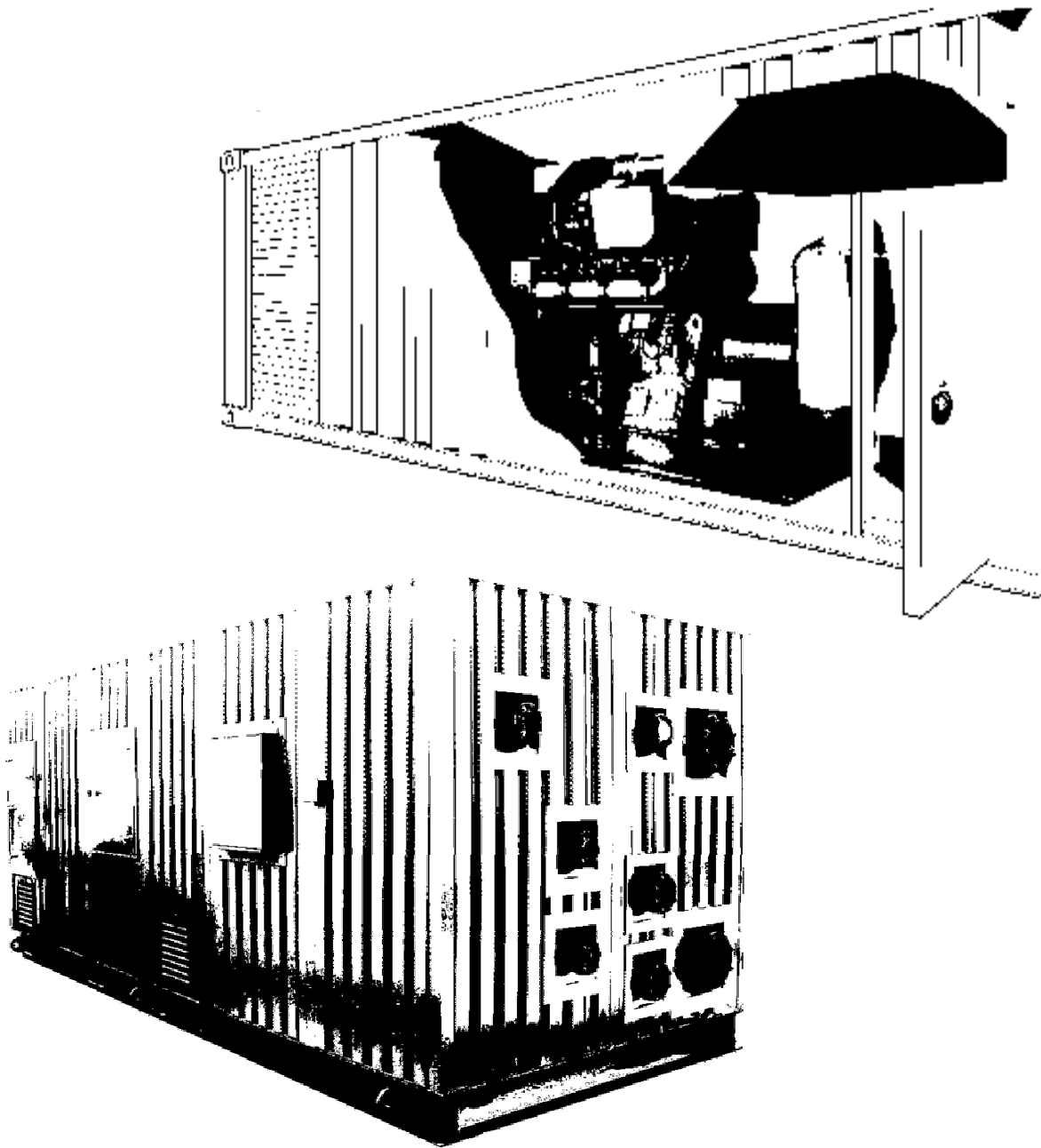


# Waukesha Integrated Power/Cooling/Heating System



**375 kW / 107 Tons / 1,900 MBH**

## OUTLINE CHP SYSTEM SPECIFICATIONS

### Engine Generator Pkg

Manufacturer	Waukesha	
Model	VGF24GSID	
Fule Consumption	3,990	MBH
ISO Electric Output	375	kW
Net Busbar Electric Output	356	kW
Jacket Heat Rejection	1,200	MBH
Exhaust Temperature	1114	F
Exhaust Flow	3445	lbs/hr
Available Waste Energy	2,710	MBH
Exhaust HEX Temperature	275	F
Total Heat Recovered	1900	MBH
Engine Outlet Temp	215	F
Nominal Electric Efficiency	32%	
Heat Recovery Efficiency	70%	
Dimensions	20 x 8 x 9 H	Ft
Operating Weight	22,000	lbs

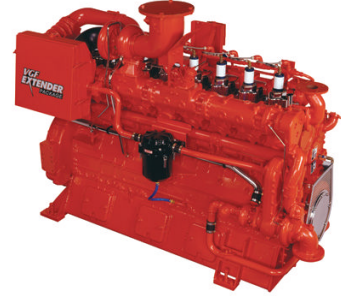
### ICHM

Chiller Manufacturer	York	
Model	YIA-1A2-HW	
Chiller Efficiency	68%	
Chiller Output	107	Tons
Chiler System Parasitics	6	kW
Chilled Water Outlet/Inlet Temp	44/54	F
Chiller Water Flow	256	GPM
Pressure Drop	11	Ft H2O
Pressure Rating	125	psig
Heating Output	1900	MBH
Hot Water Outlet/Inlet Temp	180/160	F
Hot Water Flow	190	GPM
Pressure Drop	10	Ft H2O
Pressure Rating	125	psig
Cd Water Inlet/Outlet Temp	85/100	F
Condenser Water Flow	424	GPM
Pressure Drop	14	Ft H2O
Pressure Rating	125	psig
Dimensions	20 x 8 x 9 H	Ft
Operating Weight	25,000	lbs

## BASIC GENERATOR SPECIFICATIONS

Waukesha **MODEL** VFG24 GSID with heat recovery and generator package.

The **ENGINE**, generator and radiator or heat exchanger are mounted and aligned on a welded steel, structural steel base, designed for solid mounting on an inertia block, with standard through-base holes for lifting. The Waukesha Custom Engine Control electronic ignition system is provided with coils, cables, hall effect pickup and spark plugs. A Woodward 4024 Electrically Powered Governor (EPG) control system and Electronic Detonation Protection system are provided. Engine lubrication is achieved using a gear type pump, full flow spin-on filters and industrial type oil pan, and engine mounted plate type oil cooler. A 24 V DC starting motor with crank termination switch (shipped loose) and dry type Turbocharger are also supplied. Pistons are aluminum alloy, three ring, with combustion bowl.



The **HOT WATER CIRCULATING SYSTEM** is powered with a Gear-driven pump and includes thermostatic temperature regulation. An Auxiliary Circuit Gear driven pump is provided for the intercooler and oil cooler.

**EXHAUST** energy is recovered in a water-cooled, cast iron exhaust manifold with a single vertical flexible stainless steel exhaust connection with ANSI 125# 8oulet flange.

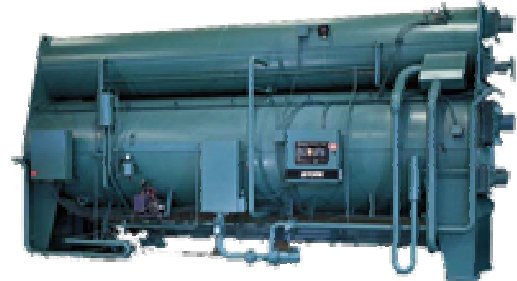
**FUEL SYSTEM** Natural gas carburetor, gas pressure regulator, and 24V DC gas solenoid valve (shipped loose). Pressure required: 8 - 20W.C.

**GENERATOR** Open, drip-proof, direct connected, synchronous, fan cooled, AC revolving field type, 2/3 pitch, single bearing generator with PMG brushless exciter for 300% short circuit sustain (250% for 50 Hz) and motor starting. Voltage: 480/277, 3 phase, 12 wire Wye, 60 Hz, Automatic type Voltage regulation is  $\pm 0.5\%$ . Generator is rated at 0.8 power factor with a 10% overload capability.

## BASIC CHILLER SPECIFICATIONS

York **MODEL** YIA-HW Single-Stage Hot Water Absorption Chiller.

The **CHILLER** shall be of hermetic design and factory helium leak tested. All unit mounted controls and control panels shall be factory mounted, wired, tested, and shipped pre-installed as integral components of the chiller. Chiller shall include 3/4" neoprene insulation of the entire shell. The chiller shall consist of a generator, solution heat exchanger, absorber, condenser and an evaporator. A shell-side bursting disk set to burst at 15 psig shall also be furnished. Water boxes will be removable to permit tube cleaning and replacement. All water boxes and associated water circuit nozzles and tube bundles will be designed for 150 psig working pressure. Chiller shall ship complete with factory balanced lithium bromide with inhibitor and refrigerant pre-charged in unit. Chiller shall include an automatic decrystallization system that shall immediately detect a blockage in the heat exchanger through the use of thermal sensors and respond by diluting the strong solution entering the solution heat exchanger. The absorber shall be equipped with a purging system to remove non-condensable vapors from the unit during operation.

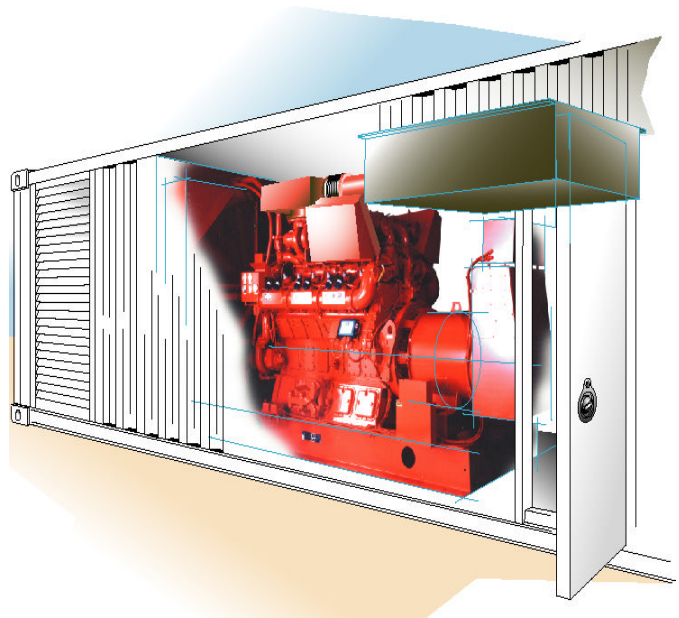


**TUBE MATERIALS** Generator tubes shall be 3/4", 0.035" wall 90/10 copper-nickel and allow for the removal of the tubes from either end of the machine. Evaporator tubes shall be 3/4", 0.028 inch" wall copper. Absorber tubes shall be 3/4", 0.028 inch" wall copper. Condenser tubes shall be copper and be sized to eliminate the need for contractor provided bypass piping [3/4" or 1 "] with a wall thickness of 0.028 inch". Tubes for the solution heat exchanger shall be 0.043" wall carbon steel.

**UNIT CONTROLS** Each unit shall be furnished complete with a factory mounted and pre-wired control system and power panel in separate NEMA 1 enclosures. The control center panel shall include a 40 character alphanumeric display showing all system parameters in the English language with numeric data in English (or Metric) units. The operating program shall be stored in non-volatile memory (EPROM) to eliminate chiller failure due to AC power failure/battery discharge. In addition, programmed set points shall be retained in lithium battery-backed RTC memory for a minimum of 5 years. 115V control voltage will be supplied through a 1 KVA power transformer located in the power panel and will be factory wired to the microcomputer control panel. The control panel shall automatically control the input hot water flow rate to maintain the programmed leaving chilled water set point for cooling loads ranging from 10% to 100% of design.

## WAUKESHA 375 kW / 107 Ton / 1,900 MBH CHP SYSTEM

The Waukesha CHP Package is a **pre-engineered electric generating and heat recovery system**. It consists of a skid mounted continuous duty, natural gas engine, generator, jacket water and exhaust heat recovery, coolant pump, dump heat exchanger, exhaust silencer, batteries, synchronous switchgear and control system. The CHP package controller is designed to operate with the ICHM controller and provide a single 2-wire MODBUS control connection to the building automation system for complete system operation and data acquisition.



The ICHM is connected to the IC engine generator coolant loop and to the building hydronic loops. The unit is driven with the heat rejected by the engine and provides both cooling and heating. The cooling and heating heat exchangers are in series and normally operate simultaneously for high load factor. Condenser water will be provided by the buildings main cooling tower loop.

The Integrated Cooling & Heating Module (ICHM) is a complete, **pre-engineered thermal system** that optimizes the heat recovered from the engine and provides simultaneous cooling and heating for a building's HVAC system. The ICHM consists of a YORK hot water fired absorber, cooling tower, condenser water pump, load controls, heat exchangers, pipe, valves, fittings, sensors, base frame, outdoor enclosure and system control panel. The ICHM controls are integrated with the generator and the building's automation system.

