



Catalyst Handling and Mechanical Services

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SETTING NEW STANDARDS



Catalyst Handling and Mechanical Services

CR International continues to set new standards in catalyst handling and mechanical services. By providing a genuinely multi-skilled workforce we ensure optimal performance and productivity, while maintaining a safety record that sets us apart from others in the industry.

We supply refineries and petrochemical plants with superior equipment and staff. As a result of this commitment we can offer a complete, 'blinds to blinds', range of services for both on and offshore purposes. This includes the commissioning and maintaining of catalytic reactors, columns, and vessels; by one integrated team.

Our in-house design and engineering capabilities ensure continuous improvement and supply of state of the art equipment; when and where required.

CR International is committed to best practice operations, and as such is constantly developing new methods or improvements for both inert and non-inert entries, as well as non-entry catalyst removal.



CATALYST HANDLING SERVICES

Photo above:
Technicians remove catalyst using modular vacuum equipment.



MECHANICAL SERVICES

Photo above:
Installing a new catalyst support grid beam.



SAFETY

Photo above:
A technician practices rescue techniques for work to be done under inert atmospheres, in one of our purpose-built training reactors.

Catalyst Handling Services

By utilising a specially trained workforce and purpose-built equipment, Contract Resources mobilise and execute catalyst projects efficiently and safely.

- Services in inert and toxic atmospheres, plus hot and hostile environments
- Catalyst loading of reactors and vessels using licensed Dense Loading processes
- Catalyst loading of tubular reactors using the UNIDENSE™ loading process
- Unloading and loading of catalyst under inert or normal atmospheres
- Dense phase loading of vertical and horizontal vessels
- Mercury detection and handling
- Catalyst screening, density grading, and oxidation
- Vacuum unloading with closed loop nitrogen re-circulation
- Catalyst transportation, storage, and containment (UN approved containers)
- Pre-commissioning of reactors and vessels
- Pre-sulphiding (DMDS Injection)
- Reactor cooling utilising a proprietary liquid nitrogen system
- Metals reclamation and disposal of materials
- Catalyst sampling and particle measurement
- Video inspection and assessment
- Shutdown planning, coordination, and execution



01. Vacuum unloading of Catalyst 02. Loading a basket using the Casale nozzles 03. Technicians use a CR Drum Decenter on site for the efficient loading of Hoppers and Bags 04. Vacuum unload of catalyst 05. Spent catalyst stored in UN approved containers 06. Confined Space Dense Loading in progress

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Mechanical Services

CR International has a comprehensive range of mechanical services for the installation, revamp, and repair of reactors, columns, and vessels.

- Vessel blinding and isolation
- Vessel repairs, de-bottlenecking, and internal modifications
- Cold cutting using Ultra High Pressure water
- On site store for supply of internals, spares, and componentry
- Specialised welding and repairs
- Ultrathermic and plasma cutting
- Preparation for weld inspection
- Bolt tensioning, bolt torquing, and nut splitting
- Plant preservation and demolition
- Chemical cleaning and decontamination

CR International has extensive specialised mechanical and engineering capabilities. We are a major provider of internal column refurbishment services to the oil and gas industry and have wide-ranging general fitting capabilities. Our ability to utilise technology from a broad range of industrial services is a significant advantage when working in hazardous conditions and providing solutions to difficult mechanical problems.

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01. Unpacking Mass Transfer equipment for installation 02. Moving Pipework into place under BA for installation 03. Technicians unbolt a Manway with a client supervisor 04. Confined space welding 05. Arc gouging of internal column inserts before removal

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SAFETY AND TRAINING

CR International' aim is flawless safety performance with a target of zero incidents. This is achieved by having a fulltime safety management team to provide internationally recognised and respected safety training programs and systems to ISO 9001.

- Our purpose-built training facilities are arguably the best in the world.
- Highly-skilled trainers make use of superior, unique in-house facilities to provide specialised, tailored training and refresher courses to OSHA and NZ/AUS standards. These include confined space entry, breathing apparatus (hard helmet and soft mask systems), work in inert atmospheres, advanced first aid and rescue techniques, fall arrest and height safety training, rigging and load lifting, rope access, gas detection and monitoring, and other specific training.
- Basic Offshore Safety Induction Emergency Training (BOSIET), and T-BOSIET; for tropical waters, allows Contract Resources' staff to safely work offshore and is OPITO Approved.
- Contract Resources frequently provides site safety and rescue teams during shutdowns and other hazardous activities.
- Specialised equipment, designed by our dedicated Equipment Innovations Group with input from our operations personnel, increases safety and enhances performance.
- The modular, purpose-built equipment made in Contract Resources' workshops have a small footprint; making transportation and organisation on site much easier.



01. Fire fighting training in progress 02. A CR International purpose-built training tower and reactor
03. Helicopter Underwater Escape Training (HUET) for BOSIET 04. Breathing Air Rescue Trailer
05. Technicians demonstrating safe methods of rope access cleaning 06. Technicians practicing stretcher rescues in 'Hard Helmet' BA systems

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TECHNICAL ALLIANCES

CR International has technology agreements with a number of international licensors, which further increases our effectiveness and range of services.

- Catalyst loading, density, and distribution is improved through our agreements with UOP (USA) and UNIDENSE™ (Germany); allowing CR International to significantly improve reactor performance.
- Catalyst Particle Measurement is achieved through Sigma-Visual Technology (Denmark). This allows for fast and accurate measurement of catalyst size, attrition, and other analytical data.
- Contract Resources are licensed to install Koch-Glitsch internal componentry on reactors, columns, and vessels.
- The use of Packgen (USA) packaging allows CR International to meet all international and UN requirements for the safe transport and storage of new and spent catalyst materials; including pyrophoric material. This means faster and more secure unloading, and avoids drum handling.
- Pneumat Systems (USA) equipment, including the Cardox™, BinWhip™, and BinDrill™ systems are used for removing blockages and fused catalyst.
- CR International use Clean Concepts Inc. (USA) range of specialist Chemicals for chemical decontamination on shutdowns. The use of Clean Concepts Inc. (USA) vastly improves shutdown times and provides safe access to towers, vessels, and columns.



01. Vacuum units onsite in Oman 02. Catalyst Loading with the UOP Dense Loader 03. Catalyst equipment and Packgen™ Packaging on site

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INNOVATION

CR International has always prided itself on its ability to innovate and adapt to the situation at hand. This has led to the development of many new pieces of equipment and tools, as well as new processes and systems. A focus on constant innovation and improvement has resulted in CR International being one of the safest and most efficient companies in the industry today. Some of our developments in Mechanical and Catalyst Handling services include:

- Modular Catalyst Vacuum Systems, with only a small site footprint, enable the vacuum removal of catalyst in large multi bed reactors, while cooling, filtering and recycling nitrogen. These can be used effectively in all locations.
- Modular Life Support Systems meeting all international and client safety requirements. Reactor entries can be managed from the ground or reactor top with full video and audio communication and recording.
- Latest technology for blinding, elbow removal, and internals breakout and reinstatement.
- Dense Phase Loading systems for the transfer of catalyst directly from grade to reactor manway, without the use of Cranes and Hoppers.
- Pneumat equipment and solutions for fused materials. This includes Cardox™, BinWhip™, and BinDrill™.
- Automated drum decanting systems reduce drum handling labour and time required, while improving safety.
- A range of packaging solutions provides the most cost-effective and safe methods for handling both new and spent catalysts.
- Internal Lifting Systems for handling support grids and other components.
- Nitrogen Heating Systems for hot nitrogen purging. This reduces hydrocarbon sweeping time and enables faster access to reactors after shutdown.



01. Life Support Unit trailer designed and built in the US
02. CR International Rail Crane' being used to install filters inside a vessel 03. Cardox™ firing unit

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QUALITY AND MANAGEMENT

The CR International name stands for quality and technical expertise; with the company being ISO-9001 certified and externally audited. We work with our clients to establish specific Inspection and Test Plans mirroring the project's specific needs, and client requirements. After each project is completed we conduct a thorough debriefing with clients to identify further improvements, cost savings, and best practices.

CR International uses a custom built, web-based IT Management system that enables staff to access all significant documents and carry out all business functions wherever they are in the world. Inbuilt customer project reporting functions ensure the client is kept up to date at all times on cost and progress.

Multi skilling and ongoing training ensures the best possible workforce is assigned to any project. Our specialised workforce has been the most important factor in our international growth, and is one of our greatest strengths. The majority of our equipment is proprietary, and with offices located in strategic positions around the globe, CR International is able to quickly respond to project requirements; wherever they may be.



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