

<p>SAFETY REGULATION VV01</p> <p>Provision and use of Personal Protective Equipment</p>	 Balen/Pelt
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SAFETY REGULATION VV 01

**The provision and use of
Personal protective equipment (PPE)**



Balen/Pelt

1 PURPOSE

This Safety Regulation describes the requirements for Personal Protective Equipment (PPE) when working on the Nyrstar Belgium sites.

The requirements are subject to a layering:

- the basis is formed by the Standard PPE,
- in addition, department specific PPE is prescribed. These are listed per department;
- additional requirements may follow from risk analyses. This regulation contains a number of principles that must be followed.

2 SCOPE

The requirements of this safety regulation apply to the premises of Nyrstar Belgium.

3 DEFINITIONS

A personal protective equipment (PPE) is any equipment that, subject to regulatory exceptions, is intended to be worn or held by the worker in order to protect him from one or more risks that may threaten his safety or health at work, as well as any additions or accessories that may contribute to this.

4 REGULATION

4.1 Standard PPE

Within the zones of the production¹ facilities, at least the standard PPE must always be worn. These include:

- Close fitting Safety glasses
- Safety helmet (according to EN397)
- Safety footwear minimum type **S3**
- Closed clothing with long sleeves and long pants with increased visibility through striking colors and reflective bands.
- Gloves

¹ The 'zone of production facilities' means from the time you are on the site, carry out work, come in production departments and workshops and come into an environment where there are dangers. When in doubt whether one is within the zone, one should assume that one is within the zone.

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When carrying out work, the clothing must be sufficiently resistant to the action of acid and chemicals. Safety footwear should then be of a semi-high type.

Outside the areas of the production installation, the above standard PPE must be worn in case the nature of the work entails risks that are higher than normal office work.

4.1.1 PPE during grinding work

In the case of **grinding work**, a **face shield** with the safety glasses underneath must be worn to protect the face. If the work does not allow the wearing of a face shield (e.g. lack of space), then at least dust goggles must be worn. The deviation must be noted on the work permit. Hearing protection should also be worn as standard during grinding work.

4.1.2 Exceptions

The requirement to wear standard PPE shall not apply in the following cases:

- when staying in office spaces, control room, etc. Wearing heavily contaminated work clothes is not allowed in these areas.
- workers travelling to and from the workplace as part of their commute, provided that they use the red walkways.

For groups of visitors who do not enter risk zones, the requirements can be weakened in accordance with the risk. The condition is that the footwear is sufficiently sturdy (no stiletto heels, slippers or open shoes).

For work in maintenance workshops where no lifting work is carried out or other risk factors, the safety helmet does not have to be worn.

Other exceptions should be included in the department specific PPE matrix.

4.2 Department specific PPE

Each Nyrstar department, in collaboration with the safety department, has compiled a list of **Department specific PPE**. These lists are based on the principle that PPE is permitted as protection if source measure or collective protection is not feasible. The department specific PPE relates to both the mitigation of risks from the environment and risks arising from the work. The list of Department Specific PPE includes mandatory requirements for both the employees of the department and third parties who carry out work within the department. In the latter case, the requirements are communicated to the executors through the process of granting the work permit.

4.3 General requirements for additional PPE

The following requirements apply in general terms to the choice of required PPE. When the Department Specific PPE was adopted, these requirements were already taken into account where

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relevant. When drawing up a risk analysis, the requirements must be used. Here too, PPE may only be used if source measures or collective protection are not reasonably feasible.

4.3.1 Respiratory protection

In case of exposure to hazardous gases, vapours or dust particles, adequate respiratory protection should be worn. As general rule, respiratory protection should be worn at expected concentrations of 50% of the MAC (maximum allowable concentration) value. When choosing the type of respiratory protection one should take account of the content of **Annex 1**.

4.3.2 Hearing protection

Hearing protection should be worn at exposure above 85 dB(A). Both the noise level of the environment (to be checked via the so-called sound plans) and of the work must be taken into account.

4.3.3 Foot protection

Metatarsal protection can always be worn during frequent handling with heavy objects (e.g. cathode plates, zinc plates, maintenance work, etc.). In case of high-pressure cleaning (at a pressure > 150 bar), high-pressure boots should be worn. In case of high pressure cleaning, see VV 14 Rinsing - Cleaning, §4.1.4

4.3.4 Possible contact with acid or leach

See Safety regulation 20: [Risk of contact with acids/bases](#)

4.3.5 Possible contact with hot mass or liquid metal

Work in the vicinity of hot mass (e.g. calcine in the furnace) or liquid metal should be avoided as much as possible. If this is not possible, collective protection (e.g. shielding wall) should be sought. If that is also not possible, then one should use the following PPE.

PPE requirements in the vicinity of liquid metal:

- Clothing based on 100% cotton
- In case of presence in the vicinity (< 3 meters) one must at least
 - wear a face shield
 - Neck protection/neck flaps (monk's cap)
 - Shoes with heat protection gaiters
 - Depending on the work : Apron or other resistant clothing (aluminized or leather)

[PPE requirements in the vicinity of hot mass are included in the department specific PPE matrix according to the task.](#)

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For all non-specifically described situations, such as welding work, HP (high pressure) cleaning, exposure to the risk of falling, etc., the appropriate PPE must be chosen on the basis of a TRA

4.4 Requirements to be observed when using PPE

PPE should be used in accordance with legal requirements. Specifically (but non-restrictive) the following points are cited.

- The user must use the PPE in accordance with the instructions;
- The user must ensure that the PPE is kept clean and stored correctly;
- No changes or adjustments may be made to PPE.

The user's employer is responsible for ensuring that the user is instructed in the use of the PPE, is (medically) suitable for their use and is provided for supervision of correct use. This regardless of who provided the PPE.

In the event of a dispute about the PPE to be used, advice should be sought from Nyrstar's safety department. This advice is binding for the further approach.

4.5 Provision of PPE

Nyrstar employees (own employees and interims) must use the range of PPE available in the warehouse (order via SAP MM). Alternatives may only be used after consultation with the safety department. When selecting new PPE or PPE for new tasks, the selection shall be as set out in **Annex 2**.

Contractors shall, at their own expense, provide the standard PPE + the PPE to cover the general risks arising from the execution of the works and are not specific to Nyrstar's activities. Examples (not exhaustive):

- Protective workwear, safety shoes or boots, helmet, close fitting safety goggles
- Welding hood, welding clothing
- Fall protection
- Respiratory protection required from the works (e.g. when using solvents, dust formation during grinding)
- Face shield (for example during grinding work!)
- Protective clothing HD spraying
- Hearing protection
- Gloves

Nyrstar is responsible for the PPE that serves to address the risks arising from Nyrstar's processes. Examples (non-restrictive):

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- when working with possible contact with acid: acid-resistant clothing (overalls / gloves, etc.), acid glasses. Neutralizing agent (BUMB) as a first aid in contact with acid.
- In case of possible contact with ores, roasting dust formation/dusty environment: P3 respiratory protection, protective overall
- Respiratory protection when exposed to gases from Nyrstar's processes. This can be half face mask, full face mask with filters appropriate to the risk or independent respiratory protection.

Some items are provided on loan and must be returned after the work has been completed. These materials are then taken back in, cleaned, checked and made available again after use.

5 ANNEX 1: GUIDANCE ON THE CHOICE OF RESPIRATORY PROTECTION

1. Protection against dust

If there is (expected) exposure to dust in visible concentrations, protection must be worn against this.

For dust filters (particle filter) there are three classes to distinguish namely P1, P2 and P3. In addition to dust, dust filters also offer protection against liquid particles.

Filter type	Colour band by filter	Field of application
P1, FFP1	White	SHOULD NOT BE USED!
P2, FFP2	White	Should only be used after RA
P3, FFP3	White	All other cases where inhalation of toxic dust is possible These are the following toxic substances: zinc concentrate (ore), roasting material (calcine), cadmium-containing dust, welding fumes, lead dust, lead zinc dust, acid mist, BLP dust, cobalt cake dust, copper cake dust, manganese dioxide (brownstone) dust, lead silver dust

FF= "fitting facepiece" or maintenance-free disposable masks

The useful life or **deciding** time of the dust filter is achieved if a form of breathing resistance becomes noticeable in the mask. Also with excessive perspiration and very humid breathing air such as e.g. cold, disposable masks / muzzles can become saturated earlier, so replacement may be

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necessary for hygienic reasons. On the other hand, if the masks are dirty on the inside (due to hand contact or due to pollutants,..) replacement is mandatory.

2. Protection against gases and vapours

If there is exposure to gases or vapours, protection can be provided by means of a gas filter or combination filter. The choice of the type of filter depends on the nature of the substance against which it provides protection. For this purpose, color codes (visible as a band on the filter) and letters with the following meaning are used.

Type of filter	Colour band by filter	Field of application
A	Brown	Organic vapours and solvents with boiling point > 65°C, ethanol, acetic acid
AX	Brown	Organic vapours and solvents with boiling point < 65°C.
B	Grey	Inorganic gases and vapours : hydrogen sulphide gas H ₂ S, chlorine gas Cl ₂ , acetic acid, hydrochloric acid HCl, nitrogen dioxide NO ₂ , NaHS liquid (H ₂ S)
E	Yellow	Sulphur dioxide gas SO ₂ , sulphurtrioxide SO ₃ , hydrochloric acid HCl , formic acid, acetic acid, and other acid-reacting substances
K	Green	Ammonia gas NH ₃ and organic ammonia compounds
CO	Black	Carbon monoxide (better protection is independent with e.g. compressed air bottles)

Combination filters

Hg P3	Red-white	Metallic mercury vapour and mercury-containing dust, calomel
NO-P3	Blue-white	Nitrogen oxide gases: nitrogen dioxide NO ₂ and nitric oxide NO
FFP2 + layer of activated carbon	Blue mask	Protection against acid gases thanks to a layer of activated carbon. (Zinc Halls)

A common type of filter is the ABEK, which therefore offers protection against organic gases and vapours, inorganic gases and vapours, acid vapours and ammonia.

The absorption capacity of gas filters are divided into three classes:

- Class 1: low capacity, concentrations up to 1000 ppm (0.1 volume%)

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- Class 2: medium capacity, concentrations up to 5000 ppm (0.5 volume%) and
- Class 3: large capacity, concentrations up to 10,000 ppm (1 volume%). With an A3 filter up to 8000 ppm.

The combination filters are not classified.



Figure: Example of a filter bus with encodings (color band, letter and class)

Saturation of the filters (= end of life) must be taken into account. Saturation will lead to the gas or vapor passing through the filter.

The service life of a gas filter depends on many factors:

- The nature of the gases/vapours to be removed which significantly determine the active useful life of a filter. Not all substances bind to activated carbon equally easily.
- A combination of different substances can negatively affect the useful life of a filter. The activated carbon has a preference for certain substances. So much so that it releases previously bound substances.
- High temperature and humidity have a negative impact. Especially if the filter is not properly sealed airtight, it continues to absorb pollution and water vapor from the ambient air. Shutting off a filter on both sides when not in use extends the service life.

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- With an already used filter that is saved for a subsequent "deployment", the contamination can move through the filter. This allows the contamination by the filter to end up in the mask on the next use.
- Due to the presence of product droplets/mist, activated carbon can be saturated faster. Therefore, in those situations, if possible, also use a P pre-filter.

The following rules are therefore best followed:

- Always respect the expiration date stated on the filter
- If a change of smell, taste or stimulus can be observed when inhaling, immediately replace the filter.
- If the breathing resistance increases, replace the filter (especially with dust filters)
- If the filter has become damp or wet, replace it (the filter will then become noticeably heavier)
- If a maximum duration of use is prescribed, always respect it (e.g. for Hg filters max duration of use = 50 h). This is therefore stated on the filter.
- In case of possible exposure to toxic gases without odor, it is best to replace the filter every time after use or use independent respiratory protection.
- If the filter is removed from the original packaging, always mention the date on the filter. If this is > 3 months old, the filter must be replaced.

3. Independent respiratory protection

In the event of exposure to high concentrations of gas or vapour with possible acute injury and exposure to hazardous gases or vapours in confined spaces, independent respiratory protection should be chosen. This can consist of fresh air hoods or breathing air equipment. For the enclosed and bounded space, the requirement is specified in the Confined Space Sheet

6 ANNEX 2: PROCEDURE FOR THE CHOICE OF PPE

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