EVIA Position on the working document on Ecodesign requirements for Ventilation Units

11 Feburary 2013
Status: Draft

Brussels, 11 February 2013

Dear Mr Kemna, Dear Mr. Biermann,

EVIA, the European Ventilation Industry Association, would like to thank you for the further draft working document on Ecodesign requirements for ventilation units dated 17 January 2013.

Overall, we support the general approach. However, we have some comments, which we would like to share with you.

You will find below the main points of concern to which we would like to bring your attention and we hope that these will be of constructive support for the further development of the consolidated working document.

EVIA stresses the importance, the new approach of SFP is not yet final approved and we see the need of further discussion.

Should you have any questions regarding EVIA or our comments, do not hesitate to contact us.

Best regards,

Stefan Wiesendanger
Chairman of EVIA

Claus Händel
EVIA Technical Secretary

Rick Bruins
Chair of the EVIA Residential ventilation working group

Dr. Christoph Kaup
Chair of the EVIA Non-residential ventilation working group

Geoff Lockwood
Chair of the EVIA Fans working group

Marc Jardinier
Chair of the Ventilation 2020 Policy Task Force

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1. SEC calculation and classes of Residential Ventilation units

The case of defrosting:

EVIA still highlights, that the calculation of defrosting energy in the WD does not reflect the market and good or bad defrosting strategies. In detail see HLH 61/2010 attached. The current test method is a functional test and does not measure the energy impact.
EVIA´s proposal is to delete this parameter in the current version and include defrosting in the future revision, when further energy measurements will be available.

SEC classes for ventilation:

Bases on the equation given in the WD

$$SEC = \frac{8760}{1000} \times PRI_{el} \times 1{,}3 \times \mathrm{MISC} \times CTRL^{x} \times SPI - t_h \times \Delta T_h \times \frac{344}{10^6} \times PRI_h \times \left(2{,}2 - 1{,}3 \times CTRL \times MISC \times (1 - HR)\right) + \mathrm{Q_{defrost}}$$

EVIA is proposing the following SEC classes, considering a common label for all types of residential ventilation units.

SEC class	SEC in kWh/(a m^2) average climate	SEC in kWh/(a m^2) warm climate	SEC in kWh/(a m^2) cold climate
A+++			
A++	SEC ≤ - 40	SEC ≤ - 15	SEC ≤ - 85
A+	-40 < SEC ≤ -35	-15 < SEC ≤ -13	-85 < SEC ≤ -75
A	-35 < SEC ≤ -30	-13 < SEC ≤ -11	-75 < SEC ≤ -64
B	-30 < SEC ≤ -25	-11 < SEC ≤ -9	-64 < SEC ≤ -53
C	-25 < SEC ≤ -20	-9 < SEC ≤ -7	-53 < SEC ≤ -43
D	-20 < SEC ≤ -15	-7 < SEC ≤ -6	-43 < SEC ≤ -32
E	-15 < SEC ≤ -10	-6 < SEC ≤ -4	-32 < SEC ≤ -21
F	-10 < SEC ≤ -5	-4 < SEC ≤ -2	-21 < SEC ≤ -11
G	-5 < SEC	-2 < SEC	-11 < SEC

The basic for this proposal is the fact:

- A very good Exhaust Ventilation System (suitable for refurbishments) shall be able to reach an A classification in average climates (Figure 1, Figure 2, Figure 3).
- In wam climate zones a very good demand controlled exhaust ventilation system is comparable to a good HR-unit (no controls option)(Figure 4).
- In cold climates the exhaust ventilation systems are lower (Figure 5).

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Climate zones for classification:

EVIA stresses the importance to show an efficiency class for climate zones (warm and cold) instead the energy savings @100 m^2.
The reason is, that these given values do not reflect the aspects of the combination with the buildings and possibly the end user has a wrong expectation.

Example: In a very low energy building, the presented savings might be higher, than the calculated values according EPBD.

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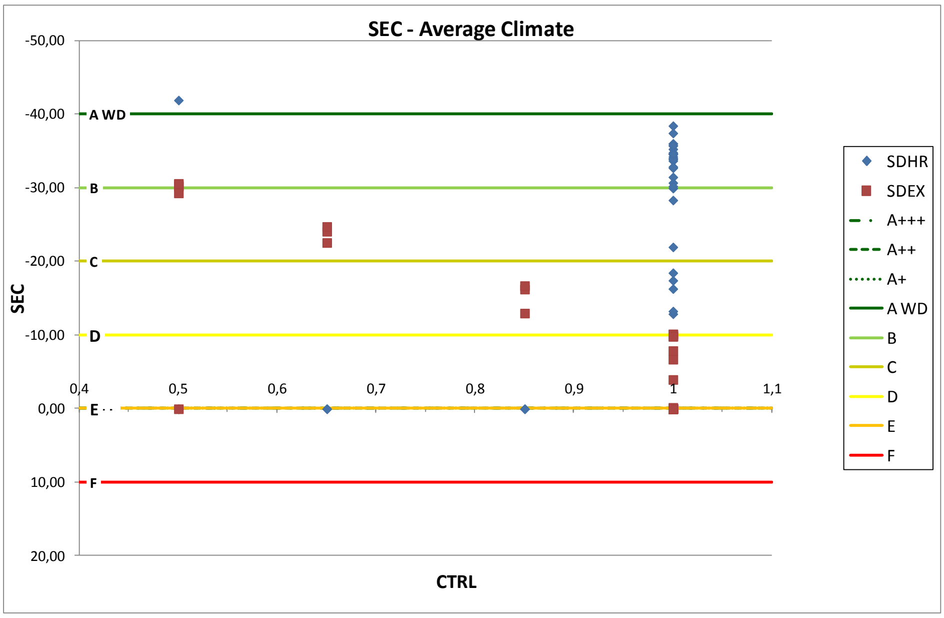

Figure 1: Typical products and classification according current WD

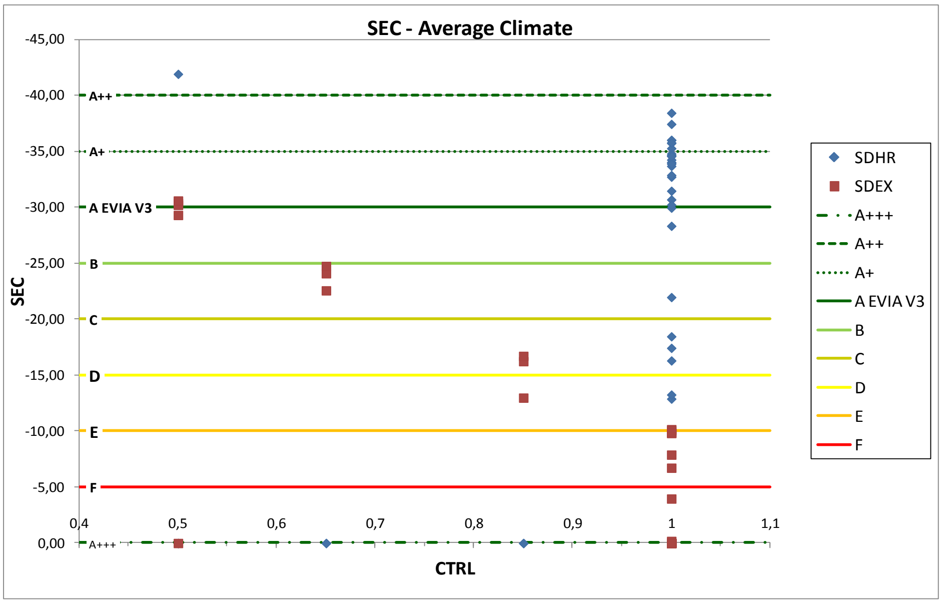

Figure 2: Typical products and classification according EVIA proposal average climate

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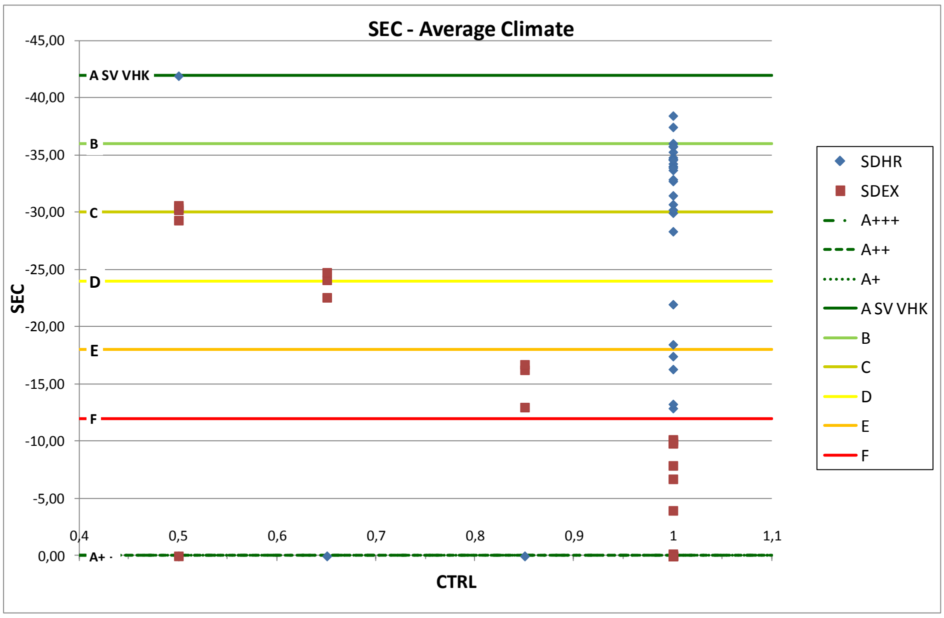

Figure 3: Typical products and classification according VHK proposal

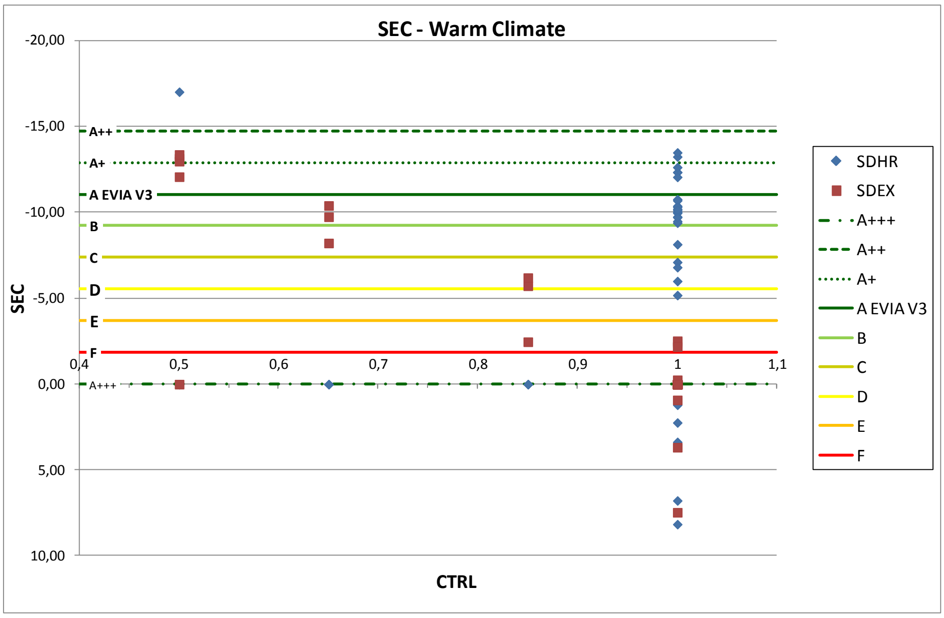

Figure 4: Typical products and classification according EVIA proposal warm climate

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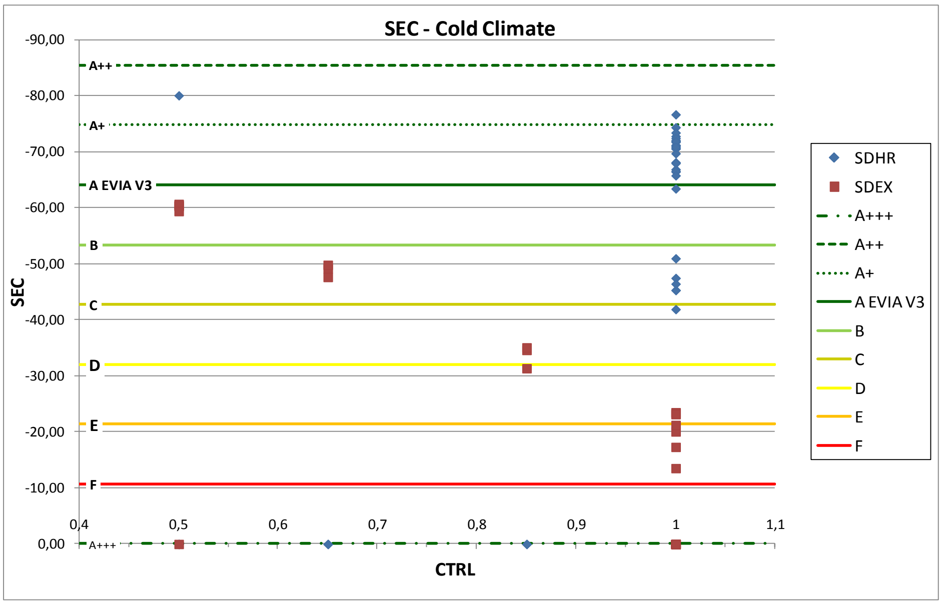

Figure 5: Typical products and classification according EVIA proposal cold climate

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2. The case of enthalpy recovery (clarification of 14th Dec. Document):

Humidity recovery can play an important role in the energy efficiency of residential ventilation when considering thermal comfort in winter and enthalpy recovery in summer cooling. EVIA supports the idea not to include these aspects in the current SEC-calculation by adding an additional humidity balance, but EVIA supports using a correction factor for temperature ratios.

Justification: All available plate heat recovery systems with humidity recovery will not fulfil the minimum criteria of dry temperature ratio of 80%.
EVIA proposes to allow a correction of temperature ratio, if humidity ratio is significant and measured.
The minimum thermal efficiency of heat recovery units with humidity recovery ratio (not condensing units) shall be calculated using the following table.

Class EN 13142	Humidity ratio %	Add %, in climate zone Cold	average	warm
I	>= 90	15	13	8
II	80-89	15	13	8
III	70-79	12	10	5
IV	60-69	8	6	3
V	50-59	5	3	0

A simplified approach might be: $\eta_{t,corr} = \eta_t * 1{,}125$ if $\eta_h \geq 0{,}6$

3. The case of fan efficiency

EVIA still stresses the importance to allow different fan designs depending on the application (see comments of December 2012).

As a compromise and considering the current discussion on SFP values EVIA proposes a modified formula for the fan efficiency.

Proposed formula:

$$\eta e_{ref} >= 6{,}2 \times LN(Pm) - 14{,}3 + X$$

T1: X = 46

T2: X = 56

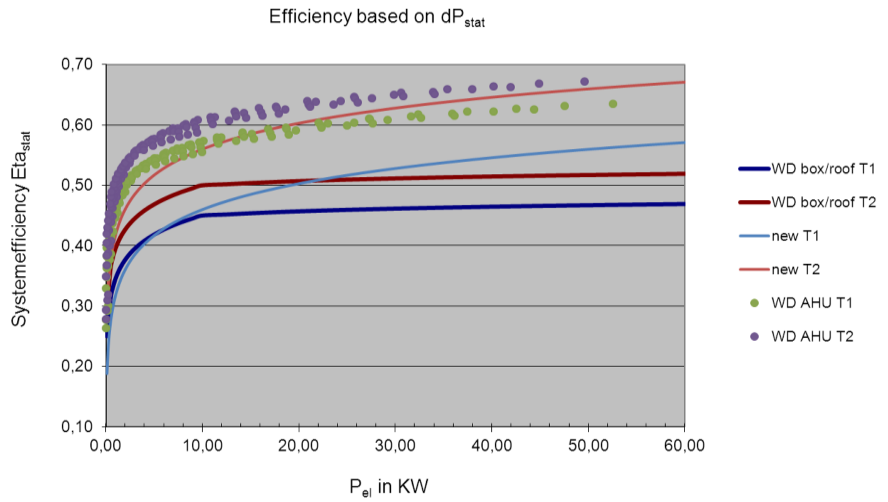

Figure 6: Proposal for a modified fan efficiency

- Solves the inconsistency with EN 13053 pm classes.
- Gives add. 2 years for the industry needed to redevelop a great variety of products and applications
- Comparable efficiency in Tier 1 at higher power, but solves the problems of smaller fans in smaller units to reach the target.
- Higher efficiency in Tier 2

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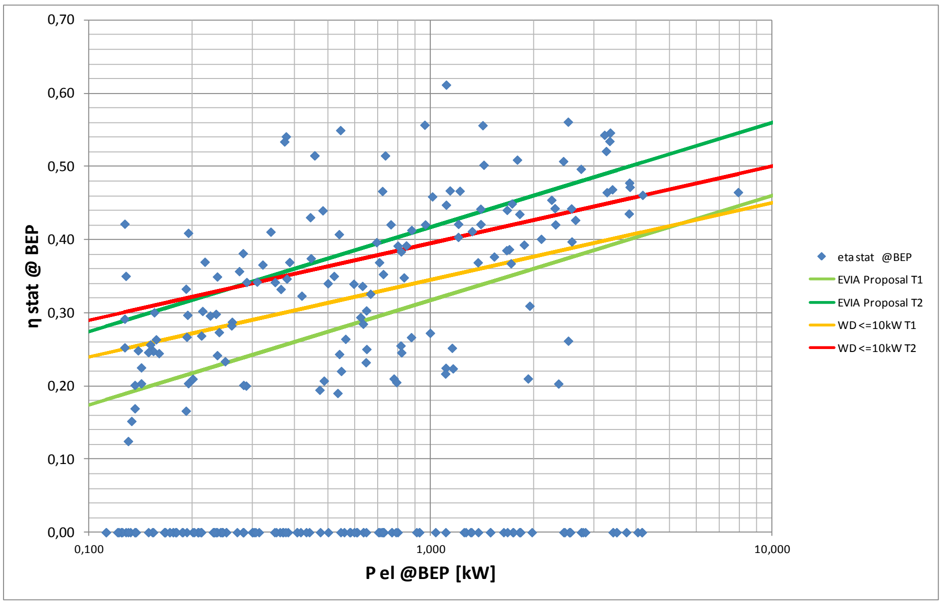

Figure 7: Typical box and roof fans and the EVIA proposal for min efficiency

4. Minimum Requirements of NRV-units – modified SFP approach

EVIA comments on amendment VHK memo 17th Jan 2013

The split at 1.000 m3/h between RVU <-> NRVU still not satisfying for the products on the market

Summarised EVIA EVIA still sees many problems using the SFP or modified SFP approach. This case needs further discussions and investigations.

It might be possible to solve it with a split approach:

- **Keep the existing velocity approach for tailor made units, considering the needs of limited space in refurbished buildings.**
- **Further development of the modified SFP approach for Compact Units.**

Some argumentations and examples:

Annex II texts (NRVU):

Section 1. Definitions

Definition 3 is to be replaced by three definitions (numbering is provisional and will be changed in final text):

3a. *'Nominal external pressure'* ($\Delta p_{s,\ ext}$) in Pa means the declared design external static pressure difference at nominal flow rate.

3b. *'Internal pressure drop of ventilation components'* ($\Delta p_{s,int}$) in Pa means the sum of the in- and outlet static pressure drops at nominal flow rate and nominal external pressure for a BVU over the casing, fine filter on the supply side, intermediate filter on the exhaust side and heat recovery system at both supply and exhaust side, and for a UVU over the casing and possibly –where part of the product—a fine filter.

3c. *'Internal pressure drop of non-ventilation components'* ($\Delta p_{s,add}$) in Pa means the remainder of the sum of all internal static pressure drops at nominal flow rate and nominal external pressure after subtraction of the internal pressure drop of ventilation components $\Delta p_{s,int}$.

EIVA comments:

3b. Definition shall be given separate for supply air side and exhaust air side.
This means:

$\Delta p_{s,SUP} = \Delta p_{s,int,SUP} + \Delta p_{s,add,SUP} + \Delta p_{s,ext,SUP}$

$\Delta p_{s,EXH} = \Delta p_{s,int,EXH} + \Delta p_{s,add,EXH} + \Delta p_{s,ext,EXH}$

New definitions for SFPint and 'zero cross-contamination HRS' will be added

10. *'Internal specific fan power of ventilation components'* (SFP_{int}) in W/(m³/s) is the ratio of the internal pressure drop of ventilation components $\Delta p_{s,int}$ in Pa and the fan efficiency η_f .

11. *'zero cross-contamination HRS'* is a heat recovery system where exhaust and supply side are completely separated and do not even share an adjacent wall that would allow the possibility of leakage from one to the other air stream.

EIVA comments:

10. Fan efficiency η_f shall be defined at nominal operating point (Nominal air volume flow and $\Delta p_{s,SUP}$ and $\Delta p_{s,EXH}$)

11. This definition is not satisfying because the case of zero cross contamination is not only located in HR section. An adjacent wall might be also possible with run-around-coils. The difference of 3% is not the case to add a new product group.

EVIA´s proposal is to reduce the minimum requirements to 70%, that even typical run-around-coils can reach the target

Comment [Hd1]: To be discussed

Comment [ChK2]: I Agree in general. It makes no sense to define different requirements on the several systems.
I would like to have one requirement for all HRS.
But CC-System must be possible.
And with a CC System a efficiency of 75 % is possible if a pressure drop of around 250 Pa per airside is excepted!

The aspecet of zero cross contamination shall be deleted.

3. Specific ecodesign requirements

Non-residential ventilation units shall comply with the following requirements:

(1) From [date to be inserted: [2] year after the entry into force of the Regulation]:

- all Ventilation Units shall be equipped with a multi-speed drive or a variable speed drive;
- all Balanced Ventilation Units (BVUs) shall have a heat recovery system HRS.
- the HRS shall have a thermal by-pass facility;

EVIA comments:
The by-pass must be deleted. Depending on the type and the requirements there is no need for a by-pass or it is not possible to have a by.pass.

- the thermal efficiency of the HRS shall be at least 67%;
- the minimum fan efficiency $\eta_{f,min}$ for fan(s) used in the ventilation units shall be

4,56%*ln(P) – 10,5% +53% for P≤ 10 kW or

1,1%*ln(P) – 2,6%+53% for P>10 kW,

where P is the nominal electric power input of the fan (in kW) and the fan efficiency is determined in accordance with Commission Regulation (EU) 327/2011;

EVIA comments:
See the case of fan.

– the maximum internal specific fan power $SFP_{int,\ max}$ (in W/(m³/s)), relating to internal static pressure drop $\Delta p_{s,\ int}$ (in Pa) of casing, HRS and filters as appropriate, shall be

$SFP_{int,\ max} = \Delta p_{s,\ int,\ max} / \eta_{f\ min}$

where

the value of $\Delta p_{s,\ int}$, including correction for the nominal airflow, can be derived for various VU configurations from the equations in table 1;

if a filter module is required, $\Delta p_{s,\ int}$ shall be determined with appropriate low energy consuming filters of type F7 for the supply side and M5 for the exhaust side, following the definition in Annex II (1) and (2.3);

alternatively, if no filter module is required, $\Delta p_{s,\ int}$ shall be determined by adding default filter pressure drop penalty values in Table 1 to the $\Delta p_{s,\ int}$ determined for casing and possibly HRS of the unit without filter(s);

if more than one fan is used, η_f is the straight average of all fans.

Table 1

Ventilation unit type	standard configuration (always with casing)			$\Delta p_{s,\ int,\ max}$ [in Pa]	penalty [in Pa] for test without filter	
	supply filter	exhaust filter	HRS			
BVU	Yes (F7)	Yes (M5)	Yes	???/ $\eta_{f,min}$	??	
UVU with filter module	Yes (F7)		No	??/ $\eta_{f,min}$	??	
UVU without filter module	No		No	??/ $\eta_{f,min}$	-	

???=anchor value and air flow-related correction, to be determined after industry feedback. (see BACKGROUND section hereafter)

BACKGROUND for determining values of $\Delta p_{s,\ int,\ max}$ and other issues discussed (VHK research):

GENERAL NOTES

$\Delta p_{s,\ int,\ max}$
SE proposal BVU: $\Delta p_{s,\ int,\ max} = 2 \cdot 0{,}9 \cdot (250 + 50 \cdot \log (q_v + 0{,}1))$ = 450 Pa + $90 \cdot \log (q_v + 0{,}1)$
VHK preliminary estimate : $\Delta p_{s,\ int,\ max} = 2 \cdot 200 =$ ca. 400 Pa (at around 1 m³/s) + a flow correction to be determined.

Comment [ChK3]: 400 Pa incl. filters is to low, especially if a better HRS is wished by the customer.
e. g. 80 % efficiency is not realistic with 200 Pa per airside!

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Industry: Feedback later (homework). EVIA to deliver adapted flow-correction, specifically with view also to UVUs using the same formula.
VHK: On revisit, SE proposal more ambitious than first assessed. Difference is small and compromise in the 400-450 Pa range must be possible.

EVIA comments:

If we consider equation SE proposal per each flow side (including Filter):

$$\Delta p_{s,\ int,\ max} = 0{,}9 \cdot (250 + 50 \cdot \log (q_v + 0{,}1))$$

$\Delta p_{s,\ int,\ max}$ [Pa]
q_v [m³/s]

This is approach is far too ambitious!

$\Delta p_{s,\ int,\ max} = 1{,}0 \cdot (350 + 50 \cdot \log (q_v + 0{,}1))$

Comment [ChK4]:

EVIA stresses the importance that this is for tailor made units definitively NOT OK, smaller units will have higher velocities in the components and therefore smaller units will have higher pressure losses!

	A	0,9	1
	B	250	350
	C	50	50
qV [m3/h]	qV [m3/s]	Δp [Pa]	Δp [Pa]
36	0,010	182	302
125	0,035	186	306
360	0,100	194	315
500	0,139	197	319
1000	0,278	206	329
3600	1,000	227	352
10000	2,778	246	373
20000	5,556	259	388
36000	10,000	270	400

A quick estimation shows, that with the SE proposal nearly all units will not reach the target (the squared areas is one unit at different air volume flows).

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	A	0,9									
	B	250				Fan					
	C	50				Estimation					
				Estimation		@BEP					
qV [m3/h]	qV [l/s]	$\Delta p_{s,INT,SUP}$	$\Delta p_{s,add,SUP}$	$\Delta p_{s,ext,SUP}$	$\Delta p_{s,SUP}$ [Pa]	P_{el}[kW]	η_f	$\eta_{f,min}$	$SFP_{INT,max}$	SFP_{INT}	
36	10,00	182	0	50	232	0,025					NOT
125	34,72	186	0	100	286						NOT
360	100,00	194	0	100	294						NOT
500	138,89	197	0	150	347						NOT
1000	277,78	206	0	150	356	0,35	0,283	0,377	546	729	NOT
3600	1000,00	227	0	200	427	1,3	0,328	0,437	519	691	NOT
10000	2777,78	246	0	300	546	4	0,379	0,488	503	648	NOT
20000	5555,56	259	0	400	659	8	0,458	0,520	498	566	NOT
36000	10000,00	270	0	500	770	15	0,513	0,534	506	526	NOT
800	222,22	203	0	0	203	0,13	0,347	0,482	421	585	NOT
3000	833,33	224	0	0	224	0,7	0,266	0,500	447	840	NOT
2000	555,56	217	0	0	217	0,29	0,415	0,490	442	522	NOT
2500	694,44	221	0	0	221	0,45	0,340	0,495	445	648	NOT
1300	361,11	210	0	0	210	0,25	0,303	0,489	429	692	NOT
4400	1222,22	230	0	0	230	0,95	0,296	0,503	458	777	NOT
4100	1138,89	229	0	0	229	0,81	0,322	0,502	457	711	NOT
1000	277,78	206	0	110	316	0,222	0,395	0,487	423	521	NOT
755	209,72	202	0	60	262	0,175	0,314	0,485	417	643	NOT
415	115,28	195	0	18	213	0,085	0,289	0,477	409	675	NOT
5910	1641,67	236	200	250	686	2,186	0,515	0,513	460	458	ok
1000	277,78	206	0	0	206	0,27	0,212	0,490	421	972	NOT
700	194,44	201	0	0	201	0,13	0,301	0,482	418	669	NOT
2200	611,11	218	0	0	218	0,5	0,267	0,496	440	818	NOT
1900	527,78	216	0	0	216	0,35	0,326	0,492	438	663	NOT

Using a modified equation seem to be possible for compact units.

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	A	1									
	B	350				Fan					
	C	50				Estimation					
				Estimation		@BEP					
qV [m3/h]	qV [l/s]	$\Delta p_{s,INT,SUP}$	$\Delta p_{s,add,SUP}$	$\Delta p_{s,ext,SUP}$	$\Delta p_{s,SUP}$ [Pa]	P_{el}[kW]	η_f	$\eta_{f,min}$	$SFP_{INT,max}$	SFP_{INT}	
36	10,00	302	0	50	352	0,025					NOT
125	34,72	306	0	100	406						NOT
360	100,00	315	0	100	415						NOT
500	138,89	319	0	150	469						NOT
1000	277,78	329	0	150	479	0,35	0,380	0,377	872	865	ok
3600	1000,00	352	0	200	552	1,3	0,425	0,437	806	829	NOT
10000	2777,78	373	0	300	673	4	0,467	0,488	764	798	NOT
20000	5555,56	388	0	400	788	8	0,547	0,520	746	709	ok
36000	10000,00	400	0	500	900	15	0,600	0,534	750	667	ok
800	222,22	325	0	0	325	0,13	0,556	0,482	676	585	ok
3000	833,33	349	0	0	349	0,7	0,415	0,500	697	840	NOT
2000	555,56	341	0	0	341	0,29	0,653	0,490	695	522	ok
2500	694,44	345	0	0	345	0,45	0,532	0,495	697	648	ok
1300	361,11	333	0	0	333	0,25	0,481	0,489	682	692	NOT
4400	1222,22	356	0	0	356	0,95	0,458	0,503	707	777	NOT
4100	1138,89	355	0	0	355	0,81	0,499	0,502	707	711	NOT
1000	277,78	329	0	110	439	0,222	0,549	0,487	675	599	ok
755	209,72	325	0	60	385	0,175	0,461	0,485	669	704	NOT
415	115,28	317	0	18	335	0,085	0,454	0,477	664	698	NOT
5910	1641,67	362	200	250	812	2,186	0,610	0,513	706	594	ok
1000	277,78	329	0	0	329	0,27	0,338	0,490	672	972	NOT
700	194,44	323	0	0	323	0,13	0,484	0,482	672	669	ok
2200	611,11	343	0	0	343	0,5	0,419	0,496	690	818	NOT
1900	527,78	340	0	0	340	0,35	0,513	0,492	690	663	ok

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The case of tailor made units:

The added table shows the effect on the different unit size in practice:

Unit size Filters num. 610 x 610 mm	Unit *hight* outside	*depth* outside	Unit *hight* inside	*depth* inside	Tier 1 v_{Unit} m/s	ETA $_{HR}$ = 0,73 - 0,77 v_{HE} m/s	q_V m³/h	dP_{HR} Pa	ETA_{HR} %	v_{Filter} m/s	dP_{F7} Pa	dP_{M5} Pa	dP_{Unit}	dP_{total} Pa
0,5	455	705	375	625	1,8	3,4	1.519	454	**0,73**	2,4	128	69	8	**1.121**
1,0	705	705	625	625	1,8	3,3	2.531	433	**0,74**	2,0	99	53	8	**1.034**
1,5	705	1035	625	955	1,8	**3,0**	3.868	372	**0,75**	2,0	102	55	8	**916**
2,0	1035	1035	955	955	1,8	2,8	5.910	333	**0,75**	2,3	123	66	8	**871**
3,0	1035	1365	955	1285	1,8	2,7	7.952	314	**0,75**	2,1	**106**	**57**	8	**807**
4,0	1365	1365	1285	1285	1,8	2,4	10.700	260	**0,76**	2,1	107	58	8	**701**
5,0	1365	1695	1285	1615	1,8	2,4	13.448	260	**0,76**	2,1	108	58	8	**702**
6,0	1695	1695	1615	1615	1,8	2,2	16.901	226	**0,77**	2,2	115	62	8	**646**
7,5	1695	2025	1615	1945	1,8	**2,1**	20.355	210	**0,77**	2,2	110	59	8	**604**

Unit size number of rs 610 x 610 mm	Filter *592 x 592* M²	Tier 2 v_{Unit} m/s	ETA $_{HR}$ = 0,75 - 0,78 v_{HE} m/s	q_V m³/h	dP_{HR} Pa	**based on measured datas (green)** ETA_{HR} %	v_{Filter} m/s	dP_{Filter} Pa	dP_{Filter} Pa	dP_{Unit}	dP_{total} Pa
0,5	0,18										
1,0	0,35	1,6	**3,0**	1.350	362	**0,75**	2,1	125	72	7	**935**
1,5	0,53	1,6	2,9	2.250	343	**0,75**	1,8	119	56	7	**875**
2,0	0,70	1,6	2,7	3.438	300	**0,75**	1,8	**106**	**57**	7	**777**
3,0	1,05	1,6	2,5	5.253	269	**0,76**	2,1	96	69	7	**717**
4,0	1,40	1,6	2,4	7.069	254	**0,76**	1,9	91	59	7	**672**
5,0	1,75	1,6	**2,1**	9.511	210	**0,77**	1,9	78	60	7	**572**
6,0	2,10	1,6	**2,1**	11.954	210	**0,77**	1,9	78	60	7	**572**
7,5	2,63	1,6	2,0	15.023	183	**0,77**	2,0	69	65	7	**513**
		1,6	1,9	18.093	170	**0,78**	1,9	64	61	7	**479**

with: m_{supply} / $m_{exhaust}$ = 1:1

Note: $NTU_m = \Phi_m / (1 - \Phi_m)$ $\Phi_r = NTU_r / (1 + NTU_r)$ dry conditions acc. EN 308

Exponent HRS 2
Exponent Filter 1

bigger units that 7,5 will have the same ratio between v_{Unit} and v_{HR}

In this table you will see, that the velocity in the unit with 1,8 m/s will generate a velocity in the HRS of 3,4 m/s in a small unit with 0,5 Filter and 2,1 m/s in a big unit with 7,5 standard filter bags.

And the velocity based on the net filter area is also not linear to the velocity in the unit. The difference deviates between 2,0 up to 2,4 m/s

If we recalculate the values (based on real measured datas) to the min. requirements as proposed we will have the following situation:

Tier 1 ETA $_{HR}$ = 0,70 based on recalculated datas

v_{Unit} m/s	q_V m³/h	$NTU_{measured}$	$NTU_{recalculated}$	dP_{HR} Pa	ETA_{HR} %	$dP_{Filter\ F7}$ Pa	$dP_{Filter\ M5}$ Pa	dP_{Unit}	dP_{total} Pa
1,8	1.519	2,70	2,03	341	**0,67**	128	69	8	**895**
1,8	2.531	2,85	2,03	309	**0,67**	99	53	8	**786**
1,8	3.868	3,00	2,03	251	**0,67**	102	55	8	**676**
1,8	5.910	3,00	2,03	225	**0,67**	123	66	8	**656**
1,8	7.952	3,00	2,03	212	**0,67**	**106**	**57**	8	**604**
1,8	10.700	3,17	2,03	167	**0,67**	107	58	8	**515**
1,8	13.448	3,17	2,03	167	**0,67**	108	58	8	**516**
1,8	16.901	3,35	2,03	137	**0,67**	115	62	8	**468**
1,8	20.355	3,35	2,03	127	**0,67**	110	59	8	**439**

Tier 2 ETA $_{HR}$ = 0,75 based on recalculated datas

v_{Unit} m/s	q_V m³/h	$NTU_{measured}$	$NTU_{recalculated}$	dP_{HR} Pa	ETA_{HR} %	$dP_{Filter\ F7}$ Pa	$dP_{Filter\ M5}$ Pa	dP_{Unit}	dP_{total} Pa
1,6	1.350	3,00	3,00	362	**0,75**	133	72	7	**944**
1,6	2.250	3,00	3,00	343	**0,75**	103	56	7	**859**
1,6	3.438	3,00	3,00	300	**0,75**	**106**	**57**	7	**777**
1,6	5.253	3,17	3,00	255	**0,75**	128	69	7	**720**
1,6	7.069	3,17	3,00	240	**0,75**	110	59	7	**664**
1,6	9.511	3,35	3,00	188	**0,75**	112	60	7	**562**
1,6	11.954	3,35	3,00	188	**0,75**	112	60	7	**563**
1,6	15.023	3,35	3,00	164	**0,75**	120	65	7	**526**
1,6	18.093	3,55	3,00	144	**0,75**	114	61	7	**476**

REMARK SFP might generate a problem! If SFP is limited, a better HR could not be used!
If a better HRS will be used, we have to consider a higher HR pressuredrop and that will cause to high SFP´s !!!!

Therefore the HRS MUST be selected by EN 13053 by my point of view.

Even here you will see, that the pressure losses in smaller units are much higher than in bigger units.

From that point of view we will have 2 problems:

1. We have to solve the fact, that velocity in the unit and velocity in the component is totally different.

2. We have to avoid the situation, that a better HRS will not be possible by exceeding the SFP Limit

Based on these facts I would suggest to keep:
- the velocity inside of the unit as a limit requirement
- the min. efficiency of the fan unit as a min. requirement
- the energy efficiency of the HRS acc. to EN 13053 based on thermal efficiency and pressure losses
- to force the manufacturers to give the SFP values acc. En 13779 as a mandatory value

5. General aspects

EVIA still highlights the following aspets:

- Minimum requirements of acoustics in NRVU do not make sense > shift to the product information
- Minimum acoustic requirements (case radiation) to stringent. In analogy to LOT 10 AC 60dB(A) might be suitable