# **PURPOSE OF THESE CHECKLISTS**

The purpose of these checklists is to identify any issues of non-compliance with the ARPANSA Source Licence conditions. Each checklist relates to a different aspect of non-ionising radiation safety and protection. A different combination of checklists is to be used for different laboratories.

# **HOW TO USE THESE CHECKLISTS**

1. Carefully read the summary page (following page) to identify the relevant checklists to be completed.
2. Complete each relevant checklist by placing a tick in the appropriate box next to each checklist item (**C**=**C**ompliant, **NC**=**N**ot **C**ompliant, **NA**=**N**ot **A**pplicable).
3. Sign and date the summary page.
4. Forward a copy of each completed checklist and the summary page to the Radiation safety officer.
5. Forward a copy of each completed checklist and the summary page to the WEG.

**SUMMARY**

|  |  |
| --- | --- |
| College or Division: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Research School or Department: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Building Number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Room Number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Radiation Safety Officer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Principal Supervisor: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

The laboratory contains the following source(s) of non-ionising radiation:

|  |  |
| --- | --- |
|  | Ultra Violet radiations → Complete checklist 1. |
|  | Visible Light → Complete checklist 2. |
|  | Infra Red and Radiant Heat → Complete checklist 3. |
|  | Radio Frequency radiation → Complete checklist 4. |
|  | Extremely low frequency radiation → Complete checklist 5. |
|  | Lasers → Complete laser audit checklist. |

After completing the relevant checklists, this summary page must be signed and dated in the spaces provided below.

Where the exposure is unknown, please contact the WEG ([whs@anu.edu.au](mailto:whs@anu.edu.au)) for evaluation.

Print Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Training:**

It is an expectation that all persons working in areas where potentially hazardous non-ionising radiation sources are used, should be instructed in:

1. The nature of the hazard
2. Minimization of the hazard
3. Methods protecting against damage
4. Recognition, assessment and possible treatment of any effect from overexposure
5. Reporting any incident relevant to health and safety and
6. Regulatory requirements relating to the particular radiation

**Checklist 1: Ultra Violet Radiations**

**Manufacturer:**   **Model #:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Serial #: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Year of Manufacture:**  **Lamp code** (if relevant)**:**   **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Power:** \_\_\_\_\_\_\_\_\_\_\_\_

**Intended purpose / process:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Type of source:

* Hand held UV lamp
* Fixed UV lamp
* Transilluminators
* Biological safety cabinet
* By-product of another source (i.e. plasma)
* Solar radiation – Do not complete this form – follow the outdoor workers guidance material.
* Other:

1. Type of Ultraviolet Light**:**

* **UV-A** (near UV, long UV)315 – 400 nm
* **UV-B** (middle UV, Erythema UV)280 – 315 nm
* **UV-C** (Short UV, far UV)180 – 280 nmcaution – ozone and oxides of nitrogen may be present
* **Broad band source** 180 – 400+ nmcaution – ozone and oxides of nitrogen may be present

1. Is exposure to the UV light possible?

* Yes, to the skin
* Yes, to the eyes
* Yes, use of photosensitising agents, photosensitive individuals or aphakes[[1]](#footnote-1)♣ work in the laboratory.
* No, the source is enclosed and controls are in place. (go to the risk assessment section)

♣ Those persons that have had their lens of the eye removed during cataract surgery.

1. Laboratory System Control

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item** | **Present** | **NC** | **NA** | **Comment** |
| Restricted access to the laboratory/equipment |  |  |  |  |
| Enclosure/shielding of source   * Is it effective at reducing UV exposure? * Interlocked or needs tools to remove. |  |  |  |  |
| Documented work practices, which include recommendations on -   * Safe methods of working * Minimising exposure time and * Maximising distance between personnel and UV source. |  |  |  |  |
| Warning sign –  For the laboratory.  For the equipment. cl. |  |  |  |  |
| Labels indicating potential hazardous areas |  |  |  |  |

1. Personal Protective Equipment

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item** | **Required** | **Present** | **NA** | **Comment** |
| Protective Clothing |  |  |  |  |
| Protective gloves |  |  |  |  |
| Protective face Shield (in addition to standard safety glasses) |  |  |  |  |
| Skin cream |  |  |  |  |
| Labels indicating need for personal protective equipment |  |  |  |  |

**Note:** Plastic absorption – polycarbonate or methyl methacrylates are good UV absorbers, polyester absorbs UV-B & C but transmits UV-A, polyethylene provides no useful protection.

1. Are the protective equipment made of appropriate materials, or have their suitability been verified as appropriate? *Yes No*
2. Risk rating: Consider the information above, including the type and effectiveness of shielding and personal protective equipment.

The risk of exposure is:

* low
* moderate
* high
* extreme

Sources of high or extreme risk of exposure or personal injury should be measured and assessed. Contact the WEG for implementation of additional controls to reduce the risk.

General comments:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Auditor’s name: Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_\_

**Checklist 2: Visible Light**

**Manufacturer:**   **Model #:**  **Serial #:**

**Year of Manufacture:**  **Lamp code** (if relevant)**:**   **Power:** \_\_\_\_\_\_\_\_\_\_\_\_

**Lamp Pressure***: High Medium Low Vacuum*

**Intended purpose / process:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Type of source:

* Enclosed lamp
* Open lamp
* Electric arc
* Flash tube (*laser* or *photographic*)
* Lighting for \_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Plant growth cabinet
* By-product of another source (i.e. plasma)
* Laser (complete the laser audit form)
* Solar radiation – Do not complete this form – follow the outdoor workers guidance material.
* Other:

1. Type of light:

* **Narrow wavelength** (non laser) 400 – 760 nm
* **Broad band source** 400 – 760+ nm
* **Pulsating light\* \_\_\_\_\_** pulse per second

\* light pulsing between 8-14 pulses per second can give rise to epileptic and hypnotic effects, while 14-15 pulses per second can cause nausea.

1. Is exposure to the hazardous part of the light possible? This may be only the bulb, but not reflected light.

* Yes, to the skin.
* Yes, to the eyes.
* No, the source is enclosed and controls are in place. (go to the risk assessment section)

1. Is the light source (luminance) greater than 1 x 10 4 cd/ m2?

* Yes.
* No.

1. Laboratory System Controls:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item** | **Present** | **NC** | **NA** | **Comment** |
| Restricted access to the laboratory/equipment |  |  |  |  |
| Enclosure/shielding of source   * Are vents baffled to block direct rays? * Interlocked or needs tools to remove. * Are they effective at reducing visible light exposure? |  |  |  |  |
| Documented work practices, which include recommendations on -   * Safe methods of working * Minimising exposure time and * Maximising distance between personnel and light source. |  |  |  |  |
| Warning sign –   * For the laboratory. * For the equipment. |  |  |  |  |
| Labels indicating potential hazardous areas |  |  |  |  |
| Is a viewing widow fitted? |  |  |  |  |
| Does the window filter visible and infrared radiation? |  |  |  |  |

1. Personal Protective equipment:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item** | **Required** | **Present** | **NA** | **Comment** |
| Protective eye wear (tinted)   * Safety glasses (wrap around type) * Safety goggles   Lens Type: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Class: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Shade Number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  |  |  |  |
| Labels indicating need for personal protective equipment |  |  |  |  |

1. Are the protective equipment made of appropriate materials, or have their suitability been verified as appropriate? *Yes No*
2. Risk rating: Consider the information above, including the type and effectiveness of shielding and personal protective equipment.

* Is your natural aversion response activated? *Yes No*
* Are you force to override this blink reflex/aversion response to conduct your work? *Yes No*

The risk of exposure is:

* low
* moderate
* high
* extreme

Sources of high or extreme risk of exposure or personal injury should be measured and assessed. Contact the WEG for implementation of additional controls to reduce the risk.

General comments: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Auditor’s name: Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_\_

**Checklist 3: Infra-Red (IR) Radiation**

**Manufacturer:**   **Model #: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Serial #:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Year of Manufacture:**  **Lamp type** (if relevant)**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Power:** \_\_\_\_\_\_\_\_\_\_\_\_

**Lamp Pressure***: High Medium Low Vacuum*

**Intended purpose / process:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Type of source:

* IR Lamp
* Filtered IR Lamp
* Furnaces
* Heated (glowing) objects
* By-product of another source (i.e. plasma)
* Laser (complete the laser audit form)
* Solar radiation – Do not complete this form – follow the outdoor workers guidance material.
* Other:

1. Type of light:

* **Near- IR 700nm – 1400 nm**
* **Far- IR**  **1400nm – 1mm**

1. Is exposure to IR radiation possible?

* Yes, to the skin.
* Yes, to the eyes.
* No, the source is enclosed and controls are in place. (go to the risk assessment section)

1. Is a visual stimulus present?

* Yes.
* No.

1. Laboratory System Controls:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item** | **Present** | **NC** | **NA** | **Comment** |
| Restricted access to the laboratory/ equipment |  |  |  |  |
| Enclosure/shielding of source   * + - Are vents baffled to block direct rays?     - Interlocked or needs tools to remove.     - Are they effective at reducing radiant heat exposure? |  |  |  |  |
| Documented work practices, which include recommendations on -   * + - Safe methods of working     - Minimising exposure time and     - Maximising distance between personnel and IR   source |  |  |  |  |
| Warning sign –   * For the laboratory. * For the equipment. |  |  |  |  |
| Labels indicating potential hazardous areas |  |  |  |  |
| Is a viewing widow fitted? |  |  |  |  |
| Does the window filter visible and IR radiation? |  |  |  |  |

1. Personal Protective equipment:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item** | **Required** | **Present** | **NA** | **Comment** |
| Protective Clothing |  |  |  |  |
| Protective gloves |  |  |  |  |
| Protective eye wear (tinted)   * Safety goggles   Lens Type: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Class: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Shade Number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  (The use of safety goggles that provide optical attenuation in the IR range  Helps to reduce the intensity of light which enters operator’s eye, in well  Illuminated laboratory) |  |  |  |  |
| Labels indicating need for personal protective equipment |  |  |  |  |

1. Are the protective equipment made of appropriate materials, or have their suitability been verified as appropriate? *Yes No*
2. Risk rating: Consider the information above, including the type and effectiveness of shielding and personal protective equipment.

The risk of exposure is:

* low
* moderate
* high
* extreme

Sources of high or extreme risk of exposure or personal injury should be measured and assessed. Contact the WEG for implementation of additional controls to reduce the risk.

General comments:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Auditor’s name: Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_\_

**Checklist 4: Radio-Frequency (RF) Radiation**

**Manufacturer:**   **Model #:**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**Serial #: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Year of Manufacture:**  **Operating Frequency:**   **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Power output:** \_\_\_\_\_\_\_\_\_\_\_\_

**Duty Cycle: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Intended purpose / process:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Type of source:

* RF heater/welder
* Microwave equipment
* Induction heater/furnace/welder
* Microwave oven
* RF radiator/antenna
* RF Plasma tube
* Medical diathermy equipment
* Other:

1. Exposure standards for radiofrequency radiation and background information can be found at <http://www.arpansa.gov.au/radiationprotection/Basics/rf.cfm>

If the risk assessment indicates the need for further evaluation or measurements, contact the WEG.

1. Laboratory System Controls:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item** | **Present** | **NC** | **NA** | **Comment** |
| Restricted access to the laboratory/equipment |  |  |  |  |
| Enclosure/shielding of source by physical barrier |  |  |  |  |
| Documented work practices, which include recommendations on -   * + - Safe methods of working;     - Minimising exposure time. |  |  |  |  |
| Warning sign –   * For the laboratory. * For the equipment. |  |  |  |  |
| Visible/Audible RF on Indicator |  |  |  |  |
| Interlocks on enclosure (if RF standard exceeds) |  |  |  |  |

1. Personal Protective equipment:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item** | **Required** | **Present** | **NA** | **Comment** |
| Protective Clothing |  |  |  |  |
| Protective gloves |  |  |  |  |
| Protective eye wear |  |  |  |  |

**Note:** Do not wear jewellery, watches while working near RF sources. Personal protective equipment (against RF radiation) is generally only required when levels exceed the exposure standards. If levels exceed the exposure standard the hierarchy of controls should be investigated to reduce exposures to safe levels. Reliance on PPE is not recommended.

1. Are the protective equipment made of appropriate materials, or have their suitability been verified as appropriate? *Yes No*
2. Risk rating: Consider the information above, including the type and effectiveness of shielding and personal protective equipment.

The risk of exposure is:

* low
* moderate
* high
* extreme

Sources of high or extreme risk of exposure or personal injury should be measured and assessed. Contact the WEG for implementation of additional controls to reduce the risk.

General comments:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Auditor’s name: Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_\_

**Checklist 4: Extremely Low Frequency Radiation**

**Manufacturer:**   **Model #: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Serial #: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Year of Manufacture:**  **Operating Frequency:**   **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Power output:** \_\_\_\_\_\_\_\_\_\_\_\_

**Intended purpose/process:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Type of source:

* Large power supply transformer
* Large electric motor
* Induction heater/furnace/welder
* Normal building supply electrical system (ignore this section).
* Other:

1. Does the equipment operate at greater than 5 KV?

* Yes, if yes (x-rays may be produced). Are operators shielding from x-rays: Yes No.
* No.

1. Exposure standards for extremely low frequency radiation and background information can be found at <http://www.arpansa.gov.au/radiationprotection/basics/elf.cfm>

If the risk assessment indicates the need for further evaluation or measurements, contact the WEG.

1. Laboratory System Controls:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item** | **Present** | **NC** | **NA** | **Comment** |
| Restricted access to the laboratory/equipment |  |  |  |  |
| Enclosure/shielding of source by properly earthed conducting enclosures |  |  |  |  |
| Documented work practices, which include recommendations on -   * + - Safe methods of working;     - Minimising exposure time; and     - Increasing the distance from source. |  |  |  |  |
| Warning sign –   * For the laboratory. * For the equipment. |  |  |  |  |

1. Risk rating: Consider the information above, including the type and effectiveness of applied controls.

The risk of exposure is:

* low
* moderate
* high
* extreme

Sources of high or extreme risk of exposure or personal injury should be measured and assessed. Contact the WEG for implementation of additional controls to reduce the risk.

General comments:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Auditor’s name: Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_\_

1. [↑](#footnote-ref-1)