

# DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK CITY OF PORTLAND BUILDING PERMIT



This is to certify that WILLIAM G III BECKER

Located At 66 BIRCHWOOD DR

Job ID: 2012-09-5003-HVAC

CBL: 278A- E-006-001

has permission to Installing an electric Steffes 5130 heat system

provided that the person or persons, firm or corporation accepting this permit shall comply with all of the provisions of the Statues of Maine and of the Ordinances of the City of Portland regulating the construction, maintenance and use of the buildings and structures, and of the application on file in the department.

Notification of inspection and written permission procured before this building or part thereof is lathed or otherwise closed-in. 48 HOUR NOTICE IS REQUIRED. A final inspection must be completed by owner before this building or part thereof is occupied. If a certificate of occupancy is required, it must be

#### **Fire Prevention Officer**

Code Enforcement Officer / Plan Reviewer

THIS CARD MUST BE POSTED ON THE STREET SIDE OF THE PROPERTY PENALTY FOR REMOVING THIS CARD

#### BUILDING PERMIT INSPECTION PROCEDURES Please call 874-8703 or 874-8693 (ONLY) or email: buildinginspections@portlandmaine.gov

With the issuance of this permit, the owner, builder or their designee is required to provide adequate notice to the city of Portland Inspections Services for the following inspections. Appointments must be requested 48 to 72 hours in advance of the required inspection. The inspection date will need to be confirmed by this office.

- Please read the conditions of approval that is attached to this permit!! Contact this office if you have any questions.
- Permits expire in 6 months. If the project is not started or ceases for 6 months.
- If the inspection requirements are not followed as stated below additional fees may be incurred due to the issuance of a "Stop Work Order" and subsequent release to continue.

The project cannot move to the next phase prior to the required inspection and approval to continue, REGARDLESS OF THE NOTICE OF CIRCUMSTANCES.

IF THE PERMIT REQUIRES A CERTIFICATE OF OCCUPANCY, IT MUST BE PAID FOR AND ISSUED TO THE OWNER OR DESIGNEE BEFORE THE SPACE MAY BE OCCUPIED.



Strengthening a Remarkable City, Building a Community for Life . www.portlandmaine.gov

Director of Planning and Urban Development Jeff Levine

Job ID: 2012-09-5003-HVAC

Located At: 66 BIRCHWOOD DR

CBL: 278A- E-006-001

#### **Conditions of Approval:**

#### Building

Equipment shall be installed in compliance with the manufacturer's specifications and the UL listing.

## 2012-09-5003

### Low Voltage Wall Thermostat, Sensor, and Compressor Connections

- 24 VAC wall thermostat must be used.
- A digital wall thermostat is recommended for use with Comfort Plus Systems. If utilizing a mechanical wall thermostat, it may be necessary to add a load resistor (250 ohm, 5 watt) due to the low current draw (.01 amps) on the heat call input circuit.
- In heat pump applications, the Honeywell brand thermostat is recommended and shown in the wiring schematic.
- An outdoor temperature sensor is included with the system to provide outdoor temperatures for automatic charge control (regulation of stored heat).

#### Single Hydronic Heating Zone Application



#### **Terminal Block Code Designations**

- R = Low Voltage Hot
- C = Low Voltage Common
- Y = Compressor/Stage 1 Heat Call
- Y2 = Compressor Output
- G = Fan Call
- O = Reversing Valve Input
- O2 = Reversing Valve Output
- W = Stage 2 Heat Call
- H = Hydronic Heat
- OS = Outdoor Temperature Sensor
- SC = Outdoor Temperature Sensor Common
- DS = Duct Temperature Sensor

<b>Specifications for Standar</b>	d 240V/	AC Sys	tems			and and a subset of the second second	
MODEL	5120		5130		51.40		
Charging Input (See Note 1)	14.0 kW	19.2 kW	24.8 kW	28.8 kW	37.2 kW	38 4 LW	40 45 6 hW
Element Current Draw	59 AMPS	80 AMPS	104 AMPS	120 AMPS	155 AMPS	160 A MDS	43.0 KW
Element Circuits Required (See Note 2)	3-30 AMP	3-40 AMP	3-50 AMP	4-40 AMP	1-50 AMD	100 AM 5	190 AMPS
Pump/Blower/Controls Circuit Required			o bornin	1 10 / 101	4-30 AMI	4-30 AMP	4-00 AMP
(See Note 2)			One 15 AM	P (10 AMPS 1	naximum loa	d)	
Pump Voltage			120V (Ne	eutral Conduct	or Required)		······
Blower/Controls Voltage	240V or 209V						
Storage Conspity (Geo Mate 2)	120 kWh		180 kWb		240 1-107		
Storage Capacity (See Note 3)	(426 500 BTLD)		(D)	(614 160 BTID)		(919 990 DTID	
Approximate Installed Weight	2 218 lbs		3.046 lbs		(818,880 B10)		
Pipe Size – Water Inlet/Water Outlet		2,210 105		1"	0 105		4 105
Output Water Temperature Selection Range	500E to 1050E						
Maximum Working Pressure	50 P0(0			·····			
Minimum Flow Rate (primary loop)	1 GPM per 10 000 PTU of required output of 200PU						
Maximum Maintainable Heat Loss (See Note 3)	1 GI WI per	10,000 D1 (	Joi lequiled	output at 20-1	temperature	rise (10 GPM	maximum)
8 Consecutive Charge Hours (BTU/hr)	20.414	28 013	24 100	42.002	40,001		
12 Consecutive Charge Hours (BTU/hr)	30 621	42 002	34,100 45,550	42,002	49,201	55,991	65,613
18 Consecutive Charge Hours (BTU/hr)	45 931	42,002	43,330	02,986	65,613	84,003	87,484
	45,951	02,980	81,376	94,478	122,047	125,971	131,225

Note 1: Standard configuration (240V) systems can be connected to 208V; however, the charging input of the system will be derated by 25%. If 208V specific charging voltage is required, it is available as a special factory order. For 277V systems, refer to the 7100 series.

Note 2: Unit is factory configured to be field connected to multiple line voltage circuits. If single feed to the elements and pump/blower/system controls circuits is desired, an optional single feed kit is available to order.

Note 3: The size and heating ability of the system required for an installation is dependent on the heat loss of the area and the power company's off-peak hours. In addition, if the unit is not installed within the heated area, heat lost statically must be taken into account when sizing a system. Contact Steffes Corporation for assistance in selecting an appropriately sized system.

#### **Optional Steffes Air Handler**

The Steffes Air Handler is an optional device designed to interface to the Comfort Plus Hydronic (5100 Series) furnace to allow it to provide forced air heating as a stand alone furnace or as a supplement to other ducted heating systems such as a heat pump. When used with a heat pump, it allows the Comfort Plus Hydronic furnace to serve as the back-up heat source and to provide comfort modulation. Heat pumps can be operated to much lower temperatures allowing for full utilization of its efficiency and optimizing system performance. A duct sensor constantly monitors outlet air temperature and modulates the precise amount of stored off-peak heat needed to eliminate cool and uncomfortable discharge air temperatures typically associated with heat pump systems during cool outdoor temperatures. The air handler will also direct the heat lost statically through the furnace's outer panels into the ductwork for delivery to the living space (automatic static heat recovery). The internal controls of the Comfort Plus Hydronic furnace automatically regulate the operation of the air handler. The Steffes Air Handler includes a return plenum, supply air blower, water coil, and air filter. It is painted and fully insulated. The Air Handler attaches directly to the right side of the Steffes furnace.

SPECIFICATIONS	½ HP, 60 HZ Variable Speed (ECM) Air Handler	1 HP, 60 HZ Variable Speed (ECM)
Order Item Number	1302132	1302124
Dimensions (H x L x D)	72 11/16" x 23 ½" x 23 7/8"	75 11/16" x 26 ½" x 23 7/8"
Approximate Weight	200 lbs	225 lbs
Maximum Static Pressure (inches water column)	.75 inches H <sub>2</sub> 0	.75 inches $H_{2}0$
Maximum Water Coil Output	60,000 BTU/hr	90.000 BTU/hr
Maximum Outlet Temperature	120°F	120°F
A-Coil Tray - Front Access (H x L x D)	30" x 22 5/16" x 22 3/4"	33" x 25 5/16"x 22 3/4"
Filter Dimensions	20" x 20" x 2"	25" x 20" x 2"
Voltage	240/208 VAC	240/208 VAC
Wattage	560W	1.050W
CFM ratings	1000, 1200, 1400, 1600	1200, 1400, 1600, 2000

<sup>1</sup>/<sub>2</sub> HP configuration can accommodate most 1.5 to 4 ton heating/cooling coils

- I HP configuration can accommodate most 3 to 5 ton heating/cooling coils
- The 1 HP air handler 90,000 BTU/hr water coil output may decrease when using heating/cooling coils smaller than 5 tons
  Interfaces to multi-speed air conditioners or heat pumps. When interfaced to a 2-stage air conditioner or heat pump, the ECM motor will operate at 70% of the selected air flow in low speed (Stage 1) compressor mode. If 50% air flow is required in low speed, a Stage 1 speed adjusting relay must be installed. Steffes recommends the Allen Bradley Relay #700-HA32A24 with Relay Base #700-HN125 or equivalent.



Steffes Corporation • 3050 Hwy 22 North • Dickinson, ND 58601-9413 • 888-783-3337

#### City of Portland, Maine - Building or Use Permit Application

389 Congress Street, 04101 Tel: (207) 874-8703, FAX: (207) 8716

Job No: 2012-09-5003-HVAC	Date Applied: 9/2072012 i4		CBL: 278A- E-006-001			
Location of Construction: 66 BIRCHWOOD DR	Owner Name: SALLY & JEFF ANDER	SON	Owner Address: 66 BIRCHWOOD E PORTLAND, ME 0	PR 4102		Phone:
Business Name:	Contractor Name: BRIAN E GAGNE		Contractor Addre 10 FOREST LN C	SS: UMBERLAND CTR	MAINE 04021	Phone: 232-2609
Lessee/Buyer's Name:	Phone:		Permit Type: HVAC			Zone: R-3
Past Use: Single Family Dwelling	Proposed Use: Single Family Dwelling - to		Cost of Work: \$10,000.00			CEO District:
	install Steffes 5130 el heating system	lectric	Fire Dept: Signature:			Inspection: Use Group: 2:3 Type: 53 HVIAC Signature:
Proposed Project Description Installing an electric Steffes 5130 h	: neat system		Pedestrian Activi	ties District (P.A.I	D.) (	$\bigtriangledown$
Permit Taken By: Brad	ын с с , , , , , , , , , , , , , , , , ,		L	Zoning Appro	val	
<ol> <li>This permit application d Applicant(s) from meetin Federal Rules.</li> <li>Building Permits do not i septic or electrial work.</li> <li>Building permits are void within six (6) months of t False informatin may inv permit and stop all work.</li> </ol>	loes not preclude the ag applicable State and include plumbing, d if work is not started the date of issuance. alidate a building	Special Zo Shoreland Wetland Flood Zo Subdivis Site Plan Maj Date:	one or Reviews ad s one sion $_Min - Min$ $_Ain - Min$	Zoning Appeal Variance Miscellaneous Conditional Use Interpretation Approved Denied Date:	Historic Pr Not in Dia Does not Requires Approved Approved Denied Date:	reservation st or Landmark Require Review Review W/Conditions

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the appication is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

SIGNATURE OF APPLICANT	ADDRESS	DATE	PHONE
RESPONSIBLE PERSON IN CHARGE O	OF WORK, TITLE	DATE	PHONE

FILL IN AND	Sign with Ink
APPLICATION HEATING OR PO	
H 2012 -09 - 5003 - HW To the INSPECTOR OF BUILDINGS, PORTLAND, ME. The undersigned hereby applies for a permit to insta accordance with the Laws of Maine, the Building Code of the 2080 Code of the Location / CBL UBSTCHWOOD Name and address of owner of appliance UEFF and ESO 66 Birchwood Dr Installer's name and address Brian Gagne 10	AL all the following heating, cooking or power equipment in the City of Portland, and the following specifications: Use of Building Date Forest Lane Cumber and Telephone 829-4179 232-2609
Location of appliance:	Type of Chimney:
□ Attic □ Roof	Factory built
Type of Fuel: Electric Gas Oil Solid	Metal Factory Built U.L. Listing #
Appliance Name: Steffes 5130	Direct Vent
U.L. Approved Yes D No	Type UL#
Will appliance be installed in accordance MEP the manufacture's installation instructions? Vester 1921 No SEP 1921	Type of Fuel Tank Size of Tank
The Type of License of Installer:	Number of Tanks
Master Plumber # $1628$ Solid Fuel # Oil # Gas # Other Electrical MS600 3648	Distance from Tank to Center of Flame feet. (0,000 Cost of Work: \$ Permit Fee: \$20
Approved	Approved with Conditions
Fire:	See attached letter or requirement
Ele.:	
Signature of Installer	Inspector's Signature Date Approved
White - Inspection Yellow - File Pi	nk - Applicant's Gold - Assessor's Copy



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Receipts Details:

**Tender Information:** Check , Check Number: 8054 **Tender Amount:** 120.00

Receipt Header:

Cashier Id: bsaucier Receipt Date: 9/20/2012 Receipt Number: 48432

Receipt Details:

Referance ID:	8080	Fee Type:	BP-Constr
Receipt Number:	0	Payment	
		Date:	
Transaction	120.00	Charge	120.00
Amount:		Amount:	
Job ID: Job ID: 201	2-09-5003-HVAC - Installing an electric Steffes 5	130 heat system	n
Additional Comm	ents: 66 Birchwood		

Thank You for your Payment!

# HYDRONIC SYSTEM

The Premier Off-Peak Hydronic Heating System for Radiant and Forced Air Heating



he Comfort Plus Hydronic system adds a new dimension to heating by blending hydronic heating with Electric Thermal Storage (ETS) technology. During off-peak hours, when electricity costs and energy usage generally are substantially lower, the Comfort Plus Hydronic unit converts electricity into heat and stores that heat in specially designed high-density ceramic bricks located inside the unit. Through the use of a heat exchanger, this stored heat is transferred as needed from the storage media to a water or glycol solution, which is circulated to areas where the heat is needed. The Comfort Plus Hydronic system has the ability to utilize off-peak, time of day (or time of use), demand-based or other preferential electric rates to generate considerable savings for the consumer, while delivering the many benefits associated with hydronic heating.

The system is extremely flexible and can handle multiple heating zones. Heat can be delivered via a radiant floor system, baseboard radiation, free standing radiators, a forced air system or almost any combination of zoned delivery systems. The Comfort Plus Hydronic System can also be used as a supplement to a single or multiple heat pump system installation. The built-in microprocessor provides the ability to easily adjust output water temperature, thereby reducing or eliminating the need for costly add-on controls.

The Comfort Plus Hydronic system is easy to operate. Just set the room thermostat to the desired comfort level and enjoy the safe, clean, reliable and economical heat this off-peak hydronic system provides.

- Low Cost Electric Heat (100% Efficient)
- Comfortable, Clean, Quiet, Even Heat
- Hydronic Heating with Electric Thermal Storage (ETS)
- Safe and Reliable
- Easy to Operate

Ideal for residential or commercial applications to include:

- Radiant Floor Systems
- Hydronic Baseboards
- Free Standing Radiators
- Supplemental Heat for a Heat Pump
- Make-up Alr Tempering and Demand Management



With the optional air handler, you can enjoy forced air heating and/or cooling in addition to radiant hydronic heating.



#### COMPONENTS

- 1 Programmable microprocessor-based control panel and digital display
- 2 Built-in circuit breakers for power disconnect
- 3 High density heat storage bricks
- 4 Electric heating elements
- 5 Primary water loop and accessories Required (separately ordered or contractor supplied)
  6 Air handler (optional) 1/2 HP or 1 HP high efficiency variable speed (ECM) blower with hydronic coil and air filter
  7 AC or heat pump coil (installer supplied if applicable)

#### OTHER FEATURES

- Automatic core charging based on outdoor temperature
  Easily selectable outlet water temperature or can automatically adjust based on outdoor temperature (outdoor reset feature)
  Digital display provides operating and servicing information
  Interfaces easily to heat pumps or air conditioners (if using air handler)

- Built-in power line carrier receiver
- Optional time clock module available for peak control

#### **SPECIFICATIONS** for standard 240V units 208V, 277V, and 347V configurations also available. Contact factory for technical specifications.

1WW = 3412 RTII/br 1WWh = 3412 RTII

MODEL	5120			(51	30 )	5140	
Charging Input	14.0 kW	19.2 kW	24.8 kW	28.8 kW	37.2 kW	38.4 kW	45.6 kW
Element Current Draw	59 amps	80 amps	104 amps	120 amps	155 amps	160 amps	190 amps
Element Circuits Required	(3) 30 amp	(3) 40 amp	(3) 50 amp	(4) 40 amp	(4) 50 amp	(4) 50 amp	(4) 60 amp
Pump and Blowers/Controls Circuit			1 - 15 amp (10 a	amps maximu	um load)		
nequireu	Unit is factory conf and blowers contro when making conr	igured with multiple ols circuits is desired nections in 3-phase a	line voltage, single p I, an optional single for applications.	hase circuit conn eed kit is availabl	ections. If single e. Phase balanci	feed to the elem ng is recommend	ent led
Storage Capacity		120 kWh 180 kWh 240 kWh (409,440 BTU) (614,160 BTU) (818,880 BTU			kWh 30 BTU)		
Approximate Installed Weight		2,218 lbs.		3,04	6 lbs.	3,89	4 lbs.
	Contact a building Adhere to all nation	contractor or archite nal and local electrica	ct if you have structu al and building code	ral weight conce placement requir	rns of the installa ements for elect	ation surface sele ric heating applia	icted. Inces.
Pipe Size - Water Inlet/Water Outlet	1"						
Output Water Temperature Selection Range	50°F to 185°F						
Maximum Working Pressure	20 PSIG Standard (Optional pressure relief valves providing 60 PSIG or 125 PSIG maximum working pressure available as special factory orders).						
Minimum Flow Rate (primary loop)	1 GPM per 10,000 BTU of required output at 20°F temperature rise (10 GPM maximum)						
Internal Pressure Drop (assuming 50% glycol mix)	.1 ft @	.1 ft @ 2 GPM .4 ft @ 6 GPM 1.1 ft @ 10 GPM			SPM		
Heating Ability Based on Charge Time							
8 Consecutive Charge Hours (BTU/hr)	20,414	27.996	32.808	41.994	49.212	55.992	65.615
12 Consecutive Charge Hours (BTU/hr)	30,621	41,994	43,774	62,991	65,615	83,988	87,487
6/4/6/8 Charge Strategy (BTU/hr)	30,621	41,994	54,242	62,991	81,363	83,988	99,738
	The size and heating the power company taken into account. system for your spur mid-day. (The heating delivery rate is the	ig ability of the syste y's off-peak hours. If Contact your local d acific charge strategy ing ability figures list listed value multiplie	m required for an ap the unit is not install lealer or power comp y. The 6/4/6/8 strateg ed have a heat use a d by .78 heat use far	plication is dependent within the heat any for assistance gy listed is 8 hour illowance factore ctor.)	ndent on the hea ated area, heat lo ce in selecting an s off-peak at nig d in for sizing pu	t loss of the area ss statically mus a appropriately siz ht plus 4 hours o rposes. Average I	and t be red ff-peak BTU

#### UNIT DIMENSIONS



NOTE: There are required installation clearances. Refer to technical data sheet available at www.steffes.com

#### WARRANTY

Steffes Corporation proudly offers product warranties. The heating system is covered by a five-year limited parts warranty.



STEFFES "Commitment to innovation" ISO 9001 COMPLIANT 3050 Highway 22 N • Dickinson, ND 58601-9413 Phone: 701-483-5400 • Fax: 701-456-7497 Websites: www.steffes.com • www.HeatForLessNow.com

Manufacturer reserves the right to discontinue or change at any time, specifications or designs, without notice or incultring obligations.



#### **Placement and Clearances**

- The area in which the Comfort Plus unit is installed must remain free of debris and adequate ventilation is required to maintain room temperature of less than 85°F.A static heat recovery unit or air handler are options that are available to move the radiant heat from the outer panels to a more desireable area.
- Adhere to all national and local electrical and building code placement requirements for electric heating appliances.
- An 18" high stand is available from the factory to elevate the system if necessary.



- Front = 36 inches (for ease in servicing)
- Left Side = 36 inches (for ease in servicing)
- Back and Right Side = 3 inches (from combustible material)

#### Low Voltage Peak Control Connections

 If using the optional Steffes Power Line Carrier Transceiver or Steffes Time Clock Module for peak control, the direct wiring shown here is not necessary.



- AP = Anticipated Peak (Pre-Peak) Control Input
- COM = Peak Control Output Common
  - NC = Peak Control Output (Normally Closed)
  - NO = Peak Control Output (Normally Open)

#### **Typical System Plumbing**

 There are many ways to connect plumbing and regulate temperature of water supplied from the primary loop. These are typical plumbing schematics.



#### Pressure Drop Through Heat Exchanger

STATIC PRESSURE	.1 ft @ 2 GPM
(Feet Water Column)	.2 ft @ 4 GPM
Based on 80 degree entry	.4 ft @ 6 GPM
water temperature with	.7 ft @ 8 GPM
a 50% glycol mix.	1.1 ft @ 10 GPM

#### **Typical Floor Zone Design**

Pipe Size	Maxiumum Pipe Length
3/8"	200'
1/2"	300'
5/8"	500'

Pipe length will vary by manufacturer.

#### **Primary Water Loop Plumbing**

- The Comfort Plus Hydronic System must be plumbed with a primary water loop consisting of a minimum of 10' of 1" pipe and its own circulator pump (Grundfos UP15-42F single speed 115 VAC or equal recommended). The primary loop serves to regulate heat transfer from the unit's heat exchanger. A kit containing components generally installed with hydronic heat systems is available from Steffes. The primary loop must be powered by the Comfort Plus control system.
- The Comfort Plus Hydronic unit is factory configured for left side plumbing attachment only.





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