



**NATIONAL COMPETENCY STANDARDS  
FOR  
POWER CABLE TECHNICIAN  
(NC2)**

**Department of Occupational Standards  
Ministry of Labour and Human Resources  
Thimphu Bhutan  
(August 2018)**



**NATIONAL COMPETENCY STANDARDS  
FOR  
POWER CABLE TECHNICIAN  
(NC2)**

**Department of Occupational Standards  
Ministry of Labour and Human Resources  
Thimphu Bhutan  
(August 2018)**

First Publication 2018

© Department of Occupational Standards (DOS), MoLHR

## Table of Contents

Foreword .....	1
Acknowledgement .....	2
Packaging of Qualifications for Power Cable Technician .....	4
Overview of the National Competency Standards for Power Cable Technician	5
UNIT TITLE: Carryout Power cable laying .....	6
UNIT TITLE: Carryout Power Cable Jointing .....	9
UNIT TITLE: Perform Power Cable termination .....	11
Annexure .....	15
1.1 National Competency Standards (NCS) .....	15
1.2 Purpose of National Competency Standards .....	15
1.3 Bhutan Vocational Qualifications Framework (BVQF) .....	16
1.4 Components of the Bhutan Vocational Qualifications Framework (BVQF) .....	16
1.5 BVQF Levels .....	17
1.6 Purpose .....	19
1.7 Coding used for National Competency Standards .....	19
1.8 Assessment Guide .....	22



## **FOREWORD**

The Department of Occupational Standards of the Ministry of Labour and Human Resources is pleased to present National Competency Standards (NCSs) for power cable technician. 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

## Acknowledgement

### NATIONAL COMPETENCY STANDARDS FOR POWER CABLE TECHNICIAN

**Validation date** : 03/10/2018

**Endorsement date:** 05/10/2018

**Date of Review** : 03/10/2022 (Max. 3 years)

#### **Technical Advisory Committee (TAC) members for the Power Sector involved in the validation of NCS:**

- 1) TP Sharma (**Chairperson**), Tala Hydropower Plant, Chukha
- 2) Karma Loday (**Member Secretary**), Chief Program Officer, MoLHR
- 3) Rinchen Dorji, TTI-Rangjung
- 4) Shatu, TTI-Rangjung
- 5) Nidup Tshering, BHSL, Jigmeling, Gelephu
- 6) Sonam Yangki, JWPTI, Gelephu
- 7) Pema Wangdi, TPSD, DTE, MoLHR

#### **Subject experts involved during the consultative workshop for the development of NCS:**

1. Chencho Dorji, DGPC, Chukha Hydro Power Plant.
2. Kuenzang Namgyel, DGPC, Chukha Hydro Power Plant.
3. Samten Wangchuk, DGPC, Tala Hydro Power Plant.
4. Pema Wangchuk, DGPC, Tala Hydro Power Plant.
5. Rinchen Tshering, BPC, Phuntsholing
6. Dechen Wangdi, BPC, Phuntsholing
7. Kelzang Phuntsho, BPC, Phuntsholing
8. Kharka Bdr. Ghalley, BPC, Phuntsholing

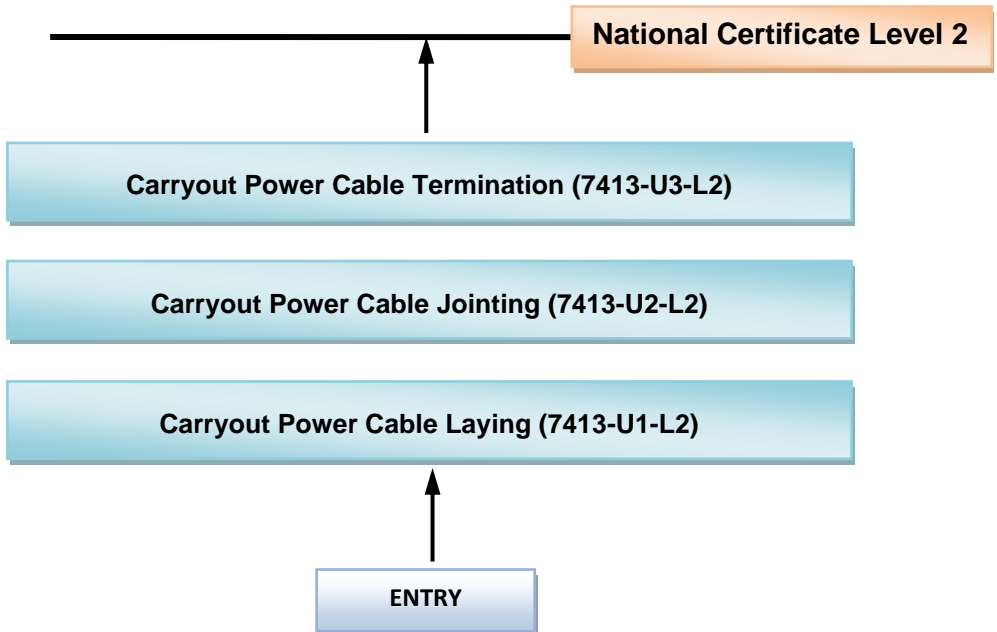
**Facilitators:**

1. Karma Loday, Chief Program Officer, SQD,DOS, MoLHR
2. Chogay Lhendup, Program Officer, SQD, DOS, MoLHR



## Packaging of Qualifications for Power Cable Technician

The National Competency Standards for the Power Cable Technician comprises of three units of competencies which are clustered into following levels of qualifications.



## Overview of the National Competency Standards for Power Cable Technician

UNIT TITLE	ELEMENTS OF COMPETENCE
1. Carryout Power Cable Laying	<ol style="list-style-type: none"><li>1. Prepare Trench</li><li>2. Prepare cable for laying</li><li>3. Lay the cables</li></ol>
2. Carryout Power cable Jointing	<ol style="list-style-type: none"><li>1. Prepare cable for jointing</li><li>2. Perform cable jointing</li></ol>
3. Carryout Power Cable termination	<ol style="list-style-type: none"><li>1. Prepare cable for termination</li><li>2. Perform cable termination</li><li>3. Carryout Troubleshooting of power cables</li></ol>

<b>UNIT TITLE:</b>	<b>Carryout Power cable laying</b>
<b>DESCRIPTOR :</b>	This unit covers the competencies required to prepare trench, prepare cable for laying and lay the cables following standard procedures.
<b>CODE :</b>	7413-U1-L2
<b>ELEMENTS OF COMPETENCE</b>	<b>PERFORMANCE CRITERIA</b>
1. Prepare Trench	<p>1.1 Select and use required <b>PPE</b> as per the job requirement following standard procedures.</p> <p>1.2 Interpret drawings of trenches as per the job requirement.</p> <p>1.3 Obtain clearances from <b>relevant agencies</b> as per the job requirement following standard procedures.</p> <p>1.4 Construct trench as per drawing following standard procedures.</p> <p>1.5 Construct cable tray/racks as per the job requirement following standard procedures.</p> <p>1.6 Construct distribution chamber as per the drawings following standard procedures.</p>
2. Lay the cables	<p>3.1 Prepare the trench for cable laying following standard procedures.</p> <p>3.2 Test the cables for defects as per the standard procedures.</p> <p>3.3 Unwind the cable following standard procedures.</p> <p>3.4 Lay the cable in the trench as per the job requirement following standard procedures.</p>

	<p>3.5 Fill the trench with required <b>materials</b> as per job requirement following standard procedures.</p> <p>3.6 Install <b>pipes</b> at road crossing/stream as per the job requirement following standard procedures.</p> <p>3.7 Install cable route marker as per the standard procedures.</p>
--	---

<b>RANGE STATEMENT</b>	
<b>PPE may include but not limited to:</b>	
<ul style="list-style-type: none"> <li>• Helmet</li> <li>• Gloves</li> </ul>	<ul style="list-style-type: none"> <li>• Safety boot</li> <li>• Safety vest</li> </ul>
<b>Relevant agencies may include but not limited to:</b>	
<ul style="list-style-type: none"> <li>• Thromdey</li> <li>• Telecom</li> </ul>	<ul style="list-style-type: none"> <li>• Individual</li> <li>• Forest</li> </ul>
<b>Materials may include but not limited to:</b>	
<ul style="list-style-type: none"> <li>• Sand</li> <li>• Bricks</li> </ul>	<ul style="list-style-type: none"> <li>• Soil</li> </ul>
<b>Pipes may include but not limited to:</b>	
<ul style="list-style-type: none"> <li>• HDPE</li> <li>• GI Pipe</li> </ul>	<ul style="list-style-type: none"> <li>• Hume Pipe</li> </ul>

**Critical Aspects:**

- Follow occupational health and safety procedures.
- Construct trench as per drawing following standard procedures.
- Lay the cable in the trench as per the job requirement following standard procedures.

<b>UNDERPINNING KNOWLEDGE</b>	<b>UNDERPINNING SKILLS</b>
<ul style="list-style-type: none"><li>• Ethics and Integrity</li><li>• Occupational Health and safety regulations</li><li>• Basic first aid</li><li>• Types of cables</li><li>• Size of cables</li><li>• Color coding of cables</li><li>• Route Marker</li><li>• Right of Way</li><li>• Constructional features of UG Power Cables</li><li>• Types of cable laying trenches/ducts/ trays</li><li>• Relevant rules for power cable laying (BSR)</li><li>• Bending Radius of UG power cables</li><li>• Fundamentals of electricity</li></ul>	<ul style="list-style-type: none"><li>• Team work</li><li>• Communication skills</li><li>• Problem solving</li><li>• Negotiation skills</li><li>• Time management skills</li><li>• Map reading</li></ul>

<b>UNIT TITLE:</b>	<b>Carryout Power Cable Jointing</b>
<b>DESCRIPTOR :</b>	This unit covers the competencies required to prepare cables for jointing and jointing the cables following standard procedures.
<b>CODE :</b>	7413-U2-L2
<b>ELEMENTS OF COMPETENCE</b>	<b>PERFORMANCE CRITERIA</b>
1. Prepare cable for jointing	<p>1.1 Select cable jointing kits as per the size of cable following standard procedures.</p> <p>1.2 Prepare cable for jointing following standard procedures.</p>
2. Perform cable jointing	<p>2.1 Measure the size and distance of cable joints as per the standard procedures.</p> <p>2.2 Perform <b>LT cable jointing</b> as per the standard procedures</p> <p>2.3 Perform <b>HT cable jointing</b> as per the standard procedures.</p> <p>2.4 <b>Test the cable joints</b> as per the standard procedures.</p>
<b>RANGE STATEMENT</b>	
LT cable jointing may include:	

<ul style="list-style-type: none"> <li>• Straight through joint</li> </ul>	<ul style="list-style-type: none"> <li>• End Joint</li> </ul>
<b>HT cable jointing may include:</b>	
<ul style="list-style-type: none"> <li>• Straight through joint</li> </ul>	<ul style="list-style-type: none"> <li>• End Joint</li> </ul>
<b>Test the cable joint may include:</b>	
<ul style="list-style-type: none"> <li>• IR test</li> </ul>	<ul style="list-style-type: none"> <li>• Continuity test</li> </ul>
<b>Critical Aspects:</b>	
<ul style="list-style-type: none"> <li>• Follow occupational health and safety procedures.</li> <li>• Perform LT cable jointing as per the standard procedures</li> <li>• Perform HT cable jointing as per the standard procedures.</li> </ul>	

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<ul style="list-style-type: none"> <li>• Ethics and Integrity</li> <li>• Basic first aid</li> <li>• Types of joints</li> <li>• Types of jointing kits</li> <li>• Relevant rules for Power Cable Jointing (BSR)</li> <li>• Method of Jointing</li> <li>• Fundamentals of electricity</li> </ul>	<ul style="list-style-type: none"> <li>• Team work</li> <li>• Communication skills</li> <li>• Problem solving</li> <li>• Negotiation skills</li> <li>• Time management skills</li> </ul>

<b>UNIT TITLE:</b>	<b>Perform Power Cable termination</b>
<b>DESCRIPTOR :</b>	This unit covers the competencies required to prepare cable for termination and carrying out termination works following standard procedures.
<b>CODE :</b>	7413-U3-L2
<b>ELEMENTS OF COMPETENCE</b>	<b>PERFORMANCE CRITERIA</b>
1. Prepare for cable termination	<p>1.1 Identify the cable termination components as per the job requirement following standard procedures</p> <p>1.2 Prepare the cable end for termination following standard procedures.</p> <p>1.3 Identify the cable coding to match as per the standard procedures.</p>
2. Perform Cable termination	<p>2.1 Perform LT cable termination as per the standard procedures</p> <p>2.2 Perform HT cable termination as per the standard procedures</p> <p>2.3 Provide rain guard to outdoor HT termination as standard procedures.</p> <p>2.4 Check for phase sequence as per the standard procedure.</p> <p>2.5 Measure voltage value for LT terminal to check for voltage drop as per the standard procedure.</p>



	2.6 Conduct IR test of power cables as per the job requirement following standard procedures
3. Carryout troubleshooting of power cables	<p>3.1 conduct test of power cables as per the job requirement following standard procedures</p> <p>3.2 Locate the power cable faults as per standard procedures</p> <p>3.3 Repair/replace faulty cables as per the job requirement following standard procedures</p>

<b>RANGE STATEMENT</b>
<b>Critical Aspects:</b>
<ul style="list-style-type: none"> <li>• Follow occupational health and safety procedures.</li> <li>• Perform LT cable termination as per the standard procedures</li> <li>• Perform HT cable termination as per the standard procedures</li> <li>• Perform power cable test as per the standard procedures</li> </ul>

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<ul style="list-style-type: none"> <li>• Ethics and Integrity</li> <li>• Occupational Health and safety regulations</li> <li>• Basic first aid</li> <li>• Checking of terminals</li> <li>• Fundamentals of electricity</li> <li>• Methods of cable termination</li> <li>• Relevant rules of cable termination (BSR)</li> <li>• Troubleshooting of UG power cables</li> </ul>	<ul style="list-style-type: none"> <li>• Team work</li> <li>• Communication skills</li> <li>• Problem solving</li> <li>• Negotiation</li> <li>• Time management</li> </ul>



## **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**

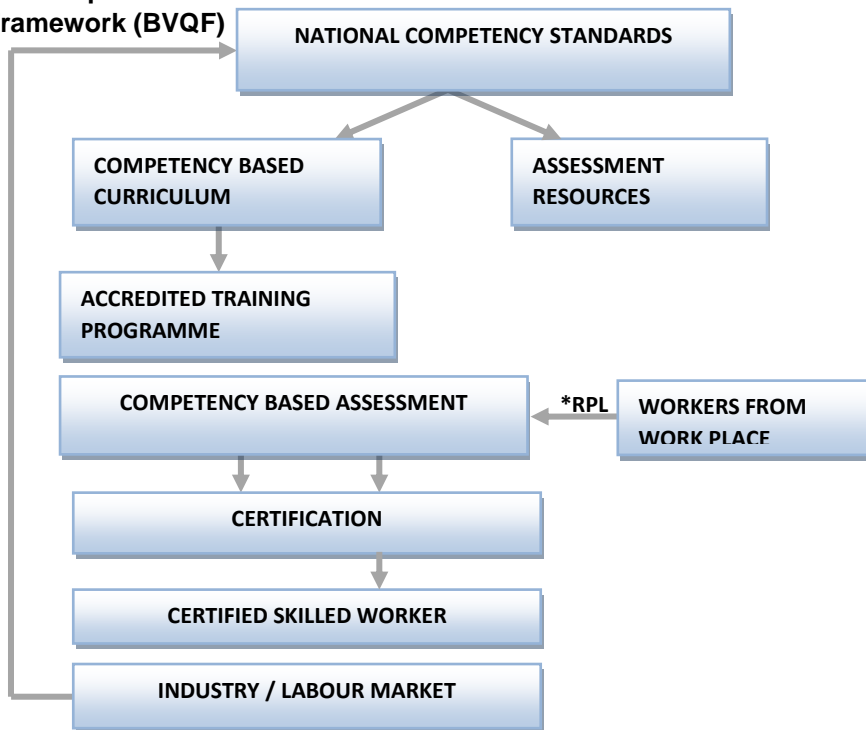
National Competency Standards serve a number of purposes including:

- 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.

### 1.4 Components of the Bhutan Vocational Qualifications Framework (BVQF)



\* RPL = Recognition of Prior Learning

## 1.5 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

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

## National Certificate Level 2

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

## National Certificate Level 3

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

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

## 1.6 PURPOSE

This qualification is designed for people interested in a career as a Power Cable Technician at the Certificate level. It comprises of three units that cover the essential knowledge and skills required at workplace.

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

## 1.7 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:

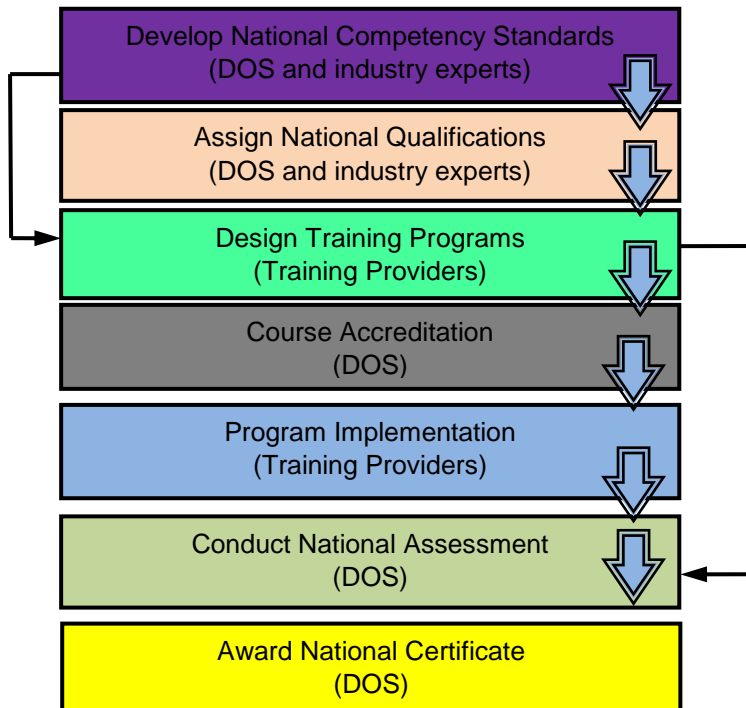
- to identify the level,
- to identify to which module the standard belongs,
- to identify in which order the standard is clustered within that module.

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 7413 to the occupation of Power cable technician and related trades. Therefore, in the Bhutan's context, the occupation Underground Power Cable Technician has been assigned the code 7413 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

## **1.8 ASSESSMENT GUIDE**

### **Form of assessments**

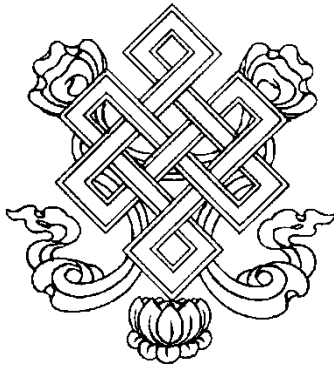
- Continuous assessment together with collected evidence of performance will be used.
- Evidence of the performance shall be based on practical demonstration.
- Knowledge can be assessed through diagrams, in writing or orally (viva-voce).

### **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.



**Department of Occupational Standards  
Ministry of Labour & Human Resources  
Thongsel Lam, Lower Motithang  
P.O. Box 1036, Thimphu.  
Tel: 02-331611, Fax: 02-326873  
[www.molhr.gov.bt](http://www.molhr.gov.bt)**