TECHNOLOGY AND EXPERIENCE FOR VARIOUS KIND OF REACTOR

Applied research aimed to Joint Development and Prototyping for chemical reactors and System Integration

Pressure up to 30 bar
Temperature up to 850°C

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A BUSINESS MODEL BASED ON RESEARCH COOPERATION

icicaldaie.com
**THE 5 KEYWORDS OF OUR RESEARCH LABORATORY**

**COLLABORATION**
From the very beginning ICI_LAB has been taking part in a number of European projects together with outstanding Universities and Research Centers.

**INTEGRATED LABORATORY**
The choice to place the laboratory inside the production site has the precise aim of bringing closer two way of thinking normally apart such as research and production in order to speed up the introduction of new products with high innovative content in the market.

**PROTOTYPING**
Thanks to its fully-equipped laboratory and a rapid setup manufacturing unit, provided with data acquisition and analyzing tools, the testing and implementation of new solutions is now a routine at ICI Caldaie.

**TURNKEY SYSTEM**
Over the years the laboratory has developed projects resulting in several registered patents mainly on chemical reactors for hydrogen production for turnkey system easy to transport and install.

**ROAD TO MARKET**
Expertise and Experience in the Industrialization of processes from TRL 3 to TRL 9.

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**OVER 10 YEARS OF RESEARCH COOPERATION**

Fifteen years ago ICI Caldaie realized that chemical reactors were the best way to use the high level reached by its R&D department and started a dedicated laboratory called "ICI LAB".

Over the years the laboratory has developed a number of projects resulting in several registered patents mainly on "Fuel Processing" for hydrogen production and the integration of "Fuel cells" systems. Together with hydrogen production and purification, the experience and the know-how gained so far range from "CO2 capture and sequestration", "gas to liquid reactors" to several other systems. From the very beginning ICI_LAB has been taking part in a number of European projects together with outstanding Universities and Research Centers such as:

**UNIVERSITY**
- Lappeenrannan Teknikirahv Alypiisto (LUT, Finland)
- Politecnico di Milano (POLIMI, Italy)
- Technische Universität Graz (TUG, Austria)
- Universiteit Eindhoven (TU/e, Netherlands)
- University of Castilla - La Mancha (UCLM, Spain)
- Universidade da Porta (UPORTO, Portugal)
- Università degli Studi di Salerno (UNISA, Italy)
- Vysoká škola chemicko-technologická v Praze (CZTIF, Czech Republic)
- Zachodniodopomorski University Technologiczny w Szczecin (ZUT, Poland)

**RESEARCH CENTRES**
- Agenzia nazionale per le nuove tecnologie, l’energia e lo sviluppo economico sostenibile (ENEA, Italy)
- Commissariat à l’energie atomique et aux énergies alternatives (CEA, France)
- Consiglio Nazionale delle Ricerche (CNR, Italy)
- Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR, Germany)
- Fraunhofer-Institut für Keramische Technologien und Systeme IKTS (IKTS, Germany)
- Fundación Tecnalia Research & Innovation (TECNALIA, Spain)
- IRC – Joint Research Centre - European Commission (IARC, Belgium)
- OWI Cel-Wärme-Institut GmbH (OWI, Germany)
- Stiftelsen Sintef (SINTEF, Norway)
- Teknologian Tutkimuskeskus VTT (VTT, Finland)

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**INDUSTRIALIZATION OF PROCESSES FROM TRL 3 TO TRL 9**

**TECHNOLOGY READINESS LEVEL**

- **04** Technology validated in lab
- **05** Technology validated in relevant environment
- **06** Technology demonstrated in operational environment
- **07** System prototype, demonstration in operational environment
- **08** System complete and qualified
- **09** Actual system proven in operational environment

**OVER 10 YEARS OF RESEARCH COOPERATION**

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**FROM LEVEL 04 TO 09**

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