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Selection Principles for Pressure Doors

Potable water chambers must allow access even after start-up, for cleaning and inspection work. In the past, the position for access was often selected above the free water surface. But stairs or ladders were needed then to reach the tank bottom, which meant troublesome transportation work for the operating staff. The moist subsoil involved additional accident risks.

Access over water surface:

- impeded access
- constructional complexity
- increased cleaning work
- formation of dead zones
- hindered flow

The introduction of submersible doors in the bottom section was a considerable improvement and facilitation. They allow easy access from the control building. If the door size is big enough, devices for cleaning or material for possible reconstruction can be brought in easily and the flow is not disturbed.

Bottom access:

- easy access
- easy installation
- reduced cleaning work
- no formation of dead zones
- unhindered flow
- reduced overall height due to pressure door saves building costs

Requirements on and features of pressure doors

Tightness must be a matter of course. But even this is not guaranteed by all makes available in the market. Other requirements which must strictly be fulfilled are:

1. Static safety

A pressure door, which is mostly embedded in concrete walls, is part of the building and demands accurate and controllable static calculations by an independent stress analyst. The door has to be carefully dimensioned referring to the maximum overflow head. Planners and operators should be aware that in view of the risk of bursting material thickness is not the suitable point to save on. But only careful and workmanlike construction guarantee a long life. For safety reasons, the DVGW sheet W 311 recommends at least material class 1.4571 ("V4A"). Acid-treatment in a pickling bath afterwards followed by passivation is indispensable. The manufacturer is to supply at least the "small" qualification certificate, preferably however the "big" one including chromium-nickel steels. Damage of the stainless steel surface has been reported sometimes by improper cleaning with chlorine-containing cleansers. The localized selective corrosion caused thereby may be stopped with suitable measures, but the material removed by then is another reason to keep certain reserves.

2. Hygienic safety

Pressure doors may never cause additional risks of germination. Both hollows and working surfaces for microbial growth have to be avoided. It lies already in the nature of stainless steel to eliminate any microbial attack due to its plain surface, providing proper material processing. It prevents also impairment of drinking water as no measurable migration (material transport) takes place. In some tanks the sealing between door plate and door frame has turned out to be problematic. Therefore, the KTW recommendations by the Federal Ministry for Sanitation and Health have to be complied with, the manufacturer being responsible to forward according certificates. HUBER pressure doors fulfil these requirements.

HUBER derived further variants from previous reference objects which facilitate installation and make operation safer:

3. Easy to maintain

Tightness is achieved only by several press-on points. While usually applied lever handles are inconvenient for frequent use, HUBER pressure doors are with a central shutter and need only turning of one single hand wheel to open the whole door. Joints and swinging mechanisms make quick opening and closing possible.

4. Supervision of water quality

Potable water has to be controlled permanently as to turbidity which is usually done via inspection windows above water level. To have the possibility to control also the bottom-near area, an additional inspection hole can be integrated in the door plate. An underwater projector is ideal to complete this solution. For chemical and microbial tests water samples need to be taken, which the pressure door is optimally suitable for: A short stainless steel pipe is fitted into the door plate in a way that its free end is with approx. 30 cm outside the boundary layer whereas the other end terminates with a stainless steel ball valve. Prior to taking the samples this valve is flamed for sterilisation.

5. Installation means

To ensure tightness a optimal connection between the door and outer wall is necessary. The HUBER pressure door has not only a sufficiently dimensioned wall flange, also installation is very easy: The complete door is integrated in the reinforcement and lined, which facilitates the building contractor's work and ensures tight connection with the concrete wall.

When filling in concrete, there is the risk of hollows formation and leakage if vibration is insufficient. On customer request, ventilation lines can be laid in the bottom frame. Enclosed air can escape and tightness between concrete wall and pressure door frame is guaranteed.

6. Condensed water outlet

As pressure door surfaces are in direct contact with the stored water, they are often much colder than the air in the control building. Dehumidifiers are mostly not installed so that increased condensation occurs mainly during summer. Though properly applied stainless steel does not involve any risk of corrosion, such condensed water is nevertheless unwelcome for hygiene and constructional reasons. A condensed water outlet integrated in the frame helps there: The frame plate is rolled to the middle and an outlet bow bedded in the concrete. A guide plate on the lower end of the door directs the liquid to the outlet, connection to the central collecting shaft is sensible.

7. Retrofit

Retrofit of the HUBER pressure door is no problem, but requires careful preparation and accurate installation: The frame is fitted into an accurately prepared wall clearance, is sealed and finally bolted.

8. Tank coatings

When refurbishing tank surfaces, partially even on new constructions, an additional coating is applied on the concrete. A S-shaped frame is therefore recommended which ensures that the coating material will close reliably with the frame. This avoids the formation of hollows and reduces the risk of germination. The complete coating with stainless steel makes it possible to have a tight connection by workmanlike welding.

High standard with the option for improvement

HUBER pressure doors have proven their suitability in many hundreds of water works. Beside high-quality standard designs, also a large variety of other types is available.

We will gladly give support and supply further information on request.

Related Products:

- [Pressure-tight Door](#)

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