

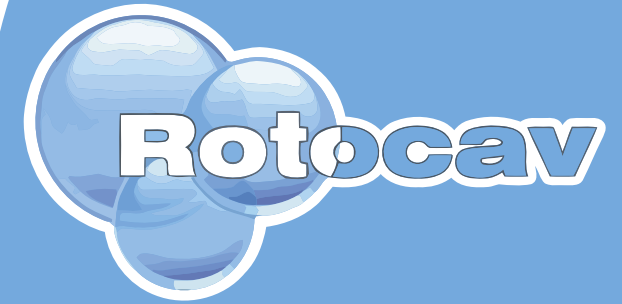
## Advantages

- Process efficiencies improvement
- Time, operating cost, capital cost saving
- Product quality and yield improvement
- Low power mixing for most all applications
- More effective and efficient mixing
- Mass transfer maximization
- Easy, compact, durable technology
- Safe and efficient technology
- Easy scale-up, installation, replacement and maintenance
- Space requirements and footprinting minimization

*Founded in 2010, E-PIC S.r.l. is an innovative leader in developing Hydrodynamic Cavitators (ROTOCAVs). All the members are qualified chemical engineers with expertise in process development, innovation and troubleshooting, with process intensification techniques. The Company provides high efficient technologies to process liquids, mixtures, emulsions and suspensions. E-PIC S.r.l. offers unique process solutions to debottleneck and improve competitiveness of existing processes and plants with its innovative systems.*



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## CAVITATION PHENOMENON AND BUBBLES DYNAMIC

ROTOCAV device is designed to generate "controlled cavitation" on fluids, mixtures and suspensions.

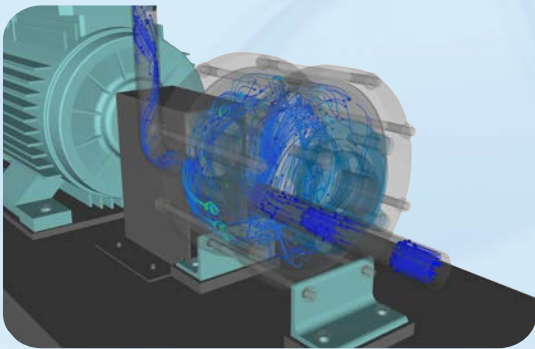
Cavitation is defined as the dynamic process of formation and implosion of cavities in liquids.

When a liquid is forced through certain constrictions, the kinetic energy of the fluid increases and its pressure decreases.

When the liquid pressure falls close to its vapor pressure, bubbles are generated.

When the fluid decreases in velocity, pressure recovers and bubbles collapse in a confined area.

As microscopic cavitation bubbles are produced and collapse, shockwaves are given off into the liquid: the implosion of the vapor bubbles creates intense pressure and temperature conditions as well as shear forces in the bulk media.



Summarizing, cavitation is defined as the phenomenon of formation, growth and subsequent collapse of microbubbles or cavities occurring in extremely short time interval.

## ROTOCAV - CAVITATION TECHNOLOGY

ROTOCAV is a patented technology that achieves controlled hydrodynamic cavitation by forcing fluids through its rotor-stator apparatus.

ROTOCAV is an emerging technology for industrial processes and it is designed according to process intensification approach, improving the development of faster, cleaner and cheaper devices.

During high speed rotation, rotor channels are periodically aligned with stator channels. The processed liquid is accelerated in the radial direction in the cavitation chamber and, flowing through the free channels, is subjected to a pressure wave resulting in cavitation.

ROTOCAV is designed to maximize the area to generate cavitation: compared to the other dynamic hydrodynamic cavitators of the same size on the market, volume of cavitation is 3-4 times more.

The main advantage is the generation of local zones with very high temperature and pressure, while the overall environment stays at ambient conditions.

## TYPICAL SKID MOUNTED ROTOCAV LAB UNIT



## APPLICATIONS

- Efficient and rapid mixing of liquid/liquid, liquid/gas, liquid/solids
- Particle size reduction
- Biogas yield enhancement
- Vegetable oil refining
- Bioethanol yield enhancement
- Biodiesel production
- Homogenization and mechanical treatment of Immiscible liquids to form stable emulsions
- Wastewater treatment
- Debacterization
- Oxidation reactions
- Extraction
- Delignification of wheat straw for paper manufacturing
- Upgrading of crude oil
- Homogenization of pig feed
- Cooling towers

## TECHNICAL CHARACTERISTICS

- Modular design validated through complete dynamic CFD simulation as well as with extensive design of experiments
- Outstanding performance in micro-mixing
- Fully continuous operation
- Compact system: multiple process steps in one machine: mixing, disintegration, homogenization
- Processing of a great variety of feedstocks
- Short processing time in comparison with traditional reactors
- Maximization of the micro-mixing, of available phase interface area and of the use of reagents
- Lower operative costs in comparison with traditional reactors
- Small reaction and mixing hold-up
- Easy scale-up
- High quality and top reliability seals
- Self-draining design
- Construction in stainless steels
- Closed system, no emission of hazardous gases or dust