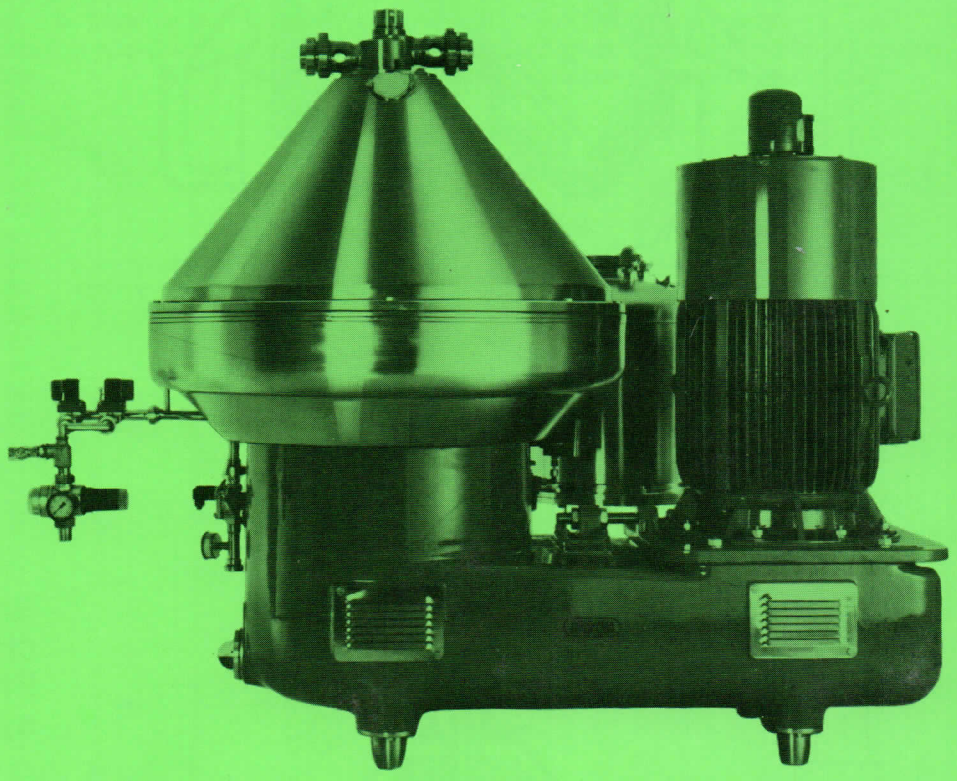
Data Sheet

SA 100 Clarifier

with self-cleaning bowl and integrated sound insulation

WESTFALIA SEPARATOR



SA 100-06-777

SA 100-06-777
Time-dependent control; photoelectric control

SA 100-36-777
Self-thinker control system sensing sediment level in bowl

SA 100- . . -577
For use in explosive surroundings

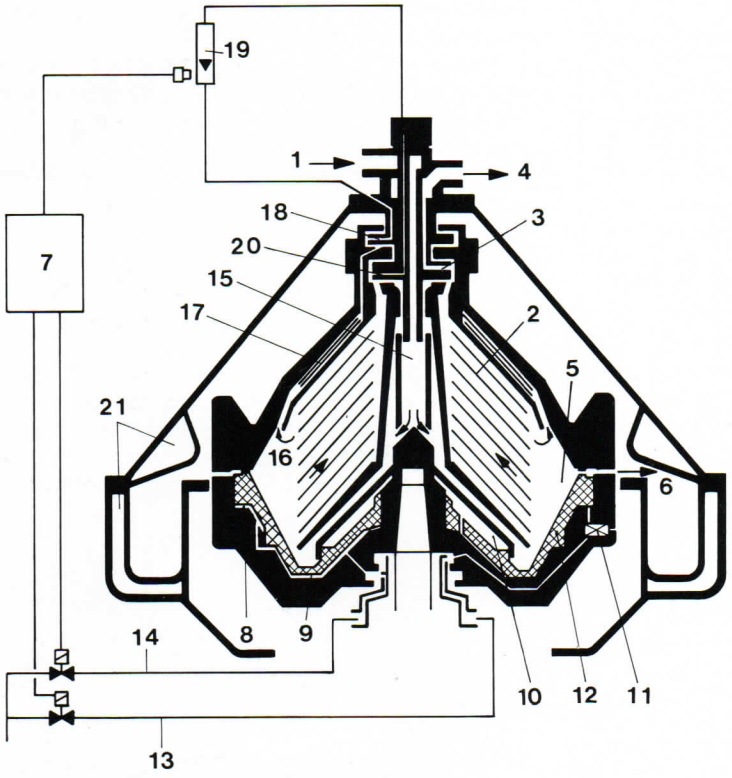
Function

Continuous clarification of suspensions; recovery of valuable solids.

Fields of application

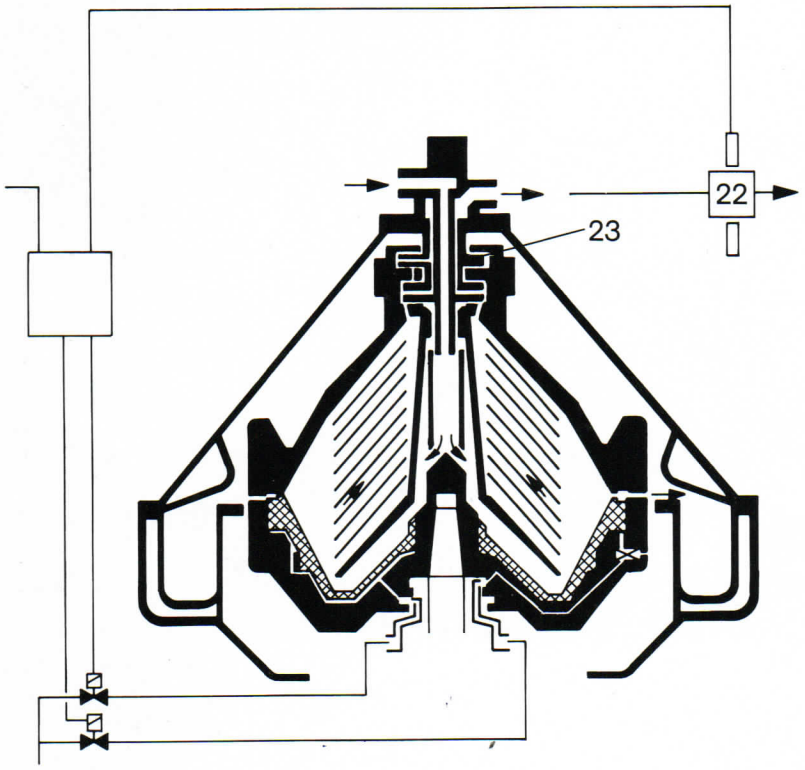
Food, beverage, chemical and pharmaceutical industries.

Operating principles and constructional features



Bowl with opening chamber (10) for maximum length of piston travel. Self-thinker control system using sensing liquid.

1 Feed
2 Discs
3 Centripetal pump
4 Discharge
5 Sediment holding space
6 Sediment ejection ports
7 Timing unit
8 Outer closing chamber
9 Inner closing chamber
10 Opening chamber
11 Bowl valve
12 Piston
13 Opening water
14 Closing water
15 Soft-stream inlet
16 Sensing liquid offtake
17 Clarifying discs for sensing liquid
18 Sensing liquid pump
19 Flowmeter
20 Sensing liquid pump
21 Cooling chambers

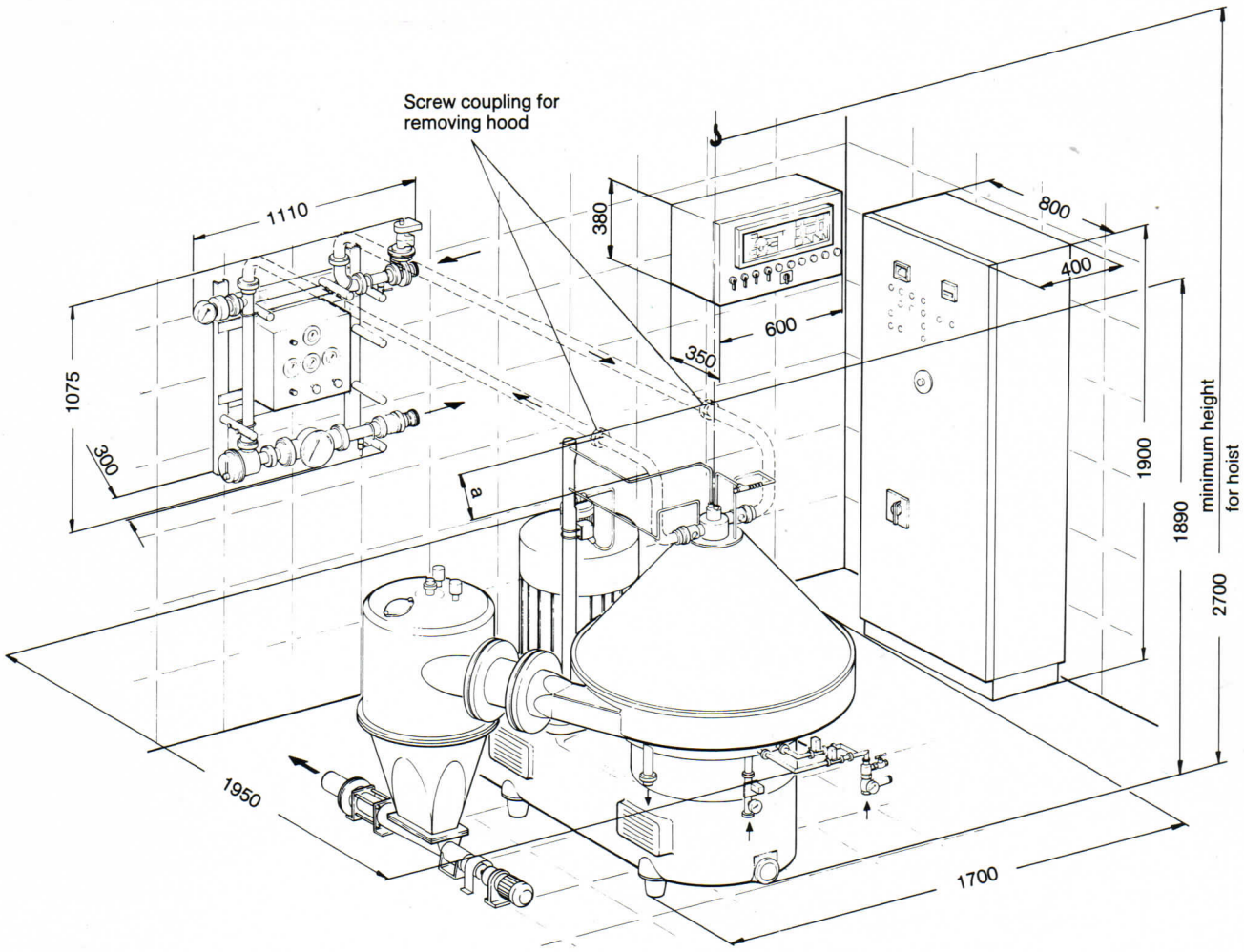


Bowl without opening chamber. Photoelectric control system.

22 Photoelectric cell
23 Hermetic liquid seal
(only used in beverage industry)

Optional features (available at extra cost)

- Stored-program timing unit
- Valve assembly
  All valves and control elements (pressure gauges, flowmeters, photoelectric cell) are mounted on a compact valve assembly.
  A cabinet containing pilot valves, pressure reducers, pressure gauges and a compressed-air control assembly is also mounted on the valve assembly (cf. fig. below as well as data sheet for valve assembly).
- Sealing mechanism using eccentric bolts
  to allow the space around the bowl to be filled with cleaning or disinfecting agent or to be supplied with steam, which prevents bacteria from forming within the stationary centrifuge.
  Once the machine has come to rest, the drive section can be sealed off by turning eccentric bolts located on the operating-water system. This automatically locks the drive section and lights up an indicator lamp. Once all feed and discharge lines have been closed, the entire upper section of the frame and hood interior can be filled with cleaning and disinfecting agents through a separate line.
  This method ensures that not only the bowl interior but also the bowl exterior as well as the hood and the sediment collector are subjected to intensive cleaning.
  If necessary, steam can be passed through the centrifuge.
  Overpressure inside the machine is not produced.
- Enclosed solids discharge system
  If the unit employs an enclosed solids discharge system, a compensator and a funnel are required to prevent vibrations from the centrifuge reaching the solids pump.
  The pump is controlled by level probes. The level in the solids collector can be monitored visually through the illuminated sight glass.
- Assembly jig
  for assembling and disassembling the bowl. The jig enables the bowl to be swung for inspecting and assembling the bowl valve.
  The jig also permits any maintenance work necessary to be carried out at a convenient height.
- Electronic vibration monitoring system
  This system monitors the level of vibration. If a certain pre-set level is exceeded, an alarm is sounded.



All dimensions in mm
All figures subject to alteration

In order to produce this separator, tried and tested methods have been combined with the most recent developments in the field of centrifuge construction.

This development has the following characteristics:

- A hydraulic system designed for controlled partial de-sludgings. It is not affected by external influences such as friction in the bowl, operating-water pressure, valve operation etc.
- The quantity of solids ejected can be controlled externally.
- The self-thinker and photoelectric control systems select the most suitable time for de-sludgings.
- A hermetic liquid seal avoids unwanted intrusion of air.
- Lower noise level due to sound insulating materials.
- A soft-stream system ensures gentle treatment of the liquid in the inlet section.

Bowl

The product enters the bowl via the inlet (1) and is clarified in the disc set (2). Centripetal pump (3) then conveys the clarified liquid under pressure to outlet (4), where it is discharged without foam.
The separated solids collect in sediment holding space (5) and are ejected periodically via ports (6).
This ejection process is controlled by timing unit (7). Bowl valve (11) releases operating water which in turn activates the piston (12). Operating water is used only during the actual process of de-sludging.

Product feed incorporating soft-stream system

A soft-stream system (15) ensures that the product is not subjected to shearing forces when it enters the bowl and is thus treated gently.

Automatic solids ejection

Bowl de-sludgings are controlled automatically by timing unit (7).

The following operations are possible:

- partial or total de-sludgings
- a combination of partial and total de-sludgings
- product displacement
- flushing after each total de-sludging.

Control systems

The following systems are available for controlling the fully automatic bowl de-sludgings:

- Timer
  A timer can be set to suit the particular operation. Recommended for use with suspensions in which the level of solids content remains constant.
- Photo-electric cell
  A turbidity meter or photo-electric cell (22) monitors the clarified liquid. If a pre-set turbidity level is exceeded, a signal is passed to the timing unit (7) which then initiates a de-sludging operation.
  Recommended for use with translucent liquids in which the level of solids content is not constant. This monitoring system can be installed on every standard centrifuge.
- Sensing liquid
  A small amount of liquid is drawn off and passed through clarifying discs (17). It flows through the flowmeter (19) before it is discharged in the main stream via sensing liquid pump (20). If the entrance to the sensing liquid cycle (16) is blocked by an accumulation of solids in the sediment holding space, a proximity switch installed on the flowmeter (19) passes an impulse to the timing unit (7) which then initiates a de-sludging operation.

Partial de-sludging/ total de-sludging

De-sludging operations are controlled by the timing unit.

Partial de-sludging

Inlet remains open during de-sludging operation. This is only possible for smooth, fibre-free solids such as yeast.
It is possible to adjust the bowl so that either 12, 15 or 20 l of solids are ejected.
The quantity of solids discharged during partial de-sludgings can be further regulated by throttling the feed rate.
For this purpose, a special compressed-air control valve is necessary (cf. optional features on valve assembly).

Total de-sludging

Inlet is closed during de-sludging operation. All the contents in the bowl are ejected.
It is possible to avoid losing valuable liquid by feeding a suitable medium into the centrifuge in order to displace the liquid from the bowl. This process can also be controlled by the timing unit.

Partial de-sludging operations

The piston (12) is in the closed position (left side of figure) when the closing chambers (8) and (9) are filled. When the bowl valve (11) is opened, the outer closing chamber (8) is emptied. The inner closing chamber remains filled. The bowl is opened for a short time and the solids are ejected through the ports (6). The piston closes automatically once some of the solids have been ejected and the pressure in the closing chamber (9) exceeds the opening pressure exerted by the product in the bowl. No liquid phase is lost during this operation. This system of controlled partial de-sludgings ensures that the quantity of solids which are ejected remains constant.

Total de-sludging operations

In the case of the total de-sludgings, both closing chambers (8 and 9) are emptied and the entire contents of the bowl are ejected.
In those versions with an opening chamber (fig. 1, item

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In those versions with an opening chamber (fig. 1, item

10) the hydrostatic pressure produced in this chamber forces the piston down to its lowest position.
The ejection ports are opened to their maximum extent. This method ensures that even particularly stubborn solids are ejected.

Feed and discharge

The product is fed into the centrifuge by means of a closed system of pipes. The clarified liquid is discharged foam-free and under pressure via a centripetal pump. The feed and discharge housing is equipped with sight glasses. All valves and gauges are mounted on a separate valve assembly.

Hermetic liquid seal

In the -06-version, as used in the beverage industry, the product is sealed off from contact with the outside air at the centripetal pump by means of an additional disc immersed in liquid. In the -36-version, the product is sealed off by means of a sensing liquid pump (18) situated above the main centripetal pump.

Cleaning-in-place (CIP)

Once the centrifugation process has been completed, the machine can be cleaned-in-place. The cleaning solution is circulated round the centrifuge and the connected systems.

Cooling system

The double-walled solids collector also serves as a cooling chamber. Even at high levels of concentration, the solids do not become baked on the walls.

Frame and drive

The frame is made of cast iron. The solids can be pumped away in an enclosed pipe system. For this purpose the concentrate cyclone is equipped with a compensator (see optional features).
In order to reduce the level of noise in this centrifuge, special noise insulated materials have been used as standard for the hood and the collector.
The level of noise is less than 78 dB (A) if an enclosed solids discharge system is used. The peaks attained during de-sludging operations exceed this figure for short periods.
The machine is driven by a force ventilated AC motor with heavy load starting using star-delta switching.
Narrow V-belts transfer the power directly to the bowl spindle without the intermediary of a clutch.
Intensive braking is made possible by a water brake for use at high speeds in conjunction with subsequent counter-current braking at lower speeds.
An independent lubricating pump greases the spindle bearings both when the machine is starting up and during normal operations. In addition, there is also an automatic lubricating system incorporating a suction pipe.
This two-fold feature ensures that production is not interrupted if one of the lubricating systems fails.

Monitoring features

- Sight glass for lubricating oil level
- Sight glass and pressure gauge for lubricating oil flow
- Flow monitor for lubricating oil flow
- Sensing liquid flow indicator for self-thinker control system (-36-version)
- Temperature feelers and automatic cut-off for motor in case of overloading
- Digital bowl speed indicator with limit contacts (optional feature)
- Electronic vibration monitor with limit contacts (optional feature)
- Illuminated sight glass for visual monitoring of solids in cyclone (optional feature).

Materials

All parts coming into contact with the product and the discharged solids are made of stainless steel.

Assembly and disassembly

The connection housing and the hood are removable.
The special tools required for assembling and disassembling the bowl are supplied with the machine.
A hoist with a lifting capacity of at least 1000 kg is necessary for lifting the bowl parts or the completely assembled bowl.

Optional features (available at extra cost)

- Stored-program timing unit
- Valve assembly
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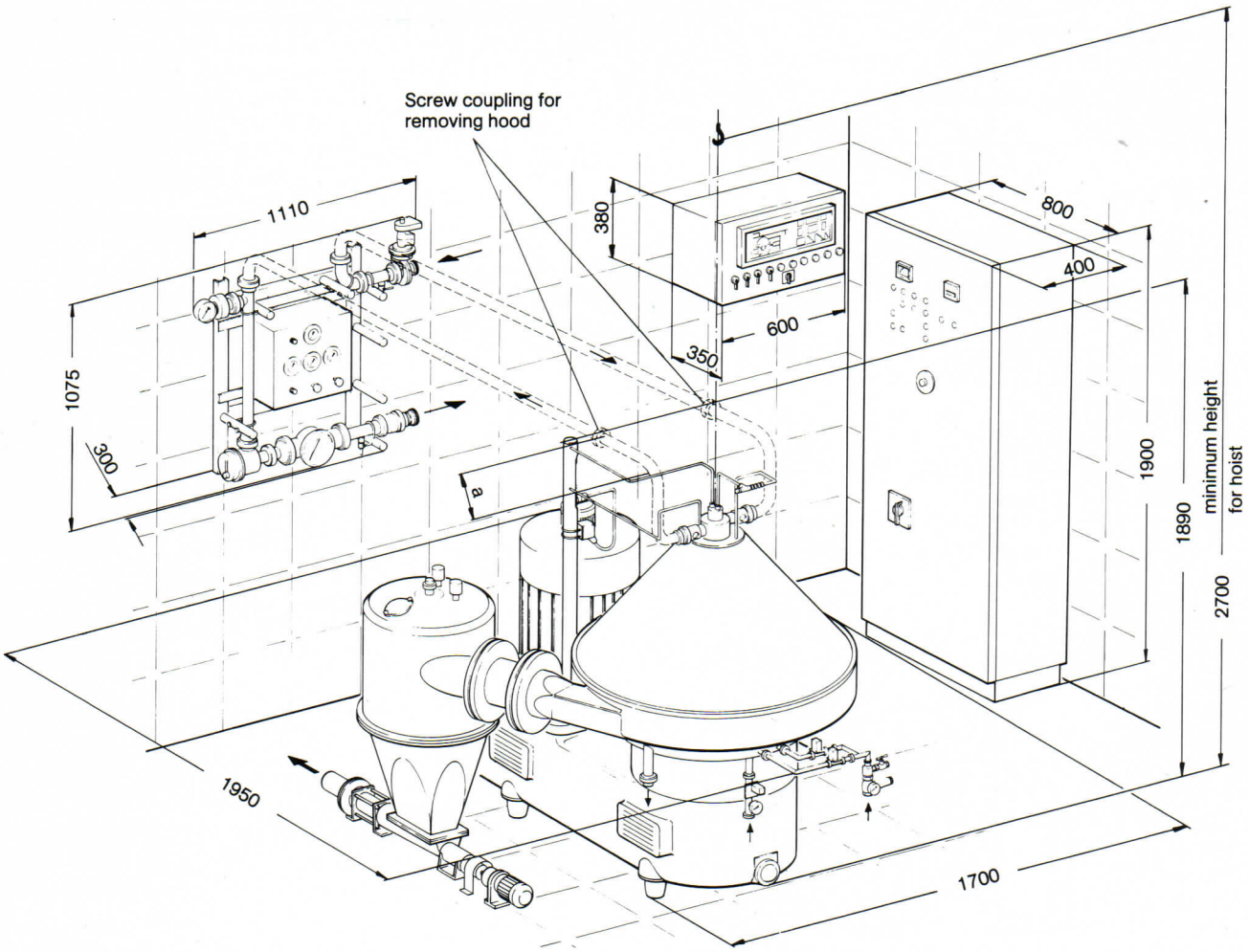

All dimensions in mm
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Technical data

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Bowl		
speed	4870	min^{-1}
total bowl volume (incl. 25 l sediment holding space)	46	l
Volume of sediment holding space using:		
small disc set	35	l
standard disc set	25	l
large disc set	20	l
Max. pressure produced by centripetal pump at 55000 l/h (higher discharge pressures at lower throughput rates)	4	bar
AC motor		
motor power (standard version)	37	kW

A 45 kW motor must be used if the following limit values are exceeded:

15000 l/h effective capacity and about 10 % (vol.) solids in product
20000 l/h effective capacity and about 6 % (vol.) solids in product
30000 l/h effective capacity and about 2 % (vol.) solids in product

If the de-sludging intervals are less than 1.5 minutes, a 45 kW motor is always required.

speed at 50 Hz	1500	min^{-1}
speed at 60 Hz	1800	min^{-1}
type	V 1	

Weights and shipping data

Weight of separator (excluding motor and bowl)	net	1460	kg
	gross	1750	kg
Weight of bowl	net	755	kg
	gross	815	kg
Weight of motor	net	485	kg
	gross	575	kg

Dimensions of packing cases (length, width, height)		
frame	2060 x 1510 x 1490	mm
bowl	800 x 800 x 860	mm
motor	1350 x 810 x 910	mm
Shipping volume	6.18	m^3

Capacity

Rated capacity	55000	l/h

The rated capacity indicates the maximum throughput rate of the bowl. The actual operating capacity is usually lower. It depends on the particular product and on the required level of clarification.

Subject to modification.

WESTFALIA SEPARATOR

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