

*“Commercial-scale chemical production at pilot-scale size and cost.”*

## CUSTOMER CASE STUDY

# Acrylics Manufacturing



Actual acrylic installation

**THE SITUATION.** The largest global supplier of bio-polymers was experiencing extreme pressure on margins, unable to pass on increases in raw material costs to customers. To avoid shutting down or accepting lower market share, the company needed to reduce the cost of raw materials substantially. The company was selling product of approximately 39 tonnes annually representing \$55 million in annual revenue.

**THE SOLUTION.** The supplier company implemented TID's proprietary Process Intensification solution – The CUBE chemical processing plant using our Acrylic and Acrylic Salt Monomer modules. Implementing The CUBE technology enabled the supplier to integrate backwards into its supply chain. The supplier company opted to lease the plant and technology from TID, resulting in zero capital expenditure outlay for The CUBE.

TID provided intellectual property in the form of Automation, Coaxial Kinetic, Phased Cryogenic and Process Intensification to generate 11 product lines and/or chemistry variants.

The time from signed contract to chemical IP delivery was 9 months, and installation at the customer's site required 2 months and one month was needed for plant start-up and commissioning.

**THE RESULTS.** The customer realized \$14 million in annual savings from reduced raw material input costs, net of all royalty and licensing fees. Installation costs of \$540,000 were incurred to pay for ancillary equipment, installation and commissioning of The CUBE modular chemical processing plant. It took only 12 months from signed contract to realization of first raw material savings. The first-year Return on Investment is 2493% ( $\$14,000,000 / \$540,000$ ).

**BUSINESS MODEL.** TID earns an annual Use & License Fee of \$840,000 for providing the Process Intensification intellectual property, plus \$14,000,000 (50% of the total raw material cost savings of \$28 million, as measured by comparing actual costs to a mutually agreeable index).

## SPECIFICS

**Customer Name:** Contractually Restricted

**Customer Background:** The LARGEST global supplier of bio-polymers

**Customer Location:** North America, U.S.A.

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**Type of Buyer:** Supply Chain Vertical Integration.  
(Replacing sourced raw materials)

**Chemistry:** Acrylic and Acrylic Salt Monomer

**TID's Intensification IP Summary:** Automated, Continuous, Coaxial Kinetic, Phased Cryogenic, Process

**Product Lines, Chemistry Variants Developed:** 11

**Production Output:** 39 tones/year

**Output Value in Sales:** \$55MM/year

**Output Value in Saved Customer Costs:** \$14MM/year  
(after all royalty and licensing fees paid)

**Customer Paid Capital for Equipment \$0** (NO Capital) ... Lease Option

**Customer Paid Capital for Equipment to, and Installation on, their Site:** \$540,000

**Return on Invested Capital:**  $(\$540,000/\$14,000,000)$

**Time Needed from Contract Signing to Equipment and Chemical IP Delivery:** 9 months

**Time Needed for Customer Installation:** 2 months

**Start-up Time:** 1 Month

**Total Time From Signed Contract to Accretive Profits:** 12 Months

**Use & License Fee / Yr.:** \$ 840M +(\$14,000,000 based on a TOTAL customer savings of 28,000,000/Yr.)

**Use & License Commercial Agreement:** TID supplied the equipment and chemical IP. The Customer paid for freight, installation on their plant sight. Each party splits 50% of the TOTAL cost savings (vs. an index)

## About Technology Investment & Development

### OUR PROCESS

Our patented Process Intensification components, including Utilities, Kinetics, Catalysts and Control are the core of The CUBE modular chemical processing plant, and the technology behind the next revolution in chemical processing.

TID's is the first to bring a commercially successful Process Intensification breakthrough to market. Our proprietary technology produces in minutes what

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takes traditional manufacturers to do in hours, in a relatively small space. The cost advantage can be significant, providing customers with the strategic flexibility to use the substantial savings to pursue a cost leadership strategy and increase market share or reinvest incremental profits back into growth initiatives.

### WHAT IS THE CUBE?

Using patented process intensification technology (Kinetics, Utilities, Controls and Catalysts) Technology Investment & Development's Intensification Reaction CUBE is delivered as a complete chemical process, accepting raw materials and producing desired finished product(s). Its enabling commercial advantage is a disproportionate reduction in size (or footprint) compared to its rate of production. Using TID's Process Intensification Core Technology, chemical rates of reaction increase by a factor greater than 10. This allows for an equal reduction in scale and footprint. The CUBE's smaller size and advanced computer sensors, monitors and control, allows for similar reductions in capital and variable costs, as well as headcount. Safety is improved and liability is mitigated. It is the only example of a large commercial-scale platform modifiable to be a zero-emission chemical-manufacturing solution available today.

### WHY USE THE CUBE?

Managing precision while navigating the most complicated multi-step or phase reactions is where our Intensification Reaction CUBE is in its element. State-of-the-art data acquisition and process-automation systems algorithmically combine with R&D's concept to make even the most commercially challenging products feasible.

Like you, we consider safety our first priority. The advantage of a 1/10th scale operational footprint translates into the ability to more easily control safe environments. Safe engineering principles are at the core of every CUBE. Real-time situational awareness, environmental and operational control, and automated anticipation and prevention are the solutions for almost all safe operating situations. With this unit, human contact is limited, backup and containment systems are feasible, and all but the most extreme countermeasures can be process actuated.

For environmentally conscious customers, the Intensification Reaction CUBE's micro-footprint lends itself to the option of complete environmental control and (what we believe to be) the only zero discharge-based chemicals manufacturing commercially presently available.

**CONTACT US TODAY TO LEARN IF PROCESS INTENSIFICATION IS A POTENTIAL SOLUTION FOR YOUR COMPANY.**

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