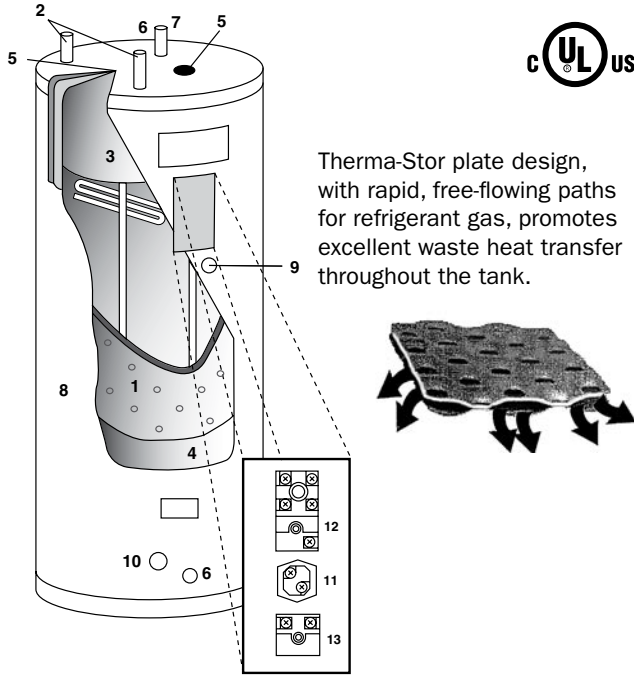




Therma-Stor II-1 and III-1

Heat Recovery Systems and Specification Information



Therma-Stor plate design, with rapid, free-flowing paths for refrigerant gas, promotes excellent waste heat transfer throughout the tank.

3. Industrial glass lined hot water storage tank.
4. 2" foam-in-place urethane insulation.
5. Dual anode protection against corrosion for extended tank life.
6. 1-1/4" male NPT water inlet and high-temperature outlet.
7. 150 psi and 195°F pressure/temperature relief valve.
8. Attractive enameled galvanized external wrapper
9. Mid tank 3/4" NPT (female) opening for recirculating loop return or for aquastat.
10. Stub out for equalization tube (optional for use when two or more Therma-Stors are piped in parallel; see diagram D).

III-1 Only:

11. 6000 watt medium density electric heating element. 208/230 single phase is standard, also available with 480 volt element.
12. Thermostat to control element.
13. Thermostat to control 3-way reclaim valve or water bleed valve.

**UL requires the manufacturer to supply a control to avoid overheating the water. If utilizing a 3-way reclaim valve, ignore the water bleed solenoid that is included.*

Other Features and Specifications

- Diameter: 29", Height: 67", Weight: 427 lbs
- 119 gallon nominal water capacity
- Rated for 450 psi refrigerant operating pressure
- Max heat exchange rating 80,000 BTU/HR
- 150 psi maximum operating water pressure
- R-16 insulation
- UL Listed
- Meets ASHRAE 90 standards
- High refrigerant capacity
- Double wall protection between refrigerant and water
- Triple leak checked, shipped with N₂ holding charge
- Approved for Canada

Part No. 4020166 – II-1

Part No. 4021992 – II-1A with Ammonia connections (R-717)

Part No. 4021540 – III-1 208/230

Part No. 4021956 – III-1 480 volt

Construction Specifications

1. Single circuit heat exchanger plate is welded and expanded for internal refrigerant passage.
2. 1-5/8" O.D. refrigerant inlet and outlet.

Operation

Therma-Stor II-1 and III-1 heat and store hot water by transferring refrigeration waste heat to cold water. This cost-efficient alternative for producing hot water fits any existing refrigeration system and improves the system's efficiency at the same time. Hot water production depends on the evaporator load and temperatures, compressor, water usage, condensing temperatures, etc. A water heating chart is found on the back page.

Application Specification

Therma-Stor II-1 and III-1 can accommodate evaporating loads of up to 85* tons total (R-22) on an open drive air conditioning system. Capacities for more typical systems such as supermarket racks are listed on back.

You can connect a II-1 or III-1 to an individual compressor or parallel units in multiples for larger tonnages. Therma-Stor's are not intended as a substitute for air or water cooled condensers.

**These ratings assume approximate 15 lb. pressure drop at maximum capacities. For complete pressure drop information, contact the factory.*

Specifications subject to change without notice.

Water Temperature Control

Incorporating provisions in the piping to bypass the hot gas around the Therma-Stor to the condenser are recommended. You can do this using an aquastat along with hot gas bypass valve. Another option to avoid overheating the water is to bleed off hot water. (See diagram A). The III-1 has a built-in surface mount thermostat to control either a 3-way valve or the water bleed solenoid.

For the II-1, the 3/4" NPT female coupling at the mid point of the tank is for the recommended water temperature controller if there is no recirculation loop. (A surface mount aquastat can be mounted on the hot water out line on a recirculation loop system).

Using capillary tube systems with the Therma-Stor is not normally recommended. Please contact the factory with any questions.

II-1 and III-1		
Max. Recommended Capacity (in tons) for Typical Refrigeration Systems		
Refrigerant	Low	Medium
	Temperatures	Temperatures
R-22	60	64
R-502, R-404A, R-507	42	51
R-134A	47	53
R-717 (ammonia) II-1A only	100+	100+

How Much Hot Water Do You Use?

The chart on the right shows the water temperature you can expect at any of the given compressor outputs and water usages.

First, determine your hot water usage in gallons/hour.

Second, determine your compressor(s) output (in tons).

Third, extend the compressor output until it intersects the water usage line on the water heating chart.

Example:

Given: • 27 ton compressor(s) output • 120 gallon/hour water usage
• 60°F cold water supply temp. • 70°F estimated water temp. rise

With these given conditions, one Therma-Stor can heat 120 gallons/hour of 60° water to 130°F. If hotter water is desired, recalculate using two Therma-Stors (this doubles the heating plate area), or consider the Therma-Stor III-1.

Only the III-1 has a 6000 watt back-up element. To calculate heat added by the 6kW element:

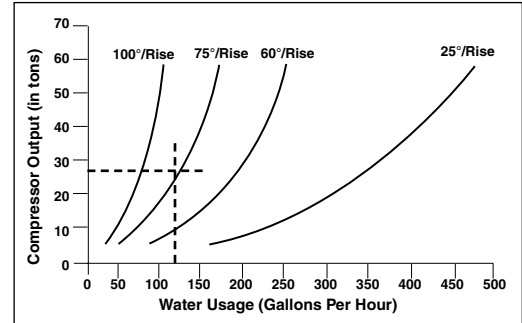
20,478 BTUs/hr. (from element)/ _____ gallons/hr/8.33 lbs./Gallon = _____°F rise from element.

To convert to BTUs reclaimed:

Multiply gallons per hour x 8.33 (the weight of one gallon of water) x _____°F rise = _____ BTUs per hour reclaimed.

Example

120 gallons/hour x 8.33 lbs./gallon/x 70°F rise = 69,972 BTUs/hour reclaimed. The heating element could add another 20.5°F (20,478 BTUs/hr. x 120 gallons/hr x 8.33 lbs./Gallons = 20.5°F).



Supermarket Applications

You can now run the entire refrigerant load (up to 64 tons) of today's larger rack systems through a single Therma-Stor II-1 or III-1 Heat Recovery System.

Typically, the Therma-Stor is piped in series with a conventional water heater. See diagram B.

In applications with "batch" cleaning, adding a storage tank is recommended. You can install the storage tank to accommodate thermal-syphoning (circulating without a pump). See diagram C.

The III-1 (or multiple III-1's) would typically replace the conventional water heater.

If you install a Therma-Stor System in a circulating loop, pump the water as slowly as possible and return to the 3/4" NPT midport.

Do not circulate directly between water heater and Therma-Stor unit unless heater has been deactivated so that it acts as storage only.

You can also install Therma-Stor units in parallel to accommodate larger loads. Adding the balance tube assures pressure equalization so that refrigerant flows evenly through each tank at all times. See diagram D.

