RELIEF VALVES FOR HOT WATER STORAGE TANKS

1. GENERAL

1.01 This section describes A.S.M.E. Standard pressure and temperature relief valves, spring loaded types, recommended for installation on hot water storage tanks to prevent excess pressure and temperature in the tank under all conditions of operation.

1.02 This section includes recommendations for minimum and maximum relief valve sizes and installation of relief valves. In addition, it advises of a device for vacuum relief for use only where required by local and/or state regulation.

1.03 This section is issued to place relief valves for hot water storage tanks in a separate section. Pressure relief valves for hot water storage tanks were mentioned under Section H34.222, Issue 1, March 1944, Safety and Relief Valves, which is replaced by Section H34.290, Issue 1, January, 1952, Safety Valves for Low Pressure Steam Boilers. It also includes recommendations for temperature relief and for vacuum relief where required together with methods of installation not covered in the replaced section.

1.04 This section applies generally to new installations. In existing installations non-standard relief valves need not be replaced and installed in accordance with this section provided they are of the spring loaded type, are in operative condition, are testable by means of a substantial integral lifting lever and have no shutoff valve or other obstruction between the tank and the relief valves or on the discharge side of these valves.

If, however, there is any doubt as to the effectiveness of an existing valve, it is recommended that a new valve be installed as outlined herein.

1.05 Hot water storage tanks referred to in this section include:

(a) Tanks in which hot water is stored but is heated in a separate hot water supply boiler or heater used exclusively for that purpose.

(b) Tanks in which hot water is stored but is heated by means of heat exchanging devices, either inside or outside the tank, connected to the building heating plant or to a separate steam boiler provided for that use.

(c) Tanks of storage type gas fired, electric, and oil fired water heaters.

1.06 Where local and/or state codes, rules, and regulations call for higher requirements than these indicated or implied in this section, such authority takes precedence and its requirements are followed; where those requirements are lower than these in this section, compliance with the provisions of this section is recommended.

2. RECOMMENDED TYPES

2.01 Each hot water storage tank is provided with A.S.M.E. Standard relief valves set by the manufacturer to discharge at a pressure not more than 15 pounds higher than the maximum working pressure stamped on the tank and to discharge when hot water from tank is at a temperature not higher than the boiling point of water at atmospheric pressure; the temperature relief closes when temperature of hot water has been reduced approximately 35 degrees lower than relief temperature. Only where required by local and/or state authority is relief for vacuum in a tank provided; this type of device relieves vacuum instantly at a minus pressure not greater than 1 inch of vacuum.

2.02 A standard combination pressure and temperature relief valve or two individual relief valves, one for pressure and one for temperature, may be used. The use of individual valves is recommended. (See Paragraph 5.03.)

2.03 The standard valves are of the spring loaded type without disc guides below the seat or pressure side of the valve. If the valve is an individual pressure relief or a combination pressure and temperature relief, it has a substantial integral lifting device.

2.04 The standard individual temperature relief valve is an automatic type in that it discharges hot water until the hot water

has been reduced to a temperature below the atmospheric boiling point, then the valve closes; its capacity is governed by the maximum heating rate of the hot water heating equipment.

2.05 Standard relief valves have seats and discs of non-corrosive materials.

2.06 Each standard individual pressure and temperature relief valve and combination pressure and temperature relief valve has a relief outlet connection.

2.07 Where vacuum relief is required, valves of the ball check type are not allowed for this purpose. Vacuum relief devices do not have relief outlet connections as none is necessary. A vacuum relief valve is made of materials that will not corrode or hold fast to the seat after prolonged use.

2.08 Pressure and temperature relief valves are selected with a rating in relieving capacity in British Thermal Units per hour at least matching the gross output of the heating medium for the water of the storage tank in British Thermal Units per hour to prevent excess pressure and increase in water temperature in the tank above the relieving temperature under all conditions of operation such as improperly prolonged firing of the heating source, a bottled up system, etc.

3. MINIMUM AND MAXIMUM INLET SIZE

3.01 The inlet size of standard relief valves used in connection with hot water storage tanks is not smaller than 3/4-inch iron pipe size and not larger than 2-inch iron pipe size.

3.02 Where the capacity of a hot water storage tank requires the size of a relief valve to be larger than 2-inch iron pipe size, two or more relief valves are installed to provide the required capacity. Cross-sectional areas of tappings in tanks for relief valves and of piping used in this connection are at least equal to the total cross-sectional area of the valves.

4. MARKINGS

4.01 Each standard relief valve is plainly labeled with the manufacturer's name or registered trade mark and the letters "A.S.M.E. Standard."

4.02 In addition to the foregoing markings, other markings are as follows:

(a) On combination pressure and temperature relief valves, the pressure in pounds per square inch, the temperature in degrees Fahrenheit, and relieving capacity in British Thermal Units per hour at which the valve is set to discharge.

(b) On an individual pressure relief valve or on an individual temperature relief valve, the pressure in pounds per square inch or temperature in degrees Fahrenheit, and relieving capacity in British Thermal Units per hour at which the valve is set to discharge.

4.03 These data are usually stamped or cast on a plate securely attached to the casting so as not to be obliterated in normal service.

4.04 In the case of a vacuum valve or other approved device used to prevent a vacuum in the tank, any vacuum valve or similar device bearing the mark of a recognized manufacturer is acceptable.

5. INSTALLATION

5.01 An individual temperature relief valve or a combination pressure and temperature relief valve is installed directly on top or within 12 inches of top of a hot water storage tank in a tapping in tank. Such valves may be placed on the flow pipe from top of tank within 8 inches, developed length, from top of tank and within 2 inches of flowing water. The tapping or piping is not smaller in cross-sectional area than the cross-sectional area of the inlet of the valve.

5.02 An individual pressure relief valve is installed in the hot or cold water supply above tank between control valve and tank and this piping is not smaller in cross-sectional area than the cross-sectional area of the inlet of the valve. If installed in this manner on the cold water supply, contact of the valve disc with hot water is eliminated thus reducing the possibility of the valve leaking.

5.03 It is recommended that a standard individual temperature relief valve and a standard individual pressure relief valve be installed in preference to a combination pressure and temperature relief valve; the temperature relief valve is installed on the tank and

the pressure relief valve is located in the cold water piping as described in Paragraphs 5.01 and 5.02, respectively. The installation of the pressure relief valve on the cold water supply piping reduces the tendency for the build-up of scale which might interfere with the operation of the valve.

5.04 The relief outlet is connected with discharge piping, brass or copper, sized full area for this outlet connection. The discharge piping is run within the building and terminates at an open plumbing fixture where available or in the basement within 12 inches of the floor. This piping pitches down from the valve it serves to prevent trapping of water. If piping is run into the drainage system, it is not connected directly but as an indirect waste. Terminating end of discharge piping is cut at 45 degrees to prevent its being capped or plugged, thus insuring free relief discharge. Where two or more valves are connected to same discharge, the pipe area is not less than area of valves it serves. This arrangement of the discharge adequately protects personnel and property.

5.05 Where required, a vacuum relief valve is installed on the cold water supply piping to tank above tank; where cold water supply enters below top of tank from a water supply located below tank, the supply pipe is raised to above top of tank forming a loop and the vacuum valve is placed on top of loop above tank.

5.06 To further insure functional operation of the relief valves at all times, no shutoff or cutout valves or any means of obstruction are installed between the relief valves and the tank or on the discharge piping.

6. MEANS FOR TESTING

6.01 The integral lifting lever on the standard combination pressure and temperature relief valve and individual pressure relief valve provides a means for manual testing. By hand operating the lever, the valve disc is raised and the valve will discharge if in operable condition.