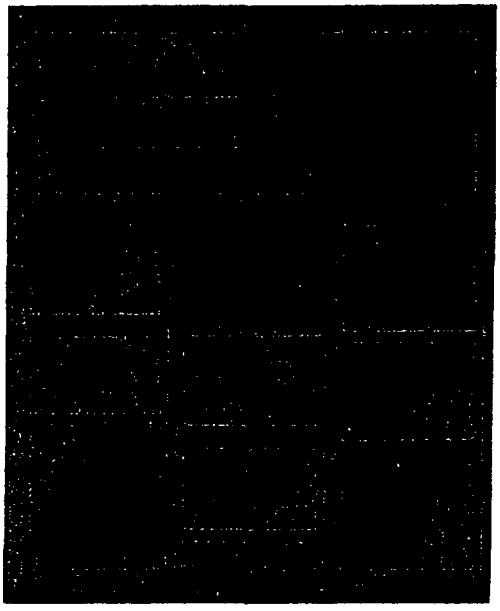
PLAINTIFF'S EXHIBIT

ASI-684

INSTALLATION & OPERATING INSTRUCTIONS



GUF - GDF
GLF - GH
GAS FURNACES

AMERICAN STANDARD

RESIDENTIAL AIR CONDITIONING DEPT.

HM-151 (6-68)

PART #13446-00

19807

IMPORTANT MESSAGE TO HOMEOWNER: These instructions should be carefully read and kept for future reference. It is suggested that this booklet be affixed on or adjacent to the furnace. It is addressed to your dealer and serviceman, but we highly recommend you read it – paying particular attention to the section titled "MAINTENANCE".

INSPECTION AND HANDLING:

Material in this shipment has been inspected at the factory and released to transportation agency without known damage. Inspect exterior of carton for evidence of rough handling in shipment. Unpack carefully after moving equipment to approximate location. If damage to contents is found, report immediately to delivering agency.

GENERAL INSTALLATION INSTRUCTIONS:

The manufacturer assumes no responsibility for equipment installed in violation of any code or regulation. The operational portion of your manual will instruct you in the service and care of your unit. Have your installer go over the operational portion of your manual with you so that you fully understand your conditioner and how it is intended to function.

All electrical wiring must be in accordance with national and local codes.

It is recommended that Manual J of the National Warm Air Heating and Air Conditioning Association or A.R.I. 230 be followed in estimating heating requirements.

Air duct systems should be installed in accordance with standards for air conditioning systems, National Fire Protection Association Pamphlet No. 90. They should be sized in accordance with National Warm Air Heating and Air Conditioning Association Manual K or whichever is applicable. Check on controls to make certain they are correct for the electrical supply.

This warm air furnace should be installed in accordance with the latest A.G.A. Standard Z21.30 for installation of gas piping and gas appliances. Reference should also be made to gas company regulations, national and local electrical codes, local building, plumbing or other codes in effect in the area in which the installation is made.

HIGH ALTITUDE INSTALLATIONS:

IMPORTANT: The sea level rated input of the conditioner installed at elevations above 2,000 feet should be reduced 4% for each 1,000 feet above sea level. For example, for elevations of 4,350 feet, the correct input would be the sea level rated input less 17%.

ORDERING PARTS:

When reporting shortages or damaged parts, or when ordering repair parts, give the complete unit model and serial number as stamped on the unit nameplate. Order all parts through your local contractor.

EQUIPMENT LOCATION:

Locate the furnace as close to the chimney or flue as permissible and as centralized with respect to the air distribution system as practical.

INSTALLATION CLEARANCES:

UPFLOW MODELS

Upflow models are authorized by the American Gas Association for installation on combustible floors and for closet installation with minimum permissible clearance to combustible material as follows:

Top of Plenum	1 in.
Front	6 in.
Sides	1 in.
Rear	0 in.
Flue or Vent	6 in.

COUNTERFLOW MODELS

Counterflow models are authorized by the American Gas Association for installation on non-combustible floors and for closet installation with minimum permissible clearance to combustible material as listed below. For installation on combustible floor frame (Part #8923), the minimum permissible closet clearance to combustible material is the same as those applicable to counterflow conditioners installed on non-combustible flooring.

Top of Plenum	1 in.
Front	6 in.
Sides	1 in.
Rear	0 in.
Flue or Vent	6 in.

HORIZONTAL MODELS

These conditioners are authorized by the American Gas Association for installation on combustible floors and when installed in an alcove, attic, basement, utility room or in a crawl space under a basementless home with minimum permissible clearance to combustible material as follows:

Top	6 inches
Front	18 inches
Back	6 inches
Flue or Vent	6 inches
Drafthood	6 inches

LO-BOY MODELS

Low-Boy models are authorized by the American Gas Association for installation on combustible floors with minimum permissible clearance to other combustible materials of 6 inches.

ALL MODELS

Accessibility clearances must take precedence over fire protection clearances.

Minimum accessibility clearances are as follows:

1. 24 inches at sides where access is required for servicing or cleaning.

2. 18 inches at a side where passage is required to another side requiring servicing or cleaning, or at a side requiring inspection or replacement of the drafthood or flue connector.

3. In utility room installations, the door shall be wide enough to allow the largest furnace part to enter or to permit the replacement of another appliance, such as a gas water heater.

4. Where external filter racks are used, clearance must be provided for removal of filters.

AIR FOR COMBUSTION AND VENTILATION:

(Extracted from U.S.A. Standard Z21-30.)

3.4.1 GENERAL:

a. The provisions of 3.4 are intended to apply to appliances that are installed in buildings and which require air for combustion, ventilation and drafthood dilution from within the building. They are not intended to apply to (1) sealed combustion system appliances which are constructed and installed so that all air for combustion is derived from the outside atmosphere and all flue gases are discharged to the outside atmosphere, or (2) enclosed furnaces which incorporate an integral total enclosure and use only outside air for combustion and drafthood dilution.

b. Appliances shall be installed in a location in which the facilities for ventilation permit satisfactory combustion of gas, proper venting and the maintenance of ambient temperature at safe limits under normal conditions of use. Appliances shall be located so as not to interfere with proper circulation of air within the confined space. When buildings are so tight that normal infiltration does not meet air requirements, outside air shall be introduced.

CHIMNEY:

FLUE CONNECTOR PIPE DIAMETER IN INCHES	CHIMNEY AREA IN SQUARE INCHES
3	7.1
4	12.6
5	19.7
6	28.3
7	38.5
8	50.4

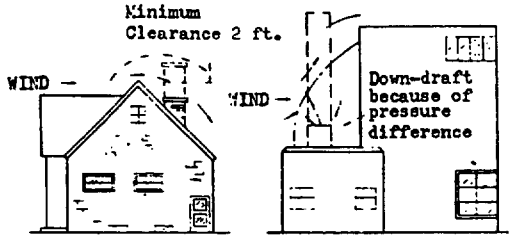


FIG. 4

CHIMNEY FLUE AREAS

Carry chimney well above roof of high building, outside metal stacks unsatisfactory unless type B vent is used

FLUE CONNECTOR:

Use a corrosion resistant flue connector pipe of sufficient thickness. Aluminum or galvanized flue pipe is satisfactory for most natural gas applications. However, local practice will generally determine material to be used. The pipe diameter must be the same as the collar on the drafthood or the round equivalent of the oval collar. Keep the connector as short as possible with an upward pitch of at least 1/4 inch per foot. The connector shall not be inserted beyond the inside wall of the chimney and must be securely supported. Avoid sharp turns and sags. Dampers are prohibited. There must be a minimum clearance of a least 6 inches from any combustible surface. When passing through a combustible wall, the flue connector has to be protected by a ventilated metal thimble or sleeve 4 inches larger in diameter than the connector pipe. The flue connector must pass through the center of the sleeve.

DUCT CONNECTIONS:

On any job, asbestos cloth collars or other non-flammable material should be used for the return air and discharge connections to prevent transmission of vibration. Though these units have been specially designed for quiet, vibration free operation, air ducts can act as sounding boards and could, if poorly installed, amplify the slightest vibration to the annoyance level.

Where the furnace is located in a utility room adjacent to the living area, the system should be carefully designed with returns to minimize noise transmission through the return air grille. Although these winter air conditioners are designed with large blowers operating at moderate speeds, any blower moving a high volume of air will produce audible noise which could be objectionable when unit is located very close to a living area. It is often advisable to carry the return air ducts under the floor or through the attic. Such design permits the installation of the air return remote from the living area (i.e. central hall).

INSTALLATION:

These furnaces are factory assembled and wired. The installer should proceed with installation as follows:

1. Mount the furnace level, either on supports or, if a horizontal model, in a suspended position. (Suspension rods available as optional equipment.)

2. Central furnaces, when used in connection with cooling units, shall be installed in parallel or on the upstream side of the cooling units to avoid condensation in the heating element, unless the furnace has been specifically approved for downstream installation. With a parallel flow arrangement, the dampers or other means used to control flow of air shall be adequate to prevent chilled air from entering the furnace, and if manually operated, must be equipped with means to prevent operation of either unit unless the damper is in full heat or cool position.

3. The installer must make the plenum chamber at least 8 inches in width and sufficiently wide to take the largest duct to be attached to it.

4. Connect flue pipe to collar of the drafthood. Flue pipe or vent connector to chimney must be the same size as the outlet of the drafthood. Where two or more appliances vent into a common flue, the area of the common flue should at least equal the area of the largest flue or vent connector plus 50% of the areas of the additional flues or vent connectors. The flue pipe shall maintain a pitch or rise from the appliance to the flue or chimney. It is recommended that a rise as great as possible, at least 1/4 inch to the foot (horizontal length), be maintained. The chimney to which flue is connected should be clean and of adequate size and extend at least 3 feet above any adjacent roof or building. Flue or vent connector must be inserted into but not beyond the inside wall of the chimney flue.

5. Check orifice spud with drill size specified on tag. To change orifice spuds: Remove control cover, secondary aeration baffle, and burner tray hold-down clip and remove burner tray assembly (GH)

6. Make wiring connections to unit as indicated on enclosed wiring diagram. All wiring must conform to the National Electrical Code or any existing local codes.

7. Remove blower door and loosen blower tie-down screws. Do not remove screws. Replace blower access door.

8. Check for gas leaks with soapy solution before lighting. DO NOT CHECK WITH AN OPEN FLAME.

9. Adjust installation to obtain an air temperature rise of from 70° to 100° F., or 45° to 75° F. Refer to A.G.A. rating plate for correct air rise range adjustment.

10. Before leaving a furnace after completing installation, make sure all controls are functioning as required.

11. Cover filter intake with cardboard or paper and raise the thermostat setting so that gas valve opens (furnace fires). With blocked air flow the burner should shut off in a very few minutes at the setting of the limit switch. After checking the operation of the fan and limit control, be sure to remove the paper or cardboard from the filter.

CONTINUOUS POWER:

As with all gas appliances using electrical power, this furnace shall be connected into a permanently live electric circuit, i.e., one that is not controlled by a light switch. It is recommended that it be provided with a separate fused electric circuit.

LIGHTING AND OPERATING:

Light conditioner as directed on the Lighting Instructions Plate.

MAIN BURNER INPUT ADJUSTMENT:

The proper burner flame is one in which no yellow flame appears. To obtain this, first close primary air shutter until you get a yellow flame, then re-open until all traces of the yellow flame have dissappeared. After adjustment, tighten screw to lock shutter in position.

NOTE: Horizontal models do not have primary air shutters.

Input must never exceed that shown on the rating plate. These furnaces are equipped with fixed orifices intended to give the correct input with a manifold pressure as follows:

Approximately 11 inch W.C. for Propane Gases.
Approximately 3-1/2 inch W.C. for Natural Gas.

For gases other than Propane, check input at the meter making sure than no other gas appliances are in operation. If input does not agree with rating plate, it may be adjusted slightly at the pressure regulator. Ordinarily, natural gas manifold pressure between 3 and 3.8 W.C. is considered quite satisfactory. Propane gas pressure should be maintained between 10 and 12 inch W.C.

Gas Consumption Rate (Cubic Ft /Hr.)=
Input Rating (BTU per hr.) ÷
Heating Value of Gas (BTU per Cu. Ft.)

BLOWER SPEED ADJUSTMENTS:
BELT DRIVE UNIT:

Remove blower access door. Adjust blower speed by turning adjustable motor pulley in to increase blower speed, and out to slow down speed. IMPORTANT: Make sure belt tension is carefully adjusted so that when the belt is gripped by hand there is approximately a one-inch deflection (total) when "finger" pressure is applied.

NOTE:
REFER TO SERIES AND RATING PLATE FOR INFORMATION ON STATIC PRESSURES AND TEMPERATURE RISE.

DIRECT DRIVE UNITS:

Remove transformer from junction box and change wire as shown on the wiring diagram. Do not change the white wire. Be sure to tape the exposed wire ends with electrician's tape to prevent shorting.

REMOVAL OF BLOWER FOR SERVICE:

COUNTERFLOW MODELS

If the blower should have to be removed for servicing, turn off electricity to unit. Disconnect electrical lead in junction box or at the motor. You must disconnect the flue pipe to remove the blower completely. Remove top panel by releasing four screws, remove flue pipe sleeve and flue pipe in blower compartment.

NOTE:
Care must be taken in removing the blower to prevent damage to the auxiliary limit control mounted on the blower panel.

TO CLEAN BURNERS:

HORIZONTAL MODELS

1. Remove burner tray.
2. Remove burners from tray; remove inserts and clean with bottle brush.
3. Using 5/8 inch diameter wire brush with flexible handle, brush heat exchanger sections through burner compartment.
4. Replace burners in tray and replace tray in unit.

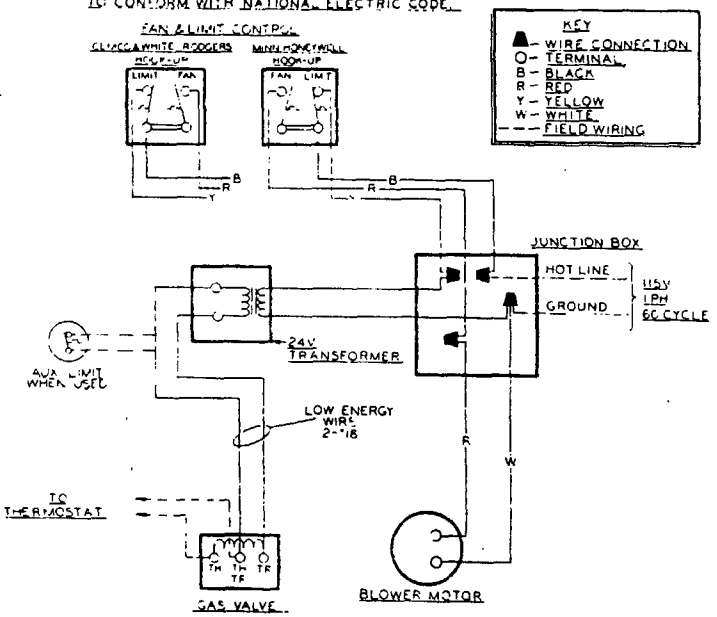
UPFLOW, COUNTERFLOW AND LO-BOY MODELS

To remove burners, remove screws from burner door, lift door to disengage from manifold support bracket. Remove screws securing ignition hood-pilot burner assembly, disconnect pilot tube and thermocouple and lift assembly from burners. Lift the back of the burner up and slide to rear to disengage the burner from the spud. Slide burner out of the chamber. Remove the snap-on mixer face and air shutter, and using a soft brush that will pass through the venturi. clean the inside of the burner. Reassemble parts by reversal of the above procedure.

INSTRUCTIONS TO OWNER:

IMPORTANT: In the event that electrical, fuel, or mechanical failures occur, the owner should immediately turn off the electric power and the manual gas valve supplying the furnace and contact the service agency designated by your dealer.

NOTE: IF ANY OF THE ORIGINAL WIRE AS SUPPLIED WITH THE APPLIANCE MUST BE REPLACED, IT MUST BE REPLACED WITH 105°C WIRE OR ITS EQUIVALENT, SIZED TO CONFORM WITH NATIONAL ELECTRIC CODE.

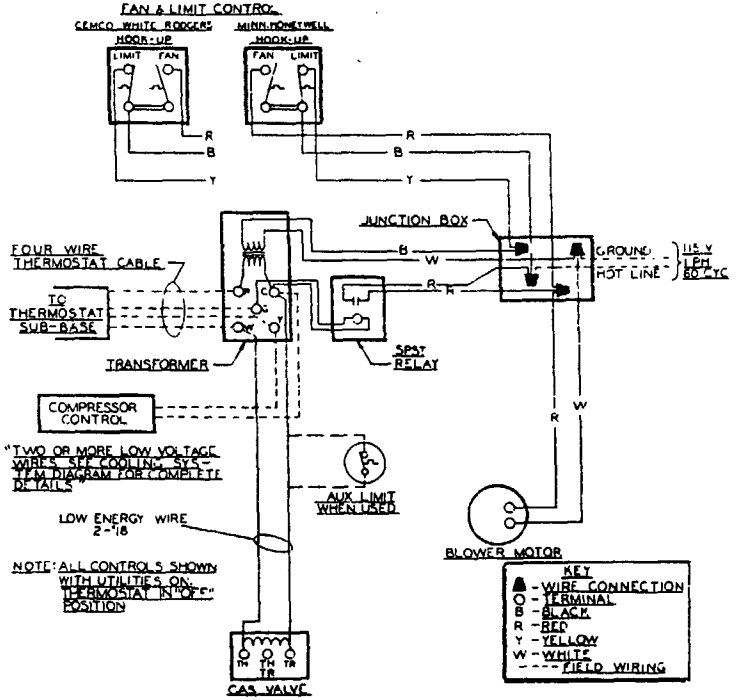


NOTE: ALL CONTROLS SHOWN WITH UTILITIES ON, THERMOSTAT IN "OFF" POSITION.

WIRING DIAGRAM FOR 24 VOLT SYSTEM ON ALL GASES
(BELT DRIVE HEATING MODELS ONLY)

010-13057 (2-68)

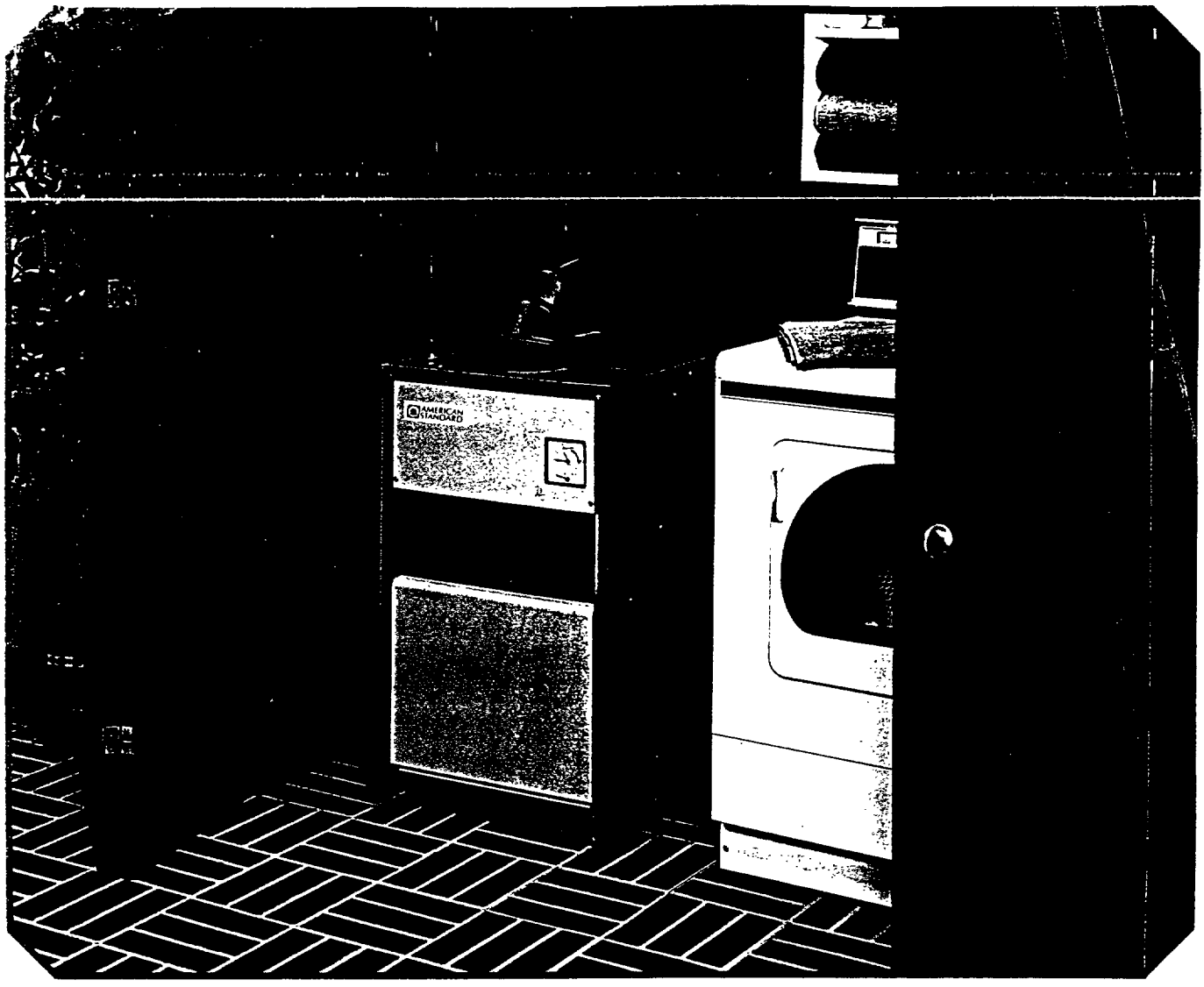
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WIRING DIAGRAM FOR 24 VOLT SYSTEM ON ALL GASES
BELT DRIVE AC MODELS

010-13060 (2-68)

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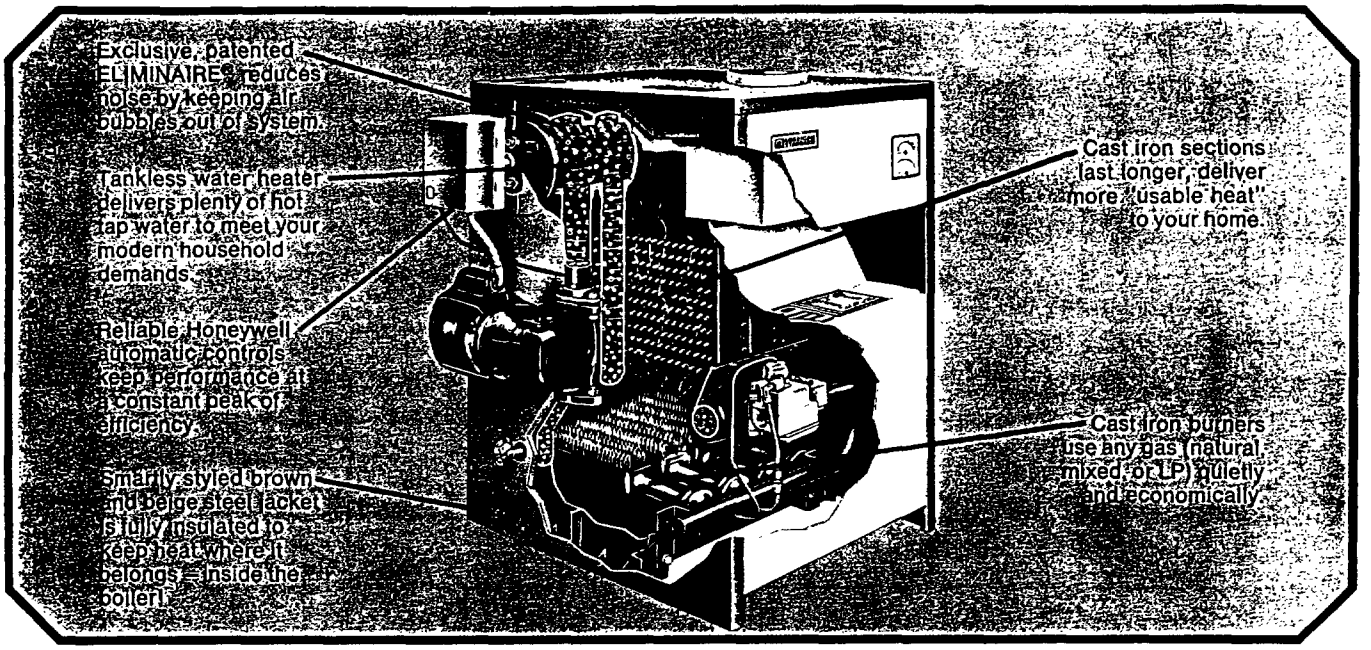


Take the headaches out of heating with this American-Standard gas boiler!

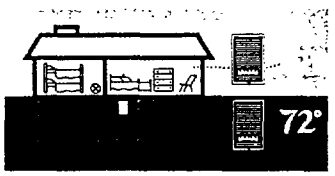
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The American-Standard gas-fired G-2 boiler provides gentle, clean heat for natural, healthful comfort Economically! Efficiently! Automatically!

If you're building a new house or replacing your present boiler, you can be confident that the G-2 will do what is promised. Because at American-Standard *top-quality performance* is the result of *top-quality engineering*. Ruggedly constructed of durable cast iron, the G-2 is completely automatic, features fuel-saving burners, may be used for hot water or steam heat, and comes ready for immediate space-saving installation. A fully insulated jacket prevents heat loss and keeps the boiler's outer surface cool to the touch. American-Standard uses only the best – in materials, design, and engineering – to produce this highly efficient, truly top-quality heating unit.



Bring your hydronic heating system up-to-date with these bonus benefits



ZONED HEATING. Partition your home into separate comfort zones. With the inexpensive addition of **zoned heating**, individual thermostats control each zone ...let you have warmer living areas, cooler sleeping areas. Ideal for any style home, zoned heating gives you complete comfort control.



SLIM BASEBOARD PANELS: American-Standard baseboard panels — **Heatrim** for hot water and **Radiantrim** for either hot water or steam heat—let you enjoy clean, even, draft-free heat as well as full living space in every room. Their wall-hugging design gives you complete decorating freedom (floor length draperies and wall-to-wall carpeting never interfere with the heating system). Baseboard panels are easily painted to blend with any room's color scheme

G-2 ratings (all gases)

boiler size	A.G.A. ratings (steam/water) gross input (Btu/hr)	gross output (Btu/hr)
G-23	60,000	48,000
G-24	90,000	72,000
G-25	120,000	96,000
G-26	150,000	120,000
G-27	180,000	144,000
G-28	210,000	168,000
G-29	240,000	192,000
G-210	270,000	216,000
G-211	300,000	240,000

Your boiler's pedigree

American-Standard G-2 boilers are certified by American Gas Association and American Society of Mechanical Engineers. Ratings have been approved by the Institute of Boiler and Radiator Manufacturers.

AMERICAN STANDARD

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