

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

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ASSET INTEGRITY THROUGH CORROSION MANAGEMENT,  
INSPECTION AND ENGINEERING TECHNOLOGY



## INSPECTION SUMMIT 2015

### 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

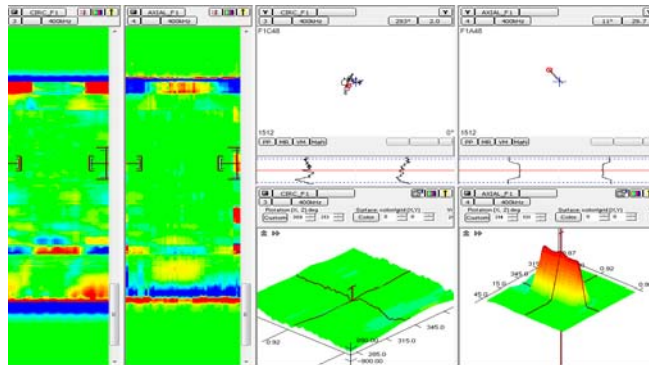
- Improved plant reliability.
- Reduced risk of tube failures during operation.
- Condition assessment for Life Cycle Management.
- All are dependant on optimum test results.
- Reducing probe size should not be a corrective action for insufficient cleaning

## 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

## Inspection Benefits

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



## Blocked Tubes



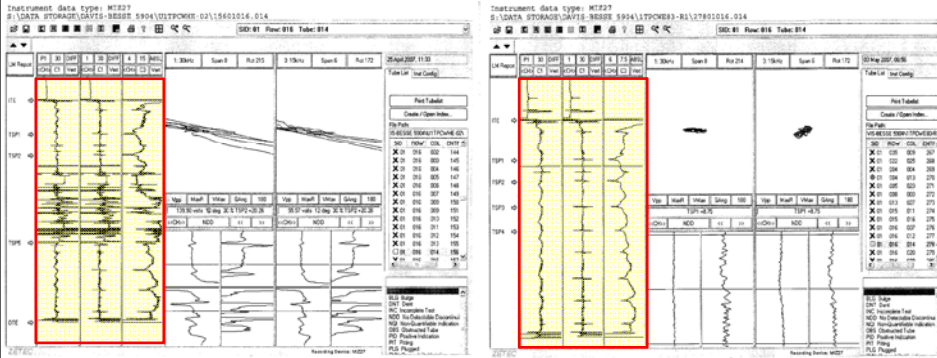
Probe inaccessibility yields no inspection data

## 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

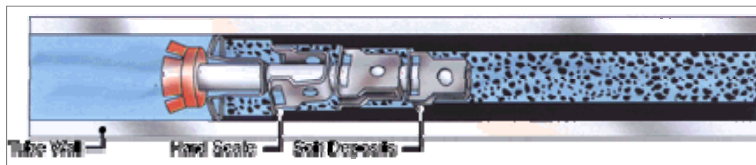


Standard Metal Cleaner for  
Standard Deposits



Higher Tension Metal Cleaner  
for Heavy Scale

## Metal Bladed Cleaners for Harder Deposits



Mechanical Tube Cleaner in Action

- 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.

## 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



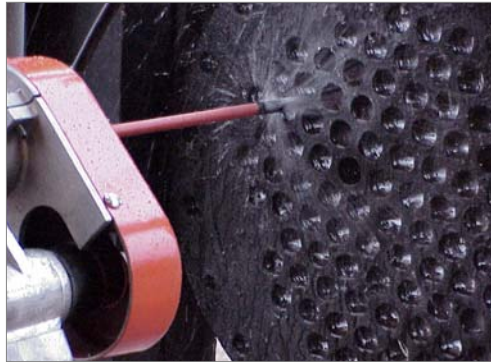
Water Gun



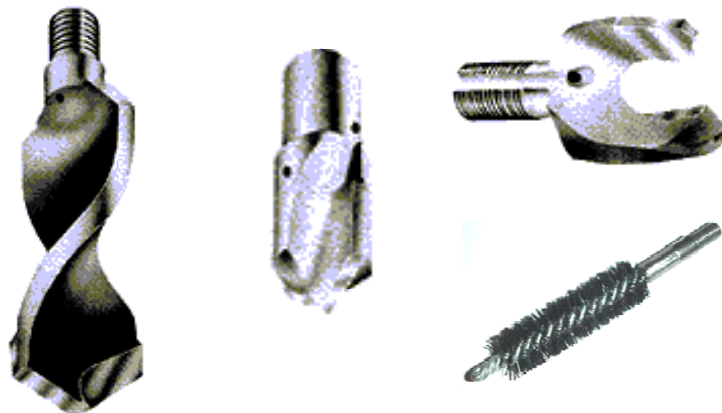
Mobile Pump System



## 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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