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GUIDELINE REGARDING PROTECTIVE CLOTHING

This guideline provides a practical framework for the use, maintenance and inspection of radiation protective aprons, gonad shields, thyroid shields and protective gloves.

Document History

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Glossary

Abbreviation/ Term	Meaning
Act	Hazardous Substance Act 15 of 1973 (Act 15, of 1973)
Gonads	Primary reproductive gland that produces reproductive cells (gametes). I
ICRP	International Commission on Radiological Protection
Lead aprons	this a type of protective clothing made of thin rubber externally lead interior that acts as a radiation shield
Radio-opaque	Any high-density material that attenuates radiation
Radiographic	Process of producing an image using x-ray machine
Regulation	Regulation concerning the control of electronic products, (R1332)
Thyroid	A gland that makes and stores hormones that help regulate the heart rate, blood pressure, body temperature, and the rate at which food is converted into energy

1. INTRODUCTION

The regulation 1332 (R.1332) states very clear that the holder shall be liable for the entire scope of radiation protection with regard to a listed electronic product or premises for which he holds a license. Such liability shall relate to any aspect that could reasonably be included under radiation protection. Radiation protective clothing is an essential safety tool used in a radiology department to protect medical radiation workers and patients from scatter radiation during x-ray procedures. It is therefore the responsibility of the license holder to ensure radiation workers in areas need have the required protective clothes.

1.1 Purpose

This guideline provides a practical framework for the use, maintenance and inspection of radiation protective aprons, gonad shields, thyroid shields, and protective gloves.

1.2 Scope

The recommended use of radiation protective clothing during x-ray procedures in a Radiology Department. Damaged lead aprons, gonad shields, protective gloves and thyroid shields should be withdrawn from use. It may be repaired provided that it is restored to its original shielding ability. Any supplier of lead aprons, gonad shields, protective gloves and thyroid shields should be able to assist the user with regards to the repair thereof.

2. LEGAL PROVISION

The SAHPRA Radiation control regulates ionizing devices as promulgated by the hazardous Substances 15 of 1973 with its related regulations R1332 concerning the control of electronic products.

3. PROTECTIVE APRONS (WORKERS)

SAHPRA Radiation Control has accepted the conditions stated by the International Commission on Radiological Protection (ICRP Publication 57, paragraph 174), namely:

“If workers cannot remain in the protected area when the x-ray machine is operated, they shall wear a protective apron of at least 0.25 mm lead equivalence. As far as is reasonably practicable they should occupy areas of the room where the levels of radiation exposure are low. Any person required standing within 1 metre of the x-ray tube or patient should wear a protective apron of at least 0.35-mm lead equivalence. All such protective clothing should bear an identifying mark and should be examined at 3 monthly intervals. Defective items should be withdrawn from use”.

4. PROTECTIVE GLOVES (WORKERS)

SAHPRA Radiation Control has also accepted the conditions stated by the ICRP Publication 57 (paragraph 174)

regarding protective gloves, namely: “Protective gloves should be of at least 0.35 mm lead equivalence. All such protective clothing should bear an identifying mark and shall be examined at 3 monthly intervals. Defective items should be withdrawn from use”.

5. THYROID SHIELDS

The ICRP Publication 57 (paragraph 175) stated namely:

“Thyroid protection, if deemed necessary can be achieved either by wearing a collar of suitable lead equivalence, or by the use of a protective apron with a high neckline”.

5.1 Patients

No requirements

5.2 Radiation workers

A lead equivalence of 0.35-mm lead is required (in correspondence with ICRP Publication 57, paragraph 174).

6. GONAD SHIELDS

6.1 Patients

Gonad shielding should only be used when it does not interfere with radiographic diagnosis. The gonads of males with reproductive potential must be protected if they are within the primary beam or within 5 cm of it, and if the shielding does not exclude important diagnostic information or interfere with the study. If the gonads are beyond 5 cm the gain obtained in shielding is negligible. The use of gonadal shielding in males can reduce dose to the gonads by 95% when the gonads are in the direct beam. In females the saving is considerably lower (about 50%).

There are three basic types of gonadal shields (contact shield, the shadow shield and the shaped contact shield). These shields must be at least 0.5 mm lead equivalent. Contact shields are the simplest to use and are the least expensive. They are simply pieces of lead sheet or lead rubber or even objects such as lead gloves that can be placed over the gonads. Shadow shields are radio-opaque shields that are placed between the X-ray tube and the patient but are not in contact with the patient. Shaped contact shields are available only for the male.

For female patients shielding of ovaries may obscure structures of clinical importance and must therefore be abandoned. Shielding of the ovaries are recommended only if loss of diagnostic information can be avoided. Due to uncertainty in the location of the ovaries, the real shielding effectiveness cannot always be predicted.

7. REPAIR OF LEAD APRONS, GONAD SHIELDS, PROTECTIVE GLOVES AND THYROID SHIELDS

7.1 To verify that lead aprons, gonad shields, protective gloves and thyroid shields are free from any defects, holes and cracks:

7.1.1 A visual and manual check must be performed 3 monthly, and

7.1.2 A radiographic / fluoroscopic test if a defect is suspected.

7.2 Damaged lead aprons, gonad shields, protective gloves and thyroid should be withdrawn from use. It may be repaired provided that it is restored to its original shielding ability.

Any supplier of lead aprons, gonad shields, protective gloves and thyroid shields should be able to assist the user with regard to the repair thereof.

8. REFERENCES

8.1 ICRP, 1982. Protection of the Patient in Diagnostic Radiology. ICRP Publication 34. Ann. ICRP 9 (2-3).

8.2 ICRP, 1990. Radiological Protection of the Worker in Medicine and Dentistry. ICRP Publication 57. Ann. ICRP 20 (3).

8.3 Hazardous Substance Act 15 of 1973 (Act 15, of 1973), <https://www.sahpra.org.za/radiation-control-acts-and-regulations/>

8.4 Regulation concerning the control of electronic products, (R1332), <https://www.sahpra.org.za/radiation-control-acts-and-regulations/>

9. VALIDITY

This guideline is valid for a period of 5 years from the effective date of revision and replaces the old guideline for Protective Clothing, revised October 2012. It will be reviewed on this timeframe or as and when required.