

pump installation, or may be a self-contained domestic-water heat pump.

Various designs of self-contained domestic water heat pumps are available, and one particular arrangement is shown in Fig. 17.

Hot water heating by means of a heat pump is not yet advisable where high water temperatures are desired. This is due to the fact that higher water outlet temperatures result in lower coefficients of performance.

For coefficients of performance of 4 or higher, the heat-pump water heater may be more economical to operate than a conventional water heater.

Although the first cost of domestic hot water heat pumps is somewhat high, they have the advantages of operating without products of combustion, odors, soot, or chimney. A further advantage is that they may be used for cooling purposes. With a coefficient of performance of $2\frac{1}{2}$ to 3, water temperatures of 140 to 150 F may be obtained.*

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CODES AND STANDARDS

THE Codes and Standards listed in Table 1 represent accepted practice, methods, or standards prepared and accepted by the organizations indicated. They are valuable guides for the practicing engineer in determining test methods, ratings, performance requirements, and limits applying to equipment used in heating, ventilating, and air conditioning. Copies can usually be obtained from the organization listed in the reference column.

Table 1 . . . Codes and Standards Prepared and Accepted by Various Societies and Associations

Subject	Title	Sponsor	Reference
Acoustics (Terminology)	American Standard Acoustical Terminology (1951).	AS of A	ASA Z24.1
Air Conditioners	ASHRAE Standard Methods of Rating and Testing Air conditioners (1956).	ASHRAE	ASHRAE Standard 16-56
Air Conditioners (Room)	Standards for Room Air-Conditioners.	ARI	ARI Standard 110-58
Air Conditioning (120,000 Btu/hr or less)	Code and Manual for the Design and Installation of Warm Air Winter Air Conditioning Systems, 4th Edition (1953).	NWAH&ACA	NWAH&ACA Manual No. 7
Air Conditioning (above 120,000 Btu/hr)	Code and Manual for the Design and Installation of Mechanical Warm Air Heating Systems, 6th Edition (1950).	NWAH&ACA	NWAH&ACA Manual No. 9
Air Conditioning	Standards for the Installation of Air Conditioning and Ventilating Systems of Other Than Residence Type (1958).	NFPA	NFPA or NFPA No. 90A
Air Conditioning	Standards for the Installation of Residence Type Warm Air Heating and Air Conditioning Systems (1956).	NFPA	NFPA or NFPA No. 90B
Air Conditioning (Residential)	Design and Installation of Summer Air Conditioning for New and Existing Residences, Tentative (1956).	NWAH&ACA	NWAH&ACA Manual No. 11
Air Conditioning (Unitary Equipment)	Standard for Unitary Air Conditioning Equipment.	ARI	ARI Standard 210-57
Air Conditioning (Year-Round Residential)	Standard for Year-Round Residential Air-Conditioning.	ARI	ARI Standard 230-57
Airplane	Air Conditioning Equipment, Airplane—General Requirements for (1956).	SAE	SAE ARP 85C
Airplane	Heaters, Airplane, Internal Combustion Heat Exchangers Type (1949).	SAE	SAE ARP 143B
Airplane	Heaters Airplane, Steam Type (1943).	SAE	SAE ARP 87
Attic Ventilation	Residence Ventilation Guide (1950).	PFMA	PFMA-AMCA
Boilers	I=B=R Testing and Rating Code for Low Pressure Cast Iron Heating Boilers, 6th Edition, 1958.	IBR	IBR
Boilers	Net Load Recommendations for Heating Boilers. Publ. semi-annually.	MCAA	MCAA
Boilers	ASME Boiler and Pressure Vessel Code (1959, 8 Sections).	ASME	ASME
Boilers	ASME Boiler and Pressure Vessel Code, Section IV, Low Pressure Heating Boilers (1959).	ASME	ASME
Boilers (Gas)	American Standard Approval Requirements for Central Heating Gas Appliances Vol. 1, Steam and Hot Water Boilers (1958).	A.G.A.	ASA Z21.13.1-1958
Boilers (Miniature)	ASME Boiler and Pressure Vessel Code, Section V, Miniature Boilers (1959).	ASME	ASME
Boilers (Packaged Firetube)	Standard Test Procedure for Packaged Firetube Boilers (1959).	ABAI	ABAI
Boilers (Power)	ASME Boiler and Pressure Vessel Code, Section I, Power Boilers (1959).	ASME	ASME
Boilers (Power)	ASME Boiler and Pressure Vessel Code, Section VII, Suggested Rules for Care of Power Boilers (1959).	ASME	ASME
Boilers (Steel)	Steel Boiler Institute Rating Code for Steel Boilers (1958).	SBI	SBI
Boilers (Steel)	Simplified Practice Recommendation for Steel Firebox Boilers and Steel Heating Boilers (Commercial and Residential Types) (1950).	BS SBI	CSD R157-50
Buildings	National Building Code (1957 Edition).	NBFU	NBFU
Building Requirements	American Standard Building Requirements (1946).	NHA USPHS	ASA A53.1-1946
Buildings	Basic Building Code (Also published in abridged form as Abridged Building Code) 1955.	BOCA	BOCA