



WATER ENERGY DISTRIBUTORS, INC.

2 Starwood Drive Hampstead, NH 03841

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www.northeastgeo.com

ClimateMaster & Direct Expansion Geo HP Efficiencies Technical Bulletin 2007-01

GENERAL	NOTES
<p data-bbox="131 514 332 541">1.0 SUMMARY</p> <p data-bbox="131 573 1174 663">As listed by third party evaluators, ClimateMaster Tranquility 27 geothermal heat pumps are approximately 25% more efficient for heating and 45% more efficient for air conditioning than direct expansion heat pumps, <i>including</i> well water pumping penalties.</p> <p data-bbox="131 695 386 722">2.0 BACKGROUND</p> <p data-bbox="131 753 1203 907">Third parties have rated both ground water and direct expansion geothermal heat pumps. In past years the Air Conditioning and Refrigeration Institute (ARI), Arlington, VA has rated geothermal heat pumps, (standard 325 and 330, both before 1990). In 2000 ARI joined with the International Standards Organization (ISO 13256-1998) program of rating. ISO has several sections, two of which cover the requirements of the old ARI 325 and 330.</p> <p data-bbox="131 938 1195 1029">Since 2000, ISO 13256 and ARI have been overlapping with some more stringent rating requirements by ISO. As of January 2006 ISO standard 13256 is the industry standard for geothermal heat pumps.</p> <p data-bbox="131 1060 784 1087">3.0 WATER SOURCE GEOTHERMAL HEAT PUMPS</p> <p data-bbox="131 1119 1179 1209">Both ARI and ISO ratings <u>include</u> efficiency reduction “pumping penalty” for well pumping volume (gpm) and for pressure drops (PD) as piping and heat exchanger resistance in water source geothermal heat pumps.</p> <p data-bbox="131 1241 456 1268">4.0 DIRECT EXPANSION</p> <p data-bbox="131 1299 1200 1365">ARI 870 was established in 2005 to rate direct expansion geothermal heat pumps. We are not aware of any ISO ratings for direct expansion geothermal heat pumps.</p> <p data-bbox="131 1396 315 1423">5.0 RATINGS</p> <p data-bbox="131 1455 1172 1577">At conditions and agencies shown below listed are third party efficiencies. Coefficient of Performance (COP) is a <u>heating</u> efficiency factor and is an international rating. Energy Efficiency Ratio (EER) is and <u>air conditioning</u> efficiency factor and is the ratio of BTU's removed per watt of electricity.</p>	



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<u>Manufacturer</u>	<u>Model</u>	<u>COP</u>	<u>EER</u>
Earth Source Energy Solutions Inc.	28-64 mbtuh	3.7	16.6
All six models from DXG with TWE AHU			
ECR Technologies Inc H5 with BA AHU	24 mbtuh	3.5	15.4
	30 mbtuh	3.6	17.2
	36 mbtuh	3.7	16.6
	42 mbtuh	3.8	16.3
	48 mbtuh	3.7	16.7
	60 mbtuh	3.7	16.8
ClimateMaster Tranquility 27	26 full load	4.8	24.5
	26 part load	5.1	30.8
	38 full load	4.7	23.0
	38 part load	5.1	31.5
	49 full load	4.7	22.5
	49 part load	5.1	28.7
	64 full load	4.4	22.0
	64 part load	4.7	29.7
ClimateMaster Tranquility heat pumps operate in "part load" approximately 75% of the winter season and approximately 100% of the air conditioning season.			
6.0 COMPARISON- From www.ARI.org			
Ratings Conditions*	<u>Heating</u>	<u>Cooling</u>	
	<u>Earth Water Temperatures*</u>		
ISO 13256-1998 GWHP Was ARI 325	50°F	59°F	
ISO 13256-1998 GSHP Was ARI 330	32°F	77°F	
	<u>Refrigerant Temperatures*</u>		
ARI 870-2005	32°F	77°F	