

SUBJECT	TITLE	WHEN ADOPTED	REFERENCE
Garages	Code for Heating and Ventilating Garages	June, 1929	A.S.H.V.E. JOURNAL, May, 1929, p. 63
Heat transmission through walls	Standard Test Code for Heat Transmission through Walls	January, 1928	A.S.H.V.E. TRANSACTIONS, Vol. 34, 1928
Minimum requirements	Code of Minimum Requirements for Heating and Ventilation of Buildings, Edition-1929	June, 1925	A.S.H.V.E. Codes
Pitot tube	Code for Use of Pitot Tube	January, 1914	A.S.H.V.E. TRANSACTIONS, Vol. 20, 1914, p. 211
Radiators	Code for Testing Radiators	January, 1928	A.S.H.V.E. TRANSACTIONS, Vol. 33, 1927. Reprints available
Radiators (concealed)	Code for Testing and Rating Concealed Gravity Type Radiation (Steam Code)	January, 1931	Heating, Piping and Air Conditioning, August, 1931
Unit heaters	Standard Code for Testing and Rating Steam Unit Heaters ^c	January, 1930	A.S.H.V.E. TRANSACTIONS, Vol. 36, 1930. Reprints available

^cAdopted jointly by the Industrial Unit Heater Association, and the A.S.H.V.E.

The following Codes and Standards have been endorsed or approved by the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS:

SUBJECT	TITLE	SPONSORED BY	REFERENCE
Chimneys	Standard Ordinance for Chimney Construction	National Board of Fire Underwriters	Chapter 14, GUIDE, 1931
Piping systems	Identification of Piping Systems ^d	American Society of Mechanical Engineers	Heating, Piping and Air Conditioning, July, 1929
Warm air furnaces	Standard Code Regulating the Installation of Gravity Warm Air Furnaces in Residences	National Warm Air Heating Association	National Warm Air Heating Association, Columbus, Ohio

^dAdopted November, 1928. Sponsored by (1) American Society of Mechanical Engineers, (2) National Safety Council.

GREENHOUSE HEATING

It is important that the heat shall be diffused evenly, that there shall be no high-velocity air currents, especially for flowers, and that no rapid temperature fluctuation shall be permitted.

Steam and hot water systems both are used in greenhouse heating. Electrically propelled unit heaters have been used with good results. Unfortunate results occasionally are encountered with all of these different kinds of apparatuses.

Table 1 gives the usual temperatures required in greenhouses. The heat losses from greenhouses are computed the same as are the heat losses from other types of buildings. The service is for 24 hours per day, and the peak demand occurs when the weather is cold and there is no sunshine, as at night. Leakage of air through cracks in the glass frames is not serious since in cold weather these freeze due to condensation, and seal tightly with ice. The boiler in a greenhouse must always be selected on the basis of the heat demand and will seem large in proportion to the square feet of radiation, since greenhouse radiators or convectors usually

TABLE 1. USUAL TEMPERATURES REQUIRED IN GREENHOUSES

KIND OF VEGETATION	TEMPERATURE REQUIRED, DEG. FAHR.
Violets.....	40 to 45
Camelias.....	
Azaleas.....	
Lettuce.....	
Cool Palm Houses.....	50 to 55
Carnations.....	
General Purposes.....	55 to 60
Roses.....	
Mushrooms.....	
Forcing Houses.....	
Conservatories.....	60 to 65
Orchid Houses.....	
Fern Houses.....	
Peach House.....	
Vinery.....	65 to 70
Early Tomatoes and Cucumbers.....	
Tropical Palm House.....	

are highly efficient. The piping, where direct heaters are used, is designed usually with a view to the kind of plants to be grown, though there is some tendency to use side wall and free hanging overhead heating surface in preference to piping under the plant benches.

It is probable that there are more low-pressure steam heating systems in greenhouses than any other kind of system. It is highly desirable that with such plants there shall be vacuum pump returns, with thermostatic heater traps. It is important, whatever the type of system, that the heating surface or out-put be well subdivided, so that no matter how much or how little heat shall be needed, just enough and no more than enough can be delivered. The heat must be distributed just as evenly over the whole area of the greenhouse as though all of the output were being delivered. One recommendation is that the heating surface be subdivided and provided with valves in increments of not exceeding 10 per cent.