RARITAN VALVE & AUTOMATION

WATER CONTROL GATES & AUTOMATION

A Practical Resource Guide for Selection, Application, Mounting, Operation, Maintenance & Troubleshooting



Large fabricated stainless-steel gates in a municipal water/wastewater structure.

For municipal engineers, operators, plant managers and maintenance personnel

Raritan Valve & Automation | raritanvalve.com

How to Use This Guide

This guide is intended as a practical field and design reference for water-control gates and gate automation. It follows one core principle: a gate is a system. Reliable performance depends on matching hydraulic duty, gate construction, seals, stem, guides, mounting interface, operator, controls, installation and maintenance.

Use this guide to answer three questions

1) What job must the gate perform? 2) What hydraulic and structural condition must it withstand? 3) How will operators safely operate, inspect and maintain it over its service life?

This document is educational and does not replace project specifications, a manufacturer's certified design, installation/O&M instructions, or engineering judgment. Verify the applicable standard edition, design head, leakage criteria, materials, controls, environmental classification and project-specific requirements before procurement or fabrication.

- 1. Core selection principles
- 2. Gate types and applications
- 3. Hydraulic design fundamentals
- 4. The gate as a system
- 5. Mounting configurations
- 6. Seals and leakage
- 7. Stems and stem guides
- 8. Operators and automation
- 9. Electric actuation, controls and SCADA
- 10. Installation, commissioning and maintenance
- 11. Failure analysis and troubleshooting
- 12. Replacement and retrofit
- 13. Engineering and operator checklists
- 14. Field data worksheet
- 15. Glossary and references

1. Core Selection Principles

Start With the Function - Not the Product Name

Function	What the gate must do	Typical design questions
ISOLATE	Take equipment, channels or basins out of service safely.	How much leakage is acceptable? Must isolation work under seating, unseating or reverse head?
ROUTE	Direct flow to another process train, channel or bypass.	Must the gate operate under flowing conditions? What happens if it stops mid-stroke?
REGULATE	Throttle flow or hold an intermediate position.	Is the gate mechanically suitable for positioning? What duty and control resolution are required?
CONTROL LEVEL	Set an upstream water elevation or overflow crest.	Is a downward-opening weir gate more appropriate than a conventional slide gate?

Field principle

The same 48 x 48 gate can be a very different machine depending on head, solids, operating frequency, operator location and what happens when it fails.

1. What is the clear opening?
2. What fluid and solids are present?
3. What are the maximum water levels on each side?
4. What are the seating and unseating heads?
5. Can the head reverse?
6. Is the duty isolation or modulating/positioning?
7. How frequently will the gate operate?
8. What leakage performance is required?
9. Where will the operator/actuator be located and accessed?
10. How will the gate be inspected and maintained 20 years from now?

2. Gate Types and Applications

Terminology varies across manufacturers, specifications and legacy facilities. Define the intended function and construction rather than relying on the name alone.

Gate type	Primary purpose	Strengths	Watch items
Fabricated slide / sluice gate	Isolation and flow control	Flexible sizes/materials; resilient seals; broad actuation options	Head direction, seal friction, frame flatness, stem thrust
Open-channel gate	Isolation or control within a channel	Easy process integration; self-contained arrangements common	Debris, channel geometry, access, top-of-slide overflow
Downward-opening weir gate	Upstream level / overflow control	Gate position becomes overflow crest; can automate level control	Downward travel, control philosophy, dual-stem synchronization on wide gates
Stop gate	Temporary isolation / diversion	Simple removable panel; no permanent operator	Handling, lifting, storage, safe guide access
Stop logs	Sectional isolation / level adjustment	Incremental installation; manageable section weights	Lifter design, seal condition, storage and operator access

Requirement	Slide / Sluice	Open-Channel	Downward Weir	Stop Logs
Routine isolation	Strong	Strong	Limited	Good
Frequent operation	Strong	Strong	Strong	Limited
Water-level control	Good	Good	Strong	Limited
Automated operation	Strong	Strong	Strong	Usually no
Maintenance isolation	Good	Good	Limited	Strong
Low mechanical complexity	Good	Good	Good	Strong
Requires lifting/storage planning	No	No	No	Yes

- Influent/headworks, screens and grit systems
- Pump stations, wet wells and bypass structures
- Clarifiers, basins, aeration and equalization
- Filter/backwash and residuals systems
- Sludge handling and solids processes
- Outfalls, reservoirs, flood-control and intake structures

Related Equipment: Knife Gates

Knife gates are pipeline valves, not open-channel slide gates. They are commonly used where solids, slurry or large line sizes make a conventional valve less attractive. Selection should address body style, seating, pressure class, solids service, actuator thrust, flushing/cleanout needs and maintainability. For municipal water and wastewater applications, AWWA C520 is the principal AWWA knife-gate valve standard; verify the current edition and project-specific requirements.

Why this distinction matters

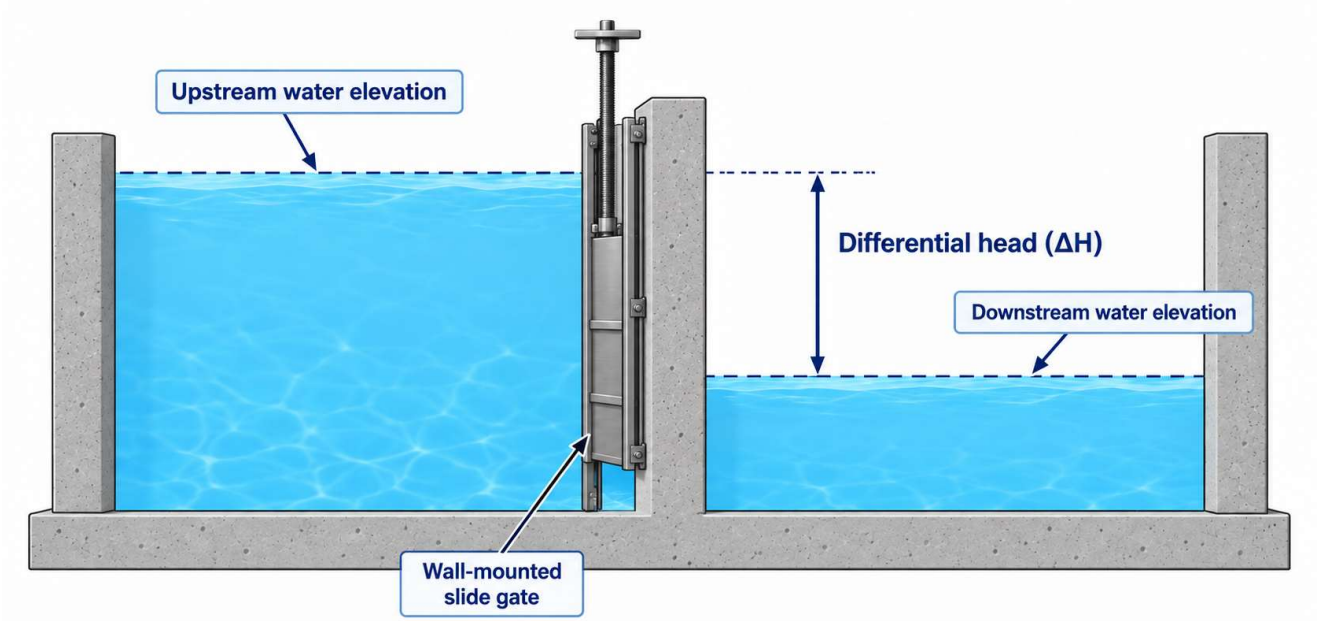
A slide/sluice gate usually isolates an opening in a civil structure; a knife gate typically isolates flow in a pressure or process piping system. Similar stem-and-actuator issues can occur, but the pressure boundary, seating system and installation interface are different.



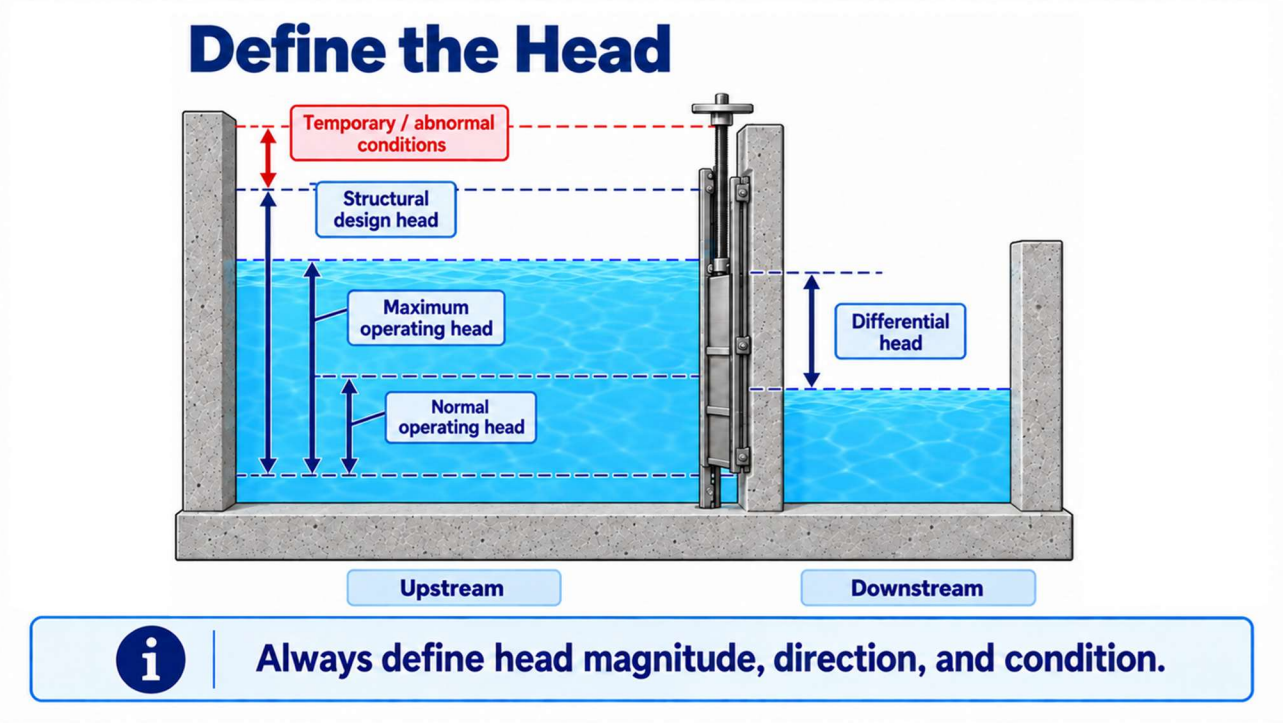
Example of large knife-gate valves installed in process piping. Source: NJ Water Association presentation supplied by Raritan Valve & Automation.

3. Hydraulic Design Fundamentals

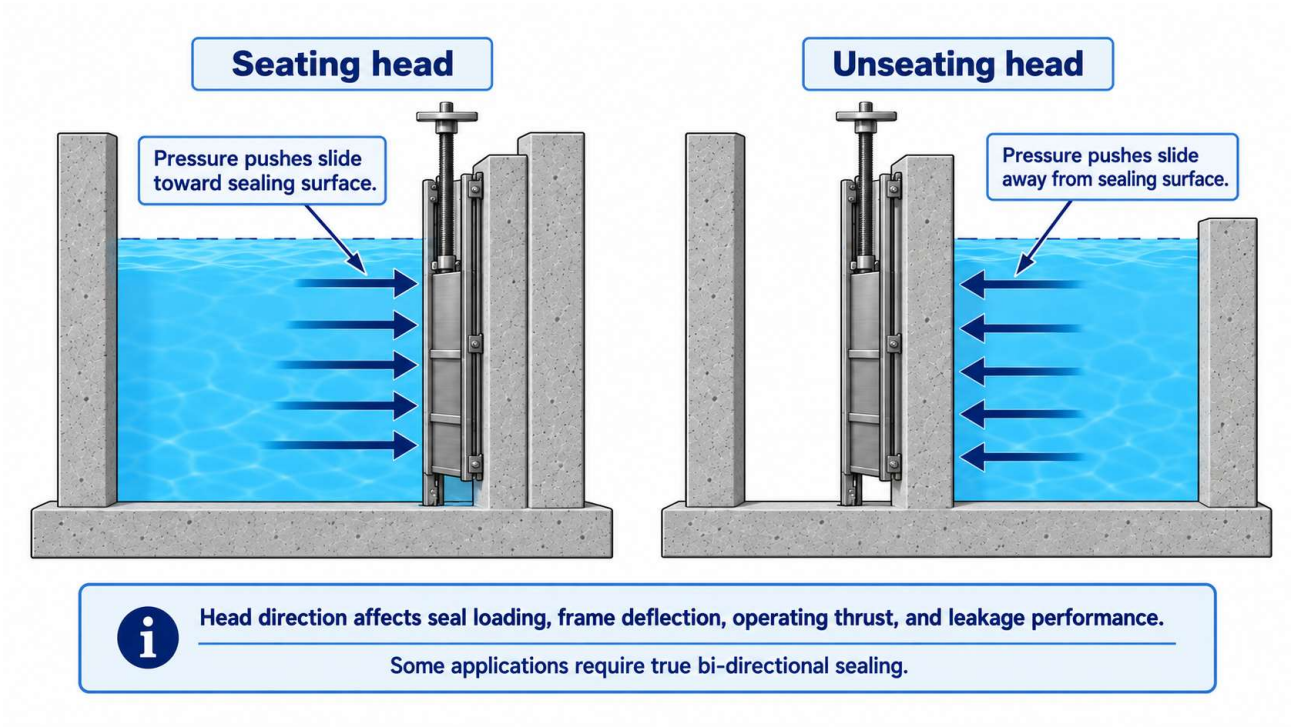
Hydraulic conditions determine the load the gate really sees. A specification such as “20 ft of head” is incomplete unless the magnitude, direction, water elevations and operating condition are defined.



Start with upstream and downstream water elevations and the resulting differential head.



Define normal, maximum, differential and structural design conditions - including temporary or abnormal conditions.



Seating head pushes the slide toward the sealing surface; unseating head pushes it away.

Why direction matters

Head direction affects seal loading, frame deflection, operating thrust and leakage performance. Some applications require true bi-directional sealing.

- Clear opening - width x height
- Normal and maximum water elevations on both sides
- Maximum differential head
- Direction of head and whether it can reverse
- Whether the gate moves under balanced or differential head
- Whether it must move while flow is passing through the opening
- Temporary, emergency or abnormal water levels

4. The Gate Is a System

Field performance is the result of interaction among the gate components and the civil structure. A problem observed at the actuator or seal may originate elsewhere in the system.

System element	Primary function	What to verify
Slide / gate leaf	Blocks or regulates the opening	Stiffness, material, reinforcing, travel, corrosion condition
Frame / guides	Supports and guides the slide	Geometry, guide clearance, attachment, distortion
Seals / sliding surfaces	Control leakage and friction	Material, compression, cleanliness, wear, replaceability
Stem	Transfers operator thrust to the slide	Diameter, material, straightness, tension/compression load
Stem guides	Reduce unsupported length and maintain alignment	Spacing, anchorage, alignment, wear
Mounting interface	Transfers hydraulic load into structure	Flatness, grout, anchors, thimble/embedded-frame condition
Operator / actuator	Provides force and motion	Output, duty, limits, torque protection, manual override
Controls / feedback	Commands and reports position/status	Local/remote logic, indication, position, alarms, SCADA signals

Diagnostic principle

When a gate starts operating differently, ask what changed in the complete mechanical system before changing actuator settings.

5. Mounting Configurations

Mounting determines how hydraulic load is transferred into the civil structure and how readily the gate can be installed, aligned, serviced, removed or replaced.

Mounting	Best fit	Advantages	Primary cautions
Wall-mounted	Flat wall / retrofit openings	Compact; accessible for service; common retrofit option	Depends on wall integrity, flatness, anchor layout and grout
Channel-mounted	Existing channels / drainage	Uses channel walls; integrates directly into process channel	Channel geometry must be well defined; manage sediment/debris
Embedded	New permanent construction	High structural integration; durable	Difficult to modify or remove after concrete placement
Flange-mounted	Pipelines / bolted interfaces	Serviceable and replaceable connection	Flange/gate alignment and load transfer are critical
Thimble-mounted	High-load or legacy interfaces	Rigid reinforced mounting surface; useful for existing thimbles	Requires civil/fabrication coordination; verify dimensions and condition

11. What are the seating and unseating heads?
12. Is this new construction or a retrofit?
13. What mounting surface already exists - wall, channel, pipe, thimble or embedded frame?
14. Will the gate need to be removed or replaced later?
15. How will flatness, alignment, anchors and grout be verified in the field?

Field lesson

Poor flatness, alignment, anchoring or grout can show up later as leakage, binding, high stem thrust or actuator torque problems.

6. Seals and Leakage

Leakage performance is a system outcome - not simply a seal-material claim. The sealing arrangement, head direction, frame geometry, installation and final travel/limit settings all matter.

Leakage Performance and Field Conditions

Allowable leakage

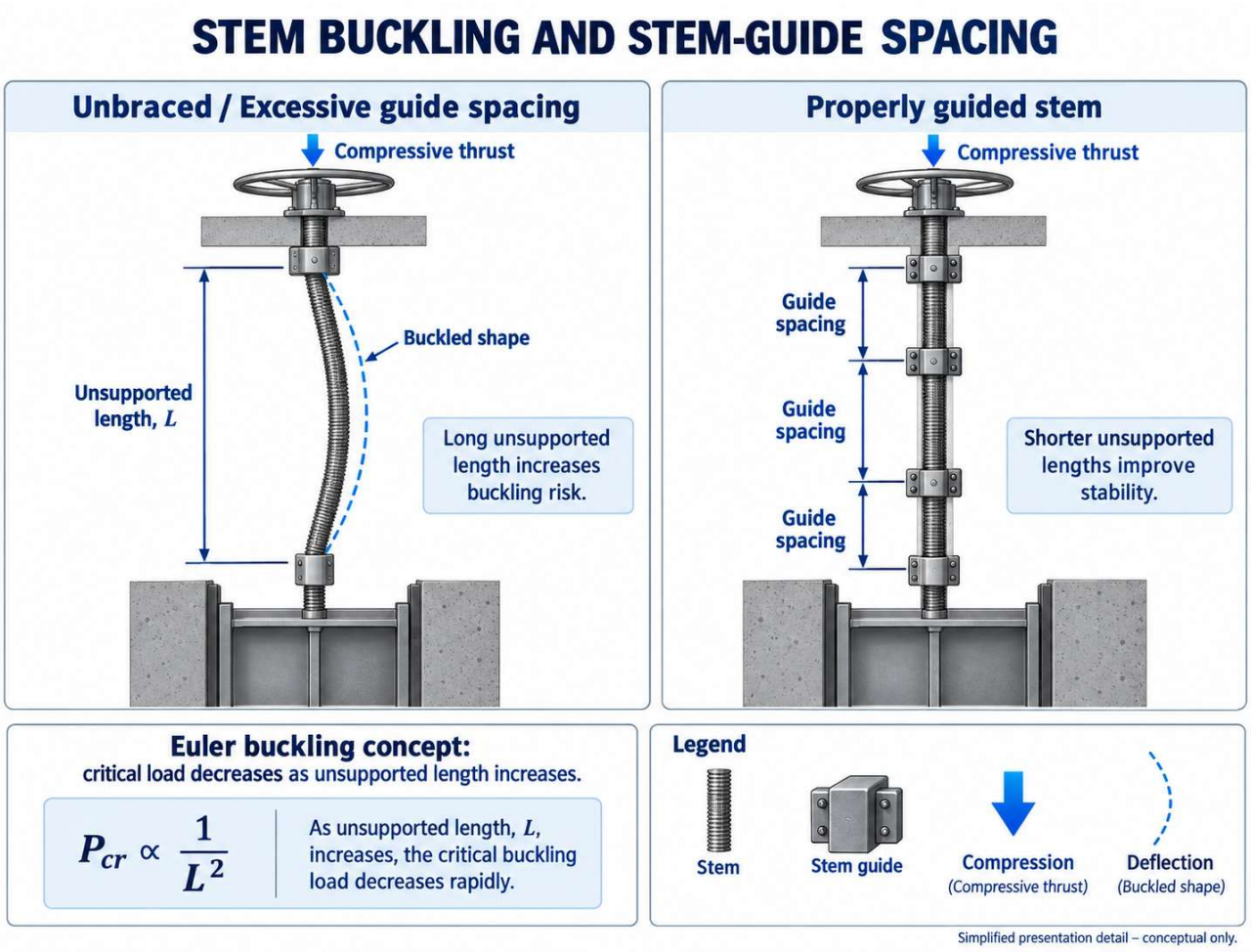
For fabricated stainless-steel slide gates under AWWA C561, the reference criterion is 0.10 gpm per foot of seating perimeter under the specified design head, seating or unseating. Verify the current standard edition and project specification before testing or acceptance.

Area	Design / maintenance considerations
Side seals	Compression, sliding friction, wear, guide geometry and replaceability
Bottom / sill seal	Debris accumulation, flush-bottom needs, invert condition and full closure
Top seal	Submerged/full-perimeter service, compression and structural support
Low-friction surfaces	UHMW or similar materials may reduce friction and wear; inspect for damage or contamination
Gaskets / mounting seals	Wall gaskets and grout help provide a stable interface; installation condition affects performance

- Confirm the gate actually reaches the intended closed position.
- Remove debris from the sill, guides and sealing path.
- Verify the head magnitude and direction match the design/test condition.
- Inspect frame flatness and possible installation-induced distortion.
- Inspect seals for damage, wear, misadjustment or swelling.
- Verify actuator limits and torque protection have not been mis-set.

7. Stems and Stem Guides

The stem is a structural member. Depending on direction of motion and gate configuration, the stem may see tension or compression. Compression introduces column-buckling risk.



Euler-buckling concept: increasing unsupported stem length reduces the critical compressive load.

- Stem diameter and material
- Unsupported length between supports
- Stem-guide spacing and stiffness
- End conditions and alignment
- Required gate thrust and friction
- Obstructions that cause abnormal compressive load
- Actuator torque/thrust settings

Stem Guides - Support and Alignment

Guides reduce unsupported length and lateral movement, but a misaligned guide can increase friction and become the source of a torque trip. Guide location, attachment and field alignment should be treated as engineered requirements, not accessories.

Failure lesson

A bent stem is often evidence of excessive compressive thrust, inadequate support, misalignment or an obstruction. A larger actuator is not the correct first response.

8. Operators and Automation

Choose the operator around duty, access, speed, available utilities and the consequence of failure. Gate opening dimensions alone do not determine operator size.

Operator	Best fit	Advantages	Key considerations
Manual handwheel / crank / gearbox	Infrequent operation, accessible locations	Simple, visible, minimal infrastructure	Rim pull, number of turns, operator elevation, emergency access
Electric multi-turn actuator	Remote operation, SCADA, automated municipal service	Position feedback, torque protection, local/remote control	Duty, voltage, enclosure, controls, limits, torque/thrust sizing
Pneumatic cylinder	Fast operation where reliable plant air exists	Simple motion; fast stroke	Air quality, corrosion, fail position, stored energy, cylinder sizing
Hydraulic cylinder / HPU	High force and smooth motion	High thrust capability	HPU, hoses/tubing, leakage, maintenance and fail behavior

- Hydraulic load on the slide
- Seal friction
- Guide friction
- Gate/slide weight
- Stem and lift-nut friction
- Process solids and debris
- Operating speed and duty
- Appropriate design margin

9. Electric Actuation, Controls and SCADA

An electric gate actuator does more than turn a stem. It protects the mechanical system, stops at the intended end positions, provides emergency/manual operation and communicates status to operators and the control system.

Electric Actuation - More Than a Motor

Function	Why it matters
Open/close vs. positioning/modulating duty	Motor duty and switching frequency must match the application.
Travel limits	Define the intended end positions.
Torque protection	Protects the gate/stem/drive from abnormal load; do not confuse with travel limits.
Manual emergency operation	Provides a means to operate the gate if power or controls are unavailable.
Environmental protection	Outdoor, corrosive, flood-prone or hazardous areas require appropriate enclosure/material selections.
Local controls	Open/stop/close and local/remote selection support commissioning and maintenance.
Position/status feedback	Open, closed, fault, intermediate position and diagnostic information support operations.

Commands from control system	Feedback to control system
OPEN	OPEN status
STOP	CLOSED status
CLOSE	FAULT / overload
LOCAL / REMOTE permissive or status	POSITION (discrete or analog)
Emergency command if required	TORQUE / diagnostic data where available

Control philosophy principle

Use an architecture the plant can support and maintain. Hardwired I/O, 4-20 mA signals and fieldbus can all be appropriate depending on the facility standard.

- Open and closed limit settings
- Torque protection settings
- Travel time
- Motor current or actuator torque trend if available
- Actual position indication vs. local/SCADA display
- Manual override accessibility and operation
- Actuator location and accessibility





If your actuator is in a location that is difficult or dangerous to access specify an actuator with the ability to remote mount the controls. This allows all actuator information and diagnostics to be in an area accessible to the operators.



Consider if a chainwheel operator will be needed, and if change over from electric to manual operation can be completed from the operating floor.

10. Installation, Commissioning and Maintenance

Many gate problems can be prevented before the first automatic cycle. The installation must preserve the geometry the gate was designed around.



Field installation: inspect the entire system – frame-to-wall interface, stem alignment, access, guides and structural surroundings.

- Mounting surface flat and true
- Do not pull the frame against uneven concrete by overtightening anchors
- Use uniform anchor tightening
- Correct irregularities with approved grout or mounting method
- Align stem, operator and guides on the same centerline
- Install stem guides at the required locations
- Protect gates from warping and construction damage before installation
- Remove stone, sand, grout, rubbish and debris before cycling
- Clean sealing and sliding surfaces
- Verify fasteners and assembly bolts
- Move the gate a short distance first and confirm free travel
- Verify limits, torque protection, local/remote controls and position indication
- Record baseline travel time and current/torque where practical

- Exercise seldom-used gates on a planned interval
- Remove debris, solids, sand and silt from sill and guides
- Inspect and lubricate stems/drive components per manufacturer instructions
- Inspect seals, anchors, guide fasteners, brackets and operator
- Trend changes in operating effort, current, torque or travel time
- Avoid carbon-steel contamination of stainless surfaces during cleaning/maintenance

11. Failure Analysis and Troubleshooting

Diagnostic mindset

The actuator is often where the problem shows up - not where the problem starts. Treat alarms, torque trips and changes in operating effort as information.

Symptom	Possible causes	First inspection	Avoid
Excessive leakage	Debris; seal damage; incomplete closure; frame distortion; wrong head direction	Verify full travel; clean sealing path; inspect seals and frame	Assuming the seal is the only cause
Actuator torque trip	Binding; dry stem; misalignment; debris; excessive hydraulic load	Stop cycling; inspect stem, guides, frame and obstruction	Raising torque setting without diagnosis
Bent / buckled stem	High compressive thrust; inadequate guide support; obstruction; misalignment	Check guide spacing, thrust and stem straightness	Installing a larger actuator as first fix
Hard operation	Corrosion; lubrication loss; solids; guide/frame movement	Compare with baseline current/torque; inspect alignment	Forcing repeated cycles
Will not fully close	Bottom obstruction; bad limit; bent stem; damaged seal	Inspect sill/opening and confirm limit setup	Hammering gate closed electrically
Uneven travel	Guide/frame geometry; dual-stem synchronization; structural movement	Observe both sides during controlled movement; verify supports	Continuing operation until jamming occurs
Surface rust / corrosion	Wrong alloy; chlorides; steel contamination; galvanic contact	Identify environment and contact materials	Assuming all stainless behaves the same

16. Identify the symptom precisely.
17. Verify the hydraulic condition and whether it changed.
18. Inspect for debris, obstruction and obvious damage.
19. Inspect alignment, frame geometry, stem and guides.
20. Confirm actuator limits, torque settings and controls.
21. Inspect seals and sliding surfaces.
22. Correct the root cause before increasing available force.

12. Replacement and Retrofit

A replacement gate should not be specified from an old nameplate alone. Existing equipment may reflect obsolete materials, poor access, outdated leakage expectations or a design condition that no longer matches the process.

Replacement Is an Engineering Opportunity

Category	Information
Opening / structure	Clear width and height; wall thickness; channel geometry; invert elevation; existing thimble or embedded frame; mounting surface condition
Hydraulics	Normal and maximum water levels on both sides; maximum differential head; direction and possible reversal
Mechanical	Stem length; guide locations; operator elevation; available clearances; existing actuator/gear data
Electrical / controls	Voltage/phase; local controls; remote I/O; position feedback; communication standard; hazardous-area requirements
Access / safety	Ladder/platform access; lifting points; removable covers; maintenance clearances; confined-space considerations
Documentation	Photos with scale; existing drawings; O&M manuals; nameplates; history of leakage/torque issues

- Re-evaluate the actual seating/unseating heads.
- Verify whether an existing thimble or embedded frame can be reused.
- Consider improved sealing, materials or automation where justified.
- Correct poor operator access or stem-guide geometry if practical.
- Define commissioning and field testing before procurement.

13. Engineering and Operator Checklists

Engineer's Gate Specification Checklist

Design / mechanical	Operation / controls / lifecycle
☐ Gate type and service	☐ Clear opening dimensions
☐ Fluid/process description	☐ Normal and maximum water levels
☐ Seating head	☐ Unseating head
☐ Reversible head if applicable	☐ Structural design head
☐ Leakage requirement and test condition	☐ Gate/frame material
☐ Fastener/anchor material	☐ Seal materials
☐ Bottom/invert seal arrangement	☐ Rising or non-rising stem
☐ Stem material/diameter/design criteria	☐ Stem-guide spacing and support
☐ Mounting arrangement	☐ Wall/thimble/embedded-frame geometry
☐ Manual operator effort/turns	☐ Actuator type and output
☐ Voltage / phase	☐ Controls and local station
☐ Remote I/O / position feedback	☐ Environmental/hazardous-area rating
☐ Shop test requirements	☐ Field test requirements
☐ Installation/start-up responsibility	☐ Spare parts / special tools
☐ O&M documentation	☐ Access and lifecycle maintenance

Operator Routine Inspection Checklist

- ☐ Stem clean, straight and lubricated where required.
- ☐ Stem guides secure and aligned.
- ☐ No unusual noise, vibration or change in travel time.
- ☐ No repeated torque trips or overload alarms.
- ☐ Gate reaches fully open and fully closed limits.
- ☐ Leakage is stable and within expected range.
- ☐ No debris accumulation at sill, guides or seals.
- ☐ No loose anchors, bolts or set screws.
- ☐ No damage to stem cover, pedestal, bracket or operator.
- ☐ No visible corrosion or stainless-steel contamination.
- ☐ Local position indication agrees with actual gate position.
- ☐ Remote/SCADA indication agrees with local position.

Good maintenance record

Record abnormal noise, travel time, motor current/torque, leakage and visible changes. A trend is often more useful than a one-time observation.

14. Field Data Worksheet

Use this worksheet when requesting a budget, replacement recommendation or formal quotation. Measurements should be verified in the field and reconciled with drawings.

Field	Record
Project / facility	
Gate tag / location	
Service / fluid	
Gate type (existing / proposed)	
Clear opening W x H	
Wall / channel / thimble geometry	
Normal upstream water elevation	
Maximum upstream water elevation	
Normal downstream water elevation	
Maximum downstream water elevation	
Maximum seating head	
Maximum unseating head	
Can head reverse?	Yes / No / Unknown
Operating frequency	
Isolation or modulating duty	
Leakage requirement	
Stem configuration	Rising / Non-rising / Unknown
Operator elevation	
Operator / actuator type	
Power supply	
Controls / SCADA signals	
Hazardous / flood-prone area?	
Existing guide locations	
Access / lifting constraints	
Known performance problems	
Photos / drawings attached	Yes / No

15. Glossary and References

Term	Meaning
Differential head	Difference in water elevation/pressure across the gate.
Seating head	Head direction that pushes the slide toward the sealing surface.
Unseating head	Head direction that pushes the slide away from the sealing surface.
Structural design head	Hydraulic condition used to establish structural adequacy of the gate system.
Slide / sluice gate	Gate that moves vertically to isolate or regulate an opening; terminology varies by construction and legacy practice.
Open-channel gate	Gate arranged within an open channel, often with a self-contained frame.
Downward-opening weir gate	Gate that opens downward so the top edge acts as a variable overflow crest.
Stop gate / stop log	Removable isolation element; stop logs are sectional elements stacked in guides.
Rising stem	Stem translates vertically with the gate; provides direct visual position indication but requires clearance.
Non-rising stem	Stem arrangement in which the stem does not rise above the operator in the same manner; useful where headroom is limited.
Torque protection	Actuator function that limits mechanical load; not the same as end-position travel limits.
Stem guide	Support that reduces unsupported stem length and maintains alignment.

Standards and Technical References

- ANSI/AWWA C560-21 - Cast-Iron Slide Gates. Verify current edition before specification or procurement.
- ANSI/AWWA C561-21 - Fabricated Stainless-Steel Slide Gates. Verify current edition and project-specific leakage/testing criteria.
- ANSI/AWWA C562-21 - Fabricated Aluminum Slide Gates; ANSI/AWWA C563-21 - Fabricated Composite Slide Gates.
- ANSI/AWWA C541-16(R21) - Hydraulic and Pneumatic Cylinder and Vane-Type Actuators for Valves and Slide Gates.
- ANSI/AWWA C542-16(R21) - Electric Motor Actuators for Valves and Slide Gates.
- ANSI/AWWA C520-24 - Knife-Gate Valves, Sizes 2 In. Through 96 In., for related pipeline knife-gate applications.
- Whipps, Inc. - Comparing Sluice Gate Mounting Configurations: https://whipps.com/comparing-sluice-gate-mounting-configurations/
- AUMA - Water / hydropower actuator resources and multi-turn actuator product information: https://www.auma.com/
- Manufacturer literature from Dynamic Water Control Gates, Golden Harvest and Rodney Hunt was used as configuration and application background; project-specific certified submittals and O&M manuals govern supplied equipment.
- Project specifications, certified gate submittals and manufacturer installation/O&M manuals should govern project-specific head, materials, leakage, testing, alignment, lubrication, control setup and maintenance requirements.

10 Questions Before You Specify or Replace a Gate:

1. Clear opening dimensions?
2. Fluid / Solids?
3. Maximum water lever on each side?
4. Seating & unseating head?
5. Can head reverse?
6. Isolating or modulating service?
7. Operating frequency?
8. Leakage requirement?
9. Operator / actuator location?
10. How will it be maintained in 20 years?

5 Take Aways:

1. Define the hydraulic condition.
2. Treat the gate as a system.
3. Installation affects performance.
4. Torque protection is information.
5. Design for the operator who inherits the equipment.

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REQUEST A SLIDE / SLUICE GATE

Design information worksheet | Use one form per unique gate configuration

1. PROJECT & SERVICE INFORMATION

Project / Facility: _____ Location: _____

Gate Tag / ID: _____ Quantity: _____

Service / Process: _____ Fluid / Solids: _____

2. GATE OPENING & STRUCTURE Record field dimensions whenever possible.

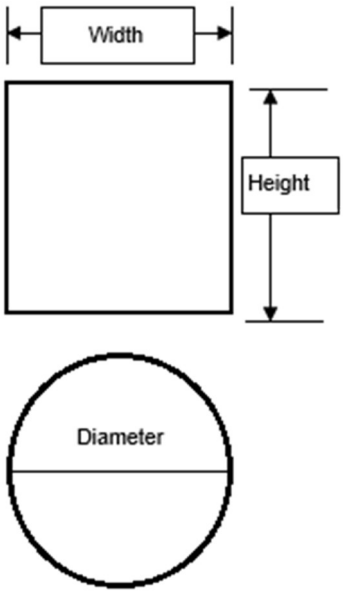
Rectangular opening width: _____

Rectangular opening height: _____

Round opening diameter: _____

Invert elevation: _____

Operating floor elevation: _____



Opening / pipe type

☐ Rectangular opening
☐ Round opening - RCP
☐ Round opening - DIP
☐ Round opening - PVC
☐ Round opening - corrugated pipe
☐ Other: _____

Gate / frame material

☐ 304L stainless steel
☐ 316L stainless steel
☐ Aluminum
☐ Other: _____

3. HYDRAULIC DESIGN CONDITION Define head magnitude, direction and operating condition.

Normal upstream WL: _____

Maximum upstream WL: _____

Maximum differential head: _____

Seating head: _____

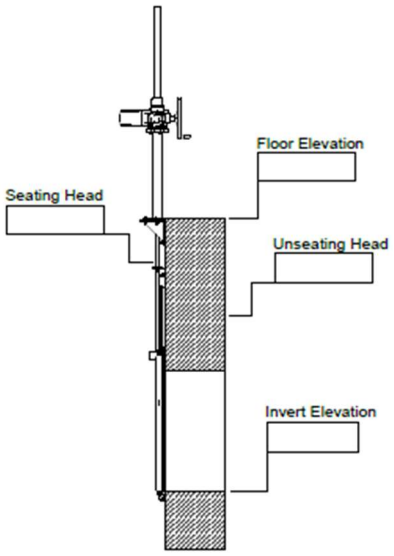
Normal downstream WL: _____

Maximum downstream WL: _____

Structural design head: _____

Unseating head: _____

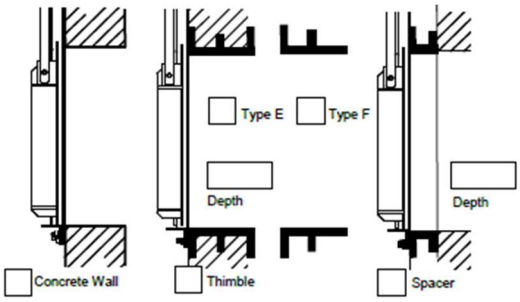
Flow direction / notes: _____



Head direction:

☐ Seating
☐ Unseating
☐ Reversible / bi-directional

4. MOUNTING, STRUCTURE & DUTY



Gate mounted to

☐ Concrete wall
☐ Wall thimble
☐ Wall pipe / Spacer
☐ Other: _____

Thimble mount:
Thimble depth: _____
Thimble type: _____

Structure / mounting

☐ Existing structure
☐ New structure
☐ Embedded invert

Service duty

☐ Isolation / open-close
☐ Positioning
☐ Modulating / throttling
☐ Emergency / bypass

Stem configuration

☐ Rising stem
☐ Non-rising stem
☐ Stem guide required
☐ Other: _____

Record operating floor elevation, water levels, seating / unseating head and invert elevation.

5. OPERATOR REQUIREMENTS

Manual operator

☐ Handwheel
☐ Gear with handwheel
☐ Hand crank
☐ Pedestal
☐ Wall Bracket
☐ 2” square nut
☐ Gear with 2” square nut

Maximum rim pull / effort: _____

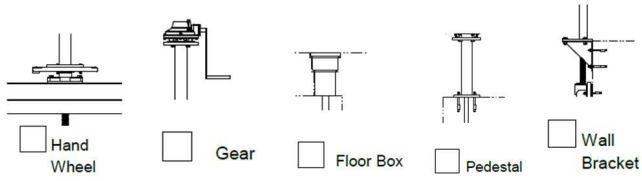
Powered operator

☐ Electric actuator
☐ Pneumatic cylinder
☐ Hydraulic cylinder

Operator mounting / access

☐ Floor-mounted
☐ Wall-mounted
☐ Yoke-mounted
☐ T-wrench & 2” square nut
☐ Other: _____

Operator centerline elevation: _____



Automation note: Complete the separate Gate Automation Sheet when a powered operator is required.

SLIDE / SLUICE GATE - STEM, POSITION & FIELD INFORMATION

6. STEM COVER & POSITION INDICATION

Stem cover

☐ Clear polycarbonate
☐ Aluminum
☐ Stainless steel
☐ Other: _____

Position indication

☐ Mylar / travel strip
☐ Mechanical counter (non-rising stem only)

7. FIELD VERIFICATION & SUBMITTAL INFORMATION

Field verification

☐ Opening dimensions verified
☐ Invert elevation verified
☐ Wall / thimble dimensions verified
☐ Mounting surface condition verified
☐ Operator elevation / access verified
☐ Stem guide locations verified
☐ Photographs available

Request / submittal information

☐ Plan / section drawings available
☐ Existing gate drawings available
☐ Applicable gate standard identified
☐ Leakage requirement identified
☐ Material requirement identified
☐ Shop / field testing required
☐ O&M / spare parts requirements identified

8. ADDITIONAL INFORMATION, NOTES & SKETCH

Specification note: *This worksheet is intended to collect selection information. Final gate design, materials, structural capacity, leakage performance, stem/guide design and operator sizing must be confirmed for the actual application and contract requirements.*

RARITAN VALVE & AUTOMATION

REQUEST AN OPEN-CHANNEL GATE

Design information worksheet | Use one form per unique gate configuration

1. PROJECT & SERVICE INFORMATION

Project / Facility: _____ Location: _____

Gate Tag / ID: _____ Quantity: _____

Service / Process: _____ Fluid / Solids: _____

2. GATE & CHANNEL GEOMETRY Record field dimensions whenever possible.

Channel width: _____

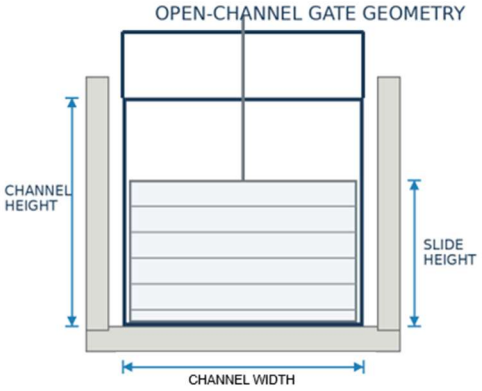
Channel height: _____

Slide / gate height: _____

Invert elevation: _____

Operator elevation: _____

Gate / frame material
☐ 304L stainless steel
☐ 316L stainless steel
☐ Aluminum
☐ Other: _____



3. HYDRAULIC DESIGN CONDITION Do not specify head without magnitude, direction and operating condition.

Normal upstream WL: _____ Normal downstream WL: _____

Maximum upstream WL: _____ Maximum downstream WL: _____

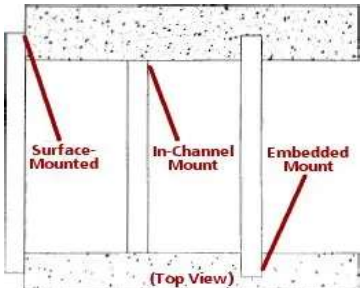
Maximum differential head: _____ Structural design head: _____

Head direction
☐ Seating
☐ Unseating
☐ Reversible / bi-directional

Operating condition
☐ Balanced head
☐ Differential head
☐ Flowing water
☐ Temporary / abnormal condition

Required leakage / test criterion: _____ Flow direction / notes: _____

4. MOUNTING & DUTY



Mounting style

☐ Wall/Surface-mounted

☐ In-channel mount

☐ Embedded

☐ Other: _____

Service duty

☐ Isolation / open-close

☐ Positioning

☐ Modulating / throttling

☐ Emergency / bypass

Stem configuration

☐ Rising stem

☐ Non-rising stem

☐ Stem guide required

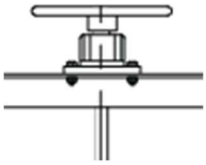
☐ Other: _____

OPEN-CHANNEL GATE - OPERATOR & POSITION INFORMATION

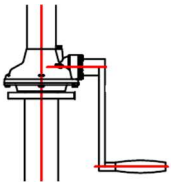
5. OPERATOR REQUIREMENTS

Manual operator

☐ Handwheel
☐ Gear with Handwheel
☐ Hand crank
☐ 2” Square nut
☐ Gear with 2” Square nut
Maximum rim pull / effort: _____



Handwheel



Hand crank



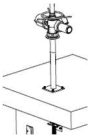
Gear & Square nut

Powered operator

☐ Electric actuator
☐ Pneumatic cylinder
☐ Hydraulic cylinder

Operator mounting / access

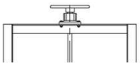
☐ Floor-mounted ☐ Wall-mounted
☐ Yoke-mounted ☐ Other: _____
Operator centerline elevation: _____



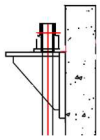
Floor



Wall



Yoke



2” Nut

6. STEM COVER & POSITION INDICATION

Stem cover

☐ Clear polycarbonate
☐ Aluminum
☐ Stainless steel
☐ Other: _____

Position indication

☐ Mylar / travel strip
☐ Mechanical counter (non-rising stem only)

Automation note: Complete the separate Gate Automation Sheet when a powered operator is required.

7. ADDITIONAL INFORMATION, NOTES & SKETCH

Specification note: *This worksheet is intended to collect selection information. Final gate design, materials, structural capacity, leakage performance, stem/guide design and operator sizing must be confirmed for the actual application and contract requirements.*

RARITAN VALVE & AUTOMATION

REQUEST A WEIR GATE

Design information worksheet | Use one form per unique gate configuration

1. PROJECT & SERVICE INFORMATION

Project / Facility: _____

Location: _____

Gate Tag / ID: _____

Quantity: _____

Service / Process: _____

Fluid / Solids: _____

2. GATE & CHANNEL GEOMETRY Record field dimensions whenever possible.

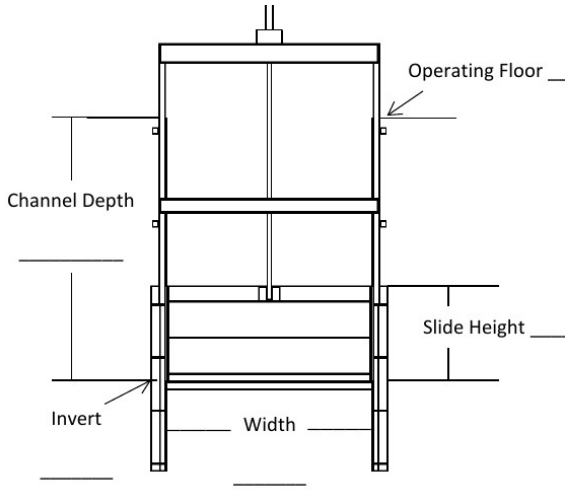
Channel width: _____

Channel depth: _____

Slide / gate height: _____

Invert elevation: _____

Operating floor elevation: _____



Gate / frame material

☐ 304L stainless steel

☐ 316L stainless steel

☐ Aluminum

☐ Other: _____

3. HYDRAULIC / LEVEL-CONTROL DESIGN CONDITION Define the water levels and the control range.

Normal upstream WL: _____

Normal downstream WL: _____

Maximum upstream WL: _____

Maximum downstream WL: _____

Minimum operating crest elevation: _____

Maximum operating crest elevation: _____

Maximum differential head: _____

Structural design head: _____

Desired control level / range: _____

Flow direction / notes: _____

Operating Service: ☐ Level control / overflow ☐ Flow splitting ☐ Positioning / modulating ☐ Temporary / abnormal condition

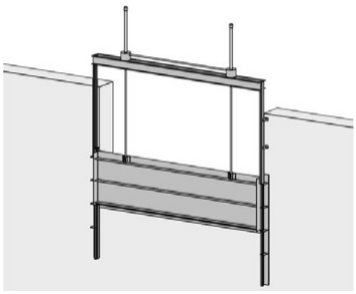
WEIR GATE - ARRANGEMENT, MOUNTING & OPERATION

4. STEM ARRANGEMENT, MOUNTING & DUTY

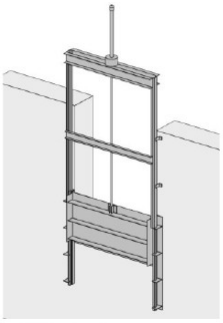
Stem arrangement

☐ Single stem ☐ Dual stem

Stem Arrangement



☐ Dual Stem



☐ Single Stem

Service duty

☐ Upstream level control

☐ Flow splitting / distribution

☐ Positioning / modulating

☐ Emergency / bypass

Stem configuration

☐ Rising stem

☐ Non-rising stem

☐ Stem guide required

☐ Other: _____

Mounting / structure

☐ Wall / surface-mounted

☐ In-channel / embedded frame

☐ Existing structure

☐ New structure

☐ Other: _____

5. OPERATOR REQUIREMENTS

Manual operator

☐ Handwheel

☐ Gear with handwheel

☐ Hand crank

☐ 2” square nut

☐ Gear with 2” square nut

Maximum rim pull / effort:

_____

Powered operator

☐ Electric actuator

☐ Pneumatic cylinder

☐ Hydraulic cylinder

Operator mounting / access

☐ Floor-mounted

☐ Wall-mounted

☐ Yoke-mounted

☐ T-wrench & 2” square nut

☐ Other: _____

Operator centerline elevation: _____

Automation note: Complete the separate Gate Automation Sheet when a powered operator is required.

6. STEM COVER & POSITION INDICATION

Stem cover

☐ Clear polycarbonate

☐ Aluminum

☐ Stainless steel

☐ Other: _____

Position indication

☐ Mylar / travel strip

☐ Mechanical counter (non-rising stem only)

WEIR GATE - FIELD VERIFICATION & REQUEST INFORMATION

7. FIELD VERIFICATION & SUBMITTAL INFORMATION

Field verification

☐ Channel width / depth verified

☐ Invert elevation verified

☐ Operating floor elevation verified

☐ Mounting surface / channel condition verified

☐ Operator access verified

☐ Stem arrangement / clearance verified

☐ Photographs available

Request / submittal information

☐ Plan / section drawings available

☐ Existing gate drawings available

☐ Control level / operating range identified

☐ Material requirement identified

☐ Leakage / testing requirement identified

☐ Applicable gate standard identified

☐ O&M / spare parts requirements identified

8. ADDITIONAL INFORMATION, NOTES & SKETCH

Specification note: *This worksheet is intended to collect selection information. Final gate dimensions, structural capacity, stem arrangement, leakage performance, operator sizing and control requirements must be confirmed for the actual application and contract requirements.*

RARITAN VALVE & AUTOMATION

REQUEST A STOP GATE

Design information worksheet | Use one form per unique gate configuration

1. PROJECT & SERVICE INFORMATION

Project / Facility: _____ **Location:** _____

Gate Tag / ID: _____ **Quantity:** _____

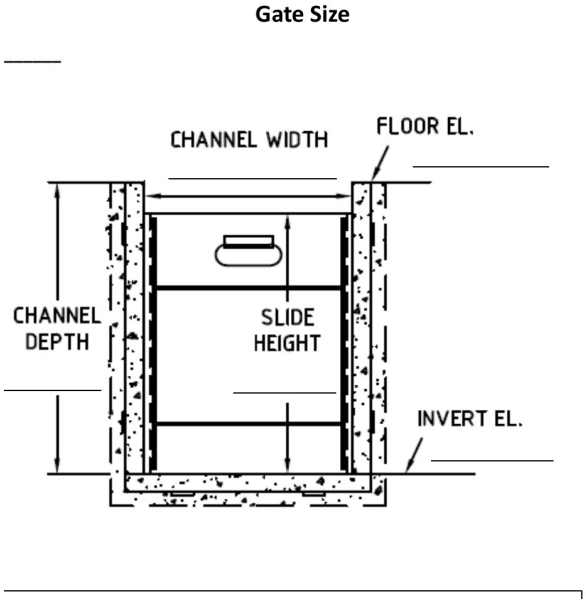
Service / Process: _____ **Fluid / Solids:** _____

2. GATE & CHANNEL GEOMETRY Record field dimensions whenever possible.

Channel width: _____
Channel depth: _____
Slide / gate height: _____
Invert elevation: _____
Operating floor elevation: _____

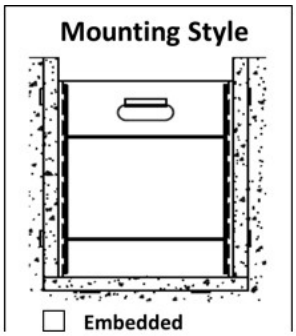
Gate / panel material

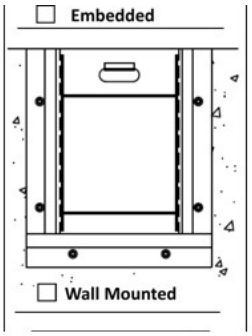
☐ 304L stainless steel
☐ 316L stainless steel
☐ Aluminum
☐ Other: _____

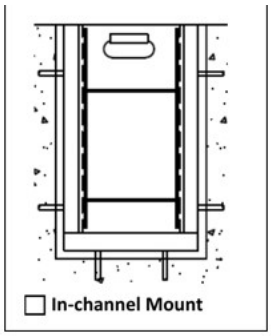


3. MOUNTING STYLE

Mounting:
☐ Wall / Surface
☐ Embedded
☐ In-Channel







STOP GATE - SELECTION & FIELD INFORMATION

4. HANDLING / OPERATOR REQUIREMENTS

Panel handling feature

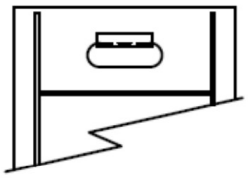
☐ Hand hole
☐ Handle
☐ Other: _____

Access / removal notes: _____

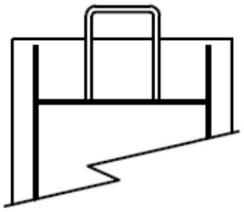
Panel storage location: _____

Operator Requirements

☐ **Hand Hole**



☐ **Handle**



5. FIELD VERIFICATION & REQUEST INFORMATION

Field verification

☐ Channel width / depth verified
☐ Slide height verified
☐ Invert / floor elevation verified
☐ Mounting condition verified
☐ Photographs available

Request / submittal information

☐ Plan / section drawings available
☐ Existing gate drawings available
☐ Material requirement identified
☐ Required design head identified
☐ Leakage / testing requirement identified

6. ADDITIONAL INFORMATION, NOTES & SKETCH

_____
_____
_____
_____
_____

Specification note: *This worksheet collects selection information. Final gate dimensions, structural capacity, materials, mounting details and leakage performance should be confirmed for the actual application and contract requirements.*

RARITAN VALVE & AUTOMATION

REQUEST A STOP LOG

Design information worksheet | Use one form per unique stop-log configuration

1. PROJECT & SERVICE INFORMATION

Project / Facility: _____

Location: _____

Stop Log / Guide Tag: _____

Quantity of guide sets: _____

Service / Process: _____

Quantity of logs per set: _____

Fluid / Solids: _____

Isolation purpose: _____

2. CHANNEL & STOP-LOG GEOMETRY Record field dimensions whenever possible.

Channel / opening dimensions

Channel width: _____

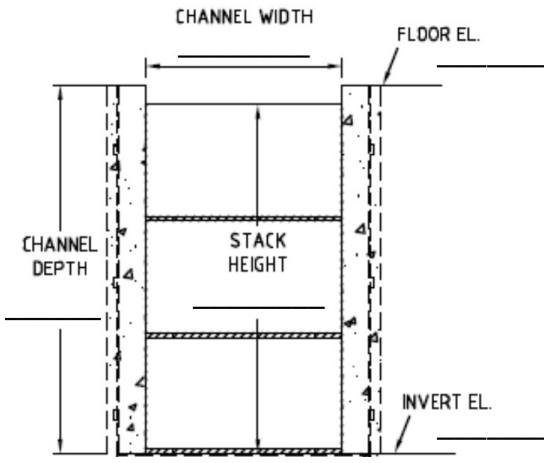
Channel depth: _____

Stack height required: _____

Individual log height: _____

Invert elevation: _____

Operating floor elevation: _____



Reference geometry - verify actual field dimensions.

Materials

Stop logs: ☐ Aluminum ☐ 304L SS ☐ 316L SS ☐ Other: _____

Guides: ☐ Aluminum ☐ 304L SS ☐ 316L SS ☐ Other: _____

3. HYDRAULIC DESIGN CONDITION Define water levels and the maximum differential head across the installed stack.

Normal upstream WL: _____

Normal downstream WL: _____

Maximum upstream WL: _____

Maximum downstream WL: _____

Maximum differential head: _____

Structural design head: _____

Required leakage / sealing criterion: _____

Flow direction / notes: _____

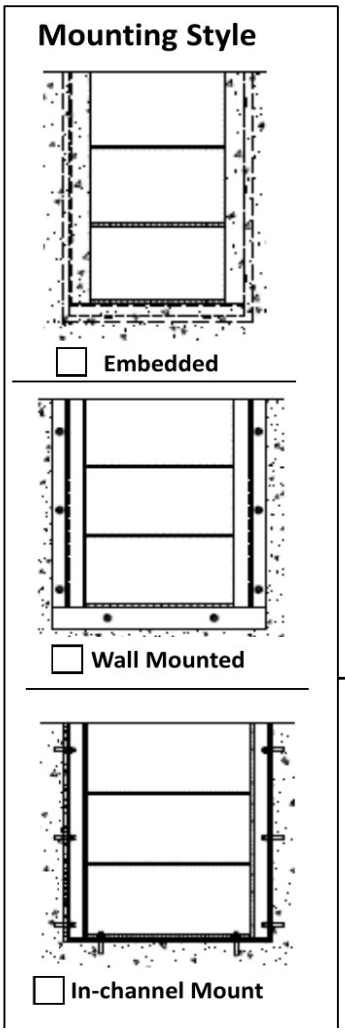
Head direction

☐ Seating
☐ Unseating
☐ Reversible / bi-directional

Operating condition

☐ Balanced head
☐ Differential head
☐ Flowing water
☐ Temporary / abnormal condition

4. MOUNTING STYLE & STRUCTURE



Mounting style

☐ Embedded
☐ Wall-mounted
☐ In-channel mount
☐ Other: _____

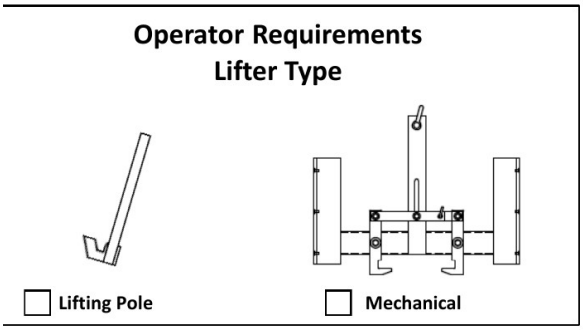
Structure

☐ Existing structure
☐ New structure
☐ Concrete channel
☐ Other: _____

Guide clear opening / slot notes: _____

Mounting surface / embed notes: _____

5. LIFTING, HANDLING & STORAGE



Lifting pole and mechanical lifter concepts.

Lifter / handling method

☐ Lifting pole
☐ Mechanical lifter / lifting beam
☐ Crane / hoist by others
☐ Other: _____
Maximum individual log weight (if known): _____

Available lifting capacity: _____

Storage rack required: ☐ Yes ☐ No ☐ By others

Storage location / access: _____

Operator handling / access notes: _____

Design reminder: Stop logs are only practical if the lifting method, safe access, individual section weight and storage location are planned with the isolation function.

6. FIELD VERIFICATION & REQUEST INFORMATION

Field verification

☐ Channel width / depth verified
☐ Invert and floor elevations verified
☐ Guide mounting condition verified
☐ Access for log removal verified
☐ Lifting path / overhead clearance verified
☐ Photographs available

Request / submittal information

☐ Plan / section drawings available
☐ Existing guide / log drawings available
☐ Material requirement identified
☐ Leakage / sealing requirement identified
☐ Lifter / handling requirement identified
☐ Storage requirement identified

7. ADDITIONAL INFORMATION, NOTES & SKETCH

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Specification note: This worksheet is intended to collect selection information. Final stop-log, guide, seal, structural and lifting-system design must be confirmed for the actual application and contract requirements.

RARITAN VALVE & AUTOMATION

REQUEST GATE ACTUATOR & AUTOMATION

Design information worksheet | Complete one form per unique actuator/control configuration

1. PROJECT & EQUIPMENT INFORMATION

Project / Facility: _____

Location: _____

Gate Tag / ID: _____

Quantity: _____

Gate type: _____

Service / Process: _____

Gate size / opening: _____

New installation / Retrofit: _____

2. ACTUATOR & MECHANICAL DUTY

Start with required gate thrust / torque and operating duty.

Actuator type

- ☐ Electric actuator
- ☐ Pneumatic cylinder
- ☐ Hydraulic cylinder
- ☐ Existing actuator replacement

Service duty

- ☐ Open-close / isolation
- ☐ Positioning
- ☐ Modulating / throttling
- ☐ Emergency / bypass

Gate / stem arrangement

- ☐ Rising stem
- ☐ Non-rising stem
- ☐ Single stem
- ☐ Dual / synchronized stems

Required output torque (if known): _____

Required closing time: _____

Required stem thrust (if known): _____

Estimated cycles / day: _____

Full stroke / travel: _____

Starts / hour (if applicable): _____

Required opening time: _____

Mechanical interface / drive notes: _____

3. POWER / UTILITY REQUIREMENTS

Electric power

Voltage: _____

Phase: _____

Frequency: _____

Control power: _____

Pneumatic supply

Available air pressure: _____ psi

Minimum pressure: _____ psi

Plant air quality / notes: _____

☐ Plant air available

Hydraulic supply

Operating pressure: _____ psi

☐ Existing HPU

☐ New HPU required

Fluid / notes: _____

4. INSTALLATION & ENVIRONMENT

Installation

- ☐ Indoor
- ☐ Outdoor
- ☐ Wet / washdown
- ☐ Flood-prone

Area classification

- ☐ Non-hazardous
- ☐ Hazardous / classified

Class / Div / Zone: _____

Area notes: _____

Environment

Min ambient: _____

Max ambient: _____

☐ Corrosive atmosphere

☐ Direct sun / weather exposure

Actuator mounting elevation: _____

Required enclosure / ingress rating: _____

Accessibility / platform notes: _____

Corrosion protection / coating notes: _____

5. LOCAL & MANUAL CONTROL

Local station / selector	Local commands	Manual operation
☐ Integral local controls	☐ OPEN	☐ Integral handwheel
☐ Remote-mounted local station	☐ STOP	☐ Manual declutch / engage
☐ Local / Off / Remote selector	☐ CLOSE	☐ Portable operator provision
☐ Local / Remote selector	☐ Emergency Stop	☐ Other: _____
Local indication	**Additional indication**	**Manual access**
☐ OPEN light	☐ LOCAL / REMOTE status	Handwheel elevation: _____
☐ CLOSED light	☐ Torque / overload indication	Max manual effort: _____
☐ FAULT light	☐ Running indication	Turns / travel: _____
☐ Position display	☐ Other: _____	Access notes: _____

6. REMOTE CONTROL / SCADA INTERFACE

Select only the signals required by the plant control philosophy.

Remote commands	Remote feedback	Interface
☐ OPEN	☐ OPEN status	☐ Hardwired discrete I/O
☐ STOP	☐ CLOSED status	☐ 4-20 mA analog
☐ CLOSE	☐ FAULT / overload	☐ Fieldbus / network
☐ ENABLE / permissive	☐ LOCAL / REMOTE status	☐ Dry contacts
☐ Emergency command	☐ Running status	☐ Other: _____
☐ Position setpoint	☐ Position feedback	Protocol: _____
☐ Reset fault	☐ Torque / diagnostic data	Network standard: _____
☐ Other: _____	☐ Motor current / load	PLC / DCS: _____
	☐ Other: _____	

GATE AUTOMATION - INFORMATION FLOW



7. CONTROL PHILOSOPHY & INTERLOCKS

Fail / loss-of-power action	Positioning logic	Interlocks / permissives
☐ Fail in place	☐ Open-close only	☐ Process permissive required
☐ Fail open	☐ Discrete intermediate positions	☐ Pump / equipment interlock
☐ Fail closed	☐ Analog position setpoint	☐ High / low level interlock
☐ Other / sequence: _____	☐ Level / flow control loop	☐ Other: _____

8. TESTING, COMMISSIONING & DOCUMENTATION

Testing / startup	Submittal documents	O&M / closeout
☐ Factory functional test	☐ Actuator datasheet	☐ O&M manual
☐ Witnessed factory test	☐ Wiring / terminal diagram	☐ Setpoint / parameter list
☐ Field startup / commissioning	☐ Control schematic	☐ As-built wiring
☐ Operator training	☐ I/O list	☐ Recommended spare parts
Commissioning record	**Control verification**	**Optional data**
☐ Open / closed limits recorded	☐ Local commands tested	☐ Baseline motor current
☐ Torque settings recorded	☐ Remote commands tested	☐ Baseline torque / thrust
☐ Travel time recorded	☐ Feedback verified	☐ Diagnostic snapshot
☐ Manual override tested	☐ Position signal calibrated	☐ Network configuration record

9. FIELD / EXISTING EQUIPMENT INFORMATION

Existing equipment	Field verification	Plant standards
☐ Existing actuator nameplate photo	☐ Stem / drive interface verified	☐ Plant control standard available
☐ Existing gate / stem photos	☐ Mounting elevation verified	☐ I/O standard available
☐ Existing wiring diagram	☐ Available power verified	☐ Area classification confirmed
☐ Existing control schematic	☐ Cable / conduit route verified	☐ Network standard confirmed

10. ADDITIONAL INFORMATION, NOTES & SKETCH

Selection note: *Final actuator sizing, output torque/thrust, duty, environmental rating, controls, network interface, protection settings and commissioning requirements must be confirmed for the actual gate, hydraulic load, contract documents and facility standards.*

RARITAN VALVE & AUTOMATION

Need help with a gate application, retrofit or actuator package?

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Use this guide in the field

Bring the checklists to design reviews, startup meetings and maintenance rounds. The best gate decisions are made when engineers and operators define the hydraulic condition, access requirements and lifecycle expectations together.