

MODEL

MU SLIDE GATES



GENERAL DESCRIPTION

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" (150mm x 150mm) to 48" x 48" (1200mm x 1200mm), the MU model has a unique self adjusting seal design that can achieve minimal equal seating and unseating (bidirectional) leakage rates. Sizes 52" x 52" (1300mm x 1300mm) up to 160" x 160" (4000mm x 4000mm) are available in both uni-directional (only suitable for seating water heads) and bi-directional configurations.

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 STANDARD

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.



ORBINOX reserves the right to change specifications without notice

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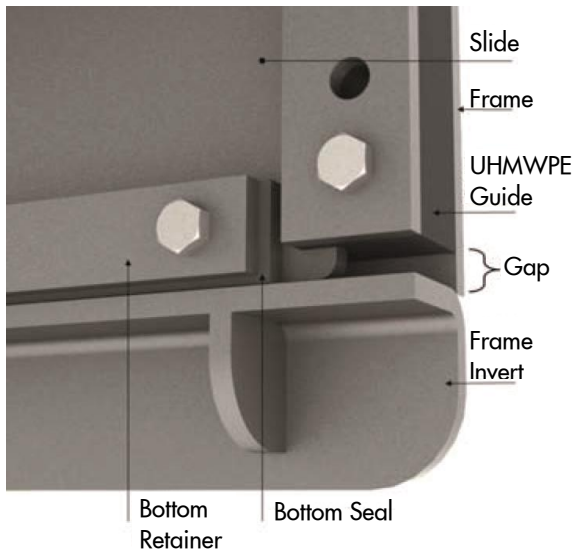
OBXC 06/24

Rev.5

MU_1

DESIGN FEATURES

- Modular design allows for both Open Frame and Self-Contained configurations.
- Frame configuration options:
 - Square (standard)
 - Round & Rectangular opening
 - Round base
- Mounting configuration options:
 - Wall Mount (standard for sizes ≤ 48" or unidirectional and sizes >48")
 - Embedded in concrete (standard for bidirectional and sizes >48")
 - Thimble Mount
 - Curved Wall Mount
- 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 penstocks are factory assembled and tested eliminating the need for on site adjustment
- All gate fasteners are stainless steel



Self-cleaning guides

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 (1.24 l/min per meter)
- ORBINOX standard leakage rate: 0.05 USGPM per foot of perimeter (0.62 l/min per meter) under seating head conditions and 0.1 USGPM per foot of perimeter (1.24 l/min per meter) under unseating head conditions up to 20 feet (6m) of head pressure

Seating / Unseating Design Head:

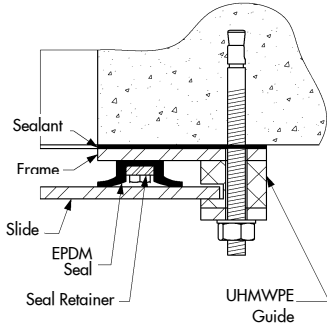
Size	UNI /BIDIRECTIONAL	Water Head	
		Seating head pressure	Unseating head pressure
Std. Range 6" x 6" - 48" x 48" 150x150 - 1200x1200	BI-DIRECTIONAL	6"-40": 33 fWC 44"-48": 20 fWC	6"-40": 33 fWC 44"-48": 20 fWC
52" x 52" - 160" x 160" 1300x1300 - 4000x4000	BI-DIRECTIONAL	Designed according to the project specification. Typically 20fWC of seating and unseating water head	
52" x 52" - 160" x 160" 1300x1300 - 4000x4000	UNI-DIRECTIONAL	Designed according to the project specification. Typically 20fWC of seating water head	0 feet of water column

NOTE: For higher head pressures, please consult an ORBINOX representative

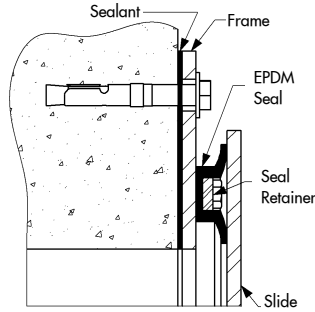
SEAL DESIGN: BI-DIRECTIONAL

Seal Design: sizes 6" x 6" (150mm x 150mm) to 48" x 48" (1200mm x 1200mm)

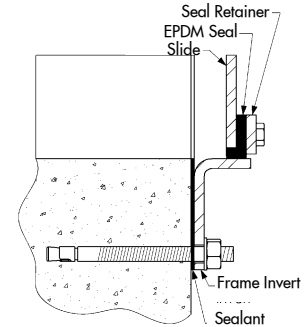
SIDE SEAL



TOP SEAL

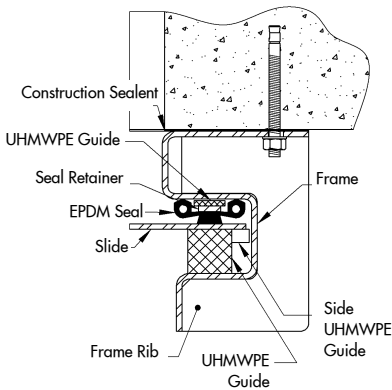


BOTTOM SEAL

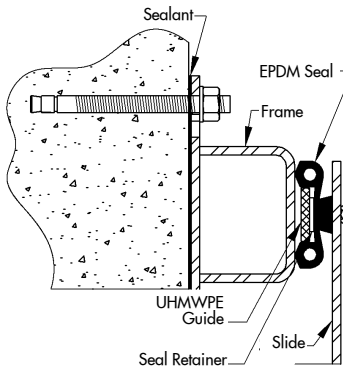


Seal Design: sizes 52" x 52" (1300mm x 1300mm) to 160" x 160" (4000mm x 4000mm)

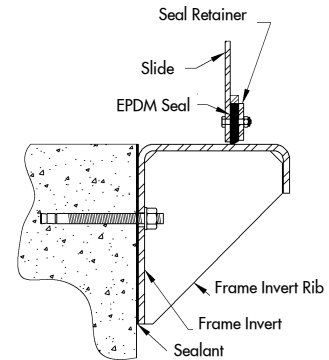
SIDE SEAL



TOP SEAL



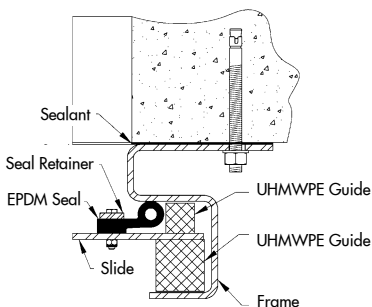
BOTTOM SEAL



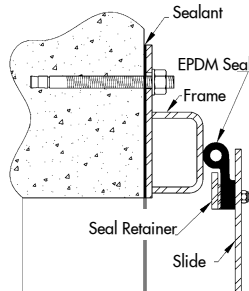
SEAL DESIGN: UNI-DIRECTIONAL

Seal Design: sizes 52" x 52" (1300mm x 1300mm) to 160" x 160" (4000mm x 4000mm)

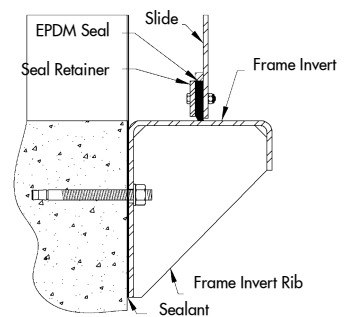
SIDE SEAL



TOP SEAL

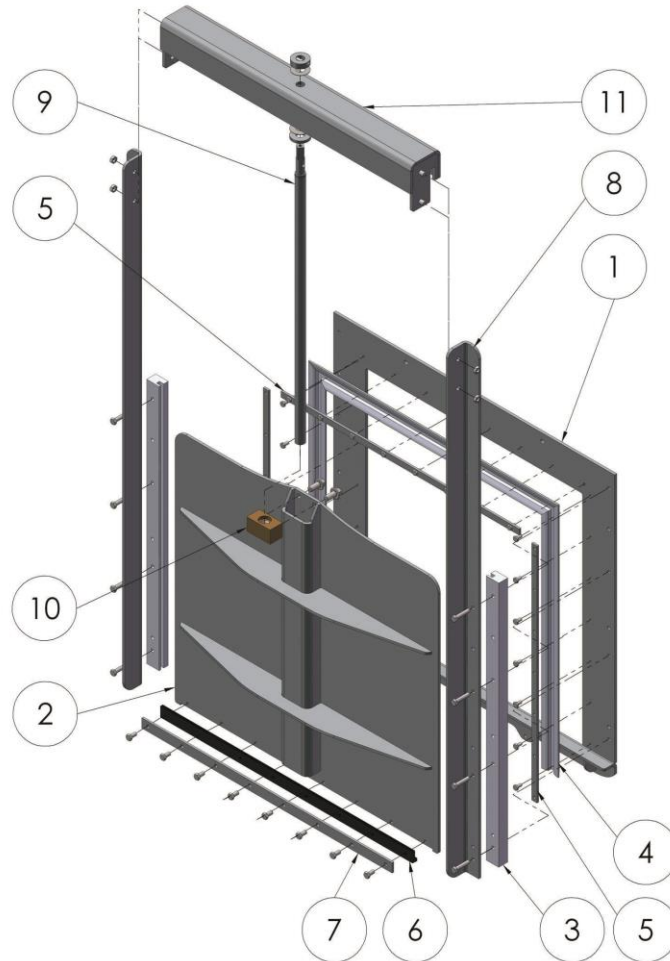


BOTTOM SEAL



STANDARD MATERIALS OF CONSTRUCTION

Sizes 6" x 6" (150mm x 150mm) to
48" x 48" (1200mm x 1200mm)

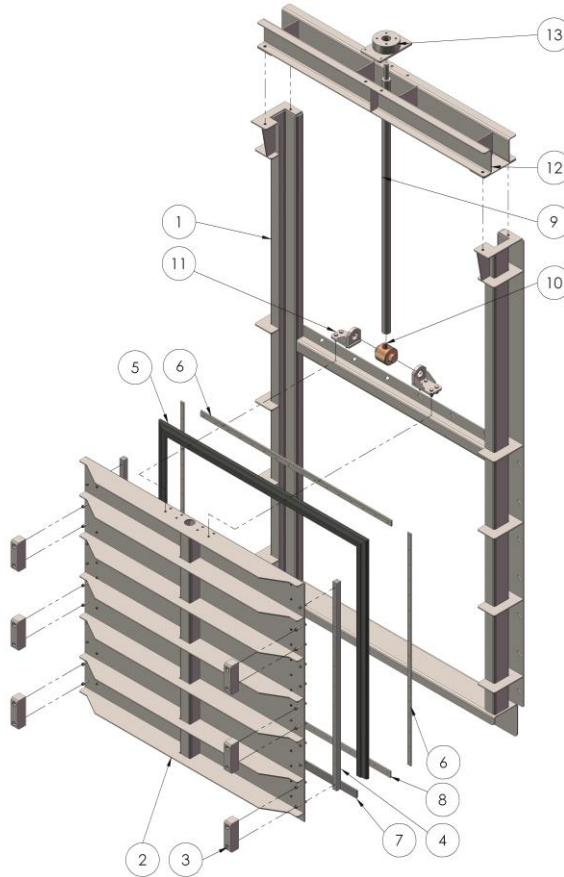


ITEM	DESCRIPTION	MATERIAL (standard)
1	Frame	Stainless Steel ASTM A-240 / Type 304/304L or 316/316L
2	Slide	Stainless Steel ASTM A-240 / Type 304/304L or 316/316L
3	Guides	Ultra High Molecular Weight Polyethylene (UHMWPE) ASTM D-4020
4	Seal	EPDM
5	Seal Retainer	Stainless Steel ASTM A-240 / Type 304/304L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

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

STANDARD MATERIALS OF CONSTRUCTION

**Sizes 52" x 52" (1300mm x 1300mm) to
160" x 160" (4000mm x 4000mm)**



ITEM	DESCRIPTION	MATERIAL (standard)
1	Frame	Stainless Steel ASTM A-240 / Type 304/304L or 316/316L
2	Slide	Stainless Steel ASTM A-240 / Type 304/304L or 316/316L
3	Front Guides	Ultra High Molecular Weight Polyethylene (UHMWPE) ASTM D-4020
4	Guides	Ultra High Molecular Weight Polyethylene (UHMWPE) ASTM D-4020
5	Seal	EPDM
6	Seal Retainer	Stainless Steel ASTM A-240 / Type 304/304L or 316/316L
7	Bottom Seal	EPDM
8	Bottom Seal Retainer	Stainless Steel ASTM A-240 / Type 304/304L or 316/316L
9	Stem	Stainless Steel
10	Stem Nut	Bronze
11	Stem Nut Bracket	Stainless Steel ASTM A-240 / Type 304/304L or 316/316L
12	Yoke	Stainless Steel ASTM A-240 / Type 304/304L or 316/316L
13	Stem Coupling	Stainless Steel ASTM A-240 / Type 304/304L or 316/316L

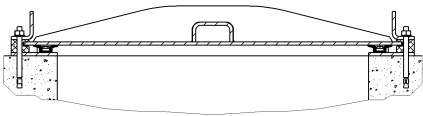
Note: for materials other than the above, please consult an ORBINOX representative

MOUNTING OPTIONS

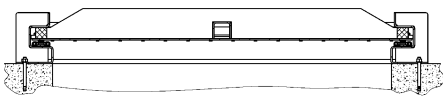
The following drawings show the most common mounting options for MU penstocks. For other types of mounts, please consult an ORBINOX representative

WALL MOUNT (STANDARD)

Sizes 6" x 6" (150mm x 150mm) to 48" x 48" (1200mm x 1200mm)

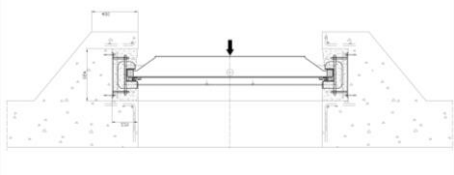


Sizes 52" x 52" (1300mm x 1300mm) to 160" x 160" (4000mm x 4000mm)

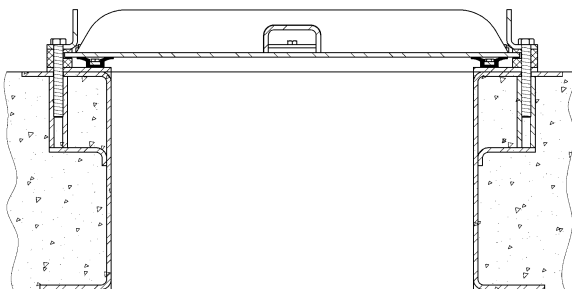


EMBEDDED IN CONCRETE

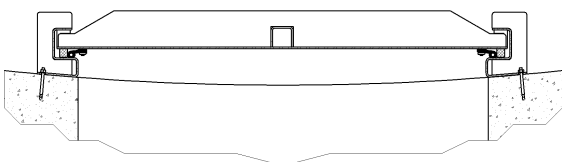
(Standard for bidirectional and >1200)



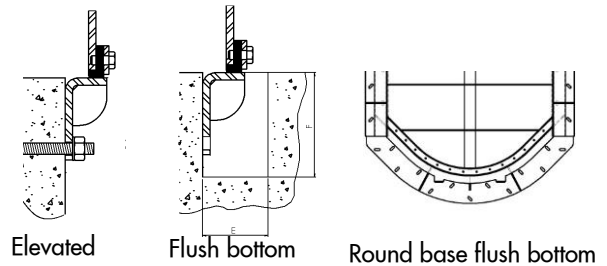
THIMBLE MOUNT



CURVED WALL MOUNT

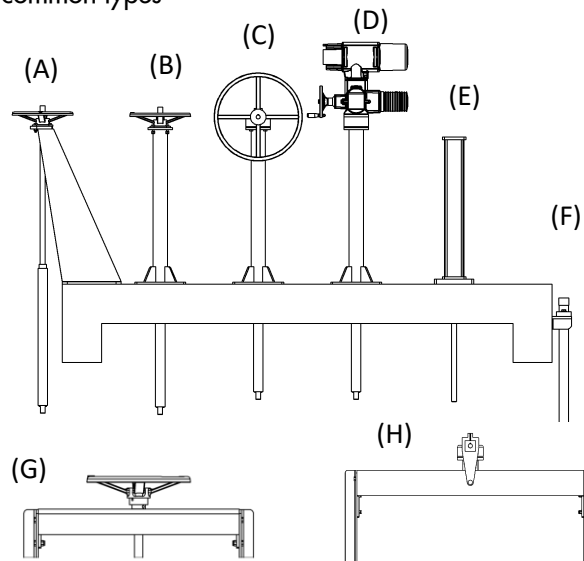


FRAME INVERT MOUNTING OPTIONS



ACTUATORS

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



Various types of actuators as shown above:

- (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:

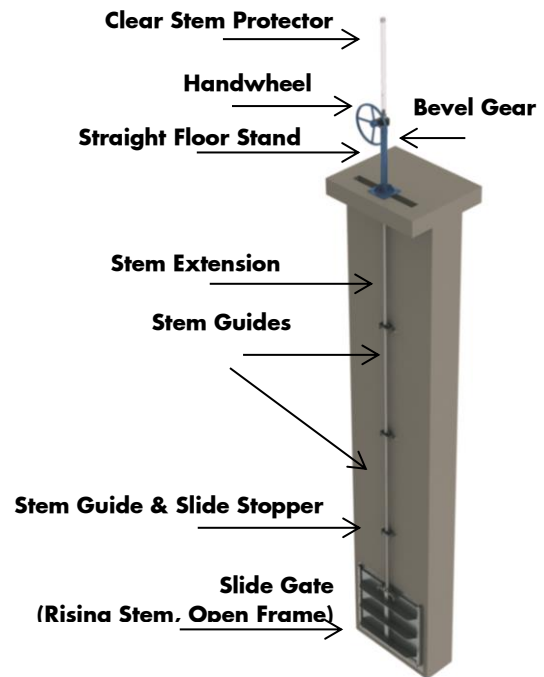
- Mechanical stops (for the completely closed position and manual actuator)
- Actuator manual overrides
- Positioners
- Limit / Proximity switches

STEM EXTENSIONS

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
NON-RISING STEM CONFIGURATION.

As standard, non-rising stem gate configurations are used with self-contained frame designs. Therefore, the stem extension does not support the axial load (only torque) and less wall brackets are required. As a general rule, a stem guide should be installed every 10 feet (3 meters) of unsupported stem extension.
RISING STEM CONFIGURATION

As standard, rising stem gate configurations are used with open-frame designs. Therefore, the stem extension has to support the axial load when the gate is operated. In consequence, the use of stem guides is critical to avoid any buckling failure. As a general rule, a stem guide should be installed every 6½ feet (2 meters) of unsupported stem extension.



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 (200ml per meter of opening perimeter)

The minimum concrete strength shall be 3,000PSI (20.7 MPa). 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:

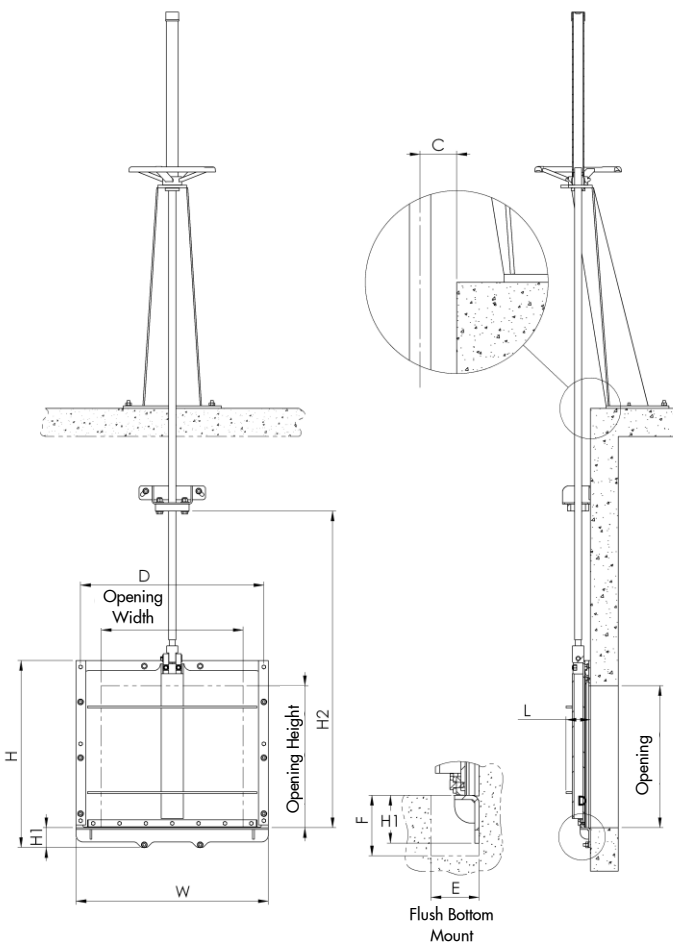
The ORBINOX MU Slide Gates need practically no maintenance. The stem should be kept lubricated and seals should be replaced if damaged. The MU Slide Gate is closed by applying a clockwise rotation. Applying excessive force on the operator when closing the gate may cause damage to the stem

Size	Water Pressure	Anchor Bolt Type	Recommended (Hilti or equivalent)
BI-DIRECTIONAL Std. Range 6" x 6" - 48" x 48" (150mm x 150mm - 1200mm x 1200mm)	Seating and Un-Seating (Bi-Directional)	Wall Mount: Stud Type Mechanical Anchor Bolts and Bolt Type Mechanical Anchor Bolts	Hilti “Kwik 3” & Hilti “HSL”
BI-DIRECTIONAL 52x 52" - 160"x160" (1300mm x 1300mm - 4000mm x 4000mm)	Seating and Un-Seating (Bi-Directional)	Embedded in concrete: Optional wall mount + chemical anchor bolts	Hilti “HVU”
UNI-DIRECTIONAL 52x 52" - 160"x160" (1300mm x 1300mm - 4000mm x 4000mm)	Seating (Uni-Directional)	Wall mount: Stud Type Mechanical Anchor Bolts	Hilti “Kwik 3”

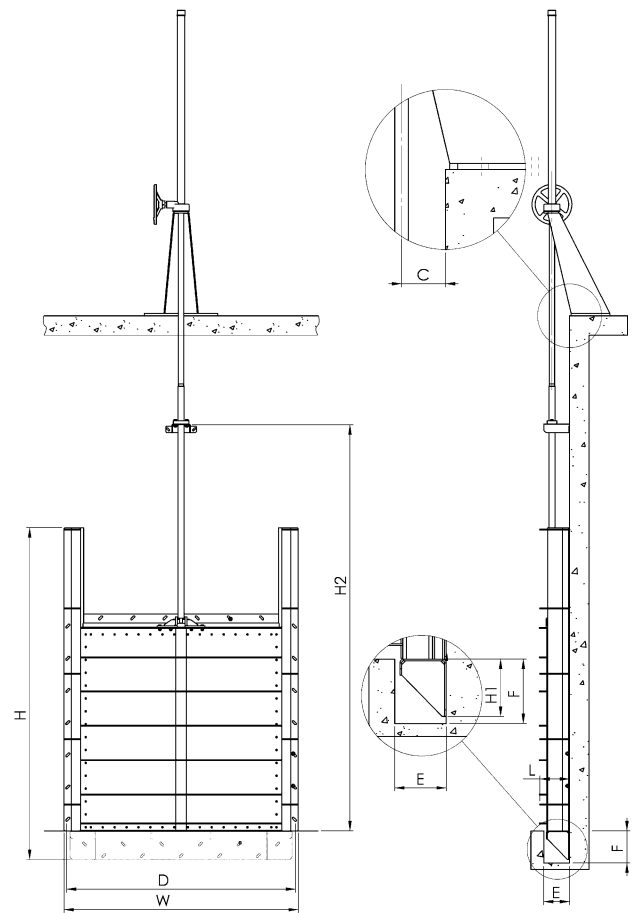
OPEN FRAME - RISING STEM - DIMENSIONS

The following drawings show the most common frame and stem configurations and their dimensional charts. Note that any frame (open and self-contained), stem (rising and non-rising) and actuator combination can be manufactured for MU slide gates

Sizes 6" x 6" (150mm x 150mm) to 48" x 48" (1200mm x 1200mm)



Sizes 52" x 52" (1300mm x 1300mm) to 160" x 160" (4000mm x 4000mm)



OPEN FRAME - RISING STEM - DIMENSIONS

**Sizes 6" x 6" (150mm x 150mm) to
48" x 48" (1200mm x 1200mm)**

SIZE opening	W	H	H1	H2	D	L	C	ExF
6"x6"	13 1/16	12 1/8	2 9/16	15	11 13/16	2 5/16	1 11/16	2 3/4 x 2 15/16
8"x8"	15 1/16	14 1/8	2 9/16	19	13 13/16	2 5/16	1 11/16	2 3/4 x 2 15/16
10"x10"	17 1/16	16 1/8	2 9/16	23	15 13/16	2 5/16	1 11/16	2 3/4 x 2 15/16
12"x12"	19 1/16	18 1/8	2 9/16	27	17 13/16	2 5/16	1 11/16	2 3/4 x 2 15/16
14"x14"	21 1/16	20 1/8	2 9/16	31	19 13/16	3 7/16	1 12/16	2 3/4 x 2 15/16
16"x16"	23 1/16	22 1/8	2 9/16	35	21 13/16	3 7/16	1 12/16	2 3/4 x 2 15/16
18"x18"	25 1/16	24 1/8	2 9/16	39	23 13/16	3 7/16	1 12/16	2 3/4 x 2 15/16
20"x20"	27 1/16	26 1/8	2 9/16	43	25 13/16	3 7/16	1 12/16	2 3/4 x 2 15/16
24"x24"	31 1/16	30 1/8	2 9/16	51	29 13/16	3 7/16	1 12/16	2 3/4 x 2 15/16
28"x28"	35 1/16	34 1/8	2 9/16	59	33 13/16	3 7/16	1 12/16	2 3/4 x 2 15/16
30"x30"	37 1/16	36 1/8	2 9/16	63	35 13/16	3 7/16	1 12/16	2 3/4 x 2 15/16
32"x32"	39 1/16	38 1/8	2 9/16	67	37 13/16	3 7/16	1 12/16	2 3/4 x 2 15/16
36"x36"	43 7/8	42 3/16	3 1/4	76 3/4	42 5/8	5 13/16	2 5/16	2 3/4 x 3 9/16
40"x40"	47 7/8	46 3/16	3 1/4	84 3/4	46 5/8	5 13/16	2 5/16	2 3/4 x 3 9/16
42"x42"	49 7/8	48 7/16	3 1/4	88 3/4	48 5/8	5 13/16	2 5/16	2 3/4 x 3 9/16
44"x44"	51 7/8	50 7/16	3 1/4	92 3/4	50 5/8	5 13/16	2 5/16	2 3/4 x 3 9/16
48"x48"	55 7/8	54 7/16	3 1/4	100 3/4	54 5/8	5 13/16	2 5/16	2 3/4 x 3 9/16

**Sizes 52" x 52" (1300mm x 1300mm) to
160" x 160" (4000mm x 4000mm)**

BI-DIRECTIONAL

SIZE opening	W	H	H1	H2	D	L	C	ExF
52"x52"	65	110 1/4	4 1/2	111 7/8	62 3/8	9 1/4	5 3/8	10 13/16 X 5 7/8
60"x60"	73	126	4 1/2	127 7/8	70 3/8	9 1/4	5 3/8	10 13/16 X 5 7/8
64"x64"	77	133 7/8	4 1/2	135 7/8	74 3/8	9 1/4	5 3/8	10 13/16 X 5 7/8
72"x72"	85	149 5/8	4 1/2	151 7/8	82 3/8	9 1/4	5 3/8	10 13/16 X 5 7/8
80"x80"	93	165 3/8	4 1/2	167 7/8	90 3/8	9 1/4	5 3/8	10 13/16 X 5 7/8
100"x100"	113	204 3/4	4 1/2	207 7/8	110 3/8	9 1/4	5 3/8	10 13/16 X 5 7/8
120"x120"	133	244 1/8	4 1/2	247 7/8	130 3/8	9 1/4	5 3/8	10 13/16 X 5 7/8
160"x160"	173	322 7/8	4 1/2	327 7/8	170 3/8	9 1/4	5 3/8	10 13/16 X 5 7/8

UNI-DIRECTIONAL

SIZE opening	W	H	H1	H2	D	L	C	ExF
52"x52"	63 13/16	110 1/4	4 1/2	111 7/8	61 7/16	9 1/4	5 3/8	10 13/16 X 5 7/8
60"x60"	71 13/16	126	4 1/2	127 7/8	69 7/16	9 1/4	5 3/8	10 13/16 X 5 7/8
64"x64"	75 13/16	133 7/8	4 1/2	135 7/8	73 7/16	9 1/4	5 3/8	10 13/16 X 5 7/8
72"x72"	83 13/16	149 5/8	4 1/2	151 7/8	81 7/16	9 1/4	5 3/8	10 13/16 X 5 7/8
80"x80"	91 13/16	165 3/8	4 1/2	167 7/8	89 7/16	9 1/4	5 3/8	10 13/16 X 5 7/8
100"x100"	111 13/16	204 3/4	4 1/2	207 7/8	109 7/16	9 1/4	5 3/8	10 13/16 X 5 7/8
120"x120"	131 13/16	244 1/8	4 1/2	247 7/8	129 7/16	9 1/4	5 3/8	10 13/16 X 5 7/8
160"x160"	171 13/16	322 7/8	4 1/2	327 7/8	149 7/16	9 1/4	5 3/8	10 13/16 X 5 7/8

NOTE: for dimensions other than above, please contact an ORBINOX representative
These dimensions are for information only. Do not use for installation or submittal purposes

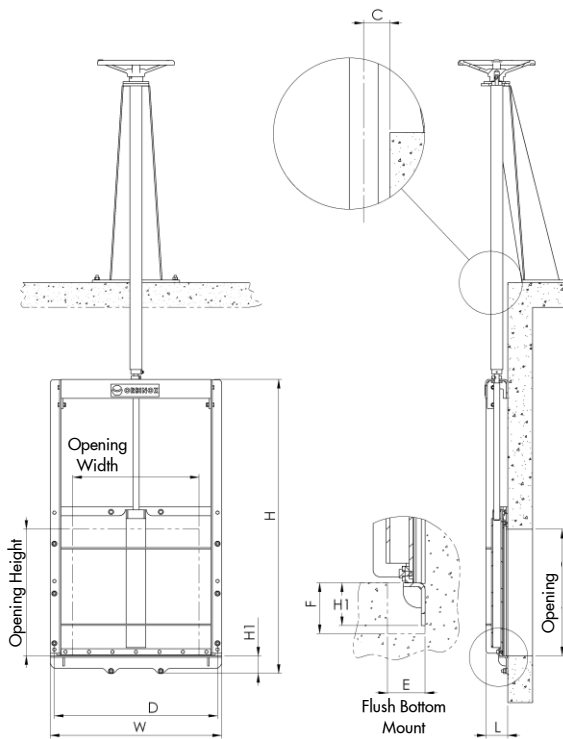
MODEL

MU SLIDE GATES

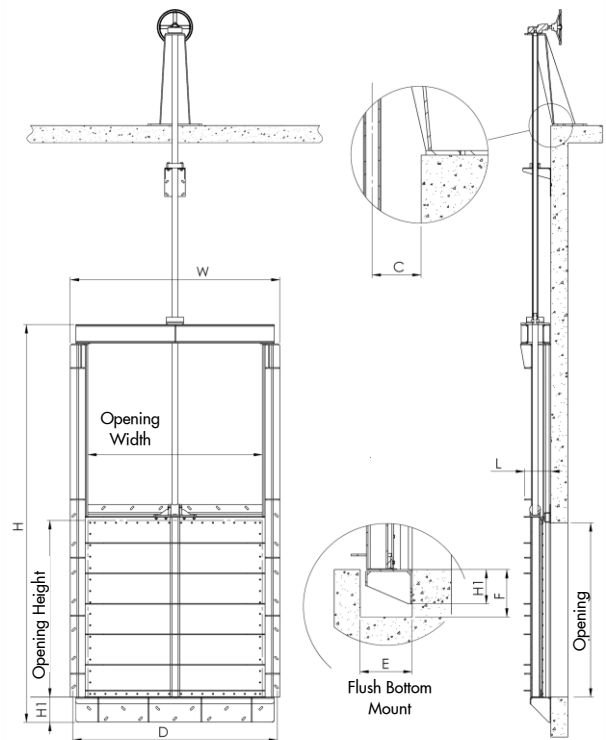


CLOSED FRAME - NON RISING STEM - DIMENSIONS

Sizes 6" x 6" (150mm x 150mm) to
48" x 48" (1200mm x 1200mm)



Sizes 52" x 52" (1300mm x 1300mm) to
160" x 160" (4000mm x 4000mm)



CLOSED FRAME - NON RISING STEM - DIMENSIONS

**Sizes 6" x 6" (150mm x 150mm) to
48" x 48" (1200mm x 1200mm)**

SIZE opening	W	H	H1	D	L	C	ExF
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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

**Sizes 52" x 52" (1300mm x 1300mm) to
160" x 160" (4000mm x 4000mm)
BI-DIRECTIONAL**

SIZE opening	W	H	H1	D	L	C	ExF
52" x 52"	65	110 4/16	4 1/2	62 3/8	9 1/4	5 3/8	10 13/16 X 5 7/8
60" x 60"	73	126	4 1/2	70 3/8	9 1/4	5 3/8	10 13/16 X 5 7/8
64" x 64"	77	133 14/16	4 1/2	74 3/8	9 1/4	5 3/8	10 13/16 X 5 7/8
72" x 72"	85	149 10/16	4 1/2	82 3/8	9 1/4	5 3/8	10 13/16 X 5 7/8
80" x 80"	93	165 6/16	4 1/2	90 3/8	9 1/4	5 3/8	10 13/16 X 5 7/8
100" x 100"	113	204 3/4	4 1/2	110 3/8	9 1/4	5 3/8	10 13/16 X 5 7/8
120" x 120"	133	244 1/8	4 1/2	130 3/8	9 1/4	5 3/8	10 13/16 X 5 7/8
160" x 160"	173	322 7/8	4 1/2	170 3/8	9 1/4	5 3/8	10 13/16 X 5 7/8

UNI-DIRECTIONAL

SIZE opening	W	H	H1	D	L	C	ExF
52" x 52"	63 13/16	110 4/16	4 1/2	61 7/16	9 1/4	5 3/8	10 13/16 X 5 7/8
60" x 60"	71 13/16	126	4 1/2	69 7/16	9 1/4	5 3/8	10 13/16 X 5 7/8
64" x 64"	75 13/16	133 14/16	4 1/2	73 7/16	9 1/4	5 3/8	10 13/16 X 5 7/8
72" x 72"	83 13/16	149 10/16	4 1/2	81 7/16	9 1/4	5 3/8	10 13/16 X 5 7/8
80" x 80"	91 13/16	165 6/16	4 1/2	89 7/16	9 1/4	5 3/8	10 13/16 X 5 7/8
100" x 100"	111 13/16	204 3/4	4 1/2	109 7/16	9 1/4	5 3/8	10 13/16 X 5 7/8
120" x 120"	131 13/16	244 1/8	4 1/2	129 7/16	9 1/4	5 3/8	10 13/16 X 5 7/8
160" x 160"	171 13/16	322 7/8	4 1/2	149 7/16	9 1/4	5 3/8	10 13/16 X 5 7/8

NOTE: for dimensions other than above, please contact an ORBINOX representative
These dimensions are for information only. Do not use for installation or submittal purposes

STANDARD SPECIFICATIONS

Model MU Slide Gate 6"x 6" (150mm x 150mm) to 80"x 80" (2000mm x 2000mm)

GENERAL CONDITIONS

The equipment provided under this section shall be fabricated, assembled, erected, and placed in proper operating condition in full conformity with the drawings, specifications, engineering data, instructions and recommendations of the equipment manufacturer unless exceptions are noted by the engineer. Gates and operators shall be supplied with all necessary parts and accessories indicated on the drawings, specified or otherwise required for a complete, properly operating installation, and shall be the latest standard product of a manufacturer regularly engaged in the production of fabricated gates. Gates supplied under this section shall be Model MU Stainless Steel Slide Gates as manufactured by ORBINOX.

GOVERNING STANDARDS. The sluice gates specified in this section shall be manufactured in general accordance to AWWA C561, latest edition.

QUALITY ASSURANCE. The manufacturer shall have experience in the production of substantially similar equipment, and shall show evidence of satisfactory operation in at least 50 installations. The manufacturer's shop welds, welding procedures and welders shall be qualified and certified in accordance with the requirement of the latest edition of ASME, Section IX. Gates shall be shop inspected for proper operation before shipping.

SUBMITTALS. The manufacturer shall submit for approval by the purchaser, drawings showing the main dimensions, general construction and materials used in the gate.

PERFORMANCE

LEAKAGE. Slide gates shall be substantially watertight under the design head conditions. Under the design seating head, the leakage shall not exceed 0.05 U.S.gallon per minute per foot (0.62 l/min per meter) of seating perimeter. Under the design unseating head, the leakage for heads of 20 feet (6m) shall not exceed 0.05 U.S. gallon per minute per foot (0.62 l/min per meter) of seating perimeter. For unseating heads greater than 20 feet (6m), the allowable leakage shall be the rate per foot (meter) of perimeter specified by the following equations or better:

Maximum allowable leakage

Gallons per minute per foot of perimeter:
 $= 0.10 + (0.0024 \times (\text{unseating head in feet} - 20))$

Liters per minute per meter of perimeter:
 $= 1.24 + (0.101 \times (\text{unseating head in feet} - 6.1))$

Example: If we have a gate with 30 feet head, the leakage for the unseating head will be:

$0.10 + (0.0025 \times (30 - 20)) = 0.125$ US gpm/ft of perimeter.

DESIGN HEAD. The slide gates shall be designed to withstand the design head shown in the schedule.

SEAL PERFORMANCE TEST. The gate's seating system should have been tested through a cycle test and should show that the leakage requirements are still obtained with a minimum deterioration.

PRODUCT (SLIDE GATE)

GENERAL DESIGN. Gates shall be either self-contained or non self-contained and of the rising stem, or non-rising stem configuration as indicated on the gate schedule.

WALL THIMBLE. The wall thimble (optional) shall be stainless steel and supplied by the gate manufacturer. Refer to the gate schedule for type and applicable locations. Material thickness should be according to the manufacturer's recommendations and be of sufficient resistance to handle the operating forces.

FRAME. The gate frame shall be constructed of structural members or formed plate welded to form a rigid one-piece frame. The frame shall be suitable for mounting on a concrete wall (wall mount). The frame configuration shall be of type and design that shall allow the replacement of the side and bottom seals without removing the gate frame from the concrete wall or wall thimble. The minimum thickness at the frame members shall be 1/4 " (6,35mm). The design stress shall not exceed the lesser of 50% of the yield strength or 25% of the ultimate strength of the materials for maximum load conditions.

STANDARD SPECIFICATIONS

SLIDE. The slide shall consist of a flat plate reinforced with formed plates or structural members to limit its deflection to 1/720 of the gate's span or 1/16", whichever is less, under the design head. The minimum thickness shall be 1/4". The design stress shall not exceed the lesser of 50% of the yield strength or 25% of the ultimate strength for maximum load conditions

GUIDES AND SEALS. The guides shall be made of UHMWPE (ultra high molecular weight polyethylene). Guides shall be self-cleaning, providing a relief gap for the evacuation of foreign media. Side and top seal shall be made of EPDM and shall be of the self adjusting lip design (wedging devices are not acceptable). The bottom seal shall be made of resilient EPDM set onto the bottom member of the slide and shall be replaceable without removing the gate frame from the wall or wall thimble.

OPERATORS AND STEM

STEM AND COUPLINGS. The operating stem shall be of stainless steel designed to transmit in compression at least 2 times the rated output of the operating manual mechanism with a 40 lbs (178 N) effort on the crank or hand wheel. The stem shall have a slenderness ratio less than 200. The threaded portion of the stem shall have machined cut threads of the Acme type or metric DIN 103. Where a hydraulic, pneumatic or electric operator is used, the stem design force shall not be less than 1.5 times the output thrust of the hydraulic or pneumatic cylinder with a pressure equal to the maximum working pressure of the supply, or 1.5 times the output thrust of the electric motor in the stalled condition. The stem extension shall be made of extension tubes and joined to the stem by a solid coupling. The couplings shall be of greater strength than the stem. As a general rule, gates having a width greater than two times their height shall be provided with two lifting mechanisms connected by a tandem shaft.

STEM GUIDES. Stem guides shall be fabricated from type 304L (or 316L) stainless steel. The guide shall be equipped with an UHMWPE bushing. Guides shall be adjustable and spaced the manufacturer's recommendation. The slenderness ratio shall not be greater than 200

STEM COVER. Rising stem gates shall be provided with a carbon steel or a clear polycarbonate stem cover. The clear polycarbonate stem cover shall have a cap and condensation vents and a clear position indicating tape. The tape shall be field applied to the stem cover after the sluice gate has been installed in place and positioned.

ACTUATORS. Manual operators of the types listed in the schedule shall be provided by the gate manufacturer. All bearings and gears shall be totally enclosed in a weather tight housing. The pinion shaft of crank-operated mechanisms shall be constructed of stainless steel and supported by roller or needle bearings. Each manual operator shall be designed to operate the gate under the maximum specified seating and unseating heads by using a maximum effort of 40 lbs (178 N) on the crank or hand wheel, and shall be able to withstand, without damage, an effort of 80 lbs (356 N). The crank shall be removable and fitted with a rotating handle. The maximum crank radius shall be 15 inches (381mm) and the maximum hand wheel diameter shall be 30 inches (750mm) unless otherwise specified. Electric motors shall meet AWWA 542-09 Standard and pneumatic and hydraulic actuators AWWA 541-08 Standard.

YOKE. Self-contained gates shall be provided with a yoke made of structural members or formed plates. The maximum deflection of the yoke shall be 1/360 of the gate's span or 1/4", whichever is less. The design stress shall not exceed the lesser of 50% of the yield strength or 25% of the ultimate strength of the materials for maximum load conditions.

STANDARD SPECIFICATIONS

MATERIALS

Part	Material
Frame	Stainless Steel ASTM A-240 / Type 304/304L or 316/316L
Slide	Stainless Steel ASTM A-240 / Type 304/304L or 316/316L
Front Guides	Ultra High Molecular Weight Polyethylene (UHMWPE) ASTM D-4020
Guides	Ultra High Molecular Weight Polyethylene (UHMWPE) ASTM D-4020
Seal	EPDM
Seal Retainer	Stainless Steel ASTM A-240 / Type 304/304L or 316/316L
Bottom Seal	EPDM
Bottom Seal Retainer	Stainless Steel ASTM A-240 / Type 304/304L or 316/316L
Stem	Stainless Steel ASTM A-240 / Type 304/304L or 316/316L
Stem Nut	Bronze
Yoke	Stainless Steel ASTM A-240 / Type 304/304L or 316/316L
Stem Protector	Polycarbonate ASTM D-3935 or Carbon Steel ASTM A-501
Hardware	ASTM F593 & F594 GR1 for 304L Frame and GR2 for 316L Frame

SCHEDULE

Gate Identification

Opening Size (Width x Height)

Invert Elevation

Operating Floor Elevation

Seating Head

Unseating Head

Mounting Type

- WM: Concrete Wall Mounted
- WTM: Wall Thimble Mounted
- RMH: Round Manhole Wall Mounted

Frame configuration

- SF: Self Contained Frame
- OF: Open Frame

Stem configuration

- RS: Rising Stem
- NRS: Non Rising Stem

EXECUTION

INSTALLATION:

Gates and appurtenances shall be handled and installed in accordance with the manufacturer's recommendations.

MODEL

MU SLIDE GATES



MU SLIDE GATE SELECTION FORM

Customer: _____ Tag No.: _____ Date: _____
 Order Number: _____ Qty.: _____

SLIDE GATE DESIGN

Units: mm Size: Wall Opening Width: _____
 inch Wall Opening Height: _____

Seating Water Head: _____

Unseating Water Head: _____

Invert to Operating Floor Height: _____

- Non Rising Stem Uni-Directional Closed Frame
 Rising Stem Bi-Directional Open Frame

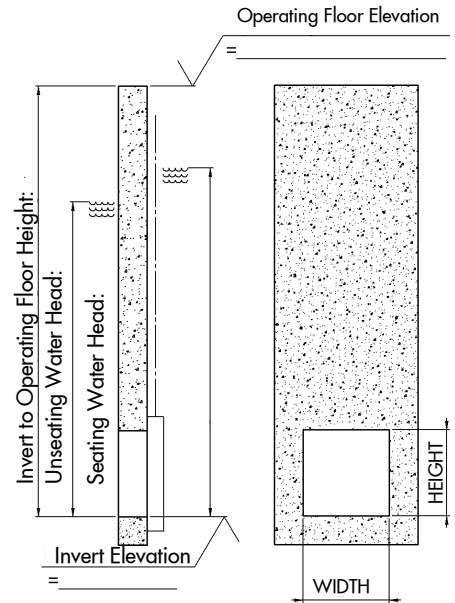
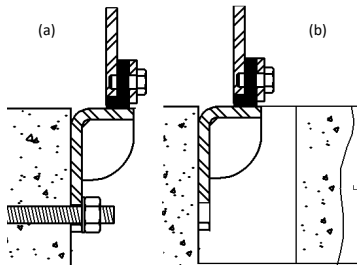
SLIDE GATE MOUNTING

- Concrete Wall Mount
 Wall thimble Mount
 Round Manhole: ID=
 Embedded in Concrete

Frame Invert Mounting:

- Standard Wall Mount (a)
 Flush Bottom Mount (b)

↳ E= F=

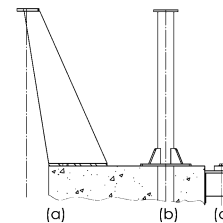
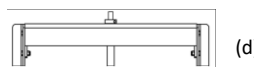


ACTUATORS

- Handwheel
 Crank (w/ B.Gear and 2" Sqr. Nut)
 2" Square Nut (NRS Only)
 Bevel Gear
 Electric Motor
 Pneumatic Cylinder
 Hydraulic Cylinder

Actuator Mounting:

- Inclined Floor Stand (a)
 Straight Floor Stand (b)
 Wall Bracket (for 2" Sqr.Nut)(c)
 Frame Mounted (d)
 Floor Box (for 2" Sqr.Nut)



Position Indicator:

- (For RS Only)
 Mylar Tape
 Limit Switch
 Proximity Switch

MATERIALS

- | | | | |
|---------------|---------------------------------------|--|---------------|
| Frame & Slide | <input type="checkbox"/> 304L SS | <input type="checkbox"/> 316L SS | Others: _____ |
| Stem | <input type="checkbox"/> 303 SS | <input type="checkbox"/> 316 SS | Others: _____ |
| Extension | <input type="checkbox"/> 304L SS | <input type="checkbox"/> 316L SS | Others: _____ |
| Floor Stand | <input type="checkbox"/> Carbon Steel | <input type="checkbox"/> 304L SS | Others: _____ |
| Seal | <input type="checkbox"/> EPDM | | Others: _____ |
| Stem Cover | <input type="checkbox"/> Carbon Steel | <input type="checkbox"/> Clear Polycarbonate | |

REMARKS

Name: _____ Signature: _____