

COMBO PERB2:W45FICATION SUMMARY (Ref. CSA Standard P.9-11)

Testing Agency: Exova Canada
 System Integrator: iFLOW HVAC Inc.

 Date First Issued: Feb. 19, 2019
 Date Reissued: Mar. 21, 2019
 Rationale: To include missing info

Model Number: N/A
 Nameplate Information: 110 Volts N/A Amps
 Nominal Burner Input: 47.0 kW 160,000 Btu/hr
 Fuel Type: Nat. Gas

PERFORMANCE RATING

Thermal Performance Factor (TPF) 0.94
Annual Electrical Consumption (AE) 643 kWh/y

Efficiency Ratings

Composite Space Heating Efficiency (CSHE) 94 (%)
Water Heating Performance Factor (WHPF) 0.95
 Recovery Efficiency 98 (%)
 Thermal standby loss - Circ fan off see comments W
 Thermal standby loss - Circ fan on see comments W

Maximum Capacity Ratings and Related Information

Space heating (all ratings below are at a PLF of 1)
 Capacity 48,663 Btu/hr 14.26 kW
 Airflow 1,080 SCFM 510 L/s
 ESP (Return) 0.2 " w.c. 50 Pa
 ESP (Supply) 0.2 " w.c. 50 Pa
 Return air temperature 21.9 °C
 Air temperature rise 22.9 °C
 Entering water temperature to coil 56.1 °C
 Water flow rate 2.0 USGPM 7.6 L/min

Space Heating Part Load Efficiency Ratings

Part Load Factor (PLF)	Net Efficiency	Average Electricity Use	Circulating Blower Electricity Use*
@ PLF 1	96 %	370 W	271 W
@ PLF 0.4	94 %	82 W	39 W
@ PLF 0.15	92 %	50 W	40 W

* measured when circulation blower running

DHW One-Hour Delivery Rating (OHR):

OHR - no call for space heating 1,096 L
 OHR - concurrent call for space heating 1,100 L

Concurrent Space & DHW Test Results

Water draws at 49 ±3°C with & without concurrent call for heat

Flow (L/min)	Time to reach temperature (minutes)		Time within ±3°C tolerance (minutes)	
	with heating call	without heating call	with heating call	without heating call
3	0.6	0.3	Indefinite	Indefinite
15	0.4	0.3	Indefinite	Indefinite

Additional Electrical Ratings

Standby power (P_{circ}) 49 W
 Standby power (P_{cont}) 12 W
 Daily electricity use for water heating (E_{24h-SUT}) 0.3 kWh
 Annual electricity use for water heating (AE_{DHW}) 104 kWh/y
 Annual electricity use forspace heating (AE_{SH}) 520 kWh/y

Description of Major Components of Packaged Combo

Packaged System Components

Heat Generator (HG) make, model: Rinnai RU160in
 Air Handler (AH) make, model: iFLOW iFLH-180000 (also applies to iFLH-18000W, iFLH-18000D, iFLH-18000Q)
 Circulating blower motor make, model, size, type: ¼ hp Genteq 5SDA39RL, EON/ECM motor, variable speed
 Circulator pump make / model and location: Grundfos; UPS15-58RU 130, PWM driven by AH controls, external
 Additional controls external to HG and AH: Outdoor Temperature sensor connected to AH control board
 Flow switch in cold water supply to provide DHW priority
 Automatic means for adjusting water temperature while space heating (Y/N): N
 Related type, make and model number: None
 Interconnect piping (length, nom.dia., insulation): 20 ft equivalent length, 3/4" PEX, R4 insulation
 Other: Thermostatic mixing valve c/w check valves, Honeywell AM101-US-1

Test Agency Comments:

Thermostatic mixing valve set to 120°F (49°C) for DHW
 Water heater output temperature set to 140°F (60°C)
 Controls activate Pump 'exercise' for 30 sec. every 24 hours
 Pump exercise does not initiate burner operation
 Circulating blower has a variable 'ON' delay and a variable 'OFF' delay
 Air handler controls modulate blower speed
 Thermal stand by test not required (No storage tank)

Filter use during testing	_____ Yes	_____ X No
Filter rating	_____	_____ MERV
Segregated DHW System	_____ Yes	_____ X No
Water Circulation	_____ Yes	_____ X No
DHW Priority	_____ X Yes	_____ No

Conversions:

249 Pascals = 1" of Water 1 kW = 3413 Btu/h 1 L/s = 2.12 SCFM 1 USG = 3.785 L

Reference Report(s):

18-06-M0055-RV1