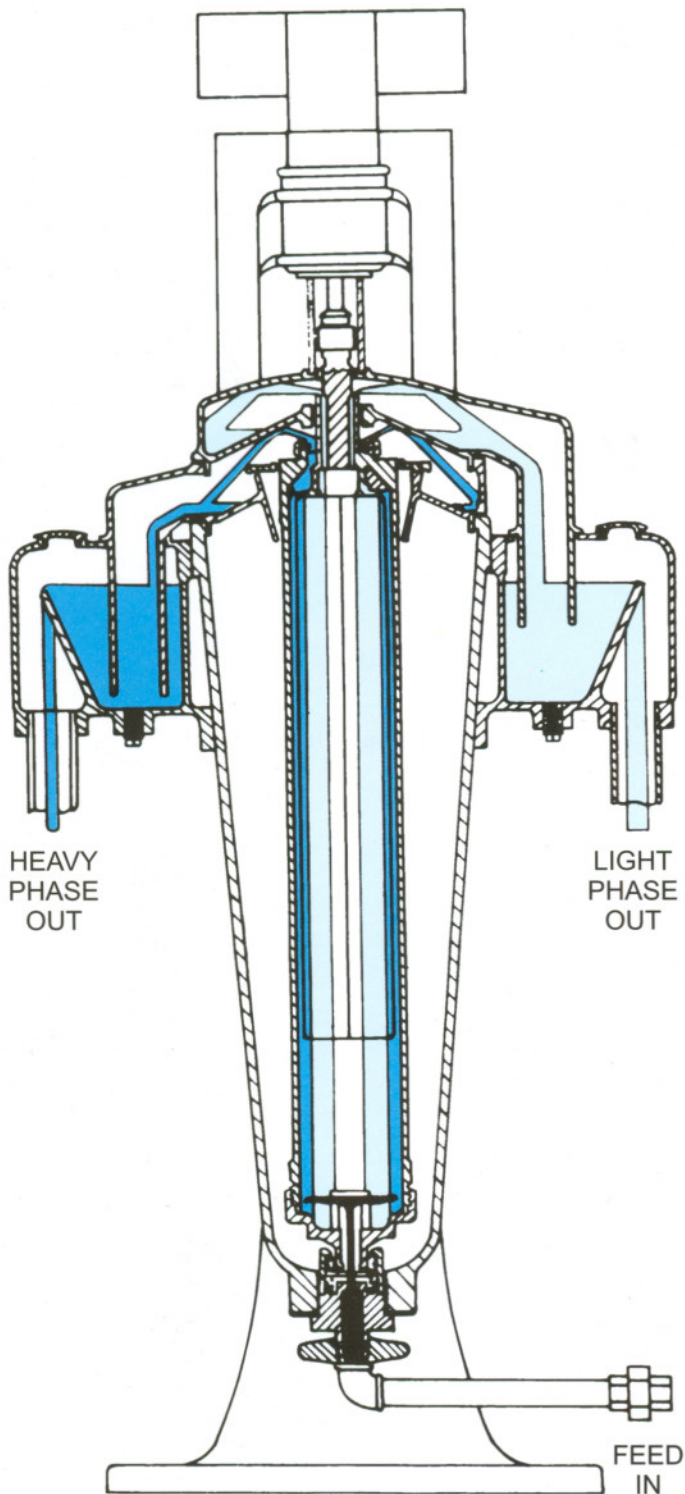


**High-G Tubular Bowl
SUPER CENTRIFUGE**

 **PENWALT**

HOW THE SUPER-CENTRIFUGE OPERATES



This sectional view of a super-Centrifuge shows the application of centrifugal force to separate a mixture of two immiscible liquids that may contain fine suspended solids, in small quantities, heavier than either liquid.

The mixture enters the Super-Centrifuge through an inlet at the base of the machine, and is introduced into the hollow cylindrical rotor which has two sets of openings at the top to allow discharge of the separated liquids. The rotor turns at 15,000 r.p.m. or higher, and generates a centrifugal force in excess of 13,000 times the force of gravity. This force separates the two liquids according to their specific gravities into concentric cylindrical layers. The lighter liquid is nearer the centre of the rotor and the heavier liquid forms the outside layer. At the same time the solids are deposited against the rotor wall.

The operation of the Super-Centrifuge is continuous, with the separated liquids being continuously displaced upwards by the incoming mixture, and discharged through their respective outlet ports at the top of the rotor. The layer of accumulated solids that builds up on the rotor wall is cleaned out when the centrifuge is shut down.

The flow from the covers is generally by gravity. A rotor designed to separate two liquids continuously, is known as a "separator". For removal of fine solids from a liquid a "clarifier" bowl is provided, for polishing the liquid.

High G Tubular Bowl SUPER CENTRIFUGE FOR PHARMA & BIO-TECHNOLOGY APPLICATIONS



- Sanitary design with all contact parts in stainless steel electro polished to a surface roughness $Ra < 0.5\mu$
- Material and manufacturing procedure meet cGMP requirements
- Clean-in-place (CIP) and sterilization-in-place (SIP) features are provided
- O-rings and gaskets in EPDM or Viton. Saturated steam sterilization at 1.0 bar g (121°C) to achieve BL-1-LS containments of Biohazards.
- High G force of up to 20000X G
- Jacketed barrel provided as an optional feature for temperature control.
- Inbuilt centripetal pump for pressurized liquid discharge
- Mylar or equivalent Bowl liner is supplied as standard for harvesting of solids batch wise as a paste or cake.
- cGMP documentation.

SUPER CENTRIFUGE In BIO-DIESEL PRODUCTION

Centrifugal separation forms an integral part of Bio diesel production.

- For refining of used vegetable oils.
- For separation of Bio diesel from glycerol methanol mixture after transesterification
- For separation of Bio diesel form wash water.
- To obtain the final purity of Bio diesel to international standards e.g. ASTM D- 6751
- Machine can be operated at high G forces up to 20000 X g.
- Centrifuge enclosure can be designed for N₂-blanketing & minimum solvent vapors loss wherever excess methanol is present.



MECHANICAL SPECIFICATIONS				
MODEL	AS12/HC	AS16	AS18	AS26
BOWL SPEED (MAXIMUM)	15000	17000	15000	17000
MAXIMUM CENTRIFUGAL FORCE	13200	17000	13200	20000
TOTAL BOWL CAPACITY	3.1 litres	6 litres	6 litres	9 litres
BOWL DIRT CAPACITY	2 litres	3.5 litres	3.5 litres	5.25 litres
BOWL WEIGHT	11 kg.	17 kg.	17 kg.	25 kg.

MINERAL OIL PURIFIERS						
CAPACITY LITRES/HR.						
MODEL	CRUDE OIL	MACHINE OIL	HYDRAULIC OIL	LUBE OIL	DIESEL OIL	HEAVY FUEL OIL
AS12	550	250/550	700	700	700	-
AS12HC	800	400/800	1000	1000	1000	-
AS16	1800	1500/1800	1800	1800	1800	-
AS18	1800/3000	1500/3000	2200/3400	2200/3400	2200/3400	1600/2200
AS26	3500/4500	3000/4000	4000/4500	4000/4500	4000/4500	-

SOME INDUSTRIAL APPLICATIONS OF SUPER-CENTRIFUGES

The field of application of the Super-Centrifuge is almost unlimited. The number of processes which involve a liquid/liquid/solid or liquid/solid separational steps are too numerous to describe here. A few of the better known ones are mentioned briefly below:

Oil Purification

Literally thousands of Super-Centrifuges are employed for the purification of:

- Diesel fuel oil
- Diesel lubricating oil
- Heavy fuel oil
- Turbine lubricating oil
- Transformer oil
- Switch oil
- Biodiesel

In steel mills and engineering works for the purification of:

- Rolling mill oil
- Engine test bed oil
- Cutting and hardening oils
- Grinding and drawing oils
- Hydraulic oils

Chemicals, Biotechnology and Pharmaceuticals Applications here include:

- Clarification of caustic soda solution
- Gum clarification
- Fractionation of human blood
- Printing inks
- Virus recovery
- Separation of cell debris

and very many special separation jobs which are often special to each particular process.

Food Manufacture

- Cider and wine clarification
- Soup clarification
- Fat clarification
- Fruit juice clarification
- Cocoa butter clarification and chocolate

Paint and varnish

- Removal of oversize pigment from paints & lacquers
- clarification of varnish.



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