FOX-IQ:
TUBE AND ROD

The automated QC / PMI analyzer
for fast 100% testing of steel tubes

www.innovxsys.com

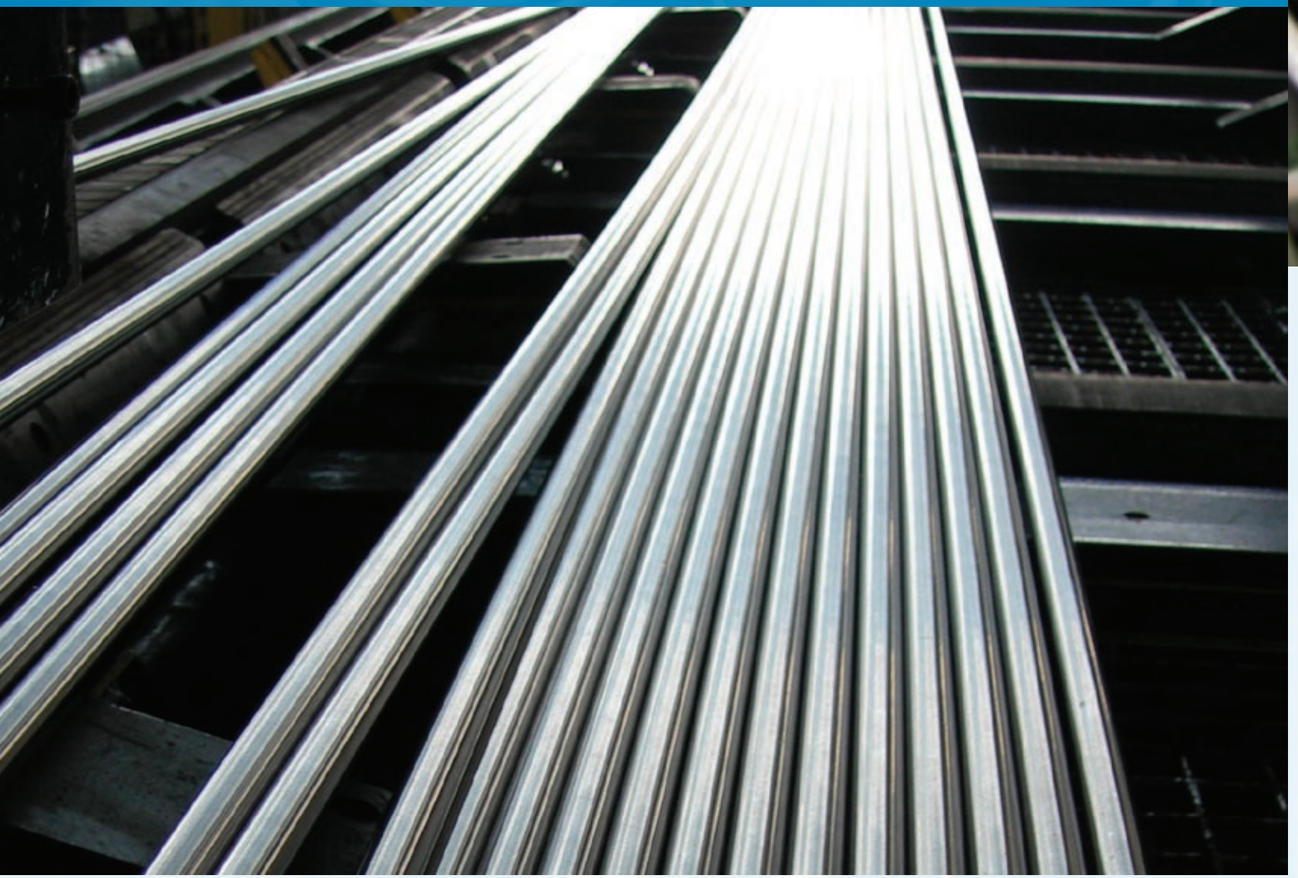
AUTOMATED ON-LINE QC SYSTEM

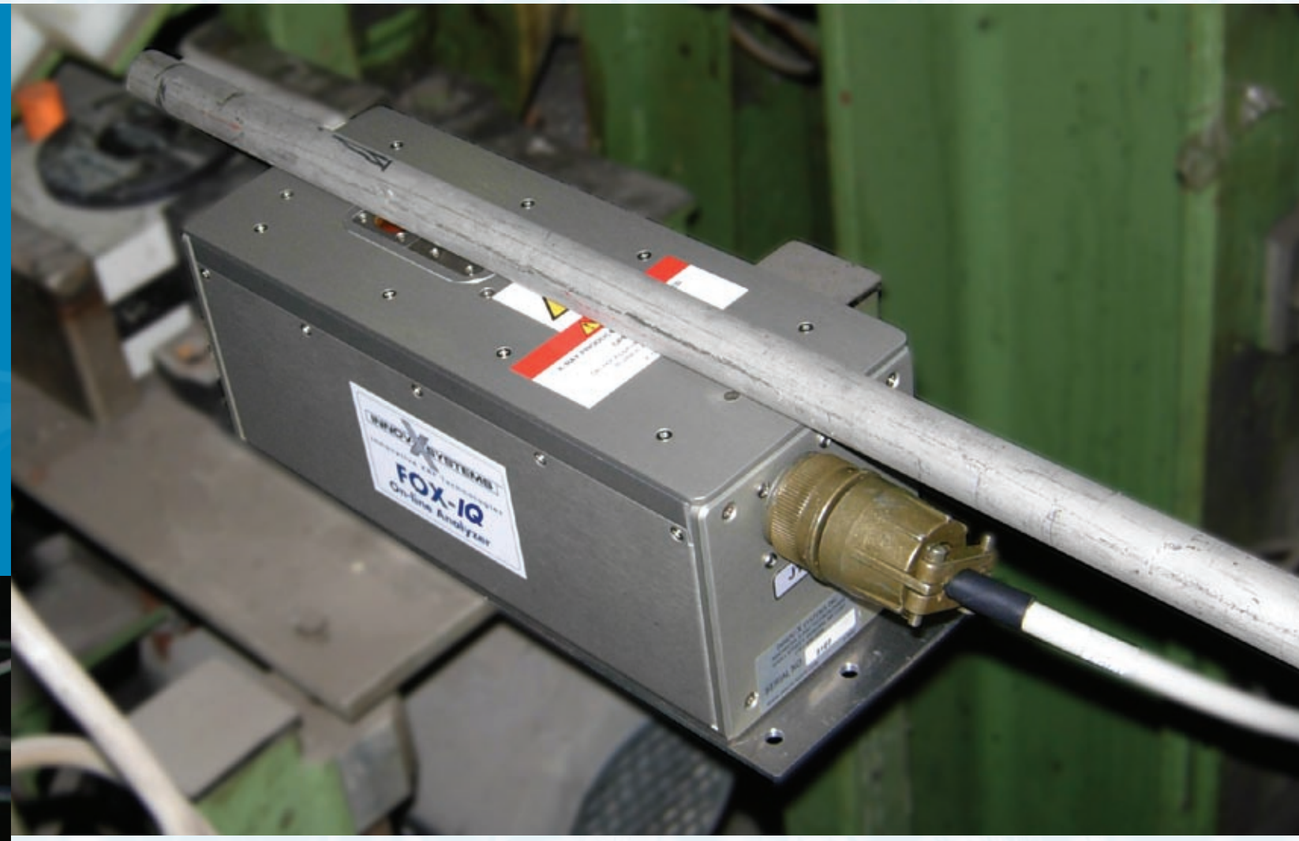
Tube and pipe manufacturers use many different metals and alloys in their production lines. To eliminate liabilities, avoid material mix-ups and to meet their customers' requirements, they must compare their product against acceptable alloy specifications.

Particularly in the aerospace, petrochemical and nuclear industries, the consequences of processing or fabricating with the wrong alloy material can be catastrophic, resulting in product failure, personal injuries, fatalities, liability claims and eventual loss of business. To protect their business, high volume manufacturers need a fast, non-destructive method that checks each piece prior to shipping. The FOX-IQ Tube & Rod system offers these capabilities in an easy to integrate, easy to use, and reliable solution.

FOX-IQ PERFORMANCE

The FOX-IQ XRF system performs fully automated on-line analysis for 100% high-volume process control. X-ray Fluorescence (XRF) is a proven analytical technique commonly used to quickly and non-destructively verify alloy grade and chemistry. The FOX-IQ is a compact system that integrates easily with existing or new PLC-controlled processes. This CE certified system is engineered for 24/7 operation in industrial environments – it can endure high levels of vibration, electromagnetic and acoustical noise as well as dust and moisture. The FOX-IQ's compact design and minimal power requirements allow quick and easy integration for both new and existing operations.





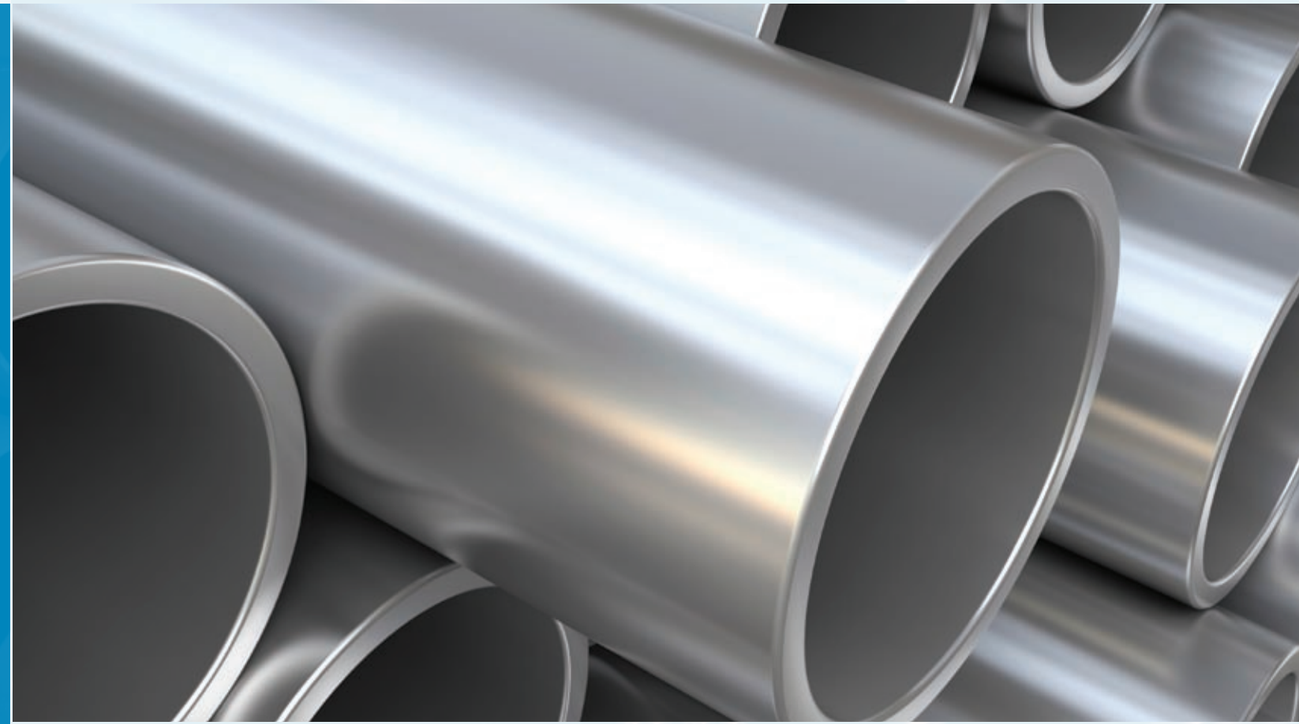
FOX-IQ SYSTEM

Each FOX-IQ delivers fast, pass/fail tests, accurate grade ID, and chemistry with automated links to the QC/QA reporting system. The FOX-IQ is controlled by a PC for start/stop, data acquisition, decision making and communication to external devices.

The FOX-IQ is driven by powerful and intuitive software that has been developed and custom designed specifically for the Tube/Pipe industry in cooperation with several market leaders. Features include multi-level access, automated retesting, extensive reporting and an intuitive touch screen interface.

FOX-IQ ADVANTAGES

- Compact, robust design fits into most existing operations with no or minimal infrastructure changes
- Minimal downtime - pre-calibrated Probe Head Assemblies can be exchanged in minutes
- Fast accurate analysis in matter of seconds
- Flexible; simple intuitive control allows for minimal user intervention and makes it easy to add new alloys
- Low power requirements: needs only 110/220V
- Integrated automatic analyzer QC and performance verification
- Uses an X-ray tube, eliminating the regulatory headaches of a radioactive source



FOX-IQ SYSTEM COMPONENTS

The Innov-X FOX-IQ system consists of three major industry hardened components:

Probe Head Assembly contains the X-ray tube, detector, and front end Digital Signal Processing electronics. The PHA can be pre-calibrated and its modular design allows exchange in minutes.

Electrical Interface Assembly supports an external sample trigger input, and provides a pass/ fail indicator signal that can be used to trigger a “kicker” or other line equipment, such as a PLC to accept or reject the sample, based on the analysis result.

User Interface Computer runs Innov-X PC software to control the instrument, analyze sample, manage results and interface with external devices through RS 485 or TCP/IP.

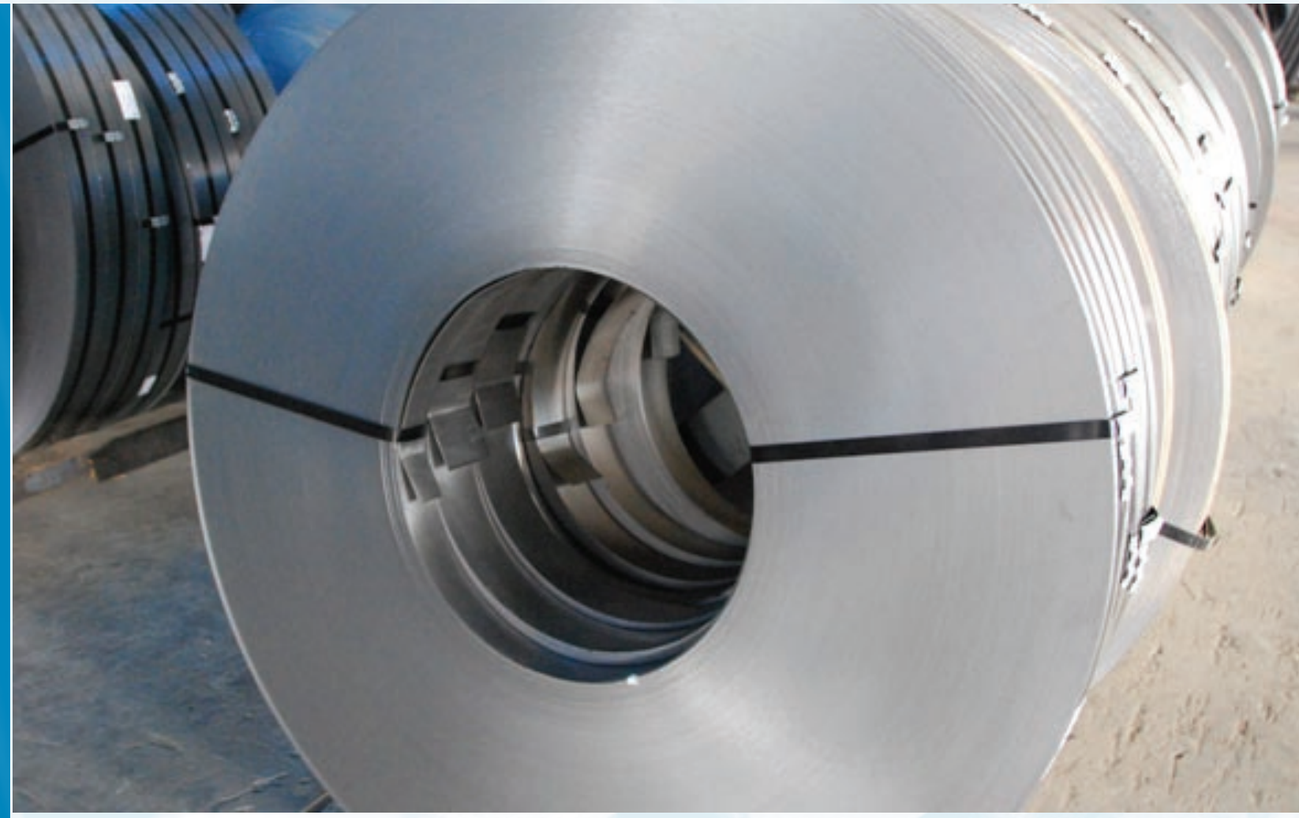
FOX-IQ MODES OF OPERATION

Pass/Fail mode is designed for high-throughput alloy sorting and quality control. All sorting is done by comparing your sample to an operator-selected reference fingerprint. It provides a PASS or FAIL result in seconds. The system comes with a standard reference library of common alloy fingerprints, though adding your own (up to 300 more) is a simple one minute procedure. Furthermore, once the fingerprint is added, no periodic calibration is required.

PMI Positive Material Identification quickly identifies an alloy in seconds by matching the spectral signature of the unknown sample to spectral signatures of reference standards stored in the library. The chemistry of the alloy is then calculated by using stored elemental assays using the identified grade as reference standard. Customer's proprietary materials can be added to the library simply and quickly.

Analytical mode utilizes a Fundamental Parameters (FP) algorithm to determine elemental chemistry. The FP calibration is done at the factory, and requires no user set-up or recalibration. The FP method utilized in Analytical mode is ideal for applications that require analysis of proprietary or uncommon alloys, for monitoring chemistry of tramp elements, or for monitoring chemistry during processing. The Analytical mode can identify an unknown material in approximately 5 seconds, with increased precision for longer test times.

Long-term service contracts are available to assure highest levels of system up-time.
Other applications include QC on Solar Cell manufacturing, QC Deposition Chemistry.
Different enclosures available depending on requirements.



BASIC SPECIFICATIONS

Analysis Method: X-ray Fluorescence (XRF), 25+ elements simultaneously, using fundamental parameters, empirical or spectral signature matching. Element range: typically P (Z=15) to U (Z=92).

SYSTEM DESCRIPTION

The Innov-X FOX-IQ System consists of three major industry hardened components: **Probe Head Assembly**, **Electrical Interface** and **Computer**.

SYSTEM SPECIFICATIONS

Source:	X-ray tube, no radioactive isotopes
Detector:	Si PiN diode detector, <250 eV resolution at 5.95 keV Mn K-alpha line
PC:	External PC, Windows XP operating system
Houseing:	Anodized aluminum. Sealed to moisture and dust. Shielded from EMI Emissions. Weight: Probe Head Assembly: 4 lb / 1.8 kg; Electrical Interface: 18 lb / 8 kg
Dimensions:	Measure Head: 12 in x 4 in x 4.125 in ; 30.5 cm x 10 cm x 10.5 cm (LWH) Electrical Interface: 12.3 in x 10.5 in x 5.25; 31.3 cm x 26.6 cm x 13.3 cm (LWH)
Cable Length:	Probe Head Assembly - Electrical Interface: Up to 100 ft / 30 m Standard Lengths: 3, 5, 10 or 20 meters. Electrical Interface - PC: Dependent on customer requirement.
Tube Voltage:	10 kV - 40 kV
Current:	100 µA maximum, 10 µA typical
Tube Filtering:	Up to 5 filter positions for optimal analysis on 25+ elements
Shutter:	Automatic shutter for safety and internal standardization
Power:	AC 110-250 V, 50/60 Hz
I/O:	The User Interface runs on a PC equipped with the Innov-X PC software to control the FOX-IQ to analyze sample spectra, manage results and to interface with external devices through RS-485 or TCP/IP. RS-485 or TCP/IP, TTL type External Start/Stop, Flags and programmable logic for Pass/Fail protocols and alarms. Data Logging: Up to 12 fields of information per sample including Job #, Work Order, Part #, etc. Auto tracks alarms, pass/fails and elemental results within a work order or run. Stores >100,000 tests including results, sample ID, and spectral data, in binary, tamper-proof format meeting 21CFR Part 11. The Electrical Interface supports an external sample trigger input and provides a pass/fail indicator signal that can be used to trigger other line equipment to accept or reject the sample, based on the analysis results.

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