



**Optimize production and boost profitability  
while keeping your people safe.**

## **Refining Solutions**

Leverage Emerson's valves, actuators, regulators, and services to reduce emissions and improve the safety, production, and reliability of your refinery.





Environmental regulations are changing frequently—  
and becoming more and more restrictive.

## Operating more efficiently is difficult with changing environmental responsibilities.

Refineries, more than most process facilities today, are tasked with environmental, safety, and social responsibilities that make it harder than ever to stay profitable. It's critical to keep personnel safe in hazardous environments, but it is becoming more difficult to hire and retain qualified local personnel as the experienced workforce continues to retire.

On top of this, meeting production volume targets is essential to staying afloat in a competitive market. But, fleet inefficiencies create operating constraints that put production at risk, and unscheduled shutdowns and slowdowns make meeting those targets and contract commitments virtually impossible.

“We’re staffed to run, not staffed to change.”  
–Refinery Operations Manager, North America



Refining is much more than just a technical  
operation. It's subject to a strong business  
constraint: meeting market demand.  
–Independent Refiner



Many refiners believe that regulatory changes,  
like IMO, will present a medium to major  
disruption to the industry.  
–OilandGas360.com, 2019



# Stay ahead of the competition by responding to market conditions with greater flexibility.

In today's changing energy market, refiners are under increasing pressure to implement operational flexibility. Emerson's solutions make it easier for operators to safely meet demand while lowering operating costs, reduce unplanned slowdowns and shutdowns, and adapt to new clean fuels regulations.



## Produce cleaner fuels to reduce emissions and energy use.

- Access comprehensive consulting expertise to identify and correct all energy-related issues
- Implement pre-packaged energy-saving solutions quickly with global support

“Fisher™ Control-Disk™ valves have enabled our compressors and chillers to run smoothly, with less loading and unloading energy required.”  
– Process Engineer, CAMECO



## Train and equip personnel to be more efficient and decrease overall operating costs.

- Utilize proven solutions to improve awareness of and response to imminent asset failures
- Run units at capacity and adapt to changing process conditions with maximum yields

In 2017 alone, more than 19,900 students participated in relevant product or industry training through Emerson's Educational Services team—offered from 80+ global service locations and taught by 300+ certified instructors.



## Better prioritize maintenance requirements to operate more reliably and increase availability.

- Digital installed base asset recording and tracking creates turnaround execution efficiency
- Valve Condition Monitoring and diagnostic analysis allows for data-driven maintenance planning

With wireless THUM adapters, previously stranded diagnostic information was made available to the refinery's information database and distributed to the staff responsible for maintaining the assets, enabling them to act before a process interruption.  
– Refinery in California, USA

# Refining Solutions

## Crude Distillation

- Meet product specifications, minimize energy use, and improve throughput. ▶ p5

## Hydroprocessing

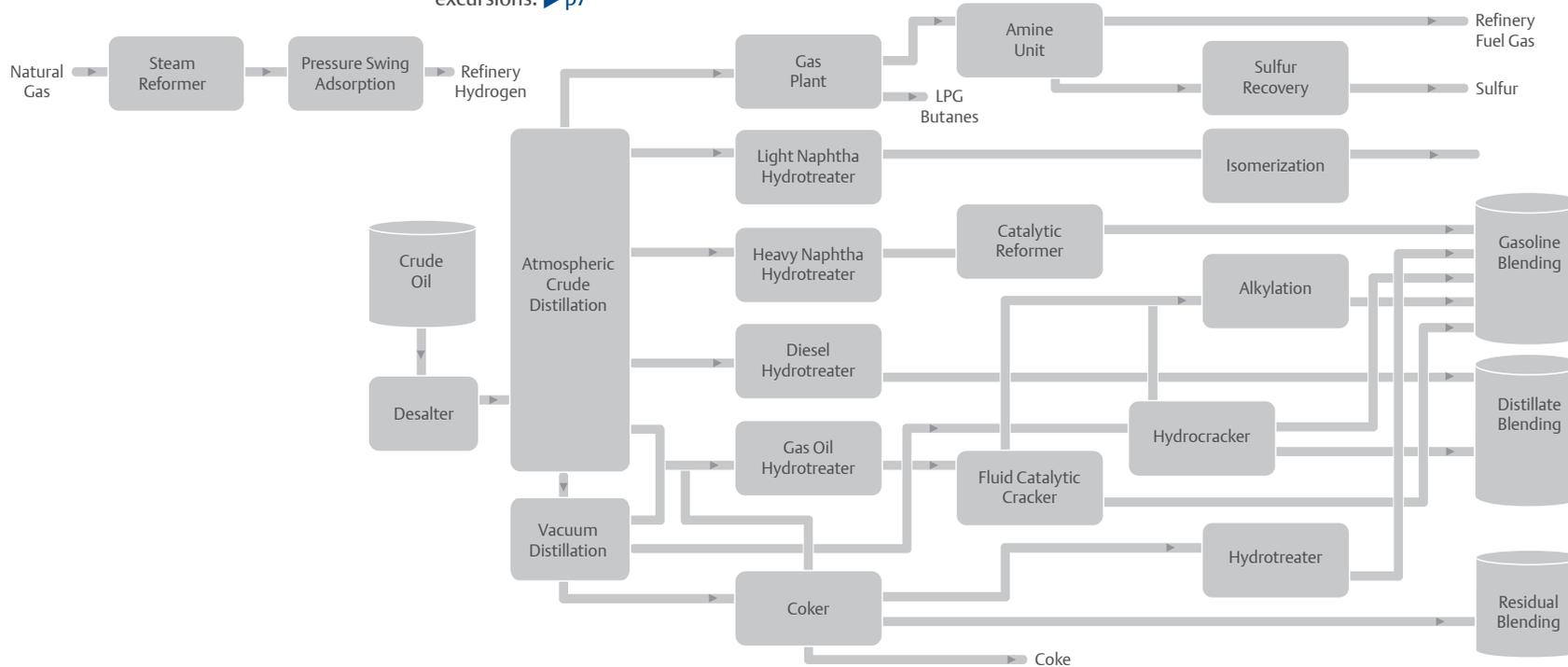
- Increase product yield and prolong the life of your catalyst. ▶ p7
- Improve yield, extend catalyst life, and mitigate reactor temperature excursions. ▶ p7

## Fluidized Catalytic Cracking

- Reduce steam usage while maintaining quality with improved distillation control. ▶ p9

## Catalytic Reformer

- Ensure reformer availability for hydrogen generation and high-octane gasoline component. ▶ p11



## Hydrogen Generation

- Optimize hydrogen production and improve the reliability of your hydrogen purification process. ▶ p13

## Delayed Coker

- Maximize higher-value cut points and improve safety by streamlining your coke removal process. ▶ p15

## Sulfur Recovery

- Maintain refinery throughput while ensuring availability and safe operation. ▶ p17

## Tanks

- Improve inventory insight, quality tracking, and safety. ▶ p19



## Crude Distillation Solutions

Minimize product quality variation, off-spec production, and energy-consumption per unit of feed to increase column throughput. ▶ p5

## Hydroprocessing Solutions

Address low and ultra-low sulfur diesel requirements while adding product yield flexibility. ▶ p7

## Fluidized Catalytic Cracking Solutions

Reduce Fluidized Catalytic Cracking (FCC) complexity to convert low value heavy oils to higher value products. ▶ p9

## Catalytic Reformer Solutions

Maintain optimum naphtha reformer performance and consistent intermediates for downstream petrochemical availability. ▶ p11

## Hydrogen Generation Solutions

Meet increasing hydrogen demand and purity requirements to fulfill downstream requirements. ▶ p13

## Delayed Coker Solutions

Maximize higher value cut points and improve safety by streamlining coke removal process. ▶ p15

## Sulfur Recovery Solutions

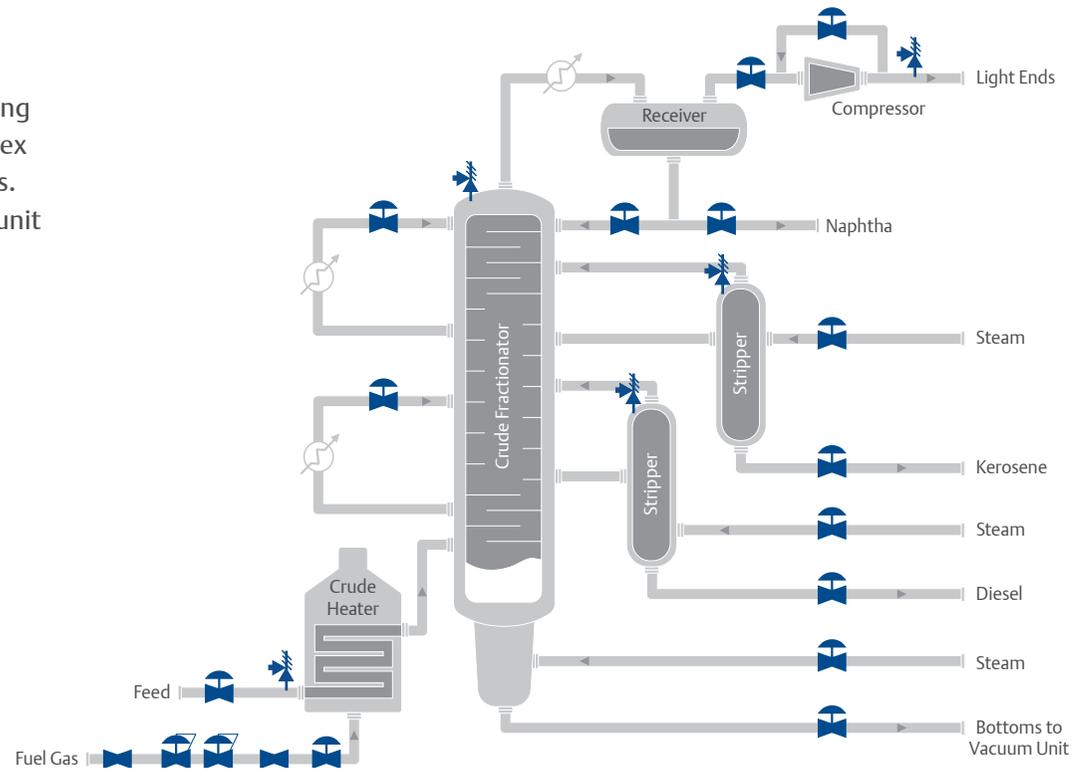
Maintain reliable and safe combustion control and reduce the effects of corrosion. ▶ p17

## Tank Solutions

Manage tanks and terminals more efficiently to achieve better inventory insight, quality control, and safety. ▶ p19

# Crude Distillation Solutions

The atmospheric crude distillation unit (CDU) is the first processing unit in a refinery downstream of the desalter. The unit is a complex column that fractionates crude oil into the basic product streams. These intermediate product streams from the crude distillation unit can vary widely depending on the refinery operating objectives.



## What's your opportunity?

- Consistently meet sidestream specifications, minimize energy use, and improve throughput
- Reduce product quality variation and off-spec production
- Increase recovery of more valuable products
- Maximize feed rate upon demand
- Increase column throughput



## Ensure on-spec quality and throughput.

With Emerson's advanced control solutions for crude distillation units, combined with best-in-class measurement capabilities, you'll consistently save energy costs while minimizing disturbances and reducing quality giveaway.

[Crude Unit Application Solutions Guide](#) ►



## Services offered...

- Valve Condition Monitoring time series analysis
- Control valve calibration
- Regulator configuration and repair
- Pressure relief valve configuration and repair
- Technology upgrades and retrofit
- Product and system training
- Pressure relief valve spare pool management
- Valve sizing and selection

## Featured Crude Distillation Solutions

### Fisher Feed Valve to Furnace



Obtain tight shutoff and precise flow of heavy gas oil feed into the furnace with a valve designed for streamlining flow passages.

- An eccentric plug minimizes contact with the seat ring when opening, reducing friction and elongating the life of the valve

[Fisher V500 product webpage](#) ▶

### Fisher Pump-Around Valve



Extract heat from the column efficiently for pump-around applications.

- This valve will provide optimal performance and separation between product draws, reducing the variability in quality specifications

[Fisher easy-e ED product webpage](#) ▶

### Fisher Fuel Gas Valve



Precisely control the flow of fuel to heat the charge heaters with a valve solution designed to reduce process variability.

- Designed to provide excellent shutoff to help avoid temperature swings in the heater and efficiently process feed further downstream

[Fisher Control-Disk product webpage](#) ▶

### Anderson Greenwood™ Desalter Overpressure Protection



Achieve stable relief regardless of flashing liquids or where they occur, optimize operations to prevent unnecessary releases to the flare, and improve the safety system lifecycle.

- Dampening feature provides additional protection from water hammer

[Anderson Greenwood Series 200/400/800 product webpage](#) ▶

### AEV™ | Bettis™ | KTM™ | Vanessa™ Automated Isolation Valves



Isolate fuel, feed stock and fractionator product lines with ultimate dependability and control. These valves provide reliable, automated operation with repeatable, zero leakage shutoff.

- Fully integrated Emerson solution
- Low Fugitive Emission designs
- Low running torques

[AEV 2XC product webpage](#) ▶

[Vanessa 30,000 Series product webpage](#) ▶

[KTM Series EB1 product webpage](#) ▶

[Bettis brand webpage](#) ▶

### Fisher Burner and Pilot Gas Regulator



Ensure efficient and steady fuel gas supply pressure during start-up and continuous operation from the fuel gas header.

- Pilot-operated burner regulator
- Self-operated pilot gas regulator
- Fast speed of response

[Fisher 1098 Series product webpage](#) ▶

### Fisher Digital Isolation™ Solutions



Improve safety and reduce the risk of unplanned outages with a fully integrated and verified SIL 3 Emergency Shutdown (ESD) valve solution.

- Applied diagnostic coverage
- Standardized solution decreases engineering and execution time

[Fisher Digital Isolation TOV webpage](#) ▶

### Fisher Fuel Gas Header Regulator



Maintain constant fuel gas header pressure throughout the process unit with precise pressure control.

- Pilot-operated and fast speed of response
- Noise-attenuation technology

[Fisher EZH product webpage](#) ▶

### Additional products

- Fisher FIELDVUE™ digital valve controller



Visit the [Distillation & Fractionation Application Solutions webpage](#) to learn more.

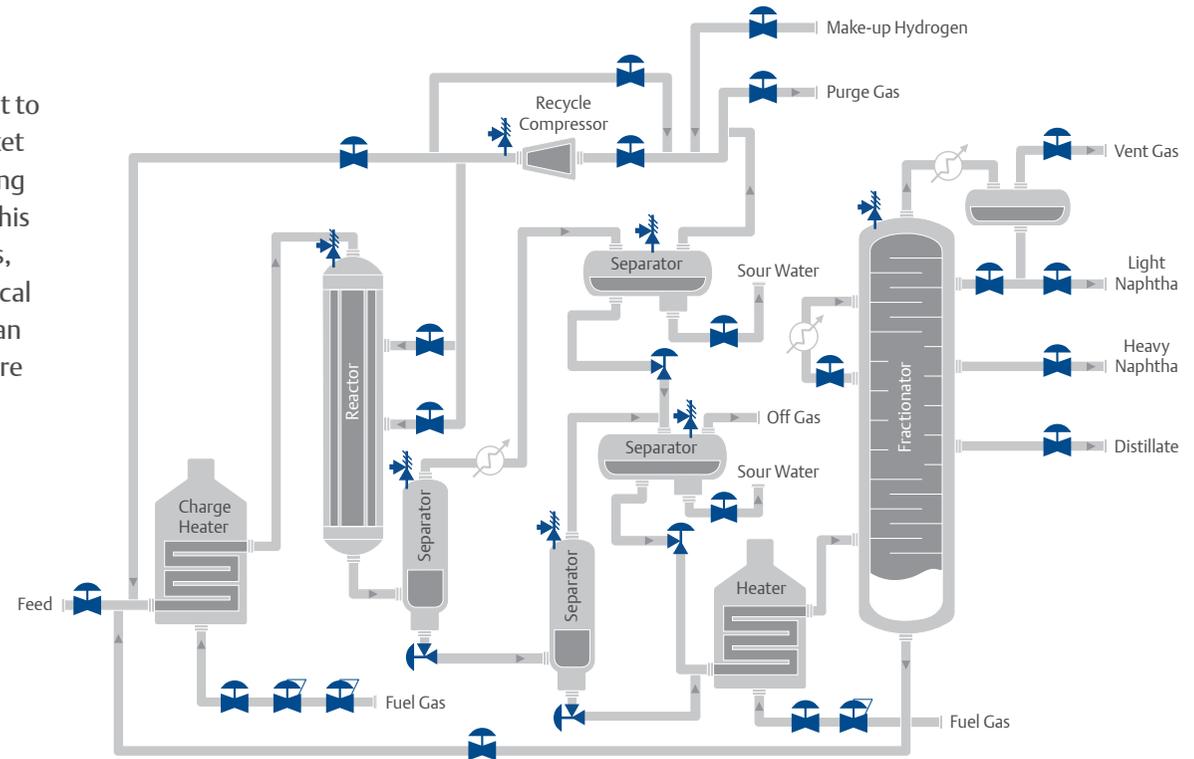
# Hydroprocessing Solutions

Hydroprocessing refers to two separate but similar processes: hydrotreating and hydrocracking. The hydrocracker unit is important to meet low sulfur diesel while taking advantage of opportunistic market conditions between gasoline and diesel, so keeping this unit operating reliably and effectively is imperative. Safety is also a challenge with this unit due to high pressures, hydrogen, hydrogen sulfide, fired heaters, and potential reactor temperature excursion. Hydrotreaters are critical in protecting downstream process catalysts, as poor performance can significantly affect product yield and efficiency and potentially require an earlier shutdown for catalyst replacement.

## What's your opportunity?



- Increase quality and yields with better regulatory controls that improve temperature control of the fired heater and hydrogen quench controls
- Improve functioning safety and operate within increasingly stringent environmental regulations with automation solutions that deliver better measurement, control, and diagnostic information
- Meet low sulfur fuel requirements



▲ Hydrocracker Unit process diagram



## Maximize uptime with tight reactor bed temperature control and improved downstream catalyst performance.

Emerson's advanced hydrocracker solutions provide tighter control in the field, more accurate temperature measurements, detection of potential problems, and enhanced insight into the hydrocracker's performance. [Hydrocracker Unit Application Solutions Guide](#) ►

Using our hydrotreating solutions, you'll gain the tight control, accurate measurements, and real-time compositional data needed to maximize the yield of higher-value products while reducing the typical operator intervention needed to keep your process running well.



## Services offered...

- Startup optimization and performance testing
- Valve Condition Monitoring and analysis
- Control valve online and offline diagnostics
- Regulator configuration and repair
- Pressure relief valve configuration and repair
- Technology upgrades and retrofit
- Product and system training
- Leak detection
- Pressure relief valve spare pool management
- Outgassing valve sizing and selection

## Featured Hydrocracker Solutions

### Fisher Separator Letdown Valve Trim



Minimize outgassing issues that lead to severe vibration and poor controllability and accelerated trim wear. This trim is ideal for critical, high-pressure letdown applications where long valve and trim life is crucial to keeping the unit running smoothly.

- Staged pressure drops help prevent cavitation and a lower cage separates the flow steam into smaller jets to help avoid erosion
- Pressure profile helps avoid premature outgassing within the valve trim while splitting the flow steam into smaller jets at the valve outlet to prevent vibration

[Fisher DST-G product webpage](#) ▶

### Fisher Hydrogen Quench Valve



Control the reactor bed temperatures to avoid an excursion, prevent a runaway reaction, maximize catalyst life, and achieve a better product yield.

- These valves use a balanced valve plug and offer excellent shutoff with process temperatures below 232°C (450°F)

[Fisher HPT product webpage](#) ▶

### Anderson Greenwood H2 Compressor Discharge Overpressure Protection



Achieve stable relief despite pressure “spikes” from the reciprocating compressor with this pilot-operated pressure relief valve.

- Soft seat design provides repeatable, bubble-tight performance before and after each relief cycle
- Minimize product loss per relief situation with available modulating action

[Anderson Greenwood Series 200/400/800 product webpage](#) ▶

## Featured Hydrotreater Solutions

### Fisher Optimized Compressor Anti-surge Valve and Accessories



Protect your critical and costly compressor from a damaging surge event with a complete optimized anti-surge valve package that provides higher gains, precise response, and remarkable stability.

- The Fisher control valve provides quick, accurate response during a surge to recycle the discharge flow back to the suction side of the compressor, avoiding expensive and disruptive damage
- The Fisher SS-263 volume boosters offer three times the capacity of traditional boosters, high vibration resistance, enhanced throttling control, and a desirable fail-safe mode
- The FIELDVUE ODV-tier digital valve controller is dual certified as intrinsically safe and explosion proof, and offers an anti-surge-specific tuning capability

[Fisher anti-surge valve solutions webpage](#) ▶

### AEV | Bettis | KTM Automated Isolation Valves



Isolate fuel lines, pumps, flare lines and manage reactor depressurization with fully engineered automated isolation solutions.

- Zero leakage shutoff
- Low Fugitive Emissions designs
- Low running torques

[AEV 2XC product webpage](#) ▶

[KTM Series EB1 product webpage](#) ▶

[Bettis G Series product webpage](#) ▶

[Bettis RPE Series product webpage](#) ▶

### Tartarini™ Fuel Gas Header Regulator



Achieve reliable pressure control to maintain a constant fuel gas header pressure throughout the process unit.

- Pilot-operated regulator
- Fast speed of response
- Noise attenuation

[Tartarini FL Series product webpage](#) ▶

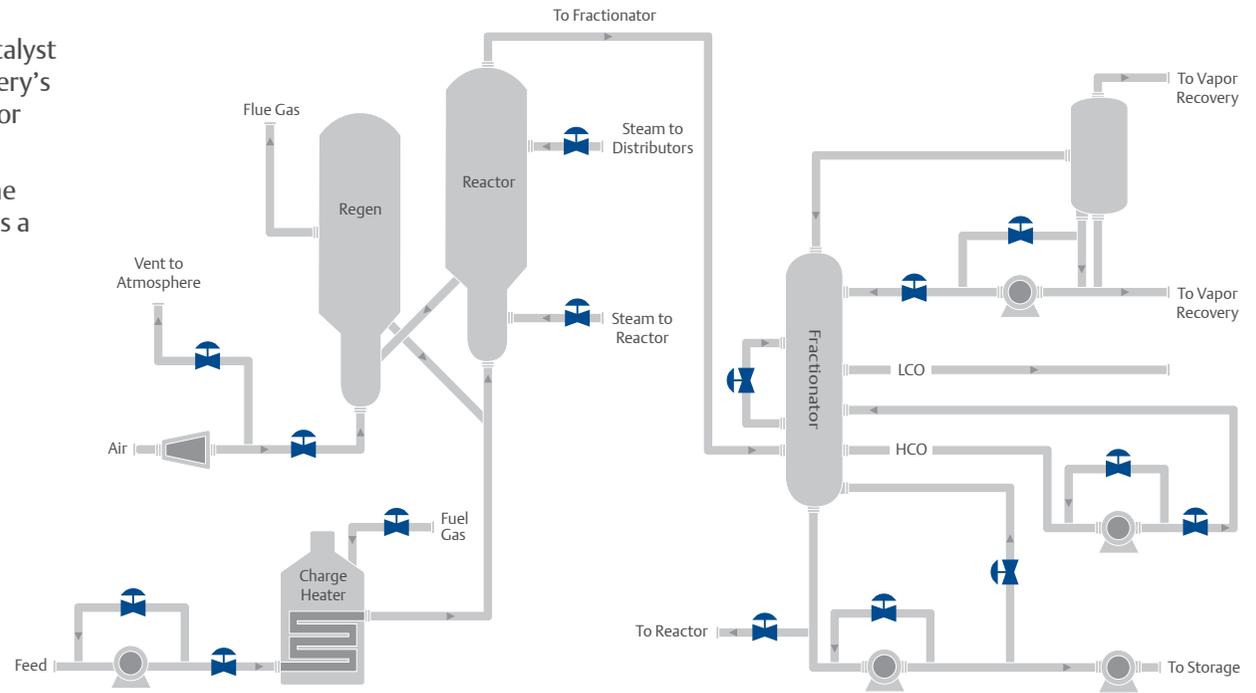


Visit the [Hydrocracker](#) and [Hydrotreater](#) Application Solutions webpages to learn more.

# Fluidized Catalytic Cracking Solutions

The Fluid Catalytic Cracking (FCC) is a dynamic and complex process, operating in severe conditions where plugging and catalyst reversal are always a risk. With a significant portion of the refinery's heavy petroleum being processed in the FCC unit, a slowdown or shutdown can directly impact the refinery's profitability.

The FCC unit is also an important source of butene and pentene olefins used in refinery processes such as the alkylation unit. As a critical unit in the refinery, the alkylation unit's optimum operation is essential.



## What's your opportunity?

- Reduce steam usage while maintaining quality with improved distillation control in the gas concentration section
- Reduce FCC complexity to convert low value heavy oils to higher value products
- Size and select the right control valve to prevent catalyst erosion and avoid process interruptions
- Keep assets running reliably in spite of severe reactor and regenerator temperatures.



## Detect line plugging and catalyst reversal in real time.

Using Emerson solutions for FCC, you'll have the tight control over your process and real-time measurement accuracy needed to ensure smooth and efficient operation.



## Services offered...

- Valve Condition Monitoring and analysis
- Control valve calibration
- Regulator configuration and repair
- Pressure relief valve configuration and repair
- Technology upgrades and retrofit
- Product and system training
- Pressure relief valve spare pool management
- Valve sizing and selection

## Featured Fluidized Catalytic Cracking Solutions

### Fisher Charge Oil Flow Valve



Ensure precise flow control of feedstock into the charge heater, which helps avoid excessive buildup on the heater tubes, maintains outlet temperature, and optimizes reaction performance and efficiency.

- Designed for forward or reverse flow with tight shutoff in either flow direction
- Oversized shaft and rugged trim parts allow for high pressure drops

[Fisher CV500 product webpage](#) ▶

### Fisher Charge Pump Spillback Valve Trim



Prevent cavitation in the charge pump with valve trim designed to handle high pressure drops. Reducing cavitation damage means less unscheduled maintenance and longer asset life.

- Valve trim uses a series of flow restrictions and expansions to eliminate cavitation
- Hardened metal seats provide tight shutoff to minimize seat erosion

[Fisher anti-cavitation trim solutions webpage](#) ▶

### Anderson Greenwood FCCU Regenerator Protection



Reduce the number of spring valves and associated piping systems by implementing pilot valves with full bore orifices.

- Dual outlets reduce or eliminate the effects of excessive reaction forces to avoid special pipe support structure
- Maximum capacity with non-API standard size
- Pilot purge or ISO-DOME options to isolate catalyst media

[Anderson Greenwood Series 400 webpage](#) ▶

### Bettis | KTM | Vanessa Regenerator & Reactor Isolation Valves



Isolate input and output lines of the regenerator and reactor units with fully engineered automated isolation solutions.

- Zero leakage shutoff
- Low Fugitive Emission designs
- Low running torques

[KTM Series EB1 product webpage](#) ▶  
[Vanessa Series 30,000 product webpage](#) ▶  
[Bettis RPE Series product webpage](#) ▶

### Anderson Greenwood Flowing Pilot Relief Valve



Ensure stability of the Pilot for Steam application by keeping the internal critical pilot evenly warmed.

- Pilot warming consistency prevents steam from condensing within the pilot while the main valve is open, which could result in significant pressure decreases and main valve instability.

[Anderson Greenwood Series 500 webpage](#) ▶

### Fisher Main Column Bottoms Valve



Circulate flow from the bottom of the column to the reboiler and back to the column to facilitate separation and ensure proper product specification.

- Streamlined flow passages, rugged components, and a wide choice of erosion-resistant trim materials all promote long, dependable service life in high-viscosity slurry applications

[Fisher V500 product webpage](#) ▶

### Fisher Charge Oil Heater Fuel Gas Valve



Maintain discharge temperature of the charge oil as it is injected into the reactor.

- Designed to control non-lubricating, viscous, or other hard-to-handle fluids
- Post guiding stabilizes the valve plug at all points in its travel range to reduce vibration, mechanical noise, and trim wear

[Fisher easy-e EZ product webpage](#) ▶

### AEV | Bettis | Vanessa Automated Fractionator Isolation Valves



Isolate fuel lines, pumps, flare lines and manage reactor depressurization with fully engineered automated isolation solutions.

- Zero leakage shutoff
- Low Fugitive Emission designs
- Low running torques

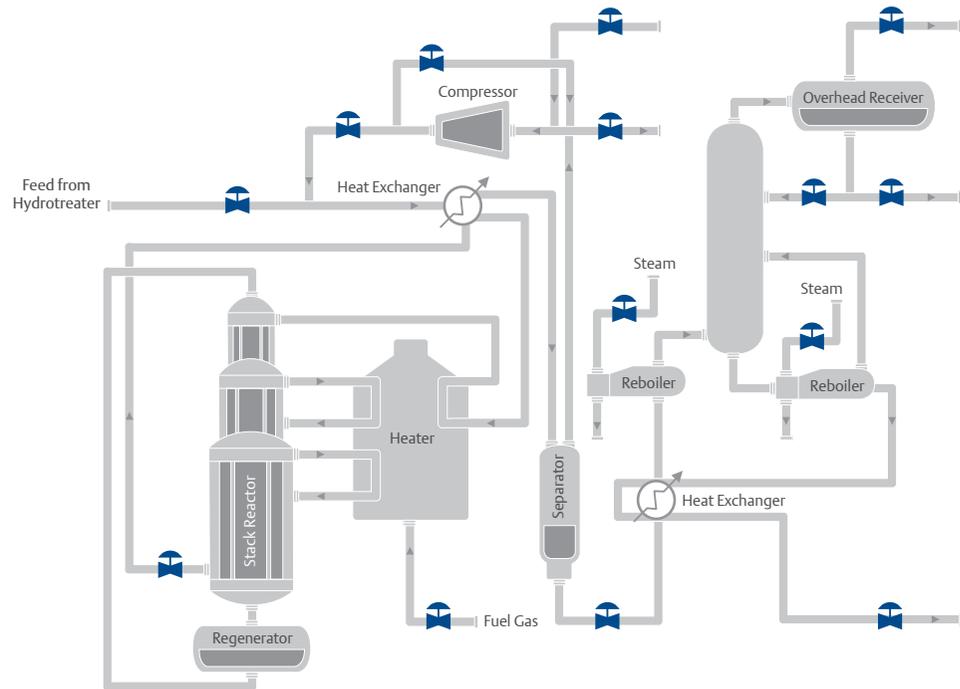
[AEV 2XC product webpage](#) ▶  
[Vanessa 30,000 product webpage](#) ▶  
[Bettis G Series product webpage](#) ▶  
[Bettis CBA Series product webpage](#) ▶



Visit the [Fluidized Catalytic Cracking Application Solutions webpage](#) to learn more.

# Catalytic Reformer Solutions

As a primary process unit, the catalytic reformer is essential to providing high-octane gasoline component, petrochemical intermediate feedstock, and hydrogen for the rest of the refinery, and any upset in the reformer can easily cause a slowdown or shutdown in these processes.



## What's your opportunity?

- Maintain optimum catalytic reformer performance and consistent hydrogen availability
- Ensure reformer availability for hydrogen generation and high octane gasoline component



## Ensure reliable high-octane component, petrochem intermediates, and hydrogen supply with precise heater control.

With Emerson's catalytic reformer solutions, you'll gain precise control of heater outlet temperature to ensure product quality and the accurate asset health measurements needed to ensure your reformer consistently supplies the hydrogen needed.



## Services offered...

- Valve Condition Monitoring and analysis
- Control valve calibration
- Regulator configuration and repair
- Pressure relief valve configuration and repair
- Technology upgrades and retrofit
- Product and system training
- Pressure relief valve spare pool management
- Valve sizing and selection

## Featured Catalytic Reformer Solutions

### Fisher Catalyst Handling Valve



Reduce crushing of the catalyst and pressure build up downstream by controlling gravity feed of the catalyst through the valve.

- Specially-designed flow passages eliminate solids accumulation that can hinder valve operation, which can extend the life of the catalyst spheres, reduce maintenance cost, and improve regeneration efficiency

[Fisher SS138B product bulletin](#) ►  
[Fisher SS252B product bulletin](#) ►

### Fisher Overtravel Valve Trim



Reliably control and purge the hydrogen and nitrogen transfer gases.

- Rugged guiding provides high valve plug stability, which reduces vibration and noise
- Unique plug deflector and dual-seat design helps prolong life span and protect against catalyst fines

[Fisher EZ-OVT product webpage](#) ►

### Fisher Optimized Compressor Anti-surge Valve and Accessories



Protect the compressor from damaging surge events with quick and accurate valve response to immediately recycle the discharge flow.

- The proper valve, actuator, and accessories can help increase compressor throughput, reliability, and efficiency as well as plant uptime
- [Proper Anti-Surge Valve Selection white paper](#) ►

### Fisher Separator Liquid Valve



Prevent cavitation damage while controlling the separator level and feed of the stabilizer to help ensure products meet their purity targets.

- Hardened trim materials provide excellent wear resistance for longer trim life

[Fisher NotchFlo™ product webpage](#) ►

### Crosby Blocked Discharge Overpressure Protection



Meet fugitive emissions requirements for gas and steam applications, like API 526 and 527, with spring-loaded pressure relief valves.

- Styles available for liquid service and two-phase applications
- Metal or soft seats and conventional or balanced bellows options available for more application flexibility

[Crosby J Series product webpage](#) ►

### Fisher Burner and Pilot Gas Regulator



Ensure efficient and steady fuel gas supply pressure during start-up and continuous operation from the fuel gas header.

- Pilot-operated burner regulator
- Self-operated pilot gas regulator
- Fast speed of response

[Fisher MR95 product webpage](#) ►

### Bettis | KTM Automated Isolation Valves



Isolate fuel lines with ultimate dependability and control. These valves provide reliable, automated operation with repeatable, zero leakage shutoff.

- Fully integrated Emerson solution
- Low Fugitive Emission designs
- Low running torques

[KTM Series EB1 product webpage](#) ►  
[Bettis RPE Series product webpage](#) ►

### Tartarini Fuel Gas Header Regulator



Achieve pressure control to maintain a constant fuel gas header pressure throughout the process unit with this pilot-operated regulator.

- Fast speed of response
- Noise-attenuation technology

[Tartarini FL product webpage](#) ►

### Additional products

- Anderson Greenwood H2 Compressor Discharge Overpressure Protection Relief Valve



Visit the [Catalytic Reformer Application Solutions webpage](#) to learn more.

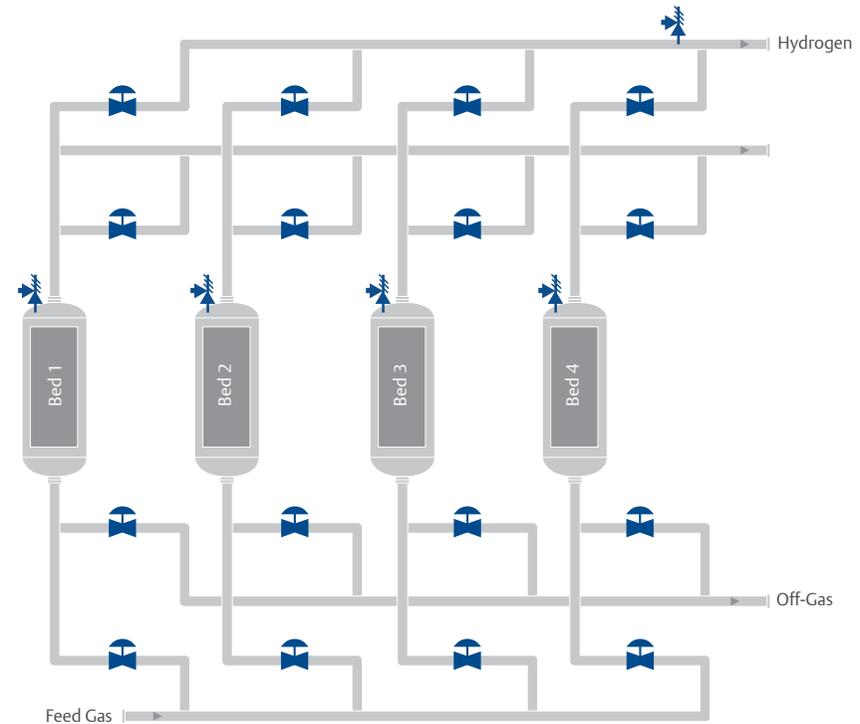
# Hydrogen Generation Solutions

The hydrocracker, hydrotreaters, and isomerization units rely on a consistent supply of pure hydrogen to avoid slowdowns and shutdowns. Coupled with the need to process heavier and higher sulfur crude slates, generating and managing hydrogen production is more critical than ever.



## What's your opportunity?

- Ensure reliable hydrogen generation and distribution
- Meet increasing hydrogen demand and purity requirements to fulfill downstream requirements
- Increase availability for on-spec hydrogen to maximize constant refinery utilization
- Improve hydrogen purity control, leading to a longer catalyst lifespan



## Ensure reliable hydrogen generation and distribution.

Using Emerson hydrogen generation solutions, you can ensure the supply and purity of hydrogen created will enable you to improve hydrocracking, minimize coke laydown, and increase catalyst life and throughput.



## Services offered...

- Valve Condition Monitoring and analysis
- Control valve calibration
- Regulator configuration and repair
- Pressure relief valve configuration and repair
- Technology upgrades and retrofit
- Product and system training
- Valve sizing and selection

## Featured Hydrogen Generation Solutions

### Fisher Feed Valve



Implement adjustable cycle times as required for high-cycling feed applications with a reliable rotary valve and actuator package.

- No O-rings to wear, an inherent position on air failure, low actuator pressures for operation, and double-sided diaphragms
- Designed for long service life—over 1,000,000 cycles—under load conditions

[Fisher 8580 product webpage](#) ▶

[Fisher 2052 product webpage](#) ▶

### Fisher Dump/Purge Valve



Ensure hydrogen is processed purely and efficiently with a valve solution that provides quick stroke speeds and fully open to fully closed travel.

- Rugged cage guiding provides high valve plug stability, reducing vibration, noise, and maintenance requirements

[Fisher easy-e ET product webpage](#) ▶

### Fisher Valve Diagnostics



Receive advanced notice of PSA valve performance issues and recommended corrective actions.

- No linkage to wear, loosen, corrode, or vibrate in order to handle harsh environments and provide non-stop cycling
- Integral independent position feedback is available

[Fisher FIELDVUE™ DVC6200 product webpage](#) ▶

[Fisher FIELDVUE ValveLink™ product webpage](#) ▶

### Bettis | Vanessa Automated Hydrogen Isolation Valve



Reduce corrosion, embrittlement, and blistering issues often caused by HPHT hydrogen.

- Zero-leakage valve integrates metallurgy, design, manufacturing, and gasket technology to achieve the high performance standards demanded by hydrogen processes

[Vanessa 30,000 Series product webpage](#) ▶

[Bettis G Series product webpage](#) ▶

### Anderson Greenwood Modulating Pressure Relief Valve



Protect against control valve failures to enhance the reliability of your process.

- Soft seat design provides repeatable, bubble-tight performance before and after each relief cycle

[Anderson Greenwood 400 Series webpage](#) ▶

### Rigorous Testing and Verified Performance



Gain confidence in the performance and reliability of your control valves knowing they go through Emerson's cycle testing lab specifically designed to represent the PSA unit as accurately as possible

- A large volume tank provides process pressure in high capacity to all of the control valve assemblies being tested
- Each valve assembly is tested with standard option parts—including valve seats, packing, actuator springs, and diaphragms—and is controlled with a FIELDVUE digital valve controller

[PSA Valve Solutions webpage](#) ▶

### Fisher Low-Emissions Valve Packing



Achieve long-term, consistent valve sealing performance with packing systems proven to help secure your process to conserve valuable process fluid and effectively control emissions to avoid regulatory fines and help keep personnel safe.

- Easily installed in existing valves or added to new valve assemblies

[Fisher ENVIRO-SEAL product bulletin](#) ▶

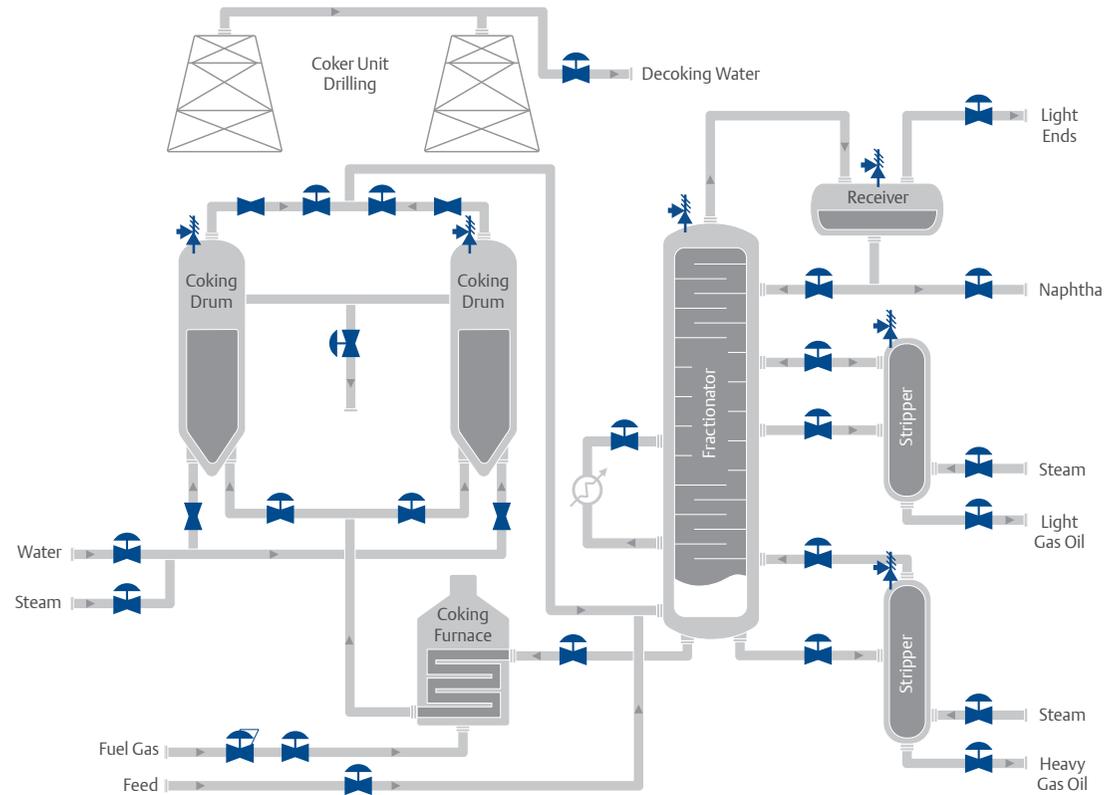


Visit the [Hydrogen Generation Application Solutions webpage](#) to learn more.

# Delayed Coker Solutions

The coker is an important processing unit for extracting high-value fuel products from the bottom of the oil barrel, but unmonitored disturbances during coke drum switchovers can often lead to process slowdowns or even shutdowns.

Because it is typically one of the “dirtiest” and most high maintenance processes in the refinery, maintaining a safe, healthy environment around the coker is critical. Anything that can be done to increase reliability, lower maintenance costs, and enable higher on-stream time is valuable.



## What’s your opportunity?

- Consistently meet side-cut specifications and improve safety by streamlining your coke removal process
- Minimize the cycle time between drum switching
- Achieve an accurate and reliable material balance around the coker, optimizing the unit’s efficiency



## Operate your coker safely and efficiently.

Our advanced process control solutions for delayed cokers and fired process heaters can minimize disturbances, optimize temperature control, reduce buildup, and provide a faster transition back to normal operating conditions.



## Services offered...

- Valve Condition Monitoring and analysis
- Control valve calibration
- Regulator configuration and repair
- Pressure relief valve configuration and repair
- Technology upgrades and retrofit
- Product and system training
- Valve sizing and selection

## Featured Delayed Coker Solutions

### Fisher Fractionator Reflux Valve



Reduce product variability and maintain safe operating conditions for your coker unit.

- Achieve tight emissions control with excellent shutoff capability
- Reduce vibration and mechanical noise with high valve plug stability
- Prolong asset life with increased wear resistance of hardened stainless steel trim

[Fisher easy-e ET product webpage](#) ▶

### Fisher Furnace Feed Valve



Achieve precise flow of heavy gas oil feed into the furnace and avoid temperature swings that can lead to excessive coke build up in the furnace tubes.

- Specially selected trim materials and body coatings help to withstand oil sands, furnace feed, and other highly erosive applications

[Fisher V500 FFD product webpage](#) ▶

### Bettis | AEV Automated Coker Drum Switching Valves



Automate valve performance and improve coker Mean Time Between Failure (MTBF) with a fully automated valve solution that is proven to execute consistently and reliably in demanding coker conditions.

- Zero valve cavity to eliminate coke fines build up
- Non-rubbing rotation to minimize wear and extend life
- Robust construction and high temperature performance

• Simple, rapid maintenance

[Bettis M2CP product webpage](#) ▶

[AEV ?XC product webpage](#) ▶

### Bettis | Vanessa Automated Delayed Coker Unit Isolation Valves



Isolate multiple critical process within the DCU with ultimate dependability and control, from vapor lines to pumps, heaters and drums.

- Fully integrated Emerson solution
- Low Fugitive Emission designs
- Low running torques

[Vanessa Series 30,000 product webpage](#) ▶

[Bettis M2CP product webpage](#) ▶

### Bettis | Yarway™ Automated Blowdown & Drain Valves



Automate your drain valves to improve the efficiency and uptime of your Delayed Coker Unit. For use in elevated piping runs, or where an emergency will require rapid, positive, and remote operation

- Fully integrated Emerson solution
- High dependability and flow capacity
- Available in fail-to-open or fail-to-close modes
- Rapid in-line maintenance

[Yarway Welbond product webpage](#) ▶

[Bettis XTE3000 product webpage](#) ▶

### Crosby™ Spring-Operated Relief Valve



Implement as a cost-effective alternative to multiple small, high-pressure relief valves where set pressure requirements exceed industry standards.

- The forged body construction allows an extensive array of sizes, pressure ratings, and connections to suit the application

[Emerson Pressure Relief Valves overview brochure](#) ▶

### Additional products

- Fisher FIELDVUE digital valve controller



Visit the [Delayed Coker Application Solutions webpage](#) to learn more.

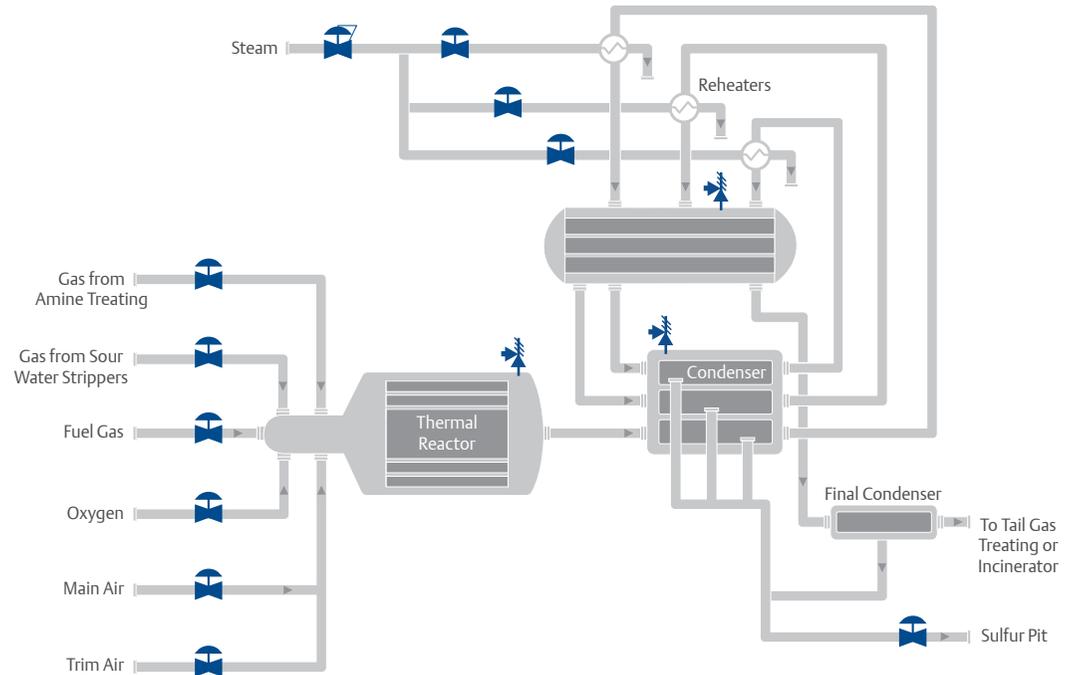
# Sulfur Recovery Solutions

An imbalance of combustion air in sulfur recovery units could result in too much hydrogen sulfide or sulfur dioxide in the tail gas and possibly cause a shutdown of the entire refinery—and corrosion is an ongoing challenge. Overall refinery throughput can also be negatively impacted if the sulfur being removed is not able to be fully processed.



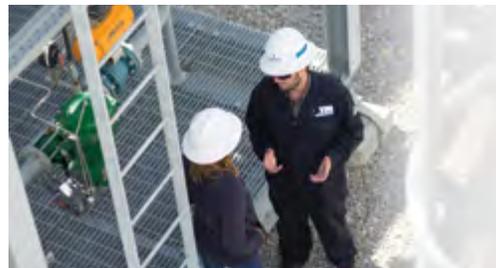
## What's your opportunity?

- Maintain reliable and safe combustion control and reduce the effects of corrosion
- Avoid limited throughput due to sulfur content



## Safely recover sulfur and ensure regulatory compliance.

With Emerson final element solutions, you can help ensure the combustion air ratio is properly controlled to maintain safe and reliable sulfur recovery.



## Services offered...

- Valve Condition Monitoring and analysis
- Control valve calibration
- Regulator configuration and repair
- Pressure relief valve configuration and repair
- Technology upgrades and retrofit
- Product and system training
- Valve sizing and selection

## Featured Sulfur Recovery Solutions

### Fisher Acid Gas from Amine Valve



Effectively handle highly-sulfuric processes, like bringing acid gas to the thermal reactor, with durable, NACE-compliant materials.

- Increased wear resistance of the standard hardened stainless steel trim means long-lasting service
- Monitor valve performance online to evaluate performance and reliability

[Fisher easy-e EWT product webpage](#) ▶

[Fisher FIELDVUE DVC6200 product webpage](#) ▶

### Fisher Sour Water System (SWS) Valve



Move sour gas from the sour water strippers efficiently and avoid the costly effects of valve sulfur damage.

- Engineered passages within the valve body provide optimal capacity and create a stable flow pattern for smooth operation

[Fisher easy-e ET product webpage](#) ▶

### Bettis | Vanessa Automated Sulfur Isolation Valves



Protect against thermal loss, medium solidification and corrosion with an on/off or bypass valve solution featuring a thermal jacket, bearing flushing and suitable material selection.

- Ensures temperature of the valve seat/bearing areas will not fall below the sulfur crystallization point
- Asymmetric, frictionless triple offset design prevents jamming or sticking
- Camming action promotes sweeping of build-ups off the sealing surface

[Vanessa 30,000 Series product webpage](#) ▶

[Bettis XTE3000 product webpage](#) ▶

### Yarway™ Boiler and Trim Level Solutions



Ensure optimized boiler performance and steam generation by removing sediment, controlling boiler level surge, and managing liquid level.

- Rugged construction to withstand high pressures and velocities
- Designed to meet increasing demand for reliable, cost-effective means of sensing water level in boilers and other refining applications

[Yarway Blow-Off Valves webpage](#) ▶

[Yarway Water Columns & Probes webpage](#) ▶

### Yarway Drip, Tracing, & Process Steam Traps



Minimize steam loss throughout the distillation column with thermodynamic, thermostatic, and mechanical steam traps.

- Energy-efficient design is suitable in low, medium- or high-pressure applications

[Yarway Repairable Drip & Tracer webpage](#) ▶

### Crosby Direct Spring Pressure Relief Valve



Protect against overpressure events to avoid process interruptions and reduce risks to personnel.

- Designed as both a conventional valve and a balanced bellows valve for application flexibility
- NACE-compliant trim

[Crosby J Series product webpage](#) ▶



Visit the [Sulfur Recovery Application Solutions webpage](#) to learn more.

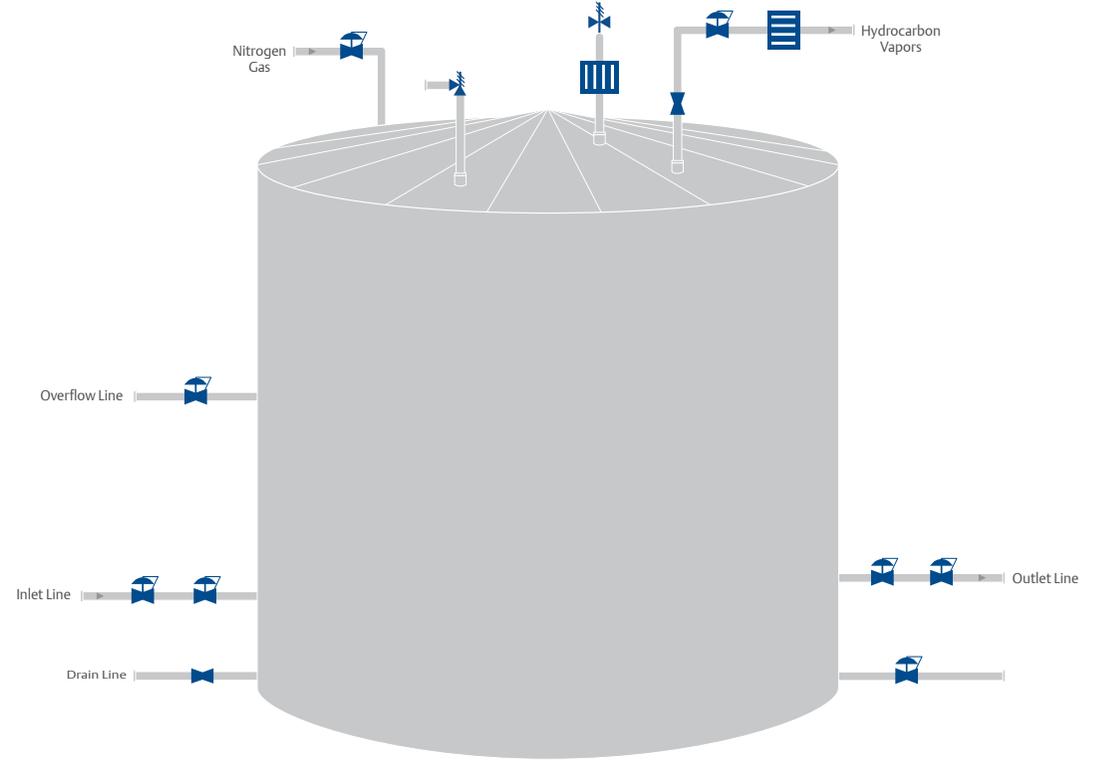
# Tank Solutions

Tanks contain large quantities of materials with significant commercial value so it's important to safeguard quality and control operations related to storage and movements. The rise in the number of products and the increasing customer and market demands have resulted in logistical, environmental, and inventory challenges that can be solved with additional insight from appropriate instrumentation and control systems.



## What's your opportunity?

- Improve the way tanks and terminals are managed by integrating tank gauging systems with the site's automatic control system
- Enhance visibility of tank status and movements to avoid cross-contaminating product or improper valve alignment
- Expand your process monitoring and automation capabilities
- Improve safety with better alarm management



## Improve inventory insight, quality tracking, and safety.

With Emerson's tank solutions, you can gain better insight into your tank inventory, and detect potential safety and environmental incidents early enough to avoid any product loss.



## Services offered...

- Valve Condition Monitoring and analysis
- Regulator configuration and repair
- Pressure relief valve configuration and repair
- Technology upgrades and retrofit
- Product and system training
- Tank walkdown to understand stranded diagnostics

## Featured Tank & Storage Solutions

### Fisher Tank Blanketing Regulators



Prevent outside air from entering the tank, reducing the possibility of explosion and oxidation.

- Low set point technology
- Pilot-operated models provide higher accuracy and capacity
- Direct-operated models provide fast response

[Fisher 1190/1290 product webpage ▶](#)  
[Fisher ACE95 product webpage ▶](#)

### Enardo | Varec Pressure Vacuum Relief Valves



Manage normal pressure changes and allow tanks to breathe, responding to challenges in temperature, liquid level, or both.

- PPS pallets and seats or PTFE coated internals to prevent freezing or sticking
- Tight seal to minimize product loss
- Wireless remote monitoring option

[Enardo 850/950 product webpage ▶](#)  
[Varec 2010B/2020B product webpage ▶](#)

### AEV | Bettis | Vanessa Emergency Shutdown Valves



Ensure consistently tight shutoff in critical emergency shutdown and overfill prevention applications.

- Zero leakage shutoff
- Rapid open or close in emergency event
- Advanced diagnostics and data logging

[AEV 2XC product webpage ▶](#)  
[Vanessa Series 30,000 product webpage ▶](#)  
[Bettis EHO product webpage ▶](#)  
[Bettis RTS product webpage ▶](#)

### Bettis | Keystone | KTM Automated Isolation Valves



Isolate refinery products, manage blending and utilities with fully engineered automated isolation solutions.

- Zero leakage shutoff
- Low fugitive emission designs
- Responsive automation

[Keystone K-LOK product webpage ▶](#)  
[KTM Series EB1 product webpage ▶](#)  
[Bettis XTE3000 product webpage ▶](#)  
[Bettis SCE300 product webpage ▶](#)

### Enardo Flame Arrestors



Protect against vapor ignition by reducing the temperature and momentum of a flame.

- Detonation models for the most extreme conditions
- Range covers both unconfined and confined applications and gas groups B, C, and D
- Wireless extended burn and fouling detection available

[Enardo DFA series product webpage ▶](#)

### Anderson Greenwood High- and Low-Pressure Pilot Valves



Maintain a specific pressure in the vapor space of the tank by precisely controlling the flow of a gas.

- High- and low-pressure pilot valves reduce cost of ownership and complexity against traditional control loops and multiple spring actuated control systems

[Anderson Greenwood Series 9300H product webpage ▶](#)  
[Anderson Greenwood Series 9300 product manual ▶](#)

### Enardo™ Wireless Monitoring Panel



- Reduce operational emergencies
- Monitor and troubleshoot problems before they occur
- Minimize the need to climb onto tanks
- Base Maintenance schedules on actual operational data

[850/950 Wireless technical specifications ▶](#)  
[Benefits of wireless monitoring whitepaper ▶](#)

### Enardo™ Emergency Vents



Protect against abnormal, high pressure conditions with high pressure relief.

- Full range, including hinged and lift-up styles
- Tight sealing technology
- Wireless remote monitoring option

[Enardo 2000/2100 Series product webpage ▶](#)

### Additional products

- Fisher FIELDVUE digital valve controller
- Fisher 4320 wireless position monitor
- Anderson Greenwood 90/9000 pressure relief valve
- Anderson Greenwood 4040 pressure and vacuum valves



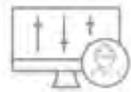
Visit the [Blending Application Solutions webpage](#) to learn more.

# Continuous support in the face of changing market and operating conditions

Emerson leads the way with industry-defining end-to-end digital service experiences, enabling you achieve superior outcomes through our maintenance, reliability, and performance offerings. The tools we've developed support the digital transformation of the refining industry, providing the confidence to extract the maximum value from your service and technology investments. Our teams partner with you across the globe to help you maintain safe operation, improve reliability, and optimize plant performance.

With over 200 regional service centers and 80+ mobile service centers worldwide, local experts are available to work with you to understand your unique challenges and enable you to find a solution. Our broad portfolio of service offerings allows us to tailor our support to align with your specific business goals.

[Webpage: Lifecycle Services for Valves, Actuators & Regulators ▶](#)



## Valve Condition Monitoring

Leverage smart valve technology and Emerson expertise to help your workforce make informed performance and reliability decisions.

[Webpage: Valve Condition Monitoring ▶](#)



## Turnaround Services

Identify, prioritize, and plan long-term plant reliability improvements to reduce maintenance events and enhance refinery performance.

[Brochure: Shutdowns, Turnarounds & Outages ▶](#)



## Digital Walkdown & Installed Base Assessment

Train new hires, improve your current workforce skills, and help your team adapt to new technology or products.

[Flyer: Digital Walkdown & Installed Base Assessment ▶](#)



## Startup and Commissioning

Certified technicians meticulously work through approvals, calibration, testing, and certification to deliver a comprehensive handover, on time and on budget.

[Flyer: Startup & Commissioning ▶](#)





With locations worldwide, Emerson local experts are never far away. Get in touch today to arrange a site walk and see the value Emerson can bring to your operations.

# Reduce emissions and improve the safety, production, and reliability of your refinery.



Emerson delivers time-tested and innovative refining solutions designed to help you improve your operation's overall safety, reliability, and performance. Contact us now for world-class technologies and services that can maximize your energy savings, improve asset management, and shorten turnarounds. Getting started is easy. Visit [Emerson.com/FinalControl](https://www.emerson.com/FinalControl)

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