



## The Forefront of New Exchanger Coatings

### Foul Release Coatings for Process-Critical Exchangers

Curran International is at the forefront of new exchanger coating technology to reduce fouling in high-temperature crude and hydrocarbon manufacturing operations.

Curran's thin film application reduces surface tension of steel, leading to improved "release" down tube of exchangers in heavy crude and fouling services.

### Field Trials Also Found Indications of Improved Product Shear During Normal Operations.

Using hybrid polymers and inorganic components, Curran applications are suited for use in many crude and hydrocarbon services. This class of coatings covers wide operating parameters, including crude and coking services to 800°F.

### A Wide Selection of Effective Coatings

Curran has a portfolio of heat exchanger application materials with several applications at less than 50-microns total thickness. This enables a value-added solution to solve fouling and reduce routine maintenance of heat exchangers critical to operations.

Applications have been developed for exchanger tube IDs, tube ODs, and Plate and Frame exchangers. Several years of lab testing has been carried out by Curran International, and independently by a number of Curran's refinery clients.

Using select materials and applications performed on exchangers in refinery operating service, field trials were developed at production sites around the globe.

### A Summary of Client Performance Reports:

- FCC bottoms/slurry exchanger, crude >650°F, tube ID coating: Reduced fouling and lower head pressure, improved thermal duty by about 10% compared to uncoated exchangers. Observations recorded at 20 days, 100 days and 150 days. Nearly a year after installation, the exchanger remains in service and data indicates marginally improved performance compared to when uncoated.
- Offshore platform, OD coated tube bundle, light hydrocarbon service at 350°F: improved production compared to uncoated exchanger at 240-day period, no cleaning required, continued operation uninterrupted. Thin film coating no impact to thermal duty.
- Asia mid-continent refinery, ID coated tube bundle, crude service 350°F: operations experience with uncoated exchanger - severe fouling, dP increase. Since coating, the exchanger has 150 days with no dP increase, bundle in continuous operation.
- Power Plant, Admiralty Brass oil coolers, sea water: Uncoated exchangers required monthly cleaning of barnacle, particulate deposits. Coated exchangers delivered 7 months uninterrupted service (evaluation measuring period), plant recognized additional cooling capacity.

### Put Curran's Portfolio of Coatings to Work for You

Using this portfolio of exchanger coatings and Curran's application expertise combine to provide anti-fouling solutions for many services.

Contact Ed Curran [ecurran@curranintl.com](mailto:ecurran@curranintl.com) or 281.339.9993 to review of operating conditions and fouling coatings

# Curran Coating Improved Cooling Capacity and Net FCC Production Gains

## More International News

A large international refinery sought to improve the reliability of its cooling water exchangers in the FCC and realized operating performance benefits, as well.

## 120 Curran-Coated Exchangers

This refinery has more than 120 Curran-coated exchangers across its large multi-unit complex. Curran has provided coated exchanger tube bundles to the site for more than 10 years.

As a result of improved performance of Curran-coated cooling water condensers, the refinery recognized significant increases in unit capacity.

## Significant Additional Cooling

Six O/H trim exchangers found nearly 1000 cubic meters per hour additional cooling water capacity compared to the uncoated exchangers that had been previously installed.

With the higher cooling water flow, key operating improvements were recognized as well:

- Increased reactor feed temperature
- Improved condensation
- Reduced propylene loss in fuel gas
- Reduced HP steam demand.

## More Than Reduced Corrosion

The initial objective was to reduce corrosion and fouling on the cooling water side of these exchangers. In the years since installation, the refinery reported no maintenance for tube fouling, a key factor in the original funding request for coated exchangers.

Most clients take this approach – using coating to reduce tube fouling and mitigate under-deposit corrosion leading to tube failure.

## It Appears Coating More Than Pays for Itself

The contribution to unit throughput and crude manufacturing may not be as readily measured; but as in this case, the benefits to operations could be a significant to the overall business case for coated versus uncoated exchangers.

To Learn More, please contact Alex Barre global sales, at Curran International. [abarre@curranintl.com](mailto:abarre@curranintl.com), or 281.339.9993



Curran coated exchanger improves refining cooling capacity, contributes to unit optimization.

# 8,000 Miles from Headquarters – Curran Cleaning Satisfies T/A Team at Saudi Refinery

## Curran International Continues to Expand its International List of Clients

These clients have endorsed Curran's tube cleaning method for predictable NDE.

In December, Curran crews supported a turnaround in an eastern province of Saudi Arabia. This project showed the refinery the range of Curran's versatility for clean in place work on air-cooled, and work at bundle slab on tube exchangers. NDE inspections of exchangers were front-end loaded in the outage schedule.

Higher-integrity inspection cleaning was the result. The Curran method also eliminated cleaning rework that had become a scheduling factor due to ineffective hydro-jetting by another contractor.

## Failure Is Not an Option

After previous attempts, by another contractor, using hydro-jetting were not effective and failed to support inspection cleanliness, the refinery brought in Curran to provide its grit-blast cleaning method. The refinery turnaround team contracted Curran after witnessing a demonstration of its grit blast cleaning method at a nearby fabrication shop.

## A Plan Was Developed Quickly and Executed Well

Curran technicians were integrated into the event. Work-scope included, exchangers in two separate operating units, and tube cleaning for NDT of pull-and-clean bundles taken to a nearby fabrication shop, in Juaymah.

The turnaround and inspection teams reported that all exchangers assigned to Curran were cleaned and inspected and the refinery was satisfied with the effectiveness of Curran's method and the inspection data obtained.

## Patented Grit-Blasting Technology is Very Effective

Curran's patented grit-blasting technology effectively removes tenacious mineral and hydrocarbon scale downtube; and ID fouling that interferes with inspection data acquisition. The Curran system includes, a dust vacuum which eliminates the nuisance dust and debris normally associated with dry grit-blasting. When grit-blasting, the dust collector maintains a vacuum on the containment, capturing all airborne debris.

**To Learn More**, please contact Yasir Idlibi [yidlibi@curranintl.com](mailto:yidlibi@curranintl.com) for sales and turnaround project support in Saudi Arabia, and Mideast nations; or contact Alex Barre global sales, Curran International. [abarre@curranintl.com](mailto:abarre@curranintl.com), or 281.339.9993



Refinery tech using borescope to visually inspect tube cleanliness

## Catch Curran

You will be able to meet Curran Professionals at:

**NACE Corrosion Conference & Expo 2019**

**March 24 – 28**

Nashville Music City Center, Nashville TN

**CORROSION**  
Conference & Expo **2019**  
March 24-28 • Nashville, Tennessee

**AFPM 2019 Reliability Maintenance  
Conference and Exhibition**

**May 21 – 24**

Gaylord Convention Center, Grapevine TX



**AFPM**

American  
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Manufacturers

# Plant Specifies High Functionality Coating to Arrest Tube End Erosion

## Tubesheet Coating Protects Sealing Integrity

While performing routine maintenance of quench water exchangers plant inspectors observed erosion at most tube end projections across the bundle. To complicate matters, many were eroded flush to tubesheet.

The plant's tube-side service is hot, turbid quench water and hydrocarbons, with a designed fluid-velocity of less than less than 3ft/second.

At this point, it was decided that remediation of tubesheets was the best way to enhance the functional integrity of the exchanger.

NDE inspection of the bundle found full-length tubes satisfactory for return to service.

In the end, the remediation meant protecting sealing joints and encapsulating tube ends to arrest oxidation. To do this, the exchanger tubesheets would be coated.

## Curran 1500, a high functionality novolac hybrid epoxy coating was selected.

Tube-side quench water operates at higher temperatures than shell-side cooling water. This difference in temperature creates a risk of cold wall failure when specifying a tubesheet protective coating.

The Curran Coating offered mechanical performance attributes for this tubesheet restoration project.

All coatings are permeable, and protective. However, in cold wall service the molecular energy of heated water may blister coated steel at places where the opposite side is exposed to cooler conditions.

Cold-wall-resistant coatings overcome that molecular kinetic reaction when coated steel is in hot immersion service. There are few protective epoxy coatings for cold wall service, and test data should be available to verify which coating is best.

Curran 1500, a 100% solids (0 VOC) novolac hybrid epoxy coating meets all the exchanger operating parameters.

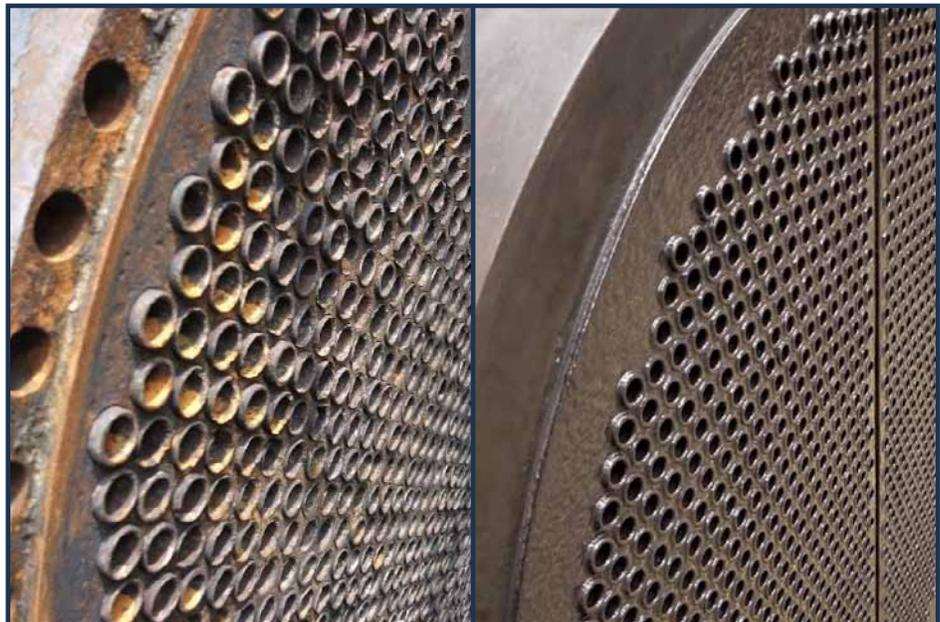
## Here's How the Project Was Done

- 1.) Curran technicians grit-blasted the tubesheets to NACE 1 white metal, inspected and remediated soluble contaminants (chlorides).
- 2.) Using a short bush, a primer coat was applied at tube and tubesheet joints, encapsulating the crevice to strengthen the seal. A thin film was wrapped over and into the tube end to about 3/4" down-tube to mitigate erosion and tube end wear.
- 3.) Two coats of Curran 1500 were applied, achieving about 32 to 40-mil total thickness across tubesheets.

## The coating is amine catalyzed, and ambient curable.

Curran 1500 can be used widely across industry. Contact Curran International for more information about coatings for fixed equipment and pressure vessels.

To Learn More, please contact Ed Deely, [edeely@curranintl.com](mailto:edeely@curranintl.com), or 281.339.9993



Images of tubesheet prior to coating; tube end erosion threatened sealing joint integrity. Image at right after coating tubesheets with Curran 1500, a 100% solids hybrid novolac for cold wall services.