

Integrated inspection and design optimization



Heat Exchanger Inspection by FORCE Technology

Background

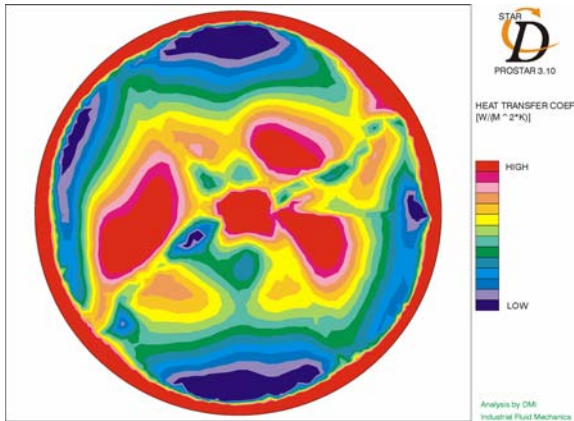
By combining advanced inspection with state-of-the-art fluid dynamic analysis and materials know-how FORCE Technology provides an efficient service for maintaining heat exchangers at optimum operation.

Heat exchangers are vital components in many manufacturing processes. With the increasing focus today on greater efficiency, higher productivity and improved safety, it is crucial that this equipment functions optimally. This can be ensured through regular and thorough inspection.

In the combination of inspection with fluid dynamic analysis and materials know-how a solid base for design optimization of heat exchangers is like-wise provided.

Advantages

- Regular maintenance provides optimal operation
- Systematic maintenance of tubing, walls and tube sheets minimizes costs in the long term
- Inspection based on predictive computation of flow and temperature condition is faster and more effective
- Fast inspection means shorter down time keeping production losses to a minimum
- Compliance with current standards and requirements is ensured
- Compliance with quality requirements is documented
- Improved risk assessment and optimal planning of maintenance
- Design optimization of flow conditions to avoid damages



Analysis of heat exchange coefficient using CFD

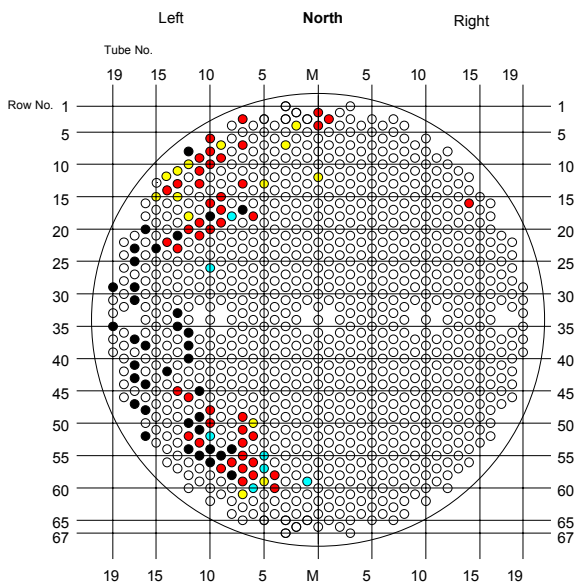
Applications

- Industrial companies that use heat exchangers
- Manufacturers of heat exchangers
- Subsuppliers to heat exchanger manufacturers

Services available

Through our many years of work in testing heat exchangers and industrial flow consultancy FORCE Technology has developed a number of different inspection methods and flow analysis tools. Some of the most often used techniques are:

Computational fluid dynamic analysis of the flow and temperature conditions inside the heat exchanger allows for prediction of the parts of the system which are most heavily exposed to potential damages, thus enabling a risk analysis based inspection strategy to be followed.



Interpretation of inspection data using computational fluid dynamic analysis provides valuable information for assessment of future risks and planning the inspection and maintenance programs.

Pre-Service / New-product inspection

- Predictive computation of flow and temperature patterns in the heat exchanger
- Inspecting the outer walls of the exchanger
- Inspecting the tubing in the exchanger
- Inspecting the welds between the tubes and tube sheets
- 'Year Zero' inspection and flow analysis with which subsequent inspections can be compared

Exchanger in-service inspection

- Inspecting the outer walls of the exchanger
- Inspecting the tubing in the exchanger
- Inspecting the welds between the tubes and tube sheets
- Interpretation of inspection results based on flow analysis
- Metallurgical testing for damage prevention

Exchanger design optimization

- Recommendations for inlet and outlet design
- Flow modification recommendations
- Materials selection recommendations

Methods

Inspections, industrial flow analysis, materials evaluation and risk assessment are performed using a number of known techniques, e.g.

- Automated ultrasonic testing
- Eddy current testing
- Helium leak testing
- Video inspection
- Experimental flow investigations using scale model
- Computational Fluid Dynamic (CFD)
- Fields measurements including tracers
- Metallurgical consultancy and testing
- Thermo graphic inspection.



Further information:

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