Predict®-Amine 2.0
Corrosion Prediction and Material Selection for Rich Amine Systems

The Predict®-Amine 2.0 Corrosion Prediction Software System encapsulates inferences, experimental results, and research data from a Joint-Industry research program (JIP) sponsored by industry leading refining and engineering companies. For the first time, these research results have been made available in an easy-to-use and high-value software program. This latest release incorporates data and predictive capabilities for various Amine solvents commonly used in the refining and gas processing industries.

The goal of the Rich Amine JIP was to develop a quantitative engineering database and to predict corrosion in Amine systems as a function of critical environmental parameters, such as, solvent type, H₂S loading, CO₂ loading, temperature, and heat stable amine salt impurities integrated with characterization of flow regimes and wall shear stress. Predict-Amine 2.0 is the resultant product of this extensive, industry-leading research and is designed to:

- Predict corrosion rates for a wide range of applicable conditions for six commonly used materials, including carbon steel, stainless, and Nickel-based alloys
- Analyze corrosion rates through graphically simulate inlet and outlet balanced piping networks
- Quantify corrosion in amine systems as a function of solvent, velocity (shear stress), H₂S loading and CO₂ loading, and various additional parametric variables
- Ability to address the effect of impurities in amine systems
- Perform flow modeling, compute wall shear stress and analyze flow regimes in multiphase flow
- Correlate flow effects with corrosion rate based on extensive lab data and flow modeling
- Study parametric effects with Sensitivity Analysis and Multipoint Analysis tool
- Access lab-data used to support system decision-making and analyses
- Supports generation of extensive data reports, multiple case analyses and data-sharing across platforms
- Quantify, characterize and analyze amine systems helping to prevent un-scheduled shutdowns

Predict-Amine in Use

Users will find that it takes very little time to be proficient in using Predict-Amine and to get real results.

The intuitive user interface requires commonly available process data, such as:

- Operating conditions such as pressure, temperature, type of solvent, etc
- Amine type and gas loadings for CO₂ and H₂S
- Application information like pipe ID, corrosion allowance, etc
- Process flow rates and properties including vapor, and liquid amine properties
- Users can make fact-based financial and engineering decisions with real material performance data using Predict-Amine
Analysis of amine systems through in-depth data and interpretation of iso-corrosion curves

The program interprets and interpolates JIP data based on a mathematical model derived from comprehensive baseline iso-corrosion curves, to enable, for the first time ever, determination of corrosion rates for various materials ranging from carbon steels to Alloy 825 as a function of flow loop velocity and H2S loading for different combinations of Amines, temperatures and impurity levels.

These iso-corrosion curves have already had a profound impact on the refinery industry. They represent the first comprehensive set of amine corrosivity data available to the industry for use in evaluating corrosion in, and selecting appropriate materials of construction for amine systems.

Improved rules and data to account for more accurate corrosion rate predictions at different levels of H2S loading and CO2 loading

By incorporating baseline data and additionally characterizing roles of several key process variables on corrosion rates in amine systems, Predict-Amine provides an accurate framework to account for effects of H2S and CO2 loading, temperature, and solvent type / concentration. H2S and CO2 loading have been shown to be major variables contributing significantly to corrosion in rich amine systems.

Secondary to the effect H2S and CO2 loading is the effect of temperature. Predict-Amine includes the effect on corrosion rates due to increasing temperature. The program data show that there is a significant effect of temperature on corrosion at higher temperatures.

In addition to accounting for key process variables, Predict-Amine features an enhanced flow modeling module that provides key insights into understanding contribution of typical flow-induced corrosion parameters. The in-depth, flow modeling module automates computation of fluid dynamic parameters such as pressure drops, flow regimes, void fractions and wall shear stresses. This module eliminates the need for the user to separately quantify complexities associated with flow modeling, and provides the capability to include momentum transfer effects into corrosion rate predictions.

The system also facilitates assessment of the effect of impurity concentration on corrosion rates. Program data show presence of impurities (Heat Stable Amine Salts) generated environments that could lead to increased corrosion in both steels and Corrosion Resistant Alloys.

Analyzing Piping Networks with ease

The latest developments in graphical piping simulation have been made available in Predict-Amine 2.0 providing users the ability to map piping networks for amine systems. A typical piping network with straight piping, T-Joints and Elbows can be easily recreated in Predict-Amine and the results at each location may be analyzed with the click of a button.

This tool provides users the capability to analyze the entire piping system for corrosion rate prediction including, bends, elbows, weld protrusions etc. and view corrosion rates for different materials, different locations all on the same screen with ability to filter data as needed.

Predict-Amine outputs corrosion rates for each material and the calculated wall shear stress for your review and analysis.
Secure Access to JIP Data

Users can securely and electronically access the actual laboratory test data, program reports and presentations used within Predict-Amine.

Predict-Amine runs on any Windows-based workstation and/or network. Licenses are available as single user and network (multi-user) licenses.

The original research program entitled “Prediction and Assessment of Corrosion in Amine Systems”. The program was conducted over the period from March 2003 to May 2007 and was jointly sponsored by a group of refining and engineering companies, led by Honeywell corrosion scientists and modeling experts.

More Information

For more information on Honeywell’s corrosion solutions, visit www.honeywell.com/ps or contact your Honeywell account manager.

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