

Guidelines for Topten Public Procurers

Heat Pumps

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Why follow Topten criteria?

- Topten.eu/pro (www.topten.eu/pro) is a European web portal helping buyers, professionals, public procurers and large buyers to find the most energy efficient products available in Europe. The products are selected and updated continuously, according to their high energy and environmental performances, independently from the manufacturers.
- The Topten criteria below can be inserted directly into tendering documents.
- All heat pumps displayed on www.topten.eu meet the criteria contained in these guidelines. Procurers can therefore use the website to check the availability and assortment of products currently on the market, which meet the [Topten selection criteria for Heat Pumps](#).
- Topten.eu/pro links to national partners Topten Pro websites and was developed under the Topten Act project, supported by the European Union through Horizon 2020 programme.

How much can you save?

The category heat pumps, listed on www.topten.eu, includes brine-to-water heat pumps, water-to-water heat pumps and air-to-water heat pumps for single-family homes and apartment buildings.

Considering the following assumptions, it is possible to achieve the savings indicated in the next table.

- Assumptions {
- Lifetime expectation: 15 years
 - Avg heat capacity p.a. for modern house 20 mWh / old house 40 mWh
 - Electricity cost: 0.20 €/kWh

	Topten model	Inefficient model	Topten model	Inefficient model
Type of building	modern/new	modern/new	old	old
Energy class of heat pump	A+++	A	A+++	A
Efficiency index	175	115	175	115
Heat capacity per year (in kWh)	20,000	20,000	40,000	40,000
Electricity consumption per year (kWh)	6,708	10,208	13,417	20,416
Use cost (electricity for 15 years)	20,125 €	30,625 €	40,250 €	61,249 €
Savings	34% energy / unit ⇒ 10,500 € / unit		34% energy / unit ⇒ 21,000 € / unit	

A heat pump with Topten criteria compared to an inefficient model saves 34% energy. This is a significant saving, especially considering the heat pump's lifetime of 15-20 years.

The example above distinguishes two scenarios. First, what are the savings with an efficient heat pump in a new building, generally having better construction and heat insulation. Second, what are the savings in an old house with less insulation.

Assuming the same heat pump, the efficient model saves roughly 34% of energy compared to the inefficient one. The monetary saving in a new house can be 10,500 € over 15 years, in the old building twice as much with 21,000 €. This is given the higher heat capacity (heat demand expressed in kWh per annum) of an older building.

Procurement criteria

The following criteria can be inserted directly into tendering documents. The Topten selection criteria and the product lists are updated regularly. The newest versions are always available at www.topten.eu/pro.

SUBJECT: HIGHLY ENERGY-EFFICIENT HEAT PUMP

TECHNICAL SPECIFICATIONS

Energy class

Heat pumps must have a minimum energy class of A++ for 35° C and 55° C, as declared in agreement with the European Energy Label.

Verification

Bidders must supply the energy label and technical data according to EU Regulations No. 813/2013 and No. 811/2013.

FURTHER INFORMATION

Base heat demand for building

The annual heat requirement of a building is subject to its individual structural characteristics and the ambient conditions. The three main factors are

- 1. Construction of house/building**

The construction determines the volume inside to be heated, the type of building shell (walls, roof), air tightness, thermal mass of internal structural components, and internal heat sources.

- 2. Climate zone**

Another decisive factor for the energy demand is the difference from outside temperature and inside temperature. A house in Norway tends to have a higher heat demand than a similar house in Spain given the climatic conditions.

- 3. Type of indoor heat exchanger (via radiators or floor heating)**

The heat emission via radiators requires a medium-temperature application (55 °C), floor heating only low-temperature application at 35 °C, with the latter using much less energy.

How much heat output does your building need? For new builds the architect provides the numbers. They can be found in the construction plans. For existing, older buildings the heat output can be estimated based on the past energy consumption. 1'000 liters of oil have a calorific value corresponding to ca. 10'000 kWh.

Saving fossil fuels is an additional benefit of the heat pump systems. The two houses in the savings example above can save 2'000 and 4'000 liters oil annually.

The right heat output is decisive for the choice of the right heat pump: Too small means to be cold or having to have an additional electrical heat generator. An oversized heat pump however leads to higher acquisition cost and higher ongoing consumption resp. inadequate efficiency.

Source of heat

The types of heat pumps are:

- Heat pumps brine/water
- Heat pumps water/water
- Heat pumps air/water

Most efficient are water-to-water heat pumps, using ground, river, or lake water as heat source. Brine pumps and using water as heat source require a permit.

The heat source outdoor air works well when you need a high portion of the heat for warm water (year-round) in combination with a noise-optimized and inverter heat pump.

To increase savings and reduce environmental impact, procurers should evaluate life cycle costs when tendering for heat pumps. Thus, it is advisable to include in the tender a costing exercise - even if simple - for the product life cycle costs.

Table 1: Example of a breakdown costs table, to be filled in by bidders

	Information details	Different unit costs in € (excluding tax)	Total cost in € (excluding tax)
Delivery			
Installation			
Use*	Energy consumption in kWh/year x product life time (15 yrs) x n° units	Electricity cost**: 0,20 €/kWh	
Maintenance			
Recycling and disposal			

* Example of how use costs can be determined.

** This figure is just an example. The procurer can use the average electricity price paid during the last 2 or 3 years, and also include subscription fee and taxes.

Advice and support

If you would like further assistance in using the information presented here in your own procurement actions or more information on [Topten Pro](#) contact your national Topten team (find it on [Topten.eu](#)).

The European Commission's [Green Public Procurement](#) website contains valuable legal and practical guidance together with procurement criteria for a range of commonly procured products and services.



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