

## SCHEDULE 1

(Annex I of the Directive)

### Commencement Information

**II** Sch. 1 in force at 3.8.2017, see [reg. 1](#)

### B. Essential requirements for exhaust emissions from propulsion engines

Propulsion engines shall comply with the essential requirements for exhaust emissions set out in this Part.

#### 1. PROPULSION ENGINE IDENTIFICATION

1.1. Each engine shall be clearly marked with the following information:

- (a) engine manufacturer's name, registered trade name or registered trade mark and contact address; and, if applicable, the name and contact address of the person adapting the engine;
- (b) engine type, engine family, if applicable;
- (c) a unique engine serial number;
- (d) [<sup>F1</sup>CE marking, as provided for in Article 18.]  
[<sup>F1</sup>UK marking, as provided for in regulation 54.]

### Textual Amendments

**F1** Words in [Sch. 1 Pt. B para. 1.1](#) substituted (E.W.S.) (31.12.2020) by [The Product Safety and Metrology etc. \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/696\)](#), [reg. 1](#), [Sch. 28 para. 43\(3\)\(a\)](#) (with [Sch. 28 para. 41](#)) (as amended by [S.I. 2020/676](#), [regs. 1\(1\), 2](#)); 2020 c. 1, [Sch. 5 para. 1\(1\)](#)

1.2. The marks referred to in point 1.1 must be durable for the normal life of the engine and must be clearly legible and indelible. If labels or plates are used, they must be attached in such a manner that the fixing is durable for the normal life of the engine, and the labels/plates cannot be removed without destroying or defacing them.

1.3. The marks must be secured to an engine part necessary for normal engine operation and not normally requiring replacement during the engine life.

1.4. The marks must be located so as to be readily visible after the engine has been assembled with all the components necessary for engine operation.

#### 2. EXHAUST EMISSION REQUIREMENTS

Propulsion engines shall be designed, constructed and assembled so that when correctly installed and in normal use, emissions shall not exceed the limit values obtained from point 2.1, Table 1 and point 2.2, Tables 2 and 3:

2.1. Values applying for the purposes of Article 55(2) and Table 2 of point 2.2:

*Table 1*

(g/kWh)	Carbon monoxide	Hydrocarbons	Nitrogen oxides	ParticulatesPT
Type				

**Changes to legislation:** *There are currently no known outstanding effects for the The Recreational Craft Regulations 2017, Division B.. (See end of Document for details)*

$$\text{CO} = A + B / P_n^N$$

$$\text{HC} = A + B / P_n^N$$

	<b>A</b>	<b>B</b>	<b>n</b>	<b>A</b>	<b>B</b>	<b>n</b>		
Two-stroke spark ignition	150,0	600,0	1,0	30,0	100,0	0,75	10,0	Not applicable
Four-stroke spark ignition	150,0	600,0	1,0	6,0	50,0	0,75	15,0	Not applicable
Compression ignition	50,0	0	0	1,5	2,0	0,5	9,8	1,0

Where A, B and n are constants in accordance with the table,  $P_N$  is the rated engine power in kW.

2.2. Values applying from 18 January 2016:

**Table 2**

**Exhaust emission limits for compression ignition (CI) engines(2)**

<b>Swept Volume SV(L/cyl)</b>	<b>Rated Engine Power <math>P_N</math>(kW)</b>	<b>Particulates PT(g/kWh)</b>	<b>Hydrocarbons + Nitrogen Oxides HC + NO<sub>x</sub> (g/kWh)</b>
<b>SV &lt; 0,9</b>	$P_N < 37$	The values referred to in table 1	
	$37 \leq P_N < 75$	0,3	4,7
	$75 \leq P_N < 3700$	0,15	5,8
<b>0,9 ≤ SV &lt; 1,2</b>	$P_N < 3700$	0,14	5,8
<b>1,2 ≤ SV &lt; 2,5</b>		0,12	5,8
<b>2,5 ≤ SV &lt; 3,5</b>		0,12	5,8
<b>3,5 ≤ SV &lt; 7,0</b>		0,11	5,8
<b>a +</b>		Alternatively, compression-ignition engines with rated engine power at or above 37 kW and below 75 kW and with a swept volume below 0,9 L/cyl shall not exceed a PT emission limit of 0,20 g/kWh and a combined HC + NO <sub>x</sub> emission limit of 5,8 g/kWh.	
<b>b ++</b>	Any compression-ignition engine shall not exceed a Carbon monoxide (CO) emission limit of 5,0 g/kWh.		

**Table 3**

**Exhaust emission limits for spark ignition (SI) engines**

<b>Type of engine</b>	<b>Rated Engine Power <math>P_N</math>(kW)</b>	<b>Carbon monoxide CO(g/kWh)</b>	<b>Hydrocarbons + Nitrogen Oxides HC + NO<sub>x</sub> (g/kWh)</b>
Stern-drive and inboard engines	$P_N \leq 373$	75	5

(2) 2015 c.26

**Changes to legislation:** There are currently no known outstanding effects for the The Recreational Craft Regulations 2017, Division B.. (See end of Document for details)

	$373 < P_N \leq 485$	350	16
	$P_N > 485$	350	22
Outboard engines and PWC engines	$P_N \leq 4,3$	$500 - (5,0 \times P_N)$	30
	$4,3 < P_N \leq 40$	$500 - (5,0 \times P_N)$	$15,7 + \left(\frac{50}{P_N^{0,9}}\right)$
	$P_N > 40$	300	$15,7 + \left(\frac{50}{P_N^{0,9}}\right)$

2.3. Test cycles:

Test cycles and weighting factors to be applied:

The following requirements of ISO standard 8178-4:2007 shall be used, taking into account the values set out in the table below.

For variable speed CI engines test cycle E1 or E5 shall be applied or alternatively, above 130 kW, test cycle E3 may be applied. For variable speed SI engines test cycle E4 shall be applied.

<b>Cycle E1, Mode number</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Speed</b>	<b>Rated speed</b>		<b>Intermediate speed</b>		<b>Low-idle speed</b>
Torque, %	100	75	75	50	0
Weighting factor	0,08	0,11	0,19	0,32	0,3
<b>Cycle E3, Mode number</b>	<b>1</b>		<b>2</b>	<b>3</b>	<b>4</b>
<b>Speed</b>	<b>Rated speed</b>		<b>Intermediate speed</b>		<b>Low-idle speed</b>
Speed, %	100		91	80	63
Power, %	100		75	50	25
Weighting factor	0,2		0,5	0,15	0,15
<b>Cycle E4, Mode number</b>	<b>1</b>		<b>2</b>	<b>3</b>	<b>4</b>
<b>Speed</b>	<b>Rated speed</b>		<b>Intermediate speed</b>		<b>Low-idle speed</b>
Speed, %	100		80	60	40
Torque, %	100		71,6	46,5	25,3
Weighting factor	0,06		0,14	0,15	0,25
<b>Cycle E5, Mode number</b>	<b>1</b>		<b>2</b>	<b>3</b>	<b>4</b>
<b>Speed</b>	<b>Rated speed</b>		<b>Intermediate speed</b>		<b>Low-idle speed</b>
Speed, %	100		91	80	63
Power, %	100		75	50	25
					Idle
					0

Weighting factor	0,08	0,13	0,17	0,32	0,3
------------------	------	------	------	------	-----

[<sup>F2</sup>Notified][<sup>F2</sup>Approved] bodies may accept tests carried out on the basis of other tests cycles as specified in a [<sup>F3</sup>harmonised][<sup>F3</sup>designated] standard and as applicable for the engine duty cycle.

**Textual Amendments**

- F2** Word in Sch. 1 Pt. B para. 2.3 substituted (E.W.S.) (31.12.2020) by The Product Safety and Metrology etc. (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/696), reg. 1, Sch. 28 para. 43(3)(b)(i) (with Sch. 28 para. 41) (as amended by S.I. 2020/676, regs. 1(1), 2); 2020 c. 1, Sch. 5 para. 1(1)
- F3** Word in Sch. 1 Pt. B para. 2.3 substituted (E.W.S.) (31.12.2020) by The Product Safety and Metrology etc. (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/696), reg. 1, Sch. 28 para. 43(3)(b)(ii) (with Sch. 28 para. 41) (as amended by S.I. 2020/676, regs. 1(1), 2); 2020 c. 1, Sch. 5 para. 1(1)

**2.4. Application of the propulsion engine family and choice of parent propulsion engine**

The engine manufacturer shall be responsible for defining those engines from his range which are to be included in an engine family.

A parent engine shall be selected from an engine family in such a way that its emissions characteristics are representative for all engines in that engine family. The engine incorporating those features that are expected to result in the highest specific emissions (expressed in g/kWh), when measured on the applicable test cycle, should normally be selected as the parent engine of the family.

**2.5. Test fuels**

The test fuel used for exhaust emission testing shall meet the following characteristics:

<b>Petrol Fuels</b>				
<b>Property</b>	<b>RF-02-99Unleaded</b>		<b>RF-02-03Unleaded</b>	
	<b>min</b>	<b>max</b>	<b>min</b>	<b>max</b>
Research Octane Number (RON)	95	—	95	—
Motor Octane Number (MON)	85	—	85	—
Density at 15 °C (kg/m <sup>3</sup> )	748	762	740	754
Initial boiling point (°C)	24	40	24	40
Mass fraction of sulphur (mg/kg)	—	100	—	10
Lead content (mg/l)	—	5	—	5
Reid vapour pressure (kPa)	56	60	—	—
Vapour pressure (DVPE) (kPa)	—	—	56	60
<b>Diesel Fuels</b>				
<b>Property</b>	<b>RF-06-99</b>		<b>RF-06-03</b>	

**Changes to legislation:** There are currently no known outstanding effects for the The Recreational Craft Regulations 2017, Division B.. (See end of Document for details)

	<b>min</b>	<b>max</b>	<b>min</b>	<b>max</b>
Cetane number	52	54	52	54
Density at 15 °C (kg/m <sup>3</sup> )	833	837	833	837
Final boiling point (°C)	—	370	—	370
Flash point (°C)	55	—	55	—
Mass fraction of sulphur (mg/kg)	To be reported	300 (50)	—	10
Mass fraction of ash (%)	To be reported	0,01	—	0,01

[<sup>F4</sup>Notified][<sup>F4</sup>Approved] bodies may accept tests carried out on the basis of other tests fuel as specified in a [<sup>F5</sup>harmonised][<sup>F5</sup>designated] standard.

#### Textual Amendments

- F4** Word in Sch. 1 Pt. B para. 2.5 substituted (E.W.S.) (31.12.2020) by The Product Safety and Metrology etc. (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/696), reg. 1, Sch. 28 para. 43(3)(b)(i) (with Sch. 28 para. 41) (as amended by S.I. 2020/676, regs. 1(1), 2); 2020 c. 1, Sch. 5 para. 1(1)
- F5** Word in Sch. 1 Pt. B para. 2.5 substituted (E.W.S.) (31.12.2020) by The Product Safety and Metrology etc. (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/696), reg. 1, Sch. 28 para. 43(3)(b)(ii) (with Sch. 28 para. 41) (as amended by S.I. 2020/676, regs. 1(1), 2); 2020 c. 1, Sch. 5 para. 1(1)

### 3. DURABILITY

The manufacturer of the engine shall supply engine installation and maintenance instructions, which if applied should mean that the engine in normal use will continue to comply with the limits set out in points 2.1 and 2.2 throughout the normal life of the engine and under normal conditions of use.

This information shall be obtained by the engine manufacturer by use of prior endurance testing, based on normal operating cycles, and by calculation of component fatigue so that the necessary maintenance instructions may be prepared by the manufacturer and issued with all new engines when first placed on the market.

The normal life of the engine is as follows:

((a)) For CI engines: 480 hours of operation or 10 years, whichever occurs first;

((b)) For SI inboard or stern drive engines with or without integral exhaust:

((i)) for the engine category

$$P_N \leq 373 \text{ kW}$$

: 480 hours of operation or 10 years, whichever occurs first,

((ii)) for engines in the category

$$373 < P_N \leq 485 \text{ kW}$$

: 150 hours of operation or three years, whichever occurs first,

((iii)) for the engine category

$$P_N > 485 \text{ kW}$$

: 50 hours of operation or one year, whichever occurs first;

((c)) personal watercraft engines: 350 hours of operation or five years, whichever occurs first;

((d)) outboard engines: 350 hours of operation or 10 years, whichever occurs first

4. OWNER'S MANUAL

Each engine shall be provided with an owner's manual in [<sup>F6</sup>a language or languages which can be easily understood by consumers and other end-users, as determined by the [<sup>F7</sup>relevant state] in which the engine is to be marketed][<sup>F6</sup>English].

**Textual Amendments**

- F6** Word in Sch. 1 Pt. B para. 4 substituted (E.W.S.) (31.12.2020) by The Product Safety and Metrology etc. (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/696), reg. 1, **Sch. 28 para. 43(3)(c)(i)** (with Sch. 28 para. 41) (as amended by S.I. 2020/676, regs. 1(1), 2); 2020 c. 1, Sch. 5 para. 1(1)
- F7** Words in Sch. 1 Pt. B para. 4 substituted (N.I.) (31.12.2020) by The Product Safety and Metrology etc. (Amendment) (Northern Ireland) (EU Exit) Regulations 2020 (S.I. 2020/1112), reg. 1(b), **Sch. 15 para. 7(a)(ii)**

The owner's manual shall:

- ((a)) provide instructions for the installation, use and maintenance needed to assure the proper functioning of the engine to meet the requirements of Section 3 (Durability);
- ((b)) specify the power of the engine when measured in accordance with the [<sup>F8</sup>harmonised][<sup>F8</sup>designated] standard.

**Textual Amendments**

- F8** Word in Sch. 1 Pt. B para. 4 substituted (E.W.S.) (31.12.2020) by The Product Safety and Metrology etc. (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/696), reg. 1, **Sch. 28 para. 43(3)(c)(ii)** (with Sch. 28 para. 41) (as amended by S.I. 2020/676, regs. 1(1), 2); 2020 c. 1, Sch. 5 para. 1(1)

**Changes to legislation:**

There are currently no known outstanding effects for the The Recreational Craft Regulations 2017, Division B..