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Installation Instructions Boiler Burner Unit

Model VT 1000 E (For Hot Water Heating Systems)

MODEL	NOZZLE SIZE GPH + TYPE	HEATING CAPACITY BTUH	NET OUTPUT BTUH	NET OUTPUT SQ. FT.	BECKETT BURNER	WATER CAPACITY GAL.	SMOKE OUTLET SIZE	CHIMNEY SIZE	SHIPPING WEIGHT POUNDS
VT 1000 E	1.65 - 80 H	191000	166000	1107	AFG56YB	19	7	8x8x15	435
	1.50 - 80 H	174000	151000	1006					
	1.35 - 80 H	158000	137000	915					
	1.10 - 80 H	130000	113000	754					

Specifications

These installation instructions provide information for the installation and adjustment for the proper operation of the VT 1000 Oil Fired Boiler units. Be sure to follow these instructions carefully when making the installation. Before proceeding with the installation, be sure to check local ordinance requirements. Installation must be made in accordance with local ordinances which may differ from these installation instructions.

The unit is subject to shipping damage during transit or can be shipped with missing parts. Upon receipt, examine carton and boiler unit for possible missing parts or damage. If unit is damaged, notify carrier immediately. If parts are missing, notify factory as soon as possible.

The boiler is shipped completely assembled except for the circulator and drain cock which are furnished but shipped loose.

The VT 1000 boiler is designed for use with a circulating hot water heating system (30 PSI Max.).

Do not use or store flammable liquids, especially gasoline in the vicinity of the boiler.

Setting Boiler

Make sure that foundation for boiler is level and adequate to support unit weight (approximately 435 pounds).

Locate boiler close to chimney with adequate clearance around unit for service. See Figure 1 for installation dimensions.

Chimney

The chimney should be masonry with tile lining (8″×8″×15′ high) or metal insulated, with a stainless steel internal surface such as the tradename "Metalbestos" (7″ dia. inside × 15′ high).

The chimney should provide a minimum of .04 draft at the boiler flue outlet, although it is preferable to have .05 draft. The draft loss through the boiler is as follows:

MODEL	FIRING RATE	DRAFT LOSS
VT 1000 E	1.10 GPH	.005
	1.35 GPH	.010
	1.50 GPH	.020
	1.65 GPH	.025

Air For Combustion And Ventilation

Be certain adequate facilities are available to provide air for satisfactory combustion and ventilation.

Open basements without storm windows or tight fitting doors will generally permit adequate air infiltration. If the boiler is located in a separate room with a tight door, ventilation must be provided to an open area within the building or to the outside. If the building is of tight construction or with exhaust fans, an outside air supply that is ducted into the Boiler Room may be required.

For installation in confined areas provide two openings, one near the floor and one near the ceiling. Each opening to interior space must have a minimum free area of 150 square inches per gallon firing rate.

Each opening to outdoors must have a minimum free area of 50 square inches per gallon firing rate.

Piping Boiler To System

Refer to Figure 1 for location of piping connections on boiler. Refer to Figures 5 and 6 for piping diagrams.

Pipe boiler to heating system in accordance with recommended practices in order to assure satisfactory heating performance.

Electrical Installation

All wiring must be in accordance with local codes or in the absence of a local code must comply with the National Electric Code.

Refer to the appropriate wiring diagram. Figure 2 for a single zone, Figure 3 for a multi-zone with circulators and Figure 4 for a multi-zone with zone valves.

Provide a separate branch circuit with a fused disconnect switch to the boiler. The VT 1000 operates on 120 vac 60 HZ with a power draw of 5 amps. or less with one circulator.

The unit, as shipped, is furnished with the wiring between the aquastat and the oil burner installed. Balance of wiring must be furnished by the installer.

Oil Line Installation

The burner on the VT 1000 is furnished with a Sundstrand Model A, single stage, 3450 RPM pump as standard equipment.

One pipe installations must be absolutely air tight or loss of prime may result. Maximum lift on a one-pipe installation is 8 feet.

On a two pipe installation, the by-pass plug (furnished with pump-in plastic bag) must be inserted in the bottom return port. The lift on a 2 pipe installation depends on size and length of the tubing. With 52 feet of ½ inch tubing, the lift is 10 feet.

Install a shutoff valve and oil filter in the oil supply line. Locate shutoff valve close to tank with oil filter between valve and burner.

Vent Connection

The flue pipe must be 7" nominal dia. galvanized steel. The flue pipe should be short as possible (while maintaining service clearance behind unit), with a minimum of elbows and must pitch upward to the chimney connection. Maintain 18 inches clearance (minimum) between stack and combustible material. Secure each flue pipe joint and boiler flue outlet connection with sheet metal screws. Seal opening at chimney connection.

Install barometric draft control (furnished with unit) in the flue pipe to reduce fluctuating draft conditions.

Starting And Adjustment Procedure

Refer to burner manufacturers instructions furnished with this unit.

The VT 1000 boiler is shipped with a 1.35 GPH 80° hollow spray nozzle as standard equipment. Check burner to be sure proper nozzle is installed. Change nozzle size if desired. See specifications on Page 1. Do not fire units under or above ratings shown.

These units should be set up with an .02 WC. over fire draft. Refer to section under "chimney" for draft loss through boiler at various firing rates. Adjust barometric draft control accordingly.

The combustion air should be adjusted to secure a 12 to 13% CO_2. The smoke must be between a trace to No. 1 smoke maximum.

The gross stack temperature at the specified firing rates will vary between 370°F. to 480°F.

With these low stack temperatures, steady state output efficiencies in excess of 86% can be achieved.

Maintenance And Service

Refer to burner manufacturers instructions furnished with this unit.

To clean boiler heating surfaces:

Remove top cabinet panel.

Remove flue collector.

Remove turbulators.

Remove all scale and soot from surfaces by means of brush and vacuum cleaning. Precautions should be taken not to damage combustion chamber or insulation.

Clean flue pipe and collector.

Replace all parts and clean cabinet surface and area around boiler.

It is recommended that the boiler be cleaned and inspected annually.

Instructing The Homeowner

The operation and care of the heating system should be explained to the homeowner, including the simple checks to make before calling for service if the burner fails to operate automatically.

INSTALLATION DIMENSIONS

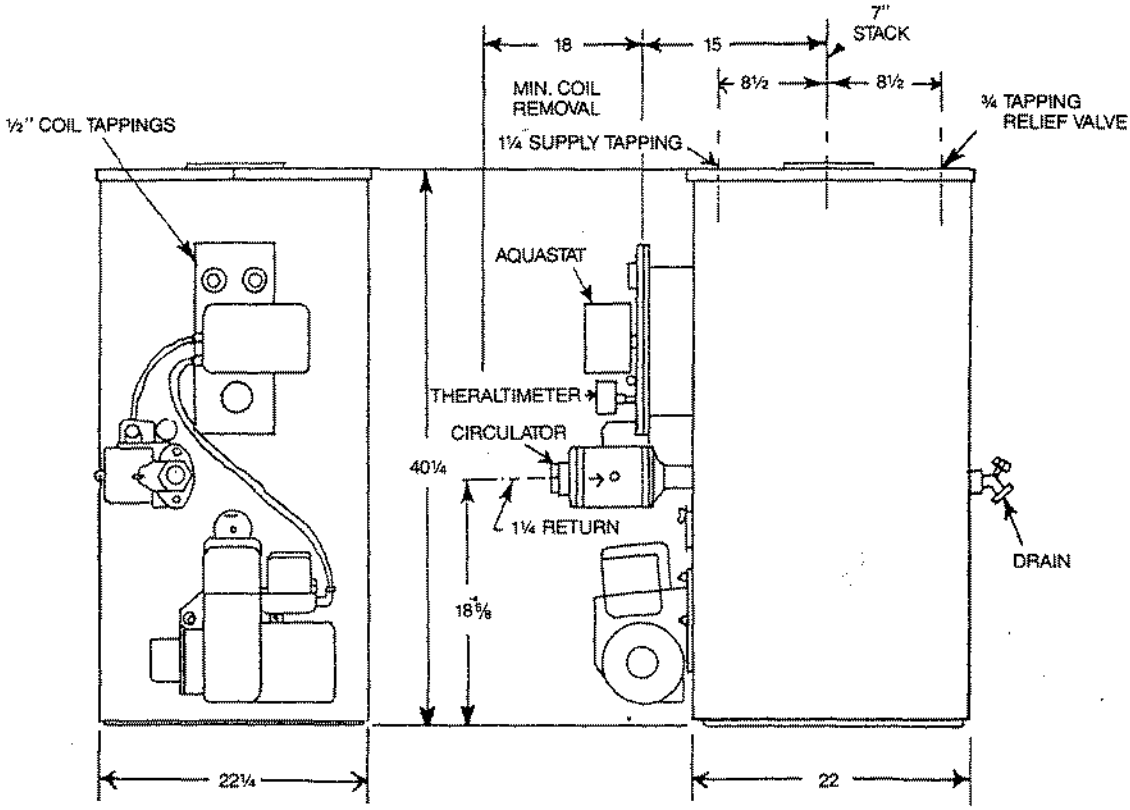
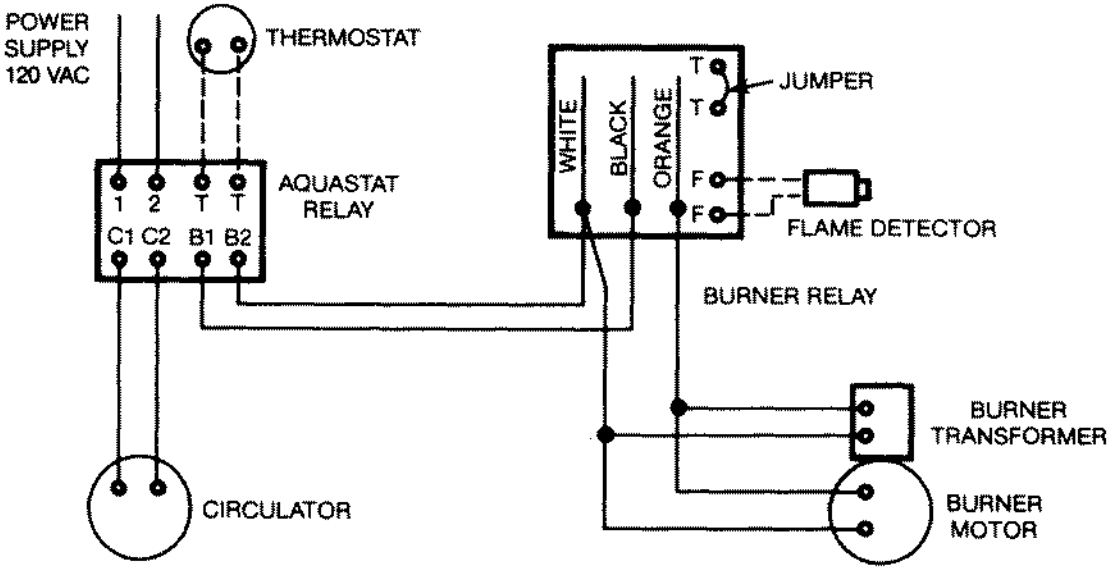


FIG. 1

WIRING DIAGRAM
SINGLE ZONE



WIRING DIAGRAM
MULTI-ZONE WITH CIRCULATORS

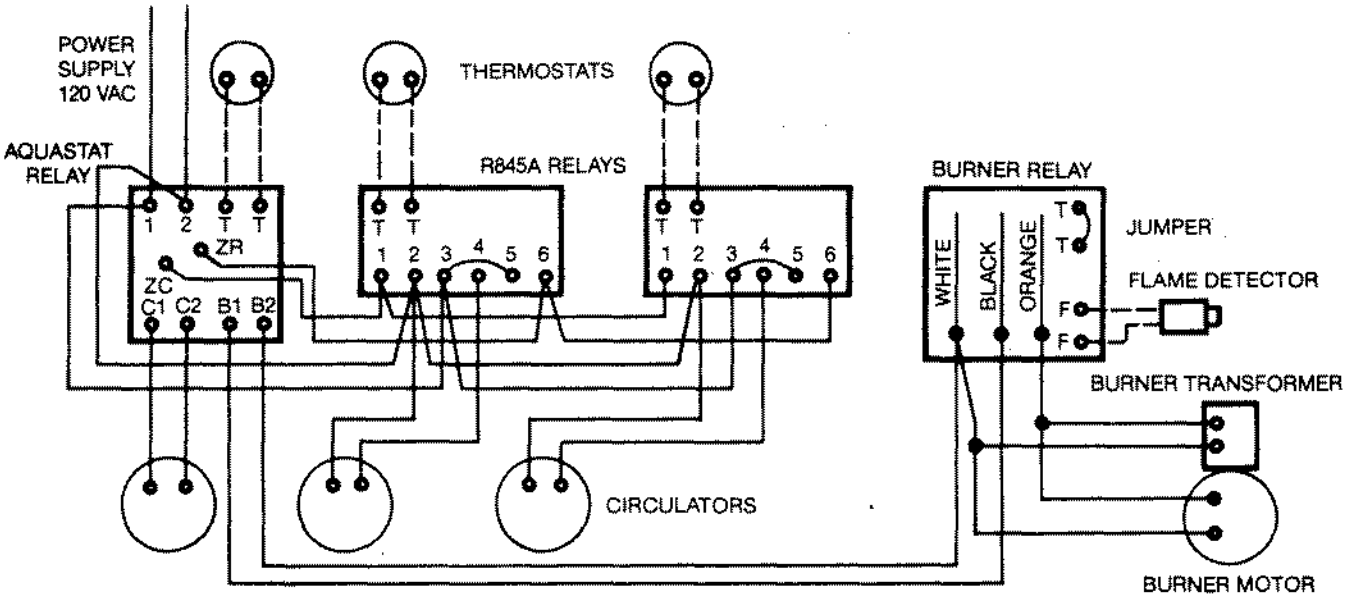


FIG. 3

WIRING DIAGRAM
MULTI-ZONE WITH ZONE VALVES

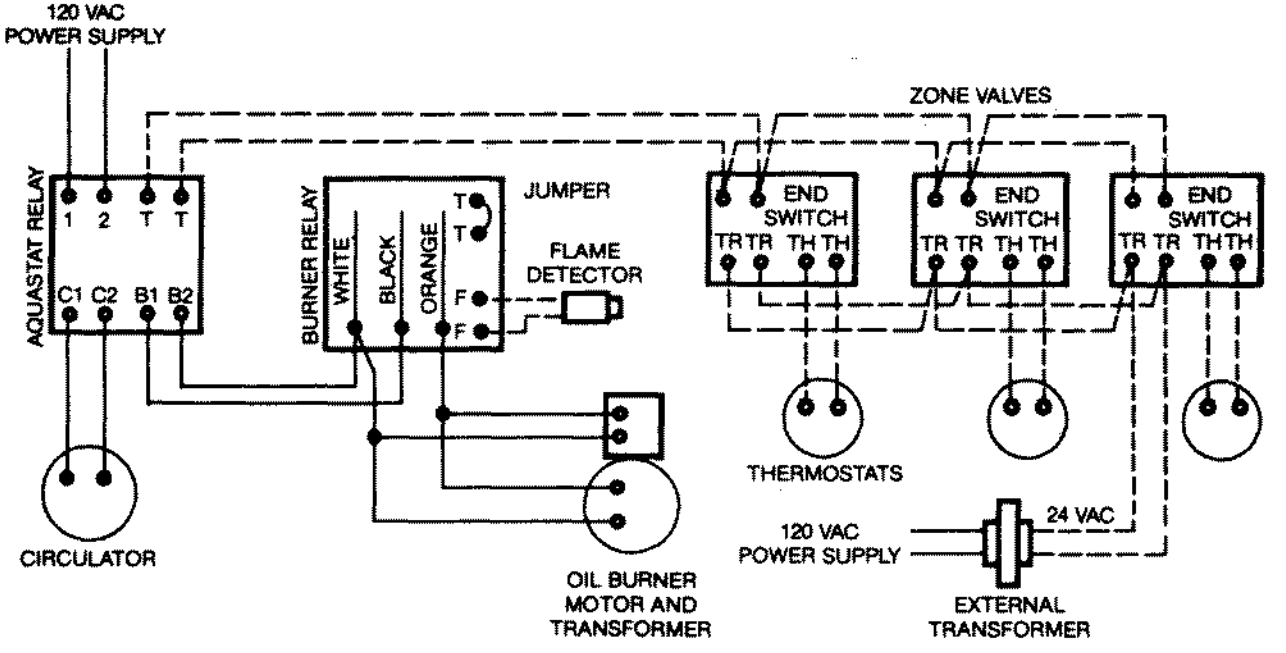
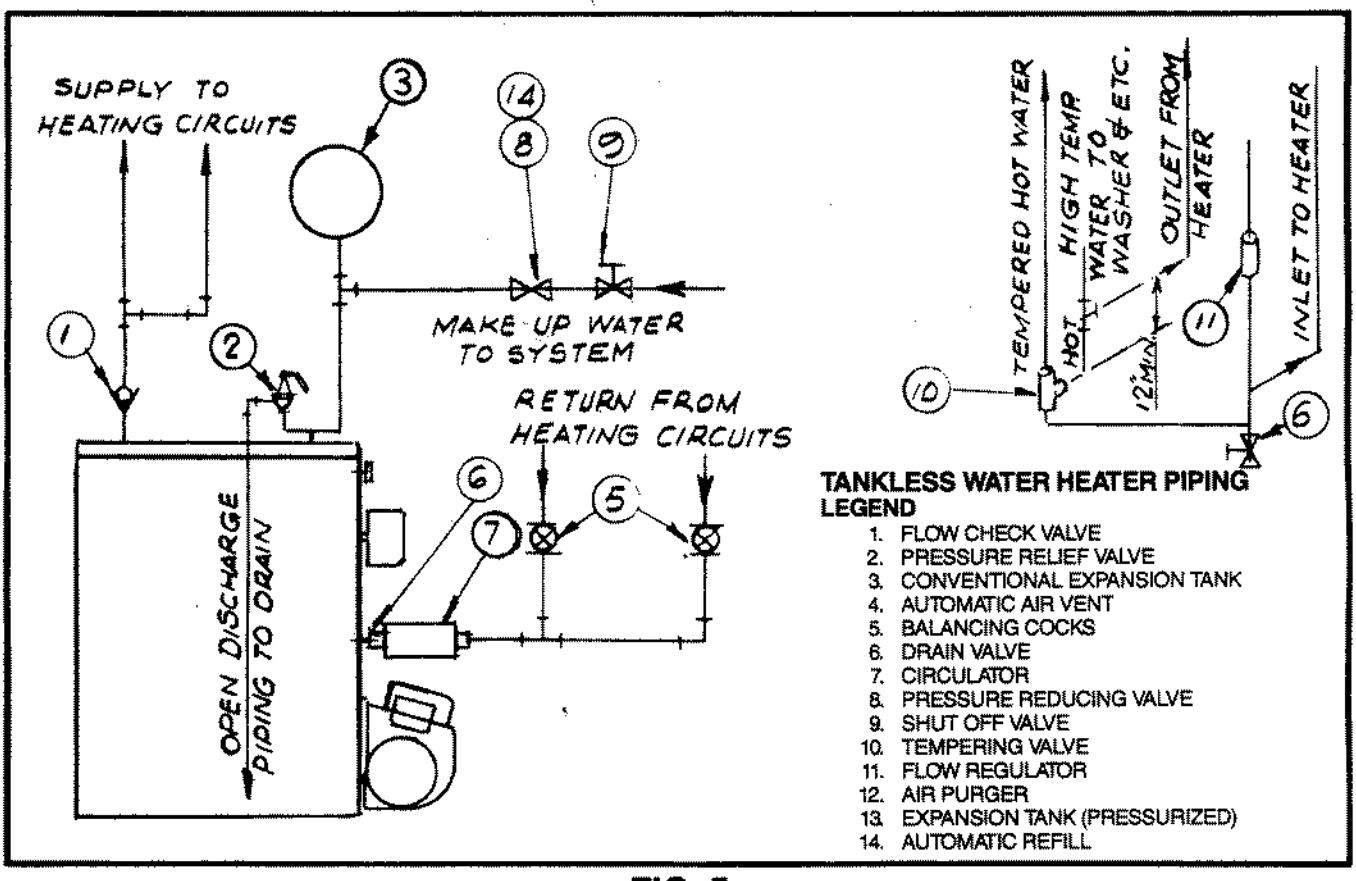


FIG. 4

PIPING DIAGRAM



TANKLESS WATER HEATER PIPING
LEGEND

1. FLOW CHECK VALVE
2. PRESSURE RELIEF VALVE
3. CONVENTIONAL EXPANSION TANK
4. AUTOMATIC AIR VENT
5. BALANCING COCKS
6. DRAIN VALVE
7. CIRCULATOR
8. PRESSURE REDUCING VALVE
9. SHUT OFF VALVE
10. TEMPERING VALVE
11. FLOW REGULATOR
12. AIR PURGER
13. EXPANSION TANK (PRESSURIZED)
14. AUTOMATIC REFILL

FIG. 5

ALTERNATE PIPING DIAGRAM

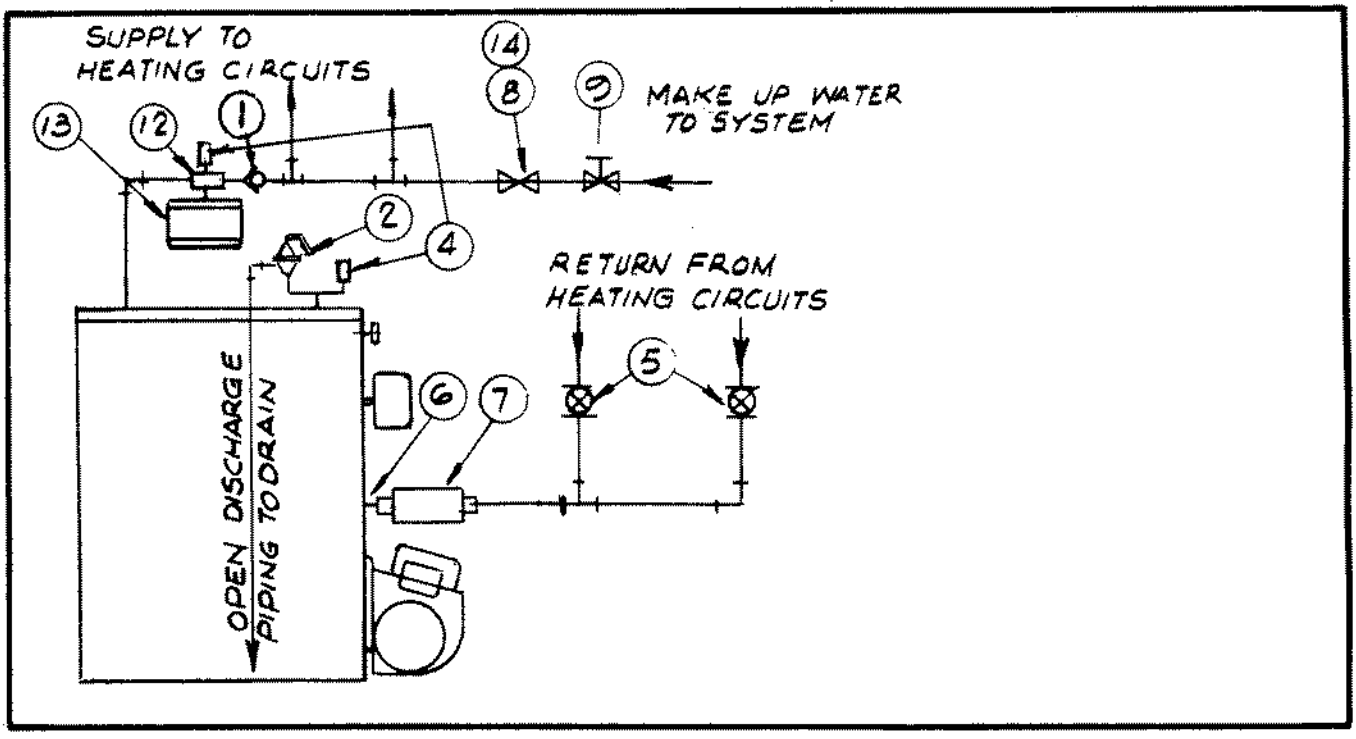


FIG. 6

ENERGYGUIDE

ELECTRIC FURNACE MAN DIV. **GENERAL MACHINE CORP.**

WATER BOILER
MODEL: VT 1000 E @ 1.10 GPH
CAPACITY: 130,000 BTUH

EFFICIENCY RATING

LEAST MOST

THIS MODEL

74.9 82.39 87.6

Only models with 128,000 to 144,000 BTU/HR capacities are used in the scale.

COMPARATIVE NATIONAL AVERAGE YEARLY COST ($)					
Cost per gallon of oil (cents)	BTU/HR HEAT LOSS OF HOME (1,000's)				
	70	80	90	100	
76	767	870	979	1087	
79	796	903	1016	1129	
82	825	937	1054	1171	
85	854	970	1091	1213	
88	883	1004	1129	1255	
91	913	1037	1167	1296	
94	942	1071	1204	1338	
97	971	1104	1242	1380	
100	1000	1138	1280	1422	

WATER BOILER
MODEL: VT 1000 E @ 1.35 GPH
CAPACITY: 158,000 BTUH

EFFICIENCY RATING

LEAST MOST

THIS MODEL

72.5 81.31 87.4

Only models with 145,000 to 161,000 BTU/HR capacities are used in the scale.

COMPARATIVE NATIONAL AVERAGE YEARLY COST ($)						
Cost per gallon of oil (cents)	BTU/HR HEAT LOSS OF HOME (1,000's)					
	80	90	100	110	120	
76	870	979	1087	1196	1305	
79	903	1016	1129	1242	1355	
82	937	1054	1171	1288	1405	
85	970	1091	1213	1334	1455	
88	1004	1129	1255	1380	1506	
91	1037	1167	1296	1426	1556	
94	1071	1204	1338	1472	1606	
97	1104	1242	1380	1518	1656	
100	1138	1280	1422	1564	1706	

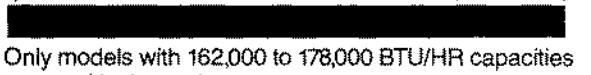
WATER BOILER
MODEL: VT 1000 E @ 1.50 GPH
CAPACITY: 174,000 BTUH

EFFICIENCY RATING

LEAST MOST

THIS MODEL

74.5 81.20 87.6



Only models with 162,000 to 178,000 BTU/HR capacities are used in the scale.

COMPARATIVE NATIONAL AVERAGE YEARLY COST ($)						
Cost per gallon of oil (cents)	BTU/HR HEAT LOSS OF HOME (1,000's)					
	90	100	110	120	130	
76	979	1087	1196	1305	1402	
79	1016	1129	1242	1355	1457	
82	1054	1171	1288	1405	1511	
85	1091	1213	1334	1455	1565	
88	1129	1255	1380	1506	1619	
91	1167	1296	1426	1556	1674	
94	1204	1338	1472	1606	1728	
97	1242	1380	1518	1656	1782	
100	1280	1422	1564	1706	1836	

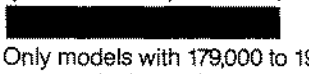
WATER BOILER
MODEL: VT 1000 E @ 1.65 GPH
CAPACITY: 191,000 BTUH

EFFICIENCY RATING

LEAST MOST

THIS MODEL

72.1 80.67 87.4



Only models with 179,000 to 195,000 BTU/HR capacities are used in the scale.

COMPARATIVE NATIONAL AVERAGE YEARLY COST ($)						
Cost per gallon of oil (cents)	BTU/HR HEAT LOSS OF HOME (1,000's)					
	100	110	120	130	140	
76	1087	1196	1305	1402	1510	
79	1129	1242	1355	1457	1569	
82	1171	1288	1405	1511	1627	
85	1213	1334	1455	1565	1685	
88	1255	1380	1506	1619	1744	
91	1296	1426	1556	1674	1802	
94	1338	1472	1606	1728	1861	
97	1380	1518	1656	1782	1919	
100	1422	1564	1706	1836	1978	

ENERGY COSTS AND ENERGY EFFICIENCY RATINGS ARE BASED ON U.S. GOVERNMENT STANDARD TESTS

Efficiency rating shown is "Annual Fuel Utilization Efficiency" and should not be confused with "Steady State Efficiency" which is a higher value. Energy Costs are average for the nation. Your cost may vary due to location, climate or living habits.

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EMMAUS, PA

DIVISION OF GENERAL MACHINE CORPORATION