Designing/Development/Manufacturing/Sale/Service

Skyray Instrument

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Skyray Instrument

EDX-Pocket-Ⅲ

Handheld X-ray Fluorescence Spectrometer

Precision Instruments, Skyray Elaborates

EDX-Pocket-Ⅲ

Handheld X-ray Fluorescence Spectrometer

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Company Profile

Established in 1992, Skyray Instrument Inc specializes in the development, manufacture, sales and support of X-ray Fluorescence Spectrometers. XRF technology is characterized as rapid, accurate and non-destructive. XRF analyzers can be used in areas requiring elemental analysis from Na to U, e.g., electronic and electric appliances (RoHS), jewelries and ornaments (precious metals, plating thickness), toy safety (EN71-3), building materials (cement, glass, ceramic), metallurgy (steel, non-ferrous metals), petroleum (trace elements S, Pb, etc), chemistry, geography, commodity inspection, quality control and even human body trace elements analysis. Up to now Skyray has won two World's No.1 titles: No. 1 in Sales Amount and No. 1 in Product Categories.

EDX-Pocket-Ⅲ

Handheld X-ray Fluorescence Spectrometer

The 3rd and 4th generation of Handheld X-ray Fluorescence Spectrometers i.e. EDX-Pocket-III and EDX-Pocket-IV are to be put on the market soon. They are improved on basis of the 2nd generation. They have the features of more functions, better accuracy and simpler operation. Their introduction makes on-site elemental analysis practical and feasible.

EDX-Pocket-Ⅲ Handheld X-ray Fluorescence Spectrometer Application Fields:

EDX-Pocket-Ⅲ Handheld X-ray Fluorescence Spectrometer Specifications:

- Working principle: XRF analysis using X-ray fluorescence Spectrometry
- Measurable elements: Ti-Bi
- Detector: advanced electric-cooling Si-PIN semiconductor X-ray detector with high performance and high energy resolution
- Excitation source: mini 40kV/50μA X-ray tube, Ag anode
- Data display: high definition and high resolution PDA (Personal Digital Assistant), Windows CE operating system, Bluetooth communication, personal data handling and e-mail sending.
- Data storage: Large capacity SD card and SD card reader enable the data to store on PC and print out
- Power supply: operating time of two fully-charged Lithium batteries is 8 hours
- Weight: 1.35 kg
- Overall size: 260×25×25mm（L×H×W）
- Ambient environment: temperature -20℃-50℃; humidity <85%
- Safety: both PDA and software operations require passwords. Unauthorized people are not allowed to operate.
- Standard accessories: shock, pressure & water-proof carrying case with padlocks, 110v/220v general-purpose charger, large capacity SD memory card, SD card reader, two 4000mAh Lithium batteries, Lithium battery charger, PDA accessories, lab test stand (optional), etc.

EDX-Pocket-Ⅲ Handheld X-ray Fluorescence Spectrometer Main characteristics:

- The instrument is small, light and portable, providing rapid and non-destructive analysis of the tested samples on the site.
- Figurative interface, flexible software operation, intuitive spectrum display and definite results
- Several working curves are provided in the software, which can even be edited and renewed upon test requirements.
- Optional GPS helps locate the tested sample when mining or surveying in the field.
- SD card with super large capacity is available. There is no limit of data storage.
- Attractive design and comfortable feel when held in hand
- The carrying case has high strength and high sealing capacity, drop and shock proof as well.
- Faster analysis and better accuracy, delivering lab-quality results
- Measurable elements: Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Zr, Nb, Mo, Sn, Hf, Ta, W, Re, Pb, Bi, Se, Sb, Pb, Au and Hg
- Application fields: RoHS screening; full-element analysis; analyzing alloy steel, stainless steel, tool steel, Chrome-Molybdenum Steel, Nickel alloy, Cobalt alloy, Nickel-Cobalt heat-resistant alloy, Titanium alloy, Copper alloy, Bronze, Zinc alloy and Tungsten alloy; Grade identification of light Aluminum and Magnesium alloys by measuring other alloy elements.

EDX Pocket III
Application fields

An Introduction to Alloy Analysis

EDX Pocket III Handheld X-ray Fluorescence Spectrometer can analyze all kinds of high and low alloy steel, stainless steel, tool steel, Chrome-Molybdenum Steel, Nickel alloy, Cobalt alloy, Nickel-Cobalt heat-resistant alloy, Titanium alloy, Copper alloy, Bronze, Zinc alloy and Tungsten alloy; it can also identify Grades of light Aluminum and Magnesium alloys through measuring other alloy elements.

Steels are alloys in which Iron is mixed with Carbon (major elements) and other elements such as Silicon, Manganese, Sulfur and Phosphor. Other elements are added to produce the chemical specifications for the desired steel grade. By determining the concentration of these elements, we know the properties and types of steels.

◆Chromium—Chromium is added to increase abrasion resistance, hardness and most of all corrosion resistance. Steel with chromium above 13% is regarded as stainless steel.

◆Manganese—Manganese is a very important alloying element in steel, which helps to produce texture and strengthen toughness and abrasion resistance. In the heat treatment and press process, it de-oxidizes the inner side of the liquid steel. Manganese is often seen in steels used to make scissors (except A-2, L-6 and CPM420V).

◆Molybdenum—Molybdenum is a carbonization agent, which is used to prevent embrittlement of certain steels. It keeps the strength of the steel at higher temperature. Molybdenum is seen in many types of steel, e.g. the air-hardening steel (e.g. A-2, ATS-34). Air-hardening steel contains 1% or more Molybdenum. Mo' s function is to cause the steel to harden in the air.

◆Nickel—Nickel is used to improve strength, corrosion resistance and ductility of the steels. It is often seen in L-6\AUS-6 and AUS-8.

◆Silicon—Like Manganese, Silicon improves the strength of the steel. Further, it keeps the strength of steel during the production process.

◆Vanadium—Vanadium is added to improve the abrasion resistance and the ductility of the steels. Vanadium appears in many types of steel, such as M-2, Vascowear, CPM T440V and 420VA. The biggest difference between BG-42 and ATS-34 is that the former contains Vanadium.

Applied to:

- High-temperature and high-pressure industries: steel melting, boiler, pipeline and vassal manufacturing
- Industries such as non-ferrous metals, space and aviation, weaponry and shipbuilding

◀ Material identification and quality assurance of high-temperature and high-pressure industries such as steel melting and boiler.

EDX Pocket III
Application fields

An Introduction to Alloy Analysis

▲

Alloy composition identification and quality assurance of high-tech industries such as shipbuilding and space and aviation industries

Alloy Grade Library and Measurable Standard Elements :

Extensive Alloy Grade Libraries: standard libraries of countries such as China (GB), USA (AISI, UNS,ASTM), Japan (JIS), France (NF), Russia (TOCT), Sweden (SS14), Britain (BS) and Germany (DIN). EDX Pocket III allows easy editing of grade libraries. The measurable standard elements include 26 elements Al, Ti, V, Cr,Mn,Fe,Co,Ni, Cu, Zn, Se, Zr, Nb, Mo, Pd, Cd, In, Sb, Hf, Ta, Pt, Pb, Ag, Sn, Bi and Au.

▲ Compliance and safety tests of spare parts in power and power station industries

EDX-Pocket-Ⅲ

Handheld X-ray Fluorescence Spectrometer

Skyray Skyray Instrument

EDX-Pocket Features

- Same performance and reliability as the bench-top spectrometers due to combined use of low-power integrated mini X-ray tube and large area Be-window electric-cooling Si-Pin detector with the former having low power consumption but high excitation efficiency.
- Small, light and convenient for work in the field. Anytime and anywhere on-site or in-situ analysis.
- High resolution PDA (640*480), coupled with mini multi-channel analyzer in Bluetooth communication, keeps the measurement data in hands under any circumstances.
- Adapt to rapid analysis in handheld mode or long time precise test in stand mode.
- The instrument is proof against water and dust and operable in high temperature and high humidity surroundings. Besides, the design of the protective case consists with that of the military supplies: moisture, shock and pressure proof.
- Professional software specifically designed for tests of alloy elements characterized by high sensitivity, short measurement time, simple operation and low requirements of operators.
- Rapid identification of alloy grades, auto qualitative and quantitative analysis of multi elements, different test options, free and unlimited adding of test modes and in-built intensity correction mode correcting deviation caused by different geometric shapes or uneven structural density.
- One battery' s operating time of 4 hours and three batteries in supply guarantees us the test in any time and at any place. Solar or car charger is optional.
- Complete Alloy Grades databases: including Standard Databases defined by China (GB), America (AISI, UNS, ASTM), Japan (JIS), France (NF), Russia (TOCT), Sweden (SS14), England (BS) and Germany (DIN) and supportive to users defined Alloy Grades databases.

Configurations

- PDA
- Si-PIN semiconductor detector
- Amplifier circuit
- X-ray tube and high and low power supplies
- Professional minerals analyzing software in PDA version
- Support to Handheld Spectrometer (optional)
- Backup battery and adapter (AC and DC)
- Protective case

▲ Case

▲ PDA

Application Fields

- Iron and steel smelting and processing industry, scrap metal recycling industry
- Electronics, power industry
- Weaponry, shipbuilding, space and aviation industries
- High-temperature and high-pressure industry: boiler, pipeline and vessel
- Petrochemical refining, pharmaceutical industry, beer and beverage industry

▲ Scrap metals recycling

▲ Pipeline

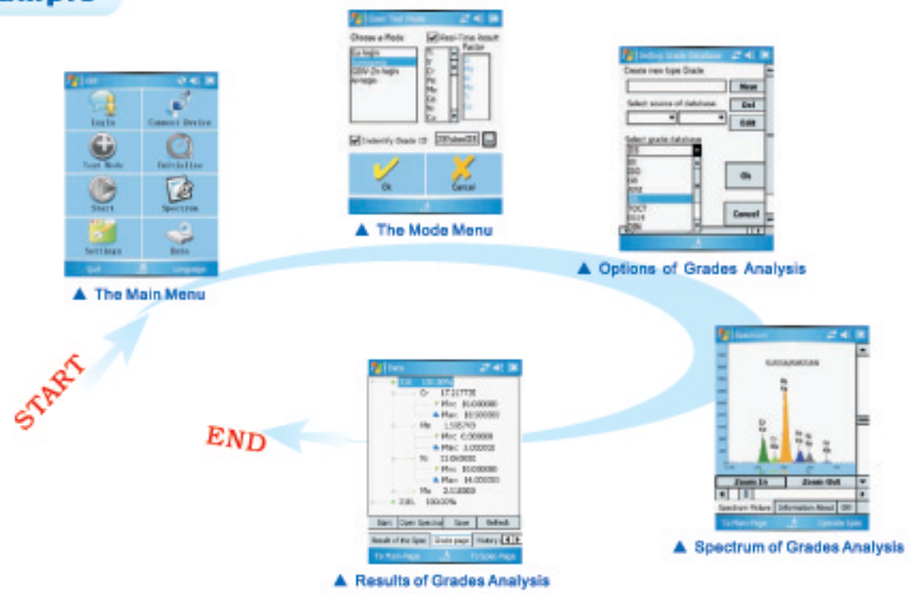
▲ Space and Aviation

▲ Shipbuilding

Main Specifications

- Model: EDX-Pocket Series Handheld X-ray Fluorescence Spectrometer
- Detector: electric-cooling Si-PIN detector
- Excitation source: 40KV/50uA-Ag anode end window integrated mini X-ray tube
- Measurement time: 10-200s (handheld or in stand mode)
- Forms of objects: solid, liquid or powder
- Measurable elements: S-U
- Ability of simultaneous analysis: up to 26 elements
- Detection limit: 0.001%~0.01%
- Correction mode: Ag
- Safety: administrator mode with in-built password at which data can be saved at any time
- Data storage: stored in computer for printing out. Massive storage card is supplied.
- Battery rundown time: 4 hours
- Weight: 1.47 Kg (with PDA and battery); 1.2 Kg (without PDA and battery)
- Ambient temperature: −10℃ − +50℃
- Ambient humidity: up to and including 90%
- Databases: supportive to standard alloy grades of international standard organization (ISO) and other 9 countries including China (GB), supportive to user defined alloy grades. Measurable standard elements: 26 elements as Al, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Se, Zr, Nb, Mo, Pd, Cd, In, Sb, Hf, Ta, Pt, Pb, Ag, Sn, Bi and Au.

Example



▲ The Main Menu
▲ The Mode Menu
▲ Options of Grades Analysis
▲ Spectrum of Grades Analysis
▲ Results of Grades Analysis

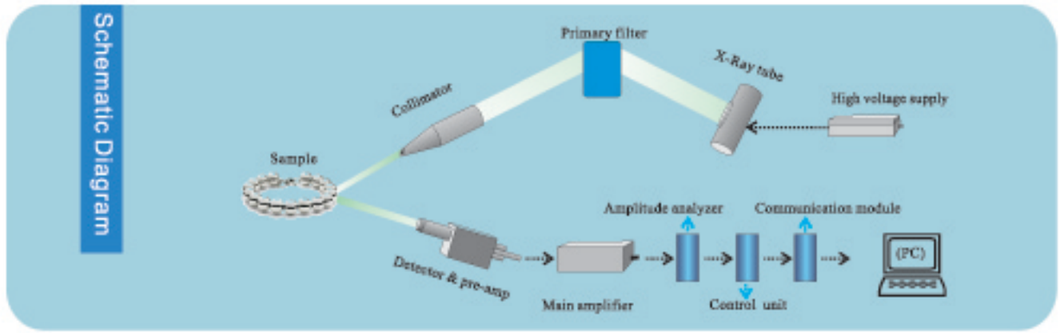
Element	Min	Max
Ti	0.00	0.00
V	0.00	0.00
Cr	16.00	18.50
Mn	0.00	2.00
Fe	66.00	72.00
Co	0.00	0.00
Ni	10.00	14.00
Cu	0.00	0.50
Hf	0.00	0.00
Zn	0.00	0.00
Ta	0.00	0.00
W	0.00	0.00
Se	0.00	0.00
Pb	0.00	0.00
Re	0.00	0.00
Bi	0.00	0.00
Zr	0.00	0.00
Nb	0.00	0.00
Mo	2.00	3.00
Al	0.00	0.00
Ag	0.00	0.00
Pd	0.00	0.00
Sn	0.00	0.00
Sb	0.00	0.00

▲ Comparison of Contents in AISI 316

Standard Alloy Elements

26 standard elements are Al, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Se, Zr, Nb, Mo, Pd, Ag, Cd, In, Sn, Sb, Hf, Ta, Pt, Au, Pb, and Bi. For Skyray handheld alloy analyzer, elements in the above list can be added or replaced.

Working Principle



Characteristic X-radiation of element

Each element will emit X-ray at its own energy level when excited. This X-ray is characteristic and called X-ray fluorescence. It is the foundation of analysis.

Scattering

It is the background of spectrum.

Photoelement

The photoelectron is the foundation of detector. In the sample, the X-ray intensity of every element is expressed as $I_1, I_2, I_3, I_4, I_5 \cdots\cdots$ respectively. The element content C is the function of X-ray fluorescence intensity I, expressed as follows:

$$C = f(I_1, I_2, I_3, I_4, I_5 \cdots\cdots)$$

This equation is too complicated and can be simplified as:

$$C = K_1 I_1 + K_2 I_2 + K_3 I_3 + K_4 I_4 + K_5 I_5 \cdots\cdots$$

Where

C is the element content in the sample; $I_1, I_2, I_3, I_4, I_5 \cdots\cdots$ are X-ray intensity of element respectively; $K_1, K_2, K_3, K_4, K_5 \cdots\cdots$ are coefficients which can be determined by measuring known standard sample to calibrate.