Government of the People's Republic of Bangladesh
Skills Development Project

National Competency Standards for Plumbing

Qualification Title**: National Skills Certificate (NSC) -II in Plumbing (Construction Sector)**

Qualification Code: **CONPLM020212A**

Bangladesh Technical Education Board

July'2013

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Approval Sheet

Bangladesh Technical Education Board

Standard Curriculum Development Committee

NATIONAL COMPETENCY STANDARDS

for

Plumbing

(Pre-voc 2, NTVQF 1,2&3)

Meeting held on 26.06.2013

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Developed by: **Shafiqul Alam Bhuiyan**
Chairman
On behalf of Construction Sector I*ndustry* Skills Council

Under the guidance of: **Chowdury Mufad Ahmed**
Project Director
Skills Development Project

Approved by: **Prof. Md. Abul Kashem**
Chairman
Bangladesh Technical Education Board

Preface

The TVET system has a large role to play in economic growth and social development as workforce provider to the labor market and as provider of skills to those who are looking for employment. In the case of Bangladesh, the TVET sector needs major reforms to ensure that issues of quality and capacity, relevance, and access are properly addressed.

The Directorate of Technical Education (DTE) with funding from the Asian Development Bank (ADB), Swiss Agency Development for Cooperation SDC and the Government of Bangladesh (GoB) is implementing a project known as Skills Development Project (SDP). The main target of the Skills Development Project (SDP) is to improve the relevance of TVET in labor market by introducing competency-based training system: a system that proceeds from the development of a qualifications framework, competency standards, curriculum, training delivery, assessment, and quality assurance mechanisms in order to develop a competitive workforce.

The development of competency standards is regarded as the heart of a competency-based training regime. Each standard defines sets of knowledge, skills and attitudes (KSAs) that a Bangladeshi trainee should be able to demonstrate at a recognized level of competence. It provides a common framework of outcomes between the labor and education sectors, as well as among workers, trainers and trainees.

In the process of development, I*ndustry* Skills Council (ISCs) were organized to determine competencies expected of an occupation in Bangladesh. The ISC, whose membership come from "top performers" in the industry, performed occupational, competency and unit analyses based on their rich experiences in the field, existing documents, and on the advice of national and international experts. Competency standards of Sri Lanka, Philippines, Australia, Korea, Malaysia, Maldives and other countries were examined.

A series of workshops – development, review and finalization - were conducted to ensure a workable National Competency Standards for the occupation. Further, a validation instrument was developed and administered to other top industry performers to verify and confirm the draft being developed.

It is hoped that this document reflects the real needs of the industry thereby providing a concrete basis for the curriculum development and assessment. In such a way, the development of relevant and competent workforce is not farfetched.

Chowdury Mufad Ahmed
Project Director
Skills Development Project

Md. Shah Jahan Mian
Director General
Directorate of Technical Education

Prof. Md. Abul Kashem
Chairman
Bangladesh Technical Education Board

Contents

Acronyms

MoE	Ministry of Education
DG	Director General
DTE	Directorate of Technical Education
SDP	Skills Development Project
PD	Project Director
PIU	Project Implementation Unit
PLM	Plumber
GOB	Government of Bangladesh
ADB	Asian Development Bank
SC	Swiss contact
ANTA	Australian National Training Authority
APEC	Asia Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
BMET	Bureau of Manpower Employment and Training
NTVQ	National Technical Vocational Qualification
NTVQF	National Technical Vocational Qualification Framework
BTEB	Bangladesh Technical Education Board
CBT	Competency Based Training
CS	Competency Standard
HSC (Voc)	Higher Secondary Certificate (Vocational)
KSA	Knowledge, Skills, Attitude
MoLE	Ministry of Labor and Employment
OHS	Occupational Health and Safety
PSC	Project Steering Committee
RMG	Ready Made Garments
RPL	Recognition of Prior Learning
SSC (Voc)	Secondary School Certificate (Vocational)
STEP	Skills and Training Enhancement project (WB)
ISC	Industry Skills Council
TESDA	Technical Education and Skills Development Authority
TL	Team Leader
TSC	Technical Sub Committee
TVET	Technical and Vocational Education and Training
WB	World Bank
DACUM	Development of a Curriculum
CBLM	Competency based learning Materials

Section 1. The Qualification

1. Title of Qualification**: National Skills Certificate-II in Plumbing** (Construction Sector)	
2. Qualification code:	3. Endorsement date:
CONPLM020212A	10 April 2012
4. Purpose of the qualification	The NSC II in Plumbing Qualification consists of a set of competencies that a person must achieve in order to work competently in the Construction Sector as a Plumber. In particular, he/she should be able to: 1. Install water supply pipe with fittings 2. Install waste water pipe with fittings 3. Install plumbing fixtures 4. Conduct pipe leakage testing 5. Repair and maintenance works for plumbing
5. Regulatory Arrangements	The holder of this qualification should have been assessed by a BTEB certified assessor and found to be competent in the units listed in Section 2.
6. Accreditation requirements	The qualifications shall be offered in compliance with the accreditation requirements set by BTEB.
7. Transition arrangements	In the absence of certified assessors, the BTEB shall appoint trainers who have undergone assessment trainings.
8. Contact for comments	Chairperson Bangladesh Technical Education Board (BTEB) Agargaon, Sher-E-Bangla Nagar Dhaka-1207.

Section 2: National Competency Standards

for

National Skills Certificate in Plumbing

Generic Competencies

Code	Unit of Competency	Level	No. of Hrs.
GN100112A	Communicate in the workplace	1	30
GN100212A	Work in a team environment	1	18
GN100312A	Practice workplace cleanliness	1	18
GN100412A	Practice occupational health and safety (OHS) procedures	1	30
GN300512A	Demonstrate work values	3	18
GN300612A	Lead small team	3	18
GN300712A	Practice negotiation skills	3	24
		Total	156 hrs.

Sector Specific Competencies

Code	Unit of Competency	Level	No. of Hrs.
CON100112A	Work in the Construction Sector	1	24
CON100212A	Interpret Drawings and Specifications in Plumbing Manuals	1	30
CON100312A	Use Hand Tools and Power Tools for the Plumbing	1	30
CON200412A	Perform Measurement and Calculations in Plumbing	2	48
CON200512A	Maintain tools and equipment	2	30
		Total	162 hrs.

Occupation Specific Competencies

Code	Unit of Competency	Level	No. of Hrs.
CONPLM100112A	Fabricate Pipes	1	45
CONPLM100212A	Prepare Pipes for Installation	1	45
CONPLM100312A	Make Pipe Joints and connections	1	45
CONPLM100412A	Perform cutting and penetration for plumbing works	1	45
CONPLM200512A	Install water supply pipe with fittings	2	42
CONPLM200612A	Install waste water pipe with fittings	2	42
CONPLM200712A	Install plumbing fixtures	2	48
CONPLM200812A	Conduct pipe leakage testing	2	30
CONPLM200912A	Repair and maintenance works for plumbing	2	30
CONPLM301012A	Perform plumbing Layout.	3	50
CONPLM301112A	Perform plumbing fixture installation and assemblies	3	55
CONPLM301212A	Install hot and potable chilled water piping system.	3	50
CONPLM301312A	Perform Plumbing system installation and assemblies in multi-storied building (up to six storied)	3	55
		Total	582 hrs.
		Grand Total	900 hrs.

Course Structure for National Skills Certificate in Plumbing

For Level - II

Sector Specific Competencies

Code	Unit of Competency	Level	No. of Hrs
CON200412A	Perform Measurement and Calculations in Plumbing	2	48
CON200512A	Maintain tools and equipment	2	30
		Total	78

Occupation Specific Competencies

Code	Unit of Competency	Level	No. of Hrs
CONPLM200512A	Install water supply pipe with fittings	2	42
CONPLM200612A	Install waste water pipe with fittings	2	42
CONPLM200712A	Install plumbing fixtures	2	48
CONPLM200812A	Conduct pipe leakage testing	2	30
CONPLM200912A	Repair and maintenance works for plumbing	2	30
		Total	192 hrs.
		Grand Total	270 hrs.

Section 3. The Sector Specific Competencies

Unit of Competency	**Perform Measurement and Calculations in Plumbing**
Unit Code	CON200412A
Unit Descriptor	This unit covers the knowledge skills and attitude required to perform measurements and calculations in plumbing relating to activities in the construction sector. It includes the following steps: select measuring devices, obtain measurements, perform simple calculations and clean the work place.
Nominal Hours	48 hours

Elements of Competency	**Performance Criteria** Bold italicized words are detailed in the Range of Variables
1. Select measuring devices	1.1. ***PPE*** (Personal protective equipment) and other safety devices are selected and used. 1.2. Work instructions are confirmed and applied. 1.3. ***Materials*** to be measured are identified and classified. 1.4. Appropriate ***measuring devices*** are selected. 1.5. Specifications are obtained from relevant ***documents***. 1.6. Tolerance and clearance limits are identified and adjusted.
2. Obtain measurements	2.1. M***easurements*** are obtained using measuring devices. 2.2. Systems of measurements are identified and converted. 2.3. Results are confirmed and recorded.
3. Perform simple calculations	3.1. Simple calculations involving ***four basic operations*** are carried out. 3.2. ***Other operations*** are used to complete tasks. 3.3. Appropriate formulas for calculating quantities of materials are selected. 3.4. ***Calculations*** are performed and verified. 3.5. Material quantities are calculated. 3.6. Results are interpreted and communicated to authority.
4. Clean the work place	4.1. Cleaning tools and materials are collected. 4.2. Measuring devices are cleaned, maintained and stored.

	4.3 Waste materials are decomposed at proper place.

Ranges of Variables

Variables	**Range** (Included but not limited to):
1. Materials	Refers to all construction materials included but not limited to the following: 1.1. Construction Site Support (Dogging, Rigging, etc.) 1.2. Carpentry and Form Works 1.3. Masonry, Brick/Block Laying and Concreting 1.4. Surface Finishing, Tiling and Painting 1.5. Roofing 1.6. Plumbing 1.7. Residential Electrical Wiring and Cabling
2. Measuring devices	2.1. Set squares 2.2. Dial indicators 2.3. Micrometers 2.4. Slide calipers 2.5. Steel tape measure 2.6. Triangle 2.7. Steel rule 2.8. Carpenter's square 2.9. Calculator 2.10. Verniers 2.11. Feeler gauges 2.12. Thermometers 2.13. protractors
3. PPE	3.1. Dust mask 3.2. Goggles 3.3. Gloves 3.4. Safety shoes 3.5. Aprons 3.6. Overalls 3.7. Helmet
4. Documents	4.1. Technical Manuals 4.2. Specifications 4.3. Sketches

	4.4. Drawings
5. Measurements	5.1. Length 5.2. Width 5.3. Depth 5.4. Height 5.5. Weight 5.6. Number 5.7. Mass 5.8. Diameter 5.9. Tolerance 5.10. Roundness 5.11. Angles 5.12. Flatness angle 5.13. Clearances
6. Four basic operations	6.1. Addition 6.2. Subtraction 6.3. Multiplication 6.4. Division
7. Other operations	7.1. Fractions 7.2. Percentages 7.3. Mixed numbers 7.4. Conversions 7.5. Scales 7.6. Trigonometric functions 7.7. Algebraic computations
8. Calculations	8.1. Area 8.2. Volume 8.3. Circumference 8.4. Clearance 8.5. Diameter 8.6. Scales 8.7. Ratio

Evidence Guide

1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 Demonstrated knowledge in measurement and calculation. 1.2 Satisfied the requirements in the Performance Criteria and Range of Variables
2. Underpinning knowledge	2.1. Types of Measuring Devices 2.2. Measurement and Calculation 2.3. Recording 2.4. Collection and storing materials. 2.5. Fraction and Decimals 2.6. Linear Measurement 2.7. Unit Of Conversion and Conversion Factors 2.8. Dimension 2.9. Ratio And Proportion 2.10. Trigonometric Function 2.11. Algebraic Equation 2.12. Allowances And Tolerances 2.13. Presentation Of Data and Information 2.14. Tolerances 2.15. Care in the Use of Measuring Devices
3. Underpinning Skills	3.1. Selecting measuring devices 3.2. Obtaining measurements 3.3. Performing calculations 3.4. Cleaning up
4. Underpinning Attitude	4.1 Commitment to occupational health and safety 4.2 Environmental concerns 4.3 Eagerness to learn 4.4 Tidiness and timeliness 4.5 Respect for rights of peers and seniors in workplace
5. Resource Implications	The following resources should be provided 5.1 Suitable ventilated work area/shop with facilities and accessories 5.2 Easy access and scope of measurement 5.3 Availability of quality measuring and calculating devices 5.4 Information on construction materials

	appropriate to the relevant construction field
6.Method of Assessment	Competency should be assessed by 6.1 Workplace observation 6.2 Demonstration 6.3 Oral Interview 6.4 Written examinations 6.5 Portfolio
7. Context of Assessment	For certification competency should be assessed individually in the actual work place after completion of the module.

Accreditation Requirements

Training providers must be accredited by Bangladesh Technical Education Board (BTEB), the national quality assurance body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of any national qualification.

Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by BTEB.

Unit of Competency	**Maintain tools and equipment**
Unit Code	CON200512A
Unit Descriptor	This unit covers the knowledge, skills, and attitude required to Maintain tools and equipment. It includes check condition of tools and equipment, perform basic preventive maintenance and store tools and equipment.
Nominal Hours	30 hours

Elements of Competency	**Performance Criteria** Bold italicized words are detailed in the Range of Variables
1. Check condition of tools and equipment	1.1 ***Materials, tools and equipmen***t are identified. 1.2 Non-functional tools and equipment are segregated and labeled. 1.3 Safety of tools and equipment are observed. 1.4 Condition of ***PPE*** are checked.
2. Perform basic preventive maintenance	2.1 Appropriate lubricants are identified. 2.2 Tools and equipment are lubricated. 2.3 Measuring instruments are checked and Calibrated. 2.4 Tools are cleaned and lubricated. 2.5 Defective instruments, equipment and accessories are inspected and replaced. 2.6 Tools are inspected, repaired and replaced after use. 2.7 Work place is cleaned and kept in safe state in line.
3. Store tools and equipment	3.1 Inventory of tools, instruments and equipment are conducted and recorded. 3.2 Tools and equipment are stored safely in appropriate locations.

Range of Variables

Variables	**Range** (Included but not limited to):
1. Materials	1.1 Mobil oil 1.2 Grease 1.3 Kerosene oil 1.4 Waste cotton 1.5 Hand wash 1.6 Soap
2. Tools and equipment	2.1 **Tools** Cutting tools - hacksaw, crosscut saw, rip saw Boring tools - auger, brace, grin let, hand drill Holding tools - vise grip, C-clamp, bench vise Threading tools - die and stock, taps 2.2 Measuring instruments/equipment
3. PPE	3.1 Goggles 3.2 Gloves 3.3 Safety shoes 3.4 Aprons/Coveralls
4. Forms	4.1 Maintenance schedule forms 4.2 Requisition slip 4.3 Inventory Form 4.4 Inspection Form 4.5 Procedures

Evidence Guide

1. Critical aspects of competency	Assessment requires that the candidate: 1.1 Selected and used processes, tools and equipment to carry out task 1.2 Identified functional and non-functional tools and equipment 1.3 Checked lubricated and calibrated tools, equipment and instruments. 1.4 Replaced defective tools, equipment and their accessories 1.5 Observed and applied handling of tools and equipment and safety work practices 1.6 Prepared and submitted inventory report. 1.7 Maintained workplace in accordance with OHSA regulations 1.8 Stored tools and equipment safely in appropriate locations.

2. Underpinning knowledge	2.1 Safety Practices 2.1.1 Use of PPE 2.1.2 Handling of tools and equipment 2.1.3 Good housekeeping 2.2 Materials, Tools and Equipment 2.2.1 Types and uses of lubricants 2.2.2 Types and uses of cleaning materials 2.2.3 Types and uses of measuring instruments and equipment 2.3 Preventive Maintenance 2.3.1 Methods and techniques 2.3.2 Procedures
3. Underpinning Skills	3.1 Preparing maintenance materials, tools and equipment 3.2 Proper handling of tools and equipment 3.3 Performing preventive maintenance 3.1 Following instructions
4. Underpinning Attitude	4.1 Commitment to occupational health and safety 4.2 Environmental concerns 4.3 Eagerness to learn 4.4 Tidiness and timeliness 4.5 Respect for rights of peers and seniors in workplace
5. Resource implications	The following resources should be provided: 5.1 Workplace 5.2 Maintenance schedule 5.3 Maintenance materials, tools and equipment relevant to the proposed activity/task
6. Methods of assessment	Competency should be assessed by 6.1 Workplace observation 6.2 Demonstration 6.3 Oral Interview 6.4 Written examinations 6.5 Portfolio
7. Context of assessment	For certification competency should be assessed individually in the actual work place after completion of the module.

Accreditation Requirements

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Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by BTEB.

Section 4. The Occupation Specific Competencies

Unit of Competency	**Install Water Supply Pipe with fittings**
Unit Code	CONPLM200512A
Unit Descriptor	This unit covers the knowledge, skills and attitude required to Install water supply pipe with fittings. It includes collecting tools equipment and materials, cutting pipes, cutting threads, fixing joints and fitting for pipe, performing threaded pipe joints and connection, fixing pipe fittings, installing pipes and Cleaning the workplace.
Nominal hrs	42 hours

Elements of Competency	**Performance Criteria** Bold italicized words are detailed in the Range of Variables
1. Collect tools, equipment and materials	1.1 ***PPE*** are selected and used. 1.2 ***Tools and equipment*** are selected and collected. 1.3 ***Size of pipes*** is chosen. 1.4 ***Pipes*** are selected and collected.
2. Cut pipes	2.1 Pipes are fixed with vice. 2.2 Pipes are marked. 2.3 Pipes are cut with ***tolerance.***
3. Cut threads	3.1 Pipes are fixed with ***vice.*** 3.2 ***Diestocks*** are adjusted. 3.3 Diestock is rotated in clockwise with equal Pressure. 3.4 Oil is used during operation. 3.5 Thread of pipes is cut.
4. Fix joints and fittings for pipe.	4.1 Measurements are taken. 4.3 ***PVC/ uPVC pipe joints*** are made with strict Adherence. 4.2 Pipe joints are selected. 4.4 Pipe ends are cleaned prior to fix.
5. Perform threaded pipe joints and connection.	5.1 Measurements are taken. 5.2 Threaded connections are perform. 5.3 Teflon tape or other related materials are fitted to ensure joint is water tight. 5.4 Tools and equipment are selected.
6. Fix pipe fittings	6.1 **Fittings** are Collected. 6.2 Fittings are fixed.

7. Install pipes	7.1 Pipes are installed with a standard **slope.** 7.2 Pipes are jointed. 7.3 Pipes are jointed with fittings & fixtures.
8. Clean the workplace	8.1 Tools & equipment are cleaned. 8.2 Workplace is cleaned. 8.3 Waste materials are disposed.

Range of Variables

Variable	**Range** (Include but not limited to):
1. Personal protective equipment (PPE)	1.1 Dust mask. 1.2 Goggles. 1.3 Safety shoes. 1.4 Apron. 1.5 Gloves.
2. Tools and equipment	2.1 Measuring tape. 2.2 Marking chalk. 2.3 Pipe cutter/hack saw with blade. 2.4 Flat file. 2.5 Adjustable wrench. 2.6 Hammer. 2.7 chain Wrench 2.8 Pipe wrench. 2.9 Pipe thread Cutter. 2.10 Pipe vice.
3. Size of pipe	3.1 12mm dia. 3.2 16mm dia. 3.3 25mm dia. 3.4 32mm dia. 3.5 40mm dia. 3.6 50mm dia. 3.7 62mm dia. 3.8 75mm dia.
4. Pipes	4.1 G.I Pipe. 4.2 P.V.C/uPVC pipe. 4.3 M.S Pipe. 4.4 C.I pipe.

5. Vice	5.1 Table vice. 5.2 Pipe vice.
6. Diestock	6.1 Wrenched diestock. 6.2 Hand diestock.
7.PVC/uPVC pipe joints	7.1 Right angle. 7.2 180^{0}. 7.3 30^{0} /60^{0}.
8. Fittings	8.1 Socket. 8.2 Elbow. 8.3 Bend. 8.4 Union. 8.5 Reducing socket. 8.6 Nipple. 8.7 Plug. 8.8 Cross T. 8.9 Y – T.
9. Slope	9.1 slope is 1:20 9.2 slope is 1:30

Evidence Guide

1. Critical aspects of Competency	Competency assessment requires evidence that the candidate: 1.1 Selected tools, equipment and materials in accordance with requirement. 1.2 Cut Pipes according to marking following safety rules and regulations. 1.3 Performed Thread of pipes according to requirement. 1.4 Fixed joint according to requirements. 1.5 Performed threaded connections in pipes with requirement. 1.6 Fixed fittings as per drawing. 1.7 Installed pipe with a standard slope.
2. Underpinning knowledge	2.1 Types and uses of tools, equipment and materials. 2.2 Measurements. 2.3 Materials specification. 2.4 Types of threads 2.5 Types and uses of pipe fittings 2.6 Work place cleaning

3. Underpinning skills	3.1 Pipe cutting 3.2 Thread cutting 3.3 Fixing joints 3.4 Pipes installing 3.5 Site cleaning
4. Underpinning Attitude	4.1 Commitment to occupational health and safety 4.2 Environmental concerns 4.3 Eagerness to learn 4.4 Tidiness and timeliness 4.5 Respect for rights of peers and seniors in workplace
5. Resource implications	The following resources should be provided- 5.1 Work place location. 5.2 Tools and equipment are available. 5.3 Materials relevant to proposed activity. 5.4 Drawing and specifications relevant to the task.
6. Methods of assessment	Competency should be assessed by 6.1 Workplace observation 6.2 Demonstration 6.3 Oral Interview 6.4 Written examinations 6.5 Portfolio
7.Context for assessment	For certification competency should be assessed individually in the actual work place after completion of the module.

Accreditation Requirements

Training providers must be accredited by Bangladesh Technical Education Board(BTEB) , the national quality assurance body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of any national qualification.

Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by BTEB.

Unit Competency	**Install Waste Water Pipe with fittings**
Unit Code	CONPLM200612A
Unit Descriptor	This unit covers the knowledge, skills and attitude required to Install waste water pipe with fittings. It includes collecting tools equipment and materials, cutting pipes, cutting threads, fixing pipe fittings, performing threaded pipe joints and connection, Installing pipes and Cleaning the work place
Nominal hrs	42 hours

Elements Of Competency	**Performance Criteria** Bold Italicized words are detailed in the Range of Variables
1. Collect tools, equipment and materials	1.1 ***PPE*** are selected and used. 1.2 ***Tools and equipment*** are selected and collected. 1.3 ***Size of pipes*** is chosen. 1.4 ***Pipes*** are selected and collected.
2. Cut pipes	2.1 Pipes are fixed with vice. 2.2 Pipes are marked. 2.3 Pipes are cut with tolerance.
3. Cut threads	3.1 Pipes are fixed with ***vice.*** 3.2 ***Diestocks*** are adjusted. 3.3 Diestock is rotated in clockwise with equal Pressure. 3.4 Oil is used during operation. 3.5 Thread of pipes is perform.
4. Fix pipe fittings	4.1 **Fittings** are selected. 4.2 Fittings are fixed.
5. Perform threaded pipe joint and connection	5.1 Measurements are taken. 5.2 Threaded connections are perform. 5.3 Teflon tape or other related materials are fitted to ensure joint is water tight.
6. Install pipe	6.1 Pipes are installed with a standard slope. 6.2 Pipes are jointed. 6.3 Pipes are jointed with fittings & fixtures.

7. Clean the workplace	7.1 Tools & equipment are cleaned. 7.2 Workplace is cleaned. 7.3 Waste materials are disposed.

Range of Variables

Variable	**Range** (Include but not limited to):
1. PPE	1.1 Dust mask. 1.2 Goggles. 1.3 Safety shoes. 1.4 Apron. 1.5 Gloves.
2. Tools and equipment	2.1 Measuring tape 2.2 Marking chalk 2.3 Pipe cutter/hack saw with blade. 2.4 Flat file 2.5 Chain Pulley 2.6 Hammer 2.7 Chisel 2.8 Rope 2.9 Blower 2.10 Pipe wrench. 3.11 Pipe vice.
3. Size of pipe	3.1 50mm dia. 3.2 62mm dia. 3.3 75mm dia. 3.4 100mm dia. 3.5 150mm dia. 3.6 200mm dia. 3.7 225mm dia. 3.8 300mm dia. 3.9 450mm dia.
4. Pipes	4.1 G.I Pipe. 4.2 P.V.C/uPVC pipe. 4.3 M.S Pipe. 4.4 Cast iron pipe. 4.5 Asbestos sheet pipe. 4.6 Cement concrete pipe.

5. Vice	5.1 Table vice. 5.2 Pipe vice.
6. Die stock	6.1 Wrenched diestock. 6.2 Hand diestock.
7. Fittings	7.1 Socket. 7.2 Elbow. 7.3 Bend. 7.4 Tee. 7.5 Reducing Tee. 7.6 Cross Tee. 7.7 Y – Tee. 7.8 Door Tee. 7.9 Trap.

Evidence Guide

1. Critical aspects of Competency	Competency assessment requires evidence that the candidate : 1.1 Selected and collected tools and equipment according to requirement. 1.2 Chose Size of pipes on the basis of requirement. 1.3 Selected and collected pipes. 1.4 Cut the pipes according to marking following safety rules and regulations. 1.5 Performed Thread of pipes according to requirement. 1.6 Fitted-up joint and fittings according to requirements 1.7 Installed pipe with a standard slope.
2. Underpinning knowledge	2.1 Types and uses of tools, equipment and materials. 2.2 Measurements. 2.3 Materials specification. 2.4 Types of threads 2.5 Types and uses of pipe fittings 2.6 Work place cleaning 2.7 Pipe slop
3. Underpinning skills	3.1 Pipe cutting 3.2 Thread cutting 3.3 Fixing joints

	3.4 Pipes installing 3.5 Site cleaning
4. Underpinning Attitude	4.1 Commitment to occupational health and safety 4.2 Environmental concerns 4.3 Eagerness to learn 4.4 Tidiness and timeliness 4.5 Respect for rights of peers and seniors in workplace
5. Resource implication	The following resources should be provided: 5.1 Work place location 5.2 Tools and equipment are available 5.3 Materials relevant to proposed activity 5.4 Drawing and specifications relevant to the task
6. Methods of assessment	Competency should be assessed by 6.1 Workplace observation 6.2 Demonstration 6.3 Oral Interview 6.4 Written examinations 6.5 Portfolio
7.Context for assessment	For certification competency should be assessed individually in the actual work place after completion of the module.

Accreditation Requirements

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Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by BTEB.

Unit Competency	**Install plumbing fixtures**
Unit Code	CONPLM200712A
Unit Descriptor	This unit covers the knowledge, skills and attitude required to install plumbing fixtures. It includes collecting tools equipment and materials, cutting pipes, cutting threads, fixing pipe fittings, performing threaded pipe joints and connection, Installing fixtures and Cleaning the workplace .
Nominal hrs :	48 hours

Elements of Competency	**Performance Criteria** Bold italicized words are detailed in the Range of Variables
1. Collect tools, equipment and materials	1.1 ***PPE*** are selected and used. 1.2 ***Tools and equipment*** are selected and collected. 1.3 ***Size of pipes*** is chosen. 1.4 ***Pipes*** are selected and collected.
2. Cut pipes	2.1 Pipes are fixed with vice. 2.2 Pipes are marked. 2.3 Pipes are cut uniformly and smoothly.
3. Cut threads	3.1 Pipes are fixed with ***vice.*** 3.2 ***Diestocks*** are adjusted. 3.3 Diestock is rotated in clockwise/anticlockwise with equal Pressure. 3.4 Oil is used during operation. 3.5 Thread of pipes is performed.
4. Fix pipe fittings	4.1 ***Fittings*** are collected. 4.2 Fittings are fixed.
5. Perform threaded pipe joints and connection.	5.1 Measurements are taken. 5.2 Threaded connections are performed. 5.3 Teflon tape or other related materials are fitted properly to ensure joint is water tight.
6. Install fixtures	6.1 ***Fixtures*** are installed. 6.2 Fixture are jointed with fittings.

7. Clean the workplace	7.1 Tools & equipment are cleaned. 7.2 Workplace is cleaned. 7.3 Waste materials are disposed.

Range of Variables

Variable	**Range** (Include but not limited to):
1. PPE	1.1 Dust mask 1.2 Goggles 1.3 Safety shoes 1.4 Apron 1.5 Gloves
2. Tools and equipment	2.1 Measuring tape 2.2 Marking chalk 2.3 Pipe cutter/hack saw with blade. 2.4 Flat file 2.5 Chain Pulley 2.6 Hammer 2.7 Chisel 2.8 Rope 2.9 Blower 2.10 Pipe wrench. 2.11 Pipe vice.
3. Size of pipe	3.1 12mm dia. 3.2 16mm dia. 3.3 25mm dia. 3.4 32mm dia. 3.5 40mm dia. 3.6 50mm dia. 3.7 62mm dia. 3.8 75mm dia.
4. Pipes	4.1 G.I Pipe. 4.2 P.V.C/uPVC pipe. 4.3 M.S Pipe. 4.4 C.I pipe.
5. Vice	5.1 Table vice 5.2 Pipe vice
6. Diestock	6.1 Wrenched diestock. 6.2 Hand diestock.

7. Fittings	7.1 Socket 7.2 Elbow 7.3 Bend 7.4 Tee 7.5 Reducing Tee 7.6 Cross Tee 7.7 Y – Tee 7.8 Door Tee 7.9 Trap
8. Fixture.	8.1 Wash basin 8.2 Commode 8.3 Sink 8.4 Water closet 8.5 Urinal 8.6 Bath tub 8.7 Geyser 8.8 Lundy tray

Evidence Guide

1. Critical aspects of Competency	Competency assessment requires evidence that the candidate: 1.1 Selected and collected tools and equipment according to job requirement. 1.2 Chose Size of pipes on the basis of job requirement. 1.3 Selected and collected pipes properly. 1.4 Cut the pipes according to marking following safety rules and regulations. 1.5 Performed Thread of pipes according to job requirement. 1.6 Fitted-up joint and fittings according to job requirements 1.7 Installed Fixture with a standard rule according to Bangladesh National Building code.
2. Underpinning knowledge	2.1 Types and uses of tools, equipment and materials. 2.2 Measurements. 2.3 Materials specification. 2.4 Types of threads 2.5 Types and uses of pipe fittings 2.6 Fixture description

	2.7 Work place cleaning
3. Underpinning skills	3.1 Pipe cutting 3.2 Thread cutting 3.3 Fixing joints 3.4 Fixture installing 3.5 Site cleaning
4. Underpinning Attitude	4.1 Commitment to occupational health and safety 4.2 Environmental concerns 4.3 Eagerness to learn 4.4 Tidiness and timeliness 4.5 Respect for rights of peers and seniors in workplace
5. Resource implication	The following resources should be provided: 5.1 Work place location. 5.2 Tools and equipment are available. 5.3 Materials relevant to proposed activity 5.4 Drawing and specifications relevant to the task.
6. Methods of assessment	Competency should be assessed by 6.1 Workplace observation 6.2 Demonstration 6.3 Oral Interview 6.4 Written examination 6.5 Portfolio
7.Context for assessment	For certification competency should be assessed individually in the actual work place after completion of the module.

Accreditation Requirements

Training providers must be accredited by Bangladesh Technical Education Board (BTEB) , the national quality assurance body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of any national qualification.

Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by BTEB.

Unit Competency	**Conduct pipe leakage testing**
Unit Code	CONPLM200812A
Unit Descriptor	This unit covers the knowledge, skills and attitudes in conducting pipe leakage testing. It includes Practicing OSH, collecting tools equipment and materials, Performing pipe leakage testing and Cleaning the workplace.
Nominal hrs	30 hrs

Elements of Competency	**Performance Criteria** Bold italicized words are detailed in the Range of Variables
1. Practice OSH	1.1 Personal protective equipment (PPE) are collected. 1.2 ***PPE*** are used.
2. Selected and collected tools, equipment and materials	2.1 ***Tools, equipment*** and ***materials*** are selected and collected. 2.2 Size of pipes is chosen. 2.3 Pipes are selected and collected.
3. Perform pipe leakage testing	3.1 Faults and problems are identified. 3.2 Fixtures are tightly installed. 3.3 Apparatus is set to specified pressure range. 3.4 Testing is applied after completion of plumbing roughing in installation.
4. Clean the Workplace	4.1 Tools & equipment are cleaned. 4.2 Workplace is cleaned. 4.3 Waste materials are disposed.

Range of Variables

Variable	**Range (Include but not limited to):**
1. PPE	1.1 Dust mask 1.2 Goggles 1.3 Safety shoes 1.4 Apron 1.5 Gloves

2. Tools and equipment	2.1 Measuring tape 2.2 Marking chalk 2.3 Pipe cutter/hack saw with blade. 2.4 Flat file 2.5 Chain Pulley 2.6 Hammer 2.7 Chisel 2.8 Rope 2.9 Blower 2.10 Pipe wrench. 2.11 Pipe vice. 2.12 Pressure pump device 2.13 Pressure gauge
3. Materials	3.1 G.I. Socket 3.2 G.I Nipple 3.3 G.I. Union 3.4 G.I. Elbow 3.5 G.I. Bend 3.6 G.I. Tee 3.7 G.I. Cross 3.8 G.I. Reducer 3.9 G.I. Gate valve 3.10 Stop cock (C.P) 3.11 Bib cock(C.P) 3.12 Plug and cap 3.13 Pipes 3.14 Thread tape 3.15 Mobil oil
4. Leak testing procedures/method	4.1 Water test method 4.2 Testing by section method 4.3 House sewer test method 4.4 Gravity test method

Evidence Guide

1. Critical aspects of competency	Competency assessment requires evidence that the candidate: 1.1 Used PPE properly. 1.2 Selected and prepared materials, tools and equipment 1.3 Identified faults and problems. 1.4 Installed/fixed fixtures are tightly prior to leak testing procedures/method 1.5 Apparatus is set to specified pressure range for leak testing 1.6 Applied testing after completion of plumbing roughing-in installation and in accordance with the job requirements.
2. Underpinning knowledge	2.1 5-S implementation 2.2 Mensuration 2.3 Materials use and specification 2.4 Proper use of plumbing tools, equipment and materials 2.5 Understand economic use of material 2.6 Knowledge of pipe leakage testing 2.7 Leak testing procedures/method
3. Underpinning skills	3.1 Apply PPE 3.2 pipe leakage testing 3.3 perform tools & equipment cleaning
4. Underpinning Attitudes	4.1 Commitment to occupational health and safety 4.2 Environmental concerns 4.3 Eagerness to learn 4.4 Tidiness and timeliness 4.5 Respect for rights of peers and seniors in workplace
5. Resource implications	The following resources should be provided : 5.1 Workplace location. 5.2 Tools and equipment appropriate to construction processes. 5.3 Materials relevant to the proposed activity. 5.4 Drawings and specifications relevant to the task.

6. Methods of Assessment	Competency should be assessed by 6.1 Workplace observation 6.2 Demonstration 6.3 Oral Interview 6.4 Written examination 6.5 Portfolio
7. Context for Assessment	For certification competency should be assessed individually in the actual work place after completion of the module.

Accreditation Requirement

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Unit Competency :	**Repair and maintenance works for plumbing.**
Unit Code :	CONPLM200912A
Unit Descriptor :	This unit covers the knowledge, skills and attitude required to repair and maintenance works for plumbing It includes: Practicing OSH, collecting tools equipment and materials, Repairing pipes fittings and plumbing fixtures, Clearing clogged pipes and drains, Maintaining plumbing fixtures and cleaning the workplace.
Nominal hrs :	30 hours

Elements of Competency	**Performance Criteria** Bold italicized words are detailed in the Range of Variables
1. Practice OSH	1.1 Personal protective equipment (PPE) are collected. 1.2 ***PPE*** are used.
2. Selected and collected tools, equipment and materials	2.1 ***Tools, equipment*** and materials are selected and collected. 2.2 Size of pipes is chosen. 2.3 Pipes are selected and collected.
3. Repair pipes, fittings and plumbing fixtures	3.1 Defective ***pipes, fittings*** and plumbing fixtures are identified, disconnected and replaced. 3.2 Replacements are checked. 3.3 Joints are secured and leak proof. 3.4 Damaged areas are repaired. 3.5 Correct usage of tools and equipment is observed.
4. Clear clogged pipes and drains	4.1. Clogged pipes and drains are located in line. 4.2. Clogged pipes and drains are cleared. 4.3. Pipes and drain are cleared and provided with screen in line.

5. Maintain plumbing fixtures	5.1 Defective ***plumbing fixtures*** are identified, disconnected and replaced. 5.2 Replacements are checked. 5.3 Joints are secured and leak proof. 5.4 Damaged areas are replaced. 5.5 Correct usage of tools and equipment is observed.
1. Clean the Workplace	6.1 Tools & equipment are cleaned. 6.2 Workplace is cleaned. 6.3 Waste materials are disposed.

Range of Variables

Variable	Range (Include but not limited to):
1. PPE	1.1 Dust mask 1.2 Goggles 1.3 Safety shoes 1.4 Apron 1.5 Gloves
2. Tools and equipment	2.1 Hacksaw frame with blade 2.2 Measuring steel tape(10m) 2.3 Measuring tape(30m)fiber 2.4 Slide calipers 2.5 Plumb bob 2.6 Brick hammer 2.7 Ball pin hammer 2.8 Claw hammer 2.9 Mallet 2.10 Level pipe(plastic)-30m 2.11 Spirit level 2.12 Mason's chisel 2.13 Cold chisel 2.14 Punch 2.15 Combination pliers 2.16 Screw driver(flat/ star/Phillips) 2.17 Slide wrench 2.18 Adjustable pipe wrench 2.19 Chain tongue 2.20 Hand die stock 2.21 Pipe vice 2.22 Drill bits(mason) 2.23 Pipe cutter(3 wheel) 2.24 Slope/level measuring tools 2.25 Pipe grip 2.26 Pipe reamer Pipe thread set(NTP) 2.27 Pipe taps(NTP) 2.28 Tri-Square(steel) 2.29 Spanner set 2.30 Socket wrench set 2.31 File(all types) 2.32 Oil cane

3. Pipes and fittings	3.1 PVC pipes and fittings 3.2 G.I. pipes and fittings 3.3 C.I. pipes and fittings 3.4 Tank fittings 3.5 Flush tank fittings 3.6 Circuit/loop vent 3.7 Riser
4. Plumbing fixtures	4.1 Water closet 4.2 Bath tub 4.3 Shower valve 4.4 Flush valve 4.5 Electronic flushing devices (urinal, closet, faucet)

Evidence Guide

1. Critical aspects of competency	Competency assessment requires evidence that the candidate : 1.1 Selected and prepared materials, tools and equipment in accordance with job requirements. 1.2 Identified, disconnected and repaired defective pipes, fittings and plumbing fixtures in accordance with standard specification. 1.3 Cleared clogged pipes and drains. 1.4 Defective plumbing fixtures are identified, disconnected and replaced with the same model.
2. Underpinning knowledge	2.1 Mensuration. 2.2 5-S implementation. 2.3 Proper use of tools and equipment. 2.4 Materials use and specification. 2.5 Understand economic use of material. 2.6 Knowledge of repair and maintenance work 2.7 Plumbing fixture. 2.8 Work place cleaning
3. Underpinning skills	3.1 Interpreting plan and details. 3.2 Preparing materials. 3.3 Replacing broken/defective pipes. 3.4 Clearing clogged pipes and drain. 3.5 Replace plumbing fixture

4. Underpinning Attitudes	4.1 Commitment to occupational health and safety 4.2 Environmental concerns 4.3 Eagerness to learn 4.4 Tidiness and timeliness 4.5 Respect for rights of peers and seniors in workplace
5. Resource implications	The following resources should be provided : 5.1 Workplace location. 5.2 Tools and equipment appropriate to plumbing repair and maintenance work. 5.3 Drawings and specifications relevant to the task.
6. Methods of Assessment	Competency should be assessed by 6.1 Workplace observation 6.2 Demonstration 6.3 Oral Interview 6.4 Written examination 6.5 Portfolio
7. Context for Assessment	For certification competency should be assessed individually in the actual work place after completion of the module.

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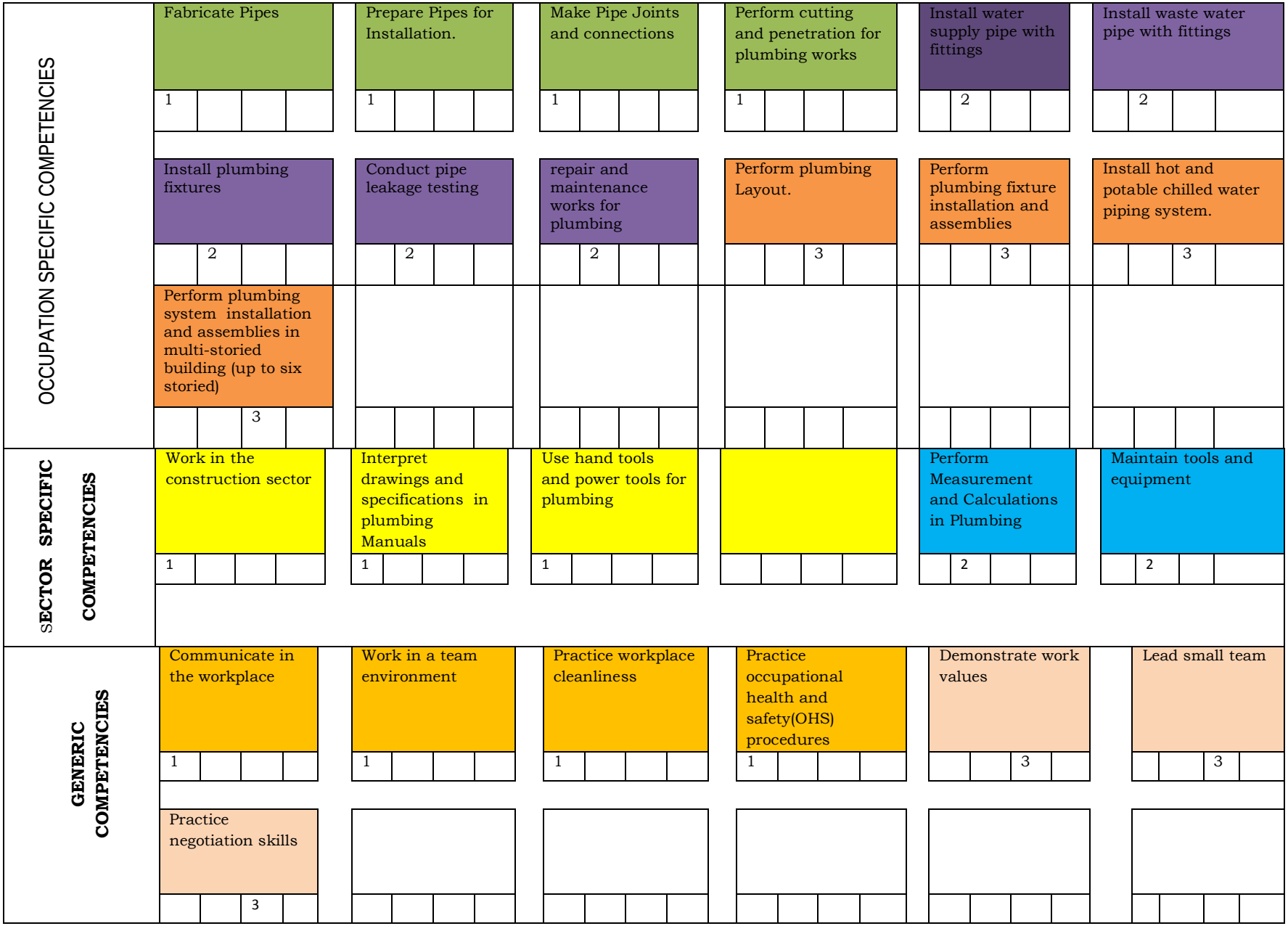
Annexes

Annex 1. Competency Map for Plumbing in Construction Sector



Annex 2. Bangladesh National Qualifications Framework

TVQF Level	Education Type			Current Qualification Structure	Job Classification
	Pre-Voc	VE	TE		
TVQF 6			Diploma	4-year Diploma	Supervisor/Middle Manager/Sub-Assistant Engineer
TVQF 5		**NSC -V		NSS Master	Highly-Skilled Worker/Supervisor
TVQF 4		**NSC -IV		NSS 1/HSC (Voc) Year 11/12	Skilled Worker
TVQF 3		**NSC -III		NSS 2/SSC (Voc) Year 10	Semi-Skilled Worker
TVQF 2		**NSC -II		NSS 3/SSC (Voc) Year 9	Basic Skilled Worker
TVQF 1		**NSC -I		NSS Basic/ Basic Trade Course	Basic Worker
Pre-Voc 2	*NPVC -II			None	Pre-Vocational Trainee
Pre-Voc 1	*NPVC -I			None	Pre-Vocational Trainee

*NPVC – National Pre-Vocational Certificate
**NSC – National Skill Certificate

Annex 3. Qualification Level Descriptors

BTVQF Level	Knowledge	Skill	Responsibility	Job Class
6	Comprehensive actual and theoretical knowledge within a specific study area with an awareness of the limits of that knowledge.	Specialised and restricted range of cognitive and practical skills required to provide leadership in the development of creative solutions to defined problems	Manage a team or teams in workplace activities where there is unpredictable change Identify and design learning programs to develop performance of team members	Supervisor/Middle-Level Manager/Sub Assistant Engineer
5	Very broad knowledge of the underlying, concepts, principles, and processes in a specific study area	Very broad range of cognitive and practical skills required to generate solutions to specific problems in one or more study areas.	Take overall responsibility for completion of tasks in work or study Apply past experiences in solving similar problems	Highly Skilled Worker / Supervisor (NSC 4)
4	Broad knowledge of the underlying, concepts, principles, and processes in a specific study area	Range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying the full range of methods, tools, materials and information	Take responsibility, within reason, for completion of tasks in work or study Apply past experiences in solving similar problems	Skilled Worker
3	Moderately broad knowledge in a specific study area.	Basic cognitive and practical skills required to use relevant information in order to carry out tasks and to solve routine problems using simple rules and tools	Work or study under supervision with some autonomy	Semi Skilled worker
2	Basic underpinning knowledge in a specific study area.	Basic skills required to carry out simple tasks	Work or study under indirect supervision in a structured context	Medium Skilled Worker

BTVQF Level	Knowledge	Skill	Responsibility	Job Class
1	Elementary understanding of the underpinning knowledge in a specific study area.	Limited range of skills required to carry out simple tasks	Work or study under direct supervision in a structured context	Basic Skilled Worker
Pre-Voc 2	Limited general knowledge	Very limited range of skills and use of tools required to carry out simple tasks	Work or study under direct supervision in a well-defined, structured context.	Pre-Vocation Trainee (NPVC 2)
Pre-Voc 1	Extremely limited general knowledge	Minimal range of skills required to carry out simple tasks	Simple work or study exercises, under direct supervision in a clear, well defined structured context	Pre-Vocation Trainee (NPVC 1

Annex 4. Key for Coding

Code	Description
Occupational Sector	
RMG	Ready-Made Garments
LEG	Light Engineering
CON	Construction
INF	Informal Sector
Competencies	
GC	Generic Competencies
SSC	Sector specific Competencies
OSC	Occupation specific Competencies
Occupation	
PLM	Plumbing
MAS	Mason
PNT	Painter

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