

## 1. GENERAL DESCRIPTION

"Taintor" type radial gates are gates with a pivoting section which be located in channels and dam spillways either as control elements for water levels or as regulation and discharge elements in deepwater outlets of dams.

It is a unit formed by a mechanically welded curved sector shaped panel which closes with elastomer profiles attached to the panel with fixed parts embedded in the concrete.

The cylindrical surface or panel is concentric to the support shafts, so that the thrust produced by the water will pass through them; this method therefore only needs a small amount of movement to raise or lower the gate. The loads to be moved include the weight of the gate, the friction resistance between the side closures, the piers and the shaft friction resistance.

Its main advantages are:

- Lifting force is considerably less
- Regulation capacity
- Safe and simple operation and rapid lifting

## 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 gates which are used in channels and dam spillways are watertight on 3 sides, sides and bottom (fig.1) and are designed to support overflows if needed.

The gates which are used as a regulation and discharge element for deepwater dam outlets are watertight on 4 sides, upper lintel, sides and lower seal (fig. 2). The complete structure is correctly reinforced in order for it to support the high mechanical stresses.

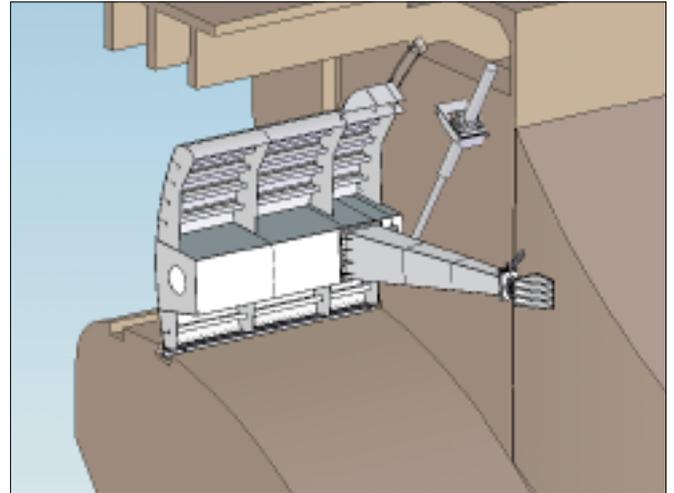


Fig. 1 Spillway

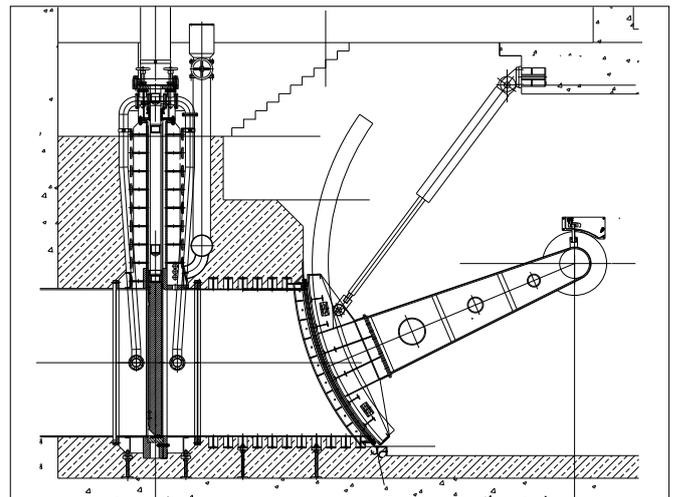


Fig. 2 Bottom outlet

A radial gate has the following elements:

- Gate
- Arms
- Fixed parts
- Actuator

### Gate:

The taintor gate is formed of a skin plate reinforced with horizontal and vertical beams to form a rigid unit. In some cases the rigidity in the central region is provided by a box beam in addition to the horizontal and vertical beams.

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#### Arms:

The arms joined to the panel are formed by mechanically welded structures and transmit the stresses to the concrete through maintenance free spherical bearings. The bearings have large-sized bolts through which the thrust is transmitted to the base plate on the concrete. Base plates are sized in order to uniformly distribute pressure to the concrete, without said pressures resulting excessive.

#### Fixed parts:

Water tightness on three sides (sides and bottom) is achieved with special profiles of EPDM elastomer (Ethylene-propylene) located on the panel. These profiles are secured using small metal plates and stainless steel screws. Both the side and lower closure surfaces are embedded in the concrete and are made of stainless steel AISI 304.

## 4. ACTUATORS

Manoeuvres are performed using two double acting hydraulic cylinders, with stainless steel chrome plated shaft. The normal operation pressure is between 60 and 120 Bar.

The hydraulic unit is equipped with a double motor pump and an emergency manual pump. The system is also equipped with automatic locking for the open position which detects any loss in the gate position and resets the unit until it is positioned in the completely open position again. The electrical cabinet is equipped with a PLC for programming opening and closure manoeuvres.

## 5. SERVICE AND LOAD CONDITIONS

ORBINOX "Taintor" radial gates are designed for:

- a) Spillway gates:** supporting water loads equal to the maximum gate height plus the specified overspill in each case.
- b) Bottom outlet gates:** water loads of up to 100 mwc.

Consult our technicians about special overspills and/or higher water loads.

## 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

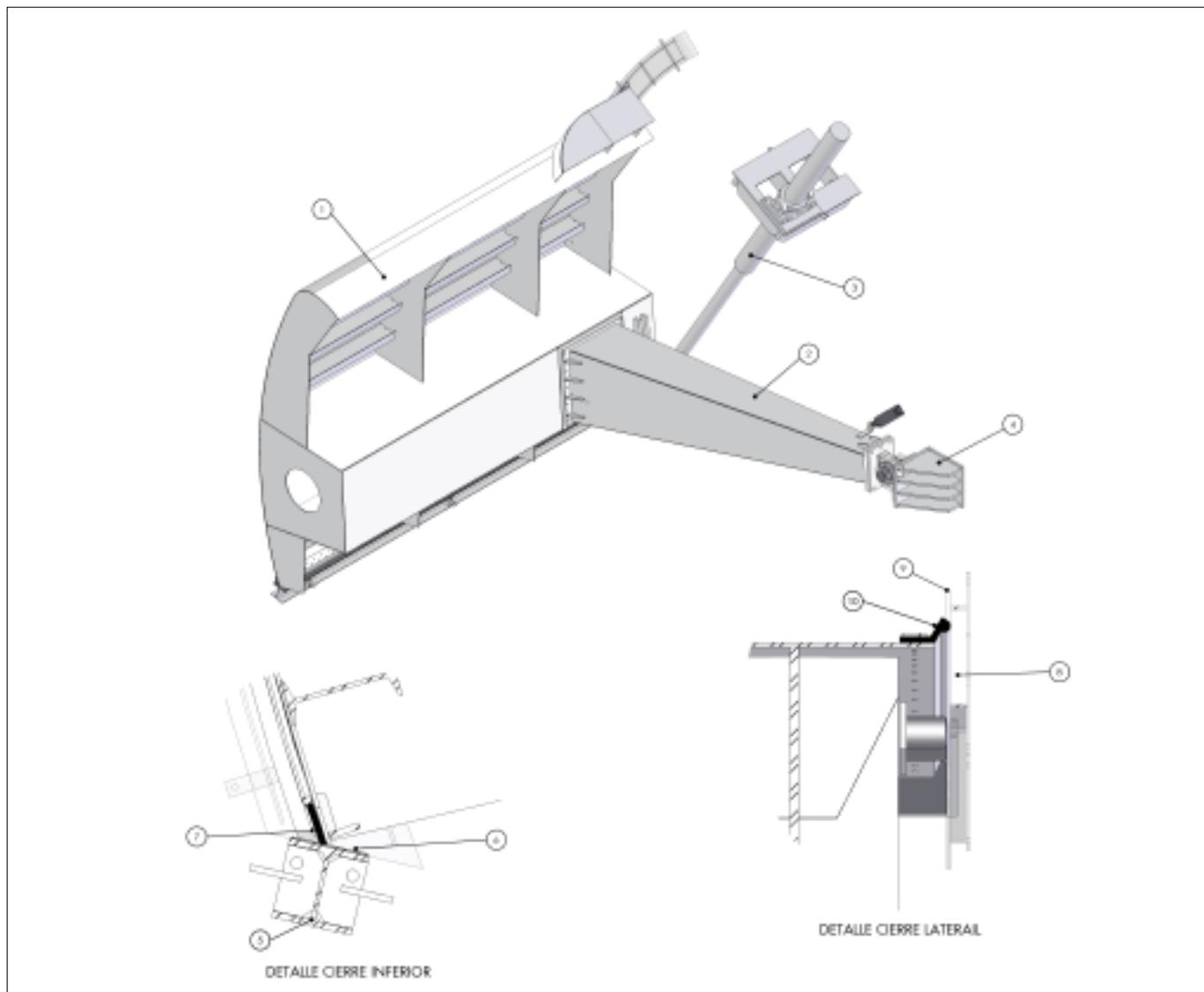
## 7. MATERIALS AND STANDARDS

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
2. Arms:	S275JR
3. Hydraulic Cylinder:	Steel with shaft in ASI 420
4. Bearing shaft:	AISI 431
5. Bottom fixed parts:	S275JR
6. Bottom seat:	AISI 304
7. Bottom joint:	EPDM
8. Side fixed parts:	S275JR
9. Side seat:	AISI 304
10. Side seal:	EPDM



### TAINTOR GATE SPECIFICATIONS

#### OPERATING CONDITIONS

Gate application: \_\_\_\_\_

Type of gate:

Spillway (sealed on 3 sides)

- Maximum overspill: \_\_\_\_\_ mm

Bottom outlet (sealed on 4 sides)

- Maximum operating pressure: \_\_\_\_\_ mwc
- Design Pressure: \_\_\_\_\_ mwc

#### CHARACTERISTICS

Size of the opening \_\_\_\_\_ mm x \_\_\_\_\_ mm

Actuator:

Hydraulic:

- Hydraulic Unit
- Electrical Cabinet ( \_\_\_ V/ \_\_\_ Hz)

Observations: \_\_\_\_\_

#### TESTS

NDT \_\_\_\_\_

Welding approval: ASME IX

Other: \_\_\_\_\_

#### OBSERVATIONS

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