



CATALYTIC REACTOR UNIT



CATALYTIC REACTOR UNIT (CRU™) AND SERVICES

APPLIED CATALYSTS

COMPANY ADDRESS
5555 PLEASANTDALE ROAD
DORAVILLE, GA 30340

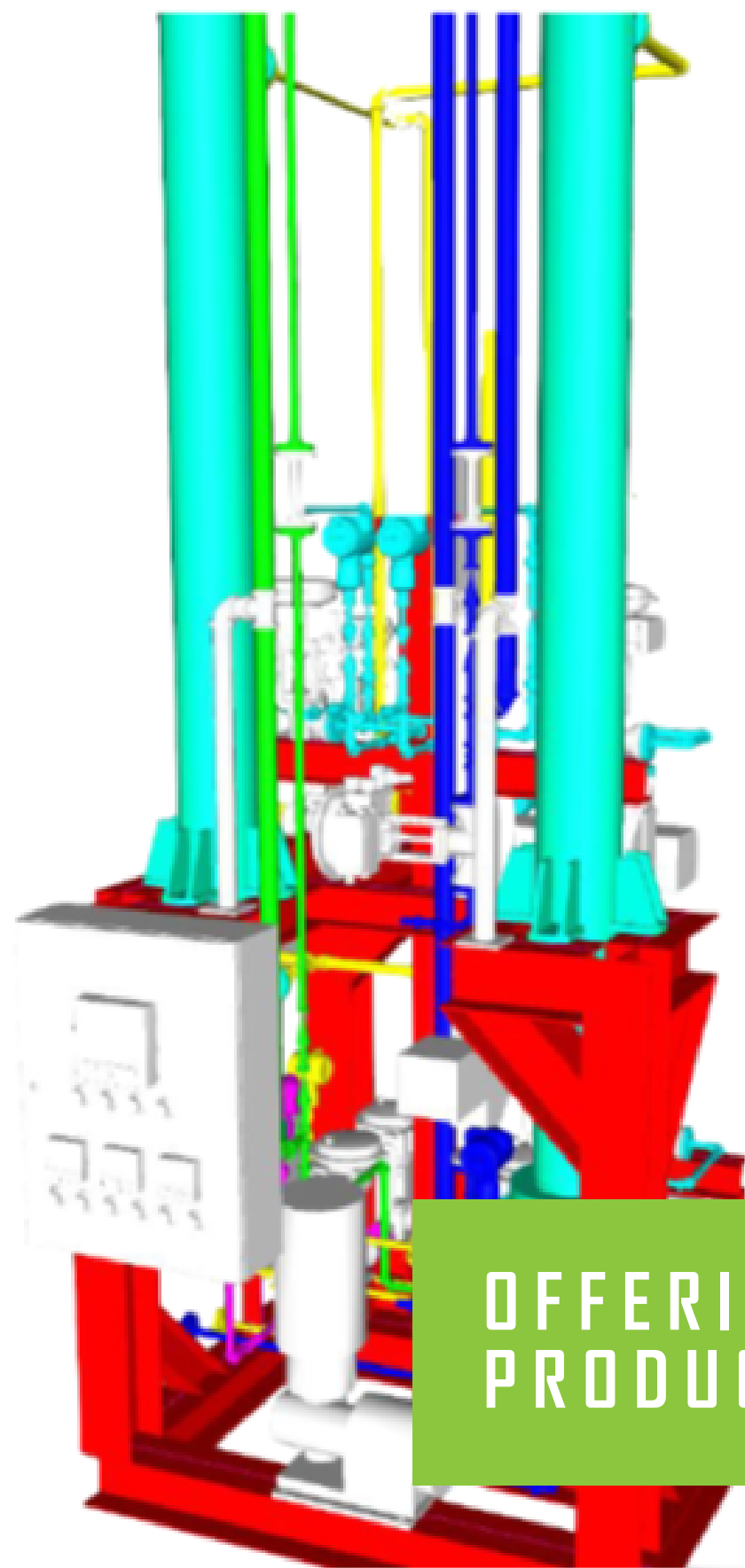
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OFFERING COMMERCIAL SCALE
PRODUCTION SYSTEMS

CATALYTIC REACTOR UNIT AND SERVICES OFFERING



- A Turn-key Catalytic Reactor Unit (CRU™) for Hydrogenation, Amination and other continuous chemistry of interest to the customer
- General Purpose unit for specialty chemical production
- Cost advantaged over standard 4000 gallon Batch reactor system
- Implementing world class catalyst technology for the chemistry of interest
- Developing the process and system for the customer
- Offering lab scale test systems for catalyst screening and lifetime studies
- Complete catalyst and process testing services

WHY APPLIED CATALYSTS

- Applied Catalysts has 30 years of experience manufacturing monolithic and particulate catalysts for a broad range of commercial applications.
- Applied Catalysts will provide world class catalyst technology for the chemistry of interest using internal and industry standard catalysts –assuring the best available catalysts for each application
- Implementing world class system Engineering and Construction with trusted partners
- In-house process chemistry testing and support
- Intellectual Property protection- the process IP developed is yours

CRU™ ADVANTAGES

- Lower capital and operations costs
- Low and High pressure operation (3.5 to 100 bar is standard)
- High Selectivity
- Improved catalyst lifetime (with fewer changeouts)
- Less energy required
- Improved safety (low reactor volume)
- More Efficient heat transfer
- Ease of scale-up from lab to commercial scale
- Sold as modular units to match your site.

**INTELLECTUAL PROPERTY
PROTECTION**



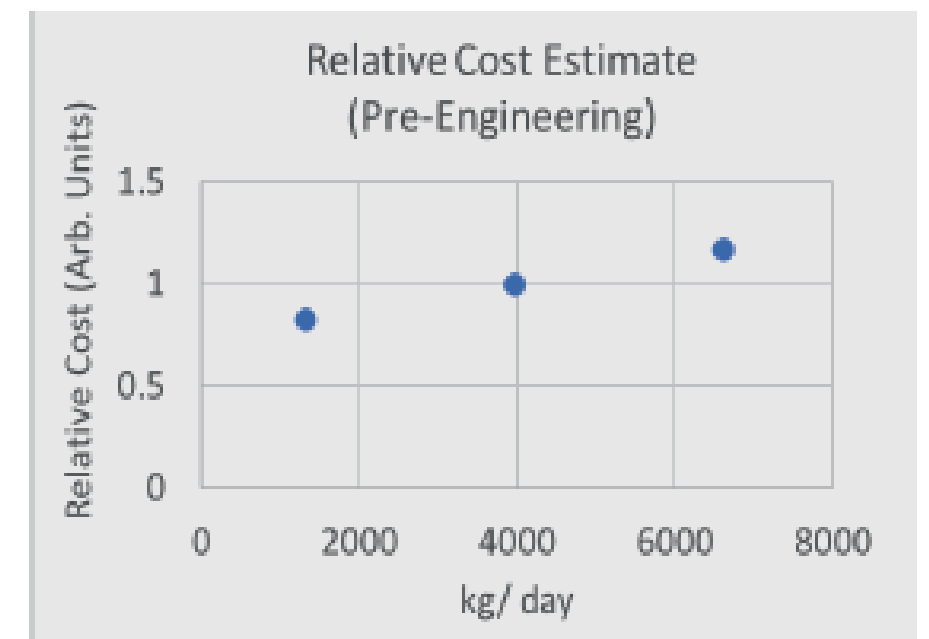
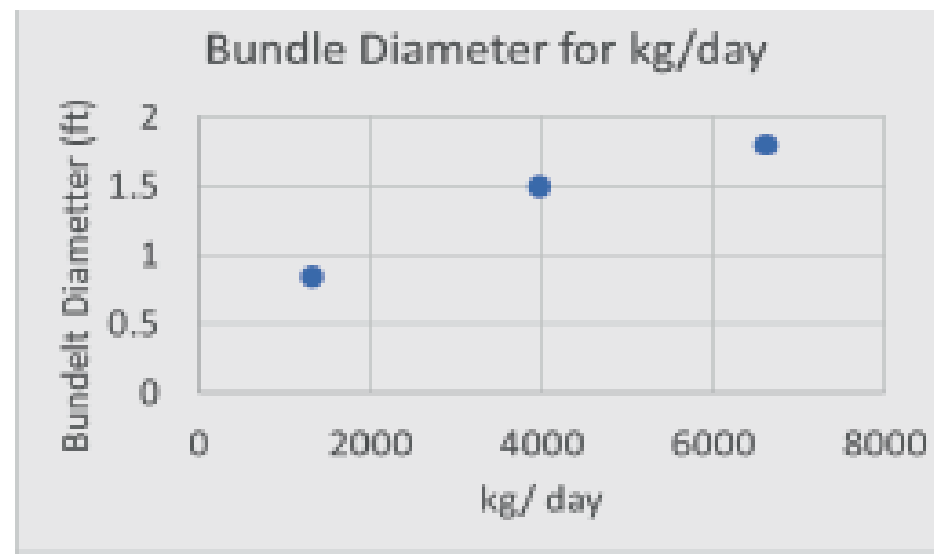
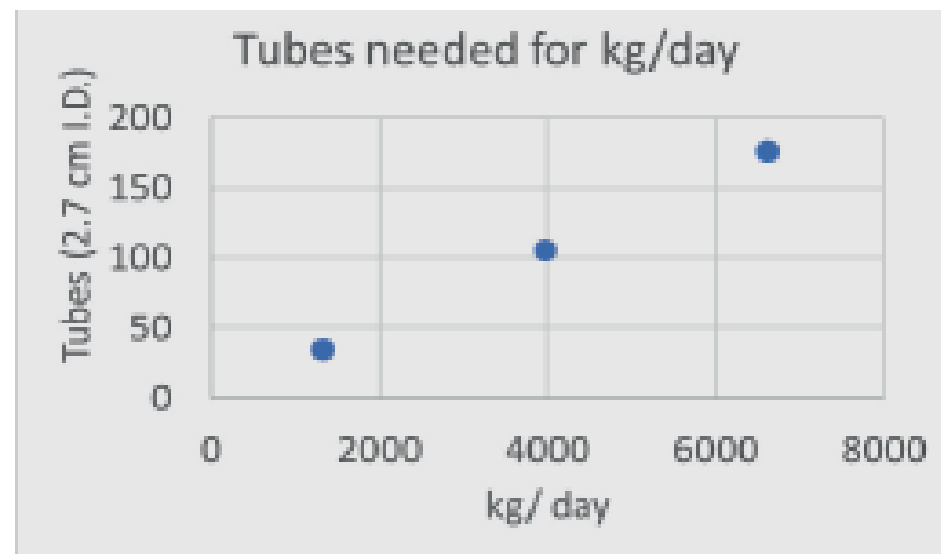
PROJECT WORK FLOW

- Request a preliminary quote.
- Non-Disclosure Agreement (NDA)
- Catalyst is selected from both industry standard and Applied Catalysts' products – best in class for your particular application
- Lab Scale demonstration of target chemistry
- Validate process conditions based using Applied Catalysts semi-pilot shell and tube reactor
- Detailed Engineering and modular design by world class engineers
- Installation and commissioning by world class system builders

CRU™ SIZE CONSIDERATIONS



- Volume of substrate per day for a representative process:
 1. For the catalyst bed length (~5 m), each tube will convert 37.4 kg/day
 2. A daily productivity of 4 metric tons per day (1400 t/ yr) would be a 106 tube unit (0.5 m bundle diameter)
 3. A 4 metric tons/ day system has similar productivity to a 15000 L Batch reactor with a 2 day turn-around
 4. The system cost relative to a 4 metric ton per day CRU™ (106 tubes, 0.5 m bundle) is given below, please call for quote.



Services: Process and Catalyst Testing, Catalyst Development

1. Lab scale and semi-pilot scale testing in our shell and tube reactor with 39" catalyst bed.
2. GC, FTIR, HC and CO analyzers, surface area, crush strength, particle size, viscosity, and AA elemental.
3. Lifetime testing and catalyst screening studies also available.
4. Custom catalyst development support.

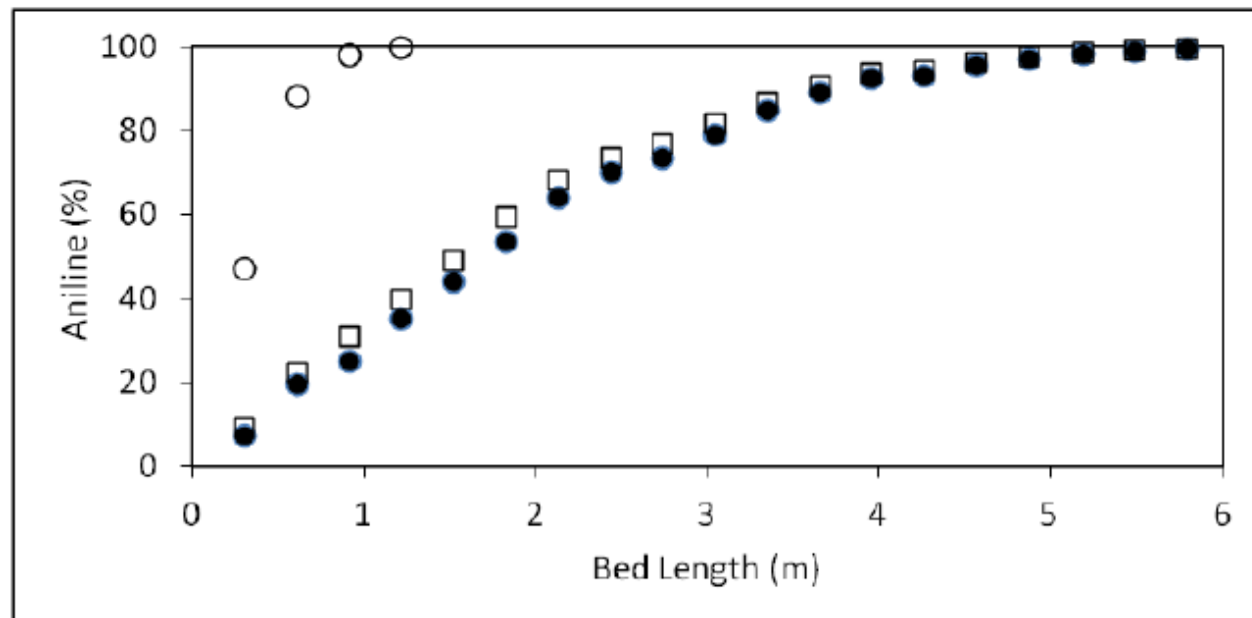
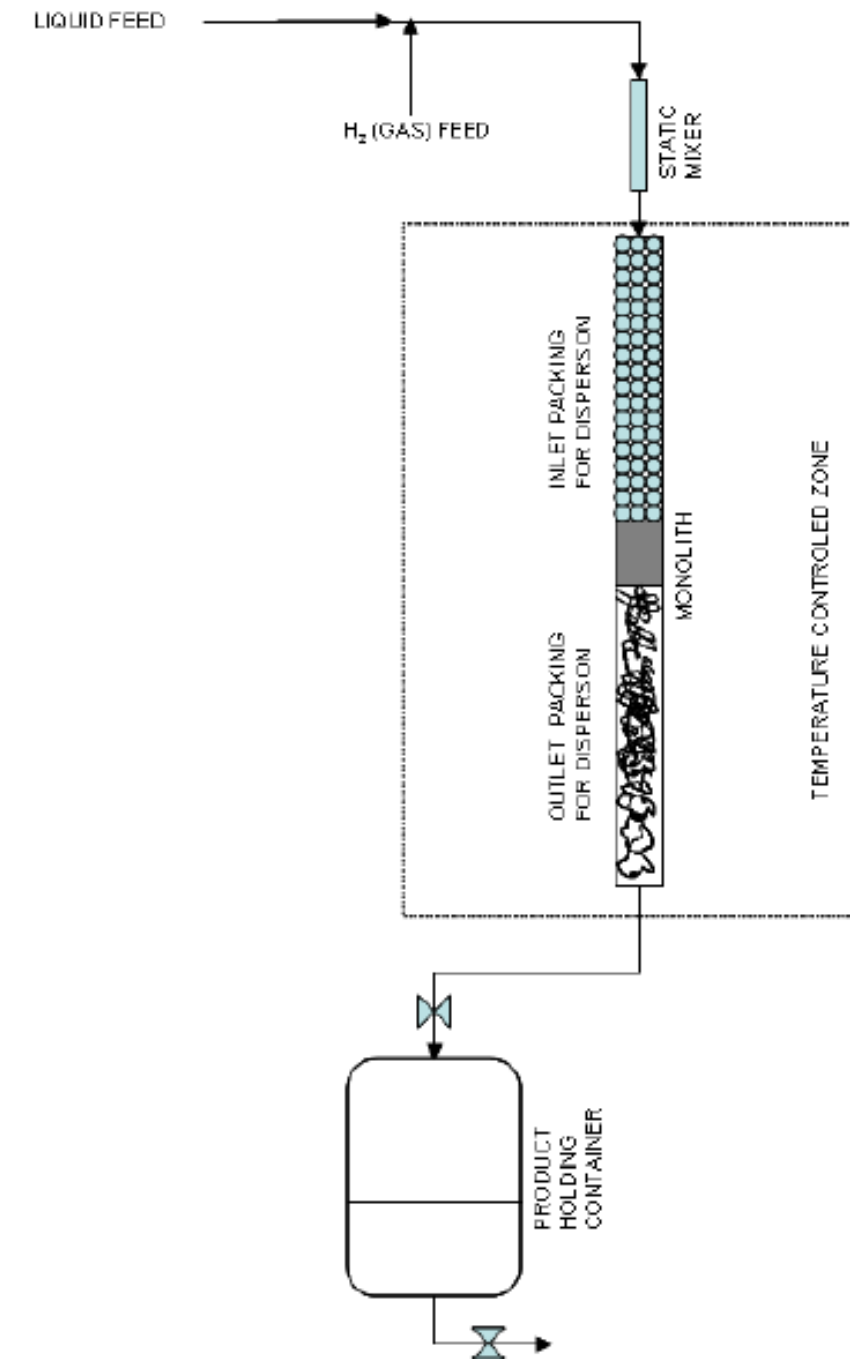


Figure Caption: Cumulative Aniline produced (solid circles) and Nitrobenzene converted (open squares) to Aniline with Reactor pass at 0.345 MPa and 60 °C. Cumulative Aniline produced at 82 °C (open circles).



CRU

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