GATHA Enterprises
An ISO 9001-2008 Company

ATOMIC (OPTICAL) EMISSION SPECTROMETER

The Spectrometer is built to provide rapid, precise, accurate and certifiable elemental analysis in weight percentages of metals. Using a CCD, it analyses the entire spectrum in the wavelength range 160 to 410 nm. In this range are found almost all the wavelengths that represent the entire gamut of important elements -whether for ferrous or non-ferrous metals &their alloys. We are currently providing calibrations in various bases Fe, Cu, Al, Zn, Ni, Pb, & Sn. However, more bases can be added by us as per customer requirements. Concentrations, right from ppm to high percentages can be analysed.

The operating software, The Analyst, whilst being user friendly, is powerful and flexible. It provides the analyst (you) the capability to present analytical data in the manner he and his management need. The analyst is provided with vast CRM and Grades' Libraries for reference and use as needed. Software development is an on-going activity and the user gets the benefit of free up-gradation in the first 2 years after purchase, subject to the hardware having the capability to accept upgrades.

All elements in a sample emit light simultaneously when the sample is Subjected to a high voltage using a silver or tungsten counter-electrode . Since there are many elements in a metal alloy, the emitted light appears as 'white' light. Each element has its own set of characteristic wavelengths and when this white light is focused on a holographic grating (the latest in optical technology) the white light is diffracted (broken) into its component walvelengths, which are in turn focused on a microchip consisting of 3648 light sensitive diodes, known as a CCD or Charge Coupled Device. Based on the well-known concept that the intensity of light is proportional to the concentration of the corresponding element, analytical curves are generated by running Certified Reference Materials, also known as Primary Standards. These curves (one for each element) are stored in a Computer's memory. When an unknown metal sample is run, the software takes over and referring the respective intensities to the curves stored in the memory, gives the elemental concentrations as certifiable elemental analysis in weight percentages of metals. direct weight percentages.

Trying to make our products and services even more meaningful and useful for customers has led us to develop **Sample Preparation:** Properly and freshly prepared samples are most important for good precision and accuracy. Towards this made available a very. economical range of 2in I & 3in I Sample Preparation Machines.

How It Works

1. An Atomic (Optical) Emission Spectrometer (AES or OES) is used for direct elemental analysis of metals. The result is obtained in weight percentages.
2. When a metal is given energy by electrically sparking a portion of it, the atoms of the various elements present in the metal get energized.
3. The energy imparted to the different atoms takes the electrons in each of the atoms to higher energy states. In an AES, electrical energy is imparted using a pulse train.
4. The electrons absorb energy and return to ground state at the end of each pulse.
5. When electrons return to ground state they lose energy, which is emitted as radiation.
6. The atoms of a particular element emit energy as radiation in a set of frequencies . (wavelengths) that are characteristic of that element.
7. Higher the concentration of an element, the more will be the intensity of its radiation.
8. In an AES, a metal sample is taken and energized with a high energy spark. The radiation (light) emitted is a combination of radiations emitted by the atoms of all the different elements present in the sample.
9. This composite light is directed on a diffraction grating, which breaks up the light in an ordered array of frequencies (spectrum) going from low to high frequencies.

10. The spectrum is focused on a detector, which in our case is a linear CCO -Charge Coupled Device. A CCD has many thousands of pixels, each capable of sensing the wavelength falling on it and converting it to electrical energy. The output of each pixel is directly proportional to the intensity of the wavelength falling on it.
11. Depending on the elements of one's interest, the spectrometer designer chooses the optical elements (mainly the diffraction grating and the CCD). The selection of wavelengths is done using appropriate software, designed by the spectrometer maker.
12. The CCD's output goes to a microprocessor, which controls every function of the spectrometer through software.
13. An AES is calibrated using sets of standard metal pieces of certified elemental compositions. These standards have to be of the same type as the metal one needs to analyze. Thus to calibrate for stainless steels one needs to have a set of SS standards.
14. Since a spectrometer does not provide an empirical method for determination of the elemental concentrations (also known as chemical composition in common parlance), to check if a spectrometer is analyzing correctly, one needs to have standards of the type of metal(s) one is interested in analyzing. Thus, to check a spectrometer, which has been calibrated for analyzing SS, one needs to have an SS standard. For example, a user of AISI:316, would be well-advised to keep a Certified Standard of AISI:316.
15. Spectrometer manufacturers use sets of "Calibrations Standards" for calibrating.
16. As a user, as far as possible, you need to buy grade-specific standards, which are manufactured by various well-known manufacturers like ARMI, A1can etc.

TECHNICAL SPECIFICATIONS OF SPECTROMETER

FEATURES

» Analysis of Ferrous & non-Fe Metals » Argon-saving System incorporated » CCD array Detector, 3648 sensors » Capital cost lowest in the world » Compact Desktop Unit » Low Operating & Maintenance costs » Multi-base capability » Precise and Accurate » Rapid, Rugged and Reliable » Shutter for Entrance Window » Temperature-stabilised Spectrometer » User friendly -easy to operate » Weighs just 25 Kg.

OPTICAL SYSTEM

» Auto-profiling » Linear CCD detector: 3648 sensors » Patented Argon Saver » Sealed against dust contamination » Selectable "bum" parameters » Software-selectable channels » Temp-stabilised Compact System » Uses Holographic Diffraction Grating » Wavelength range: I 60 to 410 nm

SOURCE

» Arc/Spark Optimised Sparking » Computer-controlled Excitation » Frequency range: 150 to 500Hz » High Energy Pre-Spark » High Stability » Optimised parameters for analysis » Peak current up to 125A » Unipolar discharge

SPARK STAND

» Can analyse large or small samples » Easy to service and clean » Long-life Tungsten Electrode » Patented Argon Saver » Pneumatic Sample Clamp » Sample plate easily exchangeable » Standard Petrey Sample Stand

SPECTROMETER CONTROL AND DATA PROCESSING

» Capable of running Windows XP (SP-2) » External Pentium PC » Large capacity HDD & DVD-RW » USB Connection to PC

SOFTWARE OPERATION

» Simple multi-choice menu

A. ANALYTICAL

Auto Id » Auto line finding » Check-burn Facility » Deletion of bad burns » Display of mean value and RSD / SD » Factory calibrated » Global Standardisation » Type Standardisation » Simple Re-standardisation » Graphical representation of all element ranges

B. QUALITY

» Log of last I000 burns » Logging of all actions to HDD » Retrieval of results from HDD » Simple to use Report Generator

DIMENSIONS » Unit: 170 x 425 x 580mm/7" x 17" x 23" **WEIGHT** » 25 Kg. net

ELECTRICAL REQUIREMENT » 230VAC ± 10%, 50-60Hz

ENVIRONMENTAL » Operating temp. 15 -30 ^{0} C /59 -86° F » Storage temp. 0 -70*oC* /32 -158° F

All specifications are subject to *change without notice*

For - Universal Testing Machines (Static and Dynamic), Hardness Tester (Rockwell , Brinell, Vickers, Micro), Impact Testing Machines, Microscopes, Abrasive Cut off Machine, Sample preparation equipments, Image Analysis,etc. visit our website : **www.gatha.com**

From:

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