



**NOS.MC.01
FIRST EDITION**

**NATIONAL OCCUPATIONAL STANDARD FOR METAL
CASTERS**

ZAMBIA QUALIFICATIONS AUTHORITY

APPROVING AUTHORITY

This National Occupational Standard has been prepared and published under the authority of the Zambia Qualifications Authority Board on 15th February 2024.

ZAMBIA QUALIFICATIONS AUTHORITY

The Zambia Qualifications Authority Act No. 13 of 2011 was enacted by the Government of the Republic of Zambia to ***“provide for the development and implementation of a national qualifications framework; provide for the registration and accreditation of qualifications; establish the Zambia Qualifications Authority; provide measures to ensure that standards and registered qualifications are internationally comparable; and provide for matters connected with, or incidental to the foregoing”***. Among other functions, ZAQA is responsible for ***determining national standards for any occupation***, through various sector specific National Occupational Standards Development Teams (NOSDTs).

REVISION OF NATIONAL OCCUPATIONAL STANDARDS

National Occupational Standards (NOS) shall be revised every after **5 years**, or whenever necessary, by the issue of either amendments or of revised editions. It is important that users of NOS ascertain that they are in possession of the latest amendments or editions.

NOS DEVELOPMENT TEAM RESPONSIBLE

This National Occupational Standard was prepared by the Manufacturing National Occupational Standards Development Team, upon which the following organisations were represented:

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2. Copperbelt University (CBU)
3. Engineering Institution of Zambia (EIZ)
4. Good Time Steel Company Zambia Limited (GTS)
5. Lusaka Vocational and Technical College (LVTC)
6. Makeni Ecumenical Centre (MEC)
7. Ministry of Commerce, Trade and Industry (MCTI)
8. Ministry of Health (MoH)
9. National Institute for Scientific and Industrial Research (NISIR)
10. Northern Technical College (NORTEC)
11. University of Lusaka (UNILUS)
12. University of Zambia (UNZA)
13. Zambia Association of Manufacturers (ZAM)
14. Zambia Forestry College (ZFC)
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FOREWORD

The Zambia Qualifications Authority (ZAQA) is a statutory body under the Ministry of Education established by ZAQA Act No. 13 of 2011 to “**develop and implement a national qualifications framework; register and accredit qualifications; and ensure that standards and registered qualifications are internationally comparable**”.

Among other functions, ZAQA is responsible for “**determining national standards for any occupation**”, through various sector specific National Occupational Standards Development Teams (NOSDTs) of experts composed of representation from appropriate authorities, government departments, industry, academia, regulators, consumer associations and non-governmental organisations, etc.

This National Occupational Standard (NOS) has been developed by the Manufacturing National Occupational Standards Development Team in accordance with the procedures and guidelines of ZAQA. All users should ensure that they have the latest edition of this publication as National Occupational Standards are revised from time to time.

This NOS shall be used by, among others, industry, employers, quality assurance bodies, awarding and professional bodies and education and training institutions, as a benchmark to identify training needs, develop job profiles/descriptions, develop curricula and learning programmes, in various sectors where the occupation exists. In the Manufacturing sector, demonstration of competence against this NOS may be required in order to run a business or practice a craft or profession.

JUSTIFICATION

A Metal Caster is responsible for manufacturing metal cast parts or other related metal items as either finished or semi-finished products needed by industry as spare parts. Spare parts are a critical component in the manufacturing industry. The Metal Caster's role is to manufacture metal castings into parts specified by users using various available alloys.

This NOS highlights core knowledge, skills, competencies and personal attributes that Metal Casters must possess to be successful in their jobs.

ACRONYMS AND ABBREVIATIONS

CS	Core Skill
DNOS	Draft National Occupational Standard
MC	Metal Casters
NOS	National Occupational Standard
NOSDT	National Occupational Standards Development Team
OK	Organisational Knowledge
PC	Performance Criteria
PS	Professional Skill
RK	Regulatory Knowledge
RPL	Recognition of Prior Learning
TK	Technical Knowledge
ZAQA	Zambia Qualifications Authority
ZQF	Zambia Qualifications Framework

GLOSSARY OF TERMS

For the purposes of this NOS, the following terms and definitions shall apply:

Core Skills/Generic Skills: A group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the NOS, these include communication related skills that are applicable to most job roles.

Function: An activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through functional analysis and form the basis of NOS.

Job Title: A unique set of functions that together form a unique employment opportunity in an organisation.

Knowledge and Understanding: Statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.

National Occupational Standards (NOS): Statements of the standards of performance individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding. They are precise descriptions of what an individual is expected to be able to do in his/her work role.

National Occupational Standards (NOS) Code: A unique reference code that identifies a NOS.

National Occupational Standards Development Team (NOSDT): An established group of national stakeholders/experts responsible for the development of National Occupational Standards within a specific economic sector or occupation.

Occupation: A set of job roles, which perform similar/related set of functions in an industry.

Organisational Context: The manner in which the organisation is structured and how it operates, including the extent of operative knowledge that managers have in their relevant areas of responsibility.

Performance Criteria: Statements that together specify the standard of performance required when carrying out a task.

Scope: A set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on the quality of performance required.

Sector: A conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.

Sub Sector: A further breakdown of a sector based on the characteristics and interests of its components.

Technical Knowledge: Specific knowledge needed to accomplish specific designated responsibilities.

Unit Title: An overall statement about what the incumbent should be able to do.

1. OVERVIEW

This is an introductory section providing a brief summary and specific information or commentary about the content of the NOS and the targeted sector and occupation to help the user judge whether it is relevant to them.

NOS Code	NOS.MC.01
Occupation	Metal Casting
Job Title	Metal Caster
Job Description	<p>A metal caster is responsible for;</p> <ul style="list-style-type: none"> • Making patterns and moulds or casts from different materials such as metal, wax and sand. • Examining moulds to ensure they are clean, smooth and properly coated. • Assembling and embedding cores in the mould using appropriate tools and equipment • Loading specified amounts of metal flux into furnaces or clay crucibles • Reading temperature gauges and observing colour changes, adjusting furnace flames, torches or electrical heating units as necessary to melt metal to required specifications • Operating hand controlled mechanisms to pour and regulate the flow of the molten metal into moulds to produce castings or ingots • Turning valves to circulate water through mould cooling system or spraying water on filled moulds to cool and solidify metal • Transporting metal ingots to storage areas using forklifts
Job Purpose	A Metal Caster is responsible for using different types of tools, moulds, cores and furnaces, through a casting process to produce parts and tools from molten metal.
ZQF Level	3
Sector	Manufacturing
Sub sectors	Machine shops, Metal fabrication
Other Economic Sector(s) in which the Occupation is Practiced	Mining and Mineral processing; Aviation/Aerospace; Telecommunication; Water and Sanitation.
Other Similar Jobs that can be performed by the Metal Casters	Welder, Metal Fabricators.
Minimum Educational Job Entry Qualification(s)	Level 3 Certificate

Practicing License Requirements (if any)	Membership with the Engineering Institution of Zambia at Craftsman or above
Training/RPL	<ol style="list-style-type: none"> 1. Awareness of the Industry Standards and Rules and Regulations and their application 2. Quality Enhancement Methods. 3. First Aid Training
Minimum Job Entry Age	20 years
Prior Experience (Suggested)	Minimum of 1 year internship
Performance Criteria	As described in the Units under Section 4

2. SCOPE

This NOS specifies the fundamental knowledge and understanding, skills and competences that Metal Caster must possess to be successful in their jobs.

3. PERSONAL ATTRIBUTES (VALUES, ETHICS AND ATTITUDES)

The individual must be able to read and write a simple report, understand gauges, apply basic mathematics to keep records of inputs and outputs, and plan as well as prioritise their work. The individual is expected to be quality-conscious, occupational health and safety orientated, physically fit, courteous and creative. Further, the individual must have the ability to use fingers, hands and feet with ease to complete the assigned task (dexterity).

4. UNITS AND ELEMENTS

This National Occupational Standard is divided into **4 units** representing the tasks that a jobholder should undertake in his/her day-to-day work. The Units are further broken down into elements depicting the number of activities to be carried out for the successful execution of a particular task.

Unit 1 [This unit is about demonstrating competence to use available tools and mechanism to produce casts of various sizes from molten metal]

Unit No.	01
Unit Title	Produce casts of various sizes from molten metal
Description	This Unit describes the competencies required to use available tools and mechanisms to produce casts of various sizes from molten metal. The job holder is responsible for carrying out the casting process from molten metal to a solid cast while regulating the process parameters like temperatures, flow rates and pressures to cool the casting. He/she must be able to use various mechanisms to move the molten alloy and casting from one stage to the other of the casting process.
Scope	This Unit covers the following: <ul style="list-style-type: none"> • Preparing patterns and moulds • Making a solid metal from molten alloy • Extract the solid metal casting from the mould • Finishing
Performance Criteria (PC) with respect to the Scope	
Element	Performance Criteria (PC)
Preparing patterns and moulds	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC1. Translate information from a drawing or sketch to create a pattern that will determine the mould's shape. PC2. Determine suitable material to make the pattern from. PC3. Use the pattern to make a mould depending on the type of casting. PC4. Use various workshop tools to prepare the mould.
Making a solid metal from molten alloy	To be competent, the individual must be able to; <ul style="list-style-type: none"> PC5. Receive the molten metal and ensure it is the right alloy for the job then record it in a log book PC6. Use the appropriate lifting device or mechanism to move the ladle to the mould PC7. Operate the hoisting mechanism to pour the molten metal into the mould cavity PC8. Observe any temperature and colour changes to the molten metal to determine the quality of the product. PC9: Monitor and record the temperatures of the molten metal PC10. Recognise the lay out of the cooling system of the casting process. PC11. Operate water valves, water pumps and water spray nozzles for cooling and solidifying the cast. PC12. Regulate the water flow using inlet and outlet valves in order to maintain the temperature in the mould for uniform cooling
Extract the solid metal casting	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC13. Identify appropriate tools to extract the cast from the mould. PC14. Extract the solidified metal casting from the mould.
Finishing	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC15. Inspect the cast for any defects like shrinkage or cracking and any other faults.

	<p>PC16. Measure the dimensions of the casted metal and ensure the shape comes out as per specifications.</p> <p>PC17. Use appropriate tools to clean the cast by trimming off runners, breaking off the casting gates, grinding, sanding and polishing to give it a final finish as per specification</p>
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/ organisation and its processes)	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>OK1. Company standard operating procedures</p> <p>OK2. Company code of conduct</p> <p>OK3. Relevant people and their responsibilities within the work area</p> <p>OK4. Managing work processes and work plans</p> <p>OK5. Company Safety regulation policy</p>
B. Technical Knowledge	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>TK1. Measuring tools like temperature devices, water flow meters, air pressure gauges and callipers</p> <p>TK2. Lifting and hoisting equipment</p> <p>TK3. Operations of cutting, trimming and polishing tools</p> <p>TK4. The types of patterns and moulds</p> <p>TK5. The basic knowledge of ICT</p> <p>TK6. Molten alloys, making of solid metal, chemical composition requirements of casting materials</p> <p>TK7. Caster inspections, testing and lock functionality</p>
C. Regulatory context (knowledge of factory safety rules and regulations)	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>RK1: The Factories Act and Regulations</p> <p>RK2: Occupational, Health and Safety Act</p> <p>RK3: Mine Safety Act and Regulations</p>
Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	<p>The individual on the job must be able to:</p> <p>CS1. Write in English (at least working level) and/or have the means to give simple instructions in the local language used at the site</p> <p>CS2. Prepare and provide clear and simple instructions, details and sketches to co-workers</p> <p>CS3. Record production figures to include input, output, non - conformities and wastage</p>
	Reading Skills
	<p>The individual on the job must be able to:</p> <p>CS4. Report production figures to include input, output and waste</p> <p>CS5. Read and be able to or have the means to give simple instructions in the local language used at the site.</p> <p>CS6. Read and interpret readings of drawings and sketches, temperature and other gauges or instruction provided for the required job.</p>
	Oral Communication (Listening and Speaking skills)

	<p>The individual on the job must be able to:</p> <p>CS7. Listen attentively and interpret communication/instructions from the supervisor and other co-workers</p> <p>CS8. Convey information clearly and concisely to co-workers</p>
<p>B. Professional Skills</p>	<p>Decision Making</p>
	<p>The individual on the job must be able to:</p> <p>PS1. Determine and report to the superior whether the working space is safe</p> <p>PS2. Make decisions in emergency situations in the absence of the superior</p>
	<p>Plan and Organise</p>
	<p>The individual on the job must be able to:</p> <p>PS3. Plan work and organise required resources in coordination with team members and superiors</p> <p>PS4. Collect, store and disseminate updated information</p>
	<p>Customer Centricity</p>
	<p>The individual on the job must be able to:</p> <p>PS5. Manage relationships with the supervisor with intent to satisfying their specific requirements</p>
	<p>Problem-Solving</p>
	<p>The individual on the job must be able to:</p> <p>PS6. Identify and report the problem to the superiors</p> <p>PS7. Solve any routine problems that may arise in his/her work</p>
	<p>Analytical Thinking</p>
	<p>The individual on the job must be able to:</p> <p>PS8. Identify and report any problem to the superiors</p>
<p>Critical Thinking</p>	
<p>The individual on the job must be able to:</p> <p>PS9. Use common sense and make judgements in day-to-day activities</p> <p>PS10. Use reasoning skills to Identify and resolve basic problems</p> <p>PS11. Identify and deal with or report violation of any safety norms which may lead to accidents and report to the superiors</p>	

Unit 2 [This unit is about personal health, safety and environmental requirements at the casting area]

Unit No.	02
Unit Title	Work according to personal health, safety and environment requirements at the casting area
Description	This Unit describes the skills and knowledge required to work according to personal health, safety and environmental rules at the casting area.
Scope	<p>This Unit covers the following:</p> <ul style="list-style-type: none"> • Follow safety procedures as defined by the organisation. • Maintain environmental, health and safety work practices. • Implement good housekeeping and environmental protection process and activities.
Performance Criteria (PC) with respect to the Scope	
Element	Performance Criteria (PC)
Follow safety norms as defined by the Organisation	<p>To be competent, the individual should be able to:</p> <p>PC1. Identify and report any hazards, risks or breaches in the workplace to the appropriate authority.</p> <p>PC2. Follow emergency and evacuation procedures in case of accidents, fire incidents and natural calamities.</p> <p>PC3. Adhere to recommended safe practices in handling casting materials, including chemical and other hazardous materials.</p> <p>PC4. Participate in safety awareness programs like safety talks and safety demonstrations.</p> <p>PC5. Identify and report near misses, unsafe conditions and acts.</p>
Maintain environmental, health and safety work practices	<p>To be competent, the individual must be able to:</p> <p>PC6. Use appropriate Personal Protective Equipment (PPE) as per work requirements.</p> <p>PC7. Follow safe disposal of waste, harmful and hazardous materials as per the environmental, health and safety guidelines.</p> <p>PC8. Adhere to safety protocols and practices as laid down by the environmental, health and safety department/team at the site.</p>
Implement housekeeping practices	<p>PC9. Collect and deposit waste into identified containers before disposal</p> <p>PC10. Label and separate containers with toxic or hazardous wastes</p>
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/ organisation and its processes)	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>OK1. Company standard operating procedures</p> <p>OK2. Company code of conduct</p> <p>OK3. Occupational Safety and Health Policy</p> <p>OK4. Relevant people and their responsibilities within the work Area</p>

<p>B. Technical Knowledge</p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <ul style="list-style-type: none"> TK1. The procedure for responding to accidents and other emergencies at the site. TK2. Appropriate personal protective equipment to be used TK3. Safe usage of tools, equipment and materials TK4. Health and environmental effects of various types of materials TK5. Storage of waste in appropriate locations, such as: <ul style="list-style-type: none"> ☐ non-combustible scrap materials and debris; ☐ combustible scrap materials and debris; ☐ general waste and trash (non-toxic and non-hazardous); ☐ sharp edged offcuts, shavings and mills and TK6. Tools for conducting risk assessment. TK7. Housekeeping activities relevant to a particular task.
<p>C. Regulatory context (knowledge of factory safety rules and regulations)</p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <ul style="list-style-type: none"> RK1: Company Safety Regulation Policy. RK2: Factories Act and regulation. RK3: Occupational, Health and Safety Act and Regulations
<p>Skills (S)</p>	
<p>A. Core Skills/ Generic Skills</p>	<p>Writing Skills</p>
	<p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> CS1. Fill in safety-related forms for near misses, unsafe conditions and safety enhancement suggestions. CS2. Note down observations (if any) related to the operations and Share the same with the supervisor CS3. Note down the data for the respective shifts in the log sheets/ online systems as per applicability in the organisation CS4. Prepare requisitions to the supervisor on the requirement of chemicals, equipment, tools etc
	<p>Reading Skills</p>
	<p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> CS5. Read signposts and notice boards relevant to safety CS6. Read internal information sent by supervisor/ other teams on safety issues
<p>Oral Communication (Listening and Speaking skills)</p>	
<p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> CS7. Speak in English (at least working level) and/or have the means to give simple instructions in the local language used at the site on safety issues CS8. Listen attentively to instructions/communications shared by Site's environmental, health and safety department/team and Superiors regarding site safety 	

B. Professional Skills	Decision Making
	The individual on the job must be able to: PS1. Avoid creating unsafe working conditions for others PS2. Keep the workplace clean and tidy PS3. Communicate safety problems appropriately to supervisor and co-workers
	Plan and Organise
	PS4. Plan and organise the safety materials, tools and equipment required to execute the work
	Customer Centricity
	The individual on the job must be able to: PS5. Complete all assigned tasks safely, taking into account the safety of the end-users
	Problem-Solving
	The individual on the job must be able to: PS6. Identify, record and deal with or report safety risks that may affect one's health and the safety, and environment of others working in the vicinity
Analytical Thinking	
The individual on the job must be able to: PS7. Assess and analyse areas which may affect health, safety and environmental aspects at the workplace	
Critical Thinking	
The individual on the job must be able to: PS8. Behave and conduct him/herself in a safe manner. PS9. Respond to emergencies as soon as it is safe to do so.	

Unit 3 [This unit is about basic attitudes and competencies that an individual is required to possess and demonstrate in their behaviour and interactions with others in the workplace]

Unit No.	03
Unit Title	Working effectively with others
Description	This Unit is about basic etiquette and competencies that an individual is required to possess and demonstrate in their behaviour and interactions with others in the workplace.
Scope	This Unit covers the following: <ul style="list-style-type: none"> Working effectively with co-workers and supervisors.
Performance Criteria (PC) with respect to the Scope	
Element	Performance Criteria (PC)
Knowledge and Understanding (K)	
Working effectively with co-workers and supervisors.	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC1. Display appropriate communication etiquette while working PC2. Display active listening skills while interacting with coworkers and supervisors at work PC3. Demonstrate responsible and disciplined behaviour at the Workplace PC4. Receive information and instructions from the supervisor and co-workers, getting clarification where required. PC5. Pass on information to authorised persons who require it and within agreed timelines PC6. Consult with and assist co-workers to maximise effectiveness and efficiency in carrying out tasks PC7. Escalate grievances and problems to the appropriate authority as per procedure to resolve them and avoid conflict
A. Organisational Context (Knowledge of the company/ organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: <ul style="list-style-type: none"> OK1. Company standard operating procedures OK2. Company code of conduct OK3. Occupational Safety and Health Policy OK4. Relevant people and their responsibilities within the work Area
B. Technical Knowledge	The individual on the job must demonstrate knowledge and understanding of: <ul style="list-style-type: none"> TK1. Importance of effective communication in the workplace TK2. Importance of teamwork in organisational and individual success TK3. Barriers to effective communication TK4 Company's organisational structure

<p>C. Regulatory context (knowledge of factory safety rules and regulations)</p>	<p>The individual on the job must demonstrate knowledge and understanding of: RK1: Company Safety Regulation Policy RK2: Factories Act and Regulations RK3: Occupational, Health and Safety Act and Regulations</p>
<p>Skills (S)</p>	
<p>A. Core Skills/ Generic Skills</p>	<p>Writing Skills</p>
	<p>The individual on the job must be able to: CS1. Fill in appropriate technical forms, process charts, and log sheets as per Organisational format CS2. Note down observations (if any) related to the operations and Share the same with the supervisor CS3. Note down the data for the respective shifts in the log sheets/ online systems as per applicability in the organization CS4. Prepare requisitions to the supervisor on the requirement of chemicals, tools etc.</p>
	<p>Reading Skills</p>
	<p>The individual on the job must be able to: CS5. Read and interpret information correctly from various job specification documents, manuals, and health and safety instructions CS6. Read internal information sent by supervisor/other teams</p>
<p>B. Professional Skills</p>	<p>Oral Communication (Listening and Speaking skills)</p>
	<p>The individual on the job must be able to: CS7. Check and clarify task-related information CS8. Liaise with appropriate authorities using the correct protocol CS9. Communicate with people in a respectful manner and in line with organisational protocol</p>
	<p>Decision Making</p>
	<p>The individual on the job must be able to: PS1. Identify problems with work planning, procedures, output and behaviour and their implications PS2. Prioritise and plan for problem-solving PS3. Communicate problems appropriately to supervisor and co-workers PS4. Identify effective resolution techniques PS5. Select and apply resolution techniques</p>
<p>B. Professional Skills</p>	<p>Plan and Organise</p>
	<p>The individual on the job must be able to: PS6. Plan, prioritise and schedule work operations as per job requirements PS7. Organise and analyse information relevant to work</p>
	<p>Customer Centricity</p>
<p>B. Professional Skills</p>	<p>The individual on the job must be able to: PS8. Manage relationships with the supervisor with intent to satisfying their specific requirements</p>

	Problem-Solving
	The individual on the job must be able to: PS9. Identify and report the problem to the superiors
	Analytical Thinking
	The individual on the job must be able to: PS10. Identify and report the problem to the superiors
	Critical Thinking
	The individual on the job must be able to: PS11. Use common sense and make judgements in day-to-day activities PS12. Use reasoning skills to Identify and resolve basic problems PS13. Identify and deal with or report violations of any safety norms which may lead to accidents and report to the superiors

Unit 4 [This unit is about Entrepreneurship opportunities in Metal Casting]

Unit No.	04
Unit Title	Entrepreneurship opportunities in Metal Casting
Description	This Unit describes the skills and knowledge required by a Metal Caster to identify areas of entrepreneurship in Metal Casting.
Scope	This Unit covers the following: <ul style="list-style-type: none"> • Business opportunities in the manufacturing and sale of cast ingots, moulds, cores and patterns, setting up private foundries and training of new casters.
Performance Criteria (PC) to the Scope	
Element	Performance Criteria (PC)
Business opportunities in the manufacturing and sale of cast ingots, moulds, cores and patterns, setting up private foundries and training of new casters.	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC1. Identify and explore a wide range of business opportunities available in the Metal casting industry PC2. Develop, organize and run a new business PC3. Act on the business idea to disrupt the current market with a new product or service PC4. Assess the market and demand for the product or service and the financial risk associated with the business planned
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the Standard Procedures guiding business set up in Zambia)	The individual on the job must demonstrate knowledge and understanding of: <ul style="list-style-type: none"> OK 1. Relevant National laws, standards, policies and procedures followed in the registration of the business company OK 2. Business company roles, responsibilities, accountabilities, and authorities
B. Technical Knowledge	The individual on the job must demonstrate Technical knowledge and understanding of: <ul style="list-style-type: none"> TK 1. Creating a business plan TK 2. Acquiring resources and financing for the new business TK 3. Hiring suitable labour for the business TK4. Providing leadership and management for the business
C. Regulatory Knowledge (Knowledge of rules and regulation)	The individual on the job must demonstrate knowledge and understanding of: <ul style="list-style-type: none"> RK1. Patents and Companies Registration Acts RK2. Zambia Revenue Authority (ZRA) RK3. Zambia Development Agency (ZDA) RK4. Competition and Consumer Protection Commission (CCPC). RK5. EIZ ACT

Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	The individual on the job must be able to: CS1. Issue instructions, recommendations and commendations in writing CS2. Conduct basic performance assessments and develop performance reports
	Reading Skills
	The individual on the job must be able to: CS3. Read and understand basic leadership skills
B. Professional Skills	Oral Communication (Listening and Speaking skills)
	The individual on the job must be able to: CS4. Manage basic meetings and discussions CS5. Provide feedback on strengths, weaknesses, opportunities and threats for the business CS6. Give instructions to the team CS7. Listen attentively and comprehend the information given by the speaker
	Decision Making
	The individual on the job must be able to: PS1. Decide whether the business plan will contribute significantly to society by improving the casting methodologies while assessing the financial risks related to the business
	Plan and Organise
	The individual on the job must be able to: PS2. Plan, organise, lead and control business activities PS3. Use the basic Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis in their functional area of Responsibility
	Customer Centricity
	The individual on the job must be able to: PS4. Follow a code of conduct relating to the setting up of the business and ensure that products or services offered meets the set national standards to meet customer expectations
	Problem Solving
The individual on the job must be able to: PS5. Solve problems within the business PS6. Identify predictable and unpredictable problems PS7. Apply appropriate problem-solving techniques and assertive in decision-making PS8. Consult widely to identify possible remedies of complex challenges	
Analytical Thinking	
The individual on the job must be able to: PS9. Analyse and categorise the challenges that affected the Setting up of the business.	

	PS10. Solve predictable and unpredictable problems quickly and effectively using a step-by-step approach to thinking and breaking down challenges into single and manageable components.
	Critical Thinking
	The individual on the job must be able to: PS11. Use common sense and make judgments in day-to-day activities PS12. Use reasoning skills to identify and resolve basic problems PS13. Use intuition to identify any potential problems which could arise during business operations.

5. EQUIPMENT, TOOLS AND CONSUMABLE MATERIALS

These include, but not limited to: personal protective equipment such as leather jackets, safety boots, hardhat, respirators, leather gloves, safety goggles and shield;

Equipment and Tools:

Casting tools such as ladles, moulds and pouring spoons; Testing equipment and tools such as callipers, mass scales and temperature recorders, hammers, trimming tools and grinders to polish the end product of a cast.

Raw Materials and Consumables:

Consumables such as facing sand, graphite and vegetable oils to prevent sticking of casted parts in the mould; Basic molten metal, Lubricants, Spare parts and components.

6. DILEMMAS/CHALLENGES AND COMPLEXITIES FOR A JOB HOLDER

Metal Casters face challenges such as exposure to high temperatures, lack of personal protective equipment, inconsistencies in company and government policies and regulations, and pressure from supervisors.

6.1 Alternative Choices (Solutions) to Dilemmas and Complexities

Solutions to challenges include: wearing proper safety attire and ensure participation in safety awareness meeting; adhere to company's policy on safety and operating standards every time; selecting and procuring appropriate equipment and tools for the job; supporting capacity building through training; participating in lobbying and formulation of policies, and allocation of adequate financial resources.

7. WORKING CONDITIONS/ENVIRONMENT

Metal Casters work with a variety of machinery, toxic substances and volatile materials. Their work environment is susceptible to fires, explosions, fumes, structural failures and equipment malfunctions. Working conditions include hot conditions, climbing heights, standing and/or walking for long hours and lifting materials. Metals Caster are also expected to work in day or night shifts, as well as in areas with limited lighting and ventilation.

8. PARTIES INVOLVED/INTERACTING WITH THE JOB HOLDER OR TRAINEE

8.1 Internal/Within the Organisation

Management, supervisors, subordinates and other section members.

8.2 External/Outside the Organisation

Government regulators, professional bodies, trainers, consultants and clients, suppliers of consumables, equipment and tools, metal casters from other companies, labour unions, clients, students/interns, occupational health and safety officials.

9.0 PHYSICAL DEMANDS ON THE BODY

- Physique to sustain strenuous conditions; e.g. high temperatures and fumes
- Be able to walk and stand for long periods of time during casting process
- Bend, stretch, twist, or reach out;
- Be able to lift relatively heavy materials e.g. the moulds and cores, tools and equipment;
- Be able to use fingers, hands and feet with ease to complete the assigned task (dexterity);

ANNEX A

Criteria for Assessments based on this NOS

A.1 Guidelines for Assessment

A.1.1 Criteria for assessment for curricula and learning programmes based on this NOS will be created by curricula and programmes developers. Each Performance Criteria (PC) will be assigned marks proportional to its importance in the NOS. Curricula and programmes developers will also lay down proportion of marks for theory and practical skills for each performance criteria, giving more weight to practical skills.

There shall be allocated the 'Total Mark', which will be the sum of all marks in each Unit, distributed across the number of PCs in that particular Unit. The 'out of' mark will be the mark allocated to each PC, which will be shared between theory and skills practical assessments.

A.1.2 Individual awarding/assessment bodies or institutions and other users of the NOS will create unique question papers for the theory part and evaluations for skill practical part for their respective candidates.

ANNEX B NOS Version Control

This Annex gives details necessary for the tracking of the NOS versions based on the number of revisions.

NOS Code	DNOS.MC.01		
ZQF Level	3	Version Number	01
Sector	Manufacturing	Date of Approval	
Sub Sector	Machine shop and metal fabricator	Date of Last Review	N/A