

## **PORTASPEC® X SERIES X-RAY SPECTROGRAPH**

Cianflone Scientific LLC now offers a new generation of XRF instruments capable of performing multi-elemental analysis in the range of Titanium through Uranium and is ideal for measuring coating weights of both chrome and titanium pretreatments.

The Model 2501XBT Portaspec® is a conventional, wavelength dispersive type x-ray spectrographic system, often called XRF (x-ray fluorescence) and utilizes an x-ray tube as the source of radiation. The X Series version of the familiar Model 2501 Portaspec is now mostly computer controlled. A Windows® based; touch-screen notebook computer is now the standard operating interface, eliminating the need for meters, knobs and switches.

The 2501XBT Portaspec comes configured with a manual adjustable goniometer that allows the user to analyze one or as many as six pre-set elements in a sequential fashion. The elemental range is from element #22 titanium through element # 92 uranium (with the exception of elements #48-#55).

The attached Two-Position Sample Holder can be readily configured for analyzing liquids, powders, solids, thin films as well as coating thickness analysis. The samples are loaded over an open port so the x-ray optical path does not become contaminated with debris from the sample. One sample can be under analysis while the operator is changing the other.

The 2501XBT Portaspec contains a tungsten target x-ray tube and a complete optical system consisting of a source and detector collimator, a lithium fluoride crystal and a gas sealed proportional detector. It also houses the detector pre-amplifier and safety interlock switch system. The new Power Control Board interprets and executes commands from the computer to turn x-rays on and off, set x-ray tube current and read counts on the digital scaler. An mA stabilizer board provides constant current to the x-ray tube. Also new to the 2501 X Series Portaspec is a high frequency, constant potential high voltage power supply, providing a high level of stability and is lightweight.

The Bench Top Portaspec can be configured to a number of input voltages, 50 or 60 hertz and features a modular component design.

In addition to elemental chemical analysis, it is being used to measure and control the thickness of coatings of various products, such as tin on iron base materials, zinc on iron, manganese on iron, chromium and titanium on metal substrates. It is also applicable for measuring the thickness of paper and plastic sheet products. The application of the instrument is as varied as one's imagination.

Some types of industries using the instrument are:

Foundries (castings)	Ores and minerals	Petroleum
Synthetic fibers	Airborne particulates	Paper
Tubing and bar stock	Sorting of scrap metals	Glass
High and low alloy steels	Ceramics	Plastics
Copper and aluminum alloys	Turbine blades	Rubber

and many others too numerous to mention.

The Portaspec has approved safety requirements of the U.S. Department of Health and Human Services, as well as the safety requirements of the industry. The instrument is completely radiation safe for operator protection.

The dimensions of the Portaspec XBT are: 18" long, 14" wide, 13" high and weighs approx. 50 pounds (*shipping weight 70 Lbs.*) The entire system operates on 115 volts, 50 or 60 hertz, or 220 volts, 50 or 60 hertz.

Water cooling for the x-ray tube requires approximately two (2) quarts per minute. A small, portable water circulator is included with the instrument.

The Portaspec incorporates a LiF 200 Lithium Fluoride Crystal (grating). Other crystals are available. The elemental range is Atomic No. 22 (Titanium) through Atomic No. 92 (Uranium). The average low range of detectability for elements in metal samples is in the order of 0.05%. Lower limits of 50 PPM can be detected in lighter matrices.

Also available, is an XLE light element X Series Bench Top Portaspec, which is ideal for measuring zirconium or phosphorus pretreatments. The unit is also able to analyze powder or solid samples with single element options of Al, Si, P, S, Cl, K, Ca or Zr. A single position sample holder and 3.5 cfm vacuum pump are standard. It also includes a touch-screen notebook computer and Windows® based software. Able to analyze light elements in the lab or plant, the unit requires minimal setup and a short analysis time.

### **LIMITS OF DETECTABILITY**

We have investigated the detectability of elements from Titanium to Uranium in various types of steels and non-ferrous materials. All tests were conducted on N.I.S.T. Standards utilizing a scintillation counter. Detectability on V and Ti can be improved by the use of an argon gas filled proportional detector.

<u>ELEMENT</u>	<u>CAST STEEL</u>	<u>TOOL STEEL</u>	<u>CARBON STEEL</u>	<u>HI TEMP ALLOY</u>	<u>STAINLESS STEEL</u>	<u>COPPER BASE</u>	<u>TITANIUM BASE</u>
Mn	0.05%	0.05%	0.01%	0.05%	0.05%	--	0.01%
Cu	0.08%	0.05%	0.01%	--	0.05%	--	--
Ni	0.01%	--	0.01%	0.01%	0.01%	0.05%	--
Cr	0.01%	0.01%	0.01%	0.01%	0.01%	--	0.01%
V	0.02%	0.05%	--	--	0.05%	--	0.01%
Mo	0.05%	0.05%	--	0.05%	0.05%	--	0.05%
Ti	0.05%	--	--	--	0.05%	--	--
Co	--	0.03%	--	0.03%	0.03%	--	--
W	--	0.05%	--	0.05%	--	--	--
Fe	--	--	--	--	--	0.02%	0.01%
Pb	--	--	--	--	--	0.05%	--
Zn	--	--	--	--	--	0.05%	--