# National Vocational Certificate in Metallurgy (Level 3) (Operator)

**Level of Qualification: 3**

**Credit total: 134 - 169 (depending on strand and elective)**

| | Compulsory | Mineral Processing Strand | | |
|---|---|---|---|---|
| | | Compulsory | | Elective |
| | | Set A | Set B | |
| level 1 credits available | - | - | 2 | - |
| level 2 credits available | - | - | 55 | 35 |
| level 3 credits available | 12 | 22 | 101 | 79 |
| level 4 credits available | 12 | - | - | 12 |
| minimum totals required | 24 | 22 | 72 - 73 | 50 |

| | Hydrometallurgical Processing Strand | | | Pyrometallurgical Processing Strand | | |
|---|---|---|---|---|---|---|
| | Compulsory | | Elective | Compulsory | | Elective |
| | Set A | Set B | | Set A | Set B | |
| level 1 credits available | - | 4 | - | - | - | - |
| level 2 credits available | 11 | 84 | 7 | - | 46 | - |
| level 3 credits available | 12 | 77 | 91 | 20 | 60 | 52 |
| level 4 credits available | 18 | - | - | 20 | - | - |
| minimum totals required | 41 | 78 | 18 | 40 | 58 - 73 | 12 |

**Registration date:** 28 September 2016

**Scheduled review date:** 2021

**Body responsible for the qualification:** Namibia Training Authority (NTA) - Industry Skills Committee for Mining; Quarrying; Construction; Electricity, Gas and Water supply; and Sanitation (MQCEGWS)

**Other bodies whose unit standards are included in the qualification:**
Namibia Training Authority - NTA

## 1. Purpose

This Qualification has been developed to assist with the advancement of people across different mining industries in which metallurgical operations are carried out. The intention of this qualification is to assist;

- Those who have been in the workplace for a long time, by using the recognition of prior learning process to assess and recognise workplace skills acquired without the benefit of formal education and training;
- New entrants, by describing the learning outcomes required to participate effectively, e.g. in a structured workplace programme;
- Education and training providers, by providing guidance for the development of appropriate learning programmes and assessment documentation;

- Employers, by enabling skills gaps to be identified and addressed ensuring that productivity levels are increased and business objectives achieved.

Training programmes leading to the award of this qualification will address the on-going demand for qualified operators working in a metallurgical plant in Namibia by equipping learners with knowledge, understanding, skills and application techniques, which enable them to maintain the smooth operation of metallurgical field processes in the plant, such as comminution, dewatering, extracting, purifying, calcining, and smelting by identifying and troubleshooting metallurgical process deviations and taking corrective action under general supervision of a senior operator.

As a result, this qualification provides opportunities for self- or paid employment acting as a reward for contributions to society by facilitating social and economic transformation, empowerment and general upliftment of the mining industry and country in general.

The strands of this qualification are designed to recognise the specialised skills in Mineral Processing, Hydrometallurgical Processing, and Pyrometallurgical Processing, enabling the qualification to be tailored to meet the demand of particular sections in metallurgical operations in the different mining industries.

This qualification is based on the assumption that people entering programmes of study leading towards the certificate have already demonstrated ability in metallurgical processing operations. Consequently, the National Vocational Certificate in Metallurgy (Level 3) (Junior Operator), or the demonstration of equivalent knowledge and skills, is a prerequisite for entry to this qualification.

This qualification represents a stage of progression to the;

National Vocational Certificate in Mineral Processing (Level 4) (Senior Operator) with strands in;

- Comminution & Sizing, Classification, and Concentration;
- Sizing, Classification, and Concentration & Dewatering;
- Dewatering & Tailings.

National Vocational Certificate in Hydrometallurgical Processing (Level 4) (Senior Operator) with strands in;

- Extraction & Solid from liquid separation;
- Solid from liquid separation & Purification;
- Purification & Recovery.

National Vocational Certificate in Pyrometallurgical Processing (Level 4) (Senior Operator) with strands in;

- Calcining & Roasting;
- Roasting & Smelting;
- Smelting & Refining.

## 2. Regulations for the qualification

### 2.1 Summary of qualification requirements

This qualification will be awarded to people who are credited with:

i. Requirements of the compulsory set.
ii. Requirements of the strand compulsory sets A and B and strand elective set in one (1) of the following strands:
- Mineral Processing,
- Hydrometallurgical Processing, or
- Pyrometallurgical Processing.

## 2.2 Detailed qualification requirements

**Compulsory set**
*The following unit standards are required*

**FIELD:** PHYSICAL PLANNING AND CONSTRUCTION
**Subfield:** Metallurgy
**Domain:** Metallurgical Processing - Core

| Unit No. | Unit Standard Title | Level | Credits |
|---|---|---|---|
| 1487 | Apply knowledge of sustainable environmental management practices in the workplace | 3 | 6 |
| 1488 | Operate and control recyclable water systems in a metallurgical plant | 4 | 12 |

**FIELD:** PHYSICAL PLANNING AND CONSTRUCTION
**Subfield:** Metallurgy
**Domain:** Mineral Processing

| Unit No. | Unit Standard Title | Level | Credits |
|---|---|---|---|
| 1559 | Conduct thickening and clarifying process in a metallurgical plant | 3 | 6 |

**Mineral Processing Strand**

**Compulsory Set A**
*The following unit standards are required*

**FIELD:** PHYSICAL PLANNING AND CONSTRUCTION
**Subfield:** Metallurgy
**Domain:** Mineral Processing

| Unit No. | Unit Standard Title | Level | Credits |
|---|---|---|---|
| 1545 | Operate a crushing plant | 3 | 12 |
| 1556 | Grind and mill material in a metallurgical plant | 3 | 10 |

**Compulsory Set B**
*All strand specific requirements (Mineral Processing Strand) of Q0755 in Metallurgy (Level 3) (Junior Operator)*

**Elective Set**
*A minimum of 50 credits is required*

**FIELD:** PHYSICAL PLANNING AND CONSTRUCTION
**Subfield:** Metallurgy
**Domain:** Mineral Processing

| Unit No. | Unit Standard Title | Level | Credits |
|---|---|---|---|
| 1554 | Control an ore storage and transport system | 3 | 12 |
| 1558 | Process lime products | 3 | 14 |
| 1546 | Control quality of aggregate produced by mobile and static plant | 4 | 12 |
| 1544 | Operate screens in a metallurgical plant | 3 | 14 |
| 1547 | Conduct stockpile reclaiming operations | 3 | 4 |
| 1548 | Make-up a heavy medium suspension in a metallurgical plant | 2 | 6 |
| 1549 | Perform gravity concentration in a metallurgical plant | 2 | 6 |
| 1550 | Produce backfill from waste slurry | 2 | 6 |
| 1551 | Carry out acid treatment of carbon | 2 | 8 |
| 1552 | Operate an x-ray sorter | 2 | 2 |
| 1553 | Construct a tailings dam catwalk | 3 | 7 |
| 1555 | Control medium density in a dense-medium separation process | 3 | 8 |
| 1557 | Conduct dense-medium separation | 2 | 7 |

**FIELD:** PHYSICAL PLANNING AND CONSTRUCTION
**Subfield:** Metallurgy
**Domain:** Metallurgical Processing - Core

| Unit No. | Unit Standard Title | Level | Credits |
|---|---|---|---|
| 1489 | Perform basic tests as part of metallurgical operations | 3 | 12 |

**FIELD:** PHYSICAL PLANNING AND CONSTRUCTION
**Subfield:** Metallurgy
**Domain:** Pyrometallurgical Processing

| Unit No. | Unit Standard Title | Level | Credits |
|---|---|---|---|
| 1513 | Conduct blending operations | 3 | 8 |

**Hydrometallurgical Processing Strand**

**Compulsory Set A**
*The following unit standards are required*

**FIELD:** PHYSICAL PLANNING AND CONSTRUCTION
**Subfield:** Metallurgy

**Domain:** Hydrometallurgical Processing

| Unit No. | Unit Standard Title | Level | Credits |
|---|---|---|---|
| 1428 | Leach metal bearing material in a metallurgical plant | 3 | 6 |
| 1427 | Control the pH level in a metallurgical process | 2 | 4 |
| 1429 | Filter liquids from solids in a metallurgical plant | 2 | 7 |
| 1433 | Operate and monitor boiler steam and water cycle | 4 | 18 |
| 1434 | Conduct electrometallurgy operations | 3 | 8 |

**Compulsory Set B**
*All strand specific requirements (Hydrometallurgical Processing Strand) of Q0755 in Metallurgy (Level 3) (Junior Operator)*

**Elective Set**
*A minimum of 18 credits is required*

**FIELD:** PHYSICAL PLANNING AND CONSTRUCTION
**Subfield:** Metallurgy
**Domain:** Hydrometallurgical Processing

| Unit No. | Unit Standard Title | Level | Credits |
|---|---|---|---|
| 1424 | Operate a drying plant | 3 | 10 |
| 1425 | Operate pipeline stations and equipment | 3 | 6 |
| 1426 | Conduct precipitation operations in a metallurgical plant | 2 | 7 |
| 1430 | Strip precious metal from carbon | 3 | 5 |
| 1431 | Extract metal from a solution by means of solvent extraction | 3 | 5 |
| 1432 | Absorb chlorine gas in a metallurgical plant | 3 | 8 |
| 1435 | Conduct elution processes | 3 | 12 |
| 1438 | Generate sulphur trioxide gas by means of a catalytic converting process | 3 | 8 |
| 1437 | Monitor and control the sulphuric acid production process | 3 | 15 |
| 1436 | Shut-down a sulphur dioxide gas system for maintenance | 3 | 10 |

**FIELD:** PHYSICAL PLANNING AND CONSTRUCTION
**Subfield:** Metallurgy
**Domain:** Metallurgical Processing - Core

| Unit No. | Unit Standard Title | Level | Credits |
|---|---|---|---|
| 1489 | Perform basic tests as part of metallurgical operations | 3 | 12 |

**Pyrometallurgical processing Strand**

**Compulsory Set A**
*The following unit standards are required*

**FIELD:** PHYSICAL PLANNING AND CONSTRUCTION
**Subfield:** Metallurgy
**Domain:** Pyrometallurgical Processing

| Unit No. | Unit Standard Title | Level | Credits |
|---|---|---|---|
| 1516 | Operate furnaces | 4 | 20 |
| 1517 | Load a charge into a furnace | 3 | 8 |
| 1511 | Produce metal bar by means of a casting process | 3 | 12 |

**Compulsory Set B**
*All strand specific requirements (Pyrometallurgical Processing Strand) of Q0755 in Metallurgy (Level 3) (Junior Operator)*

**Elective Set**
*A minimum of 12 credits is required*

**FIELD:** PHYSICAL PLANNING AND CONSTRUCTION
**Subfield:** Metallurgy
**Domain:** Pyrometallurgical Processing

| Unit No. | Unit Standard Title | Level | Credits |
|---|---|---|---|
| 1512 | Conduct roasting operations in a metallurgical plant | 3 | 8 |
| 1514 | Tap furnaces | 3 | 6 |
| 1515 | Remove impurities from molten metal by means of a converting process | 3 | 10 |
| 1518 | Control molten metal in a holding furnace | 3 | 8 |
| 1513 | Conduct blending operations | 3 | 8 |

**FIELD:** PHYSICAL PLANNING AND CONSTRUCTION
**Subfield:** Metallurgy
**Domain:** Metallurgical Processing - Core

| Unit No. | Unit Standard Title | Level | Credits |
|---|---|---|---|
| 1489 | Perform basic tests as part of metallurgical operations | 3 | 12 |

## 3. Credit recognition and transfer arrangements

Credits for any version of a unit standard with the same identification number will be recognised in the award of this qualification.

## 4. Special Arrangements

**4.1** Special Arrangements apply to the accreditation of providers offering learning pathways to and/or undertaking assessments relating to all unit standards listed in this qualification under the Subfield of Metallurgy. These Special Arrangements are available from:

Industry Skills Committee - MQCEGWS
Rand Street
Khomasdal
Namibia
Telephone number: 061-207 8550
Facsimile number: 061-207 8551
Email info@nta.com.na

**4.2** Special Arrangements may apply to the accreditation of providers offering learning pathways to and/or undertaking assessment relating to all unit standards listed in this qualification in other Subfields and Domains. These Special Arrangements are available from:

Namibia Qualifications Authority
44 Bismarck St.
Windhoek
Namibia
Telephone number: 061-384116
Facsimile number: 061-384114
Email: info@namqa.org

Namibia Training Authority
Rand Street
Khomasdal
Namibia
Telephone number: 061-207 8550
Facsimile number: 061-207 8551
Email info@nta.com.na

**4.3** Regardless of the above, providers seeking accreditation through the relevant authorities must have or have confirmed access to all equipment and facilities detailed in the Special Notes, Performance Criteria and/or Range Statements in the unit standards that are included in this qualification.

## 5. Transition arrangements

### 5.1 Non National Qualifications Framework transition

None.

### 5.2 National Qualifications Framework transition

This is the first version of this qualification.