

ErP ratings for ground source versus air source 4.0

From the 26th September 2015 any heat pump, ground, water or air sold into the European Union has to be supplied with a EU product label indicating the units efficiency rating. This takes the form of an efficiency band rated from G to A++ and has been used for many years on goods such as fridges, TVs etc.

The rating is there to provide the consumer information about the items efficiency so that they can make an informed choice as to what unit suits their efficiency requirements best.

The ratings are derived from manufacturers tests of the unit over a set of conditions equating to a 'standard' heating season for an average European climate. (Europe is split into three climate zones, average, warmer and colder).

The same energy efficiency scale is used for ground source, water source and air source and at first glance it could mistaken to believe that a direct comparison of efficiency could be made between the different technologies, however it is important to remember that the actual tests carried out by the manufacturer to determine the seasonal space heating energy efficiency are at different conditions for different technologies.

Key details:

- From the 26th September 2015 every heat pump sold within the European Union has to have a product label detailing the units energy efficiency.
- Although the same efficiency scale is used the testing points are much more onerous for ground source.
- Real life experience shows ground source is significantly more efficient than air source .

Technology	Air Source		Ground Source		Water Source	
	Source	Load	Source	Load	Source	Load
Temp range	-7 to 12C	24 to 55C	0C	24 to 55C	10C	24 to 55C

It can be seen that the source temperatures used in the air source tests vary from -7 to 12C (with the majority of the time greater than 0C) where as the ground and water source temperatures remain constant throughout the year and in fact in all climates including the Warmer climate. Within the UK MCS standards also dictate that the ground array for a ground source heat pump must be designed for a minimum temperature of the thermal transfer fluid entering the heat pump of 0C and that the average ground temperature is actual equal to the average ambient air temperature which ranges from 8.5 to 11.3C in the UK.

As efficiency can vary with inlet temperature it can be seen that the test conditions for ground source are very stringent and not really representative of the 'true' UK climate and conditions. This leads to a lower seasonal space heating energy efficiency than would be recorded in actual installations. This is

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backed up by in-field monitoring programs such as the project carried out by the Energy Saving Trust.

It is therefore reasonable to assume that the performance of a ground source heat pump or water source will actually be higher than that reported on the seasonal heating energy efficiency figure and certainly higher than an air source.

Installation design can also have an effect on the actual performance of the heat pump for example if the ground arrays are oversized the temperature of the thermal transfer fluid increases and hence the efficiency of the unit increases.