

Requirements for Safe Use of Medical Ultraviolet Radiation

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Table of Contents

Introduction	2
Requirements	3
1. For Healthcare provider (HCP)	3
2. For Physicians.....	5
3. For workers	5
Annexes.....	6
Annex (1): Definitions & Abbreviations	7

Introduction

Ultraviolet radiation (UVR) is the band of non-ionizing radiation that lies between the ionizing radiation and the visible radiation (light) electromagnetic spectrum. The UVR wavelength range is between 100 nm and 400 nm. It is commonly subdivided into types upon the radiation wavelength and health risk (Table 1).

UVR type	Wavelength	Health risk
UVA	315 nm to 400 nm	Low to medium
UVB	280 nm to 315 nm	Medium to high
UVC	200 nm to 280 nm	High
Vacuum UV	100 nm to 200 nm	Very high

Table1: URV types.

Several sources of artificial UVR are found in medical applications (e.g. dental, diagnostics, dermatology, ophthalmology and surgery). In addition, Sunbeds used for cosmetic tanning have become a more prevalent source of Ultraviolet (UV) exposure in many countries in the last two decades.

To ensure compliance with the Saudi Food and Drug Authority (SFDA) requirements. This document is intended to clarify the general requirement of the safe use of UVR for healthcare Provider (HCP).

Requirements

1. For Healthcare provider (HCP)

HCP shall implement several steps to control the risk of UVR:

A. Administrative requirements

- Aware the workers to the hazards of excessive exposure of UVR and provide adequate equipment for the protection of their employees.
- Provide educational material and workshops on UV hazards and protection.
- Encourage the use of an internationally acceptable UV index.
- Avoid using sunlamps and sunbeds for cosmetic purposes unless having medical devices marketing authorization (MDMA) for this purpose.
- Report skin and eye injuries occurred by the use of medical ultraviolet radiation to the SFDA and the Ministry of Health (MoH).
- Support and encourage research on health effects of UV and protective measures.
- UVR devices monitoring and health planning.
- Organizational measures regarding room and time-management.

B. Technical requirements

- Suitable engineering control measures shall include shielding barriers, UVR blocking filters and door interlocks.
- Hazard warning signs in both Arabic and English should be used to indicate the presence of a potential UVR hazard. The warning signs can also indicate restriction of access, and the need to use personal protection equipment. Warning signs and lights shall also be used to show when the UV equipment is energized.
- Keeping staff at a safe distance and limiting the time during which UV radiation sources are energized.
- Technical measures from primary sources, shielding, blinding and optical filters.

- Periodic preventive maintenances (PPMs) and Quality control (QC) tests for the medical UV device as per the manufactured recommendations. Data shall be filed inside the department for a minimum of two years.

C. Training

- Should be offered to all employees expected to expose to the UVR at work. In order to give familiarity of the risks and what is expected at the workplace.
- Establish educational programs include UVR protection material by the manufacturer or authorized body.

D. Personal protective equipment (PPE)

- Appropriate skin and eye protective equipment (e.g. clothing and goggles).

E. Risk assessment

The risk assessment should include:

- Level, wavelength range and duration of exposure to UVR.
- Exposure limit values.
- Any effects concerning the health and safety of workers belonging to particularly sensitive risk groups.
- Any possible effects on workers' health and safety resulting from workplace interactions between UVR and photosensitizing chemical substances.
- Any indirect effects such as temporary blinding, explosion or fire.
- Existence of replacement equipment designed to reduce the levels of exposure to UVR.
- Appropriate information obtained from health surveillance, including published information, as far as possible.
- Multiple sources of exposure to artificial UVR.
- Information provided by the manufacturers of the UVR sources.

2. For Physicians

- Physicians who prescribe UVR treatment for their patients should determine whether the benefits outweigh any risk.

3. For workers

- Employees should take seriously the need to be aware of the health effects of excessive exposure to UVR and to use the protective measures and devices provided for their work.
- Employees should be aware of the consequences of not availing themselves of the protective measure provided by HCP.

Annexes

Annex (1): Definitions & Abbreviations

HCP	Healthcare provider
MDMA	Medical devices marketing authorization
MoH	Ministry of Health
nm	Nanometer
PPE	Personal protective equipment
PPM	Periodic preventive maintenance
QC	Quality control
SFDA	Saudi Food and Drug Authority
UV	Ultraviolet
UVR	Ultraviolet Radiation