Unit ID: 1437

Domain HYDROMETALLURGICAL PROCESSING
Title: Monitor and control the sulphuric acid production process

Level: 3 **Credits: 15**

Purpose

This unit standard is intended for those who carry out metallurgical processing operations. People holding credit for this unit standard are able to: Demonstrate knowledge of the fundamental principles applicable to the sulphuric acid production process; monitor and control the different ancillary systems interacting with the sulphuric acid production process; monitor and control the quality standards of process materials in the sulphuric acid production process; monitor and control the sulphuric acid production process; and monitor the safety, health, environment, security and housekeeping aspects of the sulphuric acid production process.

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 hydrometallurgy operations are carried out.

3. This unit standard includes strong acid production.

4. Safe working practices include day-to-day observation of safety policies and procedures and compliance with emergency procedures.

5. Specifications refer to any, or all of the following: manufacturer's specifications and recommendations, and workplace specific requirements.

6. Performance of all elements in this unit standard must comply with relevant regulatory, legislative, workplace requirements and/or manufacturers' specifications.

7. 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: Demonstrate knowledge of the fundamental principles applicable to the sulphuric acid production process

Range

Equipment may include but is not limited to packed scrubbing tower; packed cooling tower; mist precipitator with star wires; mist pads; packed drying tower; catalytic reactor; gas transfer pump (main blower); packed absorption tower including stack; heat exchangers; water cooling tower; anodic cooler; pumps; valves; pipelines; ducting; vessels; and converter pre-heaters.

Chemicals may include but are not limited to dilution water; vanadium pentoxide catalyst; sulphur dioxide gas; and sulphur trioxide gas.

Performance Criteria

1.1 The purpose of the sulphuric acid production process is described in terms of the final product manufactured.

1.2 The principles of the sulphuric acid production process are described by making use of a generic flow diagram.

1.3 The flow of material through the sulphuric acid section is traced and all equipment is identified using standard industry terminology.

1.4 The purpose and functioning of equipment used in the sulphuric acid section is described in terms of its role in the overall process.

1.5 The functions of all chemicals used within the sulphuric acid production process are described in terms of their chemical and physical properties.

Element 2: Monitor and control the different ancillary systems interacting with the sulphuric acid production process

Range

Ancillary systems refer to the interface between mechanical equipment, electrical equipment, instrumentation and utilities and the sulphuric acid production process. It only includes those parts of each ancillary system, which interact directly with the sulphuric acid production process and not the full ancillary system.

Mechanical equipment may include but is not limited to pipelines; valves; linings; pumps; ducting; spray nozzles; entrance/exit hatches; ceramic packing (saddles); cast iron troughs; mist eliminator pads; exhaust stack; water cooling tower with fan; and water treatment equipment.

Electrical equipment may include but is not limited to electrical motors; switchgear; drive equipment; electrical interlock systems; stop/start stations; emergency stop switches; and lock out facilities.

Instrumentation may include but is not limited to conductivity meters; temperature controls; process indicators; level controllers; flow meters; control valves; controllers; alarms; and instrument interlocks used to monitor and control the process.

Utilities may include compressed air, electricity; and cooling water.

Performance Criteria

2.1 Mechanical equipment used in the sulphuric acid production process is identified and described in terms of purpose and application.

2.2 Electrical equipment used in the sulphuric acid production process is identified and described in terms of purpose and application.

2.3 Instrumentation used in the sulphuric acid production process is identified and described in terms of purpose and application.

2.4 Utilities used in the sulphuric acid production process is identified and described in terms of purpose and application.

2.5 Ancillary systems are monitored and any deviations from operating parameters are corrected in accordance with operating procedures.

Element 3: Monitor and control the quality standards of process materials in the sulphuric acid production process

Range

Process materials may include but are not limited to sulphur dioxide gas, dilution water, vanadium pentoxide catalyst, sulphur trioxide gas, diluted and concentrated sulphuric acid and any additives forming part of the sulphuric acid production process.

Performance Criteria

3.1 The properties of process materials are described in terms of their key characteristics.

3.2 The purpose of process material quality control procedures is explained.

3.3 The quality requirements of raw materials, chemicals and additives are described according to workplace requirements.

3.4 Corrective action are taken in the case of non-conforming raw materials according to workplace procedures.

Element 4: Monitor and control the sulphuric acid production process

Performance Criteria

4.1 The sulphuric acid production process is monitored and parameters recorded according to workplace procedures.

4.2 Deviations in process conditions are evaluated and corrective action taken according to workplace procedures.

Element 5: Monitor the safety, health, environment, security and housekeeping aspects of the sulphuric acid production process

Performance Criteria

5.1 Safety, health, environmental and security policies are observed with specific reference to own responsibility.

5.2 Risks in the sulphuric acid plant emanating from the process, chemicals, equipment and operational conditions are identified in terms of their possible impact on personnel, equipment, production and the environment.

5.3 Security requirements pertaining to the sulphuric acid plant are observed according to safety procedures and workplace procedures.

5.4 Housekeeping requirements are implemented according to workplace procedures.

Registration Data

Subfield:	Metallurgy
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Body responsible for review:	Namibia Training Authority