

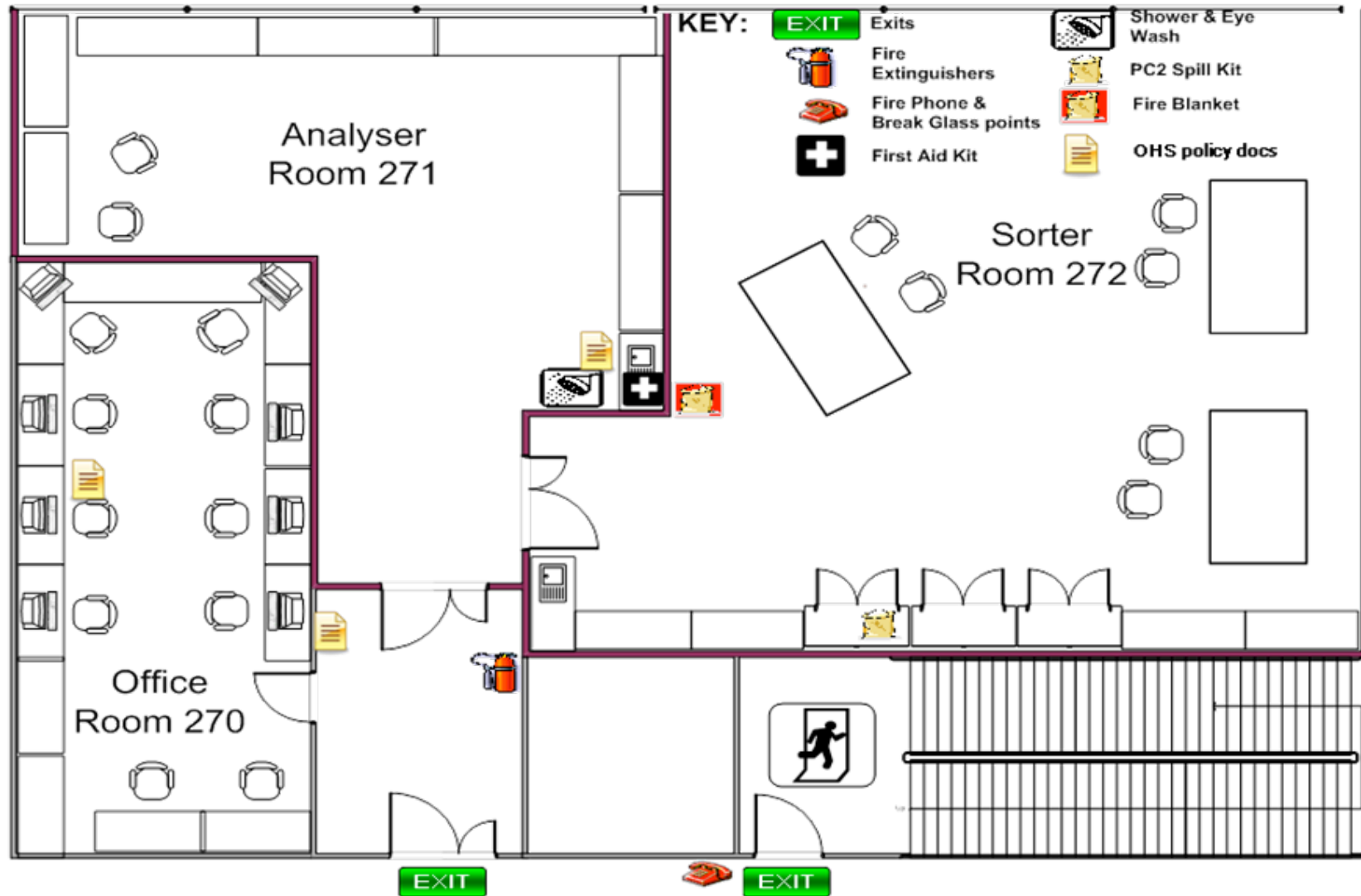


flowcore  
Safety Manual 4

PQMS3-FLOW-REF-0006-V2



MONASH University



## FlowCore

The FlowCore facility was previously established jointly by the former Australian Stem Cell Centre (ASCC) and the Australian Regenerative Medicine Institute (ARMI). FlowCore is now a Monash University Core Platform Facility, under the Faculty of Medicine, Nursing and Health Sciences. FlowCore currently houses Monash University instrumentation, as well as equipment contributed by ARMI and CSIRO.

All personnel (including staff, visitors and contractors) who enter the facility must have received training in the fundamental aspects of laboratory safety in accordance with the OH&S Act 2004 from their employer or host institution.

The FlowCore facility has been certified at Physical Containment (Level 2) and as such; all personnel conducting general or experimental work at the facility must do so in accordance with the requirements for PC2 Certification. The minimum training requirement for supervised access to the FlowCore PC2 facility is completion of Local Area Induction (AS/NZS 4801) to be provided by trained FlowCore staff. Additional safety training will be provided by the FlowCore safety officer, to any personnel conducting (supervised or unsupervised) experimental work within the FlowCore facility.

Any genetically modified material transported into the FlowCore facility must have the appropriate approval under the terms of the Gene Technology Act 2000 and subsequent amendments 2007. All genetically modified material must be transported in compliance with the guidelines for the transport of Genetically Modified Organisms (Version 2.1, 2007).

## Individual Responsibilities

Individuals must:

- Understand all aspects of safety in the laboratory.
- Conduct all activities in the FlowCore laboratory in a safe and responsible manner.
- Ensure your own personal safety and of those around you is not compromised.
- Ensure you have the appropriate approval, permit or license to conduct any experiment
- Notify the FlowCore Manager of any concerns or issues.
- Notify senior staff or the Laboratory Manager when they are not sure of any policy/procedure, or how to use any equipment or conduct experiments

## **Incident Reporting**

Any incident (potential or actual) involving personal injury, chemical spill, equipment failure etc must be reported using the Monash University Incident Report protocol. Incident reports may be submitted via the Monash University S.A.R.A.H. system [my.monash.edu](http://my.monash.edu) website, or via hard copy to the FlowCore office.

Completion of incident reports must occur immediately after an incident occurring. All incident reports must be submitted immediately to the Laboratory Safety Officer who will conduct an investigation into the incident and initiate any immediate action. All incident reports will be tabled at meetings of the Monash Platforms Safety Committee where further action/responses can be considered.

## **Visitors**

Visitors to FlowCore facility must notify a FlowCore staff member before entry to the laboratories. The visitor must identify themselves and the purpose of their visit. A FlowCore staff member must escort visitors into the facility, and the visitor remains the responsibility of that staff member at all times during the visit. This includes family and friends of employees, visiting scientists and company representatives.

Persons under the age of 16 years old are not permitted into the PC2 section of FlowCore at any time.

## **Facilities and Services staff / Contractors**

All Facilities and Services staff / contractors are required to contact FlowCore prior to their visit, and notify FlowCore of all works to be undertaken within the facility.

All contractors that are required to perform work in the FlowCore facility must receive instruction and complete a Local Area Induction; to be provided by the FlowCore Manager or Safety Officer. Specialist contractors who are required to service/repair a single piece of equipment must report to the FlowCore Manager before entering the facility. The FlowCore Manager will escort the contractor to the area where the contractor's services are required. The contractor will receive instruction on any hazards and risks of the area in which they will work. Contractors must demonstrate an understanding of the hazards and risks present in the area before they can commence work. All works must be supervised by a FlowCore staff member, unless otherwise arranged and approved.

## **Children in laboratories**

Under no circumstances are children permitted to enter any laboratory area at any time, regardless of whether they are accompanied by a parent or guardian. There can be no possible justification for exposing children to the hazards of a laboratory. A child is a person under 16 years of age.



## After hours work

The operational hours of the FlowCore facility are from 8.00 am to 6.00 pm Monday to Friday (excluding Monash holiday dates). Any access or use of the FlowCore facility outside of the operational hours must be in accordance with the After Hours surveillance and reporting procedures of Monash University (Monash University Staff and Students).

## First Aid Kit & Trained First Aid Personnel

A St John Ambulance Australia First Aid Kit is located in the FlowCore PC2 facility. Contact details of trained First Aid personnel are clearly displayed on the front of the First Aid kit and on the Safety notice board adjacent to the First Aid Kit.

Any incident (potential or actual) involving personal injury, chemical spill, equipment failure etc must be reported using the Monash University S.A.R.A.H system.

## Fire & Fire Evacuation

### Raise the Alarm

1. **IF SAFE TO DO SO** Ensure the immediate safety of anyone within the vicinity of the fire.
2. Break the nearest fire Break Glass Alarm (located next to the Fire Escape stairs) which automatically notifies the Fire Brigade & Security.

**OR**

3. Phone Security (dial **9905 3333** or use the Red Emergency phone). Give your name, Building No. 75, level 2 North, room number (R276, 277 or 270), type and extent of fire, etc. Inform the FlowCore manager or fire warden if safe to do so.
4. Evacuate the immediate area.

### Fire Fighting

5. **IF SAFE TO DO SO** and **ONLY IF TRAINED IN THE USE OF THE EQUIPMENT** attempt to extinguish the fire.

### Evacuation

6. **DON'T PANIC.** On hearing the **ALERT** signal (an intermittent beep) prepare to leave the facility – shut down experiments, equipment etc.



7. On hearing the **EVACUATE** signal (a whooping tone), or if instructed to do so by a Fire warden, leave the building **by the nearest and safest exit route** (The Fire warden will direct you to this exit).

Assist any person with a disability to leave the building, or to the nearest fire isolated stair or fire safe haven- do not attempt to carry people down stairs.

8. Walk quickly and calmly to the designated assembly area for Building 75 or as advised by the Fire warden or Fire Brigade personnel.

### 9. DO NOT USE THE LIFTS

10. Close doors as you exit – **DO NOT LOCK DOORS**

11. Remain at the assembly area until instructed to leave by the Fire Warden or Fire Brigade personnel. Do not re-enter the building until informed that it is safe to do so.

## Manual Handling & Ergonomics

Manual handling covers a wide range of activities including lifting, pushing, pulling, holding, throwing and carrying. It also includes repetitive tasks such as typing, cleaning, sorting, pipetting and operating equipment.

Unsafe manual handling may cause a range of injuries and conditions including;

- Muscle sprains and strains
- Injuries to muscles, ligaments, inter-vertebral discs and other structures in the back
- Injuries to soft tissues such as nerves, ligaments and tendons in the wrist, arms, shoulders, neck or legs.
- Abdominal hernias
- Chronic pain

In the Manual Handling Regulations, all of these conditions are referred to as musculoskeletal disorders or injuries (MSD).

FlowCore has an obligation to provide and maintain a safe and healthy workplace. As part of this obligation, FlowCore is committed to eliminating, or if that is not reasonably practicable, to reduce the risk of musculoskeletal injuries throughout the facility.

Ergonomics is a key step to reducing musculoskeletal injuries. Ergonomics is essentially about fitting work to people. It's the process of designing or arranging workplaces, products and systems so that they fit the people who use them. Flowcore has a number of ergonomic tools such as footrests and

adjustable chairs to aid users whilst operating equipment throughout the facility.

**FlowCore users must practice good ergonomics by adjusting chairs and footrests before operating equipment in the FlowCore facility.**

**FlowCore encourages users to take regular breaks while using the facilities' equipment. Users are encouraged to reserve sufficient time on FlowCore equipment to include regular breaks to prevent musculoskeletal injuries.**

### **Handling of Biohazardous Materials**

- All users are required to wear lab coats and appropriate PPE when working in the FlowCore PC2 laboratories.
- All biological materials must be transported inside a non-porous, closed container with lockable lid.
- All sample tubes or vesicles containing biological or chemical materials must be securely capped / have lids in place.
- When using gloves at each workstation, users **must** cover computer keyboard with plastic wrap provided.
  - Plastic wrap and gloves must be disposed of at the completion of each experiment in the biohazard bins provided.
- All workstations **must** be decontaminated by the user at the completion of each experiment, using 70% ethanol or Tasgene (dilution 1:40).

## Laser Safety



<http://en.wikipedia.org/wiki/Image:Laser-symbol.svg>

The Flow Cytometry instruments use Laser light emitting devices during standard operating conditions. The FlowCore lasers have been classified by the manufacturer as Class 3b and Class 4 as described below. Never look directly into the laser light source or at scattered laser light from any reflective surface. Never sight down the beam into the source. Never attempt to remove the protective covers surrounding the laser light source. Never intercept the laser beam with any object, for any reason.

A person exposed to laser [radiation](#) (especially invisible radiation) may be unaware that damage is occurring. Some lasers are so powerful that even the [diffuse reflection](#) from a surface can be hazardous to the eye. Laser radiation predominantly causes eye injury via thermal effects on the retina. A transient increase of only 10 °C can destroy retinal [photoreceptors](#). [http://en.wikipedia.org/wiki/Image:Human\\_eye\\_cross-sectional\\_view\\_grayscale.png](http://en.wikipedia.org/wiki/Image:Human_eye_cross-sectional_view_grayscale.png) [http://en.wikipedia.org/wiki/Image:Human\\_eye\\_cross-sectional\\_view\\_grayscale.png](http://en.wikipedia.org/wiki/Image:Human_eye_cross-sectional_view_grayscale.png)

The [coherence](#), the low divergence angle of laser light and the focusing mechanism of the eye means that laser light can be concentrated into an extremely small spot on the [retina](#). If the laser is sufficiently powerful, permanent damage can occur within a fraction of a second, faster than the blink of an eye. Sufficiently powerful visible to near infrared laser radiation (400-1400 [nm](#)) will penetrate the eyeball and may cause heating of the retina, whereas exposure to laser radiation with wavelengths less than 400 nm and greater than 1400 nm are largely absorbed by the cornea and lens, leading to the development of [cataracts](#) or [burn](#) injuries.





## Laser Classification

The classification of a laser is based on the concept of *accessible emission limits* (AEL) that are defined for each laser class. This is usually a maximum power (in W) or energy (in J) that can be emitted in a specified wavelength range and exposure time. For infrared wavelengths above 4  $\mu\text{m}$ , it is specified as a maximum power density (in  $\text{W}/\text{m}^2$ ). It is the responsibility of the manufacturer to provide the correct classification of a laser, and to equip the laser with appropriate warning labels and safety measures as prescribed by the regulations. Safety measures used with the more powerful lasers include key-controlled operation, warning lights to indicate laser light emission, a beam stop or attenuator, and an electrical contact that the user can connect to an emergency stop or interlock.

### Class 1M

**LASER RADIATION  
DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS  
CLASS 1M LASER PRODUCT**

A Class 1M laser is safe for all conditions of use except when passed through magnifying optics such as microscopes and telescopes. Class 1M lasers produce large-diameter beams, or beams that are divergent. The MPE for a Class 1M laser cannot normally be exceeded unless focusing or imaging optics are used to narrow the beam. If the beam is refocused, the hazard of Class 1M lasers may be increased and the product class may be changed. A laser can be classified as Class 1M if the total output power is below class 3B but the power that can pass through the pupil of the eye is within Class 1.

### Class 2

**LASER RADIATION  
DO NOT STARE INTO BEAM  
CLASS 2 LASER PRODUCT**

A Class 2 laser is safe because the [blink reflex](#) will limit the exposure to no more than 0.25 seconds. It only applies to visible-light lasers (400–700 nm). Class-2 lasers are limited to 1 mW continuous wave, or more if the emission time is less than 0.25 seconds or if the light is not spatially coherent. Intentional suppression of the blink reflex could lead to eye injury. Many [laser pointers](#) are class 2.

**Class 2M**

**LASER RADIATION  
DO NOT STARE INTO BEAM OR VIEW  
DIRECTLY WITH OPTICAL INSTRUMENTS  
CLASS 2M LASER PRODUCT**

A Class 2M laser is safe because of the blink reflex if not viewed through optical instruments. As with class 1M, this applies to laser beams with a large diameter or large divergence, for which the amount of light passing through the pupil cannot exceed the limits for class 2.

**Class 3R**

**LASER RADIATION  
AVOID DIRECT EYE EXPOSURE  
CLASS 3R LASER PRODUCT**

A Class 3R laser is considered safe if handled carefully, with restricted beam viewing. With a class 3R laser, the MPE can be exceeded, but with a low risk of injury. Visible continuous lasers in Class 3R are limited to 5 mW. For other wavelengths and for pulsed lasers, other limits apply.

**Class 3B**

**LASER RADIATION  
AVOID EXPOSURE TO THE BEAM  
CLASS 3B LASER PRODUCT**

A Class 3B laser is hazardous if the eye is exposed directly, but diffuse reflections such as from paper or other matte surfaces are not harmful. Continuous lasers in the wavelength range from 315 nm to far infrared are limited to 0.5 W. For pulsed lasers between 400 and 700 nm, the limit is 30 mJ. Other limits apply to other wavelengths and to [ultra-short pulsed](#) lasers. Protective eyewear is typically required where direct viewing of a class 3B laser beam may occur. Class-3B lasers must be equipped with a key switch and a safety interlock.

**Class 4****LASER RADIATION  
AVOID EYE OR SKIN EXPOSURE TO  
DIRECT OR SCATTERED RADIATION  
CLASS 4 LASER PRODUCT**

Class 4 lasers include all lasers with beam power greater than class 3B. By definition, a class-4 laser can burn the skin, in addition to potentially devastating and permanent eye damage as a result of direct or diffuse beam viewing. These lasers may ignite combustible materials, and thus may represent a fire risk. Class 4 lasers must be equipped with a key switch and a safety interlock.

**Appendix 1****Monash University Staff Only****After Hours Procedure**

24 hour Access to the FlowCore facility will be granted to Monash University staff and students, as well as approved external users under the following conditions:

- There must be two or more personnel in attendance in the FlowCore facility outside of normal operating hours (i.e. when FlowCore Staff are not in attendance).
- Users of the facility should note the locations of the FlowCore facility telephones, First Aid kit, Spill kits and other emergency equipment.
- In the event of emergency, dial **3333** for assistance.