eurofuel
The European Heating Oil Association

Brussels, 11th Dec 2009

Eurofuel – Issues relating to the 16.12.2009 Meeting of the Technical Working Group to Address the Technical Functioning of the "EcoBoiler" Model, related Test Points and Overall Workability - Eco Design (EuP) Lot 1 (Boilers) and Associated Lots

A. Introductory Remarks Regarding Procedural Transparency, Related Implementing Measures Documentation, and Related Legislation

1. **Importance of Resolving Problems associated with the "EcoBoiler" Model, Testing Methodologies and Assumptions – re. Both EuP and Energy Performance of Buildings (Recast) Directive**

   The Energy Performance of Buildings Directive (Recast), subject to its 2nd Reading in the European Parliament, now formally embeds the principles of the EuP directive at Member State implementation level, within the EPBD Recast Directive, regarding heating and cooling systems.

   Therefore, it is even more important to rectify anomalies in the "EcoBoiler" model and associated Implementation Measures (IM) documents, regarding Lot 1 IM, and to achieve consensus regarding "best practice" amongst the external stakeholder experts providing input, from industry and NGO bodies.

2. **IM Documents being addressed – IM Documents 7,8 and 9 are inherently related to IM Documents 3, 5 and 6, and the associated "EcoBoiler" model; IM Documents 7, 8 and 9 must be revisited in the light of any clarification progress made to IM Documents 3, 5 and 6**

   IM Documents 7, 8 and 9 are inherently and reciprocally related to the process of revising IM Documents 3, 5 and 6.

   IM Document 7 will need to be cross-checked by an independent third party entity to ensure that the "EcoBoiler" model utilises accepted CEN procedures, and that any departure from CEN procedures is firstly fully documented, and secondly is justified.

   IM Documents 8 and 9 also require revisiting in parallel with all revisions to IM Documents 3, 5 and 6, and any related changes from IM Document 7.

3. **Once all EuP Lot 1 IM Documents have been revised, and the "EcoBoiler" Model amended, the whole complete package must be revised in its entirety, with sufficient review time being given to stakeholders and Member States**

   All IM Documents regarding EuP Lot 1, plus the "EcoBoiler" model, are reciprocally related, **and must be reviewed together**, for procedural transparency, as a "draft final" package, once subsequently prepared in "draft final" format. This review process must allow sufficient time for external stakeholders and Member States' representatives to make any additional comments.

4. **It is unacceptable for the EuP Lot 1 IM Documents and associated "EcoBoiler" model amendments to proceed in isolation from associated heating and cooling technology "Lots" in the wider EuP process**

Member States' national and/ or regional implementing or advisory bodies, which address building and heating/cooling codes, and the implementation of the EuP directive, will require an "EcoBoiler" model and EuP IM Documents which provide them with consistent and fair guidance, and which ensure equal technical treatment when assessing heating and cooling system options via EuP, which will now be "nested" within the EPBD, via the acceptance of the EPBD Recast.

Eurofuel already called for (response dated 24.07.2009) equal and common application across all heating/ cooling-related EuP "Lots" of the system process for assessing the "seasonal efficiency" (or "specific efficiency"), presently under discussion with regard to IM in EuP Lot 1. This means that a common approach, using the same modelling and efficiency parameters, must be applied to, inter alia: Lot 1 ("boilers"), Lot 2 ("water heaters"), Lot 11 ("circulators"), Lot 15 ("solid-fuel boilers"), Lot 20 ("local room heating products") and Lot 21 ("central heating products using hot air").

The above consistency approach between "Lots" is especially needed, now that the EuP process is embedded within the EPBD Recast, via Article 8 and associated Recitals. It is needed for national and regional bodies, installers, and critically consumers, who might otherwise be grossly misled regarding the relative efficiency levels of differing heating/ cooling technologies.

B. Initial Remarks Regarding Details of the Revised "EcoBoiler" Model (Version 11.11.2009), and Implementing Measures Documents 3, 5 and 6 of EuP Lot 1 [all the above received 25.11.2009]

Comments by Edward Harris, Bosch Thermotechnology Ltd, with additional remarks by Ernst-Moritz Bellingen, IWO/ Eurofuel Technical Commission.

1. Document 3 [Technical Definitions], page 12

CITED EXTRACT:

Air-fuel mix controls (***AFM, AFMb***) relate to gas- and oil fired CH-boilers and the method of controlling the flow of air (oxygen) and fossil fuel to the combustion process. Four methods are distinguished (values of AFM/AFMb in brackets):

1. ***Atmospheric***: burner regulation through gas-valve. No pre-mix fan present.(0,018)
2. ***Pneumatic***: pre-mix fan present.(0,010)
3. ***Ionisation***: pre-mix fan present plus control of fan and gas-valve through measurement of ionisation from flames.(0,004)
4. ***Next gen O2***: pre-mix fan present plus control of fan and gas-valve through (next generation) measurement of oxygen-content of flue gases.(0,001)

Eurofuel Questions

a) What do the above numbers mean (e.g., 0,018)? How are these numbers related to the lambda values?

For reference, previous lambda values from "EcoBoiler" model V6 e (05/11/2007) are shown below.

b) Although the latest draft IM Document 3 text claims to relate to both gas and oil fossil fuel heating devices, it is regrettable that the proposed descriptions are very gas-specific. This is unacceptable, from an open, technology-neutral EuP approach to technical solutions offering similar end results to installer-designers, and the general public ultimately using the technologies. Eurofuel will provide further input and suggestions to rectify this situation.

c) Additional potential conclusions: use lambda values rather than the descriptors "Atmospheric", "Pneumatic", etc, and clarify what the numbers in parentheses mean, and whether they contribute any additional value.

2. Document 5 [Testing Methods] - Test Conditions, page 29

CITED EXTRACT - Note [1] to Table IV.4, paragraph 4, p29:

For fixed capacity boilers only test condition 'A' is mandatory. Part load and low temperature tests are optional for units with variable or staged capacity, alternatively the manufacturer may use the results from condition 'A' for condition 'C' and the results from condition 'E' for conditions 'B' and 'C' with Tfos0=0,5*(60+20)=40 °C.

Eurofuel Comments

a) These suggested test conditions are confusing. Test conditions "A" and "C" stipulate full load tests, which is acceptable. However, the sentence following the above cited extract then suggests using test condition "E" for conditions "B" and "C". However, it must be noted that condition "B" is a part-load test at average 70 degrees Celsius, whereas condition "C" is a full-load test at average 40 degrees Celsius.

b) In addition, manufacturers will not have test results for condition "E". Condition "E" is described (see below) in the 147-slide PowerPoint presentation, associated with the draft IM Documents 3, 5 and 6 (also dated 25.11.2009), as being a test for micro-CHP only, and at 50% of the minimum turn-down. Conclusion: The p29 text conflicts with p109 of the PowerPoint. Clarification is required.

In table below A=eta4, B=eta3, C=eta2, D=eta1, E=eta0

nr.	FOS	FOSB	reported Power output*	Treturn***	reported Tsys=Tfos
			kW	*oC*	*oC*
I	eta1	etab1	Pfos1= Pmin s.s.	30	Tfos1
II	eta2	etab2	Pfos2= Pmax s.s.	30	Tfos2
III	eta3	etab3	Pfos3= Pmin s.s.	60	Tfos3
IV	eta4	etab4	Pfos4= Pmax s.s.	60	Tfos4
	eta0**	etab0	Pfos0=0,5 Pmin	ca.26	no test, only if CHP

*=Pmin s.s./ Pmax s.s.= minimum/maximum steady state heating power output at minimum/maximum steady state heating fuel input
**= cycle time (50%'on'+ 50% 'off') is 1 h; test only if CHP is part of configuration
***= or as low as declared minimum return temperature Tminret allows

Source: 147-page PowerPoint presentation, 25.11.2009, at page 109.

3. Document 3 [Technical Definitions] – Buffer Modelling for Smaller Buffer Systems (e.g., UK and Ireland), page 11 et seq., and related parameters within the "EcoBoiler" model, and Documents 5 and 6

- There is a buffer error if one tries to model a UK-type combi condensing boiler (e.g., with a 40 litre primary storage integrated into the appliance). The model does not expect such a low volume.

Eurofuel Questions/ Comments

- How can such an appliance be realistically modelled using the "EcoBoiler" model? What realistic amendments to the model need to be incorporated? One of Eurofuel's members has results (probably incorrect, or at least not representative, of the low volume of primary water storage that the company wanted to measure - as indicated by the error message) which showed that when the buffer is selected, the "EcoBoiler" model indicates a 4% point increase in system efficiency.

- When larger volumes are used/ input, representing a larger standalone primary storage, the indicated system efficiency calculated by the "EcoBoiler" model does not seem to change with respect to the change in volume.

- Additional Primary Storage cylinders would not be acceptable in the UK market, where the boiler is normally located in the kitchen, where space is confined. Particularly in a crisis replacement situation it is not acceptable logistically or financially, and it is also usually unfeasible, to expect a consumer to dismantle and remodel his/ her entire kitchen, to install a replacement boiler and new primary storage cylinder.

4. Documents 3, 5 and 6, and Nov 2009 "EcoBoiler" Model – System Efficiency Treatment of Modulating v. Non-Modulating Boilers

- From limited testing thus far – in the time available - using real input parameters on actual boilers and system configurations, the Nov 2009 version of the "EcoBoiler" model simulates the system efficiency results for condensing, non-modulating oil boilers in an even more unrealistic manner, and in an unjustified "worst-case" configuration, than the already inadequate treatment given to non-modulating boilers (gas or oil) in the June 2009 version of the "EcoBoiler" model.

- Conclusion: Further "EcoBoiler" model refinement is needed, and the supposed differences/ "credits" between modulating and non-modulating performance requires independent third-party assessment.

- Eurofuel will present an independent analysis of full-load and part-load modulating, compared to non-modulating, boiler performance at the December 16th meeting. This study was specifically commissioned for the EuP Technical Mini-Working Group Meeting.

5. Documents 3, 5 and 6, and Nov 2009 "EcoBoiler" Model – Incorrect Treatment in "EcoBoiler" Model of "Night Setback" Parameters

- Initial simulation exercises utilizing the Nov 09 version of the "EcoBoiler" model with realistic manufacturer's input data have shown that in cell B14 of the model an error message has been received, on all calculations using night setback. The message is "Error: Back-up needed". The model thus indicates,

via the energy balance calculated, that not enough kWh have been provided by the fossil fuel boiler to meet the Lhsys (system demand). This indicates, in turn, that the boiler – as modelled - cannot meet the calculated heat load. Unfortunately as the heat load is calculated from the boiler size, every time one raises the heat output from the boiler, a new heat load is calculated, which – again, in turn - is higher than that which the new boiler size can meet. This **circular problem** is not unique to oil boilers; the same error message has been observed when calculating system efficiencies for comparable gas boilers, by manufacturers who produce both of these types of boiler products.

Conclusion: there is a recurrent "bug" in the "EcoBoiler" system regarding "Night Setback" modelling, which must be addressed.

Ongoing Procedure – Eurofuel's Members and Contact Details

Eurofuel looks forward to continuing to take part in the ongoing constructive process with the European Commission and Member States regarding LOT 1 of the EuP.

For further information or clarification, please contact Michael Bennett (mbe@eurofuel.eu), Executive Director of Eurofuel, www.eurofuel.eu

Eurofuel's Members

Austria: IWO-Austria, Institute of efficient oil heating systems, www.iwo-austria.at

Belgium: Informazout, www.informazout.be

Finland: The Finnish Oil and Gas Federation, www.oil-gas.fi

France: Chauffage Fioul, www.chaleurfioul.com

Germany: IWO-Institute for economic oil heating, www.iwo.de

Republic of Ireland: OFTEC (Oil Firing Technical Association), www.oftec.org

Luxembourg: Mazout-info Luxembourg ASBL (M.I.L.), www.mazoutinfo.lu

Norway: Norwegian Petroleum Industry Association (NP), www.np.no

UK: OFTEC (Oil Firing Technical Association), www.oftec.org

Switzerland (Associate Member): Union Pétrolière, www.erdoel.ch

UPEI (Associate Member): Union Pétrolière Européenne Indépendante, www.upei.org