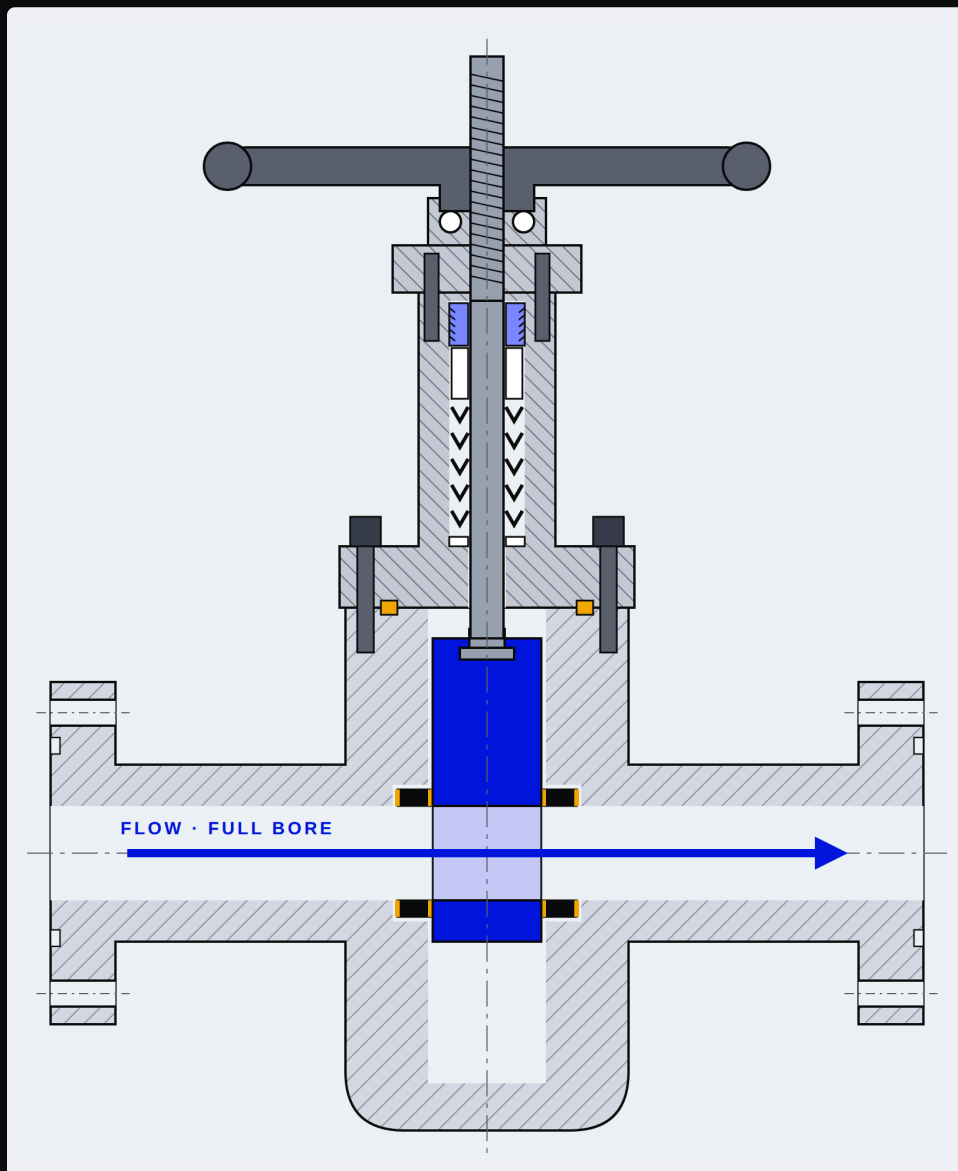


How a gate valve works

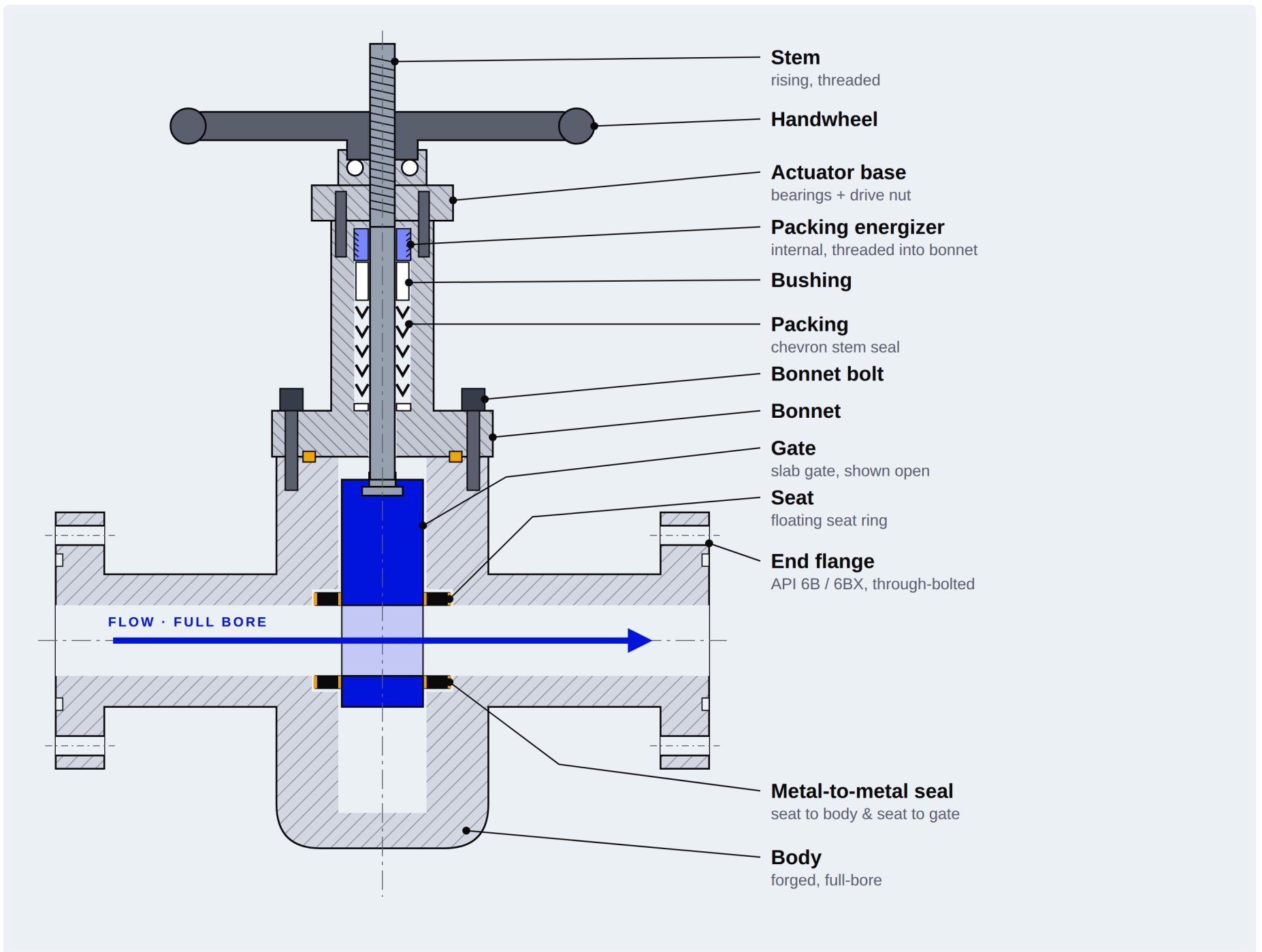
Inside the slab gate valve that opens, closes and isolates flow on wellheads, trees and manifolds.



- 02 Anatomy
- 03 Open vs closed
- 04 How it seals
- 05 Stem and packing
- 06 API 6A essentials

ANATOMY

Thirteen parts, three jobs



Contain pressure

Body, bonnet, bonnet bolts and end flanges.

Stop the flow

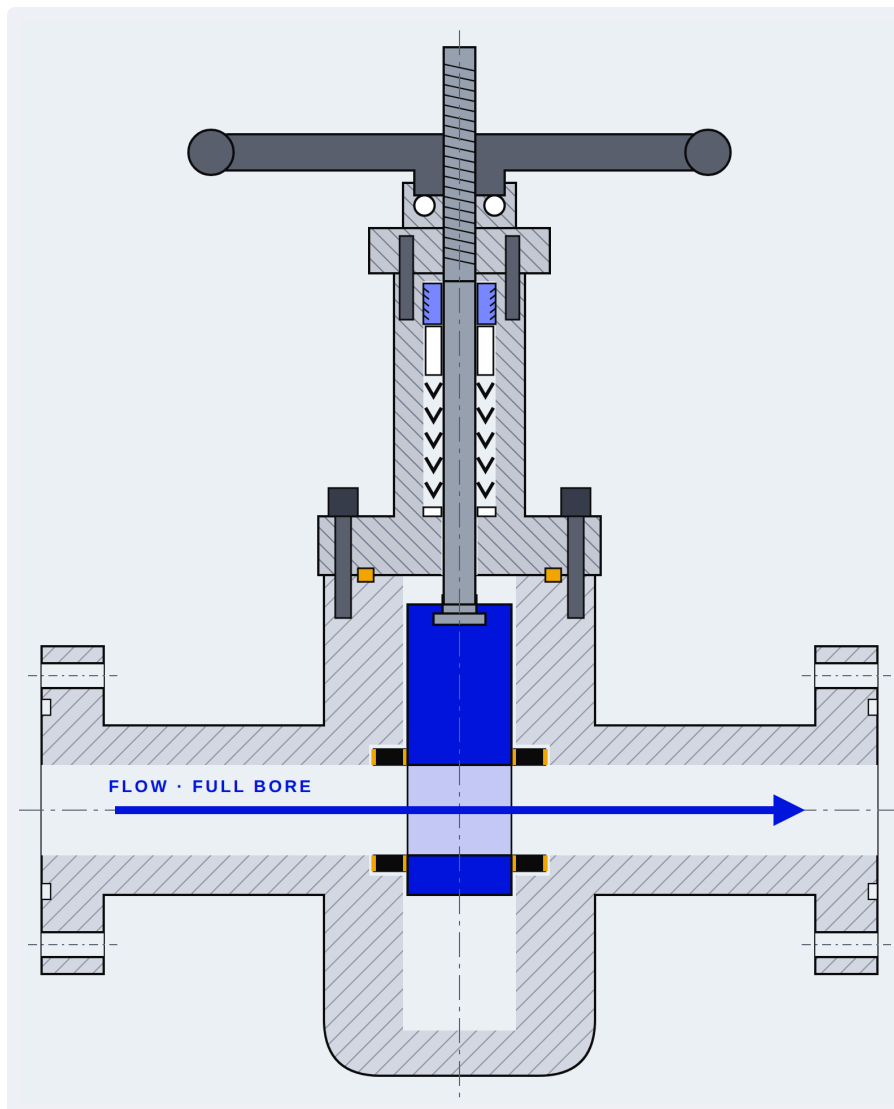
Slab gate and two floating seats, sealing metal to metal.

Move the gate

Handwheel, actuator base, stem and stem packing.

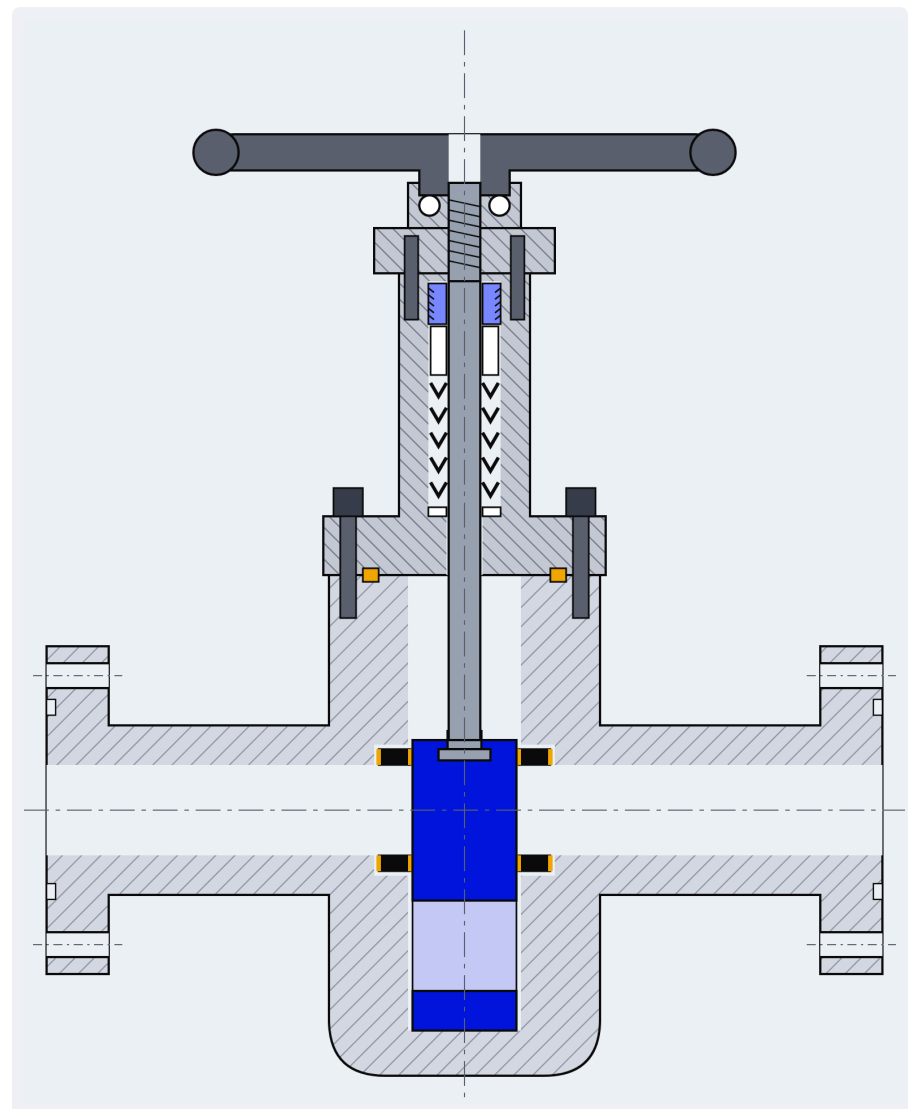
OPERATION

Open or closed: the gate moves



OPEN

Stem up. The gate's through-bore lines up with the flow bore: full bore, no restriction, piggable.



CLOSED

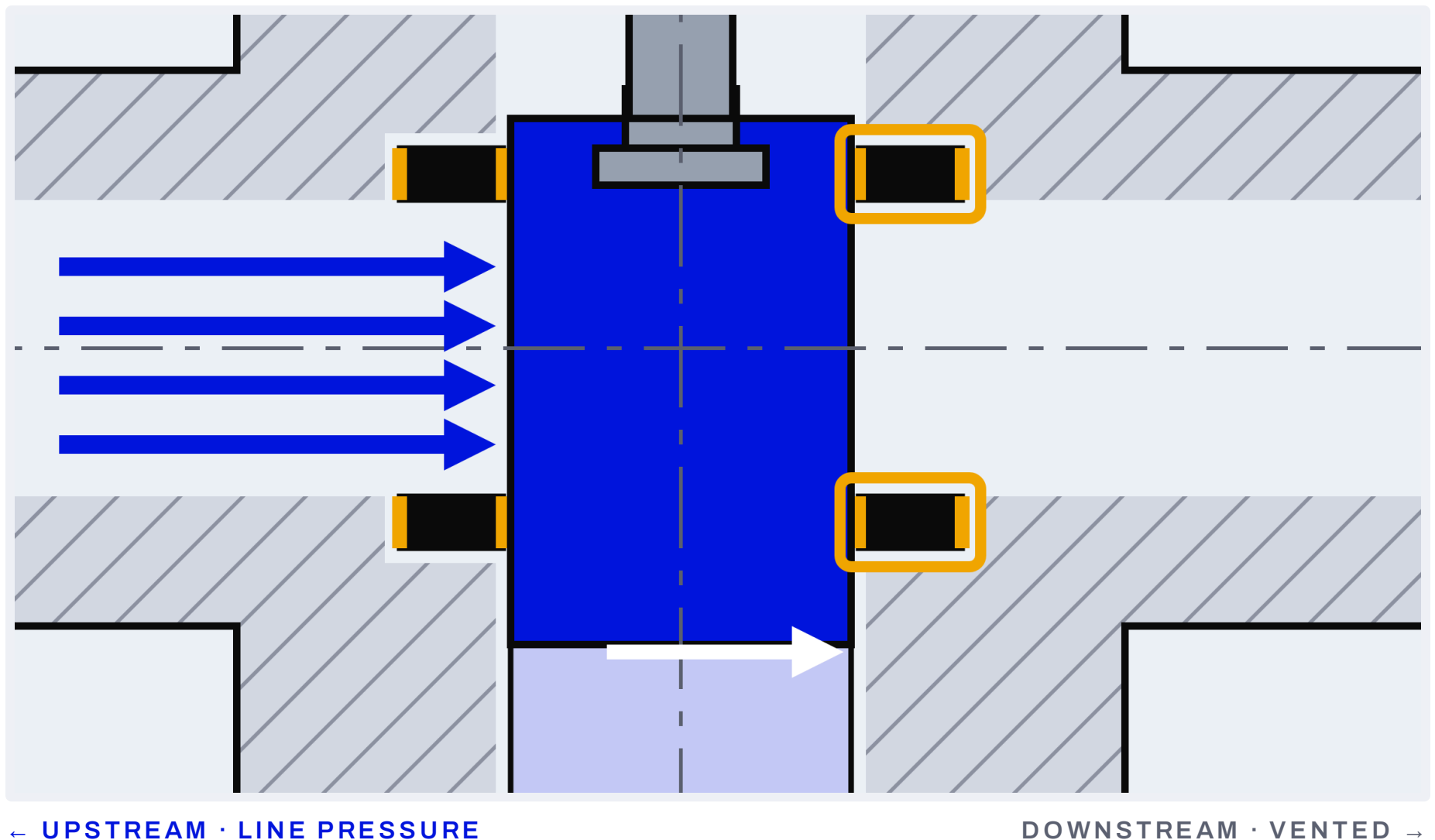
Stem down. The solid part of the gate sits across the bore, pressed against the seats.

Turn the handwheel → the drive nut turns in its bearings → the threaded stem rises or lowers → the gate slides between the seats.

FULLY OPEN OR FULLY CLOSED ONLY. NEVER THROTTLE.

HOW IT SEALS

Line pressure does the sealing



1

Pressure loads the gate

Upstream pressure acts on the full face of the closed slab gate.

2

The gate floats downstream

The gate shifts a fraction and bears hard on the downstream seat.

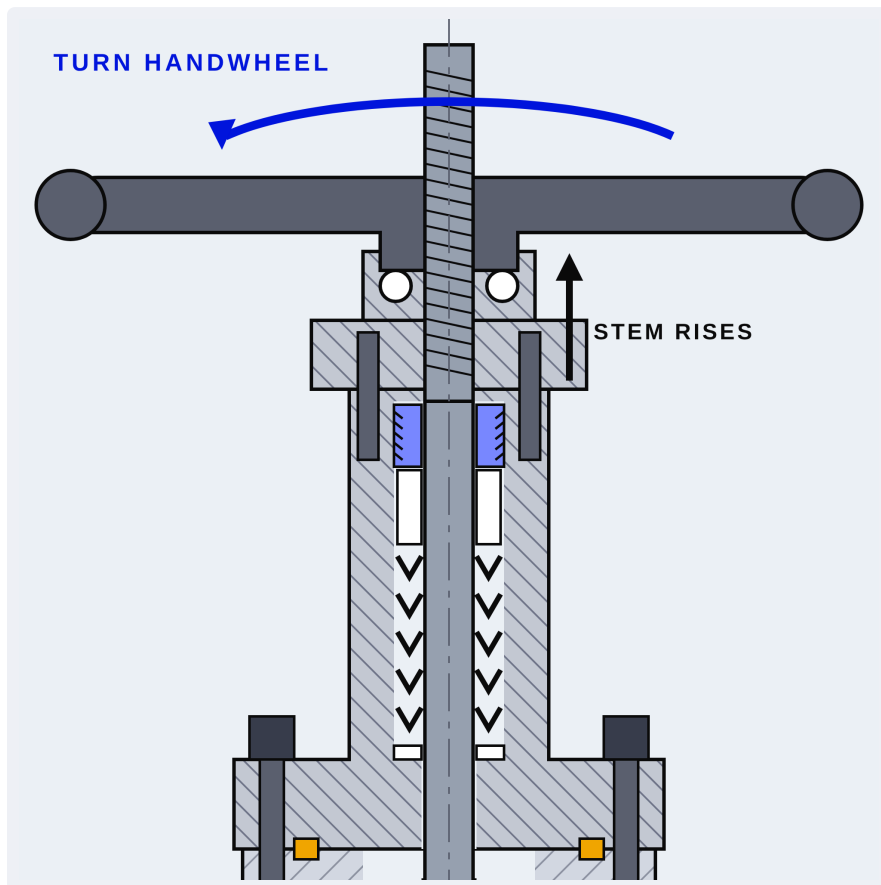
3

Metal meets metal

Gate-to-seat and seat-to-body faces seal. More pressure, more contact stress.

STEM AND PACKING

Moving the gate without leaking



Drive nut on bearings

The handwheel turns a nut held in the actuator base. Bearings take the thrust, so it turns smoothly under pressure.

Rising stem shows position

The threaded stem climbs as the valve opens. Stem up means open, at a glance.

Chevron packing

V-rings seal the stem in the bonnet. Pressure spreads the lips and tightens the seal.

Internal energiser

A threaded ring inside the bonnet preloads the packing through the bushing. No external gland studs.

API 6A ESSENTIALS

What the spec controls

Rated working pressure

2,000 to 20,000 psi, matched to the end flanges.

Material class

AA to HH. Sour service also follows NACE MR0175 / ISO 15156.

PR1 or PR2

PR2 adds design validation: cycle and temperature testing of the design.

Temperature class

Letter codes K to V, for example L: -46 to 82 °C, U: -18 to 121 °C.

PSL 1 to 4

Each level adds inspection, NDE, testing and traceability.

Factory tests

Hydrostatic shell test above rated pressure, then seat tests on every valve.

Designing or qualifying an API 6A valve?

Rapid Global: wellhead and valve engineering, CAD and FEA to API standards.

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