

Unit ID: 1520

Domain

PYROMETALLURGICAL PROCESSING

Title:

**Monitor and maintain furnace gas
efficiency**

Level: 3

Credits: 8

Purpose

This unit standard is intended for those who carry out metallurgical processing operations. People holding credit for this unit standard are able to: Plan and prepare for plant and equipment operation; demonstrate knowledge relating to the operation of a furnace gas plant and systems; maintain efficient operation of furnace gas plant and systems; control furnace gas emissions; maintain efficient operation of furnace air injection system; monitor furnace feed materials; maintain plant and equipment efficiency; and complete duties pertaining to furnace gas operations.

Special Notes

1. Entry information:

Prerequisite

- 1449 - *Comply with health, safety and environmental rules and regulations pertaining to processing operations; or demonstrated equivalent knowledge and skills.*

2. Assessment evidence may be collected from a real workplace or a simulated workplace in which processing operations are carried out.
3. Safe working practices include day-to-day observation of safety policies and procedures and compliance with emergency procedures.
4. Specifications refer to any, or all of the following: manufacturer's specifications and recommendations, and workplace specific requirements.
5. Performance of all elements in this unit standard must comply with relevant regulatory, legislative, workplace requirements and/or manufacturers' specifications.
6. Regulations and legislation, including subsequent amendments, relevant to this unit standard may include but are not limited to the following:
 - Labour Act, No. 11, 2007
 - Mineral Act, No. 33, 1992
 - Mine Health and Safety Regulations, 1999
 - Regulations relating to the Health and Safety of employees at work, 1997 and all industry specific regulations, legislations, code of practice, or code of conduct.

Quality Assurance Requirements

This unit standard and others within this subfield may be awarded by institutions which meet the accreditation requirements set by the Namibia Qualifications Authority and the

Namibia Training Authority and which comply with the national assessment and moderation requirements. Details of specific accreditation requirements and the national assessment arrangements are available from the Namibia Qualifications Authority and the Namibia Training Authority. All approved unit standards, qualifications and national assessment arrangements are available on the Namibia Training Authority website www.nta.com.na.

Elements and Performance Criteria

Element 1: Plan and prepare for plant and equipment operation

Performance Criteria

- 1.1 Work instructions, including plans, specifications, quality requirements and operational details are obtained, explained, clarified and applied to the allocated task.
- 1.2 Safety and security requirements, including personal protective clothing and equipment are obtained from the site safety plan, workplace policies and procedures, explained, and applied to the allocated task.
- 1.3 Equipment, tools, attachments and accessories selected to carry out tasks are checked for consistency with the requirements of the job, their usability and any faults rectified or reported prior to commencement of work.
- 1.4 Visual pre-start checks are carried out to ensure equipment is ready for operation according to workplace procedures.
- 1.5 Environmental protection requirements are identified from the project environmental management plan and applied to the allocated task.
- 1.6 Work area is ventilated, inspected and prepared according to workplace procedures.

Element 2: Demonstrate knowledge relating to the operation of a furnace gas plant and systems

Range

Principal components include furnace gas plant system components; auxiliary systems; safety devices; and interlock systems.

Performance Criteria

- 2.1 The actions and conditions pertaining to a safe, healthy environment in the operation of a furnace gas plant are described.
- 2.2 The importance of maintaining furnace gas efficiency is described in terms of achieving specified production requirements.
- 2.3 Hazards and associated risks are identified through relevant risk assessment procedures.

- 2.4 The principal components, applicable to the plant, are identified and their functions described in terms of design and operational requirements.
- 2.5 The communication requirements pertaining to working in the plant are described.
- 2.6 Corrective actions, in case of sub-standard conditions and problems be encountered, are described.

Element 3: Maintain efficient operation of furnace gas plant and systems

Performance Criteria

- 3.1 Workplace hazards and associated risks are identified, minimised or eliminated according to workplace procedures and legislative requirements.
- 3.2 Plant and equipment start-up checks and procedures are carried out according to plant configuration and system requirements.
- 3.3 Air operated breathing equipment for furnace gas plant off-line entry is operated and maintained.
- 3.4 Distributed Control System (DCS) is monitored and controlled according to workplace procedures.

Element 4: Control furnace gas emissions

Performance Criteria

- 4.1 Workplace hazards and associated risks are identified, minimised, eliminated or reported according to workplace procedures and legislative requirements.
- 4.2 Plant and equipment start-up checks and procedures are carried out according to plant configuration and system requirements.
- 4.3 Accretion build-up removal equipment is monitored and operated to ensure efficient operation of air injection equipment.
- 4.4 Furnace feed chutes are monitored for blockages and maintained to ensure optimum production.
- 4.5 Samples of molten metal are taken to confirm molten metal quantity and condition of molten metal bath.
- 4.6 If necessary, corrective and/or reporting actions are taken according to workplace procedures.

Element 5: Maintain efficient operation of furnace air injection system

Performance Criteria

- 5.1 Workplace hazards and associated risks are described, identified, minimised or eliminated according to workplace procedures and legislative requirements.

- 5.2 Plant and equipment start-up checks and procedures are carried out according to plant configuration and system requirements.
- 5.3 Furnace conditions and operations are monitored to identify the correct, efficient operation of the furnace air injection equipment, and reported to control room.
- 5.4 Furnace inefficiencies and furnace air injection equipment are identified and changed or replaced, where necessary, ensuring minimum furnace downtime.
- 5.5 Furnace air injection equipment is cleaned according to workplace procedures.
- 5.6 Furnace air injection equipment position is checked and recorded, and recalibrated where outside operating parameters.

Element 6: Monitor furnace feed materials

Performance Criteria

- 6.1 Condition of furnace feed material is monitored and maintained according to workplace procedures.
- 6.2 Furnace additives supply is monitored and reported to control room.

Element 7: Maintain plant and equipment efficiency

Performance Criteria

- 7.1 Workplace hazards and associated risks are described, identified, minimised or eliminated according to workplace procedures and legislative requirements.
- 7.2 Plant is cleaned to maintain condition of all equipment to ensure safe and efficient operations.
- 7.3 Plant condition is checked and adjusted to maintain efficient operation according to workplace procedures.
- 7.4 Stand-by furnace burner equipment is installed and controlled to maintain safe furnace refractory temperatures.
- 7.5 Air, gas, diesel and combustion supply equipment is inspected and replaced or faults reported according to workplace procedures.
- 7.6 Minor plant maintenance and lubrication tasks are carried out according to workplace procedures.
- 7.7 Process of plant and/or equipment shutdown or isolation is carried out according to workplace procedures.
- 7.8 Post shutdown or isolation checks are performed according to workplace procedures.

Element 8: Complete duties pertaining to furnace gas operations

Range

Housekeeping may include but is not limited to ensure the work area is ready for next user; remove work materials to designated locations; correctly identify waste and re-usable material; and remove waste and re-usable materials to designated locations.

Performance Criteria

- 8.1 Task-specific tools, personal protective and safety equipment, are cleaned, maintained and stored for further use according to workplace procedures.
- 8.2 Good housekeeping practices are maintained according to workplace procedures.
- 8.3 Reporting and recording requirements are met according to workplace procedures.
- 8.4 Work related documents are completed according to job requirements and workplace procedures.

Registration Data

Subfield:	Metallurgy
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