No. 1095 **17 October 2008**

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

In accordance with Regulation 24(c) of the National Standards Bodies Regulations of 28 March 1998, the Standards Generating Body (SGB) for

Manufacturing and Assembly Processes

registered by Organising Field 06 – Manufacturing, Engineering and Technology, publishes the following Qualification and Unit Standards for public comment.

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the Qualification and Unit Standards. The full Qualification and Unit Standards can be accessed via the SAQA web-site at **www.saqa.org.za**. Copies may also be obtained from the Directorate of Standards Setting and Development at the SAQA offices, SAQA House, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the Qualification and Unit Standards should reach SAQA at the address below and ***no later than 17 November 2008.*** All correspondence should be marked **Standards Setting SGB for Manufacturing and Assembly Processes** and addressed to

The Director: Standards Setting and Development
SAQA
Attention: Mr. E. Brown
Postnet Suite 248
Private Bag X06
Waterkloof
0145
or faxed to 012 – 431-5144
e-mail: ebrown@saqa.org.za

D. MPHUTHING
ACTING DIRECTOR: STANDARDS SETTING AND DEVELOPMENT

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:
Further Education and Training Certificate: Metals Production

SAQA QUAL ID	***QUALIFICATION TITLE***		
64209	Further Education and Training Certificate: Metals Production		
ORIGINATOR		***PROVIDER***	
SGB Manufacturing and Assembly Processes			
QUALIFICATION TYPE	***FIELD***	***SUBFIELD***	
Further Ed and Training Cert	6 - Manufacturing, Engineering and Technology	Manufacturing and Assembly	
ABET BAND	***MINIMUM CREDITS***	***NQF LEVEL***	***QUAL CLASS***
Undefined	140	Level 4	Regular-Unit Stds Based

This qualification replaces:

Qual ID	Qualification Title	NQF Level	Min Credits	Replacement Status
49020	Further Education and Training Certificate: Metals Production	Level 4	146	Will occur as soon as 64209 is registered

PURPOSE AND RATIONALE OF THE QUALIFICATION
Purpose:

This qualification is for any individual who is, or wishes to be, involved in a metals production environment and be able to perform a range of activities to control an entire production process within a metal production environment. The individual will operate within a specific metals production environment like melting, refining, casting, rolling, shearing, forging and other metallurgical processes.

In general, individuals at this level in the metal production environment will operate in a 'pulpit' from which they have oversight of the entire production process. In the iron and steel sector, for example, they would be found controlling the production process at a blast furnace, or at steel furnace or the production of coils in a hot rolling environment. These processes are large scale operations involving a high level of responsibility. Production errors committed at this level result in huge financial losses and can impact significantly on related processes or activities both upstream and downstream. While in some instances the production process controller will manage other individuals in most instances the controller manages and coordinates the activities of the individuals involved in the production process. An individual acquiring this qualification will be able to contribute towards the smooth and efficient operation of the entire production processes in the metal production sector.

The core component contains generic competencies covering, inter alia:

> Managing the input of material, the conversion process and product flow.
> Controlling auxiliary systems to ensure an efficient production process.
> Knowledge of systems (process computer systems, for example).
> Knowledge of all the preparation, setting-up and operating production process equipment.
> Problem solving.
> Interaction with clients, suppliers and maintenance up to level of responsibility.

> Coordinating the improvement of productivity within a functional unit.
> Knowledge of production quality and organisational procedures.
> Knowledge and application of health, safety and environmental procedures involved in controlling the production process.
> Knowledge of the sequence for start-up and shut-down, cooling and shut-down procedures and changeover and back-up procedures.

These competencies will enable the learner to work in different industries within the diverse production sector.

The qualification ensures progression of learning, enabling the learner to perform optimally and provides access to a higher qualification within the same or a related sector. The qualification will facilitate access to, and mobility within, education and training for learners who:

> Would like to achieve this qualification through the process of Recognition of Prior Learning (RPL) and/or formal study.
> Wish to extend their range of skills and knowledge and hence their competencies in the metals production environment.

The qualification also focuses on the skills, knowledge, values and attitudes required to progress further. The intention is to:

> Release the potential of people.
> Provide opportunities for people to explore different but related activities within the metals production sector.

Rationale:

Metals production can be defined as the processing of raw materials into metal products, including value adding processes. The metals production sector constitutes the following industries: iron and steel, aluminium, platinum, chrome and zinc and is characterised by sophisticated processes. Companies within this sector operate in a global competitive and challenging environment. The products produced have to respond to a wide variety of customer requirements and safety, health, environmental, quality and risk management issues.

Typical learners will be persons who wish to become qualified controllers in a metals production environment. Many of these will be persons currently operating in this environment who have not received any formal recognition for their skills and knowledge. Other learners will be those who have completed the National Certificate: Metals Production at NQF Level 3.

In terms of the learning pathway, this is the third in a series of three qualifications for anyone wishing to follow a career in a ferrous or non-ferrous metals production working environment, in a variety of contexts. The qualification will allow this learner to progress to the level of a technologist in a metal production environment by completing the Diploma: Production Technology at NQF Level 5.

South Africa has a very extensive and highly developed metals production sector. This sector employs a large number of people, is well-established and economically powerful. In terms of transformation in the country, learners will require skills and competencies to gain access to positions within management structures by completing other Qualifications and training. It will be in the interest of the country and the sector to ensure that those who operate in the metals production environment are trained according to this Qualification to improve productivity and efficiency.

This national Qualification and its related Unit Standards were developed to standardise the accreditation of learning programmes, resulting in improved quality management in terms of programme delivery.

This Further Education and Training Certificate: Metal Production at NQF Level 4 supports the objectives of the NQF in that it gives the learner access to a registered qualification. It will ensure that the quality of education and training in the sub-field is enhanced and of a world-class standard. The qualification will allow learners to benchmark their competencies against international standards.

RECOGNIZE PREVIOUS LEARNING?
Y

LEARNING ASSUMED IN PLACE
Learners wishing to study towards this qualification are assumed to have:

> Mathematical literacy at NQF Level 3.
> Communication at NQF Level 3.
> Computer Literacy.

Recognition of Prior Learning:

This Qualification may be achieved in part (or whole) through the recognition of relevant prior knowledge and/or experience. The learner must be able to demonstrate competence in the knowledge, skills, values and attitudes implicit in this Qualification. As part of the provision of recognition of prior learning providers are required to develop a structured means for the assessment of individual learners against the Unit Standards of the Qualification on a case-by-case basis. A range of assessment tools and techniques during formative and summative assessment procedures should be used which have been jointly decided upon by the learner and the assessor. Such procedures, and the assessment of individual cases, are subject to moderation by independent assessors. The same principles that apply to assessment of this Qualification also apply to recognition of prior learning.

Learners may provide evidence of prior learning for which they may receive credit towards the Unit Standards and/or the Qualification by means of portfolios or other forms of appropriate evidence as agreed to between the relevant provider and relevant ETQA or ETQA that has a Memorandum of Understanding in place with the relevant ETQA.

RPL is particularly important, as there are people in the metal production sector with a variety of skills and competencies of differing quality and scope. It is important that an RPL process be available to assist in making sense of existing competencies and skills, and helping to standardise these competencies and skills towards a common standard.

Access to the Qualification:

There is an open access to this qualification, keeping in mind the "Learning Assumed to be in Place". It is preferable for a learner to have completed the National Certificate: Metal Production at NQF Level 3.

QUALIFICATION RULES
The Qualification consists of a Fundamental, a Core and an Elective Component.

To be awarded the Qualification learners are required to obtain a minimum of 140 credits as detailed below.

Fundamental Component:

The Fundamental Component consists of Unit Standards, to the value of 56 credits, in:

> Mathematical Literacy at NQF Level 4 to the value of 16 credits.
> Communication in First Language at NQF Level 4 to the value of 20 credits.
> Communication in Second Language at NQF Level 4 to the value of 20 credits.

All Unit Standards in the Fundamental Component are compulsory.

Core Component:

The Core Component consists of Unit Standards to the value of 74 credits all of which are compulsory.

Elective Component:

The Elective Component consists of two specialisation areas, each with its own set of Unit Standards. Learners are to choose one specialisation and choose Elective Unit Standards totalling a minimum of 10 credits from the Unit standards listed under that specialisation area so as to attain a minimum of 140 credits for this Qualification.

Specialisation Area 1: Metal Production: (Manufacturing, Engineering and Related Industries):

Learners must choose Elective Unit Standards from the list below to give a minimum of 10 credits for the Elective Component:

Elective Component:

The Elective Component consists of two specialisation areas, each with its own set of Unit Standards. Learners are to choose one specialisation and choose Elective Unit Standards totalling a minimum of 10 credits from the Unit standards listed under that specialisation area so as to attain a minimum of 140 credits for this Qualification.

Specialisation Area 1: Metal Production: (Manufacturing, Engineering and Related Industries):

Learners must choose Elective Unit Standards from the list below to give a minimum of 10 credits for the Elective Component:

> ID 242815: Apply the organization's code of conduct in a work environment, Level 4, 5 Credits.
> ID 242816: Conduct a structured meeting, Level 4, 5 Credits.
> ID 242822: Employ a systematic approach to achieving objectives, Level 4, 10 Credits.
> ID 242821: Identify responsibilities of a team leader in ensuring that organisational standards are met, Level 4, 6 Credits.
> ID 242819: Motivate and Build a Team, Level 4, 10 Credits.
> ID 242813: Explain the contribution made by own area of responsibility to the overall organisational strategy, Level 4, 5 Credits.
> ID 114877: Formulate and implement an action plan to improve productivity within an organisational unit, Level 4, 8 Credits.
> ID 110009: Manage administration records, Level 4, 4 Credits.
> ID 11473: Manage individual and team performance, Level 4, 8 Credits.
> ID 254596: Manage time keeping records, Level 4, 5 Credits.
> ID 114589: Manage time productively, Level 4, 4 Credits.
> ID 118028: Supervise customer service standards, Level 4, 8 Credits.
> ID 15234: Apply efficient time management to the work of a department/division/section, Level 5, 4 Credits.

> ID 10631: Demonstrate an understanding of manufacturing, principles, methodologies and processes, Level 5, 7 Credits.
> ID 116389: Write a technical report, Level 4, 4 Credits.
> ID 9506: Communicate in an assertive manner with clients and fellow workers, Level 4, 4 Credits.
> ID 9505: Manage basic business and personal finance, Level 4, 6 Credits.
> ID 12429: Develop a personal financial plan, Level 3, 2 Credits.
> ID 116714: Lead a team, plan, allocate and assess their work, Level 3, 4 Credits.
> ID 114884: Coordinate the improvement of productivity within a functional unit, Level 4, 8 Credits.
> ID 13254: Contribute to the implementation and maintenance of business processes, Level 4, 10 Credits.

Total Number of Credits for Metal Production Electives: 127 Credits.

Specialisation Area 2: Mining and Minerals:

Learners must choose Elective Unit Standards from the list below to give a minimum of 10 credits for the Elective Component:

> ID 259700: Remove impurities from molten metal by means of a vertical converting process, Level 4, 17 Credits.
> ID 259695: Control the operation of a pelletising process, Level 4, 25 Credits.
> ID 259725: Control the operation of converting in a metallurgical plant, Level 4, 25 Credits.
> ID 242815: Apply the organization's code of conduct in a work environment, Level 4, 5 Credits.
> ID 242816: Conduct a structured meeting, Level 4, 5 Credits.
> ID 242822: Employ a systematic approach to achieving objectives, Level 4, 10 Credits.
> ID 242821: Identify responsibilities of a team leader in ensuring that organisational standards are met, Level 4, 6 Credits.
> ID 242819: Motivate and Build a Team, Level 4, 10 Credits.
> ID 242813: Explain the contribution made by own area of responsibility to the overall organisational strategy, Level 4, 5 Credits.
> ID 114877: Formulate and implement an action plan to improve productivity within an organisational unit, Level 4, 8 Credits.
> ID 110009: Manage administration records, Level 4, 4 Credits.
> ID 11473 - Manage individual and team performance, Level 4, 8 Credits.
> ID 254596: Manage time keeping records, Level 4, 5 Credits.
> ID 114589: Manage time productively, Level 4, 4 Credits.
> ID 118028: Supervise customer service standards, Level 4, 8 Credits.
> ID 15234: Apply efficient time management to the work of a department/division/section, Level 5, 4 Credits.
> ID 10631: Demonstrate an understanding of manufacturing, principles, methodologies and processes, Level 5, 7 Credits.

Total Number of Credits for Mining and Minerals Electives: 156 Credits.

EXIT LEVEL OUTCOMES
Qualifying learners will be able to:

1. Set-up and control a metals production process to ensure quality products.

2. Fault find to solve a variety of problems within a metals production process.

3. Demonstrate a familiarity with process machinery operations and procedures in a particular context in order to diagnose and troubleshoot machinery functioning.

4. Demonstrate the ability to coordinate team to run a metals production process.

5. Promote, implement and maintain procedures that support safety, health, the environment, quality and risk management.

6. Communicate and present information clearly and accurately and demonstrate the ability to analyse information to identify problems and determine trends.

Critical Cross-Field Outcomes:

Identify and solve problems in which responses display that responsible decisions using critical and creative thinking have been made when:

> Implementing and maintaining health, safety and environmental legislation in a workplace.
> Developing an occupational health, occupational hygiene and medical surveillance programmes.
> Evaluating the quality of manufactured products.
> Allocating tasks and creating a task list.
> Making adjustments to process parameters.
> Dealing with identified risks and hazards.
> Monitor the production process and resolve problems.

Work effectively with others as a member of a team, group, organisation, community to:

> Take reasonable care of one's and other's safety in the workplace.
> Obtain stakeholder involvement in generating solutions to problems.
> Allocate work, schedule tasks and monitor progress.
> Ensure that the production process is planned, set-up and operated as per standard operating procedure.
> Ensure the safety of all personnel and equipment.

Organise and manage oneself and one's activities responsively and effectively when:

> Taking into account the activities around him/her and ensure that his/her actions are complementary.
> Organising and managing oneself and one's activities responsibly and effectively in using the criteria for selection of optimum solution.
> Interpret production schedules.
> Planning and controlling the production process.

Collect, analyse, organise and critically evaluate information to:

> Implement and maintain health, safety and environmental legislation.
> Apply the risk management process to manage occupational health and occupational hygiene in a specific workplace.
> Interpret results for quality of sampled products.
> Ensure accurate problem definition.
> Solve problems by making adjustments to the planning and process.
> Deal with variations and deviations.

Communicate effectively using visual, mathematical and/or language skills in the modes of oral and/or written presentation to:

> Keep all relevant persons informed on matters of health and safety.

> Explain the requirements of the different Acts, produce plans and design records.
> Ensure efficient functioning of personnel and equipment.

Use science and technology effectively and critically, showing responsibility towards the environment and the health of others by:

> Coordinating the use of the equipment according to manufacturer's instructions and standard operating procedure.

Learners are capable of seeing the world as a set of related systems identifying potential health risks and proposing control measures.

ASSOCIATED ASSESSMENT CRITERIA
Associated Assessment Criteria for Exit Level Outcome 1:

> Principles, functions and procedures pertaining to the process are explained to obtain an in-depth understanding of the process.
> The process is set-up to specifications and standard operating procedure.
> Quantities of materials are determined, mixed and/or prepared according to product/customer specifications.
> The process is monitored and controlled according to production efficiency and customer requirements.
> The importance of maintaining a clean working area is explained.
> Mathematical principles and techniques are applied while performing the tasks related to metals production activities.
> Oral and written communication is maintained and adapted as required to promote effective interaction in a metals production context.

Associated Assessment Criteria for Exit Level Outcome 2:

> Problems are identified and addressed in terms of process controller's scope of practice.
> Solutions to production problems are based on an analysis of information gathered through diagnostic procedures.
> Mathematical techniques and competencies are used to solve problems.
> Procedures are modified to respond to unfamiliar problems where appropriate.
> Problems beyond scope of a process controller are communicated to appropriate personnel to be resolved within appropriate timeframes.
> All actions related to problem solving are accurately recorded for future reference.

Associated Assessment Criteria for Exit Level Outcome 3:

> Equipment functioning and operations are explained through an in-depth understanding of the components and systems that constitute them.
> Machinery malfunction during production is identified to demonstrate knowledge of familiar problems.
> Equipment repair and preventive maintenance needs are communicated and discussed with production and maintenance specialists.
> Defect types are categorised and the root cause of problem established.
> Checks are conducted to ensure that repairs and maintenance have been carried out.

Associated Assessment Criteria for Exit Level Outcome 4:

> Tasks/responsibilities allocated to team members are appropriate to production process requirements and to level of skill of team members in a consistent and timely manner.
> Team members are coached on processes and procedures as they are applied in metals production to ensure production targets are met and efficiencies maintained.

> Problems/misunderstandings between team members are discussed or managed (where applicable) to ensure a cooperative work environment.

Associated Assessment Criteria for Exit Level Outcome 5:

> Occupational health, safety, environmental, quality and risk management policies and procedures are explained and applied in area of responsibility and are implemented and updated where required.
> A safe environment is maintained for team members to work.
> Safety, health, environmental, quality and risk management practices are investigated systematically and suggestions for improvement made as appropriate.
> All actions related to maintaining safety, health, environmental, quality and risk management procedures are documented.

Associated Assessment Criteria for Exit level outcome 6:

> Conditions, evidence and incidents are reported accurately in a timely manner and discussed with peers and management.
> Data gathered through diagnostic procedures is examined systematically and analysis is repeated until problem is solved.
> Records are available for scrutiny and future reference.

Integrated Assessment:

The importance of integrated assessment is to confirm that the learner is able to demonstrate applied competence (practical, foundational and reflexive) and ensure that the purpose of this Qualification is achieved. Both formative and summative assessment methods and strategies are used to ensure that the Exit Level Outcomes and the purpose of the Qualification are achieved through achieving the Unit Standards. Learning, teaching and assessment are inextricably linked.

Learning and assessment should be integrated and assessment practices must be fair, transparent, valid and reliable. A variety of assessment strategies and approaches must be used. This could include tests, assignments, projects, demonstrations and/or any applicable method. Evidence of the acquisition of competencies must be demonstrated through the Unit Standards, which enhance the integration of theory and practice as deemed appropriate at this level.

Formative assessment is an on-going process which is used to assess the efficacy of the teaching and learning process. It is used to plan appropriate learning experiences to meet the learner's needs. Formative assessments can include a mix of simulated and actual (real) practice or authentic settings. Feedback from assessment informs both teaching and learning. If the learner has met the assessment criteria of all the Unit Standards then s/he has achieved the Exit Level Outcomes of the Qualification.

Summative assessment is concerned with the judgement of the learning in relation to the Exit Level Outcomes of the Qualification. Such judgement must include integrated assessment(s) which test the learners' ability to integrate the larger body of knowledge, skills and attitudes, which are represented by the Exit Level Outcomes. Summative assessment can take the form of oral, written and practical examinations as agreed to by the relevant ETQA.

Integrated assessment must be designed to achieve the following:

> An integration of the achievement of the Exit Level Outcomes in a way that reflects a comprehensive approach to learning and shows that the purpose of the Qualification has been achieved.

> Judgement of learner performance to provide evidence of applied competence or capability.

Assessors and moderators should make use of a range of formative and summative assessment methods. Assessors should assess and give credit for the evidence of learning that has already been acquired through formal, informal and non-formal learning and work experience.

Assessment should ensure that all specific outcomes, embedded knowledge and critical cross-field outcomes are assessed. The assessment of the critical cross-field outcomes should be integrated with the assessment of specific outcomes and embedded knowledge.

INTERNATIONAL COMPARABILITY

This is the third and last in a series of three qualifications. In terms of the learning pathway, a learner has the opportunity to start at Level 2 and progress to Level 4 in the Metal Production environment. Hence, there is a duplication of competencies between the three qualifications; competencies acquired at Level 2 are used as a foundation to acquire other competencies at Level 3 and competencies acquired at Level 3 form the foundation for competencies at Level 4. It follows that the international comparability also reflects the overlap of the competencies.

The following competencies are addressed by this Qualification:

> Set-up and control a metals production process to ensure quality products.
> Maintain and support procedures to solve a variety of problems within a metals production process.
> Demonstrate a familiarity with process machinery operations and procedures in a particular context in order to diagnose and troubleshoot machinery functioning.
> Demonstrate the ability to coordinate team to run a metals production process.
> Promote, implement and maintain procedures that support safety, health, the environment, quality and risk management.
> Communicate and present information clearly and accurately and demonstrate the ability to analyse information to identify problems and determine trends.

The following countries were chosen primarily for two reasons:

> They are significant metal producing countries.
> They have a substantial number of providers for this type of training.

These are:

> The United Kingdom.
> India.
> The United States.
> Canada.
> China and Japan.
> New Zealand.
> Australia.

It must be noted that although India, for instance, is a significant metal producer, information on the training is severely limited. The websites of Nigeria, Ghana, Angola, Botswana, Zambia and Tunisia were checked, to no avail in terms of comparability purposes.

It must be noted that although India, for instance, is a significant metal producer, information on the training is severely limited.

United Kingdom:

Oxford Cambridge RSA Qualification Examination (OCR):

The Manufacturing and Product Design (Level 3) qualification of the Oxford Cambridge RSA Qualification Examination in the United Kingdom is also to be implemented in 2009. Its draft unit titles - which constitute the principal learning - have resonance with the competencies of the South African Level 4 qualification in Metal Production. Although the UK qualification is focussed on product design and is located primarily in the manufacturing environment, there are many generic competencies that can be drawn upon for comparison purposes. In fact, manufacturing and production are closely related but not identical.

The draft unit titles are:

> Manufacturing business principles.
> Manufacturing: customer needs and market requirements.
> The importance of supply chain management to manufacturing.
> Management of resources and working practices in manufacturing.
> Research, development and introduction of new manufactured products.
> Manufacturing: Theory and application of materials Science.
> Production and processing systems in manufacturing.
> Management of production and processing operations in manufacturing.
> Quality in manufacturing.

Assessment and Qualification Alliance (AQA) and City & Guilds:

Assessment and Qualification Alliance (AQA) is the UK's main provider of GCSEs and A levels. City & Guilds is well-known for vocational qualifications. It works closely with employers and industry bodies to ensure that its qualifications provide the benchmark standard for workplace skills and knowledge.

The collaboration between AQA and C&G brings together the providers of qualifications in both fields to provide all the support needed to deliver them at one point of contact.

AQA and C&G offer the Foundation Diploma in Engineering at Level 1 in the UK. As part of this course they offer a unit on 'Manufacturing engineering' which is relevant to this qualification.

The purpose of this unit is to provide learners with an understanding of multiple production processes relevant to the engineering world. Learners will undertake a range of practical processes including production and resource planning, providing evidence of methods and processes used. They will also carry out quality control procedures by testing part completed and finished products or components. This is a practical unit which allows the learner to replicate the methods used to produce a component or system on a quantity production basis, as well as using processes, tools and equipment safely and effectively. The emphasis on different engineering manufacturing processes is particularly important in order for learners to gain a broad understanding of the Engineering industry.

An important aspect of this unit is the emphasis on project planning and team working, including the use of people resources and ensuring that team members are using their skills and abilities in order to be most effective in the production process. Learners should be encouraged to both review their own work and get feedback from others. They should use the review and the feedback to improve their work.

Learning outcomes:

The learner will:

> Be able to plan and prepare for the production of multiple components.

> Be able to perform manufacturing processes.
> Know about Health and Safety and quality standards, and be able to apply them to manufacturing processes.

Assessment criteria:

Plan and prepare for the production of multiple components:

The learner can:

> Plan, and prepare for, sequences of processes or operations for multiple production, including:
 > Scheduling operations, e.g. by using Gantt charts.
 > Considering opportunities for automated processes to be used.
 > Preparing for multiple production by producing moulds, tools and jig/fixtures.
 > Developing a production plan.
> Understand the importance of setting up machines.
> Recognise that machining operations can be carried out manually and using computer control.
> Plan, contribute and work as a member of a team when preparing for the production of multiple components.

Perform manufacturing processes.

The learner can:

> Explain the use of computer numerical controlled (CNC) machines including programming methods.
> Use engineering manufacturing processes.
> Carry out machining operations manually and using computer control to produce components to specifications and tolerances.
> Work in groups, adapting behaviour to suit a wide range of engineering manufacturing processes when producing multiple components.

Apply Health and Safety and quality standards to manufacturing processes.

The learner can:

> Explain the importance of Health and Safety in an industrial workplace.
> Describe how quality control procedures are used when producing in quantity by:
 > Explaining how statistical methods are applied to testing.
 > Revising test procedures:
 > Evaluating procedures to inform future progress.
> Follow quality control procedures by:
 > Using test or measurement equipment.
 > Using statistical methods when testing (IE2).
> Follow safety procedures when working in an industrial environment (SM4).

Another relevant unit is 'Maintenance' from the Higher Diploma in Engineering at Level 2 in the UK.

The purpose of this unit is for learners to understand the importance of engineering maintenance, and also to develop the practical ability to carry out the removal and replacement of worn or damaged components. Learners should also be able to recognise the need for routine maintenance by using simple diagnostic techniques and statistical data. Skills and techniques used in this unit will allow the learner to work with confidence in other units, reflect on past experience, and transfer their skills from one sector to another. This is an important

aspect of the unit as many sectors are engaged in maintenance operations and will adopt similar strategies to carry out the work.

Learning outcomes:

The learner will:

> Be able to describe and evaluate the operation of a simple maintenance system.
> Be able to complete and record maintenance procedures.

Assessment criteria:

Describe and evaluate the operation of a maintenance system:

The learner can:

> Explain the use of policies relating to controlling risks to Health and Safety in terms of:
> Health and Safety procedures in the workplace (SM4).
> The use of personal protective equipment (PPE).
> Identifying the responsibility for Health and Safety and for reporting Health and Safety matters and realising the importance of personal conduct.
> Identifying the hazards that may exist in a workplace.
> Describe, interpret and use sources of technical information (IE4).
> Source technical information and data to support maintenance activities (IE2).
> Explain the importance of planned maintenance and shutdown operations (IE6).
> Document simple maintenance operations.
> Explain and record component failure using statistical data.
> Report problems or issues to the relevant person(s) promptly.
> Explain the importance of ensuring maintenance operations are correctly carried out.

Complete and record maintenance procedures:

The learner can:

> Use aural, visual and functional methods to carry out examination procedures.
> Follow correct procedures for removal and replacement of worn or damaged components.
> Select correct tools, equipment and materials for different types of engineering maintenance procedures.
> Demonstrate the use of PPE when carrying out maintenance operations.
> Conform to safe working practices.
> Remove and replace components to manufacturers' specifications.
> Demonstrate the use of simple diagnostic procedures.
> Use investigative procedures to determine causes of failure.
> Select and use tools and materials for carrying out maintenance operations, and devise simple maintenance procedures.
> Complete documentation to record the maintenance operations carried out.

Another unit from the Advanced Diploma in Engineering at Level 3 also has relevance for this qualification. This unit is entitled Production and manufacturing.

The purpose of this unit is to provide learners with the opportunity to learn about the types and methods of production and manufacturing processes and systems, including the operation of computerised systems within engineering. Learners will apply their understanding of manufacturing and production systems and develop a production plan, taking into consideration all the influencing factors, including implications of quality control and quality assurance.

Learning outcomes:

The learner will:

> Know the types, uses and importance of engineering manufacturing systems.
> Understand quality control and quality assurance within the Engineering sector.
> Know about and be able to carry out engineering production planning.

Assessment criteria:

Engineering manufacturing systems:

The learner can:

> Describe and analyse different types of manufacturing processes and applications including suitability for:
> One-off production.
> Mass production.
> Batch production.
> Continuous production.
> Explain the importance and operation of computerised manufacturing systems such as:
> Computer Aided Engineering (CAE).
> Computer Aided Manufacturing (CAM).
> Computer numerical control (CNC).
> Describe and compare production systems used in Engineering industries including:
> Lean manufacturing, continuous process improvement and waste reduction.
> Flexible manufacturing and automation.
> Just in time (JIT) and Kanban.
> Assembly systems and techniques.

Quality control and quality assurance within the engineering sector:

The learner can:

> Critically analyse the factors influencing production systems, such as:
> Quality control.
> Quality assurance.
> Describe quality control and quality assurance requirements in manufacturing and production, such as:
> Applying Six Sigma methodology.
> Process improvement.
> Applying basic statistical control.
> Demonstrate analytical and problem-solving skills by using statistical methods as part of ensuring quality of manufacture (EP3).

Engineering production planning:

The learner can:

Explain production requirements, planning and scheduling, including:

> Costing:
> Fixed.
> Variable.

> Production control:
> Gantt charts.
> Inspection.
> Quality control.

Carry out the development of a production plan for a complex manufacturing operation.

Carry out project planning and scheduling for a complex manufacturing operation.

National Standards Developed by Specialist Bodies:

A variety of national standards developed by sector skills authorities in the United Kingdom has relevance for aspects of this qualification. Some of these bodies are Metal Processing and Allied operations(Metals Industry Skills & Performance Ltd), Chemical, Pharmaceutical and Petro-Chemicals Operations (Cogent) and others.

Unit Title: Control and maintain quality within multi-stage manufacturing operations.

While this unit is focusssed on the food industry, it has generic application in terms of the competencies.

This unit is about the essential activity of controlling and maintaining quality within multi-stage manufacturing operations as part of the processing and packaging of food and drink products. This includes:

> Achieving product specification and operational targets.
> Maintaining operations.
> Complying with legislation and your company's requirements.
> Communicating with the necessary people.
> Completing the necessary records.

This unit contains two elements:

> Achieve product specification and operational targets.
> Maintain operations.

Unit Title: Achieve product specification by adjusting process parameters.

This unit is for those working on the manufacture of metal products and covers set-up, monitoring and checking of machinery and equipment in line with production specifications. You must demonstrate competence in setting up machinery and equipment accurately, evaluating the design under production conditions, identifying possible discrepancies, and testing and checking that products meet specifications.

This unit contains two elements:

> Set up machinery and equipment to produce prototype product.
> Monitor, evaluate and adjust the processing parameters to achieve product specification.

An individual doing the Level 4 Metal Production Qualification will also require these competencies.

Unit Title: Assess production feasibility:

This unit covers the skills and knowledge you will need to assess product feasibility. This involves establishing the method of working that is required that is specific to the process, and then assessing the requirements for and the availability of required resources.

In achieving this element you must:

> Assess work that needs to be carried out in order to meet client specifications.
> Present suitable alternatives for discussion with client where client specifications cannot be met.
> Clarify any problems in achieving client specification with relevant personnel.
> Inform the client promptly where specifications cannot be met and suitable alternatives are unavailable.
> Ensure that product specifications accepted are within resource capabilities and conform to organisational requirements.
> Develop the method of working to achieve client specification according to operational and organisational requirements.
> Record relevant information using appropriate documentation.
> Follow relevant Health & Safety and environmental requirements and legislation at all times.

Unit Title: Carry out complex manual operations:

This unit covers the skills and knowledge you need to produce process outcomes by carrying out complex manual operations. it is suitable for process industries personnel who have responsibility for complex manual operations at any stage of the process, including complex manual packaging.

This involves:

> Interpreting specifications and setting up equipment accordingly.
> Operating and responding to problems with equipment.
> Monitoring the operation and taking steps to deal with problems so that an optimum outcome is achieved.
> Making sure that equipment is left in a suitable state after use.
> Keeping records.

This unit is suitable for process industries personnel who have responsibility for complex manual operations at any stage of the process, including complex manual packaging.

There are three elements in this unit, each of which has performance standards, a scope section specific to each element, and the associated knowledge base is detailed at the end of the unit.

> Prepare for complex manual process operations.
> Control the outcomes of complex manual operations.

Restore the manual process equipment and work area after use.

Unit Title: Allocate personnel to maintain processing:

This unit addresses the competence required to allocate personnel to ensure the processing operation achieves its objectives. This involves:

> Planning the work of teams and individuals.
> Providing feedback when necessary for teams and individuals.
> Ensuring planned process objectives are achieved.
> Maintaining your own and other's safety while working.

There are two elements in this unit, each of which has performance standards and a knowledge base associated with it.

> Plan the work.
> Achieve the objectives.

Unit Title: Analysing the results of inspection and confirming quality of production.

This unit covers the skills and knowledge required to evaluate the results of the inspection and testing procedure, taking the appropriate action to confirm the quality of the products and materials according to defined operating procedures.

This unit on confirming quality of production involves:

> Evaluating and interpreting results of inspection and testing.
> Confirming the quality of samples, products and materials.
> Identifying and reporting any samples, products and materials which do not meet quality requirements.
> Correctly recording inspection and testing results.
> Reporting unsolvable problems, or problems that you are not responsible for, to the appropriate person.
> Working in ways which maintain the safety of yourself and others.

Unit Title: Conduct sample analysis.

This unit is for individuals who analyse samples and evaluate the production implications of producing the same or similar products. This is often an essential part of the product development process. The unit covers the process of analysis which consists of: identification of materials and components, recommendation of appropriate machinery and equipment to re-produce the sample product and evaluation of the sample when it has been produced.

> Carry out sample analysis.
> Contribute to sample production.
> Evaluate the prototype sample.

Unit Title: Configure and set processing systems to meet production requirements.

The scope of the work is such that the individual would be expected to know when problems which might arise can be dealt with directly or when specialist assistance is required. The processing system may be for continuous or batch production and should include ancillary equipment.

This involves:

> Establishing configuration requirements from specifications and schedules.
> Making sure you have the necessary equipment, tools and people to complete the configuration safely and effectively within the specified timescale.
> Integrating processing equipment and ancillary equipment to function as an effective and efficient system.
> Carrying out safety checks to ensure that equipment and the work area are safe and free from potential hazards.
> Setting and adjusting processing parameters to comply with the processing specification.
> Using visual inspections, monitoring devices and test results to check and verify equipment settings.
> Identifying and reporting specified settings that appear to conflict with production requirements.

> Monitoring the process system to identify variances from specification and taking appropriate action to maximise efficiency and effectiveness of the system.
> Testing the system over a period of time to ensure consistency of performance.
> Maintaining the records required for keeping specifications up-to-date.
> Providing information to those who will run, maintain or quality assure the processing system.

Unit Title: Controlling manufacturing operations.

This unit covers the skills and knowledge required to control manufacturing operations according to defined operating procedures. It involves gathering data that accurately reflects the condition of the manufacturing process, interpreting the data to identify any trends, variance or discrepancy, and restoring operating parameters to the process specifications promptly by making any adjustments allowable within the limits of your responsibility.

This unit on controlling manufacturing operations involves:

> Gathering data which accurately reflects the condition of the manufacturing process.
> Interpreting the data to identify any trends, variance or discrepancy.
> Restoring operating parameters by making allowable adjustments.
> Making sure the production continues to meet specification.
> Correctly recording information about data collection, data interpretation and any adjustments made to the manufacturing operation.
> Reporting problems to the relevant person.
> Working in ways which maintain the safety of yourself and others.

India:

India is a substantial producer of metals mainly steel. While websites for the many Indian steel companies provide much information, unlike in the UK they contain very little information on the kind of training and the respective levels at which the training that takes.

The following information - pertinent to this qualification was obtained from the website of the National Institute of Secondary Steel Technology in India. Seminars/Workshops/Training/In-house Programmes are held on the following aspects:

Details of Seminars/Workshops/Training/In-house Programmes:

> Rolling Technology; Concept and Development.
> 8 Modules Training programme on Melting and Casting covering Induction Furnace.
> Improving efficiency of reheating furnace.
> Energy optimisation of reheating furnace.
> In-house training programme for rolling mills.
> Cost Reduction by energy conservation in Re-rolling mills.
> In-house training programme on improvement in foundry practice.
> Total Quality Management.
> Reheating Furnace Optimisation.
> Safety Awareness in Secondary Steel Sector.
> Optimization of operating parameters in secondary steel sector (Electrical, Thermal etc.).
> Energy Efficiency Improvement in re-rolling mills.
> Industrial Metallurgy.
> Performance optimization of induction furnace steelmelting.
> Rolling of Angles and Rectification of Defects.
> Energy Conservation in Steelmaking.
> Rolling Mill Operation.
> Importance of Safety Training and Inspection in Induction Furnace units.

The United States:

According to the websites of the American Iron and Steel Institute the education and training you need to work in the steel industry depends on the kind of job you want. Some companies prefer to hire high school or vocational school graduates for processing jobs. Most training is done on the job, however. Usually, workers start in unskilled jobs and learn by helping experienced workers. It takes up to four years to learn some of the most highly skilled jobs, such as those of blowers or rollers, but you may have to wait much longer for an opening in one of these positions. Steel companies often encourage their employees to take courses in subjects such as chemistry, physics, or metallurgy to upgrade their skills.

To qualify for one of the maintenance trades such as those of machinists, millwrights, or pipe fitters, you usually have to serve a three- to four-year apprenticeship. Generally, apprentices are chosen from among high school or vocational school graduates already employed in the plant. To qualify for a job as an administrator or engineer, you usually need a bachelor's degree in the appropriate field. New professional employees often go through a formal training period in the plant before they are fully qualified.

Advancement in plant jobs in the steel industry usually follows a set pattern. For example, a worker may start as a laborer and become a second helper, a first helper, and then a keeper before advancing to a job as a blast furnace blower. Companies usually consider such factors as experience and leadership ability when promoting workers into positions that require the supervision of other workers.

The website of the United Steelworkers of America does not have any information regarding training in metals production at these levels.

Canada:

According to the Human Resources and Social Development Canada, in the primary metal industry most training is done on the job and does not involve the acquisition of formal certifiable skills. In recent years the steel division has made a major effort to increase levels of literacy and numeracy among its personnel. Much of this has been done through the Canadian Steel Trade and Employment Congress (CSTEC) which has developed a wide range of programs offered through secondary schools, community colleges, CEGEP's and, in some cases, through universities. CSTEC has also developed a distance learning initiative to teach basic skills. The levels at which training is done remains unspecified.

While on-the-job training is the most common form of training in the primary metal industry, training is becoming increasingly formalised through the work of CSTEC. CSTEC has begun to develop standardised job descriptions for basic occupations in the industry and to design training packages in basic steel making practice.

China and Japan:

China is one of the world's biggest metals producers. Japan is a producer of steel. However, an intense internet search proved futile in terms of locating and obtaining information about training within the metal production at this level. In Japan, a search of the following steel producing companies yielded no results: Itoshu Corporation and Nippon Steel Corporation, the second largest steel producer in the world.

New Zealand:

The following Unit Standards are relevant to the competencies that will be acquired through this Qualification.

Standard Title: Complete heat treatment of metals in a furnace.

People credited with this unit standard are able to: demonstrate knowledge of heat treatment equipment and materials; prepare for and complete heat treatment of metals; and test metals and document results. Heat treatments may include homogenising, annealing, normalising, stress relieving, hardening, recrystalisation, and tempering. This standard also includes knowledge of furnaces, hazards of the workplace and quality control mechanisms.

Standard Title: Control automated multihearth furnace and kiln processes.

People credited with this unit standard are able to: Control multihearth furnace (MHF) and kiln processes; communicate process requirements; and monitor plant performance. This includes controlling multiple process streams and maintaining production schedules.

Standard Title: Control iron melting operations on the floor.

People credited with this unit standard are able to: Monitor plant performance; interpret process information; operate plant; and rectify plant failures. This also involves managing plant breakdown and communicating breakdown information to enable the production schedule.

Standard Title: Control iron melting process parameters from a control room.

Learners credited with this unit standard are able to: Control iron making process parameters; manage plant malfunction and breakdown; and optimise melter integrity. This involves controlling multiple process streams and the prioritisation of remedial actions.

Standard Title: Control molten iron and slag tapping operations on the floor.

Learners credited with this unit standard are able to: Identify molten iron and slag tapping requirements; coordinate the activities of tappers to achieve taps; and organise support services for tapping.

Standard Title: Maintain metal transfer for casting using an overhead crane.

Learners credited with this unit are able to: Transport ladles of liquid steel; perform specific maintenance lifts; and manage crane operations.

Standard Title: Maintain metal transfer for steelmaking using an overhead crane.

Learners credited with this unit are able to: Charge the oxygen steelmaking vessel; transport ladles of liquid steel; and remove and replace the oxygen steelmaking vessel.

Standard Title: Demonstrate knowledge of heat treatment for engineering non-ferrous metals.

Persons credited with this unit standard are able to demonstrate knowledge of: The principles of heat treatment of non-ferrous metals; heat treatment processes; and heat treatment applications.

Standard Title: Monitor and control kilns, multihearth furnaces.

Learners credited with this unit standard are able to: Control kiln start-up process; monitor and control plant performance; and deal with contingency situations.

Standard Title: Schedule a production process.

People credited with this unit standard are able to: Select orders to be scheduled and match feedstock; sort orders into sequence; and produce schedules for production staff.

This unit standard is designed for schedulers with responsibility for scheduling the production of a single work centre over a restricted time-frame (typically up to one week), and working from a given master production schedule.

Australia:

The following information has been taken from the National Training Information Service (NTIS) of Australia.

The following standards are relevant to this Qualification.

MEM24012B: Apply metallurgy principles.

MEM14005A: Plan a complete activity.

This unit covers planning activities which, whilst following established procedures, may require a response and modification of procedures or choice of different procedures to deal with unforeseen developments. The unit covers the development of plans for individual complete activities and may include the use of planning techniques and tools. The activity may require prioritising of the individual plan components to facilitate the meeting of the objectives.

MEM15005B: Select and control inspection processes and procedures.

This unit covers selecting inspection and test procedures, and controlling the inspection/test environment and equipment. This unit is not intended to be applied to maintenance personnel carrying out their day-to-day activities, for example, fault finding, remedial and checking activities.

MEM16005A: Operate as a team member to conduct manufacturing, engineering or related activities.

This unit covers operating as a member of a team, where operations and outcomes are dependent on the performance of the entire team. This unit applies to a range of team activities that are carried out within a section of a manufacturing, engineering or a related work environment. Activities are interdependent in nature, with each team member providing a critical component of the output. Effective interaction and collaboration between team members is required in order to achieve team goals.

MEM18011C: Shut down and isolate machines/equipment.

This unit covers isolating and shutting down machines and equipment. It applies to situations that require extensive system knowledge that exclude the straightforward starting/stopping of machinery/equipment through the use of simple switching, including use of emergency switches. Shut-down/isolation is undertaken autonomously or as part of teamwork.

MEM15002A: Apply quality systems.

This unit is applicable for any work within a quality improvement system in a manufacturing, engineering or related environment. The definition of customer is wide and applies to the next person or organisation receiving the product or service. Application may include quality inspection of own or other employee's work up to the level of the employee's technical competence.

In conclusion, a Qualification very similar to this one could not be found. At this level most countries seem to offer skills programmes. This Qualification is far more comprehensive in terms of the competencies it offers.

ARTICULATION OPTIONS
This Qualification lends itself to both vertical and horizontal articulation possibilities.

Horizontal articulation is possible with the following Qualifications:

> ID 58779: Further Education and Training Certificate: Production Technology at NQF Level 4 .
> National Certificate: Mineral Processing at NQF Level 4 (under development).

Vertical articulation is possible with the following qualifications:

> Diploma: Production Technology at NQF Level 5.

MODERATION OPTIONS
> Anyone assessing a learner or moderating the assessment of a learner against this Qualification must be registered as an assessor with the relevant Education, Training, Quality, and Assurance (ETQA) Body.

> Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant ETQA.

> Assessment and moderation of assessment will be overseen by the relevant ETQA according to the ETQA's policies and guidelines for assessment and moderation; in terms of agreements reached around assessment and moderation between ETQA's (including professional bodies); and in terms of the moderation guideline detailed immediately below.

> Moderation must include both internal and external moderation of assessments at exit points of the Qualification, unless ETQA policies specify otherwise. Moderation should also encompass achievement of the competence described both in individual unit standards, the integrated competence described in the Qualification and will include competence within core sales and the elective standards relevant to the economic sector.

> Anyone wishing to be assessed against this Qualification may apply to be assessed by any assessment agency, assessor or provider institution that is accredited by the relevant ETQA.

CRITERIA FOR THE REGISTRATION OF ASSESSORS
For an applicant to register as an assessor, the applicant needs:

> A minimum of 2 (two) years' practical, relevant occupational experience.
> A relevant Qualification at NQF Level 5 or higher.
> To be registered as an assessor with the relevant ETQA.

NOTES
This qualification replaces qualification 49020, "Further Education and Training Certificate: Metals Production", Level 4, 146 credits.

UNIT STANDARDS

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Fundamental	119472	Accommodate audience and context needs in oral/signed communication	Level 3	5
Fundamental	119457	Interpret and use information from texts	Level 3	5
Fundamental	119467	Use language and communication in occupational learning programmes	Level 3	5

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Fundamental	119465	Write/present/sign texts for a range of communicative contexts	Level 3	5
Fundamental	9015	Apply knowledge of statistics and probability to critically interrogate and effectively communicate findings on life related problems	Level 4	6
Fundamental	119462	Engage in sustained oral/signed communication and evaluate spoken/signed texts	Level 4	5
Fundamental	119469	Read/view, analyse and respond to a variety of texts	Level 4	5
Fundamental	9016	Represent analyse and calculate shape and motion in 2- and 3-dimensional space in different contexts	Level 4	4
Fundamental	119471	Use language and communication in occupational learning programmes	Level 4	5
Fundamental	7468	Use mathematics to investigate and monitor the financial aspects of personal, business, national and international issues	Level 4	6
Fundamental	119459	Write/present/sign for a wide range of contexts	Level 4	5
Core	259694	Control a production process	Level 4	25
Core	120366	Demonstrate understanding of the implementation of occupational health, safety and environmental legislation in the work place	Level 4	9
Core	243301	Manage safety and emergency incidences	Level 4	6
Core	14586	Monitor and control quality control practices in a manufacturing/engineering environment	Level 4	8
Core	259685	Plan and set-up a metals production process	Level 4	13
Core	242811	Prioritise time and work for self and team	Level 4	5
Core	242817	Solve problems, make decisions and implement solutions	Level 4	8
Elective	12429	Develop a personal financial plan	Level 3	2
Elective	116714	Lead a team, plan, allocate and assess their work	Level 3	4
Elective	242815	Apply the organisation's code of conduct in a work environment	Level 4	5
Elective	114884	Co-ordinate the improvement of productivity within a functional unit	Level 4	8
Elective	9506	Communicate in an assertive manner with clients and fellow workers	Level 4	4
Elective	242816	Conduct a structured meeting	Level 4	5
Elective	13254	Contribute to the implementation and maintenance of business processes	Level 4	10
Elective	259725	Control a converting process in a metallurgical plant	Level 4	25
Elective	259695	Control the operation of a pelletizing process	Level 4	25
Elective	242822	Employ a systematic approach to achieving objectives	Level 4	10
Elective	242813	Explain the contribution made by own area of responsibility to the overall organisational strategy	Level 4	5
Elective	114877	Formulate and implement an action plan to improve productivity within an organisational unit	Level 4	8
Elective	242821	Identify responsibilities of a team leader in ensuring that organisational standards are met	Level 4	6
Elective	110009	Manage administration records	Level 4	4
Elective	9505	Manage basic business and personal finance	Level 4	6
Elective	11473	Manage individual and team performance	Level 4	8
Elective	254596	Manage time keeping records	Level 4	5
Elective	114589	Manage time productively	Level 4	4
Elective	242819	Motivate and Build a Team	Level 4	10
Elective	259700	Remove impurities from molten metal by means of a vertical converting process	Level 4	17
Elective	118028	Supervise customer service standards	Level 4	8
Elective	116389	Write a technical report	Level 4	4
Elective	15234	Apply efficient time management to the work of a department/division/section	Level 5	4
Elective	10631	Demonstrate an understanding of manufacturing, principles, methodologies and processes	Level 5	7

LEARNING PROGRAMMES RECORDED AGAINST THIS QUALIFICATION
None

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Plan and set-up a metals production process

SAQA US ID	*UNIT STANDARD TITLE*		
259685	Plan and set-up a metals production process		
ORIGINATOR		*PROVIDER*	
SGB Manufacturing and Assembly Processes			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	13

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the controlling of a production process.

SPECIFIC OUTCOME 2
Plan the production process.

SPECIFIC OUTCOME 3
Set-up the production process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	64209	Further Education and Training Certificate: Metals Production	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Control a production process

SAQA US ID	*UNIT STANDARD TITLE*		
259694	Control a production process		
ORIGINATOR		*PROVIDER*	
SGB Manufacturing and Assembly Processes			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	25

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Start-up/initiate the production process.

SPECIFIC OUTCOME 2
Control the process for a particular production schedule.

SPECIFIC OUTCOME 3
Inspect the product-in-process.

SPECIFIC OUTCOME 4
Identify and respond to problems that occur during the production operation.

SPECIFIC OUTCOME 5
Complete shift changeover process.

SPECIFIC OUTCOME 6
Shutdown the production process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	64209	Further Education and Training Certificate: Metals Production	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Control the operation of a pelletizing process

SAQA US ID	*UNIT STANDARD TITLE*		
259695	Control the operation of a pelletizing process		
ORIGINATOR		*PROVIDER*	
SGB Manufacturing and Assembly Processes			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Fabrication and Extraction	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	25

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the controlling of a pelletizing process.

SPECIFIC OUTCOME 2
Demonstrate knowledge relating to the operation of a pelletizing process.

SPECIFIC OUTCOME 3
Control a pelletizing process.

SPECIFIC OUTCOME 4
Complete the duties pertaining to the controlling of a pelletizing process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64209	Further Education and Training Certificate: Metals Production	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Remove impurities from molten metal by means of a vertical converting process

SAQA US ID	*UNIT STANDARD TITLE*		
259700	Remove impurities from molten metal by means of a vertical converting process		
ORIGINATOR		*PROVIDER*	
SGB Manufacturing and Assembly Processes			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Fabrication and Extraction	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	17

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the removing of impurities from molten metal by means of a vertical converting process.

SPECIFIC OUTCOME 2
Prepare to remove impurities.

SPECIFIC OUTCOME 3
Remove impurities.

SPECIFIC OUTCOME 4
Complete the duties pertaining to the vertical converting process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64209	Further Education and Training Certificate: Metals Production	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Control a converting process in a metallurgical plant

SAQA US ID	*UNIT STANDARD TITLE*		
259725	Control a converting process in a metallurgical plant		
ORIGINATOR		*PROVIDER*	
SGB Manufacturing and Assembly Processes			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Fabrication and Extraction	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	25

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the controlling of a converting process.

SPECIFIC OUTCOME 2
Demonstrate knowledge relating to the operation of a converting process.

SPECIFIC OUTCOME 3
Control a Converting process.

SPECIFIC OUTCOME 4
Complete the duties pertaining to the controlling of a converting process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64209	Further Education and Training Certificate: Metals Production	Level 4