Online Chlorine Analysis in Liquid Hydrocarbon Process Streams

Chlorine contributes significantly to the corrosion of plant equipment and must be treated accordingly. With ever-changing crude quality and potential for process upsets, chlorine levels can shift quickly, making real-time analytical results invaluable. Powered by MWDXRF®, Clora® Online uses ASTM D7536 technology and delivers real-time, continuous analysis of total chlorine from 0.2 ppmw up to 3000 ppmw. By monitoring desalted crude, a plant can optimize performance and immediately see impacts of crude changes (including organic chloride). This process analyzer is NEC Class I Division 2 Certified for hazardous area locations.

APPLICATIONS

- Upstream desalting, refining, power generation and effluent management
- Total chlorine analysis in:
  - raw and desalted crudes
  - water and effluent streams
  - refinery process streams
  - finished product

FEATURES

- Uses ASTM D7536 technology
- NEC Cl I Div 2 Certified
- LOD: 0.2 ppmw in hydrocarbon matrices @ 300 s
- LOD: 0.6 ppmw in aqueous streams @ 300 s
- Dynamic range: 0.2 ppmw – 3000 ppmw
- Calibration is linear up to 3000 ppmw and one calibration curve runs all hydrocarbon matrices
- Robust industrial design: wall mounted or stand alone
- Bigger 15”/38 cm touchscreen
- Easy to use with intuitive touchscreen interface
- Direct measurement in ppm wt

BENEFITS

- Continuous, real-time analysis
- Rapid response to upsets
- Low maintenance: no consumable liquids, gasses, combustion, or sample conversion
- Not sensitive to sample temperature changes

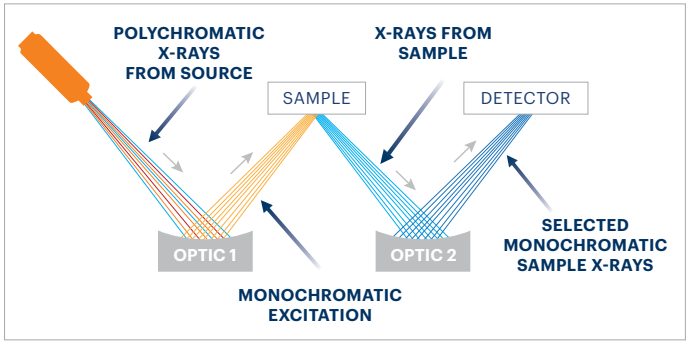
OPTIONS

- Multi-stream analysis capability
- Auto-validation capability

17 35.45 Clora ONLINE Chlorine Analyzer

NEC Certified

ADVANCED ANALYSIS WITH MWDXRF

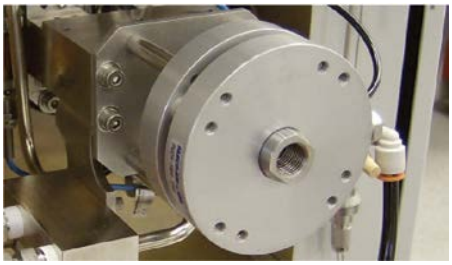


Monochromatic Wavelength Dispersive X-ray Fluorescence (MWDXRF) utilizes state-of-the-art focusing and monochromating optics to increase excitation intensity and dramatically improve signal-to-background ratio compared to traditional WDXRF instruments. This enables significantly improved detection limits, precision, and a reduced sensitivity to matrix effects. A monochromatic and focused primary beam excites the sample and secondary characteristic fluorescence X-rays are emitted from the sample. A second monochromating optic selects the chlorine characteristic X-rays and directs these X-rays to the detector. MWDXRF is a direct measurement technique and does not require consumable gasses or sample conversion delivering robust and low-maintenance analyzers with dramatically lower detection limits and faster response times.

PRECISION

The MWDXRF analytical platform enables unrivalled precision and accuracy. Long term stability studies indicate highly stable and precise results.

	Crude 1	Crude 2	Water
Average Value	14 ppmw	3 ppmw	10 ppmw
Run Time	5 min	5 min	5 min
STD DEV	0.4 ppmw	0.25 ppmw	0.6 ppmw



VISCOSITY AND SAMPLE CONDITIONING

Clora Online can measure most crude oil streams with a maximum viscosity limitation of 160 cSt at 70°F (1.6 cm3/s at 21°C). More viscous materials can be analyzed by increasing sample temperature up to 275°F. A 100 micron self-cleaning by-pass flow style filter or inline filter assembly is recommended. The analyzer is insensitive to water content in the crude oil. Aqueous matrices can be tested for chlorine concentration in the same fashion as hydrocarbon matrices.

HIGH VISCOSITY DYNAMIC WINDOW MODULE

The High Viscosity Dynamic Window Module (HV-DWM) ensures stable and accurate test results independent of sample matrix. The HV-DWM automatically, and at preprogrammed intervals, positions a new and robust window material in the measurement area. As a result, the measurement is stable and drift caused by contamination buildup is eliminated. The HVDWM uses an X-ray transparent polyimide film allowing stream pressures up to 80 psi (550kPa). While the sample stream flows continuously through the HV-DWM, the sample analysis takes place continuously as well, ensuring rapid and highly representative chlorine monitoring of the sample stream.

PRODUCT SPECIFICATIONS

Analytical Platform	MWDXRF
Dynamic Range	Hydrocarbon: 0.2 ppmw - 3000 ppmw / Aqueous: 1.5 ppmw - 3000 ppmw
Response Time	300 s for precise measurement, 15 s for rapid update
Calibration	3-5 point linear calibration curve
Data Communication	2x 4-20 mA analog outputs, multiple discrete alarm outputs
Digital Communication	Modbus TCP, Optional – Modbus RS-232 or Modbus RS-485 (half or full duplex)
Local HMI	15"/ 38 cm touchscreen display
Power	110-240 VAC, 50-60 Hz, 750 W max.
Instrument Air - Purge and Valve	60-115 psig, (414-793 kPa) 4 scfm max; -40 F (-40 C) dewppoint, oil free, N2 optional
Ambient Temperature	32-95 F (0-35 C) Standard; -4 to 113 F (-20 to 45 C) Optional - Consult Factory
Dimensions	60 in (h) x 38 in (w) x 18 in (d) / 152 cm (h) x 97 cm (w) x 46 cm (d)
Weight	300 lbs (136 kg)
Certifications	CE, NEC Class I Div 2 Groups B,C,D T4A; ATEX Zone 1 model also available with different screen and features.

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