

Summary of consultation returns for the Stakeholder consultation on possible Ecodesign Requirements for DG ENTR Lot 1 Professional Refrigeration: High temperature industrial process Chillers

Summary

- 13 responses: seven from manufacturers; 4 national authorities; two consultants. 3 from France, 2 Finland and one each from: Belgium, Denmark, Germany, Italy, Netherlands, Norway, Sweden, UK.
- For air cooled HT chillers: Good or very good agreement with the estimated market average EER, best available EER and market average ESEER figures, except for the small segment ESEER which was thought too high.
- For watercooled HT chillers: fairly good agreement with estimated market average EER (suggestion that they should be slightly lower); balance of views disagreed with best available EER (4Yes vs. 5No; one suggested that it should be lower than stated); and balance supporting assumed typical ESEER estimates (5Y vs 2No; suggestion from one expert respondent that these should be higher than stated).
- Six respondents agreed that the SEPR method is acceptable and five stated that it is not. Objections included: BIN method is too complicated; it should take into account different climate zones across Europe (particularly inappropriate for Nordic area); air and water temperatures used for the point at 80% load are too low; operation at rating point D requires head pressure control.
- One respondent requested to have an information requirement for EER as well.
- Statistical average estimate for the proportion of market removed by Tier 1 was 40%; and 60% for Tier 2. (in line with design). One smaller manufacturer (Climaveneta) estimated that Tier 1 would remove 70% of their products from the market and Tier 2 would remove 90%. One large manufacturer suggested that the SEPR requirement at Tier 2 is too ambitious for watercooled chillers above 1000 kW and a figure of 8.5 (instead of 9.0) would be more appropriate.
- Four respondents who expressed a preference did not know of any segments or regions that would be harder hit than others. Others pointed out Scandinavia due to different weather conditions, excessive requirements for large watercooled chillers and impact on partial load systems such as for supermarkets and ice rinks. One quoted that data centre applications (cited as “the main application of high-temperature chillers”) involve partial load operation and so do not fit the SEPR profile. One suggested that traditional technologies (scroll, screw compressor types) would suffer most.
- 9 /11 respondents answering agreed that the regulation would place market focus on better performing products; 9/11 believed it would encourage investment in product development and innovation; 9 of 10 providing an answer agreed that there would continue to be an adequate supply of products that meet the requirements, one emphasising that costs would rise.
- The following flaws in the rationale were suggested: possibility of two different requirements for the same chiller depending on the application where it is used; one suggested that heat recovery should feature in the requirements; two respondents questioned whether the differences in annual hours between air conditioning and industrial applications are in reality as extreme as suggested (600 hours per year versus 7500 hours per year) and that southern Europe air-conditioners are used far more than that; not all industrial chillers are used so heavily.
- One suggested that SME manufacturers would “suffer extreme regulatory burden”.
- One respondent was insistent that the regulation should include evaporative condenser use. If not, it was suggested that cheap chillers would be used coupled with evaporative units.
- 8/11 respondents said that the suggested approach to product definition was not workable (i.e. based on primary intended application, qualified with specific definitions). The basis for this disagreement varied:

one felt that highly efficient industrial chillers would not be able to meet the air conditioning requirements and products would have to divert; two because the same chillers are today sold for both purposes and problems might follow having two regulations for similar products; one suggested there is no realistic way to control which product is used for which purpose; one major manufacturer did not agree with the need to set different requirements for air conditioning and processor locations (citing that a unit with good SEER would perform well for both applications); one suggested it would be a challenge to avoid air-conditioning chiller is being installed process clearly if the price difference was too big; another suggested that the two products types are not technically different; another believed this could present challenges for market surveillance and criteria must be very specific with documentation specified in regulation. One questioned whether indirect systems were included or not. One expert (GEA) queried the temperature ranges as currently defined - **to be followed up by discussion**.

- One felt that the regulation should give an incentive for products that use low GWP refrigerants
- Regarding how the products should be grouped between the regulations: respondents were highly divided. There was almost equal support for grouping high-temperature process chillers with air conditioning chillers under the same regulation compared with grouping high, medium and low temperature chillers together under a regulation separate to air conditioners. Slightly less support for all types of chiller in the same regulation.
- Regarding impacts on profitability: 4 out of 11 suggested there would be none, seven replied yes and suggestions included: impact on SMEs, higher cost units that nobody is interested to pay for; no real advantage for end users who are only interested in investment cost; one manufacturer was not sure to be able to pass the cost increase on to end users in all European markets; another is concerned about the high proportion of products that would be banned. One described it as a 'win-win' situation with lower life-cycle costs for end users and manufacturers selling more expensive equipment. One felt that the impact would be more on product development with manufacturers developing products with excellent SEPR that would not be optimum for specific industrial applications.
- One respondent focused only on waste and recycling implications of the products, including suggesting the need for design for disassembly and use of basic plastics and metal combination suitable for recycling.
- Significantly, one smaller manufacturer (Climaveneta) felt that the SEPR requirements are too high and would exclude 90% of production for many of that nation's chiller manufacturers. This was investigated in a follow-up telephone conference call on 25 March 2013 – see separate notes. The respondent suggested alternative SEPR requirements (table included herein).

Introduction to Questionnaire

This questionnaire on Ecodesign of Refrigeration Process Chillers enables stakeholders to comment on proposals and provide evidence that will assist the commission in preparing for an envisaged future regulation.

See also the following documents:

- Annex 1: Transitional Method For Determination Of The SEPR (Seasonal Energy Performance Ratio) For Chillers Used For Refrigeration And Industrial Applications, Draft of 20 December 2012 (PDF document)
- Annex 2: SEPR calculation spreadsheet tool for Process chillers (Excel spreadsheet, Version 1.5 dated 7 January 2013)
- Annex 3: Summary of supporting evidence (background on product data analysis and justification for thresholds, PDF document)

13 Respondents: 7 manf; 3 national authorities; 3 consultants

All comments transferred from submitted documents to this document by J Tait 21st March 2013.

First name	Surname	Organisation	Type	Country
Lore	Mariën	OVAM, the public Waste Agency of Flanders	NA	BE
Dieter	Mosemann	GEA Group	MF	DE
Per Henrik	Pedersen	Danish Technological Institute	NA	DK
Mika	Kapanen	Technetium (consultant helping SMEs in all regulatory affairs, but also independent technical adviser in refrigeration, includes answers from few Finnish SME chiller manufacturers)	CO	FI
Vesa	Tamminen	Pemco Oy, Finland	MF	FI
Denis	Simonin	Trane	MF	FR
Paul	DE LARMINAT	Johnson Controls	MF	FR
Pierre	Crevat	CARRIER Building Systems Services	MF	FR
Sormani	Giancarlo	Climaveneta (initial comments 19 March; questionnaire sent in 3 April 2013)	MF	IT
Veerle	Beelaerts	McQuay / Daikin Europe N.V.	MF	NL
Hans	Haukaas	HANS T. HAUKÅS AS on behalf of Norwegian Water Resources and Energy Directorate	NA	NO
Anna	Carlén	Energy Efficiency Department Swedish Energy Agency	NA	SE
Grahame	Keeping	BJA Ltd	CO	UK

13 Respondents:

- 7 manf
- 4 national authorities
- 2 consultants

3 France; 2 Finland. One from each of: Belgium, Denmark, Germany, Italy, Netherlands, Norway, Sweden and UK.

1. In order to estimate the energy savings that could be achieved through regulation, it is necessary to estimate the **efficiency of typical products on the market today**. The table below shows current estimates. Efficiency is only widely known in terms of ESEER at this time, until SEPR is properly established. ESEER is defined as the European Seasonal Energy Efficiency Ratio, according to Eurovent definition.

AIR COOLED CHILLERS

Temperature range	Capacity range, kW	Assumed Market average capacity for that range, kW	Typical (market average) EER	I agree with typical EER (Y/N/DK)	Best available EER today on the market*	I agree with best available EER (Y/N/DK)	Typical (market average) ESEER	I agree with typical ESEER (Y/N/DK)
High	<100 kW	40	2,7	8Y/ 0N/ 4 DK	3,4	7Y/ 0N/ 5 DK	3,8	3Y/ 3N/ 6 DK ,Lower value' SEER: 3,5
	>100 & <400 kW	250	2,7	10Y/ 0N/ 2 DK	3,5	8Y/ 1N/ 3 DK <3.5	3,8	8Y/ 0N/ 4 DK SEER: 3,5
	>400 kW	1000	2,9	9Y/ 1N/ 2 DK	3,4	8Y/ 1N/ 3 DK <3.4	3,9	8Y/ 0N/ 4 DK SEER: 3,6

*With best available technology, irrespective of price.

DTI DK: For ESEER both AC and WC: The fact is that very limited figures are available for ESEER (and even for EER for natural refrigerants since most data are for other conditions

Technitium: Typical (market average values) sounds reasonable, but best available EER might be a little bit higher, closer 4 than 3. Our customers do not follow ESEER (hence "don't know).

Carrier: Indicated EER are valid for standard units. In real life most chillers have factory installed options, ie: coil corrosion protection, low sound, evaporator with less water passes...etc which impact negatively energy efficiency by a few %.

Y/N/DK = Yes / No / Don't Know

WATER COOLED CHILLERS

Temperature range	Capacity range, kW	Assumed Market average capacity for that range, kW	Typical (market average) EER	I agree with typical EER (Y/N/DK)	Best available EER today on the market*	I agree with best available EER (Y/N/DK)	Typical (market average) ESEER	I agree with typical ESEER (Y/N/DK)
High	<400 kW	250	4,4	9Y/ 1N/ 2 DK <4,4 Y but a bit high	5,6	4Y/ 5N/ 3 DK <5,6	5,4	5Y/ 2N/ 4 DK >5,4 SEER: 5,1
	>400 & <1000 kW	750	4,8	9Y/ 1N/ 2 DK <4,8 Y but a bit high	5,9	4Y/ 5N/ 3 DK <5,9	5,4	5Y/ 2N/ 4 DK >5,4 SEER: 5,1
	>1000 kW	1600	4,9	9Y/ 1N/ 2 DK <4,9 Y but a bit high	6,3	4Y/ 5N/ 3 DK <6,3	5,7	5Y/ 2N/ 4 DK >5,7 SEER: 5,4

Y/N/DK = Yes / No / Don't Know

McQuay/Daikin: Had marked Yes to Typ average ESEER (except No to AC <100kW) but also suggested values for SEER (rather than ESEER).

Technitium: Also as in air cooled chillers: Typical (market average values) sounds reasonable, but **best available EER might be a little bit higher, about 6,0 in <400 kW class**. Our customers do not follow ESEER (hence "don't know").

Haukas Norway: Note for all WC EER 'best available' answers (was Y to all): There is probably an effect of capacity within the ranges, with the **figures the most representative for the upper range ends**.

Climaveneta: [JT: Climaveneta reply was added to stats in tables above following submission of questionnaire 4Apr2013] In our opinion the **new limits for HT profile are too high**, and according actual chiller production it means to exclude in some case 90% of actual production for us and many of the chiller italian manufacturers, so we propose the following table [JT: see comments on other topics at end of document]:

BJA: For WC EER and ESEER: "**Figures high (when tested in the field)**"

Carrier: We consider that **Tier 2 SEPR is too ambitious for water cooled chillers > 1000 kW**. The proposed **SEPR is difficult to achieve without variable frequency drive on the compressor**, but this technology is not available with high power voltage (11 kV) which is often used for large chillers with centrifugal compressor. **Suggest 8.5 SEPR > 1000 kW [proposed figure is 9.0]**

2. Please have a look at **Annex 1 explaining the SEPR calculation method**. The method is for use by manufacturers to provide comparable information on the energy performance of all chillers placed on the EU market. Therefore, it has to be based on "standardised" use pattern and load profile. Do you agree that the proposed SEPR calculation method is acceptable to assess the energy performance of high temperature chillers over the year?

6 Yes

5 No (Please state why and what improvements you suggest):

GEA: **BIN method is too complicated**; IPLV (ARI 550) and ESEER (EUROVENT) calculation follows the principle "keep it simple": 4 efficiency related data (EER) are combined with running time factors by simple multiplication and then summation; similar proposed by prEN 14825, edition December 2009; similar used by German VDMA for seasonal efficiency evaluation for refrigeration plants.

DTI DK: One Danish manufacturer has expressed a **wish to also inform about EER**, because this is known by customers

Technitium: There are pros and cons for such a standardized methods.
Pro: it is a standardized method, and every manufacturer shall follow it.
Con: it **does not take into an account different climate zones over Europe**, and that is why it does not tell anything about real situation performance (to the customer). This has an effect specially during summertime in Southern Europe and during winter time in Northern Europe. **This could be easily improved, if e.g. three different climate is used like in air conditioning units** (regulation EU 206/2012).

Pemco Oy: Temperature range for Nordic area must be different. Calculating points for high temp chillers should be for air cooled 0,10,20,30C and water cooled 4,11,18,25
Same for table 7

Trane: The air and water temperatures used for the point at 80% load are too low in regard of the minimum thresholds set in the control logic of most air cooled and water cooled chillers

Carrier: Head pressure control is required to operate chiller at condition D. For water cooled chiller a field installed valve or VFD pump is required to control condensing temperature (some chillers can supply an analog signal to control the valve/pump)

McQuay/Daikin: see attachment with detailed comments.

3. The proposed requirements will result in products with lower SEPR being removed from the market. The available evidence suggests that Tier 1 would remove around one third of 2012 products from the market; Tier 2 is more stringent and evidence implies that it would remove around two thirds of 2012 products from the market (but less than that proportion of larger water cooled products).

a) In your view, what share (in %) of all process chillers **CURRENTLY SOLD** on the EU market **would fail to meet the Tier 1 SEPR requirements?**

0%-10% 11%-20% 5 21%-40% 2 41%-60% 1 61%-80% Over 81%
Statistical average is 40%

3 Don't Know

b) In your view, what share (in %) of all process chillers **CURRENTLY SOLD** on the EU market **would fail to meet the Tier 2 SEPR requirements?**

0%-10% 11%-20% 21%-40% 3 41%-60% 3 61%-80% 1 Over 81%
Statistical average is 60%

Pemco Oy marked Tier 2 as 11%-20% - error of understanding.

3 Don't Know

[JT 4/4/13: Climaveneta reply confirmed as 90% of products removed by Tier 2; 70% for Tier 1]

McQuay/Daikin: we do not answer for reasons given to question 2

(repeated from earlier qu by jt:) Carrier: We consider that Tier 2 SEPR is too ambitious for water cooled chillers > 1000 kW. The proposed SEPR is difficult to achieve without variable frequency drive on the compressor, but this technology is not available with high power voltage (11 kV) which is often used for large chillers with centrifugal compressor. Suggest 8.5 SEPR > 1000 kW [proposed figure is 9.0]

4. In your view, will the requirements affect any sub-segments of the market, or any geographical region much harder than others? (For example any specific type of product, any specific cooling capacity range, disproportionately affect industry in any particular region of Europe). If so, please state which and why.

Pemco Oy: In Scandinavia the temperature ranges are different and weather requirements very different

Carrier: See Carrier's comment on centrifugal chillers [which was: *We consider that Tier 2 SEPR is too ambitious for water cooled chillers > 1000 kW. The proposed SEPR is difficult to achieve without variable frequency drive on the compressor, but this technology is not available with high power voltage (11 kV) which is often used for large chillers with centrifugal compressor. Suggest 8.5 SEPR > 1000 kW*]

1 No answer

4 No

1 Don't know

Technitium: Please, look at the question 2. [which was: **does not take into an account different climate zones over Europe**]

Sweden: Depending on scope it **could affect sub-segments of the market as systems used for supermarket refrigeration (designed for partial load) and products using low-GWP refrigerants** - see the attached document [JT: refers to Swedish comments submitted for impact assessment consultation in June 2012, resubmitted for this].

BJA: with legislation no: as long as works designed correctly.

Climaveneta: *Units with traditional technology (scroll and screw compressor) would suffer most*

5. Our preliminary assessment is for some positive and some negative impacts on competitiveness / profitability. Do you agree with each statement?

- i. Such a regulation will help ensure that poor performing chillers are less widely available for industrial applications and so **place market focus on better performing products**. If not, please indicate why

9 Yes 2 No 1 No answer

Climaveneta: See question n°3 (refers to high proportion of market removed from sale)_

- ii. The regulation will **encourage investment in product development** and innovation

9 Yes 2 No 1 No answer

- iii. There will **continue to be an adequate supply of products** that meet the requirements, although not at current price levels. If not, please indicate why

9 Yes 1 No 2 No answer

McQuay/Daikin: products will not be optimised on customer needs

Climaveneta: *Only products with high technology (i.e. centrifugal chillers) and high cost will exceed the requirements*

6. **Does this summary cover the main impacts of a possible regulation** for high temperature industrial process chillers? If there are other important impacts to consider, please mention them here. Indicate which parts of the market are affected and how important the additional impacts are:

6 No Answer

Technitium: There are chillers that are used for both high and (middle or) low temperature applications; hence **there will be two different requirements for one single chiller**, depending on an application where it will be used. These **chillers are manufactured by SMEs, and it will mean extreme regulatory burden for them.**

Pemco Oy: The heat recovery should be used more efficient with the systems. It is not enough to reduce the used power. The energy should be reused.

DTI DK: Yes. It should be mentioned that the duty time of AC and process chillers are not necessary that much different as mentioned in this questionnaire. AC chillers in Southern Europe is probably in duty much more than 600h/y_ Many process chillers are not necessary in duty 7500 h/y

McQuay/Daikin: note this does not cover the main impacts. Not representative of real process applications, differently from air conditioning (EN 14511 & BN14825)

Haukas (NO): Yes, but it is assumed that the average number of full load hours are less than 7500 h

BJA: must include evaporative condenser use. If not cheap chillers will continue to be used and coupled up to the evaporative units. Also with evaporative condenser a greater EER/SEPR should be achievable.

7. Product definitions: It is proposed that the manufacturers will have to declare, for each model of high temperature chiller which they sell in the EU, whether it is:

- a. Primarily intended for industrial process applications and so designed to operate all year round, or if it is
- b. Primarily intended for conventional cooling-season only air conditioning applications and so designed only to operate during ambient temperatures above [10°C - exact temperature to be confirmed].

This will determine whether the chiller has to meet the legal requirements applicable to industrial process applications (under the Regulation which is discussed here under DG ENTR Lot 1) or air conditioning applications (under a future Regulation, DG ENER Lot 6), or both. **Do you agree that this approach should be workable?**
3 Yes 8 No 1 No answer

GEA: Question isn't clear (chiller has to meet both /a.c. & process/ or a.c. or process have to meet own requirements.

Reasons, if no and any alternative suggestions:

GEA: High efficient Industrial process Chiller cannot meet both [JT: does this mean that and efficient HT process chiller will not be able to meet the aircon reqts?] / Load profile and pressure part load ratio differ too much, each have to meet own requirements in the future

DTI DK: Maybe, but the same chillers are today sold for both purposes. It might cause problems to have two different regulations for high temperature chillers, even if they are labeled for specific usage (AC or process cooling). It is however important to go on with the regulation, and ensure the process is not postponed.

Technitium: Chiller products = one regulation, independent of its application. Air conditioning and process chiller shall be combined into a one regulation. If there will be two different regulations, then there is a possibility that chiller could be under two regulations simultaneously, or does not fall under the scope of any of the regulations ("grey areas").

We would like to see that there is only one chiller regulation, where some basic requirements will be set to all chillers, and then there could be some application specific requirements.

Pemco Oy: All chillers should be considered under same regulations. There is no realistic ways to control which is used for industrial purposes and which for air conditioning.

Climaveneta: *We don't agree with this strict division because it's not defined an unique load profile for industrial application.*

Trane: Provided the "comfort" chillers can still be used in Industry if they meet SEPR targets

JCI: Some machines, especially water cooled, are intended for both types of applications. We might ask if a machine is designed to be suitable for both sets of conditions.

Carrier: *High temperature chillers are the same machine as air conditioning chillers with the exception of extra head pressure control (low ambient kit) for some air cooled chillers. We do not see the need to set different MEPS for air conditioning & process applications. A unit with a good SEER will also perform well for process applications.*

There is no standard chilled water conditions for process cooling, very often the customer will request partial load data at actual ambient & chilled water conditions to to predict energy consumption. This process is very frequent for Data Center which are the main application of high temperature chillers

McQuay/Daikin: especially for high-temperature chillers there is an overlapping between air conditioning and process applications:

- units are not technically differentiated
- possible discrepancy with Lot 6

Haukas (NO): In principle, we agree with the proposed approach. But it might be a challenge to avoid AC chillers being installed for process cooling if the price difference becomes too big

Sweden: This could create a loophole making it difficult to perform market surveillance and the effects of the regulation would be lost. The criteria must be very specific and wording like primarily will probably create problems. The manufacturer should also have to be able to show proof of why the product does not have to meet the requirements. The documents must be specified.

GEA:

Temperature ranges are not really logic, to be confirmed:

ii. 'Low operating temperature' means that the chillers is intended to function at an operating temperature between -25°C and -8°C with the reference point at -25°C

iii. 'Medium operating temperature' means that the chillers is intended to function at an operating temperature between -12°C and +3°C with the reference point at -8°C

iv. 'High operating temperature' means that the chillers is intended to function at an operating temperature between +2°C and +15°C with the reference point at +7°C

Sweden: Has the scope changed to exclude indirect systems and chillers designed for partial load? It is stated in the document that one object of the regulation is to establish a distinction between chillers designed to operate for only part of the year at *partial and variable* loading and chillers designed to operate at *high loading* for the whole year. Also the definition of high-temperature industrial process chiller does not include remote refrigeration systems.

The scope should however be made clear about this and attention must be given to avoid loopholes.

Please find the Swedish comments in the document sent along with this questionnaire [JT: this refers to

the Swedish delegate comments submitted in July 2012 for the first impact assessment consultation: Key points include regarding concerns about how the regulation would affect supermarket cooling systems, ice rinks and similar process chillers with variation of load and demand; indirect cooling (as a means to use less refrigerant); refrigerant losses]

It is unfortunate that the calculation does not give any incentives for products that use low-GWP refrigerants.

8. Please indicate any issues that you believe need to be taken into account relating to how industrial process chillers and air-conditioning chillers **should be grouped for regulation**. Options for regulation include:

3+ a) grouping high-temperature industrial process chillers with air conditioning chillers and low/medium temperature chillers under a separate regulation (i.e. putting chillers with similar operating temperature ranges under the same regulation);
3 b) grouping high-temperature industrial process chillers with low and medium temperature process chillers, and air conditioning chillers under a separate regulation;
2+ c) grouping all industrial process chillers with air conditioning chillers under the same regulation

1 No Answer

Equal preference to group HT process chillers with air conditioning chillers, vs grouping HT with MT and LT.

GEA: preference for b

DYI DK: DK has argued for a) because the same chillers are sold for both purposes

Technitium: We prefer solution c) (Please, look at also question 6)

Pemco Oy: I propose a)

Trane: High and Medium Temp Industry chillers should be grouped in the same regulation as Comfort chillers

Carrier: Low & medium (?JT: Does this mean 'group with Low and Medium'?)

McQuay/Daikin: it is hard to separate process chillers for reasons in answer 2

Haukas (NO): Option b) is the most logical choice due to the differences in requirements for HT process chillers and AC chillers. Option a) (which Norway supported in May last year) should be chosen if the requirements for the two groups are coordinated to some degree (which there may be practical reasons for).

BJA: option c) - all as one otherwise processed chillers will be rebadged as air conditioning chillers.

Climaveneta: We chose option b

9. Do you foresee any significant **impact(s) on the profitability** of this sector resulting from the proposed requirements?

4 No

7 Yes, and the main ones are: _____

1 No answer.

GEA: see point 7, a.c and process chiller each have to meet own requirements in the future which influences product development and influences both prices and costs.

Technitium: - especially for SMEs the cost of proving conformity to the regulation(s), will be high.

Pemco Oy: It will lead to more expensive units which nobody is interested to pay for. There is no real advantage for the end user. They are mainly looking only for investment cost.

Trane: All manufacturers will have to move to more costly technology to meet SEPR requirements, not sure to be able to completely pass this cost increase on all european markets

JCI: Win-win situation. Manufacturers may sell more expensive equipment for higher energy efficiency. Users will still be winning because of lower life cycle cost.

McQuay / Daikin: the impact will be, more than on profitability, on the product development (see answer 2) [JT: which emphasises there are different load profiles in reality for industrial applications, so optimum chiller will not be picked].

BJA: No, as long as legislation in place and policed.

Climaveneta: see question n°3 (refers to high proportion of products to be removed from market)

Comments received on other topics:

1. OVAM, the public Waste Agency of Flanders, wants to focus on the material-use and the waste phase of the products.

It is important that the products are dismantled at the end of their lifetime, to re-use the materials (resource efficiency). Disassembly is only possible if the product is designed for it.

Some general requirements on design for disassembly are:

-connections:

- don't use any glues, except watersoluble
- use snapfits of synthetic material in stead of screws when making connections with different plastics

-identify the plastics

-use magnetic metals

-plastics: use basic plastics like PP, PE, PS and ABS because of their recyclability

- use plastics with different density: it is of import because plastics with different desity can be dissassembled easy
- in PP: please keep the use of material to fill up (like talcum powder) under the 20 %
- don't add natural fibres, it disturbs the recycling process
- don't use multi-layered plastics: the composition of different kinds of plastics leads to less/no recycling
- use biobased plastics: they can be recycled together with petroleumbased plastics
- use recyclates

-use metal combinations that are compatible with the recyclingprocess

Climaveneta:

In our opinion the new limits for HT profile are too high, and according actual chiller production it means to exclude in some case 90% of actual production for us and many of the chiller italian manufacturers, so we propose the following table:

Table 1 – Minimum requirements to be met by *air-cooled* process chillers. Medium and low temperature requirements included for reference only.

Operating temperature	Cooling capacity At +35°C ambient	Minimum SEPR	
		Tier 1	Tier 2
High	<400 kW	3.2	3.5
	>400 kW	3.6	4.1
Medium	<300 kW	2,24	2,58
	>300 kW	2,80	3,22
Low	<200 kW	1,48	1,70
	>200 kW	1,60	1,84

Table 2 – Minimum requirements to be met by *water-cooled* process chillers

Operating temperature	Cooling capacity At +30°C cooling	Minimum SEPR	
		Tier 1	Tier 2
High	<400 kW	5.0	5.5
	>400 & <1000 kW	5.5	6
	>1000 kW	5.5	6
Medium	<300 kW	2,86	3,29
	>300 kW	3,80	4,37
Low	<200 kW	1,82	2,09
	>200 kW	2,10	2,42

McQuay/Carrier supporting paper (quoted in full):

for air conditioning chillers (Lot 6) the seasonal efficiency is currently measured through the ESEER and in the future through the SEER according to EN 14511 and 14825.

In both cases the assumed load profile and working conditions for ESEER/SEER representative of the real air-conditioning applications required by customers, I mean that the conditions we consider are quite close to the most of real applications. In other words customers look at the ESEER or SEER and they get a reliable indication of the machine performance for their application: the specific unit selection provides then the exact efficiency.

All the above is not true for process chillers and below I tried to explain why.

Process chillers, even if we limit the attention to high-temperature process chillers, can work in a wide range of temperatures (from 2 to 15°C) but there is not a typical or more frequent temperature, differently from air conditioning. It is very hard to standardise the occasions and define reference load profile and working conditions.

The proposal from the commission includes a load profile but it can be very far from the reality.

We have performed some simulations and it happens that units that from our experience are the best for process applications can be very penalised from the proposed calculation method and MEPS.

The risks are the following:

1. Units will be on the market or not, based on the SEPR but this does not say how good is the efficiency for approval process applications.
2. Customers will buy a unit with very good SEPR but that in the reality will not allow the best efficiency and low consumption which is the main target within the spirit of eco-design.
3. The regulation as it is not drive the product development in the right direction: manufacturers will indeed design units featuring fantastic SEPR but not optimised for the real process applications.
4. There is a negative discrepancy with Lot 6: there could be the case of chillers with SEER above the lot 6 MEPS, kept on the market, while the SEPR will be lower than the MEPS and out of market even if the product is good for process.

Cover emails from those who submitted comments

On 19 Mar 2013, at 09:41, Hans T. Haukaas <hthaukas@online.no> wrote:

Dear Jeremy,

Please find enclosed the filled in questionnaire with Norwegian comments regarding high temperature industrial process chillers. I apologise for (again) being one day late.

Best regards,

Hans T. Haukås

Consulting Engineer Refrigeration

HANS T. HAUKÅS AS

Lingavegen 225

N-5630 Strandebarne

Tel.: +47 56559225

Fax: +47 56559402

Mob.: +47 95759112

e-mail: hthaukas@online.no

From: beelaerts.v@daikineurope.com

Subject: Re: Reminder: Re: Consultation on eco-design requirements for high temperature industrial process chillers (DG ENTR Lot 1)

Date: 18 March 2013 13:48:02 GMT

To: jeremy@taitconsulting.co.uk

Cc: baert.e@daikineurope.com, e.pellis@mcquay.it, Laure Baillargeon <Laure.BAILLARGEON@ec.europa.eu>, Ugo Miretti <Ugo.MIRETTI@ec.europa.eu>

Dear Jeremy,

In attachment you can find Daikin/McQuay's contribution to the questionnaire.

Our main concern is that the SEPR for the HT chillers does not approximate a real life situation, this could lead to the wrong choice of chiller. For more details, please, see the attached document.

Kind regards,

Veerle

Veerle Beelaerts Daikin Europe nv Environment Readiness Section <mailto:beelaerts.v@daikineurope.com> direct: +32 59 55 46 98

On 18 Mar 2013, at 11:57, "Simonin, Denis" <Denis_Simonin@trane.com> wrote:

Jeremy

Find attached Trane's inputs and comments

Best Regards

Denis SIMONIN

Water Cooled Chillers Portfolio Leader

TRANE EMEA

Climate Solutions IR

Office: +33 (0)3 29 31 73 10

Mobile: +33 (0)6 07 45 37 19

E-mail : Denis_Simonin@irco.com

Société Trane SAS

Route de Chamagne

F-88130 CHARMES

On 18 Mar 2013, at 16:49, "CREVAT, Pierre CCS" <Pierre.CREVAT@carrier.utc.com> wrote:

Dear Sir

Please find attached the position of our company regarding the proposed implementing measures for high temperature process chillers

Please note that all data shall be treated confidentially and neutralized in a common position paper

Best regards

Pierre CREVAT

CARRIER Building Systems Services

Phone: + 33 4 72 25 21 01

Mobile: + 33 6 07 18 06 64

Email: pierre.crevat@carrier.utc.com

On 18 Mar 2013, at 15:44, Anna Carlén <anna.carlen@energimyndigheten.se> wrote:

Dear Sir, Madam

Please find the questionnaire and appendix to the questionnaire attached to this e-mail regarding stakeholder consultation on possible minimum performance requirements for high temperature industrial process chillers.

Best regards,

Anna Carlén

Anna Carlén

Energy Efficiency Department

Swedish Energy Agency

Tel. +46 (0)16 544 21 61

www.swedishenergyagency.se

On 18 Mar 2013, at 13:41, Per Henrik Pedersen <prp@teknologisk.dk> wrote:

Dear Jeremy,

Enclosed you will find the answer from Denmark. The comments are written with red text. If you have any questions related to the answers, please come back to me.

Best regards

Per Henrik Pedersen

Center for Refrigeration and Heat Pump Technology

Danish Technological Institute

DK-2630 Taastrup

Phone: +45 72 20 25 13

e-mail: prp@dti.dk

On 18 Mar 2013, at 06:56, Paul.DeLarminat@jci.com wrote:

Dear Jeremy,

Please find attached our Johnson Controls answer to the consultation.

Best regards.

Dr Paul de Larminat

Director of Advanced Technologies

Chiller Solutions

Building Efficiency

Tel: +33 (0) 2 40 30 62 18

E-mail: Paul.DeLarminat@jci.com

Internet: www.johnsoncontrols.fr

On 17 Mar 2013, at 16:34, Mika Kapanen <Mika.Kapanen@technetium.fi> wrote:

Dear, Jeremy,

Please, find here as attached file comments and **answers from few Finnish SME chiller manufacturers that I have collected during this winter time.**

best regards,

Mika

Mika Kapanen

Technetium Consulting Oy

phone +358 20 7619 828

mobile +358 400 48 68 55

email mika.kapanen@technetium.fi

www.technetium.fi

On 18 Mar 2013, at 09:29, Grahame Keeping <Grahame.Keeping@bjacool.co.uk> wrote:

Good morning Jeremy,

please received filled in comments reference the above. **Please note comments regarding evaporative condensers. What is the rational about excluding chillers coupled to these?**

Many thanks,

Grahame Keeping

BJA Ltd,

07870495289

On 12 Mar 2013, at 09:11, Vesa Tamminen <Vesa.Tamminen@pemco.fi> wrote:

Hello,

Please find attached some comments on the questionnaire.

Best regards

Mr. Vesa Tamminen

CEO

Pemco Oy, Finland

Tel. +358 3 887 410

Mob: +358 400 495 485

www.pemco.fi

On 5 Mar 2013, at 10:05, Lore Mariën <lmarien@ovam.be> wrote:

Dear,

OVAM, the public Waste Agency of Flanders, wants to focus on the material-use and the wastefase of the products.

It is important that the products are dismantled at the end of their lifetime, to re-use the materials (resource efficiency). Disassembly is only possible if the product is designed for it.

Some general requirements on design for disassembly are:

-connections:

- don't use any glues, except watersoluble
- use snapfits of synthetic material in stead of screws when making connections with different plastics
-

-identify the plastics

-use magnetic metals

- plastics: use basic plastics like PP, PE, PS and ABS because of their recyclability
- use plastics with different density: it is of import because plastics with different density can be disassembled easy
- in PP: please keep the use of material to fill up (like talcum powder) under the 20 %
- don't add natural fibres, it disturbs the recycling process
-
- don't use multi-layered plastics: the composition of different kinds of plastics leads to less/no recycling
- use biobased plastics: they can be recycled together with petroleumbased plastics
- use recyclates

-use metalcombinations that are compatible with the recyclingprocess

Don't hesitate to contact me if you have any questions about this topic

Kind regards,

Lore Mariën

European and international policy team

Policy Innovation Service

Waste and Materials Management Department

OVAM Public Waste Agency of Flanders

Stationsstraat 110 | B-2800 Mechelen | BELGIUM

T +32 15 284 504 | F +32 15 413 072

E lore.marien@ovam.be | www.ovam.be

From: "Mosemann, Dieter (Extern)" <dieter.mosemann@gea.com>

Subject: Questionnaire HT-Chillers

Date: 19 March 2013 17:57:23 GMT

To: "ecodesign@taitconsulting.co.uk" <ecodesign@taitconsulting.co.uk>

Dear Jeremy,

Attached you find please wanted information.

Advices: Answers in purple, wanted changes in red.

Temperature ranges are not really logic, to be confirmed:

ii. 'Low operating temperature' means that the chillers is intended to function at an operating temperature between -25°C and -8°C with the reference point at -25°C

iii. 'Medium operating temperature' means that the chillers is intended to function at an operating temperature between -12°C and +3°C with the reference point at -8°C

iv. 'High operating temperature' means that the chillers is intended to function at an operating temperature between +2°C and +15°C with the reference point at +7°C

With kind regards

Dieter Mosemann

GEA Refrigeration Germany GmbH

On 19 Mar 2013, at 16:23, giancarlo.sormani@climaveneta.it wrote:

Starting message to Mr Jeremi Tait:

Dear Mr Tait,

as regards the attached consultation document for HT Process Chillers I'd like to submit you my comments.

In the following table you can find the new limits compared to previous values (see red values).

In our opinion the new limits for HT profile are too high, and according actual chiller production it means to exclude in some case 90% of actual production for us and many of the chiller italian manufacturers, so we propose the

following table:

Many thanks,

best regards

Sormani Giancarlo

Technical Manager Climaveneta SPA