

EXPERIMENTER'S XRF KIT

**XRF
Kit**

Amptek's "XRF Kit" is a package designed to help a user quickly begin doing elemental analysis via X-ray fluorescence (XRF). It includes hardware and software supplied by Amptek, which must be supplemented by some components from the user. Once this kit is assembled and the software configured and calibrated, one can begin doing simple analyses. This kit is general purpose, so is not tailored to a particular application, but can be the starting point for a customized system.

The X-123 configuration is designed for OEM and custom applications where size and portability are considerations. The X-123 is designed to be small and low power and therefore has fixed power supplies set to the requirements of the detector.

The XRF Kit is available with any Amptek Si-PIN or with the *SUPER* SDD detector.

The user must supply a Windows SP2 or later (32-bit only) PC with three (3) available USB ports, radiation shielding and an enclosure, and a sample mount or holder.



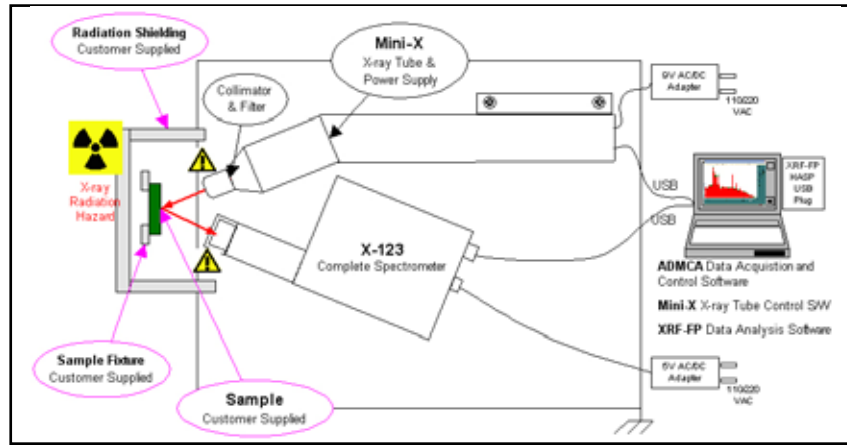
Experimenter's XRF Kit with Si-PIN Includes:

- X-123 Complete Spectrometer with Si-PIN Detector (6 mm²/500 μm, 1 mil Be window)
- Mini-X USB Controlled X-Ray Tube
- XRF-FP Quantitative Analysis Software
- MP1 XRF Mounting Plate
- Stainless Steel 316 (SS316) test sample
- Complete documentation with step-by-step instructions
- XRF Kit wizard for quick software setup

Experimenter's XRF Kit with SDD Includes:

- X-123 Complete Spectrometer with *SUPER* SDD (25 mm²/500 μm, 0.5 mil Be window)
- Mini-X USB Controlled X-Ray Tube
- XRF-FP Quantitative Analysis Software
- MP1 XRF Mounting Plate
- Stainless Steel 316 (SS316) test sample
- Complete documentation with step-by-step instructions
- XRF Kit wizard for quick software setup

Amptek Experimenter's Kit



Frequently Asked Questions (FAQ) For Amptek Experimenter's Kit

Is this XRF Experimenter's Kit comparable to a turn-key XRF system?

This kit contains all of the critical hardware and software required to do energy dispersive X-ray fluorescence (EDXRF), but it is not a turn-key system. It requires not only assembly but also fabrication of radiation shielding and sample mount hardware, configuration of the hardware and software, and calibration.

A turn-key system is generally designed to handle a wide range of measurement applications. If a user has a specific application, particularly one that is challenging for turn-key systems, the Experimenter's Kit lets the user optimize the entire system for that one application. It is a very powerful tool for specific and challenging measurement applications. But to obtain its advantages, the user must invest the time to fully optimize the hardware, the software, the calibration procedures, and so on.

A turn-key system is designed for an operator with minimal training. The operator turns on the system, takes a measurement, and the system gives the answer. The designers of the turn-key system have already optimized the configuration, calibrated the system, and evaluated its measurement uncertainty. The Experimenter's Kit requires a user to carry out these steps and to have the knowledge to carry them out. It is possible to use the Experimenter's Kit to fabricate a prototype of an OEM system, which is simple to use, but this requires development effort.

To do XRF, do I need to buy or build anything other than the Experimenter's Kit?

At a minimum, you need to fabricate (1) a fixture to hold the sample in place and (2) radiation shielding.

One of the most important considerations in XRF is how you hold the sample: the geometry between the excitation source, the sample, and the detector must be fixed. If it varies, by even a small amount, there will be important variations in the analytical result. The fixture to hold the sample has to be designed around the sample so is not provided by Amptek, Inc.

Radiation safety is very important. The X-ray tube represents a personnel hazard if it is not shielded properly and if interlocks are not used to ensure shielding is in place. The shielding must prevent accidental personnel exposure but must permit easy access to the samples and should not be too massive (for portable systems). In addition, one must ensure that material in the shield (e.g. Pb) does not produce X-rays measured by the detector, since these would interfere with measurements. The shield has to be designed around the sample so is not provided by Amptek, Inc. The Mini-X includes hardware to simplify safety interlocks and warnings (blinking lights, audible beepers), but the user is responsible for assuring that the complete system meets any application radiation safety requirements.

What must I do to start using the XRF Experimenter's Kit as a laboratory prototype?

- 1) The kit comes with instructions to guide you through (a) assembling the hardware, (b) installing the software, (c) selecting a "basic" configuration which permits you to acquire a spectrum, and (d) calibrating the energy scale.
- 2) You must fabricate some form of sample fixture, radiation shielding, and safety interlocks. You may need to fabricate an enclosure for the system.
- 3) The kit comes with a single sample material, a piece of stainless steel 316, to use in initial setup and calibration. You must obtain any other samples necessary.
- 4) You need to optimize the configuration of the system for your measurement application. There are many parameters to consider: the energy and filtering of the excitation source, geometry of the detector, tube and sample, the parameters of the signal processor (there are many parameters, though usually only a few are key), and the parameters of the spectrum processing and analysis software.
- 5) You need to calibrate the energy scale. For accurate results, you also need to calibrate the analysis software using samples of known composition.

