



TEST REPORT

31-8983

Product: Hot-water boilers burning wood pellets
with automatic fuel supply

Type designation: EG PELLET 10
EG PELLET 15
EG PELLET 25
EG PELLET 40
EG PELLET 60

Customer: Zaklad Slusarski "GREN" sp.j
ul. Miarki 1B,
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Manufacturer: Zaklad Slusarski "GREN" sp.j
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**Person responsible for re-
view and evaluation:** Ing. Stanislav Buchta

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Distribution list: 1 copy to the Engineering Test Institute
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The results of tests and the evaluations relate only to the products tested.
(**) Thus indicated parts of the Report contain findings verified otherwise than by tests
within the meaning of ČSN EN ISO/IEC 17025.



The tests have been conducted based on Order B-45617 of 2013-01-11, Contract B-45617/31 of 2013-01-15, and Amendment to the Contract of 2013-03-29.

Based on technical assessment of all the product versions, the following – the most complex – products have been selected as the representative samples to be tested, i.e.: the types

EG PELLET 10;
EG PELLET 15;
EG PELLET 25;
EG PELLET 40;
EG PELLET 60.

Another commercial designation:

GB PELLET 10;
GB PELLET 15;
GB PELLET 25;
GB PELLET 40;
GB PELLET 60.

I. Product description, intended use and mode of application

The hot-water boilers burning wood pellets with automatic fuel supply, type EG PELLET 10, EG PELLET 15, EG PELLET 25, EG PELLET 40, and EG PELLET 60, are intended for heating of residential houses and similar buildings. The boilers are designed for burning of wood pellets.

The boiler assembly comprises the boiler body, boiler burner, feed screw and the fuel chamber of various construction designs (see the enclosed technical documentation). A rotary separator is fitted between the feed screw of the burner and any of the various types of the fuel chamber. The boiler body is equipped with automatic mechanism for cleaning of combustion product passages. The boiler body is a steel-sheet weldment, cylindrical in shape. The panel with control, regulation and safety elements is in the top part of the boiler. The boiler body is thermally insulated with mineral felt.

Further detailed descriptions of individual assembly groups are provided in the enclosed technical documentation to Task 31-8983.

II. Sample tested

Boiler output versions that are the subject of the proceedings:

Boiler output version	EKV No.	Place of testing
EG PELLET 10	0211.13.14862.000	SZU Brno
EG PELLET 15	0211.13.14862.000	
EG PELLET 25	0211.13.14863.000	
EG PELLET 40	0211.13.14867.000	
EG PELLET 60	0211.13.14864.000	

Visual inspection, testing and evaluation were carried out by Ing. Michal Havlů, Test Engineer, at the test station of SZU in Brno, in 01/2013. The tests were performed with the measurement and test equipment with valid calibration.



III. Measuring and test equipment

No.	Description	Inventory number	Calibration valid until	Accuracy
1.	Combustion product analyser, Horiba, type 680 P	92-0004	Calibration prior to each measurement	see CRM 103000237769 see CRM 103000237770
2.	Weighing machine	02-2290	10/2015	see Calibration Sheet 6051-KL-H-0651-10
3.	Water meter, NW 20	02-1575	03/2015	see Calibration Sheet AKL-P/006/2009
4.	Data collection system	02-2241	12/2013	see Calibration Sheet 110002
5.	Moisture meter, thermometer	11-6258	11/2015	see Calibration Sheet 7630F/09
6.	Barometer	11-2541	11/2013	see Calibration Sheet 613-KL-K011-08
7.	Draught gauge	11-7275	01/2015	see Calibration Sheet 0144F/11
8.	Stop watch	99-0760	10/2015	see Calibration Sheet 2850E-07
9.	Calorimeter, IKA, type C 5000	02-2236	03/2015	± 0.12 MJ/kg
10.	Elemental analyser, Perkin Elmer, type 2400 CHNS	02-2107	03/2015	± 0.2 % rel.
11.	Gravimat, SHC 501	02-2328	12/2013	see Calibration Sheet 090177 (8,9), 090180
12.	Laboratory weighing machine	02-1458	06/2015	see Calibration Sheet 6051-KL-H376-09
13.	Weighing machine, Ohaus MB 45	02-2274	06/2015	see Calibration Sheet 6051-KL-H374-09
14.	Manometer	11-1985	02/2014	see Calibration Sheet 090162
15.	Prandtl tube, 0.3 m	ME 484	11/2015	see Calibration Sheet 5012-KL-RS090-09
16.	Psychrometer H 4220	92-0005	12/2013	see Calibration Sheet 090176



IV. Results of tests and evaluation

No.	Requirement	Technical standard, regulation applied	Source materials	Evaluation	
				Test	Evaluation
1.**	General requirements	EN 303-5:2012 Art. 4.1	Pages 6 – 7		+
2.**	Construction requirements	EN 303-5:2012 Art. 4.2, 4.2.1, 4.2.1.1, 4.2.1.2, 4.2.2, 4.2.2.1, 4.2.2.2, 4.2.2.3, 4.2.2.4, 4.2.4, 4.2.4.1, 4.2.4.2, 4.2.4.3, 4.2.4.4, 4.2.4.5, 4.2.4.6, 4.2.4.7, 4.2.4.8, 4.2.4.9, 4.2.4.10, 4.2.4.11, 4.2.4.12	Pages 8 – 12		+
3.**	Safety requirements	EN 303-5:2012 Art. 4.3, 4.3.1, 4.3.3, 4.3.3.1, 4.3.3.2, 4.3.3.3, 4.3.3.4, 4.3.3.5, 4.3.4, 4.3.5, 4.3.6, 4.3.7, 4.3.8, 4.3.8.1, 4.3.8.2, 4.3.8.3, 4.3.8.4, 4.3.9, 4.3.9.1, 4.3.9.2, 4.3.9.3	Pages 13 – 22		+
4.**	Performance requirements	EN 303-5:2012 Art. 4.4, 4.4.1, 4.4.2, 4.4.3, 4.4.4, 4.4.5, 4.4.6, 4.4.7	Pages 23 - 24		+
5.**	Marking	EN 303-5:2012 Art. 7, 7.1, 7.2, 7.3	Page 25		+
6.**	Technical documentation, supplied with boiler	EN 303-5:2012 Art. 8, 8.1, 8.2, 8.3, 5.16.1	Pages 26 - 29		+
7.	Pressurized component tightness and strength test (1001.1*)	EN 303-5:2012 Art. 5.4, 5.4.1, 5.4.2	Page 30	+	
8.	Test for gas side soundness (1002*)	EN 303-5:2012 Art. 5.6, 4.3.7	Page 31	+	
9.	Surface temperature test (1003*)	EN 303-5:2012 Art. 5.12, 5.16.4, 4.3.6	Pages 32 - 33	+	
10.	Test of heat output, input and efficiency(1004.1*) Test of combustion product temperature (1004.2*)	EN 303-5:2012 Art. 4.4.2, 4.4.3, 5.7, 5.8, 5.10 EN 303-5:2012 Art. 4.4.3	Pages 34 - 44	+	
11.	Combustion efficiency test – emissions (1005.1*)	EN 303-5:2012 Art. 4.4.7, 5.7.3, 5.7.4, 5.9, 5.10.4	Pages 45 - 47	+	
12.	Test of heat output, input and efficiency (1004.1*)	EN 303-5:2012 Annex C, Deviation from Austria, C.2.2, C.2.3	Pages 48 - 51	+	
		EN 303-5:2012 Annex C, C.3 Deviation from Croatia	-	0	
		EN 303-5:2012 Annex C, Deviation from Denmark , C.4.1, C.4.2	Pages 52 - 54	+	
		EN 303-5:2012 Annex C, Deviation from Germany, C.5.1, C.5.2	Pages 55 - 57	+	
	Combustion efficiency test – emissions (1005.1*)	EN 303-5:2012 Annex C C.6 Deviation from Switzerland	Pages 58 - 60	EG PELLET 10 -	
				EG PELLET 15 -	
			EG PELLET 25 +		
			EG PELLET 40 -		
			EG PELLET 60 +		



No.	Requirement	Technical standard, regulation applied	Source materials	Evaluation	
				Test	Evaluation
12.	Test of heat output, input and efficiency (1004.1*) Combustion efficiency test – emissions (1005.1*)	EN 303-5:2012 Annex C C.8 Deviation from Italy	-	0	
13.	Test of control, regulation and safety elements (1006.1*) Combustion efficiency test – emissions (1005.1*)	EN 303-5:2012 Art. 5.13, 5.14, 5.16.2, 5.16.3 EN 303-5:2012 Art. 5.9, 5.10.4	Pages 61 - 63	+	

Note:

No.:

(**) Not a test

Evaluation:

+ Requirement fulfilled
 - Requirement not fulfilled
 x Not assessed
 0 Not applicable



Requirement	Requirement specification	Evaluation	Note
resistance against heat and fire in either EN 60335-1 or EN 60730-1.			
<p>Component parts of covers, operating controls, safety devices and electrical accessories shall be arranged in such a way that their surface temperatures, under steady state conditions, do not exceed those specified either by the manufacturer or in the component part standard.</p> <p>The materials for the parts subject to pressure shall be in accordance with generally accepted technical requirements. They shall be suitable for the purpose and intended use. Documented proof of mechanical and physical properties of materials used and their chemical composition shall be obtained from the supplier.</p> <p>The design of the boiler shall be such that it can be handled safely. It shall be designed and packaged so that it can be stored safely and without damage.</p> <p>Where the weight, size or shape of the boiler or its components prevents them from being moved by hand, they shall be fitted with means to lift them easily.</p> <p>Constructional parts accessible during use and maintenance shall be free from sharp edges and corners that might cause damage or personal injury during use or maintenance.</p> <p>Motors and fans shall be mounted in such a way as to minimize noise and vibration.</p>	EN 303-5:2012 Art. 4.1	<p>+</p> <p>+</p> <p>+</p> <p>+</p> <p>+</p> <p>+</p>	

Note:

+	Compliant
-	Non-compliant
0	Not applicable
x	Not assessed

Evaluation drafted by: Ing. Michal Havlík

Date: 2013-03-26

Signed:

Person responsible for the evaluation:
Ing. Stanislav Buchta

Date: 2013-03-27

Signed:



Requirement assessed: **Construction requirements**

Requirement specification: EN 303-5:2012
Art. 4.2, 4.2.1, 4.2.1.1, 4.2.1.2, 4.2.2, 4.2.2.1, 4.2.2.2, 4.2.2.3,
4.2.2.4, 4.2.4, 4.2.4.1, 4.2.4.2, 4.2.4.3, 4.2.4.4, 4.2.4.5,
4.2.4.6, 4.2.4.7, 4.2.4.8, 4.2.4.9, 4.2.4.10, 4.2.4.11, 4.2.4.12

Sample assessed: EG PELLET 10, EG PELLET 15, EG PELLET 25,
EG PELLET 40, EG PELLET 60

Evaluation results: see the following Table

Requirement	Requirement specification	Evaluation	Note
Construction requirements	EN 303-5:2012 Art. 4.2		
Production documentation	EN 303-5:2012 Art. 4.2.1		
Drawings The drawings and/or the relevant documentation shall include at least the following information: a) the specification of the material; b) the welding process, the seam type (generally the symbol for the seam type is sufficient) and the welding fillers; c) the maximum allowable operating temperature, in °C; d) the maximum allowable operating pressure, in bar; e) the type test pressure, in bar. f) the nominal heat output or the heat output range for every boiler size, in kW, in accordance with the fuel(s) recommended for use in the boiler.	EN 303-5:2012 Art. 4.2.1.1	+ + + + +	
Manufacturing controls A Quality Manual shall be compiled on the inspections and tests necessary during the manufacturing process. The manual shall: 1) describe the inspection system; 2) specify the person responsible for quality assurance; 3) specify the necessary inspections and tests as well as the pertinent limit values and; 4) lay down the requisite measuring and testing equipment and their inspection.	EN 303-5:2012 Art. 4.2.1.2	+ + + +	
Heating boilers made of steel and non-ferrous materials	EN 303-5:2012 Art. 4.2.2		
Execution of welding work Boiler manufacturers who carry out welding work shall meet the requirements of EN 287-1 and EN ISO 9606-2 as follows: - only welders who are qualified in the welding of the materials to be processed shall be used; - equipment shall be available to allow defect-free welding	EN 303-5:2012 Art. 4.2.2.1	+ + +	Enclosed technical documentation.



Requirement	Requirement specification	Evaluation	Note
to be carried out;			
- supervision of the welding shall be carried out by staff qualified in welding (at least one supervisor shall be qualified).		+	
<p>Welding seams and welding fillers</p> <p>The materials shall be suitable for welding. <i>NOTE 1 The materials in Table 1 are suitable for welding and do not require additional heat treatment after welding.</i></p> <p>The welded seams shall not show any cracks or lack of fusion and shall be defect free over the whole cross section for butt welds. One-sided fillet welds, and half Y-welds which have been welded through, shall be kept substantially free from bending stresses. Smoke tubes, inserted stays and similar components need not be counter welded.</p> <p>Double fillet welds are only permissible when sufficiently cooled. Projections into the flue gas side in areas of high thermal stresses shall be avoided.</p> <p>Corner welds, edge welds and similar welded connections, which shall only be subject to high bending stresses during production and operation, are to be avoided.</p> <p>When welding longitudinal stay bars or stay tubes, the shearing cross section of the fillet weld shall be 1.2 times the required stay bar or stay tube cross sectional area.</p> <p>The permissible types of weld and appropriate material thicknesses are given in Table 2 and these parameters shall be met.</p> <p>Welding fillers shall be suitable for the material being used.</p>	EN 303-5:2012 Art. 4.2.2.2	<p>+</p> <p>+</p> <p>+</p> <p>+</p> <p>+</p> <p>+</p> <p>+</p>	Enclosed technical documentation (welding procedures).
<p><i>NOTE 2: The terms given in Table 2 are in accordance with EN 22553; the reference numbers of welding processes are in accordance with ISO 857-1, ISO 857-2 and EN ISO 4063.</i></p>		+	
<p>Parts of steel subject to pressure</p> <p>The steels listed in Table 1 shall be used. Materials and wall thicknesses other than those specified shall only be used on the production of appropriate evidence, with regard to (at least) their equivalent corrosion resistance, heat resistance and strength to non-alloy steel at the material thicknesses specified in Table 1 for the particular application/usage.</p> <p>The specification of the materials shall be documented by a works certificate in accordance with EN 10204. These certificates shall be obtained by the boiler manufacturer. This does not apply to components, e.g. sockets up to DN 50, screws and nuts.</p>	EN 303-5:2012 Art. 4.2.2.3	<p>+</p> <p>+</p> <p>+</p>	Enclosed technical documentation (welding procedures).



Requirement	Requirement specification	Evaluation	Note
<p>Minimum wall thicknesses</p> <p>The minimum wall thicknesses listed in Table 3 have been specified in order to take into account the following:</p> <ul style="list-style-type: none"> a) the maximum allowable operating pressure; b) the nominal heat output; c) the material properties. <p>For boilers which consist of a combination of individual geometrically identical parts (sections), the requirements of the minimum wall thickness for the complete range of the nominal heat output of the boiler shall be in accordance with the individual boiler sections as specified in Table 3.</p> <p>The wall thickness tolerance for carbon steels shall be as specified in EN 10029.</p>	EN 303-5:2012 Art. 4.2.2.4	+	
<p>The minimum wall thicknesses according to Table 3 apply to pressure-loaded sheets, tubes (except immersion coils and safety heat-exchangers) and forgings.</p> <p>Smaller wall thicknesses shall be permitted upon the production of evidence demonstrating equivalence with regard to corrosion, heat resistance and strength.</p>		+	Enclosed technical documentation (semi-finished products).
Design requirements	EN 303-5:2012 Art. 4.2.4		
<p>Venting of the water sections</p> <p>The boiler and its components shall be designed in such a way that their respective water sections can be fully vented. The boiler shall be designed in a way that under normal operation in accordance with the manufacturer's instructions no undue boiling occurs.</p> <p><i>NOTE: Boiling can be detected by boiling noise.</i></p>	EN 303-5:2012 Art. 4.2.4.1	+	
<p>Cleaning of heating surfaces</p> <p>The heating surfaces shall be accessible from the flue gas side for inspection and cleaning with chemical agents and brushes. A sufficient number and appropriate arrangement of cleaning openings shall be provided. If special tools (for example special brushes) are required for cleaning and maintenance of the boiler, these shall be supplied.</p>	EN 303-5:2012 Art. 4.2.4.2	+	
<p>Inspection of the flame</p> <p>A facility shall be provided which allows inspection of the flame or fire bed. If this facility is a door, then hazard-free inspection shall be possible.</p> <p><i>NOTE The facility of an inspection window is recommended.</i></p>	EN 303-5:2012 Art. 4.2.4.3	+	
<p>Water tightness</p> <p>Holes for screws and similar components which are used for the attachment of removable parts shall not enter into spaces through which water flows. This does not apply to pockets for measuring or control and safety equipment</p>	EN 303-5:2012 Art. 4.2.4.4	+	



Requirement	Requirement specification	Evaluation	Note
<p>Replacement parts Replacement and spare parts (e.g. inserts, shaped fire-bricks, turbulators etc.) shall be designed, made or marked in such a way that their installation shall be correct in accordance with the manufacturer's instructions.</p>	<p>EN 303-5:2012 Art. 4.2.4.5</p>	<p>+</p>	
<p>Boiler shell tapings Boiler shell tapings shall comply with EN 10226-1, ISO 7-2, EN ISO 228-1, EN ISO 228-2; flange connections shall comply with ISO 7005-1, ISO 7005-2 and ISO 7005-3. The arrangement of the tapings shall be such that they are easily accessible and the function of each respective connection can be adequately fulfilled. There shall be sufficient space around the connection to allow the installation of the connecting pipes (flanges, bolts) with the necessary tools.</p> <p>Threaded pipe connections above 2 inches (DN 50) are not recommended. Threaded pipe connections with nominal diameters above 3 inches (DN 80) shall not be permitted. This information shall be supplied with the boiler. If connections are fitted with flanges, the mating flanges and seals shall also be supplied except where standardised flanges and seals are available.</p> <p>The minimum size for flow outlet shall be DN 20. The boiler shall have at least one connection for filling and emptying. This connection may be common. The size of the connection shall be as a minimum: – G 1/2 for nominal heat outputs up to 70 kW; – G 3/4 for nominal heat outputs above 70 kW.</p> <p>It is possible to provide these connections outside the boiler if satisfactory filling and emptying of the boiler can be assured.</p>	<p>EN 303-5:2012 Art. 4.2.4.6</p>	<p>+</p>	
<p>Every boiler shall be equipped with at least one immersion pocket which is used for temperature control, a safety temperature limiter and a thermometer. If a threaded pipe connection is required, the minimum nominal diameter shall be G 1/2. Alternative arrangements are allowed, provided that the control devices are supplied with the boiler, and that they cannot be substituted by other components. The immersion pockets shall be designed so that an unintended change of position of the temperature sensor is avoided. The position of the immersion pocket shall be chosen in such a way that the highest temperature of the boiler water is recorded with sufficient accuracy. Where additional connections for safety devices such as a pressure detector, manometer, low water cut-out device or a safety valve are provided, then their size (especially the size of the safety valve), shall be determined according to the output of the boiler.</p> <p><i>NOTE For further information on safety valves, see EN 12828.</i></p>	<p>EN 303-5:2012 Art. 4.2.4.7</p>	<p>+</p>	



Requirement	Requirement specification	Evaluation	Note
Thermal insulation All boilers shall be fitted with thermal insulation. The thermal insulation shall withstand normal thermal and mechanical stresses. It shall be made of non-combustible material and shall not give off fumes during normal running.	EN 303-5:2012 Art. 4.2.4.8	+	
Water side resistance of the boiler The water side resistances are to be determined for those flows which correspond to the nominal heat output with two temperature differences of 10 K and 20 K between the flow and return connections of the boiler. The results are to be stated in mbar for each boiler size and shall correspond to the values indicated by the manufacturer.	EN 303-5:2012 Art. 4.2.4.9	+	
Integral fuel hopper A boiler with integral fuel hopper shall be made of fire resistant material according to EN 13501-2. The volume shall be limited to a maximum of 1,5 m ³ . The hopper shall be designed in such a way that the fuel moves freely until the hopper is empty.	EN 303-5:2012 Art. 4.2.4.10	+	
Fuel chamber The fuel chamber shall be designed in such a way that the fuel moves freely and the duration of the combustion period is assured.	EN 303-5:2012 Art. 4.2.4.11	+	
Ash chamber The capacity of the ash chamber shall be adequate for a combustion period of at least 12 h using the stipulated fuel at nominal heat output. It shall be designed to ensure the unobstructed flow of combustion air under the grate. If the system is designed with devices for automatic ash and clinker removal, the above requirement shall be considered as met.	EN 303-5:2012 Art. 4.2.4.12	+	

Note:

- + Compliant
- Non-compliant
- 0 Not applicable
- x Not assessed

Evaluation drafted by: Ing. Michal Havlů

Date: 2013-03-26

Signed: _____

Person responsible for the evaluation:
Ing. Stanislav Buchta

Date: 2013-03-27

Signed: _____



Requirement assessed: **Safety requirements**

Requirement specification: EN 303-5:2012
Art. 4.3, 4.3.1, 4.3.3, 4.3.3.1, 4.3.3.2, 4.3.3.3, 4.3.3.4, 4.3.3.5,
4.3.4, 4.3.5, 4.3.6, 4.3.7, 4.3.8, 4.3.8.1, 4.3.8.2, 4.3.8.3, 4.3.8.4,
4.3.9, 4.3.9.1, 4.3.9.2, 4.3.9.3

Sample assessed: EG PELLET 10, EG PELLET 15, EG PELLET 25,
EG PELLET 40, EG PELLET 60

Evaluation results: see the following Table

Requirement	Requirement specification	Evaluation	Note
<p>General Potential hazards caused by the boiler, including the operation of the firing system and any stoking device, shall be avoided by either constructional means or by, the use of safety devices. Safety shall be maintained in the event of possible failures in the safety device itself. The manufacturer shall undertake a risk assessment covering all potential hazards of the boiler and the measures how to avoid or control them in a safety concept. Control functions within the safety concept shall be classified and realized accordingly. The risk assessment shall be performed according to EN ISO 12100 with particular emphasis on the type of the boiler and the fuel fired. Control functions are classified as follows.</p> <p>Class A: Control functions which are not intended to be relied upon for the safety of the application.</p> <p>Class B: Control functions which are intended to prevent an unsafe state of the appliance. Failure of the control function will not lead directly to a hazardous situation. For devices used in a class B control function, a single fault assessment of the device including use of software class B according to EN 60730-1 is required.</p> <p>Class C: Control functions which are intended to prevent special hazards such as explosion or whose failure could directly cause a hazard in the appliance. For devices used in a class C control function, a second fault assessment of the device including use of software class C according to EN 60730-1 is required. In case of safety routines realised in a programmable logic control the software shall meet the requirements of the appropriate software class B or C (including fault assessment according to EN 60730-2-5 in connection with EN 60730-1).</p> <p>This risk assessment shall cover at least the following: – elements given in 4.3.4 to 4.3.9; – boiler functions, including start-up, purge, ignition, flame supervision, flue gas flow, control of heat demand and combustion control.</p> <p>In the risk assessment, one of the above mentioned classifications of the control function shall be allocated to any identified hazard.</p>	<p>EN 303-5:2012 Art. 4.3.1</p>	<p>+</p>	<p>Class B 39-8983/E 39-8983/ EMC</p>



Requirement	Requirement specification	Evaluation	Note
<ul style="list-style-type: none"> - an emergency discharge device emptying the stoking device without overfilling the boiler; which is reacting below 95 °C (alternatively 20 K increase to standard operation conditions); - a stoking device which is cooled by a water circuit and the temperature of the water is limited by a cut out (e.g. water circuit is part of boiler circuit). <p>Accepted solutions to prevent overheating in the integrated hopper due to thermal conductance in combination with accepted solutions for stoking devices are:</p> <ul style="list-style-type: none"> - an extinguishing device directly in the hopper e.g. water sprinkler system and an STB adjusted to a maximum of 95 °C; - sufficient insulation of the hopper from hot parts of the boiler; - naturally ventilated space between hopper and boiler body (separate casing). <p>Criteria to verify the design of accepted solutions are listed in Table B.1. No test needs to be performed according to 5.16.4 if the chosen design is an accepted solution and the risk assessment proves the suitability for the boiler burner unit and the control algorithm interaction. If the risk assessment fails, further tests shall be required.</p>		<p style="text-align: center;">0</p> <p style="text-align: center;">0</p> <p style="text-align: center;">0</p> <p style="text-align: center;">+</p> <p style="text-align: center;">+</p>	
<p>Back flow of ignitable combustion gases into the fuel line or integral hoppers</p> <p>No significant flow of combustion gases in an ignitable concentration or carrying a critical amount of energy to ignite wood (e.g. sparks or hot gases) shall pass the constructional means or safety device(s) into the fuel line or into the hopper. Due to other safety reasons (for example to hinder poisoning by CO), any back flow of combustion gases shall be avoided (see 4.1).</p> <p><i>NOTE 1: Indications for significant back flow might include:</i></p> <ul style="list-style-type: none"> a) a temperature rise of more than 20 K compared to operation without back flow; b) CO concentration of more than 1 vol. % CO (dry) in the fuel line caused by any operational status or failure; c) accumulation of smoke in an integrated hopper <p>This requirement applies during the tests according to 5.7 (thermal performance for nominal load and partial load including ignition, start up, continuous operation and shut down) and 5.13 to 5.16.</p> <p>Accepted solutions to prevent back flow in the fuel line are listed as follows.</p> <ul style="list-style-type: none"> - Safety device to maintain a continuous seal between the stoking device and the fuel line, e.g. cell feeder. - Safety device to seal the fuel line not during fuel supply but during all other phases of operation (e.g. lid) in combination with a boiler operating with a negative pressure (tightness requirements in closed state identical to continuously sealing safety devices). - Tight fuel hopper lid in combination with pressure equalization that works during normal operation and in case of start-up, shut down or power loss. Diffusion of hot gases into the hopper shall be avoided by a connection for 	<p style="text-align: center;">EN 303-5:2012 Art. 4.3.3.3</p>	<p style="text-align: center;">+</p> <p style="text-align: center;">+</p>	<p style="text-align: center;">Rotary separator between fuel chamber and screw-feeder of fuel to burner.</p>



Requirement	Requirement specification	Evaluation	Note
pressure equalization between the combustion air supply and the fuel hopper. The dimension of the connection shall only be sufficient to equalize pressure, not to accelerate fire propagation. Hopper lid shall be fitted with an interlock switch (according to H27 of EN 60730-2-5) which stops combustion air supply in case of an open lid.			
- Tight fuel hopper lid in combination with negative pressure operation of the boiler. Diffusion of hot gasses into the hopper shall be avoided by natural draught (e.g. inclined auger). The hopper lid shall be fitted with an interlock switch (according to H27 of EN 60730-2-5) which stops combustion air supply in case of an open lid.		0	
- Use of directed flow to create stable pressure conditions, e.g. injector, safety device to control fan rotation of supply fan or relevant pressure, which closes the fuel supply in case of failure.		0	
		0	
<i>NOTE 2 Other solutions include the use of a flue gas fan to assure negative pressure condition in the boiler compared to pressure in the fuel line or hopper. The flue gas fan operation is controlled by a safety device for rotation or for pressure in combination with an additional safety device that prevents back flow in case fan failure or power loss. Criteria to verify the design of accepted solutions are listed in Table B.1.</i> No test needs to be performed according to 5.16.4 if the chosen design is an accepted solution and the risk assessment proves the suitability for the boiler burner unit and the control algorithm interaction. If the risk assessment fails, further tests shall be required.	EN 303-5:2012 Art. 4.3.3.3	0	
Fire propagation into the fuel line or integral hopper Fire propagation into the fuel line or integral hopper shall be avoided in any operational state or in case of any failure. This does not include the thermal reaction of a small amount of fuel at the end of the stoking device, if there is no further reaction into the fuel line. <i>NOTE: Indication for significant fire propagation might include:</i> a) a temperature raise of more than 20 K in the stoking device above normal operation; b) a temperature of more than 85 °C on the surface of the stoking device; c) an accumulation of smoke in an integral hopper. This requirement shall be proven during the tests according to 5.7 (thermal performance for nominal load and partial load) and 5.13 to 5.16 with a permanent temperature measurement until the maximum temperature is reached. Accepted solutions to hinder fire propagation to the fuel line are listed as follows. - An extinguishing device, e.g. water sprinkler system and an STB adjusted to a maximum of 95 °C. - A safety device to seal continuously the supply line and with a sufficient fuel free distance and fuel free cross section, (e.g. cell feeder, rotary air lock) in combination with a design to prevent overfilling.			Rotary separator between fuel chamber and screw-feeder of fuel to burner.
	EN 303-5:2012 Art. 4.3.3.4	0 +	



Requirement	Requirement specification	Evaluation	Note
<ul style="list-style-type: none"> - A safety device to seal the fuel line not during fuel supply but during all other phases of operation (e.g. lid) in combination with a boiler operating with a negative pressure (tightness requirements in closed state identical to continuously sealing safety devices), in combination with a design to prevent overflowing and with a sufficient fuel free distance and fuel free cross section. - An emergency discharge device emptying the stoking device without overflowing the boiler, which is reacting at a temperature limit not exceeding 95 °C (alternatively 20 K increase to standard operation conditions). 		0 0	
<ul style="list-style-type: none"> - Inclined auger in combination with fuel transport slide to/in the combustion chamber and a safety limiter reacting at a temperature not exceeding 95 °C. <p>Criteria for accepted solutions to verify the design are listed in Table B.1. No test needs to be performed according to 5.16.4 if the chosen design is an accepted solution and the risk assessment proves the suitability for the boiler burner unit and the control algorithm interaction. If the risk assessment fails, further tests shall be required.</p>	EN 303-5:2012 Art. 4.3.3.4	0 0	
<p>Alternative verification of safety against back burning</p> <p>In case of any deviations regarding 4.3.3.2 to 4.3.3.4, the safety against back burning shall be verified according to the following procedures, combining a risk assessment including reliable tests of the alternative safety devices with reference to the criteria in 5.16.1.</p> <p>If:</p> <ul style="list-style-type: none"> - no accepted solution is chosen, or; - the risk assessment ensures no suitability of a accepted solution for the boiler design, or; - the accepted solutions against back burning are not applicable (e.g. the suitability of constructional means or devices or the tightness criterion for certain boiler designs), <p>further tests shall be performed (see 5.16.5).</p> <p>The test shall be documented by the third party laboratory in a report which includes the description of the test sample and the test installation, the way to perform the back burning test, the test conditions and the test results.</p>	EN 303-5:2012 Art. 4.3.3.5	0 0 0	
<p>Safety against fuel overload of the boiler or interruption in fuel supply</p> <p>During start up and continuous operation of the boiler with the fuel feed rate of the stoking device set at maximum capacity or interruption of the stoking device, no dangerous situation shall occur.</p> <p>The test at overload mode according to 5.16.2 may be omitted if a safety device, safety level C according to 4.3.1, prevents an overload mode.</p> <p>The boiler shall be equipped with a safety device that stops the fuel supply in the event that there is either insufficient or no combustion in the burner head.</p> <p>The test for interruption of fuel supply according to 5.16.2</p>	EN 303-5:2012 Art. 4.3.4	+	Class B 31-8983/E 31-8983/ EMC



Requirement	Requirement specification	Evaluation	Note
<p>may be omitted if a safety device, safety level B or C according to 4.3.1, is used.</p> <p>In the ignition phase, a safety device shall stop the fuel supply after a safety time which shall be declared by the manufacturer of the burner start up function, if there is no or insufficient combustion. A failure in the safety device to detect insufficient combustion shall not lead to a dangerous situation.</p>			
<p>Safety against lack of air supply or insufficient combustion</p> <p>If the air supply includes fan assistance or adjustable devices to control the cross section of the air inlet, the tests according to 5.16.3 shall be performed. Neither a combination of a failure of the fan and the malposition of the adjustable devices nor the malposition of adjustable devices with separate actuators at the same time shall be taken into account.</p> <p>The CO concentration in the boiler shall not exceed 5 % volume.</p>	<p>EN 303-5:2012 Art. 4.3.5</p>	+	<p>Less than 5% CO</p>
<p>Surface temperatures</p> <p>The surface temperature on the outside of the boiler (including the bottom and doors but not including the flue gas outlet and maintenance openings of natural draft boilers) shall not exceed the room temperature by more than 60 K when tested in accordance with 5.12. The requirement for the bottom is not applicable for instances when the manufacturer declares that the boiler is to be installed on a non-combustible base.</p> <p>When tested in accordance with 5.12, the surface temperature of operating levers and all parts which shall be touched by hand during operation of the boiler shall not exceed the room temperature by more than the following values:</p> <ul style="list-style-type: none"> - 35 K for metals and similar materials; - 45 K for porcelain and similar materials; - 60 K for plastics and similar materials. 	<p>EN 303-5:2012 Art. 4.3.6</p>	+	
<p>Leakage of the combustion system</p> <p>For boilers designed to operate with a positive pressure in the combustion chamber when tested in accordance with 5.6 at a test-pressure of 1,2 times the gas side resistance at nominal heat output, the leakage rate based on mass flow shall not exceed 2 % of the flue gas mass flow at the nominal heat output.</p> <p>The gas side resistance shall be determined with the fuel chamber filled to maximum capacity (as specified by the manufacturer).</p> <p><i>NOTE: For boilers designed to operate with negative pressure, the leakage rate measured according to 5.6 characterises the boiler.</i></p>	<p>EN 303-5:2012 Art. 4.3.7</p>	+	
<p>Temperature control and limiting devices</p>	<p>EN 303-5:2012 Art. 4.3.8</p>		
<p>General</p> <p>The control and safety devices described in the sections below as well as the appropriate installation options shall be provided for each boiler, depending on the type of firing system and the type of protection provided for the installations in which the boiler is to be fitted. The equipment required in each case shall be supplied by the boiler manufacturer along</p>	<p>EN 303-5:2012 Art. 4.3.8.1</p>	+	



Requirement	Requirement specification	Evaluation	Note
<p>Devices for dissipating excess heat The safety heat exchanger or other devices for dissipating excess heat shall ensure that a maximum boiler water temperature of 110 °C is not exceeded in accordance with 5.14. For this purpose, a thermal discharge safety device shall be used such as an STW type Th according to EN 14597, in combination with a heat exchanger integrated in the boiler. Admissible heat exchangers include storage or circulatory water heaters, provided they are designed and sized in such a way that the heat can be transferred without any additional auxiliaries and outside energy. Fixed integrated circulatory water heaters cannot be used as operating water heaters but only as safety heat exchangers. Additionally, the following conditions shall be met</p> <ul style="list-style-type: none"> – the thermal safety discharge device and the heat exchanger shall be adapted to the design and thermal properties of the boiler and be capable of reliably dissipating the maximum heat output possible in the event of malfunction or, in the case of partly disconnectable heating systems, the residual heat output; – if a storage water heater is used as the heat exchanger, it shall be designed so that it meets the aforementioned condition at its maximum operating temperature; – in the case of safety heat exchangers used exclusively to dissipate heat in the event of malfunctions, the thermal safety discharge device shall be fitted ahead of the heat exchanger in the cooling water inlet. <p>Other solutions are not excluded provided they comply with the protection objectives and safety standards described above. In principle however, all devices for dissipating excess heat are only admissible for</p> <ul style="list-style-type: none"> – boilers without a disconnectable firing system with rated heat outputs of maximum 100 kW, – boilers with a partly disconnectable firing system with residual heat outputs of up to 100 kW. 	<p>EN 303-5:2012 Art. 4.3.8.4</p>	<p>0</p> <p>0</p> <p>0</p> <p>0</p> <p>0</p> <p>0</p>	
<p>Heating boiler accessories</p>	<p>EN 303-5:2012 Art. 4.3.9</p>		
<p>General If the boiler is factory equipped with additional fittings which need to be serviced to ensure their correct operation and the safety of the boiler, the design shall ensure ease of access without requiring extensive dismantling work.</p>	<p>EN 303-5:2012 Art. 4.3.9.1</p>	<p>0</p>	



Requirement	Requirement specification	Evaluation	Note
<p>Electrical safety The electrical safety of the boiler and the interfaces (e.g. connectors) between control devices shall comply with EN 60335-2-102. The electrical safety of control devices shall comply either with EN 60335-2-102, with EN 60730-1 or its relevant part 2 or with the electrical requirements of the standards listed in Annex ZBB of EN 60335-2-102:2006. For abnormal operation as fault condition according to 19.11.2 f) of EN 60335-2-102:2006 (failure of integrated circuits), only output signals which cause only one malfunction in one actuator shall be considered as relevant. Combinations of output signals which cause malfunction in more than one actuator are not considered relevant in the sense of abnormal operation because it is unlikely that any hazardous situation can occur. The documentation of the electrical connections for the individual components shall be provided by means of an electrical wiring and connection diagram.</p>	<p>EN 303-5:2012 Art. 4.3.9.2</p>	<p>+</p>	<p>Class B 31-8983/E</p>
<p>Electromagnetic compatibility The EMC requirements shall be fulfilled in accordance with EN 61000-6-2 and EN 61000-6-3. For this testing, it is permissible to use an adapted version of the boiler software for simulating boiler operation.</p>	<p>EN 303-5:2012 Art. 4.3.9.3</p>	<p>+</p>	<p>31-8983/ EMC</p>

Note: + Compliant
 - Non-compliant
 0 Not applicable
 x Not assessed

Evaluation drafted by: Ing. Michal Havlů

Date: 2013-03-26

Signed: _____

Person responsible for the evaluation:
 Ing. Stanislav Buchta

Date: 2013-03-27

Signed: _____



Requirement assessed: **Performance requirements**

Requirement specification: EN 303-5:2012
Art. 4.4, 4.4.1, 4.4.2, 4.4.3, 4.4.4, 4.4.5, 4.4.6, 4.4.7

Sample assessed: EG PELLETT 10, EG PELLETT 15, EG PELLETT 25,
EG PELLETT 40, EG PELLETT 60

Evaluation results: see the following Table

Requirement	Requirement specification	Evaluation	Note
<p>General The following performance requirements shall be assessed in tests using the appropriate test fuel(s) specified in Table 7. These shall be selected to represent the recommended fuel(s) which it is claimed the boiler can burn. <i>NOTE The nominal heat output and the heat output range might vary depending on the fuel.</i> The requirements for the boiler efficiency and the emission limits are divided into 3 classes. To meet the class requirements, all the efficiency and emission limits of that class shall be fulfilled.</p>	EN 303-5:2012 Art. 4.4.1	+	
<p>Boiler efficiency The boiler efficiency, when tested in accordance with 5.7, 5.8 and 5.10, shall not be less than the formula shown in Figure 1 for the nominal heat output. For boilers above 100 kW, the requirement for class 4 is given at 84 % and class 5 is given at 89 %. For boilers above 300 kW, the requirement of class 3 is given at 82 %.</p>	EN 303-5:2012 Art. 4.4.2	+	
<p>Flue gas temperature For boilers which operate with a flue gas temperature below 160 K and above room temperature at nominal heat output, the boiler manufacturer shall make recommendations regarding the flue installation in order to ensure sufficient draught and to prevent the chimney sooting up and condensation.</p>	EN 303-5:2012 Art. 4.4.3	+	Less than 160K
<p>Draught The manufacturer shall specify the minimum draught at the flue gas outlet of the boiler needed for correct operation of the boiler. Where the manufacturer gives no detailed values, the figures according to Table B.2 of EN 13384-1:2002+A2:2008 shall apply.</p>	EN 303-5:2012 Art. 4.4.4	+	
<p>Combustion period The combustion period for hand-stoked boilers at nominal heat output shall be stated by the manufacturer and shall be at least: – 2 hours for biogenic and other solid fuels ; – 4 hours for fossil fuels.</p>	EN 303-5:2012 Art. 4.4.5	0	
<p>Minimum heat output For automatically stoked boilers, the minimum heat output shall not exceed 30 % of the nominal heat output. This requirement on limiting the maximum heat output shall be achieved automatically by a control device.</p>	EN 303-5:2012 Art. 4.4.6	+	



Requirement	Requirement specification	Evaluation	Note
<p>The control of the fuel and/or the air supply may be either continuous or intermittent. For manually stoked boilers where the manufacturer specifies that the boiler shall be connected to an accumulator tank, the minimum continuous heat output can be greater than 30 % of nominal heat output, provided that the manufacturer specifies in the technical document</p> <p>The control of the fuel and/or the air supply may be either continuous or intermittent. For manually stoked boilers where the manufacturer specifies that the boiler shall be connected to an accumulator tank, the minimum continuous heat output can be greater than 30 % of nominal heat output, provided that the manufacturer specifies in the technical document</p> <p>The boiler plate shall state the minimum accumulator tank volume.</p> <p>Manually stoked boilers do not require testing at minimum heat output if the manufacturer claims that they shall always be connected to accumulator tank.</p> <p>The following applies as a reference for the minimum accumulator tank volume:</p> $V_{Sp} = 15 T_B \times Q_N \left(1 - 0,3 \frac{Q_H}{Q_{min}} \right)$ <p>where</p> <p>V_{Sp} is the accumulator tank volume, in litres;</p> <p>Q_N is the nominal heat output, in kilowatts;</p> <p>T_B is the burning period, in hours;</p> <p>Q_H is the heating load of the premises, in kilowatts;</p> <p>Q_{min} is the minimum heat output, in kilowatts.</p> <p>For heating boilers using several allowable fuels, the tank size shall be based on the fuel which requires the largest accumulator tank. The minimum volume of the accumulator tank shall be 300 l.</p>		<p>+</p> <p>0</p> <p>0</p> <p>0</p> <p>+</p>	<p>Less than 30% Qn</p>
<p>Emission limits</p> <p>Combustion shall be of low-emission. This requirement shall be satisfied if the emission values shown in Table 6 are not exceeded when operating at nominal heat output or, in the case of boilers with heat output range, when operating at nominal heat output and minimum heat output, in accordance with 5.7, 5.9 and 5.10.</p>	<p>EN 303-5:2012 Art. 4.4.7</p>	<p>+</p>	

Note: + Compliant 0 Not applicable
 - Non-compliant x Not assessed

Evaluation drafted by: Ing. Michal Havlů

Date: 2013-03-26

Signed: 

Person responsible for the evaluation:
 Ing. Stanislav Buchta

Date: 2013-03-27

Signed: 



Requirement assessed: **Marking**

Requirement specification: EN 303-5:2012
Art. 7, 7.1, 7.2, 7.3

Sample assessed: EG PELLETT 10, EG PELLETT 15, EG PELLETT 25, EG PELLETT
40, EG PELLETT 60

Evaluation results: see the following Table

Requirement	Requirement specification	Evaluation	Note
Marking	EN 303-5:2012 Art. 7		
General Each heating boiler shall have a data plate. The boiler data plate shall be written in the language of the country of destination and be affixed in an accessible spot.	EN 303-5:2012 Art. 7.1	+	
Information on the boiler plate The boiler plate shall contain at least the following information: a) name and company domicile of the manufacturer and, where available, the manufacturer's symbol; b) trade designation, type under which the boiler is marketed; c) production number and year of construction (coding is permissible at the manufacturer's discretion); d) nominal heat output and heat output range in kilowatts for each type of fuel; e) boiler class regarding each fuel type that was tested; f) maximum allowable operating pressure, in bar; g) maximum allowable operating temperature, in degrees Celsius; h) water content, in litres; i) electrical connection (V, Hz, A) and wattage, in watts; j) the fuel class according to Clause 1 and for fuels of class E the tested fuel.	EN 303-5:2012 Art. 7.2	+	
Boiler plate requirements The material and labelling used for the plate shall be durable. The labelling shall be abrasion-proof. Under normal operating conditions, the plate shall not discolour so as to make its information difficult to read. Self-adhesive plates should not become detached as a result of moisture and temperature.	EN 303-5:2012 Art.7.3	+	

Note: + Compliant 0 Not applicable
- Non-compliant x Not assessed

Evaluation drafted by: Ing. Michal Havlů

Date: 2013-03-26

Signed: 

Person responsible for the evaluation:
Ing. Stanislav Buchta

Date: 2013-03-27

Signed: 



Requirement assessed: **Technical documentation, supplied with boiler**

Requirement specification: EN 303-5:2012
Art. 8, 8.1, 8.2, 8.3, 5.16.1

Sample assessed: EG PELLET 10, EG PELLET 15, EG PELLET 25, EG PELLET 40, EG PELLET 60

Evaluation results: see the following Table

Requirement	Requirement specification	Evaluation	Note
Technical documentation, supplied with boiler	EN 303-5:2012 Art. 8		
General For each boiler, the documents listed below shall be made available in the language of the boiler's country of destination; the documents specified under 8.2 and 8.3 shall be enclosed with every boiler.	EN 303-5:2012 Art. 8.1	+	
Technical information and installation instructions These documents shall contain at least the following indications:			
a) necessary draught, in millibars;		+	
b) water content, in litres;		+	
c) exhaust gas temperature at nominal heat output and minimum heat output, in degrees Celsius;		+	
d) exhaust mass flow at nominal heat output and at minimum heat output, in kilograms per second;		+	
e) flue pipe diameter, in millimetres;		+	
f) water-side resistance, in millibars;		+	
g) nominal heat output and heat output range, in kilowatts;		+	Enclosed technical documentation.
h) boiler class;		+	
i) combustion period in hours at Q_N ;		+	
j) setting range for the temperature controller, in degrees Celsius;		+	
k) minimal return temperature at boiler return tapping, in degrees Celsius;	EN 303-5:2012 Art. 8.2	+	
l) fuel type and water content as well as fuel size and detail information according to Table 7 for fuels type E resp. e;		+	
m) filling chamber capacity in litres and filling opening dimensions, in millimetres;		+	
n) necessary accumulator storage, in litres if $Q_{min} > 0,3 Q_N$;		0	
o) auxiliary power requirement at Q_N and Q_{min} , in watts;		+	
p) stand by power, in watts;		+	
q) cold water temperature and pressure for safety heat exchanger, in bars;		0	
r) electrical connections including appliance and main-switch-off;		+	
s) whether the heating appliance is running with or without using a fan;		+	
t) whether the heating appliance is working under over pressure or under pressure at flue gas outlet;		+	



Requirement	Requirement specification	Evaluation	Note
<p>Operating instructions The operating instructions shall contain references to:</p> <ul style="list-style-type: none"> - the operation of the boiler, stoking and opening doors without risk; - cleaning and cleaning intervals, including the equipment required for the cleaning operations; - measures to be taken in the event of malfunction; - the reasons for recommending a regular, competent maintenance service and the necessary maintenance intervals; - the type of fuel and water content and the fuel size (with the direction of the layers in the case of wood logs); - the maximum filling height for fuel in the filling chamber; - the nominal combustion period for fuel types at nominal heat output. <p><i>Other documents (brochures, etc.) shall not contain any information that is in contradiction with that of the operating instructions.</i></p>	<p>EN 303-5:2012 Art. 8.3</p>	<p style="text-align: center;">+</p> <p style="text-align: center;">+</p> <p style="text-align: center;">+</p> <p style="text-align: center;">+</p> <p style="text-align: center;">+</p> <p style="text-align: center;">+</p> <p style="text-align: center;">+</p>	
<p>Check of the safety and risk assessment A risk analysis shall be performed by the manufacturer according to EN ISO 12100. "Force majeure risks" shall not be taken into consideration. Completeness, correctness and plausibility of the risk analysis of the manufacturer shall be verified by a third party. The verification does not generally require testing. If tests are performed, the following conditions shall be applied.</p> <ol style="list-style-type: none"> a) Adjust the firing so that it corresponds to the nominal heat output Q_N of the boiler, a steady state condition shall be reached and the outlet pressure at the flue gas section shall be according to the nominal heat output setting. b) For manual stoked boilers, the boiler shall be refuelled after reaching steady state with a full batch before starting the test. <p>The verification of the risk analysis can be done on the basis of one or more of the following:</p> <ul style="list-style-type: none"> - implementation of accepted solutions according to this standard; - implementation of safety functions with verification of the shut-off function; - check of the characteristics of the boiler at normal operation and in the case of failures; - relevant references to other standards or associated test results. <p>The risk analysis shall at least provide risk assessments for the following tasks and take into account possible failures in the components of the fuel supply, the air supply, the combustion and combustion control, the flue gas exit, the heat dissipation, fire prevention and the risk of injuries of persons.</p>	<p>EN 303-5:2012 Art. 5.16.1</p>	<p style="text-align: center;">+</p>	



Requirement	Requirement specification	Test evaluation	Note
The following risks shall be evaluated in detail: c) fuel feed operation continuously at maximum speed, fuel overload; d) feed rate too low; e) loss of air supply; f) loss of power; g) unstable combustion chamber pressure; h) unclosed doors and openings within the boiler or the stoking device; i) open integral fuel hopper; j) empty integral fuel hopper; k) ignition failure during start up; l) check of the strategy for safety against back burning; m) safety check regarding effect of emptiness or a blockage of the stoking device; n) voltage variation; o) leakage of combustion products (e.g. flue gas fan failure, power loss, pressurized combustion chamber); p) lockout and restart; q) electric safety (documents and certificates have to be provided); r) risk of injuries of persons. <i>NOTE Additional tests are recommended.</i>	EN 303-5:2012 Art. 5.16.1	+	

Note: + Compliant
 0 Not applicable
 - Non-compliant
 x Not assessed

Evaluation drafted by: Ing. Michal Havlů

Date: 2013-03-26

Signed: _____

Person responsible for the evaluation:
 Ing. Stanislav Buchta

Date: 2013-03-27

Signed: _____



Accredited test number: **1002*** Test title: **Test for gas side soundness**

Test method: EN 303-5:2012
 Art. 4.3.7, 5.6

Sample tested: EG PELLET 10, EG PELLET 15, EG PELLET 25,
 EG PELLET 40, EG PELLET 60

Measuring equipment used: Chapter III - Measuring and test equipment

Date of testing:	2012-11-27	$t_{ok} = 22.3$	$^{\circ}\text{C}$	r.v. = 45.0	%	$p_a = 750$	Torr
Place of testing:	At SZU	<input checked="" type="checkbox"/>	At the Manufacturer's	<input type="checkbox"/>	At the Customer's	<input type="checkbox"/>	Other:

Test results:

Requirement	Requirement specification	Test evaluation	Note
Leakage of the combustion system For boilers designed to operate with a positive pressure in the combustion chamber when tested in accordance with 5.6 at a test-pressure of 1.2 times the gas side resistance at nominal heat output, the leakage rate based on mass flow shall not exceed 2 % of the flue gas mass flow at the nominal heat output. The gas side resistance shall be determined with the fuel chamber filled to maximum capacity (as specified by the manufacturer). <i>NOTE: For boilers designed to operate with negative pressure, the leakage rate measured according to 5.6 characterises the boiler.</i>	EN 303-5:2012 Art. 4.3.7	+	

Pressure drop (mbar)	1.2 times draught loss (mbar)	Mass flow rate of combustion products (kg/s)	Air leakage measured (kg/s)	Measured leakage uncertainty (%)	Permissible air leakage (kg/s)
0.45	0.54	0.037	0.00042	5	0.00074

Measurement uncertainty: Specified in Measurement results

"The above-specified extended measurement uncertainties are calculated as a factor of the measurement uncertainty and the extension coefficient, $k=2$, corresponding to the coverage certainty of 95% for standard classification. The uncertainties do not reflect the impact of sample taking and lack of homogeneity. The standard uncertainty was determined in accordance with Document EA 4/02"

Test evaluation: The measured air leakage does not exceed permissible value.

Tested by: Ing. Michal Havlů

Date: 2013-01-20

Signed: 

Reviewed by: Ing. Stanislav Buchta

Date: 2013-01-21

Signed: 



Accredited test number: **1003*** Test title: **Surface temperature test**

Test method: EN 303-5:2012 Art. 5.12, 5.16.4, 4.3.6

Sample tested: EG PELLETT 10, EG PELLETT 15, EG PELLETT 25, EG PELLETT 40, EG PELLETT 60

Measuring equipment used: Chapter III - Measuring and test equipment

Test results:

Requirement	Requirement specification	Test evaluation	Note
<p>Surface temperature The mean surface temperature shall be measured at nominal heat output. In order to do this, a minimum of 5 points on each boiler surface shall be measured. Under the same conditions, the critical temperatures (e.g. boiler doors, operating levers) shall be measured.</p>	EN 303-5:2012 Art. 5.12	+	
<p>The surface temperature on the outside of the boiler (including the bottom and doors but not including the flue gas outlet and maintenance openings of natural draft boilers) shall not exceed the room temperature by more than 60 K when tested in accordance with 5.12. The requirement for the bottom is not applicable for instances when the manufacturer declares that the boiler is to be installed on a non-combustible base. When tested in accordance with 5.12, the surface temperature of operating levers and all parts which shall be touched by hand during operation of the boiler shall not exceed the room temperature by more than the following values:</p> <ul style="list-style-type: none"> - 35 K for metals and similar materials; - 45 K for porcelain and similar materials; - 60 K for plastics and similar materials. 	EN 303-5:2012 Art. 4.3.6	+	
<p>Resistance to thermal conductance Temperature measurement shall be performed on the surface of the stoking device at the place next to the fuel line but within a maximum distance which shall be less than 1 m against the feeding direction from the inner wall of the combustion chamber. For boilers with integrated hopper, the temperature measurement shall be performed on the surface of the stoking device at the place next to the integrated hopper but within a maximum distance which shall be less than 1 m against the feeding direction from the inner wall of the combustion chamber. In addition, the highest surface temperature of the hopper shall be measured.</p>	EN 303-5:2012 Art. 5.16.4	+	



Measurement results: EG PELLET
 60

Average temperatures of boiler walls, doors and covers (°C):	
Fuel type	Pellets – C1
Front wall	30
Rear wall	43
Right wall	25
Left wall	37
Upper wall	38
Lower wall (a base was used, non-combustible material)	100
Ash-pan door (under cover)	134
Temperatures of control elements (°C):	
Ash-pan door handle - metal	31
El. control panel – plastic	28
Temperature of fuel chamber and stoking elements (°C):	
Inner face of fuel chamber	32
Temperature of fuel line tube (screw feeder - flange)	55

Measurement uncertainty: 2 °C for temperatures within the range of (0 ÷ 250)°C

"The above-specified extended measurement uncertainties are calculated as a factor of the measurement uncertainty and the extension coefficient, k=2, corresponding to the coverage certainty of 95% as regards standard classification. The uncertainties do not reflect the impact of sample taking and lack of homogeneity. The standard uncertainty was determined in accordance with Document EA 4/02."

The results of the surface temperature measurements and their evaluation for EG PELLET 10, EG PELLET 15, EG PELLET 25, and EG PELLET 40 are included in the background materials to Task 31-8861/T.

Test evaluation: The specified temperature rise values have not been exceeded.

Tested by: Ing. Michal Havlů

Date: 2013-01-23

Signed: 

Reviewed by: Ing. Stanislav Buchta

Date: 2013-01-24

Signed: 



Accredited test number: **1004.1*** Test title: **Test of heat output, input and efficiency**
1004.2* **Test of combustion product temperature**

Test method: EN 303-5:2012
Art. 4.4.2, 4.4.3, 5.7 to 5.10

Sample tested: EG PELLETT 10, EG PELLETT 15, EG PELLETT 25, EG PELLETT 40, EG PELLETT 60

Measuring equipment used: Chapter III - Measuring and test equipment

Test results:

Average measured and calculated values (solid fuels):

Test:		I.	II.
Boiler type:		EG PELLETT 10	
Output tested:		Nominal	Minimum
Fuel type:		Pellets - C1	
Combustion period, (manual/automatic) stoking		Minimally 6 hours	
Nominal heat output (specified by manufacturer)	[kW]	10	10
Flue gas temperature	[°C]	105.9	67.2
Fuel mass added	[kg/hour]	2.390	0.640
Flow temperature	[°C]	64.7	64.5
Return temperature	[°C]	81.6	79.9
Temperature of the entering cold water	[°C]	11.2	14.6
Cooling water flow rate	[m3/hour]	0.1220	0.0290
Draught	[Pa]	20	20
Ambient temperature	[°C]	19.7	20.9
Relative air humidity	[%]	35.3	35.2
Barometric pressure	[kPa]	99.102	99.125

Fuel analysis:

Test (period of burning) :		I.	II.
Oxygen, O ₂	[%]	8.82	13.09
Carbon dioxide CO ₂	[%]	10.85	6.81
Carbon monoxide CO	[ppm]	105	490
Higher hydrocarbons THC/OGC	[ppm]	14	21
Nitrogen oxides NO _x	[ppm]	109	71



Auxiliary combustion values (solid fuels):

Test (period of burning) :		I.	II.
Stoichiometric oxygen volume	[m ³ /kg]	0.945	0.940
Stoichiometric air volume	[m ³ /kg]	4.498	4.478
Stoichiometric volume of dry combustion products	[m ³ /kg]	4.416	4.395
Maximum content of CO ₂	[%]	19.51	19.50
Stoichiometric air multiple	[-]	1.67	2.62
Volume of dry combustion products, actual	[m ³ /kg]	7.932	12.508
Content of H ₂ O in combustion air	[m ³ /kg]	0.061	0.102
Content of H ₂ O in combustion products	[m ³ /kg]	0.845	0.886

Calculated values - thermal overview

Test (period of burning) :		I.	II.
Loss of sensible heat of combustion products	[%]	5.99	4.81
Loss of gas underburning	[%]	0.08	0.5
Loss of mechanical underburning	[%]	1.16	1.61
Loss of heat transfer into environment	[%]	1.16	1.73
Total loss	[%]	8.4	8.7
Efficiency – indirect method	[%]	91.6	91.3
Heat input	[kW]	11.54	3.1
Heat output	[kW]	10.54	2.83
Uncertainty of determining heat output	[kW]	0.44	0.12
Efficiency – direct method	[%]	91.3	90.9
Output / nominal output	[%]	105.4	28.2

At nominal output, when burning **pellets – C1**, the boiler efficiency meets the requirements applicable to **Class 5** as per EN 303-5:2012, Fig. 1.

Test evaluation:

The measured heat output is within the ± 8% tolerance;
 Boiler Class 5;
 At nominal output, combustion product temperature is less than 160 K above the ambient temperature;
 When burning wood pellets, the period of burning is more than 6 hours;
 The minimum heat output is less than 30% of nominal heat output.



EG PELLET 10	
Electricity consumption	
During the tests, the electrical consumption shall be determined according to EN 15456. The values for maximum consumption, for stand-by, nominal heat output and minimum heat output shall be stated in the test report. For boilers with automatic feeding systems (fuel line), the electrical consumption of the boiler and the fuel line shall be determined and stated separately. The average electrical power consumption during stand by shall be measured for a minimum duration of 10 min and shall be stated in watts. In cases where control operations influence the intrinsic energy consumption, a longer duration might be necessary.	
Maximum electrical input	1810 W
Electrical input at nominal heat output	210 W
Electrical input at minimum heat output	70 W
Electrical input for STAND BY mode	7 W
Maximum electrical input for fuel supply (fuel line)	40 W
Maximum electrical input for ignition system	1600 W

Test results:

Average measured and calculated values (solid fuels):

Test:	I.	II.
Boiler type:	EG PELLET 15	
Output tested:	Nominal	Minimum
Fuel type:	Pellets - C1	
Combustion period, (manual/automatic) stoking	Minimally 6 hours	
Nominal heat output (specified by manufacturer) [kW]	15	15
Flue gas temperature [°C]	125.6	71.1
Fuel mass added [kg/hour]	3.680	0.990
Flow temperature [°C]	60.7	64.8
Return temperature [°C]	76.3	80.6
Temperature of the entering cold water [°C]	10.1	11.8
Cooling water flow rate [m3/hour]	0.2026	0.0480
Draught [Pa]	20	20
Ambient temperature [°C]	19.0	19.1
Relative air humidity [%]	34.2	34.0
Barometric pressure [kPa]	99.102	99.125

Fuel analysis:

Test (period of burning) :	I.	II.
Oxygen, O ₂ [%]	8.80	11.77
Carbon dioxide CO ₂ [%]	10.58	7.86
Carbon monoxide CO [ppm]	140	364
Higher hydrocarbons THC/OGC [ppm]	23	9
Nitrogen oxides NOx [ppm]	127	78



Auxiliary combustion values (solid fuels):

Test (period of burning) :		I.	II.
Stoichiometric oxygen volume	[m ³ /kg]	0.951	0.938
Stoichiometric air volume	[m ³ /kg]	4.529	4.465
Stoichiometric volume of dry combustion products	[m ³ /kg]	4.447	4.383
Maximum content of CO ₂	[%]	19.52	19.50
Stoichiometric air multiple	[-]	1.71	2.25
Volume of dry combustion products, actual	[m ³ /kg]	8.190	10.828
Content of H ₂ O in combustion air	[m ³ /kg]	0.058	0.075
Content of H ₂ O in combustion products	[m ³ /kg]	0.843	0.860

Calculated values - thermal overview

Test (period of burning) :		I.	II.
Loss of sensible heat of combustion products	[%]	7.62	4.74
Loss of gas underburning	[%]	0.12	0.31
Loss of mechanical underburning	[%]	0.51	1.88
Loss of heat transfer into environment	[%]	1.03	1.77
Total loss	[%]	9.3	8.7
Efficiency – indirect method	[%]	90.7	91.3
Heat input	[kW]	17.71	4.80
Heat output	[kW]	16.10	4.35
Uncertainty of determining heat output	[kW]	0.68	0.18
Efficiency – direct method	[%]	90.9	90.7
Output / nominal output	[%]	107.3	29.0

At nominal output, when burning **pellets – C1**, the boiler efficiency meets the requirements applicable to **Class 5** as per EN 303-5:2012, Fig. 1.

Test evaluation:

The measured heat output is within the ± 8% tolerance;
 Boiler Class 5;
 At nominal output, combustion product temperature is less than 160 K above the ambient temperature;
 When burning wood pellets, the period of burning is more than 6 hours;
 The minimum heat output is less than 30% of nominal heat output.



EG PELLET 15	
Electricity consumption	
During the tests, the electrical consumption shall be determined according to EN 15456. The values for maximum consumption, for stand-by, nominal heat output and minimum heat output shall be stated in the test report. For boilers with automatic feeding systems (fuel line), the electrical consumption of the boiler and the fuel line shall be determined and stated separately. The average electrical power consumption during stand by shall be measured for a minimum duration of 10 min and shall be stated in watts. In cases where control operations influence the intrinsic energy consumption, a longer duration might be necessary.	
Maximum electrical input	1820 W
Electrical input at nominal heat output	220 W
Electrical input at minimum heat output	75 W
Electrical input for STAND BY mode	7 W
Maximum electrical input for fuel supply (fuel line)	45 W
Maximum electrical input for ignition system	1600 W

Test results:

Average measured and calculated values (solid fuels):

Test:	I.	II.
Boiler type:	EG PELLET 25	
Output tested:	Nominal	Minimum
Fuel type:	Pellets - C1	
Combustion period, (manual/automatic) stoking	Minimally 6 hours	
Nominal heat output (specified by manufacturer) [kW]	25	25
Flue gas temperature [°C]	119.3	77.8
Fuel mass added [kg/hour]	6.170	1.660
Flow temperature [°C]	61.7	62.4
Return temperature [°C]	80.3	76.9
Temperature of the entering cold water [°C]	9.9	9.8
Cooling water flow rate [m3/hour]	0.3230	0.0880
Draught [Pa]	25	25
Ambient temperature [°C]	16.9	17.9
Relative air humidity [%]	30.1	27.7
Barometric pressure [kPa]	99.102	99.125

Fuel analysis:

Test (period of burning) :	I.	II.
Oxygen, O ₂ [%]	8.62	11.14
Carbon dioxide CO ₂ [%]	10.76	8.52
Carbon monoxide CO [ppm]	249	114
Higher hydrocarbons THC/OGC [ppm]	23	6
Nitrogen oxides NOx [ppm]	126	85



Auxiliary combustion values (solid fuels):

Test (period of burning) :		I.	II.
Stoichiometric oxygen volume	[m ³ /kg]	0.945	0.938
Stoichiometric air volume	[m ³ /kg]	4.498	4.465
Stoichiometric volume of dry combustion products	[m ³ /kg]	4.416	4.383
Maximum content of CO ₂	[%]	19.51	19.50
Stoichiometric air multiple	[-]	1.68	2.11
Volume of dry combustion products, actual	[m ³ /kg]	7.992	10.020
Content of H ₂ O in combustion air	[m ³ /kg]	0.044	0.053
Content of H ₂ O in combustion products	[m ³ /kg]	0.828	0.838

Calculated values - thermal overview

Test (period of burning) :		I.	II.
Loss of sensible heat of combustion products	[%]	7.15	5.09
Loss of gas underburning	[%]	0.18	0.10
Loss of mechanical underburning	[%]	1.16	1.88
Loss of heat transfer into environment	[%]	0.88	1.29
Total loss	[%]	9.4	8.4
Efficiency – indirect method	[%]	90.6	91.6
Heat input	[kW]	29.79	8.05
Heat output	[kW]	26.92	7.35
Uncertainty of determining heat output	[kW]	1.13	0.31
Efficiency – direct method	[%]	90.4	91.3
Output / nominal output	[%]	107.7	29.4

At nominal output, when burning **pellets – C1**, the boiler efficiency meets the requirements applicable to **Class 5** as per EN 303-5:2012, Fig. 1.

Test evaluation:

The measured heat output is within the $\pm 8\%$ tolerance;
 Boiler Class 5;
 At nominal output, combustion product temperature is less than 160 K above the ambient temperature;
 When burning wood pellets, the period of burning is more than 6 hours;
 The minimum heat output is less than 30% of nominal heat output.



EG PELLET 25	
Electricity consumption	
During the tests, the electrical consumption shall be determined according to EN 15456.	
The values for maximum consumption, for stand-by, nominal heat output and minimum heat output shall be stated in the test report. For boilers with automatic feeding systems (fuel line), the electrical consumption of the boiler and the fuel line shall be determined and stated separately.	
The average electrical power consumption during stand by shall be measured for a minimum duration of 10 min and shall be stated in watts. In cases where control operations influence the intrinsic energy consumption, a longer duration might be necessary.	
Maximum electrical input	1820 W
Electrical input at nominal heat output	220 W
Electrical input at minimum heat output	75 W
Electrical input for STAND BY mode	7 W
Maximum electrical input for fuel supply (fuel line)	45 W
Maximum electrical input for ignition system	1600 W

Test results:

Average measured and calculated values (solid fuels):

Test:	I.	II.
Boiler type:	EG PELLET 40	
Output tested:	Nominal	Minimum
Fuel type:	Pellets - C1	
Combustion period, (manual/automatic) stoking	Minimally 6 hours	
Nominal heat output (specified by manufacturer) [kW]	40	40
Flue gas temperature [°C]	122.0	81.1
Fuel mass added [kg/hour]	8.787	2.420
Flow temperature [°C]	61.3	61.0
Return temperature [°C]	77.0	75.7
Temperature of the entering cold water [°C]	9.6	11.0
Cooling water flow rate [m3/hour]	0.4850	0.1360
Draught [Pa]	25	25
Ambient temperature [°C]	17.3	17.6
Relative air humidity [%]	30.1	27.7
Barometric pressure [kPa]	99.102	99.125

Fuel analysis:

Test (period of burning) :	I.	II.
Oxygen, O ₂ [%]	9.97	12.64
Carbon dioxide CO ₂ [%]	9.56	7.09
Carbon monoxide CO [ppm]	180	331
Higher hydrocarbons THC/OGC [ppm]	12	10
Nitrogen oxides NOx [ppm]	99	63



Auxiliary combustion values (solid fuels):

Test (period of burning) :		I.	II.
Stoichiometric oxygen volume	[m ³ /kg]	0.953	0.951
Stoichiometric air volume	[m ³ /kg]	4.539	4.528
Stoichiometric volume of dry combustion products	[m ³ /kg]	4.457	4.446
Maximum content of CO ₂	[%]	19.52	19.52
Stoichiometric air multiple	[-]	1.89	2.48
Volume of dry combustion products, actual	[m ³ /kg]	9.084	12.175
Content of H ₂ O in combustion air	[m ³ /kg]	0.050	0.062
Content of H ₂ O in combustion products	[m ³ /kg]	0.835	0.847

Calculated values - thermal overview

Test (period of burning) :		I.	II.
Loss of sensible heat of combustion products	[%]	8.19	6.43
Loss of gas underburning	[%]	0.14	0.32
Loss of mechanical underburning	[%]	0.29	0.53
Loss of heat transfer into environment	[%]	0.62	1.04
Total loss	[%]	9.2	8.3
Efficiency – indirect method	[%]	90.8	91.7
Heat input	[kW]	42.23	11.65
Heat output	[kW]	38.43	10.67
Uncertainty of determining heat output	[kW]	1.61	0.45
Efficiency – direct method	[%]	91.0	91.6
Output / nominal output	[%]	96.1	26.7

At nominal output, when burning **pellets – C1**, the boiler efficiency meets the requirements applicable to **Class 5** as per EN 303-5:2012, Fig. 1.

Test evaluation:

The measured heat output is within the $\pm 8\%$ tolerance;
 Boiler Class 5;
 At nominal output, combustion product temperature is less than 160 K above the ambient temperature;
 When burning wood pellets, the period of burning is more than 6 hours;
 The minimum heat output is less than 30% of nominal heat output.



EG PELLET 40	
Electricity consumption	
During the tests, the electrical consumption shall be determined according to EN 15456. The values for maximum consumption, for stand-by, nominal heat output and minimum heat output shall be stated in the test report. For boilers with automatic feeding systems (fuel line), the electrical consumption of the boiler and the fuel line shall be determined and stated separately. The average electrical power consumption during stand by shall be measured for a minimum duration of 10 min and shall be stated in watts. In cases where control operations influence the intrinsic energy consumption, a longer duration might be necessary.	
Maximum electrical input	1990 W
Electrical input at nominal heat output	390 W
Electrical input at minimum heat output	130 W
Electrical input for STAND BY mode	7 W
Maximum electrical input for fuel supply (fuel line)	45 W
Maximum electrical input for ignition system	1600 W

Test results:

Average measured and calculated values (solid fuels):

Test:	I.	II.
Boiler type:	EG PELLET 60	
Output tested:	Nominal	Minimum
Fuel type:	Pellets - C1	
Combustion period, (manual/automatic) stoking	Minimally 6 hours	
Nominal heat output (specified by manufacturer) [kW]	60	60
Flue gas temperature [°C]	166	89
Fuel mass added [kg/hour]	14.260	4.020
Flow temperature [°C]	53.3	61.6
Return temperature [°C]	76.1	74.3
Temperature of the entering cold water [°C]	8.4	9.5
Cooling water flow rate [m3/hour]	0.8040	0.2300
Draught [Pa]	20	20
Ambient temperature [°C]	19.2	20.6
Relative air humidity [%]	21.5	21.0
Barometric pressure [kPa]	99.132	99.140

Fuel analysis:

Test (period of burning) :	I.	II.
Oxygen, O ₂ [%]	5.24	8.21
Carbon dioxide CO ₂ [%]	14.29	11.74
Carbon monoxide CO [ppm]	261	234
Higher hydrocarbons THC/OGC [ppm]	18	14
Nitrogen oxides NOx [ppm]	182	108



Auxiliary combustion values (solid fuels):

Test (period of burning) :		I.	II.
Stoichiometric oxygen volume	[m ³ /kg]	1.000	1.008
Stoichiometric air volume	[m ³ /kg]	4.762	4.801
Stoichiometric volume of dry combustion products	[m ³ /kg]	4.657	4.695
Maximum content of CO ₂	[%]	19.18	19.20
Stoichiometric air multiple	[-]	1.32	1.63
Volume of dry combustion products, actual	[m ³ /kg]	6.240	7.664
Content of H ₂ O in combustion air	[m ³ /kg]	0.031	0.041
Content of H ₂ O in combustion products	[m ³ /kg]	0.831	0.841

Calculated values - thermal overview

Test (period of burning) :		I.	II.
Loss of sensible heat of combustion products	[%]	7.9	4.4
Loss of gas underburning	[%]	0.1	0.1
Loss of mechanical underburning	[%]	1.4	0.6
Loss of heat transfer into environment	[%]	1.6	2.1
Total loss	[%]	11.1	7.3
Efficiency – indirect method	[%]	88.9	92.7
Heat input	[kW]	72.8	20.4
Heat output	[kW]	63.7	17.8
Uncertainty of determining heat output	[kW]	2.7	0.8
Efficiency – direct method	[%]	87.6	87.4
Output / nominal output	[%]	106.2	29.7

At nominal output, when burning **pellets – C1**, the boiler efficiency meets the requirements applicable to **Class 4** as per EN 303-5:2012, Fig. 1.

Test evaluation:

The measured heat output is within the ± 8% tolerance;
 Boiler Class 4;
 At nominal output, combustion product temperature is higher than 160 K above the ambient temperature;
 When burning wood pellets, the period of burning is more than 6 hours;
 The minimum heat output is less than 30% of nominal heat output.



EG PELLET 60	
Electricity consumption	
During the tests, the electrical consumption shall be determined according to EN 15456. The values for maximum consumption, for stand-by, nominal heat output and minimum heat output shall be stated in the test report. For boilers with automatic feeding systems (fuel line), the electrical consumption of the boiler and the fuel line shall be determined and stated separately. The average electrical power consumption during stand by shall be measured for a minimum duration of 10 min and shall be stated in watts. In cases where control operations influence the intrinsic energy consumption, a longer duration might be necessary.	
Maximum electrical input	2000 W
Electrical input at nominal heat output	400 W
Electrical input at minimum heat output	140 W
Electrical input for STAND BY mode	7 W
Maximum electrical input for fuel supply (fuel line)	45 W
Maximum electrical input for ignition system	1600 W

Fuel analysis

Fuel type	Pellets – C1			
	Symbol	Unit	Value	Uncertainty
Analytical indicator				
Heat of combustion	Q_s	[MJ/kg]	19.71	0.14
Caloric value	Q_j	[MJ/kg]	18.14	0.14
All water in original condition	W'_t	[% by weight]	5.16	0.01
Ash	A	[% by weight]	0.46	0.02
Carbon	C	[% by weight]	49.07	0.25
Hydrogen	H	[% by weight]	6.63	0.10
Nitrogen	N	[% by weight]	0.16	0.10
Sulphur	S	[% by weight]	0.011	0.001
Chlorine	Cl	[% by weight]	0.015	0.002
Oxygen – calculation for 100%	O	[% by weight]	38.49	
Conversion factor f_{emis} for emissions in [mg/m ³] to [mg/MJ]	f_{emis}	[-]	0.26077	

Note: Sample in original condition

Measurement uncertainty: Specified in Measurement results

“The above-specified extended measurement uncertainties are calculated as a factor of the measurement uncertainty and the extension coefficient, $k=2$, corresponding to the coverage certainty of 95% for standard classification. The uncertainties do not reflect the impact of sample taking and lack of homogeneity. The standard uncertainty was determined in accordance with Document EA 4/02”.

Tested by: Ing. Michal Havlí

Date: 2013-01-23

Signed: 

Reviewed by: Ing. Stanislav Buchta

Date: 2013-01-24

Signed: 



Accredited test number: **1005.1*** Test title: **Combustion efficiency test - emissions**

Test method: EN 303-5:2012
Art. 4.4.7, 5.7.3, 5.7.4, 5.9, 5.10.4

Sample tested: EG PELLET 10, EG PELLET 15, EG PELLET 25, EG PELLET 40, EG PELLET 60

Measuring equipment used: Chapter III - Measuring and test equipment

Requirement	Requirement specification	Test evaluation	Note
Emission limits Combustion shall be of low-emission. This requirement shall be satisfied if the emission values shown in Table 6 are not exceeded when operating at nominal heat output or, in the case of boilers with heat output range, when operating at nominal heat output and minimum heat output, in accordance with 5.7, 5.9 and 5.10.	EN 303-5:2012 Art. 4.4.7	+	

Table 6

Stoking	Fuel	Nominal heat output kW	Emission limits								
			CO			OGC/THC mg/m ³ at 10% O ₂			Dust		
			Class	Class	Class	Class	Class	Class	Class	Class	Class
			3	4	5	3	4	5	3	4	5
Manual	Biogenic	≤ 50	5000	1200	700	150	50	30	150	75	60
		> 50 ≤ 150	2500			100			150		
		> 150 ≤ 500	1200			100			150		
	Fossil	≤ 50	5000			150			125		
		> 50 ≤ 150	2500			100			125		
		> 150 ≤ 500	1200			100			125		
Automatic	Biogenic	≤ 50	3000	1000	500	100	30	20	150	60	40
		> 50 ≤ 150	2500			80			150		
		> 150 ≤ 500	1200			80			150		
	Fossil	≤ 50	3000			100			125		
		> 50 ≤ 150	2500			80			125		
		> 150 ≤ 500	1200			80			125		

NOTE 1: The dust values in this Table are based on the experience of the gravimetric filter method. The method used needs to be referred to in the test report. The particulate matter emission measured according to this European Standard does not include condensable organic compounds which may form additional particulate matter when the flue gas is mixed with ambient air. The values are therefore not directly comparable with values measured by dilution tunnel methods. Neither can they be directly translated into ambient air particulate concentrations.

NOTE 2: Additional test methods and emission limits which apply in some countries are given in the A-Deviations in Annex C.

^a Referred to dry exit flue gas, 0 °C, 1013 mbar.

^b Boilers of class 3 for type E-fuels according to 1.2.1 or e-fuels according to 1.2.3 in this Table and marked with the classification E-fuels and e-fuels do not need to fulfil the requirements for the dust emissions. The actual value shall be stated in the technical documentation and shall not exceed 200 mg/m³ at 10 % O₂.



Measurement results: EG PELLET 10 – Pellets - C1

Boiler output	Average values									
	Measured values						Converted values O ₂ =10%			
	O ₂ [%]	CO ₂ [%]	CO [ppm]	OGC/THC [ppm]	NO _x [ppm]	Dust [mg/m ³]	CO [mg/m ³]	OGC/THC [mg/m ³]	NO _x [mg/m ³]	Dust [mg/m ³]
Nominal	8.52	10.85	269	14	109	23	297	20	197	20
Minimum	13.09	6.81	290	21	71	33	652	16	203	22

Test evaluation:

EG PELLET 10 (Pellets - C1) meets at nominal and minimum output the emission requirements for **Class 4**, as per EN 303-5:2012 Table 6.

Measurement results: EG PELLET 15 – Pellets - C1

Boiler output	Average values									
	Measured values						Converted values O ₂ =10%			
	O ₂ [%]	CO ₂ [%]	CO [ppm]	OGC/THC [ppm]	NO _x [ppm]	Dust [mg/m ³]	CO [mg/m ³]	OGC/THC [mg/m ³]	NO _x [mg/m ³]	Dust [mg/m ³]
Nominal	8.80	10.58	140	23	127	22	158	35	234	20
Minimum	11.77	7.86	364	9	78	32	542	6	191	19

Test evaluation:

EG PELLET 15 (Pellets - C1) meets at nominal and minimum output the emission requirements for **Class 4**, as per EN 303-5:2012 Table 6.

Measurement results: EG PELLET 25 – Pellets - C1

Boiler output	Average values									
	Measured values						Converted values O ₂ =10%			
	O ₂ [%]	CO ₂ [%]	CO [ppm]	OGC/THC [ppm]	NO _x [ppm]	Dust [mg/m ³]	CO [mg/m ³]	OGC/THC [mg/m ³]	NO _x [mg/m ³]	Dust [mg/m ³]
Nominal	8.62	10.76	249	13	126	26	276	18	230	23
Minimum	11.14	8.52	114	6	85	30	159	4	194	35

Test evaluation:

EG PELLET 25 (Pellets - C1) meets at nominal and minimum output the emission requirements for **Class 5**, as per EN 303-5:2012 Table 6.



Measurement results: EG PELLET 40 – Pellets - C1

Boiler output	Average values									
	Measured values						Converted values O ₂ =10%			
	O ₂ [%]	CO ₂ [%]	CO [ppm]	OGC/THC [ppm]	NO _x [ppm]	Dust [mg/m ³]	CO [mg/m ³]	OGC/THC [mg/m ³]	NO _x [mg/m ³]	Dust [mg/m ³]
Nominal	9.97	9.56	180	12	99	26	224	19	202	26
Minimum	12.64	7.09	331	10	63	36	545	7	170	47

Test evaluation:

EG PELLET 40 (Pellets - C1) meets at nominal and minimum output the emission requirements for **Class 4**, as per EN 303-5:2012 Table 6.

Measurement results: EG PELLET 60 – Pellets - C1

Boiler output	Average values									
	Measured values						Converted values O ₂ =10%			
	O ₂ [%]	CO ₂ [%]	CO [ppm]	OGC/THC [ppm]	NO _x [ppm]	Dust [mg/m ³]	CO [mg/m ³]	OGC/THC [mg/m ³]	NO _x [mg/m ³]	Dust [mg/m ³]
Nominal	5.24	14.29	261	18	182	33	227	21	261	23
Minimum	8.21	11.74	191	14	108	46	204	20	191	39

Test evaluation:

EG PELLET 60 (Pellets - C1) meets at nominal and minimum output the emission requirements for **Class 5**, as per EN 303-5:2012 Table 6.

Tested by: Ing. Michal Havlů

Date: 2013-01-23

Signed: 

Reviewed by: Ing. Stanislav Buchta

Date: 2013-01-24

Signed: 



Accredited test number: **1004.1*** Test title: **Test of heat capacity, input and efficiency**
1005.1* **Combustion efficiency test - emissions**

Test method: EN 303-5:2012
Annex C,
Deviation from Austria, C.2.2, C.2.3

Sample tested: EG PELLETT 10, EG PELLETT 15, EG PELLETT 25, EG PELLETT 40, EG PELLETT 60

Measuring equipment used: Chapter III - Measuring and test equipment

Test results:

Requirement		Requirement specification	Test evaluation
Boiler efficiency for nominal heat output and minimum heat output			EN 303-5:2012 Annex C, Deviation from Austria, C.2.2
Boiler	Minimum efficiency		
Heating boilers for solid fuels	75 %	+	
a) manually loaded			
up to 10 kW	79 %		
>10 to 200 kW	(71.3 + 7.7 log Pn) %		
>200 kW	89 %		
a) automatically loaded			
up to 10 kW	80 %	+	
>10 to 200 kW	(72.3 + 7.7 log Pn) %	+	
>200 kW		90 %	
NOTE <i>Pn is the nominal heat output (Qn in this standard)</i>			

Requirement					Requirement specification	Test evaluation
Emission limits						EN 303-5:2012 Annex C, Deviation from Austria, C.2.3
Small burners used for solid fuels automatically loaded						
Parameter	Emission limits mg/MJ					
	Wooden pellets Room heaters	Wooden pellets Central heaters	Other wooden fuels	Other stand- ardised biogenous fuels		
CO	500 ^a	250^a	250 ^a	500 ^a		
NO _x	150	150	150	300		
OGC/THC	30	30	30	30		
Dust	50	40	50	60	+	

^a The limit value can be exceeded by 50 % during partial load operation at 30 % of nominal heat output.



Measurement results: EG PELLET 10 – Pellets - C1

Boiler output	Minimum efficiency	Measured efficiency
Nominal	80.0	91.3
Minimum		90.9

Measurement results: EG PELLET 15 – Pellets - C1

Boiler output	Minimum efficiency	Measured efficiency
Nominal	81.4	90.9
Minimum		90.7

Measurement results: EG PELLET 25 – Pellets - C1

Boiler output	Minimum efficiency	Measured efficiency
Nominal	83.1	90.4
Minimum		91.3

Measurement results: EG PELLET 40 – Pellets - C1

Boiler output	Minimum efficiency	Measured efficiency
Nominal	84.6	91.0
Minimum		91.6

Measurement results: EG PELLET 60 – Pellets - C1

Boiler output	Minimum efficiency	Measured efficiency
Nominal	86.0	87.6
Minimum		87.4

Test evaluation:

The measured efficiency of EG PELLET 10, EG PELLET 15, EG PELLET 25, EG PELLET 40, EG PELLET 60 (Pellets - C1) is **higher** than required.



Measurement results: EG PELLET 10 – Pellets - C1

Boiler output	Average values								
	Measured values					Converted values O ₂ =0%			
	O ₂ [%]	CO [ppm]	NO _x [ppm]	OGC/THC [ppm]	Dust [mg/m ³]	CO [mg/MJ]	NO _x [mg/MJ]	OGC/THC [mg/MJ]	Dust [mg/MJ]
Nominal	8.52	269	109	14	23	145	96	3	10
Minimum	13.09	290	71	21	33	215	60	18	22

Measurement results: EG PELLET 15 – Pellets - C1

Boiler output	Average values								
	Measured values					Converted values O ₂ =0%			
	O ₂ [%]	CO [ppm]	NO _x [ppm]	OGC/THC [ppm]	Dust [mg/m ³]	CO [mg/MJ]	NO _x [mg/MJ]	OGC/THC [mg/MJ]	Dust [mg/MJ]
Nominal	8.80	140	127	23	22	78	116	6	10
Minimum	11.77	364	78	9	32	264	56	7	19

Measurement results: EG PELLET 25 – Pellets - C1

Boiler output	Average values								
	Measured values					Converted values O ₂ =0%			
	O ₂ [%]	CO [ppm]	NO _x [ppm]	OGC/THC [ppm]	Dust [mg/m ³]	CO [mg/MJ]	NO _x [mg/MJ]	OGC/THC [mg/MJ]	Dust [mg/MJ]
Nominal	8.62	249	126	23	26	135	112	5	11
Minimum	11.14	114	85	6	30	77	57	4	12

Measurement results: EG PELLET 40 – Pellets - C1

Boiler output	Average values								
	Measured values					Converted values O ₂ =0%			
	O ₂ [%]	CO [ppm]	NO _x [ppm]	OGC/THC [ppm]	Dust [mg/m ³]	CO [mg/MJ]	NO _x [mg/MJ]	OGC/THC [mg/MJ]	Dust [mg/MJ]
Nominal	9.97	180	99	12	26	111	100	3	13
Minimum	12.64	331	63	10	36	269	51	8	23



Measurement results: EG PELLETT 60 – Pellets - C1


Boiler output	Average values								
	Measured values					Converted values O ₂ =0%			
	O ₂ [%]	CO [ppm]	NO _x [ppm]	OGC/THC [ppm]	Dust [mg/m ³]	CO [mg/MJ]	NO _x [mg/MJ]	OGC/THC [mg/MJ]	Dust [mg/MJ]
Nominal	5.24	261	182	18	33	111	128	10	11
Minimum	8.21	234	108	14	46	124	94	10	16

Test evaluation:

The measured emission values for EG PELLETT 10, EG PELLETT 15, EG PELLETT 25, EG PELLETT 40, EG PELLETT 60 (Pellets - C1) **do not exceed** the specified values.

Tested by: Ing. Michal Havlů

Date: 2013-01-23

Signed: 

Reviewed by: Ing. Stanislav Buchta

Date: 2013-01-24

Signed: 



Accredited test number: **1004.1*** Test title: **Test of heat output, input and efficiency**
 1005.1* **Combustion efficiency test - emissions**

Test method: EN 303-5:2012
 Annex C,
 Deviation from Denmark, C.4.1, C.4.2

Sample tested: EG PELLETT 10, EG PELLETT 15, EG PELLETT 25,
 EG PELLETT 40, EG PELLETT 60

Measuring equipment used: Chapter III - Measuring and test equipment

Test results:

Requirement	Requirement specification	Test evaluation
Boiler Efficiency	EN 303-5:2012 Annex C, Deviation from Denmark , C.4.1	Pellets – C1
According to the Danish Construction Code BR08, Clause 8.5.1.4, Sub-clause 7, boilers for coal, coke, bio fuel or biomass shall have an efficiency equivalent to Class 3 in EN 303-5.		
Minimum efficiency (67 + 6 log Qn) %		
For boilers above 300 kW, the requirement corresponding to 300 kW shall be used.		

Requirement	Requirement specification	Test evaluation	
Emission limits	EN 303-5:2012 Annex C, Deviation from Denmark , C.4.2	Pellets – C1	
According to the Danish EPA Statutory Order no. 1432 of 11/12/2007, only Class 3 (or higher) is acceptable for Denmark.			

^a Referring to dry exit flue gas, 0 °C, 1 013 mbar.



Measurement results: EG PELLET 10 – Pellets - C1

Boiler output	Minimum efficiency	Measured efficiency
Nominal	73.0	91.3
Minimum		90.9

Measurement results: EG PELLET 15 – Pellets - C1

Boiler output	Minimum efficiency	Measured efficiency
Nominal	74.1	90.9
Minimum		90.7

Measurement results: EG PELLET 25 – Pellets - C1

Boiler output	Minimum efficiency	Measured efficiency
Nominal	75.4	90.4
Minimum		91.3

Measurement results: EG PELLET 40 – Pellets - C1

Boiler output	Minimum efficiency	Measured efficiency
Nominal	76.6	91.0
Minimum		91.6

Measurement results: EG PELLET 60 – Pellets - C1

Boiler output	Minimum efficiency	Measured efficiency
Nominal	77.7	87.6
Minimum		87.4

Test evaluation:

Measured efficiency for EG PELLET 10, EG PELLET 15, EG PELLET 25, EG PELLET 40, EG PELLET 60 (Pellets - C1) is **higher** than required.

Measurement results: EG PELLET 10 – Pellets - C1

Boiler output	Average emission values						
	Measured values				Converted values O ₂ =10%		
	O ₂ [%]	CO [ppm]	OGC/THC [ppm]	Dust [mg/m ³]	CO [mg/m ³]	OGC/THC [mg/m ³]	Dust [mg/m ³]
Nominal	8.52	269	14	23	297	20	20
Minimum	13.09	290	21	33	652	16	22



Measurement results: EG PELLETT 15 – Pellets - C1

Boiler output	Average emission values						
	Measured values				Converted values O ₂ =10%		
	O ₂ [%]	CO [ppm]	OGC/THC [ppm]	Dust [mg/m ³]	CO [mg/m ³]	OGC/THC [mg/m ³]	Dust [mg/m ³]
Nominal	8.80	140	23	22	158	35	20
Minimum	11.77	364	9	32	542	6	19

Measurement results: EG PELLETT 25 – Pellets - C1

Boiler output	Average emission values						
	Measured values				Converted values O ₂ =10%		
	O ₂ [%]	CO [ppm]	OGC/THC [ppm]	Dust [mg/m ³]	CO [mg/m ³]	OGC/THC [mg/m ³]	Dust [mg/m ³]
Nominal	8.62	249	23	26	276	33	23
Minimum	11.14	114	6	30	159	4	35

Measurement results: EG PELLETT 40 – Pellets - C1

Boiler output	Average emission values						
	Measured values				Converted values O ₂ =10%		
	O ₂ [%]	CO [ppm]	OGC/THC [ppm]	Dust [mg/m ³]	CO [mg/m ³]	OGC/THC [mg/m ³]	Dust [mg/m ³]
Nominal	9.97	180	12	26	224	19	26
Minimum	12.64	331	10	36	545	7	47

Measurement results: EG PELLETT 60 – Pellets - C1

Boiler output	Average emission values						
	Measured values				Converted values O ₂ =10%		
	O ₂ [%]	CO [ppm]	OGC/THC [ppm]	Dust [mg/m ³]	CO [mg/m ³]	OGC/THC [mg/m ³]	Dust [mg/m ³]
Nominal	5.24	261	18	33	227	21	23
Minimum	8.21	191	14	46	204	20	39

Test evaluation:

The measured emission values for EG PELLETT 10, EG PELLETT 15, EG PELLETT 25, EG PELLETT 40, EG PELLETT 60 (Pellets - C1) **do not exceed** the specified values.

Tested by: Ing. Michal Havlů

Date: 2013-01-23

Signed: 

Reviewed by: Ing. Stanislav Buchta

Date: 2013-01-24

Signed: 



Accredited test number: **1004.1*** Test title: **Test of heat output, input and efficiency**
1005.1* **Combustion efficiency test - emissions**

Test method: EN 303-5:2012
Annex C,
Deviation from Germany, C.5.1, C.5.2

Sample tested: EG PELLETT 10, EG PELLETT 15, EG PELLETT 25, EG PELLETT 40, EG PELLETT 60

Measuring equipment used: Chapter III - Measuring and test equipment

Test results:

Requirement					Requirement specification	Test evaluation
Emission limits					EN 303-5:2012 Annex C, Deviation from Germany, C.5.1	Pellets – C1
Table 7 – Emission limits						
The emission limits are regulated in Chapter 2, paragraphs 4, 5 and Annex 2 of the German Immission Control Ordinance "Erste Verordnung zur Durchführung des Bundes-Immissionsschutzgesetzes (Verordnung über kleine und mittlere Feuerungsanlagen - 1. BImSchV)". Boilers operated with solid fuels shall only be installed, possess the quality and be put into operation if they fulfil the following specifications of the 1. BImSchV:						
	Fuel acc. to §3 (1)	Nominal output range kW	Dust g/m³	CO g/m³		
Stage 1: Appliances, which will be installed after 22.3.2010	Numbers 1 to 3a	$\geq 4 \leq 500$	0.09	1.0		
		> 500	0.09	0.5		
	Numbers 4 to 5	$\geq 4 \leq 500$	0.10	1.0		
		> 500	0.10	0.5		
	Number 5a	$\geq 4 \leq 500$	0.06	0.5		
		> 500	0.06	0.5		
Numbers 6 to 7	$\geq 30 \leq 100$	0.10	0.8			
	$> 100 \leq 500$	0.10	0.5			
	> 500	0.10	0.3			
Stage 2: Appliances, which will be installed after 31.12.2014	Numbers 1 to 5a	≥ 4	0.02	0.4		
		$\geq 30 \leq 500$	0.02	0.4		
	Numbers 6 to 7	> 500	0.02	0.3		
		Numbers 8 to 13	$\geq 4 < 100$	0.02	0.4	
NOTE Differing from sentence 1 for firing systems (appliances) which will exclusively be fired by fuels according §3 article 1 Number 4 in the form of split logs, the limits according Stage 2 apply for firing systems (appliances) if they are installed after 31.12.2016.						



Measurement results: EG PELLET 10 – Pellets - C1

Boiler output	Average emission values				
	Measured values			Converted values O ₂ =13%	
	O ₂ [%]	CO [ppm]	Dust [mg/m ³]	CO [g/m ³]	Dust [g/m ³]
Nominal	8.52	269	23	0.216	0.014
Minimum	13.09	290	33	0.420	0.033

Measurement results: EG PELLET 15 – Pellets - C1

Boiler output	Average emission values				
	Measured values			Converted values O ₂ =13%	
	O ₂ [%]	CO [ppm]	Dust [mg/m ³]	CO [g/m ³]	Dust [g/m ³]
Nominal	8.80	140	22	0.115	0.014
Minimum	11.77	364	32	0.394	0.028

Measurement results: EG PELLET 25 – Pellets - C1

Boiler output	Average emission values				
	Measured values			Converted values O ₂ =13%	
	O ₂ [%]	CO [ppm]	Dust [mg/m ³]	CO [g/m ³]	Dust [g/m ³]
Nominal	8.62	249	26	0.201	0.017
Minimum	11.14	114	30	0.116	0.024

Measurement results: EG PELLET 40 – Pellets - C1

Boiler output	Average emission values				
	Measured values			Converted values O ₂ =13%	
	O ₂ [%]	CO [ppm]	Dust [mg/m ³]	CO [g/m ³]	Dust [g/m ³]
Nominal	9.97	180	26	0.163	0.019
Minimum	12.64	331	36	0.396	0.034



Measurement results: EG PELLET 60 – Pellets - C1

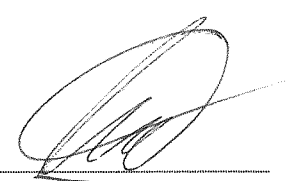
Boiler output	Average emission values				
	Measured values			Converted values O ₂ =13%	
	O ₂ [%]	CO [ppm]	Dust [mg/m ³]	CO [g/m ³]	Dust [g/m ³]
Nominal	5.24	261	33	0.165	0.017
Minimum	8.21	191	46	0.183	0.029

Test evaluation:

The measured emission values for EG PELLET 10, EG PELLET 15, EG PELLET 25, EG PELLET 40, EG PELLET 60 (Pellets - C1) **do not exceed** the specified values.

Tested by: Ing. Michal Havlů Date: 2013-01-23

Reviewed by: Ing. Stanislav Buchta Date: 2013-01-24

Signed: 

Signed: 



Accredited test number: **1004.1*** Test title: **Test of heat output, input and efficiency**
1005.1* **Combustion efficiency test - emissions**

Test method: EN 303-5:2012
Annex C
C.6 Deviation from Switzerland

Sample tested: EG PELLETT 10, EG PELLETT 15, EG PELLETT 25,
EG PELLETT 40, EG PELLETT 60

Measuring equipment used: Chapter III - Measuring and test equipment

Test results:

Requirement		Requirement specification	Test evaluation				
<p>Clause 4.4.7, Table 7 The emission limits are regulated in Annex 4 of the Swiss Ordinance on Air Pollution Control ([OAPC] SR 814.318.142.1) of 1985-12-16 (as at 2010-07-15). Boilers operated with woody biomass shall only be put on the market if they fulfil the following specifications of the OAPC: – declarations of conformity (Figure 20 OAPC); – Figures 1, 212, 23 Annex 4 OAPC; – Figures 31, 32 Annex 5 OAPC. Emissions for boilers operated with coal or wood fuels shall not exceed the following limits:</p>		EN 303-5:2012 Annex C C.6 Deviation from Switzerland	Pellets – C1				
Type of installation	Particular requirements (emission limits)^a for carbon monoxide (CO) and particulate matter (dust)						
	CO (mg/m ³)				Dust (mg/m ³)		
Boilers for log wood and boilers for coal, manual stoking	800				50	EG PELLETT 10	-
Boilers for chipped wood and boilers for coal, automatic stoking	400				60	EG PELLETT 15	-
Boilers for wood pellets, automatic stoking	300	40	EG PELLETT 25	+			
			EG PELLETT 40	-			
			EG PELLETT 60	+			
^a Referred to oxygen basis: – for boilers for natural state wood 13 % volume; – for boilers for coal 7 % volume.							
<p>The sulphur content of coal, coal briquettes and coke shall not exceed 3 %. Boilers operated with non-woody biomass shall comply with the following specifications of the OAPC: – Figures 741, 742, 743 Annex 2 OAPC; – Figures 81, 82 Annex 3 OAPC. According to Figure 743, Annex 2 OAPC, non-woody biomass, such as biogenic waste and products from agriculture, may only be burnt in boilers with a heat input of at least 70 kW. Such units need an approval and shall meet stronger emission limits according to Figure 742, Annex 2 OAPC.</p>			0				



Measurement results: EG PELLET 10 – Pellets - C1

Boiler output	Average emission values				
	Measured values			Converted values O ₂ =13%	
	O ₂ [%]	CO [ppm]	Dust [mg/m ³]	CO [mg/m ³]	Dust [mg/m ³]
Nominal	8.52	269	23	216	14
Minimum	13.09	290	33	420	33

Measurement results: EG PELLET 15 – Pellets - C1

Boiler output	Average emission values				
	Measured values			Converted values O ₂ =13%	
	O ₂ [%]	CO [ppm]	Dust [mg/m ³]	CO [mg/m ³]	Dust [mg/m ³]
Nominal	8.80	140	22	115	14
Minimum	11.77	364	32	394	28

Measurement results: EG PELLET 25 – Pellets - C1

Boiler output	Average emission values				
	Measured values			Converted values O ₂ =13%	
	O ₂ [%]	CO [ppm]	Dust [mg/m ³]	CO [mg/m ³]	Dust [mg/m ³]
Nominal	8.62	249	26	201	17
Minimum	11.14	114	30	116	24

Measurement results: EG PELLET 40 – Pellets - C1

Boiler output	Average emission values				
	Measured values			Converted values O ₂ =13%	
	O ₂ [%]	CO [ppm]	Dust [mg/m ³]	CO [mg/m ³]	Dust [mg/m ³]
Nominal	9.97	180	26	163	19
Minimum	12.64	331	36	396	34



Measurement results: EG PELLET 60 – Pellets - C1

Boiler output	Average emission values				
	Measured values			Converted values O ₂ =13%	
	O ₂ [%]	CO [ppm]	Dust [mg/m ³]	CO [mg/m ³]	Dust [mg/m ³]
Nominal	5.24	261	33	165	17
Minimum	8.21	191	46	183	29

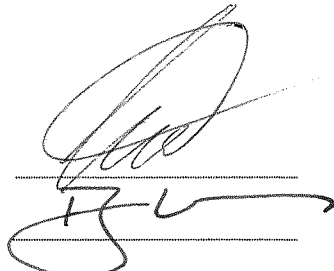
Test evaluation:

The measured emission values for EG PELLET 10, EG PELLET 15, EG PELLET 40 (Pellets - C1) **exceed** the specified values.

The measured emission values for EG PELLET 25, EG PELLET 60 (Pellets - C1) **do not exceed** the specified values.

Tested by: Ing. Michal Havlů Date: 2013-01-23

Reviewed by: Ing. Stanislav Buchta Date: 2013-01-24

Signed: 



Accredited test number: **1006.1*** Test title:
1005.1* **Function test of control, regulation and safety elements**
Combustion efficiency test - emissions

Test method: EN 303-5:2012
Art. 5.13, 5.14, 5.16.1, 5.16.2, 5.16.3
EN 303-5:2012
Art. 5.9, 5.10.4

Sample tested: EG PELLETT 10, EG PELLETT 15, EG PELLETT 25,
EG PELLETT 40, EG PELLETT 60

Measuring equipment used: Chapter III - Measuring and test equipment

Test results:

Requirement	Requirement specification	Test evaluation	Note
<p>Function check of the temperature controller and safety temperature limiter at the boiler</p> <p>The water-side flow rate shall comply with that specified for the nominal heat output test. The flow temperature of 75 °C shall not be exceeded at the start of the test °C.</p> <p>Adjust the firing so that it corresponds to the nominal heat output Q_N of the boiler. A steady state condition shall be reached and the outlet pressure at the flue gas section shall be according to the nominal heat output setting. For manual stoked boilers, the boiler shall be refuelled after reaching steady state with a full batch before starting the test.</p> <p>The dissipated output shall be reduced to (40 ± 5) % of the nominal heat output of the boiler, circulating pump running in continuous operation; temperature controller adjusted to maximum set value.</p> <p>When the temperature controller is operating normally, the measured flow temperature shall not exceed 100 °C; the safety temperature cut out or limiter or the device for dissipating excess heat shall not trigger.</p> <p>Repeat the test with the temperature controller out of function. This time, check if the safety temperature limiter/detector switches off the firing system at the highest value specified by the boiler manufacturers and if all hazardous operation states are avoided (see 4.1).</p>	<p>EN 303-5:2012 Art. 5.13</p>	<p>+</p>	



Requirement	Requirement specification	Test evaluation	Note
<p>Function test for the rapidly disconnectable firing system</p> <p>– Sudden absence of heat dissipation</p> <p>The water-side flow rate shall comply with that specified for the nominal output test. The flow temperature of 75 °C shall not be exceeded at the start of the test.</p> <p>Adjust the firing so that it corresponds to the nominal heat output Q_N of the boiler, a steady state condition is reached and the outlet pressure at the flue spigot is according to the rated heat output.</p> <p>The heat consumption is set to 0; water circulation in the boiler is permitted; temperature controller is adjusted to manufacture recommended maximum set value.</p> <p>Check if the safety temperature limiter or the temperature controller switches off the firing system and all hazardous operation states are avoided.</p> <p>- Loss of the electrical power supply</p> <p>The water-side flow rate shall comply with that specified for the nominal heat output test. The flow temperature of 75 °C shall not be exceeded at the start of the test.</p> <p>Adjust the firing so that it corresponds to the nominal heat output Q_N of the boiler, a steady state condition is reached and the outlet pressure at the flue gas section is according to the rated heat output.</p> <p>The electrical power supply including the circulation is cut off, check that no hazardous operation conditions occur.</p> <p>For the evaluation of the temperatures and the CO-concentrations, only mean values at a maximum average time of one minute shall be considered.</p>	<p>EN 303-5:2012 Art. 5.14</p>	<p>+</p>	
<p>Safety test of consequences of fuel overload and effect of a blockage of the fuel supply</p> <p>The safety of the boiler shall be checked at continuous operation of the boiler with the fuel feed rate of the stoking device set at possible maximum capacity, taking into account failures according to the risk analyses and the electrical safety. If other fuel feed rates lower than the maximum are categorised as critical by the risk analysis, these shall also be tested.</p> <p>The functionality of the safety device for the shut-down of the fuel shall occur by prevention of the ignition after release of fuel if no or insufficient combustion in the combustion chamber occurs.</p> <p>The test for blocked fuel line shall be achieved by deactivating the stoking device.</p> <p>The requirements specified in 4.3.4 shall be satisfied.</p>	<p>EN 303-5:2012 Art. 5.16.2</p>	<p>+</p>	



The test methods in this Report were applied without deviations, additions or exceptions.

V. List of source materials

The tests were performed based on Order B-45617 of 2013-01-11, Contract B-45617/31 of 2013-01-15, and Amendment to the Contract of 2013-03-29.

- Order B-45617 of 2013-01-11
- Contract B-45617/31 of 2013-01-15 and Amendment to the Contract of 2013-03-29
- EN 303-5:2012 – Heating boilers - Part 5: Heating boilers for solid fuels, manually and automatically stoked, nominal heat output of up to 500 kW - Terminology, requirements, testing and marking
- Instructions for assembly, installation and operation of the boiler
- A set of required drawing documentation as per EN 303-5:2012; Boiler EG PELLETT 10, EG PELLETT 15, EG PELLETT 25, EG PELLETT 40, EG PELLETT 60
- Report to Task 31-8861

The persons named below are accountable for the accuracy of the above-specified data:

Ing. Stanislav Buchta
Head of Boilers and Industrial Heat
Equipment Department



Milan Holomek
Head of Heat and Environment-
Friendly Equipment Test Station