

# Engineering Selection Criteria for Water Control Gate Applications

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## OVERVIEW

A short, crisp overview of why proper gate selection matters: reliability, safety, cost, and lifecycle performance. Selecting the right water control gate is one of the most important engineering decisions in any hydraulic structure. Proper gate selection drives performance. When the wrong gate type is chosen, the result is usually the same: leakage, difficult operation, frequent maintenance, and avoidable cost over the life of the project. This white paper provides practical selection guidance to help engineers, owners, and project stakeholders consistently choose the right Waterman gate for each application.

This white paper is intended to be used as a common reference when evaluating and selecting Waterman's water control equipment. The selection criteria discussed apply across the following product lines:

- Slide Gates / Sluice Gates
- Downward Opening Slide (Weir) Gates
- Rectangular Butterfly Gates
- Radial Gates
- Stop Logs, Stop Gates & Bulkheads
- Flap Gates
- Tilting Weir Gates
- Large Custom Gates

Each gate type operates differently, but the same basic selection factors can be used to compare options and select the most appropriate gate for a given application.

## INTRODUCTION: WATER CONTROL GATES

Waterman manufactures a broad range of water control gates, which are used to control or isolate water flow in flood control, water and wastewater treatment plants, irrigation systems, hydropower facilities, and industrial applications.

Each project comes with its own set of conditions. Water levels, flow velocity, corrosion exposure, mounting details, and operating frequency can vary significantly from one installation to another. These differences directly affect how a gate performs over its service life.

This white paper outlines standardized engineering selection criteria to help evaluate these conditions in a consistent way. The goal is to reduce guesswork and support the selection of reliable, well-suited gate equipment for each specific application.



## HOW THESE CRITERIA APPLY TO DIFFERENT GATE TYPES

Not all Waterman gate products work the same way. Some gates are linear and actuated (like upward or downward opening slide gates, stop logs, stop gates or bulkheads), some are passive or gravity-operated (like flap gates), and others are rotational (like rectangular butterfly gates). Radial gates and tilting weir gates also have their own structural and operating characteristics due to their trunnion-supported design.

The key is to understand what the gate is required to do, the hydraulic conditions it will see, how it will be installed and operated, and which materials are best suited?

The following criteria should be reviewed when evaluating and selecting a water control gate. While different gate types operate in different ways, these factors provide a consistent basis for comparing options and identifying the most suitable solution for a given application.



## Application Requirements

Start by clearly defining what the gate is required to do. Common application needs include isolation, flow regulation, level control, backflow prevention, or temporary closure for maintenance. Identifying the primary function early helps narrow down the appropriate gate type and avoids selecting equipment that is not well suited for the intended purpose.

## Functional Parameters

Look at the conditions the gate will actually see in service, such as water level, differential head, flow velocity, pressure conditions, and allowable leakage (defined leakage rate based on industry standards). These conditions help determine how strong the gate needs to be, what materials should be used, and how it should be sealed.

Understanding these requirements helps ensure the selected gate can handle actual hydraulic pressure, maintain acceptable leakage performance, and operate reliably without deformation or performance issues.



## Installation Type

Evaluate where and how the gate will be installed. Common installation locations include channels, headwalls, treatment basins, pump stations, or pipe systems, and may involve fully or partially submerged conditions. The installation environment directly influences which gate types and configurations are feasible.

Typical installation types include:

- **Direct Face Wall Mounted** - Gate mounted directly to a concrete wall or structure
- **Wall Thimble Mounted** - Used where wall surfaces are uneven or require a formed opening
- **Pipe Flange Mounted** - Installed at the end of a pipe
- **Side Wall Embedded** - Installed within a channel with the gate frame embedded into the side wall grooves
- **Side Wall Anchored** - Installed in a channel with the gate frame anchored to existing side walls or structure

Installation conditions also affect structural interface, required clearances, and access for installation, operation, and maintenance. Clearly defining these factors helps ensure the selected gate fits the structure, installs correctly, and performs reliably over its service life.

## Operation & Control Method

Define how the gate will be used and controlled during operation. Consider how often the gate will operate, how quickly it needs to respond, and whether it will be manually/electrically/hydraulically operated, or self-operating based on flow or water level.

Operation and control requirements should also account for control needs, operator access, safety, and reliability. Clearly defining these factors helps ensure the selected gate can be operated effectively without unnecessary complexity.



## Fluid Type

Identify the type of fluid the gate will handle, such as clean water, wastewater, seawater, sludge, or industrial effluent. The nature of the fluid helps determine the right material and sealing option for the gate.

Corrosive or abrasive fluids may require higher-grade stainless steel, protective coatings, or special seals. Selecting materials suited to the fluid and environment helps extend service life, reduce maintenance, and improve long-term reliability.

## Lifecycle Cost

Don't look at the purchase price alone. Long-term costs like maintenance, coatings, operation, and eventual replacement matter just as much. Thinking in terms of lifecycle cost usually leads to better value and more reliable performance over time. A slightly higher upfront investment in equipment or automation can reduce operating expenses and minimize downtime over the life of the project.

## Accessories

Identify any supplementary components required for safe operation, installation, and maintenance. Depending on the gate type and application, this may include guides, supports, indicators, covers, lifting provisions, or other handling and safety features.

Accessories will be selected based on gate types, operating conditions, water level variation, and maintenance access requirements. Properly matched accessories help improve safety, reliability, and ease of operation.

## Miscellaneous / Site-Specific Considerations

Consider any project specific requirements such as owner preferences, compatibility with existing equipment, site access limitations, or future expansion plans.

Waterman water control gates can be customized to meet any specific application needs, ensuring the final solution fits the site and performs as intended while avoiding design or installation challenges later in the project.

