Annexes

To the

Commission Regulation (EU)

setting ecodesign requirements for solid fuel boilers pursuant to Directive 2009/125/EC of the European Parliament and of the Council and repealing Commission Regulation (EU) 2015/1189

Version of 12 of February 2024

ANNEX I
Definitions for the purpose of Annexes II to V

For 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/m^3;

(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/m^3;

(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/m^3;

(d) for solid fuel cogeneration boilers, the emissions at rated heat output, expressed in mg/m^3;

(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) 'biomass boiler' means a solid fuel boiler that uses biomass as the preferred fuel;

(4) '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;

(5) 'non-woody biomass' means biomass other than woody biomass, including straw, miscanthus, reeds, kernels, grains, olive stones, olive cakes and nut shells;

(6) '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, compressed wood in the form of briquettes, and sawdust;

(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) ‘solid fuel boiler housing’ means the part of a solid fuel boiler designed for fitting a solid fuel heat generator;

(9) ‘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;

(10) ‘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;

(11) ‘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;

(12) ‘other fossil fuel’ means fossil fuel other than bituminous coal, brown coal, coke (including briquettes), coke, anthracite or blended fossil fuel briquettes;

(13) ‘electrical efficiency’ (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* and/or in terms of final energy multiplied by *CC*;

(14) ‘gross calorific value’ (*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;

(15) conversion coefficient’ (CC) means the primary energy factor for electricity conversion coefficient of 1.9 set under Directive (EU) 2023/1791[5] “ ~~‘conversion coefficient’ (*CC*) means the default coefficient for primary energy per kWh electricity referred to in Directive 2012/27/EU of the European Parliament and of the Council[1]; the value of the conversion coefficient is *CC* = 1,9~~;

(16) ‘auxiliary electricity consumption at rated heat output’ (el_{max}) means the electric power consumption of the solid fuel boiler while providing the rated heat output, excluding electricity consumption from a back-up heater and from incorporated secondary emission abatement equipment, expressed in kW;

(17) ‘auxiliary electricity consumption at minimum heat output’ (el_{min}) means the electric power consumption of the solid fuel boiler while providing the applicable part load, excluding electricity consumption from a back-up heater and from incorporated secondary emission abatement equipment, expressed in kW;

(18) ‘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;

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1 OJ L 315, 14.11.2012, p. 1.

(19) ‘full load’ means operation at rated heat output;

(20) ‘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;

(21) ‘standby mode’ means a condition where the product is connected to the mains power source and provides only one or more of the following functions, which may persist for an indefinite time:

(a) reactivation function, or reactivation function and only an indication of enabled reactivation function;

(b) reactivation function through a connection to a network (‘networked standby’);

(c) information or status display;

(22) ‘reactivation function’ means a function that via a remote switch, a remote control, an internal sensor or timer provides a switch from standby mode to another mode, including active mode, providing additional functions;

(23) ‘information or status display’ means a continuous function providing information or indicating the status of the equipment on a display, including clocks. A simple light indicator is not considered a status display;

(24) ‘active mode’ means a condition in which the equipment is connected to the mains power source and at least one of the main functions has been activated;

(25) ‘main function’ means a function delivering the main service(s) for which the equipment is designed, tested and marketed, and which corresponds to the intended use of the equipment;

(26) ‘off mode’ means a condition in which the equipment is connected to the mains power source and is not providing any function, or it is in a condition providing only:

(a) an indication of off mode condition;

(b) functionalities intended to ensure electromagnetic compatibility under Directive 2014/30/EU of the European Parliament and of the Council;

(27) ‘idle mode’ means a condition in which the product is connected to the mains power source and is able to automatically provide heat to the room according to the setpoint temperature;

(28) ‘network’ means a communication infrastructure with a topology of links, an architecture, including the physical components, organisational principles, communication procedures and formats (protocols);

(29) ‘auxiliary electricity consumption’ means the annual electricity required for the designated operation of a solid fuel boiler, excluding electricity consumption from a back-up heater, calculated from the electric power consumption at full load (el_{max}), at applicable part load (el_{min}), in standby mode and default operating hours at each mode, expressed in kWh in terms of final energy;

(30) ‘seasonal space heating energy efficiency in active mode’ (η_{son}) means

(a) 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 %;

(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 useful efficiency at

rated heat output and the useful efficiency at 50 % of the rated heat output, expressed in %;

(c) for manually stoked solid fuel boilers that cannot be operated at 50% or less of the rated heat ouput in continuous mode, the useful efficiency at rated heat output, expressed in %;

(d) for solid fuel cogeneration boilers, the useful efficiency at rated heat output, expressed in %;

(31) 'useful efficiency' at either the rated heat output (η_n) or part load (η_p) means:

(a) for solid fuel boilers, the ratio of the useful heat output and the total energy input in kW in terms of the GCV of the fuel;

(b) for solid fuel cogeneration boilers, the ratio between the sum of the useful heat output and of the electric output multiplied by the electricity conversion factor of 2,65 in kW, and the total energy input in kW in terms of the GCV of the fuel;

(32) 'useful heat output' (P) means the heat output of a solid fuel boiler transmitted to the heat carrier, expressed in kW;

(33) 'temperature control' means the equipment that provides one or more control functions and that interfaces with the end-to regulate the heat output of a solid fuel boiler in scope of this Regulation;

(34) 'gross calorific value moisture free' (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;

ANNEX II
Ecodesign requirements referred to in Article 3

1. REQUIREMENTS FOR SEASONAL SPACE HEATING ENERGY EFFICIENCY

Seasonal space heating energy efficiency of solid fuel boilers shall not be less than 82%;

2. REQUIREMENTS FOR SEASONAL SPACE HEATING POLLUTANT EMISSIONS

(1) Seasonal space heating pollutant emissions of particulate matter (PM) from solid fuel boilers shall not exceed the following values, measured at 10% O_2:

(a) emissions of PM by solid fuel boilers using woody biomass and solid fossil fuel shall not exceed 3 mg/m^3;

(b) emissions of PM by solid fuel boilers using non-woody biomass shall not exceed 30 mg/m^3 at 10% O_2;

(2) seasonal space heating emissions of organic gaseous compounds (OGC) from solid fuel boilers shall not exceed the following values:

(a) emissions of OGC by solid fuel boilers using woody biomass and solid fossil fuel shall not exceed 10 mg/m^3 at 10% O_2;

(b) emissions of OGC by solid fuel boilers using non-woody biomass shall not exceed 15 mg/m^3;

(3) seasonal space heating emissions of carbon monoxide (CO) from solid fuel boilers shall not exceed the following values:

(a) emissions of CO by solid fuel boilers using solid fossil fuel shall not exceed 250 mg/m^3;

(b) emissions of CO by solid fuel boilers using woody biomass shall not exceed 350 mg/m^3;

(4) seasonal space heating emissions of nitrogen oxides (NOx) from solid fuel boilers shall not exceed the following values:

(a) emissions of NOx by solid fuel boilers using solid fossil fuel shall not exceed 200 mg/m^3;

(b) emissions of NOx by solid fuel boilers using woody biomass shall not exceed 350 mg/m^3;

3. REQUIREMENTS FOR LOW POWER MODES

Solid fuel boilers shall meet the following requirements:

(1) they shall have an off-mode or a standby mode or both. The power consumption in off-mode (P_o) shall not exceed 0,30 W and the power consumption in standby mode (P_{sm}) shall not exceed 0,50 W;

(2) if the standby mode includes the display of information or status, the power consumption of that mode shall not exceed 1,00 W;

(3) if the standby mode provides for a connection to a network and provides networked standby as defined in Article 2, point (10) of Regulation (EU) 2023/826, the power consumption of this mode (P_{nsm}) shall not exceed 2,00 W; if the communication between the solid fuel boiler and the temperature control is wireless or through powerline carrier the power consumption of this mode shall not exceed 3,00 W;

(4) if they provide for an idle mode, the power consumption of the idle mode (P_{idle}) shall not exceed 1,00 W as average over 1 hour, except if the idle mode depends on the input from a network connection to automatically provide heat, in which case the power consumption shall not exceed 3,00 W as average over 1 hour.

4. PRODUCT INFORMATION REQUIREMENTS

(1) The instruction manuals for installers and end-users, free access websites of manufacturers, their authorised representatives and importers, shall contain the following elements:

(a) the information set out in Table 1, with the technical parameters measured and calculated in accordance with Annex III and showing the significant figures indicated in that table;

(b) any specific precautions that shall be taken when the solid fuel boiler is assembled, installed or maintained;

(c) information relevant to disassembly, recycling and/or disposal at end-of-life;

(d) 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;

(e) 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;

(2) manufacturers, importers or authorised representatives of solid fuel boilers shall provide a quick user guide on how to operate the solid fuel local space heater in order to maximise energy efficiency and minimise pollutant emissions, including the following information:

(a) recommended fuels;

(b) recommended layering of the fuel in the firebox;

(c) type and position of the firelighter;

(d) procedure for stoking the fire;

(e) recommended amount of fuel for ignition;

(f) recommended time of refuelling and recommended amount of fuel for each refuelling;

(g) procedure for ending the operation of the solid fuel boiler;

(h) an explanation on how failure to follow the indications in the quick user guide may result in lower energy efficiency and higher pollutant emissions, for instance, in case of fuel loading above the recommended quantities;

(i) instructions in the event of faults during operation;

(j) any indication related to the safe operation of the solid fuel local space heater;

(3) for solid fuel cogeneration boilers, the electrical capacity shall be marked in a permanent manner on the appliance.

5. RESOURCE EFFICIENCY REQUIREMENTS

(1) Availability of spare parts:

(a) For all models, for which units are placed on the market as from 1 July 2027, manufacturers, importers or authorised representatives of solid fuel boilers shall make available to professional repairers at least the following spare parts:

- temperature control;
- printed circuit boards;
- buttons and switches;
- display or status indicators;
- impellers;
- temperature control sensors;
- buttons and switches;
- remote control sensors;

(b) availability of spare parts referred to in point (a), shall be ensured for a minimum period starting at the latest on 1 July 2027 or two years after the placing on the market of the first unit of the model, whichever is the latest, and ending at least, 10 years after placing the last unit of the concerned model on the market. For this purpose, the list of spare parts and the procedure for ordering them shall be publicly available on the free access website of the manufacturer, importer or authorised representative, at least during the minimum period indicated above;

(c) for models of automatically stoked solid fuel boilers, for which units are placed on the market as from 1 July 2027, manufacturers, importers or authorised representatives of solid fuel boilers shall make available to professional repairers and users at least the following spare parts:

- remote control;
- fuel feeder;

(d) availability of spare parts, under point (c), shall be ensured for a minimum period starting at the moment of placing that unit on the market and ending at least 10 years after placing the last unit of the concerned model on the market. For this purpose, the list of spare parts, the procedure for ordering them and the repair and maintenance information shall be publicly available on the free access website of the manufacturer, importer or authorised representative, at least during the minimum period indicated above;

(e) manufacturers, importers or authorised representatives of solid fuel boilers shall ensure that the spare parts mentioned in points (a) and (c) can be replaced with the use of commonly available tools and without permanent damage to the solid fuel boiler;

(f) during the periods referred to in points (b) and (d), manufacturers, importers or authorised representatives shall provide indicative pre-tax prices at least in euro for spare parts listed in points (a) and (c), including the indicative pre-tax price of fasteners and tools, if supplied with the spare part on the free access website of the manufacturer, importer or authorised representative;

(g) manufacturers, importers or authorised representatives of solid fuel boilers using software shall make available software and firmware updates for a minimum of 10 years after placing the product on the market, and these updates shall be provided free of charge.

(2) Maximum delivery time of spare parts:

During the period of availability of spare parts, the manufacturer, importer or authorised representative shall ensure the delivery of the spare parts within 10 working days after having received the order.

(3) Access to repair and maintenance information:

During the period mentioned under point 1(b) the manufacturer, importer or authorised representative shall provide access to the appliance repair and maintenance information to professional repairers in the following conditions:

(a) the manufacturer's, importer's or authorised representative's website shall indicate the process for professional repairers to request access to information; in order to accept such a request, the manufacturers, importers or authorised representatives may only require the professional repairer to demonstrate that:

(i) the professional repairer has the technical competence to repair solid fuel boilers and complies with the applicable regulations for repairers of solid fuel boilers in the Member States where it operates. Reference to an official registration system as professional repairer, where such system exists in the Member States concerned, shall be accepted as proof of compliance with this point;

(ii) the professional repairer is covered by insurance covering liabilities resulting from its activity regardless of whether this is required by the Member State;

(b) manufacturers, importers or authorised representatives shall accept or refuse the registration within 5 working days from the date of request;

(c) manufacturers, importers or authorised representatives may charge reasonable and proportionate fees for access to the repair and maintenance information or for receiving regular updates. A fee is reasonable if it does not discourage access by failing to take into account the extent to which the professional repairer uses the information;

(d) once registered, a professional repairer shall have access, within one working day after requesting it, to the requested repair and maintenance information. The information may be provided for an equivalent solid fuel boiler model or local space heater model of the same family, if relevant;

(e) the repair and maintenance information shall include:

(i) the unequivocal solid fuel boiler identification;

(ii) a disassembly map or exploded view;

(iii) technical manual of instructions for repair;

(iv) list of necessary repair and test equipment;

(v) component and diagnosis information (such as minimum and maximum theoretical values for measurements);

(vi) wiring and connection diagrams;

(vii) diagnostic fault and error codes (including manufacturer-specific codes, where applicable);

(viii) instructions for installation of relevant software and firmware including reset software;

(ix) information on how to access data records of reported failure incidents stored on the solid fuel boiler (where applicable); and

(x) electronic board diagrams;

(f) without prejudice to intellectual property rights, third parties shall be allowed to use and publish unaltered repair and maintenance information initially published by the manufacturer, importer or authorised representative and covered by point (e) once the manufacturer, importer or authorised representative terminates access to that information after the end of the period of access to repair and maintenance information.

(4) Requirements for dismantling for material recovery and recycling while avoiding pollution:

(a) manufacturers, importers or authorised representatives shall ensure that local space heaters are designed in such a way that the materials and components referred to in Annex VII to Directive 2012/19/EU of the European Parliament and of the Council[2] can be removed from the appliance with the use of commonly available tools;

(b) manufacturers, importers or authorised representatives shall fulfil the obligations laid down in Article 15(1) of Directive 2012/19/EU.

6. TECHNICAL DOCUMENTATION

The technical documentation for solid fuel boilers for the purposes of conformity assessment pursuant to Article 4 and of the verification procedure set out in Annex V shall contain the following elements:

(1) the declared values of all parameters specified in Table 1; for this purpose, the same layout of Table 1 may be used;

(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;

(4) all other elements indicated in Article 4, where applicable.

[2] Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE) (OJ L 197, 24.7.2012, p. 38).

Table 1: Information requirements for solid fuel boilers

Model(s): [information identifying the model(s) to which the information relates]							
Stoking mode: [Manual: this boiler has to be operated with a hot water storage tank of a volume of at least x ([1]) litre / Automatic: it is recommended to operate this boiler with a hot water storage tank of a volume of at least x ([2]) 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 [%]**:**	Seasonal space heating emissions ([4])			
				PM	OGC	CO	NO_x
				mg/m^3			
Log wood, moisture content ≤ 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	[yes/no]	[yes/no]					
Sawdust, moisture content ≤ 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	[yes/no]	[yes/no]					
Coke	[yes/no]	[yes/no]					
Anthracite	[yes/no]	[yes/no]					
Other fossil fuel	[yes/no]	[yes/no]					
Characteristics when operating with the preferred fuel only:							

Item	**Symbol**	**Value**	**Unit**
Useful heat output			
At rated heat output	P_n ([3])	x,x	kW
At [30%/50%] of rated heat output, if applicable	P_p	[x,x/ N.A.]	kW
For solid fuel cogeneration boilers: electrical efficiency			
At rated heat output	$\eta_{el,n}$	x,x	%

Item	**Symbol**	**Value**	**Unit**
Useful efficiency			
At rated heat output	η_n	x,x	%
At [30%/50%] of rated heat output, if applicable	η_p	[x,x/ N.A.]	%
Auxiliary electricity consumption			
At rated heat output	*elmax*	x,x	kW
At [30%/50%] of rated heat output, if applicable	*elmin*	[x,x/ N.A.]	kW
In standby mode	P_{SB}	x,xxx	kW

Contact details	Name and address of the manufacturer or its authorised representative.

([1]) Volume tank = 45 * P_r * (1 – 2.7 / P_r) or 300 litre whichever is higher, with P_r indicated in kW

([2]) Volume tank = 20 * P_r with P_r indicated in kW

([3]) For the preferential fuel P_n equals P_r

([4]) PM= particulate matter, OGC= organic gaseous compounds, CO= carbon monoxide, NO_x= nitrogen oxides, PN= particulate number

ANNEX III
Measurements and calculations referred to in Article 3

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.

1. GENERAL CONDITIONS FOR MEASUREMENTS AND CALCULATIONS

(1) 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%;

(2) declared values for rated and partial heat output and for seasonal space heating energy efficiency shall be rounded to the nearest one decimal place;

(3) declared values for seasonal space heating pollutant emissions shall be rounded to the nearest integer;

(4) 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.

2. GENERAL CONDITIONS FOR SEASONAL SPACE HEATING ENERGY EFFICIENCY

(1) The useful efficiency values η_n, η_p and the useful heat output values P_n, P_p shall be measured, as appropriate. For solid fuel cogeneration boilers the electrical efficiency value $\eta_{el,n}$ shall also be measured.

(2) 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 2,65.

(3) The consumption of electricity shall be multiplied by the conversion coefficient (*CC*).

3. SPECIFIC CONDITIONS FOR SEASONAL SPACE HEATING ENERGY EFFICIENCY

(1) The seasonal space heating energy efficiency η_s , except solid fuel cogeneration boilers, is defined as:

$$\eta_s = \eta_{son} \times \left(1 - F(1) - F(2)\right)$$

where:

– η_{son} is the seasonal space heating energy efficiency in active mode expressed in %;

– *F(1)* is a correction accounting for a negative contribution to the seasonal space heating energy efficiency due to adjusted contributions of temperature controls; *F(1)* = 0,03;

– *F(2)* is a correction factor accounting for a negative contribution to the seasonal space heating energy efficiency by auxiliary electricity consumption;

(2) The seasonal space heating energy efficiency of solid fuel cogeneration boilers η_s, is defined as:

$$\eta_s = (\eta_{son} + 2{,}65 \times \eta_{el,n}) \times \big(1 - F(1) - F(2)\big)$$

(3) The seasonal space heating energy efficiency in active mode η_{son} shall be calculated as follows:

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

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

(b) 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:

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

(4) *F(2)* shall be calculated as follows:

(a) 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:

$$F(2) = CC \times (0{,}15 \times el_{max} + 0{,}85 \times el_{min})/\big(0{,}15 \times P_n + 0{,}85 \times P_p\big)$$

(b) 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:

$$F(2) = CC \times el_{max}/P_n$$

4. 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:

$$CGV = CGV_{mf} \times (1 - M)$$

where:

– *GCV* and GCV_{mf} are expressed in megajoules per kilogram;

– *M* is moisture content of the fuel, expressed as a proportion.

5. SEASONAL SPACE HEATING POLLUTANT EMISSIONS

(1) Measurements shall include emissions of PM, OGC, CO, NO_x and particle number (PN), measured simultaneously with each other and with space heating energy efficiency.

(a) PM measurement shall be based on sampling a partial dry flue gas sample over a heated filter.

(b) OGC measurement as measured in the combustion products of the appliance shall be extractive and continuous and be based on the use of a flame ionisation detector. The result obtained is expressed in milligrams of carbon.

(c) CO measurement as measured in the combustion products of the appliance shall be extractive and continuous and be based on the use of an infrared detector.

(d) NO_x measurement as measured in the combustion products of the appliance shall be extractive and continuous and be based on chemiluminescent

detection. Emissions of nitrogen oxides shall be measured as the sum of nitrogen monoxide and nitrogen dioxide and expressed in nitrogen dioxide.

(e) PN measurements as measured in the combustion products of the appliance shall be extractive and continuous and based on the use of a condensation particle counter from a particle size of 23 nm and upwards.

(2) The seasonal space heating energy emissions E_s of respectively PM, OGC, CO, NOx and PN shall be calculated as follows:

(a) 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:

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

(b) 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:

– $E_{s,p}$ are the emissions of respectively PM, OGC, CO and NOx measured at 30% or 50% of rated heat output, as applicable;

– $E_{s,n}$ are the emissions of respectively PM, OGC, CO and NOx measured at rated heat output.

ANNEX IV
Transitional methods referred to in Article 3

PN measurement shall be carried out in accordance with the following requirements:

(1) samples shall be taken at least 350 mm and a maximum of 1350 mm after the last measurement point of the measurement circuit set up for pollutant measurements in accordance with EN 16510-1:2022;

(2) the sampling equipment and sampling lines up to the dilution stage shall be designed to prevent the condensation of water and volatile substances. This can be achieved by heating the sampling line or heating the dilution air. The sampling lines must be anti-static;

(3) an impactor or cyclone shall be used to separate large particles before dilution. This equipment must have a cut-off of 50% at an aerodynamic particle diameter of 0,7 to 1,5 µm;

(4) the sampled flue gas shall be diluted in one or multiple dilution stages so that the particle count concentration can be measured within the calibrated range. This is generally achieved using a dilution of 1:500 or 1:1000. The measuring instrument shall be designed for a lower response threshold of 10.000 particles/cm^3 and for a maximum particle concentration that is ten times the limit value;

(5) volatile components (components capable of adsorption) shall be removed from the sampled gas flow before the measurement. A volatile particle remover such as thermodenuder or catalytic stripper shall be used for this purpose. The temperature should be selected so that no elemental carbon forms from the hydrocarbons. This criterion is fulfilled if a separation efficiency of at least 90% is achieved for tetracontane aerosols;

(6) the measurement instrument shall comply with the following specifications:

(a) maximum absolute error: 25.000 particle/cm^3;

(b) maximum relative error: ±25% of the calculated value;

(c) efficiency between 0.2 and 0.6 for particle size of 23±5%;

(d) efficiency between 0.6 and 1.3 for particle size of 50±5%;

(e) efficiency between 0.7 and 1.3 for particle size of 80±5%;

(7) (7) all particle count measurement values shall be recorded with a sampling rate of at least 0.1 Hz, averaged over the entire test cycle and then converted for an oxygen content of 13% by volume;

(8) (8) the measurement report shall include the curve for the measured particle count over the entire test cycle without oxygen reference. In addition, the report shall state the mean value for the particle count concentration over the entire testing cycle in cm^{-3}.

ANNEX V
Conformity assessment referred to in Article 4

The conformity assessment procedure shall consist of the following steps:

(1) A notified body shall decide on the issuing of an EC-type examination certificate to a model of solid fuel boiler, according to Module B in Annex II to Decision No 768/2008/EC[3], on the basis of the measurement and calculation methods laid down in Annex III and, if applicable, in Annex IIIa.

(2) The notified body shall carry out periodic audits according to Module C2 in Annex II to Decision No 768/2008/EC, at random time intervals decided by the notification body, which shall consist of testing, in accordance with Annex III and Annex IIIa, random samples of a model of solid boiler taken at the manufacturing plant or at the manufacturer's storage facilities. The number of models to be tested shall be at least 10 every year.

(3) The notified body may decide to suspend or withdraw the EC-type examination certificate of a model of solid fuel boiler, following the periodic audits referred to in paragraph (2).

[3] Decision No 768/2008/EC of the European Parliament and of the Council of 9 July 2008 on a common framework for the marketing of products, and repealing Council Decision 93/465/EEC (OJ L 218, 13.8.2008, p.82).

ANNEX VI

Verification procedure for market surveillance purposes referred to in Article 5

(1) The verification tolerances defined in this Annex relate only to the verification of the declared parameters by Member State authorities and shall not be used by the manufacturer, importer or authorised representatives as an allowed tolerance to establish the values in the technical documentation or in interpreting these values with a view to achieving compliance or to communicate better performance by any means.

(2) Where a model is not in conformity with the requirements laid down in Article 6, the model and all equivalent models shall be considered not compliant.

(3) As part of verifying the compliance of a solid fuel local space heater model or a separate related control model with the requirements laid down in this Regulation pursuant to Article 3(2) of Directive 2009/125/EC, the authorities of the Member States shall apply the following procedure:

(a) the Member State authorities shall verify one single unit per model;

(b) the model and all equivalent models shall be considered to comply with the requirements set out in this Regulation if all the following conditions are fulfilled:

(i) the declared values given in the technical documentation pursuant to point 2 of Annex IV to Directive 2009/125/EC, and, where applicable, the values used to calculate these values, are not more favourable for the manufacturer, importer or authorised representative than the results of the corresponding measurements carried out pursuant to point 2(g) of that Annex;

(ii) the declared values meet any requirements laid down in this Regulation, and any required product information published by the manufacturer, importer or authorised representative does not contain values that are more favourable for the manufacturer, importer or authorised representative than the declared values;

(iii) when the Member State authorities check the unit of the model, any software update system that may have been set up by the manufacturer, importer or authorised representative complies with the requirements in Article 7;

(iv) when the Member State authorities check the unit of the model, it complies with the product information requirements in point 4 and resource efficiency requirements in point 5 of Annex II;

(v) when the Member State authorities test the unit of the model, the determined values (the values of the relevant parameters as measured in testing and the values calculated from these measurements) comply with the respective verification tolerances in Table 2.

(4) Where the results referred to in points (3)(b), (i), (ii) (iii) or (iv) are not achieved, the model and all equivalent models shall be considered not to comply with this Regulation.

(5) Where the result referred to in point (3)(b)(v) is not achieved, the Member State authorities shall select three additional units of the same model for testing. As an

alternative, the three additional units selected may be of one or more equivalent models.

(6) Where the result referred to in point (3)(b)(v) is not achieved, the Member State authorities shall select three additional units of the same model for testing. As an alternative, the three additional units selected may be of one or more equivalent models.

(7) The model shall be considered to comply with the applicable requirements if, for the three units referred to in point (5), the arithmetical mean of the determined values complies with the respective verification tolerances set out in Table 2.

(8) Where the result referred to in point (6) is not achieved, the model and all equivalent models shall be considered not in compliance with this Regulation.

(9) The Member State authorities shall provide all relevant information to the authorities of the other Member States and to the Commission without delay after a decision being taken on the non-compliance of the model in accordance with points (2), (4) or (7).

(10) The Member State authorities shall use the measurement and calculation methods set out in Annex III and, if applicable, the transitional methods laid down in Annex IIIa.

(11) The Member State authorities shall only apply the verification tolerances that are set out in Table 2 and shall use only the procedure described in points (3) to (7) for the requirements referred to in this Annex. For the parameters in Table 2 no other verification tolerances, such as those set out in harmonised standards or in any other measurement method, shall be applied.

Table 2: verification tolerances

Parameter	Verification tolerances
Seasonal space heating energy efficiency η_s	The determined value* is not more than 4% lower than the declared value at the rated heat output of the unit.
PM emissions	The determined value* is not more than 10 mg/m^3 higher than the declared value of the unit.
OGC emissions	The determined value* is not more than 2 mg/m^3 higher than the declared value of the unit.
CO emissions	The determined value* is not more than 30 mg/m^3 higher than the declared value of the unit.
NOx emissions	The determined value* is not more than 30 mg/m^3 higher than the declared value of the unit.
PN emissions	The determined value* shall not exceed the declared value by more than 25% expressed as NO_2 at 13 % O2.

(*) Where three additional units are tested in accordance with point (5), the determined value means the arithmetical mean of the values determined for those three additional units.

ANNEX VII
Indicative Benchmarks referred to in Article 6

At the time of entry into force of this Regulation, the best available technology on the market for solid fuel boilers in terms of seasonal space heating energy efficiency and emissions of PM, CO, OGC and NOx was identified as follows.

(1) Specific benchmarks for seasonal space heating energy efficiency of solid fuel boilers:

(a) Benchmark for seasonal space heating energy efficiency of condensing boilers: 90%;

(b) Benchmark for seasonal space heating energy efficiency of other solid fuel boilers: 84%;

there are no solid fuel cogeneration boilers on the market at the time of entry into force of this Regulation.

(2) Specific benchmarks for seasonal space heating pollutant emissions of PM, OGC, CO and NOx:

(a) 5 mg/m^3 for PM;

(b) 1 mg/m^3 for OGC;

(c) 6 mg/m^3 for CO;

(d) 102 mg/m^3 for NOx.

The benchmarks specified in points 1 and 2(a)-(d) do not necessarily imply that a combination of these 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 PM of 7 mg/m^3, of OGC of 2 mg/m^3, of CO of 6 mg/m^3 and of NOx of 120 mg/m^3.