

zone and the discharge zone. The wash can be easily applied whereas the wash liquid must then be removed without compromising the required ultimate moisture removal. Washing can only commence when the cake is sufficiently dry otherwise the cake will be washed from the drum. The diagram shows the different zones and principle of operation. Reducing the rotation speed to increase the wash window has a direct reduction in throughput.

The cake removal is assisted by applying back pressure from the underside of the filter medium within the discharge zone. The typical back pressure applied is 100 mbar which is sufficient to dislodge the cake. The discharge knife acts as a weir causing the disrupted cake to be dislodged and fall into the discharge route. Successful filtration is all about building a cake, maintaining a good level of vacuum, setting the drum speed and removing sufficient moisture to allow the cake to be completely discharged.

The ability to filter continuously relies on the complete cake being discharged before a new cake is formed within the filtration zone. An additional wash can be introduced between the discharge and filtration zones to clean the filtration medium however, this reduces the product yield unless recycled to the start of the process. Although effective, this adds complexity to the process and requires an additional separate isolation process to recover the solids.

RDVFs are used within the pharmaceutical, food, cosmetic, chemical, water and other industries. Alongside belt filters they are have the widest and most diverse span over industrial multiple industrial sectors. Maintaining RDVFs is low cost and consists of remeshing the filter medium and replacing several bearings and seals. Operating costs and the comparable cost of ownership is relatively low. Typical operating parameters for an RDVF are displayed in Table 13.1.

13.7.2 Rotary Pressure Filter/Dryer (RPF)

The BHS rotary pressure filter (type RPF), pictured in Figure 13.14 is a continuously operating filter for pressure filtration. It facilitates gas-tight cake handling in a series of separate process steps. Cake discharge can take place at atmospheric pressure.

The rotary pressure filter supports a broad range of process steps during a single rotation of the drum which takes typically 3 minutes. Further processes can be carried out after separating the slurry into filtrate and filter cake:

- Single- or multi-stage cake washing
- Displacement washing, counter-current washing, closed-cycle washing
- Reslurrying
- Solvent exchange
- Steaming, extraction
- Mechanical or thermal cake dehumidification