

WP 4.A.2 - DESIGN, DEVELOPMENT AND CHARACTERIZATION OF AN EXPERIMENTAL RESEARCH FACILITY (ERF)

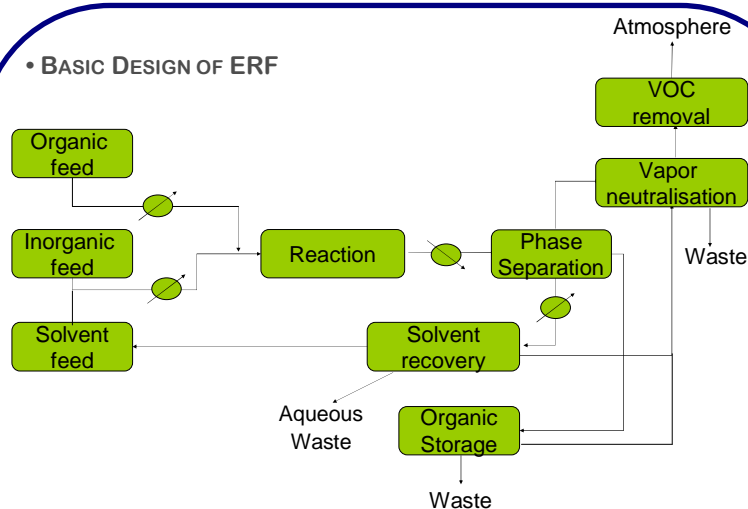
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•OBJECTIVES OF WP 4.A.2

Design and development of an ERF for characterization of two reactors (micro and meso scale) developed in WP3 for liquid-liquid reactions.

The experimental data will be used to validate the models from WP2 and build the second generation reactors to be tested later in the project.

• BASIC DESIGN OF ERF



- Modular facility allowing a wide range of operating conditions in continuous mode
- 1st and 2nd generation micro experimental reactors
- 1st and 2nd generation meso experimental reactors
- Provide enough process data
- Operate safely with minimal human intervention

•IDENTIFIED TECHNICAL RISKS

- Reaction conversion and selectivity
- Creation of stable emulsion
- Phase separation and solvent recovery
- Steady state operation of ERF

•HAZARD STUDIES

- HS 1: Establish Safety, Health and Environment (SHE) criteria and identify basic hazards of materials and operation
- HS 2 : Identify significant hazards in the process flowsheet using Guide Diagrams and establish appropriate design features including trip/alarm systems
- HS 3: Identify hazards and operability problems using the fully developed process diagram

•Implementation of 1st and 2nd generation pilot reactors

- Detailed design of the unit having in mind the range of operating conditions, materials of construction and control system
- Dedicated laboratory to host the ERF ensuring safety, health and environment criteria: ventilated, with explosive compounds detection and fire extinguishing system
- Implementation of 1st generation pilot reactors
- Construction, factory acceptance tests (FAT), assembling of ERF at FCTUC and site acceptance tests (SAT)
- Design of experiments and experimental tests

•OUTPUT

- Information on the performance of the micro and meso structured reactors for this liquid-liquid reaction regarding by products formation reduction and influence of the operating conditions
- Data enabling refinement of the models previously developed
- Allow and test improvements on the 1st generation reactors