

Industrial Applications of Compressed Fluids

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Chematur Engineering Group



Technologies offered by the Chematur Engineering Group

- ◆ Explosives & propellants
- ◆ Nitric Acid
- ◆ Fertilizers
- ◆ Isocyanates
- ◆ Nitroaromatics
- ◆ Ethanol and its derivatives
- ◆ Hydrogen peroxide
- ◆ Supercritical Fluids
- ◆ Acid concentration and recovery system
- ◆ Evaporation & Crystallization
- ◆ Electrochemistry



Environmentally Friendly Process plants



Hydrogen Peroxide plant



Bioethanol plant



SCWO plant



Compressed /Supercritical Fluid Technologies



Supercritical Water Oxidation



Supercritical Carbon Dioxide Technology



Application areas scCO₂

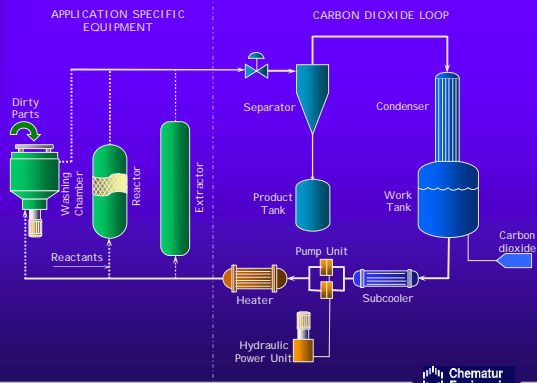
- ◆ Environmental friendly extraction of wanted components, Xtractor™
- ◆ Precision parts cleaning, Rotowasher™
- ◆ Debinding of waxes
- ◆ Solvent for chemical reactions, Swan SCF™
- ◆ Particle formation
- ◆ Chromatography



Rotowasher



scCO₂ Technology



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Rotowasher/Superdebind™



- Over 75 L CO₂/h, 400 bar
- Unique rotating cleaning basket
- Suitable for small precision parts
- Successfully used at Viking Sewing Machines since 1999
- Recently developed for use in the debinding step of PIM components production

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SCCO₂ Reactions



- Built the world first SCF Reaction plant.
- The system show very similar results to the Lab work.
- Plant can run a variety of different types of SCF reactions, such as Hydrogenation and Friedel Craft reactions.

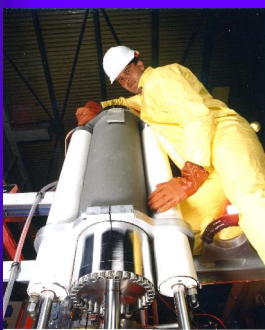
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Particle formation

- Number of different processes use compressed fluids to produce particles.
- Currently insulin for inhalation is being manufactured using such a process.

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SCCO₂ Chromatography



- Built SCF Chromatography Column in the 1990's.
- Developed a system to ensure even flow through the column.

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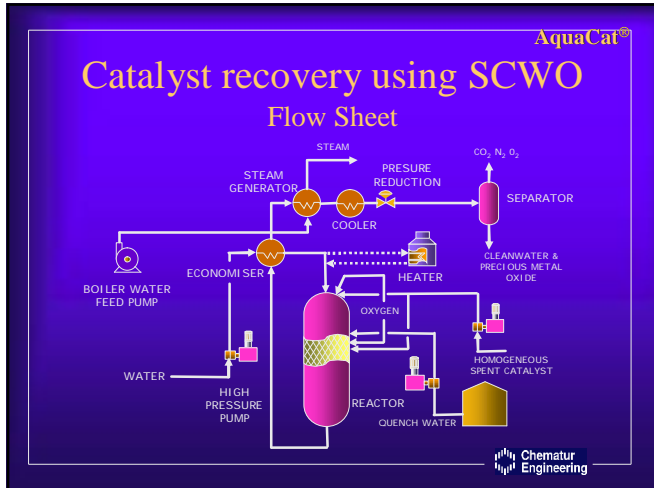
Supercritical Water Processes

Highly *efficient* process for:

- Waste water purification, Aqua Critox®
- Treatment of industrial and municipal sludge, Aqua Reci™
- Recovery of valuable inorganics from waste materials, e.g. spent catalysts, AquaCat®



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- ## Conclusions
- ◆ Compressed Fluids are in use in a number of Industrial applications.
 - ◆ Typically they use environmentally benign compounds to be the solvent.
 - ◆ Using compressed fluids can speed up traditional processes, reactions/ extraction times.
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