

Sizing Guide for Domestic Volume Water Heaters

Sizes 175,000 - 5,000,000 BTU/h

For Apartment and Condominium Complexes, Hotels and Motels

This Sizing Guide provides a simple method of accurately determining the correct heater/storage tank combination for apartment and condominium complexes, hotels and motels. By providing a variety of heater and tank combinations, the Sizing Guide allows the system designer to optimally utilize existing equipment and boiler room floor space. Sizing is based on service water heating recommendations of the American Society of Heating, Refrigeration and Air Conditioning Engineers.

Note: This is a guide and the system designer should consider all load demands and heat losses carefully.

Useful sizing equation: Boiler Output (BTU/hr) = 500 x GPM flow through boiler x temperature rise (F) through boiler.

Selecting the appropriate water heater/storage tank combination is a three-step procedure:

1. Use the table on this page to determine the total number of sizing increments in the installation.
2. The graphs on pages 3 and 4 provide various combinations available based on the information from Step 1. Graphs 1, 2 and 3 are for interior and exterior installations.
3. The system designer can combine the information from Steps 1 and 2 with the performance and dimensional data from documents 2044, 2045 and 2046 to select the optimal water heater and storage tank to complete the installation.

For sizing information on service hot water for commercial laundry see document number 5010, Laundromats and Commercial Laundries. Calculate those demands separately, add to any other domestic hot water requirements in the facility.

Sizing Increments = No. of Units x TF x FR x CW
Unit Type Factor (TF)

Unit Type	Factor
1 Bedroom Apt.	1.0
2 Bedroom Apt.	1.5
Hotel/Motel Room	1.3
Coin-Op. Washing Machine	0.5

Shower Flow Rate Factor (FR)

Flow Rate	Factor
2 gpm	0.67
3 gpm	1.0
4 gpm	1.3
5 gpm	1.7

Inlet Cold Water Temp. Factor (CW)

Water Temp.	Factor
40°F	1.0
50°F	0.9
60°F	0.8
70°F	0.75

Apartments — Examples

New 66 Unit Apartment Complex

44	1 Bedroom 1 Bath Units
22	2 Bedroom 2 Bath Units
5	Coin-Operated Machines
3	GPM Shower Heads
50°F	Inlet Cold Water Temperature

$$\begin{aligned}\text{Total Sizing Increments} &= [\text{Number of Apartment Units} \times \text{TF}] \times \text{FR} \times \text{CW} \\ &= [(44 \times 1) + (22 \times 1.5) + (5 \times 0.5)] \\ &\quad \times 1 \times 0.9 \\ &= 71.55\end{aligned}$$

Graph 2 provides the following possible combinations of water heater and storage tank (Specify Model IW Instantaneous whenever the system does not include a storage tank).

Size 1010	No Tank
Size 715	120 gal. Tank
Size 600	230 gal. Tank
Size 500	380 gal. Tank

Existing 100 Unit Apartment Complex (with a 120 gallon storage tank)

66	1 Bedroom 1 Bath Units
34	2 Bedroom 2 Bath Units
4	GPM Shower Heads
50°F	Inlet Cold Water Temperature
	Water heater to be placed outdoors.

$$\begin{aligned}\text{Total Sizing Increments} &= [\text{Number of Apartment Units} \times \text{TF}] \times \text{FR} \times \text{CW} \\ &= [(66 \times 1) + (34 \times 1.5)] \times 1.3 \times 0.9 \\ &= 136.9\end{aligned}$$

If the existing tank needs to be replaced, as well as the water heater, the following combinations could be used:

Size 1200	380 gal. Tank
Size 1010	535 gal. Tank
Size 850	800 gal. Tank

Hotel — Examples

Existing Hotel with 1000 gallon Storage Tank

145	Hotel Rooms
4	GPM Shower Heads
40°F	Inlet Cold Water Temperature

$$\begin{aligned}\text{Total Sizing Increments} &= \text{Number of Hotel Units} \times \text{TF} \times \text{FR} \times \text{CW} \\ &= 145 \text{ Hotel Units} \times 1.3 \times 1.3 \times 1 \\ &= 245\end{aligned}$$

Graph 3 shows that a size 2000 heater utilizing the existing 1000 gallon storage tank can be installed.

New Hotel

315	Hotel Rooms
4	GPM Shower Heads
50°F	Inlet Cold Water Temperature

$$\begin{aligned}\text{Total Sizing Increments} &= \text{Number of Hotel Units} \times \text{TF} \times \text{FR} \times \text{CW} \\ &= 315 \text{ Hotel Units} \times 1.3 \times 1.3 \times 0.9 \\ &= 479.1\end{aligned}$$

Graph 3 provides the following possible combinations of water heater and storage tank:

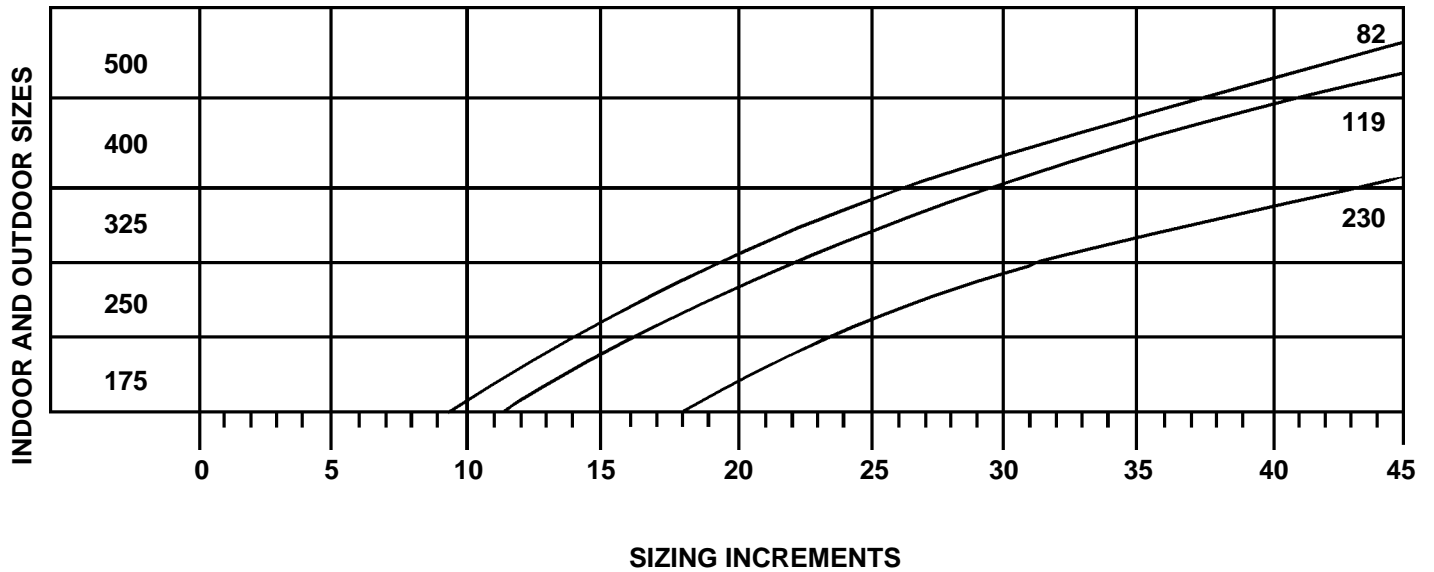
Size 5000	800 gal. Tank
Size 4500	1500 gal. Tank
Size 4050	2000 gal. Tank

NOTE: Any combination of water heater and storage tank can be used as long as they cross the sizing unit line. Whenever the combination falls on the size line, the larger unit should be installed.



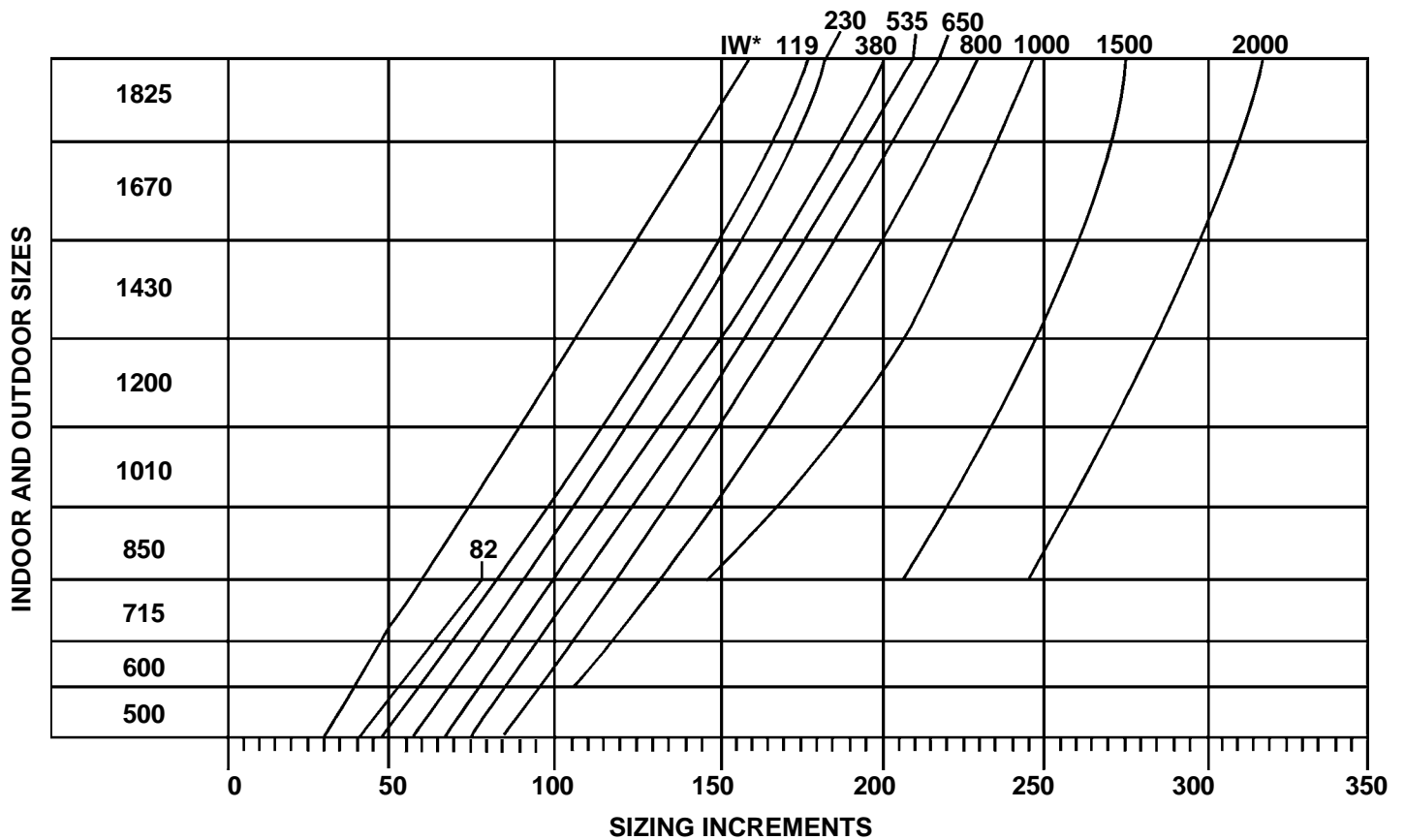
Graph 1
SIZING INCREMENTS 1 - 45

STORAGE TANK CAPACITY (IN GALLONS)



Graph 2
SIZING INCREMENTS 45 - 300

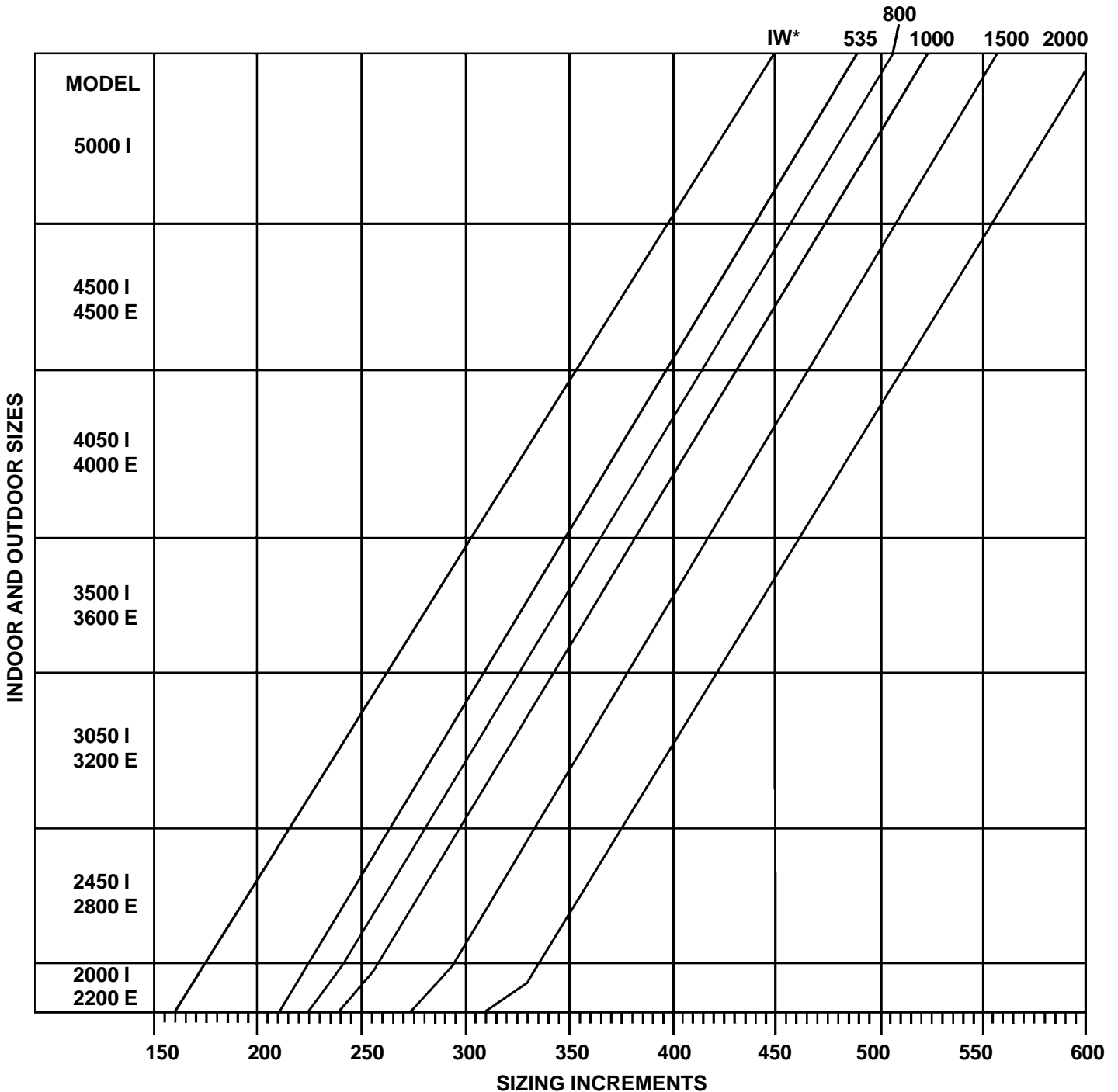
STORAGE TANK CAPACITY (IN GALLONS)



*(IW) Instantaneous heaters with no tank

Graph 3
SIZING INCREMENTS 175 - 600

STORAGE TANK CAPACITY (IN GALLONS)



I = Indoor E = Outdoor

*(IW) Instantaneous heaters with no tank