

FEDERATION OF PILING SPECIALISTS

Guidance on Emission Standards for Non-Road Mobile Machinery (NRMM)

6/04/20

On the 1st January 2017 Regulation (EU) 2106/1628⁽¹⁾ replaced Directive 97/68/EC, detailing the requirement for a reduction of exhaust gaseous⁽²⁾ and particulate pollutants⁽³⁾, and identifying an implementation timetable for Stage V emission compliant engines for use in Non Road Mobile Machinery⁽⁴⁾ (NRMM). The key requirements of the Regulation are –

- Reduction of exhaust “Particle Mass” (PM)⁽⁵⁾ –
 - from 0.025 g/kWh at Stage IV to 0.015 g/kWh at Stage V
- Introduction of an exhaust “Particle Number” (PN)⁽⁶⁾ -
 - limit of 1×10^{12} / kWh for solid particles greater than 23nm \emptyset
- Extension of legislation to include -
 - CI (Diesel) engines below 19 kW and above 560 kW Category NRE⁽⁷⁾
 - All engines above 560 kW fitted to Generators Category NRG⁽⁸⁾

Stage V NRMM Emission Standards for NRE⁽⁷⁾ + NRG⁽⁸⁾ engine subcategories ^{(17) (18) (19)}

Engine Category	Net Power (kW)	Engine Type	Market Placement	CO ⁽²⁾	H _C ⁽²⁾	NO _x ⁽²⁾	PN ⁽⁵⁾	PM ⁽⁶⁾
				g/kWh				1/kWh
NRE-v/c-1	0 < P < 8	CI	01/01/19	8.00	7.50	0.40	-	
NRE-v/c-2	8 ≤ P < 19	CI		6.60	7.50	0.40	-	
NRE-v/c-3	19 ≤ P < 37	CI		5.00	4.70	0.015	1x10 ¹²	
NRE-v/c-4	37 ≤ P < 56	CI		5.00	4.70	0.015	1x10 ¹²	
NRE-v/c-5	56 ≥ P < 130	All	01/01/20	5.00	0.19	0.40	0.015	1x10 ¹²
NRE-v/c-6	130 ≥ P < 560	All	01/01/19	3.50	0.19	0.40	0.015	1x10 ¹²
NRE-v/c-7	P > 560	All		3.50	0.19	3.50	0.045	-
NRG-v/c-1	P > 560	All						

Note – NRE-c = constant speed engine ⁽⁹⁾, NRE–v = variable speed engines ⁽¹⁰⁾

- “Market Placement” (or First Registration)
 - Date after which all new engine types in relevant categories placed on market must meet requirements of Stage V. Start of transition period.
- “Transition Engine” ⁽¹¹⁾
 - An engine meeting the latest applicable emission requirements prior to Stage V.
- “Transition Period”⁽¹²⁾
 - 24 month period from date of relevant Stage V implementation date.
- Exemption⁽¹³⁾ for category NRE engines only –
 - Original Equipment Manufacturers⁽¹⁴⁾ (OEM) producing less than 100 units per year of NRMM fitted with category NRE engines have a further 12 month exemption period⁽¹⁵⁾.
 - Mobile cranes⁽¹⁶⁾ fitted with category NRE engines have a further 12 month exemption period.

Engine power less than (<) 56 kW and greater than (≥) 130 kW

- 01/01/19 - New engines types placed on market must meet Stage V emissions
- 30/06/20 - NRMM with prior “manufactured on” date can be fitted with transition engine
- 01/01/21 - NRMM with later “manufactured on” date must be fitted with Stage V engine
- 30/06/21 - NRMM with prior “manufactured on” date can be fitted with transition engine
if Original Equipment Manufacturer produces less than 100 units per year

Engine power greater than (\geq) 56 kW and less than ($<$) 130 kW

- 01/01/20 - New engines types placed on market must meet Stage V emissions
- 30/06/21 - NRMM with prior “manufactured on” date can be fitted with transition engine.
- 01/01/22 - NRMM with later “manufactured on” date must be fitted with Stage V engine
- 30/06/22 - NRMM with prior “manufactured on” date can be fitted with transition engine
if Original Equipment Manufacturer produces less than 100 units per year

Requirements for London NRMM (37 kW – 560 kW)

In addition to the EU Regulations, the Mayor of London ⁽²⁰⁾ has identified the following emission reduction actions and timescales -

- 1st January 2020:
All constant-speed engines, such as those typically found in generators, are required to meet Emissions Stage V throughout London either by technology or by retrofit for both NOx and PM reduction.
- 1st September 2020:
Engines [variable] operating in the CAZ/CW Zones, plus those within the GLA defined Opportunity Areas, are required to meet Emissions Stage IV as a minimum.
- 1st September 2020:
Engines [variable] operating in Greater London, but outside the CAZ/CW Zones or the Opportunity Areas, are required to meet Emissions Stage IIIB as a minimum.
- 1st January 2025:
Engines [variable] are required to be at Emissions Stage IV as a minimum throughout London
- 2030:
Engines are required to be at Emissions Stage V as a minimum throughout London
- 2040:
Zero emissions from construction machinery throughout London

References

<i>Ref</i>	<i>Article</i>	<i>Paragraph</i>	<i>Note</i>
1	https://www.legislation.gov.uk/eur/2016/1628/contents		Accessed - 6 th March 2020
2	Article 3	(3)	Gaseous pollutants
3	Article 3	(6)	Particulate pollutants
4	Article 3	(1)	Non-road mobile machinery
5	Article 3	(4)	Particulate matter (PM)
6	Article 3	(5)	Particle number (PN)
7	Article 4	(1) (a)	Category - NRE engines
8	Article 4	(2)	Category - NRG engines
9	Article 3	(21)	Constant speed
10	Article 3	(22)	Variable speed
11	Article 3	(32) (a) (b)	Transitional engines
12	Article 3	(31)	Transition period
13	Article 58	5 para 2	Exemption (OEM < 100 units per year)
14	Article 3	(54)	Original Equipment Manufacturer
15	Article 3	(33)	NRMM manufactured date
16	Article 3	(45)	Mobile cranes
17	Annex I	Table I-1	Subcategories of engine category NRE
18	Annex II	Table II-1	Stage V Emission limits for engine category NRE
19	Annex III	Table III-1	Dates of application of Regulations to NRE engines

<i>Ref</i>	<i>Source</i>
20	https://www.london.gov.uk/what-we-do/environment/pollution-and-air-quality/nrmm Accessed – 6 th March 2020