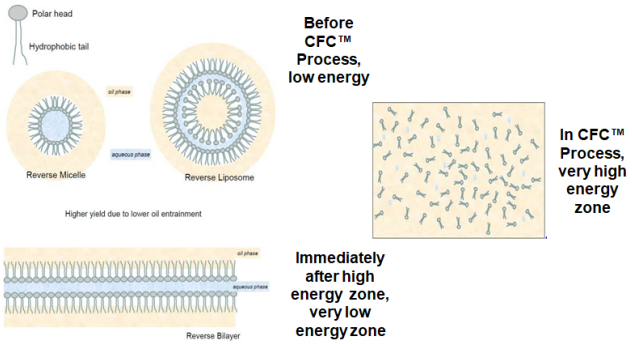
Beyond Mere Shear Force - Only CFC™ Cavitation Changes Micelles



CFC™ disrupts phosphatide, ffa and impurity aggregates for efficient reaction with water/acid/caustic

CFC™ Cavitation

- A booster pump increases pressure in bulk liquids, in turn decreasing the water droplets volume.
- Discharge occurs through a restricted, “sharp-knife-like orifice” that leads to a sudden reduction in pressure and explosive decompression.
- Sudden decompression bursts water droplets into miniscule beads due to high speed droplet deformation and expansion, resulting from atomization.

Comprehensive Manufacturing Capabilities

CFC™ Characteristics

- Small footprint
- Robust and durable
- Anti-clogging design
  - ✓ clean-in-place (CIP) not necessary
- Adjustable capacity (50 – 100%)
  - ✓ without energy inefficient recycle loop
- No erosion
- Energy efficient
- No Gas pockets in soap stock (crucial for yield)

arisdyne systems®

Applying ultra shear force through Controlled Flow Cavitation (Patented)

CFC™ Cavitation Applications for Vegetable Oil Refining

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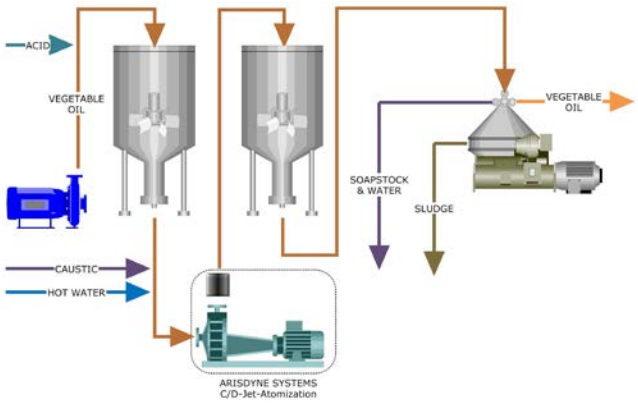
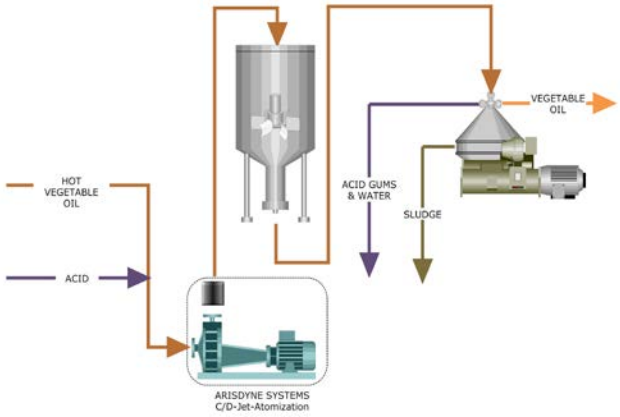
- Improved Oil Yield
- Reduced acid consumption
- Reduced caustic usage
- Reduction/elimination of water wash
- Reduced/elimination of silica usage
- Increased filter cycle times
- Reduced water consumption

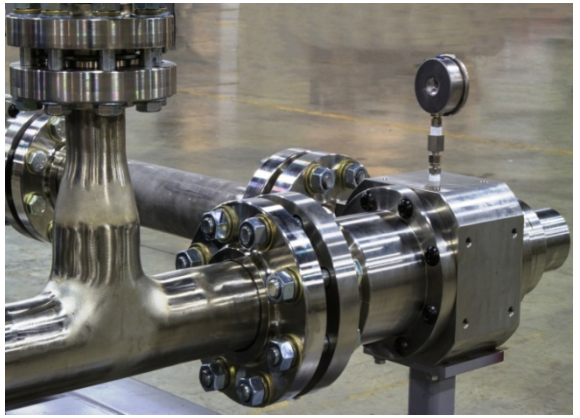
Special Degumming / Neutralization



Acid Degumming / Water Degumming



Adjustable CFC™ Chamber; Optimum Performance at Variable Capacities



Anticipated Improvements

Neutralization

Operating Parameter	Crude SBO Feedstock	Conventional	With CFC™
Oil Temp	-	50˚C - 90˚C	50˚C - 90˚C
Phos Acid Addn	-	800 ppm - 900 ppm	0 ppm – Stoich
Caustic Solution	-	7% - 16%	10% - 20%
Caustic Excess	-	25% - 80%	0% - 10%
Retention Time	-	5 min - 20 min	5 min - 15 min
FFA	0.4% - 1.5%	0.005% - 0.05%	0.005% - 0.05%
Soaps	-	150 ppm – 800 ppm	?? – 150 ppm
Phos	500 ppm - 800 ppm	5 ppm - 25 ppm	0 ppm – 5 ppm
NHP	40 ppm - 80 ppm	5 ppm - 15 ppm	0 ppm - 5 ppm
Ca	30 ppm - 50 ppm	3 ppm - 15 ppm	0 ppm - 3 ppm
Mg	10 ppm - 30 ppm	2 ppm - 10 ppm	0 ppm - 2 ppm

Degumming

Operating Parameter	Crude SBO Feedstock	Conventional	With CFC™
Oil Temp	-	75˚C - 95˚C	75˚C - 95˚C
Water Addn	-	3% - 5%	1% - 2%
Water Temp	-	80˚C - 95˚C	80˚C - 95˚C
Retention Time	-	15 min - 60 min	5 min - 10 min
Phos	500 ppm - 800 ppm	80 ppm - 500 ppm (150 ppm typical)	20 ppm – 50 ppm (< 30 ppm typical)
NHP	40 ppm - 80 ppm	40 ppm - 80 ppm	20 ppm - 50 ppm
Ca	30 ppm - 50 ppm	30 ppm - 50 ppm	15 ppm - 30 ppm
Mg	10 ppm - 30 ppm	10 ppm - 30 ppm	5 ppm - 20 ppm
AI% in dried gums	-	65% - 70%	75% - 80%

Efficient Adjustable Capacity

Power Consumption (@50Hz)

Model	capacity [mt/day]	Max. power [kW]
CM 300	60 - 150	16
CM 600	150 - 300	32
CM 1000	250 - 500	54
CM 1500	370 - 750	81
CM 2000	500 - 1000	108
CM 2550	625 - 1250	135
CM 3000	750 - 1500	163
CM 3550	870 - 1780	193

Approx. Dimensions: 2 m x 2 m x 1.2 m