D30.31.0-I

# FIXED-CONE DISPERSION VALVES

## Regulation and discharge

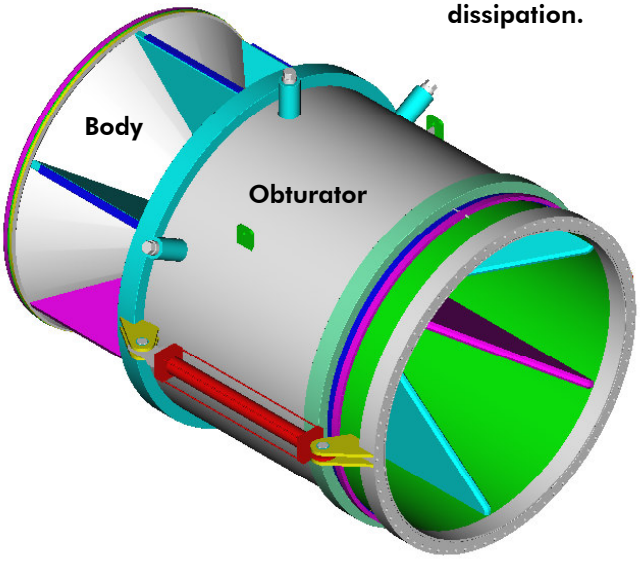
A reliable and controlled discharge, either under low or high pressure, requires an important energy dissipation without cavitation or vibration

The Fixed-Cone Dispersion Valve of high efficiency for water control and flow pass closing assuring a simple and relatively low-cost solution for dam discharge systems or other hydraulic plants.

The valve closing and control are performed by a cylindrical moving obturator and a fixed guide cone. Control is achieved with the movement of the obturator that slides over the valve body and changes the cylindrical open section between the obturator and the cone.

The Fixed-Cone Dispersion Valves are fundamentally used for free flow discharges in the atmosphere. However, in specific situations, the valve installation may be submerged in the downstream side water level. In these cases, to assure the proper energy dissipation by the valve, a dissipation chamber with proper hydraulic profile should be used to assure the flow aeration and preventing hydraulic instability phenomena.

The design concept of the valve assures an excellent hydraulic performance characterized by stable vibration and cavitation free operation, regardless of the opening. The energy dissipation is achieved under excellent conditions to assure symmetric flow. The discharge is guided so that there are no flow separation zones before the outlet section thus avoiding with this conditions that could introduce valve vibration. Due to the outlet cone, the water jet gushes out in an umbrella. Shape friction with the air over a large surface causes water spray and intensive kinetic energy dissipation.

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## Valve operation

The operation of a Fixed-Cone Dispersion Valves may as follows:

- Manual activation;
- Motor operation using an electrical activation;
- Hydraulic operation by means of two hydraulic double effect cylinders.

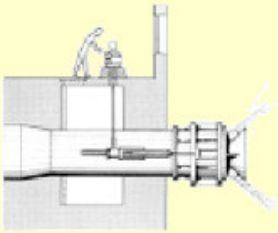
## Fields of application

The Fixed-Cone Dispersion Valves are mainly used in the case of free flow discharge in the atmosphere such as:

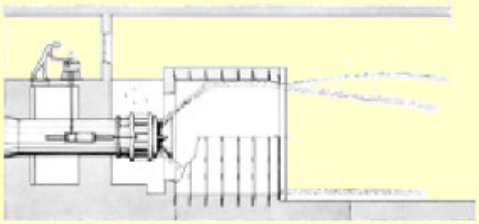
- For flood control and bottom discharge valve for a dam or reservoir;
- As a supply valve with flow control depending on the water requirement;
- As an energy dissipation valve if mounted at the end of a pipe.

## Installation schemes

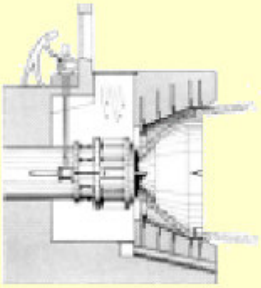
According to use and the hydraulic and constructive conditions for installation, several schemes, such as these shown below are feasible.



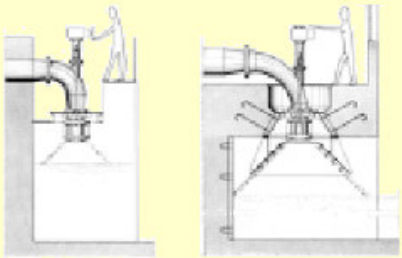
**A.** Typical installation situtation case for free flow discharge in the atmosphere without erosion damages of the dissipation chamber.



**C.** Typical case of application adopted when the flow discharge is into a gallery. The gallery liner dimensions and forms are defined by hydraulic model tests.



**B.** Installation scheme with cone deflector for energy dissipation. The hydraulic form of this deflector is defined by hydraulic model tests in order to be assured a good jet dispersion and the dissipation chamber protection against erosion.



**D.** Installation scheme in vertical position, applicable for small diameter valves.

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