Thermia Atec provides the greatest savings

Result from the test of air/water heat pumps, performed by the Swedish Energy Agency 2011.

Summary

Result from the test of air/water heat pumps performed by the Swedish Energy Agency – September 2011.

- Thermia Atec – test winner in efficiency
  Thermia Atec is the test winner in terms of efficiency. Out of 12 tested air/water heat pumps, Thermia Atec is the product that provides the greatest overall cost savings. This is made possible by having the highest Seasonal Performance Factor.

- Low sound level
  The test shows that Thermia Atec is very quiet, the sound power level is only 61 dB (A).

- Hot water comfort
  Thermia Atec has top of class results regarding hot water comfort.
  - High temperature in the hot water tank
  - Large quantities of 40°C hot water
  - Low energy losses

- Built-in cooling function
  Thermia Atec is one of two heat pumps in the test with built-in cooling. The test result shows that Atec delivers top performance also for cooling.

Thermia Atec provides the greatest savings

Thermia Atec has the highest Seasonal Performance Factor (SPF*) in the test. This gives Atec the lowest energy cost of all tested models.

- Highest SPF in all measured cases
  Annual efficiency has been tested for three different house sizes; with an annual consumption of 15 000 kWh/year, 25 000 kWh/year and 35 000 kWh/year. Thermia Atec is the winner in all three cases.

  Appendix – SPF *Diagram – SPF*

- Thermia Atec have the biggest energy savings in the test
  - For small houses (~15 000 kWh/year) the annual savings are 300-1400 kWh bigger than with the other models
  - For medium houses (~25 000 kWh/year) the annual savings are 700-3000 kWh bigger than with the other models
  - For big houses (~35 000 kWh/year) the annual savings are 800-5100 kWh bigger than with the other models

  Appendix – Savings *Diagram – Savings*

- Thermia Atec has the highest COP at all measurement points
  A single high COP value* is no guarantee for big savings in real operation. The key is to be efficient throughout the whole operating range, i.e. at all possible temperatures. Therefore, a series of COP values, spread out over the whole operating range, can give an indication of the real efficiency of the heat pump.

  Appendix – COP *Diagram – COP*

Very low sound level

The sound level of Thermia Atec is extremely low.

- Thermia Atec has a very low sound level, the second lowest in the test. Sound power level = 61 dB.
  Appendix – Sound level
- It is also possible to run Thermia Atec in "Silent Mode", which lowers the sound level further.

Top of class hot water comfort

Thermia Atec shows excellent test results regarding hot water comfort.

- Low energy losses

  Thanks to very low energy losses from the hot water tank (efficient isolation), the cost for water heating is minimized.

- High temperature in the hot water tank

  Thermia Atec has the second highest hot water temperature in the test. The advantage with this is a larger amount of 40°C hot water out from the tank. The drawback is a slightly lower COP for the water production.

- Large quantities of 40°C hot water

  Of all tested models, Thermia Atec has the largest amount of 40°C hot water in relation to volume of the hot water tank. This ensures an excellent hot water comfort without requiring a large space for the water heater. A 300 litre hot water tank can provide up to 500 liters of 40°C hot water when needed.

Appendix – Hot water comfort

Additional results

Thermia Atec has many other important benefits that appear in the test.

- Works efficiently down to -20°C

  Several of the manufacturers brag about how low outdoor temperatures they can handle, even as low as -20°C. The test however reveals that, in most cases, this is not true – they can't. When it comes to Thermia Atec, the test result shows great savings down to -20 ° C.

- Built-in cooling function

  Thermia Atec is one of only two heat pums in the test with built-in cooling. The test result shows that Atec delivers top performance also for cooling.

  Appendix – cooling

- Easy-to-understand User manual

  Only five of the User manuals in the test were approved. Thermia Atec was one of the five which recieved the rating "good".

Other observations

A few other things in the test that are worth noting.

- CTC provides only 81 liters of hot water, Daikin only 113 liters
  The way that CTC has chosen to produce hot water, means that you only get 81 liters of 40°C hot water out of a 223 liter hot water tank. To get more hot water, the electrical heater cartridge must be turned on. Also Daikin shows a remarkable low value on this measure; only 113 liters out of a 200 liter hot water tank.

- CTC, Nibe, Toshiba and Daikin never reached 55°C out to the radiators
  CTC, Nibe, Toshiba and Daikin could not reach 55°C outgoing temperature to the radiators – a temperature that was required for the test.

- CTC were unable to run at the low level temperature, stated by them selves
  CTC state that their heat pump can run down to -15°C. However, the heat pump sent to the test was factory set for -10°C.

Information about the Swedish Energy Agency

The Swedish Energy Agency is a government agency for national energy policy issues.

The Agency's headquarters are in Eskilstuna and it has around 300 employees. Their mission is to promote the development of Sweden's energy system so that it will become ecologically and economically sustainable.

Swedish Energy Agency

Strategic objectives:

- The Agency works to ensure that energy matters are automatically taken into account in relevant social sectors.
- The Agency supports the achievement of the national climate targets.
- The Agency promotes an energy system that is economical on resources and energy efficient, and that uses an increasing proportion of renewable energy sources.
- The Agency works to ensure that there is a safe and reliable energy supply.
- The Agency works for efficient energy markets in which customers have a strong position.
- The Agency is a modern and efficient public authority in all respects.
- The Agency is an attractive employer whose employees are given good development opportunities in a sound working environment.

For more information: www.energimyndigheten.se

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Information about the test

The test includes 12 different air/water heat pumps. Nine of the heat pumps are tested in 2011 and three are tested during 2006-2009.

The test has been conducted by SP (Technical Research Institute of Sweden) on the initiative of the Swedish Energy Agency.

The test is objective and done according to standard methods. Following methods are included in the test:

- Space heating performance, according to EN 14511
- Sanitary hot water heating, according to EN 255-3
- Sound power level, according to EN ISO 3747, EN 12102
- Calculation of annual energy savings, according to SP-method 0033
- Review of heat pump and documentation

Read more about the test (Swedish language): www.energimyndigheten.se/sv/Hushall/Testresultat/Testresultat/Luftvattenvärmepumpar1

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Thermia

Appendix – SPF (Seasonal Performance Factor)

	 **Bosch** EHP 8 AW	 **CTC** Eco Air 107	 **Euronom** Exo Air	 **Nibe** F-2025	 **Carrier** Aqua Snap Plus	 **Toshiba** Estia HWS-802H-E	 **IVT** Prem.Line A Plus	 **Thermia** Atec	 **Daikin** ERLQ011CAW1	 **Viessmann** Vitocal-300 AW-O	 **Sirius** S2-7 Luft	 **Thermia** Atria Optimum
House: 15 000 kWh/year **SPF**	**2,5**	**2,7**	**2,8**	**2,6**	**2,8**	**2,9**	**2,7**	**3,0**	**2,7**	**2,7**	**2,4**	**2,6**
House: 25 000 kWh/year **SPF**	**2,4**	**2,4**	**2,6**	**2,5**	**2,3**	**2,6**	**2,7**	**2,9**	**2,7**	**2,8**	**2,2**	**2,4**
House: 35 000 kWh/year **SPF**	**2,1**	**2,1**	**2,3**	**2,3**	**2,0**	**2,3**	**2,6**	**2,7**	**2,6**	**2,6**	**1,9**	**2,4**

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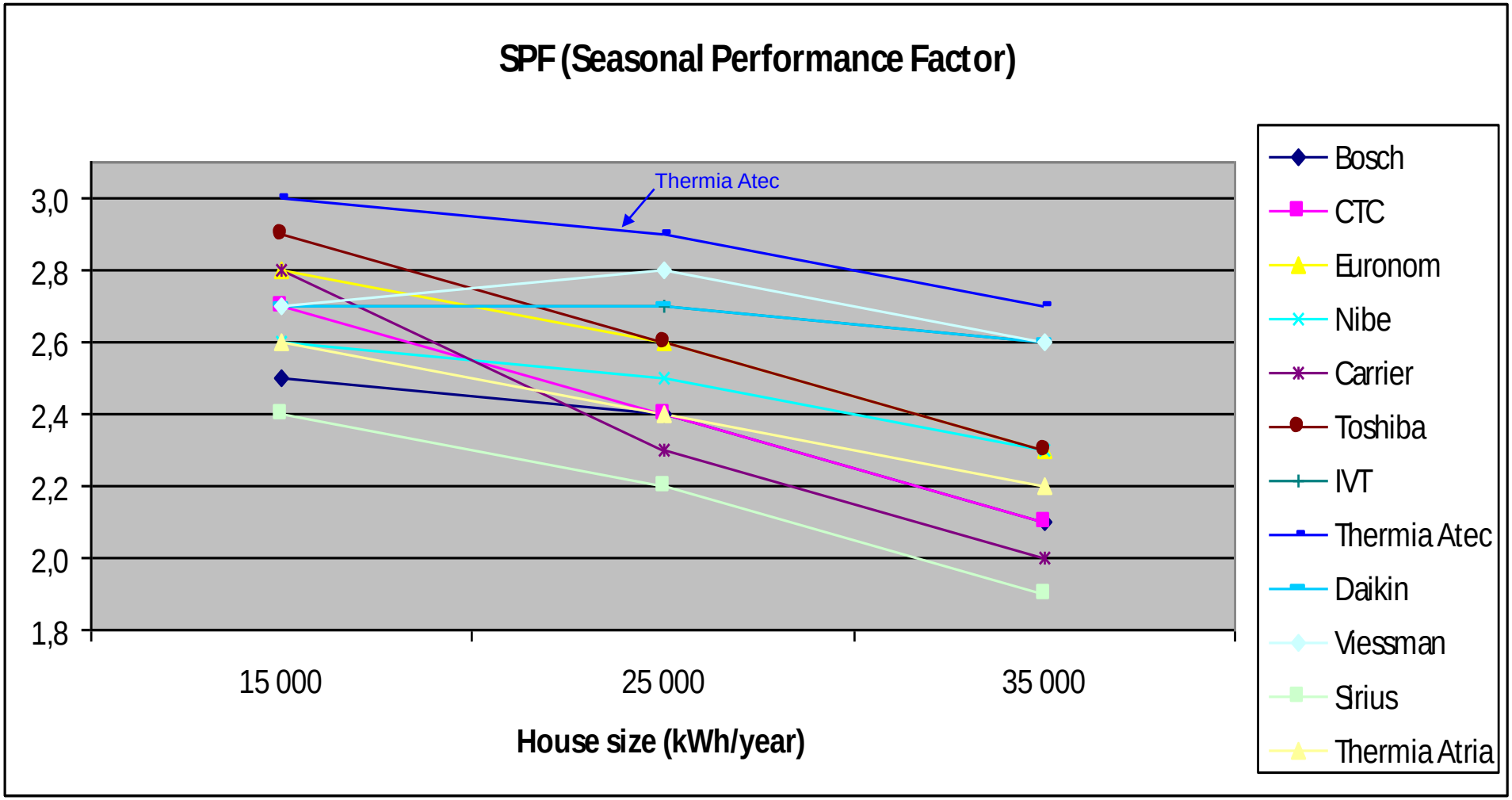
SPF (Seasonal Performance Factor)
Thermia Atec
3,0
2,8
2,6
2,4
2,2
2,0
1,8
15 000
25 000
35 000
House size (kWh/year)
Bosch
CTC
Euronom
Nibe
Carrier
Toshiba
IVT
Thermia Atec
Daikin
Viessman
Sirius
Thermia Atria

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Appendix – Energy savings

	 **Bosch** EHP 8 AW	 **CTC** Eco Air 107	 **Euronom** Exo Air	 **Nibe** F-2025	 **Carrier** Aqua Snap Plus	 **Toshiba** Estia HWS-802H-E	 **IVT** Prem.Line A Plus	 **Thermia** Atec	 **Daikin** ERLQ011CAW1	 **Viessmann** Vitocal-300 AW-O	 **Sirius** S2-7 Luft	 **Thermia** Atria Optimum
House: 15 000 kWh/year **Energy savings** (kWh/year)	**9 000**	**9 400**	**9 600**	**9 300**	**9 600**	**9 700**	**9 500**	**10 000**	**9 500**	**9 500**	**8 600**	**9 200**
House: 25 000 kWh/yesr **Energy savings** (kWh/year)	**14 600**	**14 800**	**15 400**	**15 100**	**14 300**	**15 300**	**15 800**	**16 500**	**15 700**	**16 000**	**13 500**	**14 800**
House: 35 000 kWh/year **Energy savings** (kWh/year)	**18 600**	**18 500**	**19 600**	**19 700**	**17 600**	**19 500**	**21 300**	**22 200**	**21 400**	**21 400**	**17 100**	**19 100**

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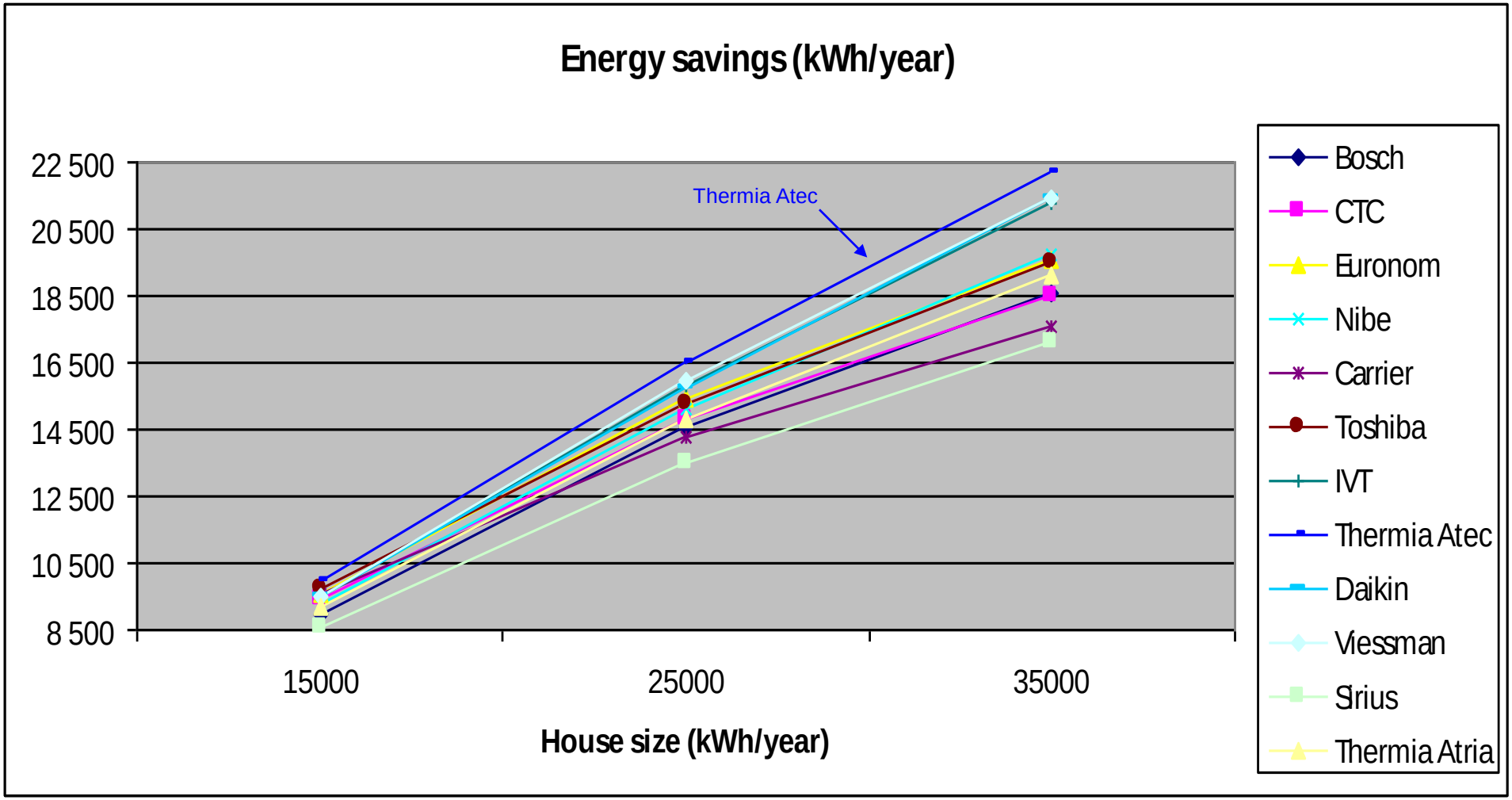
Energy savings (kWh/year)
22 500
20 500
18 500
16 500
14 500
12 500
10 500
8 500
Thermia Atec
15000
25000
35000
House size (kWh/year)
Bosch
CTC
Euronom
Nibe
Carrier
Toshiba
IVT
Thermia Atec
Daikin
Viessman
Sirius
Thermia Atria

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Appendix – COP *(Coefficient Of Performance)*

	 **Bosch** EHP 8 AW	 **CTC** Eco Air 107	 **Euronom** Exo Air	 **Nibe** F-2025	 **Carrier** Aqua Snap Plus	 **Toshiba** Estia HWS-802H-E	 **IVT** Prem.Line A Plus	 **Thermia** Atec	 **Daikin** ERLQ011CAW1	 **Viessmann** Vitocal-300 AW-O	 **Sirius** S2-7 Luft	 **Thermia** Atria Optimum
35 °C to radiators												
Out door temp: **+7**	**3,5**	**3,8**	**4,2**	**3,5**	**3,6**	**4,1**	**3,9**	**4,7**	**4,6**	**4,2**	**3,5**	**3,5**
Out door temp: **+2**	**2,9**	**3,2**	**3,6**	**3,2**	**2,9**	**3,3**	**3,5**	**3,9**	**3,5**	**3,6**	**3,1**	**3,1**
Out door temp: **-20**								**2,3**				
45 °C to radiators												
Out door temp: **+7**	**2,9**	**3,2**	**3,3**	**3,0**	**2,9**	**3,3**	**3,2**	**3,8**	**3,5**	**3,3**	**2,9**	**3,0**
Out door temp: **+2**	**2,4**	**2,7**	**3,0**	**2,8**	**2,4**	**2,7**	**2,9**	**3,1**	**2,7**	**3,1**	**2,6**	**2,6**
Out door temp: **-7**	**2,2**	**2,3**	**2,4**	**2,3**	**2,2**	**2,3**	**2,5**	**2,7**	**2,3**	**2,4**	**2,1**	**2,3**
Out door temp: **-15**	**1,8**	**1,9**	**2,0**	**1,9**	**1,5**	**-**	**2,1**	**2,2**	**1,9**	**2,0**	**1,7**	**1,9**
55 °C to radiators												
Out door temp: **+7**	**2,5**	**did not reach 55°C**	**2,8**	**did not reach 55 °C**	**2,7**	**did not reach 55 °C**	**2,8**	**3,1**	**did not reach 55 °C**	**2,9**	**2,4**	**2,5**
Out door temp: **-7**	**1,8**		**2,0**		**1,9**		**2,0**	**2,2**		**2,0**	**1,7**	**1,9**

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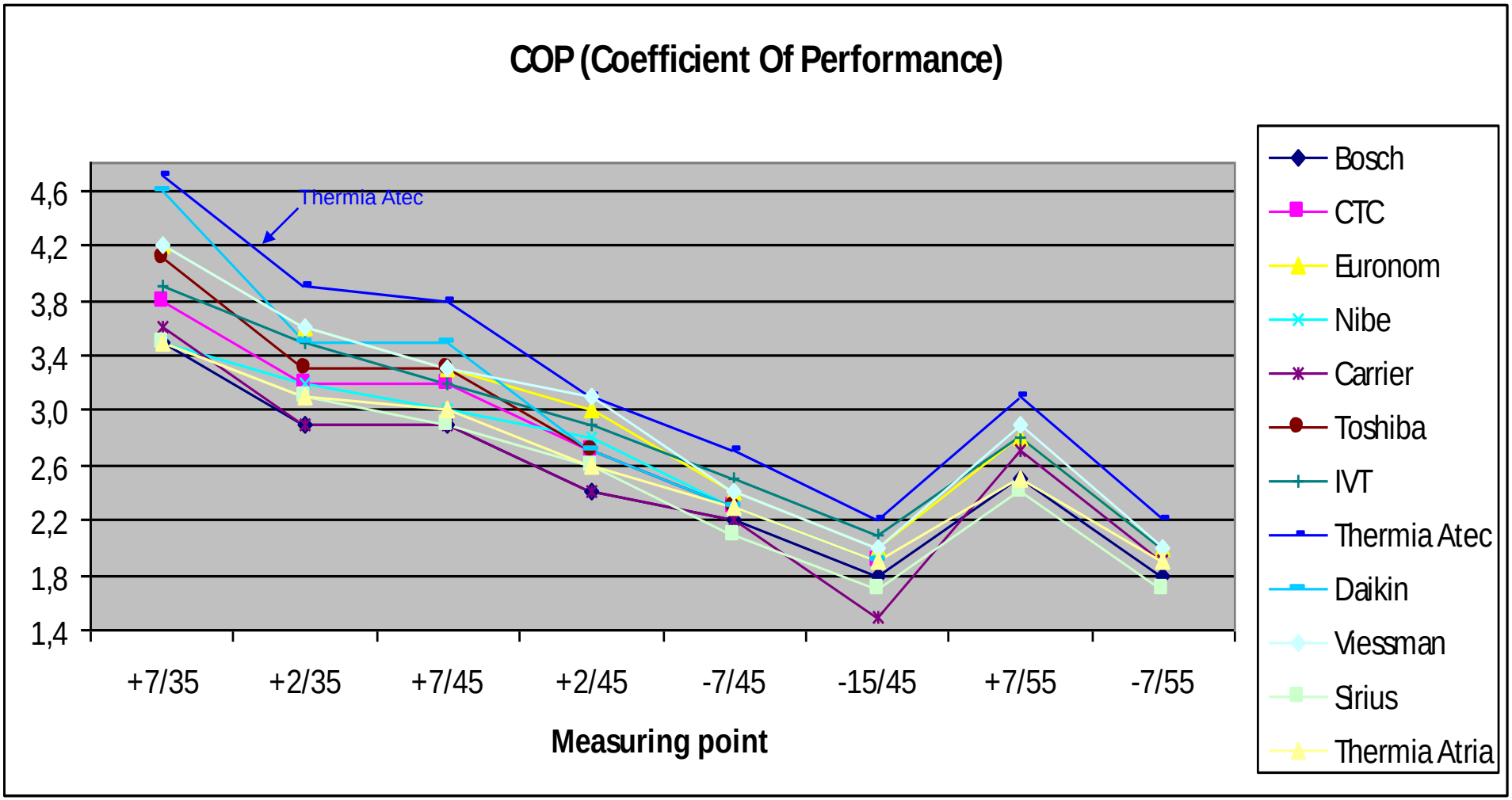
COP (Coefficient Of Performance)
4,6
4,2
3,8
3,4
3,0
2,6
2,2
1,8
1,4
Thermia Atec
+7/35
+2/35
+7/45
+2/45
-7/45
-15/45
+7/55
-7/55
Measuring point
Bosch
CTC
Euronom
Nibe
Carrier
Toshiba
IVT
Thermia Atec
Daikin
Viessman
Sirius
Thermia Atria

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Appendix – Sound level

	 **Bosch** EHP 8 AW	 **CTC** Eco Air 107	 **Euronom** Exo Air	 **Nibe** F-2025	 **Carrier** Aqua Snap Plus	 **Toshiba** Estia HWS-802H-E	 **IVT** Prem.Line A Plus	 **Thermia** Atec	 **Daikin** ERLQ011CAW1	 **Viessmann** Vitocal-300 AW-O	 **Sirius** S2-7 Luft	 **Thermia** Atria Optimum
Sound power level dB(A)	**64**	**69**	**69**	**65**	**67**	**65**	**56**	**61**	**63**	**61**	**71**	**67**

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Appendix – Hot water comfort

	 **Bosch** EHP 8 AW	 **CTC** Eco Air 107	 **Euronom** Exo Air	 **Nibe** F-2025	 **Carrier** Aqua Snap Plus	 **Toshiba** Estia HWS-802H-E	 **IVT** Prem.Line A Plus	 **Thermia** Atec	 **Daikin** ERLQ011CAW1	 **Viessmann** Vitocal-300 AW-O	 **Sirius** S2-7 Luft	 **Thermia** Atria Optimum
Volume hot water tank (litre)	**145**	**223**	**278**	**155**	**200**	**210**	**280**	**180**	**200**	**390**	**-**	**480**
Amount hot water 40°C (litre)	**210**	**81**	**316**	**196**	**255**	**250**	**337**	**300**	**113**	**590**	**495**	**740**
Volume ratio (=amount 40°C/tank volume)	**1,4**	**0,4**	**1,1**	**1,3**	**1,3**	**1,2**	**1,2**	**1,7**	**0,6**	**1,5**	**-**	**1,5**
Energy losses (kWh/year)	**1900**	**1300**	**1200**	**1000**	**1400**	**760**	**900**	**600**	**650**	**500**	**1000**	**1000**
Temperature in tank	**53°C**	**49°C**	**53°C**	**47°C**	**56°C**	**46°C**	**50°C**	**61°C**	**47°C**	**56°C**	**67°C**	**58°C**
COP (hot water production)	**2,3**	**3,0**	**3,3**	**3,3**	**2,8**	**3,3**	**3,3**	**2,6**	**2,4**	**2,7**	**2,6**	**2,6**

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Appendix – EER *(Cooling factor)*

	 **Bosch** EHP 8 AW	 **CTC** Eco Air 107	 **Euronom** Exo Air	 **Nibe** F-2025	 **Carrier** Aqua Snap Plus	 **Toshiba** Estia HWS-802H-E	 **IVT** Prem.Line A Plus	 **Thermia** Atec	 **Daikin** ERLQ011CAW1	 **Viessmann** Vitocal-300 AW-O	 **Sirius** S2-7 Luft	 **Thermia** Atria Optimum
7 °C to radiators Out door temp: +35°C	-	-	-	-	-	-	-	**2,3**	-	-	-	-
18 °C to radiators Out door temp: +35°C	-	-	-	-	-	-	-	**2,5**	-	-	-	-

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Glossary

- ***SPF (Seasonal Performance Factor)***

  A value describing how efficient a heat pump is over a full year, where both warm and cold periods are counted, and the hot water production is included. The most accurate value to see how efficient a heat pump is in real operation.

- ***COP (Coefficient of Performance)***

  A value describing the heat pump's efficiency in one unique operating condition. The relation ratio between consumed and supplied energy.

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