RAIL VEHICLE APPLICATIONS

FAQ

FREQUENTLY ASKED QUESTIONS

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

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INTRODUCTION

The purpose of this 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 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 2017/655** on monitoring of gaseous pollutant emissions from in-service combustion engines installed in non-road mobile machinery
c) **Commission Implementing Regulation 2017/656** on administrative requirements relating to emission limits and type-approval for internal combustion engines for non-road mobile machinery

The 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. The regulation entered into force on 6 October 2016 and is applicable from 1 January 2017.

The 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 railway vehicle manufacturer (original equipment manufacturer (OEM)), importers and distributors. It 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
- Constant speed engines
- Second-hand railway vehicles
- Market fuels

DISCLAIMER

This FAQ document (hereinafter 'FAQ') reflects the common view of the associations[1] 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 common 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.

[1] The associations involved are CER, EUROMOT, UIC, UNIFE

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1 SCOPE

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

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, including railway vehicles,** to which these engines are fitted to the extent that engine exhaust emissions are concerned.

Reference: Regulation 2016/1628, Article 2(1)

1.2 What is non-road mobile machinery and how are railway vehicles defined?

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".

For railway vehicles the following additional definitions apply:

'Railway vehicle' means non-road mobile machinery that operates exclusively on railway tracks;

'locomotive' means a railway vehicle designed to provide, either directly through its own wheels or indirectly through the wheels of other railway vehicles, the motive power for propelling itself and for propelling other railway vehicles that are designed to carry freight, passengers and other equipment, itself being designed or intended not to carry freight or passengers, other than those operating it;

'railcar' means a railway vehicle designed to provide, either directly through its own wheels or indirectly through the wheels of other railway vehicles, the motive power for propelling itself, and is specifically designed to carry goods or passengers, or both goods and passengers, and is not a locomotive;

'auxiliary railway vehicle' means a railway vehicle that is not a railcar or locomotive, including but not limited to a railway vehicle specifically designed to perform maintenance or construction work or lifting operations associated with the track or other infrastructure of the railway.

Reference: Regulation 2016/1628, Article 3 (1), (41) to (44)

1.3 What is an engine?

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.

Reference: Regulation 2016/1628, Article 3 (7)

1.4 What is not part of an engine?

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 railway vehicle 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).

Reference: Regulation 2016/1628, Article 3 (7), questions 9.1 and 9.2

1.5 What is an engine family?

An engine family is a manufacturer's grouping of engine types which, through their design, have similar exhaust emission characteristics, and respect the applicable emission limit values. Each engine type within the family is a series of production engines which do not differ in essential engine characteristics. For the purpose of the type-approval one of the engine types is selected as the ‘parent’. The parent engine is selected in such a way that its emissions characteristics are representative of that engine family.

Reference: Regulation 2016/1628, Article 3 (9), (10) and Regulation 2017/656 Annex I

1.6 Which engines are excluded from the scope of the regulation?

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.

Reference: Regulation 2016/1628, Article 2 (2)

1.7 Which engine categories are in the scope of this FAQ?

The engine categories which this FAQ will focus on are those applicable to the rail sector which are:

- Category RLL;
- Category RLR;
- Category NRE;
- Category NRS.

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

The regulation includes exemptions for the following engines:

- Those for export to third countries;
- Those for use by the armed forces[2];
- Those exclusively for use for replacing engines already installed in auxiliary railway vehicles or auxiliary engines installed in locomotives or railcars (Replacement engines, category NRE);
- Those for field testing that have not been EU type-approved;
- Those for locomotives or auxiliary railway vehicles intended to operate in potentially explosive atmospheres;
- 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).

The regulation allows Member States to exclude the following engines:

- Until 17 September 2026, those of stage IIIA emission level with a maximum net power greater than 2000 kW designed for locomotives. operated on a technically isolated 1520 mm broad gauge network;
- Those of stage IIIA emission level for replacing existing engines in locomotives and railcars (engines of category RLL and RLR) where the approval authority of a Member State concludes there are significant technical difficulties to install a Stage V engine;
- Those of stage IIIB emission level for replacing existing stage IIIB engines in locomotives and railcars (engines of category RLL and RLR);
- Those for locomotives and railcars, that are part of a project which was at an advanced stage of development on 6 October 2016, as defined in Directive 2008/57/EC, where the use of Stage V engines will lead to disproportionate costs. Projects need to be notified by Member States to European Commission by 17 September 2017.

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 railway vehicle or 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.

Reference: Regulation 2016/1628, Articles 34, 35, 58, Regulation 2017/654, Annex X, XI & XII and Regulation 2017/656 Annex II, III, IV & V, questions 7.1-7.10; 10.1-10.3

1.9 Does this regulation apply to engines and railway vehicles for export outside the EU?

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

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

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

1.10 What are the engine categories?

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

- Category RLL:
  - Engines exclusively used or intended to be used for the propulsion of locomotives
- Category RLR:
  - Engines used or intended to be used for the propulsion of railcars, or optionally instead of Stage V engines of category RLL.
- 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 (e.g. engines for auxiliary railway vehicles or auxiliary engines for railway vehicles) – including both variable and constant speed engines.
    - All compression-ignition (CI) engines with a reference power less than 56 KW;
    - CI engines and spark-ignition (SI) 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
- Category NRS:
  - SI engines with a reference power less than 56 kW

Reference: Regulation 2016/1628, Article 4

1.11 What engines covered by this FAQ are newly in scope?

Unlike Directive 97/68/EC the regulation covers engines for locomotives and railcars independent of their power so that engines for such railway vehicles of a power from 0 to 130 kW are newly in scope

For auxiliary railway vehicles and auxiliary engines used in locomotives and railcars the following are newly in scope:

- CI engines of category NRE with reference power below 19 kW;
- CI engines of category NRE with reference power above 560 kW;
- SI engines of category NRS with reference power between 19 kW and 56 KW;
- SI engines of category NRE above 56 KW.

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

Reference: Regulation 2016/1628, Article 2 (1), 4; Annex I and II

2 ENGINE CATEGORIES FOR RAILWAY VEHICLES

2.1 What engine categories may I use for propulsion of a locomotive?

The primary engine category for locomotive propulsion is RLL. However, engines of two other categories may be placed on the market and installed for this purpose, specifically:

- Category RLR;
- Category NRE with reference power < 560 KW.

In this case the requirements for type-approval and placing on the market are those that apply to categories RLR and NRE respectively, including the introduction timetable. No additional emission testing or type-approval is required.

Reference: Regulation 2016/1628, Articles 4 (1)(7), 4(1)(8)(b) and 4(1)(1)(b)

2.2 What engine categories may I use for propulsion of a railcar?

The primary engine category for railcar propulsion is RLR. However, engines of one other category may be placed on the market and installed for this purpose, specifically:

- Category NRE with reference power < 560 kW

In this case the requirements for type-approval and placing on the market are those that apply to category NRE, including the introduction timetable. No additional emission testing or type-approval is required.

Reference: Regulation 2016/1628, Articles 4 (1)(8)(a) and 4(1)(1)(b)

2.3 What engine categories may I use for propulsion of an auxiliary railway vehicle?

An engine of category NRE must be used, except in case of the use of an petrol engine (SI) of reference power < 56 kW where an engine of category NRS must be used. The requirements for type-approval and placing on the market are those that apply to categories NRE and NRS respectively, including the introduction timetable.

Reference: Regulation 2016/1628, Article 4 (1)(a), 4 (4)

2.4 What engine categories may I use for auxiliary power of a locomotive, railcar or auxiliary railway vehicle?

Where a separate engine is needed for providing auxiliary power (e.g. heating, lighting, lifting equipment, etc.) engines of category NRE must be used, except in case of the use of an SI engine of reference power < 56 kW where an engine of category NRS must be used. The requirements for type-approval and placing on the market are those that apply to categories NRE and NRS respectively, including the introduction timetable.

Reference: Regulation 2016/1628, Article 4 (1)(a), 4 (4)

2.5 May an engine of category RLL or RLR used for propulsion also provide auxiliary power?

Yes. If an engine is installed for the purpose of providing propulsion the regulation does not preclude the additional use of the engine to provide auxiliary power, but an engine of category RLL or RLR may not be installed solely to provide auxiliary power.

Reference: Regulation 2016/1628, Article 4

2.6 What are the emission requirements for an engine operated partially or fully on gaseous fuel such as LNG, CNG or LPG?

The same engine categories and introduction schedule apply irrespective of the fuel being used. The engines will fit into category RLL, RLR, NRE or NRS according to the criteria set out in questions 2.1-2.4. The emission limits are also the same as for an engine operated on liquid fuel, except that for engines of category RLL, RLR and NRE there is an additional hydrocarbon allowance to allow for methane slip into the exhaust. Additional emission tests may be required depending upon the combination of fuels on which the engines may be operated. Engines with reference power less than 56 kW are split according to the ignition method, with compression ignition (including dual-fuel or pilot injection) in category NRE and spark ignition in category NRS.

Reference: Regulation 2016/1628, Articles 1, 2 and 4 and Annex II. Regulation 2017/654, Annex I and VIII.

2.7 What power determines the emission category of an engine?

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%.

Reference: Regulation 2016/1628, Articles 3 (25), (26), (27) and (28) & Annex I

2.8 Is it possible to obtain a Stage V locomotive propulsion engine category RLL type-approval for an engine family with an existing Stage IIIB locomotive propulsion engine type-approval?

Yes. Although it is necessary to obtain a Stage V type-approval the principle agreed by the co-legislators was to continue using the existing Stage IIIB emission limits and technical requirements to the extent possible to avoid re-design of engines and locomotives.

Two elements of type-approval that are new for Stage V engines of category RLL are the changes to the set-points and weighting factors of the 'F'-cycle, and introduction of tamper-resistant features for the engine ECU and any parts of the emission control system that could otherwise be adjusted in-service in a manner that would cause an increase in emissions. In the case of the test-cycle, solely in this specific case it is permitted to continue to use the 'F'-cycle set-points and weighting factors from 97/68/EC. The tamper resistant features must be introduced to obtain the Stage V type-approval. The limitations on market fuel must also be respected for the Stage V engine family (see question 16.1).

In order to avoid unnecessary burden the legislation includes specific provisions to:

- Accept an existing Stage IIIB emission test report as part of a Stage V type-approval;
- Accept an existing Stage IIIB information document as part of a Stage V type-approval.

In the case that an existing Stage IIIB emission test report is used, the corresponding 'F'-cycle set-points and weighting factors from 97/68/EC would also be appropriate for existing engine types within that family (e.g. during conformity of production testing).

Reference: Regulation 2016/1628, Annex II, Regulation 2017/654, Annex XVII, Regulation 2017/656 Articles 2(2) and 7(2) and Annex X.

2.9 Is it possible to add new engine types to a Stage V locomotive propulsion engine category RLL engine family that uses the emission test report from a Stage IIIB engine family?

Yes, unless the new engine type becomes the new parent of the engine family, thus requiring a new parent engine emission test. In that case the new test would need to be conducted according to the latest technical requirements, including the 'F'-cycle set points and weighting factors from the Commission Delegated Regulation (EU) 2017/654. In that case it would be prudent to start a new engine family rather than continue with a mixture of old and new 'F'-cycle set points and weighting factors.

Reference: Regulation 2017/654, Annex XVII, Regulation 2017/656 Article 7(2)

2.10 Is it possible to add new engine types to a Stage V locomotive propulsion engine category RLL engine family that uses the information document from a Stage IIIB engine family?

Yes, however in this case it would be necessary to replace the existing Stage IIIB information document with one that is in accordance with the latest requirements, as set out in Annex I of Commission Implementing Regulation 2017/656.

Reference: Regulation 2017/656, Article 2(2)

2.11 Can a IIIB engine already placed on the market be upgraded to Stage V?

This would, in effect, result in the placing on the market of a Stage V engine (making available of a Stage V engine for distribution or use), and is not prohibited by the regulation, assuming a corresponding Stage V type-approval exists, but may not be viable. Consideration of any such upgrade would need to be made on a case-by-case basis, by the parties involved (engine manufacturer, railway vehicle OEM, railway vehicle operating organisation, as applicable). The evaluation would likely include technical feasibility, administrative impact and contractual impact.

Reference: Regulation 2016/1628, Article 8(2)

2.12 Does the regulation mandate operator inducements (de-rating of the engine) in case of unresolved issued detected by a NO_x Control Diagnostic (NCD) or Particulate Control Diagnostic (PCD) system?

For safety reasons dedicated engines for propulsion of locomotives and railcars (RLL and RLR) do not apply operator inducements leading to operational restrictions in case of faults with or tampering of the NCD system.

In case of engines for propulsion of railcars (RLR) the number and duration of incidents of inadequate reagent injection or quality, and number and duration of incidents with an active PCD alarm, must be stored in non-volatile computer memory or counters. These records may be checked by an authority.

In case of category NRE engines used in railway vehicles for any purpose (e.g. for auxiliary power, propulsion of auxiliary rail vehicles or engines with reference power less than 560 kW for propulsion of railcars or locomotive) the full inducement scheme must be applied. Consequently, NCD alarms that are not resolved in a timely manner (e.g. insufficient/incorrect reagent or an NCD system failure) will lead to de-rating of the engine or an equivalent operating restriction.

Engines of category NRS do not require an inducement scheme.

Reference: Regulation 2017/654, Annex IV

3 TIMETABLE FOR IMPLEMENTATION OF THE REGULATION

3.1 What is 'making available' of an engine or railway vehicle?

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 railway vehicle, as applicable, to be physically present within the EU (cleared customs for imported engines/ railway vehicles).

A further explanation can be found in the Blue Guide[3] of the European Commission, where making available is further explained in detail in Article 2.2.

Reference: Regulation 2016/1628, Article 3 (47)

3.2 What is 'placing on the market' of an engine or railway vehicle?

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 railway vehicle is not placed on the market until the individual unit is physically available within the EU for distribution or use. This means it must be at least 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, hired, leased, loaned or gifted to another entity or at least offered for sale, hire, lease, loan or gift to another entity.

In line with the Blue Guide of the European Commission, where the engine or railway vehicle 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').

[3] The 'Blue Guide' on the implementation of EU product rules 2016, O.J. of the EU C272/01

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.

Where the railway vehicle falls within the scope of the Railway Interoperability Directive (EU) 2016/797, it should be noted that from 16 June 2019 the vehicles will receive “authorisation for placing on the market”. Railway vehicles will no longer be 'authorised for placing in service' as done in 2008/57/EC.

The applicant shall place a vehicle on the market only after having received the vehicle authorisation for placing on the market issued by the European Union Agency for Railways or a national safety authority, in accordance with the directive.

The Railway Interoperability Directive (EU) 2016/797 defines ‘placing on the market’ as: “the first making available on the Union's market of an interoperability constituent, subsystem or vehicle ready to function in its design operating state”.

Reference: Regulation 2016/1628, Article 3 (48), Interoperability Directive (EU) 2016/797

3.3 What is the production date of an engine?

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.”

Reference: Regulation 2016/1628, Article 3 (30)

3.4 What is the production date of a railway vehicle?

The regulation defines the railway vehicle 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.”

Reference: Regulation 2016/1628, Article 3 (33)

3.5 When must production of engines other than Stage V which are not subject to an exemption for placing on the EU market stop?

The dates are as follows:

- 31 December 2018 for engines of category NRE or NRS with reference power below 56 kW and NRE with reference power above 130 kW (< 56 kW and ≥ 130 kW), i.e. engines for auxiliary railway vehicles and auxiliary engines for locomotives and railcars, and, where used (up to 560 kW), engines for propulsion of railcars and locomotives.
- 31 December 2019 for engines of category NRE with reference power between 56 kW and 130 kW (56 kW ≤ P < 130 kW) (NRE-v/c-5), i.e. engines for auxiliary railway vehicles and auxiliary engines for locomotives and railcars, and, where used, engines for propulsion of railcars and locomotives.
- 31 December 2020 for engines of category RLL and RLR, i.e. propulsion engines for railcars and locomotives.

There are special provisions for replacement engines.

Reference: Regulation 2016/1628, Article 18 (2), Annex III, chapter 10 (replacement engines) and 11 (exemptions) of this FAQ

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

Type-approval may be issued since the regulation and the supplementing legislation entered into force which was the case on 3 May 2017.

Reference: Regulation 2016/1628, Article 65

3.7 What is the last date that an EU type-approval of an engine prior to Stage V can be issued?

The dates are as follows:

- 31 December 2017 for engines of category NRE or NRS with reference power below 56 kW and NRE with reference power above 130 kW (< 56 kW and ≥ 130 kW), i.e. engines for auxiliary railway vehicles and auxiliary engines for locomotives and railcars, and, where used (up to 560 kW), engines for propulsion of railcars and locomotives.
- 31 December 2018 for engines of category NRE with reference power between 56 kW and 130 kW (56 kW ≤ P < 130 kW) (NRE-v/c-5), i.e. engines for auxiliary railway vehicles and auxiliary engines for locomotives and railcars, and, where used, engines for propulsion of railcars and locomotives.
- 31 December 2019 for engines of category RLL and RLR, i.e. propulsion engines for railcars and locomotives.

Reference: Regulation 2016/1628, Articles 18 (2), 22 (3), 58 (2 & 4) & Annex III

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

With the exception of transition engines, replacement engines and special purpose engines mentioned in question 1.6 the engine must be placed on the market no later than:

- 31 December 2018 for engines of category NRE or NRS with reference power below 56 kW and NRE with reference power above 130 kW (< 56 kW and ≥ 130 kW), i.e. engines for auxiliary railway vehicles and auxiliary engines for locomotives and railcars, and, where used (up to 560 kW), engines for propulsion of railcars and locomotives.
- 31 December 2019 for engines of category NRE with reference power between 56 kW and 130 kW (56 kW ≤ P < 130 kW) (NRE-v/c-5), i.e. engines for auxiliary railway vehicles and auxiliary engines for locomotives and railcars, and, where used, engines for propulsion of railcars and locomotives.
- 31 December 2020 for engines of category RLL and RLR, i.e. propulsion engines for railcars and locomotives.

For transition engines, replacement engines and special purpose engines specific provisions apply.

Reference: Regulation 2016/1628, Article 58 (2 & 4) and chapters 4 & 10 of this FAQ

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

With the exception of railway vehicles in which transition engines are installed the railway vehicle must be placed on the market no later than:

- 31 December 2018 for the following railway vehicles:
  - Auxiliary railway vehicles;
  - Locomotives or railcars fitted with auxiliary engines of category NRE or NRS;
  - Locomotives or railcars fitted with propulsion engines of category NRE with reference power less than 560 KW;

  where the engines concerned have a reference power less than 56 kW or greater than 130 kW (< 56 kW or ≥ 130 kW).

- 31 December 2019 for the following railway vehicles:
  - Auxiliary railway vehicles;
  - Locomotives or railcars fitted with auxiliary engines of category NRE;
  - Locomotives or railcars fitted with propulsion engines of category NRE with reference power less than 560 KW;

  where the engines concerned have a reference power between 56 kW and 130 kW (< 56 kW ≤ P < 130 kW) (NRE-v/c-5).

- 31 December 2020 for the following railway vehicles:
  - Locomotives or railcars

  where the engines concerned are of category RLL or RLR.

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

In case a railway vehicle is fitted with engines from more than one category (or power range in case of NRE) then the latest placing on the market date applicable to the railway vehicle is the earliest applicable date from the list above.

Reference: Regulation 2016/1628, Article 58 (5)

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

No, there are no restrictions.

Reference: Regulation 2016/1628, Article 3 (48)

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

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

Reference: Regulation 2016/1628, Article 3 (48)

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

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.

Reference: Regulation 2016/1628, Article 3 (48)

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

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

Reference: Regulation 2016/1628, Article 3 (48), Commission Notice: The 'Blue Guide' on the implementation of EU products rules 2016 (2016/C 272/01), Section 2.3 and 2.4

3.14 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?

Existing type-approvals according to Directive 97/68/EC are not invalidated until the placing on the market date of Stage V. 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 engines not regulated at EU level in categories that were not subject to type-approval under Directive 97/68/EC. Correspondingly, railway vehicles in which these engines are installed may be placed on the market up to the same deadline.

Reference: Regulation 2016/1628, Article 58 (1, 2 & 4)

3.15 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?

The regulation continues to permit the grating of type-approvals according to Directive 97/68/EC until the respective mandatory Stage V type-approval date. Existing Directive 97/68/EC type-approvals can be amended after the Stage V type-approval date, but not later than the Stage V placing on the market date, so long as the changes do not require a new type-approval to be issued.

Reference: Regulation 2016/1628, Article 58 (2)

3.16 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?

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 exemptions in Directive 97/68/EC:

- for engines to be used in potentially explosive atmospheres (ATEX);
- for engines > 2000 kW to be used in isolated 1520 mm broad gauge networks.

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.

Reference: Regulation 2016/1628, Article 58 (2), 61 (1) & 65 (2)

3.17 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?

In cases where the regulation introduces revised exemptions for the same cases already covered by Directive 97/68/EC, these can be applied since 3 May 2017. There is effectively an overlap period between 3 May 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. For example, during this period for replacement engines either the provisions of 97/68/EC or those of Regulation (EU) 2016/1628 may be used.

Reference: Regulation 2016/1628, Article 58

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

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 railway vehicles, these provisions apply since 3 May 2017, irrespective of whether the engine is type-approved under 97/68/EC, Stage V or not type-approved at all.

Reference: Regulation 2016/1628, Articles 34 & 65 and chapter 8 of this FAQ

3.19 Is it permitted to introduce a new railway vehicle model on the EU market using a non-stage V engine after the respective Stage V engine type-approval date?

Yes, the Stage V type-approval deadline applies only to engines and does not prevent the subsequent type-approval, where applicable, or placing on market of new railway vehicle 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.

Reference: Regulation 2016/1628, Article 5 (3)

3.20 Is it permitted to introduce a new railway vehicle type on the EU market using a non-stage V engine after the respective Stage V placing on market date?

Yes, in the following cases:

- the railway vehicle is using a transition engine. In this case the railway vehicle production and placing on the market deadlines of the transition scheme (see question 4.6) must be respected;
- locomotives or auxiliary railway vehicles to be used in potentially explosive atmospheres (ATEX);
- locomotives > 2000 kW to be used in isolated 1520 mm broad gauge networks;
- railway vehicles that use engines of category RLL or RLR and are part of a project that was at an advanced stage of development on 6 October 2016, as defined in Directive 2008/57/EC, where the use of Stage V engines will lead to disproportionate costs. Projects need to be notified by Member States to European Commission by 17 September 2017.

Reference: Regulation 2016/1628, Articles 5 (3) & 58 (6)

4 TRANSITION SCHEME

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

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

Reference: Regulation 2016/1628, Article 18 (2)

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

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.

Reference: Regulation 2016/1628, Article 58 and question 3.2 of this FAQ

4.3 Does the transition scheme impose restrictions on the railway vehicle production date?

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

Reference: Regulation 2016/1628, Article 58 (5)

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

Yes, the transition scheme allows, for a limited period, the placing on the EU market of **railway vehicles** 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 **railway vehicles** were also produced within the applicable deadline.

Reference: Regulation 2016/1628, Article 58 (5 & 6) and questions 3.2 and 4.3 of this FAQ

4.5 What engines qualify as transition engines?

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]
RLL	≤ 130	Not regulated	31 December 2020	31 December 2022
	> 130	Stage IIIB		
RLR	≤ 130	Not regulated		
	> 130	Stage IIIB		
Variable speed NRE	P < 19	Not regulated	31 December 2018	31 December 2020
	19 ≤ P < 37	Stage IIIA		
	37 ≤ P < 56	Stage IIIB		
	56 ≤ P < 130	Stage IV	31 December 2019	31 December 2021
	130 ≤ P ≤ 560	Stage IV	31 December 2018	31 December 2020
	P > 560	Not regulated		
Constant speed NRE	P < 19	Not regulated		
	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		
NRS	P < 19	Stage II [3]	31 December 2018	31 December 2020
	19 ≤ P < 56	Not regulated		

[1] Inclusive of after-treatment
[2] Certain special cases have later date (NRE Small OEM exemption)
[3] Stage I for engines placed on market using the small volume engine family exemption in Directive 97/68/EC Art. 10(4)

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

4.6 For how long may railway vehicles with transition engines be produced and placed on the market?

In general, railway vehicles 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 railway vehicle [1]	Last placing on market date for engine and railway vehicle [1]
RLL	All	30 June 2022	31 December 2022
RLR	All		
NRE	56 ≤ P < 130	30 June 2021	31 December 2021
	All except 56 ≤ P < 130	30 June 2020	31 December 2020
NRS	P < 19	30 June 2020	31 December 2020
	19 ≤ P < 56		

[1] Certain special cases have a later date (NRE Small OEM exemption)

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.

The following graphs 1 and 2 are explaining the transition scheme and respective deadlines.

Figure 1

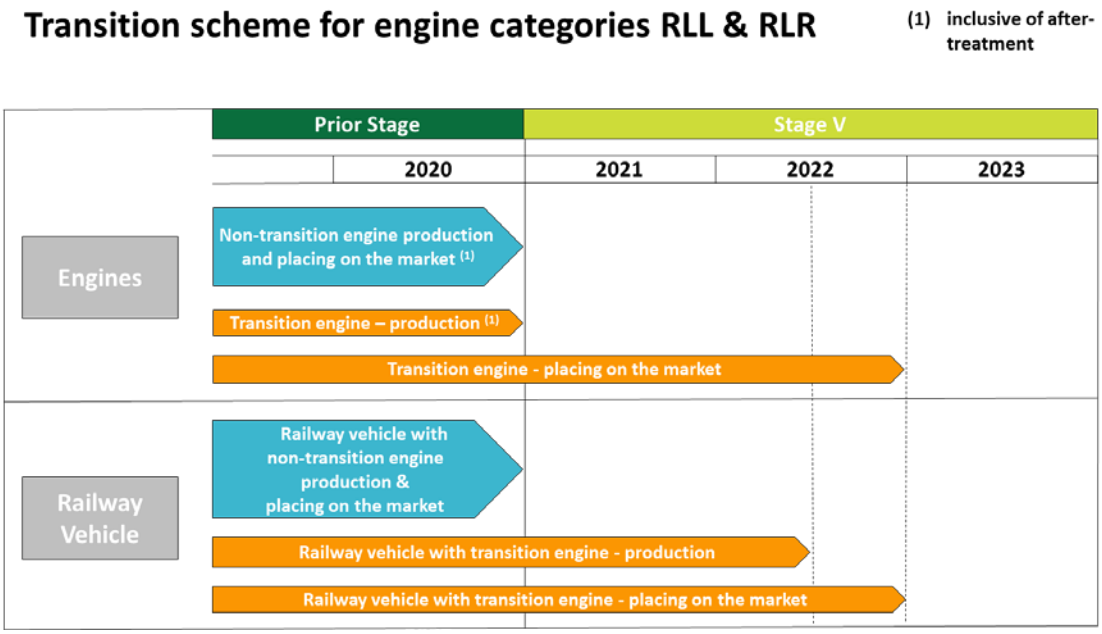
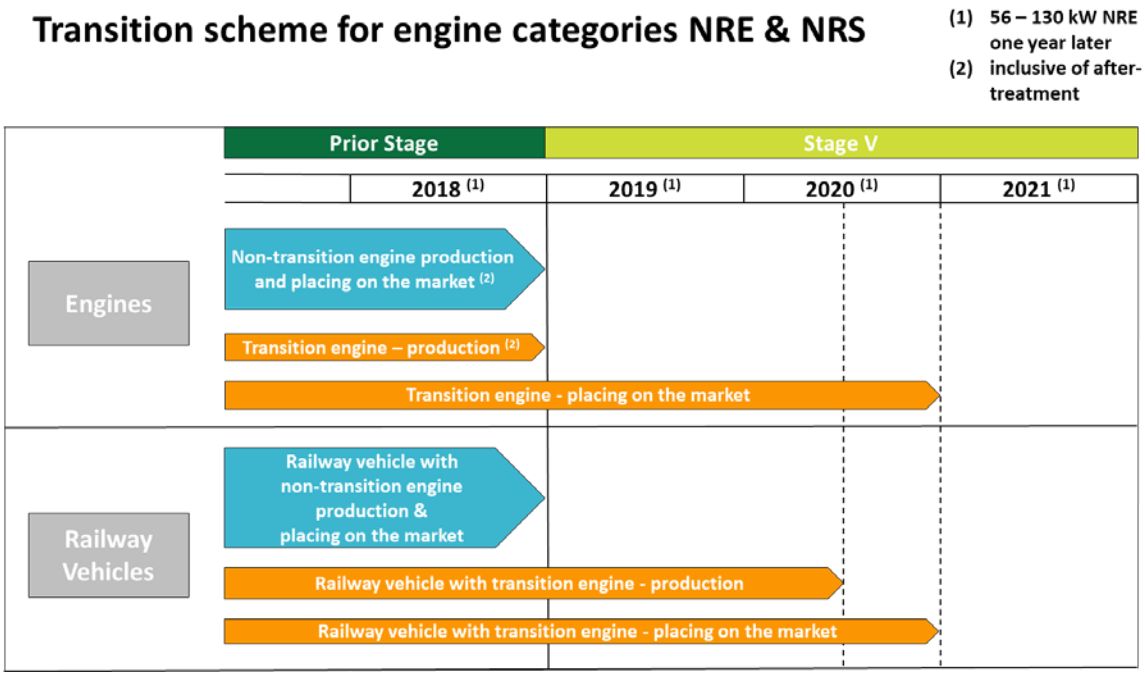


Figure 2



Reference: Regulation 2016/1628, Article 58 (5 & 7) and questions 3.2 and 7.2

4.7 Are there any exceptions to the deadlines of the transition scheme (small OEM)?

Yes, for small volume manufacturers of auxiliary rail vehicles (or small volume manufacturers of locomotives or railcars in respect to only the auxiliary engine) the time period for production of machines and placing on the market are extended by one year and given in the table below. E.g. the last placing on the market date for an auxiliary rail vehicle with engine of category NRE and a power 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

(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.

Reference: Regulation 2016/1628, Articles 58 (5), 3 (54), 32 (2) (d) & 15 (5), Regulation 2017/656, Annex I and question 7.2

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

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.

Reference: Regulation 2016/1628, Article 3 (32)

4.9 Do engines and railway vehicles produced outside the EU have different deadlines?

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

Reference: Regulation 2016/1628, Article 11

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

No, there are no limits.

Reference: Regulation 2016/1628, Article 58 (5)

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

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

Reference: Regulation 2016/1628, Article 15 (5)

4.12 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?

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

Reference: Regulation 2016/1628, Articles 14, 32 (2) and question 2.2

4.13 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 railway vehicle and do not qualify as transition engines due to their emission stage?

The engines may not be installed in new railway vehicles for the EU market. These include sell-off or flexibility engines placed on the market under Directive 97/68/EC. Sell-off engines may be used to replace engines already installed in existing railway vehicles 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. Spare engines that were already in the stocks of the rail operator may still be used for the purpose of replacing engines in existing railway vehicles.

Reference: Regulation 2016/1628, Article 15 (3)

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

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

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

5 EMISSION LIMITS

5.1 What are the emission limits for EU Stage V engines for rail vehicles

Table II-7: Stage V emission limits for engine category RLL defined in point (7) of Article 4(1)

Emission stage	Engine sub-category	Power range	Ignition type	CO	HC	NO_x	PM mass	PN	A
		kW		g/kWh	g/kWh	g/kWh	g/kWh	#/kWh	
Stage V	RLL-c-1 RLL-v-1	P > 0	All	3,50	($HC + NO_x \leq 4,00$)		0,025	-	6,00

Table II-8: Stage V emission limits for engine category RLR defined in point (8) of Article 4(1)

Emission stage	Engine sub-category	Power range	Ignition type	CO	HC	NO_x	PM mass	PN	A
		kW		g/kWh	g/kWh	g/kWh	g/kWh	#/kWh	
Stage V	RLR-c-1 RLR-v-1	P > 0	All	3,50	0,19	2,00	0,015	1×10^{12}	6,00

Table II-1: Stage V emission limits for engine category NRE defined in point (1) of Article 4(1)

Emission stage	Engine sub-category	Power range	Ignition type	CO	HC	NO_x	PM mass	PN	A
		kW		g/kWh	g/kWh	g/kWh	g/kWh	#/kWh	
Stage V	NRE-v-1 NRE-c-1	$0 < P < 8$	CI	8,00	($HC + NO_x \leq 7,50$)		0,40 [(1)]	-	1,10
Stage V	NRE-v-2 NRE-c-2	$8 \leq P < 19$	CI	6,60	($HC + NO_x \leq 7,50$)		0,40	-	1,10
Stage V	NRE-v-3 NRE-c-3	$19 \leq P < 37$	CI	5,00	($HC + NO_x \leq 4,70$)		0,015	1×10^{12}	1,10
Stage V	NRE-v-4 NRE-c-4	$37 \leq P < 56$	CI	5,00	($HC + NO_x \leq 4,70$)		0,015	1×10^{12}	1,10
Stage V	NRE-v-5 NRE-c-5	$56 \leq P < 130$	All	5,00	0,19	0,40	0,015	1×10^{12}	1,10
Stage V	NRE-v-6 NRE-c-6	$130 \leq P \leq 560$	All	3,50	0,19	0,40	0,015	1×10^{12}	1,10
Stage V	NRE-v-7 NRE-c-7	$P > 560$	All	3,50	0,19	3,50	0,045	-	6,00

(1) 0,60 for hand-startable, air-cooled direct injection engines

Table II-4: Stage V emission limits for engine category NRS defined in point (4) of Article 4(1)

Emission stage	Engine sub-category	Power range	Ignition type	CO	HC + NO_x
		kW		g/kWh	g/kWh
Stage V	NRS-vr-1a NRS-vi-1a	0 < P < 19	SI	610	10
Stage V	NRS-vr-1b NRS-vi-1b			610	8
Stage V	NRS-v-2a	19 ≤ P ≤ 30		610	8
Stage V	NRS-v-2b NRS-v-3	19 ≤ P < 56		4,40 (*)	2,70 (1)

(1) Optionally, as an alternative, any combination of values satisfying the equation (HC + NO_x) x $CO^{0,784}$ ≤ 8,57 as well as the following conditions: CO ≤ 20,6 g/kWh and (HC + NO_x) ≤ 2,7 g/kWh

Reference: Regulation 2016/1628, Annex II table II-7,8,1 & 4

5.2 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?

For category NRE engines in the power range from 19 kW to 560 kW and engines of category RLR 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 RLL engine emission limits were kept identical to prevent major modifications to Stage IIIB locomotive systems.

Reference: Regulation 2016/1628, Article 18 (2) and Annex II table II-1 & table II-4

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

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

The constant speed type approval scheme for categories RLR and RLL is newly introduced.

Reference: Regulation 2016/1628, Article 18 (2) and Annex II table II-1

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

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 NOx 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.

US EPA emission requirements for railcars (regarded as standard nonroad equipment) and locomotives (> 750 kW) differ significantly. In case of locomotives and railcars with less than 560 kW the Regulation allows to use NRE engines alternatively which increases the comparability to the level as described in the paragraph above.

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.

Reference: Question 5.2 of this FAQ

6 OBLIGATIONS FOR OEMS, IMPORTERS AND DISTRIBUTORS

6.1 What is an OEM?

An OEM is defined as any natural or legal person who manufactures non-road mobile machinery (incl. railway vehicles).

Reference: Regulation 2016/1628, Article 3 (54)

6.2 What are the obligations for OEMs?

The obligations are:

- 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 machines 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.

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

6.3 Does it matter if the power, torque or speed of the engine is limited (constrained) when installed in a railway vehicle?

It is generally acceptable for the railway vehicle 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 of category NRE 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.

Reference: Regulation 2016/1628, Article 15 (3) and Regulation 2017/654, Annex V

6.4 What is an importer?

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

Reference: Regulation 2016/1628, Article 3 (51)

6.5 What are the obligations for importers?

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).

Reference: Regulation 2016/1628, Article 11 & 12

6.6 What is a distributor?

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.

Reference: Regulation 2016/1628, Article 3 (52)

6.7 What are the obligations for distributors?

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.

Reference: Regulation 2016/1628, Article 13, 14 & 16

6.8 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?

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

Reference: Regulation 2016/1628, Article 15 (2) & 16

7 MARKING AND STATEMENT OF CONFORMITY

7.1 What are the engine marking requirements for Stage V engines?

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 railway vehicle a duplicate marking must be fitted in a visible location on the engine or railway vehicle.

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.

Reference: 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 of this FAQ

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

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.

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

7.3 Are there specific requirements for railway vehicle marking?

The regulation sets mandatory provisions regarding the marking of railway vehicles in certain circumstances.

If a non-road mobile railway vehicle 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 railway vehicle as part of the marking. This requirement could be satisfied by either including the month of production in the normal statutory plate of the railway vehicle or alternatively by the addition of a separate plate or label that has a statement such as:

Railway vehicle 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 railway vehicle, a duplicate of the marking provided by the manufacturer, according to the provisions set in the relevant implementing act.

Reference: Regulation 2016/1628, Article 15 (4 & 5)

7.4 Which engines require a statement of conformity?

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 locomotives or auxiliary railway vehicles for use in potentially explosive atmospheres[4];
- 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.

Reference: Regulation 2016/1628, Article 31 (1)

7.5 In what format shall the statement of conformity be?

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.

Reference: Regulation 2016/1628, Article 31 (1 & 2)

[4] Potentially explosive atmospheres are defined in Directive 2014/34/EU, Article 2. SPE limit values set-out in Annex VI of Regulation (EU) 2016/1628.

8 SEPARATE SHIPMENT

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

Yes, but this is limited to the exhaust after-treatment system. This consists of a catalyst, particulate filter, deNO$_x$ system, combined deNO$_x$ 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.

Reference: Regulation 2016/1628, Article 34 (3) and Regulation 2017/654, Annex X

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

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.

Reference: Regulation 2017/654, Annex X

8.3 From when do the separate shipment requirements apply?

The separate shipment requirements are already mandatory from the date of application of Delegated Regulation (EU) 2017/654. 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.

Reference: Regulation 2017/654, Article 21

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

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.

Reference: Regulation 2016/1628, Article 34 (3)

8.5 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?

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).

Reference: Regulation 2016/1628, Articles 3 (36) & 34 (3)

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

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.

Reference: Regulation 2016/1628, Article 34(3) and Regulation 2017/654, Annex X

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

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

Reference: Regulation 2016/1628, Article 34(3) and Regulation 2017/654, Annex X

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

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 OEMs 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.

Reference: Regulation 2016/1628, Article 15 (6) and Regulation 2017/654, Annex X

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

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.

Reference: Regulation 2017/654, Annex X

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

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.

Reference: Regulation 2017/654, Annex X

9 COMPONENTS OR SYSTEMS NOT PROVIDED BY THE ENGINE MANUFACTURER

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

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 railway vehicle 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.

Reference: Regulation 2017/654, Annex VI

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

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.

Reference: Regulation 2017/654, Annex XIV

10 REPLACEMENT ENGINES

10.1 What is a replacement engine in terms of the regulation?

Within the regulation the term 'replacement engine' is reserved for engines that are placed on the market for the exclusive use to replace an engine already placed on the EU market and installed in a railway vehicle.

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, IV or V 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.

Spare engines which are already placed on the market prior to the placing on the market date of the new stage and complied with the applicable legislation at that time, and are within the stocks of entities such as the manufacturer, a distributor, the OEM or a rail operator are not replacement engines in the context of this regulation, and may continue to be used.

Reference: Regulation 2016/1628, Article 3 (11) and Article 34 (7)

10.2 Are there engines which may be used to replace existing engines installed in railway vehicles, 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 railway vehicles already placed on the EU market without any time limit.

Examples are:

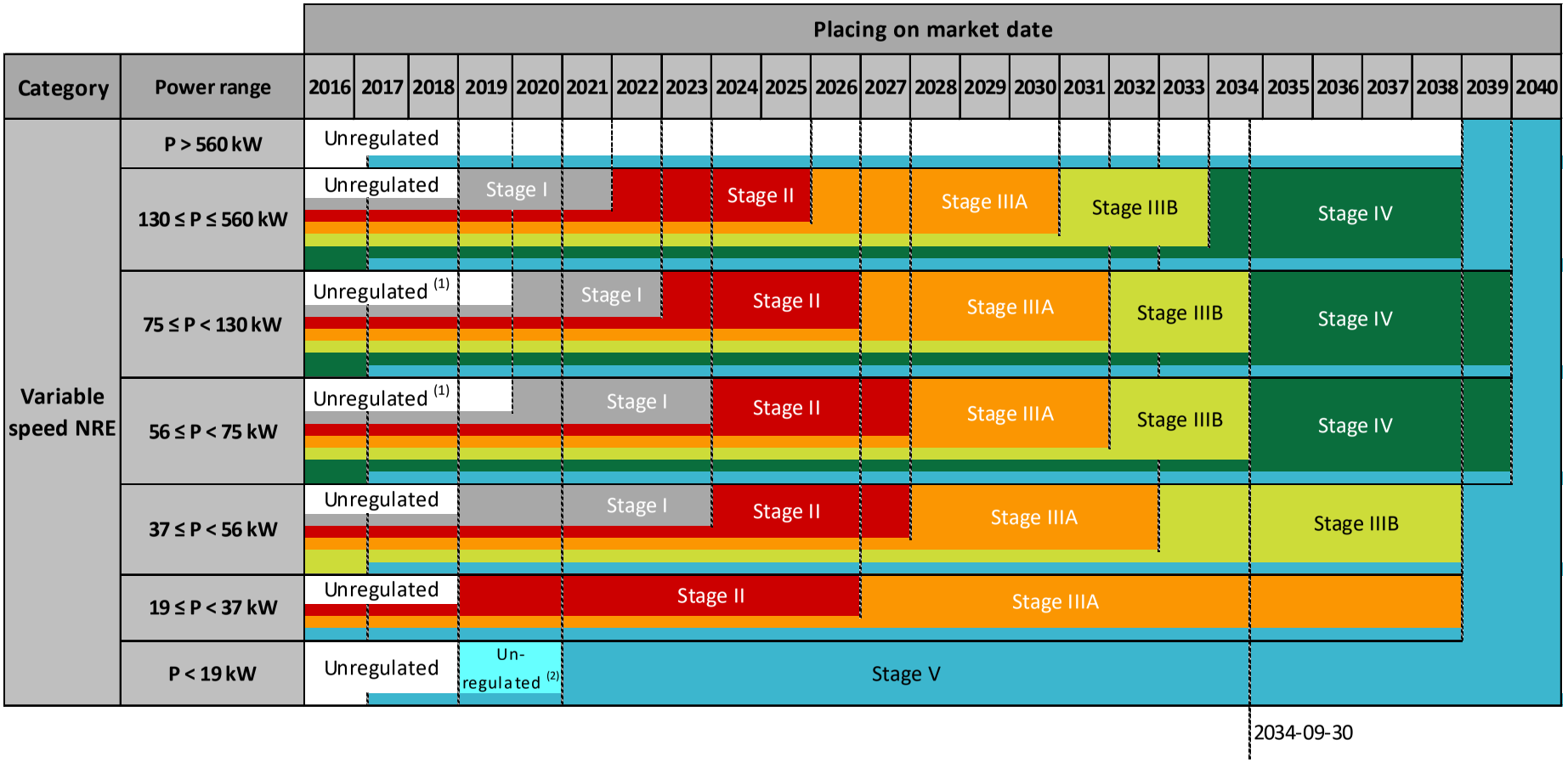
- a Stage V engine used to replace a Stage V engine installed in a railway vehicle;
- a Stage IIIA locomotive or railcar engine, placed on the market in 2011 or earlier;
- a Stage IIIB locomotive or railcar engine, placed on the market before the Stage V placing on the market date, which does not qualify as a transition engine due to the engine markings.

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

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;
- For engines of categories RLL and RLR Member States may authorize without time limit the placing on the market of Stage IIIA replacement engines (to replace IIIA and older engines, placed on the market until 31.12.11) if the approval authority concludes that the installation of a Stage V engine will involve significant technical difficulties;
- For engines of categories RLL and RLR placed on the market after 31.12.11 Member States **may** authorize without time limit the placing on the market of replacement engines of the same Stage as the engine to be replaced.
    - a Stage IIIB engine may be replaced by a Stage IIIB engine;
    - a Stage IIIA flexibility engine may be replaced by a Stage IIIA engine;
    - a Stage IIIA replacement engine may be replaced by a Stage IIIA replacement engine.

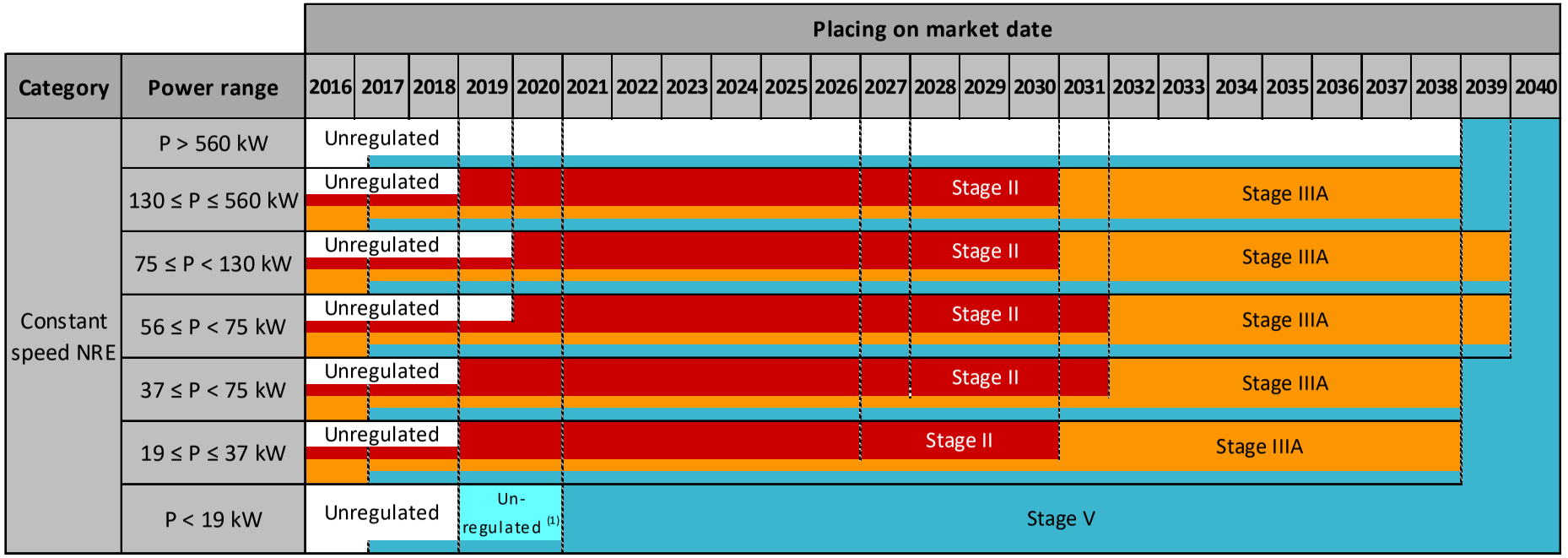
Placing on the market dates of engine category NRE - variable speed



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

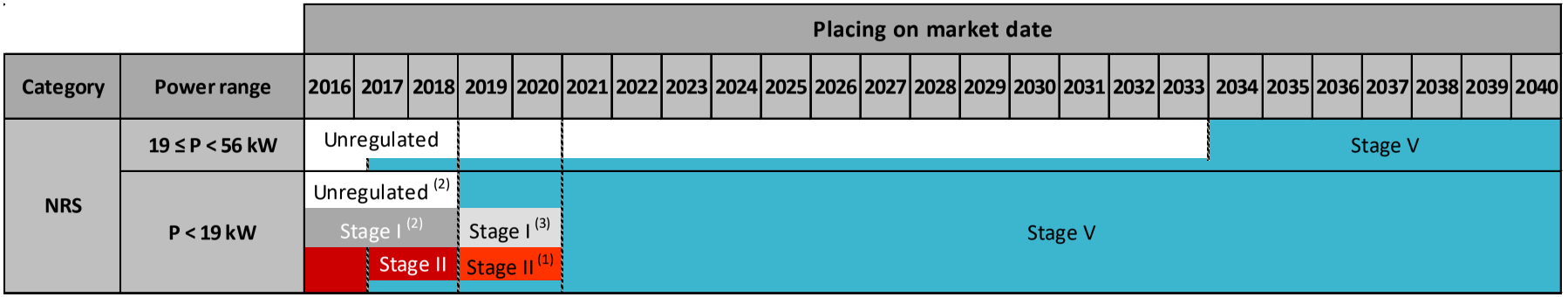
(2) Transition engines produced up to 31 Dec 2018 may be placed on market up to 31 Dec 2020 to replace existing engines otherwise Stage V engines are required after 31 Dec 2018

Placing on the market dates of engine category NRE - constant speed



(1) 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 the market dates of engine category NRS



(1) 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

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

(3) 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 exemption or transition code:

- 'EM-REA' (for engines of categories RLL and RLR replacing engines placed on the market until 31.11.11) and the supplementary marking 'RAIL REPLACEMENT A ENGINE';
- 'EM-REB' (for engines of categories RLL and RLR replacing engines placed on the market after 31.11.11) and the supplementary marking 'RAIL REPLACEMENT B ENGINE';
- '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;
- 'TR-RES' (for engines of category NRS) and the supplementary marking 'REPLACEMENT ENGINE'.

In the case of a Stage IIIA RAIL REPLACEMENT A ENGINE (EM-REA), it is necessary to obtain from the approval authority an approval reference number to be included in the statement of conformity of the engine, together with the code of the approval authority that issued the approval.

Reference: Regulation 2016/1628, Article 32 (2), Article 34 (7) and Article 58 (10 & 11), Commission Implementing Regulation 2017/656 Annex II Appendix 2

10.4 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 railway vehicle if the engine was placed on the market in accordance with the deadlines in question 2.6.

10.5 How can a rail operator obtain authorization for a replacement engine of category RLL or RLR?

In the cases of an existing installed engine placed on the market on or before 31 Dec 2011, Member States may authorize the placing on the market of these engines when the approval authority of a Member State has decided, upon examination, that the installation of a Stage V engine will involve significant technical difficulties. Consequently, in order to obtain authorization a legal person, such as the railway operator or engine manufacturer, must make a technical case to an approval authority. It is necessary to obtain from the approval authority an approval reference number to be included in the statement of conformity of the engine.

In the case of an existing engine placed on the market after 31 Dec 2011, Member States may authorize the placing on the market of these engines without any precondition required by the regulation. Consequently, in order to obtain authorization a legal person, such as the railway operator or engine manufacturer, must make a request to an approval authority. Although not mandated, it is advisable that the railway operator and engine manufacturer retain a copy of the authorisation, where granted.

Reference: Regulation 2016/1628, Article 34 (7)

10.6 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 railway vehicle?

Yes, except in the specific case of an engine placed on the market to replace the same type already installed in an existing railway vehicle, 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.

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

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 railway vehicle.

10.8 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 10.2).

10.9 Is it still allowed to use repaired engines for production of railway vehicles?

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 railway vehicles. From the Stage V placing on the market date, only Stage V engines may be used for production of railway vehicles for the EU, except in the case of transition engines used for railway vehicle production during the respective transition period.

Reference: Regulation 2016/1628, Article 5 (3) (b)

11 EXEMPTIONS

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

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 7.2).

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.

Reference: Regulation 2016/1628, Articles 31 (1) (a), 32 (2) (c), 34 (4) & 34 (9) (b), Regulation 2017/654, Annex XI and questions 1.6, 3.16 and 7.2

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

The regulation includes an exemption for engines to be installed in locomotives or auxiliary railway vehicles 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 code under which the engine is supplied;
  'EM-ATX' and the supplementary marking 'ATEX ENGINE'
- 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.

Reference: 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, 3.14, 7.4 & 12.1

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

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'.

Reference: Regulation 2016/1628, Articles 32 (2) (a) & 34 (1) and also question 1.6, 1.7, 3.14 & 7.2

11.4 What are the requirements for RLL and RLR engines being part of a project at an advanced stage of development?

Where engines have been part of a project at an advanced stage of development as defined by Directive 2008/57/EC on 6.10.16 and where the use of engines that comply with Stage V emission will lead to disproportionate costs, Member States may allow to continue to place on the market Stage IIIB engines.

The markings for such engines must include the exemption code 'EM-PPR' and the supplementary marking 'RAIL PROJECT ENGINE'.

Member States were required to communicate to the European Commission the list of affected projects by 17.09.17. Consequently, this exemption only applies in cases where that notification was made.

Reference: Regulation 2016/1628, Article 34(8), Commission Implementing Regulation 2017/656 Annex II Appendix 2

11.5 What are the requirements for RLL engines used on a 1520mm broad gauge network?

If the engines only run on a technically isolated 1520 mm broad gauge railway network, Member States may authorise the placing on the market of IIIA engines of category RLL with more than 2000 kW until 17 September 2026.

The engine manufacturer must prepare a statement of conformity to be passed to the OEM in paper or an agreed electronic format (‘BROAD GAUGE RAIL ENGINE’ ‘TR-RWG’)

Reference: Regulation 2016/1628, Article 58(9), Commission Implementing Regulation 2017/656 Annex II Appendix 2

12 PENALTIES

12.1 Are there penalties for not complying with this regulation?

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 railway vehicle 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.

Reference: Regulation 2016/1628, Article 57

13 IN-SERVICE MONITORING

13.1 What is in-service monitoring (ISM)?

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 railway vehicles. It does not require monitoring systems to be installed on all railway vehicles and there are no pass/fail criteria. The results must be reported to the type-approval authority, will be made public, and will enable the European Commission and other stakeholders to compare the results of the type-approval tests with the in-service tests.

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

13.2 Is the subject of in-service monitoring a specific railway vehicle model or specific rail operator?

No, the ISM requirement is linked to the engine category and family, not the specific railway vehicle type, model or operating organisation.

Reference: Regulation 2016/1628, Article 19 (1)

13.3 Who is responsible for conducting in-service monitoring?

It is the engine manufacturer's responsibility to identify railway vehicles to be tested, temporarily install portable emission measurement systems (PEMS) and perform the tests in cooperation with the approval authority.

Reference: Regulation 2016/1628, Article 19 (1)

13.4 Does either the railway vehicle OEM or the operator have any responsibility in regards to in-service monitoring?

No, the OEM or operator has no responsibility for this activity. Nevertheless, it is not possible for the engine manufacturer to perform such testing without the cooperation of the rail operator, and cooperation of the OEM may also be needed. Consequently, rail operators and railway vehicle OEMs may receive requests for support from the engine manufacturer from which they receive engines.

Reference: Regulation 2016/1628, Article 19 (1)

13.5 Will in-service monitoring apply to all engine categories?

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.

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

13.6 Are there any emission levels which have to be fulfilled and is it possible to fail the in-service monitoring test?

No, as in-service monitoring is a reporting exercise only without a pass/fail criterion, a failure determination is not foreseen.

Reference: Regulation 2016/1628, Article 19 (1) and Regulation 2017/655

13.7 Is the Particulate Matter Emission considered by the ISM Regulation?

No, only gaseous emissions measurement is currently in scope.

Reference: Regulation 2016/1628, Article 19 (1) and Regulation 2017/655 Article 3

13.8 Is it necessary to pre-select or mark engines at production, which are foreseen for ISM testing?

No, a preselection of engines is not foreseen. Any engine can be selected if it:

(a) is installed in one of the most representative categories of non-road mobile machinery for the selected engine type or, where applicable, engine family;

(b) is placed on the Union market;

(c) has a maintenance record to show that the engine has been properly maintained and serviced in accordance with the manufacturer's recommendations;

(d) exhibits no indications of misuse (e.g. overloading or misfuelling), or other factors (such as tampering) that could affect the gaseous pollutant emissions performance;

(e) is in conformity with the EU type-approval documents with regard to the components of the emission control systems installed in the engine and in the non-road mobile machinery.

Reference: Regulation 2016/1628, Article 19 (1) and Regulation 2017/655, Annex (1.3)

14 APPLICATION AND USE OF CONSTANT SPEED ENGINES

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

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.

Reference: Regulation 2017/654, Annex VI §5.2.5.6

14.2 May a constant speed engine have an idle speed?

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.

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

14.3 May a constant speed engine have more than one constant operating speed?

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.

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

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

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.

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

15 SECOND-HAND RAILWAY VEHICLES

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

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.

Reference: Regulation 2016/1628, Article 8 (1), questions 2.2 & 2.7 and the Blue Guide

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

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

Reference: Regulation 2016/1628, Article 3(11) & 8(1), question 9.1 of the FAQ and the Blue Guide

16 MARKET FUELS

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

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 8%, i.e. B8. 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 railway vehicle 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.

Reference: Regulation 2016/1628, Article 25 (2) and Regulation 2017/654, Annex I

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Directive 97/68/EC of the European Parliament and of the Council of 16 December 1997 on the approximation of the laws of the Member States relating to measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery

Directive 97/68/EC of the European Parliament and of the Council of 16 December 1997 on the approximation of the laws of the Member States relating to measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery

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

Commission Implementing Regulation 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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