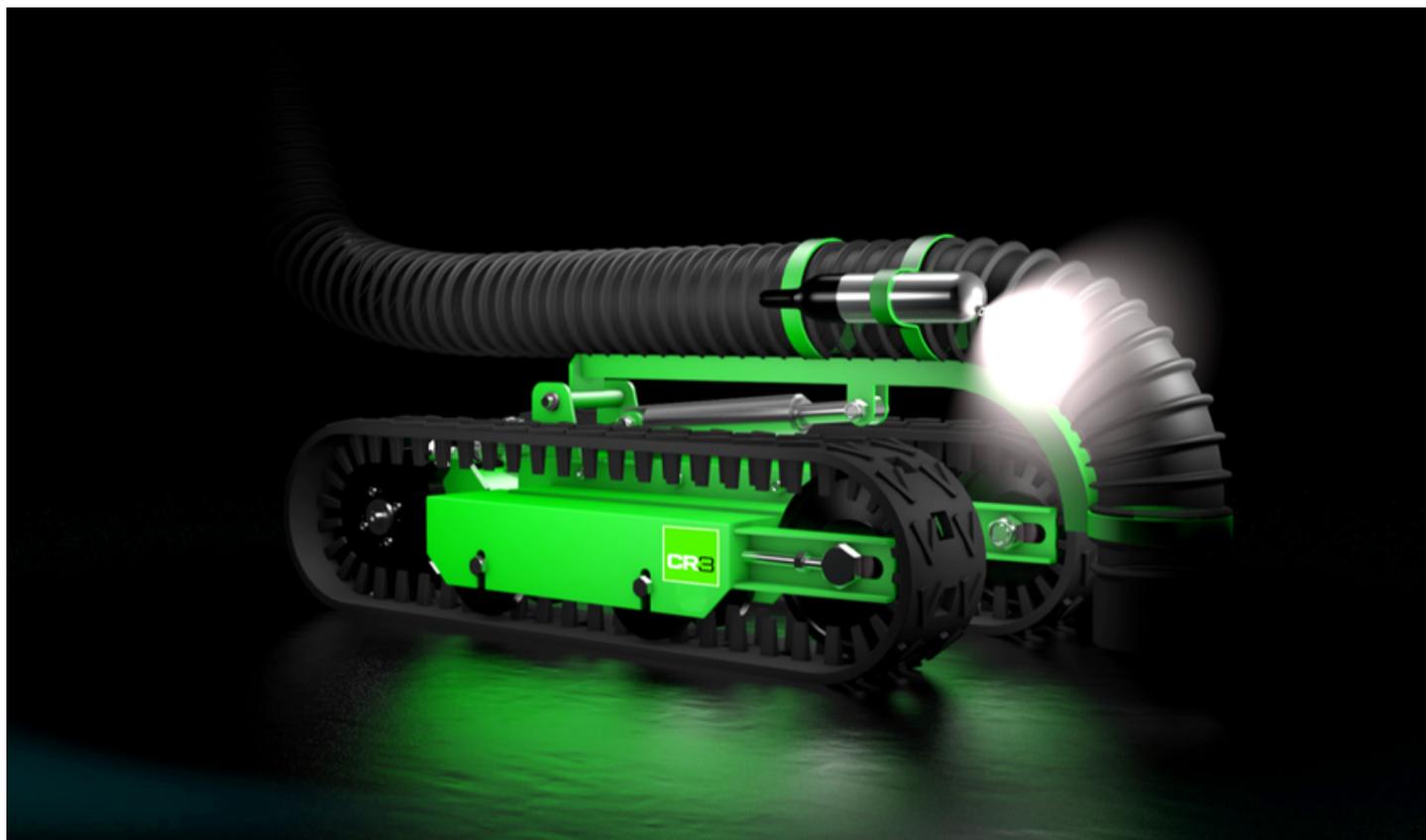




# Catalyst Handling Services



## YOUR CHALLENGES

Owners and operators of refineries and petrochemical plants need to ensure the highest levels of safety and efficiency when charging and discharging reactors. This is a critical job that requires highly skilled contractors, especially for complex or high-risk change-outs. For example, pyrophoric catalysts require specific handling techniques under inert (nitrogen) atmospheres. Catalyst vendors frequently recommend using specialist contractors to ensure materials are handled appropriately and to safeguard their performance guarantees. Over the years, CR3 has developed excellent working relationships with all major catalyst vendors.

## OUR CATALYST HANDLING SERVICES

CR3 has a long history of providing superior services for the unloading and loading of catalyst for both fixed-bed and tubular reactors throughout Asia. Our services support

catalyst handling on all reactor types, including mechanical work on internals for removal and re-installation if required.

## HOW WE SUPPORT YOUR BUSINESS

CR3 adopts a 'blind to blind' approach that minimises cost and downtime for your business. Depending on the type of reactor, catalyst or process involved, our experts customise a solution to your needs by applying different methods for unloading and loading your reactors.

In addition to providing highly trained, service-oriented personnel, we support your business with a complete range of advanced equipment including 'Rover' (our remotely operated vehicle) for unloading reactors, lockable helmets for improved safety and innovative vacuum systems for greater efficiency. In accordance with our commitment to service excellence, we are continually developing and assessing improved technologies and processes for inert and non-inert entries and non-entry catalyst handling.

## THE CR3 DIFFERENCE

CR3's large in-house team of highly trained technicians is subject to regular audits and a stringent safety passport scheme. We invest heavily in the latest equipment and SMART systems to maintain our reputation as the region's leading one-stop provider of specialised maintenance services.

### Innovative equipment and techniques

Our state-of-the-art catalyst technologies redefine safety standards while increasing efficiencies. For unloading, 'Rover' (our robotic solution) minimises exposure to hazardous environments and Advanced Wet Dumping is effective for heavily fused catalysts. When loading, our automatic four-drum tipper saves significant time over manual handling, CR3's Dense Loader boosts reactor performance through better catalyst distribution and Soft-Flow (our pneumatic loading technique) is more efficient than conventional loading by eliminating the use of cranes.

### Outstanding QHSE performance

We pride ourselves on maintaining an unblemished track record for quality and safety. Every technician is accredited under our confined space and inert entry training courses and our technicians will readily produce their training records for verification upon request. CR3's lockable helmets incorporate a breathing mask and built-in headset for communicating with team members to ensure the safest experience under the toughest of conditions.

### Unrivalled experience

With a 25-year track record of successful project delivery and certification letters in place with all major catalyst vendors, CR3 is regarded as the region's foremost catalyst handling expert. Our teams possess a wealth of experience when it comes to complex jobs involving Parex, FCC and CCR units. The term contracts we have with the likes of Shell, ExxonMobil, ConocoPhillips and PETRONAS are a testament to our competence and professionalism.

## Exceptional service

Choosing us as your single source to perform the full scope of catalyst handling services – isolating and opening the reactor, emptying and re-loading contents, closing the reactor and de-blinding or de-isolating it to save on standby time – ensures streamlined project delivery with simplified management and administration.



## OUR SOLUTIONS

- Inert entry (N<sub>2</sub>) – for catalyst unloading / reloading as well as other applications
- Dense loading – Densicat technology under license from Petroval (Total)
- Dense loading – Calydens technology under license from Crealyst
- Dense loading – technology under license from UOP (USA)
- Unidense – loading technology for reformer tubes under license from Unidense Technology GmbH
- Catalyst screening – under inert and normal atmosphere conditions
- Reactor internals – removal, reinstatement, video inspection, repair, modification, upgrade and passivation
- Reformers (furnace) – total service including tube changing / welding and uniform loading
- Reformers / Platformers – catalyst change-out and mechanical work
- Ammonia converters – total service including basket changes
- CCR – total service including centre pipe and scallop removal, repair, welding and replacement
- ARHDM & RDS – hydrodrilling technology for coked / fused reactors
- HCU – total service including repair, soda ash washing, welding and dense loading
- Parex – Molex – Olex chambers – adsorbent change-out and mechanical work
- Tubular reactors – catalyst change-out, tube cleaning & Dp measurement
- FCC – catalyst vacuuming and coke removal

## YOUR BUSINESS BENEFITS

**Benefit from a one-stop solution** – that encompasses all mechanical and repair work in addition to unloading and re-loading the catalysts in all types of reactors.

**Maintain high safety standards** – by choosing a partner with a proven commitment to ensuring a safer workplace, both onshore and offshore, in normal and inert atmosphere conditions.

**Save time and money** – with an experienced catalyst handling expert that can support your operations through a comprehensive 'blind to blind' approach.

## CR3 IN ACTION

### The challenge

A refiner needed to change its Parex adsorbent at the end of its useful life to boost production efficiencies and improve yields.

### The solution

Having performed over 25 Parex re-loads throughout the region, CR3 replaced the adsorbent and all reactor internals within 27 days, setting a new record.

### The outcome

The client generated significant savings by putting the unit back in service earlier compared with typical re-load durations.

CR3 is a leading provider of energy engineering solutions. Established in 1991, we provide specialised maintenance, plant upgrade, revamp and engineering services with a sharp focus on **Energy Efficiency, Engineering Excellence, and Sustainable Solutions.**

To learn more, visit [CR3.Group](#)

## Leading one-stop provider of specialised maintenance services

CR3 supports your business with extensive contracting experience in the delivery of catered service packages, 'blind to blind' jobs and turnkey maintenance services during major shutdowns and turnarounds. Our business upholds a culture and track record of integrated management systems that are certified to multiple international standards.

## Our Solutions

We offer a comprehensive portfolio of maintenance services that are grouped into six business lines. Our experts deliver these services – onshore and offshore – on time and on budget.

Our complete 'blind to blind' solution ensures more streamlined and efficient projects, as we maintain direct, single-source control of all critical path elements. We cater to projects of widely varying scope and complexity, and can deliver multiple shutdowns concurrently.

### Related services:

- Static & Rotating Equipment Maintenance
- Industrial Scaffolding
- Mechanical Services
- Column Modifications & Repairs
- Total Heat Exchanger Maintenance
- Flare Tip Replacements & Repairs
- Cleaning & Decontamination Services
- Mercury Management Services
- Catalyst Handling Services
- Nitrogen Services
- Waste Handling
- Decommissioning Services
- Insulation Services
- Valve Maintenance
- Storage Tank Cleaning & Maintenance

Our experts meet your demands for shorter change-outs, leaner project teams and superior quality standards for all reactor types with end-to-end solutions that reduce downtime and increase profitability.

### Related services:

- Catalyst & Adsorbent Handling Services
- Tubular Reactor Services
- Dense Loading
- 'Blind to Blind' Mechanical Services
- Reactor Internals Replacement & Repairs
- Nitrogen Services
- Waste Handling

We clean and inspect virtually all plant vessels, columns, drums and piping systems, both onshore and offshore, with services that can be tailored to requirements.

### Related services:

- Pre-Commissioning & Commissioning Services
- Nitrogen Services
- Pipeline Cleaning (Chemical & Mechanical)
- Pipeline Flooding
- Pressure Testing
- Dewatering
- Drying
- Purging

Our investment in training, equipment and SMART systems combined with our focus on safety and rigorous planning, preparation and execution of work underpins our track record as a leading provider of mechanical & plant maintenance services.

### Related services:

- Static Equipment Maintenance
- Rotating Equipment Maintenance
- Specialist Cutting Services
- Online Leak Sealing
- Controlled Bolting
- Reactor Repairs & Maintenance
- Plant Change & Piping Modifications
- In-situ Flange Facing & Machining
- Industrial Scaffolding
- Insulation Services
- Valve Maintenance
- Continuous Plant Maintenance
- Storage Tank Cleaning & Maintenance

Our extensive portfolio of cleaning services sets the benchmark in terms of technical, environmental and safety standards.

### Related services:

- Chemical Cleaning Services
- Mercury Management Services
- Fin Fan Optimisation
- Hydro Jetting Services
- CR3 Decoking Technology (CDT)
- Decontamination Services
- Waste Handling

We deliver projects safely, on time and on budget by ensuring single-source control through our multi-disciplinary approach and project management capability.

### Related services:

- Process Revamps, Rejuvenations & Retrofits
- Construction & Constructability Reviews
- Engineering, Procurement & Commissioning Services
- Operations & Maintenance
- Dismantling, Demolishing & Removal of Equipment
- Fabrication of structural, Carbon Steels & Pipe Systems
- Fabrication of Stainless Steels & Special Alloys
- Installation of Large Equipment & Pipe Systems
- Welding
- Hot & Cold Cutting
- Scaffolding & Insulation



CR3 is a leading provider of energy engineering solutions. Established in 1991, we provide specialised maintenance, plant upgrade, revamp and engineering services with a sharp focus on **Energy** Efficiency, **Engineering** Excellence, and Sustainable **Solutions**.

### Contact us today to learn more

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