

SCHEDULE 1

Regulation 2(1)

(Annex I of the Directive)

ESSENTIAL REQUIREMENTS

A. Essential requirements for the design and construction of products referred to in Article 2(1)

1. WATERCRAFT DESIGN CATEGORIES

Design category	Wind force (Beaufort scale)	Significant wave height (H $\frac{1}{3}$, metres)
A	exceeding 8	exceeding 4
B	up to, and including, 8	up to, and including, 4
C	up to, and including, 6	up to, and including, 2
D	up to, and including, 4	up to, and including, 0,3

Explanatory notes:

- A. A recreational craft given design category A is considered to be designed for winds that may exceed wind force 8 (Beaufort scale) and significant wave height of 4 m and above but excluding abnormal conditions, such as storm, violent storm, hurricane, tornado and extreme sea conditions or rogue waves.
- B. A recreational craft given design category B is considered to be designed for a wind force up to, and including, 8 and significant wave height up to, and including, 4 m.
- C. A watercraft given design category C is considered to be designed for a wind force up to, and including, 6 and significant wave height up to, and including, 2 m.
- D. A watercraft given design category D is considered to be designed for a wind force up to, and including, 4 and significant wave height up to, and including, 0,3 m, with occasional waves of 0,5 m maximum height.

Watercraft in each design category must be designed and constructed to withstand the parameters in respect of stability, buoyancy, and other relevant essential requirements listed in this Annex, and to have good handling characteristics.

2. GENERAL REQUIREMENTS

2.1. Watercraft identification

Each watercraft shall be marked with an identification number including the following information:

- (1) country code of the manufacturer,
- (2) unique code of the manufacturer assigned by the national authority of the Member State,
- (3) unique serial number,
- (4) month and year of production,
- (5) model year.

Detailed requirements for the identification number referred to in the first paragraph are set out in the relevant harmonised standard.

2.2. Watercraft builder's plate

Each watercraft shall carry a permanently affixed plate mounted separately from the watercraft identification number, containing at least the following information:

- (a) manufacturer's name, registered trade name or registered trade mark, as well as contact address;

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- (b) CE marking, as provided for in Article 18;
- (c) watercraft design category in accordance with Section 1;
- (d) manufacturer's maximum recommended load derived from point 3.6 excluding the weight of the contents of the fixed tanks when full;
- (e) number of persons recommended by the manufacturer for which the watercraft was designed.

In the case of post-construction assessment, the contact details and the requirements referred to in point (a) shall include those of the notified body which has carried out the conformity assessment.

2.3. Protection from falling overboard and means of reboarding

Watercraft shall be designed to minimise the risks of falling overboard and to facilitate reboarding. Means of reboarding shall be accessible to or deployable by a person in the water unaided.

2.4. Visibility from the main steering position

For recreational craft, the main steering position shall give the operator, under normal conditions of use (speed and load), good all-round visibility.

2.5. Owner's manual

Each product shall be provided with an owner's manual in accordance with Article 7(7) and Article 9(4). That manual shall provide all the information necessary for safe use of the product drawing particular attention to set up, maintenance, regular operation, prevention of risks and risk management.

3. INTEGRITY AND STRUCTURAL REQUIREMENTS

3.1. Structure

The choice and combination of materials and its construction shall ensure that the watercraft is strong enough in all respects. Special attention shall be paid to the design category in accordance with Section 1, and the manufacturer's maximum recommended load in accordance with point 3.6.

3.2. Stability and freeboard

The watercraft shall have sufficient stability and freeboard considering its design category in accordance with Section 1 and the manufacturer's maximum recommended load in accordance with point 3.6.

3.3. Buoyancy and flotation

The watercraft shall be constructed as to ensure that it has buoyancy characteristics appropriate to its design category in accordance with Section 1 and the manufacturer's maximum recommended load in accordance with point 3.6. All habitable multihull recreational craft susceptible of inversion shall have sufficient buoyancy to remain afloat in the inverted position.

Watercraft of less than 6 metres in length that are susceptible to swamping when used in their design category shall be provided with appropriate means of flotation in the swamped condition.

3.4. Openings in hull, deck and superstructure

Openings in hull, deck(s) and superstructure shall not impair the structural integrity of the watercraft or its weather tight integrity when closed.

Windows, port lights, doors and hatch covers shall withstand the water pressure likely to be encountered in their specific position, as well as point loads applied by the weight of persons moving on deck.

Through hull fittings designed to allow water passage into the hull or out of the hull, below the waterline corresponding to the manufacturer's maximum recommended load in accordance with point 3.6, shall be fitted with a means of shutoff which shall be readily accessible.

3.5. **Flooding**

All watercraft shall be designed so as to minimise the risk of sinking.

Where appropriate, particular attention shall be paid to:

- (a) cockpits and wells, which should be self-draining or have other means of keeping water out of the watercraft interior;
- (b) ventilation fittings;
- (c) removal of water by pumps or other means.

3.6. **Manufacturer's maximum recommended load**

The manufacturer's maximum recommended load (fuel, water, provisions, miscellaneous equipment and people (in kilograms)) for which the watercraft was designed, shall be determined in accordance with the design category (Section 1), stability and freeboard (point 3.2) and buoyancy and flotation (point 3.3).

3.7. **Life raft stowage**

All recreational craft of design categories A and B, and recreational craft of design categories C and D longer than 6 metres shall be provided with one or more stowage points for a life raft (life rafts) large enough to hold the number of persons the recreational craft was designed to carry as recommended by the manufacturer. Life raft stowage point(s) shall be readily accessible at all times.

3.8. **Escape**

All habitable multihull recreational craft susceptible of inversion shall be provided with viable means of escape in the event of inversion. Where there is a means of escape provided for use in the inverted position, it shall not compromise the structure (point 3.1), the stability (point 3.2) or buoyancy (point 3.3) whether the recreational craft is upright or inverted.

Every habitable recreational craft shall be provided with viable means of escape in the event of fire.

3.9. **Anchoring, mooring and towing**

All watercraft, taking into account their design category and their characteristics, shall be fitted with one or more strong points or other means capable of safely accepting anchoring, mooring and towing loads.

4. **HANDLING CHARACTERISTICS**

The manufacturer shall ensure that the handling characteristics of the watercraft are satisfactory with the most powerful propulsion engine for which the watercraft is designed and constructed. For all propulsion engines, the maximum rated engine power shall be declared in the owner's manual.

5. **INSTALLATION REQUIREMENTS**

5.1. **Engines and engine compartments**

5.1.1. *Inboard engine*

All inboard mounted engines shall be placed within an enclosure separated from living quarters and installed so as to minimise the risk of fires or spread of fires as well as hazards from toxic fumes, heat, noise or vibrations in the living quarters.

Engine parts and accessories that require frequent inspection and/or servicing shall be readily accessible.

The insulating materials inside the engine compartment shall not sustain combustion.

5.1.2. *Ventilation*

The engine compartment shall be ventilated. The ingress of water into the engine compartment through openings must be minimised.

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5.1.3. *Exposed parts*

Unless the engine is protected by a cover or its own enclosure, exposed moving or hot parts of the engine that could cause personal injury shall be effectively shielded.

5.1.4. *Outboard propulsion engine starting*

Every outboard propulsion engine fitted on any watercraft shall have a device to prevent the engine being started in gear, except:

- (a) when the engine produces less than 500 Newton's (N) of static thrust;
- (b) when the engine has a throttle limiting device to limit thrust to 500 N at the time of starting the engine.

5.1.5. *Personal watercraft running without driver*

Personal watercraft shall be designed either with an automatic propulsion engine cut-off or with an automatic device to provide reduced speed, circular, forward movement when the driver dismounts deliberately or falls overboard.

5.1.6. Tiller-controlled outboard propulsion engines shall be equipped with an emergency stopping device which can be linked to the helmsman.

5.2. **Fuel system**

5.2.1. *General*

The filling, storage, venting and fuel-supply arrangements and installations shall be designed and installed so as to minimise the risk of fire and explosion.

5.2.2. *Fuel tanks*

Fuel tanks, lines and hoses shall be secured and separated or protected from any source of significant heat. The material the tanks are made of and their method of construction shall be in accordance with their capacity and the type of fuel.

Petrol fuel tank spaces shall be ventilated.

Petrol fuel tanks shall not form part of the hull and shall be:

- (a) protected against fire from any engine and from all other sources of ignition;
- (b) separated from living quarters.

Diesel fuel tanks may be integral with the hull.

5.3. **Electrical system**

Electrical systems shall be designed and installed so as to ensure proper operation of the watercraft under normal conditions of use and shall be such as to minimise risk of fire and electric shock.

All electrical circuits, except engine starting circuits supplied from batteries, shall remain safe when exposed to overload.

Electric propulsion circuits shall not interact with other circuits in such a way that either would fail to operate as intended.

Ventilation shall be provided to prevent the accumulation of explosive gases which might be emitted from batteries. Batteries shall be firmly secured and protected from ingress of water.

5.4. **Steering system**

5.4.1. *General*

Steering and propulsion control systems shall be designed, constructed and installed in order to allow the transmission of steering loads under foreseeable operating conditions.

5.4.2. *Emergency arrangements*

Every sailing recreational craft and single-propulsion engine non-sailing recreational craft with remote-controlled rudder steering systems shall be provided with emergency means of steering the recreational craft at reduced speed.

5.5. **Gas system**

Gas systems for domestic use shall be of the vapour-withdrawal type and shall be designed and installed so as to avoid leaks and the risk of explosion and be capable of being tested for leaks. Materials and components shall be suitable for the specific gas used to withstand the stresses and exposures found in the marine environment.

Each gas appliance intended by the manufacturer for the application for which it is used shall be so installed in accordance with the manufacturer's instructions. Each gas-consuming appliance must be supplied by a separate branch of the distribution system, and each appliance must be controlled by a separate closing device. Adequate ventilation must be provided to prevent hazards from leaks and products of combustion.

All watercraft with a permanently installed gas system shall be fitted with an enclosure to contain all gas cylinders. The enclosure shall be separated from the living quarters, accessible only from the outside and ventilated to the outside so that any escaping gas drains overboard.

In particular, any permanently installed gas system shall be tested after installation.

5.6. **Fire protection**

5.6.1. *General*

The type of equipment installed and the layout of the watercraft shall take account of the risk and spread of fire. Special attention shall be paid to the surroundings of open flame devices, hot areas or engines and auxiliary machines, oil and fuel overflows, uncovered oil and fuel pipes and routing of electrical wiring in particular away from heat sources and hot areas.

5.6.2. *Fire-fighting equipment*

Recreational craft shall be supplied with fire-fighting equipment appropriate to the fire hazard, or the position and capacity of fire-fighting equipment appropriate to the fire hazard shall be indicated. The craft shall not be put into service until the appropriate fire-fighting equipment is in place. Petrol engine compartments shall be protected by a fire extinguishing system that avoids the need to open the compartment in the event of fire. Where fitted, portable fire extinguishers shall be readily accessible and one shall be so positioned that it can easily be reached from the main steering position of the recreational craft.

5.7. **Navigation lights, shapes and sound signals**

Where navigation lights, shapes and sound signals are fitted, they shall comply with the 1972 COLREG (The International Regulations for Preventing Collisions at Sea) or CEVNI (European Code for Interior Navigations for inland waterways) Regulations as appropriate.

5.8. **Discharge prevention and installations facilitating the delivery ashore of waste**

Watercraft shall be constructed so as to prevent the accidental discharge of pollutants (oil, fuel, etc.) overboard.

Any toilet fitted in a recreational craft shall be connected solely to a holding tank system or water treatment system.

Recreational craft with installed holding tanks shall be fitted with a standard discharge connection to enable pipes of reception facilities to be connected with the recreational craft discharge pipeline.

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In addition, any through-the-hull pipes for human waste shall be fitted with valves which are capable of being secured in the closed position.

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) CE marking, as provided for in Article 18.

- 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

Type	Carbon monoxide CO = A + B/P _N ⁿ			Hydrocarbons HC = A + B/P _N ⁿ			Nitrogen oxides NO _x	Particulates PT
	A	B	n	A	B	n		
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	5,0	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 (*)

Swept Volume SV (L/cyl)	Rated Engine Power P _N (kW)	Particulates PT (g/kWh)	Hydrocarbons + Nitrogen Oxides HC + NO _x (g/kWh)
SV < 0,9	P _N < 37	The values referred to in table 1	
	37 ≤ P _N < 75 (*)	0,30	4,7
	75 ≤ P _N < 3 700	0,15	5,8
0,9 ≤ SV < 1,2	P _N < 3 700	0,14	5,8
1,2 ≤ SV < 2,5		0,12	5,8
2,5 ≤ SV < 3,5		0,12	5,8
3,5 ≤ SV < 7,0		0,11	5,8

(*) 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_x emission limit of 5,8 g/kWh.

(**) 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

Type of engine	Rated Engine Power P _N (kW)	Carbon monoxide CO (g/kWh)	Hydrocarbons + Nitrogen Oxides HC + NO _x (g/kWh)
Stern-drive and inboard engines	P _N ≤ 373	75	5
	373 < P _N ≤ 485	350	16
	P _N > 485	350	22
Outboard engines and PWC engines	P _N ≤ 4,3	500 - (5,0 × P _N)	30
	4,3 < P _N ≤ 40	500 - (5,0 × 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.

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Cycle E1, Mode number	1	2	3	4	5
Speed	Rated speed		Intermediate speed		Low-idle speed
Torque, %	100	75	75	50	0
Weighting factor	0,08	0,11	0,19	0,32	0,3
Speed	Rated speed		Intermediate speed		Low-idle speed
Cycle E3, Mode number	1	2	3	4	
Speed, %	100	91	80	63	
Power, %	100	75	50	25	
Weighting factor	0,2	0,5	0,15	0,15	
Cycle E4, Mode number	1	2	3	4	5
Speed, %	100	80	60	40	Idle
Torque, %	100	71,6	46,5	25,3	0
Weighting factor	0,06	0,14	0,15	0,25	0,40
Cycle E5, Mode number	1	2	3	4	5
Speed, %	100	91	80	63	Idle
Power, %	100	75	50	25	0
Weighting factor	0,08	0,13	0,17	0,32	0,3

Notified bodies may accept tests carried out on the basis of other tests cycles as specified in a harmonised standard and as applicable for the engine duty cycle.

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:

Petrol Fuels

Property	RF-02-99 Unleaded		RF-02-03 Unleaded	
	min	max	min	max
Research Octane Number (RON)	95	—	95	—
Motor Octane Number (MON)	85	—	85	—
Density at 15 °C (kg/m ³)	748	762	740	754
Initial boiling point (°C)	24	40	24	40
Mass fraction of sulphur (mg/kg)	—	100	—	10

Petrol Fuels				
Property	RF-02-99 Unleaded		RF-02-03 Unleaded	
	min	max	min	max
Lead content (mg/l)	—	5	—	5
Reid vapour pressure (kPa)	56	60	—	—
Vapour pressure (DVPE) (kPa)	—	—	56	60
Diesel Fuels				
Property	RF-06-99		RF-06-03	
	min	max	min	max
Cetane number	52	54	52	54
Density at 15 °C (kg/m ³)	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

Notified bodies may accept tests carried out on the basis of other tests fuel as specified in a harmonised standard.

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 $P_N \leq 373$ kW: 480 hours of operation or 10 years, whichever occurs first,
 - (ii) for engines in the category $373 < P_N \leq 485$ kW: 150 hours of operation or three years, whichever occurs first,
 - (iii) for the engine category $P_N > 485$ 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 a language or languages which can be easily understood by consumers and other end-users, as determined by the Member State in which the engine is to be marketed.

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 harmonised standard.

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C. Essential requirements for noise emissions

Recreational craft with inboard or stern drive engines without integral exhaust, personal watercraft and outboard engines and stern drive engines with integral exhaust shall comply with the essential requirements for noise emissions set out in this Part.

1. NOISE EMISSION LEVELS

- 1.1. Recreational craft with inboard or stern drive engines without integral exhaust, personal watercraft and outboard engines and stern drive engines with integral exhaust shall be designed, constructed and assembled so that noise emissions shall not exceed the limit values in the following table:

Rated Engine Power (single engine) in kW	Maximum Sound Pressure Level = L_{pASmax} in dB
$P_N \leq 10$	67
$10 < P_N \leq 40$	72
$P_N > 40$	75

where P_N = rated engine power in kW of a single engine at rated speed and L_{pASmax} = maximum sound pressure level in dB.

For twin-engine and multiple-engine units of all engine types an allowance of 3 dB may be applied.

- 1.2. As an alternative to sound measurement tests, recreational craft with inboard engine configuration or stern drive engine configuration, without integral exhaust, shall be deemed to comply with the noise requirements set out in point 1.1 if they have a Froude number of $\leq 1,1$ and a Power to Displacement ratio of ≤ 40 and where the engine and exhaust system are installed in accordance with the engine manufacturer's specifications.
- 1.3. Troupe number F_n shall be calculated by dividing the maximum recreational craft speed V (m/s) by the square root of the waterline length lwl (m) multiplied by a given gravitational acceleration constant, g , of $9,8 \text{ m/s}^2$.

$$F_n = \frac{V}{\sqrt{(g \cdot lwl)}}$$

'Power to Displacement ratio' shall be calculated by dividing the rated engine power P_N (in kW) by the recreational craft's displacement D (in tonnes)

$$\text{Power to Displacement ratio} = \frac{P_N}{D}$$

2. OWNER'S MANUAL

For recreational craft with inboard engine or stern drive engines without integral exhaust and personal watercraft, the owner's manual required under point 2.5 of Part A, shall include information necessary to maintain the recreational craft and exhaust system in a condition that, insofar as is practicable, will ensure compliance with the specified noise limit values when in normal use.

For outboard engines and stern drive engines with integral exhaust, the owner's manual required under Section 4 of Part B shall provide the instructions necessary to maintain the engine in a condition, that insofar as is practicable, will ensure compliance with the specified noise limit values when in normal use.

3. DURABILITY

The provisions on the durability in Section 3 of Part B shall apply mutatis mutandis to the compliance with the requirements on noise emissions set out in Section 1 of this part.