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## **Information for employees and students working at the Faculty of Science (W&N)**

*This AMD information sheet describes how to choose what personal protection measures you need to take, and what other safety equipment is already present or necessary for working safely.*

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### **1 Several types of safety equipment**

Safety equipment may be divided into safety devices and personal protection equipment (PPE).

PPE are equipment carried on your body, such as a lab coat and safety glasses or goggles. They do not reduce any risks, but protect against injuries. Therefore, you should only choose for PPE if there are no other options to increase safety *or* to reduce the remaining risks. Always first look for other means to reduce the risk. This applies especially to research into physics: After all, many risks can be eliminated by proper design of the set-up, taking safety aspects into account. Please also look at [AMD information sheet RhL010 Research risk assessment](#).

Safety devices are standard devices that should be present in a room. These include mobile devices such as fire extinguishing and first-aid equipment, fire resistant cupboards, but also fixed devices build into buildings, such as fumehoods (ventilation and exhaust devices), smoke detectors, and emergency showers.

### **2 Personal protection**

The choice of personal protection equipment (PPE) depends on the type of work and the type of laboratory. All PPE should carry the CE mark. Any PPE that are provided by the employer, must be used. Therefore, take ergonomics and comfort in use into account in your choice of PPE, and make sure that all PPE work well together. PPE that do not fit or are uncomfortable in use, remain in the cupboard and do not protect! Please also consider that the state the PPE are in is of importance too. In principle, PPE are meant for one single person. If several individuals use the same PPE from time to time, hygiene and maintenance play a role too. If this applies, please appoint one person as the one responsible for check-ups and cleaning of the PPE, and make sure to replace worn-out PPE in time. The obligation to wear PPE is indicated with [mandatory signs](#) on the door leading into a room.

***Did you know:*** Many incidents happen when people think: "I JUST have to ...", and then do things without the proper personal protection!!

When working with chemicals, a first requirement is wearing safety glasses, lab coat, long trousers, and feet-covering shoes (even if the weather outside is beautiful!) Always start with the principle: "Yes, unless... ." In other words: Can you think of a reason why you should NOT have to wear an item? Carry long hair in a pony tail. If you're wearing a headscarf, then please choose a non-synthetic material for it (for example, cotton), considering fire hazards, when doing

practical work. Please also make sure that any loose ends are well tucked in under the lab coat. If these are not, they may get caught in spinning parts of equipment, or end up hanging in chemicals.

In the following you will find a description of several types of PPE to help you with a well-considered choice for (or against!) a certain PBM. A basic principle is that PPE should never increase any risks. In case of any doubt, please contact the AMD.

## 2.1 Lab coats

A lab coat protects skin and clothing against hazardous substances. In case of emergency it can be taken off quickly. The lab coats used by our Faculty are made of cotton and, therefore, fire retardant. Lab coats are available at the Gorlaeus' depot. Dirty lab coats may be deposited there in laundry bags, and clean lab coats can be picked up there too. Students provide their own lab coat.

In rooms in which people work with GMOs (ML-I, ML-II, etc.) or radiation, everyone must wear a special lab coat. To prevent contamination outside the rooms, you must take off said lab coat before leaving the laboratory. If you are going work with GMOs, ask for a **green labelled** lab coat; if you are going to work with radiation, ask for a **red labelled** lab coat at the depot.

## 2.2 Eye protection



Safety glasses



(Wide vision) safety goggles



Face shield



Laser safety glasses

Attention points by choosing safety glasses.

View: Make sure that your eyes can rotate in all directions without a major obstacle in the visual field.

Stability: Make sure that the safety glasses stays in place on the head and don't fall off with a (rapid) movement of your head.

Coverage: Make sure that the safety glasses cover the soft tissue around the eyes and connect well with the face.

Normal safety glasses protect the eyes against splashing or dusting of hazardous substances, but also against shards that may form when glass breaks. Wearing safety glasses is mandatory, when this is indicated by a pictogram on the door of the lab or when agreements have been made within the group about wearing safety glasses and when a riskassessment of an experiment tells you you need to wear safety glasses. Wearing safety glasses in a chemistry or biology lab is advisable in general, *also* when working with buffers, gels, etc. **(You can try different glasses at the warehouse of the FMD).**

*If you get a buffer in your eyes, damage may occur due to the lowered/heightened pH. Flushing will not really help much!*

If you normally wear glasses you can use “over-the-glasses” (transfer) safety glasses that cover your own glasses **(You can try different glasses at the warehouse of the FMD)**. If you are in long-term employment and you have to wear safety glasses daily, please ask your superior permission to order prescription safety glasses. You will need an order form available at the [faculty’s purchaser](#).

Modern safety glasses fit the face quite well. However, if you would like more insurance against splashing of, for example, strong acids and bases, then please use (wide vision) safety goggles. Does your entire face need protection? If so, use a face shield.

Laser safety glasses must protect against the wavelength(s) that are used, and reduce the laser’s impact. Make sure to choose the proper wavelength(s) and calculate the proper protection factor according to NEN-EN-207:2010 (or NEN-EN-208:2010 for laser adjustment safety glasses). Please note: The American OD from the ANSI standards does not always provide the same results!

### **2.3 Foot protection**

If you are going to work with hazardous substances or pathogens, please wear feet-covering shoes, preferably leather ones. These act as an extra barrier and prevent tissue damage (i.e. injury) after spillage.

If you are going to work with cryogenics, for example, if you need to tap nitrogen or helium, then also please make sure to wear feet-covering shoes. If you are wearing boots, then cover them with your trousers to make sure no cryogenics can spill into your boots!

In the animal research facilities overshoes/overboots are mandatory. On the one hand they keep you from carrying dirt into the facilities, on the other hand they prevent the spreading of laboratory animal allergens to the outside.

To employees who carry out technical work in workshops or at location, or who frequently work with mobile equipment (carts, and such), safety shoes are provided of the proper safety class.

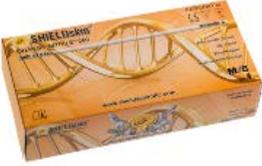
## 2.4 Hand protection

Work safety regulations in The Netherlands require that the university, in its role as employer, must provide proper protection equipment, but as an employee/student of the university you yourself are required to perform a risk assessment of your activities in advance (!) to take suitable and effective measures.

### What types of gloves may be used

There are 4 types of gloves that may be used in chemical and biological work, each with a specific, recognizable color. The glove types that are allowed and their suitability are shown in table 1 below: Glove type summary.

**Table 1; Glove type summary**

Glove	Identification	Application
<p><b>Patron Safety: Soft nitril –powder free</b> Material: nitrile 2.5mils/3.5g</p>	  <p><b>Glove color: blue</b></p>	<p>No or hardly any personal protection, meant for protecting a product. <b>Offers no chemical protection at all.</b></p>
<p><b>Shieldskin ecoSHIELD eco nitrile 250</b> Material: polychloroprene/nitrile category III PPE, AQL 0.65 G1 Extensively tested for chemical permeation (EN 16523-1:2015 supersedes EN 374-3:2003)</p>	  <p><b>Glove color: green</b></p>	<p><b>Chemically resistant.</b> Permeation times vary depending on the substance. <a href="#">Please look here for permeation times of substances tested by Shieldskin</a></p>
<p><b>Shieldskin Orange Nitrile 260</b> Material: nitrile/polychloroprene category III PPE, AQL 0.65</p>	  <p><b>Glove color: orange</b></p>	<p><b>Limited chemical resistance;</b> not suitable for solvents, suitable for some acids and bases. <a href="#">Please look here for permeation times of substances tested by Shieldskin</a></p>

<p><b>Microflex 93-260</b>  Material: nitrile/neoprene composite, 0.19mm  SATISFIES ASTM D 3577, TYPE II, PBM 89/686, EN 420, 388 &amp; 374  Category III PPE</p>	 <p>EN 374  A D F</p> <p><b>Glove color: green/blue</b></p>	<p><b>High chemical resistance.</b>  Permeation times vary depending on the substance.  See permeation times: <a href="#">Microflex 93-260</a></p>
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**More information:**

Information how to use safety gloves see AMD-information sheet Rhl020a *glove information for users*.

Information how to order safety gloves see AMD-informative sheet Rhl020b *ordering gloves*

Information over safety gloves for supervisors see AMD-information sheet Rhl020c *glove information for managers and supervisors*.

**Other types of gloves:**

There are special thermally insulating gloves for working with very hot or cold substances/objects on the market. Think of handling cryogenics (please, think of long cuffs!) and retrieving materials out of ovens. These gloves are often meant for general use in the department. Please appoint a person responsible who will make sure the gloves will be replaced in time.

In addition, there are gauntlets that protect against damage from sharp or rough surfaces. Always use these kinds of gloves (or a cloth) when removing any pieces of glassware that are stuck.

**2.5 Hearing protection**

If the noise at the work place amounts to >80 dB(A) (harmful noise), you should be provided with hearing protection, and from 85 dB(A) you are required to wear hearing protection to prevent damage to the hearing. Depending on the noise level, time of use, amount of dirt in the surroundings, and comfort, a choice can be made for soft disposable ear plugs or ear muffs. In some cases, employees who frequently work in harmful noise or bothersome noise (in the sense of being unable to concentrate), may apply for personal customized otoplastics. Otoplastics require maintenance by the user and need to be recustomized periodically by the supplier. Therefore, please keep records of employees with otoplastics to keep track of replacement dates.



**Rule of thumb:**  
Do you need to raise your voice to be heard at a distance of 1 meter? If so, the noise level is  $\geq 80$  dB(A) ! This is considered harmful noise.

Disposable earplugs  
Protection 10-15 dB(A)

Ear muffs  
Protection ca. 20-25 dB(A)

Otoplastics in ear  
Protection adjustable to 20-30 dB(A)

In working with ultrasonic sounds ear muffs are mandatory. These need to be cleaned periodically and at those times it should be verified that the rubber foam is still in working condition. Please appoint a person responsible for this. Furthermore, please keep in mind that (ultrasonic) noises may be harmful to the unborn child, who you cannot protect. Pregnant women should, therefore, avoid areas with ultrasonic and harmful noises. Employees who are exposed to harmful noise are periodically called in by the medical officers for a hearing check-up. For further information, please refer to AMD information sheet [VOM070 Noise](#).

## 2.6 Respiratory protection

If all is normal, you do not require respirators in a laboratory environment, besides from a dust mask now and then when weighing powders. The proper solution for breathing protection is working in the fumehood. In case of [calamities](#) during which substances are released outside of the fumehood, you must evacuate the lab and call in the emergency response team (BHV team). The respirator mask wearers in the BHV team may then take measures.

Are there specific actions, such as spraying with crop protection substances, or replacing gas cylinders with very toxic gasses, for which you think you may need breathing protection equipment? Then please first contact the AMD for the selection of a proper type and a work protocol.

## 3 Safety devices

In the following you will find a description of safety devices that should be present in (or near) the lab in all cases. Use of any safety devices and the corresponding incident should be reported immediately to the AMD using the [university's report form](#).

### 3.1 Eye wash bottles

In every lab in which people are working with chemical or biological agents, an eye wash bottle should be present. It should be ready for use (plastic removed!) and at a fixed spot, preferably to the right of the washbasin, so everyone will be able to find and open it blindly in case any hazardous substances ended up in an eye. Starting the flushing immediately is vital to limit damage to the eye as much as possible. Always call the internal alarm number too, and report that substances ended up in an eye. The emergency response team (BHV team) will come with a mobile eye shower with which further flushing can be performed. The eye wash bottle is only a temporary solution.

When the expiry date of the eye wash bottle has passed, you can get a new bottle at the Gorlaeus depot (for free). The bottles are meant for one use only, and cannot be reused when opened.

### 3.2 Emergency shower

The emergency shower or safety shower is a device that may be used when people are on fire or if chemicals have been spilled on a person. Take off contaminated clothing (if possible/safely) quickly to prevent further contamination in case of a chemical spill. In case of burns, always leave clothes on to prevent worsening of skin damage! The emergency showers are located in the corners of the hallways outside the labs, and should always be accessible without any obstacles. Please make sure you know where to find the emergency shower nearest to you, and keep the surrounding area free of clutter.

### 3.3 Plaster kits and anti-HF (hydrogen fluoride) emergency kits

In a number of laboratories on each floor you may find "plaster kits" (limited first-aid kits). The AMD takes care of the contents of the plaster kits, and makes sure the expiry dates of the dressing materials are monitored. If you need more than a plaster, you are supposed to [call in the first aid /emergency response team](#). They have the disposal of a full first-aid kit.

If you are going to work with hydrogen fluoride, an anti-HF emergency kit should be present. Without the anti HF-kit and the corresponding training you are not allowed to work with HF (or other fluoride generating substances.) You should report to the AMD first.

Rooms in which plaster kits and safety kits are present, are recognizable by a pictogram on the door, like the one to the right.





### 3.4 Fire detection and fire extinguishing devices

All laboratories are provided with automated smoke detectors. When these detect smoke, the evacuation alarm is sounded and the emergency response team (BHV team) and fire department are called in immediately.

All laboratories contain suitable fire extinguishers. If applicable, you may use these to extinguish a starting fire yourself. If you were able to put out a fire by yourself, please report the use of the fire extinguisher, including its location, to the AMD.

If the fire is bigger, immediately report it by activating a manual alarm (red box on the picture to the left), or calling the internal alarm number. The manual alarm may be found in the hallways together with a hose reel and fire extinguisher.

Any fire extinguishing equipment should be easily accessible at all times. Therefore, never put objects, such as boxes, carts, or furniture in front of a fire extinguisher, and do not hang (lab) coats in front of (or over) these.

### 3.5 Gas detection

Due to toxic or flammable gasses used in research, gas detection equipment may be a requirement. The equipment may consist of a permanent system and/or a mobile detector that is kept on your person. The necessity is determined by performing a [risk assessment of the set-up](#). When using suffocating gasses, such as nitrogen and helium, in small or badly ventilated rooms, oxygen monitoring may be required. Furthermore, please keep in mind that for the proper functioning of detection systems [properly calibrated equipment](#) is vital. This means that a maintenance contract with the supplier is a necessity. Rooms with toxic gasses must be recognizable by a [room warning sign](#) with an exclamation mark.

### 3.6 Fire resistant cupboards

Liquid flammable chemicals and toxic chemicals should be kept in sealable, ventilated, 90 minute fire resistant cupboards (often referred to as “yellow cupboards”, although they are often grey nowadays). These cupboards are first and foremost an environmental provision. They have in-built overflow reservoirs and are self-sealing in case of fire, to prevent the immediate release of a large number of hazardous substances in case of fire. These cupboards need to be registered in a maintenance contract by the institute through the purchases department. Please read more about the storage of chemicals in [AMD-information sheet VOM014 Storage of hazardous substances](#).

### 3.7 Ventilation devices

Proper ventilation devices are very important to laboratory safety. The fumehood is the best known ventilation device for working with hazardous substances, just like the microbiological safety cabinet for biological work. However, sufficient room ventilation is important too. In addition, some equipment requires local exhaust provisions. In the Huygens complex there is an off-gas conduit. The functioning and application of these types of ventilation are described in [AMD Information sheet RhL022 Ventilation and exhaustion](#) and [RhL023 The fumehood](#).