

MODULAR ICE RAKE SYSTEMS

EFFECTIVE DATE JANUARY 30, 2017

Prices and Specifications Subject to Change without Notice (Replaces List Dated 5/19/2016)

| RAKE MODEL NUMBER | STORAGE CAPACITY IN U.S. TONS / (METRIC TONS) | | | | | |
|-------------------------|---|----------------|----------------|----------------|----------------|----------------|
| | FLAKE | SHELL | SMALL | MID | LARGE | PLATE |
| | ICE | ICE | TUBE | TUBE | TUBE | ICE |
| | (57 Cu Ft/Ton) | (57 Cu Ft/Ton) | (62 Cu Ft/Ton) | (64 Cu Ft/Ton) | (66 Cu Ft/Ton) | (50 Cu Ft/Ton) |
| SMR-1200 | 21 (19) | 21 (19) | 19 (18) | 19 (17) | 18 (17) | 24 (22) |
| SMR-2000 | 35 (32) | 35 (32) | 32 (29) | 31 (28) | 30 (28) | 40 (36) |
| SMR-2800 | N/A | 49 (45) | 45 (41) | 43 (40) | 42 (39) | 56 (51) |
| LMR-1800 | 32 (29) | 32 (29) | 29 (26) | 28 (26) | 27 (25) | 36 (33) |
| LMR-2900 | 50 (46) | 50 (45) | 47 (43) | 45 (41) | 44 (40) | 58 (53) |
| LMR-4200 | N/A | 74 (67) | 68 (62) | 66 (60) | 64 (58) | 84 (76) |
| JMR-4500 | 79 (72) | 79 (72) | 72 (66) | 70 (64) | 68 (62) | 90 (82) |
| JMR-6300 | N/A | 110 (100) | 102 (92) | 99 (89) | 96 (87) | 126 (115) |
| HMR-6300 | 110 (100) | 110 (100) | 102 (92) | 99 (89) | 96 (87) | 126 (115) |
| HMR-8800 | N/A | 154 (140) | 142 (129) | 137 (125) | 133 (121) | 176 (160) |
| GMR-9000 | 158 (144) | 158 (144) | 145 (132) | 140 (128) | 136 (124) | 180 (164) |
| GMR-12600 | N/A | 221 (201) | 203 (185) | 197 (179) | 191 (174) | 252 (229) |
| FMR-10000 | 175 (159) | 175 (159) | 161 (147) | 156 (142) | 151 (138) | 200 (182) |
| FMR-14000 | N/A | 246 (223) | 226 (205) | 219 (199) | 212 (193) | 280 (255) |

* Rake model numbers indicate cubic feet of storage space at maximum ice depth. Specifications subject to change without notice.

A. Standard Equipment Notes:

- MR systems have fixed net inside length and width dimensions. The wall heights vary in four foot or five foot increments. (See dimensions chart: 8' to 16'). The system model number designates the ice bin storage capacity in cubic feet.
- Standard systems include the following galvanized steel items: Bin wall frames with 24-gauge sheet metal liners and hinged side access doors, rake, wear and thrust plates, bin door with plastic liner and viewing panel, hoist with cable sheaves and lifting cables, hoist drip pan, and bin door operator. SS Front Bin Panels around discharge screw and bin door are now standard. Also standard are SS drive shaft and guard cover.
- Maximum delivery rates: SMR and LMR systems - 15 U.S. tons per hour, JMR and HMR systems - 30 U.S. tons per hour, GMR and FMR systems - 30 to 40 (upon engineering approval) U.S. tons per hour.
- The standard SMR and LMR systems are provided with NH-78 PLASTIC rake chain. All the larger standard systems are provided with zinc plated chain (SS chain optional). The standard SMR, LMR and JMR systems are provided with plastic rake sprockets (drive & idle). The standard HMR systems are provided with galvanized rake drive sprockets, and plastic idle sprockets. The standard GMR and FMR systems are provided with galvanized rake drive & idle end sprockets (SS sprockets optional).
- The standard SMR and LMR systems are provided with manually controlled linear actuator for bin door operator. Larger systems are provided standard with a winch-type bin door operator, which may be controlled manually or automatically. The automatic bin door operator is available as an added cost option for the SMR and LMR systems. However, automatic bin door operation for batch type ice-on-demand is only applicable to systems storing Flake or Plate ice, since shell and tube ice will not form a stable ice wall when the bin door is opened. Linear actuator for SMR & LMR, 0.75HP motor for JMR & HMR, and 1HP motor for GMR & FMR.

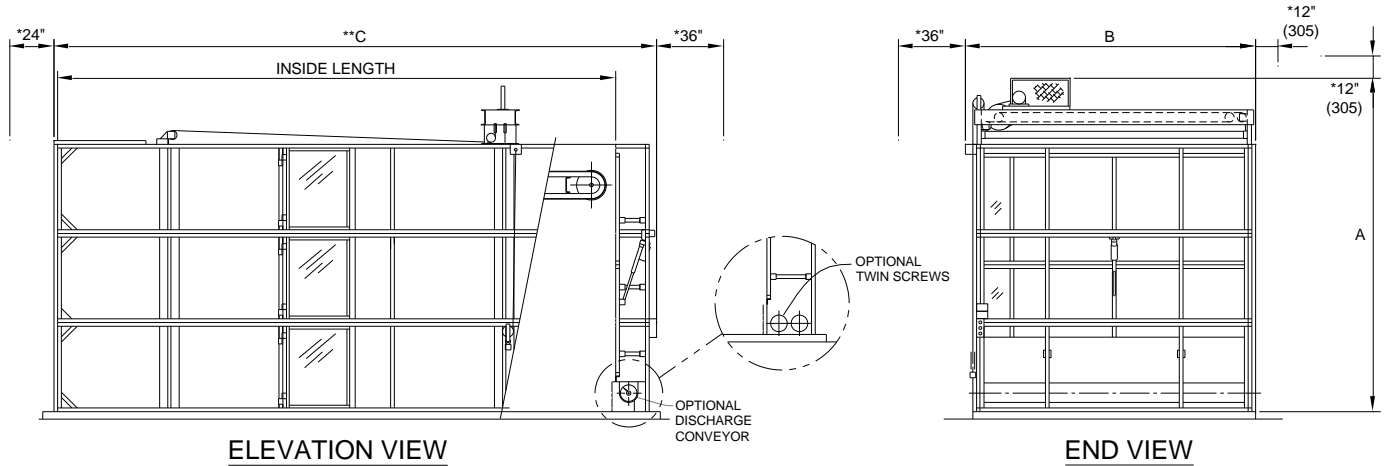
B. Optional Equipment as Adder Items:

- Reinforced wall systems for tube, shell or "wet" ice applications. Discharge screw across end of bin and other collection or delivery conveyors, Stainless Steel items for several ice contact components such as bin liners, rake flights, rake chain, drive and/or idle end sprockets, wear & thrust plates, and any screw conveyors. NH-78 plastic chain on JMR rake requires special approval by North Star Engineering. North Star can also supply a rake control panel for control of delivery equipment outside the modular ice rake. Contact North Star for special or custom designed requirements and additional pricing.

C. Other:

- Recommended MR room temperature is +10°F to +20°F (-12°C to -7°C). Non-refrigerated rooms above 32°F (0°C), called "wet" bins, require optional reinforced wall systems. Galvanized components in wet bin environment will experience accelerated corrosion.

Modular Ice Rake Dimensions



(*) INDICATES MINIMUM ACCESS CLEARANCE REQUIRED AROUND EQUIPMENT.

(**) ADD 5" TO 'C' DIMENSION FOR BINS WITH TWIN SCREWS OPTION FOR JMR AND HMR SYSTEMS; ADD 4" FOR GMR AND FMR SYSTEMS.
Dimensions in parentheses are in millimeters. Weights in parentheses are in kilograms.

| RAKE MODEL NO. | ICE DEPTH | WALL HEIGHT | INSIDE WIDTH | INSIDE LENGTH | "A" OVERALL HEIGHT | "B" OVERALL WIDTH | "C" OVERALL LENGTH | SHIPPING WEIGHT |
|-------------------------------------|------------------|------------------|------------------|-------------------|--------------------|-------------------|--------------------|---------------------------|
| SMR-1200 - 2 HP Mtz BDO optional | 6'-0" (1829) | 8'-0" (2438) | 10'-0" (3048) | 20'-0" (6096) | 11'-0" (3353) | 10'-9" (3277) | 22'-2" (6756) | 7,000 lbs (3175 kgs) |
| SMR-2000 - 2 HP Mtz BDO optional | 10'-0" (3048) | 12'-0" (3658) | 10'-0" (3048) | 20'-0" (6096) | 15'-0" (4572) | 10'-9" (3277) | 22'-2" (6756) | 8,200 lbs (3719 kgs) |
| SMR-2800 - 2 HP Mtz BDO optional | 14'-0" (4267) | 16'-0" (4877) | 10'-0" (3048) | 20'-0" (6096) | 19'-0" (5791) | 10'-9" (3277) | 22'-2" (6756) | 9,500 lbs (4309 kgs) |
| LMR-1800 - 2 HP Mtz BDO optional | 6'-0" (1829) | 8'-0" (2438) | 12'-0" (3658) | 25'-0" (7620) | 11'-0" (3353) | 12'-11" (3937) | 27'-2" (8280) | 9,000 lbs (4082 kgs) |
| LMR-2900 - 2 HP Mtz BDO optional | 9'-8" (2946) | 12'-0" (3658) | 12'-0" (3658) | 25'-0" (7620) | 15'-0" (4572) | 12'-11" (3937) | 27'-2" (8280) | 10,300 lbs (4672 kgs) |
| LMR-4200 - 2 HP Mtz BDO optional | 14'-0" (4267) | 16'-0" (4877) | 12'-0" (3658) | 25'-0" (7620) | 19'-0" (5791) | 12'-11" (3937) | 27'-2" (8280) | 12,000 lbs (5443 kgs) |
| JMR-4500 - 5 HP 0.75 HP BDO | 10'-0" (3048) | 12'-0" (3658) | 15'-0" (4572) | 30'-0" (9144) | 15'-0" (4572) | 16'-1" (4902) | 32'-9" (9982) | 12,500 lbs (5670 kgs) |
| JMR-6300 - 5 HP 0.75 HP BDO | 14'-0" (4267) | 16'-0" (4877) | 15'-0" (4572) | 30'-0" (9144) | 19'-0" (5791) | 16'-1" (4902) | 32'-9" (9982) | 14,500 lbs (6577 kgs) |
| HMR-6300 - 5 HP 0.75 HP BDO | 10'-0" (3048) | 12'-0" (3658) | 18'-0" (5486) | 35'-0" (10668) | 15'-0" (4572) | 19'-4" (5893) | 37'-9" (11506) | 16,300 lbs (7394 kgs) |
| HMR-8800 - 5 HP 0.75 HP BDO | 14'-0" (4267) | 16'-0" (4877) | 18'-0" (5486) | 35'-0" (10668) | 19'-0" (5791) | 19'-4" (5893) | 37'-9" (11506) | 19,000 lbs (8618 kgs) |
| GMR-9000 - 5 HP 1 HP BDO | 10'-0" (3048) | 12'-0" (3658) | 20'-0" (6096) | 45'-0" (13716) | 15'-0" (4572) | 21'-4" (6502) | 47'-10" (14580) | 19,600 lbs (8890 kgs) |
| GMR-12600 - 5 HP 1 HP BDO | 14'-0" (4267) | 16'-0" (4877) | 20'-0" (6096) | 45'-0" (13716) | 19'-0" (5791) | 21'-4" (6502) | 47'-10" (14580) | 22,800 lbs 10342 (kgs) |
| FMR-10000 - 5 HP 1 HP BDO | 10'-0" (3048) | 12'-0" (3658) | 20'-0" (6096) | 50'-0" (15240) | 15'-0" (4572) | 21'-4" (6502) | 52'-10" (16104) | 20,700 lbs (9389 kgs) |
| FMR-14000 - 5 HP 1 HP BDO | 14'-0" (4267) | 16'-0" (4877) | 20'-0" (6096) | 50'-0" (15240) | 19'-0" (5791) | 21'-4" (6502) | 52'-10" (16104) | 24,100 lbs (10932 kgs) |