Federal Democratic Republic of Ethiopia

OCCUPATIONAL STANDARD

CEMENT PRODUCTION EQUIPMENT OPERATION

NTQF Level II

Ministry of Education

January 2011

Introduction

Ethiopia has embarked on a process of reforming its TVET-System. Within the policies and strategies of the Ethiopian Government, technology transformation – by using international standards and international best practices as the basis, and, adopting, adapting and verifying them in the Ethiopian context – is a pivotal element. TVET is given an important role with regard to technology transfer. The new paradigm in the outcome-based TVET system is the orientation at the current and anticipated future demand of the economy and the labor market.

The Ethiopia Occupational Standards (EOS) is the core element of the Ethiopian National TVET-Strategy and an important factor within the context of the National TVET-Qualification Framework (NTQF).They are national Ethiopian standards, which define the occupational requirements and expected outcome related to a specific occupation without taking TVET delivery into account.

This document details the mandatory format, sequencing, wording and layout for the Ethiopia Occupational Standard which comprised of Units of Competence.

A Unit of Competence describes a distinct work activity. It is documented in a standard format that comprises:

- Occupational title, NTQF level
- Unit code
- Unit title
- Unit descriptor
- Elements and Performance criteria
- Variables and Range statement
- Evidence guide

Together all the parts of a Unit of Competence guide the assessor in determining whether the candidate is competent.

The ensuing sections of this EOS document comprise a description of the respective occupation with all the key components of a Unit of Competence:

- the chart with an overview of all Units of Competence for the respective occupation including the Unit Codes and the Unit Titles
- the contents of each Unit of Competence (competence standard)
- occupational map providing the technical and vocational education and training (TVET) providers with information and important requirements to consider when designing training programs for this standards, and for the individual, a career path

UNIT OF COMPETENCE CHART

Occupational Standard: Cement Production Equipment Operation

Occupational Code: IND CEO

NTQF II

IND CEO2 01 0111 Sample and Test Materials and Product	IND CEO2 02 0111 Operate Grinding Equipment	IND CEO2 03 0111 Operate Crushing Equipment
IND CEO2 04 0111 Operate Kiln	IND CEO2 05 0111 Maintain kiln Refractory	IND CEO2 06 0111 Install and Repair Refractory Brickwork/ Blockwork
IND CEO2 07 0111 Monitor Process Capability	IND CEO2 08 0111 Select and prepare Materials	IND CEO2 09 0111 Use Sustainable Energy Practices
IND CEO2 10 0111 Use Sustainable Environmental Practices	IND CEO2 11 0111 Use Enterprise Computers or Data Systems	IND CEO2 12 0111 Work In Team Environment
IND CEO2 13 0111 Participate In Workplace Communication	IND CEO2 14 0111 Develop Business Practice	IND CEO2 15 1012 Apply Continuous Improvement Processes (Kaizen)

TOP

Occupational Standard: Cement Production Equipment Operation Level II	
Unit Title	**Sample and Test Materials and Product**
Unit Code	**IND CEO2 01 0111**
Unit Descriptor	This competence covers the taking of routine samples and the conducting of simple tests

Elements	Performance Criteria
1. Take sample	1.1. Type of sample and sampling equipment required are determined. 1.2. Check sampling equipment is cleaned and in good order. 1.3. Sample of required type(s) is taken from the required place(s) and at the required time(s) and placed in required container(s). 1.4. Sample is labeled to procedure. 1.5. Sample(s) is carried to required place
2. Complete test	2.1 Test required is checked from procedures/work instruction. 2.2 Sample identification and integrity is checked. 2.3 Check test equipment is cleaned, in good order and within calibration. 2.4 Test(s) required is completed as per standard procedures/instructions 2.5 *Routine problems* are responded and handled in accordance with enterprise standard procedures and protocols
3. Interpret results and take action	3.1 Anything/***problem*** about sample, equipment or the test itself is noted which may have caused it to give a bad result. 3.2 Results are compared to specification. 3.3 Action appropriate to the test results and any other observations is taken
4. Complete sample and test cycle	4.1 Required records are completed. 4.2 Sample is stored and/or disposed of as required. 4.3 All equipment is cleaned and left ready for next sample/test

Variable	Range
Problems	Respond to routine problems means 'apply known solutions to a limited range of predictable problems'. Typical problems include: • correct sampling technique • test equipment condition/calibration • consistent test technique according to standard procedure • correct recording of result • interpretation of result and the initiation of appropriate action • correct retention/disposal of sample/test materials

Evidence Guide	
Critical aspects of competency	Assessment requires evidence that the candidate: • took a sample correctly • undertook tests with adequate reproducibility • selected and used the appropriate procedures
Underpinning knowledge	Demonstrates knowledge of: • basic principles of taking the particular sample • basic principles of the particular test • sample techniques and requirements • test methods used and critical factors leading to good/poor test results
Underpinning skills	Demonstrates skills to: • read and interpret typical sampling and testing methods/procedures and to read and interpret numbers or other test result data • writing is required to the level of completing workplace forms and labeling samples • basic numeracy is required to read and interpret test results and undertake minor data • manipulation such as might be required for the test, test interpretation or reporting
Resource implications	The following resources should be provided: • access to relevant workplace or appropriately simulated environment where assessment can take place • materials relevant to the proposed activity or task
Methods of assessment	Competence may be assessed through: • Interview / Written Test / Oral Questioning • Observation/demonstration
Context for assessment	Competence may be assessed in the work place or in a simulated work place setting

TOP

Occupational Standard: Cement Production Equipment Operation Level II	
Unit Title	**Operate Grinding Equipment**
Unit Code	**IND CEO2 02 0111**
Unit Descriptor	This unit covers grinding and size reduction of raw materials, materials in process and products. It involves monitoring the process, ensuring a safe work environment, rectifying problems and facilitating output changes.

Elements	Performance Criteria
1. Prepare to grind materials	1.1. Equipment is checked for hazards, danger and isolation tags in accordance with standard operating ***procedures***
	1.2. Checks are performed to ensure all doors, inspection openings and guards are in position and secure
	1.3. Adjustments are made to equipment and unit operations settings to ensure conformance with standard operating procedures
	1.4. Appropriate personnel is notified of intention to start equipment
	1.5. Additional pre-start checks are conducted as required in accordance with standard operating procedures
	1.6. Adequate supply of materials is ensured to meet production requirements
2. Grind materials	2.1 Equipment is started in sequence in accordance with standard operating procedures
	2.2 Instrument/control panels are monitored and adjusted as necessary to remain within specified operating parameters
	2.3 Physical inspections of plant and equipment is made at specified intervals to identify any anomalies in standard operating procedures
	2.4 Product throughput and efficiency is maximized to maintain target parameters
	2.5 Appropriate personnel is communicated regarding the status of operations in line with enterprise requirements
	2.6 Safe working practices are employed which conform with occupational health and safety (OHS) and enterprise requirements
	2.7 Equipment is shut down in accordance with procedures and complete required records
3. Rectify	3.1. The range of faults/ ***typical problems*** are identified that

routine problems	can occur during the operation 3.2. Faults caused by procedures are determined and rectified 3.3. Equipment failure causes is identified and rectified in accordance with procedures 3.4. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 3.5. Non-routine problems are identified and reported to designated person
4. Distribute ground product	4.1 ***Ground materials*** are distributed to their correct silo/storage area in accordance with standard operating procedures 4.2 Silo/storage areas are monitored to ensure compliance with enterprise storage quality/quantity requirements
5. Control hazards	5.1 Hazards are identified in the grinding work area 5.2 Risks arising from those hazards are assess 5.3 Measures are implemented to control those risks in line with procedures 5.4 Emergency is shut down as required

Variable	**Range**
Procedures	May include but not limited to: • All operations are performed in accordance with standard procedures and work instructions
Ground materials	May include but not limited to: • quarried materials (Lime stone, Clay, Sand, Pumice, Gypsum) • cement clinker • Raw Meal • Cement • Coal and pet Coke
Equipment and unit operations	All such items of equipment and unit operations which form part of the grinding system. These may include: • Crushers • ball mills • hammer mills • roller mills • other equipment integral to the operation of grinding system
Typical problems	Typical problems may include: • out of specification grinding media • variations in temperature and moisture • variations in feed • Variations in feed quality

	• product discharge problems
OHS	May include but not limited to: • The identification and control of hazards and the application of OHS is to be in accordance with current, applicable legislation and regulations, and company procedures. All work is carried out at all times in accordance with these requirements

Evidence Guide	
Critical Aspects of Competence	Assessment requires evidence that the candidate: • identified types of materials to be ground and their additives • understood individual material feed and distribution systems • followed OHS and safe work practices • followed signage, tags and isolation procedures • carried out basic maintenance and inspection practices
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • startup and shutdown processes • construction and limitations of the grinding equipment and conditions • grinding fundamentals • out of specification situations • physics and chemistry (where appropriate) of process • principles of operation of process • control philosophy of process • distinguish between causes of faults such as: ➢ raw material variations ➢ mechanical abnormalities ➢ electrical/instrument reading variations
Underpinning Skills	Demonstrates skills to: • recognizing process conditions which will lead to out of specification production and taking appropriate action • implementing the enterprise's standard procedures and work instructions and relevant regulatory requirements within appropriate time constraints and in a manner relevant to the operation of grinding equipment • reading and numeracy is required to the level of interpreting workplace documents and technical information
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

TOP

Occupational Standard: Cement Production Equipment Operation Level II	
Unit Title	**Operate Crushing Equipment**
Unit Code	**IND CEO2 03 0111**
Unit Descriptor	This unit covers the crushing and screening of raw materials, materials in process, product and recycled material. It involves operating crushing equipment, monitoring the process, ensuring a safe work environment and solving routine problems.

Elements	Performance Criteria
1. Prepare to crush materials	1.1. Equipment is checked for hazards, danger and isolation tags in accordance with standard operating ***procedures*.** 1.2. Checks are performed to ensure all doors, inspection openings and guards are in position and secure 1.3. Adjustments are made to equipment settings to ensure conformance with standard operating procedures 1.4. Appropriate personnel is notified of intention to start equipment 1.5. Additional pre-start checks are conducted as required in accordance with standard operating procedures 1.6. Adequate supply of materials is ensured to meet production requirements
2. Crush materials	2.1 ***Equipment*** is started and related ***unit operations*** in sequence in accordance with standard operating procedures. 2.2 Instrument/control panels are monitored and adjusted equipment/ controls/feed as necessary to remain within specified operating parameters. 2.3 Physical inspections of plant and equipment are made at specified intervals as required by standard operating procedures. 2.4 Product throughput and efficiency is maximised to maintain target parameters. 2.5 Screens and screened material are checked to procedures. 2.6 Appropriate personnel are communicated with regarding the status of operations in line with enterprise requirements. 2.7 Adjustments are made as appropriate to achieve required

	output. 2.8 Working practices are employed which conform to ***occupational health and safety (OHS)*** and enterprise requirements. 2.9 Material is distributed as required.
3. Rectify routine problems	3.1. Range of faults / ***typical problems*** that can occur during the operation are identified 3.2. Fault causes are determined and rectified in accordance with procedures/work instructions. 3.3. Equipment failure causes are identified and rectify in accordance with procedures/work instructions. 3.4. Ensure appropriate records and log books of equipment operations are maintained to meet procedures/work instructions. 3.5. Non-routine problems are identified and reported to designated person.
4. Control hazards	1.1 Hazards are identified in the crushing work area 1.2 Risks are assessed arising from those hazards 1.3 Measures are implemented to control those risks in line with procedures and duty of care.

Variable	**Range**
Procedures	All operations are performed in accordance with standard procedures and work instructions
Materials	Materials may include: • quarried materials • feedstock • waste materials
Equipment and unit operations	Includes all such items of equipment and unit operations which form part of the crushing system. These may include: • jaw crushers • cone crushers • grizzlies • grids • other equipment integral to the operation of the crushing system
Typical problems	Typical problems may include: • difficult material to be crushed • variations in temperature and moisture • variations in feed • variations in feed quality • product discharge problems

	• blocked screens • oversized feed
OHS	All operations are subject to stringent OHS requirements and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and OHS requirements, the OHS requirements take precedence

Evidence Guide	
Critical Aspects of Competence	Assessment requires evidence that the candidate: • identified types of materials to be crushed • understood individual material feed and distribution systems • followed OHS and safe work practices • followed signage, tags and isolation procedures • carried out basic maintenance and inspection practices
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • startup and shutdown processes • construction and limitations of the crushing equipment and conditions • crushing fundamentals • out of specification situations • physics and chemistry (where appropriate) of process • principles of operation of process • principles of control of process • distinguish between causes of faults such as: ➢ raw material variations, mechanical abnormalities ➢ electrical/instrument reading variations
Underpinning Skills	Demonstrates skills to: • recognizing process conditions which will lead to out of specification production and taking appropriate action • implementing enterprise's standard procedures and work instructions and relevant regulatory requirements within appropriate time constraints and in a manner relevant to the operation of the crushing equipment • reading and numeracy to interpret workplace documents and technical information recognizing own limitations the seeking timely advice
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Assessment Methods	Competence may be assessed through: • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

TOP

Occupational Standard: Cement Production Equipment Operation Level II	
Unit Title	**Operate Kiln**
Unit Code	**IND CEO2 04 0111**
Unit Descriptor	This unit covers the competence required in operating a calcining kiln. It involves conducting safety and system checks, operating equipment, monitoring the process and identifying and isolating equipment malfunctions.

Elements	Performance Criteria
1. Prepare the equipment for production	1.1. Equipment pre-start-up procedure and visual checks are conducted according to enterprise procedure checklist. 1.2. Equipment start-up function is set up and configures complying with ***procedures***. 1.3. Raw material is loaded in accordance with work instructions.
2. Operate equipment and check on support equipment	2.1 Equipment is started up in accordance with work instructions 2.2 Ensure ***equipment and unit operations*** are operated in accordance with established enterprise procedures. 2.3 The operation of support equipment such as grinding mills, compressors, dust collectors, mixing and blending silos, rotary kilns, product cooling units, conveying and bulk storage silos are checked.
3. Monitor and record operation	3.1 Equipment performance is monitored in accordance with work instructions and manufacturer's specifications. 3.2 Non-conforming product is monitored against customer specifications. 3.3 Equipment is adjusted and controlled to ensure correct product quality. 3.4 Final inspection checks are completed. 3.5 Appropriate records and logs are completed.
4. Rectify routine problems	4.1 The range of faults/ ***typical problems*** are identified that can occur during the operation. 4.2 Fault causes are determined and rectify by procedures. 4.3 Equipment failure causes are identified and rectify in accordance with procedures. 4.4 Make sure appropriate records and log books of equipment operations are maintained to meet

	procedures. 4.5 Non-routine problems are identified and reported to designated person.
5. Shut down equipment	5.1 Ensure line is cleared of all product and left ready for startup 5.2 Equipment is shut down in accordance with work instructions. 5.3 Appropriate records and logs are completed. 5.4 Equipment is shut down in an emergency situation.
6. Prepare equipment for maintenance	6.1 Equipment is isolated in accordance with work instructions. 6.2 Any broken materials are removed safely. 6.3 Make sure area is cleared and safe for maintenance.
7. Control hazards	7.1 Hazards are identified in the calcining work area 7.2 Risks are assessed arising from those hazards. 7.3 Measures are implemented to control those risks in line with procedures and duty of care.

Variable	**Range**
Procedures	All operations are performed in accordance with standard procedures and work instructions
Equipment and unit operations	This unit includes all such items of equipment and unit operations which form part of the kiln system. These may include: • instrument panels (local) • measuring and recording equipment • communication equipment • hand tools • emergency stop buttons and lanyards • safety clothing and equipment
Typical problems	Typical problems may include: • equipment malfunctions • temperature and pressure fluctuations • quality of product • material/feed variations • spillages and leakages
Occupational health and safety (OHS)	All operations are subject to stringent OHS requirements and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and OHS requirements, the OHS requirements take precedence

Evidence Guide	
Critical Aspects of Competence	Assessment requires evidence that the candidate: • performed startup and shutdown • responded signals and alarms immediately • followed all OHS requirements
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • isolation procedures • chemistry and physics of cement making processes • operational processes and functions, including startup and shutdown processes • composition and nature of raw materials and finished product • construction and limitations of the equipment • out of specification situations • distinguish between: ➢ raw materials ➢ product ➢ equipment ➢ types of defects/faults ➢ electrical/instrumental causes of malfunctions
Underpinning Skills	Demonstrates skills to: • recognizing variances in the process conditions and the equipment which will lead to out of specification production • implementing the enterprise's standard procedures and work instructions and relevant regulatory requirements within appropriate time constraints and in a manner relevant to the operation of the equipment • reading and numeracy to interpret workplace documents and technical information
Resource Implications	The following resources should be provided: • access to relevant workplace or appropriately simulated environment where assessment can take place • materials relevant to the proposed activity or task
Methods of Assessment	Competence may be assessed through: • Interview / Written Test / Oral Questioning • Observation/demonstration
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

TOP

Occupational Standard: Cement Production Equipment Operation Level II	
Unit Title	**Maintain Kiln Refractory**
Unit Code	**IND CEO2 05 0111**
Unit Descriptor	This unit of competence covers the removal and replacement of a kiln refractory. It involves preparing and assembling appropriate plant and equipment, removing and replacing refractory and brickwork according to procedures and completing relevant records.

Elements	**Performance Criteria**
1. Prepare for refractory replacement	1.1. Prepare and assemble, in accordance with specified requirements, materials used for the replacement of refractory. 1.2. Prepare and assemble appropriate plant and ***equipment*** in accordance with specific needs and manufacturer's operating instructions. 1.3. Notify appropriate personnel and ensure that required permits have been obtained.
2. Replace refractory	2.1 Ensure that the removal of refractory and brickwork is performed in accordance with standard ***procedures***/work instructions. 2.2 Ensure that brickwork/refractory is replaced following standard procedures and work instructions. 2.3 Ensure that waste from repairs to kiln is removed and disposed of correctly. 2.4 Complete all records and permit procedures.

Variable	**Range**
Procedures	All operations are performed in accordance with standard • procedures and work instructions
Equipment	Equipment may include: • protective clothing, hearing protection, safety glasses and adequate ventilation • hand and power tools • mobile plant • refractory support mechanisms

Variations	This unit may vary according to: • length and type of kiln • the type of process, i.e. dry, wet, semi-wet, semi-dry • type of kiln maintenance being performed • method of waste disposal
Typical problems include:	Typical problems may include: • kiln problems • major refractory problems
Occupational health and safety (OHS)	All operations are subject to stringent OHS requirements and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and OHS requirements, the OHS requirements take precedence

Evidence Guide	
Critical Aspects of Competence	Assessment requires evidence that the candidate: • followed standard procedures replacement • used correct materials • followed permit and other health and safety procedures are
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • safe work practices • function of tools/equipment used • procedures used to prepare the kiln • procedures used to install refractory • first-line maintenance procedures required • correct removal and replacement of refractory and brickwork • correct preparation and assembly of materials and tools/equipment used • safely remove waste from repairs to kiln • distinguish between causes of faults such as: • refractory materials • refractory problems
Underpinning Skills	Demonstrates skills to: • recognizing variance from specification and then analyzing the problem to determine the level of appropriate action required, which is consistent with operating guidelines • implementing enterprise's standard procedures and work instructions and relevant regulatory requirements within appropriate time constraints and in a manner relevant to the operation of the process • Reading and numeracy to interpret workplace documents and technical information.

Resource Implications	The following resources should be provided: • Access to relevant workplace or appropriately simulated environment where assessment can take place • Materials relevant to the proposed activity or task
Methods of Assessment	Competence may be assessed through: • Interview / Written Test / Oral Questioning • Observation/demonstration
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

TOP

Occupational Standard: Cement Production Equipment Operation Level II	
Unit Title	**Install and Repair Refractory Brickwork/Blockwork**
Unit Code	**IND CEO2 06 0111**
Unit Descriptor	This unit of competence covers the installation of refractory brick work. It includes the use of tools and ancillary equipment and the mixing and application of appropriate mortars.

Elements	Performance Criteria
1. Establish the suitability of resources	1.1 Check all information conforms with resources 1.2 Report any inaccuracies in information to the person in charge. 1.3 Identify and select materials, components, tools and equipment. 1.4 Identify hazards associated with materials, components, tools and equipment and take appropriate steps to minimize hazard.
2. Prepare, repair and install refractory brickwork/block work	2.1 Carry out work practices to comply with the given information and achieve the required specification 2.2 Organize work practices to complete work within the allocated time and to comply with the given information 2.3 Correct any deficiencies in the quality of work 2.4 Carry out work practices to comply with the given information to minimize the risk of damage to the work and surrounding work area. 2.5 Comply with organizational information when carrying out work practices to maintain safe working ***procedures***
3. Contribute to controlling hazards in work area	3.1 Identify hazards in work area 3.2 Assess risks arising from those hazards 3.3 Take appropriate action to control risks to procedures and duty of care

Variable	Range
Procedures	All operations are performed in accordance with standard procedures and work instructions
Tools and equipment	Tools and equipment include: • mortar mixing equipment • trowels • lifting and placing equipment

	• equipment allowing access
Installation	Installation includes: • laying combination • laying bricks/blocks to conform to required curves and angles • tying bricks/blocks to structure • keying bricks/blocks to existing refractory
Occupational health and safety (OHS)	All operations are subject to stringent OHS requirements and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and OHS requirements, the OHS requirements take precedence

Evidence Guide	
Critical aspects of competency	Assessment requires evidence that the candidate: • recognized signs of problems or potential problems with the equipment/ processes • took appropriate action in a timely manner • recognized hazards and took appropriate action to control risks arising from such hazards
Underpinning knowledge	Demonstrates knowledge of: • how to prepare for and install refractory brickwork/blockwork • the organization's requirements relating to responsibilities for installing refractory brickwork/blockwork • types and characteristics of background surfaces • methods of preparing background surfaces • types, uses and operation of tools and equipment • types of finishes to completed brickwork/blockwork • types and uses of jointing materials • methods of jointing • reasons for avoiding voids in joints • types of, and reasons for, expansion joints • types and uses of temporary support • methods of protecting work during installation • reasons for, and methods of, providing test panels • methods of cutting • safeguards to take during reinstatement work • methods of removing damaged refractory • methods of keying and bonding new to existing refractories • reasons for, and methods of, obtaining seals between new and existing refractory

	• materials sources • materials types/categorization • methods of production • familiarity with installation techniques • familiarity with principles of selection • familiarity with variety of applications
Underpinning skills	Demonstrates skills to: • adjusting/correcting/responding to work procedures • identifying and solving problems • manual • physical handling • using tools and equipment safely • working in a team or individually, as required • reading and numeracy to interpret workplace documents and technical information
Resource implications	The following resources should be provided: • access to relevant workplace or appropriately simulated environment where assessment can take place • materials relevant to the proposed activity or task
Methods of assessment	Competence may be assessed through: • Interview / Written Test / Oral Questioning • Observation/demonstration
Context for assessment	Competence may be assessed in the work place or in a simulated work place setting

TOP

Occupational Standard: Cement Production Equipment Operation Level II	
Unit Title	**Monitor Process Capability**
Unit Code	**IND CEO2 07 0111**
Unit Descriptor	This unit covers the knowledge, attitudes and skills required for gathering of data and the interpretation of simple information to determine the compliance of the process and the taking of action as defined by the procedures where the information reveals the process is out of control parameters.

Elements	**Performance Criteria**
1. Collect and process data	1.1. Take specified measurements/readings as required 1.2. Enter data onto log/into computer or other record 1.3. Manipulate and/or chart data as required by ***procedures*** and or statistical methods such as ***six sigma*** or ***three sigma***
2. Identify variations that are not random and take action	2.1 Examine chart and/or reliability information 2.2 Distinguish between ***random variations*** and those with an identifiable cause 2.3 Take action specified in ***procedures*** when a variation with an ***identifiable cause*** occurs
3. Assist in process improvement	3.1 Collect data for process capability improvement trials as directed 3.2 Make recommendations for improvement as required 3.3 Implement revised capability monitoring ***procedures*** as required

Variable	**Range**
Six sigma	• Six sigma is a process improvement methodology based on statistical process control with six sigma limits which equates to 3.4 defects per million opportunities for each product or service transaction • Six sigma is also often used as a general term covering a competitive manufacturing approach.
Three sigma	• Three sigma includes statistical process control with three sigma limits which equates to 3 defects per thousand opportunities for each product or service transaction.
Procedures	• Procedures includes all work instructions, standard

	operating procedures, formulas/recipes, batch sheets, temporary instructions and similar instructions provided for the smooth running of the plant. They may be written, verbal, computer based or in some other form. • For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (e.g. Good Manufacturing Practice (GMP), Responsible Care) and government regulations
Random variation	Random variation is the term used in statistical control to refer to those variations for which no cause can be found.
Identifiable cause	Also referred to as an 'assignable cause' or a 'special cause' ; they are those variations for which a cause can be found and so the cause of the variation eliminated.

Evidence Guide	
Critical Aspects of Competence	Assessment requires evidence that the candidate: • Processed collected data and recognized assignable causes. • Interpreted multiple causes consistently and took appropriate action
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • data collection methods • data processing techniques required • basic variability and normal distribution • recognition of identifiable causes in accordance with procedures • causes of different types of identifiable causes as defined by procedures • actions to be taken for the different causes
Underpinning Skills	Demonstrates skills to: • problem solving • statistical control • planning • communication
Resource Implications	The following resources should be provided: • access to relevant workplace or appropriately simulated environment where assessment can take place • materials relevant to the proposed activity or task
Methods of Assessment	Competence may be assessed through: • Interview / Written Test / Oral Questioning • Observation/demonstration
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

TOP

Occupational Standard: Cement Production Equipment Operation Level II	
Unit Title	**Select and Prepare Materials**
Unit Code	**IND CEO2 08 0111**
Unit Descriptor	This competence covers the selection and preparation of materials for use in production processes. The focus of this unit is finding and delivering the right materials to the process in the right condition. Along the way, some minor preparation may be required

Elements	Performance Criteria
1. Identify and locate materials.	1.1. Identify material requirements correctly from documentation 1.2. Identify type, quantity and quality of materials 1.3. Identify ***material hazards and handling procedures*** 1.4. Locate and check materials to procedures 1.5. Confirm availability of required quantity of materials 1.6. Record and report material shortages.
2. Contribute to controlling hazards.	2.1 Identify other hazards in work area 2.2 Take action to control material hazards as per documentation 2.3 Take appropriate action to control other hazards in the workplace
3. Measure quantity of materials	3.1 Identify types of measuring ***equipment*** and their purpose, and select according to requirements 3.2 Measure and assemble required quantities 3.3 Check material quantities against ***documentation*** 3.4 Document and label ***materials*** 3.5 Deliver materials to correct location.
4. Prepare materials as required.	4.1 Check that hoppers, bins and holding tanks are free from contamination 4.2 Identify classes of compatible and incompatible chemicals 4.3 Prepare materials to procedures.
5. Store prepared materials.	5.1 Identify the storage conditions required for the main classes of chemicals 5.2 Identify materials that have special storage requirements 5.3 Store and supply materials.

6. Dispose of waste materials	6.1 Correctly identify waste materials 6.2 Dispose of materials to ***procedures*** and OHS and environmental requirements

Variable	**Range**
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Ethiopian/international standards, the latest version must be used.
Tasks	This competence is typically performed by operators, weighers, mixers or stores personnel, and includes the following tasks (select relevant items): • handling raw chemicals • storing raw chemicals • labeling of materials • pre-production inspection of materials, usually involving visual inspections only for identification of deterioration or damage • pre-production measuring of materials, by weight, volume or density • disposal of waste materials • identifying and reporting hazards, safety and other issues that could affect the operation of the plant
Materials preparation	Typical examples of preparation required might include (select relevant items): • breaking up solid materials into pieces or smaller lumps • blending a powder or liquid into a solution prior to use in the process • blending powders prior to production • dilution of solutions • preparation of a solution for dosing into a process
Equipment	Equipment may include: • buckets • stirring paddle • propeller or drum mixers • measuring equipment including scales, flow meters, glass wares and graduated vessels • personal protective equipment
Documentation	Documentation may include: • materials safety data sheets (MSDSs) • enterprise procedures • labeling requirements (dangerous goods codes, classification numbers, packaging group numbers) • HAZCHEM symbols and codes • spill containment and disposal procedures

Materials	Materials may include: • raw materials • packaging materials • consumables
Problems	• Typical problems are restricted to responding in a routine, predetermined manner as specified in the procedures. • All operations are performed to procedures.
Procedures	Procedures may be written, verbal, computer-based or in some other form. They include: • all work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions • any similar instructions provided for the smooth running of the plant • for the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (e.g. Responsible Care) and government regulations.
MSDS	An operator is expected to be aware of an MSDS, its general structure and where to find the methods of use, cautions and actions in an emergency. They are not expected to understand the full text of an MSDS.
Material hazards and handling procedures	Material hazards and handling procedures may be identified from: • label • HAZCHEM symbol • MSDS • other relevant source
Health, safety and environment (HSE)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Evidence Guide	**Description**
Critical aspects of competency	Assessment requires evidence that the candidate: • performed all operations to procedures and OHS and environmental requirements • recognized signs of problems or potential problems with the equipment/processes • Took appropriate action in a timely manner • recognized hazards and took appropriate action to control risks arising from such hazards

Underpinning knowledge	Demonstrates knowledge of: • classes of compatible and incompatible chemicals • types of materials in plant and their storage requirements • other special storage requirements • basic measurement procedures • routes of entry of chemicals to the body (basic only) • procedures for safe handling and storage of chemicals and hazardous substances • correct selection, use and maintenance of required PPE • labeling requirements (dangerous goods codes, classification numbers, packaging group numbers) • HAZCHEM symbols and codes • hazardous substances regulations • spill containment and disposal procedures • Workplace Standard Operating Procedures (SOPs) related to this competency • environmental requirements related to waste disposal • workplace processes sufficient to recognize non-standard situations • workplace hazards and methods of controlling hazards according to procedures • procedures for reporting or dealing with non-standard or hazardous situations • Materials safety data sheets (MSDSs)
Underpinning skills	Demonstrates skills to: • efficient and effective operation of plant/equipment • hazard analysis • completing plant records • communication • problem solving
Resource implications	The following resources should be provided: • access to relevant workplace or appropriately simulated environment where assessment can take place • materials relevant to the proposed activity or task
Methods of assessment	Competence may be assessed through: • Interview / Written Test / Oral Questioning • Observation/demonstration
Context for assessment	Competence may be assessed in the work place or in a simulated work place setting

TOP

Occupational Standard: Cement Production Equipment Operation Level II	
Unit Title	**Use Sustainable Energy Practices**
Unit Code	**IND CEO2 09 0111**
Unit Descriptor	This unit covers the skills needed to use and make improvements in sustainable energy practices in production, maintenance and logistics

Elements	**Performance Criteria**
1. Identify energy use	1.1. Identify energy consuming processes in relation to own work 1.2. Recognize the type/source of energy consumed
2. Follow energy conservation plans	2.1 Check energy use in accordance with conservation plans 2.2 Identify most efficient or appropriate equipment or procedures to comply with conservation plans 2.3 Identify any uses which do not comply with conservation plans 2.4 Take action in accordance with procedures to bring energy use back in line with conservation plans
3. Improve energy use	3.1 Note any ***waste*** of energy use 3.2 Recommend improvements to ***energy*** use

Variable	**Range**
Waste	Waste is any activity which does not contribute to customer benefit/features in the product. Within manufacturing, categories of waste include: • excess production and early production • delays • movement and transport • poor process design • inventory • inefficient performance of a process • making defective/ non conforming product • Waste for this unit may include activities which do not yield any benefit to the organization or any benefit to the organizations customers.
Energy	Energy is used to mean all sources of energy used by the process be it electricity, fuel, gas or mobile transport fuel. The uses of the energy will also be potentially wide and include

	heating and cooling, lighting, moving materials (including pumps and conveyors), modifying materials (including cutting, reacting, mixing),generating pressure/vacuum or providing motive power for equipment and transport.

Evidence Guide	
Critical aspects of competency	Assessment requires evidence that the candidate: • Documented evidence of conformance to energy usage plans and suggestions for improvement.
Underpinning knowledge	Demonstrates knowledge of: • types and sources of energy relevant to the process • basic principles of energy efficiency • process needs for energy
Underpinning skills	Demonstrates skills to: • analysis • basic mathematics • communication • problem solving
Resource implications	The following resources should be provided: • Access to relevant workplace or appropriately simulated environment where assessment can take place • Materials relevant to the proposed activity or task
Methods of assessment	Competence may be assessed through: • Interview / Written Test / Oral Questioning • Observation/demonstration
Context for assessment	Competence may be assessed in the work place or in a simulated work place setting

TOP

Occupational Standard: Cement Production Equipment Operation Level II	
Unit Title	**Use Sustainable Environmental Practices**
Unit Code	**IND CEO2 10 0111**
Unit Descriptor	This unit covers the knowledge and skills needed to use and make improvements in sustainable environmental practices in production, maintenance and logistics

Elements	Performance Criteria
1. Identify resource use	1.1. Identify resources used by processes in area of responsibility 1.2. ***Recognize*** the type/source of resource used 1.3. Identify sources of information to expand knowledge and understanding of resources used.
2. Comply with environmental obligations	2.1 Follow procedures to ensure there is no breach of environmental regulations/license conditions 2.2 Identify situations related to job which may lead to a breach of regulations/license conditions
3. Follow resource conservation plans	3.1 Identify resource conservation plan/section of plan relevant to area of responsibility 3.2 Identify most efficient or appropriate equipment or processes to comply with conservation plans 3.3 Check resource use is in accordance with plan 3.4 Sort/recycle ***waste*** according to procedures 3.5 Note any uses which do not comply with plan 3.6 Take appropriate action specified in plan to bring resource use back in line with plans 3.7 Apply energy conservation plans to the use of equipment and tools
4. Improve resource use	4.1 Identify waste of resource use 4.2 Recommend improvements to resource use

Variable	Range
Waste	Waste is any activity which does not contribute to customer benefit/features in the product. Within manufacturing, categories of waste include: • excess production and early production • delays • movement and transport • poor process design • inventory • inefficient performance of a process • making defective items • Waste for this unit may include activities which do not yield any benefit to the organization or any benefit to the organizations customers.
Necessary waste	• Necessary waste is any activity or cost which does not contribute directly to customer benefit/feature in the product, and which cannot be avoided (for example regulatory compliance and fixed costs). Necessary waste cannot be eliminated but should be managed.
Unnecessary waste	• Unnecessary waste is any activity or cost which does not contribute directly to customer benefit/features in the product and can be avoided. Unnecessary waste should be eliminated as quickly as practical.
Resource	• Resource is used to mean resources used by the process be it raw materials, components, process water, cooling water, cleaning water and so on.
Recognize	• Recognition of type of resource is at an appropriate level for the person and the area and includes things like recognizing steam/electric heating, cooling water/refrigerated cooling, raw materials waste materials

Evidence Guide	
Critical aspects of competency	Assessment requires evidence that the candidate: • Followed resource usage plans and made suggestions for improvement.
Underpinning knowledge	Demonstrates knowledge of: • the '3 Rs' - reduce, re-use, recycle • regulatory/licensing requirements relevant to the process/plant • types and sources of resource • basic principles of resource efficiency • process needs for resource
Underpinning	Demonstrates skills to:

skills	• analysis • basic mathematics • communication • problem solving
Resource implications	The following resources should be provided: • Access to relevant workplace or appropriately simulated environment where assessment can take place • Materials relevant to the proposed activity or task
Methods of assessment	Competence may be assessed through: • Interview / Written Test / Oral Questioning • Observation/demonstration
Context for assessment	Competence may be assessed in the work place or in a simulated work place setting

TOP

Occupational Standard: Cement Production Equipment Operation Level II	
Unit Title	**Use Enterprise Computers or Data Systems**
Unit Code	**IND CEO2 11 0111**
Unit Descriptor	This competence covers the use of organization computers or data systems in order to work effectively. The operator is familiar with the system, can locate and use the appropriate data and is able to accurately record data into the system as required. This competence covers the use of computer equipment and company software programs, including selecting the correct programs for use and identifying minor faults in equipment or software.

Elements	Performance Criteria
1. Identify applications of computer or data system for work role.	1.1. Identify data and information available from the system and its application to work role. 1.2. Identify data from work role which needs to be entered in the system.
2. Use the computer/data system	2.1 Adjust work station equipment to meet ergonomic requirements and use appropriate posture. 2.2 Log-on according to ***procedures***. 2.3 Navigate system as required. 2.4 Input data or make changes as required. 2.5 Check entered or edited data is correct. 2.6 Access required data/information. 2.7 Output data as required. 2.8 Use 'Help' as needed.
3. Save file and exit system	3.1 Save and store data in appropriate directory or folder. 3.2 Close file and exit applications programs without loss of data. 3.3 Back-up data if required in accordance with procedures.
4. Respond to routine problems with the system	4.1 Recognize known faults that occur during the operation. 4.2 Identify and take action on causes of routine faults. 4.3 Log ***problems*** as required. 4.4 Identify non-routine process and quality problems and take appropriate action.

Variable	Range
Context	This unit of competence includes organization computer and data systems. This may include systems which cover (select relevant items): • word and excel documents • safety, safety data and injury reporting • orders, purchasing, stock levels and scheduling • stock control, stores, warehousing and logistics • materials hazards, labeling, materials identification, materials safety data sheets (MSDSS) • batch data, schedules, production planning and operations planning • product quality, statistical control, production trends and quality control • maintenance, maintenance planning, procedures and spare parts • the organization systems will usually be computerized, but may include data sheets, paper or hard copy records, manuals and instructions
Procedures	• All operations are performed in accordance with procedures. • Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.
Tools and equipment	This competence includes use of equipment and tools such as: • computers - stand alone and/or networked • mobile terminals and hand held devices • printers • duplicate equipment • onboard terminals • scanners • software applications may include: • Internet or intranet • word processing, database and spreadsheet programs • company/process specific software Documents may include: • work orders • work instructions/standard operating procedures • standard letters • standard reports
Hazards	Typical hazards include: • repetition strain injuries • glare from monitor screens • damages cables or connections • strains or injuries moving computer equipment

Problems	Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'. Typical process and • product problems may include: • Software problems, such as unable to access file, find correct page or input data. • loose or disconnected cables • frozen' screens • faulty monitors • key board problems
Variables	Key variables to be monitored include: • types of hardware systems • access and log on procedures • types of software packages • Internet/intranet systems • types of data to be stored and retrieved

Evidence Guide	
Critical Aspects Of Competency	Assessment requires evidence that the candidate: • utilized in-plant computer programs correctly • recognized software problems and solved effectively and efficiently • completed documents to the standard required • Input and accessed data from the system. • recognized problems in related to operation of the system and made appropriate contribution to their solution
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • demonstrate the operation of and access to data from the system • describe the scope and range of data required from the system, in order to support the solution of problems • describe the nature of the scope and range of available data • describe the causes and remedies of common problems such as those selected in the range Statement • describe principles of operation of the equipment and software, hazard policies and procedures, job procedures and work instructions • explain the application of software in relation to work role • incorrect or misleading data • system software faults • System equipment faults.
Underpinning Skills	Demonstrates skills to: • read and interpret typical product specifications, job sheets and material labels as provided to operators • writing

	• numeracy
Resource Implications	The following resources should be provided: • access to relevant workplace or appropriately simulated environment where assessment can take place • materials relevant to the proposed activity or task
Methods of Assessment	Competence may be assessed through: • Interview / Written Test / Oral Questioning • Observation/demonstration
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

TOP

Occupational Standard: Cement Production Equipment Operation Level II	
Unit Title	**Work In Team Environment**
Unit Code	**IND CEO2 12 0111**
Unit Descriptor	This unit covers the skills, knowledge and attitudes to identify role and responsibility as a member of a team.

Elements	Performance Criteria
1. Describe team role and scope	1.1 The ***role and objective of the team*** is identified from available ***sources of information*****.** 1.2 Team parameters, reporting relationships and responsibilities are identified from team discussions and appropriate external sources.
2. Identify own role and responsibility within team	2.1 Individual role and responsibilities within the team environment are identified. 2.2 Roles and responsibility of other team members are identified and recognized. 2.3 Reporting relationships within team and external to team are identified.
3. Work as a team member	3.1 Effective and appropriate forms of communications used and interactions undertaken with team members who contribute to known team activities and objectives. 3.2 Effective and appropriate contributions made to complement team activities and objectives, based on individual skills and competencies and ***workplace context.*** 3.3 Observed protocols in reporting using standard operating procedures. 3.4 Contribute to the development of team work plans based on an understanding of team's role and objectives and individual competencies of the members.

Variable	Range
Role and objective of team	• Work activities in a team environment with enterprise or specific sector • Limited discretion, initiative and judgment maybe demonstrated on the job, either individually or in a team environment
Sources of information	• Standard operating and/or other workplace procedures • Job procedures • Machine/equipment manufacturer's specifications and instructions • Organizational or external personnel • Client/supplier instructions • Quality standards • OHS and environmental standards
Workplace context	• Work procedures and practices • Conditions of work environments • Legislation and industrial agreements • Standard work practice including the storage, safe handling and disposal of chemicals • Safety, environmental, housekeeping and quality guidelines

Evidence Guide	
Critical aspects of competence	Assessment requires evidence that the candidate: • Operated in a team to complete workplace activity • Worked effectively with others • Conveyed information in written or oral form • Selected and used appropriate workplace language • Followed designated work plan for the job • Reported outcomes
Underpinning Knowledge and Attitude	Demonstrates knowledge of: • Communication process • Team structure • Team roles • Group planning and decision making
Underpinning Skills	Demonstrates skills to: • Communicate appropriately, consistent with the culture of the workplace

Resource Implications	The following resources must be provided: • Access to relevant workplace or appropriately simulated environment where assessment can take place
Assessment Methods	Competence may be assessed through: • interview/ written exam • observation/demonstration
Context for Assessment	Competence may be assessed in workplace or in a simulated workplace setting

TOP

Occupational Standard: Cement Production Equipment Operation Level II	
Unit Title	**Participate In Workplace Communication**
Unit Code	**IND CEO2 13 0111**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to gather, interpret and convey information in response to workplace requirements.

Elements	Performance Criteria
1. Obtain and convey workplace information	1.1 Specific and relevant information is accessed from ***appropriate sources*** 1.2 Effective questioning , active listening and speaking skills are used to gather and convey information 1.3 Appropriate ***medium*** is used to transfer information and ideas 1.4 Appropriate non- verbal communication is used 1.5 Appropriate lines of communication with supervisors and colleagues are identified and followed 1.6 Defined workplace procedures for the location and ***storage*** of information are used 1.7 Personal interaction is carried out clearly and concisely
2. Participate in workplace meetings and discussions	2.1 Team meetings are attended on time 2.2 Own opinions are clearly expressed and those of others are listened to without interruption 2.3 Meeting inputs are consistent with the meeting purpose and established ***protocols*** 2.4 ***Workplace interactions*** are conducted in a courteous manner 2.5 Questions about simple routine workplace procedures and matters concerning working conditions of employment are asked and responded to. 2.6 Meetings outcomes are interpreted and implemented

3. Complete relevant work related documents	3.1 Range of ***forms*** relating to conditions of employment are completed accurately and legibly 3.2 Workplace data is recorded on standard workplace forms and documents 3.3 Basic mathematical processes are used for routine calculations 3.4 Errors in recording information on forms/ documents are identified and properly acted upon 3.5 Reporting requirements to supervisor are completed according to organizational guidelines

Variable	**Range**
Appropriate sources	• Team members • Suppliers • Trade personnel • Local government • Industry bodies
Medium	• Memorandum • Circular • Notice • Information discussion • Follow-up or verbal instructions • Face to face communication
Storage	• Manual filing system • Computer-based filing system
Forms	• Personnel forms, safety reports
Workplace interactions	• Face to face • Telephone • Electronic and two way radio • Written including electronic, memos, instruction and forms, non-verbal including gestures, signals, signs and diagrams
Protocols	• Observing meeting • Compliance with meeting decisions • Obeying meeting instructions

Evidence Guide	
Critical Aspects of Competency	Assessment requires evidence that the candidate: • Prepared written communication following standard format of the organization • Accessed information using communication equipment • Made use of relevant terms as an aid to transfer information effectively • Conveyed information effectively adopting the formal or informal communication
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • Effective communication • Different modes of communication • Written communication • Organizational policies • Communication procedures and systems • Technology relevant to the enterprise and the individual's work responsibilities
Underpinning Skills	Demonstrates skills to: • Follow simple spoken language • Perform routine workplace duties following simple written notices • Participate in workplace meetings and discussions • Complete work related documents • Estimate, calculate and record routine workplace measures • Basic mathematical processes of addition, subtraction, division and multiplication • Ability to relate to people of social range in the workplace • Gather and provide information in response to workplace Requirements
Resource Implications	• Fax machine • Telephone • Writing materials • Internet
Methods of Assessment	• Direct Observation • Oral interview and written test
Context of Assessment	• Competence may be assessed individually in the actual workplace or through accredited institution

TOP

Occupational Standard: Cement Production Equipment Operation Level II	
Unit Title	**Develop Business Practice**
Unit Code	**IND CEO2 14 0111**
Unit Descriptor	This unit specifies the outcomes required to establish a business operation from a planned concept. It includes researching the feasibility of establishing a business operation, planning the setting up of the business, implementing the plan and reviewing operations once commenced

Elements	Performance Criteria
1. Identify business opportunity	1.1 ***Business opportunities*** are investigated and identified 1.2 Feasibility study is undertaken to determine likely ***business viability*** 1.3 Market research on product or service is undertaken 1.4 Assistance with feasibility study of ***specialist and relevant parties*** is sought as required 1.5 Impact of emerging or changing technology including e-commerce, on business operations are evaluated 1.6 Practicability of business opportunity assessed in line with perceived risks, returns sought and resources available 1.7 Business plan for operation is completed
2. Identify personal business skills	2.1 Financial and business skills available are identified and taken into account when business opportunities are researched 2.2 ***Personal skills/attributes*** are assessed and matched against those perceived as necessary for a particular business opportunity 2.3 ***Business risks*** are identified and assessed according to resources available and personal preferences
3. Plan for establishment of business operation	3.1 Business structure and operations are determined and documented 3.2 Procedures to guide operations are developed and documented 3.3 Financial backing for business operation is secured 3.4 Business legal and regulatory requirements are identified and complied 3.5 ***Human and physical resources*** required to commence business operation are determined

	3.6 Recruitment strategies are developed and implemented
4. Implement establishment plan	4.1 Marketing of business operation is undertaken 4.2 Physical and human resources to implement business operation are obtained 4.3 ***Operational unit*** to support and coordinate business operation is established 4.4 Monitoring process for managing operation is developed and implemented 4.5 ***Legal documents*** are carefully maintained and relevant records are kept and updated to ensure validity and accessibility 4.6 Contractual procurement rights for goods and services including ***contracts with relevant people***, negotiated and secured as required in accordance with the business plan 4.7 Options for leasing/ownership of business premises identified and contractual arrangements completed in accordance with the business plan
5. Review implementation process	5.1 Review process for implementation of business operation is developed and implemented 5.2 Improvements in business operation and associated management process are identified 5.3 Identified improvements are implemented and monitored for effectiveness 5.4 Necessary documentation are completed and records organized and kept securely.

Variable	**Range**
Business opportunities maybe influenced by:	• expected financial viability • skills of operator • amount and types of finance available • returns expected or required by owners • likely return on investment • finance required • lifestyle issues
Business viability may include:	• opportunities available • market competition • timing/ cyclical considerations • skills available • resources available • location and/ or premises available

	• risk related to a particular business opportunity, especially • in regard to Occupational Health and Safety and • environmental considerations
Specialist and relevant parties	• Chamber of commerce • Financial planners and financial institution representatives, business planning specialists and marketing specialists • accountants • lawyers and providers of legal advice • government agencies • industry/trade associations • online gateways • business brokers/business consultants
Human and physical resources may include:	• software and hardware • office premises • communications equipment • specialist services through outsourcing, contracting and • consultancy • staff • vehicles
Personal skills/attributes may include:	• technical and/ or specialist skills • business knowledge and skills • entrepreneurship • willingness to take risks
Business risks may be affected by and may include but are not restricted to:	• occupational health and safety and environmental • considerations • relevant legislative requirements • security of investment • market competition • security of premises/ location • supply and demand • resources available
Resources may include:	• staff • money • time • equipment • space
Operational unit refers to:	• office location staffed with required personnel and equipped to service and support business • home-based site or other location such as leased or owned property
Legal documents may include:	• partnership agreements, constitution documents, statutory books for companies (Register of Members, Register of Directors and Minute Books), Certificate of Incorporation, Franchise Agreements and financial documentation, appropriate software for financial records • recordkeeping including personnel, financial, taxation, OHS and environmental

Contracts with relevant people may include:	• owners, suppliers, employees, landlords, agents, distributors, customers or any person with whom the business has, or seeks to have, a performance-based relationship

Evidence Guide	
Critical Aspects of Competence	A person must be able to provide evidence: • that a business operation has been planned and implemented from initial research into feasibility of the business and completion of the plan, through to implementing the plan and commencing operations • the ability to evaluate the results of research and assess the likely viability and practicability of a business opportunity, taking into account the current business/market climate and resources available
Underpinning Knowledge and Attitudes	• Federal and regional government legislative requirements affecting business operations, especially in regard to occupational health and safety (OHS), equal employment opportunity (EEO), industrial relations and anti-discrimination • Technical or specialist skills relevant to the business operation • Financing options • Business systems and operations • Relevant marketing, management, sales and financial concepts • Methods for researching business opportunities • Principles of risk management relevant to the business • Methods of identifying relevant specialist services to complement the business • Forms and administrative systems • Services available and charges • Planning and control systems (sales, • Advertising and promotion, distribution and logistics • Financial recording systems • Legal rights and responsibilities • Record keeping duties • Operational factors relating to the business (provision of professional services, products)
Underpinning Skills	• Literacy skills to interpret legal requirements, company policies and procedures and immediate, day-to-day demands • Marketing skills • Business planning skills • Entrepreneurial skills • Problem-solving skills

	• OHS skills • Time management skills • Belief in services and products offered by the business • Communication skills including questioning, clarifying, reporting, and giving and receiving constructive feedback • Technical and analytical skills to interpret business documents, reports and financial statements and projections • Ability to relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities • Problem solving skills to develop contingency plans • Using computers and software packages to record and manage data and to produce reports • Literacy skills to enable interpretation of business information, numeracy skills for data analysis to aid research • Research skills to identify a business opportunity and to conduct a feasibility study • Analytical skills to assess personal attributes and to identify business risks • Observation skills for identifying appropriate people, resources and to monitor work
Resource Implications	The following resources should be provided: • Access to relevant workplace documentation, financial records, and equipment
Methods of Assessment	Competence may be assessed through: • Interview / Written exam • Observation/Demonstration with Oral questioning
Context for Assessment	Competence may be assessed in the workplace or in a simulated work environment

Occupational Standard: Cement Production Equipment Operation Level II	
Unit Title	**Apply Continuous Improvement Processes (Kaizen)**
Unit Code	**IND CEO2 15 1012**
Unit Descriptor	This unit of competence covers the exercise of good workplace practice and effective participation in quality improvement teams. Personnel are required to ensure the quality and integrity of their own work, detect non-conformances and work with others to suggest improvements in productivity and quality.

Elements	Performance Criteria
1. Satisfy quality system requirements in daily work	1.1 Access information on quality system requirements for own job function 1.2 Record and report quality control data in accordance with quality system 1.3 Follow ***quality control procedures*** to ensure products, or data, are of a defined quality as an aid to acceptance or rejection 1.4 Recognize and report non-conformances or problems 1.5 Conduct work in accordance with ***sustainable energy work practices*** 1.6 Promote sustainable energy principles and work practices to other workers
2. Analyze opportunities for corrective and/or optimization action	2.1 Compare current work practices, procedures and process or equipment performance with requirements and/or historical data or records 2.2 Recognize variances that indicate abnormal or sub-optimal performance 2.3 Collect and/or evaluate batch and/or historical records to determine possible causes for sub-optimal performance 2.4 Use appropriate quality improvement techniques to rank the probabilities of possible causes
3. Recommend corrective and/or optimization actions	3.1 Analyze causes to predict likely impacts of changes and decide on the appropriate actions 3.2 Identify required changes to standards and procedures and training 3.3 ***Report*** recommendations to designated personnel
4. Participate in the implementation of recommended	4.1 Implement approved actions and monitor performance following changes to evaluate results 4.2 Implement changes to systems and procedures to

actions	eliminate possible causes 4.3 Document outcomes of actions and communicate them to ***relevant personnel***
5. Participate in the development of continuous improvement strategies	5.1 Review all relevant features of work practice to identify possible contributing factors leading to sub-optimal performance 5.2 Identify options for removing or controlling the risk of sub-optimal performance 5.3 Assess the adequacy of current controls, quality methods and systems 5.4 Identify opportunities to continuously improve performance 5.5 Develop recommendations for continual improvements of work practices, methods, procedures and equipment effectiveness 5.6 Consult with appropriate personnel to refine recommendations before implementation of approved improvement strategies 5.7 Document outcomes of strategies and communicate them to relevant personnel

Variable	**Range**
Quality control procedures	Quality control procedures may include: • standards imposed by regulatory and licensing bodies • enterprise quality procedures • working to a customer brief or batch card and associated quality procedures • checklists to monitor job progress against agreed time, costs and quality standards • preparation of sampling plans • the use of hold points to evaluate conformance • the use of inspection and test plans to check compliance
Methods for statistical analysis	Methods for statistical analysis may include: • means • median • mode • ranges • standard deviations • statistical sampling procedures
Problem solving techniques	Problem solving techniques may include: • identifying inputs and outputs • sequencing a process • identifying and rectifying a problem step • root cause analysis

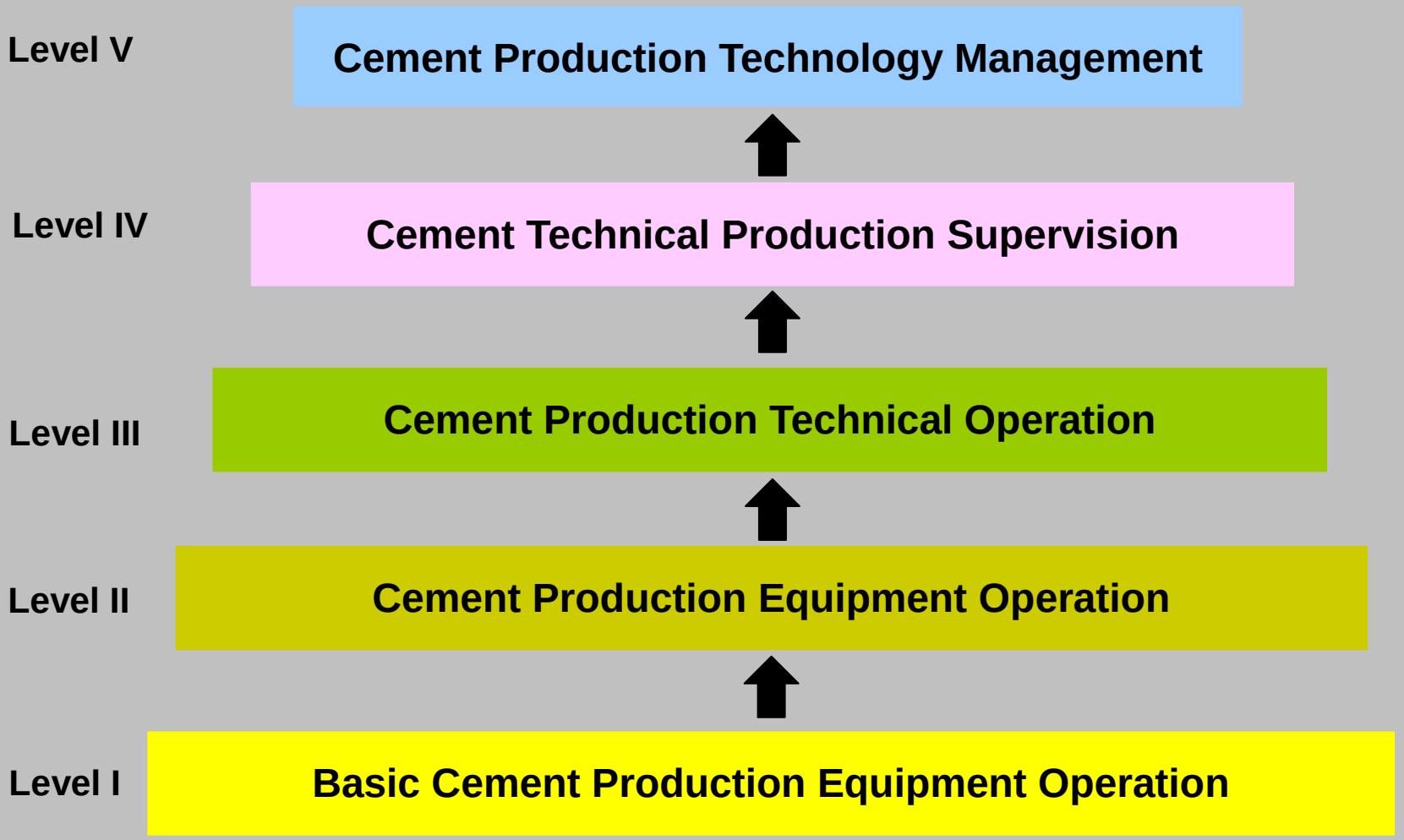
	• implementing preventative strategies
Quality improvement tools and techniques	Quality improvement tools and techniques may include: • run charts, control charts, histograms and scattergrams to present routine quality control data • plan, do, check, act (PDCA) • Ishikawa fishbone diagrams and cause and effect diagrams • logic tree • similarity/difference analysis • Pareto charts and analysis • force field/strength weakness opportunities threats (SWOT) analysis
Sustainable energy principles and work practices	Sustainable energy principles and work practices may include: • examining work practices that use excessive electricity • switching off equipment when not in use • regularly cleaning filters • insulating rooms and buildings to reduce energy use • recycling and reusing materials wherever practicable • minimizing process waste
Relevant personnel	Communication to relevant personnel may involve: • supervisors, managers and quality managers • administrative, laboratory and production personnel • internal/external contractors, customers and suppliers
Reporting	Reporting may include: • verbal responses • data entry into laboratory or enterprise database • brief written reports using enterprise proformas
Quality improvement opportunities	Quality improvement opportunities could include improved: • production processes • hygiene and sanitation procedures • reductions in waste and re-work • laboratory layout and work flow • safety procedures • communication with customers • methods for sampling, testing and recording data
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through regional or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the Ministry of Health

Evidence Guide

Critical Aspects of Competence	Assessors should ensure that candidates can: • use the enterprise's quality systems and business goals as a basis for decision making and action • apply all relevant procedures and regulatory requirements to ensure the quality and integrity of the products/services or data provided • apply and promote sustainable energy principles and work practices • detect non-conforming products or services in the work area • follow enterprise procedures for documenting and reporting information about quality • contribute effectively within a team to recognize and recommend improvements in productivity and quality • apply effective problem solving strategies • implement and monitor improved practices and procedures
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • specifications for laboratory products and services in the candidate's work area • quality requirements associated with the individual's job function and/or work area • scientific and technical knowledge underpinning the processes, procedures, equipment and instrumentation associated with the candidate's work tasks and duties • workplace procedures associated with the candidate's regular technical duties • sustainable energy principles • relevant health, safety and environment requirements • layout of the enterprise, divisions and laboratory • organizational structure of the enterprise • lines of communication • role of laboratory services to the enterprise and customers • methods of making/recommending improvements • Standards, procedures and/or enterprise requirements
Underpinning Skills	Demonstrates skills to: • applying problem solving techniques and strategies • applying statistical analysis and statistical sampling procedures • detecting non-conforming products or services in the work area • documenting and reporting information about quality • contributing effectively within a team to recognize and recommend improvements in productivity and quality • implementing and monitoring improved practices and procedures • organizing, prioritizing activities and items

	• reading and interpreting documents describing procedures • recording activities and results against templates and other prescribed formats • working with others
Resources Implication	Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the candidate • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies • enterprise quality manual and procedures • quality control data/records • customer complaints and rectifications
Methods of Assessment	Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • verified reports of improvements suggested and implemented by the candidate individually Those aspects of competence dealing with improvement processes could be assessed by the use of suitable simulations and/or a pilot plant and/or a range of case studies and scenarios. In all cases, practical assessment should be supported by questions to assess essential knowledge and those aspects of competence which are difficult to assess directly.
Context of Assessment	Competence may be assessed in the work place or in a simulated workplace setting / environment.

Sector: Industry Development
Sub-Sector: Cement Production



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