

GUIDE FOR IDENTIFICATION

OF NON-ROAD MOBILE MACHINERY
AND ENGINES COMPLIANT
WITH REGULATION (EU) 2016/1628

April 2019



CONTENTS

INTRODUCTION	5
1. Scope of this guide	6
1.1 Engines and types of machinery covered by this guide	6
1.2 Agricultural and forestry tractors	6
2. What may be placed on the market?	7
2.1 Stage V engines and machines	7
2.2 Transition engines	7
2.3 Machines with transition engines	8
2.4 Separate shipment	8
2.5 Second-hand engines or second-hand machines imported in the European Union	9
2.6 Replacement engines	9
2.7 Other exempt engines	10
3. Typical engine applications	10
4. How to identify compliant Stage V and transition engines	11
4.1 Stage V engines	11
4.2 Transition engines	15
5. How to identify compliant machines	17
6. Documentation	18
6.1 Engine exhaust emission statement of conformity	18
6.2 Type-approval certificate	19
7. Obligations	20
8. List of market surveillance authorities, approval authorities and technical services	21
9. Bibliography	22
10. Contacts	23
Annex I – Placing on the market of an engine or machine	25
Annex II – Replacement Engines	26
Annex III – Exemptions	28
Annex IV – Transition engines and machines	30
Annex V – In service fuel	32

DISCLAIMER

This document reflects the common view of the associations involved in the drafting, with regard to the legal provisions of Regulation (EU) 2016/1628 and its supplementary legislation, and it must not be considered or intended as a legally binding text for any reason whatsoever.

This document is a living document; its content could be modified or updated by the associations involved without prior notification or approval, based on updates of the legislation and/or according to their understanding on the matter.

The associations accept no responsibility for the recommendations, advice, statements and conclusions expressed or implied in this document 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 document and the text of the legislation (Regulation and the relevant supplementing legislation), the legislation shall be applied.

INTRODUCTION

This document provides guidance to market surveillance authorities to assist them in checking the compliance of engines and non-road mobile machinery in the scope of Regulation (EU) 2016/1628 with regard to their exhaust emissions. It describes the main elements that are of importance for market surveillance inspections and aims at providing practical information for this purpose. This guidance document is developed by the European industry associations CECE, CEMA, EGMF, EUnited Municipal Equipment, EUROMOT, Europgen and FEM. If further information is required, it is recommended to consult the FAQ document⁽¹⁾ also published by these industry associations and explaining in more detail the different aspects related to the implementation of Regulation (EU) 2016/1628. Regulation (EU) 2016/1628 sets out obligations for engine manufacturers, OEMs, importers, distributors and also any entity that modifies an engine. Throughout the document, the entity referred to as ‘manufacturer’ is the engine manufacturer, and the entity referred to as ‘OEM’ is the machine manufacturer.

Member States must, in accordance with the Regulation, establish or appoint Market Surveillance Authorities. They must organise and carry out the necessary market surveillance activities to ensure that only engines and machines fitted with engines that are covered by a valid type-approval, exemption or transition provision are placed on the market.

According to Article 7: *“Market surveillance authorities shall perform documentary checks and, where appropriate, physical and laboratory checks of engines, on an adequate scale and on the basis of adequate samples. When doing so, they shall take account of established principles of risk assessment, of any complaints and of any other relevant information”*. Economic operators must make available documentation and information deemed necessary for those authorities to perform their activities.

Member States must implement penalties for infringement of this Regulation and the penalties must be effective, proportionate and dissuasive.

⁽¹⁾ FREQUENTLY ASKED QUESTIONS, Regulation (EU) 2016/1628: Requirements relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for non-road mobile machinery. Published by CEMA, CECE, FEM, EGMF, EUnited Municipal Equipment, Europgen and EUROMOT, February 2019.

1

SCOPE OF THIS GUIDE

1.1

Engines and types of machinery covered by this guide

There is a large variety of non-road mobile machinery included in the scope of the legislation. This guide covers the following machinery and the engines fitted in such machinery. In brackets examples for each type.

- Construction machinery (e.g. excavators and bulldozers)
- Agricultural machinery (e.g. self-propelled sprayers and harvesting equipment)
- Material handling machinery (e.g. cranes and industrial trucks)
- Garden machinery (e.g. lawnmowers and hedge trimmers)
- Municipal equipment (e.g. road sweepers and winter maintenance equipment)
- Mobile generator sets

1.2

Agricultural and forestry tractors

Market surveillance requirements for tractors are different for certain aspects. Although some points of this guide are valid for agricultural tractors as well, there are also differences where this guide is not applicable or where there are other possibilities for tractors. Therefore, it is recommended not to use this guide for these vehicles.

2

WHAT MAY BE PLACED ON THE MARKET?

2.1

Stage V engines and machines

From 1 January 2019 (1 January 2020 for engines between 56 and 130 kW) only a stage V engine or machine equipped with such engine may be placed on the market unless it is a transition engine or machine, or is either a replacement engine or an engine subject to an exemption mentioned in the following sections 2.4 to 2.7.

For an explanation of placing on the market see Annex I.

2.2

Transition engines

A transition engine is an engine produced prior to the applicable stage V placing on the market date and that complies with the immediate prior emission stage or, where there was not a prior stage, is a non-regulated engine.

A transition engine may be placed on the market at any time up until 31 December 2020 (31 December 2021 for engines between 56 and 130 kW). For small volume OEMs, mobile cranes and snow throwers the deadline is extended. For an overview, see Figure 1 and Annex IV for more details.

For surveillance purposes, a transition engine must be marked. See section 4.2 for the marking required for transition engines.

In case the transition engine includes an after-treatment system, that system must also be produced prior to the applicable stage V placing on the market date. In case the production date of the after-treatment is not apparent, it must, upon request, be confirmed by the engine manufacturer.

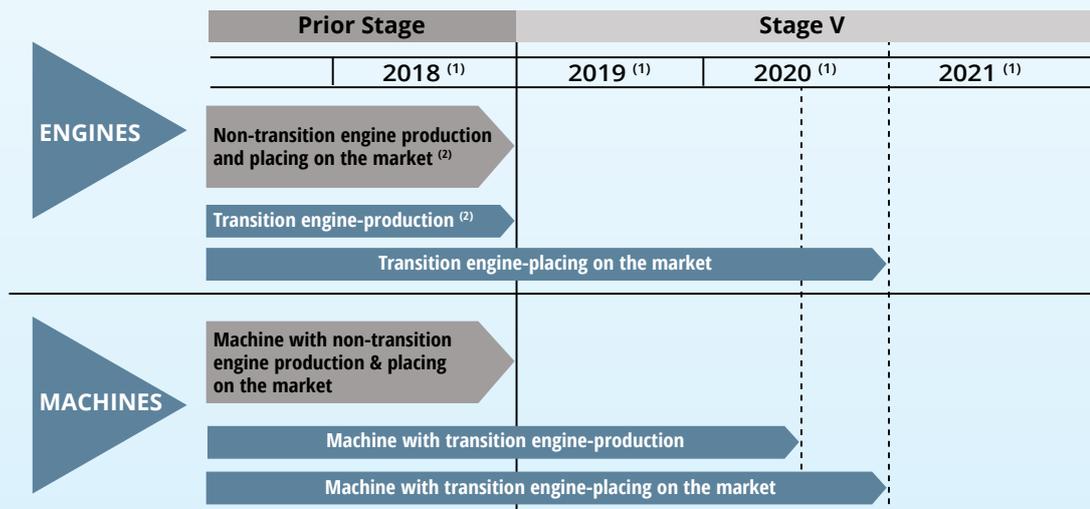
2.3

Machines with transition engines

A transition engine may be installed in a machine that is produced at any time up until 30 June 2020 (30 June 2021 for engines of 56 -130 kW), and that machine may be placed on the market at any time up until 31 December 2020 (31 December 2021 for engines between 56 and 130 kW). For small volume OEMs, mobile cranes and snow throwers the deadline is extended. **See Annex IV for more details.**

For surveillance purposes, a machine with a transition engine must be marked with the month and year of production of that machine.

FIGURE 1 Deadlines for placing on the market of engines and machines



⁽¹⁾ 56-130 kW NRE one year later

⁽²⁾ Inclusive of after-treatment

2.4

Separate shipment

Separate shipment is a special exemption used for engines that include an after-treatment system as part of their type-approved configuration.

Separate shipment happens when an engine is placed on the market not accompanied by its after-treatment system as the after-treatment system is dispatched from a different location or at a different time. Each engine that is shipped without the associated after-treatment must have a temporary label attached to it by the manufacturer stating "Separate Shipment Art 34(3)*2016/1628". This label must remain attached to the engine until it is fully assembled with the after-treatment.

The temporary marking is not required if the engine and after-treatment are shipped from the same location at the same time, but not physically attached to each other as the different parts may be packaged in different containers.

2.5

Second-hand engines or second-hand machines imported in the European Union

Second-hand 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. This means it must comply with Stage V or an applicable transition provision or exemption. The obligation to comply with the current emission stage must not be circumvented by the installation of a prior stage replacement engine. The use of a prior stage replacement engine is **ONLY** permitted where the machine has already been placed on the market in accordance with the emission requirements applicable at that time (**see also section 2.6**).

In the case of second-hand equipment that was previously placed on the EU market, is subsequently exported and then made available on the EU market again, the entity that makes that equipment available becomes a distributor in the context of the Regulation (EU) 2016/1628 and has to fulfil the corresponding obligations of the Regulation (**see section 7 of this guide**). Any entity reimporting a machine, whether or not they become the distributor, must take responsibility for providing sufficient evidence that the machine had previously been placed on the EU market and is still fitted with an engine that is in conformity with the exhaust emission type-approval that was applicable at the time the machine was placed on the EU market.

Note that a declaration of conformity for, and corresponding CE mark on, the non-road mobile machinery, does not indicate compliance with the EU exhaust emission requirements. It is necessary to separately check the engine and corresponding engine markings for this purpose.

See also section 6 of this guide.

2.6

Replacement engines

The Regulation permits, for a limited period of time, an engine manufacturer to place on the market engines that are exclusively used to replace engines already placed on the EU market and installed in non-road mobile machinery. These are called replacement engines.

For engines with reference power less than 19 kW, there is no replacement engine provision. However, transition engines produced up to 31 December 2018 may be placed on the market up to 31 December 2020 to replace existing engines. Otherwise Stage V engines are required after 31 December 2018.

More information on replacement engines can be found in Annex II.

2.7

Other exempt engines

There are other categories of engines which may be placed on the market under an exemption. Those in scope of this guide are as follows:

- Export engines
- Field test engines
- Special purpose engines for use in potentially explosive atmospheres (ATEX)
- Engines for use by armed forces
- New technology engines

More details can be found in Annex III.

3

TYPICAL ENGINE APPLICATIONS

In general, any of the engine categories NRE, NRS, NRSh may be used in any of the machinery types within scope of this guide, including, but not limited to construction machinery, agricultural machinery, material handling machinery, garden machinery, municipal equipment and mobile generator sets. In the specific case of mobile generator sets, engines of category NRE with a reference power of greater than 560 kW may not be used, but in this case engines of category NRG must be used.

4

HOW TO IDENTIFY COMPLIANT STAGE V AND TRANSITION ENGINES

All engines type-approved and manufactured in compliance with the EU NRMM engine emissions Directive 97/68/EC or the Stage V regulation (EU) 2016/1628 must be marked with certain information. These markings are commonly located on a so-called 'emissions label' or 'emissions plate' affixed to the engine or may be directly applied on the engine itself. These markings are the primary source of information regarding the exhaust emission compliance of the engine whether that engine is installed in the machine or not.

A statement of conformity will only accompany the engine in special cases. Furthermore, the engine exhaust emission type-approval certificate is not supplied together with the engine.

More details can be found in section 6.1.

4.1

Stage V engines

4.1.1 MARKING

The marking must be affixed using a durable method such as printing, stamping, engraving, etc, and shall include, but is not limited to:

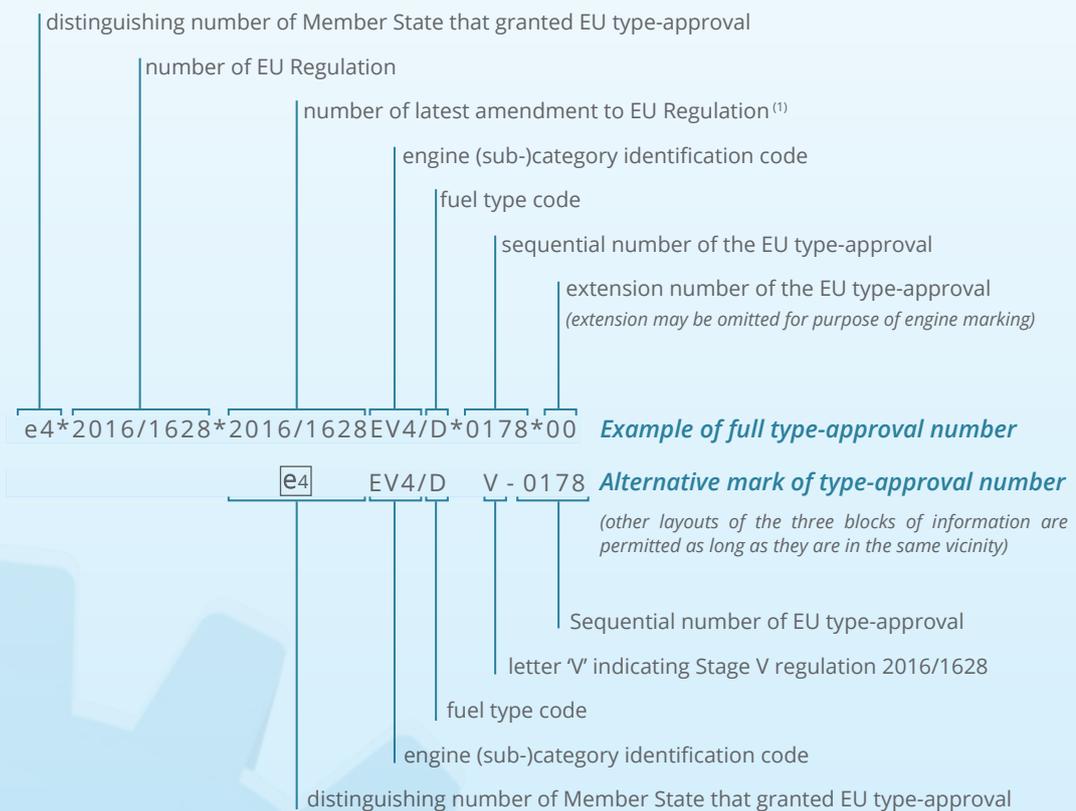
- the name, registered trade name or registered trade mark of the engine manufacturer,
- the engine family name (if applicable),
- the engine identification (serial) number and
- either the type-approval number or the mark of the type-approval number.

It is not required for all the information to be contained in a single label or location on the engine. The detailed requirements are set out in Annex III to Implementing Regulation (EU) 2017/656.

For Stage V engines the marking shall include the engine production date (month and year). Alternatively, for engine categories NRSh and NRS, excluding sub-categories NRS-v-2b and NRS-v-3, where engine and non-road mobile machinery are fully integrated and cannot be identified as separate components, it is permitted to use the non-road mobile machinery production date. The markings should be visible when the engine is installed in the machine with only necessary access covers to the engine bay open. Where necessary to ensure the markings are visible when installed, the OEM must ensure that a duplicate label is fitted on the engine or machine to fulfil this requirement.

4.1.2 GENERAL ARRANGEMENT OF STAGE V ENGINE TYPE-APPROVAL NUMBER

A fictional example of the 178th type-approval issued by the Netherlands under Stage V regulation (EU) 2016/1628 for a variable-speed NRE engine family in the 37 to 56 kW power range for operation on diesel fuel (non-road gas-oil) is given below for illustration. The key information is the number of the Regulation (i.e. 2016/1628 or letter 'V'), together with the engine sub-category identification code. This general arrangement is the same for all engine categories. The engine (sub-)category identification codes can be found Tables 1, 2, 3 and the list of fuel types and corresponding codes are contained in Annex V.



(1) When no amendment to Regulation (EU) 2016/1628 exists, the number '2016/1628' is repeated. Only regulations amending Regulation (EU) 2016/1628 can be used in this field; this should not be confused with the reference numbers of the supplementing regulations.

4.1.3 ENGINE CATEGORY NRE

The majority of engines in category NRE will operate using diesel fuel (non-road gas-oil) indicated by the letter 'D'. The engine may be type-approved for other liquid or gaseous fuels. A full list of fuel types and corresponding codes can be found in Annex V.

TABLE 1 (sub-)category identification codes for NRE engines

SUB-CATEGORY IDENTIFICATION CODE	POWER RANGE (KW)	SPEED OPERATION	SUB-CATEGORY
EV1	$0 < P < 8$	variable	NRE-v-1
EV2	$8 \leq P < 19$		NRE-v-2
EV3	$19 \leq P < 37$		NRE-v-3
EV4	$37 \leq P < 56$		NRE-v-4
EV5	$56 \leq P < 130$		NRE-v-5
EV6	$130 \leq P \leq 560$		NRE-v-6
EV7	$P > 560$		NRE-v-7
EC1	$0 < P < 8$	constant	NRE-c-1
EC2	$8 \leq P < 19$		NRE-c-2
EC3	$19 \leq P < 37$		NRE-c-3
EC4	$37 \leq P < 56$		NRE-c-4
EC5	$56 \leq P < 130$		NRE-c-5
EC6	$130 \leq P \leq 560$		NRE-c-6
EC7	$P > 560$		NRE-c-7

4.1.4 ENGINE CATEGORY NRG

The majority of engines in category NRG will operate using diesel fuel (non-road gas-oil) indicated by the letter 'D'. The engine may be type-approved for other liquid or gaseous fuels. A full list of fuel types and corresponding codes can be found in Annex V.

TABLE 2 (sub-)category identification codes for NRG engines

SUB-CATEGORY IDENTIFICATION CODE	POWER RANGE (KW)	SPEED OPERATION	SUB-CATEGORY
GV1	$P > 560$	variable	NRG-v-1
GC1	$P > 560$	constant	NRG-c-1

4.1.5 ENGINE CATEGORY NRS AND NRSH

The majority of engines in category NRS and NRSh will operate using petrol indicated by the letter 'P' or using LPG indicated by the letter 'Q'. The engine may be type-approved for other liquid or gaseous fuels. A full list of fuel types and corresponding codes can be found in Annex V.

TABLE 3 (sub-)category identification codes for NRS and NRSh engines

ENGINE CATEGORY	ENGINE SUB CATEGORY	SPEED OPERATION	POWER RANGE KW
SHA•	NRSh-v-1a	Variable or constant	0 < P < 19
SHB•	NRSh-v-1b		
SRA•	NRS-vr-1a	Variable ≥ 3600 rpm or constant	0 < P < 19
SRB•	NRS-vr-1b		
SYA•	NRS-vi-1a	Variable < 3600 rpm	
SYB•	NRS-vi-1b		
SVA•	NRS-v-2a	Variable or constant	19 ≤ P < 30
SVB•	NRS-v-2b		
SV3•	NRS-v-3		30 ≤ P < 56
TRA•	NRS-vr-1a	Variable ≥ 3600 rpm	0 < P < 19
TRB•	NRS-vr-1b		
TYA•	NRS-vi-1a	Variable < 3600 rpm	
TYB•	NRS-vi-1b		

• Denotes an additional character either 1,2 or 3 and refers to the engine's Emissions Durability Period Category

1	Category 1	Consumer product
2	Category 2	Semi-professional product
3	Category 3	Professional product

Note: Where the engine sub-category ends with the letter a or b this indicates sub-categories with different cylinder swept volumes.

4.1.6 CONTACT DETAILS FOR ENGINE MANUFACTURER AND IMPORTER

Manufacturers are required to indicate, on each engine 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. Additionally, in case the engine is placed on the market by an importer, the importer is required to 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. In each case there is no requirement to provide justification for the decision to provide an accompanying document instead of marking contact information on the engine and the type of document is not specified.

4.2

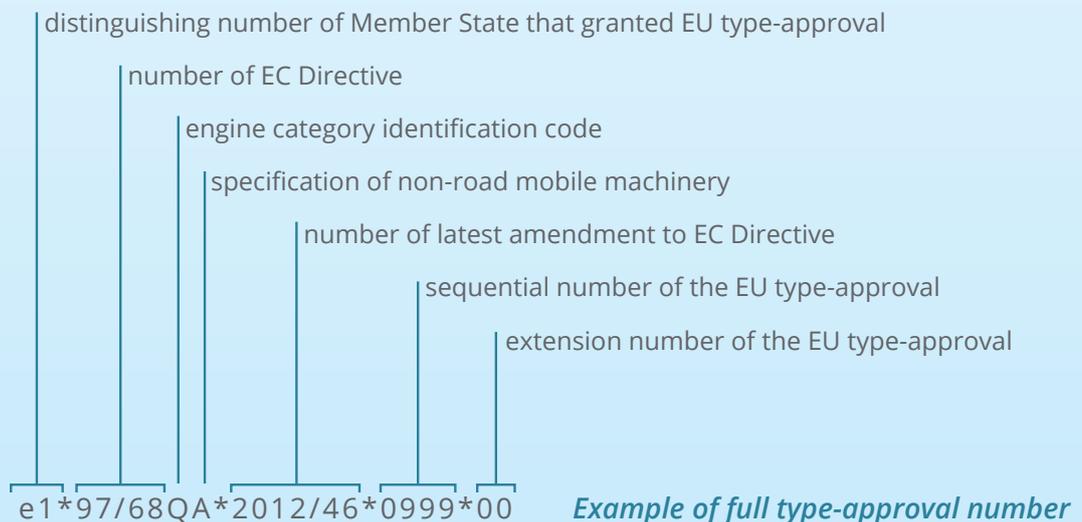
Transition engines

4.2.1 MARKING

Transition engines can be identified by the markings according to Directive 97/68/EC (**Annex I section 3**). In the case of CI engines < 19 kW and > 560 kW, and SI engines > 19 kW that were not regulated at EU level prior to Stage V, the identification markings are at the choice of the manufacturer. The production (completion) date of the engine must be no later than 31 December 2019 in case of engines of reference power between 56 and 130 kW and no later than 31 December 2018 in case of engines of any other reference power. The production date (month and year) will, in most cases, be marked on the engine. That marking is mandatory for transition engines placed on the market during the transition period, but not for those transition engines placed on the market before the transition period commences. Where that date is not marked on the engine, in case it is necessary to check the production date of the engine, confirmation of that date can be obtained from the engine manufacturer.

4.2.2 GENERAL ARRANGEMENT OF THE MARKING FOR A TRANSITION ENGINE SUBJECT TO TYPE-APPROVAL UNDER 97/68/EC

A fictional example of the 999th type-approval issued by Germany under Directive 97/68/EC for a Stage IV variable-speed compression-ignition engine family in the 130 – 560 kW power range for operation on diesel fuel (non-road gas-oil) is given below for illustration. The key information is the number of the Regulation (i.e. 97/68), together with two characters, the first of which is the engine category code and the second of which is the specification of non-road mobile machinery. This general arrangement is the same for all engine categories. The engine category identification and machinery specification codes and can be found in Table 4.



4.2.3 CI ENGINE CATEGORIES SUBJECT TO TYPE-APPROVAL UNDER DIRECTIVE 97/68/EC

There is no character to indicate fuel type as type-approval was only required for CI engines of reference power between 19 to 560 kW operated on diesel fuel. For these diesel engines the category identification code provides explicit evidence of the emission level to which the engine was manufactured. This is the method by which surveillance authorities can check the engine. The specification of non-road mobile machinery indicates whether the engine is type-approved for variable speed or constant speed operation. This second digit is of importance because prior to Stage V constant speed engine emission requirements were limited to stage IIIA (stage IIIB and IV constant speed engines do not exist).

Table 4 Engine category identification codes and specification of CI engines for non-road mobile machinery according to Directive 97/68/EC

ENGINE CATEGORY IDENTIFICATION CODE	SPECIFICATION OF NON-ROAD MOBILE MACHINERY	POWER RANGE (KW)	SPEED OPERATION	EMISSION STAGE QUALIFYING AS TRANSITION ENGINE
None	None	$P < 19$	Variable	Not regulated at EU level
K	A	$19 \leq P < 37$		Stage IIIA
P	A	$37 \leq P < 56$		Stage IIIB
R	A	$56 \leq P < 130$		Stage IV
Q	A	$130 \leq P \leq 560$		
None	None	$P > 560$		Not regulated at EU level
None	None	$P < 19$	Constant	Not regulated at EU level
K	B	$19 \leq P < 37$		Stage IIIA
J	B	$37 \leq P < 75$		
I	B	$75 \leq P < 130$		
H	B	$130 \leq P \leq 560$		
None	None	$P > 560$		Not regulated at EU level

In case the transition engine includes an after-treatment system, that system must also be produced prior to the applicable stage V placing on market date. In case the production date of the after-treatment is not apparent, it must, upon request, be confirmed by the engine manufacturer.

4.2.4 SI ENGINE CATEGORIES SUBJECT TO TYPE-APPROVAL UNDER DIRECTIVE 97/68/EC

The two letter designation used for SI engines are 'S' to indicate that it is a spark-ignition engine with net power < or equal to 19 kW, and 'A' to indicate that the engine is petrol-fuelled.

Additionally, Stage II will be indicated in parenthesized Roman numerals '(II)', except in the case of manufacturers using the small volume engine manufacturer provision, in which case the parenthesized letters '(SV)', and the parenthesized Roman numeral '(I)' must be used. In both cases, they must be visible and located near the type-approval number.

5

HOW TO IDENTIFY COMPLIANT MACHINES

This guide is limited to the identification of a compliant machine with regard to engine exhaust emissions. It does not cover how to determine whether a machine is compliant with other mandatory elements, including, but not limited to, safety and noise, for which a declaration of conformity is required, together with an associated CE mark on the machine.

Importantly, a declaration of conformity and associated CE mark on a machine is independent of the exhaust emission requirements and does NOT indicate that a machine is compliant with regard to the exhaust emissions of the installed engine. In order to establish that the machine is compliant with regard to the exhaust emissions of the installed engine it is always necessary to check the emission marking affixed to the engine complies with those for Stage V set out in section 4.1 of this guide, or with the requirements for a transition provision or exemption set out in section 4.2 of this guide.

In the case of a second-hand machine it is especially important to check the engine exhaust emission markings, not only the machine declaration of conformity and CE marking. Certain non-EU regions (especially Turkey) require non-road mobile machinery to be CE marked for safety, noise and other applicable requirements, but still permit less demanding exhaust emission levels (such as Stage IIIA). Only checking the CE marking of the machine may lead to the conclusion that a non-road mobile machine is compliant with current EU emission requirements when that is not the case.

For surveillance purposes, a machine with a transition engine must be marked with the month and year of production of that machine. This marking may be incorporated with the CE marking of the machine or may be an independent marking. This enables authorities to check that the machine was produced during the permitted production period.

6

DOCUMENTATION

The markings affixed to the engine are the primary source of information regarding the exhaust emission compliance of the engine whether that engine is installed in the machine or not. A statement of conformity will only accompany the engine in special cases. Furthermore, the engine exhaust emission type-approval certificate is not supplied together with the engine. Where further information is required, that is not available on the engine marking, the following documents may be consulted.

6.1

Engine exhaust emission statement of conformity

In general, an engine exhaust emission statement of conformity is not provided with the engine. The manufacturer should deliver a statement of conformity to accompany engines which are placed on the market on the basis of certain exemptions and transition provisions. In these cases, the statement of conformity provides information on the permitted use of the engine.

The engine statement of conformity should, where applicable, accompany the non-road mobile machine in which the engine is installed. It can be provided either as a paper document or as an electronic file.

Statement of conformity within the scope of this guide is provided in the following cases:

- Replacement engines
- Field test engines
- Special purpose engines for use in potentially explosive atmospheres (ATEX)
- Engines for use by armed forces
- New technology engines

6.2

Type-approval certificate

An approval authority certifies that an engine type or engine family satisfies the relevant administrative provisions and technical requirements of the Regulation, and subsequently, issues a corresponding type-approval certificate. The manufacturer is responsible to the approval authority for all aspects of the EU type-approval process and for ensuring conformity of production.

The type-approval certificate includes a list of engine types approved as part of an engine family, together with information on the emission control system of those engines. Additional documentation held by the type-approval authority includes a declaration by the manufacturer that the engine type/engine family does not use any defeat strategy.

The type-approval certificate does not accompany the engine or the machine, however, the statutory marking of the engine does provide a cross-reference to the relevant type-approval certificate.

National authorities may request through the approval authority that issued the type-approval a copy of the type-approval certificate. It should be noted that the non-road mobile machinery module of the European Commission Internal Market Information system (IMI) is intended to facilitate such exchange of information.

In case it is necessary to contact the manufacturer, details should be available via the IMI system. For the purpose of market surveillance, manufacturers established outside the EU should appoint a single representative established in the EU.

An importer is not required to inform the manufacturer when importing an engine or non-road mobile machine fitted with an engine, however, the importer is required to have access to the EU type-approval certificate and to make it available to approval and market surveillance authorities upon request.

7

OBLIGATIONS

There are different obligations for each of the economic operators involved in the supply chain of both engines and machines. Economic operators include the manufacturer, the manufacturer's representative, the OEM, the importer and the distributor. The general obligations are described in Chapter II of the Regulation (EU) 2016/1628.

In case of a suspected non-conformity the surveillance authorities should contact the type-approval authority that issued the type-approval certificate.

8

LIST OF MARKET SURVEILLANCE AUTHORITIES, APPROVAL AUTHORITIES AND TECHNICAL SERVICES

8.1

Market surveillance authorities

Link: <https://ec.europa.eu/docsroom/documents/32162>
(code 28- NRMM)

8.2

Approval authorities

Link: <http://ec.europa.eu/DocsRoom/documents/31942>

8.3

Technical services

Link: <http://ec.europa.eu/DocsRoom/documents?tags=technical-service-nrmm-emissions&pageSize=30&sortCol=title&sortOrder=asc>

9

BIBLIOGRAPHY

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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 2014/34/EU of the European Parliament and of the Council of 26 February 2014, on the harmonisation of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres.
- Regulation (EU) 2016/1628 of the European Parliament and of the Council of 14 September 2016, on requirements relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for non-road mobile machinery, amending Regulations (EU) No 1024/2012 and (EU) No 167/2013, and amending and repealing Directive 97/68/EC.
- Commission Delegated Regulation (EU) 2017/654, amended by Delegated Regulation (EU) 2018/989, with regard to technical and general requirements relating to emission limits and type-approval for internal combustion engines for non-road mobile machinery.
- Commission Delegated Regulation (EU) 2017/655, amended by Delegated Regulation (EU) 2018/987, on monitoring of gaseous pollutant emissions from in-service combustion engines installed in non-road mobile machinery.
- Commission Implementing Regulation (EU) 2017/656, amended by Delegated Regulation (EU) 2018/988, on administrative requirements relating to emission limits and type-approval for internal combustion engines for non-road mobile machinery.
- FREQUENTLY ASKED QUESTIONS, Regulation (EU) 2016/1628: Requirements relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for non-road mobile machinery. Published by CEMA, CECE, FEM, EGMF, EUnited Municipal Equipment, Europgen and EUROMOT, February 2019.

10

CONTACTS



European
materials
handling
federation

FEM

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

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



COMMITTEE FOR EUROPEAN
CONSTRUCTION EQUIPMENT

CECE

CECE, the Committee for European Construction Equipment, represents the interests of 1,200 construction equipment manufacturers through national trade associations in 13 European countries: Germany, the UK, France, Italy, Spain, Czech Republic, Sweden, Finland, The Netherlands, Belgium, Austria, Russia and Turkey. CECE manufacturers generate € 40 billion in yearly revenue, export a sizeable part of the production, employ around 300.000 people overall. They invest and innovate continuously to deliver equipment with highest productivity and lowest environmental impact. Efficiency, safety and high-precision technologies are key.

Contact: Riccardo Viaggi, Secretary General,
riccardo.viaggi@cece.eu, www.cece.eu



CEMA

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

Contact: Jérôme Bandry, Secretary General,
sg@cema-agri.org, www.cema-agri.org



EGMF

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

Contact: Anne Claire Rasselet, Secretary General,
secretariat@egmf.org, www.egmf.org



EU nited Municipal Equipment

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

Contact: Frank Diedrich, Director, frank.diedrich@eu-nited.net,
www.eu-nited.net/municipal_equipment



EUROMOT

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

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peter.scherm@euromot.eu, www.euromot.eu



EUROPGEN

Established circa 1987 is the European Association for the Generating set industry within Europe. Its aim is to advise all its members of the new directives and information within this industry and promote unity.

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ANNEX I

PLACING ON THE MARKET OF AN ENGINE OR MACHINE

1.1 MAKING AVAILABLE OF AN ENGINE OR A MACHINE:

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 does not require the individual engine or machine, as applicable, to be physically present within the EU, as long as there is evidence of an offer or agreement between two or more legal or natural persons for the transfer of ownership, possession or any other property right to an entity located in the EU, after the stage of manufacture of that engine or machine has taken place.

A further explanation can be found in the Blue Guide⁽¹⁾ of the European Commission, where making available is further explained in detail in Article 2.2. And in the Commission Brexit preparedness notice ‘Type approval (motor vehicles, certain other vehicles and engines) - Questions and answers.’⁽²⁾

1.2 PLACING ON THE MARKET OF AN ENGINE OR A MACHINE:

In the Regulation placing on the market is defined as: *“the first making available on the Union market of an engine or non-road mobile machinery”*.

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

An engine or machine is not placed on the market until the individual unit is available for distribution or use. This means, at a minimum, it must be complete and ready to be shipped from the factory where it is produced, and, most importantly, there must additionally be an offer or an agreement for the transfer of ownership or possession to an entity located in the EU, 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⁽¹⁾ of the European Commission, where the engine or machine is within the EU in the stocks of the manufacturer (or the authorised representative established in the Union) or the importer, the engine is only considered placed on the market where the product is made available, that is, when it is being supplied for distribution, consumption or use.

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. And in the Commission Brexit preparedness notice ‘Type approval (motor vehicles, certain other vehicles and engines) - Questions and answers.’⁽²⁾

⁽¹⁾ The ‘Blue Guide’ on the implementation of EU product rules 2016, O.J. of the EU C272/01

⁽²⁾ https://ec.europa.eu/info/brexit/brexit-preparedness/preparedness-notice_en#grow

ANNEX II

REPLACEMENT ENGINES

These engines have a different statutory marking to that of a Stage V engine. This includes supplementary information: "REPLACEMENT ENGINE" Code "TR-RES" 58(10) for engines belonging to a category equivalent to NRS with a reference power no less than 19 kW, or belonging to a category equivalent to NRG, or supplementary information: "REPLACEMENT ENGINE" Code "TR-REE" 58(11) for engines belonging to a category equivalent to NRE with a reference power no less than 19 kW.

The marking must be applied from 1 January 2019 except in the case of engines of reference power 56-130 kW where the date is 1 January 2020. In addition, a statement of conformity is required. The contact details requirements for engine manufacturers and importers as set out in section 4.1.6 also apply for these engines.

Where the engine to be replaced already includes an after-treatment system that matches the type-approval of the replacement engine and will continue to be used, the replacement engine may be shipped without an after-treatment system.

The period for which placing on the market of replacement engines is permitted is identified in the tables below.

Figure A.2.1 Variable speed engines of category NRG and NRE

		Placing on market date																								
Category	Power range	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Variable speed NRG	P > 560 kW	Unregulated																			Stage V					
	P > 560 kW	Unregulated																			Stage V					
	130 ≤ P ≤ 560 kW	Unregulated			Stage I			Stage II			Stage IIIA			Stage IIIB			Stage IV									
Variable speed NRE	75 ≤ P < 130 kW	Unregulated ⁽¹⁾			Stage I			Stage II			Stage IIIA			Stage IIIB			Stage IV									
	56 ≤ P < 75 kW	Unregulated ⁽¹⁾			Stage I			Stage II			Stage IIIA			Stage IIIB			Stage IV									
	37 ≤ P < 56 kW	Unregulated			Stage I			Stage II			Stage IIIA			Stage IIIB												
	19 ≤ P < 37 kW	Unregulated			Stage II						Stage IIIA						Stage IIIB									
	P < 19 kW	Unregulated			Unregulated ⁽²⁾		Stage V																			

2034-09-30

(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

Figure A.2.2 Constant speed engines of category NRG and NRE

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

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

Figure A.2.3 Engine categories NRS and NRSh

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

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

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

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

ANNEX III

EXEMPTIONS

This Annex sets out the exemptions given in Regulation (EU) 2016/1628. These are set out in Table A.3.1. Prior to the Stage V placing on the market date for the respective engine category, exemptions given in 97/68/EC may be used as an alternative to the exemptions in Regulation (EU) 2016/1628.

Figure A.3.1 List of exemptions from Regulation (EU) 2016/1628 and corresponding exemption codes

EXEMPTION	WHICH ENGINES ARE ALLOWED TO BE PLACED ON THE MARKET IN THE EU?	SUPPLEMENTARY INFORMATION	EXEMPTION CODE
Export engines	Engines without a valid EU type-approval for use in non-road mobile machinery intended for export outside the EU for the purpose of installation in that machinery. These engines may also be used in the EU for installation in certain machinery outside of the scope of Regulation (EU) 2016/1628, such as stationary machinery.	ENGINE NOT FOR USE IN EU NON-ROAD MOBILE MACHINERY	EM-EXP
Armed forces engines	Engines without a valid EU type-approval that are to be installed in non-road mobile machinery for use by the armed services for the purpose of installation in that machinery. For the purpose of this exemption, fire services, civil defence services, forces responsible for maintaining public order and emergency medical services are not considered to be part of the armed forces.	ARMED FORCES ENGINE	EM-AFE
Field test ⁽¹⁾	This exemption temporarily allows the placing on the market of non-type-approved engines for the purpose of conducting field testing. This field testing may be to evaluate an engine intended for use in the EU, or to test in the EU an engine intended for use in a third country. The manufacturer must inform an EU type-approval authority prior to placing a field test engine on the market and may choose any approval authority irrespective of where the field test will take place. The engine must remain the property of the manufacturer until the field test is completed, which must normally be within two years, but may be extended to a maximum of four years in total.	FIELD TEST	EM-FTE

⁽¹⁾ Prior to the implementation of Regulations (EU) 2016/1628 and (EU) 2017/656, manufacturers made their own arrangements for the field testing of engines. In those cases the marking affixed to the engine may not be consistent with the requirements in these Regulations.

EXEMPTION	WHICH ENGINES ARE ALLOWED TO BE PLACED ON THE MARKET IN THE EU?	SUPPLEMENTARY INFORMATION	EXEMPTION CODE
Engine for use in potentially explosive atmospheres	Engines that are to be installed in non-road mobile machinery for use in potentially explosive atmospheres These engines must be type-approved according to the requirements for special purposes engines (SPE).	ATEX ENGINE	EM-ATX
New technology engine	Engines that incorporate new technologies or new concepts which are incompatible with one or more requirements of the Regulation. Pending authorisation by the European Commission a member state may issue a temporary type-approval valid only in that member state.	NEW TECHNOLOGY ENGINE	EM-NTE

Engines using an exemption are required to be marked with the appropriate statutory marking, inclusive of the supplementary information identifying that exemption and the exemption code. In a similar manner as for Stage V engines the markings should be visible when the engine is installed in the machine with only necessary access covers to the engine bay open. Where necessary to ensure the markings are visible when installed, the OEM must ensure that a duplicate label is fitted on the engine or machine to fulfil this requirement.

Certain exemptions also require a corresponding statement of conformity as described in section 6.1.

The contact details requirements for engine manufacturers and importers as set out in section 4.1.6 also apply for these engines.

ANNEX IV

TRANSITION ENGINES AND MACHINES

This Annex provide an overview of the requirements with respect to the emission stage, production date and placing on the market date for transition engines and machines fitted with transition engines. The emission stages qualifying as transition engines are set out in Table A.4.1 and the respective deadlines are set out in Table A.4.2. Special cases for which deadlines are extended are set out in Table A.4.3.

Table A.4.1 Emission Stages qualifying as transition engines and corresponding production and placing on the market deadlines

ENGINE CATEGORY	POWER RANGE (KW)	EMISSION STAGE QUALIFYING AS TRANSITION ENGINE	LAST PRODUCTION DATE FOR TRANSITION ENGINE ⁽¹⁾	LAST PLACING ON MARKET DATE FOR ENGINE ⁽²⁾
Variable speed NRE	P < 19	Not regulated at EU level	31 December 2018	31 December 2020
	19 ≤ P < 37	Stage IIIA		
	37 ≤ P < 56	Stage IIIB		
	56 ≤ P < 130	Stage IV ⁽³⁾	31 December 2019	31 December 2021
	130 ≤ P ≤ 560	Stage IV	31 December 2018	31 December 2020
	P > 560	Not regulated at EU level		
Constant speed NRE	P < 19	Not regulated at EU level	31 December 2018	31 December 2020
	19 ≤ P < 37	Stage IIIA		
	37 ≤ P < 56			
	56 ≤ P < 130		31 December 2019	31 December 2021
	130 ≤ P ≤ 560	Not regulated at EU level	31 December 2018	31 December 2020
	P > 560			
	NRG	P < 19	Stage II ⁽⁴⁾	31 December 2018
NRSh	P < 19	Stage II ⁽⁴⁾		
NRS	19 ≤ P < 56	Not regulated at EU level		

(1) Inclusive of after-treatment

(2) Certain special cases have later date

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

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

Table A.4.2 Production and placing on the market dates for machines fitted with transition engines

ENGINE CATEGORY	POWER RANGE (KW)	LAST PRODUCTION DATE FOR MACHINE ⁽¹⁾	LAST PLACING ON MARKET DATE FOR ENGINE AND MACHINE ⁽¹⁾
NRE	56 ≤ P < 130	30 June 2021	31 December 2021
	All EXCEPT 56 ≤ P < 130	30 June 2020	31 December 2020
NRG	All		
NRSh	All		
NRS	All		

(1) Certain special cases have a later date

Table A.4.3 Transition provisions for special cases

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 ≤ P < 130	30 June 2021	31 December 2021
		56 ≤ P < 130	30 June 2022	31 December 2022
NRE	Mobile cranes ⁽²⁾	All EXCEPT 56 ≤ P < 130	30 June 2021	31 December 2021
		56 ≤ P < 130	30 June 2022	31 December 2022
NRS	Snow throwers ⁽³⁾	P < 19	30 June 2022	31 December 2022

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

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

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

The extensions are not cumulative, e.g. the last placing on the market date for a mobile crane with engine NRE of 150 kW produced by an OEM with less than 100 units as annual production of non-road mobile machinery remains 31 December 2021.

ANNEX V

IN SERVICE FUEL

5.1 GENERAL REQUIREMENTS

The engine is designed by the manufacturer to meet the exhaust emission limits of the Regulation (EU) 2016/1628 on a test cycle using reference fuels set out in Annex IX of Regulation (EU) 2017/654. In the case of petrol and diesel engines it is intended that engines type-approved on the reference fuel may be operated on the following corresponding market fuels:

- a) In the case of petrol, Directive 98/70/EC or the CEN standard EN 228:2012. Lubricating oil may be added according to the specification of the manufacturer;
- b) In the case of diesel (other than non-road gas-oil), Directive 98/70/EC of the European Parliament and of the Council or the CEN standard EN 590:2013;
- c) In the case of diesel (non-road gas-oil), Directive 98/70/EC and also both a cetane number not less than 45 and FAME not greater than 8,0 % v/v.

In case the manufacturer has designed the engine for other liquid fuels, such as running on B100 (EN 14214:2012+A1:2014), B20 or B30 (EN16709:2015), or on specific fuels, fuel mixtures or fuel emulsions a list of those other fuels is included in the instructions for the end-user that accompany the non-road mobile machine. The engine should only be operated on the fuels for which it has been approved.

In the case of gaseous fuels, the engine may be designed to operate on a wide range of fuels (universal fuel range engine) or a more limited range of fuel (restricted fuel range engine) or for a specific fuel (fuel-specific engine).

More information can be found in Annex I of the Delegated Regulation (EU) 2017/654.

5.2 FUEL TYPE CODE

The fuel type code indicates the standard fuel for which the engine has been type-approved. A list can be found in Annex V to Regulation 2017/656 and is reproduced below in tables A.5.1 and A.5.2

Table A.5.1 Fuelling type codes for approval marks

ENGINE FUEL TYPE (COLUMN 1)	SUB-TYPE, WHERE APPLICABLE (COLUMN 2)	FUEL TYPE CODE (COLUMN 3)
Diesel (non-road gas-oil) fuelled CI engine		D
Dedicated Ethanol (ED95) fuelled CI engine		ED
Ethanol (E85) fuelled SI engine		E85
Petrol (E10) fuelled SI engine		P
LPG fuelled SI engine		Q

ENGINE FUEL TYPE (COLUMN 1)	SUB-TYPE, WHERE APPLICABLE (COLUMN 2)	FUEL TYPE CODE (COLUMN 3)
Natural gas/biomethane fuelled SI engine	Engine approved and calibrated for the H-range of gases	H
	Engine approved and calibrated for the L-range of gases	L
	Engine approved and calibrated for both the H-range and L-range of gases	HL
	Engine approved and calibrated for a specific gas composition in the H-range of gases and transformable to another specific gas in the H- range of gases by fine tuning of the engine fuelling	HT
	Engine approved and calibrated for a specific gas composition in the L- range of gases and transformable to another specific gas in the L-range of gases after fine tuning of the engine fuelling	LT
	Engine approved and calibrated for a specific gas composition in either the H-range or the L-range of gases and transformable to another specific gas in either the H-range or the L-range of gases by fine tuning of the engine fuelling	HLT
	Engine approved and calibrated for a specific liquefied natural gas / liquefied biomethane composition resulting in a λ -shift factor not differing by more than 3 per cent the λ -shift factor of the G20 gas specified in Annex I to Delegated Regulation (EU) 2017/654 and the ethane content of which does not exceed 1,5 per cent	LN2
	Engine approved and calibrated for any other (than above) liquefied natural gas / liquefied biomethane composition.	LNG
Dual-fuel engines	for dual-fuel engines of Type 1A	1A# (*)
	or dual-fuel engines of Type 1B	1B# (*)
	for dual-fuel engines of Type 2A	2A# (*)
	for dual-fuel engines of Type 2B	2B# (*)
	for dual-fuel engines of Type 3B	3B# (*)

(*) Replace '#' with approved gas specification from Table 3.

Table A.5.2 Dual Fuel Suffix

APPROVED GAS SPECIFICATION	DUAL FUEL SUFFIX (COLUMN 2)
Dual fuel engine approved and calibrated for a specific gas composition in the H-range of gases and transformable to another specific gas in the H-range of gases by fine tuning of the engine fuelling as gaseous component of fuel	4
Dual fuel engine approved and calibrated for a specific gas composition in the L-range of gases and transformable to another specific gas in the L-range of gases after fine tuning of the engine fuelling as gaseous component of fuel	5
Dual fuel engine approved and calibrated for a specific gas composition in either the H-range or the L-range of gases and transformable to another specific gas in either the H-range or the L-range of gases by fine tuning of the engine fuelling as gaseous component of fuel	6
Dual fuel engine approved and calibrated for a specific liquefied natural gas / liquefied biomethane composition resulting in a λ -shift factor not differing by more than 3 per cent the λ -shift factor of the G20 gas specified in Annex I to Delegated Regulation (EU) 2017/654 and the ethane content of which does not exceed 1,5 per cent as gaseous component of fuel	7
Dual fuel engine approved and calibrated for any other (than above) liquefied natural gas / liquefied biomethane composition as gaseous component of fuel	8
Dual fuel engine approved for operation on LPG as gaseous component of fuel	9

