Curran international
Tubular Heat Transfer Services.

May, 2020

Heat Exchanger Foul Release Coatings
for Crude Refining

Advanced low-surface-energy coating materials targeted for heat exchanger fouling in a range of crude fouling services have expanded Curran International's tube coating portfolio.

Materials and application techniques have been developed for exchangers that are subject to performance decline related to crude processing. Such as, crude pre-heaters, vacuum bottoms, FCC slurry, produced water and desalting services.

Curramix 3500 – 60 days static soak in test fixture at 650F; crude oil flowing down coated tube.

Organic hybrid, inorganic ceramic, and a PFA/PTFE form the basis of Curran applications targeted at crude processing and coking. The material selections offer anti-fouling coatings for services to 750F.

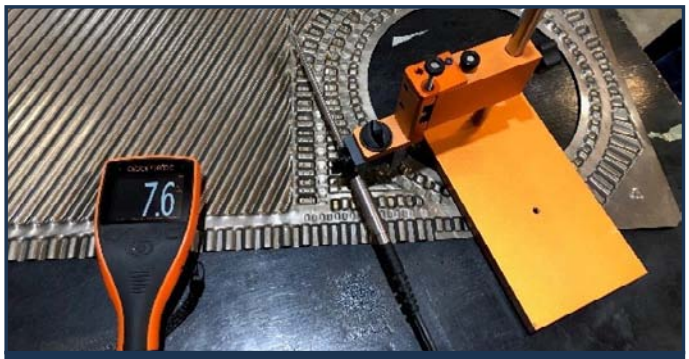
Field installed trials have demonstrated coating effective at reducing routine maintenance, and case history showing 3x operation run between shut downs.

Curramix	ID, OD, PFE – FCC & VAC bottoms, heavy gas oil, immersion 750°F
StreaMax™	ID, PFE - resistant to paraffins, asphaltenes, H2S, CO2, immersion 500°F
DTI Sol Gel	ID, PFE – low temperature crude (125°F), produced water (194°F)

ID – tube ID; OD – tube OD; PFE – Plate Frame Exchanger

New Materials Help Solve Old Problems

Curran's anti-foul tube coating portfolio offers thin film exchanger tube coatings for a wide range of refinery and petrochemical services. Some coatings are functional at 5-15 microns total thickness. The applied film reduces surface tension exponentially to <30 dynes/cm2 and a surface Ra of 0.5 microns.



Ultra-thin Curran coating applied to PFE requires use of positioning jig to record precise film thickness measurements, instrument shows 7.6 microns thickness.

The coatings impart a low surface energy finish onto the substrate, improving release and promote sheer to minimize product attachment and nucleation sites. A wide collection of exchanger field trials ranging 15 to 60 months shows favorable results against uncoated exchangers in the same service.

Ultra-thin Coatings for Plate & Frame Exchangers

In a joint effort, Curran International and Danish Technological Institute (DTI) have combined to apply DTI Sol Gel inorganic-organic hybrid to plate and frame exchangers for offshore production platform.

A recent application was facilitated at an exchanger OEM, when the client scheduled routine maintenance at an OEM facility in Southeast Asia. Together, Curran and DTI have developed an agreement for global applications.

"The thin film DTI application minimizes any impact to heat transfer. Our work with DTI provides operators with solutions that increase production, lower energy consumption, and reduce cleaning events," noted Edward Curran, president, Curran International.

Curran has exchanger application facilities in Houston, Edmonton, Rotterdam and Singapore.

To Learn More about the heat exchanger anti-foul coatings, and Curran's portfolio of heat exchanger coatings, please contact Edward Curran, (281) 339-9993 or ecurran@curranintl.com

Follow-Up: Curran Coating Restores
Large Sea Water Condenser

A $900,000.00 Strategy

A full-length condenser tube ID coating application, at a large generation and desalination facility, met benchmark performance and reliability parameters after months of operation following a unit outage.

Curran's work supported the plant's initiative to develop a cost-effective condenser tube repair strategy.

Curran International condenser tube coating enabled the plant to maintain the existing unit for operation, as an alternative to a tube replacement.

The operator noted, Curran International condenser coating was nearly $900,000.00 less in immediate project costs when compared to condenser tube replacement.

Salt water sediment and deposits severely fouled many of the condenser tubes requiring hydro lancing to clear.

Fixing a Loss of 10 Percent of Operating Duty and Leak-Free

Tube-pitting had already cost the plant about 10 percent of condenser operating duty. The tubes suffered under-deposit corrosion from seawater mineral scaling, pitting, leading to mechanical plugging.

Curran technicians applied a full-length tube ID coating to restore corroded CuNi condenser tubes. Thermal-duty was reported to be on-target when measured by plant operations monitoring condenser performance months after start-up. Since start-up, the coating condenser tubes have operated leak- free.

Curran grit blast surface preparation of tube ID and tubesheet yielded clean surface for coating.

The plant condenser restoration project compared tube ID coating against earlier projects where similar units had been retubed, upgrading the CuNI to titanium tubes. This large generation and desalination site sources local sea water for plant condenser cooling; while the heated sea water feeds downstream distillation and desalination.

Done in Less than Two Weeks

The Curran coating protect was completed in 13 days, compared to 45 days for each of the earlier retube projects.

Using tubes removed earlier from the condenser, Curran developed a thin film coating application for the 1.70" OD x 40' long CuNi tubes. The primary objective was to encapsulate pits, protect the tube substrate from new corrosion, and inhibit scale-attachment.

Curran 1000T Coating

Curran 1000T, applied down tube in a single coat. A low-surface energy release topcoat was applied – the total coating thickness was about 75 microns. The project scope included surface prep and vacuum containment.

Full-length alloy liners used in a new fabrication replacement air cooler; client upgraded only primary inlet section where operating history showed tube corrosion was severe.

A Bundle of Services

Tube ID coating is just one of the expert services Curran provides for condenser restoration; partial and full condenser and balance of plant retubes, installation of full-length tube liners, and repair ferrules – around the world.

To Learn More

For over 30 years Curran has mobilized globally to provide tubular heat transfer equipment solutions. To discuss this and other condenser restoration projects, please contact Jason Kolman, jkolman@curranintl.com, 281.339.9993.

Full-Length Alloy Tube Liners

Facilitate In-Situ Heat Exchanger Restoration

Exchanger Alloy Tube Liners- A Proven Repair Solution

When corrosion threatens to impact equipment operating-parameters, exchanger alloy tube liners are a proven repair solution.

Curran International installs and hydraulically expands alloy tube liners – the tube-in-tube installation achieves "intimate contact," and a corrosion-resistant barrier. Full-length tube liners eliminate the need for tube plugging and, thus, keep the target-tubes in-operation.

When tube plugging is employed, the risk of future tube-failure threatens the thermal capacity of the exchanger. When it is important to maintain the exchanger's thermal capacity, full-length tube liners are a reliable solution.

Full-Length Tube Liners, In-Situ

From an air cooler catwalk to an exchanger scaffold deck, Curran field crews install full-length liners in-situ. Curran high-pressure hydraulic pumps and tooling are portable and adaptable. Curran ties into plant utilities to expand, cut, trim and roller expand installed liners.

See the animation demonstrating hydraulic tube installation at www.curranintl.com

Full-length liners are sized carefully to fit down an existing exchanger tube. Curran works with several domestic and Western European-based steel mills to provide timely delivery and competitive pricing. Curran 's inventory strategy supports exchanger integrity assessments, especially when a contingency repair plan must be implemented on just-in-time basis.

The common alloys used for tube liners include, C276, 825, Stainless Steel, Admiralty Brass and CuNi tube materials. Curran has installed seamless and welded tube materials for clients specifying liners tube wall thicknesses from 0.022" to 0.049" and in-between sizes.

The Single-Contractor Service Strategy and Superior Tube Cleanliness

Curran International also offers tube-ID-cleaning prep for turnkey project execution. Curran dry grit tube cleaning is a best practice for superior tube cleanliness. Curran Cleaning yields high-integrity inspection of the existing tube prior to installing the alloy liner.

More Information is Available

Curran will provide a budget-cost for alloy tube liners, hydraulic installation, and a turnkey plan- including tube ID cleaning, just for the asking.

Please contact Ed Deely, 281.339.9993 or edeely@curranintl.com.

Catch Curran

Covid-19 has impacted industry conferences Curran International planned to attend.

NACE Corrosion 2020 Conference and Expo- Cancelled.

CORROSION Conference & Expo 2020

AFPM Summit – Excellence in Plant Performance- August 25, 2020

AFPM American Fuel & Petrochemical Manufacturers

Now, a virtual conference.

Curran International will be in virtual exhibit hall.

Join in and learn more about Curran's services, see a demonstration video, and view Curran's capabilities brochure.

AFPM virtual conference promises a "new, digital approach is designed to educate a broader audience and connect more industry professionals while safely adhering to social distancing measures."

Register at https://www.afpm.org/events/27741b00000003

Visit Curran website anytime – www.curranintl.com