DEPARTMENT OF HEALTH

DIRECTORATE: RADIATION CONTROL

GUIDELINES

CABINET AND CONVEYOR BELT X-RAY SCANNERS

1. BACKGROUND

A cabinet or conveyer belt x-ray scanner is primarily used for security screening of mail, baggage, cargo contents, etc. Other common names are X-Ray Screening Systems, X-Ray Security Systems, and scanners for the Inspection of Cargo contents. Even though cabinet and conveyer belt x-ray scanners are designed to provide safe and efficient operation, they must be operated with safety in mind.

2. REGULATORY STANDARDS

In terms of the Hazardous Substances Act, Act 15 of 1973, no person shall Import and/or Purchase and/or Use a listed electronic product unless such a product has been licensed.

New Equipment

Licensing must be done through the supplier, but in conjunction with the user of the equipment.

Pre-Owned

A RC001 form is to be fully completed by the user and forwarded, to the relevant office in application of a licence.

Changes

Responsible person - A RC005 form is to be fully completed by the user and forwarded to the relevant office

Premises or disposal of scanner - A RC002 form is to be fully completed by the user and forwarded to the relevant office.

3. INFORMATION TO BE DISPLAYED

The product licence number, as issued by the Department of Health: **Radiation Control** must be displayed in/on an easily accessible area of each unit. The identification plate, permanently affixed to the unit, should contain information regarding the manufacturer, model designation, serial number and place of manufacture for the device.

4. RADIATION WARNING SIGNS OR NOTICES

Radiation Signs or Notices shall be displayed on the x-ray scanner:

Radiation warning sign (trefoil)

- Is shown in two contrasting colours.
- Is clearly visible and identifiable from a distance of 1 meter.
- On/Near the control panel of the unit in clear view of the operator.
- On the external surface of the device.

Radiation warning notice

Radiation warning notices must bear the words below and must be permanently affixed or displayed.

- "CAUTION X-RAYS PRODUCED WHEN ACTIVATED".
- "TO BE USED BY AUTHORISED PERSONS ONLY".
- At all access openings where items are inserted or removed: "DO NOT INSERT ANY PART OF THE BODY WHEN SYSTEM IS ACTIVATED - X-RAY HAZARD".

5. RADIATION SAFETY REQUIREMENTS

Leakage radiation shall be ≤5μSv/h at any point 5cm from the external surface.

Pregnancy

The public dose limit is 1mSv per year (ICRP 103). Studies have shown that operators of x-ray scanner machines for security purposes receive well below 1mSv of radiation dose per year from workplace activities.

Items passing through

Items passing through an x-ray screening machine, will receive ionizing radiation exposure; but the exposure is too low to cause any damage.

6. OPERATORS and MAINTENANCE PERSONNEL

Personnel, that use or perform maintenance on x-ray scanners, must receive training, authorised by the original manufacturer on the operation and x-ray safety relevant to the x-ray scanner intended for use.

Use

For regulatory purposes, operators of x-ray scanners for security purposes, are exempted from being monitored as Radiation Workers.

Maintenance

All persons involved in the maintenance of these units, should be monitored as Radiation Workers.

7. OPERATIONAL SAFETY

X-ray Inspection Systems are designed to provide safe and efficient operation however the systems have inherent dangers and must be operated with safety in mind.

Conveyer Belt Unit

- Key actuated control so that x-rays cannot be produced when the key is removed.
- Clearly visible reliable light/beam-on indication.
- No x-rays shall be produced when the conveyer is stationary.
- Manual control of x-ray production in case of an emergency situation.
- For exposures exceeding 0.5 seconds, two independent means to indicate when x-rays are being produced. (e.g mA meter and X-ray ON light).
- Emergency buttons at either end of the units.
- Please note - X-rays are switched on and off automatically, by activation or deactivation of conveyor belt.

Cabinet Type

- Key actuated control so that x-rays cannot be produced when the key is removed.
- Clearly visible reliable light/beam-on indication.
- Manual control of x-ray production in case of an emergency situation.
- Accessible emergency buttons.

Additional Requirements

The exposure switch must be a "dead-man" type. A safety interlock to prevent the production of x-rays while any door or access panel leading to the interior of the cabinet or conveyer belt unit is open, must be present.

8. OTHER IMPORTANT SAFETY MEASURES

DO

- Adhere to the operation manual/instructions as prescribed by the manufacturer.
- Ensure that curtains are hanging down and in a good condition.
- Ensure that warning signs, lamps and signals are installed.
- Ensure notices are clearly legible.
- Ensure that lights are in a good working condition before operating the unit.
- Use a solid push stick to remove items that are stuck on the conveyor belt.
- Turn the system OFF before reaching or crawling inside.
- Follow the procedure established at your facility when dangerous objects or weapons are identified on the screen.
- All maintenance functions must be performed by a qualified technician.
- Maintenance reports must be filed for future reference.

DO NOT

- Insert any part of the body into the inspection tunnel while x-rays are on.
- Operate the x-ray system with lead curtains broken or removed.
- Displace the curtains while x-ray lights are on.

9. CONTACT DETAILS

Offices	Postal address	Street address	Tel & Fax
Head Office **Bellville**	Private Bag X62 Bellville 7535	c/o Kort & Vrede Str 2nd Floor Louwville Place Bellville 7530	021-948 6162 ☎ 021-946 1589
Regional Office **Pretoria**	PO Box 977 Pretoria 0001	Rooms NP28 - 47 Podium Level North Tower Civitas Building c/o Andries & Struben Street Pretoria 0002	012-395 9121 ☎ 012-395 9122 ☎ 012-395 9125
Regional Office **Durban**	PO Box 4301 Durban 4000	6th Floor, Room 604 85 On Field Building Field Street Durban 4001	031-307 2111 ☎ 031-307 6099

WEB ADDRESS: **https://sites.google.com/site/radiationcontroldoh**

ADDITIONAL INFORMATION
www.catsa.gc.ca/sites/default/files/.../2_XRay_safety_awareness_handbook-EN.pdf

REFERENCES

Hazardous Substances Act, Act 15 of 1973.

Regulations Concerning The Control of Electronic Products, R.1332.

Code of practice for users of medical x-ray equipment 01-2015.

ICRP, 2007. The 2007 Recommendations of the International Commission on Radiological Protection. ICRP Publication 103. Ann. ICRP 37 (2-4).

Health Physics Society. Airport Screening Fact Sheet.
http://hps.org/documents/airport_screening_fact_sheet.pdf

Health Physics Society. Security Screening.
http://hps.org/publicinformation/ate/faqs/securityscreening.html