

<b>National Vocational Certificate in Metallurgy (Level 4) (Pyrometallurgical Processing - Senior Operator)</b>
---

**Level of Qualification: 4**

**Credit total: 348 - 447 (depending on strand and elective)**

	Compulsory			Calcining & Roasting Strand	
	Set A	Set B	Elective	Compulsory	Elective
<b>level 1 credits available</b>	-	-	-	-	-
<b>level 2 credits available</b>	-	46	33	-	3
<b>level 3 credits available</b>	16	132	35	8	26
<b>level 4 credits available</b>	95	20	15	10	15
<b>level 5 credits available</b>	36	-	-	-	-
<b>minimum totals required</b>	<b>147</b>	<b>110-125</b>	<b>58</b>	<b>18</b>	<b>15</b>

	Roasting & Smelting Strand		Smelting & Refining Strand	
	Compulsory	Elective	Compulsory	Elective
<b>level 2 credits available</b>	4	17	4	14
<b>level 3 credits available</b>	92	25	72	33
<b>level 4 credits available</b>	10	-	10	12
<b>minimum totals required</b>	<b>106</b>	<b>11</b>	<b>86</b>	<b>23</b>

**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 processing operations, with special emphasis on Pyrometallurgy, 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, primarily associated with routine on-the job activities, leading to the award of this qualification will address the on-going demand for qualified senior operators working in a metallurgical plant in Namibia by equipping learners with in-depth knowledge and skills to manage, control and monitor the general operation and performance of complex equipment or a group of medium complexity.

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 metallurgical processing industry and country in general.

The strands of this qualification are designed to recognise the specialised skills associated with Calcining & Roasting; Roasting & Smelting; and Smelting & Refining, enabling the qualification to be tailored to meet the demand of particular sections in metallurgical processing 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) (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 higher level qualifications, such as Master Operator, Process Metallurgist, and Metallurgist.

## **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 sets A and B.
- ii. Requirements of the elective set.
- iii. Requirements of the strand compulsory and electives in one (1) of the following strands:
  - Calcining & Roasting,
  - Roasting & Smelting, or
  - Smelting & Refining.

### **2.2 Detailed qualification requirements**

#### **Compulsory Set A**

*The following unit standards are required*

**FIELD:** MANUFACTURING, ENGINEERING AND TECHNOLOGY  
**Subfield:** Metallurgy  
**Domain:** Metallurgical Processing - Core

Unit No.	Unit Standard Title	Level	Credits
1491	Control and monitor automated plant and machinery	4	12
1492	Monitor and control a metallurgical plant from a control room	4	15
1493	Manage plant shutdown and restart	4	8
1494	Decommission plant	4	6
1497	Apply the concept of motivation in a leadership context	4	6
1498	Process and interpret data in the context of metallurgical processing	4	8
1490	Isolate and lock-out plant and equipment	3	10

**FIELD:** MANUFACTURING, ENGINEERING AND TECHNOLOGY  
**Subfield:** Metallurgy  
**Domain:** Mineral Processing

Unit No.	Unit Standard Title	Level	Credits
1521	Monitor and maintain flue gas efficiency	3	6

**FIELD:** HEALTH SCIENCES AND SOCIAL SERVICES  
**Subfield:** Preventive Health  
**Domain:** Occupational Health and Safety

Unit No.	Unit Standard Title	Level	Credits
848	Develop procedures to safely control work operations	4	6
849	Monitor procedures to safely control work operations	4	5
850	Supervise the health, safety and welfare of an employee new to the role in the workplace	4	8
851	Advocate and keep pace with improvements in health and safety practice	4	6
852	Develop and maintain individual and organisational competence in health and safety matters	4	8
853	Develop and implement effective communication systems for health and safety information	4	7
855	Conduct a health and safety risk assessment in a workplace	5	10
858	Investigate and evaluate health and safety incidents, accidents, and complaints in the workplace	5	8

859	Promote a positive health and safety culture in workplaces	5	10
860	Review health and safety procedures in workplaces	5	8

**Compulsory Set B**

*All strand specific requirements (Pyrometallurgical Processing Strand) of Q0756 in Metallurgy (Level 3) (Operator)*

**Elective Set**

*A minimum of 58 credits is required*

**FIELD:** MANUFACTURING, ENGINEERING AND TECHNOLOGY

**Subfield:** Metallurgy

**Domain:** Metallurgical Processing - Core

Unit No.	Unit Standard Title	Level	Credits
1458	Apply operational maintenance skills	2	10
1489	Perform basic tests as part of metallurgical operations	3	12
1463	Operate compressors in a metallurgical plant	2	4
1459	Operate and maintain conveyors at a metallurgical plant	2	8

**FIELD:** MANUFACTURING, ENGINEERING AND TECHNOLOGY

**Subfield:** Metallurgy

**Domain:** Hydrometallurgical Processing

Unit No.	Unit Standard Title	Level	Credits
1409	Handle reagents safely in a metallurgical plant	2	6
1411	Off-load organic reagents into storage facility	3	5

**FIELD:** MANUFACTURING, ENGINEERING AND TECHNOLOGY

**Subfield:** Metallurgy

**Domain:** Pyrometallurgical Processing

Unit No.	Unit Standard Title	Level	Credits
1513	Conduct blending operations	3	8
1522	Control the operation of an electric arc furnace	4	15

**FIELD:** PHYSICAL PLANNING AND CONSTRUCTION

**Subfield:** Surface Mining and Quarrying

**Domain:** Heavy Equipment operations

Unit No.	Unit Standard Title	Level	Credits
1118	Lift, move and place loads with a forklift as part of surface mining and quarrying operations	2	5

**FIELD:** MANUFACTURING, ENGINEERING AND TECHNOLOGY  
**Subfield:** Lifting, shifting, securing loads  
**Domain:** Crane operation

Unit No.	Unit Standard Title	Level	Credits
1098	Lift and place loads with overhead crane	3	10

### Calcining & Roasting Strand

#### Compulsory

*The following unit standard is required*

**FIELD:** MANUFACTURING, ENGINEERING AND TECHNOLOGY  
**Subfield:** Metallurgy  
**Domain:** Pyrometallurgical Processing

Unit No.	Unit Standard Title	Level	Credits
1502	Conduct calcinations activities	3	8

**FIELD:** MANUFACTURING, ENGINEERING AND TECHNOLOGY  
**Subfield:** Metallurgy  
**Domain:** Mineral Processing

Unit No.	Unit Standard Title	Level	Credits
1570	Operate and monitor a dust collection plant	4	10

#### Elective Set

*A minimum of 15 credits is required*

**FIELD:** MANUFACTURING, ENGINEERING AND TECHNOLOGY  
**Subfield:** Metallurgy  
**Domain:** Pyrometallurgical Processing

Unit No.	Unit Standard Title	Level	Credits
1518	Control molten metal in a holding furnace	3	8
1500	Replace medium in a fluidised bed roaster	2	3

**FIELD:** MANUFACTURING, ENGINEERING AND TECHNOLOGY  
**Subfield:** Metallurgy  
**Domain:** Hydrometallurgical Processing

Unit No.	Unit Standard Title	Level	Credits
1443	Control the drying operation in a metallurgical plant	4	15

1424	Operate a drying plant	3	10
------	------------------------	---	----

**FIELD:** MANUFACTURING, ENGINEERING AND TECHNOLOGY  
**Subfield:** Metallurgy  
**Domain:** Mineral Processing

Unit No.	Unit Standard Title	Level	Credits
1537	Control feed distribution by means of a mobile system	3	4

### Roasting & Smelting Strand

#### Compulsory

*The following unit standards are required*

**FIELD:** MANUFACTURING, ENGINEERING AND TECHNOLOGY  
**Subfield:** Metallurgy  
**Domain:** Pyrometallurgical Processing

Unit No.	Unit Standard Title	Level	Credits
1523	Cold start-up a furnace	4	10
1519	Shut down a furnace for long-term maintenance	3	10
1520	Monitor and maintain furnace gas efficiency	3	8
1518	Control molten metal in holding furnace	3	8
1499	Dispatch solid base metals	2	4
1501	Load material into trucks by means of a loading station	3	10
1511	Produce metal bar by means of a casting process	3	12
1514	Tap furnaces	3	6
1515	Remove impurities from molten metal	3	10
1513	Conduct blending operations	3	8

**FIELD:** MANUFACTURING, ENGINEERING, AND TECHNOLOGY  
**Subfield:** Lifting, shifting, securing loads  
**Domain:** Crane operation - Core

Unit No.	Unit Standard Title	Level	Credits
1089	Sling regular loads and communicate during crane operations	3	20

#### Electives

*A minimum of 11 credits is required*

**FIELD:** MANUFACTURING, ENGINEERING AND TECHNOLOGY  
**Subfield:** Metallurgy

**Domain:** Metallurgical Processing - Core

Unit No.	Unit Standard Title	Level	Credits
1462	Conduct pump operations	2	4
1466	Operate air-blower system	3	5

**FIELD:** MANUFACTURING, ENGINEERING AND TECHNOLOGY  
**Subfield:** Metallurgy  
**Domain:** Mineral Processing

Unit No.	Unit Standard Title	Level	Credits
1527	Operate an over-belt magnetic separator	2	2
1537	Control feed distribution by means of a mobile system	3	4

**FIELD:** MANUFACTURING, ENGINEERING AND TECHNOLOGY  
**Subfield:** Metallurgy  
**Domain:** Hydrometallurgical Processing

Unit No.	Unit Standard Title	Level	Credits
1402	Dispatch metallurgical process by-products	2	4
1424	Operate a drying plant	3	10

**FIELD:** MANUFACTURING, ENGINEERING AND TECHNOLOGY  
**Subfield:** Metallurgy  
**Domain:** Pyrometallurgical Processing

Unit No.	Unit Standard Title	Level	Credits
1500	Replace medium in a fluidised bed roaster	2	3
1507	Handle bulk oxygen safely in a metallurgical plant	2	4
1508	Off-load liquefied gas into a storage facility	3	6

### **Smelting & Refining Strand**

#### **Compulsory**

*The following unit standards are required*

**FIELD:** MANUFACTURING, ENGINEERING AND TECHNOLOGY  
**Subfield:** Metallurgy  
**Domain:** Pyrometallurgical Processing

Unit No.	Unit Standard Title	Level	Credits
1523	Cold start-up a furnace	4	10
1519	Shut down a furnace for long-term maintenance	3	10

1520	Monitor and maintain furnace gas efficiency	3	8
1518	Control molten metal in a holding furnace	3	8
1499	Dispatch solid base metals	2	4
1501	Load material into trucks by means of a loading station	3	10
1511	Produce metal bar by means of a casting process	3	12

**FIELD:** MANUFACTURING, ENGINEERING, AND TECHNOLOGY  
**Subfield:** Lifting, shifting, securing loads  
**Domain:** Crane operation - Core

Unit No.	Unit Standard Title	Level	Credits
1089	Sling regular loads and communicate during crane operations	3	20

### Electives

*A minimum of 23 credits is required*

**FIELD:** MANUFACTURING, ENGINEERING AND TECHNOLOGY  
**Subfield:** Metallurgy  
**Domain:** Metallurgical Processing - Core

Unit No.	Unit Standard Title	Level	Credits
1462	Conduct pump operations	2	4
1466	Operate air-blower system	3	5

**FIELD:** MANUFACTURING, ENGINEERING AND TECHNOLOGY  
**Subfield:** Metallurgy  
**Domain:** Mineral Processing

Unit No.	Unit Standard Title	Level	Credits
1569	Perform metallurgical tests	4	12
1527	Operate an over-belt magnetic separator	2	2

**FIELD:** MANUFACTURING, ENGINEERING AND TECHNOLOGY  
**Subfield:** Metallurgy  
**Domain:** Hydrometallurgical Processing

Unit No.	Unit Standard Title	Level	Credits
1402	Dispatch metallurgical process by-products	2	4

**FIELD:** MANUFACTURING, ENGINEERING AND TECHNOLOGY  
**Subfield:** Metallurgy  
**Domain:** Pyrometallurgical Processing



Unit No.	Unit Standard Title	Level	Credits
1506	Control water quality in a cooling system	3	6
1507	Handle bulk oxygen safely in a metallurgical plant	2	4
1508	Off-load liquefied gas into a storage facility	3	6
1514	Tap furnaces	3	6
1515	Remove impurities from molten metal	3	10

### 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](mailto: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](mailto: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](mailto: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.