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Continuous Centrifuge for Use in Salt Washery

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A continuous centrifuge of capacity 10 tonnes per day has been designed and fabricated in the Institute. Preliminary trials have shown that it is suitable for use in salt washery plant.

CENTRIFUGAL separation is finding ever increasing use in chemical processing. Though it is an established operation in the chemical industry and fair descriptions of the various types of centrifuges in use abroad are available, there has not been made in India an attempt to design and fabricate a centrifuge suitable for a particular application.

Based on published articles[1-3] and literature, manufacturer's data and performance reports of various machines[4-7], laboratory data, and data on Indian batch type centrifuges, centrifuge with vertical perforated bowl and vertical scraper suitable for free draining or coarse crystalline materials is designed. Advantages are maximum output, possibility of drying the material up to 2-3 per cent moisture thus freeing the adhering liquor, low investment, unattended smooth operation with low labour cost and least wear and tear. Continuous centrifuge, suitably designed to accommodate the solid separation, is useful in overall simplification of plants and bringing down the investment.

In the continuous centrifuge designed and fabricated in the Institute, basket and scraper at 1000 and 900 r.p.m. are rotated by V belts and pulleys mounted on common shaft. Basket size is 22·85 cm. top dia. and 45·70 cm. bottom dia. with 40 cm. slant height. Output of this unit is expected to be 0·077 kg./hr sq. cm. of basket which corresponds to about 10 tonnes per day. Liquor handling rate is about 0·293 litres/hr sq. cm. Suitable hydrocyclone will be utilized in thickening the feed slurry to 50-60 per cent solids. The net cost of materials used in the fabrication of this centrifuge has been Rs 3000, overall size being $1·2 \times 0·9$ m. base $\times$ 1·2 m. height. Total weight of machine is about 3/4 tonne. Capacity to centrifuge crystals is at 10 tonnes per day, a distinct difference from batch centrifuge. A twin pulley drive dispenses with conventional four-gear assembly. There are about twenty parts of this centrifuge. These are feed hopper, top closure, casing, conical perforated dewatering basket with 150 mesh screen and scraper basket, ribs and basket supporting ring, frame, liquid collecting channel, hinge, solid shaft, hollow shaft, pulleys for two baskets to maintain differential speed, coupling and braking arrangement. This centrifuge theoretically requires 3·93 h.p. and 5 h.p. electric motor is used in practice.

Experiments have been done on dewatering the salt slurry using the centrifuge. Salt discharging rate in test runs is observed to be 6 kg. per min. which corresponds to about 8 tons per day. This is to be augmented to 10 tonnes per day by using suitable hydrocyclone. Moisture of salt crystals has been 4·07 per cent which compares favourably with the data on batch centrifuges. Attempts are being made to bring down the moisture content to 2-3 per cent and also to widen the applicability to various crystalline materials. Since all the design factors for continuous centrifuge are known, it is possible to provide

know-how on centrifuge of almost any capacity.

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