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Rotodynamic pumps - Design of pump intakes -Recommendations for installation of pumps

Pompes rotodynamiques - Conception des ouvrages d'aspiration - Recommandations d'installation des pompes

Kreiselpumpen - Gestaltung der Einlaufbauten -Empfehlungen zur Installation der Pumpen

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This document (CEN/TR 13930:2009) has been prepared by Technical Committee CEN/TC 197 "Pumps", the

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights.

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Introduction

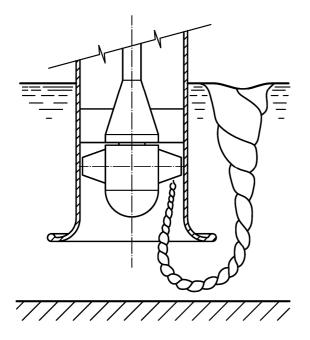
In addition to the risks of cavitation that may exist at the intake of any pump depending on the NPSH available, pumping from a sump poses specific problems.

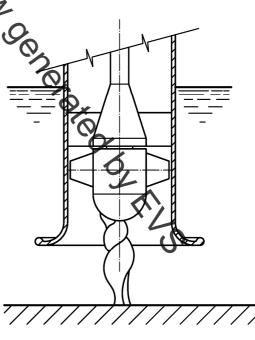
In fact, if the water passes from a flow state with an exposed surface to flow under pressure, significant swirling movements may occur and sometimes be amplified, thus creating a sort of funnel or vortex which opens out into the exposed surface of the sump with a risk of air being entrained or creating a swirling chimney, or whirl between the bottom and the intake producing degassing or vaporisation of the liquid in the entrance of the pump (see Figures 1a) and 1b) below

These phenomena, which are generally unsteady, can have unwanted effects on the plant:

- pump components; undesirable vibration of variou
- increased risk of cavitation;
- drop in efficiency;
- reduction in flow rate and/or head:
- Nr. IS OD Dr. risk of floating bodies being sucked in;
- intense and irregular noise.

Compliance with the recommendations in this document makes it possible, in most commonly encountered industrial applications, to avoid or at least limit the phenomenationed above.





1a) Vortex causing entrainment of air in suction piping

1b) Chimney or whirl between the floor and the suction inlet

Figure 1 — Types of possible disturbances

Scope 1

This technical Report contains recommendations for the design of pump intakes and the installation of 1.1 pumps.

As far as possible, these recommendations should be adhered to in order to obtain correct operation of the plant.

These recommendations are applicable regardless of the flow rate of the plant:

plant which works with clear water (or relatively unclouded) and relatively non-aerated water or any other liquid having physical and openical properties which are similar to those of water;

This document network eless contains several general recommendations for operation with cloudy (or very cloudy) NOTE water.

- pumping plant which has its from floor.
- This document deals with various intake configurations: 1.2
- Clause 3 contains recommendations which apply to intakes with vertical suction inlet;
- Clause 4 contains recommendations applicable to intakes with top suction inlet;
- Clause 5 contains recommendations applicable to intakes with floor suction inlet;
- Clause 6 contains recommendations applicable tontakes with side-wall suction inlet.

С

2 General

2.1 Factors which influence the operation of the pla

The following factors have an effect on the operation of the plant:

- a) Characteristics and position of the suction inlet:
 - arrangements of the suction inlet (vertical with bellmouth or an ered suction, top, floor or side-wall DY TYS intake);
 - presence or absence of a bellmouth or tapered suction;
 - distance between suction inlet and floor;
 - distance between suction inlet and side-walls;
 - submergence (level of liquid relative to suction inlet);
 - strainer.
- Inflow of liquid to the intake: b)
 - inflow velocity of the liquid;
 - shapes and dimensions of inflow;