MWEA Gate Presentation

Water Control Gates
GUIDE RAIL WEDGE
W-5004

1/2 NC x 1 LG.
SOC. HD. CAP SCREW

COVER WEDGE (REF)
W-5005 L & R

GUIDE RAIL

COVER (SLIDE)

TYPE "A" SIDE WEDGE
Quick Gate Review

• Self Contained Gate Frame – Yoke mounted Operator

1. Appropriate when distance from invert to operating floor elevation 2 - 10 ft.

2. End of Channel and in channel mounting applications.

3. Embedded / channel applications note: Vertical travel determines yoke location, stem diameter and operator size.
Quick Gate Review

• Non-Self Contained Frame – Pedestal Mounted Operator

1. Appropriate when distance from invert to operating floor elevation (10+ ft.)

2. Straight Pedestal: Concrete floor slab & Wall corbels.

3. Wall Bracket Pedestals or Offset Pedestals: Anchorage into concrete headwall (photo)

4. GHI can provide associated operating loads
Gate Mounting Options

- **Surface Mounting (Most Applications)**
  - Non-shrink grout pad
  - Adhesive Anchor Bolts

- **Thimble Mounting**
  - High Unseating head applications
  - F-type - 125# Flange - Mechanical Joint (MJ) - Bell End
  - Clear definition of the connection type on the drawings or gate schedule facilitates less confusion for GC and gate supplier.
Slide Gates

- Slide Gates

- Upward opening gate available with top seals.
- Leakage rates per AWWA standards.
- Incorporate industry standard seals alone without use of mechanical wedges.
- Most models incorporate fully-adjustable resilient seals.
Weir Gates

- Upward closing gate available with top seals.
- Leakage rates per AWWA standards.
- Non geared, single or dual mechanical gear operator depending on gate width to height ratio.
- All GHI weir models incorporate fully-adjustable resilient seals.
Specialty Products

- The level control gate utilizes force-balance control to automatically maintain a constant upstream water level at any given discharge while minimizing head loss.
- Sizes and materials of construction are available to meet a wide variety of flow control needs ranging from almost zero to 2000 cfs. The gate nearly closes at low discharge and progressively opens as the flow increases.
- The level control gate operates completely free of outside power and after initial adjustment absolutely no manual intervention is required. While the initial purchase cost is competitive with other systems the GH-9000 offers substantial lifecycle cost benefits. The costs associated with PLC relays, modulating actuators, maintenance, replacement and energy are relieved.
- Water distribution networks utilizing the GH-9000 become simplified and cost effective as ditch riders are no longer required to periodically adjust gates or manipulate flash boards at GH-9000 check structures. Thus, a more accurate and far more flexible distribution system is made available, reducing costly time and water waste. In addition, damage due to overtopping of banks is eliminated as the level control gates operate instantly year round to relieve or maintain a wide range of flows.
Level Control Gate

- OPERATING PRINCIPAL
  - The gate consists of a cylindrical leaf with a cylindrical buoyant compartment provided on its upstream side and balancing ballast containers to the rear. The fabricated elements make up a rigid frame that rotates freely around a horizontal trunnion axis.
  - The gate is located over the center of axis so that hydraulic thrust on the gate leaf passes through the axis and does not effect the equilibrium. The torques generated by hydraulic force, buoyancy, and weight of the gate are equal and opposite for any angular position of the level control gate.
  - As a rule the gate is set so that its trunnion axis coincides with the maximum upstream water level. As long as this condition is fulfilled, the gate will remain in complete equilibrium, when flows vary the gate automatically adjusts up or down passing the exact discharge required to keep the upstream water level constant.
Stop Gate

- Available in aluminum or stainless steel material.
- Stop gates are designed to block water flow in open channels.
- Guide rails for embedded, flatback or channel mounting are available.
- These gates are designed for a maximum head of one foot over the slide, unless otherwise specified and are used generally in diversion applications.
- Options available include Neoprene seals for minimum leakage, UHMW bushings for increased ease of operation and special cut outs such as "V" notch or slot openings for water flow measurement.
- All frames feature welded construction. Available in an almost unlimited range of sizes and configurations.
Stop Logs are made in the standard heights shown on the right. Please consult the factory if other heights are required. These stop logs are made of Alloy 6061-T6 Aluminum. However, this size of stop log can also be manufactured from either Type 304 S.S. or Type 316 S.S. using the sealing system illustrated.
Stainless Steel Fasteners

Extruded Neoprene Seal Between Corners

One Piece Molded Polyurethane Corner Seal

View of Typical Bottom Corner
- UHMW SEATS/SEALS
- LEAKAGE AS SPECIFIED IN AWWA C501
- FACE MOUNTED FRAME
- OPEN CHANNEL - NO TOP SEAL
- YOKE MOUNTED ACTUATOR
- 1/4" MINIMUM MATERIAL THICKNESS
- NEOPRENE INVERT SEAL (FLUSH BOTTOM CLOSURE)

** SEE NOTE ON CATALOG ILLUSTRATIONS ON PAGE 4
- UHMW SEATS/SEALS
- LEAKAGE AS SPECIFIED IN AWWA C501
- MOUNTS IN EXISTING CHANNEL
- OPEN CHANNEL - NO TOP SEAL
- YOKE MOUNTED ACTUATOR
- 1/4" MINIMUM MATERIAL THICKNESS
- NEOPRENE INVERT SEAL

** SEE NOTE ON CATALOG ILLUSTRATIONS ON PAGE 4**
GATE ILLUSTRATED: 72" (W) x 72" (H) x 168" (V)
* SEE ACTUATOR SECTION FOR OTHER ARRANGEMENTS
With galvanized steel taper setting collar for concrete pipe, or headwalls
INSTALLATION INSTRUCTIONS - GENERAL

1. "Keep it straight." The gate, stem, stem guides and lift mechanism must always be perfectly aligned.

SIDE RAILS TO BOTTOM RAIL ANGLES MUST BE 90° TO ASSURE COMPLETE SEATING OF SLIDE.

2. "Keep it clean." Assure that no concrete, grout or sealant is allowed to get into guide or seating areas or on stems.

3. "Keep it stress-free." Do not force gate or stem into stress or warpage conditions.
Flap Gates

- Aluminum, Stainless steel & Spun Aluminum.
- Available in square or round configurations.
- Flap gates are equipped with flat-back or spigot-back flange for attaching to wall thimbles, variety of pipe types (corrugated, HDPE), new and existing concrete walls.
- Since the gates open automatically, a mechanical lifting device is not required.
(1) Frame  
(2) Cover  
(3) Pivot Lug  
(4) Hinge Link  
(5) Hinge Stud  
(6) Hinge Nut  
(7) Hinge Pin  
(8) Hinge Bushing  
(9) Washer  
(10) Spring Pin  
(11) Set Screw  
(12) Jam Nut
(1) Frame (Flat or Spigotback)
(2) Hinge Pins
(3) Adjustable Hinge Bracket (Pivot Lug)
(4) Studs and Stud Nuts
(5) Cover Flap
(6) Link
(7) Washer
(8) Retaining Spring Pin
(9) Bushing
(10) Set Screw
Telescoping valves

- Telescopic, or T-Valve Gates (can also be called bin-discharge or decanting).
- Applications: wastewater treatment plants and other water treatment applications to draw off surface fluids and scum.
- They have a lower (outer) tube which is connected to a drain pipe, and an upper (inner) tube which slides up and down, varying the level at which skimming is required to take place. Seals can be fitted between the inner and outer tubes to prevent leakage.
- Available in rising and non-rising stem configurations.
- Electric actuator, Hand wheel, Bevel gear and Rack and Pinion operation.
TELESCOPING VALVE

WITH THREADED STEM AND BEARING SUPPORTED HANDWHEEL OPERATOR


TELESCOPING VALVE PARTS LIST

1 STEM
17 STEM GUIDE, W/ UHMW SG BUSHING
30 OPERATOR
31 STOP & LOCK NUTS
32 STEM COVER
40 PEDESTAL
50 BAIL
53 RETAINER FLANGES
54 SLIP TUBE
55 PEDESTAL ANCHOR BOLTS
58 AMPLIFICATION PLATE
125 SCUM RAIFFLE
212 SLIP TUBE SEAL, NEOPRENE RUBBER

VALVE SHOWN IN
MAX. UP POSITION

OFFSET PEDESTAL ShOWN
1' GROUT PAD
BY OTHERS
TOP OF WALL

MAX. EL. UP
SEE DETAIL 'B'
TRAVEL

MIN. EL. DOWN
TOP OF PIPE
SEE DETAIL 'A'

DETAIL 'A'
DI PIPE
BY OTHERS

DETAIL 'B'
V-NOTCH W/ BAFFLE

DETAIL 'B'

PLAIN END TUBE
TELESCOPING VALVE WITH RACK AND PINION OPERATOR


TELESCOPING VALVE MATERIAL LIST

1 ADJUSTING ROD
30 RACK & PINION OPERATOR
40 PEDESTAL
50 BAIL
51 BAIL BOLTS
62 FINE ADJUSTMENT NUTS
89 RETAINER FLANGE
94 SLIP TUBE
95 PEDESTAL ANCHOR BOLTS
120 RACK
184 RACK COUPLER
195 LOCKING PAWL
212 SLIP TUBE SEAL, NEOPRENE RUBBER

VALVE SHOWN IN MAX. UP POSITION

STRaight PEDESTAL SHOWN

H" GROUT PAD BY OTHERS

TOP OF WALL

MAX. EL. UP

TRAVEL

MIN. EL. DOWN

TOP OF PIPE

SEE DETAIL 'B'

SEE DETAIL 'A'

DETAL 'A'

V-NOTCH DETAIL 'B'

U-NOTCH DETAIL 'B'
HYDRAULIC FLUIDS

Modern industry utilizes a wide variety of fluids for hydraulic systems. Hydraulic fluid is required to provide power transmission, lubrication and surface protection, and heat transfer. The choice of a hydraulic fluid will depend on a number of factors including application and working environment. In general hydraulic fluids can be classified as petroleum fluids or fire resistant type fluids. Petroleum fluids are most often used due to availability and cost factors. The advantages and disadvantages of each class of fluids is described below.

Petroleum Fluids
Due to relatively low cost and excellent availability petroleum fluids are the choice for most hydraulic systems. Petroleum fluids are compatible with most seal materials and have excellent corrosion protection and lubricating qualities. The disadvantages of petroleum fluids are that they can be toxic and should not be used where leakage into potable water may occur. Fire resistance is low and these fluids should be avoided wherever the fluid may be exposed to an open flame. Shell Tellus 23, or equal is recommended for most systems where petroleum fluids are used. For cold environments MIL-5606-A is a good choice.

Fire Resistant Fluids
Where the possibility of fluid ignition is a concern the use of a fire resistant fluid may be the best choice. It should be noted that these fluids will burn but require a higher ignition temperature than petroleum fluids. There are two general types of fire resistant fluids.

Synthetic
These fluids are man made and are relatively expensive. They tend to have a wide operating temperature range, excellent lubricating qualities and very good corrosion protection. Disadvantages of these fluids is limited seal compatibility, high cost, and many are quite toxic. Where the application requires a fire resistant fluid, Waterman Industries recommends the use of Quinolubric #922-32, or equal.

Water Based
There are a number of water based fluids available that provide a high degree of fire resistance. These fluids tend to have low cost and good seal compatibility. The disadvantages to water based fluids include poor corrosion protection, limited pressure and temperature range, and minimum lubricating qualities. These fluids are not recommended.

Water and Air
Water and air are often used for gale actuation due to availability and the non-toxic nature of both fluids. However there are several disadvantages that severely limit the number of applications where air or water is the optimum choice. The largest disadvantage for both fluids is the typically low pressures available. Typically the available air or water pressure is 120 psi or less as compared to 2000 psi for hydraulic oil systems. This results in large cylinders, piping, and other components. Corrosion of components due to water as the medium or moisture in the air is also a consideration that limits the practical application of either fluid. Lastly, due to the compressible nature of air, operation and control of cylinder position may be difficult and expensive.
COMMON HYDRAULIC SYMBOLS

- CHECK VALVE
- CROSS PILOTTED CHECK VALVE
- ISOLATION VALVE
- HAND PUMP
- HYDRAULIC PUMP
- HYDRAULIC FILTER
- PRESSURE SWITCH
- PRESSURE REDUCING VALVE
- PRESSURE RELIEF VALVE
- FLOW CONTROL VALVE
- DIRECTION CONTROL VALVE
- ACCUMULATOR
- RESERVOIR
- MAGNET

PARTS LIST REFERENCE
- REFERENCED NOTE NUMBER
- INTERCONNECTING PIPE
- EQUIPMENT BOUNDARIES
- HYDRAULIC PILOT LINES
How Water Works

Water Utility Valves Perform Diverse Functions

Numerous types of valves are required in every water system. However, it is important to use the correct types of valves for each use. The primary uses are to start and stop flow, to regulate pressure and flow rate, and to regulate flow direction and relief pressure.

1. Gate valves are the most common type of valve found in water distribution systems. The gate or disk, which is located in the flow path, is fully open or closed. Gate valves provide almost unrestricted flow because the gates are parallel to the flow.

2. Globe valves are commonly used for water faucets and other household plumbing. The valves have a circular disc that moves downwind into the valve port to shut off flow.

3. Needle valves are similar to globe valves, except that a tapered metal shaft fits into a metal seat above the valve to shut off flow. Needle valves are used most often to precisely control flow.

4. Check valves allow flow in only one direction. They are commonly used at the discharge of a pump to prevent backflow when the power is turned off.

5. Plug valves have cylindrical or conically tapered "plug" that can be rotated inside the valve body to control flow.

6. Ball valves consist of a ball rotating in a cylindrical seat. A hole is bored through the ball to allow water to flow when the valve is open. The valve is closed when the ball is rotated 90°.

7. Control valves respond to signals generated by independent devices, such as flowmeters or temperature gauges, and are normally used with actuators and positioners. Pneumatically actuated globe valves are widely used for control purposes, although other types, such as modulating ball and butterfly valves, are also used for control.

Some illustrations courtesy of的城市水系统。然而，重要的是使用正确的类型阀门用于每种用途。主要用途是用于启动和停止流量、调节压力和流量，以及调节流向和释放压力。

1. 闸阀是水分配系统中最常见的阀门类型。门或盘位于流动路径上，完全打开或关闭。闸阀提供几乎不受限制的流动，因为门平行于流动。

2. 球阀通常用于水龙头和其他家庭管道系统。阀门具有圆形的碟片，移动到阀门孔口以切断流量。

3. 针阀类似于球阀，除了一根锥形金属轴嵌入金属座上，高于阀体用于切断流量。针阀通常用于准确控制流量。

4. 检查阀允许单向流量。它们通常用于泵出口防止回流时的泵。

5. 插头阀具有柱形或锥形的“管”可以旋转在阀体内部以控制流量。

6. 球阀由球体旋转在圆柱形座上组成。一个孔被钻穿穿过球体，当阀门打开时允许水通过。阀门关闭时球体旋转90°。

7. 控制阀响应由独立设备生成的信号，例如流量计或温度计，通常与执行器和位置器一起使用。气动球阀广泛用于控制目的，尽管其他类型，如调节球和蝶形阀，也用于控制。