



ORBINOX



Model
MU
SLIDE GATES
6" x 6" to 48" x 48"

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The ORBINOX model MU is a flush bottom 4 sided sealing slide gate. The gates are suitable for different types of applications with a highly versatile flow control for waste water treatment plants, irrigation, hydraulic works and hydro-electric power plants.

From sizes 6" x 6" to 48" x 48", the MU model has a unique self adjusting seal design that can achieve minimal equal seating and unseating leakage rates.

The leakage rate is 50% or better of the maximum allowable recommended by AWWA (C561) under normal conditions. ORBINOX also designs and manufactures the MU Slide Gate in larger sizes, for more demanding service conditions and maintains a leakage rate below the allowable standard from AWWA. For more information please contact an ORBINOX representative.

Design standards

The MU slide gate is manufactured in general accordance with awwa c561

The standard MU model is manufactured in stainless steel which has a higher corrosion resistance in many applications which results into a longer life cycle with little or no maintenance. Other materials of construction are available upon request, such as AISI 904L, Duplex stainless, etc.

Design features

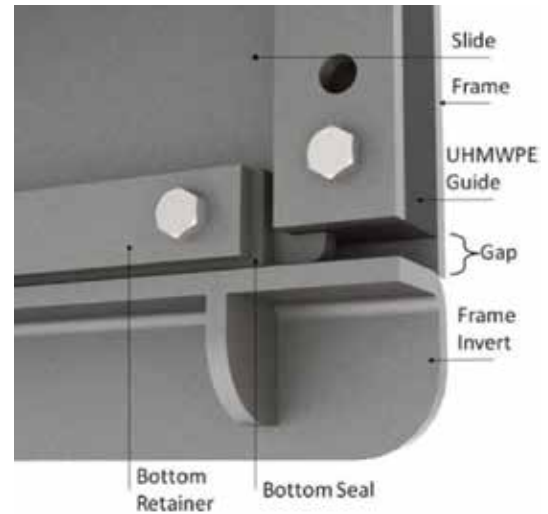
Modular design allows for both Open Frame and Self-Contained configurations:

Allowable Leakage:
 The leakage rate on MU model is lower than the maximum allowable defined by AWWA under normal conditions: AWWA C-561 standard leakage rate: 0.1 USGPM per foot of perimeter
 ORBINOX leakage rate per foot of perimeter:

- 0.05 USGPM up to 20' seating head
- 0.1 USGPM up to 20' unseating head

<p>Frame configuration options:</p> <ul style="list-style-type: none"> • Square (standard) • Round & Rectangular opening • Rect. or Round extended flange • Round base (Round manhole installations) <p>Mounting configuration options:</p> <ul style="list-style-type: none"> • Wall Mount (standard for sizes ≤ 48") • Embedded in concrete • Thimble Mount • Wall Mount • Curved Wall Mount 	<ul style="list-style-type: none"> • Option of Rising or Non-Rising stem configurations • Flush bottom design allows for elevated or flush bottom installation • Suitable for actuation with manual, electric, pneumatic or hydraulic actuators • Self-cleaning UHMWPE guides reduce the friction coefficient during operation, minimizing therefore the actuation thrust and extending the seal life • Machined slot for slide on guides to prevent "seesaw" effect when opening and closing the slide • Seal design is self adjusting (wedge-less design), thus reducing torque requirements • Slide ribs are designed to avoid crevice corrosion • Seal and guides bolting is completely separated from the frame anchoring • ORBINOX slide gates are factory assembled and tested eliminating the need for on site adjustment
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Self-Cleaning Guide Rails



Seating / Unseating Design Head

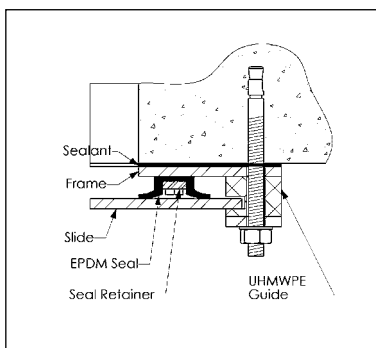
Size	Uni/Bidirectional	Head Pressure	
		Seating	Un-seating
Std. Range 6"x6" - 48"x48"	Bi-Directional	6" - 40": 33' of Head 44" - 48": 20' of Head	6" - 40": 33' of Head 44" - 48": 20' of Head

Seal design: Bi-directional

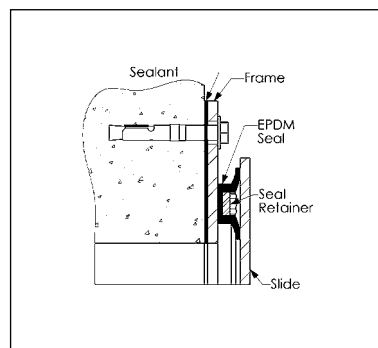
Seal Design: sizes 6"x6" to 48"x48"

Size	Uni/Bidirectional	Head Pressure	
		Seating	Un-seating
Std. Range 6"x6" - 48"x48"	Bi-Directional	6" - 40": 33' of Head 44" - 48": 20' of Head	6" - 40": 33' of Head 44" - 48": 20' of Head

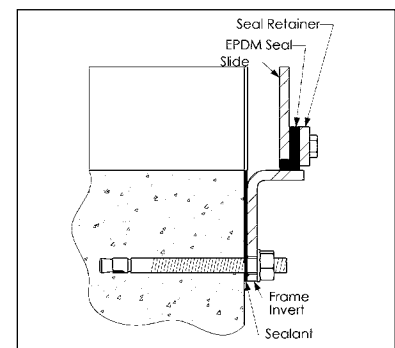
Side seal



Top seal

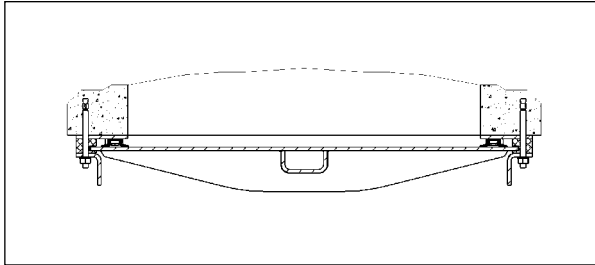


Bottom seal

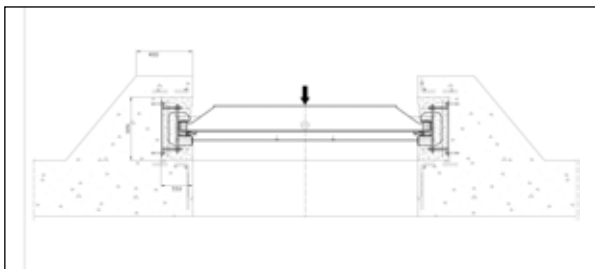


Mounting options

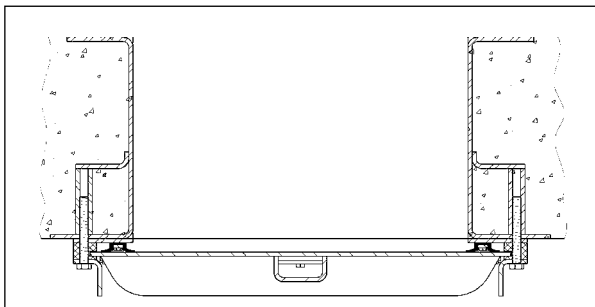
The following drawings show the most common mounting options for MU penstocks. For other types of mounts, please consult an ORBINOX representative



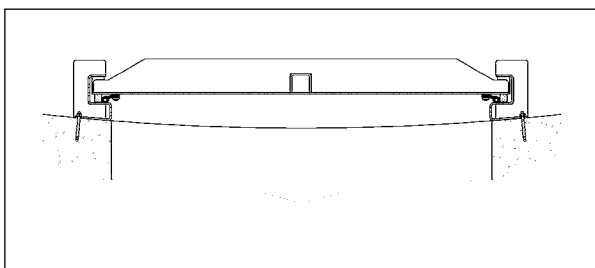
Standard flatback frame



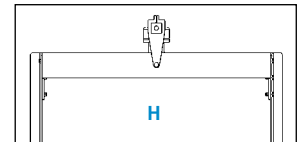
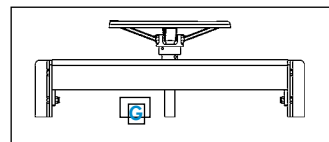
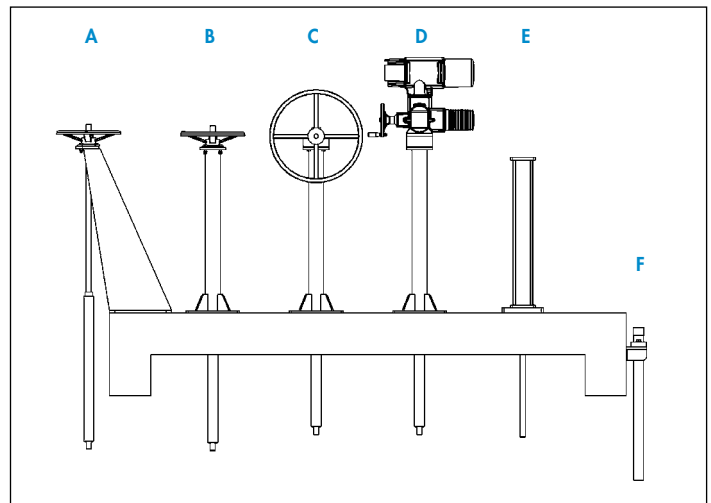
Embedded frame



Thimble mounted frame



Curved wall mount



Actuators

All ORBINOX actuators can be yoke or pedestal mounted, below are some examples of the most common types

A	Handwheel on inclined floor stand
B	Handwheel on straight floor stand
C	Bevel Gear operator on straight floor stand
D	Electric actuator on straight floor stand
E	Hydraulic or pneumatic actuator
F	2" Square nut (Non-Rising stem)
G	Yoke mounted handwheel
H	Yoke mounted gear and crank (crank installed in 2" square nut)

Accessories

- Mechanical stops (for the completely closed position and manual actuator)
- Actuator manual overrides
- Positioners
- Limit / Proximity switches

Stem extensions

Rising Stem (gives position indication) or Non-Rising Stem are primary choices

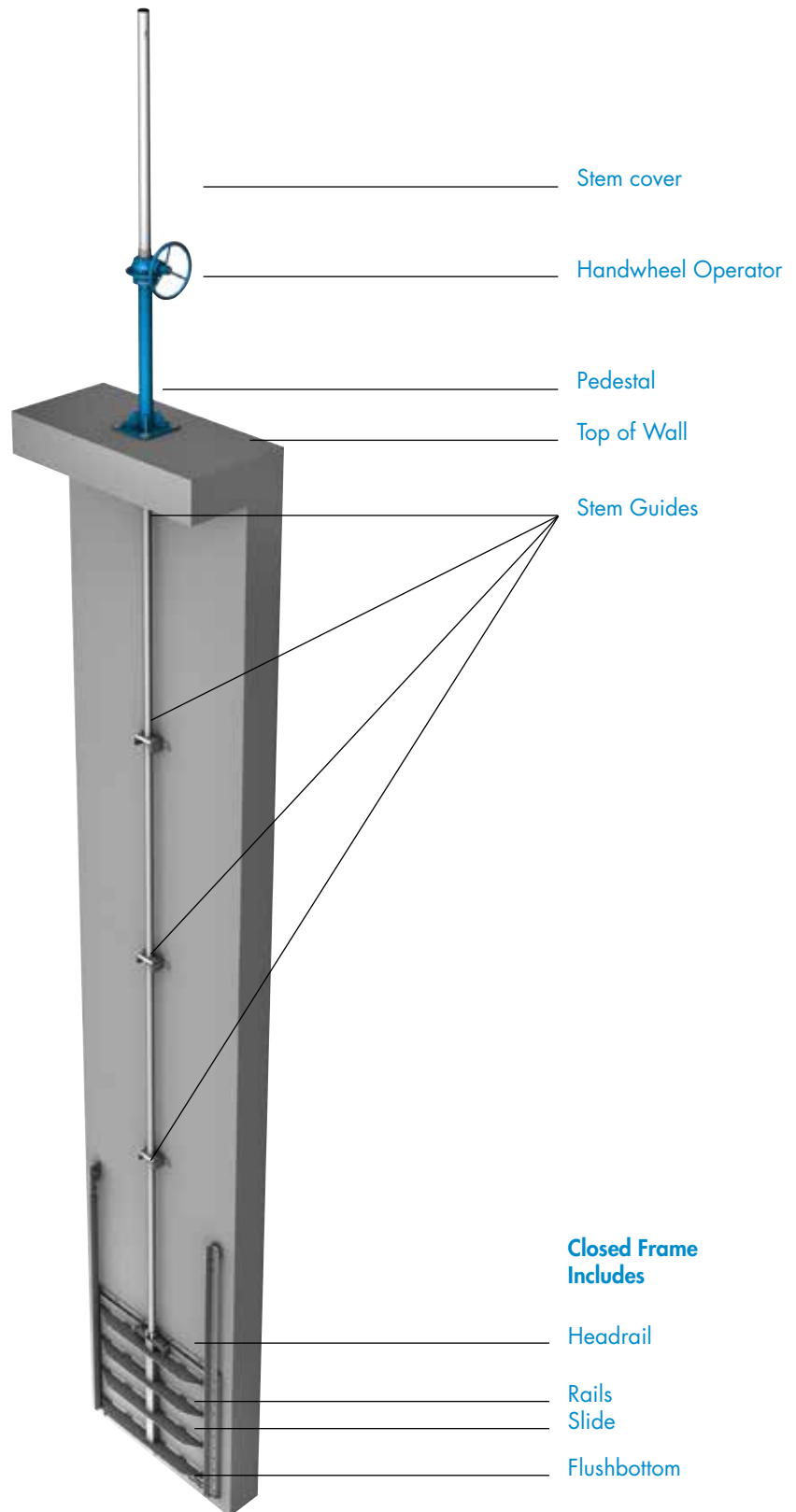
In most cases, the operating floor level is located substantially higher than the opening. In order to be able to operate the gate, stem extensions are necessary. Stem guides are used to limit the "unsupported" length of the stem extension in order to avoid any buckling failure. The stem guide has a HWMPE guide to reduce friction between the guide and the extension

Rising stem Configuration

The rising stem gate configurations are used with open-frame or closed frame designs. On the open frame style, the first stem guide has to be located close enough to the closed slide that the slenderness ratio does not exceed an l/r of 200. On the closed-frame style, the headrail can act as the first stem guide and all subsequent stem guides shall be placed to achieve the same l/r ration of 200. Depending on the stem diameter, a stem guide should be installed every 78" as a quick rule of thumb.

Non-Rising stem Configuration

The non-rising stem gate designs are used with self-contained or closed frame styles. Therefore, the stem extension does not support the axial load (only torque) and less stem guides are required. As a general rule, a stem guide should be installed every 10 feet of unsupported stem extension (l/r ratio should not exceed 200).



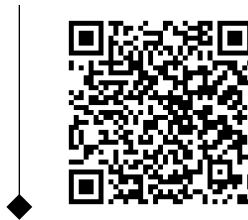
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Installation, operation and maintenance

This section briefly describes the installation, operation and maintenance of MU Slide Gates. For more detailed information please refer to the "MU IOM Manual"



Installation:

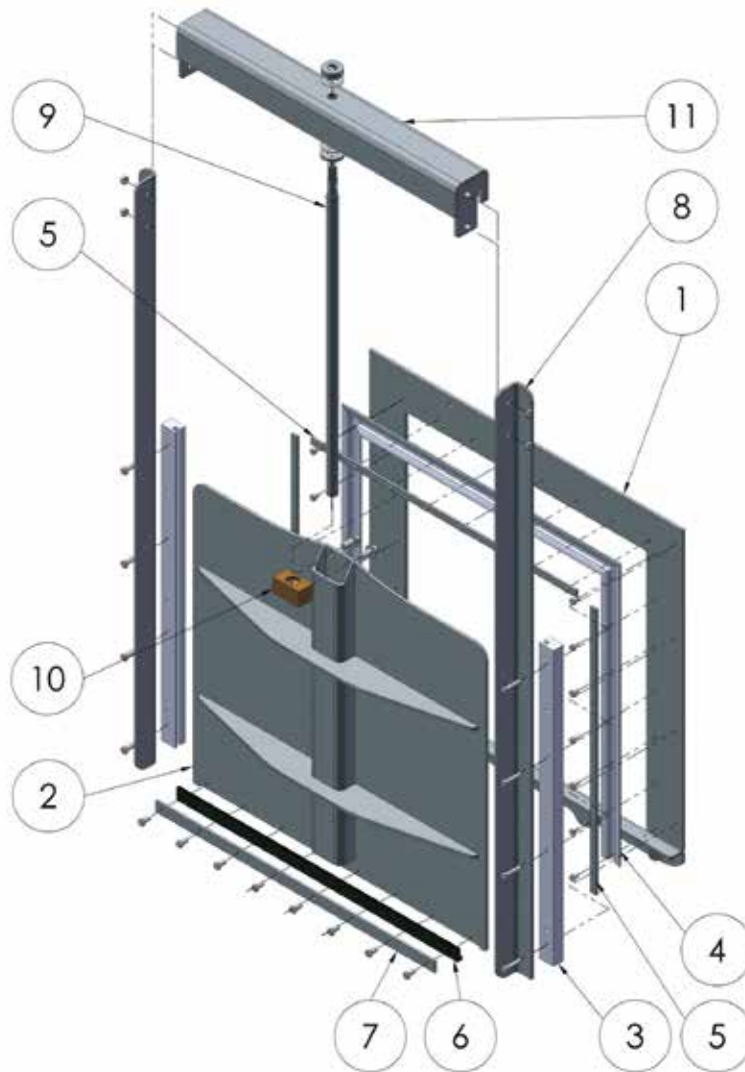
ORBINOX MU Slide Gates are installed by means of anchor bolts. Depending on the size and working conditions they shall be either of the mechanical or chemical type (see table below). In order to avoid leakage between the concrete wall and the frame, ORBINOX recommends the use of construction sealant equivalent to Sikabond Construction Sealant (2oz per foot of opening perimeter)

The minimum concrete strength shall be 3,000PSI. The concrete construction tolerance (flatness, levelness and plumbness) shall be in accordance to ACI 117-10. For detailed information about type, size and quantity of the required anchor bolts for installation, please refer to the notes on the "General Arrangement Drawing"

Maintenance and operation:

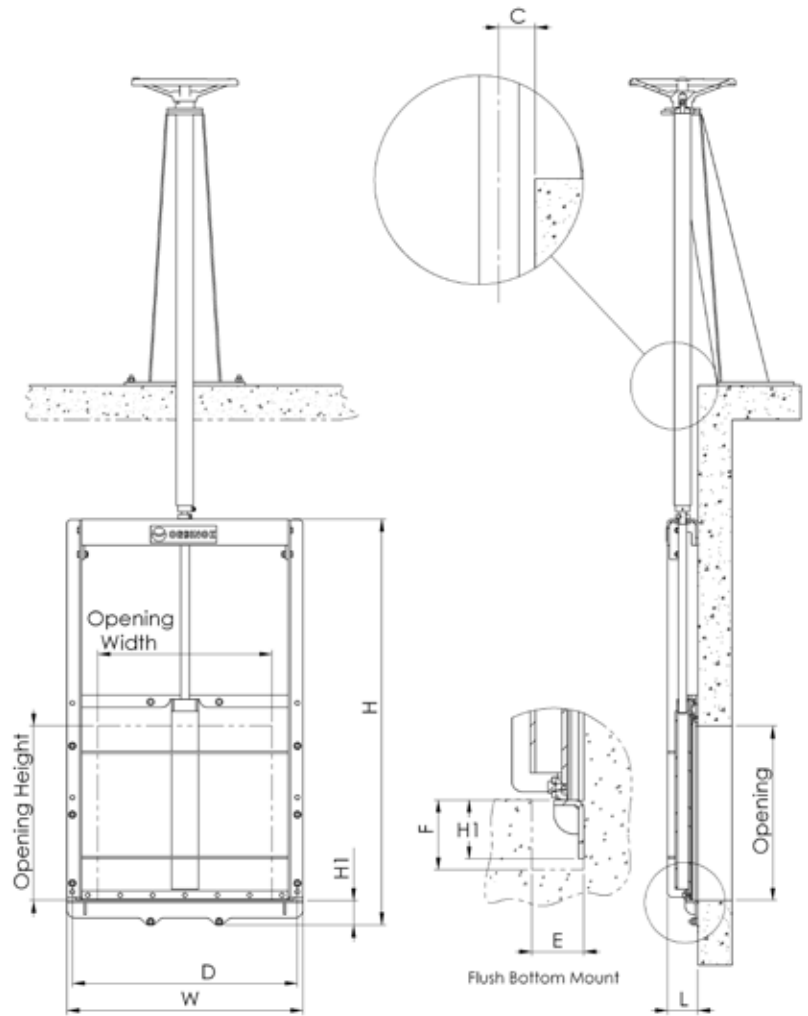
The ORBINOX MU Slide Gates need practically no maintenance. The stem should be kept lubricated and seals should be replaced if damaged. The MU Slide Gate is closed by applying a clockwise rotation. Applying excessive force on the operator when closing the gate may cause damage to the stem

Seating / Unseating Design Head			
Size	Water Pressure	Anchor Bolt Type	Recommended
Std. Range 6"x6" - 48"x48"	Seating and Un-seating	Wall mount: Stud Type Mechanical Anchor Bolts and Bolt Type Mechanical Anchor Bolts	Hilti "Kwik 3" and Hilti "HSL"



Item	Description	Material (standard)
1	Frame	Stainless Steel ASTM A-240 / Type 304L or 316L
2	Slide	Stainless Steel ASTM A-240 / Type 304L or 316L
3	Guides	Ultra High Molecular Weight Polyethylene (UHMWPE) ASTM D-4020
4	Seal	EPDM
5	Seal Retainer	Stainless Steel ASTM A-240 / Type 304L or 316L
6	Bottom Seal	EPDM
7	Bottom Seal Retainer	Stainless Steel ASTM A-240 / Type 304L or 316L
8	Frame Guide	Stainless Steel ASTM A-240 / Type 304L or 316L
9	Stem	Stainless Steel ASTM A-240 / Type 303 (standard), other on request
10	Stem Nut	Bronze
11	Yoke	Stainless Steel ASTM A-240 / Type 304L or 316L

Note: for materials other than the above, please consult an ORBINOX representative



Size opening	W	H	H1	D	L	C	ExF
6" x 6"	13 1/16	18 5/16	2 9/16	11 13/16	3 7/16	1 11/16	2 3/4 x 2 15/16
8" x 8"	15 1/16	22 5/16	2 9/16	13 13/16	3 7/16	1 11/16	2 3/4 x 2 15/16
10" x 10"	17 1/16	26 5/16	2 9/16	15 13/16	3 7/16	1 11/16	2 3/4 x 2 15/16
12" x 12"	19 1/16	30 5/16	2 9/16	17 13/16	3 7/16	1 11/16	2 3/4 x 2 15/16
14" x 14"	21 1/16	34 1/2	2 9/16	19 13/16	3 7/16	1 12/16	2 3/4 x 2 15/16
16" x 16"	23 1/16	38 1/4	2 9/16	21 13/16	3 7/16	1 12/16	2 3/4 x 2 15/16
18" x 18"	25 1/16	42 9/16	2 9/16	23 13/16	3 7/16	1 12/16	2 3/4 x 2 15/16
20" x 20"	27 1/16	46 9/16	2 9/16	25 13/16	3 7/16	1 12/16	2 3/4 x 2 15/16
24" x 24"	31 1/16	54 5/8	2 9/16	29 13/16	3 7/16	1 12/16	2 3/4 x 2 15/16
28" x 28"	35 1/16	62 5/8	2 9/16	33 13/16	3 7/16	1 12/16	2 3/4 x 2 15/16
30" x 30"	37 1/16	66 5/8	2 9/16	35 13/16	3 7/16	1 12/16	2 3/4 x 2 15/16
32" x 32"	39 1/16	70 5/8	2 9/16	37 13/16	3 7/16	1 12/16	2 3/4 x 2 15/16
36" x 36"	43 7/8	82 5/16	3 1/4	42 5/8	5 13/16	2 5/16	2 3/4 x 3 9/16
40" x 40"	47 7/8	90 5/16	3 1/4	46 5/8	5 13/16	2 5/16	2 3/4 x 3 9/16
42" x 42"	49 7/8	94 5/16	3 1/4	48 5/8	5 13/16	2 5/16	2 3/4 x 3 9/16
44" x 44"	51 7/8	98 5/16	3 1/4	50 5/8	5 13/16	2 5/16	2 3/4 x 3 9/16
48" x 48"	55 7/8	106 13/16	3 1/4	54 5/8	5 13/16	2 5/16	2 3/4 x 3 9/16