Translation. Only the Danish version has legal validity.

Order no. 1690 of 2December 2015
issued by the Ministry of Environment and Food of Denmark

Order on regulation of noise and air emissions from recreational craft and personal watercraft[1]

In pursuance of section 7(12)(i) and (v), section 7a(1), section 67, section 73(1), section 80 and section 110(3) of the act on environmental protection (*lov om miljøbeskytttelse*), cf. consolidated act no. 1317 of 19 November 2015, and section 32(1), section 33(1) and section 48 of act no. 1616 of 10 December 2015 on protection of the marine environment (*lov om beskyttelse af havmiljøet*), the following provisions are laid down:

Part 1
Purpose, scope and definitions

Section 1. The purpose of this order is to implement the provisions on the limit values for exhaust emissions and noise emissions stipulated in directive 2013/53/EU of the European Parliament and of the Council of 20 November 2013 on recreational craft and personal watercraft and repealing directive 94/25/EC.

Subsection 2. The Danish Maritime Authority shall implement the parts of directive 2013/53/EU of the European Parliament and of the Council of 20 November 2013 on recreational craft and personal watercraft and repealing directive 94/25/EC that are not related to the limit values for exhaust emissions and noise emissions, cf. order no. 1689 of 15 December 2015 on recreational craft and personal watercraft.

Section 2. This order shall apply to the following:

1) Exhaust emissions from:
   a) propulsion engines which are installed or specifically intended for installation on or in watercraft;
   b) propulsion engines which are installed on or in watercraft that are subject to a major engine modification.
2) Noise emissions from:
   a) recreational craft with inboard propulsion engine installations or stern drive propulsion engines without integral exhausts;
   b) personal watercraft;
   c) outboard propulsion engine installations; and
   d) stern drive propulsion engines with integral exhausts.

Subsection 2. This order shall not apply to the following:

1) Propulsion engines which are installed or specifically intended for installation in the following products:
   a) watercraft intended solely for racing, labelled as such by the manufacturer;
   b) experimental watercraft, provided that they are not placed on the Union market;
   c) watercraft specifically intended to be crewed and to carry passengers for commercial purposes, cf. however subsection 4, regardless of the number of passengers;
   d) submersibles;
   e) air cushion vehicles;
   f) hydrofoils;

[1] This order implements parts of Directive 2013/53/EU of the European Parliament and of the Council of 20 November 2013 on recreational craft and personal watercraft and repealing Directive 94/25/EC, Official Journal 2013, no. L 354, p. 90.

g) amphibious vehicles, i.e. wheeled or track-laying vehicles, which are able to operate both on water and on solid land.

2) Original and individual replicas of historical propulsion engines, which are based on a pre-1950 design, not produced in series and fitted on:
   a) original historical watercraft and individual replicas thereof designed before 1950, built predominantly with the original materials and labelled as such by the manufacturer; or
   b) watercraft built for own use, provided that they are not subsequently placed on the Union market during a period of five years from the putting into service of the watercraft;

3) Propulsion engines built for own use provided that they are not subsequently placed on the Union market during a period of five years from the putting into service of the watercraft.

Subsection 3. With regard to noise emissions, this order shall, furthermore, not apply to watercraft built for own use, provided that they are not subsequently placed on the Union market during a period of five years from the putting into service of the watercraft.

Subsection 4. The fact that the same watercraft could also be used for charter or for sports and leisure training shall not prevent it being covered by the directive when it is placed on the Union market for recreational purposes.

Subsection 5. This order shall not impede the showing of products referred to in subsection 1 at trade fairs, exhibitions, demonstrations and other similar events which do not comply with this order, provided that a visible sign clearly indicates that such products do not comply with directive 2013/53/EU and will not be made available or put into service in the Union until they have been made to comply.

Section 3. For the purposes of this order the following definitions shall apply:

1) 'Accredited laboratory' means a laboratory that has been accredited by the Danish Accreditation Fund (DANAK) or by a similar accreditation body that is a co-signatory to the EA (European co-operation for Accreditation) multilateral agreement on mutual recognition.
2) 'Accredited testing' means a test made by a laboratory accredited for the testing concerned.
3) 'Placing on the market' means the first making available of a product on the Union market;
4) 'CE marking' means a marking by which the manufacturer indicates that the product is in conformity with the applicable requirements set out in Union harmonisation legislation providing for its affixing;
5) 'Manufacturer' means any natural or legal person who manufactures a product or has such a product designed or manufactured, and markets that product under his name or trademark;
6) 'Means of propulsion' means the method by which the watercraft is propelled;
7) 'Propulsion engine' means any spark or compression ignition, internal combustion engine used directly or indirectly for propulsion purposes;
8) 'Recreational craft' means any watercraft of any type, excluding personal watercraft, intended for sports and leisure purposes of hull length from 2.5 m to 24 m, regardless of the means of propulsion;
9) 'Making available on the market' means any supply of a product for distribution, consumption or use on the Union market in the course of a commercial activity, whether in return for payment or free of charge;
10) 'Harmonised standard' means a European harmonised standard as adopted on the basis of a request from the Commission with a view to implementing EU harmonisation legislation, cf. article 2(1)(c) of Regulation (EU) No. 1025/2012;
11) 'Putting into service' means the first use of a product covered by this directive in the Union by its end-user;
12) 'Engine family' means the manufacturer's grouping of engines which, through their design, have similar exhaust or noise emission characteristics;

13) ‘Personal watercraft’ means a watercraft intended for sports and leisure purposes of less than 4 m in hull length which uses a propulsion engine having a water jet pump as its primary source of propulsion and designed to be operated by a person or persons sitting, standing or kneeling on, rather than within the confines of, a hull;
14) ‘Hull length’ means the length of the hull measured in accordance with the harmonised standard;
15) ‘Small and medium-sized enterprises’ means enterprises with fewer than 250 employees and with annual turnover smaller than 50 million euros or a total balance smaller than 43 million euros;
16) ‘Major engine modification’ means the modification of a propulsion engine which could potentially cause the engine to exceed the emission limits set out in annexes 1-4 or increases the rated power of the engine by more than 15 %;
17) ‘Watercraft’ means any recreational craft or personal watercraft;
18) ‘Watercraft built for own use’ means a watercraft predominantly built by its future user for his own use;
19) ‘Union harmonisation legislation’ means any Union legislation harmonising the conditions for the marketing of products.

Part 2
Requirements

Section 4. The products referred to in section 2(1) may be made available or put into service only if they do not endanger the health and safety of persons, property or the environment when correctly maintained and used in accordance with their intended purpose, and only on the condition that they meet the applicable essential requirements set out in this order.

Part 3
Requirements for exhaust emissions from engines

Section 5. Propulsion engines shall comply with the requirements for exhaust emissions set out in this part with associated annexes.

Section 6. Each engine shall be clearly marked with the following information:
1) 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;
2) engine type and, if applicable, engine family;
3) a unique engine serial number;
4) CE marking, cf. sections 16, 17 and 18 of order no. 1689 of 15 December 2015 on recreational craft and personal watercraft.

Subsection 2. The marks referred to in subsection 1 shall be durable for the normal life of the engine and shall be clearly legible and indelible. If labels or plates are used, they shall 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.

Subsection 3. The marks shall be secured to an engine part necessary for normal engine operation and not normally requiring replacement during the engine life.

Subsection 4. The marks shall be located so as to be readily visible after the engine has been assembled with all the components necessary for engine operation.

Section 7. 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 annex 1 and annex 2.

Section 8. Test cycles and weighting factors shall use the requirements of ISO standard 8178-4:2007, taking into account the values set out in annex 3.

Section 9. The test fuels used for exhaust emission testing shall meet the characteristics listed in annex 4.

Section 10. The engine manufacturer shall be responsible for defining those engines from his range which are to be included in an engine family.

Subsection 2. 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, shall normally be selected as the parent engine of the family.

Section 11. The engine manufacturer 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 annexes 1 and 2 throughout the normal life of the engine and under normal conditions of use.

Subsection 2. 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.

Subsection 3. The normal life of the engine is as follows:

1) For CI engines: 480 hours of operation or 10 years, whichever occurs first;
2) For SI inboard or stern drive engines with or without integral exhaust:
   a) for the engine category $P_N < 373$ kW: 480 hours of operation or 10 years, whichever occurs first,
   b) for engines in the category $373 < P_N \leq 485$ kW: 150 hours of operation or three years, whichever occurs first,
   c) for the engine category $P_N > 485$ kW: 50 hours of operation or one year, whichever occurs first;
3) Personal watercraft engines: 350 hours of operation or five years, whichever occurs first;
4) Outboard engines: 350 hours of operation or 10 years, whichever occurs first.

Part 4

Requirements for noise emissions from engines

Section 12. 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 annex 5.

Subsection 2. For twin-engine and multiple-engine units of all engine types, an allowance of 3 dB may be applied.

Section 13. As an alternative to noise 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 section 12 if they have a Froude number of ≤ 1.1 and a Power to Displace-

ment ratio of ≤ 40 and where the engine and exhaust system are installed in accordance with the engine manufacturer's specifications.

Section 14. 'Froude 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 m/s^2. See annex 5 for calculations.

Subsection 2. '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). See annex 5 for calculations.

Section 15. The provisions on life in section 11 shall also apply in accordance with the requirements on noise emissions in section 12.

Part 5
Requirements for measurements and tests

Section 16. Testing and sampling in accordance with parts 3 and 4 of this order shall be performed by an accredited laboratory.

Part 6
Control, etc.

Section 17. The Danish Maritime Authority, assisted by the Danish Environmental Protection Authority, shall control compliance with the provisions of this order.

Section 18. The Danish Environmental Protection Authority may prohibit the marketing and putting in service of a product covered by this order, cf. section 2(1) if it can present a risk to the environment or persons' health. A prohibition notice may be issued though the product concerned is provided with the CE marking described, has been correctly designed, constructed as well as, if relevant, fitted, maintained and used in accordance with its purpose.

Subsection 2. The Danish Environmental Protection Authority may prohibit marketing on the basis of information that a prohibition notice has been issued in another EU Member State as a consequence of non-compliance with directive 2013/53/EU.

Part 7
Appeals, penalty, entry into force, etc.

Section 19. Appeals against the decisions of the Danish Environmental Protection Authority and the Danish Maritime Authority cannot be brought before any other administrative authority.

Section 20. The provisions of this order shall not impede the making available on the market or the putting into service of products covered by Directive 94/25/EC, which are in compliance with the said Directive and which were made available or put into service before 18 January 2017.

Subsection 2. The provisions of this order shall not impede the making available on the market or the putting into service of outboard SI propulsion engines (SI engines) with power equal to or less than 15 kW

which comply with the stage I exhaust emission limits laid down in annex I and which were manufactured by small and medium-sized enterprises and placed on the market before 18 January 2020.

Section 21. Unless stricter penalty is due pursuant to other legislation, anyone shall be liable to punishment by fine who:

1) markets or puts into service a product in contravention of section 4;
2) markets or puts into service a product in contravention of section 5;
3) markets or puts into service a product that does not meet the limit values of annexes 1 and 2, cf. section 7;
4) markets or puts into service a product that has not been labelled pursuant to section 6;
5) uses test cycles and weighting factors in contravention of annex 3, cf. section 8;
6) uses test fuels for the exhaust emission test in contravention of annex 4, cf. section 9;
7) puts into service a product that does not meet the limit values of annex V, cf. section 12; or
8) contravenes a prohibition pursuant to section 18.

Subsection 2. The penalty may be increased to imprisonment for a term not exceeding two years if it was committed intentionally or grossly negligently and if:

1) the violation has resulted in damage to the environment, or risk of such damage, or
3) the violation has given or has been intended to give financial benefits to the contravenor or others, including savings.

Subsection 3. Companies, etc. (legal personalities) may be liable to punishment according to the provisions of part 5 of the penal code (*straffeloven*).

Section 22. This order shall enter into force on 1 January 2016.

Subsection 2. Order no. 1535 of 22 December 2004 on regulation of noise and air emissions from recreational craft shall be repealed.

Ministry of Environment and Food of Denmark, 2 December 2015

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Annex 1

Limit values for interim provision

Limit values applying for the purposes of section 20 and annex 2, table 1.

(g/kWh)								
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, and P_N is the rated engine power in kW.

Table 2

Exhaust emission limits

Table 1

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	
	$37 \leq P_N < 75$ (*)	0.30	4.7
	$75 \leq P_N < 3\,700$	0.15	5.8
$0.9 \leq SV < 1.2$	$P_N < 3\,700$	0.14	5.8
$1.2 \leq SV < 2.5$		0.12	5.8
$2.5 \leq SV < 3.5$		0.12	5.8
$3.5 \leq SV < 7.0$		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 2

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	$P_N \leq 373$	75	5
	$373 < P_N \leq 485$	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	$15.7 + \left[\frac{50}{P_N^{0.9}}\right]$

Table 3

Test cycles

Test cycles

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

Tests carried out on the basis of other tests cycles as specified in a harmonised standard and as applicable for the engine duty cycle may be acceptable.

Table 4

Test fuels

Test fuels

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				
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

Tests carried out on the basis of other test fuels as specified in a harmonised standard may be acceptable.

Table 5

Noise emissions

Noise emissions

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.

Calculation in section 14:

Froude number (F_n): $F_n = \frac{V}{\sqrt{g, lwl}}$

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