CINC

Liquid-Liquid seperator

AUXILL Nederland

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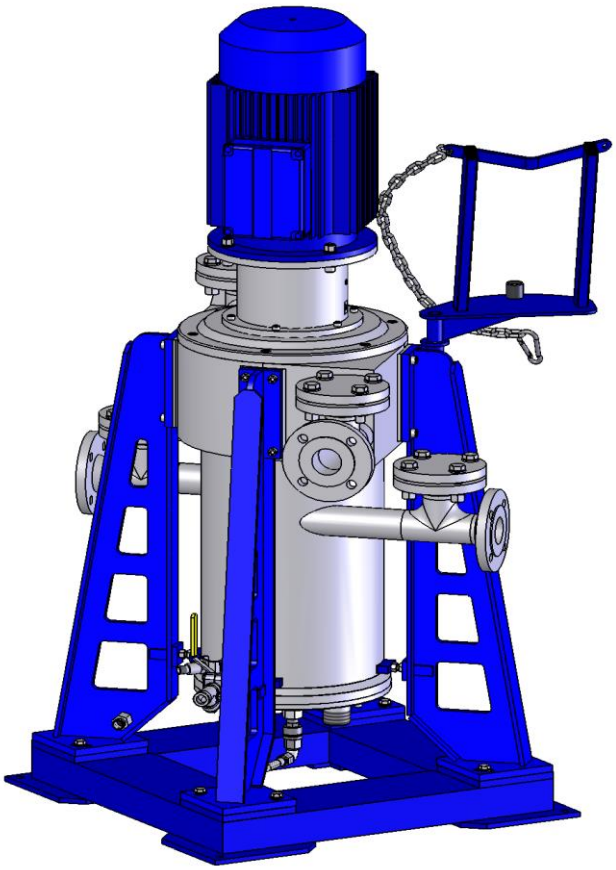


Performance

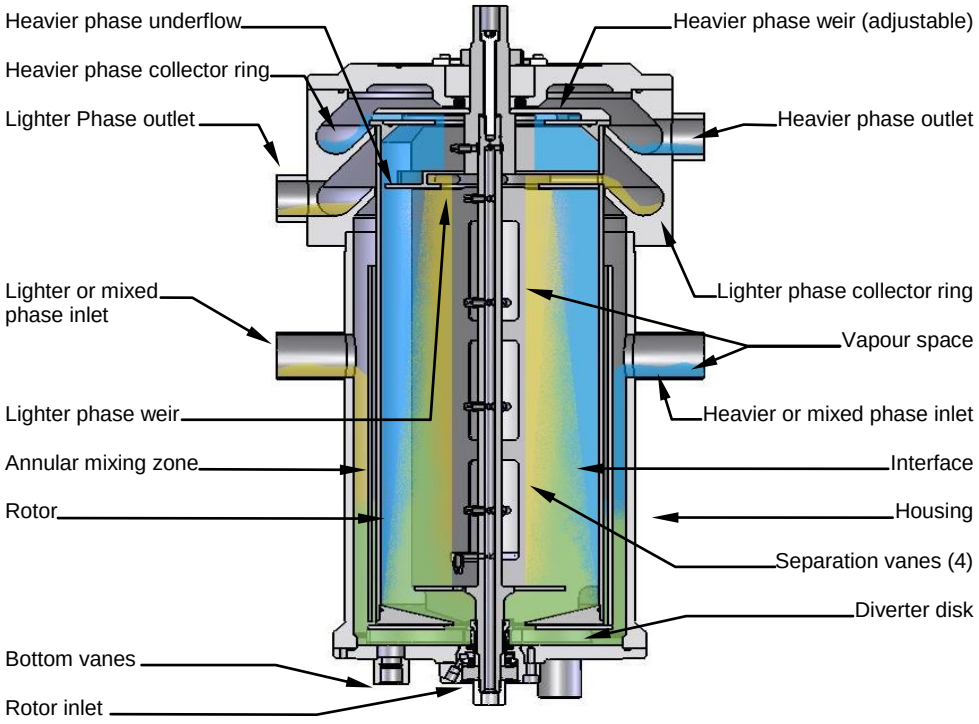
CINC proven, patented technology, coupled with our dedication to liquid processing, leads to our success in a broad range of applications worldwide. Constant research and development by CINC is combined with customer feedback to continually improve and advance our annular centrifugal contactors. Our design team develops the most dynamic, cost-effective, and reliable liquid-liquid centrifuges available. Ongoing efforts to improve existing designs and exciting new developments like our cGMP line demonstrates CINC commitment to remain on the cutting edge of centrifuge technology.

Our centrifuges are available in a variety of sizes ranging from R&D and pilot to full production scale units with flowrates ranging from 0.5 gpm to 200 gpm (1.9Lpm to 757Lpm). Process R&D results obtained with a **V 2** scale to full capacity models. Multiple units can be employed in parallel or series to handle larger flows or for multi-stage processes.

High separation efficiency from longer residence times at 100-1000 G's provides better process control for improved yields, faster processing, low in-process inventory and minimal waste.

Operation principle

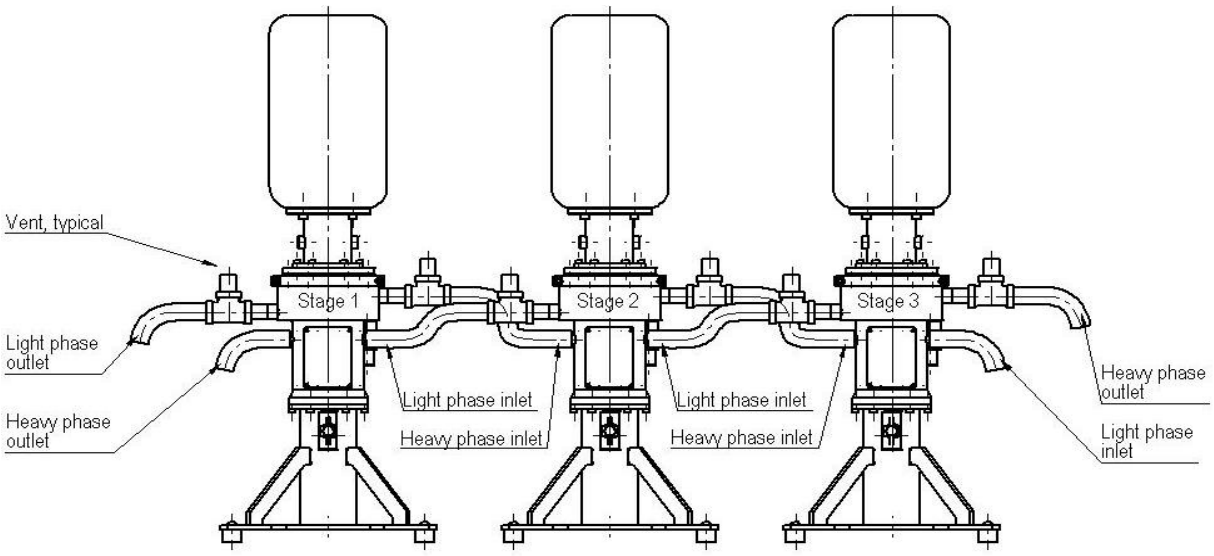
The CINC liquid-liquid centrifuge operates both as separator and contactor, which makes it a valuable tool in numerous types of processes. Its unique, patented design provides mixing and separation in a single, compact unit.



Two immiscible liquids of differing densities are fed to the unit and are rapidly mixed in the annular space between the spinning rotor and the stationary housing. The areas above the liquid levels are vapor space. For separation applications, a low-mix option is employed to reduce liquid shear in the annulus.

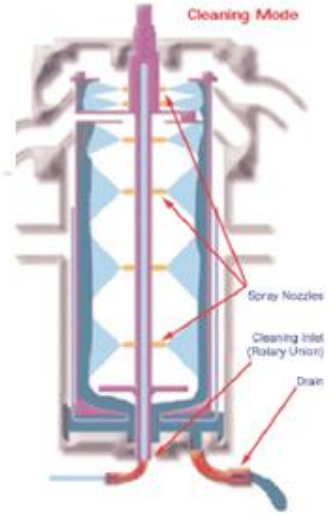
The CINC self-pumping rotor is divided into four vertical chambers, which are dynamically balanced by the pumped liquids. The mixed phases are rapidly accelerated to rotor speed once trapped in a quadrant, and separation begins as the liquids are displaced upward by continued pumping.

The separating zone extends from the diverter disk to the weir, providing a residence time for the liquid-liquid interface to form and sharpen. In most cases the CINC centrifuge can process 100% ratio changes without further adjustment. This capability is due to a large dynamic interface zone that allows it to shift a significant distance without loss of separation efficiency.



Clean-in-place (CIP) rotor

CINC unique patented Clean-in-Place (CIP) design offers ease of cleaning to remove accumulated solids from the inside wall of the rotor. The CIP design is also ideal for applications requiring thorough washing of the rotor to avoid cross contamination between product batches. A rotary union attached to the tail shaft provides the inlet for the cleaning solution. The process steps for cleaning are quite simple and the entire sequence can be fully automated. The total operation is performed in minutes requiring no disassembly of the unit or connection of supply lines. When multiple units are operating in parallel to handle a continuous process, automated sequential cleaning can be used to avoid flow interruptions, without operator attention.



Clean-in-Place rotors are available on all standard CINC centrifuges from the model **V 5** to the model **V 20**. Specialized designs utilizing both CIP and cGMP take-apart technology are also available. If your process contains tramp or small quantities of solids or requires thorough cleaning between batches to insure consistent product purity, our technology is the answer.

Design & Manufacturing

CINC maintains a complete in-house capability for the manufacture of all critical components of our liquid-liquid centrifuges. This ensures that every unit is built to the highest standards of quality and craftsmanship. All units are fully assembled and wet tested prior to shipment.

CINC experience and capabilities allow for the use of a variety of materials and drive systems to meet the most demanding application requirements. Standard construction is all 316L stainless steel. Hastelloy and other corrosion resistant alloys are also available to fit your process needs. Our direct-drive packages provide quiet operation **V 20** is 65 dB at 1 Meter) and can be configured for a variety of electrical requirements. Hydraulic and pneumatic drives are also available.

cGMP design

Our cGMP line enhances the utility of our already versatile centrifuges for use in sterile and FDA approved processes. Inherently simple, the standard CINC design lends itself well to a fully take-apart model that can be easily and rapidly dismantled for thorough cleaning and inspection. Our cGMP units are comprised of a minimum of components and disassembly is accomplished in a series of logical, easy steps.
The cGMP **V 5** design eliminates the need for a lower bearing and mechanical seal by utilizing a double upper bearing. This maintains rotor stability while enhancing the simplicity of the unit for disassembly and reducing maintenance.

Other designs
Take Apart/Hanging/Clean in Place (TAH/CIP)

The TAH/CIP centrifuge utilizes a hanging rotor with no lower seal or bearing. The removal of the seal and bearing simplifies operation and reduces maintenance requirements. Removal of the rotor for cleaning can be accomplished by removal of only six (6) cap screws at the top of the bearing housing

Hanging Hot Cell (HHC)

The Hanging Hot Cell centrifuge was specifically designed for use in nuclear applications in which removal of the rotor must be made quickly and easily to minimize exposure to technicians. It uses the hanging design to reduce maintenance and extend operating time between maintenance while at the

same time maintains the clean in place capabilities. In addition, the clean in place is expanded to include washing of the housing annulus and collector rings so that all of the internals may be flushed and cleaned to maximize removal of radioactive residue prior to maintenance.

In addition to the standard designs various special designs have been manufactured for special applications including dual seals and heating/cooling jackets.

The table below shows the configurations available by model. The CIP configuration of the V05 and V10 are no longer manufactured by parts and support are available.

MODEL CONFIGURATIONS					
MODEL	CIP	TA	TA/CIP	TAH/CIP	HHC
V02		X			X
V05	X		X	X	X
V10	X		X	X	X
V16	X				
V20	X				

Our cGMP/CIP **V 10** design allows thorough washing of the internal surfaces of the rotor without disassembly, yet can be fully taken apart when inspection is required. Custom electropolished finishes are available to meet individual plant specifications. The cGMP was chosen "breakthrough product of the year" by the editors of Processing Magazine in 1999.

Applications

Environmental Industry
- Oil-spill cleanup
- Groundwater remediation
- Wash water recycling
- Bilge water treatment
- Industrial laundry water de-oiling

Biotech Industry
- rDNA products
- Broth extraction

Mining & Metals Recovery Industry
- Solvent extraction of various metals
- Solvent recovery and recycle
- Wastewater separations

Food & Nutrition Industry
- Isoflavones
- Edible oils
- Flavors extractions
- Nutraceuticals

Chemical Industry
- Polymer feed stocks
- Polymer production
- Butadiene & styrene resins
- Organic peroxides
- Azeotrope separations
- Solvent recovery
- Heat transfer fluid recovery

Pharmaceutical Industry
- Antibiotics
- Erythromycin
- Penicillin

Petroleum Industry
- Acid-flowback
- Well completion fluid recovery
- Produced water processing
- Oil-dehydration
- Land and offshore
- FPSO & fixed platform installations

Specifications

Operating Range of	
Model	Maximum Flow (litres per minute)
V-02	1,9
V-05	22,7
V-10	113,5
V-16	340,6
V-20	757

Unit Specifications						
Model	Rotor (øcm)	Flow (lpm)	Footprint (cm)	Height (cm)	Fittings (inch NPT)	Weight (kg)
V-02	5.08	1.9	22.8 x 22.8	63.5	3/8 x 3/8	11.3
V-05	12.7	22.7	30.5 x 30.5	91.4	1 x 1	68
V-10	25.4	113.5	70 x 70	152.4	2 x 2	340
V-16	40.6	340.6	91.4 x 91.4	195.6	4 x 4	1361
V-20	50.8	757	122 x 122	256.5	4 x 4	2041

RPM vs. G-Force correlation