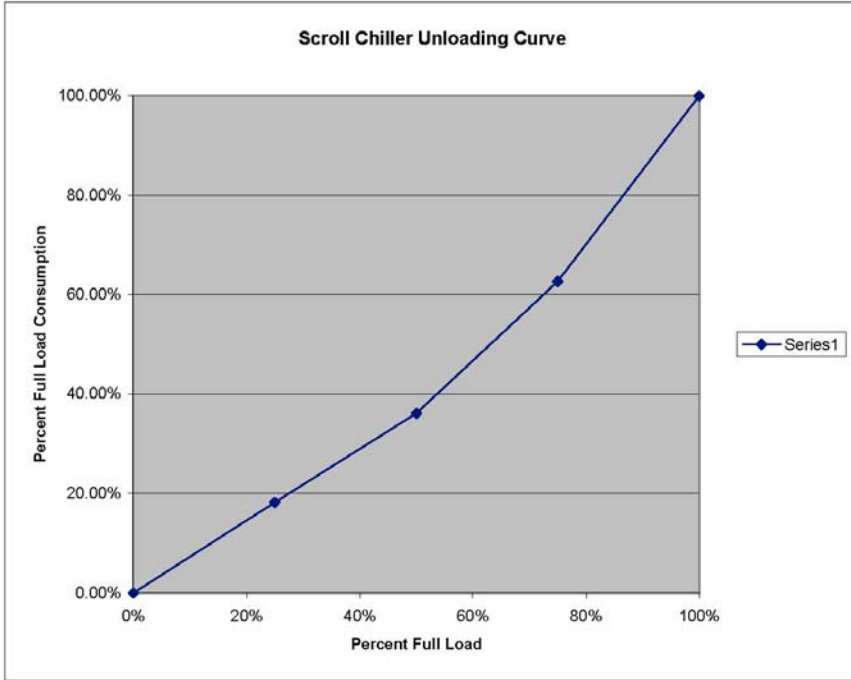


E-I Buro Happold Model Equipment

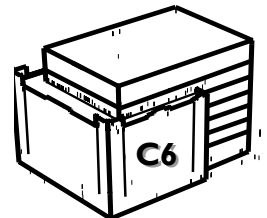
Scroll Chiller Operating Characteristics and Specifications



Percent Load	tons	kw	eer	Percent Consumption
100%	106.2	83.3	15.3	100.00%
75%	79.7	52.2	18.3	62.67%
50%	53.1	30.1	21.2	36.13%
25%	26.6	15.2	21	18.25%
0%	0	0		0.00%

Return Temp

wt	75				80				85				90				95			
	tons	kwi	eer	tons	kwi	eer	tons	kwi	eer	tons	kwi	eer	tons	kwi	eer	tons	kwi	eer		
40	103	75.7	16.3	100.6	78.7	15.3	98.3	82	14.4	96	85.7	13.4	93.8	89.7	12.6					
42	107.1	76.3	16.8	104.6	79.2	15.8	102.3	82.6	14.9	99.8	86.3	13.9	97.6	90.3	13					
44	111.2	76.97	17.3	108.6	80	16.3	106.2	83.3	15.3	103.7	87	14.3	101.3	91.1	13.3					
46	115.3	77.58	17.8	112.7	80.6	16.8	110.2	84	15.7	107.5	87.7	14.7	105.1	91.9	13.7					
48	119.7	78.2	18.4	117	81.2	17.3	114.4	84.6	16.2	111.6	88.4	15.1	109.1	92.6	14.1					
50	124.2	78.97	18.9	121.4	82	17.7	118.6	85.5	16.7	115.8	89.3	15.6	113.2	93.5	14.5					



Water-Cooled Chillers

Scroll Compressor Chillers—30 to 120 Tons

- Meets or exceeds ASHRAE Standard 90.1-2004—15.2 EER at full load, up to 20.6 EER at part load (IPLV)
- Scroll compressor technology is quiet for installation in sound sensitive environments
- Available for water-cooled or remote air-cooled condenser applications
- Controls flexibility—MicroTech II[®] controls with our Protocol Selectability™ feature for easy, low cost integration with the BAS of your choice
- Designed for easy retrofit-fits through a standard three ft. door

For more detail, refer to Catalog WGZ.
For the most current information, refer to www.mcquay.com.

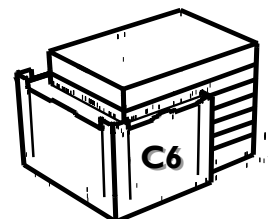
Water-Cooled Chillers



Model WGZ scroll compressor chiller—30 to 120 tons



Available LONMARK certified



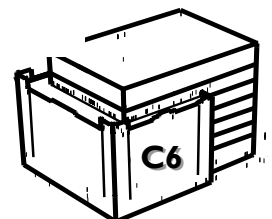
Water-Cooled Chillers

WGZ 060AW through WGZ 120 AW

WGZ unit size	060		070		080		090		100		110		120	
Unit capacity @ ARI conditions tons, (kw) ¹	60.3 (212)		68.0 (239)		75.6 (266)		84.4 (297)		93.7 (330)		106.2 (373)		117.2 (411)	
Number of circuits	2		2		2		2		2		2		2	
Compressors²														
Nominal horsepower	15	15	15	20	20	20	25	25	25	25	25	30	30	30
Number ²	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Unloading steps	25/50/75		28/50/78		25/50/75		27/50/77		25/50/75		27/50/77		25/50/75	
Oil charge, per compressor, oz (L)	140 (4.1)		140 (4.1)		148 (4.3)		148 (4.3) 200 (5.9)		200 (5.9) 200 (5.9)		200 (5.9) 200 (5.9)		200 (5.9) 200 (5.9)	
Condenser														
Number	1		1		1		1		1		1		1	
No. refrigerant circuits	2		2		2		2		2		2		2	
Diameter, in (mm)	14 (356)		14 (356)		14 (356)		14 (356)		14 (356)		14 (356)		14 (356)	
Tube length, in (mm)	120 (3048)		120 (3048)		120 (3048)		120 (3048)		120 (3048)		120 (3048)		120 (3048)	
Design W.P., psig (kPa)														
Refrigerant side	450 (3102)		450 (3102)		450 (3102)		450 (3102)		450 (3102)		450 (3102)		450 (3102)	
Water side	232 (1599)		232 (1599)		232 (1599)		232 (1599)		232 (1599)		232 (1599)		232 (1599)	
No. of passes	2		2		2		2		2		2		2	
Pump-out capacity, lb (kg) ⁵	481 (218.2)		462 (209.6)		449 (203.7)		429 (194.6)		409 (185.5)		409 (185.5)		409 (185.5)	
Connections														
Water in and out, in (mm) ⁴	5 (127)		5 (127)		5 (127)		5 (127)		5 (127)		5 (127)		5 (127)	
Relief valve, flare, in (mm)	½ (12.7)		½ (12.7)		½ (12.7)		½ (12.7)		½ (12.7)		½ (12.7)		½ (12.7)	
Purge valve, flare, in (mm)	½ (12.7)		½ (12.7)		½ (12.7)		½ (12.7)		½ (12.7)		½ (12.7)		½ (12.7)	
Vent and drain, in (mm) FPT	½ (12.7)		½ (12.7)		½ (12.7)		½ (12.7)		½ (12.7)		½ (12.7)		½ (12.7)	
Liquid subcooling	Integral		Integral		Integral		Integral		Integral		Integral		Integral	
Evaporator														
Number	1		1		1		1		1		1		1	
No. refrigerant circuits	2		2		2		2		2		2		2	
Water volume, gallons (L)	8.1 (30.7)		9.2 (34.9)		10.8 (40.7)		12.8 (48.3)		13.9 (52.5)		13.9 (52.5)		13.9 (52.5)	
Refrig. side D.W.P., psig. (kPa)	450 (3102)		450 (3102)		450 (3102)		450 (3102)		450 (3102)		450 (3102)		450 (3102)	
Water side D.W.P., psig. (kPa)	363 (2503)		363 (2503)		363 (2503)		363 (2503)		363 (2503)		363 (2503)		363 (2503)	
Water connections:														
In and out, in (mm) ⁴	3 (76)		3 (76)		3 (76)		3 (76)		3 (76)		3 (76)		3 (76)	
Drain and vent,	Field		Field		Field		Field		Field		Field		Field	
Unit dimensions														
Length, in (mm)	144.2 (3663)		146.7 (3726)		146.7 (3726)		149 (3784)		149 (3784)		149 (3784)		149 (3784)	
Width, in (mm)	32 (813)		32 (813)		32 (813)		32 (813)		32 (813)		32 (813)		32 (813)	
Height, in (mm)	66 (1676)		66 (1676)		66 (1676)		66 (1676)		66 (1676)		66 (1676)		66 (1676)	
Unit weights														
Operating wt, lb (kg)	3809 (1728)		4025 (1826)		4289 (1945)		4478 (2031)		4627 (2099)		4828 (2190)		5010 (2273)	
Shipping wt, lb (kg)	3590 (1628)		3806 (1726)		4037 (1831)		4178 (1895)		4287 (1945)		4488 (2036)		4670 (2118)	
Cir # 1, operating charge, lb (kg) R-22	87 (39.3)		84 (37.9)		82 (37.0)		76 (34.3)		76 (34.3)		85 (39)		85 (39)	
Cir # 2, operating charge, lb (kg) R-22	87 (39.3)		84 (37.9)		82 (37.0)		76 (34.3)		76 (34.3)		85 (39)		85 (39)	

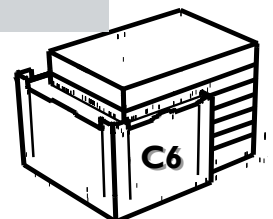
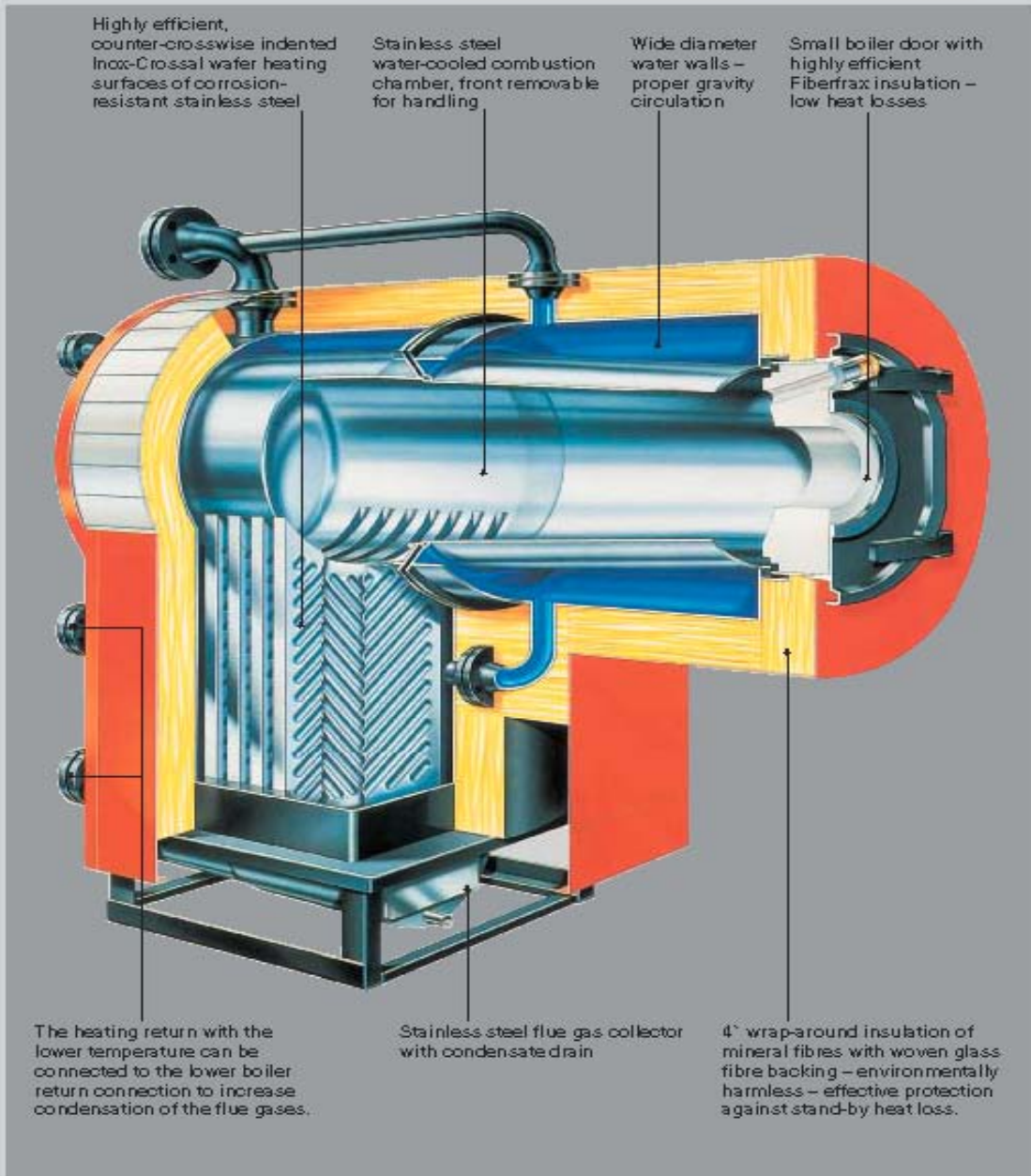
1. Certified in accordance with ARI Standard 550/590-98.
 2. All units have two compressors per circuit in parallel.
 3. 80% full R-22 at 90°F (32°C) per refrigerant circuit.
 4. Victaulic connections.
 5. Based on 100% condenser subcooling.

Water-Cooled Chillers



Boiler Characteristics, Model VSB-

**Vertomat gas-fired condensing boiler –
Flue gas temperature only approx. 10°C/
18°F above boiler return temperature**



Innovative heating technology – minimized harmful emissions

Minimum nitrous oxide emissions

Due to its low emission levels, the Viessmann Vertomat takes the top position among its competitors. The unique design of the water-cooled combustion chamber provides for extremely low nitrous oxide emissions during combustion.

Highly efficient heat transfer

The Vertomat boiler has two return connections, one in the upper part of the boiler in the area of the combustion chamber, and the other at the end of the condensing heat exchanger surface. Heating zones with higher return temperatures are connected to the upper connection, those with lower return temperatures to the lower connection. This results in increased condensation of the flue gases; the boiler water within the boiler is in counterflow direction to the flue gases, and a highly efficient heat transfer is achieved.



Flue gas passage within the gas-fired condensing boiler Vertomat

Long burner cycles – low stand-by losses

With modulating burners, the heat output of a Vertomat in a wide operating range can be modulated according to the heat requirement at any given time. The burner is operating almost continuously, except when interrupted by the programmed control for safety checks. Due to the long burner operating cycles, stand-by losses are reduced to a minimum.

Flue gas venting required

Even with gas-fired condensing boilers, the flue gases still contain a certain amount of residual moisture. Furthermore, they are cooled to the point where their natural updraft is no longer sufficient. Therefore, the flue gas vents must be suitable for positive draft and withstand condensate.

Conventional chimneys are not suitable in this application.

Because of the low flue gas temperature and the resulting low vent draft, as well as the further condensation of the flue gases in the flue gas venting system, the flue vent must be properly calculated by the chimney supplier and constructed of suitable materials such as stainless steel.

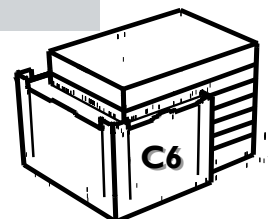
Technical Data Vertomat – angled boiler version, single vessel

Boiler model		VSB-10	VSB-13
Input	MBH	396	488
	KW	116	143
Output	MBH	381	469
	KW	112	137
Dimensions			
Length	mm	1084	1275
	inches	42 $\frac{3}{4}$	50 $\frac{1}{4}$
Width	mm	686	686
	inches	27	27
Height	mm	1663	1712
	inches	65 $\frac{1}{2}$	67 $\frac{1}{2}$
Overall weight	kg	319	356
	lbs	702	783

Technical Data Vertomat – straight boiler version, sectional vessel

Boiler model		VSB-17	VSB-22	VSB-28	VSB-37	VSB-46	VSB-57	VSB-72	VSB-89
Input	MBH	638	846	1071	1389	1726	2160	2702	3361
	KW	187	248	314	407	506	633	792	985
Output	MBH	614	814	1030	1336	1660	2078	2599	3233
	KW	180	238	302	391	486	609	761	947
Dimensions									
Length	mm	1583	1671	1752	1828	1906	2062	2172	2366
	inches	62 $\frac{3}{4}$	65 $\frac{3}{4}$	69	72	75	81 $\frac{1}{4}$	85 $\frac{1}{2}$	93 $\frac{3}{4}$
Width	mm	799	799	799	916	916	916	990	990
	inches	31 $\frac{1}{2}$	31 $\frac{1}{2}$	31 $\frac{1}{2}$	36	36	36	39	39
Height	mm	1943	1993	2032	2280	2280	2280	2537	2537
	inches	76 $\frac{1}{2}$	78 $\frac{1}{2}$	80	89 $\frac{3}{4}$	89 $\frac{3}{4}$	89 $\frac{3}{4}$	100	100
Overall weight	kg	505	615	680	780	905	965	1370	1520
	lbs	1111	1353	1496	1716	1991	2123	3014	3344

Outputs are based on a 96.2% thermal efficiency rating as per ANSI Z21.13, and CSA 4.9 - 2000.



Domestic Hot Water Heater Characteristics, Model LW-500

A.O. SMITH



HOT WATER SUPPLY BOILER
MODEL LW-500, 750 and 1000

FEATURES

ADVANCED COMBUSTION TECHNOLOGY WITH LOW NO_x — Features the very latest in pre-mix burner technology. Gas and air are precisely mixed for optimum burner performance—assures 90% thermal efficiency.

HIGH EFFICIENCY SEALED COMBUSTION — Increases efficiency while reducing NO_x. Environmentally friendly.

EXCLUSIVE HEAT EXCHANGER DESIGN — A new, extruded copper design exposes more surface area to the combustion system. This increases the transfer of heat for maximum efficiency. This unique self-baffling design (patent pending) is a dramatic improvement over existing heat exchanger. No baffles.

BUILT FOR YEARS OF RELIABILITY — All waterways are 100% copper, brass or bronze for long life. These quality metals, with similar metallurgical characteristics, greatly reduce stress on connectors and minimize the possibility of leaks. Impervious to thermal shock.

GASKET-LESS A.S.M.E. HEAT EXCHANGER — This superior design assures reliability and longevity. No deterioration of gaskets exposed to heat and pressure.

FACTORY TESTED — Every Legend boiler is water and fire-tested to assure proper operation.

HOT SURFACE IGNITION — Provides reliable 120 volt ignition. Ignitor can be inspected without removing the burner. Easily serviceable.

CIRCULATING PUMP - standard — This enclosed circulating pump is mounted in front of the unit. For cooler operation away from venting and easier to maintain.

ALL STAINLESS STEEL BURNER — Radial fired design. Laser-welded, corrosion resistant Inconel™ 625 superalloy for years of reliable performance. No moving parts. 5 year warranty on burner.

COMPACT DESIGN — Saves valuable space. Allows ease of entry and modular installations. Zero clearance, on sides, for maximum adaptability. Ideal for retrofits!

DIA-SCAN™ SELF-DIAGNOSTIC SYSTEM — Exclusive solid state system monitors 15 operating and safety control functions. LED indicators continuously display operating temperatures. Helps keep operation and trouble-shooting simple and easy.

VENTING FLEXIBILITY — Multiple venting options to choose from. They allow for direct/sealed vent with protection from flue recirculation.

MODELS FOR EVERY NEED — The Legend 2000 boiler is available in 500,000, 750,000 and 1,000,000 BTU models.

EASY ACCESS DOOR — Just lift up and out. Permits optimum access to components and controls. Total jacket cabinetry can be removed while unit is running. No pressurized jacket or gaskets.

OTHER FEATURES

ASME #160 W.P. • ASME Pressure Relief Valve • Pump and flow switch mounted • Brass Drain Valve • Pre-wired for Building Management Control • Low Gas Pressure Switch • Low Air Pressure Switch • Digital Thermometers • Manual Reset -Hi Limit

OPTIONS

CSD-1 • Illinois School Code • IRI • Sequencing Panel • Control Packages • Through-the-wall-venting • Direct/Sealed Vent Kit • Skid Mounted Systems



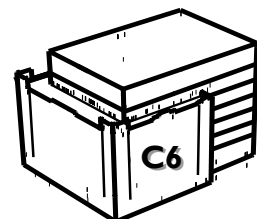
MEETS OR EXCEEDS ASHRAES 90.1B-1992

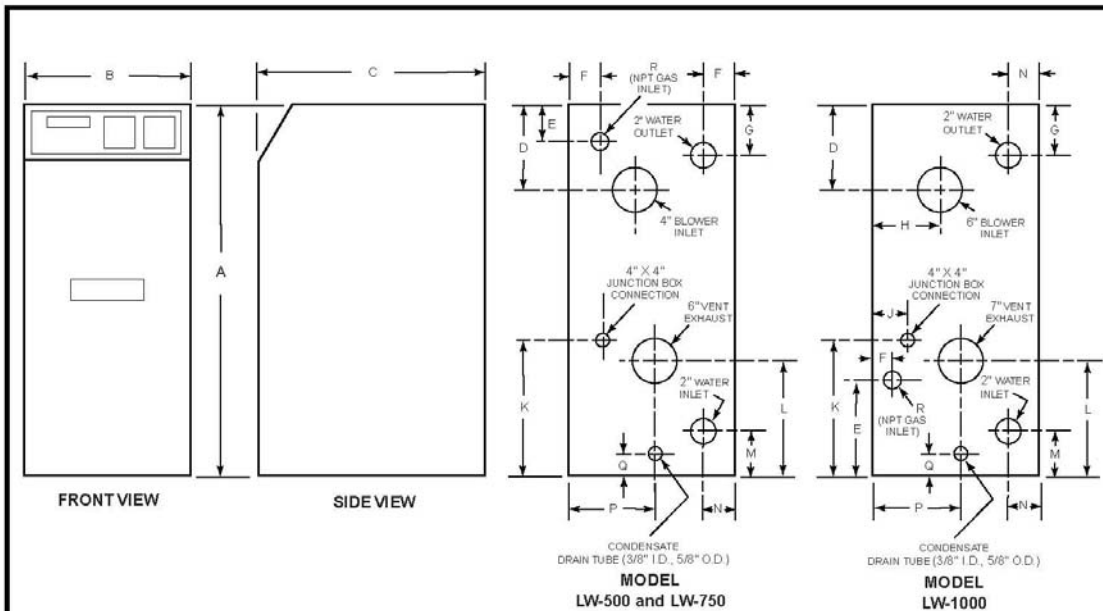
LIMITED WARRANTY OUTLINE

If the heat exchanger modules should fail within 5 years, under the terms of the warranty, A. O. Smith will furnish a replacement part; installation, labor, handling and local delivery extra. **THIS OUTLINE IS NOT A WARRANTY.** For complete information, consult the written warranty or A. O. Smith Water Products Company.

Warranty does not apply to product installed outside of the United States of America or its territorial possessions and Canada.

PROFESSIONAL START-UP SERVICE FURNISHED TO ASSURE OPTIMUM PERFORMANCE FOR EACH INSTALLATION. ALL UNITS ARE 100% TESTED AND ADJUSTED AT FACTORY.





All Dimensions in Inches

Models	BTU Input Per Hr. Nat. Only	Vent Size	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	Approx. Ship. Wt. (Lbs.)
LW-500	500,000	6	53	23	32	13 1/2	4 3/8	3 1/4	6 3/8	7 1/2	3 1/2	19	16 1/4	5	5 1/4	11 1/2	2	1	425
LW-750	750,000	6	53	23	32	13 1/2	4 3/8	3 1/4	6 3/8	7 1/2	3 1/2	19	12 1/4	5	5 1/4	11 1/2	2	1	528
LW-1000	1,000,000	7	60 1/2	27 1/8	38 3/16	13 3/4	15 1/2	3 1/2	8 1/8	8 1/4	3 1/2	21	12 1/2	6 3/4	4 1/8	13 3/8	2 1/4	1 1/4	934

RECOVERY CAPACITIES

Model	Input Rating BTU/Hr.	Thermal Efficiency %	Temperature Rise - Degrees F - Gallons Per Hour											
			40	50	60	70	80	90	100	110	120	130	140	
LW-500	500,000 Natural	90%	GPH	1364	1091	909	779	682	606	545	496	455	420	390
	450,000 Propane		GPH	1227	982	818	701	614	545	491	446	409	378	351
LW-750	750,000 Natural	90%	GPH	2045	1636	1364	1169	1023	909	818	744	682	629	584
	675,000 Propane		GPH	1841	1473	1227	1052	920	818	736	669	614	566	526
LW-1000	1,000,000 Natural	90%	GPH	2727	2182	1818	1558	1364	1212	1091	992	909	839	779
	860,000 Propane		GPH	2345	1876	1564	1340	1173	1042	938	853	782	722	670

The boiler is approved for installation on combustible flooring in an alcove with minimum clearances to combustibles of:

4" Rear ; 0" Top and Sides ; 6" Vent

Sufficient area should be provided at the front and rear of the unit for proper servicing.

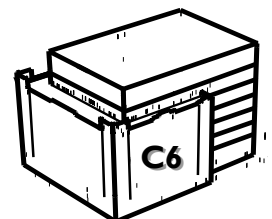
Complete installation and operating instructions are contained in the manual provided with each unit.

This boiler is not recommended for use as an instantaneous heater.

Gas supply pressure 13.8" W.C. maximum natural and propane; 7.0" W.C. minimum natural, 11.0" W.C. minimum propane.

The LEGEND 2000 must be connected to a single phase line source that is: 120 Volt, 60 Hertz, 30 Amps.

A 013.2



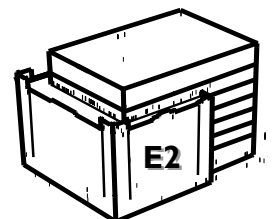
E-2 Domestic Geothermal Equipment

Operating Characteristics FHP water-to-air geothermal units

Taken From FHP's Energy Consumption Software

GT 18 4 gpm	Cooling	fan: cfm	Smallest Operating Load		Largest Operating Load	
			up to 420	after 420	750	Heat Rejection Rate
		total MBtuH	14.22	14.3	15.659	18.44319
		power input kw	0.775	0.745182	0.816	0.820589
		leaving fluid temp	68.59		69.4	
		percent full load	0.908103966	0.913213	100	
		percent full load energy	0.949754902	0.913213	100	
	Heating	total MBtuH	12.831	12.9	14.024	17.33705
		power input kw	0.979	0.893176	0.971	0.97511
		leaving fluid temp	45.17		44.55	
		percent full load	0.914931546	0.919852	100	
		percent full load energy	1.008238929	0.919852	100	

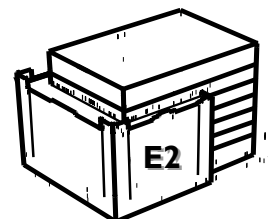
GT 24 5 gpm	Cooling	fan: cfm	Smallest Operating Load		Largest Operating Load	
			up to 670	after 670	900	Heat Rejection Rate
		total MBtuH	22.688	22.8	23.938	28.25418
		power input kw	1.233	1.204863	1.265	1.272016
		leaving fluid temp	70.96		71.51	
		percent full load	0.94778177	0.952461	100	
		percent full load energy	0.974703557	0.952461	100	
	Heating	total MBtuH	22.125	22.3	23.105	28.7348
		power input kw	1.674	1.592512	1.65	1.656772
		leaving fluid temp	43.31		42.88	
		percent full load	0.957584938	0.965159	100	
		percent full load energy	1.014545455	0.965159	100	



Operating Characteristics FHP water-to-air geothermal units

Taken From FHP's Energy Consumption Software

GT 30 5 gpm	Cooling	fan: cfm	Smallest Operating Load		Largest Operating Load	Heat Rejection Rate
			up to 750	after 750	1275	
		total MBtuH	24.812	25	27.763	32.06894
		power input kw	1.348	1.136405	1.262	1.270137
		leaving fluid temp	67.99		68.71	
		percent full load	0.893707452	0.900479	100	
		percent full load energy	1.0681458	0.900479	100	
	Heating	total MBtuH	24.906	25.1	26.42	31.7086
		power input kw	1.723	1.472559	1.55	1.557743
		leaving fluid temp	44.83		44.26	
		percent full load	0.942694928	0.950038	100	
		percent full load energy	1.111612903	0.950038	100	





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Our **Geo-Thermal** units are recognized as the most efficient way to meet all your Heating and Cooling needs. Available in Vertical and Horizontal models from 3/4 to 6 tons, Split models from 2 to 6 tons and Counterflow models 1/2 to 6 tons. Unlike air-to-air units, FHP's **GT Series** utilize the earth's ability to conserve energy. At a depth of 30 feet, ground water maintains a constant temperature within a single degree throughout the year. Even during temperature extremes, this system maintains its superior efficiencies. This temperature stability can be utilized by Well Water and Geothermal (Geoexchange) systems. Our **GT Series** is specifically designed for applications with fluid temperatures from 25°F to 110°F.

GT SERIES "Geo-Thermal"



- **ENVIRONMENTALLY SAFE** The Earth Coupled Systems emit no discharges or pollution. The ground water in the Well Water System is never exposed to the atmosphere and also causes no pollution.
- **REAL COST SAVINGS** Savings from 50% to 70% in heating bills and up to 40% in cooling costs... Plus you can get HOT WATER during the summer months with a Waste Recovery Unit.
- **RELIABILITY** With over 30 years of experience in heat pump technology behind every FHP unit, you can be sure of a quality product that will give you many years of trouble free service.

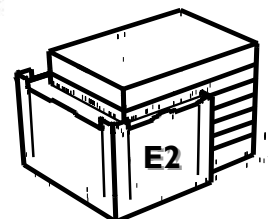
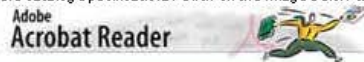


Download Complete GT Series Catalog Specifications and Drawings

Click "GT Series Specifications" below to start download
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[GT Series Installation and Maintenance](#)

You will need to have Acrobat Reader 5.0 or later in order to view the catalog specifications. Click on the image below to go get it.



		ARI / ISO 13256-1 PERFORMANCE DATA											
		ENTERING WATER TEMPERATURES											
MODEL	CFM	Water Loop				Ground Water				Ground Loop			
		86° F	68° F	59° F	50° F	77° F	32° F						
		CAPACITY AND EFFICIENCY DATA											
		COOLING CAPACITY (WLHP)	EER (WLHP)	HEATING CAPACITY (WLHP)	COP (WLHP)	COOLING CAPACITY (GWHP)	EER (GWHP)	HEATING CAPACITY (GWHP)	COP (GWHP)	COOLING CAPACITY (GLHP)	EER (GLHP)	HEATING CAPACITY (GLHP)	COP (GLHP)
GT010	350	10,500	14.0	13,000	4.7	12,000	21.2	10,500	4.1	11,000	16.1	8,300	3.4
GT018	550	15,500	16.0	16,300	5.0	17,200	24.0	13,200	4.4	16,000	18.3	10,600	3.7
GT024	800	23,500	14.2	28,500	4.6	26,400	21.0	23,200	4.1	24,500	16.2	18,200	3.5
GT030	1000	28,000	16.0	33,200	5.7	30,000	24.0	26,000	4.7	29,000	18.5	19,000	4.0
GT036	1200	34,000	14.6	40,500	5.1	37,800	21.5	32,400	4.4	35,000	17.0	24,500	3.5
GT042	1400	39,600	14.8	48,500	5.3	44,000	21.2	39,000	4.5	41,000	16.6	30,000	3.7
GT048	1600	47,000	13.8	58,000	5.0	52,000	20.1	47,000	4.2	49,000	15.8	36,500	3.5
GT054	1800	51,000	13.3	62,000	4.4	57,000	18.8	52,000	4.0	52,000	14.6	41,000	3.4
GT062	2000	60,000	12.5	77,000	4.5	65,000	17.5	60,000	4.0	60,500	14.0	48,000	3.2
GT070	2200	68,000	12.5	82,000	4.6	76,000	18.7	66,000	3.8	69,000	13.9	53,000	3.4

Tabulated performance data is at noted entering water temperatures and entering air condition of 80.6° F DB / 66.2° F WB at ARI / ISO 13256-1 rated CFM.

DIMENSIONS						
MODEL	VERTICAL/C. FLOW			HORIZONTAL		
	W	D	H	W	D	H
GT010	21.50	21.50	32.25	25.50	43.00	21.75
GT018	21.50	21.50	40.25	25.50	45.00	21.75
GT024	21.50	21.50	39.25	25.50	43.00	21.75
GT030, 036	21.50	26.00	47.25	26.00	54.50	21.75
GT042, 048	24.00	32.75	47.25	30.00	68.00	21.75
GT054, 062	26.00	33.25	51.25	30.00	68.00	21.75
GT070	26.00	33.25	58.25	30.00	78.00	21.75

Water connection side of all models is considered front in order to properly determine width (W), depth (D), and height (H).

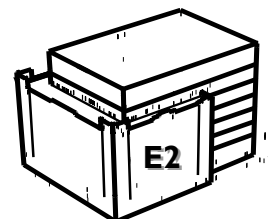
Due to continued technological advancements all specifications are subject to change without notice

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Energy Wise Heating and Air Conditioning Equipment

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This page last updated on October 18, 2005



ROOFTOP PACKAGE UNITS
DWY/DWC/DGY SERIES
WATER SOURCE HEAT PUMPS



HIGH EFFICIENCY ROOFTOP UNITS

- DWY – WATER LOOP HEAT PUMP**
- DWC – WATER LOOP COOLING ONLY**
- DGY – GROUND LOOP HEAT PUMP**

FHP packaged down-flow rooftop units are adaptable to a wide variety of applications including offices, schools, hotels, shopping centers and retirement communities.

The units are available in three configurations, water loop, geothermal and cooling only to meet your requirements.

- High efficiency in the cooling and heating modes
- Factory supplied roof curbs allow positioning on the roof above the conditioned space minimizing duct work
- All units are fully charged and run tested in both cooling and heating modes for trouble free startup
- Units designed to conform to appropriate UL/ANSI Standards by ETL or other nationally recognized testing laboratory.



Unit Performance

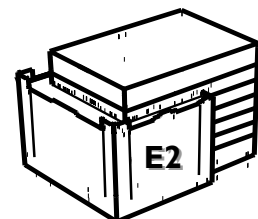
Model	DWY & DWC – Water Loop				DGY – Ground Loop			
	Btuh Cooling	EER	Btuh Heating	COP	Btuh Cooling	EER	Btuh Heating	COP
036	34,500	14.1	42,900	4.4	35,800	14.9	24,100	3.5
048	49,600	13.0	59,600	4.5	52,000	14.9	35,000	3.5
060	60,600	12.8	73,000	4.6	60,200	14.1	47,000	3.2
072	75,200	12.8	83,300	4.6	76,300	15.9	55,400	3.7
096	95,000	12.5	113,000	4.2	96,000	13.5	71,400	3.2
120	119,000	12.0	140,000	4.0	120,000	13.4	93,100	3.2
150	150,700	12.5	185,000	4.3	154,000	13.6	120,500	3.2
180	171,900	13.9	208,000	4.6	178,200	15.7	133,600	3.5
240	229,800	12.5	287,100	4.3	236,900	14.5	180,600	3.4
300	276,400	13.6	343,100	4.6	285,000	14.8	230,000	3.6
360	376,500	12.4	459,100	4.2	383,100	14.0	304,100	3.2
420	426,700	12.1	550,000	4.2	440,000	13.4	369,600	3.2

Rating in accordance with ISO Standard 13256-1

Application Range

DWY heat pumps and DWC cooling only units are designed to operate on a cooling tower/boiler system with loop entering fluid temperatures between 55 °F and 95 °F.

DGY ground loop units are designed to operate with ground loop fluid temperatures between 30 °F and 100 °F.



User: JennyHamp
 Email: jeh305@psu.edu
 Date: 03 / 16 /06

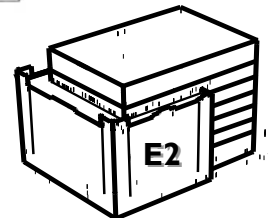


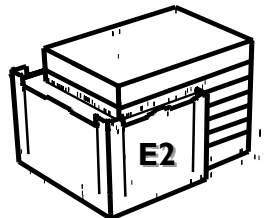
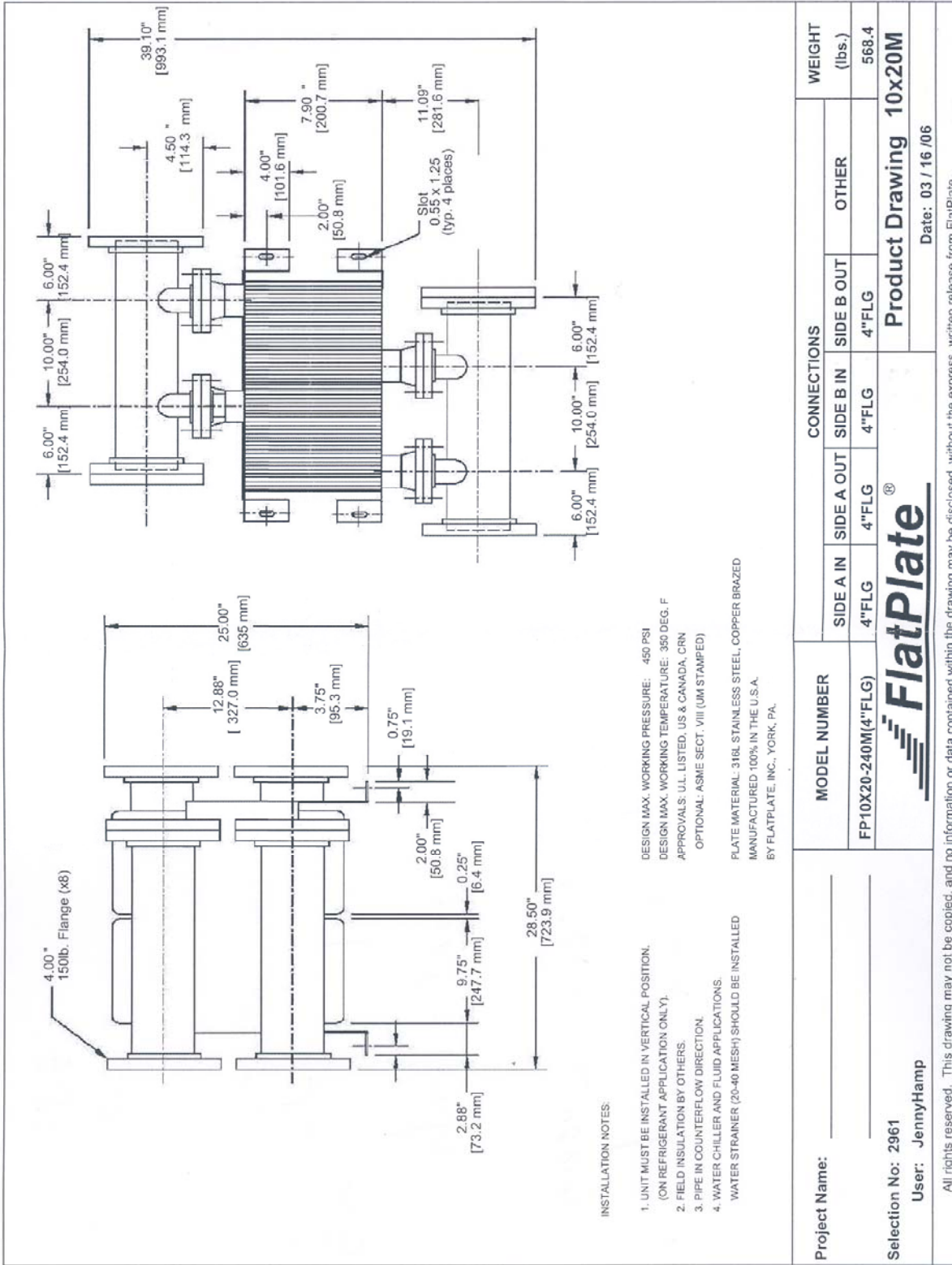
Cytec Building, 2161 Pennsylvania Avenue, York, Pennsylvania 17404
 800-774-0474 - (717) 767-9060 - Fax (717) 767-9160 - apps@flatplate.com

Project Name: _____

Selection No: 2961

Design Conditions		
	Side A (HOT)	Side B (COLD)
Fluid Type:	Water	Water
Mass Flow Rate:	1941.5 lbs/min	2501.4 lbs/min
Entering Fluid Temp:	71.0 °F	55.4 °F
Leaving Fluid Temp:	60.0 °F	63.9 °F
Flow rate:	233.0 GPM	300.0 GPM
Fouling Factor:	0.0001 °F-SqFt-H/BTU	0.0001 °F-SqFt-H/BTU
Pressure Drop:	5.1 PSI	8.2 PSI
Model Parameters:		
Number of Channels:	59	60
Velocity:	0.91 ft/sec	1.15 ft/sec
Heat Transfer Coefficient:	1994	2288
Internal Volume:	1,213 cu.ft.	1,234 cu.ft.
Heat Transfer Rate:	1,280,406 BTUH	Nominal Surface: 309.7 sq.ft.
LMTD:	5.7 °F	Over-Surface: 22.1 %
Overall Uo:	878	Net Weight: 568.4 lbs
Model No:	FP10X20-240M(4"FLG)	
Notes:	See Page 2	





Log Mean Temp Difference of Heat Exchanger used to calculate pump energy

$$Q = W1 \cdot [t1i - t1o]$$

$$Q = ua \cdot \left[\frac{t1i - t2o - (t1o - t2i)}{\ln \left(\frac{t1i - t2o}{t1o - t2i} \right)} \right]$$

$$Q = W2 \cdot [t2o - t2i]$$

$$W1 = 233$$

$$W2 = 300$$

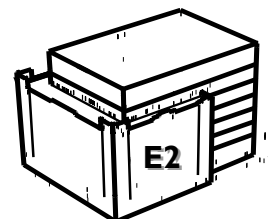
$$t1i = 71$$

$$t1o = 60$$

$$t2i = 55.4$$

$$t2o=63.9$$

$$ua = 446$$



EW Reversible Chiller 60Hz Submittal Data



9000 Conservation Way
Fort Wayne, IN 46809

Contractor: _____ P.O.: _____
Engineer: _____
Project Name: _____ Unit Tag: _____

E SERIES
EW Reversible Chiller
Submittal Data
Models EW360 & EW540
60Hz - R410a
English Language/IP Units

REVISION: 03/06



SD1480

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Revision: 03/06

Page _____ of _____

EW Reversible Chiller 60Hz Submittal Data



Contractor: _____ P.O.: _____
Engineer: _____
Project Name: _____ Unit Tag: _____

ARI/ASHRAE/ISO 13256-2
WATER TO WATER RATINGS

English (IP) Units

Model	Capacity	Load Liquid Flow (gpm)	Source Liquid Flow (gpm)	Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump					
				Cooling		Heating		Cooling		Heating		Cooling		Heating			
				Load 53.6°F Source 86°F		Load 104°F Source 68°F		Load 53.6°F Source 59°F		Load 104°F Source 50°F		Source °F		Load 53.6°F		Load 104°F	
Capacity Btuh	EER Btuh/W	Capacity Btuh	COP	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP	Source °F	Capacity Btuh	EER Btuh/W	Source °F	Capacity Btuh	COP				
EW360	Full	86.0	86.0	335,000	13.6	452,600	4.1	-	-	-	-	77	351,000	15.4	32	296,500	3.0
	Part	86.0	86.0	175,000	14.4	237,600	4.4	-	-	-	-	68	191,500	18.7	41	170,000	3.3
EW540	Full	135.0	135.0	533,400	13.8	691,200	4.1	-	-	-	-	77	558,500	15.6	32	485,800	3.1
	Part	135.0	135.0	277,300	14.5	359,400	4.3	-	-	-	-	68	302,800	18.6	41	282,600	3.5

Notes: All ratings based upon lower Voltage operation of dual voltage rated units. Load coil also called "Indoor" and Source coil also called "Outdoor". "-" not rated.

Metric (SI) Units

Model	Capacity	Load Liquid Flow (lps)	Source Liquid Flow (lps)	Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump					
				Cooling		Heating		Cooling		Heating		Cooling		Heating			
				Load 12°C Source 30°C		Load 40°C Source 20°C		Load 12°C Source 15°C		Load 40°C Source 10°C		Source °C		Load 12°C		Load 40°C	
Capacity Watts	EER (W/W)	Capacity Watts	COP	Capacity Watts	EER (W/W)	Capacity Watts	COP	Source °C	Capacity Watts	EER (W/W)	Source °C	Capacity Watts	COP				
EW360	Full	5.43	5.43	98,183	4.0	132,649	4.1	-	-	-	-	25	102,872	4.5	0	86,899	3.0
	Part	5.43	5.43	51,290	4.2	69,637	4.4	-	-	-	-	20	56,125	5.5	5	49,824	3.3
EW540	Full	8.52	8.52	156,331	4.0	202,579	4.1	-	-	-	-	25	163,687	4.6	0	142,380	3.1
	Part	8.52	8.52	81,272	4.2	105,334	4.3	-	-	-	-	20	88,746	5.5	5	82,825	3.5

Notes: All ratings based upon lower Voltage operation of dual voltage rated units. Load coil also called "Indoor" and Source coil also called "Outdoor". "-" not rated.

ARI 550 CHILLER RATINGS

English (IP) Units

Model	Capacity	Load Liquid Flow (gpm)	Source Liquid Flow (gpm)	Cooling	
				Leaving Load 44°F Ent Source 85 °F	
				Capacity Btuh	EER Btuh/W
EW360	Full	69.0	86.0	345,000	14.0
	Part	69.0	86.0	179,400	14.8
EW540	Full	108.0	135.0	540,000	14.3
	Part	108.0	135.0	280,800	15.0

Notes: All ratings based upon lower Voltage operation of dual voltage rated units. Load coil also called "Indoor" and Source coil also called "Outdoor".

SD1480

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Revision: 03/06

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Metric (SI) Units

Model	Capacity	Load Liquid Flow (lps)	Source Liquid Flow (lps)	Cooling	
				Leaving Load 12°C Ent Source 30°C	
				Capacity Watts	EER (W/W)
EW360	Full	4.35	5.43	101,114	4.1
	Part	4.35	5.43	52,579	4.3
EW540	Full	6.81	8.52	158,265	4.2
	Part	6.81	8.52	82,298	4.4

Notes: All ratings based upon lower Voltage operation of dual voltage rated units. Load coil also called "Indoor" and Source coil also called "Outdoor".

