



EVALUATION REPORT

31-9690/TH

Product: Hot-water boiler for solid fuel (wood pellets – C1) with automatic fuel supply

Type designation: ECO TOP 33

Versions: –

Customer: Topling d.o.o.
Vojvode Stepe br. 6
78340 Prnjavor
Bosnia and Herzegovina

Manufacturer: Topling d.o.o.
Vojvode Stepe br. 6
78340 Prnjavor
Bosnia and Herzegovina

Report issue date: 2016-06-20

Distribution list: 1 copy to the Customer
1 copy to the Engineering Test Institute



I. Product specification

The Hot-water boilers for solid fuel (wood pellets – C1) with automatic fuel supply, ECO TOP 33 is intended for heating of large residential buildings and similar buildings. The boiler is designed for burning of wood pellets – C1. The boiler assembly comprises the boiler body, boiler burner, feed screw and the fuel chamber (storage of fuel). The boiler body is made of welded steel components. 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 31-9690.

Boiler output version	Heat output	Place of testing
ECO TOP 33	33 kW	SZU

Based on technical assessment of all the versions of the products and the documentation to these (according to standard EN 303-5: 2013), the following products have been determined as the representatives to be tested:

ECO TOP 33

- Sample quantity: 1
- Date of submission: 2015-08-10
- Registration number: ECO TOP 33
- ID number: prototyp 1



II. Evaluation results

The evaluation results are shown in Table 1.:

Tab. 1

No.	Requirement	Technical standard, regulation applied	Source, report	Evaluation
1.**	General requirements	ČSN EN 303-5:2013 Art. 4.1	pages 4 - 5	+
2.**	Construction requirements	ČSN EN 303-5:2013 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 6 - 10	+
3.**	Safety requirements	ČSN EN 303-5:2013 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 11 - 20	+
4.**	Performance requirements	ČSN EN 303-5:2013 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 21 - 23	+
5.**	Marking	ČSN EN 303-5:2013 Art. 7, 7.1, 7.2, 7.3	page 24	+
6.**	Technical documentation, supplied with boiler	ČSN EN 303-5:2013 Art. 8, 8.1, 8.2, 8.3, 5.16.1	pages 25 - 28	+
7.	Pressurized component tightness and strength test (1001.1*)	ČSN EN 303-5:2013 Art. 5.4, 5.4.1, 5.4.2	31-9690/T	+
8.	Surface temperature test (1003*)	ČSN EN 303-5:2013 Art. 5.12, 5.16.4, 4.3.6	31-9690/T	+
9.	Test of heat output, input and efficiency(1004.1*) Test of combustion product temperature (1004.2*)	ČSN EN 303-5:2013 Art. 4.4.2, 4.4.3, 5.7, 5.8, 5.10 ČSN EN 303-5:2013 Art. 4.4.3	31-9610/T	+
10.	Combustion efficiency test – emissions (1005.1*)	ČSN EN 303-5:2013 Art. 4.4.7, 5.7.3, 5.7.4, 5.9, 5.10.4	31-9690/T	+
11.	Test of heat output, input and efficiency (1004.1*) Combustion efficiency test – emissions (1005.1*)	ČSN EN 303-5:2013 Annex C, Deviation from Austria, C.2.2, C.2.3	31-9690/T	+
		ČSN EN 303-5:2013 Annex C, C.3 Deviation from Croatia	-	0
		ČSN EN 303-5:2013 Annex C, Deviation from Denmark, C.4.1, C.4.2	31-9690/T	+
		ČSN EN 303-5:2013 Annex C, Deviation from Germany, C.5.1, C.5.2	31-9690/T	-
		ČSN EN 303-5:2013 Annex C C.6 Deviation from Switzerland	31-9690/T	+
		ČSN EN 303-5:2013 Annex C C.8 Deviation from Italy	-	0
12.	Test of control, regulation and safety elements (1006.1*) Combustion efficiency test – emissions (1005.1*)	ČSN EN 303-5:2013 Art. 5.13, 5.14, 5.16.2, 5.16.3 ČSN EN 303-5:2013 Art. 5.9, 5.10.4	31-9690/T	+

Note:
#:

Evaluation:

- + requirement fulfilled
- requirement NOT fulfilled
- X not rated
- 0 not applicable



Requirement assessed: **General requirements**

Requirement specification: ČSN EN 303-5:2013 Art. 4.1

Sample assessed: ECO TOP 33

Evaluation results: see the following Table

Requirement	Requirement specification	Note	Evaluation
General requirements	ČSN EN 303-5:2013 Art. 4.1		
Boilers shall be fire-resistant and safe to operate. They shall be made of non-combustible materials according to EN 13501-1 and shall be resistant to deformation. They shall be made such that:			+
a) they can withstand stresses arising during normal operation, the heat carrier (water) does not become heated to a dangerous extent ($\leq 110\text{ °C}$);			+
b) gases do not leak from the boiler or the stoking device or from an integrated hopper in dangerous quantities into the place of installation or into the fuel line,			+
<i>NOTE: Safety requirements regarding harmful gas concentrations of course need to be considered. Both these elements, however, strongly depend on the place of installation and the fuel storage discharge system and therefore fall outside of the scope of this standard. This requirement is deemed to be fulfilled if the requirements of the leakage of the boiler and of the emissions are met and there is no visible smoke emerging from the boiler into the test room at normal operation during type test.</i>			+
a) flames do not flare out and embers do not fall out when the boiler is operated correctly;	ČSN EN 303-5:2013 Art. 4.1		+
b) dangerous accumulations of combustible gases ($> 5\text{ % CO}$) in the combustion chamber and in the flues are prevented.			+
For the evaluation of the hazardous situation, the CO-concentration in the flue gas measuring section should not exceed the critical values for a time period greater than 1 min.			+
Combustible materials shall be allowed for the following:			
c) internal components of controls and safety equipment;			+
d) operating handles;			+
e) electrical equipment;			+
f) components of accessory (e.g. burner cover);			+
g) additional or supplemental optical outer covers (e.g. an additional decorative cover).			+



Requirement	Requirement specification	Note	Evaluation
Component parts of covers, operating controls, safety devices and electrical accessories shall fulfil the requirements of resistance against heat and fire in either EN 60335-1 or EN 60730-1.	ČSN EN 303-5:2013 Art. 4.1		+
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.			+
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.			+
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.			+
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.			+
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.			+
Motors and fans shall be mounted in such a way as to minimize noise and vibration.			+

Note:

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



Requirement assessed:

Construction requirements

Requirement specification:

ČSN EN 303-5:2013
 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:

ECO TOP 33

Evaluation results:

see the following Table

Requirement	Requirement specification	Note	Evaluation
Construction requirements	ČSN EN 303-5:2013 Art. 4.2		
Production documentation	ČSN EN 303-5:2013 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.	ČSN EN 303-5:2013 Art. 4.2.1.1		+ 0 + + + +
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.	ČSN EN 303-5:2013 Art. 4.2.1.2		+ + + +
Heating boilers made of steel and non-ferrous materials	ČSN EN 303-5:2013 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 to be carried out;	ČSN EN 303-5:2013 Art. 4.2.2.1	Enclosed technical documentation.	+ + +



Requirement	Requirement specification	Note	Evaluation
- supervision of the welding shall be carried out by staff qualified in welding (at least one supervisor shall be qualified).			+
Welding seams and welding fillers 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> 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. Double fillet welds are only permissible when sufficiently cooled. Projections into the flue gas side in areas of high thermal stresses shall be avoided. 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. 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. The permissible types of weld and appropriate material thicknesses are given in Table 2 and these parameters shall be met. Welding fillers shall be suitable for the material being used.	ČSN EN 303-5:2013 Art. 4.2.2.2	Enclosed technical documentation (welding procedures)	+
			+
			+
			+
<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>			+
Parts of steel subject to pressure 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. 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.	ČSN EN 303-5:2013 Art. 4.2.2.3	Enclosed technical documentation (welding procedures).	+
			+
			+



Requirement	Requirement specification	Note	Evaluation
Minimum wall thicknesses The minimum wall thicknesses listed in Table 3 have been specified in order to take into account the following: <ul style="list-style-type: none"> a) the maximum allowable operating pressure; b) the nominal heat output; c) the material properties. 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. The wall thickness tolerance for carbon steels shall be as specified in EN 10029.	ČSN EN 303-5:2013 Art. 4.2.2.4		+ + + +
The minimum wall thicknesses according to Table 3 apply to pressure-loaded sheets, tubes (except immersion coils and safety heat-exchangers) and forgings. Smaller wall thicknesses shall be permitted upon the production of evidence demonstrating equivalence with regard to corrosion, heat resistance and strength.		Enclosed technical documentation (semi-finished products)	+
Design requirements	ČSN EN 303-5:2013 Art. 4.2.4		
Venting of the water sections 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. <i>NOTE: Boiling can be detected by boiling noise.</i>	ČSN EN 303-5:2013 Art. 4.2.4.1		+
Cleaning of heating surfaces 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.	ČSN EN 303-5:2013 Art. 4.2.4.2		+
Inspection of the flame 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. <i>NOTE The facility of an inspection window is recommended.</i>	ČSN EN 303-5:2013 Art. 4.2.4.3		+
Water tightness 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	ČSN EN 303-5:2013 Art. 4.2.4.4		+



Requirement	Requirement specification	Evaluation	Note
Replacement parts Replacement and spare parts (e.g. inserts, shaped firebricks, 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.	ČSN EN 303-5:2013 Art. 4.2.4.5		+
Boiler shell tappings Boiler shell tappings 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 tappings 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. 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. 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. It is possible to provide these connections outside the boiler if satisfactory filling and emptying of the boiler can be assured.	ČSN EN 303-5:2013 Art. 4.2.4.6		+
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. <i>NOTE For further information on safety valves, see EN 12828.</i>	ČSN EN 303-5:2013 Art. 4.2.4.7		+



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.	ČSN EN 303-5:2013 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.	ČSN EN 303-5:2013 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 m³. The hopper shall be designed in such a way that the fuel moves freely until the hopper is empty.	ČSN EN 303-5:2013 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.	ČSN EN 303-5:2013 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.	ČSN EN 303-5:2013 Art. 4.2.4.12		+

Note:

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



Requirement assessed: **Safety requirements**

Requirement specification: ČSN EN 303-5:2013
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: ECO TOP 33

Evaluation results: see the following Table

Requirement	Requirement specification	Note	Evaluation
<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:</p> <ul style="list-style-type: none"> – 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>In the risk assessment, one of the above mentioned classifications of the control function shall be allocated to any identified hazard.</p> <p>The actuation of any control function class B or class C shall at least result in cutting off the fuel feed.</p>	ČSN EN 303-5:2013 Art. 4.3.1	Class B 31-9690/H/E	+



Requirement	Requirement specification	Note	Evaluation
Manual stoking Boilers with manual stoking shall be designed in such a way that, when the boiler is operated in accordance with the boiler manufacturer's operating instructions, the operator does not run the risk of a hazardous operation mode. Such a mode might result in an injury when opening the fuel chamber door or the combustion chamber (e.g. by ignition of gases).	ČSN EN 303-5:2013 Čl. 4.3.2		0
Safety against back burning for automatic stoked boilers	ČSN EN 303-5:2013 Art. 4.3.3		+
General Automatic stoking systems shall be designed to prevent back burning. The hazard of back burning is classified as a risk corresponding to safety level C in accordance with 4.3.1 and is related to the driving forces thermal conductance, backflow of ignitable gases and fire propagation backwards (see 4.3.3.2, 4.3.3.3 and 4.3.3.4). Back burning shall be avoided by constructional means and the implementation of one or more back burn safety devices. <i>NOTE: The handling of the risk for back burning at safety level C includes the specification that sufficient safety measures need to be available.</i> Adequate constructional means or safety devices shall: <ul style="list-style-type: none"> a) work always in the closed circuit current principle; b) avoid a back burning in the state of loss of power supply; c) avoid a back burning in the state of failure of stoking device or interruption of stoking device. In order to ensure that safety against back burning is adequately addressed, a risk assessment shall be undertaken. This assessment shall document the means employed to avoid the three driving forces for back burning and how they match the tested boiler. The documentation of the means employed shall include the specification of any chosen safety device. At least one of the safety systems shall continue to provide protection in the event of interruption of the fuel feed (e.g. blockage of the feed screw). The following mechanisms shall be avoided: <ul style="list-style-type: none"> d) Thermal conductance (4.3.3.2); e) Back flow of ignitable combustion gases (4.3.3.3); f) Fire propagation into fuel line (4.3.3.4). 	ČSN EN 303-5:2013 Art. 4.3.3.1		+ + +
Thermal conductance The surface temperature of the stoking device of the boiler (without insulation) or integrated hopper shall not exceed 85 °C in any operating state or in case of a failure. If this criterion is fulfilled by constructional means, no additional safety device is necessary. Thermal conductance shall be verified during the tests specified in 5.7 (thermal performance for nominal load and partial load), 5.13 to 5.16 and after the stopping of the stoking device of the boiler, with a permanent temperature measurement until a maximum is reached. For further	ČSN EN 303-5:2013 Art. 4.3.3.2		+



Requirement	Requirement specification	Note	Evaluation
<p>information on verification of this requirement, see 5.16.4. Accepted solutions to prevent overheating in the stoking device due to thermal conductance are:</p> <ul style="list-style-type: none"> - an extinguishing device e.g. water sprinkler system and a safety temperature limiter adjusted to a maximum of 95 °C; - 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>+</p> <p>0</p> <p>0</p> <p>0</p> <p>+</p> <p>+</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. 	<p>ČSN EN 303-5:2013 Art. 4.3.3.3</p> <p>ČSN EN 303-5:2013 Art. 4.3.3.3</p>		0



Requirement	Requirement specification	Note	Evaluation
<ul style="list-style-type: none"> - 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 gasses into the hopper shall be avoided by a connection for 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. 			+
<ul style="list-style-type: none"> - 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
<ul style="list-style-type: none"> - 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. 			+
<p>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.</p> <p>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>			0
<p>Fire propagation into the fuel line or integral hopper</p> <p>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.</p> <p>NOTE: Indication for significant fire propagation might include:</p> <ul style="list-style-type: none"> 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. <p>This requirement shall be proven during the tests according</p>			



Requirement	Requirement specification	Note	Evaluation
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.	ČSN EN 303-5:2013 Art. 4.3.3.4		
<ul style="list-style-type: none"> - 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. - 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 overfilling and with a sufficient fuel free distance and fuel free cross section. - An emergency discharge device emptying the stoking device without overfilling the boiler, which is reacting at a temperature limit not exceeding 95 °C (alternatively 20 K increase to standard operation conditions). - 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. 			+
			0
			0
			0
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.			0
Alternative verification of safety against back burning 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. If: <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), further tests shall be performed (see 5.16.5). 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.	ČSN EN 303-5:2013 Art. 4.3.3.5		+
			+
			+



Requirement	Requirement specification	Note	Evaluation
Safety against fuel overload of the boiler or interruption in fuel supply 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. 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. 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. The test for interruption of fuel supply according to 5.16.2 may be omitted if a safety device, safety level B or C according to 4.3.1, is used. 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.	ČSN EN 303-5:2013 Art. 4.3.4		+
Safety against lack of air supply or insufficient combustion 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. The CO concentration in the boiler shall not exceed 5 % volume.	ČSN EN 303-5:2013 Art. 4.3.5	Less than 5% CO	+
Surface temperatures 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: <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. 	ČSN EN 303-5:2013 Art. 4.3.6		+
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	ČSN EN 303-5:2013 Art. 4.3.7		+



Requirement	Requirement specification	Note	Evaluation
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>			
Temperature control and limiting devices	ČSN EN 303-5:2013 Art. 4.3.8		
General 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 with the boiler. If equipment is not supplied, precise specifications shall be given in the installation instructions, in particular the limit values and time constants for the safety temperature limiter.	ČSN EN 303-5:2013 Art. 4.3.8.1		+
Temperature control and limiting devices for open vented systems When used in physically protected heating installations (the temperature is limited by installation pressure) the following equipment shall be provided, according to the requirements of EN 14597: – a temperature controller; – a safety temperature limiter (manual reset). The safety temperature limiter is not necessary in cases where the firing system is neither rapidly nor partly disconnectable. In these cases (e.g. for boilers without automatic force draft), the excess heat is dissipated in the form of steam through the open vented connection with the atmosphere.	ČSN EN 303-5:2013 Art. 4.3.8.2		+
Temperature control and limiting devices for closed vented system When used in thermostatically protected heating installations, the firing system shall be either rapidly or partly disconnectable; and/or the heat or residual heat output not absorbed by the heating system shall be dissipated reliably using a safety heat exchanger or equivalent devices. Accordingly, a distinction is to be made between the following equipment variants, according to the requirements of EN 12828: a) The firing system is rapidly disconnectable; the necessary equipment shall consist of: – a temperature controller; – a safety temperature limiter (manual reset). b) The firing system is partly disconnectable; the necessary equipment shall consist of: – a temperature controller; – a safety temperature limiter (manual reset); – a thermal discharge safety device in accordance with 4.3.8.4 for dissipating the maximum heat output possible in the event of a malfunction;	ČSN EN 303-5:2013 Art. 4.3.8.3		+
			0



Requirement	Requirement specification	Note	Evaluation
<p>c) The heating system is not disconnectable and the nominal heat output is < 100 kW; the necessary equipment shall consist of:</p> <ul style="list-style-type: none"> - a temperature controller; - a thermal discharge safety device in accordance with 4.3.8.4 for dissipating the maximum heat output possible in the event of a malfunction. <p><i>If the requirements are not fulfilled, the boiler shall be installed in an open vented system according to EN 12828.</i></p>			0
<p>Temperature control and limiting devices for closed vented system</p> <p>When used in thermostatically protected heating installations, the firing system shall be either rapidly or partly disconnectable; and/or the heat or residual heat output not absorbed by the heating system shall be dissipated reliably using a safety heat exchanger or equivalent devices. Accordingly, a distinction is to be made between the following equipment variants, according to the requirements of EN 12828:</p> <p>a) The firing system is rapidly disconnectable; the necessary equipment shall consist of:</p> <ol style="list-style-type: none"> 1) a temperature controller; 2) a safety temperature limiter (manual reset). <p>b) The firing system is partly disconnectable; the necessary equipment shall consist of:</p> <ol style="list-style-type: none"> 1) a temperature controller; 2) a safety temperature limiter (manual reset); 3) a thermal discharge safety device in accordance with 4.3.8.4 for dissipating the maximum heat output possible in the event of a malfunction. <p>c) The heating system is not disconnectable and the nominal heat output is < 100 kW; the necessary equipment shall consist of:</p> <ol style="list-style-type: none"> 1) a temperature controller; 2) a thermal discharge safety device in accordance with 4.3.8.4 for dissipating the maximum heat output possible in the event of a malfunction. <p><i>If the requirements are not fulfilled, the boiler shall be installed in an open vented system according to EN 12828.</i></p>	ČSN EN 303-5:2013 Art. 4.3.8.3		+
			0
			0
			0
<p>Devices for dissipating excess heat</p> <p>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.</p>	ČSN EN 303-5:2013 Art. 4.3.8.4		0



Requirement	Requirement specification	Note	Evaluation
<p>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>0</p> <p>0</p> <p>0</p> <p>0</p> <p>0</p>
Heating boiler accessories	ČSN EN 303-5:2013 Art. 4.3.9		
<p>General</p> <p>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>	ČSN EN 303-5:2013 Art. 4.3.9.1		0
<p>Electrical safety</p> <p>The electrical safety of the boiler and the interfaces (e.g. connectors) between control devices shall comply with EN 60335-2-102.</p> <p>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.</p> <p>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.</p> <p>The documentation of the electrical connections for the individual components shall be provided by means of an electrical wiring and connection diagram.</p>	ČSN EN 303-5:2013 Art. 4.3.9.2	31-9690/H/E	+



Requirement	Requirement specification	Note	Evaluation
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.	ČSN EN 303-5:2013 Art. 4.3.9.3	31-9690/H/E	+

Note:

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



Requirement assessed: **Performance requirements**

Requirement specification: ČSN EN 303-5:2013
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: ECO TOP 33

Evaluation results: see the following Table

Requirement	Requirement specification	Note	Evaluation
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.	ČSN EN 303-5:2013 Art. 4.4.1		+
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 %. class 5 $Q < 100$ kW $\eta_K = 87 + \log Q$ (in percent) class 4 $Q < 100$ kW $\eta_K = 80 + 2 \log Q$ (in percent) class 3 $Q < 300$ kW $\eta_K = 67 + 6 \log Q$ (in percent) where η_K is the boiler efficiency in percent and Q is the heat output in kilowatts. NOTE 1 Q is heat output Q_N respectively minimum continuous heat output Q_{min} . NOTE 2 The legislation of some countries requires the efficiency values to be given on a gross basis.	ČSN EN 303-5:2013 Art. 4.4.2		+
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.	ČSN EN 303-5:2013 Art. 4.4.3		+
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.	ČSN EN 303-5:2013 Art. 4.4.4		+



Requirement	Requirement specification	Note	Evaluation
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 h for biogenic and other solid fuels ; – 4 h for fossil fuels.	ČSN EN 303-5:2013 Art. 4.4.5		0
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. 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	ČSN EN 303-5:2013 Art. 4.4.6		+
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			+
The boiler plate shall state the minimum accumulator tank volume.			0
Manually stoked boilers do not require testing at minimum heat output if the manufacturer claims that they shall always be connected to accumulator tank. The following applies as a reference for the minimum accumulator tank volume: $V_{Sp} = 15 T_B \times Q_N \left(1 - 0,3 \frac{Q_H}{Q_{min}} \right)$ where V_{Sp} is the accumulator tank volume, in litres; Q_N is the nominal heat output, in kilowatts; T_B is the burning period, in hours; Q_H is the heating load of the premises, in kilowatts; Q_{min} is the minimum heat output, in kilowatts. 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.			0



Requirement	Requirement specification	Note	Evaluation
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.	ČSN EN 303-5:2013 Art. 4.4.7		+

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



Requirement assessed: **Marking**

Requirement specification: ČSN EN 303-5:2013
 Art. 7, 7.1, 7.2, 7.3

Sample assessed: ECO TOP 33
Evaluation results: see the following Table

Requirement	Requirement specification	Note	Evaluation
Marking	ČSN EN 303-5:2013 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.	ČSN EN 303-5:2013 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;	ČSN EN 303-5:2013 Art. 7.2		+
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.			+
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.	ČSN EN 303-5:2013 Art.7.3		+

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



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

Requirement specification: ČSN EN 303-5:2013
Art. 8, 8.1, 8.2, 8.3, 5.16.1

Sample assessed: ECO TOP 33

Evaluation results: see the following Table

Requirement	Requirement specification	Note	Evaluation
Technical documentation, supplied with boiler	ČSN EN 303-5:2013 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.	ČSN EN 303-5:2013 Art. 8.1		
Technical information and installation instructions These documents shall contain at least the following indications:	ČSN EN 303-5:2013 Art. 8.2		+
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;			+
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;			+
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;			+
u) whether the heating appliance is working under			+

Requirement	Requirement specification	Note	Evaluation
condensing or non-condensing conditions; v) information about the boiler's emission of airborne noise, the method to measure the airborne noise level and the possibilities of means of reducing the noise emission of the boiler. <i>NOTE: Noise measurements should be made according to EN 15036-1.</i> Furthermore, the installation instructions shall contain information concerning:		31-9690/M	+
w) the on-site assembly of the boiler (if necessary) and the required water pressure test as per 5.4.2 or 5.5.2.2;			+
x) the installation;			+
y) the commissioning, with information on the boiler output to be set in the output range;			+
z) instructions on the location and fitting of the sensors for the control, display and safety equipment.			+
In addition, the technical information and installation instructions shall contain general references to the standards and regulations to be observed on the safety equipment of the installation:	ČSN EN 303-5:2013 Art. 8.2		
- take care of installed ventilations systems in the same heating room;			+
- take care there is sufficient amount of clean (i.e. uncontaminated) combustion air;			+
- measuring points should be self-locking and thigh;			+
- emission control after first installation;			+
- verbal instruction by a competent person before first using;			+
- take care of the correct storage of the used fuels;			+
- regularly checks if the heating appliance is in good condition;			+
- take care of the correct dimensioning of the System;			+
- take care of the correct dimensioning of the chimney including the connecting flue pipe;			+
- take care of the necessary distances to combustible materials, if required;			+
- require a shielding construction, if necessary;			0
- take care of the necessary minimum distance to walls and ceilings (related to cleaning).			+



Requirement	Requirement specification	Note	Evaluation
Operating instructions The operating instructions shall contain references to: <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. Other documents (brochures, etc.) shall not contain any information that is in contradiction with that of the operating instructions.	ČSN EN 303-5:2013 Art. 8.3		+ + + + + + +
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. <ol style="list-style-type: none"> Adjust the firing so that it corresponds to the nominal heat output QN 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. The verification of the risk analysis can be done on the basis of one or more of the following: <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. 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.	ČSN EN 303-5:2013 Art. 5.16.1		+



Requirement	Requirement specification	Test evaluation	Note
<p>The following risks shall be evaluated in detail:</p> <ul style="list-style-type: none"> 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. <p>NOTE Additional tests are recommended.</p>	<p>ČSN EN 303-5:2013 Art. 5.16.1</p>		+

Note:

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

Evaluation drafted by:
Ing. Pavel Fojtů

Date: 06/2016

Signed:

Person responsible for the evaluation:
Ing. Stanislav Buchta

Date: 06/2016

Signed:



III. List of background materials

- Order B-53642 dated 2015-08-10 (received on 2015-08-11)
- Contract B-53642/31
- Amendment D1, D2 and D3 of Contract B-53642/31
- ČSN EN 303-5:2013 – 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
- Test report 31-9690/T of 2016-06-20
- Evaluation report 31-9690/H/E of 2016-06-20
- Evaluation report 31-9690/H/M of 2016-06-17
- A set of technical documentation:
- Instructions for assembly, installation and operation of the boiler
- A set of required drawing documentation as per ČSN EN 303-5:2013
- A set of required technical documentation as per ČSN EN 303-5:2013

Evaluation Report compiled by:

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