Benefits of Hydrostatic Drive Systems

Quality and Reliability

Decanter centrifuges are often placed in harsh environments, humidity, heat, dust, and so on. In such an environment, the hydrostatic drive system is particularly suitable because of the robust design and resilience.
Hydraulics are also used in industrial, military and transport applications where there is no room for error – the use differs widely from the most sterile to the dirtiest environments. Examples include airplanes, railways, ships, submarines, elevators, construction equipment, mining, drilling and more.

- The hydrostatic drive system is especially suited to operate in such conditions because of the robust and simple construction; due to this it offers high operational safety
- Stable and reliable operation under fluctuating loading conditions this is one more reason the market place has justified the hydrostatic drive system
- Long Service life / Quality robust design and automatic heat dissipation
- No overheating of the hydraulic drive motor ROTODIFF, automatic continuous heat dissipation through the oil-conditioning system
- Hydraulic motors with only few slow moving parts are easy to maintain, in comparison to multiple stage gear-boxes with gears operating at higher speed
- Minimal operating and maintenance costs

Excellent Weight/Torque Ratio

The entire hydraulic drives made by Viscotherm (ROTODIFF product series) have an outstanding weight / torque ratio which is given due to the hydrostatic design.

- On average, hydrostatic drives have about half the weight of a standard gearbox with the same rated torque capacity
- This means that higher bowl speeds can be achieved.
- Reduced overhung loading and a reduced moment of inertia considerably decrease the vibrations on the machine
- The excellent torque to weight ratio lead to an increased life time of the main bearings

Overload Protection

A torque overload or torque peaks do not cause any damage to a drive Viscotherm.

- All mechanical components are protected against overload by various safeguards and finally protected by a simple pressure relief valve

Behavior of the Drives during Particular Operations

The Viscotherm drive system is a closed kinematic drive chain, i.e. the conveyor drive is operated independently of the bowl drive system. Due to this fact, the conveyor drive system has full 100% torque capacity in each operating mode.

- When the bowl is stationary
  Clean out of plugged scroll at stand still possible / change of direction of rotation possible.
- While the bowl is running up to speed
- During run-down of the centrifuge
- Ideal cleaning (CIP) at reduced bowl speed (lower G-Force)

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- During power failure, the energy from the rotating bowl can be recovered and used for continued operation of the scroll speed and a controlled shut-down, it prevents plugging and costly maintenance

High differential speed and full torque capacity at the same time. The danger of plugging (and therefore a total disassembly of the centrifuge) is almost eliminated. Flushing is also assisted, since a high differential speed can be obtained at near-zero bowl speed.

Automatic Operation and Regulation

On gear-box drive systems complicated control measurements are necessary for the differential speed control. Bowl speed, pinion shaft speed, gear-box ratio and the electric motor current are factors for control errors.
The hydraulic system pressure serves as a direct and accurate control variable.

- The hydraulic system pressure which is proportional to the scroll torque can be taken as a direct control signal and together with a suitable control system allows to achieve a very high degree of operational dependability and reliability of the drive
- Control and monitoring of the operation with easy integration into a process controller through standardized fieldbus interface

Highest Energy Efficiency and Increased Through-Put Capacity

The hydraulic technology operates independently of the main drive

- The scroll drive uses only the energy required to drive the scroll; it does not waste energy from the main drive. No braking action like on electrical back-drive systems, no energy conversion losses
- The direct precise speed control together with the highest torque capability permit increased through-put capacities

Reduction or Elimination of „Chatter or Slip-Stick" (Product Related Oscillations)

Some products, when sedimented in a centrifuge, have a tendency to cause torque peaks, torque oscillations "Chatter or Slip-Stick" (mostly by plasticizing). For example certain Starches, Cellulose derivatives, some crystalline products, P.V.C, Polysaccharides, Co-angulated blood, sulphur flower, or also less frequently caseins etc.. Such oscillations have devastating effects on a rigid drive systems (gear boxes) and lead to a short lifetime.

- The hydrostatic drives superb damping characteristics that can be further increased by changing the hydraulic impedance of the system
- If necessary, with the installation of a suitable hydro accumulator system, the damping effect can be enhanced (tuned), this guarantees the life of the drive system

Explosion Proof (ATEX) – ATEX Certification-ZONE 1

Applications in various hazardous areas such as oil production and refining will continue to be a challenge to the decanter manufacturer, especially as the centrifuge operation moves into less hospitable zones.

- The very durable and easy to use Viscotherm drive system is particularly suitable in hazardous areas because it contains a minimum of electrical components, which are easily obtainable in ex-proof version; this is in contrast to electric back drives
- The advantage of explosion proof design (including ATEX certification) will be a key feature to any decanter manufacturing company, contractor or end-user

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