



RAVEN PRODUCTS

WATER METER BOXES & LIDS

RECTANGULAR

&

ROUND

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MANUFACTURED IN USA & OWNED BY - **RAVEN PRODUCTS**



SHORT FORM SPECIFICATION

RMB-11-18-12 With White Interior & 17" Base Opening. (page 6)

RML-11-18, 13-24, 15-27 & 17-30 with CI reader Lid and AMR Recess. (page 12)

RML-11-18 Ductile Iron Lid Certified H-20 & Traffic Rated, with or without reader lid. (page 20)



RAVEN PRODUCTS METER BOX BOX SPECIFICATION



NEW-Manufacture Process: Meter Box shall be rotational molded by RAVEN PRODUCTS using High Density Polyethylene regrind and virgin resins in a series of LAMINATED WALLS with an optional white interior coating. The outer wall will be LAMINATED to the interior wall providing greater side load-bearing capacity. When the two walls are laminated together the Molecular Structure (fibers) from each wall are crossed, creating a dual layer of much greater strength and wall thickness. Wall thickness shall be such that when buried, it will support a traffic load as explained on page 18 with a H-20 lid. Flanges under lid area, each corrugation and base of box reduce settling and support loads. Flange under lid recess also provides an easy gripping area to transport boxes.

Deflection: Meter box shall be able to withstand a 200-lb side load with one inch deflection at the base and mid point of the longest wall of the box.

Stacking: Corrugations of top box shall overlap lid area of bottom box on both sides and each end providing greater vertical bearing area. Use 2 self-tapping screws on each side at the base of each stacked box as depicted in the recommended installation procedures. Tolerance in lid area shall be 3/8".

Impact: Impact tests shall be conducted at two different locations in accordance with ASTM D2412. These are (1) top of box at lid area and (2) center area of the long side. Failure of the test specimen shall be any crack, split or shatter of the wall section. Test using a 10-lb Tub B and flat plate Holder B. Test one box per run if failure occurs test 3 more boxes. If no failure occurs the run is approved.

Settling: Meter Box shall have an integral flat anti-settling plate (not tapered) around the top exterior portion of the box and at the base of all corrugations to support the box and maintain grade.

LIMITED-WARRANTY: Raven warrants Poly boxes and lids to be free of manufacturing defects at ship point. Warranty is limited to replacement or unit price at discretion of Raven. Raven shall not be liable for any damages of any kind. Iron lids are outsourced by others and are responsible for individual products.

SOME OF THE CUSTOMERS USING RAVEN PRODUCTS' BOX AND LIDS

Some of the Municipal and Private Water Companies using Raven Boxes and Lids

City of Vancouver

Clark Co PUD

City of Ridgefield

City of Forest Grove

City of Kennewick

City of Pasco

City of West Richland

City of Richland

City of Sunnyside

Spokane Co. Water

City of Wenatchee

City of Longview

City of Everett

City of Spanaway

City of Auburn

City of Pendleton

City of Elma

City of Enumclaw

City of Arlington

North Shore Utility Dist.

City of Olympia PWD

Lakeview Utility District

Summit Water Dist.

City of Bremerton

City of Everett

City of Daytona Beach, FL

City of Clovis, CA

City of Ontario

City of Pendleton

City of Hermiston

City of Bend

EWEB, Eugene

SUB

Dallas, Oregon

City of Ogden, UT

All of Southern Idaho

City of Twin Falls

City of Idaho Falls

City of Pocatello

Lewiston Orchards

City of Meridian

United Water

City of Kuna

City of Marsing

City of Eagle

City of Nampa

City of Caldwell

City of McCall

City of Post Falls

City of Dalton Gardens

City of Moscow

Lewiston Orchards

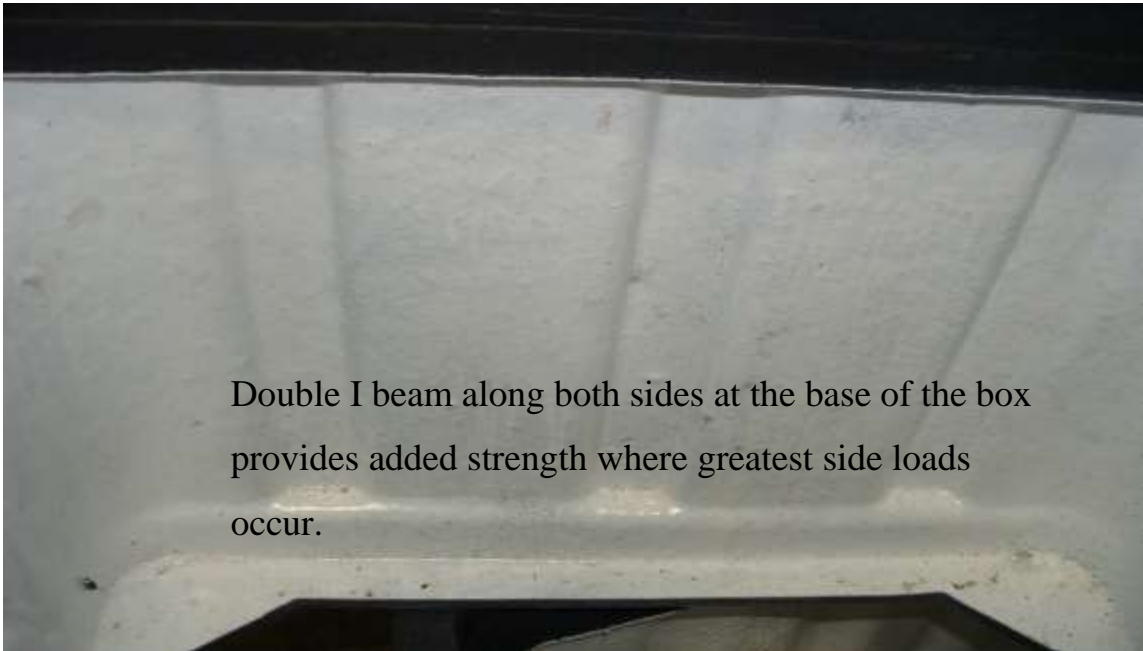
Consolidated Utilities TN

MANY MORE

RAVEN PRODUCT'S METER BOX



Raven now has available in 15-27-12 & 13-24-18 a new box designed to provide greater strength against side loads by forming an additional I beam at the base of the flanges.



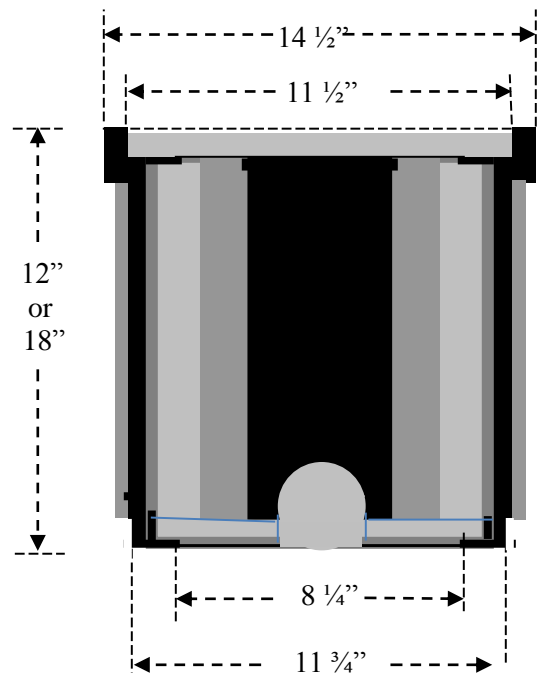
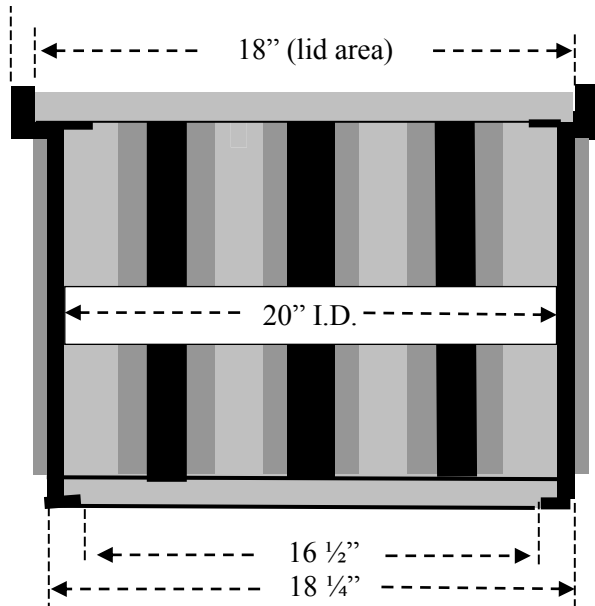
Double I beam along both sides at the base of the box provides added strength where greatest side loads occur.

WATER METER BOX

RMB-11-18-12

RMB-11-18-18

RMB-11-18-EXT



- (1) WHITE INTERIOR
- (2) Mouse Hole each end, pipe entry and exit. 4 1/2" High x 3" across. (Optional)
- (3) Flat Base, Flange under lid area, under each corrugation (see Page 10 Bearing Area).
- (4) 11-18 has 3 corrugations, each side, for greater side load support.
- (5) Half Inch Wall thickness, even at bottom of box.

MANUFACTURED IN U.S.A. FROM RECYCLED RESIN

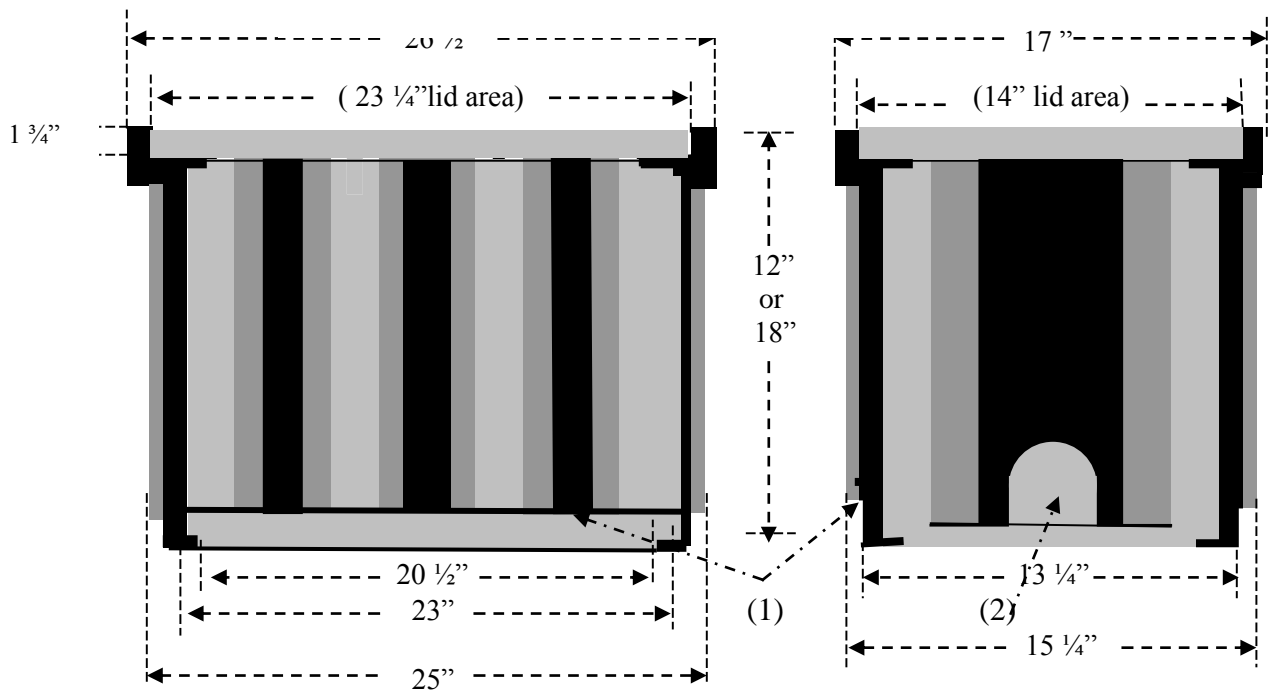
13-24 RAVEN WATER METER BOX

WATER METER BOX

RMB-13-24-12

RMB-13-24-18

RMB-13-24-EXT



- (1) WHITE INTERIOR
- (2) I Beam at Meter Box Base, below corrugation, provide greater side load support
- (3) Mouse Hole each end, pipe entry and exit. 4 1/2" High x 3 1/2" across.
- (4) Flat Base, Flange under lid area, under each corrugation (see Page 10 Bearing Area).
- (5) 13-24 has 3 corrugations, each side, for greater side load support.
- (6) Half Inch Wall thickness, even at bottom of box.

MANUFACTURED IN U.S.A. FROM RECYCLED RESIN

15-27 RAVEN WATER METER BOX

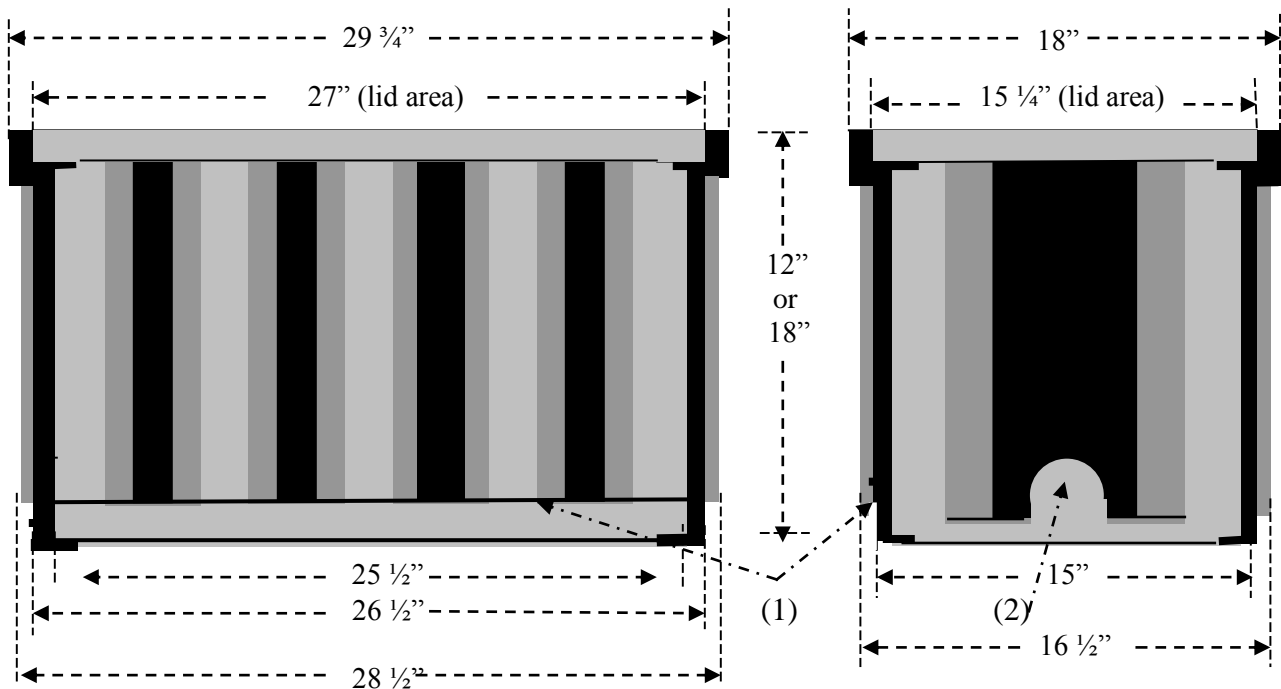
RMB-15-27-12

RMB-15-27-18

RMB-15-27-EXT



WHITE INTERIOR



- (1) 15-27-12 has I Beam at Meter Box Base, below corrugation, provide greater side load support
- (2) Mouse Hole each end, pipe entry and exit. 5 1/2" High x 3" across.
- (3) Flat Base, Flange under lid area, under each corrugation (see Page Bearing Area).
- (4) 15-27-18 has 4 corrugations, each side, for greater side load support.
- (5) Half Inch Wall thickness, even at bottom of box.
- (6) 2 lid flange supports each side.

MANUFACTURED IN U.S.A. FROM RECYCLED RESIN

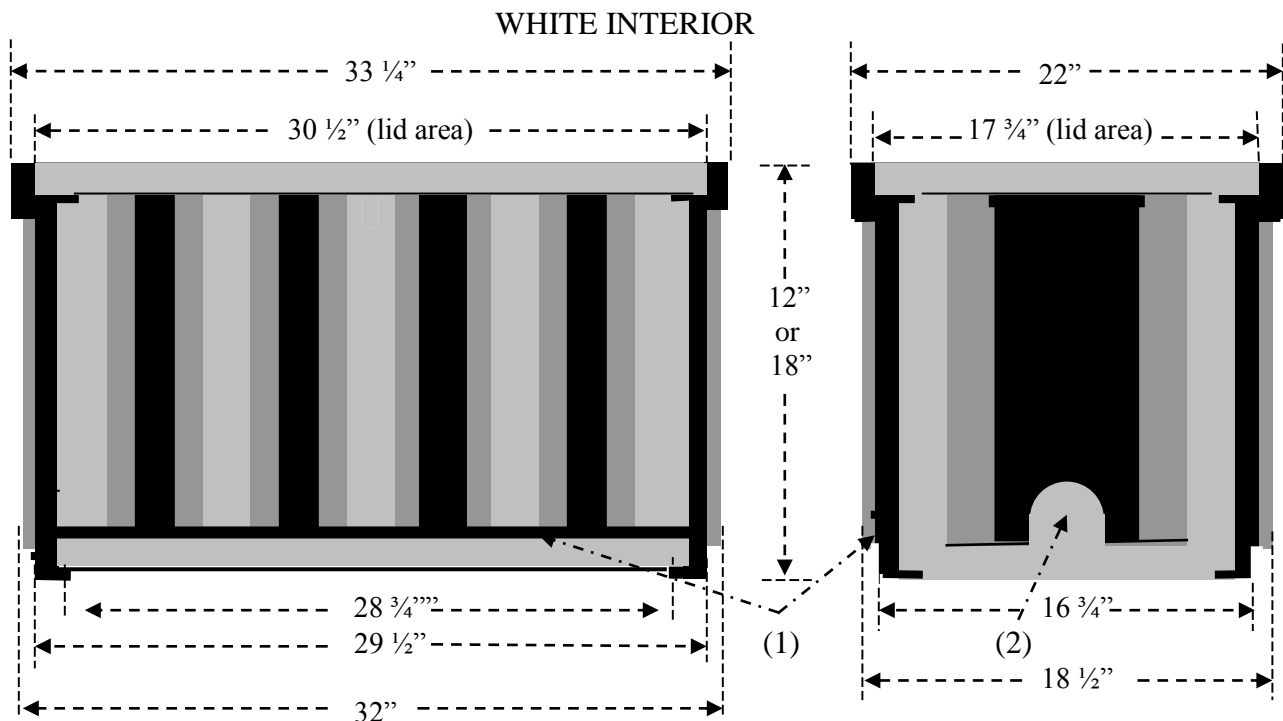
17-30 RAVEN WATER METER BOX

1½" & 2" WATER METERS

RMB-17-30-12

RMB-17-30-18

RMB-17-30-EXT



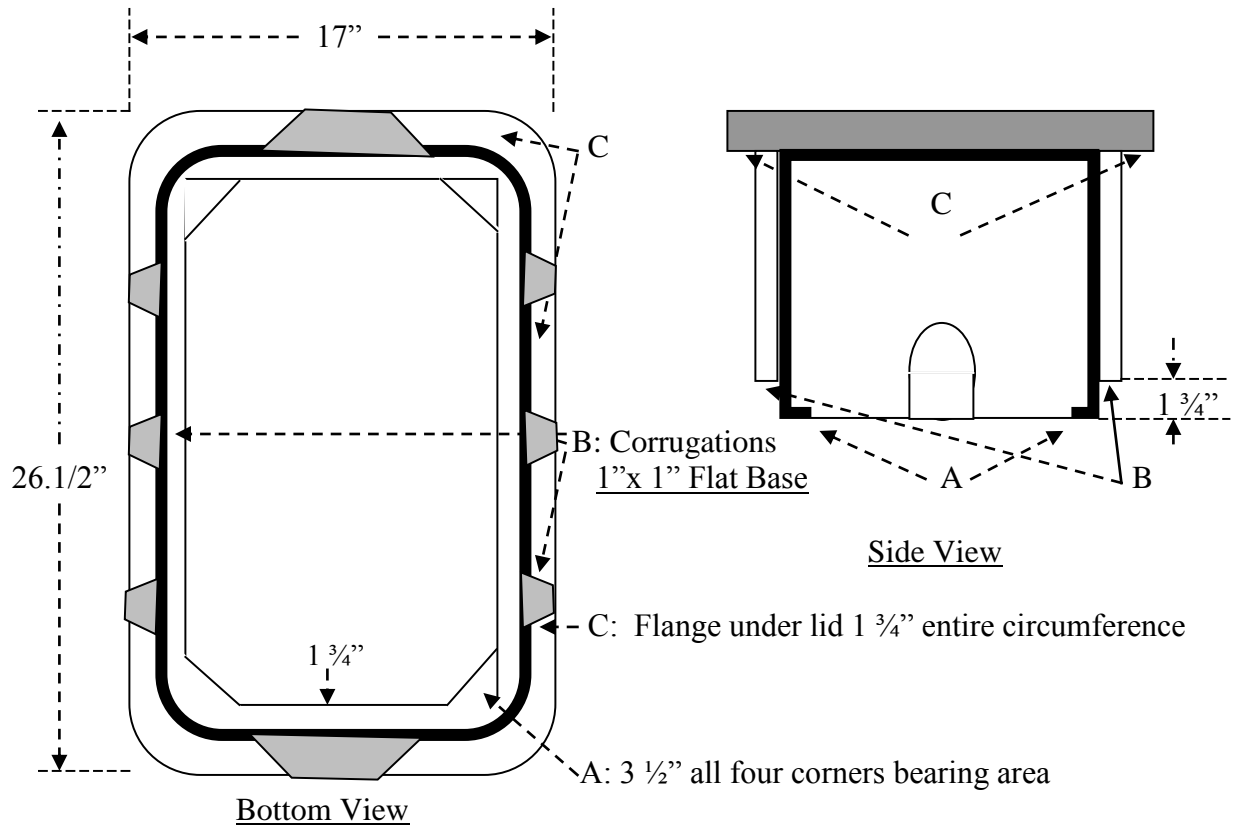
- (1) I Beam at Meter Box Base, below corrugation, provide greater side load support
- (2) Mouse Hole each end, pipe entry and exit. 5 1/2" High x 3" across.
- (3) Flat Base, Flange under lid area, under each corrugation (see Page Bearing Area).
- (4) 17-30-18 has 4 corrugations, each side, for greater side load support.
- (5) Half Inch wall thickness, even at bottom of box.

MANUFACTURED IN U.S.A. FROM RECYCLED RESIN

Raven Water Meter Box

Bearing Area

(Maintain Grade)



- A: 1 1/2" Base Flange barring area covers entire bottom of box
- B: 6 each side wall corrugations for side support bases are barring areas also has flat base 1" x 1".
- C: 1 3/4" flat barring area under lid around entire box

RAVEN PRODUCTS' METER BOXES



Raven Meter Boxes have a flat (not tapered) ridge around the underside of the lid area and under each of the corrugations in addition to the flat area at the base of each box. These bearing areas support the box keeping it from settling and loosing grade.

The flat area under the lid also makes it easier for the installation crews to pick up, transport and lower into the pit.

When stacking the boxes for greater height and transportation the base of the top box inserts into the lid area of the bottom box forming a solid interlocking union. The flat base of each corrugation overlap the lid area further supporting vertical loads. Insert 2 screws on both sides at base into lid area.



RAVEN PRODUCTS' METER BOX LID

POLYETHYLENE LID SPECIFICATION



Manufacture: Lids shall be manufactured by RAVEN PRODUCTS from High Density Polyethylene homogenously molded into one unit. The wall shall be a solid cross section of resin, not aerated, to provide greater impact strength. Wall thickness and I beam construction shall be such that it will support *1,500 pound non stationary load.

Impact Resistance: Impact tests shall be conducted in accordance with ASTM D2412. Failure of the test specimen shall be any crack, split or shatter of the wall. Test one lid per run using a 10-lb Tub B and flat plate Holder B, if failure occurs test 3 more lids. If no failure occurs the run is approved.

Color: Lids shall be black to inhibit effects of ultraviolet degradation.

Insulation: Lids are constructed with a continuous outer and inner wall forming a closed cell with I - Beam support. The closed cell provides an insulation barrier stopping frost penetration to the water meter area.

Reader Lid: Flip lid for meter reading access shall be made of ductile Iron to prevent lawn maintenance equipment from lifting into mower blades.

Lid Recess: Round recess (1/8" x 5") in lid at one corner for touch read or radio read antenna. 1 3/4" hole may be drilled in recess to complete antenna installation.

Weights: Listed in drawings.

Dimensions: Listed in drawings.

Lid Tolerances: Shall be plus or minus 3/8".

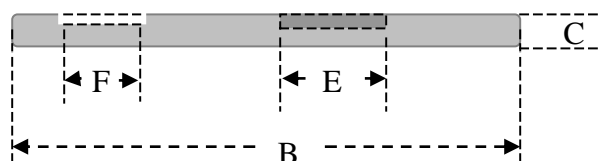
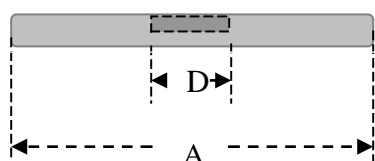
RAVEN PRODUCTS LID DIMENSIONS

CLOSED CELL POLYETHYLENE LIDS INSULATE METERS AND VALVES

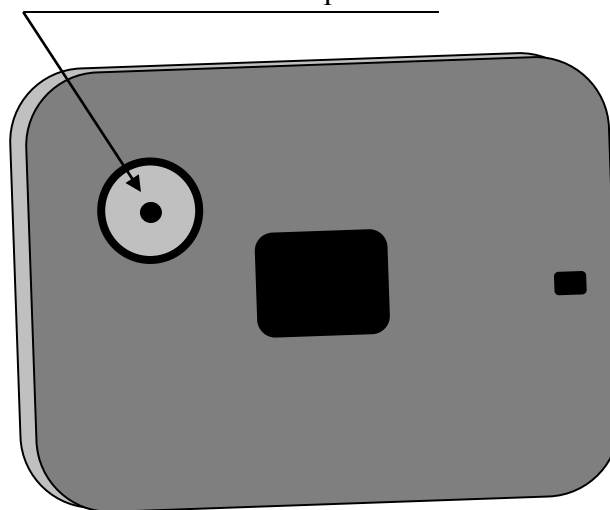
PLAIN LIDS WITH OR WITHOUT AMR RECESS

READER LIDS WITH OR WITHOUT AMR RECESS

LOCKING LIDS WITH OR WITHOUT AMR RECESS



AMR Recess 3" from top & side



| PRODUCT CODE | A | B | C | D | E | F | |
|--------------|---------|---------|-------|------|------|------|------------------------|
| RML-10-15 | 10.0" | 15.0" | 1.75" | N/A | N/A | N/A | Replace Concrete Lids. |
| RML-11-18 | 11.25" | 18.125" | 1.75" | 4.5" | 7.5" | 4.5" | |
| RML-13-24 | 13.75" | 23.375" | 1.75" | 4.5" | 7.5" | 4.5" | |
| RML-15-27 | 15.75" | 27.125" | 1.75" | 4.5" | 7.5" | 4.5" | |
| RML-17-30 | 17.625" | 30.5" | 1.75" | 4.5" | 7.5" | 4.5" | |

RAVEN PRODUCT'S METER BOX LID

SUBMITTAL SHEET

Raven Lids of High Density Polyethylene construction provides excellent weight to strength ratio. Lids maintain original finish, will not corrode or loose strength. Strong enough to drive lawn care equipment over without damage. Black pigmentation supports retardation of ultraviolet degradation.

Reader lid is made of Cast Iron, so lawn equipment will not vacuum lid into blade. Reader lid can be removed and replaced if necessary.

Air pockets in lid structure provide an excellent thermo blanket retarding frost at ground level. Lids are lightweight, easily removed without maintenance crew back or hand injury.



Recessed area for AMR touch read or radio read is standard in all lids. Does not come with 1 3/4" hole drilled unless ordered. Poly makes for an easy conversion should you change from direct read to touch or radio read. Poly is more forgiving than PVC (plastic) will not crack when impacted.



Poly Lids, without Cast Iron readers are available.

RAVEN PRODUCTS' METER BOX

INSTALLATION RECOMMENDATIONS

I). Raven Products Certifies Traffic Rated Water Meter Boxes only:

Certification does not cover Engineers Design, Installation, Back-fill, Lids, Grade, Surrounding Materials or Location.

Lids must be Traffic Rated and fit lid area. If too small lids will not be supported properly, resting only on the outer portion of the flange and not supported by the corrugation under the flange.

II) Embedment Material:

DO NOT USE ROCKS OR FROZEN CLODS GREATER THAN 1 ½" IN BACKFILL OR IN CONTACT WITH THE BOX. The same bedding as would be used for SDR 35 flexible walled pipe. DO NOT USE PEA GRAVEL OR ROUND RIVER ROCK.

Class I, II, III & IV – Native to angular aggregates 1 ½" in diameter or less. (¾" minus)

Introduce initial backfill in one-foot increments lightly tamping each level with native or imported backfill containing aggregates 1 ½" or less in diameter.

III). Box Installation:

Backfill by replacing excavated soil or import in one foot lifts.

Place a 2x6 wood support across short side in base of box if compaction devises are employed around the box.

IV). Parking Lot/Driveway Installation:

Place metal lids upside down in boxes before pouring cement. Place a 2x 6 wood support in base of box if compaction devises are employed around the box.

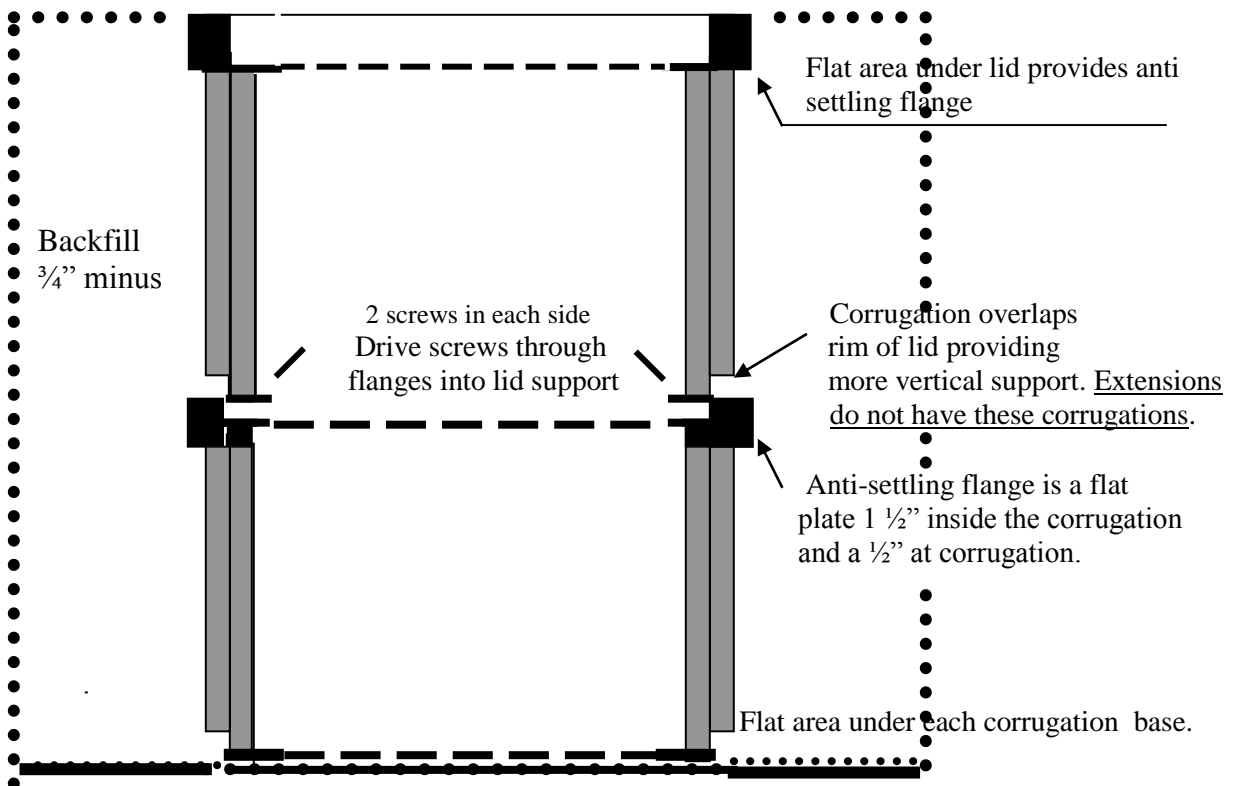
V). Installation in flowing mud or soils without cohesion:

Not recommended.

VI). After installation, especially where wet soil surrounds boxes, do not drive equipment in close proximity to boxes as this will create excessive side loads which may realign the box and loose grade.

Stacking Boxes & Using Extensions:

- 1). Measure base of hole to ground level at each end.
- 2). Stack boxes to a greater height than measurement, cut off base of riser box to correct height and or angle.
- 3). Use 2 screws on each side as depicted when stacking boxes. This provides much greater strength against side loads and is easier to set grade when boxes are in the ground, they won't pull apart allowing dirt into the lid area.
- 4). Place boxes in meter pit and backfill. **DO NOT PLACE LARGE ROCKS (1 ½") IN BACKFILL OR NEXT TO BOX.**
- 5). Do not allow drive by equipment around boxes until the soil has dried.
- 6). Self tapping screws are also recommended when stacking regular boxes.



RAVEN PRODUCTS INSTALLATION



Installation is in a Pasco Washington subdivision approved and inspected by the City of Pasco Public Works Department, Jess U. Greenough III Field Division Manager.

When stacking one box into another, place 2 each self tapping screws in each long side to insure side load strength and to help maintain box continuity when lifting boxes to grade.

Raven Products Poly lid provides a thermo barrier preventing meters from freezing.

When installing in flowing mud conditions the boxes must have lids installed and a cross brace in the base of the box to avoid bowing from the unsupported soil loads.

When installing in cement the lids must be installed until the cement sets or the lid area may bow slightly making it difficult to install the lid after cement sets. Turn metal lids upside down.



H-20 WHEEL LOADING

H-20 WHEEL LOADS (LIVE LOADS) TRANSMITTED TO BELOW GROUND THERMOPLASTIC PRODUCTS SUCH AS POLYETHYLENE METER BOXES ARE SIMILAR TO ANY IN GROUND INSTALLATION WHERE SOIL STIFFNESS SHARES IN CARRYING THE LIVE LOAD.

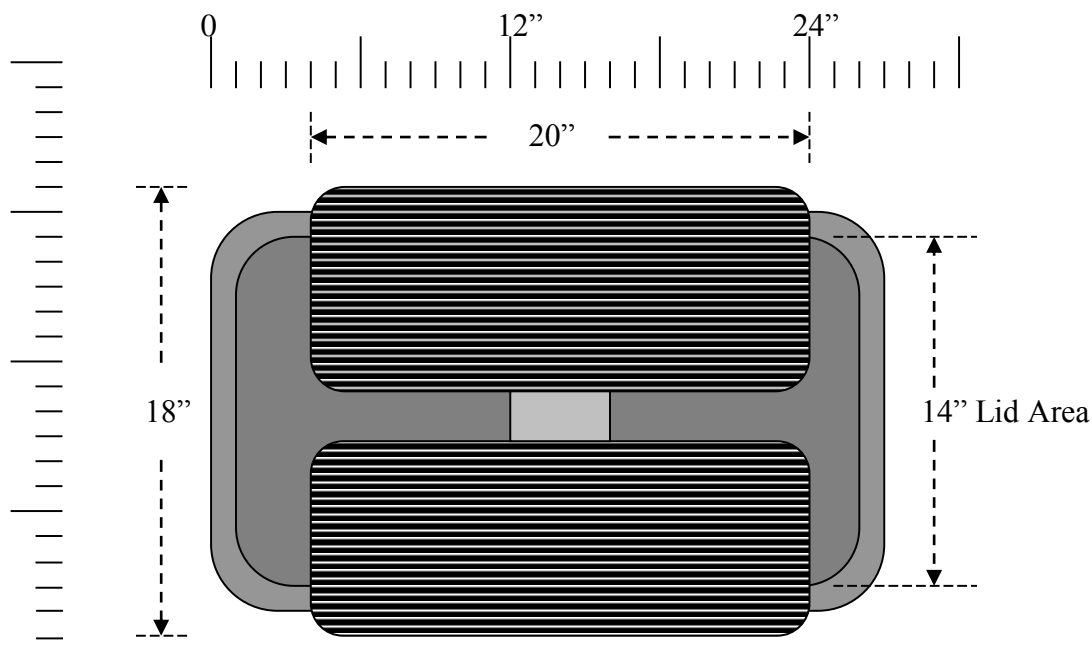
FOLLOWING TAKEN FROM UNI-BELL (HANDBOOK OF PVC PIPE) PAGE 192.

“The H-20 live load assumes two 16,000 lb concentrated loads applied to two 18” x 20” areas, one located over the point in question, and the other located at a distance of 72” away. In this manner, a truckload of 40,000 lbs is simulated.”

This live load is spread over a footprint 20” long and 18” wide. The impact area under the tires is also supported by the surrounding soil next to the meter box.

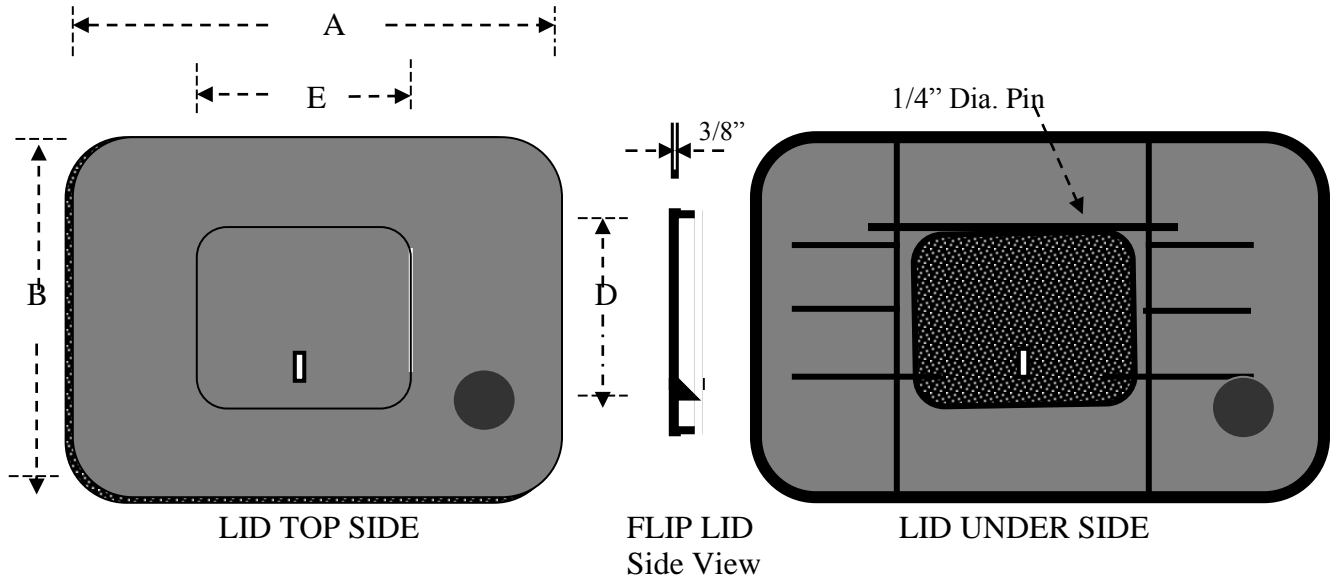
If RAVEN meter boxes are to be placed in casual traffic areas they should be encased in cement deep enough to support under the top flange around the lid area. Box must be reinforced at the base when using vibratory compactors.

Example of H-20 footprint on a 13x24x12 RAVEN meter box.

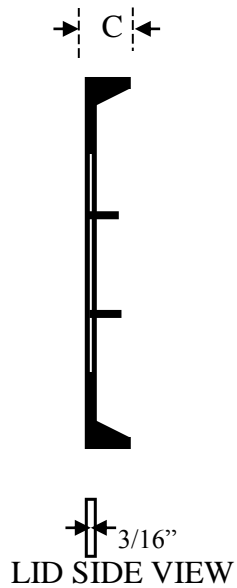


DUCTILE IRON METAL LIDS

H-20 TRAFFIC RATED



NOW PLAIN WITHOUT FLIP LID



| Product # | A | B | C | D | E | Weight |
|-----------------|---------|---------|-------|--------|------|--------|
| RML-DI-11"x 18" | 18.00" | 11.125" | 1.75" | 6.375" | 9.0" | 23 Lbs |
| RML-DI-13"x 24" | 22.875" | 13.75" | 1.75" | 6.375" | 9.0" | 35 Lbs |
| RML-DI-15"x 27" | 26.563" | 15.00" | 1.75" | 6.375" | 9.0" | 40 Lbs |
| RML-DI-17"x 30" | 30.125" | 17.313" | 2.00" | 6.375" | 9.0" | 48 Lbs |



Quality – Service – Commitment – Delivered.

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CERTIFICATE

This is to certify that the following Lids furnished by Sigma Corporation are manufactured from Ductile Iron as per ASTM A536 and will meet the minimum requirements of the standard.

The below mentioned Lids meet or exceed the minimum H20 loading Traffic Rated requirements specified as per AASHTO-H20 loading.

LC1118T-D
LC1527T-D
LC1324T-D
LC1730T-D

Sreenivasa Rao
Quality Control Engineer



TRAFFIC RATED SOLID LIDS ALSO AVAILABLE
NO READER LID AND AMR RECESS

CERTIFIED -- AASHTO H-20 -- TRAFFIC RATED LIDS

SIGMA LIDS



11 x 18 TRAFFIC RATED LID



13 x 24 TRAFFIC RATED LID



15 x 27 TRAFFIC RATED LID



17 x 30 TRAFFIC RATED LID

SAMPLE LIDS SHOWN IN PRIMER / ALL LIDS WILL BE BLACK



Fork lift sits atop four 11x18x12 Raven meter boxes with cast iron lids.

