

COMMISSION REGULATION (EU) 2015/1189
of 28 April 2015
implementing Directive 2009/125/EC of the European Parliament and of the Council with regard
to ecodesign requirements for solid fuel boilers

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products ⁽¹⁾, and in particular Article 15(1) thereof,

After consulting the Consultation Forum referred to in Article 18 of Directive 2009/125/EC,

Whereas:

- (1) Directive 2009/125/EC requires the Commission to set ecodesign requirements for energy-related products that represent significant volumes of sales and trade, that have a significant environmental impact and that present significant potential for improvement in terms of their environmental impact without entailing excessive costs.
- (2) Article 16(2) of Directive 2009/125/EC provides that in accordance with the procedure referred to in Article 19(3) and the criteria set out in Article 15(2), and after consulting the Consultation Forum, the Commission should, if appropriate, introduce implementing measures for products offering a high potential for cost-effective reduction of greenhouse gas emissions, such as heating equipment, including solid fuel boilers and packages of a solid fuel boiler, supplementary heaters, temperature controls and solar devices.
- (3) The Commission has carried out a preparatory study to analyse the technical, environmental and economic aspects of the solid fuel boilers typically used in households and for commercial purposes. The study has been carried out with stakeholders and interested parties from the Union and third countries, and the results have been made publicly available.
- (4) The environmental aspects of solid fuel boilers that have been identified as significant for the purposes of this Regulation are energy consumption in the use phase and emissions of particulate matter (dust), organic gaseous compounds, carbon monoxide and nitrogen oxides in the use phase. The annual energy consumption related to solid fuel boilers is expected to be 530 petajoules (PJ) (approximately 12,7 million tonnes of oil equivalent 'Mtoe') in 2030 and annual emissions are expected to be 25 kilotonnes ('kt') of particulate matter, 25 kt of organic gaseous compounds and 292 kt of carbon monoxide in 2030. Emissions of nitrogen oxides are expected to increase because of potential new solid fuel boiler designs aiming at higher energy efficiency and lower organic emissions. The preparatory study shows that use-phase energy consumption and emissions by solid fuel boilers can be significantly reduced.
- (5) The preparatory study shows that further requirements regarding ecodesign parameters for products referred to in Part 1 of Annex I to Directive 2009/125/EC are not necessary in the case of solid fuel boilers. In particular, emissions of dioxins and furans are not identified as significant.
- (6) Boilers generating heat exclusively for providing hot drinking or sanitary water, boilers for heating and distributing gaseous heat transfer media and cogeneration boilers with an electrical capacity of 50 kW or more have specific technical characteristics and should therefore be exempted from this Regulation. Non-woody biomass boilers are exempted, because at present there is insufficient European-wide information to determine

⁽¹⁾ OJ L 285, 31.10.2009, p. 10.

appropriate levels for the ecodesign requirements for them and they may have further significant environmental impacts, such as furan and dioxin emissions. The appropriateness of setting ecodesign requirements for non-woody boilers will be reassessed when reviewing this Regulation.

- (7) The energy consumption and emissions of solid fuel boilers could be reduced by applying existing non-proprietary technologies without an increase in the combined costs of purchasing and operating these products.
- (8) The combined effect of the ecodesign requirements set out in this Regulation and Commission Delegated Regulation (EU) 2015/1187 ⁽¹⁾ is estimated to result by 2030 in annual energy savings of approximately 18 PJ (approximately 0,4 Mtoe), together with related carbon dioxide ('CO₂') emission reductions of approximately 0,2 Mt, and a reduction of 10 kt in particulate matter, 14 kt in organic gaseous compounds, and 130 kt in carbon monoxide.
- (9) Ecodesign requirements should harmonise energy consumption and emission requirements for solid fuel boilers throughout the Union, for the internal market to operate better and in order to improve the environmental performance of those products.
- (10) The ecodesign requirements should not affect the functionality or affordability of solid fuel boilers from the end-user's perspective and should not negatively affect health, safety or the environment.
- (11) The introduction of ecodesign requirements should give manufacturers sufficient time to redesign their products subject to this Regulation. The timing should take into account the impact on manufacturers' costs, in particular for small and medium-sized enterprises, while ensuring timely achievement of the objectives of this Regulation.
- (12) Product parameters should be measured and calculated using reliable, accurate and reproducible methods which take into account recognised state-of-the-art measurement and calculation methods, including, where available, harmonised standards adopted by the European standardisation organisations following a request by the Commission, in accordance with the procedures laid down in Regulation (EU) No 1025/2012 of the European Parliament and of the Council ⁽²⁾.
- (13) In accordance with Article 8 of Directive 2009/125/EC, this Regulation specifies which conformity assessment procedures apply. While it is appropriate to review the appropriateness of third party certification at the same time as required by Commission Regulation (EU) No 813/2013 ⁽³⁾ it is neither desirable nor seems feasible to make changes to the conformity assessment of solid fuel boilers before the entry into force of the ecodesign requirements.
- (14) In order to facilitate compliance checks, manufacturers should provide the information contained in the technical documentation referred to in Annexes IV and V to Directive 2009/125/EC insofar as that information relates to the requirements laid down in this Regulation.
- (15) To further limit the environmental impact of solid fuel boilers, manufacturers should provide information on disassembly, recycling and disposal.
- (16) In addition to the legally binding requirements laid down in this Regulation, indicative benchmarks for best available technologies should be determined to ensure that information on the life-cycle environmental performance of solid fuel boilers is widely available and easily accessible.
- (17) The measures provided for in this Regulation are in accordance with the opinion of the Committee established under Article 19(1) of Directive 2009/125/EC,

⁽¹⁾ Commission Delegated Regulation (EU) 2015/1187 of 27 April 2015 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of solid fuel boilers and packages of a solid fuel boiler, supplementary heaters, temperature controls and solar devices (see page 43 of this Official Journal)

⁽²⁾ Regulation (EU) No 1025/2012 of the European Parliament and of the Council of 25 October 2012 on European standardisation (OJ L 316, 14.11.2012, p. 12).

⁽³⁾ Commission Regulation (EU) No 813/2013 of 2 August 2013 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for space heaters and combination heaters (OJ L 239, 6.9.2013, p. 136).

HAS ADOPTED THIS REGULATION:

Article 1

Subject matter and scope

1. Without prejudice to Directive 2010/75/EU of the European Parliament and of the Council ⁽¹⁾, this Regulation establishes ecodesign requirements for placing on the market and putting into service solid fuel boilers with a rated heat output of 500 kilowatt ('kW') or less, including those integrated in packages of a solid fuel boiler, supplementary heaters, temperature controls and solar devices as defined in Article 2 of Delegated Regulation (EU) 2015/1187.
2. This Regulation shall not apply to:
 - (a) boilers generating heat exclusively for providing hot drinking or sanitary water;
 - (b) boilers for heating and distributing gaseous heat transfer media such as vapour or air;
 - (c) solid fuel cogeneration boilers with a maximum electrical capacity of 50 kW or more;
 - (d) non-woody biomass boilers.

Article 2

Definitions

In addition to the definitions set out in Article 2 of Directive 2009/125/EC, the following definitions shall apply for the purposes of this Regulation:

- (1) 'solid fuel boiler' means a device equipped with one or more solid fuel heat generators that provides heat to a water-based central heating system in order to reach and maintain at a desired level the indoor temperature of one or more enclosed spaces, with a heat loss to its surrounding environment of not more than 6 % of rated heat output;
- (2) 'water-based central heating system' means a system using water as a heat transfer medium to distribute centrally generated heat to heat emitting devices for the heating of enclosed spaces within buildings or parts thereof, including block heating or district heating networks;
- (3) 'solid fuel heat generator' means the part of a solid fuel boiler that generates the heat through the combustion of solid fuels;
- (4) 'rated heat output' or 'Pr' means the declared heat output of a solid fuel boiler when providing heating of enclosed spaces with the preferred fuel, expressed in kW;
- (5) 'solid fuel' means a fuel that is solid at normal indoor room temperatures, including solid biomass and solid fossil fuel;
- (6) 'biomass' means the biodegradable fraction of products, waste and residues from biological origin from agriculture (including vegetal and animal substances), forestry and related industries including fisheries and aquaculture, as well as the biodegradable fraction of industrial and municipal waste;
- (7) 'woody biomass' means biomass originating from trees, bushes and shrubs, including log wood, chipped wood, compressed wood in the form of pellets, compressed wood in the form of briquettes, and sawdust;
- (8) 'non-woody biomass' means biomass other than woody biomass, including straw, miscanthus, reeds, kernels, grains, olive stones, olive cakes and nut shells;
- (9) 'fossil fuel' means fuel other than biomass, including anthracite, brown coal, coke, bituminous coal; for the purposes of this Regulation it also includes peat;
- (10) 'biomass boiler' means a solid fuel boiler that uses biomass as the preferred fuel;

⁽¹⁾ Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (OJ L 334, 17.12.2010, p. 17).

- (11) 'non-woody biomass boiler' means a biomass boiler that uses non-woody biomass as the preferred fuel and for which woody biomass, fossil fuel or a blend of biomass and fossil fuel are not listed among its other suitable fuels;
- (12) 'preferred fuel' means the single solid fuel which is to be preferably used for the boiler according to the manufacturer's instructions;
- (13) 'other suitable fuel' means a solid fuel, other than the preferred fuel, which can be used in the solid fuel boiler according to the manufacturer's instructions and includes any fuel that is mentioned in the instruction manual for installers and end-users, on free access websites of manufacturers, in technical promotional material and in advertisements;
- (14) 'solid fuel cogeneration boiler' means a solid fuel boiler capable of simultaneously generating heat and electricity;
- (15) 'seasonal space heating energy efficiency' or ' η_s ' means the ratio between the space heating demand for a designated heating season supplied by a solid fuel boiler and the annual energy consumption required to meet that demand, expressed in %;
- (16) 'particulate matter' means particles of various shape, structure and density scattered in the gaseous phase of the flue gas.

For the purposes of Annexes II to V, additional definitions are set out in Annex I.

Article 3

Ecodesign requirements and timetable

1. The ecodesign requirements for solid fuel boilers are set out in Annex II.
2. Solid fuel boilers shall meet the requirements set out in point 1 and 2 of Annex II from 1 January 2020.
3. Compliance with ecodesign requirements shall be measured and calculated in accordance with the methods set out in Annex III.

Article 4

Conformity assessment

1. The conformity assessment procedure referred to in Article 8(2) of Directive 2009/125/EC shall be the internal design control set out in Annex IV to that Directive or the management system set out in Annex V to that Directive.
2. For the purposes of the conformity assessment pursuant to Article 8 of Directive 2009/125/EC, the technical documentation shall contain the information set out in point 2(c) of Annex II to this Regulation.

Article 5

Verification procedure for market surveillance purposes

Member States shall apply the verification procedure set out in Annex IV to this Regulation when performing the market surveillance checks referred to in Article 3(2) of Directive 2009/125/EC to ensure compliance with the requirements set out in Annex II to this Regulation.

Article 6

Indicative benchmarks

The indicative benchmarks for best-performing solid fuel boilers available on the market at the time of entry into force of this Regulation are set out in Annex V.

*Article 7***Review**

1. The Commission shall review this Regulation in the light of technological progress and present the result of that review to the Consultation Forum no later than 1 January 2022. In particular, the review shall assess whether it is appropriate:

- (a) to include solid fuel boilers with a rated heat output of up to 1 000 kilowatt;
- (b) to include non-woody biomass boilers, with ecodesign requirements for their specific types of pollutant emissions;
- (c) to set stricter ecodesign requirements beyond 2020 for energy efficiency and for emissions of particulate matter, organic gaseous compounds and carbon monoxide; and
- (d) to vary the verification tolerances.

2. The Commission shall review whether it is appropriate to introduce third party certification for solid fuel boilers and present the result of that review to the Consultation Forum no later than 22 August 2018.

*Article 8***Transitional provision**

Until 1 January 2020 Member States may allow the placing on the market and putting into service of solid fuel boilers which are in conformity with the national provisions in force regarding seasonal space heating energy efficiency, and emissions of particulate matter, organic gaseous compounds, carbon monoxide and nitrogen oxides.

*Article 9***Entry into force**

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, 28 April 2015.

For the Commission
The President
Jean-Claude JUNCKER

ANNEX I

Definitions applicable to Annexes II to V

For the purposes of Annexes II to V the following definitions shall apply:

- (1) 'seasonal space heating emissions' means:
 - (a) for automatically stoked solid fuel boilers, a weighted average of the emissions at rated heat output and the emissions at 30 % of the rated heat output, expressed in mg/m³;
 - (b) for manually stoked solid fuel boilers that can be operated at 50 % of the rated heat output in continuous mode, a weighted average of the emissions at rated heat output and the emissions at 50 % of the rated heat output, expressed in mg/m³;
 - (c) for manually stoked solid fuel boilers that cannot be operated at 50 % or less of the rated heat output in continuous mode, the emissions at rated heat output, expressed in mg/m³;
 - (d) for solid fuel cogeneration boilers, the emissions at rated heat output, expressed in mg/m³.
- (2) 'fossil fuel boiler' means a solid fuel boiler that has fossil fuel or a blend of biomass and fossil fuel as preferred fuel;
- (3) 'solid fuel boiler housing' means the part of a solid fuel boiler designed for fitting a solid fuel heat generator;
- (4) 'model identifier' means the code, usually alphanumeric, which distinguishes a specific solid fuel boiler model from other models with the same trade mark or manufacturer's name;
- (5) 'condensing boiler' means a solid fuel boiler in which, under normal operating conditions and at given operating water temperatures, the water vapour in the combustion products is partially condensed, in order to make use of the latent heat of this water vapour for heating purposes;
- (6) 'combination boiler' means a solid fuel boiler that is designed to also provide heat to deliver hot drinking or sanitary water at given temperature levels, quantities and flow rates during given intervals, and is connected to an external supply of drinking or sanitary water;
- (7) 'other woody biomass' means woody biomass other than: log wood with a moisture content of 25 % or less, chipped wood with a moisture content of 15 % or higher, compressed wood in the form of pellets or briquettes, or sawdust with a moisture content equal to or less than 50 %;
- (8) 'moisture content' means the mass of water in the fuel in relation to the total mass of the fuel as used in solid fuel boilers;
- (9) 'other fossil fuel' means fossil fuel other than bituminous coal, brown coal (including briquettes), coke, anthracite or blended fossil fuel briquettes;
- (10) 'electrical efficiency' or ' η_{el} ' means the ratio of the electricity output and the total energy input of a solid fuel cogeneration boiler, expressed in %, whereby the total energy input is expressed in terms of GCV or in terms of final energy multiplied by CC;
- (11) 'gross calorific value' or 'GCV' means the total amount of heat released by a unit quantity of fuel containing the appropriate moisture content, when it is burned completely with oxygen, and when the products of combustion are returned to ambient temperature; this quantity includes the condensation heat of the water vapour formed by the combustion of any hydrogen contained in the fuel;
- (12) 'conversion coefficient' or 'CC' means a coefficient reflecting the estimated 40 % average EU generation efficiency referred to in Directive 2012/27/EU of the European Parliament and of the Council ⁽¹⁾; the value of the conversion coefficient is $CC = 2,5$;
- (13) 'electric power requirement at maximum heat output' or ' el_{max} ' means the electric power consumption of the solid fuel boiler at rated heat output, expressed in kW, excluding electricity consumption from a back-up heater and from incorporated secondary emission abatement equipment;

⁽¹⁾ Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC (OJ L 315, 14.11.2012, p. 1).

- (14) 'electric power requirement at minimum heat output' or ' el_{min} ' means the electric power consumption of the solid fuel boiler at applicable part load, expressed in kW, excluding electricity consumption from a back-up heater and from incorporated secondary emission abatement equipment;
- (15) 'back-up heater' means a Joule-effect electric resistance element that generates heat only to prevent the solid fuel boiler or the water-based central heating system from freezing or when the external heat source supply is disrupted (including during maintenance periods) or out of order;
- (16) 'applicable part load' means for automatically stoked solid fuel boilers, operation at 30 % of rated heat output, and for manually stoked solid fuel boilers that can be operated at 50 % of rated heat output, operation at 50 % of rated heat output;
- (17) 'standby mode power consumption' or ' P_{sb} ' means the power consumption of a solid fuel boiler in standby mode, excluding from incorporated secondary emission abatement equipment, expressed in kW;
- (18) 'standby mode' means a condition where the solid fuel boiler is connected to the mains power source, depends on energy input from the mains power source to work as intended and provides only the following functions, which may persist for an indefinite time: reactivation function, or reactivation function and only an indication of enabled reactivation function, or information or status display;
- (19) 'seasonal space heating energy efficiency in active mode' or ' η_{son} ' means:
- for automatically stoked solid fuel boilers, a weighted average of the useful efficiency at rated heat output and the useful efficiency at 30 % of the rated heat output, expressed in %;
 - for manually stoked solid fuel boilers that can be operated at 50 % of the rated heat output in continuous mode, a weighted average of the useful efficiency at rated heat output and the useful efficiency at 50 % of the rated heat output, expressed in %;
 - for manually stoked solid fuel boilers that cannot be operated at 50 % or less of the rated heat output in continuous mode, the useful efficiency at rated heat output, expressed in %;
 - for solid fuel cogeneration boilers, the useful efficiency at rated heat output, expressed in %;
- (20) 'useful efficiency' or ' η ' means the ratio of the useful heat output and the total energy input of a solid fuel boiler, expressed in %, whereby the total energy input is expressed in terms of GCV or in terms of final energy multiplied by CC;
- (21) 'useful heat output' or ' P ' means the heat output of a solid fuel boiler transmitted to the heat carrier, expressed in kW;
- (22) 'temperature control' means the equipment that interfaces with the end-user regarding the values and timing of the desired indoor temperature, and communicates relevant data to an interface of the solid fuel boiler such as a central processing unit, thus helping to regulate the indoor temperature(s);
- (23) 'gross calorific value moisture free' or ' GCV_{mf} ' means the total amount of heat released by a unit quantity of fuel dried of inherent moisture, when it is burned completely with oxygen, and when the products of combustion are returned to ambient temperature; this quantity includes the condensation heat of the water vapour formed by the combustion of any hydrogen contained in the fuel;
- (24) 'equivalent model' means a model placed on the market with the same technical parameters set out in Table 1 of point 2 of Annex II as another model placed on the market by the same manufacturer.
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ANNEX II

Ecodesign requirements**1. Specific ecodesign requirements**

From 1 January 2020 solid fuel boilers shall comply with the following requirements:

- (a) seasonal space heating energy efficiency for boilers with a rated heat output of 20 kW or less shall not be less than 75 %;
- (b) seasonal space heating energy efficiency for boilers with a rated heat output of more than 20 kW shall not be less than 77 %;
- (c) seasonal space heating emissions of particulate matter shall not be higher than 40 mg/m³ for automatically stoked boilers and not be higher than 60 mg/m³ for manually stoked boilers;
- (d) seasonal space heating emissions of organic gaseous compounds shall not be higher than 20 mg/m³ for automatically stoked boilers and not be higher than 30 mg/m³ for manually stoked boilers;
- (e) seasonal space heating emissions of carbon monoxide shall not be higher than 500 mg/m³ for automatically stoked boilers and not be higher than 700 mg/m³ for manually stoked boilers;
- (f) seasonal space heating emissions of nitrogen oxides, expressed in nitrogen dioxide, shall not be higher than 200 mg/m³ for biomass boilers and not be higher than 350 mg/m³ for fossil fuel boilers;

These requirements shall be met for the preferred fuel and for any other suitable fuel for the solid fuel boiler.

2. Requirements for product information

From 1 January 2020 the following product information on solid fuel boilers shall be provided:

- (a) in the instruction manuals for installers and end-users, and on the free-access websites of manufacturers, their authorised representatives and importers:
 - (1) the information included in Table 1, with its technical parameters measured and calculated in accordance with Annex III and showing the number of significant figures indicated in the table;
 - (2) any specific precautions to be taken when the solid fuel boiler is assembled, installed or maintained;
 - (3) instruction on the proper way to operate the solid fuel boiler and on the quality requirements for the preferred fuel and any other suitable fuels;
 - (4) for solid fuel heat generators designed for solid fuel boilers, and solid fuel boiler housings to be equipped with such heat generators, their characteristics, the requirements for assembly (to ensure compliance with the ecodesign requirements for solid fuel boilers) and, where appropriate, the list of combinations recommended by the manufacturer;
- (b) on a part for professionals of the free-access websites of manufacturers, their authorised representatives and importers: information relevant to disassembly, recycling and disposal at end-of-life;
- (c) in the technical documentation for the purposes of conformity assessment pursuant to Article 4:
 - (1) the information listed in points (a) and (b);
 - (2) a list of all equivalent models, if applicable;
 - (3) where the preferred fuel or any other suitable fuel is other woody biomass, non-woody biomass, other fossil fuel or other blend of biomass and fossil fuel as referred to in Table 1, a description of the fuel sufficient for its unambiguous identification and the technical standard or specification of the fuel, including the measured moisture content, and the measured ash content, and for other fossil fuel also the measured volatile content of the fuel;

(d) the electrical capacity, marked in a permanent manner on the solid fuel cogeneration boiler.

The information referred to in point (c) may be merged with the technical documentation provided in accordance with measures under Directive 2010/30/EU.

Table 1

Information requirements for solid fuel boilers

Model identifier(s)

Stoking mode: [Manual: the boiler should be operated with a hot water storage tank of a volume of at least x (*) litre/Automatic: it is recommended that the boiler be operated with a hot water storage tank of a volume of at least x (**) litre]

Condensing boiler: [yes/no]

Solid fuel cogeneration boiler: [yes/no]

Combination boiler: [yes/no]

Fuel	Preferred fuel (only one):	Other suitable fuel(s):	η_s [x%]:	Seasonal space heating emissions (****)			
				PM	OGC	CO	NO _x
				[x] mg/m ³			
Log wood, moisture content \leq 25 %	[yes/no]	[yes/no]					
Chipped wood, moisture content 15-35 %	[yes/no]	[yes/no]					
Chipped wood, moisture content > 35 %	[yes/no]	[yes/no]					
Compressed wood in the form of pellets or briquettes	[yes/no]	[yes/no]					
Sawdust, moisture content \leq 50 %	[yes/no]	[yes/no]					
Other woody biomass	[yes/no]	[yes/no]					
Non-woody biomass	[yes/no]	[yes/no]					
Bituminous coal	[yes/no]	[yes/no]					
Brown coal (including briquettes)	[yes/no]	[yes/no]					
Coke	[yes/no]	[yes/no]					
Anthracite	[yes/no]	[yes/no]					
Blended fossil fuel briquettes	[yes/no]	[yes/no]					
Other fossil fuel	[yes/no]	[yes/no]					
Blended biomass (30-70 %)/fossil fuel briquettes	[yes/no]	[yes/no]					
Other blend of biomass and fossil fuel	[yes/no]	[yes/no]					

Characteristics when operating with the preferred fuel only:

Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Useful heat output				Useful efficiency			
At rated heat output	P_n (***)	x,x	kW	At rated heat output	η_n	x,x	%

At [30 %/50 %] of rated heat output, if applicable	P_p	[x,x/N.A.]	kW	At [30 %/50 %] of rated heat output, if applicable	η_p	[x,x/N.A.]	%
For solid fuel cogeneration boilers: Electrical efficiency				Auxiliary electricity consumption			
				At rated heat output	e_{max}^l	x,xxx	kW
At rated heat output	$\eta_{el,n}$	x,x	%	At [30 %/50 %] of rated heat output, if applicable	e_{min}^l	[x,xxx/N.A.]	kW
				Of incorporated secondary emission abatement equipment, if applicable		[x,xxx/N.A.]	kW
				In standby mode	P_{SB}	x,xxx	kW

Contact details	Name and address of the manufacturer or its authorised representative.
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- (*) Tank volume = $45 \times P_r \times (1 - 2,7/P_r)$ or 300 litres, whichever is higher, with P_r indicated in kW
(**) Tank volume = $20 \times P_r$ with P_r indicated in kW
(***) For the preferred fuel P_n equals P_r
(****) PM = particulate matter, OGC = organic gaseous compounds, CO = carbon monoxide, NO_x = nitrogen oxides

ANNEX III

Measurements and calculations

1. For the purposes of compliance and verification of compliance with the requirements of this Regulation, measurements and calculations shall be made using harmonised standards the reference numbers of which have been published for this purpose in the *Official Journal of the European Union*, or using other reliable, accurate and reproducible methods that take into account the generally recognised state-of-the-art methods. They shall meet the conditions and technical parameters set out in points 2 to 6.

2. General conditions for measurements and calculations

- (a) Solid fuel boilers shall be tested for the preferred fuel and any other suitable fuels indicated in Table 1 of Annex II, with the exception that boilers tested for chipped wood with a moisture content of more than 35 % meeting the applicable requirements are considered to also meet such requirements for chipped wood with a moisture content of 15-35 % and are not required to be tested for chipped wood with a moisture content of 15-35 %.
- (b) Declared values for seasonal space heating energy efficiency and seasonal space heating emissions shall be rounded to the nearest integer.
- (c) Any solid fuel heat generator designed for a solid fuel boiler, and any solid fuel boiler housing to be equipped with such a heat generator, shall be tested with an appropriate solid fuel boiler housing and heat generator.

3. General conditions for seasonal space heating energy efficiency

- (a) The useful efficiency values η_m , η_p and the useful heat output values P_m , P_p shall be measured, as appropriate. For solid fuel cogeneration boilers the electrical efficiency value $\eta_{el,n}$ is also measured.
- (b) The seasonal space heating energy efficiency η_s shall be calculated as the seasonal space heating energy efficiency in active mode η_{son} , corrected by contributions accounting for temperature controls, auxiliary electricity consumption, and, for solid fuel cogeneration boilers, by adding the electrical efficiency multiplied by a conversion coefficient CC of 2,5.
- (c) The consumption of electricity shall be multiplied by a conversion coefficient CC of 2,5.

4. Specific conditions for seasonal space heating energy efficiency

- (a) The seasonal space heating energy efficiency η_s is defined as:

$$\eta_s = \eta_{son} - F(1) - F(2) + F(3)$$

where:

- (1) η_{son} is the seasonal space heating energy efficiency in active mode expressed as a percentage, calculated as set out in point 4(b);
- (2) $F(1)$ accounts for a loss of seasonal space heating energy efficiency due to adjusted contributions of temperature controls; $F(1) = 3 \%$;
- (3) $F(2)$ accounts for a negative contribution to the seasonal space heating energy efficiency by auxiliary electricity consumption, expressed as a percentage, and is calculated as set out in point 4(c);
- (4) $F(3)$ accounts for a positive contribution to the seasonal space heating energy efficiency by the electrical efficiency of solid fuel cogeneration boilers, expressed as a percentage, and is calculated as follows:

$$F(3) = 2,5 \times \eta_{el,n}$$

(b) the seasonal space heating energy efficiency in active mode, η_{son} , is calculated as follows:

- (1) for manually stoked solid fuel boilers that can be operated at 50 % of the rated heat output in continuous mode, and for automatically stoked solid fuel boilers:

$$\eta_{son} = 0,85 \times \eta_p + 0,15 \times \eta_n$$

- (2) for manually stoked solid fuel boilers that cannot be operated at 50 % or less of the rated heat output in continuous mode, and for solid fuel cogeneration boilers:

$$\eta_{son} = \eta_n$$

(c) $F(2)$ is calculated as follows:

- (1) for manually stoked solid fuel boilers that can be operated at 50 % of the rated heat output in continuous mode, and for automatically stoked solid fuel boilers:

$$F(2) = 2,5 \times (0,15 \times el_{max} + 0,85 \times el_{min} + 1,3 \times P_{SB}) / (0,15 \times P_n + 0,85 \times P_p)$$

- (2) for manually stoked solid fuel boilers that cannot be operated at 50 % or less of the rated heat output in continuous mode, and for solid fuel cogeneration boilers:

$$F(2) = 2,5 \times (el_{max} + 1,3 \times P_{SB}) / P_n$$

5. Calculation of gross calorific value

The gross calorific value (GCV) shall be obtained from the gross calorific value moisture free (GCV_{mf}) by applying the following conversion:

$$GCV = GCV_{mf} \times (1 - M)$$

where:

- (a) GCV and GCV_{mf} are expressed in megajoules per kilogram;
 (b) M is the moisture content of the fuel, expressed as a proportion.

6. Seasonal space heating emissions

- (a) Emissions of particulate matter, organic gaseous compounds, carbon monoxide and nitrogen oxides shall be expressed standardised to a dry flue gas basis at 10 % oxygen and standard conditions at 0 °C and 1 013 millibar.

- (b) The seasonal space heating emissions E_s of respectively particulate matter, organic gaseous compounds, carbon monoxide and nitrogen oxides are calculated as follows:

- (1) for manually stoked solid fuel boilers that can be operated at 50 % of the rated heat output in continuous mode, and for automatically stoked solid fuel boilers:

$$E_s = 0,85 \times E_{s,p} + 0,15 \times E_{s,n}$$

- (2) for manually stoked solid fuel boilers that cannot be operated at 50 % or less of the rated heat output in continuous mode, and for solid fuel cogeneration boilers:

$$E_s = E_{s,n}$$

where:

- (a) $E_{s,p}$ are the emissions of respectively particulate matter, organic gaseous compounds, carbon monoxide and nitrogen oxides measured at 30 % or 50 % of rated heat output, as applicable;
 (b) $E_{s,n}$ are the emissions of respectively particulate matter, organic gaseous compounds, carbon monoxide and nitrogen oxides measured at rated heat output.

- (c) Emissions of particulate matter shall be measured by a gravimetric method excluding any particulate matter formed by organic gaseous compounds when flue gas is mixed with ambient air.
 - (d) Emissions of nitrogen oxides shall be calculated as the sum of nitrogen monoxide and nitrogen dioxide, and expressed in nitrogen dioxide.
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ANNEX IV

Verification procedure for market surveillance purposes

When performing the market surveillance checks referred to in Article 3(2) of Directive 2009/125/EC, the authorities of the Member States shall apply the following verification procedure for the requirements set out in Annex II:

- (1) The Member State authorities shall test one single unit per model. The unit shall be tested with one or more fuels with characteristics in the same range as the fuel(s) that were used by the manufacturer to perform measurements according to Annex III.
- (2) The model shall be considered to comply with the applicable requirements set out in Annex II to this Regulation if:
 - (a) the values in the technical documentation comply with the requirements set out in Annex II; and
 - (b) testing of the model parameters listed in Table 2 shows compliance for all of those parameters.
- (3) If the result referred to in point 2(a) is not achieved, the model and all other equivalent models shall be considered not to comply with this Regulation. If the result referred to in point 2(b) is not achieved, the Member State authorities shall randomly select three additional units of the same model for testing. As alternative, the three additional units selected may be of one or more equivalent models which have been listed as equivalent product in the manufacturer's technical documentation.
- (4) The model shall be considered to comply with the applicable requirements set out in Annex II to this Regulation if testing of the model parameters listed in Table 2 for the three additional units shows compliance for all of those parameters.
- (5) If the results referred to in point 4 are not achieved, the model and all other equivalent models shall be considered not to comply with this Regulation. The Member State authorities shall provide the test results and other relevant information to the authorities of the other Member States and to the Commission within one month of taking the decision on non-compliance of the model.

Member State authorities shall use the measurement and calculation methods set out in Annex III.

The verification tolerances set out in this Annex relate only to the verification of the measured parameters by Member State authorities and shall not be used by the manufacturer or importer as an allowed tolerance to establish the values in the technical documentation.

Table 2

Parameter	Verification tolerances
Seasonal space heating energy efficiency η_s	The determined value ⁽¹⁾ is not more than 4 % lower than the declared value of the unit.
Emissions of particulate matter	The determined value ⁽¹⁾ is not more than 9 mg/m ³ higher than the declared value of the unit.
Emissions of organic gaseous compounds	The determined value ⁽¹⁾ is not more than 7 mg/m ³ higher than the declared value of the unit.
Emissions of carbon monoxide	The determined value ⁽¹⁾ is not more than 30 mg/m ³ higher than the declared value of the unit.
Emissions of nitrogen oxides	The determined value ⁽¹⁾ is not more than 30 mg/m ³ higher than the declared value of the unit.

⁽¹⁾ The arithmetic average of the values determined in the case of three additional units tested as prescribed in point 3.

ANNEX V

Indicative benchmarks referred to in Article 6

The indicative benchmarks for the best available technology on the market for solid fuel boilers at the time of entry into force of this Regulation are as follows. At the time of entry into force of this Regulation, no single solid fuel boiler was identified meeting all the values specified in points 1 and 2. Several solid fuel boilers met one or more of these values:

1. For seasonal space heating energy efficiency: 96 % for solid fuel cogeneration boilers, 90 % for condensing boilers and 84 % for other solid fuel boilers.
2. For seasonal space heating emissions:
 - (a) 2 mg/m³ for particulate matter for biomass boilers; 10 mg/m³ for fossil fuel boilers;
 - (b) 1 mg/m³ for organic gaseous compounds;
 - (c) 6 mg/m³ for carbon monoxide;
 - (d) 97 mg/m³ for nitrogen oxides for biomass boilers; 170 mg/m³ for fossil fuel boilers.

The benchmarks specified in points 1 and 2(a) to (d) do not necessarily imply that a combination of those values is achievable for a single solid fuel boiler. An example of a good combination is an existing model with a seasonal space heating energy efficiency of 81 % and seasonal space heating emissions of particulate matter of 7 mg/m³, of organic gaseous compounds of 2 mg/m³, of carbon monoxide of 6 mg/m³ and of nitrogen oxides of 120 mg/m³.
