

HHXRF for HF Alkylation Units

Corrosion Prediction by Residuals in Carbon Steel

The **DELTA** Line Takes Detection Limits of Residuals in Carbon Steel to an All Time Low!

Highly accurate measurements of low levels of Cr, Ni and Cu in carbon steel are critical for predicting accelerated corrosion of components in HF Alkylation process units. It has been shown that if the sum of the residuals, Cr, Ni and Cu, exceeds 0.20%, the carbon steel components used in HF Alkylation processes will likely experience a preferentially accelerated corrosion rate. In general, a level between 0.15% and 0.20% of the sum of the three key residuals is deemed optimal, depending on the component, its use and location in the unit. As this is a decisive measurement for critical, low levels of Cr, Ni and Cu, it is necessary to grind the inspected component with an aluminum oxide disc to remove at least 0.004" of the surface prior to testing. Elbows, tees, reducers, couplings, flanges, welds, caps, plugs and other fittings, as well as pipe-scale can all be tested for the maximum allowable value of the sum of the three key residuals.



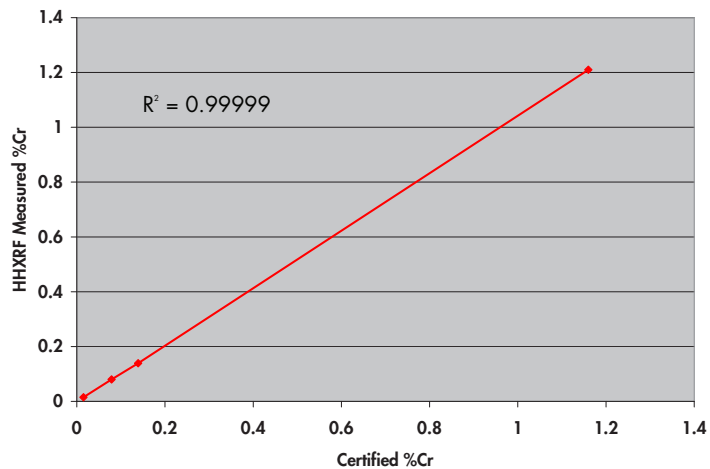
Photo by Wools

Standard	Residual Elements for HF Alkylation Accelerated Corrosion Prediction								
	Cert %Cr	XRF %Cr	Error (+/-)	Cert %Ni	XRF %Ni	Error (+/-)	Cert %Cu	XRF %Cu	Error (+/-)
IAMR 229A	0.015	0.015	0.002	0.029	0.028	0.006	0.072	0.073	0.008
IARM 28E	0.079	0.080	0.005	0.145	0.139	0.013	0.030	0.028	0.002
IARM 33D	0.139	0.139	0.006	1.78	1.777	0.03	0.014	0.013	0.003
IAMRM 35F	1.16	1.21	0.006	0.047	0.041	0.005	0.12	0.12	0.007



Standard	Residual Elements Measured by HHXRF				
	XRF %Cr	XRF %Ni	XRF %Cu	Sum of Residuals (%)	Inspection P/F
IAMR 229A	0.015	0.028	0.073	0.116	Pass
IARM 28E	0.080	0.139	0.028	0.247	Fail
IARM 33D	0.139	1.777	0.013	1.929	Fail
IAMRM 35F	1.21	0.041	0.12	1.371	Fail

Standard	Residual Elements Certified				
	Cert %Cr	Cert %Ni	Cert %Cu	Sum of Residuals (%)	Inspection P/F
IAMR 229A	0.015	0.029	0.072	0.116	Pass
IARM 28E	0.079	0.145	0.03	0.254	Fail
IARM 33D	0.139	1.78	0.014	1.933	Fail
IAMRM 35F	1.16	0.047	0.12	1.327	Fail



Comparison of DELTA Premium Innov-X Handheld XRF with Certified Assays of Trace Cr in Carbon Steel

Excellent Accuracy and Low Levels of Detection are Critical for Predicting Accelerated Corrosion

In addition to testing for corrosion indicative residuals, the petrochemical industry depends on HHXRF analyzers for material inspection startups, shutdowns, general maintenance and trouble shooting. Managers cannot afford to depend on out-of-date and unreliable equipment, or untimely support of equipment. They also cannot afford to fall behind the technology curve. The analytical capabilities of HHXRF continue expanding; and, new features enable operators to be more effective and efficient. Upgrade your HHXRF to the DELTA – the latest HHXRF loaded with innovative features and backed by the industry's best service and support.

APPLICATION BRIEF

Handheld XRF for Metals & Alloys Industries



Iron & Steel

Non-ferrous

Scrap & Secondary

Iron and steel are the most widely used of metals and alloys. Lighter metals, non-ferrous, newly developed and exotic alloys are also utilized extensively, but iron and steel are considered the basic raw materials for the majority of industrial goods and construction. Although produced from ores mined around the globe, steel is one of the most recycled materials in the world. From base form to recycled materials to finished products, metals and alloys are integral to the fabric of society, the consumption of which is often considered a primary indicator of development and economic progress.

Metals & Alloys is a serious, dynamic business.

Innov-X is serious and dynamic too. Our DELTA XRF analyzer is an essential tool for all businesses involved in the trade or use of metals & alloys. In seconds, you can nondestructively measure 25+ elements. Turnings, shavings, rods, wires, small parts, components, sizeable materials and large structures can all be analyzed directly, non-destructively. How you get them, how you make them, how you use them, how you sell them is how you measure them. Whether you check purity, chemistry, or grade ID for highest value, maximum recovery, quality, conformance, or maintenance and safety, our DELTA XRF analyzer will give you immediate answers to take action on now. Don't wait. Take your metals & alloys inspection to the next level with Innov-X!



SCRAP METAL RECYCLING

The Players:
Scrap Traders, Processors, Secondary Smelters, Mills
Precious Metals

The Prize:
Purity or Grade Confirmation gets you the Highest Value,
Maximum Recovery

The Tool:
Innov-X Systems Handheld XRF
Gives you fast, accurate valuation & sorting of scrap
Lets you identify upgrades and mistakes instantly

Want more?
Evaluate P and tramp element content for outgoing and
in-process product QC



Traded Metals & Alloys

How about long-term?
Upgrade the perception of your business and its reliability.
The most important players in scrap recycling rely on
Handheld XRF to maximize profits and eliminate mistakes,
driving the success of their businesses. You should too.

How does Innov-X take HHXRF to the Next Level for You?
Instant Karating
Grade Match Messaging
Nominal element feature
SmartSort optimizes YOUR time
The industry's most extensive smart grade library
Super rugged design optimizes up-time
Industry's best light element analysis takes HHXRF AI sorting to a new level

PMI & INSPECTION

The Players:
Petrochemical Refining, Power Plants,
Pharmaceuticals, Industrial Processing

The Prize:
High Quality and Conformity of
In-service Systems

The Tool:
Innov-X Systems Handheld XRF gives you quick, confident
alloy ID in the warehouse or in-service



Material & Component Inspection

Want more?
QC weld beads in-situ. Flag out-of-spec elements
Evaluate low concentrations of Cr, Si and residuals
Determine FAC and residuals-accelerated corrosion

How about long-term?
Safety & reliability of refineries,
process systems & power plants
How does Innov-X take HHXRF to the Next Level for You?
Grade Match Messaging for welding process
Accurate, sensitive quantification of residuals
Ergonomic, industrial design eases long-term use
Designed to withstand high temperature in-service inspection

FABRICATION & QC

The Players:
Metal/Alloy Processing, Industrial Goods Fabrication,
Aerospace & Marine Manufacturing,
Medical Device & Prosthetics Manufacturing

The Prize:
Immediate Nondestructive Analysis for
Grade & Lot Verification

The Tool:
Innov-X Systems Handheld XRF
Gives you high precision analysis
Delivers accurate results



Incoming & Outgoing Product QA

Want more?
Flag out-of-spec or nonconforming product instantly
How about long-term?
Bolster your company's quality focused image
Ensure a 100% verification QA program
Confidently know you're not delivering erroneous product

How does Innov-X take HHXRF to the Next Level for You?
Easy to use Pass/Fail mode
Reliable data tracking and reporting software
No-compromises calibration ensures high accuracy for all bases:
Titaniums, stainless & high temp Nickel alloys,
Aluminum alloys, red metals, more

APPLICATION BRIEF