

Testing a pellet burner BioLine 20 (8 appendices)

The assignment

Testing a pellet burner model BioLine 20 in accordance with European Standard SS-EN 15270.

Item for testing

The pellet burner - a BioLine 20, manufactured by CaminaEcoTec AB, in Skene, Sweden - arrived at SP on 2nd February 2009. The pellet burner was in new condition.

Technical description

The fuel to the pellet burner is conveyed from an external storage by a feed screw. The pellet falls from the feed screw to a cell feeder. From the cell feeder the fuel fill up the internal fuel storage. From the internal storage a second feed screw transports the pellet to the burner head. Combustion air is supplied by a fan. The burner has a heat input range from 20 to 12 kW. The burner ignites the pellet with an electrical ignition based on hot air and has an on/off operation. The pellet burner is designed with two different safety systems to prevent back burning, one is a temperature limiter switch located on the fuel feeding to the burner head and the other safety system is a cell feeder.

The pellet burner was delivered with the following materials:

- Sled which the burner shall be mounted on.
- Manuals

Technical data:

Height*width*length: 450 * 210 * 330 mm
Weight: 25 kg
Voltage: 230 V \pm 10 %
Frequency: 50 Hz
Free space above the burner head: 150 mm (minimum)
Draught in combustion chamber: 10 Pa

Informative material supplied:

Operating and installation instruction Pellet burner BioLine 20 marked 0611-1 and a manual for the electrical controls dated 2007-06-29. The manuals were written in Swedish.

Drawings

SP Technical Research Institute of Sweden

<i>Postal address</i>	<i>Office location</i>	<i>Phone / Fax / E-mail</i>
SP	Västeråsen	+46 33 16 50 00
Box 857	Brinellgatan 4	+46 33 13 55 02
SE-501 15 Borås	SE-504 62 Borås	info@sp.se
SWEDEN	SWEDEN	

Laboratories are accredited by the Swedish Board for Accreditation and Conformity Assessment (SWEDAC) under the terms of Swedish legislation. This report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Test arrangement

The pellet burner was connected to a test rig according to SS-EN 15270. The test rig was connected to a circulation pump, flow meter, valves and heat exchanger, which enabled the circulation flow and the supply and return temperatures to be maintained at the desired values.

The chimney diameter was 125 mm, with a height of about 5 m above floor level.

The combustion chamber in the test boiler rig was set according to the manufacturer's minimum installation dimension. The distance in the combustion chamber between the top of the burner head to the combustion chamber ceiling was 150 mm.

Test procedure

This test report relates only to the actual item tested.

Testing was carried out at/by SP's Energy Technology Department during March 2009, in accordance with European Standard SS-EN 15270, 'Pellet burners for small heating boilers- Definition, Requirements, Testing and Marking'.

The fuel used for the tests was 8 mm wood pellets (see appendix 7).

The following parameters were measured and/or calculated (as appropriate) every 20 second (mean value from measurement every 10 second):

- Flow and return temperatures
- Ambient temperature
- Flue gas temperature
- Boiler temperature
- Draught
- CO₂ concentration
- CO concentration
- O₂ concentration
- THC concentration (Total Hydro Carbon)
- NO_x concentration
- Heat input

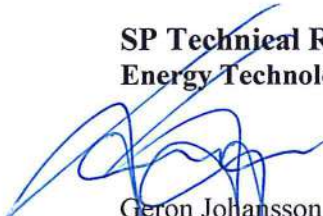
Dust concentration was measured in the chimney at maximum and minimum heat input. The dust was collected on quartz fibre filters and the temperature in the filter casing was 190 °C.

The flow and return temperatures were measured directly at the test rig connections. The flue gas temperature was measured at a distance of about three chimney diameters from the connection of the flue gas duct.

Results

The test results are presented in appendix 2.

SP Technical Research Institute of Sweden
Energy Technology - Combustion and Aerosol Technology



Geron Johansson
Technical Manager



Henrik Persson
Technical Officer

Appendices

- Appendix 1 Identification
- Appendix 2 Results
- Appendix 3 Noise measurement
- Appendix 4 Risk assessment
- Appendix 5 Drawings
- Appendix 6 Electric safety
- Appendix 7 Test fuel specification
- Appendix 8 Instrumentation and uncertainty of measurement