European Partnership for Energy and the Environment

Mr. Kolb
DG Energy and Transport
Energy Efficiency
TREN D 3
European Commission
B-1049 Brussels

27/01/2010

Copy: Mr. Brisaer, Ms. Lichtenvort, Mr. Kemna

EuP TREN Lot 1 – Ecodesign requirements for boilers
Calculation method and testing
Comments in follow-up ofmeeting on 16 December 2009

Dear Mr Kolb, Dear Mr Kemna,

EPEE wishes to thank the European Commission for the opportunity to co-operate closely on document 5 & 6 and for the possibility of giving additional input on the documents.

Taking into account the pragmatic approach and consequently considering that the present calculation method aim is mainly to differentiate technologies and has its limits in differentiating products within one technology; the comments below are made in response to:

- Conclusions of the meeting of 16 December 2009;
- E-mail of Mr Kemna dd 05.01.2010 containing revised working document 5&6;
- E-mail of Mr Kemna dd 10.01.2010 (correction factors for COP and Php if the system temperature is different from test).

Most important is to consider that this tool will be used by experts in order to develop future products.

We hope that this document will contribute in a positive way.

If there is need for further clarification or if additional information is required EPEE will be happy to provide this,

Yours sincerely,

Andrea Voigt
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EPEE

European Partnership for Energy and the Environment

EuP – TREN Lot 1 - Calculation method & testing
Comments in follow up of meeting on 16th December 2009.

1. Conversion to system temperatures:

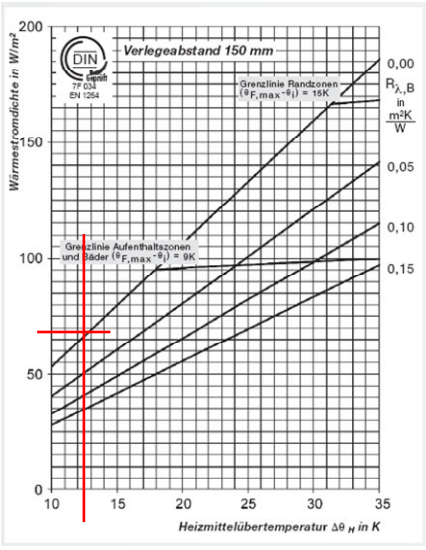
1.1. Questions have been raised as to whether the conversion from test temperatures to system temperatures as proposed by EPEE is feasible (see document sent by Mr Kemna on 10.01.2010). In response to this EPEE wishes to indicate that the proposed conversion from our side is NOT feasible; it will require for one product to test both on floor heating and radiator heating. For products only serving floor heating or only radiator heating it will give extra pressure on tests, which we would like to see as low as possible. EPEE can withdraw this comment taking into account corrections made and taking into account comments 1.2 and 1.3 below .

> Our suggestion for the moment is to leave the conversion as specified in present working document, taking into account the comments below.

1.2. The proposal to increase Pradnom to 2 for radiator heating is acceptable for EPEE.

1.3. For floorheating, typical system temperatures do not exceed 35°C leaving water, and are limited to 32,5°C (Flow 35°C/Return 30°C) in the model. The present calculation does not take this into account. (reference to EN 14511, Ecolabel, NFPAC, EHPA label, UK MCS (-Rating point for UFH applications = 35°C flow /30°C return))
EN 1264 specifies very clearly that the following temperatures may not be exceeded for physiological reasons:
comfortzones: 29°C
borders (sides): 35°C
bathrooms: 33°C

Heat emission of underfloor heating in function of Tsys is not correctly described by radiator formula with n=1,3. Practically, a more linear relation is valid. (see example of EN 1264 certified underfloor heating system)



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> EPEE proposes as follows:
Maintain the calculation of Tsys with radiator formula, but

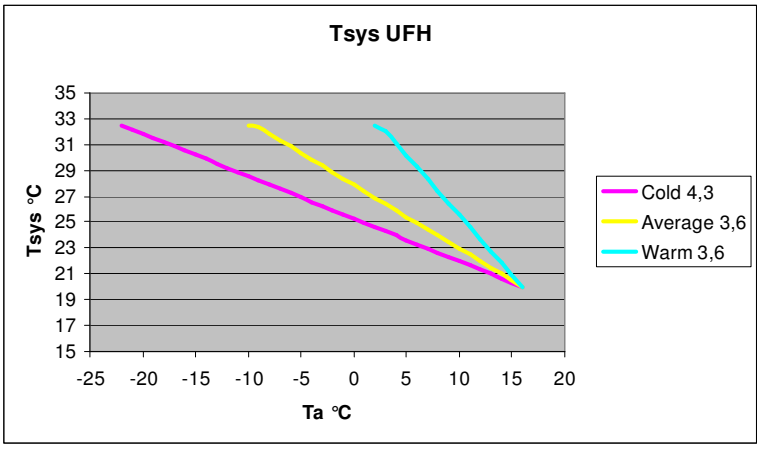
- **adapt exponent n to 1,0 for linearity and**
- **Pradnom for UFH in average and warm climate to 3,6 and for cold climate to 4,3**

to achieve Tsys of 32,5° at design Ta.

This means that present formula

20+50*(PsysA_tp/PradnomA)^(1/1,3)	**changes to**	**20+50*(PsysA_tp/PradnomA)**

As a result, the following system temperatures will be achieved. These temperatures reflect the actual situation.



2. Night setback

With regard to night set back calculation, the following question was raised:
"whether this cornight correction is still needed will depend on whether the possible benefits of night-setback will still be calculated in the conventional way. It may well be that for heat pumps the model will refer to a calculation without night-setback and an added 2 to 3% default bonus, reflecting that at least in the half-season some form of (reduced) night-setback will be beneficial, but without the necessity to make a full night-setback calculation."
(proposal Mr Kemna 10.01.2010)

2.1. EPEE finds that setback should be used to show the energy use benefits for the end user. The main gains to be achieved are in fact the huge amount of energy that can be saved. It can even achieve energy savings of more than 40%, even though the calculation shows a reduced energy efficiency.

Following example demonstrates the benefits:

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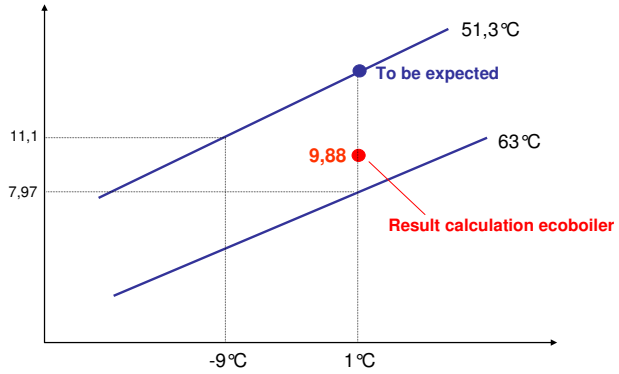
Model A **Pmax = 11,6kW**	Etas (%)	Energy consumption (LhpA) (KWh/a)
Set back	91%	13160
No set back	102%	22753
		Δ = 42%

These findings are also confirmed by testing, where a reduction in the same house of 37% has been achieved when applying night set back. When using night set back, efficiency was improved by 3,55%.

As a conclusion, the effect on efficiency is secondary to the effect on energy consumption.

2.2. There seems to be an anomaly for determining capacity and COP at setback condition: When the system temperature at night is changed to the system temperatures of any condition in the BIN, it is not possible to find the similar capacity, which should be a logical result. It is unclear, however, how to correct this.

	Ta	Tsys	Phpmax	COP
Night	1˚C	63˚C	7,97kW	1,88
	-9˚C	51,3˚C	11,1kW	1,88
Night convert Tsys to Tsys of -9˚C	1˚C	51,3˚C	9,88kW	2,3



> EPEE feels that the proposal of Mr Kemna to abandon this conversion is acceptable, but feels that the benefit on efficiency should be granted as being between 3-6% instead of 2-3%

3. Inclusion of losses

The present method includes system losses, and etas is calculated.
The losses that are constant Cdistr, Cstrat, Cfluct, should be reflected in the denominator of the etas calculation. These losses are not equipment-dependent but building-dependant.
Including these losses in the equipment performance may lead to double counting of losses in both EPBD and EuP and consequently lead to oversizing of equipment.

4. Test points

The present options for testing should allow other possibilities which have been proven to be technically equivalent to the tests prescribed. For example, where manufacturers are able to test different points and can prove to fulfil the system temperatures with an alternative method, this should be allowed. Where manufacturers are able to test different points and can prove to fulfil the building load by an alternative method, this should be allowed.
This is in line with the requirements in other directives, such as the pressure equipment directive, which allows innovative methods that still fulfil the essential requirements.

5. Temperature of storage tanks

5.1. The temperature of storage tanks is too high for heat pumps. When a storage tank is used the water will never be heated to 60°C. In this respect, EPEE proposes to provide storage temperatures in line with system temperatures. For the 3 climates, Tstore has to be calculated from the average weighted system temperature.

5.2. It should be clear that the solar buffer can be used as a system buffer. In the event that only the solar buffer is used as a storage tank, the same effect in the losses has to be considered. This principle also needs to be clarified in the working document.

Where the manufacturer of the system can prove that other water temperatures for storage tanks can be used, they can input the equivalent surface to come to the same storage tank losses.

6. Other corrections/issues to be considered

6.1. Sheet floorcalc, cells AV155: The capacities used in the sheet do not use the corrected capacities but the capacities completed in sheet GUI.
> adapt Phpf1, 2, 3, 4 to Phpf1A, 2A, 3A, 4A

6.2. Sheet floorcalc, cells BC155: The COP used in the sheet do not use the corrected COP but the COP completed in sheet GUI.
> adapt COPf1, 2, 3, 4 to COPf1A, 2A, 3A, 4A

6.3. Once minimum and maximum capacities are integrated into the calculation method, the degradation factor also needs to be integrated in the calculation of COP.

6.4. The cband value should reflect the flexibility of the product. The present correlation is made between maximum capacity at -10 and capacity and minimum capacity at 2°. Products with a bigger slope may then reach a situation where cband is too large. We believe that the difference between maximum capacity at -10°C (or 2°C) and the minimum capacity at -10°C (or 2°C) is more suitable. The same outdoor temperature should be used to assume the modulability of the product.
> We suggest to add a calculation for minimum capacity at -10, and integrate that in the cband formula

6.5. **tpmp:** The current proposal for <5min (the onhours and addition of 200) does not encompass the fact that the boiler is on/off cycling, this portion of off cycling has to be taken into account in the calculation:

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> A new column needs to be created to define the pump on-hours in case of option 1: for Php>= Pminhp ==> 1*hours, if Php<PminHp ==> Php/Pminhp*hrs*5'/60'

7. Comments on document 5 and 6 version 25.12.2009

The proposed text for efficiency degradation still requires modifications for it to be completely clear. There is no need to complete COPcyc in the GUI, so we suggest its deletion. The manufacturer should only be required to complete the default Cd factor or the Cd factor that is obtained through testing. This requires modifying the text and as follows:

> EPEE proposes to modify as follows:

For the efficiency degradation during cycling a default value Cd=0,15 may be used (no testing required), in which case COP values in the calculation BIN will be degraded as follows
COPdegraded=COPmin1*(1-Cd*(1-Phptp/Phpmin1))

In case the manufacturer decides to test the Cd factor, then the method prescribed in prEN 14825, where the appliance is tested using a cycling interval of 6/24 minutes (6 minutes on, 24 minutes off).

8. Questions

8.1. Qpump = (MAX(hphrs;foshrs)+200)/allhrs ➔It is unclear how 200 has been defined.

8.2. auxrecov
auxrecov=IF(OR(AND(FOS;FOSOUT);AND(SOL;SOLBUFOUT));0,275;0,55) ➔ It is unclear why 0,275 is used, it has been indicated that there is no gain if buffer is outside, so 0,275 should be 0?

8.3. It is strange that solar irradiance is higher for cold than warm climate, can it be explained why this is?

qsolmA_tm	70	104	149	192	129	80	56		
qsolmW_tm	129	138	182	227	126	110			
qsolmC_tm	22	75	124	192	234	120	64	24	13

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