

SERVICE & SUPPLY



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Field of operation

Process Engineering and design, Industrial Scale-up and Safety within:

- ✓ Chemicals, Fine chemicals, Waste treatment, Recovery
- ✓ Oleo chemicals, Petrochemical & Polymers
- ✓ Pharmaceuticals & Bio chemicals

Services

- ✓ **Basic (BE) to Detail (DE) Engineering including commissioning and plant start-up**
As applies from project start until reception of: → Mechanical Completion certificate → Mechanical Function Test certificate → Leak Test Certificates → Operation Function Test certificate → Performance Test certificate → Final certificate
- ✓ **Performing Process Hazard Analysis studies (PHA)** as Leader and Scribe (e.g. HAZOP + SIL)
- ✓ **Process Automation including safety instrumented system**
- ✓ **Project Management**

Full scale Support, Engineering & Supply

- ✓ Power to Gas application and plant set-up, including safety and process automation
- ✓ Intrinsic safe and dynamic on demand Phosgene production facility, dedicated to multiple consumers:
 - 10 – 50 kg/h Modular lab or pilot unit
 - 100 – 3000 kg/h Modular production unit, suitable for use up to max 8 consumers
 - 4000 – 15000 kg/h Stick built, suitable for use up to max 15 consumers
- ✓ Modular high performance, ejector based loop reactor systems, dedicated to highly exothermic and mass transfer controlled reactions (e.g. Alkoxylation, Chlorination, Hydrogenation, Phosgenation, ...)
- ✓ High temperature scrubbing systems up to 1000°C gas feed temperature
- ✓ Tailored Off gas & Vent gas scrubbing system handling toxic and explosive gases
- ✓ Tailored automation software programs based on e.g. Yokogawa Centum VP or DeltaV & HIMA as SIS
- ✓ Dynamic Heat Recovery System (DHRS), suitable for exothermal multi batch operated plants

Experts

- ✓ **Process Design (BE → DE):** Process design, Process optimisation, Process automation and Safety
- ✓ **Process Conversion:** Batch to continuous operation or Batch reaction combined with up and downstream continuous operation
- ✓ **Process Automation:** Concept, specification, software programming and implementation
- ✓ **High performance loop reactors:** For highly exothermic mass transfer controlled reactions, etc.
- ✓ **Reaction technology:** Heterogeneous or homogeneous reactions. e.g.:
 - Alkoxylation, Amination, Chlorination,
 - Dynamic, intrinsic safe, on demand Phosgene Production,
 - Hydrogenation, Oxidation, Phosgenation, ...
- ✓ **Recovery:**
 - Catalyst, Solvent,
 - Heat (DHRS),
 - White P,
 - CO, Cl₂ from HCl, ...
- ✓ **Gas- & Dust Explosion:** Classification, prevention by process design and safety measures
- ✓ **Process Hazard Analysis (PHA):** Methods: Checklists, Preliminary Hazard Analysis, What-IF, HAZOP
- ✓ **Process simulation:** Static: entire plant Dynamic: 1D plant sections, 2D&3D equipment