



## D3.4 – Activity report of the European Product lists underlining the evolution of the products on the market (Year 1)

Picture 1: Product list on Topten.eu

Brand & Model	Energy	Technical Data	Cost (€)
Styliet Lyra	Energy (kWh/year): 1,6 Efficiency index: 1,00 Standby mode (W): 0,00	Noise level (dB): 35	Electricity in 15 years: €5
Sonnenkönig TENERO	Energy (kWh/year): 4,0 Efficiency index: 0,51 Standby mode (W): 0,12	Noise level (dB): 49	Electricity in 15 years: €12
Sonnenkönig DOLMEN 3	Energy (kWh/year): 5,2 Efficiency index: 0,47 Standby mode (W): 0,47	Noise level (dB): 58	Electricity in 15 years: €16
AEG VL 5528	Energy (kWh/year): 5,6 Efficiency index: 0,90	Noise level (dB): 54	Electricity in 15 years: €17

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HACKS coordinator: ADEME – [www.ademe.fr](http://www.ademe.fr)

European portal [www.topten.eu/hacks](http://www.topten.eu/hacks)

Project partners and websites

Austria, AEA  
[www.topprodukte.at](http://www.topprodukte.at)

Belgium, GoodPlanet  
[www.topten.be](http://www.topten.be)

Czech Republic, SEVEN  
[www.uspornespotrebice.cz](http://www.uspornespotrebice.cz)

France, Guide Topten  
[www.guidetopten.fr](http://www.guidetopten.fr)

Germany, co2online  
[www.co2online.de](http://www.co2online.de)

Italy, Eliante  
[www.topten.it](http://www.topten.it)

Lithuania, LNCf  
[www.ecotopten.lt/](http://www.ecotopten.lt/)

Luxembourg, Oeko-Zenter  
[www.oekotopten.lu](http://www.oekotopten.lu)

Norway, Naturvernforbund  
[www.energismart.no/](http://www.energismart.no/)

Poland, FEWE [www.topten.info.pl](http://www.topten.info.pl)

Portugal, Quercus  
[www.topten.pt](http://www.topten.pt)

Spain, ECODES  
[www.eurotopten.es/](http://www.eurotopten.es/)

Sweden, SSNC  
[www.toptensverige.se](http://www.toptensverige.se)

Switzerland, Bush Energie  
[www.topten.ch](http://www.topten.ch)

UK, EST  
[www.toptenuk.org](http://www.toptenuk.org)

Politecnico di Milano  
[www.eerg.polimi.it](http://www.eerg.polimi.it)

## About HACKS

The objective of the Heating and Cooling Knowhow and Solutions (HACKS) project is to achieve market transformation for heating and cooling (HAC) appliances and improve comfort and health of European citizens.

Across the EU almost half of all buildings have individual boilers that were installed before 1992 with efficiency of 60% or less. The expected energy savings from a speedy replacement are immense.

To achieve this goal, 17 HACKS partners in 15 countries are working together, thanks to the financial support of the European Horizon 2020 programme.

After scanning market actors, current policies and most commonly used products in each country, starting from April 2020 the HACKS partners will implement involvement campaigns to raise awareness of the economic and environmental benefits brought by good HAC products and solutions:

- HACKS will motivate households equipped with old and inefficient devices – boilers, water heaters, air conditioners, certain types of boilers and stoves, etc. – to replace them with new super efficient equipment.
- In each country, partners will set-up dedicated on-line platforms to assist consumers in their purchasing process. The platforms will propose: tools to assess households' needs and provide customised information; best product lists with technical specifications; direct links to suppliers of most efficient products; and advice on how to use and maintain equipment.
- For those households who need to improve their situation because they feel too hot, too cold, or too humid but who cannot invest in new equipment or can avoid getting equipped, HACKS will propose simple and low costs solutions. It is possible to reduce energy consumption and energy bills while improving winter and summer comfort, air quality and health conditions through the installation of shading devices, thermostats, water saving taps and showerheads, etc.

Beyond households, HACKS will target all relevant stakeholders (“multipliers”) that participate in the decision-making process of consumers by setting up strategic partnerships to facilitate the purchase of energy efficient appliances. HACKS places a strong emphasis on installers but also retailers and consumer organisations because of their proximity to consumers, their capacity to involve them and bring them guidance on energy efficient equipment.

More information on the HACKS project can be found at [www.topten.eu/hacks](http://www.topten.eu/hacks)



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## Executive summary

The intention of the yearly activity report is to describe and analyse the development of HAC product lists of most energy efficient models available on national Topten websites. The primary objective is to showcase mayor technical trends and developments on the market and to identify opportunities for a further tightening of selection criteria.

This document covers the status and development of the following eight product lists on Topten.eu:

- solid fuel boilers
- local space heaters
- heat pump water heaters
- heat pumps
- air conditioners
- comfort fans
- taps and shower heads
- circulation pumps

It does not include the development of national lists with different selection criteria or different product categories. All covered product lists are publicly available on [www.topten.eu](http://www.topten.eu).

For each category, a description of data availability and background information are given. For categories that have already been updated, the evolution of BAT products on the lists is presented and interpreted.

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## 1 Intro

Task 3.2 covers the identification of the best available technologies (BAT) for the heating and cooling (HAC) categories covered in the criteria papers (D3.2). The presentation of the respective products is especially important as for the most part, consumers are not specialists in the topic and can get easily overwhelmed by the different technical solutions available and the terminology used in this sector.

In a first step, criteria papers have been compiled in early stage of the project, highlighting the maximum energy savings and comfort improvements for the different product groups as well as outlining ways to differentiate between efficient and less efficient products. They also include a technical explanation of the technology, an overview of policy measures, standards and labels, an FAQ and a market analysis.

The product lists are based on ambitious selection criteria, creating a shortcut for consumers in identifying and finding the best products amongst the hundreds of products available on the market. Manufacturers or associations were contacted in order to obtain as comprehensive data sets as possible. Additional data was gathered from online platforms and websites as well as product catalogues. An overview of the BAT products for Europe are presented on Topten.eu. By the end of April 2020, 8 product lists with HAC products were publicly available on [www.topten.eu](http://www.topten.eu). The following chapters reflect the data availability as well as the quantity and quality of products on Topten for each category. Where product updates have already taken place – comfort fans, air conditioners and heat pumps – a development of the BAT products on the market will be analysed.

This analysis will be repeated in one year and at the end of the project in two years to assess the market evolution.

## 2 Solid Fuel Boilers

Solid fuel boilers were added to Topten.eu in March 2020. Though covered by EU regulation – energy labels are mandatory since September 2019 and product fiches since 2017 – product information for this category is hard to come by, especially with regards to the product fiche which is available for less than half the products displayed online or in catalogues even though it is legally mandatory. As Topten selection criteria for this category cover emission rates as well as energy efficiency, gathering sufficient data to determine compliance or non-compliance with the criteria is challenging.

The largest data set was made available through the Austrian HACKS partner who have long standing contacts with relevant dealers and installers. Supplementing data was researched in catalogues and on manufacturer and installer websites.

*Table 1: Numbers of BAT products for solid fuel boilers listed on Topten.eu in August 2020*

Fuel type	A++	A+	Total
Logwood	-	3	3
Pellets	5	15	20
<b>Total</b>	5	18	23

*Source: Topten.eu*

The product list contains 23 products from 10 manufacturers. The manufacturers are: Bösch, ETA, Fröling, Hargassner, Herz Energietechnik GmbH, Hoval, KWB, Strebel-Thermostrom, Viessmann, ÖkoFEN.

### 3 Local Space Heaters

Local space heaters were added to Topten.eu in February 2020. They are covered by EU regulation: energy labels are mandatory since 2018, product fiches will become mandatory in 2022. As Topten selection criteria for this category cover emission rates as well as energy efficiency and emission values will only become mandatory with the product fiches in 2022, gathering sufficient data to determine compliance or non-compliance with the criteria is highly challenging.

Declaration and minimum efficiency requirements for emission values exist on a national level in several countries. While in Switzerland only two of the four emission values that are part of the Topten selection criteria are mandatory, the declaration of all four is mandatory in Austria and Italy. As such, the largest data set of product data was made available through the Austrian HACKS partner. Supplementing data was researched in catalogues and on manufacturer and installer websites. Hardly any emission data is available online.

In addition to national declaration requirements, minimum efficiency requirements also differ greatly between countries. National HACKS partners may adjust the selection criteria to fit their market and select products accordingly.

Table 2: Numbers of BAT products for local space heaters listed on Topten.eu in August 2020

Fuel type	A++	A+	Total
Logwood	-	2	2
Pellets	3	3	6
<b>Total</b>	3	5	8

Source: Topten.eu

The product list contains 8 products from 3 manufacturers. The manufacturers are: Haas+Sohn, RIKA, Windhager.

### 4 Heat Pump Water Heaters

Heat pump water heaters were updated on Topten.eu in April 2020 with selection criteria based on the efficiency index  $\eta$ . As few products displayed sufficient product data online to determine efficiency even though both the energy class and the  $\eta$ -value have been mandatory since 2018, a survey was initiated to cover manufacturers.

The online research resulted in 86 products from 28 brand names (some of them retailer brand names). Of those 86 products found online, only 6 products had complete product information available online; three more contained information on the  $\eta$ -average values; another 36 products declared the products' energy class but no further relevant information; the rest of the products contained no efficiency information online. The following manufacturer survey resulted in complete product information for 37 products from 16 manufacturers that could be listed on Topten. Efforts to obtain product data from further manufacturers will be continued and the development detailed in the next activity report.

Table 3: Numbers of BAT products for heat pump water heaters listed on Topten.eu in August 2020

	Efficiency index				Total
	≥ 170	≥ 150	≥ 130	≥ 110	
Water heaters	1	9	14	13	<b>37</b>

Source: Topten.eu

While water heaters are covered by an energy label, the class intervals depend on the load profile of the water heater. This makes the comparison in between sizes difficult (i.e. 3 products on Topten.eu are currently class A, 34 products are class A+). As such, the selection criteria and analysis refer to the efficiency index instead.

The product list contains 37 products of 16 manufacturers.

The manufacturers are: alpha innotec, Atlantic Suisse AG, CTA AG, Delta Solar, Dimplex/Buderus, Domotec, Elcotherm AG, Hoval, Makscom/Oekoboiler, MHG Heiztechnik, NIBE, Ochsner, Peter Wärmepumpen, Stiebel Eltron, Vaillant, Weishaupt.

## 5 Heat Pumps

Heat pumps on the European market are produced by a small number of only about 5 manufacturers but sold under numerous national brand and model names, making it almost impossible to identify the original manufacturer. As such, creating a European list of BAT products either leads to a list with multiple listings of the same model under different names or to a lot of research and manual comparison. In order to circumvent this issue, the Topten list of heat pumps – initially published with national brand names on Topten.eu in April 2020 – was updated in July 2020 to reflect the BAT products registered in the Eurovent database. This added several products to the product list on Topten.eu.

Topten selection criteria are currently based on COP values because the seasonal space heating energy efficiency index  $\eta$  is largely unavailable despite being mandatory according to Ecodesign regulation since 2015.

Table 4: Numbers of BAT products for heat pumps listed on Topten.eu in August 2020

Heat source	Efficiency class at 35°C			Total
	A+++	A++	A+	
Brine-to-water	65	16	-	81
Water-to-water	42	5	-	47
Air-to-water	48	111	3	162
<b>Total</b>	155	132	3	290

Source: Topten.eu

The product lists contain 290 products from 19 manufacturers. For consumer convenience and better comparability, the three types of heat pumps are displayed in one product category; consumers can filter according to their personal requirements.

The manufacturers are: Atlantic, Baxi, Chappee, CTA AG, Electrotherm AG, Heim AG Heizsysteme, Hoval AG, Kaysun, Midea, Nextherm Industry, Ochsner Wärmepumpen GmbH, Oertli, Remeha, Remko GmbH&Co KG, Saunier Duval, Sofath, Striebel Eltron AG, Vaillant GmbH, Weishaupt AG.

Next steps: survey to manufacturers and installers in order to gather  $\eta$ -values (efficiency index) for listed products as they were so far largely unavailable.

## 6 Air Conditioners

A list of BAT products for air conditioners has been on Topten.eu since the beginning of the project. After the cold season from September 2019 to April 2020, it was updated with national models and new market entries for the heat seasons 2020 in April, May and June. In addition, the Topten **selection criteria** were expanded in April to include requirements for the refrigerants, i.e. a maximum GWP of 700. At the same time, the efficiency criteria were tightened from class A+ to A++ for the heating function of split appliances with  $\leq 4\text{kW}$  and multi-split appliances and from class A++ to A+++ for the heating function of split appliances with  $> 4\text{kW}$ .

The table below displays the development of refrigerants on the Topten list from September 2019 to August 2020. Despite the climatically highly relevant additional selection criteria, the product list only contains 25% less products than a year ago.

*Table 5: Numbers of BAT products for air conditioners listed on Topten.eu by GWP of used refrigerants in August 2020 (September 2019)*

Type	GWP of refrigerants in air conditioners				Total
	$\leq 500$	$\leq 700$	$\leq 2000$	$\leq 3000$	
Split	-	55 (39)	<del>(-)</del>	<del>(37)</del>	55 (76)
Multi-Split	-	18 (18)	<del>(-)</del>	<del>(3)</del>	18 (21)
<b>Total</b>	-	73 (57)	- (-)	- (40)	73 (97)

Source: Topten.eu

Data gathering is made difficult by the fact that the energy class depends on each combination of outdoor and indoor units and are rarely declared in catalogues or websites of manufacturers and installers despite being mandatory since 2013. Even catalogues with technical specifications as to compatibility and recommended combinations commonly do not contain respective energy class declarations.

As such, all combinations have to be individually calculated through the use of the European label generator or one of the label generators widely available on one of the manufacturer or installer websites.

Various online platforms such as [www.condizionati.ch](http://www.condizionati.ch) or <https://www.klimaprofis.com/> claim to present comprehensive lists of air conditioners but installers frequently testify that the lists are too out of date to be of any use to them. While SCOP and SEER values are reliably available in manufacturer materials, product fiches are rarely available.

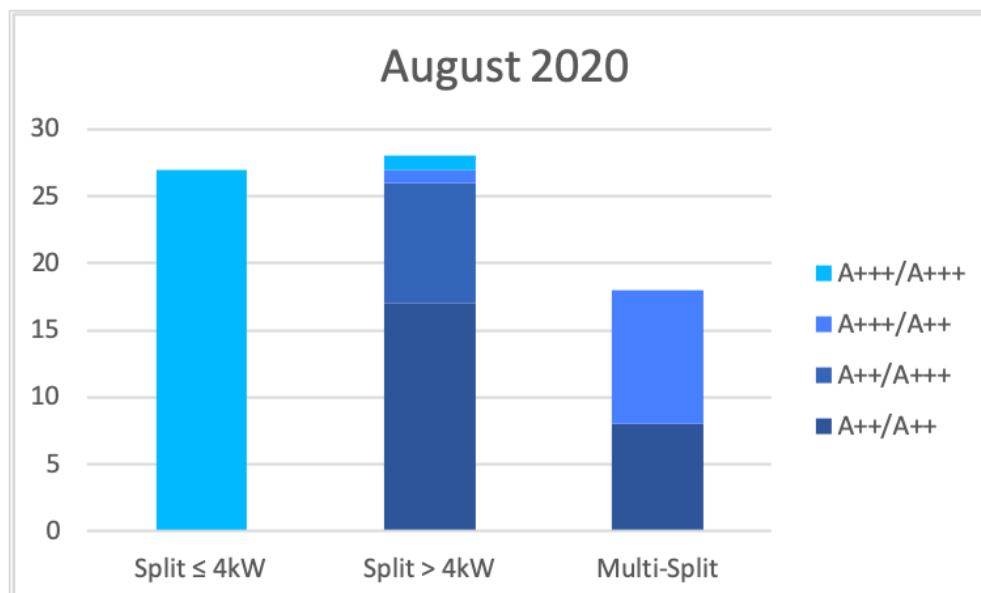
Most reliable and comprehensive data sources are national and international installers; direct contacts with manufacturers are difficult to establish. As such, the data availability is dependent



on established contacts with installers, leading to variabilities due to the high turn-over rate in those companies.

Despite the tightening of selection criteria with regards to efficiency, the BAT list for air conditioners still contains 73 products from 8 manufacturers. The manufacturers are: Daikin, Fujitsu, Hitachi, LG, Mitsubishi Electric, Panasonic, Samsung, Toshiba.

*Graph 1: Numbers of BAT products for air conditioners listed on Topten.eu in August 2020. The first energy class in each combination refers to the cooling efficiency of an individual product, the second energy class to its heating efficiency*



Source: Topten.eu

For multi-split appliances, the number of products with A++ classification for **heating** has risen significantly in the last year. While none are yet listed with A+++ classification, the A+ models can no longer be classified as “highly efficient” on the European market.

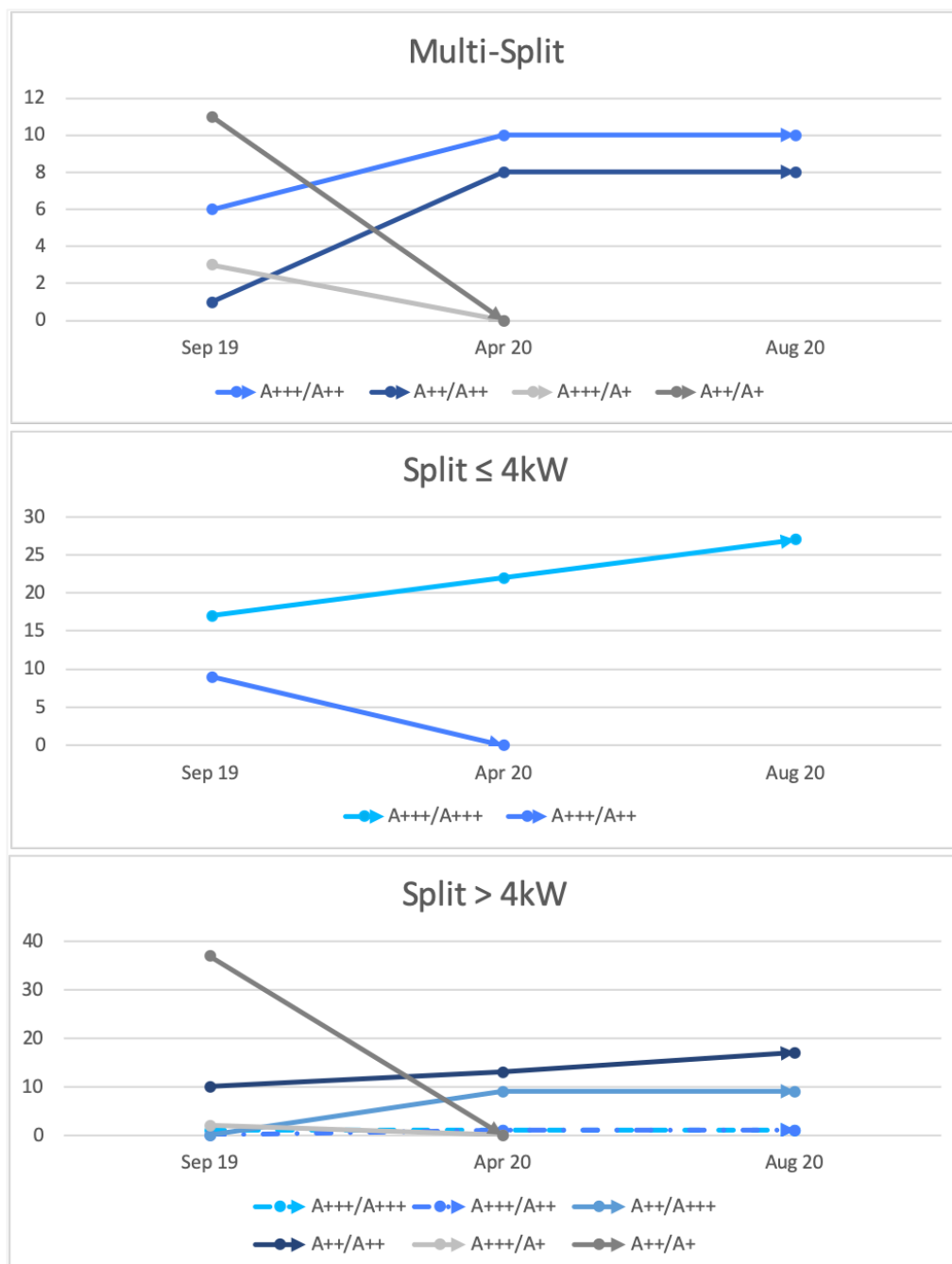
Small split appliances with  $\leq 4\text{kW}$  for cooling have already reached class A+++ for cooling and are now catching up with regards to efficiency of heating functions. All truly efficient products on the market are in the highest available classification (A+++/A+++). It remains to be seen if the development continues and a further tightening of selection criteria within the A+++ categories may become necessary.

Larger split appliances with  $> 4\text{kW}$  for cooling are becoming more efficient for cooling and heating functions, with BAT products covering the two top energy classes for both functions. However, currently most BAT products only reach energy class A++ for either or both of the functions.

As the heat season for this year ends in September, further developments on the market are not expected before spring 2021.

Graph 2: Numbers of BAT products for air conditioners listed on Topten.eu since September 2019.

The change in selection criteria is shown by arrows going down to zero in April for efficiency classes no longer allowed on Topten. The other arrows show the evolution of the remaining efficiency levels (the first energy class refers to the cooling efficiency, the second energy class to the heating efficiency of each product).



Source: Topten.eu

## 7 Comfort Fans

Comfort fans are listed on Topten.eu since March 2020. Data availability online is poor, making data gathering highly dependent on good contact persons with manufacturers and retailers. The collection of data on noise levels is a particular challenge as many values are not measured according to the official directives (set distance point) or not declared at all despite declaration of this value being mandatory since 2013 according to Ecodesign regulation for air conditioners and comfort fans. The noise levels are of special interest to consumers as they directly impact comfort levels in the vicinity.

In various countries, products are sold under retailer brand names instead of the original manufacturer brand, causing additional effort to identify original brand names. The product list was updated in April and June, adding new models on the market for the summer season as well as further products identified from national HACKS partners (esp. Belgium). The table shows the development of comfort fans on Topten.eu from March to August 2020.

Table 6: Numbers of BAT products for comfort fans listed on Topten.eu in August 2020 (March 2020)

Type	Efficiency index						Total
	min. 5.00	min. 2.75	min. 2.00	min. 1.00	min. 0.80	min. 0.45	
Table	-	-	-	18 (15)	8 (8)		26 (23)
Stand	-	-	1 (-)	27 (22)			28 (22)
Floor	-	-	1 (1)	9 (8)	1 (1)		11 (10)
Tower	-	-	-	1 (-)	2 (2)	18 (9)	21 (11)
Ceiling	6 (6)	17 (19)					23 (25)
<b>Total</b>	6 (6)	17 (19)	2 (1)	55 (45)	11 (11)	18 (9)	109 (91)

Source: Topten.eu

The product list contains 109 products from 20 manufacturers. For ceiling fans, the best product reaches an efficiency index of 13.73.

The manufacturers are: AEG, Balmuda, Bimar, CasaFan, Domo, Dyson, Honeywell, Hunter, Koenig, Princess, Rotel, Rowenta, Solis, Sonnenkoenig, Stadler Form, Styliet, Trisa, Tristar, Weber, Westinghouse.

## 8 Taps and Shower Heads

Taps, shower heads and flow regulators are listed on Topten.eu since April 2020. Source of the product data is the online [database](#) of the voluntary [European Water Label](#). As consumers are particularly visually oriented in this category, products from the online database must both reach the highest efficiency class A as well as include a product image.

Table 7: Numbers of BAT products for taps, shower heads and flow regulators listed on Topten.eu in August 2020

Product type	A	Total
Mixers	41	41
Shower heads	5	5
Flow regulators	3	3
<b>Total</b>	49	49

Source: Topten.eu

The product list contains 49 products from 10 manufacturers. Of the 41 mixers, 30 products were one-handle mixers, 7 had an automatic sensor and 4 products were two handle mixers.

The manufacturers are: AKW, Altecnic Ltd., Delabie SCS, Duravit, E.C.A., Hansa, Hans Grohe SE, Huber Cisa, La Torre Srl, Roca Sanitario SE.

## 9 Circulation Pumps

The selection criteria for circulation pumps on Topten.eu were tightened in April 2020 from maximum efficiency index 0.20 to 0.18 (0.23 is mandatory in Europe since August 2015 according to Ecodesign Regulation No 641/2009). The reason for this was that a large set of new product data became available from a fourth manufacturer in March 2020 after 6 month of communication.

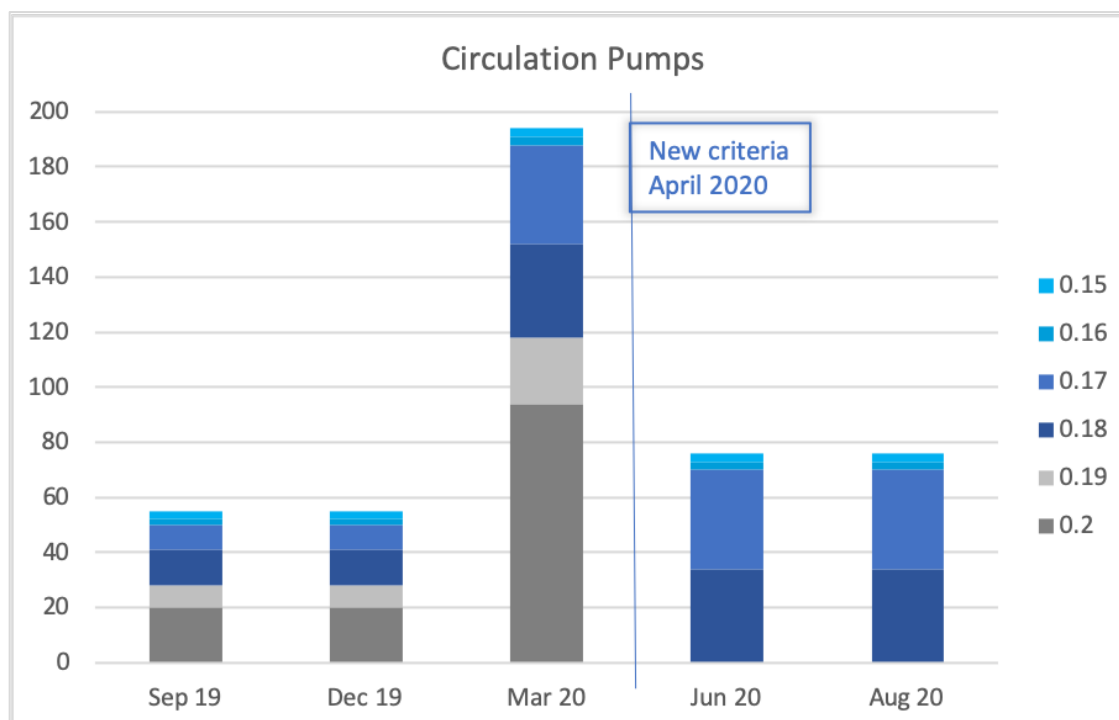
Table 8: Numbers of BAT products for circulation pumps listed on Topten.eu since September 2019

Date	Efficiency Index						Total
	0.15	0.16	0.17	0.18	0.19	0.20	
September 2019	3	2	9	13	8	20	55
December 2019	3	2	9	13	8	20	55
March 2020	3	3	36	34	24	94	194
June 2020	3	3	36	34			76
<b>August 2020</b>	<b>3</b>	<b>3</b>	<b>36</b>	<b>34</b>			<b>76</b>

Source: Topten.eu

The product list contains 76 products from 4 manufacturers. The manufacturers are: Biral, Grundfos, HALM, WILO.

Graph 3: Numbers of BAT products for circulation pumps listed on Topten.eu since September 2019



Source: Topten.eu