628 Article 3 \(48\)](#)

Yes, unless the engine is in a bonded area and therefore not yet imported into the EU.

2.12

Is an engine within the premises of an OEM within the EU considered as placed on the market?

[Regulation 2016/1628 Article 3 \(48\)](#)

Yes, unless the OEM and the engine manufacturer are the same legal entity or unless the engine is in a bonded area and therefore not yet imported into the EU.

2.13

Is an engine within the premises of an OEM outside the EU considered as placed on the market?

[Regulation 2016/1628 Article 3 \(48\)](#)

No, unless the engine was already placed on the market within the EU before shipping to an OEM outside the EU.

2.14

What is the impact of the regulation application date of 1 January 2017 and the corresponding repeal of Directive 97/68/EC on the placing on the market of non-Stage V engines?

[Regulation 2016/1628 Article 58 \(1, 2 & 4\)](#)

Existing type-approvals to Directive 97/68/EC are not invalidated. From 1 January 2017 the regulation replaces Directive 97/68/EC, but it continues to permit, until the applicable Stage V placing on the market dates, the placing on the market of engines in categories type-approved to Directive 97/68/EC and the placing on the market of unregulated engines in categories that were not subject to type-approval under Directive 97/68/EC. Correspondingly, machines in which these engines are installed may be placed on the market up to the same deadline.

2.15

What is the impact of the regulation application date of 1 January 2017 and the corresponding repeal of 97/68/EC on the type-approval of engines?

[Regulation 2016/1628 Article 58 \(2\)](#)

The regulation continues to permit type-approvals according to Directive 97/68/EC are issued until the respective Stage V type-approval date. Existing Directive 97/68/EC type-approvals can be amended after the Stage V type-approval date so long as the changes do not require a new type-approval to be issued.

2.16

What is the impact of the regulation application date of 1 January 2017 and the corresponding repeal of Directive 97/68/EC on the existing exemptions?

[Regulation 2016/1628 Articles 58 \(2\), 61 \(1\) & 65 \(2\)](#)

Exemptions according to Directive 97/68/EC continue to apply up until the respective Stage V placing on the market date, including those for engines produced under the OEM flexibility scheme, engines for export, engines for armed services and replacement engines. This additionally includes the new exemption in Directive 97/68/EC for engines to be used in potentially explosive atmospheres (ATEX).

Type-approval authorities may also continue to issue exemptions under the provisions of Directive 97/68/EC until the respective Stage V placing on the market date.

2.17

What is the impact of the regulation application date of 1 January 2017 and the corresponding repeal of Directive 97/68/EC on the revised exemptions?

[Regulation 2016/1628 Article 58](#)

In cases where the regulation introduces revised exemptions for the same cases already covered by Directive 97/68/EC, these cannot apply until the respective supplementing legislation is published (13 April 2017) and there is effectively a transition period between 13 April 2017 and the respective Stage V placing on market date when either the 97/68/EC requirement or that of the regulation could be applied.

2.18

Are there new requirements that apply even before the Stage V placing on the market dates?

[Regulation 2016/1628 Articles 34 & 65 and chapter 7 of this FAQ](#)

Yes, where the regulation introduces new exemptions that did not exist in Directive 97/68/EC, in particular shipment of engines without their corresponding after-treatment and field-testing of machines, these provisions apply as soon as the respective supplementing legislation enters into force (13 April 2017), irrespective of whether the engine is type-approved under 97/68/EC, Stage V or not type-approved at all.

2.19

Is it permitted to introduce a new machine model using a non-stage V engine after the respective Stage V engine type-approval date?

[Regulation 2016/1628 Article 5 \(3\)](#)

Yes, the Stage V type-approval deadline applies only to engines and does not prevent the subsequent type-approval or placing on market of new machine models containing non-Stage V engines up until the respective placing on the market deadline, or until the end of the transition period in the case of using transition engines.

2.20

Is it permitted to introduce a new machine model using a non-stage V engine after the respective Stage V placing on market date?

[Regulation 2016/1628 Articles 5 \(3\) & 58 \(6\)](#)

Yes, but only in the case that the machine is using a transition engine. In this case the machine production and placing on the market deadlines of the transition scheme must be respected.



3.1 Is there a flexibility scheme that permits the continued production of engines of stages prior to Stage V for the EU market?

Regulation 2016/1628 Article 18 (2)

No, production of engines of stages prior to Stage V for the purpose of producing new machines is not allowed from the applicable Stage V placing on the market date.

3.2 Is there a provision that allows for the placing on the market (sell-off) of existing stocks of engines for the EU market?

Regulation 2016/1628 Article 58 and question 2.2

Yes, there is a transition scheme that allows, for a limited period, the placing on the EU market of engines produced prior to the applicable Stage V placing on the market date. These engines are called transition engines.

3.3 Does the transition scheme impose restrictions on the machine production date?

Regulation 2016/1628 Article 58 (5)

Yes, the transition scheme imposes a deadline, unlike for the provisions in Directive 97/68/EC.

3.4 Is there a provision that allows for the placing on the market (sell-off) of existing stocks of machines?

Regulation 2016/1628 Article 58 (5 & 6) and questions 2.2 and 3.3

Yes, the transition scheme allows, for a limited period, the placing on the EU market of machines with engines produced prior to the applicable Stage V placing on the market date, that complied with the stage immediate prior to Stage V (see question 3.5) and where those machines were also produced within the applicable deadline.

3.5 What engines qualify as transition engines?

Regulation 2016/1628 Article 3 (32) and Regulation 2017/654 Annex X

Engines that don't comply with Stage V emission limits can be qualified as transition engines if

they satisfy the requirements in the table below. They may be produced anytime up until the last production deadline (see question 6.2 on required markings).

Engine category	Power range (kW)	Emission stage qualifying as Transition Engine	Last production date for Transition Engine ⁽¹⁾	Last placing on market date for engine ⁽²⁾
Variable speed NRE	P < 19	Not regulated at EU level	31 December 2018	31 December 2020
	19 ≤ P < 37	Stage IIIA		
	37 ≤ P < 56	Stage IIIB		
	56 ≤ P < 130	Stage IV ⁽³⁾	31 December 2019	31 December 2021
	130 ≤ P ≤ 560	Stage IV	31 December 2018	31 December 2020
	P > 560	Not regulated at EU level		
Constant speed NRE	P < 19	Not regulated at EU level		
	19 ≤ P < 37	Stage IIIA		
	37 ≤ P < 56			
	56 ≤ P < 130		31 December 2019	31 December 2021
	130 ≤ P ≤ 560		31 December 2018	31 December 2020
	P > 560	Not regulated at EU level		
NRG	P > 560	Not regulated at EU level		
NRSh	P < 19	Stage II ⁽⁴⁾		
NRS	P < 19	Stage II ⁽⁴⁾		
	19 ≤ P < 56	Not regulated at EU level		

⁽¹⁾ Inclusive of after-treatment

⁽²⁾ Certain special cases have later date

⁽³⁾ Stage IIIB for engines to be used in tractors of categories T2, T4.1 and C2

⁽⁴⁾ Stage I for engines placed on market using the small volume engine family exemption in Directive 97/68/EC Art. 10 (4)

3.6

For how long may machines with transition engines be produced and placed on the market?

Regulation 2016/1628 Article 58 (5 & 7) and questions 2.2 and 6.2

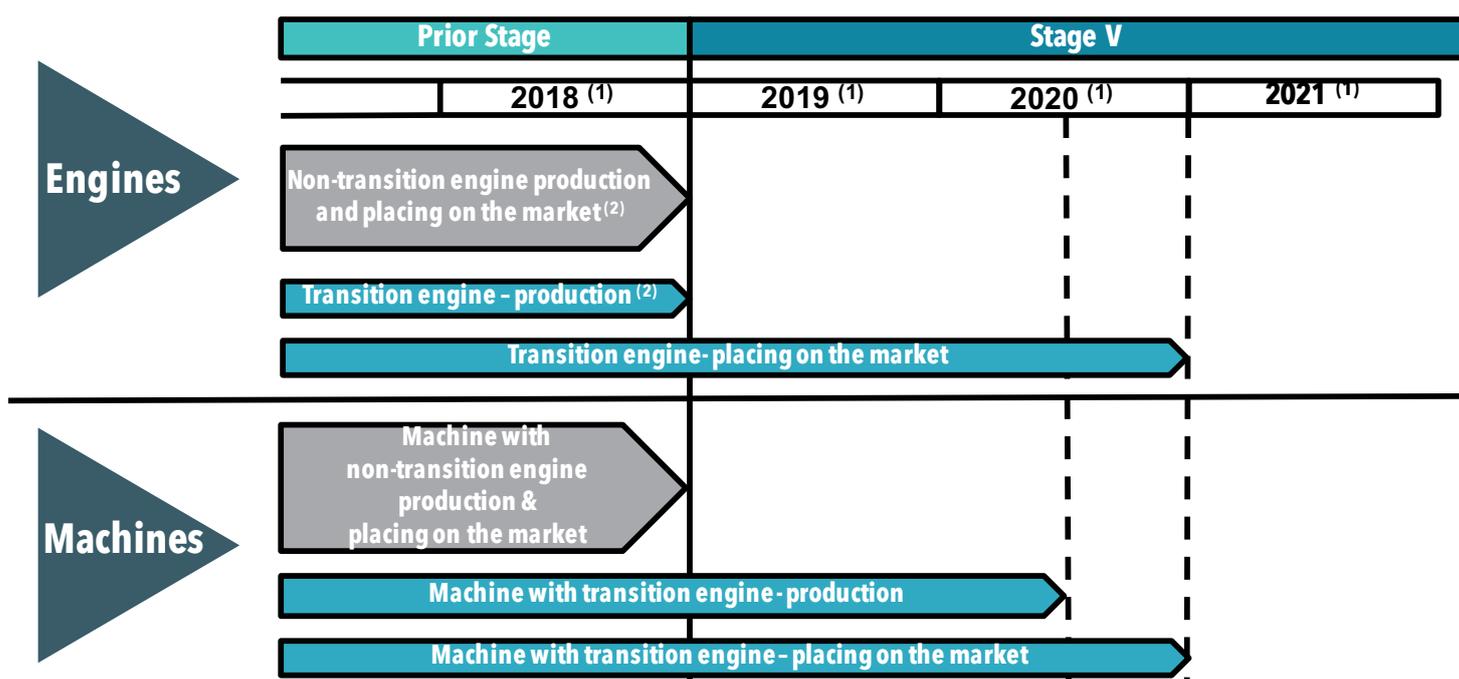
In general, machines may be produced for 18 months from the respective Stage V placing on the market dates and may be placed on the market for a further 6 months.

Engine category	Power range (kW)	Last production date for machine ⁽¹⁾	Last placing on market date for engine and machine ⁽¹⁾
NRE	56 ≤ P < 130	30 June 2021	31 December 2021
	All EXCEPT 56 ≤ P < 130	30 June 2020	31 December 2020
NRG	All		
NRSh	All		
NRS	All		

⁽¹⁾ Certain special cases have a later date

The after-treatment needs to physically exist prior to the placing on the market date in order for the engine to qualify as a transition engine.

Below is a graph explaining the transition scheme and respective deadlines.



⁽¹⁾ 56-130 kW NRE one year later

⁽²⁾ Inclusive of after-treatment

3.7

Are there any exceptions to the deadlines of the transition scheme (small OEM, mobile cranes, and snow throwers)?

Regulation 2016/1628 Articles 58 (5), 3 (45, 46 & 54), 32 (2) (d) & 15 (4),
Regulation 2017/656 Annex I and question 6.2

Yes, for mobile cranes, snow throwers and small volume manufacturers the time period for production of machines and placing on the market are extended and given in the table below. The extensions are not additive, e.g. the last placing on the market date for a mobile crane with engine NRE of 150 kW produced by an OEM with less than 100 units annual production of non-road mobile machinery remains as 31 December 2021.

Engine category	Special case	Power range (kW)	Last production date for machine	Last placing on market date for engine and machine
NRE	OEMs with a total yearly production of less than 100 units of non-road mobile machinery equipped with internal combustion engines ⁽¹⁾	All EXCEPT $56 \leq P < 130$	30 June 2021	31 December 2021
		$56 \leq P < 130$	30 June 2022	31 December 2022
NRE	Mobile cranes ⁽²⁾	All EXCEPT $56 \leq P < 130$	30 June 2021	31 December 2021
		$56 \leq P < 130$	30 June 2022	31 December 2022
NRS	Snow throwers ⁽³⁾	$P < 19$	30 June 2022	31 December 2022

⁽¹⁾ For the purposes of the calculation of that total yearly production, all OEMs under the control of the same natural or legal person shall be considered to be a single OEM. With total yearly production is meant total production of all engine powers for the EU and non-EU markets combined. Equipped with internal combustion engines means engines of all categories.

⁽²⁾ Mobile crane means a self-powered jib crane capable of travelling on-road or off-road or both, and relying on gravity for stability and operating on tyres, crawlers or with other mobile arrangements.

⁽³⁾ A snow thrower means a self-powered machine that is exclusively designed for clearing snow from a paved surface by collecting quantity of snow and projecting it forcefully through a chute

3.8

May a transition engine produced outside the EU be placed on the EU market after the Stage V placing on the market date?

[Regulation 2016/1628 Article 3 \(32\)](#)

Yes, the engine must be produced before the Stage V placing on the market date and must be placed on the EU market before the end of the transition period with the required engine production date marked.

3.9

Do engines and machines produced outside the EU have different deadlines?

[Regulation 2016/1628 Article 11](#)

No, the production and placing on the market dates apply equally regardless of production location in or outside the EU.

3.10

Are there any limits on quantity of transition engines per engine manufacturer or OEM?

[Regulation 2016/1628 Article 58 \(5\)](#)

No.

3.11

Do you need to apply at an authority to produce or use transition engines?

[Regulation 2016/1628 Article 15 \(5\)](#)

No, although production date must be marked for both engine and machine.

3.12

What happens with engines already placed on the market and meeting the production date and emission stage requirements to qualify as a transition engine, but are not marked with the month and year of production?

[Regulation 2016/1628 Articles 14, 32 \(2\) and question 2.2](#)

These engines do not qualify as transition engines. It is suggested that the OEM contacts the engine manufacturer for support.

3.13

What happens after the placing on the market date of Stage V to engines that have been placed on the market already, but not installed in a machine and do not qualify as transition engines due to their emission stage?

Regulation 2016/1628 Article 15 (3)

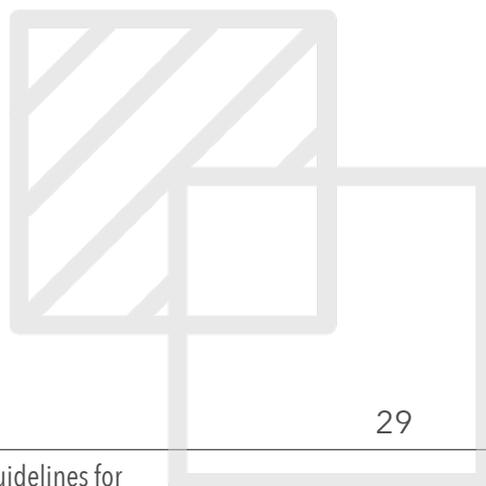
The engines may not be installed in new machines for the EU market. These include sell-off or flexibility engines placed on the market under Directive 97/68/EC⁵. Sell-off engines may be used to replace engines already installed in existing machines already placed on the EU market. Both sell-off and flexibility engines may be used for non-EU markets if the engine complies with the requirements of the intended market. OEMs are advised to contact their engine manufacturers for further advice.

3.14

What happens after the placing on the market date of Stage V to machines equipped with engines that are not transition engines such as flexibility engines, but are not yet placed on the market?

Regulation 2016/1628 Articles 15 (3), 34 (1) and question 9.1, 9.2 & 9.3

These machines may not be placed on the EU-market, but may be used for non-EU markets.



⁵ More information on sell-off and flexibility engines can be found in the CECE and CEMA guidelines for Transition provisions & exemptions for Non Mobile Machinery Engines.

4.1

For the variable speed engine power ranges that were previously regulated at EU level, how are Stage V limit values different in comparison with the previous stage?

[Regulation 2016/1628 Article 18 \(2\) and Annex II table II-1 & table II-4](#)

For category NRE engines in the power range from 19 kW to 560 kW a new limit value for particle number (PN) has been introduced additionally to a reduced particulate matter (PM) limit. The particle number limit laid down in the Regulation is likely to reflect the highest levels of performance currently achieved with particle filters by using the best available technology.

For category NRE 19 kW to 37 kW the NO_x limit has been reduced to the level of US EPA Tier 4 final.

For SI engines below 19 kW, the Stage V limits have been reduced for non-handheld applications to align with the US EPA requirements.

4.2

For the constant speed engine power ranges that were previously regulated, how are Stage V limit values different in comparison with the previous stage?

[Regulation 2016/1628 Article 18 \(2\) and Annex II table II-1](#)

The constant speed engines will change from Stage IIIA to the same level as variable speed engines at Stage V in one step.

4.3

How do the Stage V limits compare to the US EPA limits?

[Question 4.1](#)

For NRE engines for non-road mobile machinery in engine power ranges up to 19 kW and above 560 kW Stage V limit values are identical with US EPA Tier 4 limits. In power ranges above 19 kW up to 560 kW the limit values for CO, HC and NO_x are comparable but the Stage V limits for Particulate Matter (PM) are lower than the PM limits of Tier 4. There are no limits for particle numbers (PN) in US EPA legislation.

For SI engines below 56 kW, the Stage V limits are equal to the latest limits from the US EPA.

It should be noted that there are certain differences in technical requirements despite having the same limits.

4.4

Will it be necessary to obtain a separate approval for using a machine on a construction site in Switzerland?

Machines in which engines are installed that have been type-approved to the Stage V PN limit (engines of category NRE 19 kW - 560 kW) are fully compliant with the Swiss Federal Ordinance on Air Pollution Control (OAPC)⁶. Additional PN testing, conformity evaluation and marking are thus not required for these engines.



5.1

What is an OEM?

Regulation 2016/1628 Article 3 (54)

An OEM is defined as any natural or legal person who manufactures non-road mobile

5.2

What are the obligations for OEMs?

Regulation 2016/1628 Article 15, Regulation 2017/654 Annex XIV & XV and Regulation 2017/656 Annex III

- As a development from Directive 97/68/EC on non-road engine exhaust emissions, the regulation sets for the first time specific requirements for placing on the market of machines in so far as engine exhaust emissions are concerned. OEMs may not place on the market unless they are fitted with engines that meet the Stage V requirements or one of the exemptions mentioned in question 1.6.
- The OEM is required to follow all the instructions from the engine manufacturer to ensure that the installed engine is in conformity with the approved engine type following installation in the machine.
- If the OEM agrees to receive engines without its after-treatment system, that is delivered separately, he shall report to the engine manufacturer the correct completion of the engine assembly according to the manufacturer instructions.
- The OEM shall evaluate whether the engine statutory marking is visible once it is installed in the non-road mobile machine and in case it is not, ask the engine manufacturer for delivery of the supplementing statutory marking and place it on the machine or engine in a clearly visible position.
- In case the machine is fitted with a transition engine, the respective machine marking requirements apply according to question 6.3.
- The OEM shall include in the information to the end user, in the same format and language as the operating and maintenance handbook.
- Any restriction or limitation for use of the engine.
- The maintenance requirements to keep the engine inclusive of the after-treatment system correctly functioning; these may include:
 - Refill of any reagent, like urea solution (AdBlue) in the right quantities and quality.

- Cleaning or replacement of any part of the after-treatment system (as specified in the type approval conditions).
- Instructions about the warnings that might arise from lack of reagent or any other malfunction of the after-treatment system. Any action needed to correct such malfunctions.
- Information about the possible loss of machine functionality in case the above malfunctions are not promptly and adequately corrected.
- Instructions how to override the inducement system in case of emergency situations and how to proceed for its reset and the information that national authorities are entitled to check such occurrences and take action in case of any abuse.
- Information that intentional tampering with the engine, its control system and its exhaust after-treatment system makes the engine type approval void and makes the end user, in case he is a legal person, liable for this lack of conformity to the Regulation.
- The information about the correct fuel approved for the engine that may be diesel or petrol or biofuel or LPG or NG or any other fuel that the engine manufacturer approves and that was submitted to type approval testing and reported in the type approval certificate. Combinations of fuels are possible based on the engine type approval.
- Additional information in the case of the use of dual fuel engines.
- Information about the lubricant oil quality and replacement intervals.
- Any restriction for use that was delivered by the engine manufacturer.
- The CO₂ emission level along with the information about the test cycle on which this emission was measured.

5.3

Does it matter if the power, torque or speed of the engine is limited (constrained) when installed in non-road mobile machinery?

[Regulation 2016/1628 Article 15 \(3\)](#) and [Regulation 2017/654 Annex V](#)

It is generally acceptable for the non-road mobile machinery to constrain the engine, for example limiting fuel demand to prevent exceeding the maximum torque on the transmission system where necessary. It is also acceptable for an OEM to choose an engine that is capable of operating at a higher power, torque or speed than required when installed, which may be due, for example, to the unavailability an engine meeting the exact specifications of the OEM.

Specific cases where it is not permitted to constrain the engine are:

- A. Installations that permanently constrain the engine to exclusively operate within a power range corresponding to a (sub-)category with emission limits more stringent than the (sub-)category the engine belongs to; or,

B. For engine (sub-)categories subject to additional emission limitations over a range of speed and load (control area), installations that constrain the engine to exclusively operate at speed and load points outside of the control area for the torque curve of the engine.

An example of case (a) is where an engine type-approved for net power greater than 560 kW is installed in non-road mobile machinery in such a way that there are no foreseeable circumstances (even under temporary overload conditions) where the engine could operate at greater than 560 kW.

The engine manufacturer is required to inform the OEM of the restrictions applicable to the type-approved engine.

5.4

What is an importer?

[Regulation 2016/1628 Article 3 \(51\)](#)

An importer is a natural or legal person who places on the EU market from a country outside the EU an engine or a machine incorporating an engine. The importer must be established within the EU.

5.5

What are the obligations for importers?

[Regulation 2016/1628 Articles 11 & 12](#)

The regulation contains a number of obligations for importers. The following lists some of those obligations:

- An importer of an engine or machine has to ensure that he has the required documentation to demonstrate the conformity of the engine to the regulation, (see article 11 of the regulation), such as:
 - Type-approval certificate
 - Statement of conformity where applicable
 - Information and instructions to accompany the engine
- An importer must indicate on the engine or, where that is not possible, in a document accompanying the engine, their name, registered trade name or registered trade mark and the address at which they can be contacted
- The importer has to inform the engine manufacturer, market surveillance authorities and the relevant type-approval authorities when he has reason to believe an engine is not in conformity. (For details, see article 12 of the regulation)

- If an importer modifies an engine they are considered to be the manufacturer for the purpose of the regulation. (Article 16 of the regulation)

5.6

What is a distributor?

Regulation 2016/1628 Article 3 (52)

A distributor is any natural or legal person in the supply chain, other than the manufacturer or the importer, who makes an engine or a machine incorporating an engine available on the EU market.

5.7

What are the obligations for distributors?

Regulation 2016/1628 Article 13, 14 & 16

The regulation contains a number of obligations for distributors. A distributor of an engine or machine has to verify that the manufacturer and importer have fulfilled their obligations and the engines bear the necessary marking.

5.8

Does the OEM, importer or distributor have any responsibility if they modify the engine in such a way that it affects its compliance with the regulation?

Regulation 2016/1628 Article 15 (2) & 16

Yes, in this case they must take on the responsibility of the engine manufacturer and re-establish compliance with the regulation.





6.1

What are the engine marking requirements for Stage V engines?

Regulation 2016/1628 Articles 32 (1 & 2), 15 (4), 8 (5& 6), 11 (1), 13 (2) & 34 (1),
Regulation 2017/656 Annex III and question

1.6 Engines that are type-approved to the Stage V limit values must be marked according to the statutory marking requirements set-out in the implementing regulation. In the case that the marking is not visible without removing parts when the engine is installed in the machine a duplicate marking must be fitted in a visible location on the engine or machine.

In the case of engines shipped separately from their after-treatment an additional temporary marking is required. More information can be found in question 7.8.

Manufacturers shall indicate, on the engines they have manufactured and placed on the market or, where that is not possible, in a document accompanying the engine, their name, registered trade name or registered trade mark and the address in the Union at which they can be contacted. The type of document is not specified.

For NRS and NRSh engines, where the engine and machine are fully integrated and cannot be identified as separate components, the machine production date can be used instead of the engine production date. In this case, the machine production date needs to comply with the deadlines for engines.

6.2

What are the engine marking requirements for non-Stage V engines?

Regulation 2016/1628, Articles 15 (5) & 32 (2), Regulation 2017/656
Annex III (B) and question 1.6

During the limited period that they can still be placed on the market, non-Stage V engines that are type-approved according to Directive 97/68/EC and that are not transition engines only need to meet the marking requirements of that directive. In the case of engines that were unregulated at EU level prior to Stage V there are no marking requirements.

Transition engines shall bear the markings according to the above paragraph and the marking shall additionally include the engine production date (month and year).

In the case of engines shipped separately from their after-treatment an additional temporary marking is required. More information can be found in question 7.10.

For engines using exemptions or certain transition clauses specific marking requirements apply, including supplementary markings and codes. These engines are:

- Replacement engines
- Field test engines
- Engines with new technologies
- Export engines
- Engines to be used by armed forces
- Special purpose engines

6.3

Are there specific requirements for machine marking?

[Regulation 2016/1628 Article 15 \(4 & 5\)](#)

If a non-road mobile machine is placed on the market during the transition period, with a transition engine installed, the OEMs shall indicate the date of production (month and year) of such machine as part of the marking. This requirement could be satisfied by either including the month of production in the normal statutory plate of the machine or alternatively by the addition of a separate plate or label that has a statement such as: *Machine production date: MM/YYYY*

The statutory marking of the engine shall always be visible. In case that is not possible without removing parts, the OEMs shall affix, in a visible manner, to the non-road mobile machinery, a duplicate of the marking provided by the manufacturer, according to the provisions set in the relevant implementing act.

6.4

Which engines require a statement of conformity?

[Regulation 2016/1628 Article 31 \(1\)](#)

Engines placed on the EU market shall be accompanied by a statement of conformity in the following circumstances:

- Engines for use by the armed forces – this does not include fire services, civil defence services, forces responsible for maintaining public order or emergency medical services
- Engines that have not been EU type approved to Regulation 2016/1628 but that have authorisation for temporary placing on the market for testing purposes
- Special purpose engines (SPE category) that are intended to be installed in machines for use in potentially explosive atmospheres⁶ or machines that are intended for use solely to launch and recover lifeboats that are operated by a national rescue service

⁶ Potentially explosive atmospheres are defined in Directive 2014/34/EU, Article 2, Point 5

- An engine that is given provisional EU type approval within a Member State pending a decision on authorisation by the Commission on offering full type approval with possible restrictions based on an exemption for new technology or new concepts
- Replacement engines

6.5

In what format shall the statement of conformity be?

Regulation 2016/1628 Article 31 (1 & 2)

The statement of conformity may be in any EU language. It may be provided as a paper document with features to prevent forgery or as a secured electronic file.



7.1

Can part of the engine be shipped separately from the rest of the engine?

[Regulation 2016/1628 Article 34 \(3\) and Regulation 2017/654 Annex X](#)

Yes, but this is limited to the exhaust after-treatment system. This consists of a catalyst, particulate filter, deNOx system, combined deNOx particulate filter or any other emission-reducing device, with the exception of exhaust gas recirculation and turbochargers, that is part of the emission control system but is installed downstream of the engine exhaust ports.

7.2

What is separate shipment of an exhaust after-treatment system?

[Regulation 2017/654 Annex X](#)

Separate shipment happens when an engine is placed on the market not accompanied by its after-treatment system and the after-treatment system is dispatched from a different location or at a different time.

The after-treatment system includes, for example, urea injection systems, sensors and regeneration systems. Other parts of the engine unrelated to the after-treatment do not qualify for separate shipment.

The separate shipment rules apply when the engine manufacturer and the OEM are different legal entities, even if they belong to a group under the control of the same natural or legal person.

7.3

From when do the separate shipment requirements apply?

[Regulation 2017/654 Article 21](#)

The separate shipment requirements are already mandatory from the date of application of Delegated Regulation (EU) 2017/AAA. There is no transition time given in the regulation and separate shipment was not specifically allowed as an exemption in Directive 97/68/EC, therefore these requirements also apply to the separate shipment of engines of stages prior to Stage V.

7.4

Is use of the separate shipment clause the only method by which an engine may be shipped separately from its exhaust after-treatment system?

[Regulation 2016/1628 Article 34 \(3\)](#)

Yes, all components that are part of an engine (see question 1.3) must be shipped alongside the engine, unless the separate shipment clause is used. The only exception is the shipment of an incomplete engine from a supplier to the ultimate engine manufacturer, who is responsible for all aspects of the engine EU type-approval or authorisation process.

7.5

Does separate shipment apply to any parts that are required for the after-treatment system to function but that are not part of the engine?

[Regulation 2016/1628 Articles 3 \(36\) & 34 \(3\)](#)

No, it does not apply, for example, to urea storage tanks, piping to or from the urea tank or sections of exhaust system between the engine and its after-treatment system (see also question 1.4).

7.6

Does separate shipment occur if the engine and after-treatment are shipped from same location at same time?

[Regulation 2016/1628 Article 34\(3\) and Regulation 2017/654 Annex X](#)

No, it does not apply, even if the after-treatment is not physically attached to the rest of the engine or different parts are packaged in different containers.

7.7

Does separate shipment occur if the engine and after-treatment are first installed in a machine outside of the EU and then imported into the EU?

[Regulation 2016/1628 Article 34\(3\) and Regulation 2017/654 Annex X](#)

No, it does not apply unless the engine is placed on the market in the EU prior to shipment to the OEM.

7.8

What are the specific requirements for shipping into or within the EU the after-treatment separately from the incomplete engine?

[Regulation 2016/1628 Article 15 \(6\) and Regulation 2017/654 Annex X](#)

The engine manufacturer must obtain the consent of the OEM prior to implementing a separate shipment scheme.

It is the engine manufacturer's responsibility to ensure that an engine shipped separately from its after-treatment is brought into conformity with the approved engine type. The engine manufacturer must order the after-treatment before the engine leaves the engine production facility. Where an OEM is receiving engines and their after-treatment on a continuous basis, this requirement can be met by ensuring that the rate of supply of after-treatment systems does not fall behind the rate of supply of the incomplete engines. The OEM is not permitted to order the after-treatment directly from the after-treatment manufacturer.

The engine manufacturer is required to provide the OEM with all the instructions, lists and methods of identification of parts shipped separately and information on any checks needed to ensure that the engine comes into conformity with the approved type during assembly at the OEM's plant. This needs to be done to the extent necessary to achieve the aim. For example, the information may be supplied before production starts and not shipped with every engine.

Each engine that is shipped without the associated after-treatment must have a temporary label attached to it by the engine manufacturer stating "Separate Shipment Art 34 (3)*2016/1628". This label must remain attached to the engine until it is brought into conformity. This will be when it is fully assembled with the after-treatment.

The OEM and the engine manufacturer must implement a system whereby the OEM provides records to the engine manufacturer that the supplied engines have been brought into conformity in a manner that enables the engine manufacturer to maintain the required information. This reporting does not need to take place for each individual engine, but may be performed for multiple engines together. The engine manufacturer and OEM may agree when and how the reporting takes place, but the reporting must be at least once per year.

7.9

Can there be intermediaries between engine manufacturer and OEM in the separate shipment process?

[Regulation 2017/654 Annex X](#)

Yes, the engine may be shipped to other entities such as importers, distributors (dealerships) prior to its arrival at the OEM. The regulation sets no restriction on the commercial arrangements between the various actors in the supply chain. If the manufacturer ships a complete engine in its type-approved configuration, no further action is required along the way.

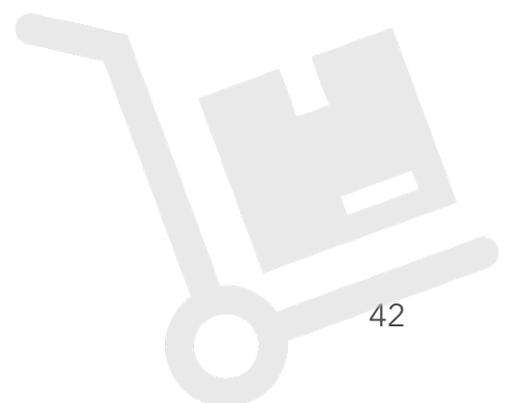
On the other hand, in the case of an engine shipped separately from its after-treatment, regardless of the involvement of intermediaries the OEM is obliged by the regulation to provide confirmation to the engine manufacturer that the engine has been brought into conformity with the approved engine type or family and that all checks necessary to ensure the proper function of the engine have been conducted.

7.10

Are there any additional requirements for transition engines when using the separate shipment provision?

[Regulation 2017/654 Annex X](#)

In the case of transition engines where the after-treatment system is shipped separately, it is necessary to be able to demonstrate that the entire engine, including the after-treatment, was manufactured before the applicable Stage V placing on the market date. It is not required to mark the after-treatment with a production date; however, if the production date is not clearly apparent on the after-treatment there must be a system that allows the engine manufacturer to confirm and record that the after-treatment for the transition engine was produced before that placing on the market date.



PART 8 COMPONENTS OR SYSTEMS



not provided by the engine manufacturer

8.1

Where a charge air cooler is used, is it considered to be part of the engine?

[Regulation 2017/654 Annex VI](#)

No, similar to the case for the engine coolant radiator or oil cooler and the cooling fan, the charge air cooler is generally part of the machine cooling system. Whilst the engine manufacturer is not prevented from providing a charge air cooler it is usually provided by the OEM. The OEM must select a charge air cooler that will comply with the requirements set by the engine manufacturer consistent with the type-approval of the engine.

8.2

Are there components or systems, not part of the engine, but still necessary in order to comply with this regulation?

[Regulation 2017/654 Annex XIV](#)

This will commonly be the case, but it depends upon the engine category and technology being used by the engine manufacturer. Examples include exhaust pipe work, urea tank and piping and operator warning systems. The engine manufacturer must provide sufficient information for the design of these elements.



9.1

What is a replacement engine in terms of the regulation?

Regulation 2016/1628 Article 3 (11)

Within the regulation the term 'replacement engine' is reserved for engines that are exclusively used to replace an engine already placed on the EU market and installed in non-road mobile machinery.

These engines must at least meet the emission stage of the engine being replaced. For example, it is not permitted to replace a Stage IIIB engine with a Stage IIIA engine, however it may be replaced with a Stage IIIB or Stage IV engine.

This includes engines that are being made available for the first time on the EU market (i.e. placed on the market) whether or not they have been built using new or remanufactured components.

9.2

Are there engines which may be used to replace existing engines installed in machines, but which are not defined as replacement engines?

Yes, an engine that has been placed on the market and which met the applicable emission requirements at that time is not defined as a replacement engine within the regulation. These engines may nevertheless be used to replace existing engines installed in machines already placed on the EU market without any time limit.

Examples are:

- A Stage V engine used to replace a Stage V engine installed in a machine
- A Stage IV engine placed on the market prior to the respective Stage V placing on the market date and used to replace a Stage IV engine installed in a machine
- A CI engine less than 19 kW which was previously unregulated at the EU level placed on the market prior to the respective Stage V placing on market date and used to replace an unregulated CI engine less than 19 kW installed in a machine

9.3

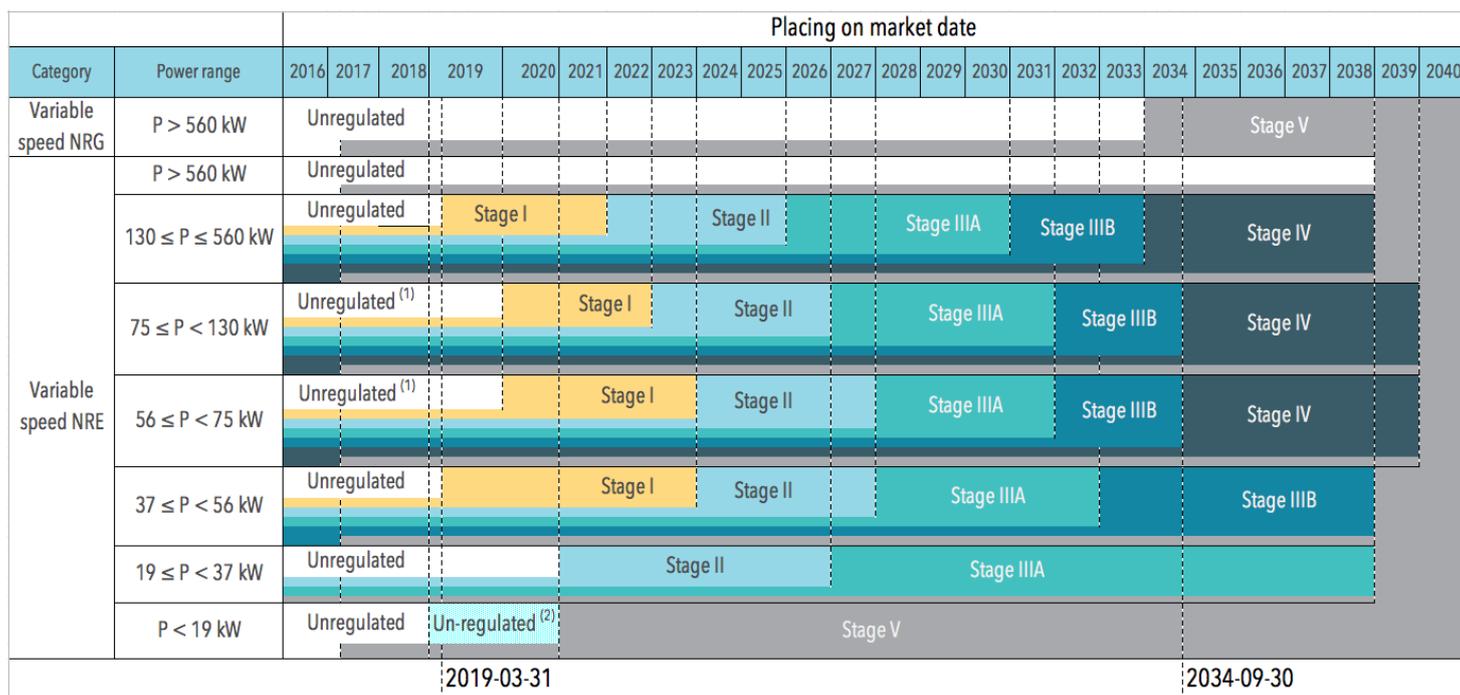
What are the limitations for placing on the market replacement engines?

Regulation 2016/1628 Article 58 (10 & 11)

The regulation introduces time limits on the placing on the market of replacement engines.

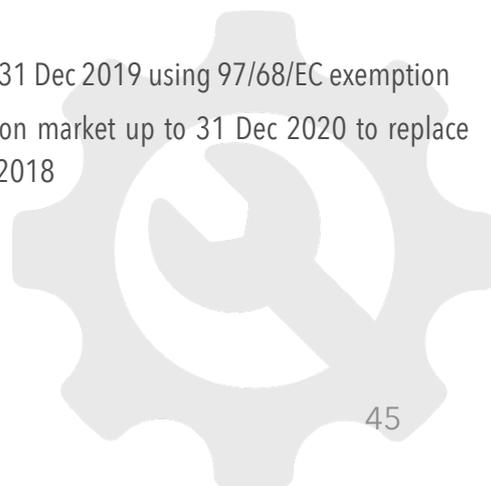
- For non-road engines of category NRE 19 – 560 kW the placing on the market of replacement engines is limited to 20 years after the end of the respective EU emission stage.
 - E.g. for Directive 97/68/EC engine category H (Stage IIIA, 130 kW – 560 kW) Stage IIIA ended on 31 December 2010. The corresponding period to place on the market replacement engines for this engine category ends on 31 December 2030.
- For engines of category NRE > 560 kW the time limit is 20 years from the date that Stage V commences, i.e. ending on 31 December 2038.
- The corresponding time period for SI engines NRS 19 kW < P ≤ 56 kW and generator set engines NRG > 560 kW is 15 years, ending 31 December 2033.
- Replacement engines for categories < 19 kW cannot be placed on the market after 31 December 2018.

In any case all replacement engine categories end at the latest 20 years after the start of the respective Stage V placing on the market date. The graphs below provide a timeline for the different engine categories.



(1) Unregulated replacement engines may be placed on market up to 31 Dec 2019 using 97/68/EC exemption

(2) Transition engines produced up to 31 Dec 2018 may be placed on market up to 31 Dec 2020 to replace existing engines otherwise Stage V engines are required after 31 Dec 2018



PART 9: REPLACEMENT ENGINES

		Placing on market date																									
Category	Power range	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	
Constant speed NRG	P > 560 kW	Unregulated																Stage V									
	P > 560 kW	Unregulated																									
Constant speed NRE	130 ≤ P ≤ 560 kW	Unregulated																Stage II		Stage IIIA							
	75 ≤ P < 130 kW	Unregulated																Stage II		Stage IIIA							
	56 ≤ P < 75 kW	Unregulated																Stage II		Stage IIIA							
	37 ≤ P < 75 kW	Unregulated																Stage II		Stage IIIA							
	19 ≤ P ≤ 37 kW	Unregulated																Stage II		Stage IIIA							
	P < 19 kW	Unregulated			Un-regulated ⁽²⁾															Stage V							

⁽²⁾ Transition engines produced up to 31 Dec 2018 may be placed on market up to 31 Dec 2020 to replace existing engines otherwise Stage V engines are required after 31 Dec 2018

		Placing on market date																											
Category	Power range	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040			
NRS	19 ≤ P < 56 kW	Unregulated																Stage V											
	P < 19 kW	Unregulated ⁽³⁾			Stage I ⁽³⁾		Stage I ⁽⁴⁾															Stage V							
NRSh	P < 19 kW	Unregulated ⁽³⁾			Stage I ⁽³⁾		Stage I ⁽⁴⁾															Stage V							
					Stage II		Stage II ⁽²⁾																						

⁽²⁾ Transition engines produced up to 31 Dec 2018 may be placed on market up to 31 Dec 2020 to replace existing engines otherwise Stage V engines are required after 31 Dec 2018

⁽³⁾ Unregulated and Stage I replacement engines may be placed on market up to 31 Dec 2018 using 97/68/EC exemption

⁽⁴⁾ Transition engines produced up to 31 Dec 2018 using the small volume engine family exemption in 97/68/EC Art. 10(4) may be placed on market up to 31 Dec 2020 to replace existing engines otherwise Stage V engines are required after 31 Dec 2018

A statement of conformity must accompany each engine that is marked as a replacement engine. The replacement engine markings must include the transition code 'TR-RES' (for engines of category NRS) or 'TR-REE' (for engines of category NRE) and the supplementary marking 'REPLACEMENT ENGINE', plus, for non-road engines of category NRE 19 – 560 kW, the prior type-approval number.

9.4

Is there a time limit to sell or install a replacement engine?

There is no time limit to sell to an end-user or install a replacement engine in an existing machine if the engine was placed on the market in accordance with the deadlines in question 2.6.

9.5

Where the engine type includes an exhaust after-treatment system, is it necessary to place on the market an engine inclusive of that after-treatment when the engine is intended to replace an existing engine already installed in a machine?

Yes, except in the specific case of an engine placed on the market to replace the same type already installed in an existing machine, where the existing after-treatment of the correct type will continue to be used. In this exception it can be considered that the correct after-treatment has already been supplied and shipment of an additional after-treatment is unnecessary.

9.6

Is it necessary to follow the requirements for separate shipment when shipping an engine intended to replace an existing engine already installed in a machine?

Yes, in the case the shipment is made to an OEM, unless engine and after-treatment are shipped at same time from the same location. In case the OEM is not involved, in the absence of an alternative approach, when placing a replacement engine on the market without an after-treatment it is recommended that the engine manufacturer:

- follow the separate shipment process
- require the installer to fulfil the obligation of the OEM and provide confirmation that the engine has been brought into conformity when installed in the machine.

9.7

Is it still allowed to repair engines?

Yes, the regulation applies to the placing on the EU market of each engine. After an engine has been placed on the market in accordance with the Regulation or the prior Directive 97/68/EC, there is no restriction on repair or remanufacture of the engine using spare parts or assemblies of parts as long as the specifications of the engine's original emission control system are respected. This is the case even if it is necessary to temporarily remove that engine from the EU to conduct the repair, as long as it remains traceable that the engine had previously been placed on the EU market (see also question 9.2).

9.8

Is it still allowed to use repaired engines for production of machines?

[Regulation 2016/1628 Article 5 \(3\) \(b\)](#)

No, not after the Stage V placing on the market date for the respective engine category, unless the repaired engines comply with Stage V. The regulation applies to both engines and machines. From the Stage V placing on the market date, only Stage V engines may be used for production of machines for the EU, except in the case of transition engines used for machine production during the respective transition period.



10.1

What are the requirements for field testing an engine which is not type-approved?

Regulation 2016/1628 Articles 31 (1) (a), 32 (2) (c), 34 (4) & 34 (9) (b), Regulation 2017/654 Annex XI and questions 1.6, 2.16 and 6.2

The regulation conditionally allows temporary placing on the market of non-type-approved field test engines. It is not only addressing engines intended for the EU market, but also allows field testing within the EU of engines for other parts of the world.

Such engines need to carry a supplementary marking and be accompanied by statement of conformity (see question 6.2).

The engine manufacturer must fulfil the following requirements:

- Ownership of the engine must remain with the manufacturer, although this does not preclude a financial agreement with the OEM or end-user.
- Type approval authority needs to be informed about:
 - name or trade mark of engine manufacturer
 - the total number of engines
 - engine number
 - production date
 - relevant information on the emission performance of the engine
 - economic operator to which the engine is supplied

The field test time is limited to 24 months, but may be extended for another 24 months subject to the approval of the authority concerned based upon the justification provided. Before the end of the field test time the engine must be removed from the market or brought into conformity. The authority concerned needs to be informed about the action taken.

10.2

What are the requirements for engines used in potentially explosive atmospheres (ATEX)?

Regulation 2016/1628 Articles 31 (1) (a), 32 (2) (b), 34 (5), 57 (2) (k) & 61 (1) & Annex VI, Regulation 2017/654 Annex XII and questions 1.6, 2.14, 6.4 & 11.1

The regulation includes an exemption for engines to be installed in machinery for use in potentially explosive atmospheres as defined in point 5 of Article 2 of Directive 2014/34/EU.

These engines must be type-approved to the special purpose engine (SPE) limit values.

Before supplying such an engine, the engine manufacturer is obliged to take reasonable measures to ensure that the engine will be used for the purpose for which it is intended. An example of such a measure could be to request a written statement from the OEM.

The engine manufacturer must:

- Affix a supplementary marking stating the exemption under which the engine is supplied
- Prepare a statement of conformity to be passed to the OEM in paper or an agreed electronic format

The OEM must:

- Pass a copy of the above mentioned statement of conformity to the end user in either a paper or electronic format

Note:

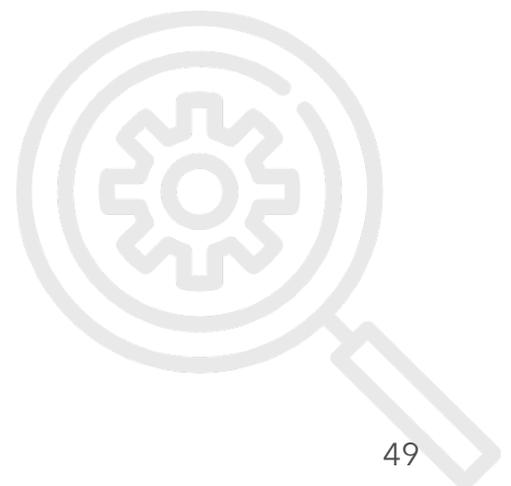
The regulation also amends Directive 97/68/EC, Article 61(1), such that engines that meet EU Stage IIIA emission limit values may be supplied for NRMM for use in potentially explosive atmospheres. In order to utilise this derogation, engine manufacturers must provide evidence of the proposed use to an approval authority. Engines subsequently supplied must be fitted with a label bearing the text 'Engine for restricted use in machinery manufactured by', followed by the name of the OEM and the reference to the derogation.

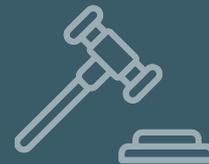
10.3

What are the requirements for engines that are intended to be exported outside the EU?

[Regulation 2016/1628 Articles 32 \(2\)\(a\) & 34 \(1\)](#) and also [question 1.6](#), [1.7](#), [2.14](#) & [6.2](#)

Engines to be exported outside the EU only need to meet the marking requirements of the regulation. This means adding marking stating: 'Engine not for use in EU machinery' in any EU language and the code 'EM-EXP'.





11.1

Are there penalties for not complying with this regulation?

Regulation 2016/1628 Article 57

The implementation of penalties is a responsibility of each individual Member State and consequently may vary between Member States.

Examples of infringements subject to potential penalties can be grouped as follows:

- Administrative: making false declarations, falsifying or withholding data, refusing access to information
- Technical: use of defeat strategies, installation of an engine in machinery of a category or with a speed operation for which the engine was not type approved such as an engine type-approved only for constant speed operation in a variable speed application.
- Placing on the market of engines that do not comply with the requirements of the regulation.



12.1

What is in-service monitoring (ISM)?

Regulation 2016/1628 Article 19 (1) and Regulation 2017/655 Article 1 & Annex

This is a requirement to temporarily measure the gaseous exhaust emissions of a limited number of engines in real operating conditions.

The principle of in-service monitoring is to test engines installed in machines; however there may be some cases where engines are removed for testing.

It does not require monitoring systems to be installed on all machines and there are no pass/fail criteria.

It is the engine manufacturer's responsibility to identify machines to be tested, temporarily install portable emission measurement systems (PEMS) and perform the tests. The results must be reported to the type-approval authority, will be made public, and will enable the European Commission to compare the results of the type-approval tests with the in-service tests. The OEM has no responsibility for this activity, although may receive requests for support from the engine manufacturer from which they receive engines.

12.2

Will in-service monitoring apply to all engine categories?

Regulation 2016/1628 Article 19 (1) and Regulation 2017/655 Article 2

Yes, in-service monitoring applies to all engine categories in scope of the regulation that are type-approved to Stage V limit values. The initial supplementing legislation only covers variable speed NRE 56 kW to 560 kW. Amendments to supplementing legislation for other categories will be defined prior to the placing on the market date of the applicable Stage V engine category.





13.1 What is a generating set (genset)?

[Regulation 2016/1628 Article 3 \(35\)](#)

A genset is identified by three specific characteristics. It is:

- An independent machine;
- Not part of a power train;
- Primarily intended to produce electric power

13.2 What are the requirements for engines to be used in generating sets (gensets)?

[Regulation 2016/1628 Article 4 \(1 & 2\), Annex II table II-2, Annex III table III-2 and chapter 2 of this FAQ document](#)

Engines with a rated net power of more than 560 kW for use in gensets must be type-approved in category NRG. Engines with a rated net power up to 560 kW must be type-approved in category NRE, or in the case of SI engines less than 56 kW, in category NRS or NRSh according to their power and displacement.

If the genset operates at variable speed, the engine must be type-approved as a variable speed engine and comply with the corresponding requirements. If the genset operates at constant speed the engine will usually be type-approved as a constant speed engine, though use of a variable speed engine is permitted.

13.3 Are there machines not classified as generating sets (gensets) that include an engine-driven generator?

[Regulation 2016/1628 Article 3 \(35\)](#)

Yes, machines that have an electric drive and use an engine-driven generator as part of the power train are not classified as gensets for the purpose of the regulation as they do not fulfil all three characteristics of a genset (see question 13.1). In this case, for engines with net power greater than 560 kW engine category NRE applies and not category NRG.

Non-exhaustive examples of machines that include an engine-driven generator as part of the power train, and thus are not gensets, are non-road trucks, excavators, loaders and oil or gas drill rigs that use electric drive. In the last example it does not matter if the engine-driven generator and the rest of the drill rig are split into modules for ease of transportation between sites; they are not intended to function independently and the engine-driven generator is still part of the power train.

PART 14 APPLICATION AND USE



of constant speed engines

14.1

Must a constant speed engine continuously maintain an exactly constant speed?

Regulation 2017/654 Annex VI §5.2.5.6

No, but the engine must operate under the control of a constant speed governor. The speed may decrease below the speed at zero load, so that the minimum speed occurs near the engine's point of maximum power. This is typically in the region of 0.1 to 10 percent.

14.2

May a constant speed engine have an idle speed?

Regulation 2016/1628 Article 3 (21) and Regulation 2017/654 Annex XIV §4.17

Yes, but only during engine start-up or shut-down and not for use as part of an operating cycle. The engine must be installed in a manner to ensure that the constant speed governor function is engaged prior to increasing the load-demand to the engine from the no-load setting.

14.3

May a constant speed engine have more than one constant operating

Regulation 2016/1628 Article 3 (21) & 24 (6) and Regulation 2017/654 Annex XIV §4.16

Yes, but only if the engine is shut-down prior to re-setting the constant speed governor to a different speed and each speed is permitted by the manufacturer and identified in the type-approval. A typical example is a genset that can operate at either 50 Hz or 60 Hz.

14.4

May a variable speed engine be used in a constant speed application?

Regulation 2016/1628 Article 4 (2) & (7 & 8)

Yes, this is permitted for all the engine categories and applications in scope of this guidance document without any need for any additional type-approval or emission test.

PART 15 SECOND-HAND MACHINES



15.1 If a second-hand machine or engine is imported into the EU for the first time, does it have to comply with the regulation?

[Regulation 2016/1628 Article 8 \(1\), questions 2.2 & 2.7 and the Blue Guide](#)

Yes, used equipment coming from outside the EU and made available on the EU market for the first time (i.e. placed on the market) has to comply with the requirements of the regulation of that moment.

15.2 Is it possible to comply with the requirements for importing a second-hand machine by installing a replacement engine?

[Regulation 2016/1628 Article 3\(11\) & 8\(1\), question 9.1 of the FAQ and the Blue Guide](#)

No, unless the engine is type-approved to the latest applicable emission stage.



16.1

Does the regulation impose limitations on the market fuels on which the engines may be operated?

[Regulation 2016/1628 Article 25 \(2\) and Regulation 2017/654 Annex I](#)

Yes, for diesel engines operation is limited to the use of diesel or non-road gas-oil with a sulphur content no greater than 10 ppm (20 ppm at point of final distribution), commonly known as sulphur-free diesel or ultra-low sulphur diesel (ULSD) with a cetane number not less than 45 and fatty acid methyl ester (FAME) content not greater than 7%, i.e. B7. This can be satisfied by fuel meeting the CEN standards EN 590 or EN 15940.

If so-called 'red diesel' is used in those member states where it is permitted, care must be taken to ensure that only non-road gas-oil is used. Heating oil or marine gas-oil may have sulphur levels in excess of those permitted and may additionally damage the engine or after-treatment system.

In the case of petrol engines operation is limited to the use of fuels complying with Directive 98/70/EC or CEN standard EN 228.

The engine manufacturer may have type-approved the engine for additional or different fuels. This includes fulfilling emission requirements with all fuels approved by the engine manufacturer. If an OEM indicates to the end-user that he may operate a machine with multiple fuels, he must first check that these fuels have been included in the engine type approval. Engines might also be type-approved to run on certain ranges of gaseous fuels including dual-fuel operation. Where an engine is type-approved for additional fuels the in-service monitoring requirements apply when operating on these fuels.

The restrictions on the fuels that may be used must be communicated by the engine manufacturer to the OEM and by the OEM to the end-user.

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Directive 2014/34/EU of the European Parliament and of the Council of 26 February 2014, on the harmonisation of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres

Regulation (EU) No 167/2013 of the European Parliament and of the Council of 5 February 2013, on the approval and market surveillance of agricultural and forestry vehicles

Regulation (EU) 2016/1628 of the European Parliament and of the Council of 14 September 2016, on requirements relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for non-road mobile machinery, amending Regulations (EU) No 1024/2012 and (EU) No 167/2013, and amending and repealing Directive 97/68/EC

Commission Delegated Regulation (EU)2017/654 with regard to technical and general requirements relating to emission limits and type-approval for internal combustion engines for non-road mobile machinery

Commission Delegated Regulation (EU)2017/655 on monitoring of gaseous pollutant emissions from in-service combustion engines installed in non-road mobile machinery

Commission Implementing Regulation (EU)2017/656 on administrative requirements relating to emission limits and type-approval for internal combustion engines for non-road mobile machinery

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CONTACT

FEM

Created in 1953, the European Materials Handling Federation represents, defends and promotes European manufacturers of materials handling, lifting and storage equipment. FEM speaks for 15 members representing some 1,000 companies (mostly SMEs) employing 160,000 people directly and with an annual turnover of more than €50 billion.

Contact: Olivier Janin, Secretary General, info@fem-eur.com, www.fem-eur.com

CECE

The Committee of European Construction Equipment (www.cece.eu) is the recognised organisation representing and promoting the European construction equipment manufacturers and related industries to achieve a fair competitive environment via harmonised standards and regulations. CECE is a European network consisting of a secretariat in Brussels and national association offices in 13 different European countries. The industry behind CECE comprises 1,200 companies. In 2014, these equipment manufacturers had a total turnover of 25 billion € and employed 130,000 people directly.

Contact: Belén Bravo, Technical Policy Manager, belen.bravo@cece.eu, www.cece.eu

CEMA

CEMA is the European association representing the agricultural machinery industry. For 50 years CEMA has acted as a network of national associations and provides services, advice and a common European industry view on relevant topics. The industry represented by CEMA includes 4,500 manufacturers of agricultural equipment employing directly 135,000 persons and indirectly in the distribution and service network another 125,000 persons. The companies are mainly small and medium-sized manufacturers according to the EU definition and they have a total turnover of 26 billion euro.

Contact: Ulrich Adam, Secretary General, sg@cema-agri.org, www.cema-agri.org

EGMF

The European Garden Machinery Industry Federation – EGMF – has been the voice of the entire garden machinery industry in Europe since 1977. With 30 European corporate members and 7 National Associations representing manufacturers of garden, landscaping, forestry and turf maintenance equipment, EGMF has the most powerful network in this sector in Europe.

Contact: Paul Wilczek, Secretary General, secretariat@egmf.org, www.egmf.org

EUnited Municipal Equipment

EUnited Municipal Equipment is the European Association of Municipal Equipment Manufacturers. The association represents the leading manufacturers of mobile machines used in municipalities and other public areas.

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EUROMOT

Established in 1991, EUROMOT is the European Association of Internal Combustion Engine Manufacturers. EUROMOT membership includes all major manufacturers of internal combustion (IC) engines in Europe and the World, spark ignition and compression ignition, representing 85% of the EU market. The EUROMOT members employ approximately 200,000 highly skilled people worldwide. The European market turnover for the business represented exceeds 25 billion Euros.

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EUROPGEN

EUROPGEN promotes the interests of the European generating set industry.

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