

1. GENERAL DESCRIPTION

Slide roller gates (fig. 1 and 2) are normally used to shut off large openings and high water loads. They are commonly used as protection mechanisms at hydraulic power stations where they can also be used as a regulation mechanism for the turbine coupling with the network (fig.2).

It is a gate formed by a strong reinforced fabricated structure, for which the guiding system works using a side roller system which reduces the gate's operation loads.

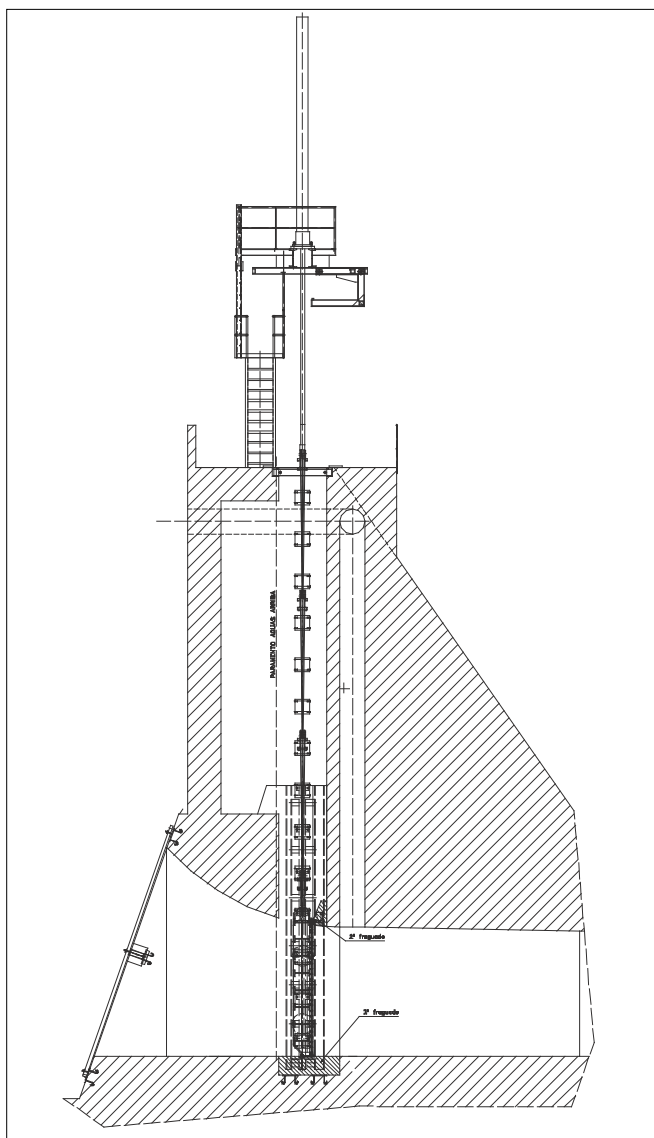


Fig.1 Roller gate

2. DESIGN AND MANUFACTURING CHARACTERISTICS

All **ORBINOX** gates are designed for the specific service conditions of each particular case.

The structural evaluation is performed using the finite elements method and CAD modelling systems.

Standards and criteria used for testing:

- DIN 19704: "Hydraulic Steel Structures. Criteria for Design and Calculation".
- DIN 19705: "Hydraulic Steel Structures. Recommendation for Design, Construction and Erection".

The roller gate includes the following elements:

- Gate
- Fixed parts
- Various
- Actuator



Gate:

Flat fabricated structure covered on its high pressure side by a skin plate adequately reinforced with profiles. Normally both the skin plate and the profiles will be made of carbon steel. At the side of the panel a roller system is installed on stainless steel shafts which enable the gate to be guided throughout its manoeuvres thus reducing operational loads.

The number of rollers will depend on the dimensions of the gate and the loads to be supported. It also has a side guiding system which may have sliding or auxiliary rollers. At the top of the panel is the large-sized shaft tie. The design of the gate is calculated for correct operation under extreme service conditions.

The gate water tightness is obtained through contact of elastomer profile joints with the seat. The joints are secured to the panel with stainless steel plates and screws and the seat, also made of stainless steel, is embedded in the concrete. All steel gates surfaces have an appropriate anti-corrosion protection for the service conditions.

Fixed parts:

The fixed parts are formed by two side profiles of laminate steel embedded in the concrete which form vertical supports serving as a guide for the rollers and which extend to the operation floor level. These supports house the front and side pressure carriages and the counter pressure carriages and are appropriately reinforced in order to transmit loads to the concrete. The seal side and at the bottom of these profiles have stainless steel plates on the sides to serve as a contact surface with the elastomer in the seal position. These side plates will be placed right up to the maximum opening position of the gate in order for the watertight seals to slide along them. In civil works a profile with a stainless steel plate will be concreted and will form the top seating face of the gate to provide water tightness for the upper seal.

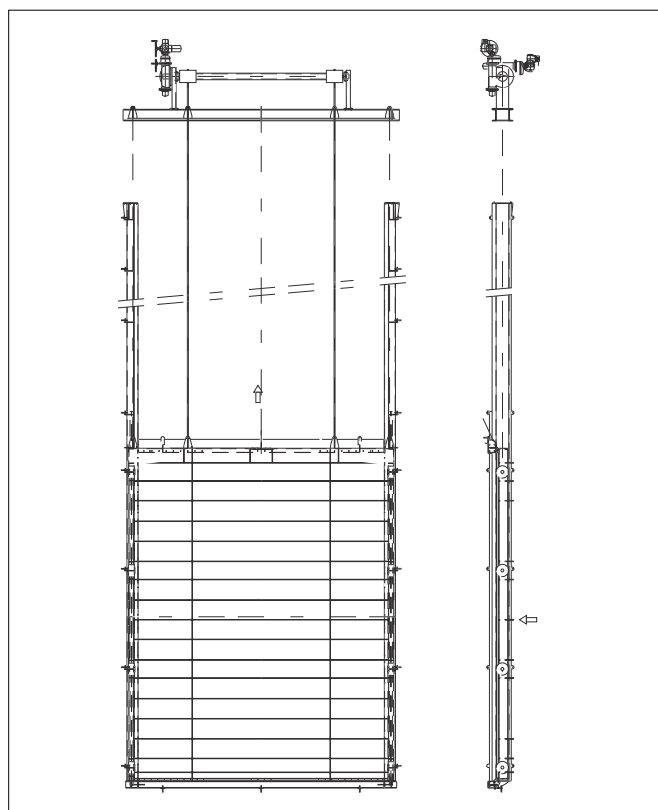


Fig. 2. Electric actuator

The bed is also placed on a concrete profile with a stainless steel surface for the lower seal. All steel surfaces of the gate have adequate anti-corrosion protection for the service conditions.

By-pass:

The roller gates incorporated a by-pass in the gate panel which will act with the main actuator and which will enable the gate to be opened with balanced loads.

3. ACTUATORS

Actuator:

The actuator may be electric (fig.3) or hydraulic (fig. 4).

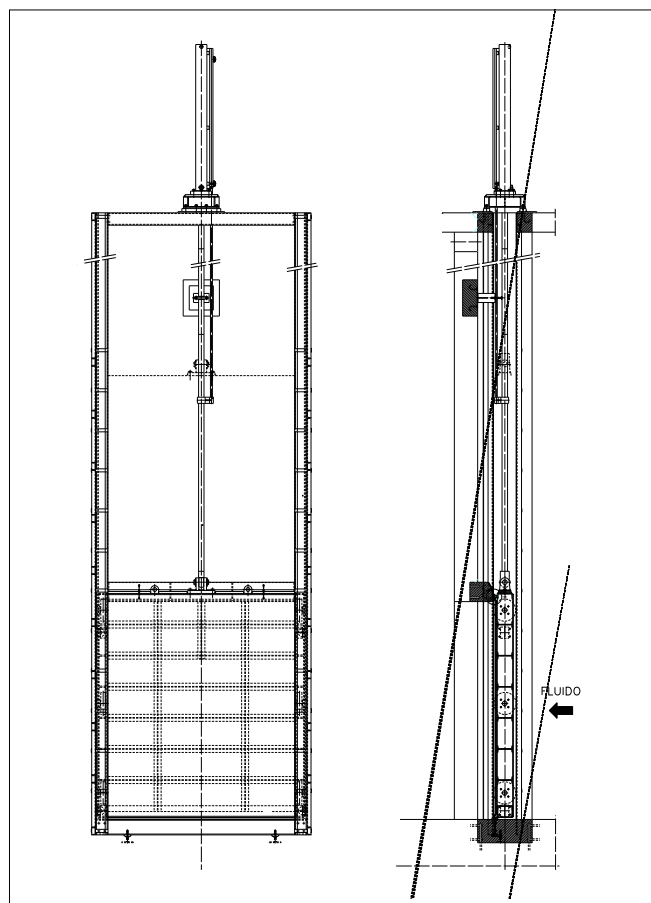


Fig. 3. Hydraulic Actuator

Hydraulic Actuator

The actuator operations are usually carried out by a double acting hydraulic cylinder with stainless steel chrome plated shaft. In the case of roller gates for protection purposes at hydraulic power stations, the actuator is commonly a single acting hydraulic cylinder with shock absorption on the final section where the gate is designed to close by force of gravity, adding ballast if necessary against passage flow. In both cases it has a mechanical position indicator device.

In cases where there is a large distance between the operation floor and the gates, the mechanical link system is used to join the two.

The hydraulic operation unit has an oil tank with a double motor pump (one for emergency purposes) and a manual emergency pump. The system is equipped with the necessary safety devices to prevent gate position losses.

The electrical operation cabinet is equipped with a PLC for programming opening and closure manoeuvres. It has the necessary buttons and indicators for controlling the gate operations.

5. SERVICE AND LOAD CONDITIONS

The slide gates are designed to support water loads of up to 100 mwc.

Consult our technician for special load conditions.

6. ANTI-CORROSION PROTECTION SYSTEM

Steel structures permanently immersed in water:

- Shot blasting SA 2 1/2
- 50 microns polyamide cured epoxy primer
- 300 microns glassflake reinforced polyamine adduct tar free epoxy coating

Steel structures in open air:

- Shot blasting SA 2 1/2
- 50 microns polyamide cured epoxy primer
- 100 microns aliphatic acrylic polyurethane finish blue RAL 5015

Steel structures, embedded in concrete:

- Shot blasting SA 2 1/2
- 50 microns polyamide cured epoxy primer

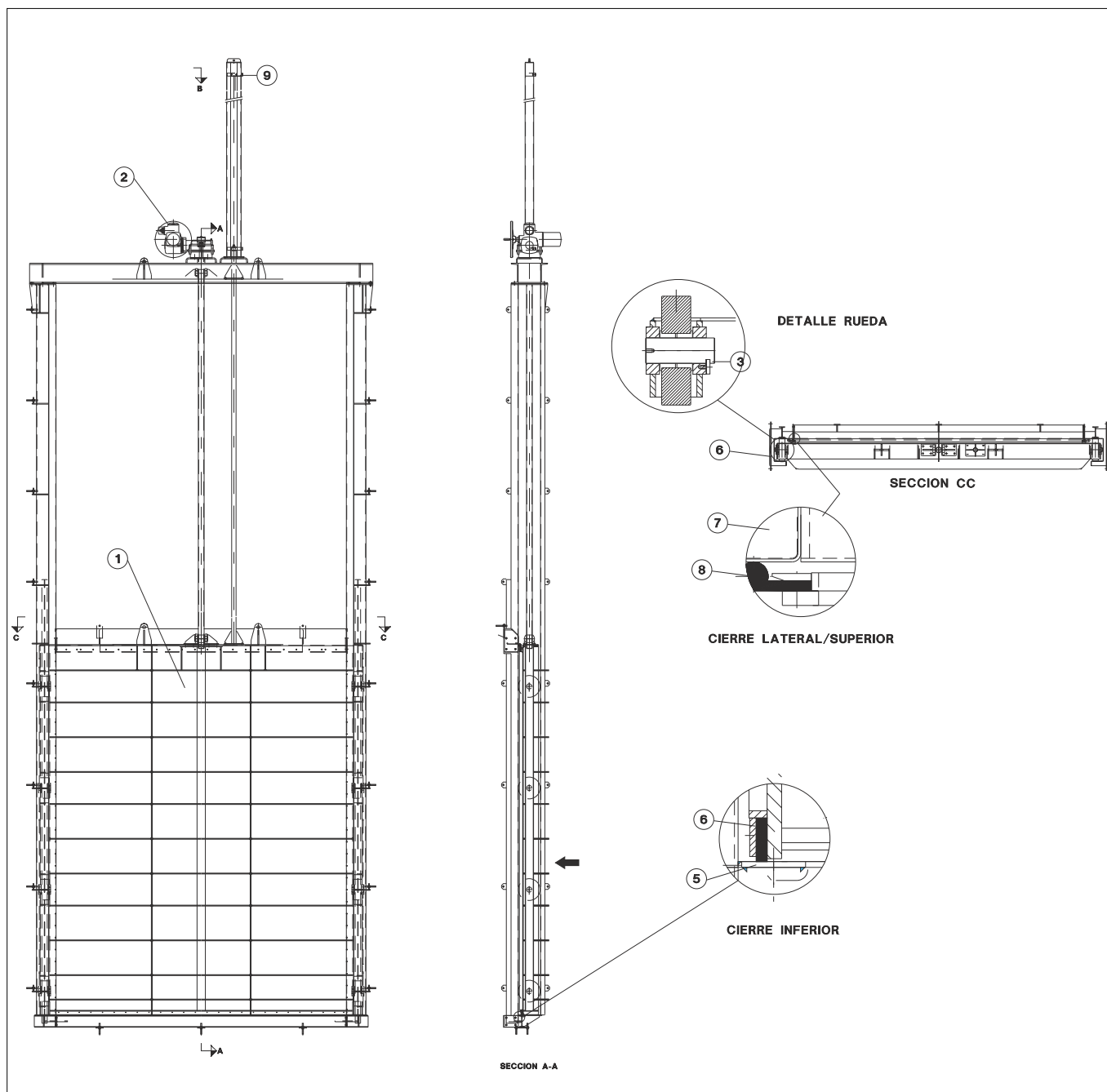
7. MATERIALS AND STANDARDS

Structural Parts:

EN 10025	DIN	ASTM
S275JR	1.0044	A570 Gr40

Stainless Steels

EN 10088	DIN	AISI
X2CrNi18-9	1.4307	304L
X2CrNiMo17	1.4404	316L
DUPLEX 2205	1.4462	A240



POSSIBLE MATERIAL COMBINATIONS

1. Gate:	S275JR	6. Side fixed parts:	S275JR
2. Actuator:	Hydraulic/Electric	7. Side seat:	AISI 304
3. Wheels:	AISI 431	8. Side/bottom/upper joint:	EPDM
4. Bottom fixed parts:	S275JR	9. Indication strip:	AISI304
5. Bottom seat:	AISI 304		

MODEL

MV



ROLLER GATE SPECIFICATIONS

OPERATING CONDITIONS

Gate application: _____

- ☐ Bottom outlet
☐ Hydraulic power stations (turbine)
☐ Other: _____

Maximum operating pressure: _____ mwc

Design Pressure: _____ mwc

CHARACTERISTICS

Size of the opening _____ mm x _____ mm

Operation floor-gate distance: _____ m

Actuator:

- ☐ Electric:
☐ Hydraulic:
 • Hydraulic Unit ☐
 • Electrical Cabinet (V/ _____ Hz) _____ ☐

☐ Bypass:

Observations: _____

TESTS

NDT _____

Welding approval: ASME IX ☐

Other: _____ ☐

OBSERVATIONS

