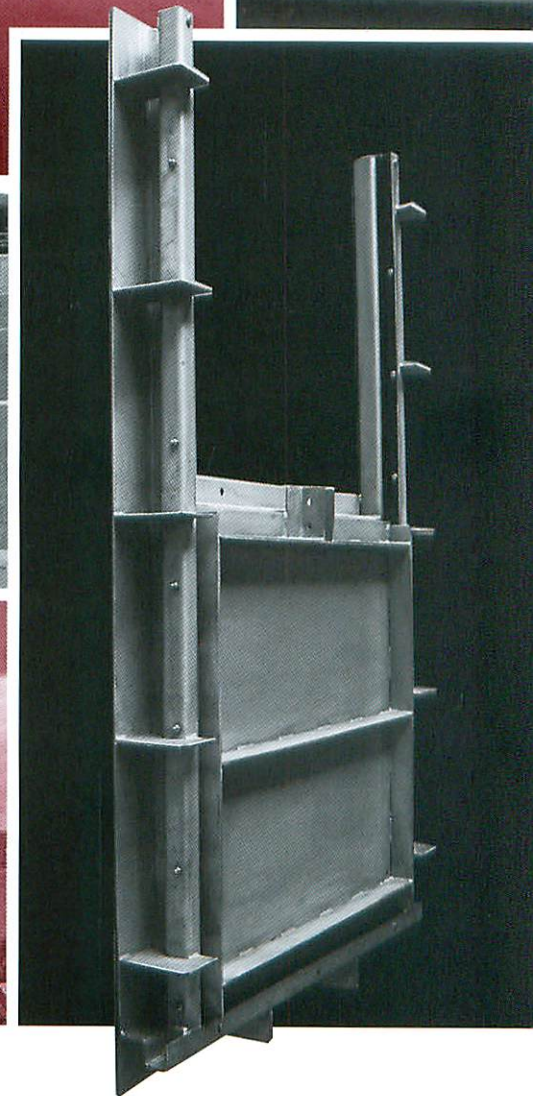
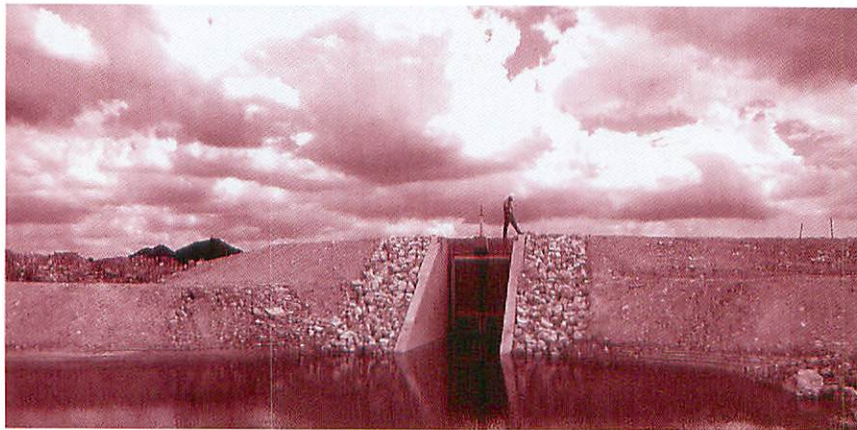
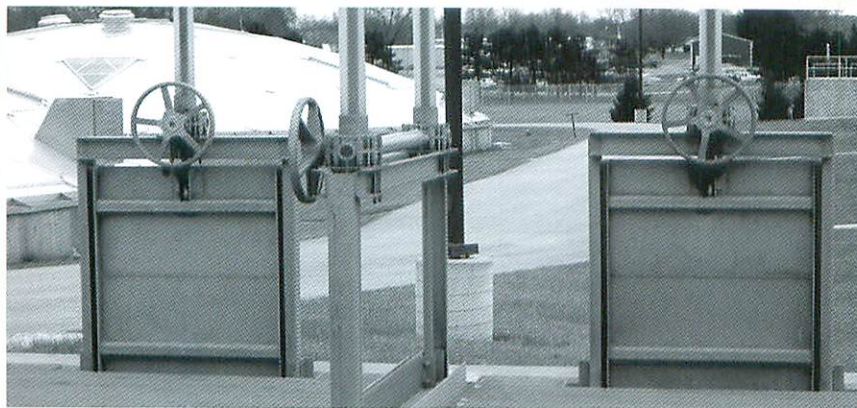
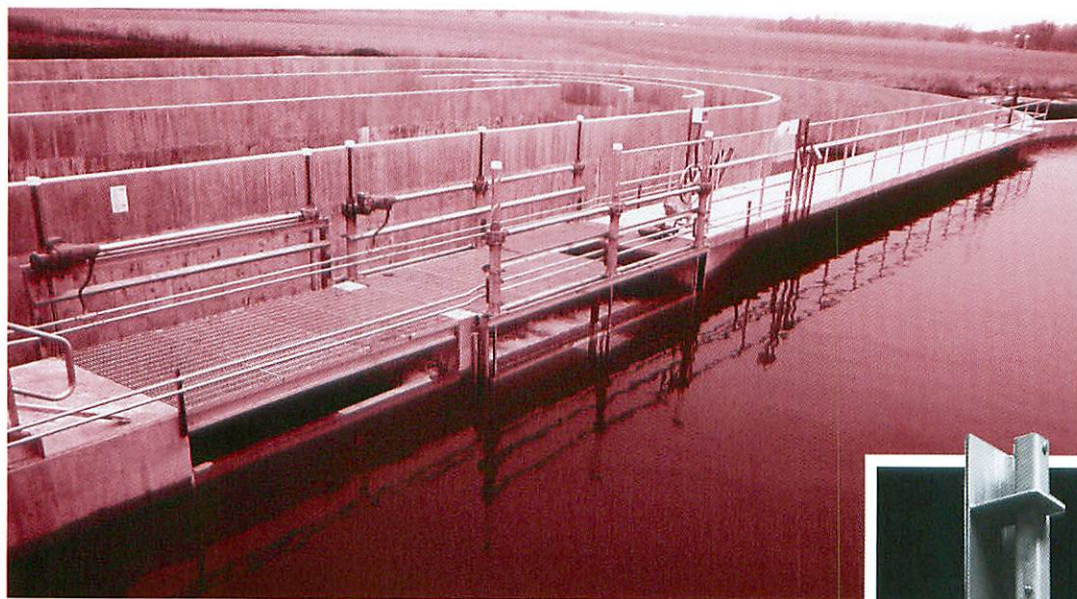


# Stainless Steel Gates

Series 900 AWWA® C561 Compliant

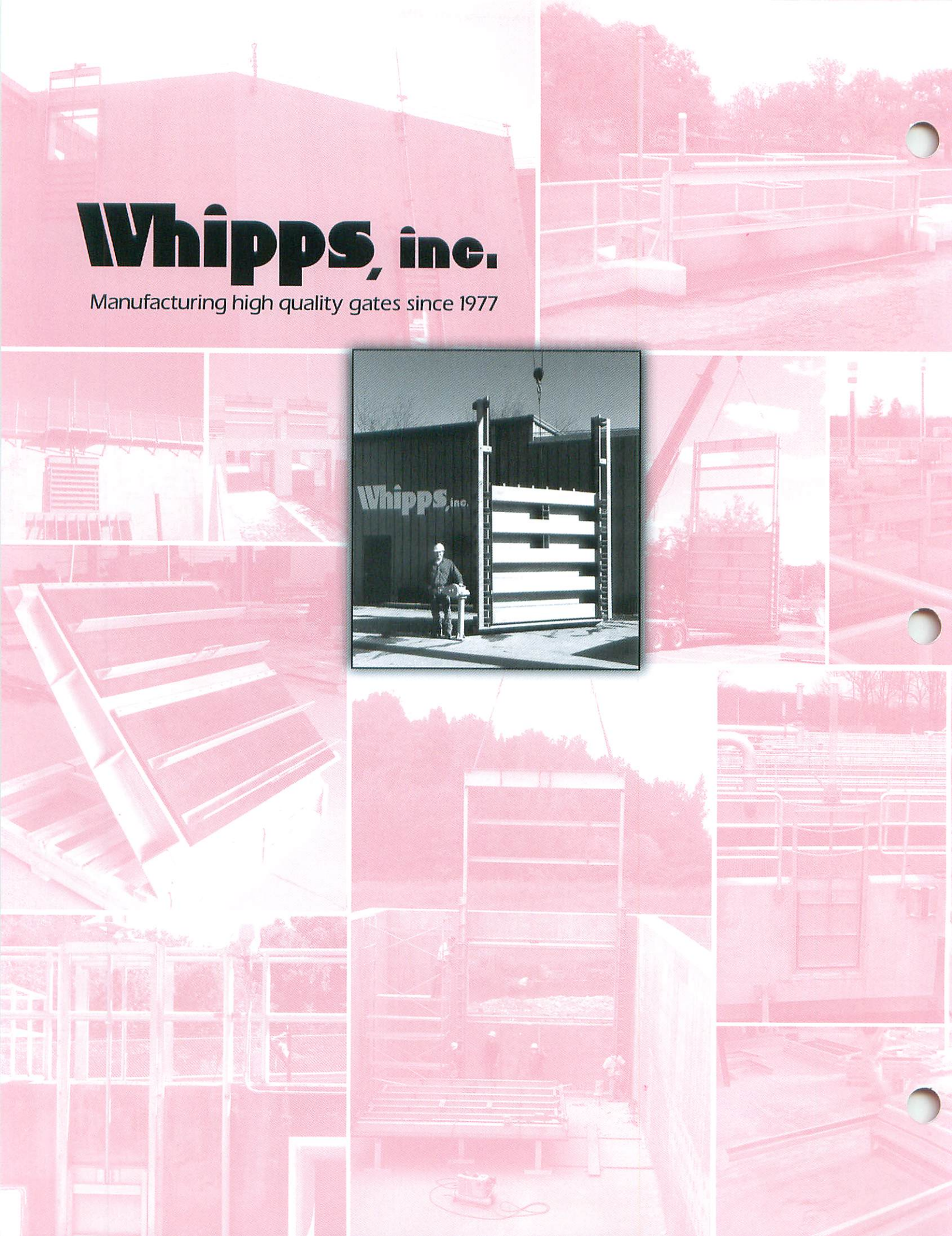
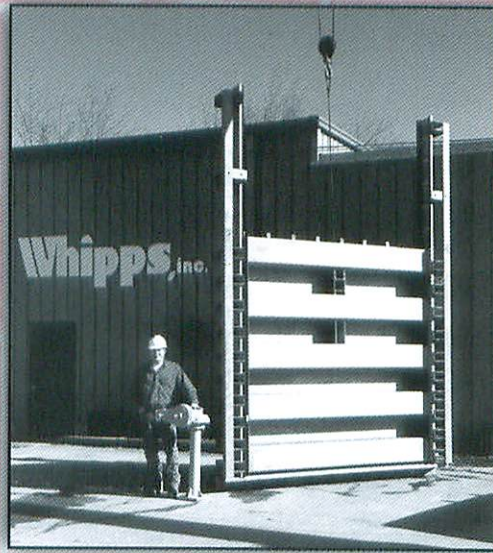


# Whipps, inc.

Manufacturing high quality gates since 1977

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## Stainless Steel Gates Series 900 AWWA® C561 Compliant

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### Introduction

**Series 900 Stainless Steel Gates** offer high performance and long life in designs which accommodate a wide range of mounting arrangements and flow conditions. Rugged, reinforced stainless steel construction is combined with tough, flexible ultra high molecular weight polyethylene (UHMW) seat/seals, to provide a

heavy-duty assembly. Flush bottom closure is provided by a resilient bottom seal. In addition to the wide range of standard gates, Whipps, Inc. can quickly and economically produce standard gates or gates customized for unusual applications.

### Advantages (vs. Cast Iron Gates)

**Superior Performance:** Whipps, Inc. guarantees lower leakage than that listed in AWWA C-501 - Cast Iron Sluice Gates or the latest revision, AWWA C-560 - Cast Iron Slide Gates. Whipps, Inc. will guarantee leakage of no more than 0.05 gpm/ft of seal perimeter in seating head and unseating head conditions. Including high head service.

**Cost:** Fabricated stainless steel gates almost always cost less than cast iron gates. As the size of the gate increases, the price difference increases. This is due to the manufacturing process (e.g. casting of parts and subsequent machining) required to produce cast iron gates.

**Strength:** The ultimate strength of stainless steel is in excess of twice the ultimate strength of cast iron and stainless steel has approximately twice the modulus of elasticity of cast iron.

**Durability:** Stainless steel resists corrosion better than cast iron. The uv stabilized UHMW seat/seals that are utilized on our stainless steel gates are field proven to maintain shape and integrity in demanding applications. Whipps, Inc. tested the UHMW seat/seals to confirm the ability to withstand continuous operation in an abrasive environment. The testing consisted of 25,000 gate open/close cycles in an abrasive media while experiencing only negligible wear. (Test results available upon request.)

**Reliability:** Unlike traditional cast iron gates, the slide will not "freeze" to the frame after long periods of inactivity. Whipps, Inc. stainless steel gates incorporate UHMW seat/seals to prevent any metal-to-metal contact between the slide and the frame.

**Delivery:** The fabrication process required to turn raw materials into a stainless steel gate is quicker than the casting and machining process required to turn raw materials into a cast iron gate.

**Self-Adjusting Seals:** The Series 900 stainless steel gates have a self-adjusting seal system that completely eliminates the need for field adjustment. This seal system was developed with the understanding that many gates are installed in locations where field adjustment of wedges is not practical or possible. Another drawback to a wedged system is that wedge adjustment is an inexact science. Wedge adjustment when attempted by inexperienced personnel can lead to additional leakage, difficult gate operation and increased localized gate stresses. The self-adjusting seal system is a combination of durable UHMW seat/seals and a resilient static spring/seal. The UHMW seat/seals are shaped to form a low friction, yet tight, seal with the slide. The spring/seal serves two main purposes: First; it acts as a bulb seal between the frame and the UHMW seat/seals,

### Advantages (continued)

and secondly; it acts as a “spring” to ensure continuous contact between the UHMW seat/seals and the slide. The spring/seal is stationary, similar to an O-ring seal, and it is protected from wear or damage from the movable slide by the UHMW seat/seals. (Wedges can be provided on our Series 900, but they are not recommended since they do not improve the performance of our gate.)

**Low Maintenance:** Stainless steel gates do not require periodic painting, and require less operator attention compared to cast iron gates.

**Ease of Repair:** In the unusual event that the seat/seals are damaged, they can be replaced in the field with common tools. The gate does not have to be removed from the wall. If the seating surface on a cast iron gate is damaged, the gate will have to be removed from the wall and shipped back to the manufacturer for re-manufacture.

**Range of Sizes:** The process to design and manufacture fabricated gates allows for a nearly unlimited range of sizes. This is not the case with cast iron gates since new patterns or modifications to existing patterns are required to accommodate unusual sizes.

**Mounting Configurations:** Gate frames may be embedded in the channel walls, mounted to a wall with anchor bolts, mounted to a pipe flange, or wall thimble. Wall thimble mounting is possible although it is usually only necessary for applications with high unseating heads. Gates can also be designed to mount to existing wall thimbles or existing pipe flanges. Flanged frames or flat frames are available for gates to cover square, rectangular or round openings in concrete structures.

### Design Features

The following chart shows the gate features indicated by each model number. These models represent the most commonly used configurations.

Additional arrangements are available for applications which cannot be served by these standard models.

GATE FEATURES		GATE MODEL NUMBERS							
		921 951 —	923 953 —	923-C 953-C —	923-D — —	923-D-1 953-D-1 —	924 954 —	925 955 975	— 955-1 —
GUIDE FRAME STYLE	Embedded	X							
	Wall Mount		X		X	X	X	X	X
	Channel Mount			X					
SEALS	Side & Invert	X	X	X	X	X			
	Side, Invert & Top						X	X	X
ACTUATOR MOUNTING	Yoke	X	X	X	X	X	X		
	Pedestal							X	X

### Optional Features

*Gate size and service conditions determine the gate configuration required for each application. Overall gate widths, side frame sections and invert sections shown in this literature illustrate only a few of the many configurations available.*

**Downward Opening:** Most gate models can be specified for downward opening service by adding a "D" to the model number. Such gates are used where there is insufficient clearance to open an upward opening gate or where the gate is to be used as an overflow weir. Downward opening gates may be furnished with or without a top seal.

**Interconnected Actuators:** All models may be specified with two interconnected actuators by adding "I" to the model number. This arrangement is generally recommended for gates 72" or wider and having a width greater than twice the height.

**Non-Rising Stems:** All models may be specified with non-rising stems by adding "N" to the model number. This operating stem arrangement is normally selected for installations with low headroom.

**Wall Thimbles:** All models with top seals can be specified for wall thimble mounting. Thimbles are typically only necessary for applications that experience high unseating heads.

### Gate Selection Criteria

**Gate Size:** In water and wastewater treatment plants, gates are most often sized to fit a pre-designed structure. In this regard, Whipps, Inc. stainless steel gates offer great flexibility to accommodate any round, square or rectangular opening.

**Gate Mounting:** Series 900 gate frames may be embedded in the channel walls, mounted on the face of a wall, on the inside of an existing channel, on a wall thimble or on a pipe flange.

**Gate Material:** Series 900 gates are typically constructed of either type 304/304L or type 316/316L stainless steel. Type 304/304L is less expensive and generally it may safely be specified for water or waste water applications if residual chlorine is 2mg/l or less.

Type 316/316L is a more conservative choice and provides greater resistance to pitting and crevice corrosion. In either case, the low carbon ("L") grade should be used for welded parts to reduce carbon precipitation in the welds. Different alloys are also available. Please consult the factory.

**Actuator Selection:** The various types of actuators are shown in the actuator section. Operating loads are calculated as shown on the adjacent page. Manual operators should be selected to provide the calculated operating thrust with no more than 40 pounds effort on the handwheel or handcrank. (For information regarding the selection of powered actuators, consult the factory.)

### Gate Selection Criteria (continued)

*In either units, the operating load is taken as the greater of  $P_1$  and  $P_2$ :*

#### ENGLISH UNITS

- $P_1 = 35 h$   
where  
 $P_1$  = operating load (pounds)  
 $h$  = gate height (inches)

---

- $P_2 = 12.48 AH$   
where  
 $P_2$  = operating load (pounds)  
 $A$  = area of opening (sq. feet)  
 $H$  = head on gate centerline (feet)

#### METRIC UNITS

- $P_1 = 6129 h$   
where  
 $P_1$  = operating load (newtons)  
 $h$  = gate height (meters)

---

- $P_2 = 1961 AH$   
where  
 $P_2$  = operating load (newtons)  
 $A$  = area of opening (sq. meters)  
 $H$  = head on gate centerline (meters)

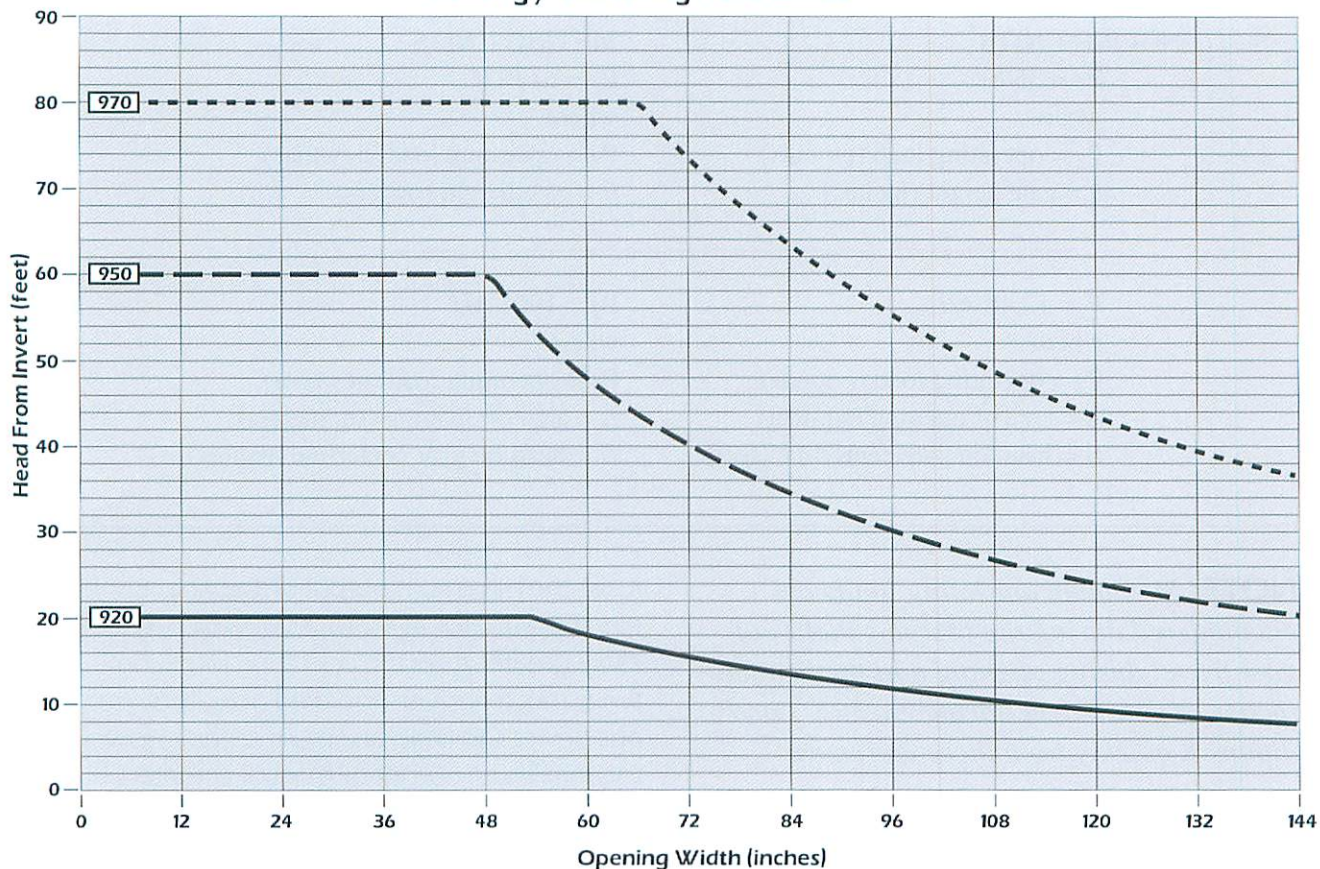
**NOTE:** *Maximum operating loads are encountered during the first few inches of gate travel during opening and the last few inches of gate travel during closing. Loads diminish quickly from these extremes.*

resist the maximum output of the actuator (e.g., electric actuator at motor stall) which is necessarily greater than the operating load, sometimes much greater. Powered actuators use various devices to limit maximum output. However, the maximum output of manual actuators is only limited by the operating personnel's effort.

**Actuator loads transmitted to structures:** On non-self contained gates, the stem thrust of pedestal mounted actuators is resisted by the structure supporting the gate and actuator. The structure must be designed to

### Application Chart

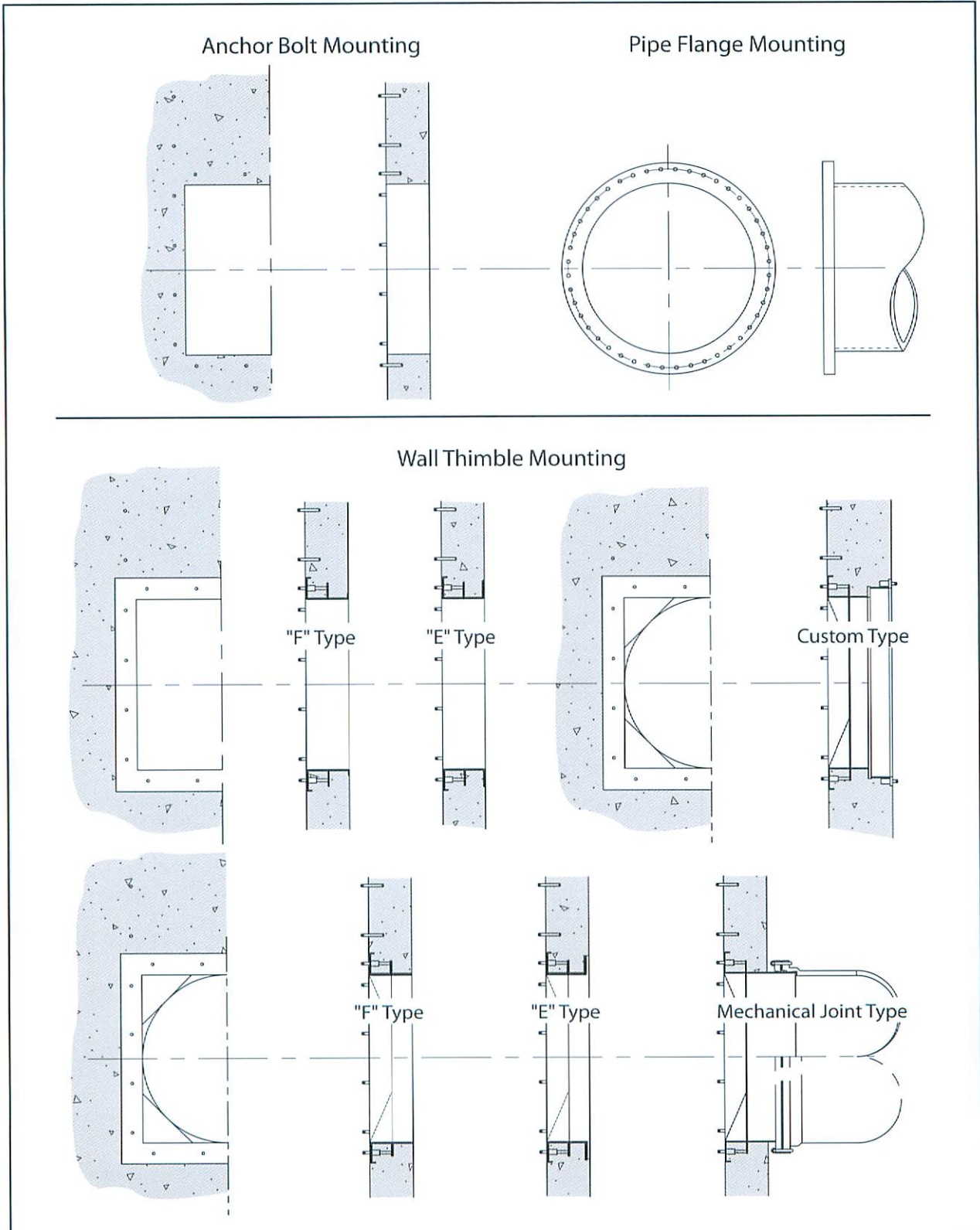
Seating / Unseating Head Limits



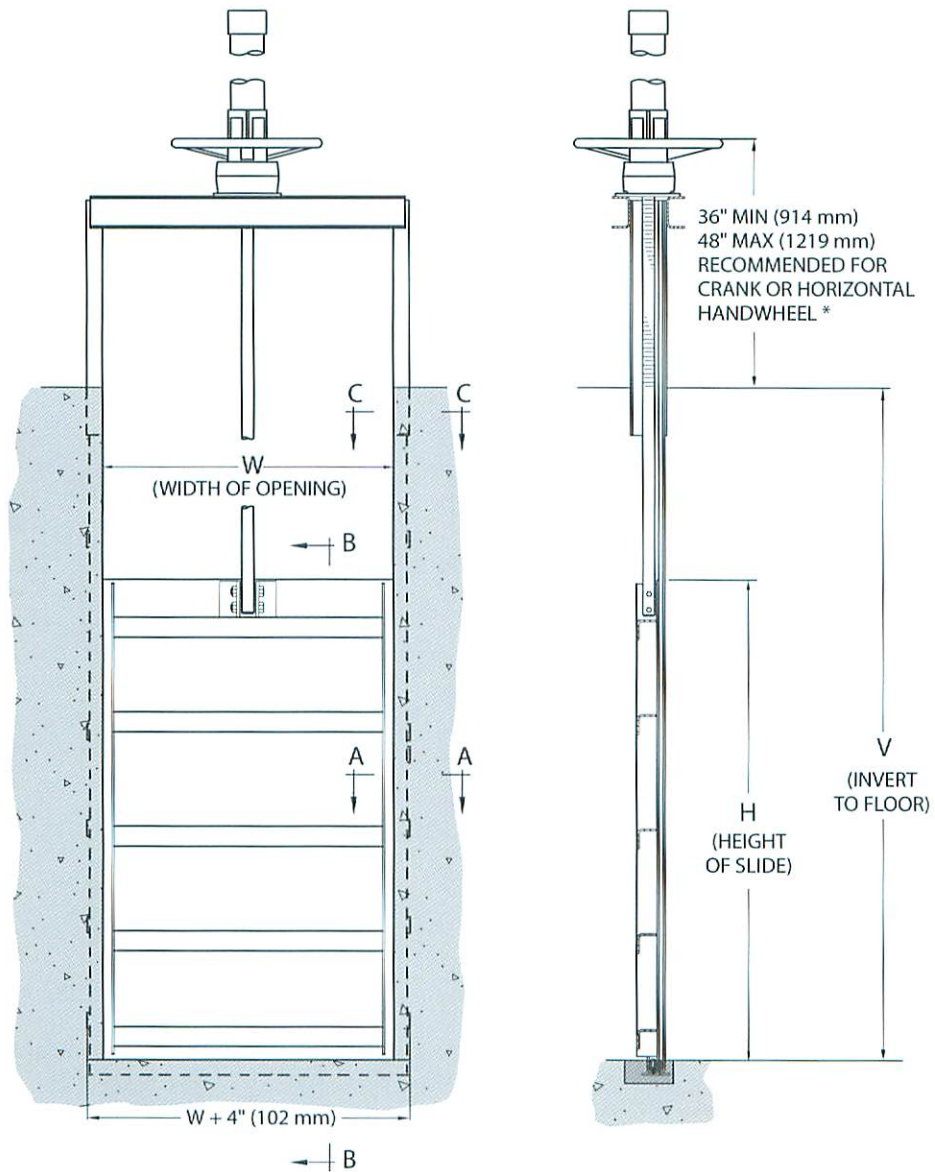
**NOTE:** The chart shown above illustrates the normal maximum range of each stainless steel gate series. Higher ratings for each series can be achieved when necessary. Consult factory for details.



### Sluice Gate Mounting

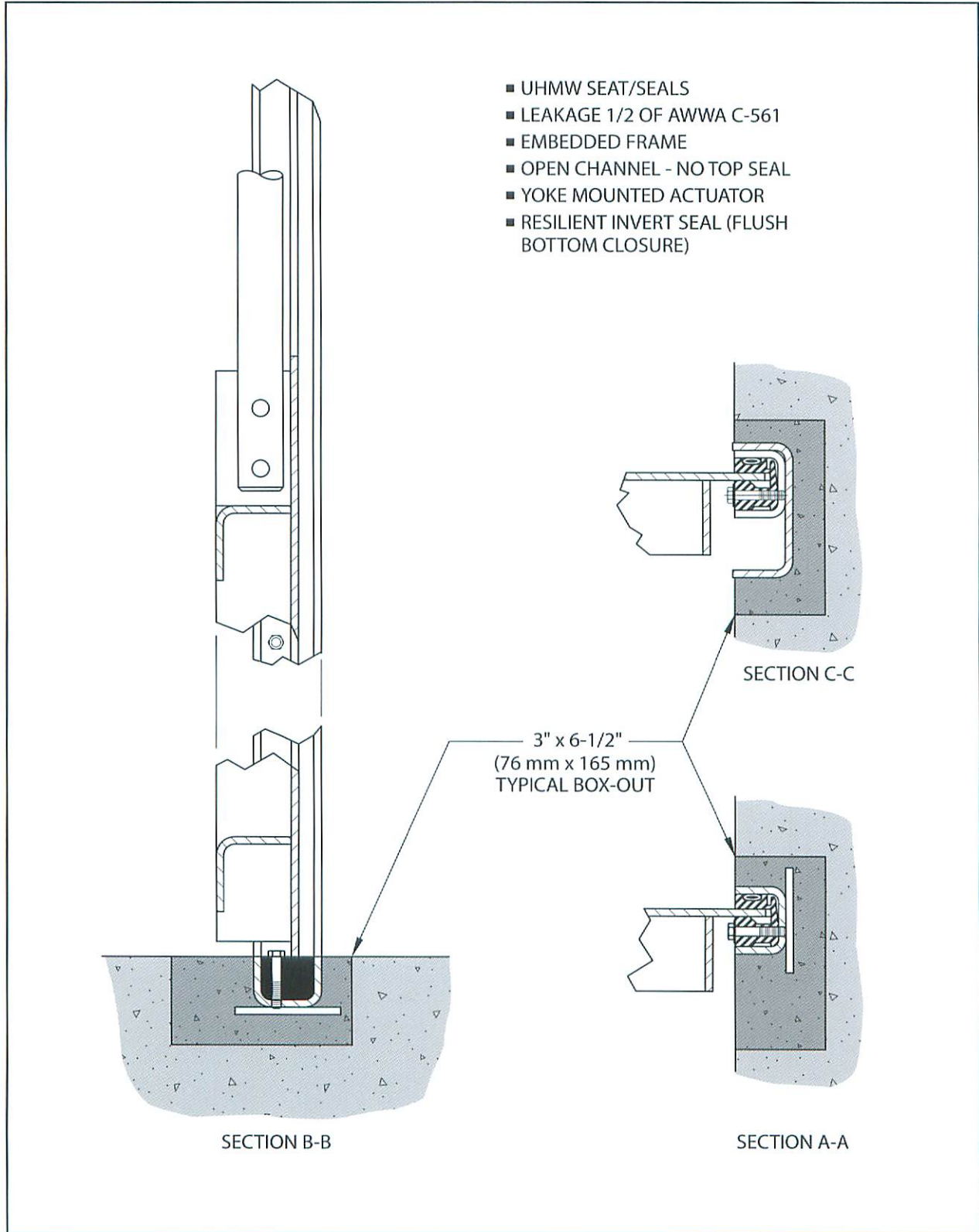


### Model 921 Slide Gate

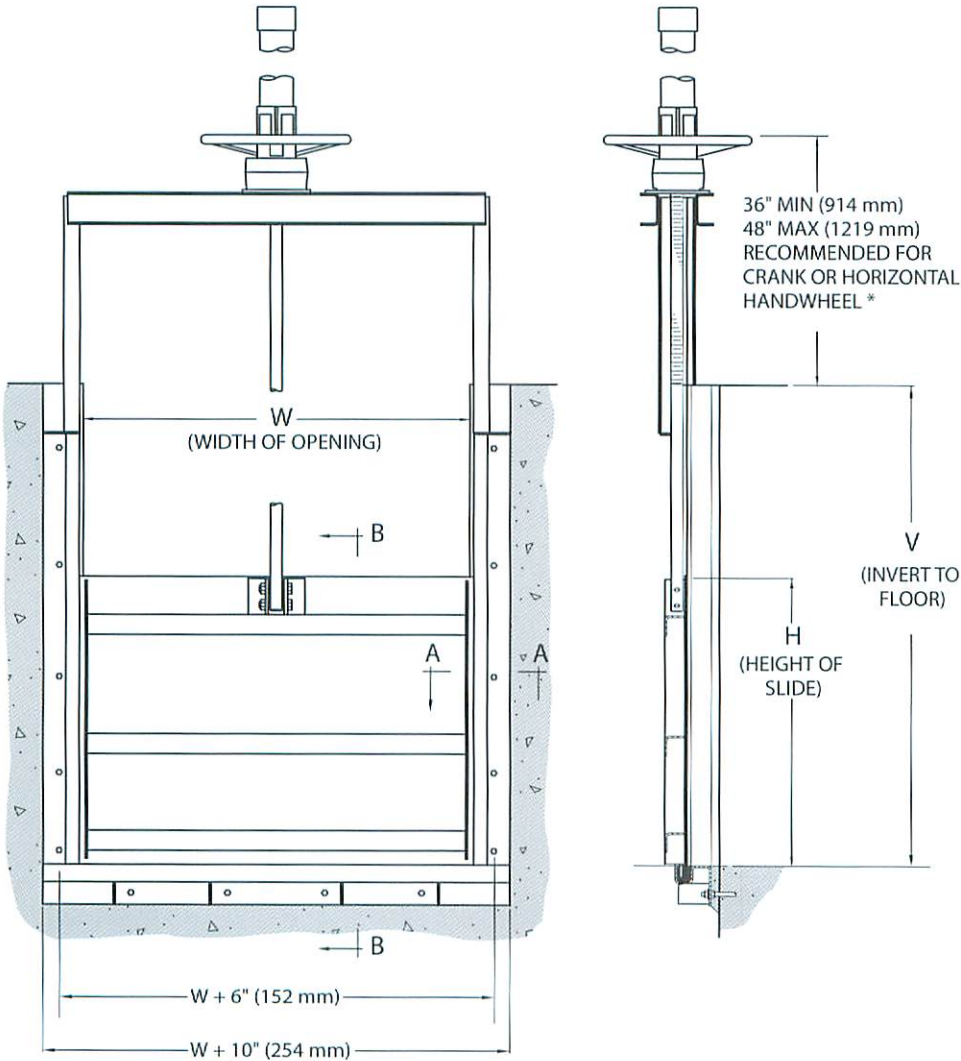


GATE ILLUSTRATED : 36" (W) x 60" (H) x 84" (V)  
\* SEE ACTUATORS SECTION FOR OTHER ARRANGEMENTS

### Model 921 Features



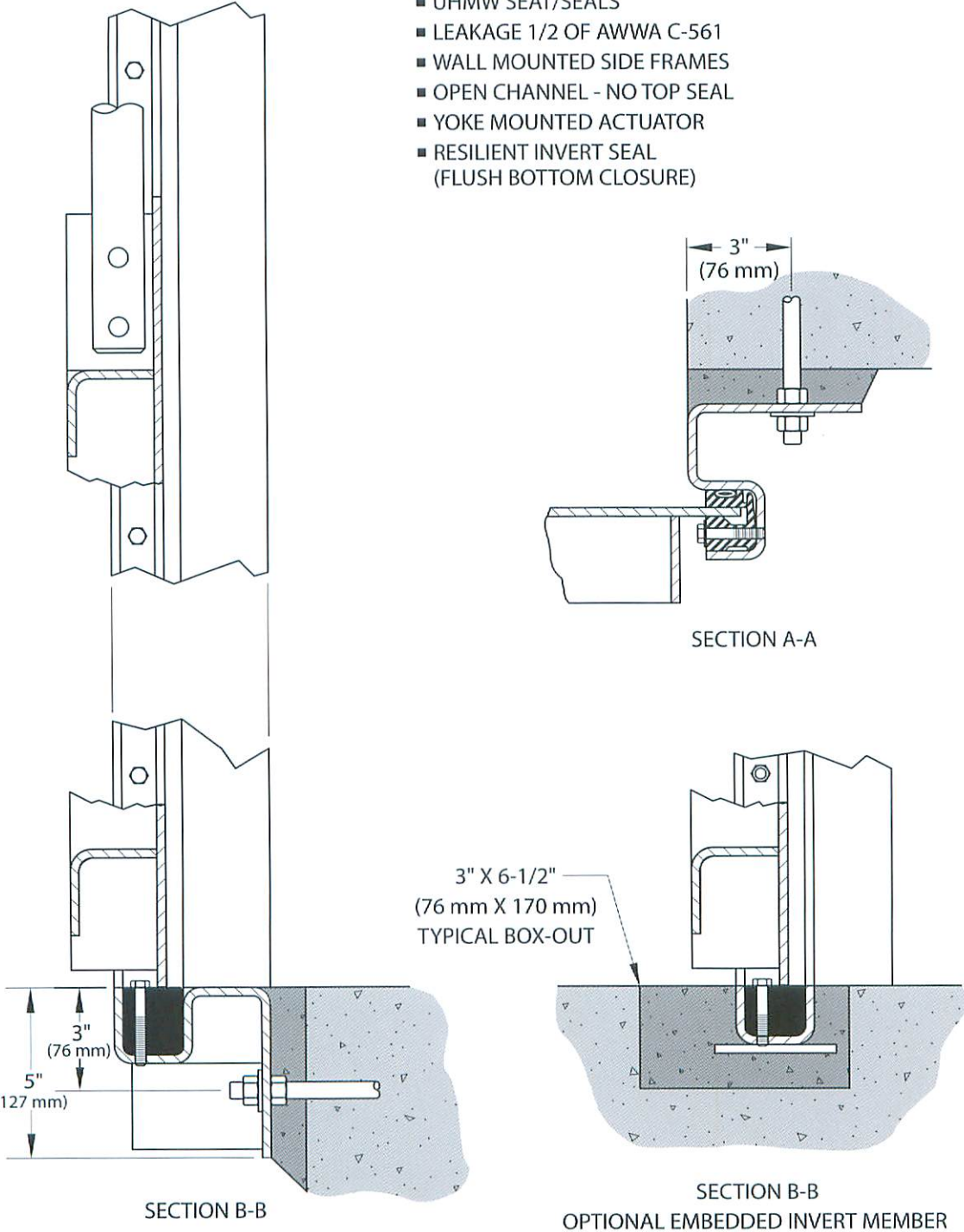
### Model 923 Slide Gate



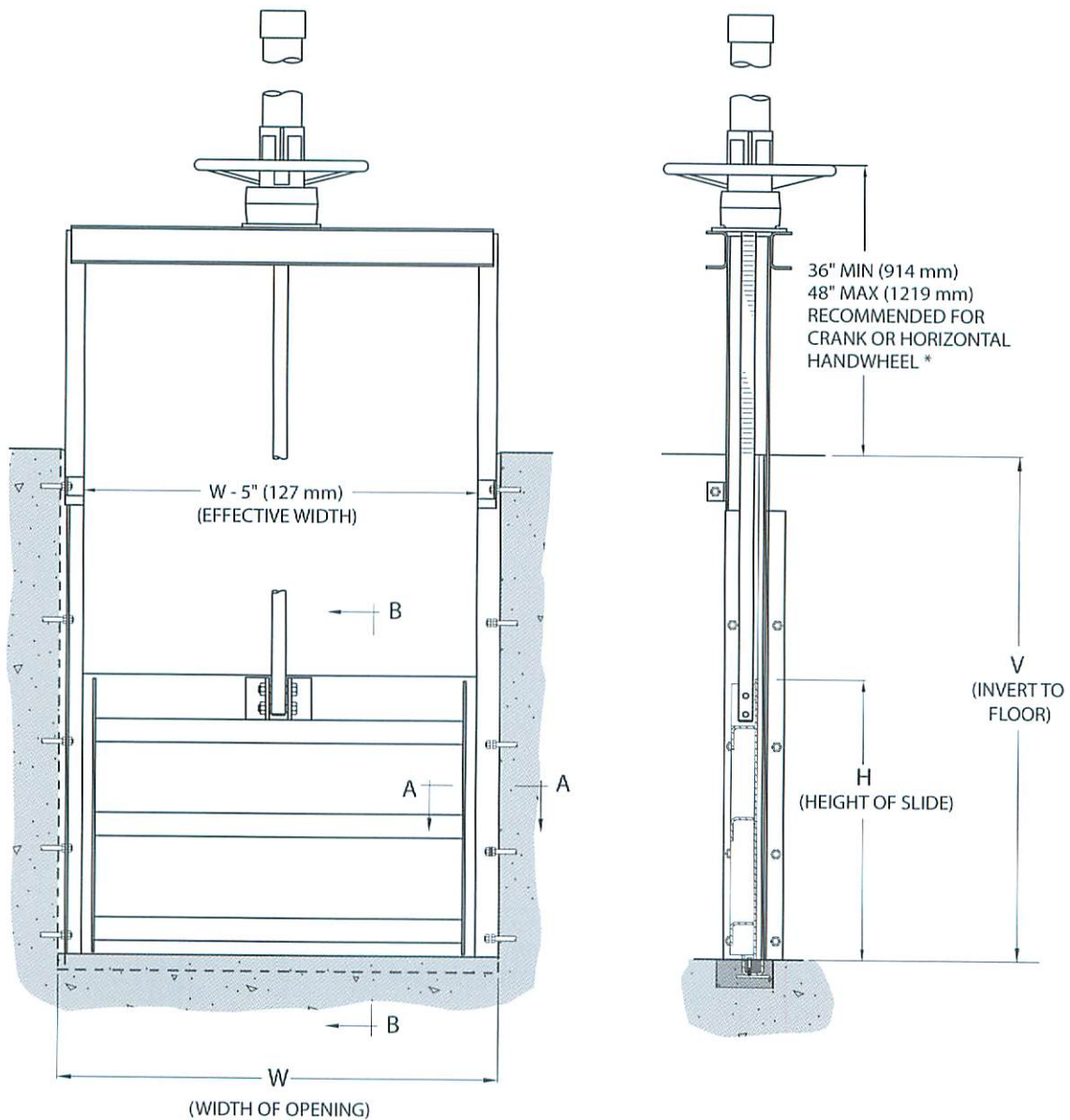
GATE ILLUSTRATED : 48" (W) x 36" (H) x 60" (V)  
\* SEE ACTUATORS SECTION FOR OTHER ARRANGEMENTS

### Model 923 Features

- UHMW SEAT/SEALS
- LEAKAGE 1/2 OF AWWA C-561
- WALL MOUNTED SIDE FRAMES
- OPEN CHANNEL - NO TOP SEAL
- YOKE MOUNTED ACTUATOR
- RESILIENT INVERT SEAL (FLUSH BOTTOM CLOSURE)



### Model 923-C Slide Gate

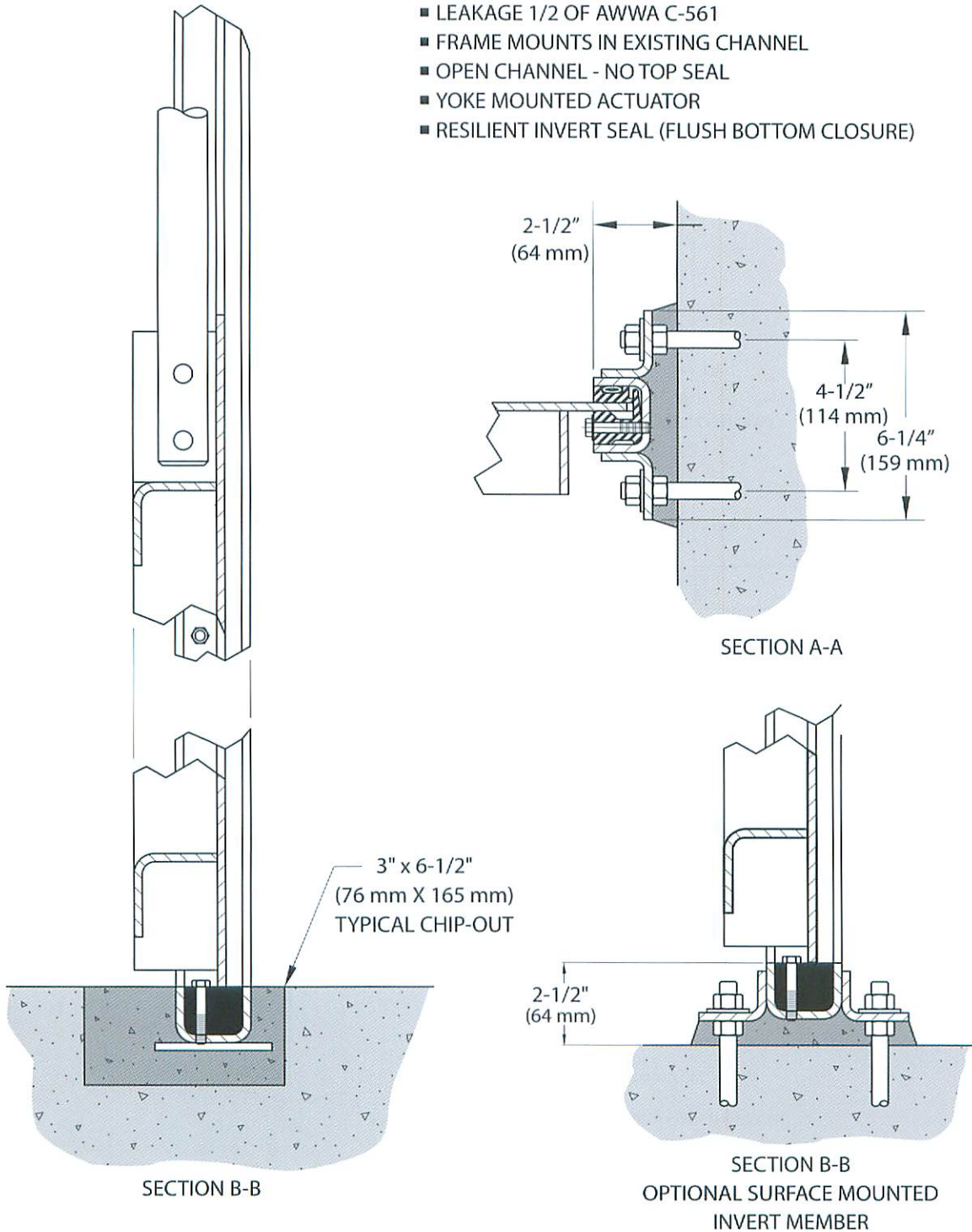


GATE ILLUSTRATED : 42" (W) X 30" (H) X 54" (V)

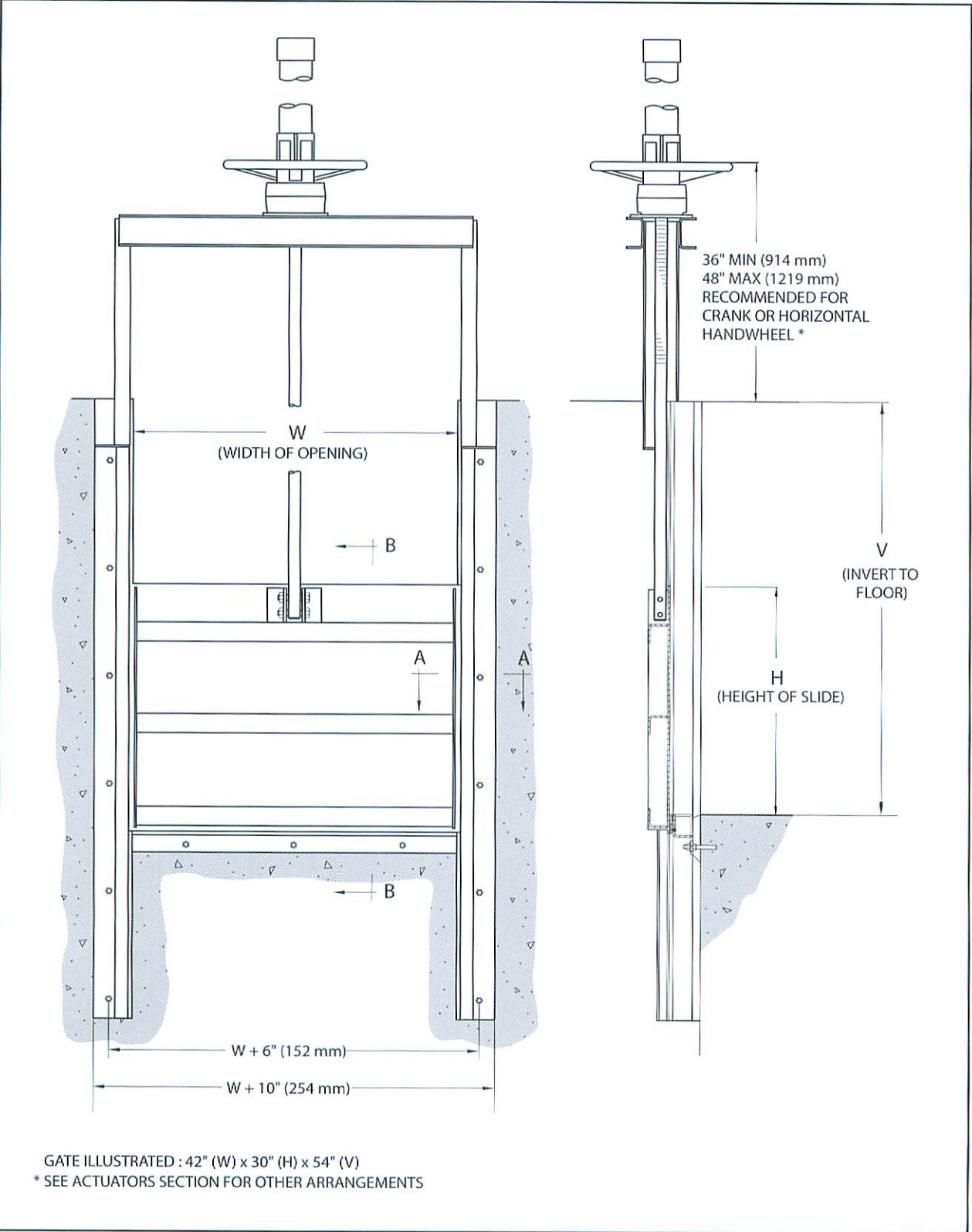
\* SEE ACTUATORS SECTION FOR OTHER ARRANGEMENTS

### Model 923-C Features

- UHMW SEAT/SEALS
- LEAKAGE 1/2 OF AWWA C-561
- FRAME MOUNTS IN EXISTING CHANNEL
- OPEN CHANNEL - NO TOP SEAL
- YOKE MOUNTED ACTUATOR
- RESILIENT INVERT SEAL (FLUSH BOTTOM CLOSURE)



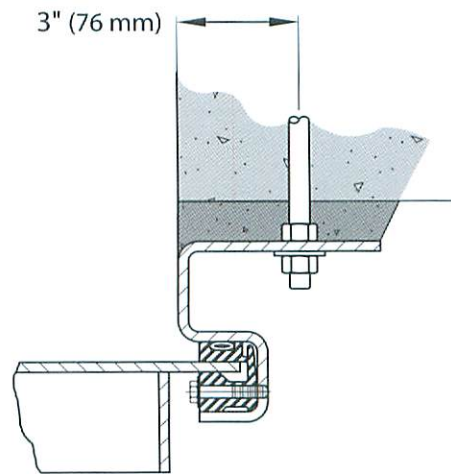
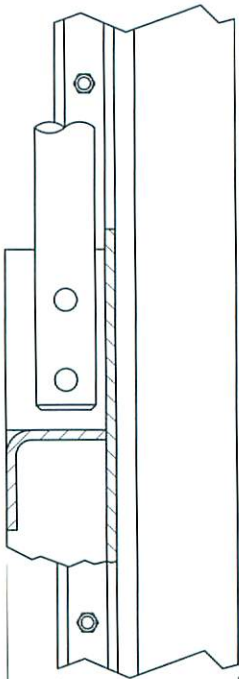
### Model 923-D Weir Gate



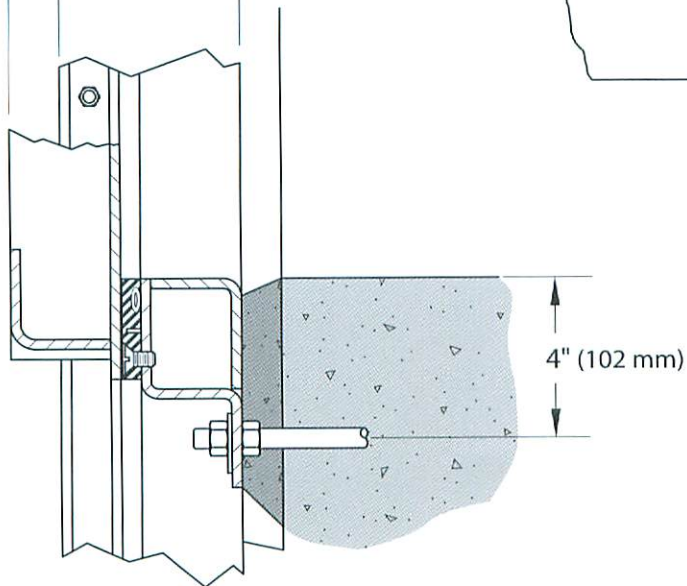


### Model 923-D Features

- UHMW SEAT/SEALS
- LEAKAGE 1/2 OF AWWA C-561
- WALL MOUNTED SIDE FRAMES
- DOWNWARD OPENING
- OPEN CHANNEL - OPTIONAL TOP SEAL
- YOKE MOUNTED ACTUATOR

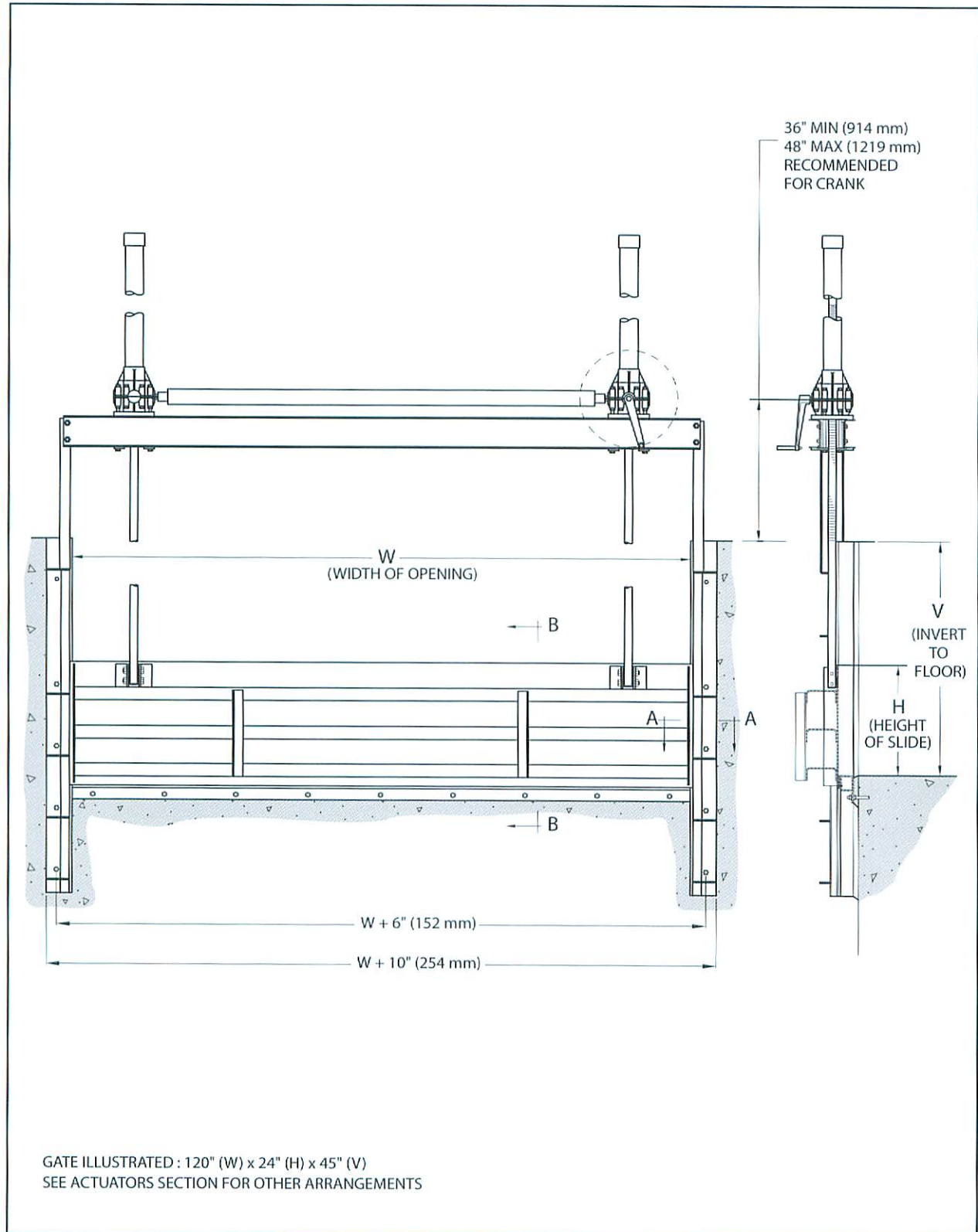


SECTION A-A



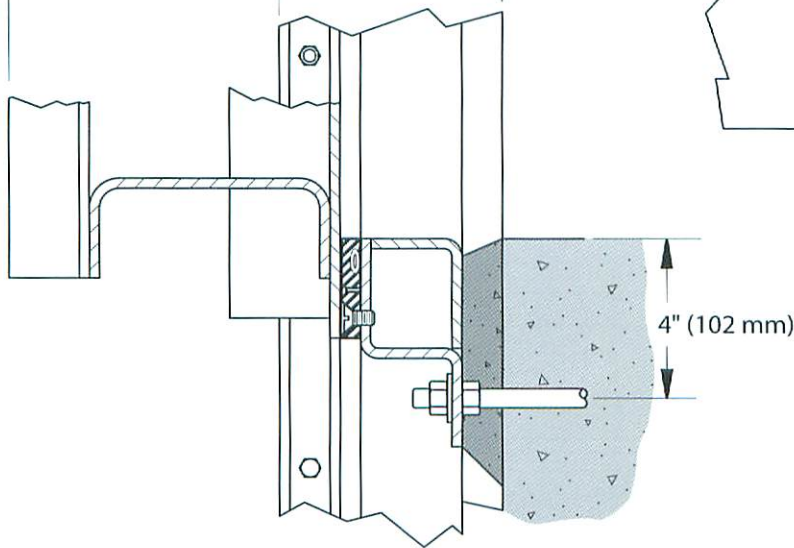
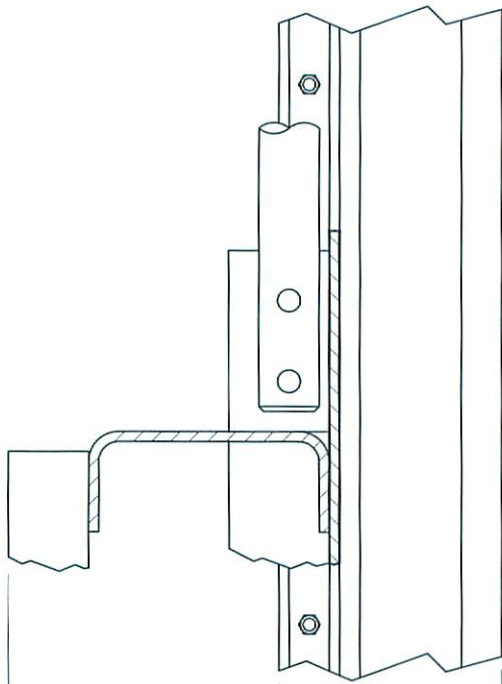
SECTION B-B

### Model 923-D-I Weir Gate

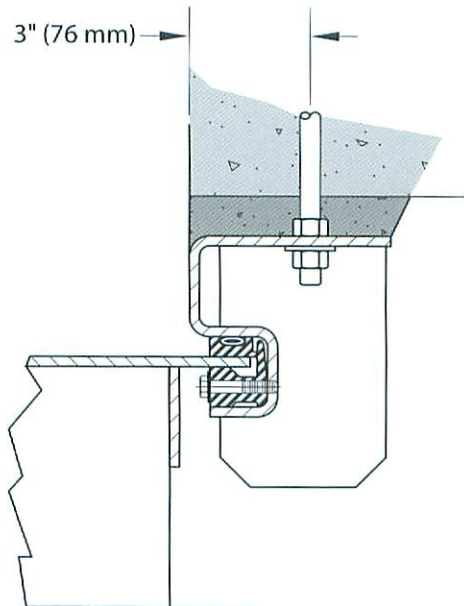


### Model 923-D-I Features

- UHMW SEAT/SEALS
- LEAKAGE 1/2 OF AWWA C-561
- WALL MOUNTED SIDE FRAMES
- DOWNWARD OPENING
- OPEN CHANNEL - OPTIONAL TOP SEAL
- YOKE MOUNTED INTERCONNECTED ACTUATORS

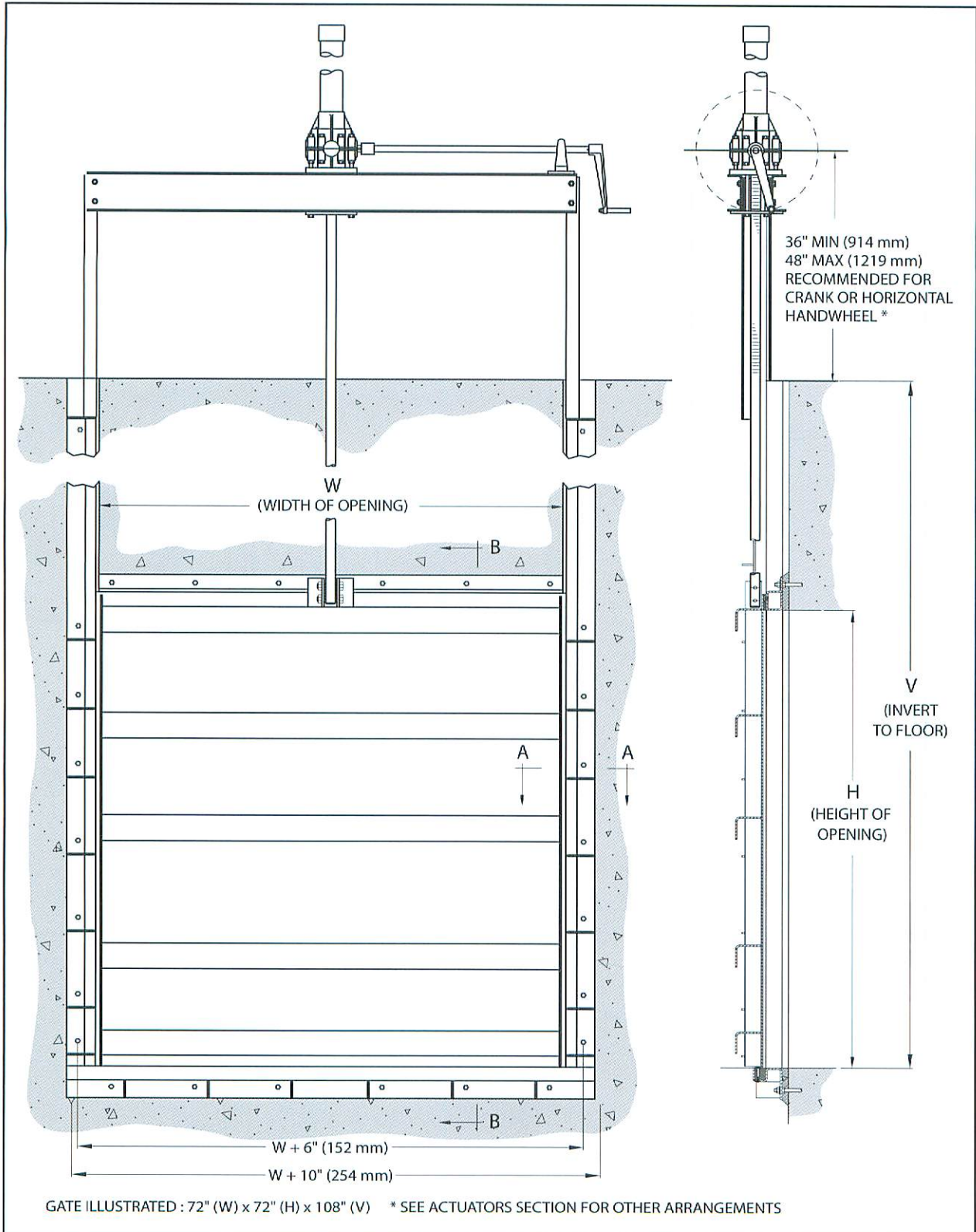


SECTION B-B



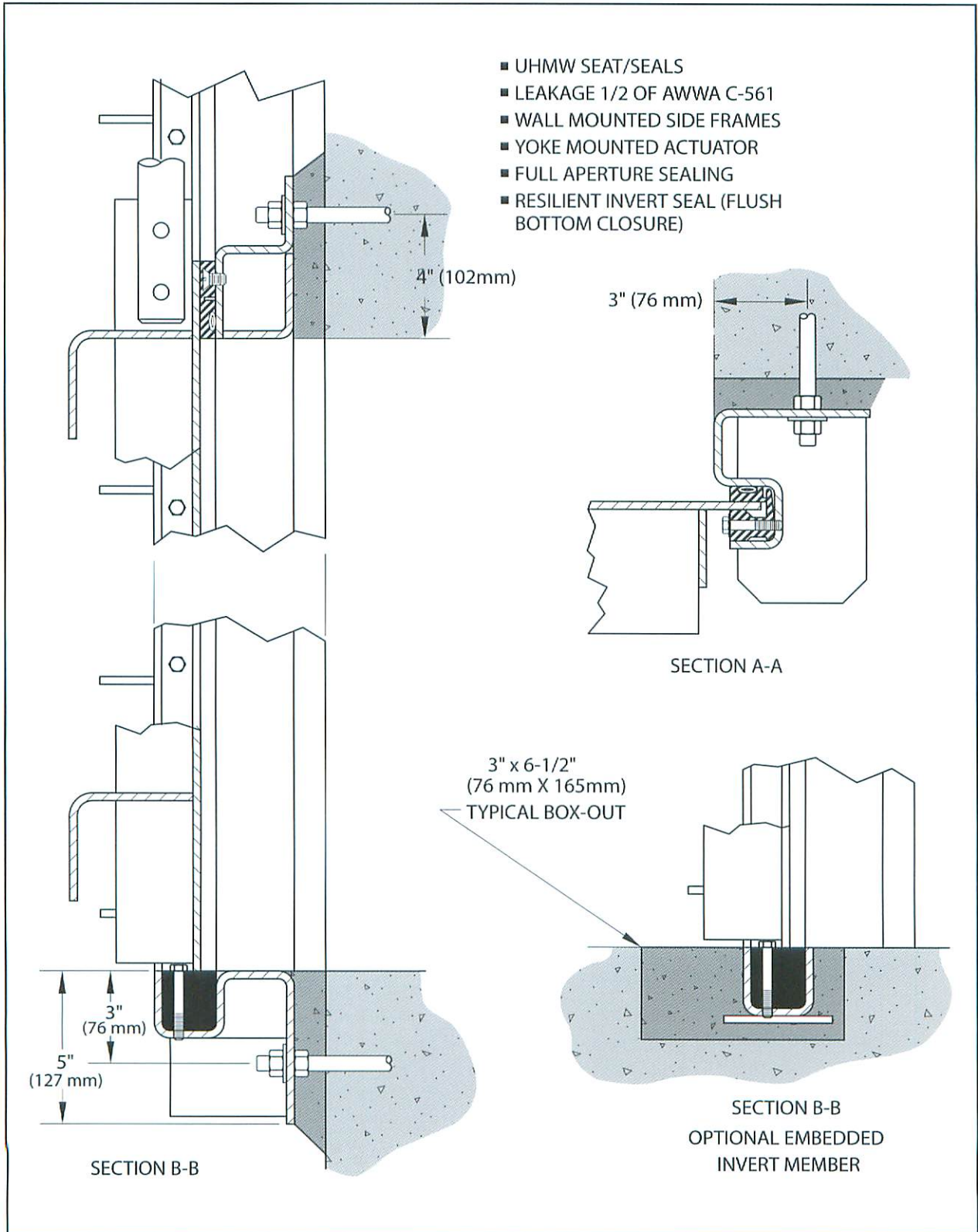
SECTION A-A

### Model 924 Sluice Gate

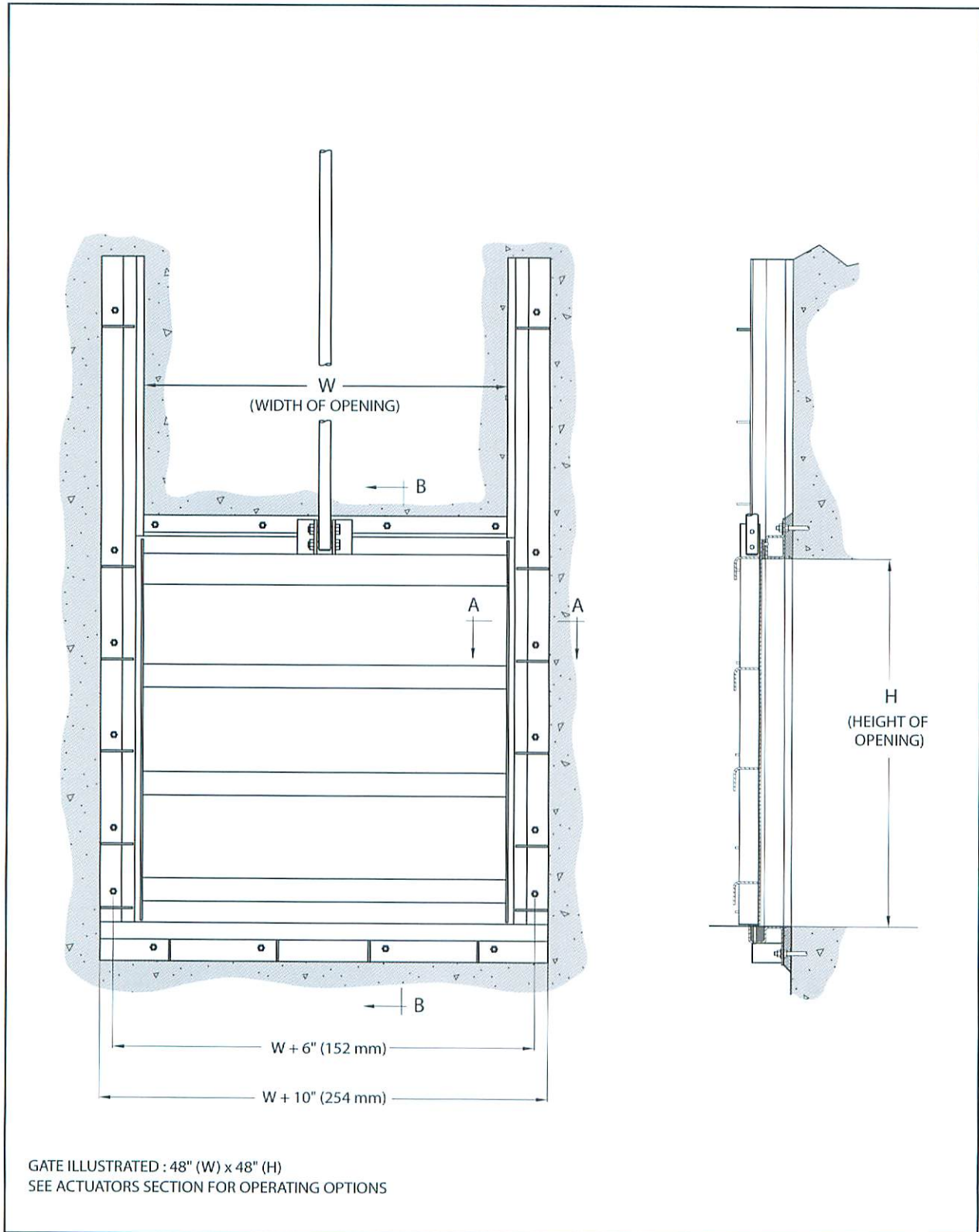


### Model 924 Features

- UHMW SEAT/SEALS
- LEAKAGE 1/2 OF AWWA C-561
- WALL MOUNTED SIDE FRAMES
- YOKE MOUNTED ACTUATOR
- FULL APERTURE SEALING
- RESILIENT INVERT SEAL (FLUSH BOTTOM CLOSURE)

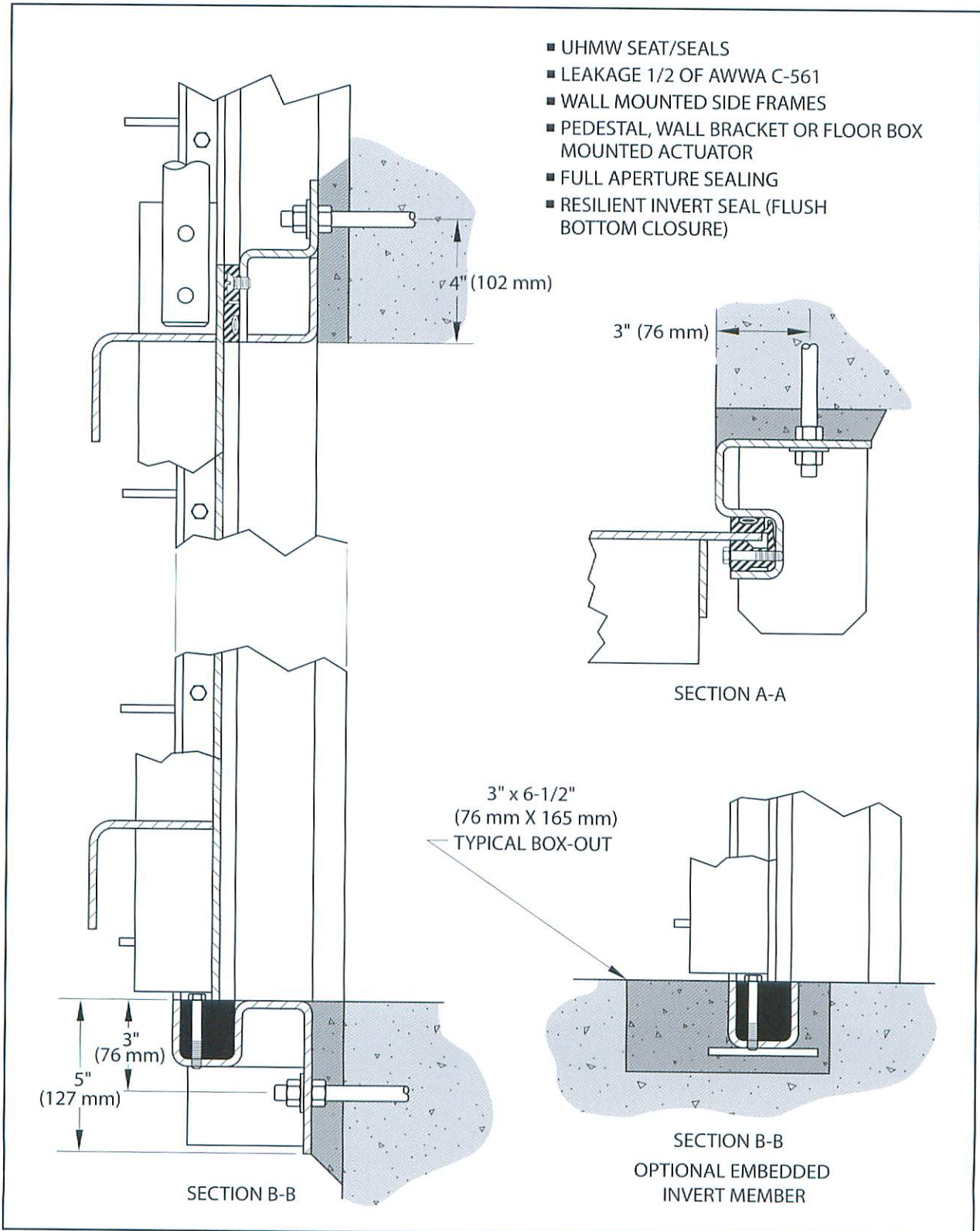


### Model 925 Sluice Gate

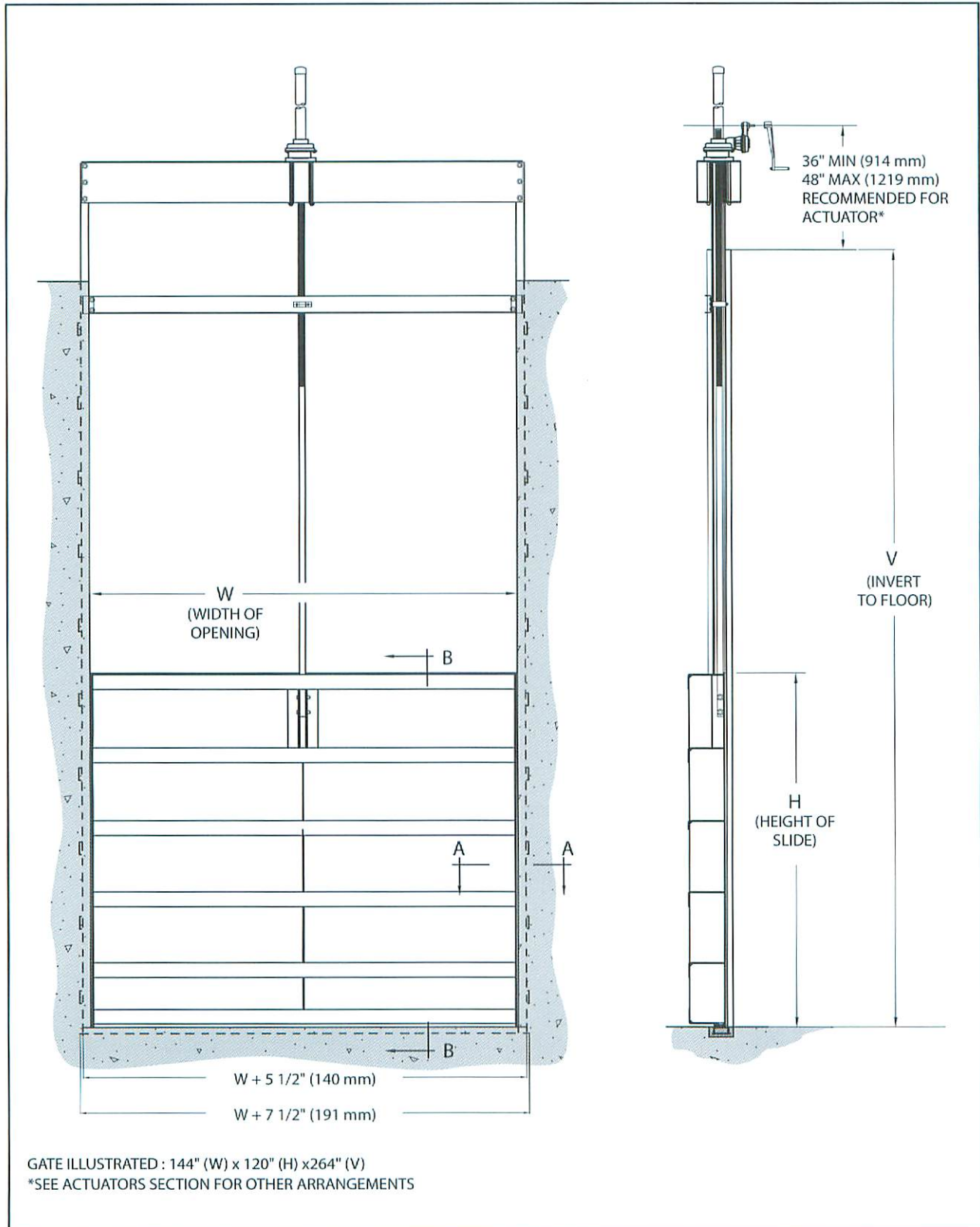


### Model 925 Features

- UHMW SEAT/SEALS
- LEAKAGE 1/2 OF AWWA C-561
- WALL MOUNTED SIDE FRAMES
- PEDESTAL, WALL BRACKET OR FLOOR BOX MOUNTED ACTUATOR
- FULL APERTURE SEALING
- RESILIENT INVERT SEAL (FLUSH BOTTOM CLOSURE)



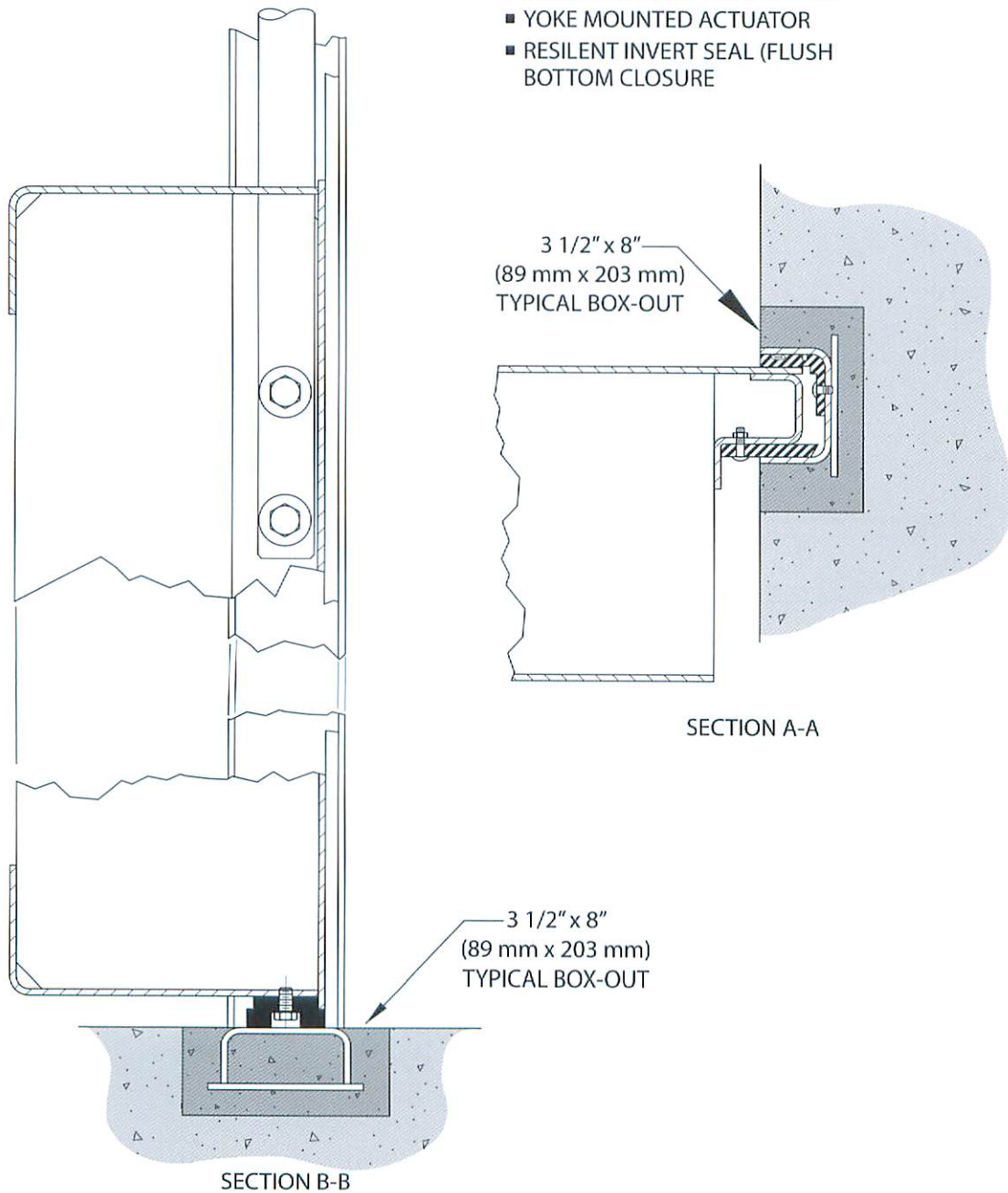
### Model 951 Slide Gate



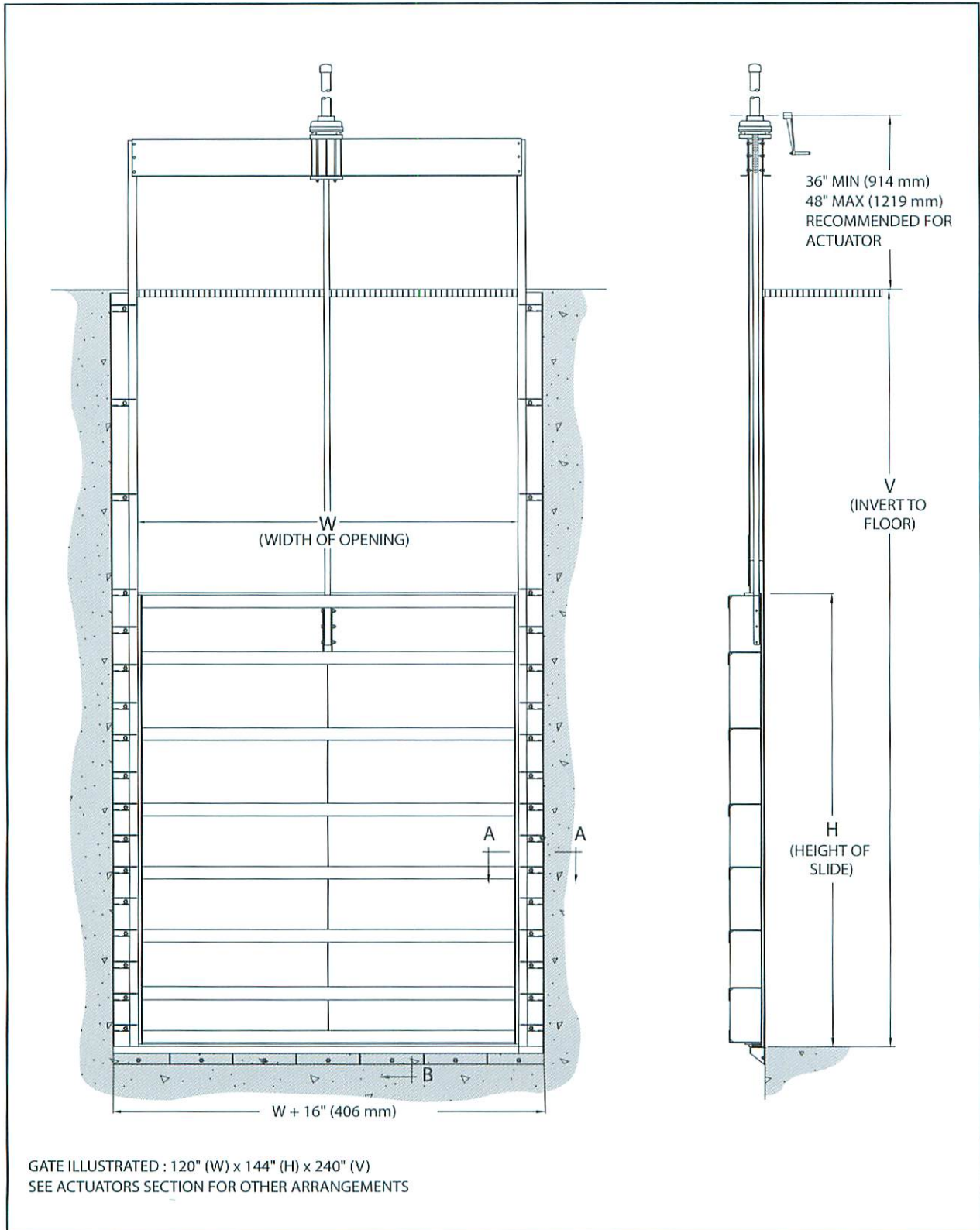


### Model 951 Features

- UHMW SEAT/SEALS
- LEAKAGE 1/2 OF AWWA C-561
- EMBEDDED FRAME
- OPEN CHANNEL - NO TOP SEAL
- YOKE MOUNTED ACTUATOR
- RESILIENT INVERT SEAL (FLUSH BOTTOM CLOSURE)

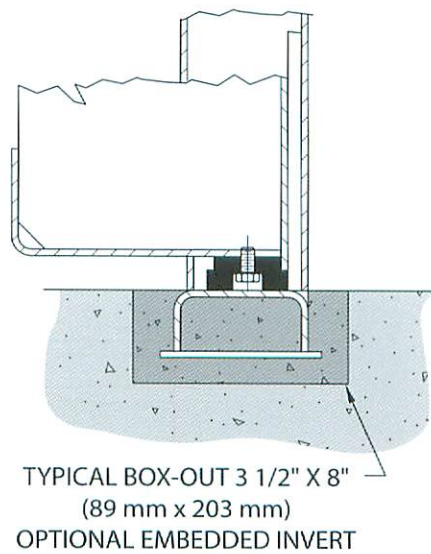
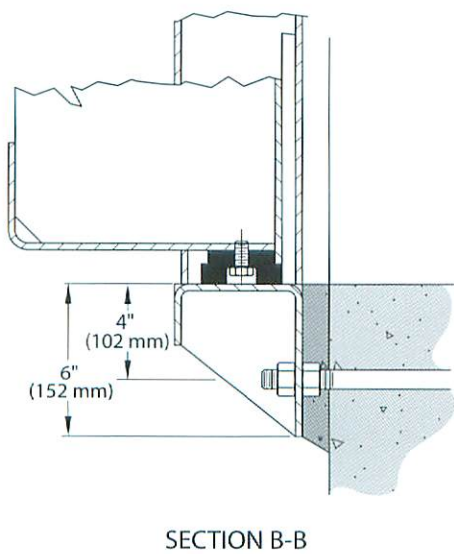
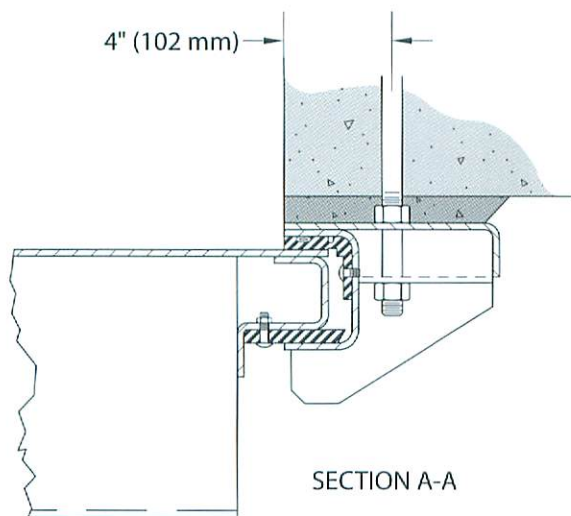


### Model 953 Slide Gate

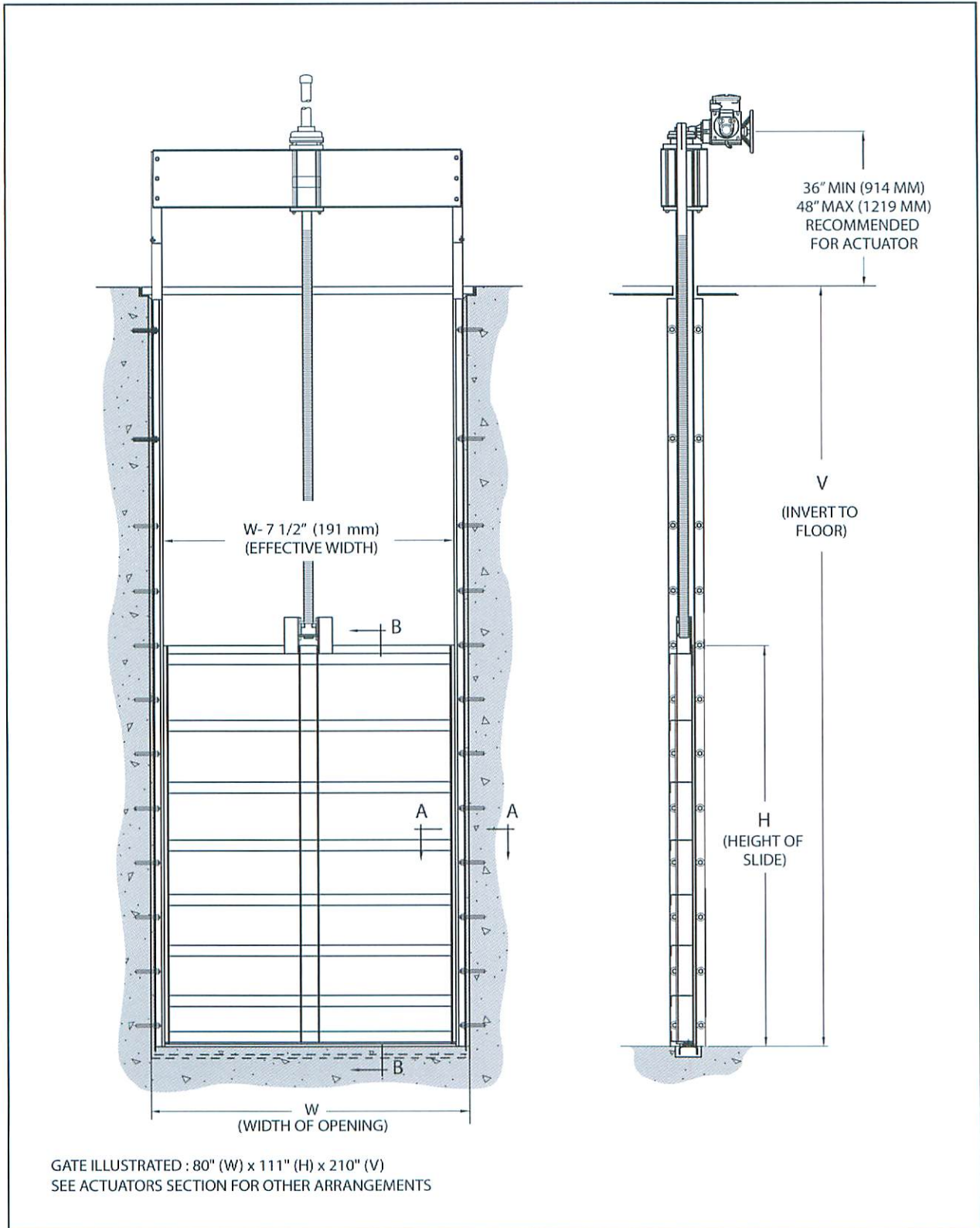


### Model 953 Features

- UHMW SEAT/SEALS
- LEAKAGE 1/2 OF AWWA C-561
- WALL MOUNTED SIDE FRAMES
- OPEN CHANNEL - NO TOP SEAL
- YOKE MOUNTED ACTUATOR
- RESILIENT INVERT SEAL (FLUSH BOTOM CLOSURE)

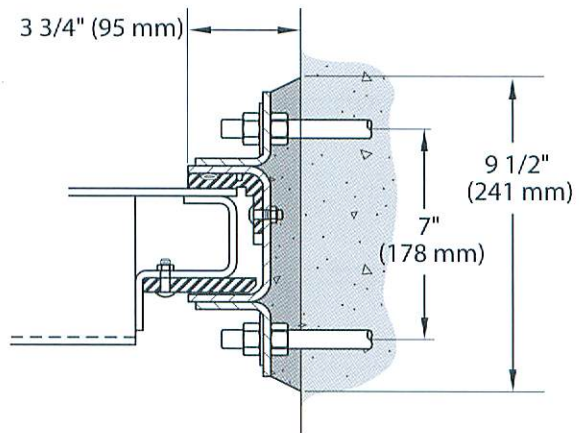
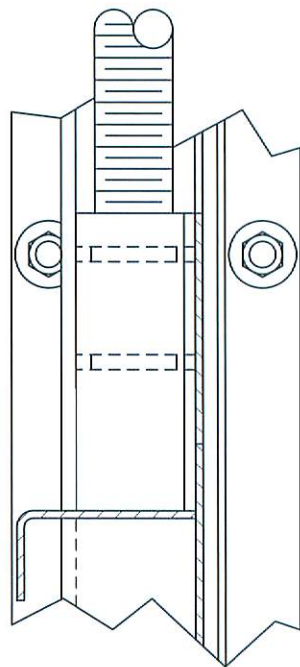


### Model 953-C Slide Gate

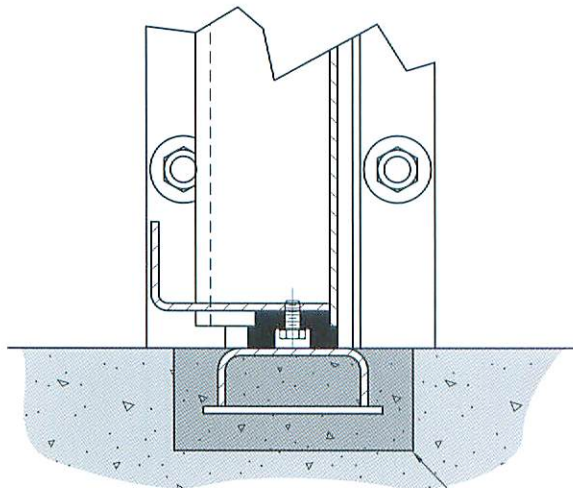


### Model 953-C Features

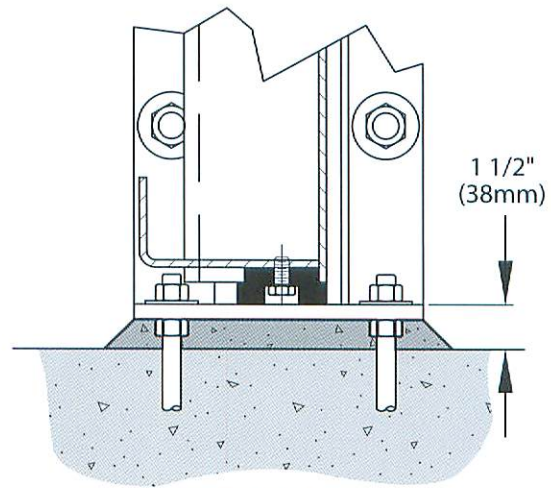
- UHMW SEAT/SEALS
- LEAKAGE 1/2 OF AWWA C-561
- FRAME MOUNTS IN EXISTING CHANNEL
- OPEN CHANNEL - NO TOP SEAL
- YOKE MOUNTED ACTUATOR
- RESILIENT INVERT SEAL (FLUSH BOTTOM CLOSURE)



SECTION A-A

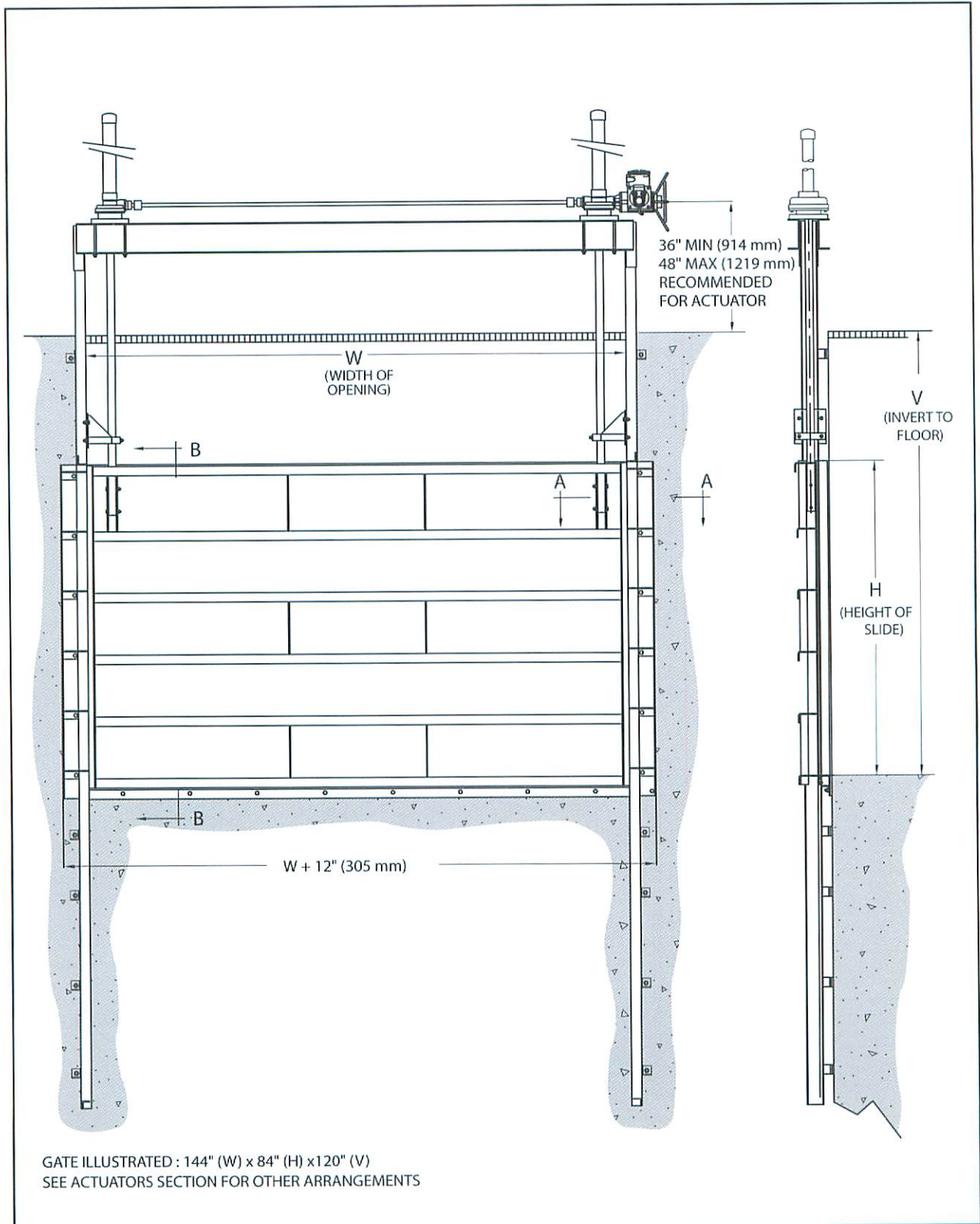


SECTION B-B  
TYPICAL CHIP-OUT 3 1/2" X 8"  
(90 mm x 200 mm)



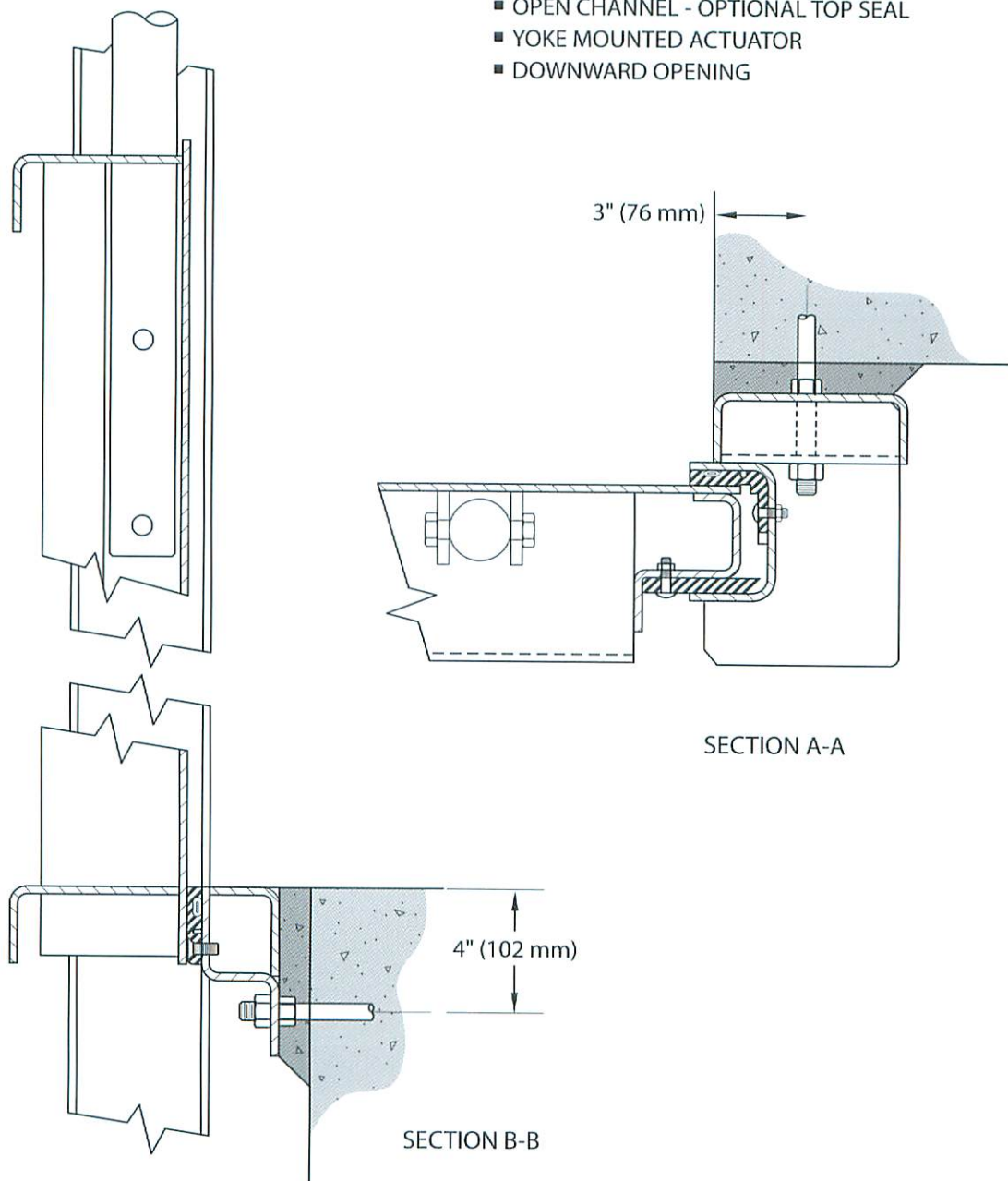
SECTION B-B  
OPTIONAL SURFACE MOUNTED  
INVERT MEMBER

### Model 953-D-I Weir Gate

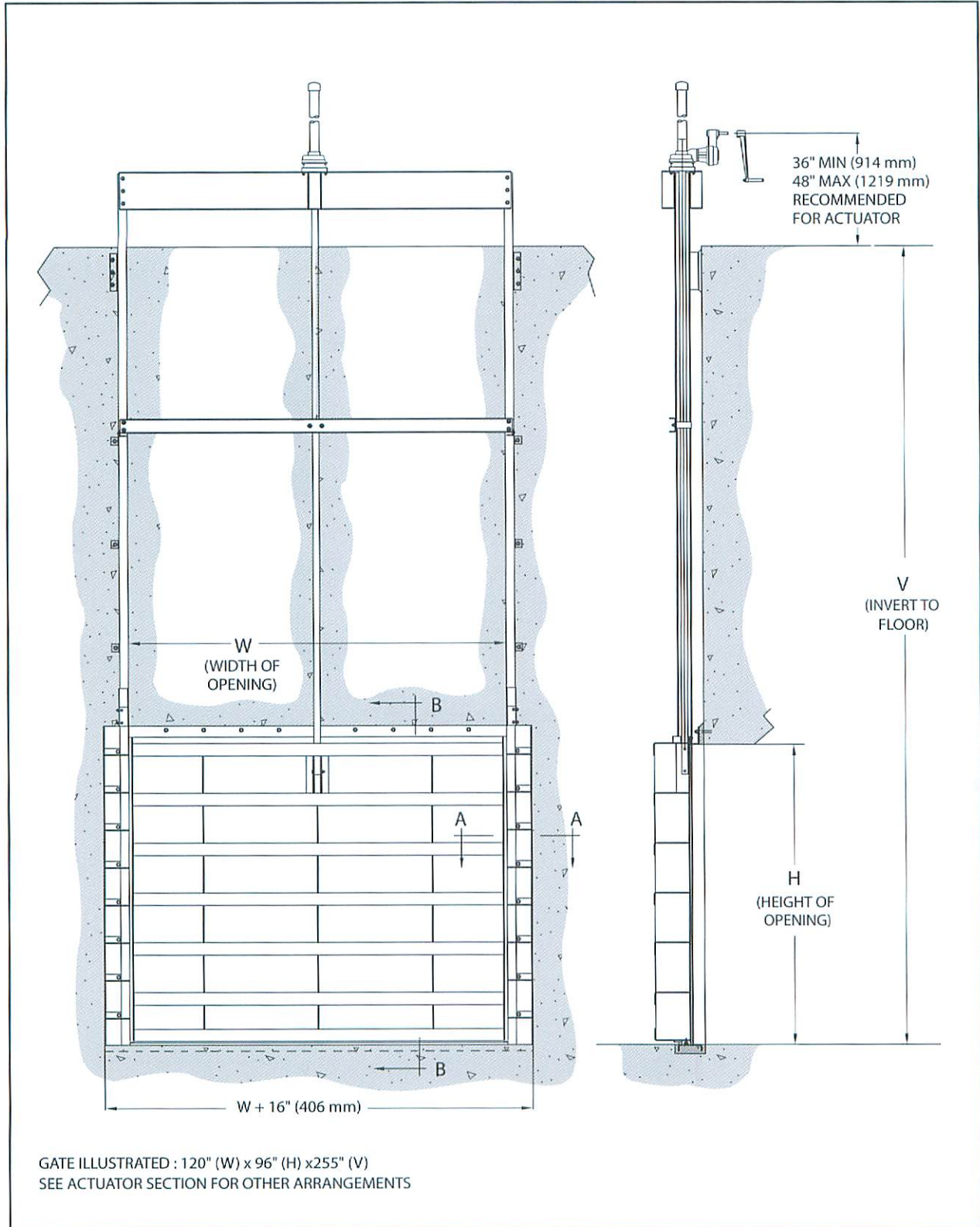


### Model 953-D-I Features

- UHMW SEAT/SEALS
- LEAKAGE 1/2 OF AWWA C-561
- WALL MOUNTED SIDE FRAMES
- OPEN CHANNEL - OPTIONAL TOP SEAL
- YOKE MOUNTED ACTUATOR
- DOWNWARD OPENING



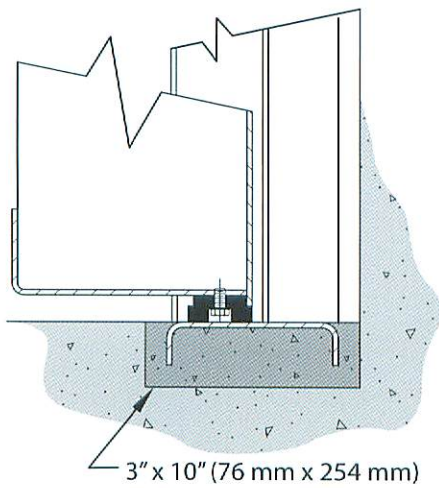
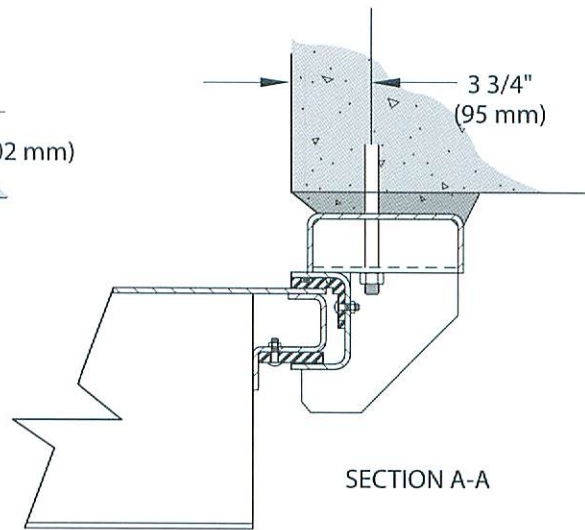
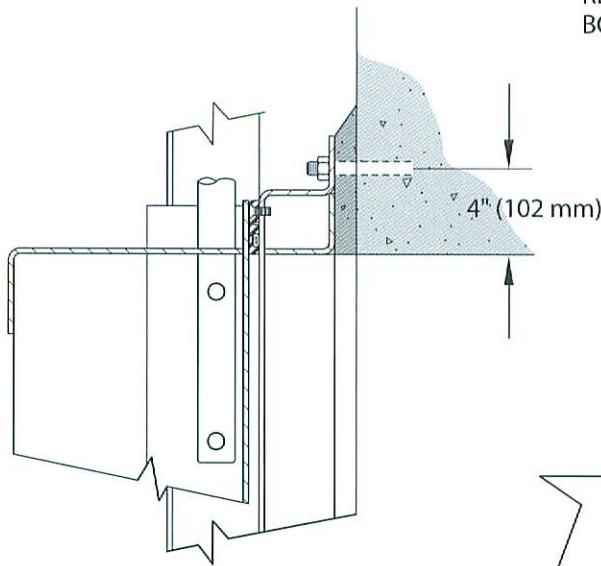
### Model 954 Sluice Gate



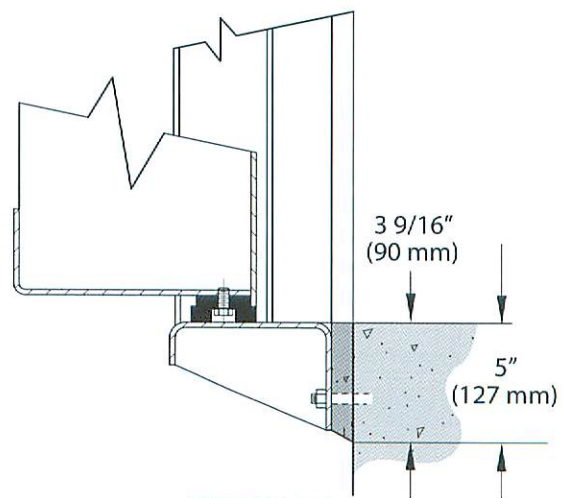


### Model 954 Features

- UHMW SEAT/SEALS
- LEAKAGE 1/2 OF AWWA C-561
- WALL MOUNTED SIDE FRAMES
- YOKE MOUNTED ACTUATOR
- FULL APERTURE SEALING
- RESILIENT INVERT SEAL (FLUSH BOTTOM CLOSURE)

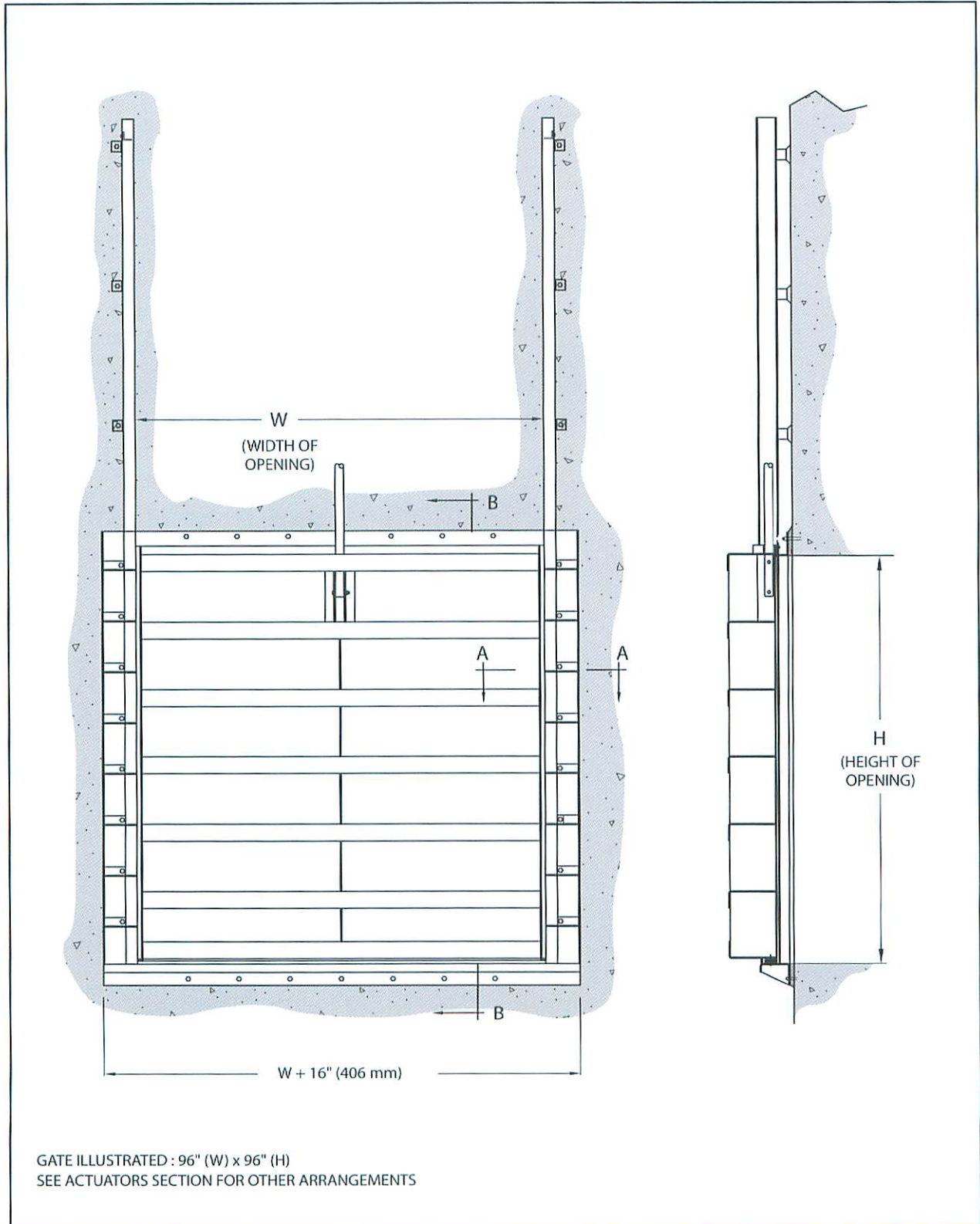


SECTION B-B  
TYPICAL BOX-OUT



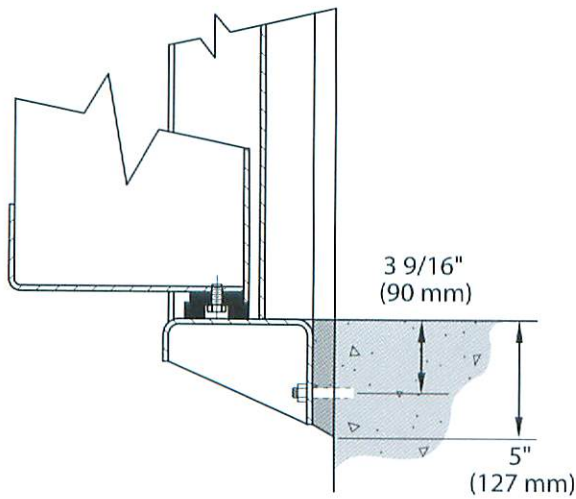
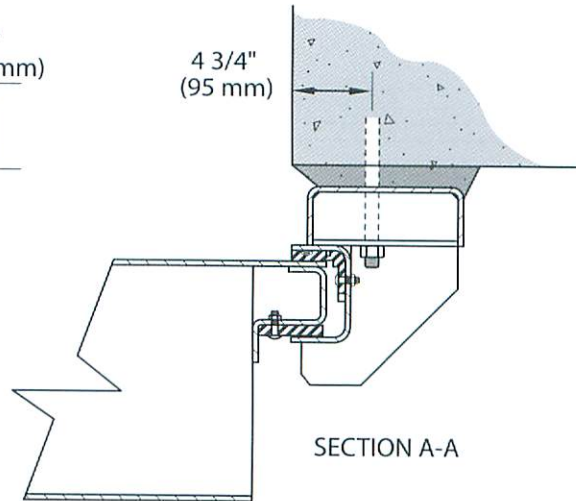
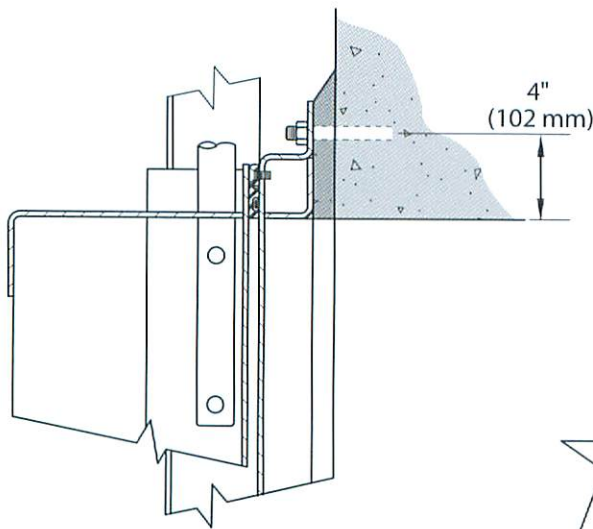
SECTION B-B  
OPTIONAL WALL MOUNTED  
INVERT MEMBER

### Model 955 Sluice Gate

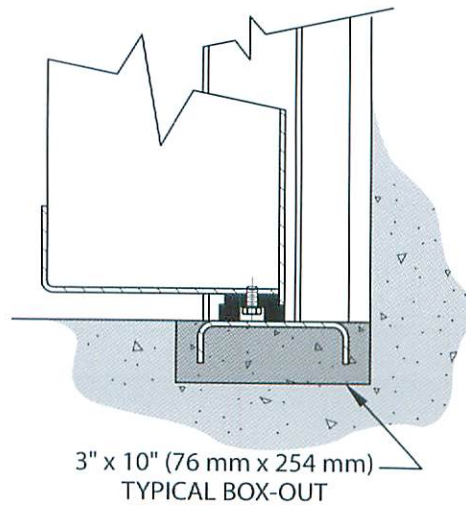


### Model 955 Features

- UHMW SEAT/SEALS
- LEAKAGE 1/2 OF AWWA C-561
- WALL MOUNTED SIDE FRAMES
- PEDESTAL, WALL BRACKET OR FLOOR BOX MOUNTED ACTUATOR
- FULL APERTURE SEALING
- RESILIENT INVERT SEAL (FLUSH BOTTOM CLOSURE)

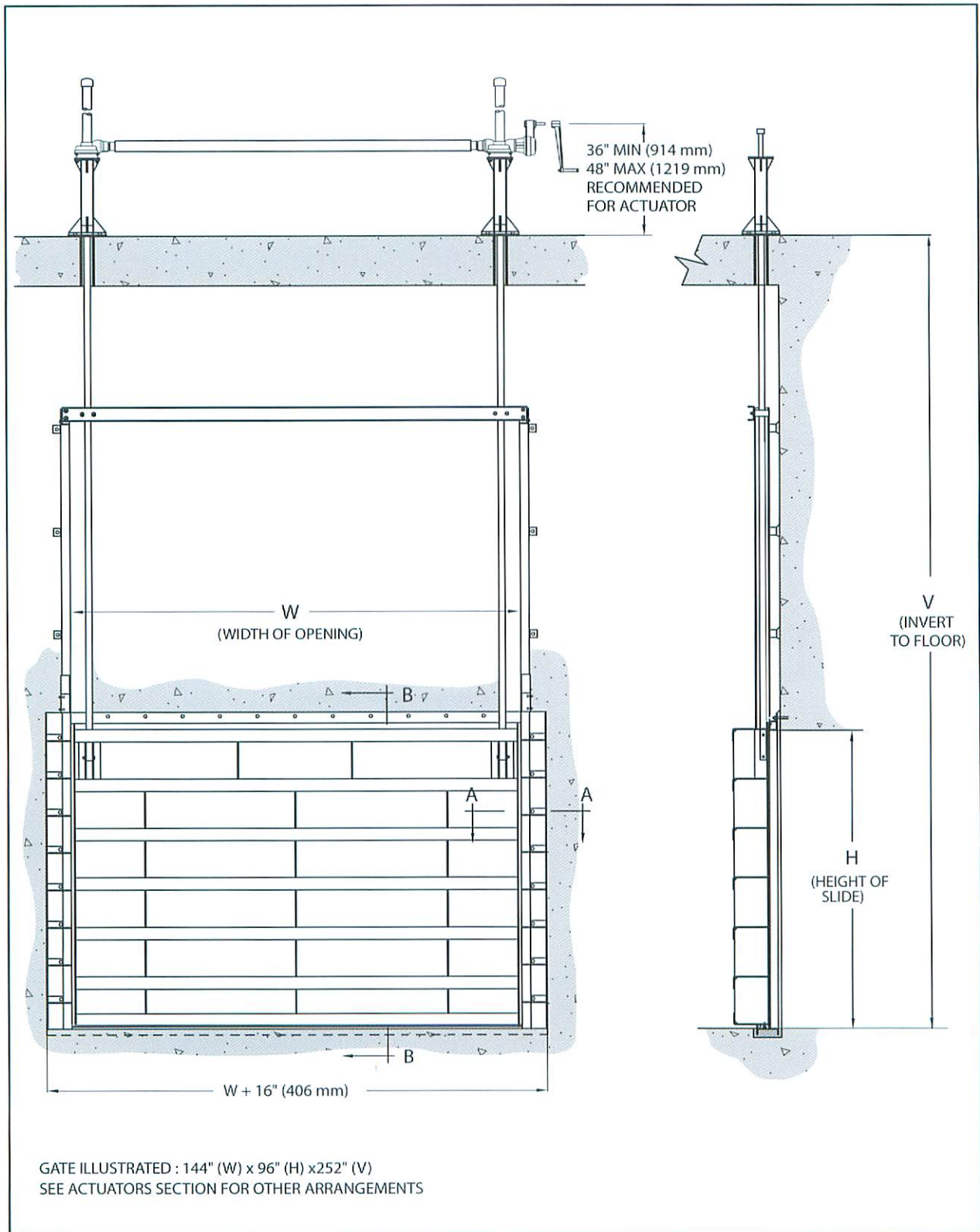


SECTION B-B



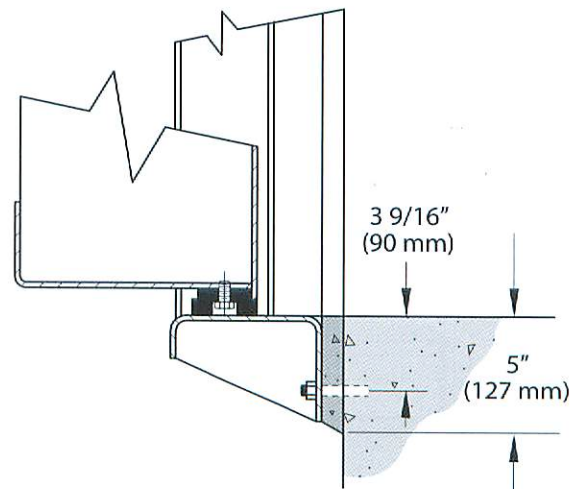
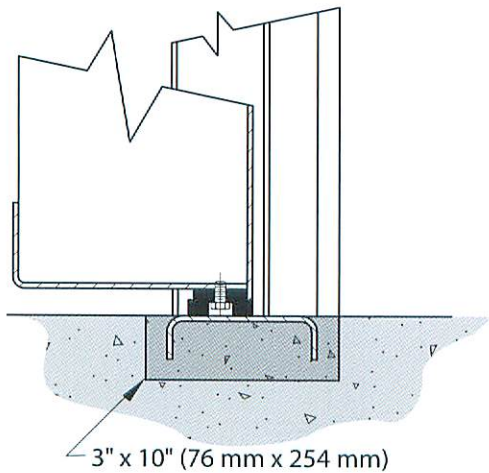
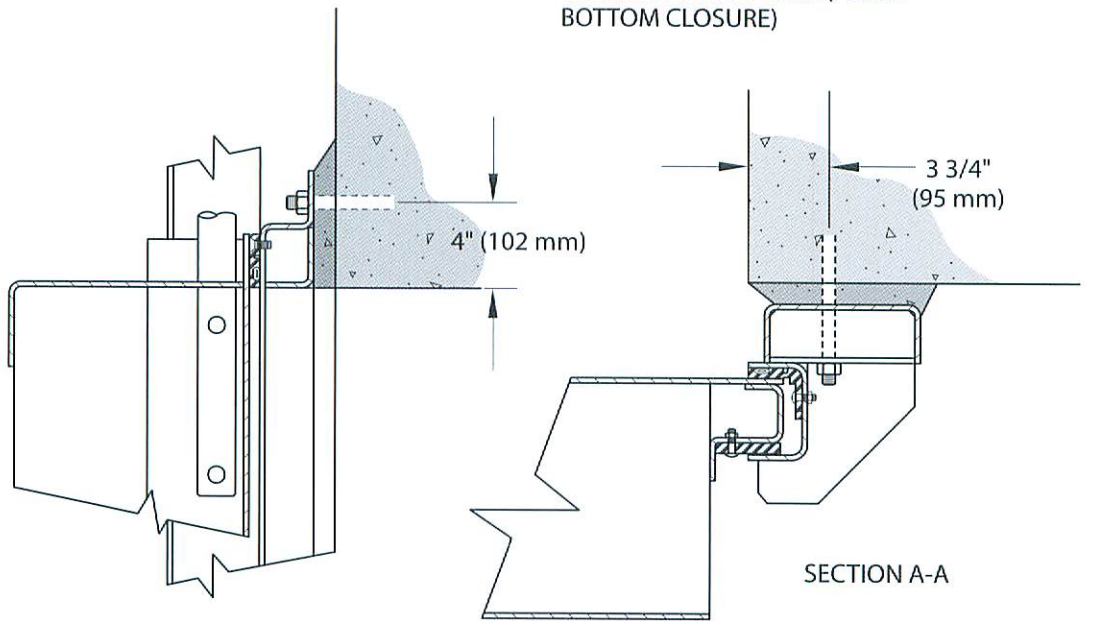
SECTION B-B  
OPTIONAL EMBEDDED INVERT MEMBER

### Model 955-I Sluice Gate

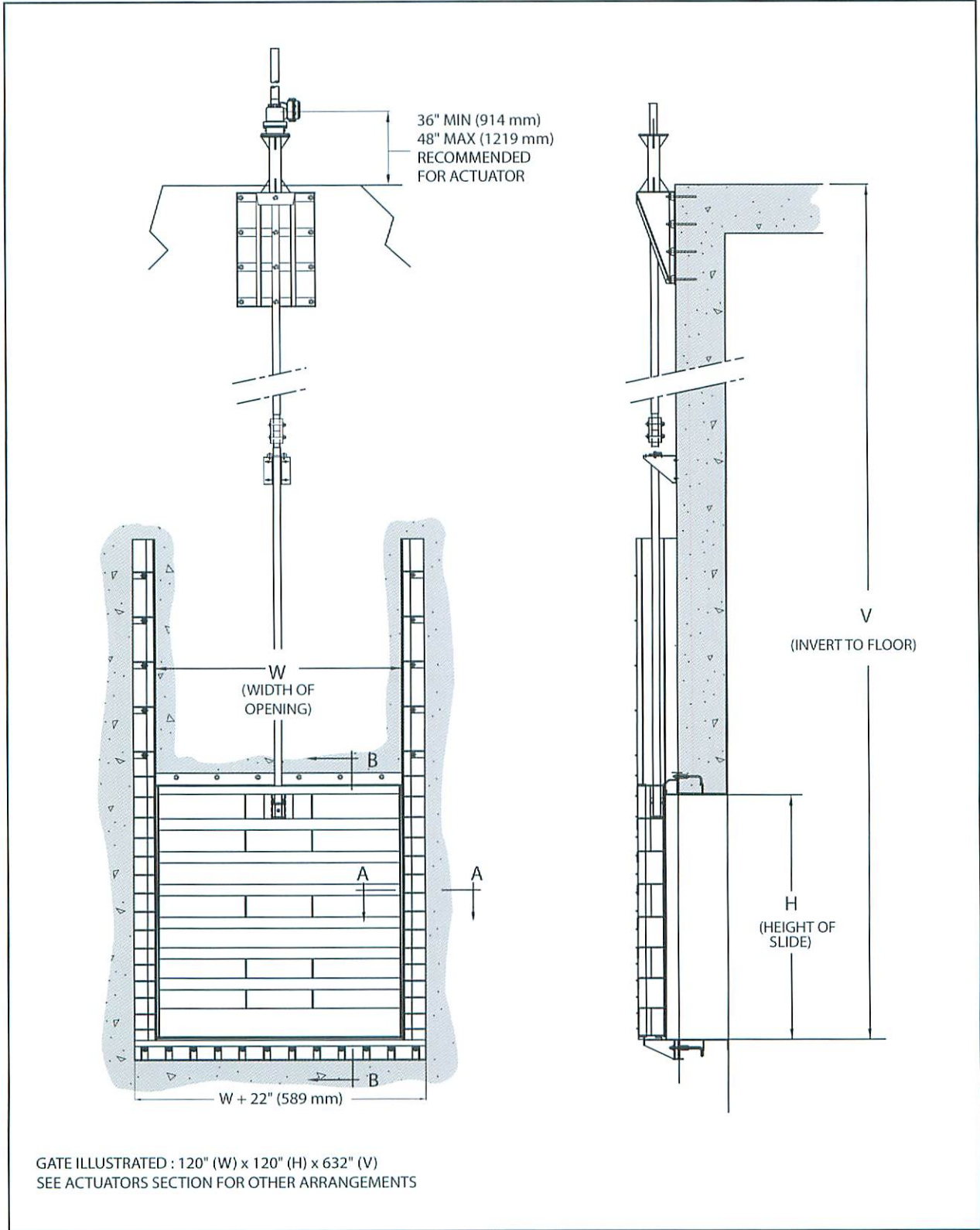


### Model 955-I Features

- UHMW SEAT/SEALS
- LEAKAGE 1/2 OF AWWA C-561
- WALL MOUNTED SIDE FRAMES
- PEDESTAL ACTUATORS
- FULL APERTURE SEALING
- RESILIENT INVERT SEAL (FLUSH BOTTOM CLOSURE)

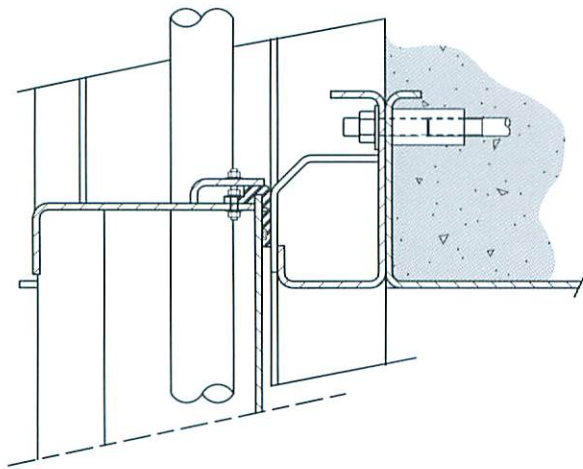


### Model 975 Sluice Gate



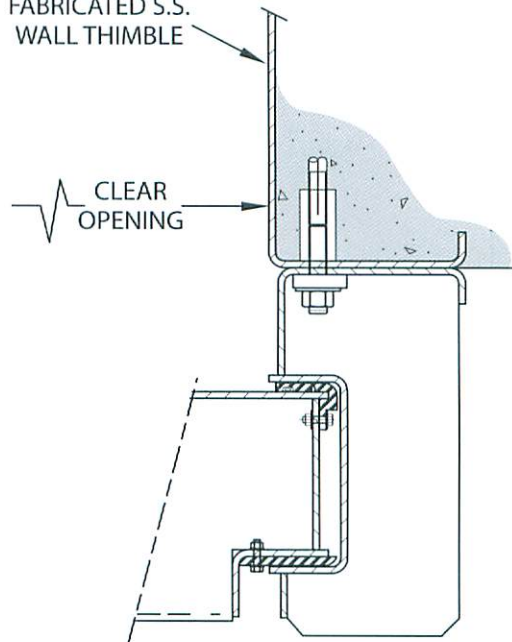
### Model 975 Features

- UHMW SEAT/SEALS
- LEAKAGE 1/2 OF AWWA C-561
- WALL THIMBLE MOUNTED (SHOWN)
- PEDESTAL, WALL BRACKET OR FLOOR BOX MOUNTED ACTUATOR
- FULL APERTURE SEALING
- RESILIENT INVERT SEAL (FLUSH BOTTOM CLOSURE)
- 3/8" THICK CONSTRUCTION

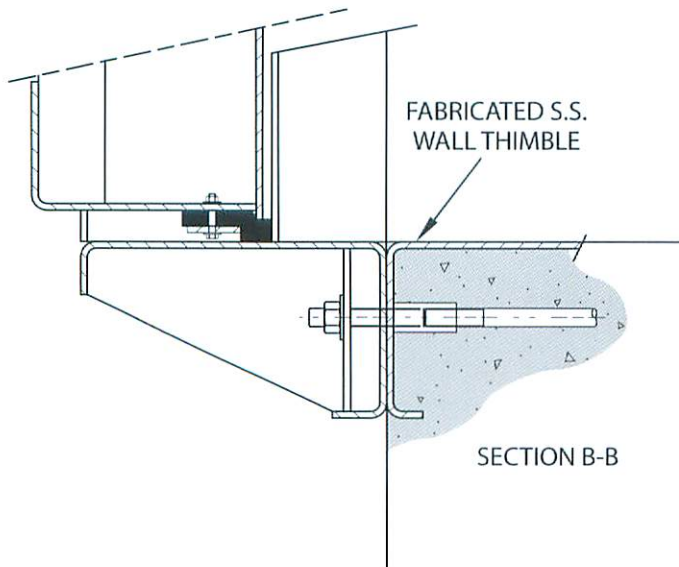


FABRICATED S.S.  
WALL THIMBLE

CLEAR  
OPENING

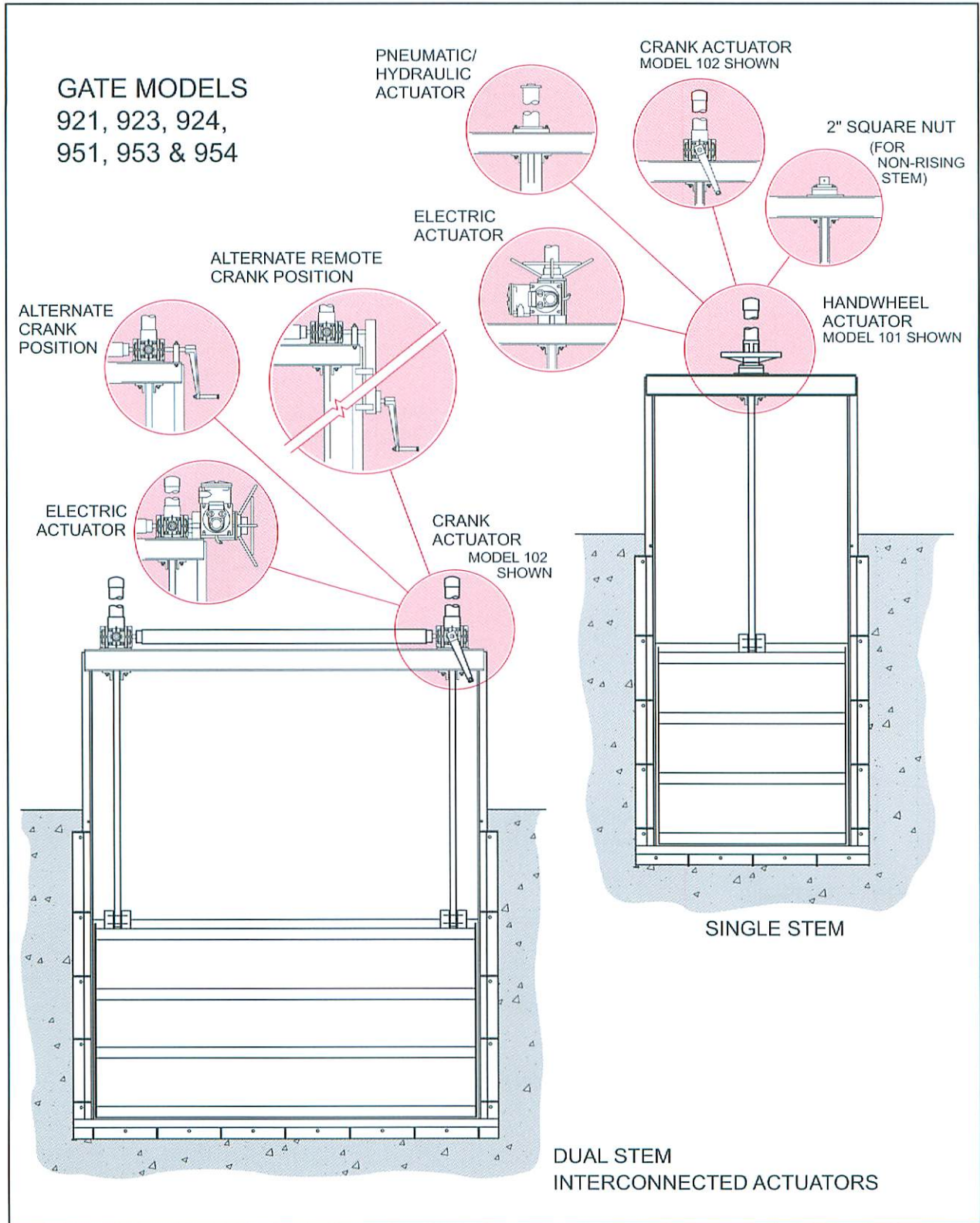


SECTION A-A



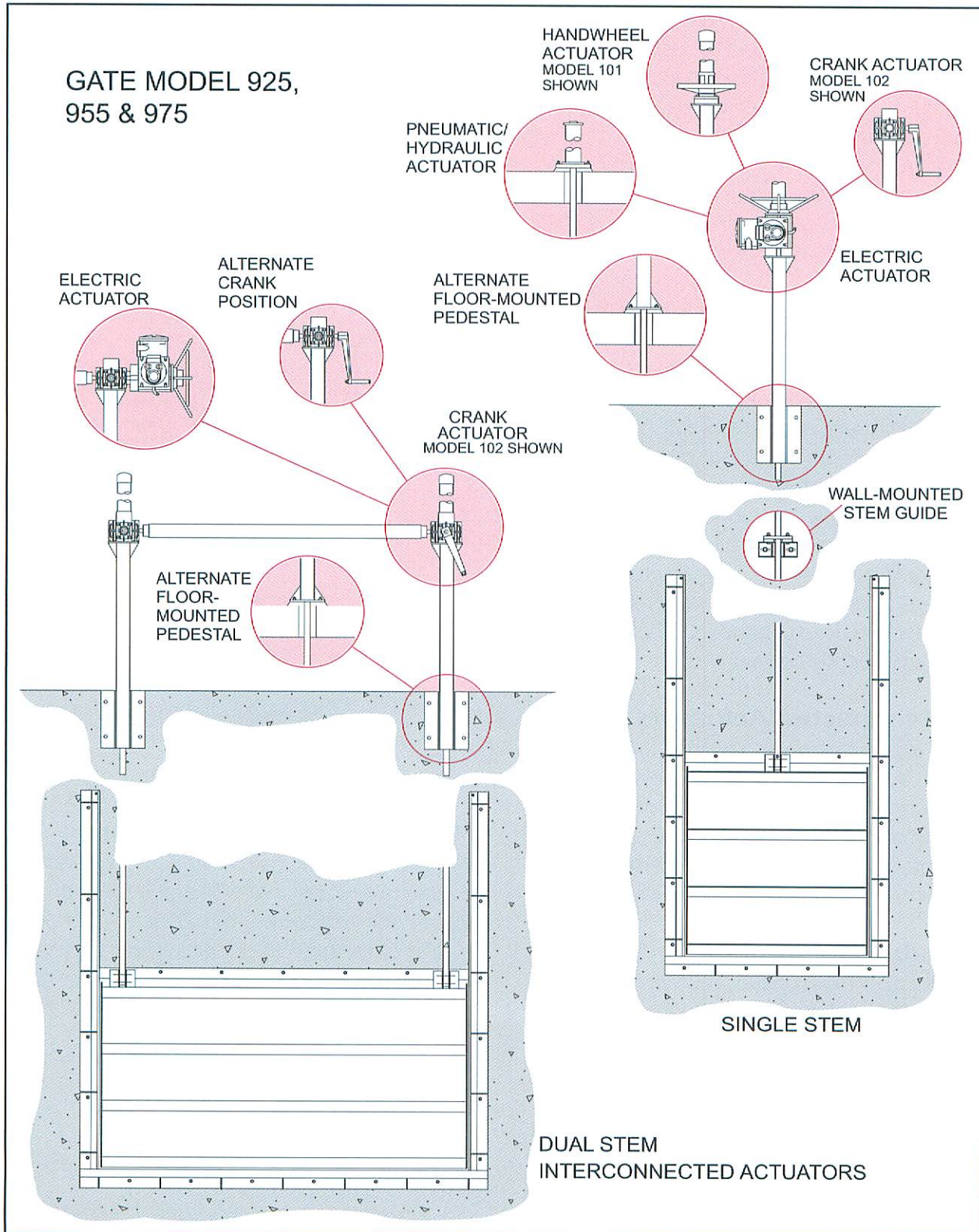
SECTION B-B

### Actuators – Self Contained Gates





### Actuators — Non-Self Contained Gates



### Actuators – General Information

**Manual Actuators:** Manual actuators (handwheel or crank type) are used where operating loads are relatively low, where operation is infrequent or where electric power is unavailable.

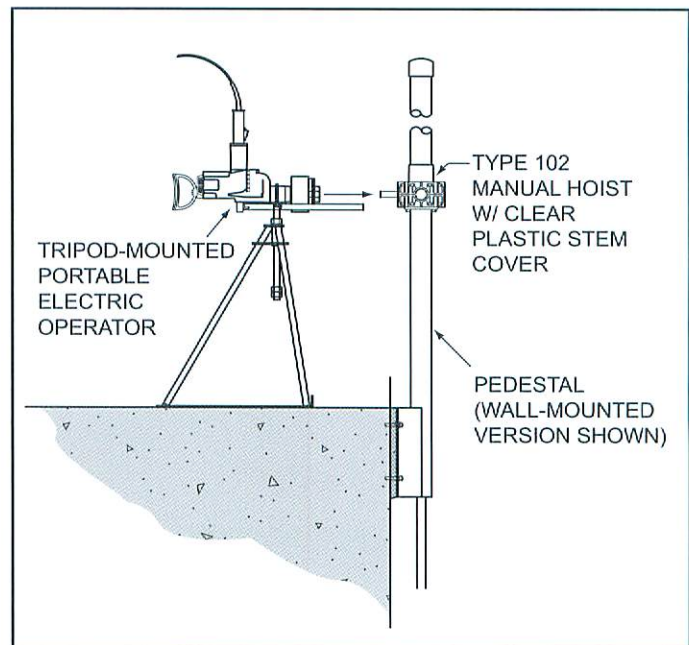
The term “handwheel type” is used to denote an actuator with a handwheel directly attached to the operating nut, concentric with the stem. This drives the nut at a one-to-one ratio.

The term “crank type” is used to denote an actuator with a horizontal input shaft which drives the operating nut through a right angle gear set. Drive ratios are available to operate virtually any gate, but it should be noted that at high ratios, e.g., greater than 8:1, the time and effort to manually operate a large gate is substantial. When crank type manual actuators are to be frequently used, or when they require many turns for full gate travel, portable operators should be considered (see comments in Portable Operators section below).

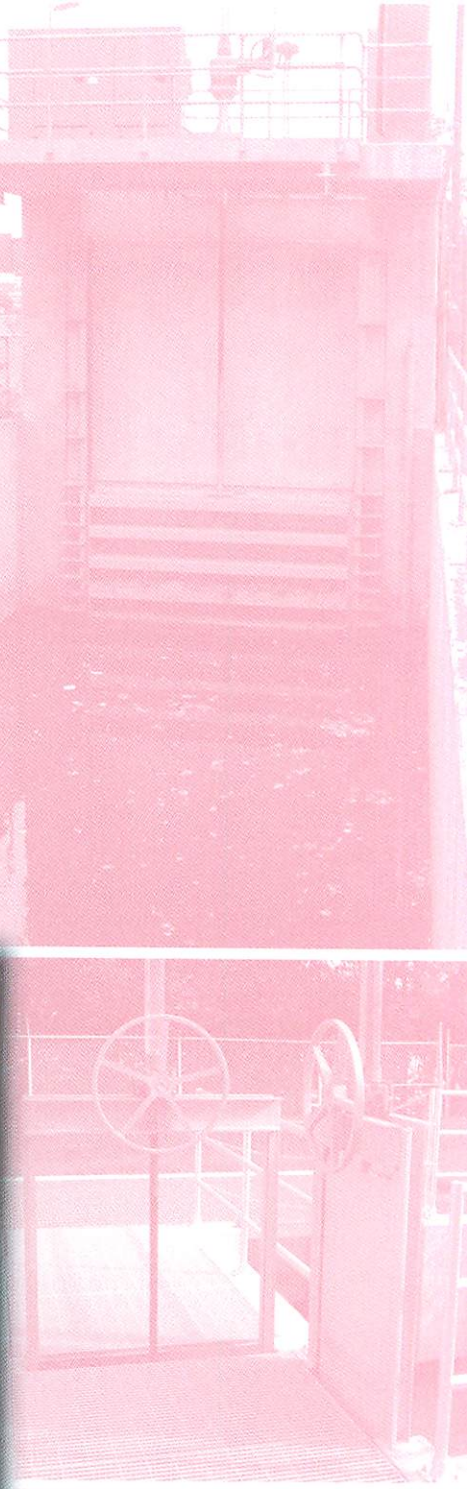
**Interconnected Actuators:** For gates with a large width relative to their height, as is common with overflow weirs, interconnected crank type actuators with a common input provide accurate positioning and smooth operation. These assemblies may be manually operated or electrically driven.

**Portable Operators:** Electric or gasoline powered portable operators of various configurations can be provided to drive crank type actuators. Consult the factory for details.

**Electric Actuators:** Electric actuators are used for higher loads, higher operating speed (12” -24” per minute), or when gates are operated with relative frequency. Electric actuators can provide remote control of gate position and can be integrated into automatic control systems.



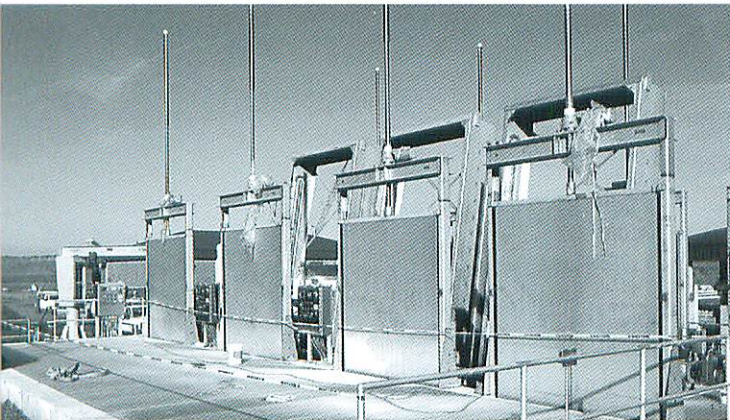
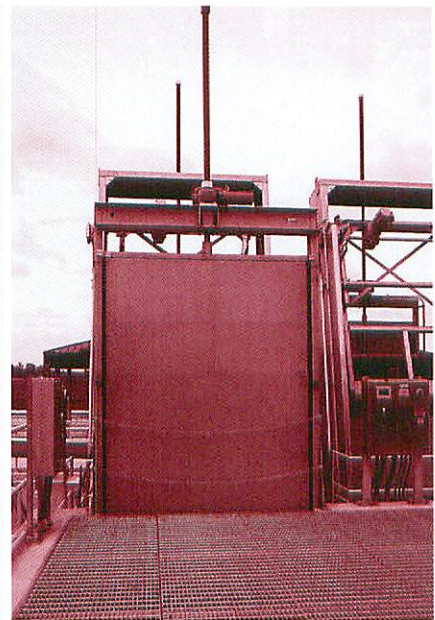
**Hydraulic Cylinder Actuators:** Hydraulic cylinders can provide smooth and fast operation and they are well suited for automatic control systems which generate frequent cycling of the gate. Hydraulic cylinder actuators can be designed to provide automatic gate positioning upon electric power failure.



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