



**NATIONAL COMPETENCY STANDARDS
FOR
METAL WORKER
(NC2)**

**Department of Occupational Standards
Ministry of Labour and Human Resources
Thimphu Bhutan
(November 2016)**



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FOREWORD

The Department of Occupational Standards of the Ministry of Labour and Human Resources is pleased to present the National Competency Standards (NCSs) for Metal Worker. The standards represent the fruits of hard work and invaluable experiences gained by the department since its establishment in the latter half of 2003. The main aim of developing NCS is to set up a well-defined nationally recognized Vocational Qualifications System that will help set a benchmark for the Technical Vocational Education and Training (TVET) System in our country aligned to international best practices.

NCS is one of the base pillars in the Bhutan Vocational Qualifications Framework (BVQF) and is the first step in its implementation. The NCS are developed and revised to ensure that employees or vocational graduates possess and acquire the desired competencies required by industries and employers. In order to ensure this close match in supply and demand of competencies, NCS have been developed and revised in close consultation and partnership with industry experts and validated by the Technical Advisory Committees of the concerned economic sectors.

A vocational education and training system based on NCS shall ensure that delivered training is of a high quality and relevant to the needs of the labour market. As a result, future TVET graduates will be better equipped to meet the need and expectations of industries and employers. This positive impact on the employability of TVET graduates will enhance the reputation of vocational education and training and make it attractive to school leavers.

I gratefully acknowledge collaboration and the valuable contributions made by experts from industries during the consultation and validation processes of the standards. I look forward for continued engagement and participation of the industry and employers in the development of a quality assured demand driven TVET system and to build competent and productive national workforce that will contribute to the continued socio-economic progress of our country.

Director
Department of Occupational Standards
Ministry of Labour and Human Resource

Validation Form for NCS

Occupation:

Unit Title:

Please respond honestly and tick where appropriate.

Component s of NCS	Explanatory	Yes	No	Any comments
Unit Title	Focused on the Outcome of job			
Descriptor	Adequately described the parameters of job			
Elements of Competence	Focused on the outcome of job			
Performance Criteria	Is assessable & demonstrable			
Range Statement	Adequately stated the context of work			
Underpinnin g Knowledge	Included all the related knowledge			
Underpinnin g Skills	Included all the related skills			
Overall NCS	Fulfilled the minimum standards requirements of the trade and can used for developing training materials			
Name of the TAC Members (Automobile Sector) Date:				
Name	Working Address	Signature		

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Acknowledgement

NATIONAL COMPETENCY STANDARDS FOR METAL WORKER

Validation date : 03/11/2016

Endorsement date: 03/11/2016

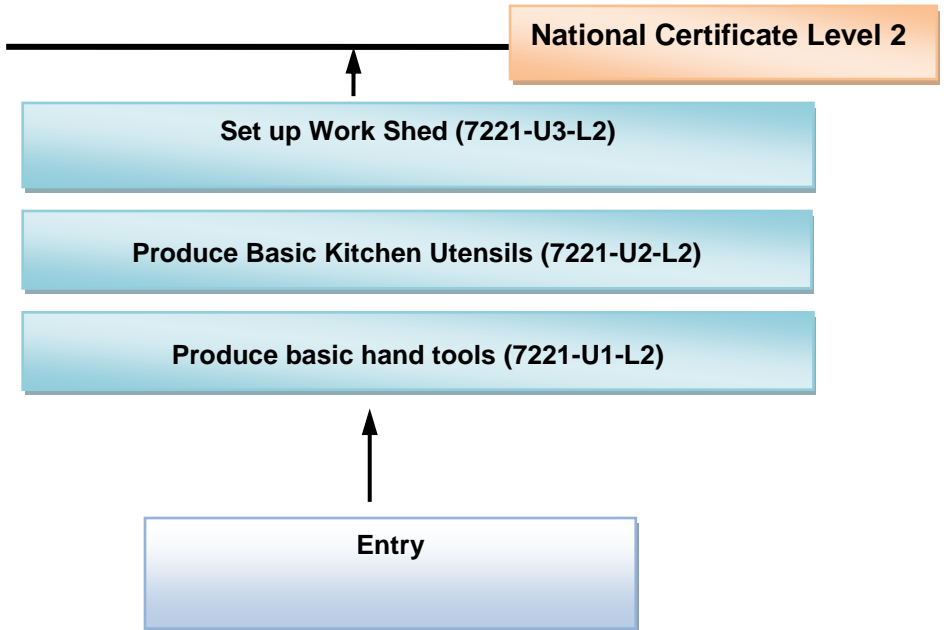
Date of Review : 03/11/2019 (Max. 3 years)

Technical Advisory Committee (TAC) members for the Manufacturing sector involved in the validation of NCS:

Subject experts involved during the consultative workshop for the development of NCS for Metal Worker:

Packaging of Qualifications for Metal Worker

The National Competency Standards for the Metal Worker comprises of three units which are clustered into following levels of qualifications.



Overview of the National Competency Standards

UNIT TITLE	ELEMENTS OF COMPETENCE
1. Produce basic hand tools	<ol style="list-style-type: none"><li>1. Make basic hand tools<li>2. Carry out finishing works on hand tools
2. Produce basic kitchen utensils	<ol style="list-style-type: none"><li>1. Make kitchen utensils<li>2. Carry out finishing works on kitchen utensils
3. Set up work shed	<ol style="list-style-type: none"><li>1. Set up furnace and blower machine<li>2. Set up anvils

UNIT TITLE: Produce basic hand tools

DESCRIPTOR : This unit covers the competencies required to produce agriculture tools, carpentry tools, masonry tools and hand tools as per the job requirement following standard procedures.

CODE : 7221-U1-L2

ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1 Make basic hand tools	<ul style="list-style-type: none">1.1 Select and use required tools and Equipment as per the job requirement following standard procedures.1.2 Select and use required PPE as per the job requirement following standard procedures1.3 Prepare estimates of materials as per the job requirement following standard procedures1.4 Pre heat the metal to make basic hand tools as per the job requirement following standard procedures.1.5 Cut the metal to the required size as per the job requirement following standard procedures.1.6 Rough hammer the metal to required shape in sequence as per the job requirement following standard procedures.1.7 Make handle shape as per the job requirement following standard procedures

<p>2 Carry out finishing work on Agriculture tools</p>	<p>2.1 Fine hammer the metal to required shape as per the job requirement following standard procedures</p> <p>2.2 Grind/file the product as per the job requirement following standard procedures</p> <p>2.3 Make serrated edge (teeth) on the product as per the job requirement following standard procedures</p> <p>2.4 Temper the product as per the job requirement following standard procedure</p>
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RANGE STATEMENT	
<p>Work connected to this unit may take place</p>	
<p>Tools and equipment may include but not limited to:</p>	
<ul style="list-style-type: none"> • Tong • Hammer • Chisel 	<ul style="list-style-type: none"> • Flat file • Grinder • Snipper
<p>Personal protective Equipment (PPE) may includes but not limited to:</p>	
<ul style="list-style-type: none"> • Hand gloves • Goggles • Apron 	<ul style="list-style-type: none"> • Mask • Safety helmet • Safety shoes

Materials may include but not limited to:	
<ul style="list-style-type: none"> • Metal 	<ul style="list-style-type: none"> •
Basic hand tools may include but not limited to:	
<ul style="list-style-type: none"> • Sickle • Dagger • Knife • Hoe • Hammer 	<ul style="list-style-type: none"> • Plough • Axe • Spade • Chisel
Performance of this unit is expected to be carried out to the following standards	
<ul style="list-style-type: none"> • Occupational Health and Safety regulations 	<ul style="list-style-type: none"> •
Critical Aspects:	
<ul style="list-style-type: none"> • Follow occupational health and safety procedures. • Concern about personal safety and safety about others. • Cut the metal as per job requirement following standard procedure • Fine hammer the metal to required size and shape as per the job requirement following standard procedures • Temper the product as per the job requirement following standard procedures. 	

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<ul style="list-style-type: none">• Basic first aid• Types of agriculture tools• Quality of metal• Tempering• Cost estimation• Types of coal	<ul style="list-style-type: none">• Handling of tools and equipment• Communication• Team work• Negotiation

UNIT TITLE: Produce basic kitchen utensils

DESCRIPTOR : This unit covers the competencies required to carry out making of basic kitchen utensils and carrying out of finishing works.

CODE : 7221-U2-L2

ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Make basic Kitchen utensils	<ul style="list-style-type: none">1.1 Select and use required tools and Equipment as per the job requirement following standard procedures.1.2 Select and use required PPE as per the job requirement following standard procedures1.3 Prepare estimates of materials as per the job requirement following standard procedures1.4 Melt the aluminum metal to make kitchen utensils following standard procedures1.5 Pour the molten aluminum on the flat sand base and allow to cool to desired temperature as per the job requirement.1.6 Hammer the metal to required size in sequence as per the job requirement following standard procedures.1.7 Cut the aluminum to required shape as per the job requirement following standard procedures.1.8 Fine hammer the aluminum to the required shape as per the job requirement following standard procedures.1.9 Make handle shape as per the job requirement following standard procedures

<p>2. Carry out finishing work on kitchen utensils</p>	<p>2.1 Finish hammer the aluminum to required finishing level as per the job requirement following standard procedure.</p> <p>2.2 Trim the aluminum to required finishing level as per job requirement following standard procedures.</p> <p>2.3 File the product as per the job requirement following standard procedures</p> <p>2.4 Carve the pattern on the product as per the job requirement.</p>
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RANGE STATEMENT	
<p>Work connected to this unit may take place</p>	
<p>Tools and equipment may include but not limited to:</p>	
<ul style="list-style-type: none"> • Tong • Hammers • Chisel • 	<ul style="list-style-type: none"> • Flat file • Grander • Metal cutting scissor
<p>PPE may include but not limited to:</p>	
<ul style="list-style-type: none"> • Hand gloves • Goggles • Apron 	<ul style="list-style-type: none"> • Mask • Safety helmet • Safety shoes

Materials may include but not limited to:	
<ul style="list-style-type: none"> • Aluminum 	<ul style="list-style-type: none"> • Brass
Kitchen utensils may include but not limited to:	
<ul style="list-style-type: none"> • Ladle 	<ul style="list-style-type: none"> • Pots
Performance of this unit is expected to be carried out to the following standards	
<ul style="list-style-type: none"> • Occupational Health and Safety regulations 	<ul style="list-style-type: none"> • Relevant environment rules and regulations
Critical Aspects:	
<ul style="list-style-type: none"> • Follow occupational health and safety procedures. • Concern about personal safety and safety about others. • Trim the aluminum as per job requirement following standard procedure • Fine hammer the aluminum to required size and shape as per the job requirement following standard procedures 	

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<ul style="list-style-type: none">• Basic first aid• Types of kitchen utensils• Quality of materials• Types of materials• Cost estimation• Types of coal	<ul style="list-style-type: none">• Handling of tools and equipment• Communication• Team work• Negotiation

UNIT TITLE: Set up work shed

DESCRIPTOR : This unit carries the competencies required to set up furnaces, blower machine and setting up of tools and equipment.

CODE : 7221-U3-L2

ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Set up furnace and blower machine	1.1 Select and use required tools and Equipment as per the job requirement following standard procedures. 1.2 Select and use required PPE as per the job requirement following standard procedures 1.3 Prepare estimates of materials as per the job requirement following standard procedures 1.4 Install blower machine as per the standard procedures. 1.5 Prepare furnace as per the job requirement following standard procedures
2. Set up tools and equipment	2.1 Install anvils as per the job requirement following standard procedures 2.2 Set up water pool for tempering works as per the standard procedures. 2.3 Set up tools and equipment as per the job requirement following standard procedures.

RANGE STATEMENT	
Work connected to this unit may take place	
Tools and equipment may include but not limited to:	
<ul style="list-style-type: none"> • Hammers • Spade 	<ul style="list-style-type: none"> • Knife • Chisel
PPE may include but not limited to:	
<ul style="list-style-type: none"> • Hand gloves • Goggle • Apron 	<ul style="list-style-type: none"> • Mask • Safety helmet • Safety shoes
Materials may include but not limited to:	
<ul style="list-style-type: none"> • Blower • Coal • Planks 	<ul style="list-style-type: none"> • Mud mixtures • Stone block
Performance of this unit is expected to be carried out to the following standards	
<ul style="list-style-type: none"> • Occupational Health and Safety regulations 	<ul style="list-style-type: none"> • Relevant environment rules and regulations
Critical Aspects:	

- Follow occupational health and safety procedures.
- Concern about personal safety and safety about others.
- Install blower machine and furnaces
- Set anvils as per the standard procedures.

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<ul style="list-style-type: none"> • Basic first aid • Types of materials • Cost estimation • Types of coal • Types of anvils 	<ul style="list-style-type: none"> • Handling of tools and equipment • Communication • Team work • Negotiation

Annexure

1.1 National Competency Standards (NCS)

The National Competency Standards specify the skill, knowledge and attitudes applied to a particular occupation. Standards also specify the standards or criteria of performance of a competent worker and the various contexts in which work may take place. Standards provide explicit advice to assessors regarding the skill and knowledge to be demonstrated by candidates seeking formal recognition either following training or through work experience.

1.2 Purpose of National Competency Standards

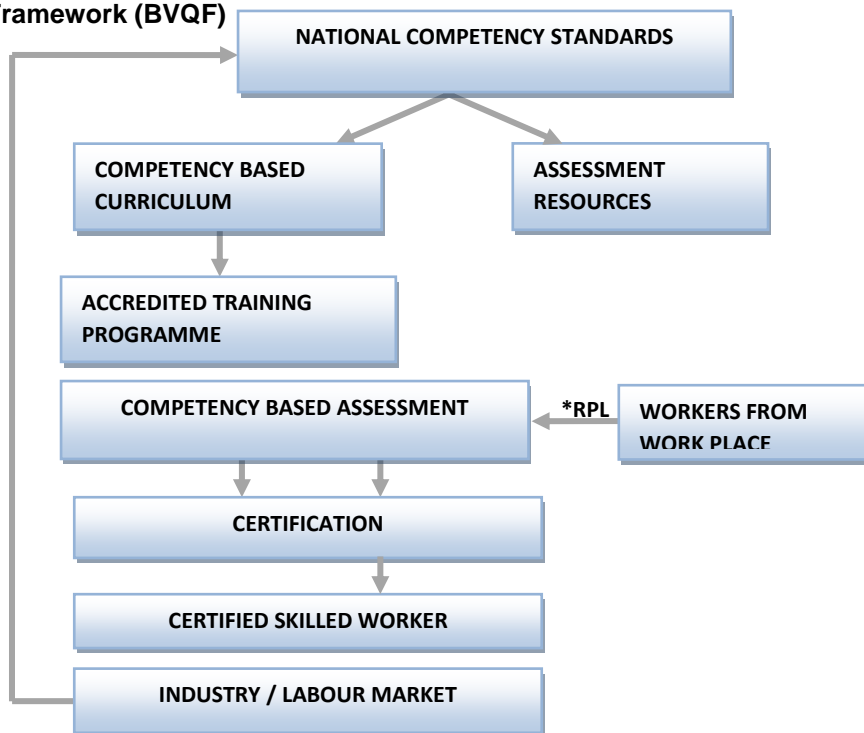
National Competency Standards serve a number of purposes including:

- Providing advice to curriculum developers about the competencies to be included in curriculum.
- Providing specifications to assessment resource developers about the competencies within an occupation to be demonstrated by candidates.
- Providing advice to industry/employers about job functions, which in turn can be used for the development of job descriptions, performance appraisal systems and work flow analysis.

1.3 Bhutan Vocational Qualifications Framework (BVQF)

Bhutan Vocational Qualifications Framework is an agreed system of Assessing, Certifying and Monitoring nationally recognized qualifications for all learning in the TVET sector against national competency standards, in training institutions, in the workplace, in schools or anywhere where learning takes place.

Components of the Bhutan Vocational Qualifications Framework (BVQF)



* RPL = Recognition of Prior Learning

1.4 BVQF Levels

The Bhutan Vocational Qualifications Framework has three levels classified based on the competency of the skilled workers. The three levels are:

- National Certificate Level 3 (NC III)
- National Certificate Level 2 (NC II)
- National Certificate Level 1 (NC I)

BVQF Level Descriptors

The qualification levels are decided based on level descriptors. The detail of the qualification level descriptor is as follows:

National Certificate Level 1

Carry out processes that:	Learning demand:	Responsibilities which are applied:
<ul style="list-style-type: none">• Are narrow in range.• Are established and familiar.• Offer a clear choice of routine responses.• Involve some prioritizing of tasks from known solutions.	<ul style="list-style-type: none">• Basic operational knowledge and skill.• Utilization of basic available information.• Known solutions to familiar problems.• Little generation of new ideas.	<ul style="list-style-type: none">• In directed activity.• Under general supervision and quality control.• With some responsibility for quantity and quality.• With no responsibility for guiding others.

National Certificate Level 2

Carry out processes that:	Learning demand:	Responsibilities which are applied:
<ul style="list-style-type: none"> • Require a range of well-developed skills. • Offer a significant choice of procedures requiring prioritization. • Are employed within a range of familiar context. 	<ul style="list-style-type: none"> • Some relevant theoretical knowledge. • Interpretation of available information. • Discretion and judgments. • A range of known responses to familiar problems 	<ul style="list-style-type: none"> • In directed activity with some autonomy. • Under general supervision and quality checking. • With significant responsibility for the quantity and quality of output. • With some possible responsibility for the output of others.

National Certificate Level 3

Carry out processes that:	Learning demand:	Responsibilities which are applied:
<ul style="list-style-type: none"> • Requires a wide range of technical or scholastic skills. • Offer a considerable choice of 	<ul style="list-style-type: none"> • A broad knowledge base which incorporates some theoretical concepts. • Analytical 	<ul style="list-style-type: none"> • In self-directed activity. • Under broad guidance and evaluation. • With complete responsibility for quantity and

<p>procedures requiring prioritization to achieve optimum outcomes.</p> <ul style="list-style-type: none"> • Are employed in a variety of familiar and unfamiliar contexts. 	<p>interpretation of information.</p> <ul style="list-style-type: none"> • Informed judgment. • A range of sometimes innovative responses to concrete but often unfamiliar problems. 	<p>quality of output.</p> <ul style="list-style-type: none"> • With possible responsibility for the output of others.
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1.5 PURPOSE

This qualification is designed for people interested in a career as a Metal worker at the Certificate level. It comprises of three units that cover the essential knowledge and skills required for people working as a Metal Worker.

It provides industry specific skills and demands a level of performance that will enable new recruits to the industry to be immediately productive.

1.6 CODING USED FOR NATIONAL COMPETENCY STANDARDS

The coding and classification system developed in Bhutan is logical, easy to use, and also aligned with international best practises. The Bhutanese coding and classification system is based on the International Standard Classification of Occupations, 2008 (ISCO-08) developed by the International Labour Organisation (ILO).

The coding of the National competency standards forms the basis of the identification code for the Vocational Education

and Training Management Information System (VET – MIS) both in terms of economic sector identification and that of the individual standard.

Coding the individual national competency standards

Coding the individual skills standard has a multiple purpose:

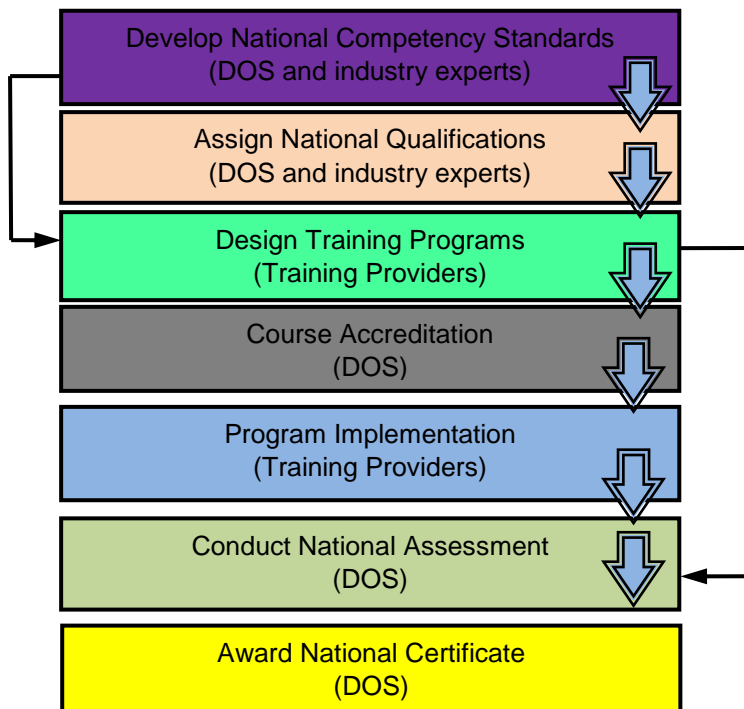
- to identify the level,
- to identify to which module the standard belongs,
- to identify in which order the standard is clustered within that module.

A job can include a number of competencies described in the national competency standards.

However, in order to follow a logical order, only national competency standards related to each other and following a logical sequence in terms of training delivery, from the simple to the complex, are clustered into a module. Some standards are so complex that they need to stand alone.

To illustrate with an example, the ILO assigns the code 7221 to the occupation of metal worker and related trades. Therefore, in the Bhutan's context, the occupation metal worker has been assigned the code 7221 in the National Coding System. The first unit is assigned the code U1. Levels are assigned the code L and follow a logical progression from the National Certificate Level 1 (NC I) to the National Certificate Level 3 (NC III). Therefore the National Certificate Level 1 is assigned the code L1.

Implementation and operational procedures for National Competency Standards (NCS)



MoLHR – Ministry of Labour and Human Resources
DOS – Department of Occupational Standards

1.7 ASSESSMENT GUIDE

Form of assessments

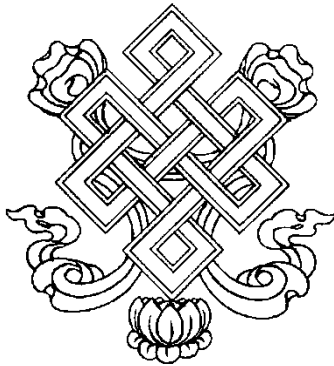
- Continuous assessment together with collected evidence of performance will be used.
- Evidence of the performance shall be based on practical demonstration.
- Knowledge can be assessed through diagrams, in writing or orally (viva-voce).

Assessment context

- Competency may be assessed in the actual work place or in a simulated workplace setting.

Assessment condition

- The candidate shall have access to all required tools, equipments, materials and documents.
- Candidate must complete the assessment in industry accepted time frame.



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