

FREQUENTLY ASKED QUESTIONS

Cabinet X-Ray

WHAT IS A CABINET X-RAY SYSTEM?

A cabinet x-ray system is always installed in an enclosure. The enclosure is intended to protect people from the x-rays generated and to exclude people from the enclosure's interior. Cabinet x-ray systems are primarily used for security screening and industrial quality control. Industrial quality control applications include the x-ray examination of foods and packaged products.*

IS IT SAFE TO STAND OR WALK NEAR A CABINET X-RAY SYSTEM WHILE IT IS PRODUCING X-RAYS?

Yes. Manufacturers are required to certify that their products meet the US Federal radiation safety performance standard for cabinet x-ray systems. Specifically, the standard requires that the radiation emitted from a cabinet x-ray system not exceed an exposure of 0.5 milliroentgens in one hour at any point five centimeters from the external surface. Most cabinet x-ray systems emit less than this limit. In addition, the standard also requires safety features that include warning lights, warning labels, and interlocks.

For comparison, the average person in the United States receives a dose of about 360 millirem of radiation per year from background radiation. (Note: 1 milliroentgen of exposure to x-rays will result in approximately 1 millirem of dose. These terms are defined below.) Background radiation is radiation that is always present in the environment. Eighty percent of that exposure comes from natural sources: radon gas, the human body, outer space, rocks, and soil. The remaining 20 percent comes from manmade radiation sources, primarily medical x-rays.*

IS IT SAFE FOR PREGNANT WOMEN TO STAND OR WALK NEAR A CABINET X-RAY SYSTEM WHILE IT IS PRODUCING X-RAYS?

Yes. The limit on radiation emission established by the performance standard is sufficiently restrictive that there is no additional hazard for specific populations such as children or pregnant women.*

ARE THE OPERATORS OF CABINET X-RAY SYSTEMS REQUIRED TO WEAR A "RADIATION BADGE"?

Personnel monitoring equipment is not required by Federal regulation for operators of cabinet x-ray systems. The Federal limit on cabinet x-ray system emissions ensures the maximum possible exposure from cabinet x-ray systems in the workplace will always fall below the minimum threshold where personnel monitoring might be required*.

ARE THE OPERATORS OF CABINET X-RAY SYSTEMS REQUIRED TO WEAR PHYSICAL PROTECTION WHEN OPERATING THE SYSTEM?

No, the system uses very low levels of X-ray intensity internally, and the external emissions in the operator area are virtually undetectable.

WHAT DO THE TERMS EXPOSURE AND DOSE MEAN? WHAT DO THEIR MEASUREMENT UNITS MEAN?

Exposure is a term defining the amount of ionizing radiation that strikes living or inanimate material. Dose is the quantity of radiation or energy absorbed. Dose may refer to the following:

- Absorbed dose, the amount of energy deposited per unit mass.
- Equivalent dose, the absorbed dose adjusted for the relative biological effect of the type of radiation being measured.
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Roentgen (R) is a unit of exposure of ionizing radiation and indicates the strength of the ionizing radiation. One Roentgen is the amount of x-ray needed to produce ions carrying one electrostatic unit of electrical charge in one cubic centimeter of dry air under standard conditions.

Roentgen absorbed dose (rad) is the basic unit of absorbed radiation dose. A dose of one rad to an object means each gram of the object received 100 ergs of energy or one rad = 100 ergs/gram.

Roentgen Equivalent Man (rem) is the basic unit of equivalent dose, and relates the absorbed dose in human tissue to the biological effect of the radiation. Not all radiation has the same biological effect, even for the same amount of absorbed dose.*

DOES MY X-RAY SYSTEM REQUIRE SPECIAL REGISTRATION PAPERWORK?

For each X-Ray System sold, Eriez will first contact your state and notify them that we will be shipping a piece of X-Ray equipment in. You will then need to submit a fairly basic X-Ray registration form (the form varies from state to state). On that form you will need to designate one employee as your "radiation safety officer" and that person will need to be trained on the system. After that you will be required to measure radiation levels on and around the machine and record them on a yearly basis.

WHO WILL BE QUALIFIED TO OPERATE THE X-RAY SYSTEM?

After the system is set up and the paperwork is filed, the Eriez E-Z Tec X-Ray system is as easy to use as any metal detector and, in fact, may even be easier to operate.

WILL MY FOOD PRODUCT BE CONTAMINATED IF IT PASSES THROUGH A CABINET X-RAY SYSTEM?

There are no known adverse effects from eating food that has been irradiated by a cabinet x ray system. In order to induce changes in a product, or to sterilize a product, very powerful beams of radiation are required. The radiation dose typically received by objects scanned by a cabinet x-ray system is 1 millirad or less. The average dose rate from background radiation is 360 millirad per year. The minimum dose used in food irradiation for food preservation or destruction of parasites or pathogens is 30,000 rad. *

WHY HAVE X-RAY MACHINES BECOME SUCH A POPULAR METHOD OF DETECTION?

In using a cabinet X-Ray System, the customer is able to detect more than just contaminants. You will have the ability to scan for piece counts, missing product, deformities, as well as many other processing errors.

**Portions of this information were adapted from and more information may be obtained from the Food and Drug Administration website <www.fda.gov>*

