Ice Bank®
THERMAL ENERGY STORAGE

General Specifications
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THERMAL ENERGY STORAGE SYSTEM

General. The thermal storage system equipment must have been employed in at least 20 systems of 500 ton-hours (1758 kWh) or more capacity, all of which have operated successfully for five years.

Piping System. The piping system shall be filled with a fully formulated appropriate mixture of heat transfer fluid of ethylene or propylene glycol. Ethylene glycol shall be 25% mixture, minimum. Propylene glycol shall be 29% mixture, minimum. The solution shall be thoroughly mixed in a separate container before it is put into the system. System leak protection shall be provided by liquid level and/or pressure switches in the expansion tank. Tank bottoms shall be level and supported over their entire area. All system piping shall be insulated with _____ inches (mm) of insulation by others. Tanks shall have _____ inches (mm) of unobstructed overhead clearance for service.

Glycol Management System. A glycol manangement system (GMS) is recommended for the piping system instead of a potable water connection to provide make-up solution, insure proper heat transfer fluid concentrations, and provide operational safeties.

Ice Inventory Meter. The thermal storage system shall be provided with an ice inventory measuring device which will indicate the amount of ice available at any time within an accuracy of ±5 percent. The ice inventory meter shall consist of an insertion probe which connects to the storage tanks and is supplied with air by an air pump, the output pressure of this air pump being measured by an analog meter and an electric transducer giving a 4-20 milliamp output. The input to the meter shall be 120 volts/60 Hertz AC (240 volts/50 Hertz AC).

ICE STORAGE TANKS- (For more details on a specific Model consult CALMAC engineering catalog.)

General. The ice storage tanks shall be Ice Bank® Model _____ as manufactured by CALMAC Corp., Fair Lawn, NJ. Each tank shall have a net usable capacity of _____ ton-hours (kWh). The ice storage tanks shall be designed for a minimum 30 to 35 year service life and shall be constructed solely of corrosion-resistant materials. It shall consist basically of a cylindrical container, spiral tubular heat exchanger and supply and return headers.

Each tank shall have factory rated and published charge and discharge performance curves. The tanks shall be suitable as standard for installation above ground or partially buried as shown in partially buried specifications or, with factory option fully buried as show in fully buried specifications, and shall produce a floor loading of no more than _____ pounds per square foot (kg/m^2).

Each Model _____ must be capable of being individually isolated from the thermal storage system so that each may be serviced without interrupting the operation of the total system.

Tank Container. The tank container shall be cylindrical and shall be constructed of polyethylene with an average thickness of 3/8 inch (9.5 mm) and a minimum ultimate strength of 2600 psi (18,000 kPa) per ASTM D 638-08. The tank shall be able to withstand total freezing of the water within it through repeated cycles without damage. The bottom and sides of the tank shall be insulated with a minimum R-factor of 9 and the top shall be insulated with a minimum R-factor of 16. Standby losses must not exceed 1 percent of the total stored capacity over an 85ºF (29.4ºC) day. The sides of the tank shall be covered with .032 inch (0.8 mm) textured aluminum sheet. The tank container shall be warranted for a period of 10 years.

Heat Exchanger. The tank shall contain a spiral-wound, mat-type heat exchanger consisting of polyethylene tubing arranged in multiple parallel circuits with opposite direction of flow in adjoining tubes. The heat exchanger shall be capable of operating up to a 90 psi (620 kPa) maximum pressure and shall have a minimum burst pressure rated for 4 times the maximum operating pressure. Each ice tank heat exchanger and its associated piping shall be factory hydrostatically pressure tested to a minimum of 250 psi (1724 kPa) after tank insertion, not prior.

(See more on next page.)

C Model	1045C (2F, 3F, 4F, U4F)	1082C (2F, 3F, 4F, U4F)	1098C (2F, 3F, 4F)	1105C (2F, 3F, 4F, U4F)	1190C (2F, 3F, 4F)	1220C (2F, 3F, 4F)	1320C (SF, RF)	1500C (SF, RF)
Net Usable Capacity[i], ton-hrs.(kWh)	41(144)	82 (288)	98 (345)	105 (369)	162 (570)	214 (753)	324 (1140)	486 (1710)
Maximum Operating Temp., °F (°C)	100 (38)	100 (38)	100 (38)	100 (38)	100 (38)	100 (38)	100 (38)	100 (38)
Factory Tested Pressure, psi kPa)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)
Maximum Operating Pressure[ii],psi(kPa)	90 (620)	90 (620)	90 (620)	90 (620)	90 (620)	90 (620)	90 (620)	90 (620)
Dimensions (WxLxH) [iii], in. (mm)	**(2F)** 73¾ x75x49 (1875x1900x1244) **(3F, 4F, U4F)** 73¾ x 76½ x 49 (1875x1940x1244)	**(2F)** 73¾ x 75 x 84½ (1875 x 1900 x 2140) **(3F, 4F, U4F)** 73¾ x 76½ x 84½ (1875 x 1940 x 2140)	**(2F)** 89x91x69½ (2260 x 2310 x 1765) **(3F, 4F)** 89 x 92 x 69½ (2260 x 2340 x 1765)	**(2F)** 73¾ x 75x102 (1875 x 1900 x 2590) **(3F, 4F, U4F)** 73¾ x 76½ x 102 (1875 x 1940 x 2590)	**(2F)** 89 x 91 x 102 (2260 x 2310 x 2590) **(3F, 4F)** 89 x 92 x 102 (2260 x 2340 x 2590)	**(2F)** 89x91x134½ (2260x2310x3415) **(3F, 4F)** 89x92x134½ (2260x2340x3415)	**(SF)** 89 x 180 x 102 (2260 x 4580 x 2590) **(RF)** 89 x 182 x 102 (2260 x 4620 x 2590)	**(SF)** 89 x 270x102 (2260 x 6860 x 2590) **(RF)** 89 x 272 x 102 (2260 x 6910 x 2590)
ShippingWeight[iv], lbs. (kg)	615 (280)	1065 (485)	1275 (580)	1315 (595)	2000 (910)	2625 (1190)	4000 (1815)	6000 (2720)
Weight, Filled, lbs. (kg)	4475 (2030)	8580 (3890)	10,235 (4645)	10,885 (4935)	16,900 (7665)	23,000 (10,433)	34,000 (15,420)	50,600 (22,950)
Floor Loading, lbs./sq.ft.(kg/m²)	150 (732)	286 (1396)	237 (1157)	363 (1772)	391 (1909)	531 (2593)	391 (1909)	391 (1909)
Volume of Water/Ice,gals. (l)	410 (1550)	820 (3105)	980 (3710)	1045 (3955)	1655 (6265)	2215 (8385)	3310 (12,530)	4965 (18,795)
Volume of 25% Glycol Solution in HX, gals. (l)	47 (178)	86 (326)	99 (375)	99 (375)	157 (594)	210 (795)	315 (1192)	472 (1787)
Inlet/Outlet Flange Connections, in.	4	4	4	4	4	4	4	4

A Model	1045A	1082A	1098A	1105A	1190A
Net Usable Capacity[i], ton-hrs.(kWh)	41 (144)	82 (288)	98 (345)	105 (369)	162 (570)
Maximum Operating Temp., °F (°C)	100 (38)	100 (38)	100 (38)	100 (38)	100 (38)
Factory Tested Pressure, psi (kPa)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)
Maximum Operating Pressure[ii],psi(kPa)	90 (620)	90 (620)	90 (620)	90 (620)	90 (620)
Dimensions (Od x H) [iii], in.(mm)	73¾ x 48 (1875 x 1220)	73¾ x 82 (1875 x 2080)	89 x 68 (2260 x 1730)	73¾ x101 (1875x2570)	89 x 101 (2260 x 2570)
ShippingWeight[iv], lbs. (kg)	580 (265)	1025 (465)	1225 (555)	1275 (580)	1950 (885)
Weight, Filled, lbs. (kg)	4380 (1985)	8455 (3835)	10,100 (4580)	10,760 (4880)	16,765 (7605)
Floor Loading, lbs./sq.ft.(kg/m²)	147 (718)	283 (1382)	234 (1142)	360 (1758)	388 (1894)
Volume of Water/Ice,gals. (l)	410 (1550)	820 (3105)	980 (3710)	1045 (3955)	1655 (6265)
Volume of 25% Glycol Solution in HX, gals. (l)	40 (151)	78 (295)	90 (341)	99 (375)	148 (560)
Inlet/Outlet Flange Connections, in.	2	2	2	2	2

(i) Typical value, actual varies with conditions.
(ii) Consult factory for higher ratings.
(iii) Tolerance for all dimensions is ± 1/2" except "L" for Models 1500 and 1320 where ± 1".
(iv) Shipping weight may vary because of residual water from hydrostatic test.

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