Heat Exchanger Cleaning Technology for Improved Eddy Current and Remote Field Inspection Results

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Introduction

- The fouling of heat exchanger tubes has a negative impact on heat transfer and production capacity.

- Reliable inspection results can be compromised by inadequate cleaning.

- Deposits can cause false indications or increased baseline noise interfering with detection and resolution of defect signals.

- Heat exchanger tubes may be lightly fouled with organic deposits or severely blocked with hardened process chemicals.
Introduction

- Heavy deposits can interfere with the accessibility of the inspection probe.
- Success in cleaning is dependent on the selection of appropriate cleaning technology for the specific heat exchanger fouling conditions.
- State-of-the-Art mechanical cleaning technologies are available for all types of heat exchangers to meet specific cleaning needs.
- Mechanical cleaning methods can enhance or replace conventional high pressure cleaning.

Inspection Benefits

- Improved plant reliability.
- Reduced risk of tube failures during operation.
- Condition assessment for Life Cycle Management.
- All are dependant on optimum test results.
- Reducing probe size should not be a corrective action for insufficient cleaning.
INSPECTION SUMMIT 2015

Additional Benefits

- Entire tube gets cleaned. No dead spots at the beginning and end of tube.
- Better accessibility with inspection probes.
- Safety – Low pressure 150 psi – 300 psi normal operating range for mechanical cleaners
- Thorough flush of loosened deposits

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Inspection Benefits

- Advanced inspection technologies may necessitate improved fill factors requiring optimal tube cleanliness.
Blocked Tubes

Probe inaccessibility yields no inspection data

Conductive Deposits

Noisy inspection data and false indications from deposits
Side-By-Side Data Comparison

Comparison of ineffective cleaning (Left) and the same tube after successful cleaning (Right)

Cleaners for Light Silt and Soft Deposits

Plastic Cleaner

Nylon Brush Tube Cleaner
Metal Bladed Cleaners for Harder Deposits

- Standard Metal Cleaner for Standard Deposits
- Higher Tension Metal Cleaner for Heavy Scale

Selecting a cleaner that is properly sized for each tube gauge is crucial for optimum contact with the tube surface.

There is no "One Size Fits All" mentality to achieve the best possible results from mechanical cleaners.

Mechanical Tube Cleaner in Action
Metal Bladed Cleaners for Harder Deposits

Mechanical Tube Cleaner in Action

Specialty and Innovative Cleaners
U-Tube Mechanical Cleaners

Delrin Plastic

Spring-Loaded Metal

Delivery System for Mechanical Cleaners

Water Gun

Mobile Pump System
Drilling Technologies for Blocked Tubes and Hard Deposits

Drill Bits and Specialized Tips
Hard Deposits That Typically Require Drilling

- Asphalt
- Bauxite
- Calcium
- Catalyst materials
- Coke
- Oxides
- Plastics
- Polymers
- Powders
- Sulfur

Water Free Applications

Nitrogen cleaning systems can be used for heat exchangers where water reactivity is a concern.
Conclusion

- Understand each heat exchangers’ specific fouling and deposit condition.
- Work with tube cleaner manufacturers to select the appropriate methodology for your needs.
- Clean them right the first time to minimize rework when the inspection company cannot perform testing efficiently.

Conclusion

- Tube cleaning benefits go beyond inspection results.
  - Increased Exchanger Performance
  - Increased Product Throughput
  - Increased Tube Life
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