

SAFETY REQUIREMENT 2 Working with hot mass or liquid metals	 Balen/Pelt
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1 PURPOSE

Nyrstar Belgium's installations work with hot mass (e.g. hot ores/calcine in the Roosterij) or liquid metals (lead, zinc, aluminium) at various locations. These pose specific risks, such as burns from direct contact or burns from splashing hot material after moisture inclusion.

2 SCOPE

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

3 DEFINITIONS

- Molten material: All liquids materials that are normally solid at ambient temperature.
- Materials at elevated temperatures that have the potential of causing significant burns; this includes, but is not limited to:
 - Solids such as metals at a temperature of at least 60°C.
 - Liquids (not normally solid at ambient temperature) with a temperature of at least 60. Hot gases or vapors are not included.

4 REGULATION

4.1 Risk of moisture inclusion

With moisture inclusion, steam is formed very quickly, it leads to an explosive volume increase.

4.2 Measures

Work involving exposure to hot masses or liquid metals should be kept to a minimum. A safe distance of at least 3 meters is maintained. If it is unavoidable that work will nevertheless be carried out within 3 meters, a risk analysis must be carried out aimed at:

- the possibility of source measures or collective shielding of the hazard,
- the use of appropriate PPE (see Safety Regulation 01),
- preventing moisture from being introduced through tools by preheating tools.
- Stored hot materials (> 60°C) should be marked as long as they have not cooled down.
- Materials returned to the melting furnace must be dry.

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4.3 Design requirements for hot mass or liquid metal installations

In the case of new construction of installations or major changes, the risks must be eliminated as much as possible from the design, taking into account the requirements set out in the Nyrstar technical standard TS 208 hot and molten materials.

- All installations with hot mass or liquid metals will be considered as critical systems and will be subject to a risk analysis.
- Based on the risk analysis, all reasonably foreseeable risks with potentially heavy or catastrophic consequences will be controlled by automatic shut down systems. (safety PLC, explosion eruption, large splash, overflowing of barrels...)
- In case of risk of falling into tank or bath with hot mass, parapet must be provided.
- In the event that there is a risk of stepping into a gutter through which hot mass passes, openings smaller than 8cm or an equivalent protection must be provided.
- Areas where molten material is processed will be designed to absorb a possible spill.
- Cleaning must be carried out in a safe manner.
- Installations where molten material is processed will have a ventilation system, vapour extraction and emergency ventilation to limit exposure.
- Transport routes and rail systems for containers with molten material will only be used for this application, if this is not possible, similar measures will be taken.
- Installations where molten material is used will have sufficient emergency exits.
- Water supply to installations for molten material will be limited (e.g. water cooling, emergency showers...)
- Installations with draining and pouring will be automated and controlled as much as possible from a safe distance as far as possible.
- Roof structures above pouring installations will be inspected annually.
- The procedures must be made available to the users and they must be trained accordingly.
- There should be a procedure to avoid explosions or contamination when alloys or other recycled material are melted. Such materials should always be preheated.
- Tools that will be used to work in molten material should be checked for the presence of moisture or preheated.
- Passing and working under gutters containing hot material is not permitted unless the necessary safety measures have been taken.
- When storing hot materials, the necessary signalization must be installed so that employees and visitors are informed of this danger.