

A holistic approach: Intensified-by-Design

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A holistic approach

Intensified-by-Design (inspired by Quality-by-Design)

"...the use of robust data about a process and statistical, analytical and risk management methodologies to 'redesign', modify, adapt and alter that process in a continuous, intensified system."







- PI technology and methodologies (UNEW, DRA, HSO)
- Equipment manufacturers (AMT, OUTOTEC)
- Reactor and process design, including downstream processes (DRA, UNIVLEEDS, TUE)
- Powder handling and control technologies (VTT, TELTEK, ZHAW, ITC)
- Solids metering (FREEMAN)
- Numerical and simulation tools (LEITAT, A-DSC)
- LCA, waste management and energy management (LEITAT, ZHAW)
- ICT and software platform development (IRIS)
- Process Industries
 - Minerals processing (*PYHASALMI*)
 - Ceramics processing (EURATOMIZADO)
 - Non-ferrous metals (*MBN*)
 - Pharmaceuticals (ALMIRALL, SANOFI)
 - Outreach to the wider EU Process industry (DECHEMA)

- 3. The IbD platform
- A devices-and-processes design-platform
- Design modules for the commonest intensified reactors-Rotating fluidized beds, micro-structured reactor and spinning disk, etc.
- A generic Module Builder -equipped with a set of both proprietary and third-parties design tools- for designs carried out on the basis of radically novel ideas.

Outputs datasets:

- ✓ Intensified reactor design
- ✓ Upstream/downstream intensified unit operations and their solids handling capability
- ✓ Cleaning methods etc.
- ✓An optimised whole process design and the expected economic and environmental quantitative impacts











IbD platform





- Direct impact of PI technologies implementation
 - The implementation of intensified processes and equipment will renders huge benefits to the process industry in terms of:
 - Carbon footprint reduction (Smaller and "greener" processes)
 - Improved efficiency (Increased productivity and yield)
 - Cost reduction (Based on previous benefits, the gross margin of the products will increase leading to higher profitability)
- Impact of making a platform available for the identification of PI solutions
 - The platform itself will be of great help and will facilitate the introduction of PI into process industry.
 - To use the platform an insight on the current processes will be needed, leading to increased process knowledge.



Thank you for listening!

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