COMPETENCY STANDARD

Plastic Injection Moulding Machine Operation

Level: 02

(Light Engineering Sector)

Competency Standard Code: CS-LE-PIMMO-L2-EN-V1

National Skills Development Authority
Prime Minister's Office
Government of the People's Republic of Bangladesh

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National Skills Development Authority
Prime Minister's Office
Level: 10-11, Biniyog Bhaban,
E-6 / B, Agargaon, Sher-E-Bangla Nagar Dhaka-1207, Bangladesh.
Email: ec@nsda.gov.bd
Website: www.nsda.gov.bd.
National Skills Portal: http:\\skillsportal.gov.bd

This Competency Standard for Plastic Injection Moulding Machine Operation is a document for the development of curricula, teaching and learning materials, and assessment tools. It also serves as the document for providing training consistent with the requirements of industry in order to meet the qualification of individuals who graduated through the established standard via competency-based assessment for a relevant job.

This document has been developed by NSDA in association with Light EngineeringISC, industry representatives, academia, related specialist, trainer and related employee.

Public and private institutions may use the information contained in this standard for activities benefitting Bangladesh.

Introduction

The NSDA aims to enhance an individual's employability by certifying completeness with skills. NSDA works to expand the skilling capacity of identified public and private training providers qualitatively and quantitatively. It also aims to establish and operationalize a responsive skills ecosystem and delivery mechanism through a combination of well-defined set of mechanisms and necessary technical supports.

Key priority economic growth sectors identified by the government have been targeted by NSDA to improve current job skills along with existing workforce to ensure required skills to industry standards. Training providers are encouraged and supported to work with industry to address identified skills and knowledge to enable industry growth and increased employment through the provision of market responsive inclusive skills training program. "Plastic Injection Moulding Machine Operation" is selected as one of the priority occupations of ICT Sector. This standard is developed to adopt a demand driven approach to training with effective inputs from Industry Skills Councils (ISC's), employer associations and employers.

Generally, a competency standard informs curriculum, learning materials, assessment and certification of trainees enrolled in Skills Training. Trainees who successfully pass the assessment will receive a qualification in the National Skills Qualification Framework (NSQF) under Bangladesh National Qualification Framework (BNQF) and will be listed on the NSDA's online portal.

This competency standard is developed to improve skills and knowledge in accordance with the job roles, duties and tasks of the occupation and ensure that the required skills and knowledge are aligned to industry requirements. A series of stakeholder consultations, workshops were held to develop this document.

The document also details the format, sequencing, wording and layout of the Competency Standard for an occupation which is comprised of Units of Competence and its corresponding Elements.

Overview

A competency standard is a written specification of the knowledge, skills and attitudes required for the performance of an occupation, trade or job corresponding to the industry standard of performance required in the workplace.

The purpose of a competency standards is to:

- provide a consistent and reliable set of components for training, recognising and assessing people's skills, and may also have optional support materials
- enable industry recognised qualifications to be awarded through direct assessment of workplace competencies
- encourage the development and delivery of flexible training which suits individual and industry requirements
- encourage learning and assessment in a work-related environment which leads to verifiable workplace outcomes

Competency standards are developed by a working group comprised of representative from NSDA, Key Institutions, ISC, and industry experts to identify the competencies required of an occupation in Informal Sector.

Competency standards describe the skills, knowledge and attitude needed to perform effectively in the workplace. CS acknowledge that people can achieve technical and vocational competency in many ways by emphasizing what the learner can do, not how or where they learned to do it.

With competency standards, training and assessment may be conducted at the workplace or at training institute or any combination of these.

Competency standards consist of a number of units of competency. A unit of competency describes a distinct work activity that would normally be undertaken by one person in accordance with industry standards.

Units of competency are documented in a standard format that comprises of:

- unit title
- nominal duration
- unit code
- unit descriptor
- elements and performance criteria
- variables and range statement
- curricular content guide
- assessment evidence guides

Together, all the parts of a unit of competency:

- describe a work activity
- guide the assessor to determine whether the candidate is competent or not yet competent

The ensuing sections of this document comprise of a description of the relevant occupation, trade or job with all the key components of a unit of competency, including:

- a chart with an overview of all Units of Competency for the relevant occupation, trade or job including the Unit Codes and the Unit of Competency titles and corresponding Elements
- the Competency Standard that includes the Unit of Competency, Unit Descriptor, Elements and Performance Criteria, Range of Variables, Curricular Content Guide and Assessment Evidence Guide.

Competency Standards for National Skills Certificate – Level-2 in Plastic Injection Moulding Machine Operation in Light Engineering Sector

Level Descriptors of NSQF (BNQF 1-6)

Level & Job Classification	Knowledge Domain	Skills Domain	Responsibility Domain
6-Mid-Level Manager/ Sub Assistant Engineer	Comprehensive actual and theoretical knowledge within a specific work or study area with an awareness of the validity and limits of that knowledge, able to analyse, compare, relate and evaluate.	Specialised and wider range of cognitive and practical skills required to provide leadership in the development of creative solutions to defined problems. Communicate professional issues and solutions to the team and to external partners/users.	Work under broad guidance and self-motivation to execute strategic and operational plan/s. Lead lower-level management. Diagnose and resolve problems within and among work groups.
5-Supervisor	Broad knowledge of the underlying, concepts, principles, and processes in a specific work or study area, able to scrutinize and break information into parts by identifying motives or causes.	Broad range of cognitive and practical skills required to generate solutions to specific problems in one or more work or study areas. Communicate practice-related problems and possible solutions to external partners.	Work under guidance of management and self-direction to resolve specific issues. Lead and take responsibility for the work and actions of group/team members. Bridge between management.
4-Highly Skilled Worker	Broader knowledge of the underlying, concepts, principles, and processes in a specific work or study area, able to solve problems to new situations by comparing and applying acquired knowledge.	A 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. Communicate using technical terminology and IT technology with partners and users as per workplace requirements.	Work under minimal supervision in specific contexts in response to workplace requirements. Resolve technical issues in response to workplace requirements and lead/guide a team/ group.
3-Skilled Worker	Moderately broad knowledge in a specific work or study area, able to perceive ideas and abstract from drawing and design according to workplace requirements.	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. Communicate with his team and limited external partners upholding the values, nature and culture of the workplace	Work or study under supervision with considerable autonomy. Participate in teams and responsible for group coordination.
2-Semi Skilled Worker	Basic understanding of underpinning knowledge in a specific work or study area, able to interpret and apply common occupational terms and instructions.	Skills required to carry out simple tasks, communicate with his team in the workplace presenting and discussing results of his work with required clarity.	Work or study under supervision in a structured context with limited scope of manipulation
1 –Basic Skilled Worker	Elementary understanding of ability to interpret the underpinning knowledge in a specific study area, able to interpret common occupational terms and instructions.	Specific Basic skills required to carry out simple tasks. Interpret occupational terms and present the results of own work within guided work environment/ under supervision.	Work under direct supervision in a structured context with limited range of responsibilities.

List of Abbreviations

General	
NSDA	National Skills Development Authority
ISC	Industry Skills Council
BPGMEA	Bangladesh Plastic Goods Manufacturers and Exporters Association
NPVC	National Pre-Vocation Certificate
NSQF	National Skills Qualifications Framework
PPP	Public Private Partnership
SCVC	Standards and Curriculum Validation Committee
STP	Skills Training Provider
UoC	Unit of Competency
PIMMO	Plastic Injection Moulding Machine Operation
Occupation Specific	
PPE	Personal protective equipment
OSH	Occupational Safety and Health
PE	Polyethylene
PP	Polypropylene
PS	Polystyrene
ABS	Acrylonitrile Butadiene Styrene
PVC	Polyvinyl chloride
PMMA	Polymethyl Methacrylate
PET	Polyethylene Terephthalate
CA	Cellulose Acetate
PTFE	Polytetrafluoroethylene
PA	Poly Amide
PC	Poly carbonate
POM	Poly Oxy Methylene
PBT	Poly Butylene Terephthalate
PEEK	Poly ether ether ketone
PAI	Polyamide Imide
MF	Melamine formaldehyde
UF	Urea Formaldehyde
PF	Phenol Formaldehyde
EP	Epoxy
UP	Unsaturated Polyester
IMM	Injection moulding machine
SOP	Standard Operating Process
QC	Quality Control

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Approval of Competency Standard

Approved by
23rd Authority Meeting of NSDA Held on 26.12.2022

26.12.22

Md. Saniul Ferdous
Deputy Director (Admin)
National Skills Development Authority
Prime Minister's Office

Deputy Director (Admin)
and
Officer of Secretarial Duties for Authority Meeting
National Skills Development Authority

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Competency Standards for National Skill Certificate – 2 in Plastic Injection Moulding Machine Operation in Light Engineering Sector

Course Structure

SL	Unit Code and Title		UoC Level	Nominal Duration (Hours)
Generic Units of Competencies				**35**
1.	GU-02-L2-V1	Apply Occupational Safety and Health (OSH) Procedure in the Workplace	2	15
2.	GU-10-L2-V1	Implement Work Values	2	20
Sector Specific Units of Competencies				**15**
3.	SU-PS-01-L2-V1	Work in Plastic Sector in Bangladesh	2	15
Occupation Specific Units of Competencies				**200**
4.	OU-LE-PIMMO-01-L2-V1	Operate injection moulding machine	2	120
5.	OU-LE-PIMMO-02-L2-V1	Prepare for production	2	40
6.	OU-LE-PIMMO-03-L2-V1	Carryout Plastic Product Production	2	20
7.	OU-LE-PIMMO-04-L2-V1	Perform Post-Production Activities	2	20
Total Nominal Learning Hours				**250**

Units & Elements at Glance

Generic Units of Competencies

Code	Unit of Competency	Elements of Competency	Duration (Hours)
GU-02-L2-V1	Apply Occupational Safety and Health (OSH) Procedure in the Workplace	1. Identify OSH policies and procedures. 2. Follow OSH procedure 3. Report hazards and risks. 4. Respond to emergencies 5. Maintain personal well-being	15
GU-10-L2-V1	Implement Work Values	1. Define the purpose of work 2. Apply work values / ethics 3. Deal with ethical problems 4. Maintain integrity of conduct in the workplace	20

Sector Specific Units of Competencies

Code	Unit of Competency	Elements of Competency	Duration (Hours)
SU-PS-01-L2-V1	Work in Plastic Sector in Bangladesh	1. Explore plastic industries in Bangladesh 2. Explore scope of jobs in the sector	15

Occupation Specific Units of Competencies

Code	Unit of Competency	Elements of Competency	Duration (Hours)
OU-LE-PIMMO-01-L2-V1	Operate injection moulding machine	Use tools and fittings Recognize plastic raw materials Run injection moulding machine Set mould Set Parameter Perform Trial run	120
OU-LE-PIMMO-02-L2-V1	Prepare for production	Follow OSH Perform trial run of new product Prepare to continue running production	40
OU-LE-PIMMO-03-L2-V1	Carryout Plastic Product Production	Ensure raw material for production Operate production Implement housekeeping at workplace	20
OU-LE-PIMMO-04-L2-V1	Perform Post-Production Activities	Attach accessories Stack products Generate reports Perform Work Handover Clean working area	20

Generic Units of Competencies

Unit Code and Title	**GU-02-L2-V1: Apply Occupational Safety and Health (OSH) Procedure in the Workplace**
Unit Descriptor	This unit covers the knowledge, skills and attitudes (KSA) required in applying occupational safety and health (OSH) procedures in the workplace. It specifically includes identifying OHS policies and procedures, following OSH procedure, reporting to emergencies, and maintaining personal well-being.
Nominal Hours	**15 Hours**
Elements of Competency	**Performance Criteria** **Bold & Underlined** terms are elaborated in the Range of Variables
1. Identify OSH policies and procedures.	1.1. **OHS policies** and **safe operating procedures** are accessed and stated. 1.2. **Safety signs and symbols** are identified and followed. 1.3. Emergency response, evacuation procedures and other contingency measures are determined according to workplace requirements.
2. Follow OSH procedure	2.1 **Personal protective equipment (PPE)** is selected and collected as required. 2.2 Personal protective equipment (PPE) is correctly used in accordance with organization OHS procedures and practices. 2.3 A clear and tidy workplace is maintained as per workplace standard. 2.4 PPE is maintained to keep them operational and compliant with OHS regulations.
3. Report hazards and risks.	3.1 **Hazards** and risks are identified, assessed and controlled. 3.2 Incidents arising from hazards and risks are reported to designated authority.
4. Respond to emergencies	4.1 Alarms and warning devices are responded. 4.2 Workplace **emergency procedures** are followed. 4.3 **Contingency measures** during workplace accidents, fire and other emergencies are recognized and followed in accordance with organization procedures. 4.4 Frist aid procedures is applied during emergency situations.
5. Maintain personal well-being	5.1 OHS policies and procedures are adhered to. 5.2 OHS awareness programs are participated in as per workplace guidelines and procedures. 5.3 Corrective actions are implemented to correct unsafe condition in the workplace. 5.4 **"Fit to work" records** are updated and maintained according to workplace requirements.
Range of Variables	
Variables	**Range** (may include but not limited to):
1. OHS Policies	1.1. Bangladesh standards for OHS 1.2. Fire Safety Rules and Regulations 1.3. Code of Practice

	1.4. Industry Guidelines
2. Safe Operating Procedures	2.1 Orientation on emergency exits, fire extinguishers, fire escape, etc. 2.2 Emergency procedures 2.3 First Aid procedures 2.4 Tagging procedures 2.5 Use of PPE 2.6 Safety procedures for hazardous substances
3. Safety Signs and symbols	3.1 Direction signs (exit, emergency exit, etc.) 3.2 First aid signs 3.3 Danger Tags 3.4 Hazard signs 3.5 Safety tags 3.6 Warning signs
4. Personal Protective Equipment (PPE)	4.1 Gas Mask 4.2 Gloves 4.3 Safety boots 4.4 Face mask 4.5 Overalls 4.6 Goggles and safety glasses 4.7 Sun block 4.8 Chemical/Gas detectors
5. Hazards	5.1 Chemical hazards 5.2 Biological hazards 5.3 Physical Hazards 5.4 Mechanical and Electrical Hazard 5.5 Mental hazard 5.6 Ergonomic hazard
6. Emergency Procedures	6.1 Fire fighting 6.2 Earthquake 6.3 Medical and first aid 6.4 evacuation`
7. Contingency measures	7.1 Evacuation 7.2 Isolation 7.3 Decontamination
8. “Fit to Work” records	8.1 Medical Certificate every year 8.2 Accident reports, if any 8.3 Eye vision certificate
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 Stated OHS policies and safe operating procedures 1.2 followed safety signs and symbols 1.3 used personal protective equipment (PPE) 1.4 maintained workplace clear and tidy 1.5 assessed and Controlled hazards 1.6 followed emergency procedures 1.7 followed contingency measures

	1.8 implemented corrective actions
2. Underpinning knowledge	2.1 Define OHS 2.2 OHS Workplace Policies and Procedures 2.3 Work Safety Procedures 2.4 Emergency Procedures 2.5 Hazard control procedure 2.6 Different types of Hazards 2.7 PPE and there uses 2.8 Personal Hygiene Practices 2.9 OHS Awareness
3. Underpinning skills	3.1 Accessing OHS policies 3.2 Handling of PPE 3.3 Handling cleaning tools and equipment 3.4 Writing report 3.5 Responding to emergency procedures
4. Required attitude	4.1 Commitment to occupational health and safety 4.2 Sincere and honest to duties 4.3 Promptness in carrying out activities 4.4 Environmental concerns 4.5 Eagerness to learn 4.6 Tidiness and timeliness 4.7 Respect of peers and seniors in workplace 4.8 Communicate with peers and seniors in workplace
5. Resource implications	5.1 Workplace 5.2 Equipment and outfits appropriate in applying safety measures 5.3 Tools, materials and documentation required 5.4 OHS Policies and Procedures
6. Methods of assessment	Competency should be assessed by: 6.1 Written test 6.2 Demonstration 6.3 Oral Questioning 6.4 Portfolio
7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited assessment centre 7.2 Assessment should be done by a NSDA certified/nominated assessor

Accreditation Requirements

Training Providers must be accredited by National Skills Development Authority (NSDA), 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 NTVQF qualification. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.

Unit code and Title	**GU-10-L2-V1: Implement Work Values**
Nominal Hours	**20 Hours**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to demonstrate work values. It specifically includes – define the purpose of work; apply work values / ethics; deal with ethical problems; and maintain integrity of conduct in the workplace.
Elements of Competency	**Performance Criteria** **Bold & Underlined** terms are elaborated in the Range of Variables Training Components
1. Define the purpose of work	1.1 One's unique sense of purpose for working and the why's of work are identified, reflected on and clearly defined for one's development as a person and as a member of society. 1.2 Personal mission is in harmony with industry values are defined.
2. Apply work values / ethics	2.1 **Work values / ethics / concepts** are classified and reaffirmed in accordance with the transparent industry ethical standards, policies and guidelines. 2.2 **Work practices** are undertaken in compliance with industry work ethical standards, industry policy and guidelines. 2.3 Personal behavior and relationships with co-workers are maintained as per standards, policy and guidelines. 2.4 **Company resources** are used in accordance with transparent company ethical standard, policies and guidelines.
3. Deal with ethical problems	3.1 industry ethical standard, organizational policy and guidelines on the prevention and reporting of unethical conduct are accessed and applied in accordance with transparent company ethical standard, policies and guidelines. 3.2 Work **incidents / situations** are reported and/or resolved in accordance with company protocol / guidelines. 3.3 Resolution and / or referral of ethical problems identified are used as learning opportunities.
4. Maintain integrity of conduct in the workplace	4.1 Personal work practices and values are demonstrated consistently with acceptable ethical conduct and company's core values. 4.2 **Instructions** to co-workers are provided based on ethical, lawful and reasonable directives. 4.3 Company values / practices are shares with co-workers using appropriate behavior and language.

Range of Variables	
Variable	**Range** (may include but not limited to):
1. Work values / ethics / concepts	1.1 Commitment / Dedication 1.2 Sense of urgency 1.3 Sense of purpose 1.4 Love for work 1.5 High motivation 1.6 Orderliness 1.7 Reliability 1.8 Competence 1.9 Dependability 1.10 Goal-oriented 1.11 Sense of responsibility 1.12 Being knowledgeable 1.13 Loyalty to work/company 1.14 Sensitivity to others 1.15 Compassion/Caring attitude 1.16 Balancing between family and work 1.17 Benjamin spirit/teamwork 1.18 Sense of nationalism 1.19 Gender awareness
2. Work practices	2.1 Quality of work 2.2 Punctuality 2.3 Efficiency 2.4 Effectiveness 2.5 Productivity 2.6 Resourcefulness 2.7 Innovativeness / Creativity 2.8 Cost consciousness 2.9 5S 2.10 Attention to details
3. Company resources	3.1 Consumable materials 3.2 Equipment / Machineries 3.3 Human 3.4 Time 3.5 Financial resources
4. Incidents / situations	4.1 Violent / intense dispute or argument 4.2 Gambling 4.3 Use of prohibited substances 4.4 Pilferages 4.5 Damage to person or property 4.6 Vandalism 4.7 Falsification 4.8 Bribery 4.9 Sexual Harassment 4.10 Blackmail
5. Instructions	5.1 Verbal 5.2 Written

Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent and recent and meet the requirements of the current version of the Unit of Competency	
1. Critical Aspects ofCompetency	Assessment required evidence that the candidate: 1.1 defined one's unique sense of purpose for working 1.2 clarified and affirmed work values / ethics / concepts consistently in the workplace 1.3 demonstrated work practices satisfactorily and consistently in compliance with industry work ethical standards, organizational policy and guidelines 1.4 demonstrated personal behavior and relationships with co-workers and / or clients consistent with ethical standards policy and guidelines 1.5 used company resources in accordance with company ethical standard, policies and guidelines 1.6 followed company ethical standards, organizational policy and guidelines on the prevention and reporting of unethical conduct / behavior
2. Underpinning Knowledge	2.1 Occupational safety and health. 2.2 Work values and ethics. 2.3 Company performance and ethical standards. 2.4 Company policies and guidelines. 2.5 Fundamental rights at work including gender5sensitivity. 2.6 Work responsibilities / job functions. 2.7 Corporate social responsibilities. 2.8 Company code of conduct / values. 2.9 Balancing work and family responsibilities. 2.10 Codes of practice and guidelines for the organization. 2.11 Organization policy and procedures for negotiations. 2.12 Decision making and conflict resolution strategies procedures. 2.13 Problem solving strategies on how to deal with unexpected questions and attitudes during negotiation.
3. Underpinning Skills	3.1 Developing interpersonal skills to strengthen rapport with other parties. 3.2 Communicating with others (verbal and listening). 3.3 Self-awareness, understanding and acceptance. 3.4 Applying good manners and right conduct. 3.5 Observation skills. 3.6 Negotiation skills.
4. Underpinning Attitude	4.1 Commitment to occupational health and safety 4.2 Promptness in carrying out activities 4.3 Sincere and honest to duties 4.4 Environmental concerns 4.5 Eagerness to learn 4.6 Tidiness and timeliness 4.7 Respect for rights of peers and seniors in workplace 4.8 Communication with peers, sub-ordinates and seniors in workplace

5. Resource Implications	The following resources must be provided: 5.1 Tools, equipment and physical facilities appropriate to perform activities 5.2 Materials, consumables to perform activities
6. Methods of Assessment	6.1 Written Test 6.2 Demonstration 6.3 Oral Questioning 6.4 Portfolio
7. Context of Assessment	7.1 Competency assessment must be done in NSDA Accredited Assessment center 7.2 Assessment should be done by NSDA certified/ nominated assessor
Accreditation Requirements Training Providers must be accredited by National Skills Development Authority (NSDA), 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 NTVQF qualification. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.	

Sector-specific Units of Competencies

Unit Code and Title	**SU-PS-01-L2-V1: Work in the Plastic Sector in Bangladesh**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to work in the plastic sector in Bangladesh. It specifically includes the tasks of exploring plastic industries in Bangladesh, and exploring scope of jobs in the sector.
Nominal Hours	**15 Hours**
Elements of Competency	**Performance Criteria** **Bold and Underlined** terms are elaborated in the Range of Variables Training Components
1. Explore plastic industries in Bangladesh	1.1. **Plastic industries in Bangladesh** are explored 1.2. Information on Bangladesh Plastic Goods Manufacturers and Exporters Association (BPGMEA) is explored. 1.3. Compliance issues for Plastic Industries are interpreted 1.4. Green Factory issues are explained
2. Explore scope of jobs in the sector	2.1 **Job types** in plastic sector are explored 2.2 Sources of job vacancies are identified 2.3 Requirements for jobs are recognized 2.4 **Labor law issues** are interpreted
Range of Variables	
Variables	**Range** (may include but not limited to):
1. Plastic industries in Bangladesh	1.1 Local market-oriented industries 1.2 Export oriented industries
2. Job types	2.1 Helper 2.2 Junior Operator 2.3 Assistant Operator 2.4 Operator 2.5 Senior Operator 2.6 Supervisor 2.7 Senior supervisor 2.8 Junior Assistant Manager 2.9 Assistant Manager 2.10 Deputy Production Manager

	2.11 Production Manager 2.12 Assistant General Manager 2.13 General Manager
3. Labor law issues	3.1 Duty Hour 3.2 Overtime 3.3 Leave 3.4 Salary and Allowances 3.5 Termination of duty

Evidence Guide

The evidence must be authentic, valid, sufficient, reliable, consistent and recent and meet the requirements of the current version of the Unit of Competency

1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 Explored plastic industries in Bangladesh 1.2 Explored scope of jobs in the sector
2. Underpinning knowledge	Trainee will acquire knowledge of: 2.1 Plastic Industries in Bangladesh 2.2 BPGMEA 2.3 Compliance Issues for Plastic Industries 2.4 Green Factory issues 2.5 Job Types in Plastic sector 2.6 Sources of Job vacancy 2.7 Labor law issues
3. Underpinning skill	3.1 Exploring plastic industries in Bangladesh 3.2 Exploring scope of jobs in the sector
4. Required attitude	4.1 Commitment to occupational health and safety 4.2 Promptness in carrying out activities 4.3 Sincere and honest to duties 4.4 Environmental concerns 4.5 Eagerness to learn 4.6 Tidiness and timeliness 4.7 Respect for rights of peers and seniors in workplace 4.8 Communication with peers and seniors in workplace
5. Resource implication	The following resources must be provided: 5.1 Workplace (actual or simulated) 5.2 Necessary of all manuals 5.3 Accessibility of storage area

6. Methods of assessment	Methods of assessment may include but not limited to: 6.1 Written test 6.2 Demonstration 6.3 Oral questioning
7. Context of assessment	7.1 Competency assessment must be done in a training center or in an actual or simulated workplace after completion of the training module 7.2 Assessment should be done by NSDA certified assessor

Accreditation Requirements

Training Providers must be accredited by National Skills Development Authority (NSDA), 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 NTVQF qualification. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.

Occupation Specific Units of Competencies

Unit Code and Title	**OU-LE-PIMMO-01-L2-V1: Operate injection moulding machine**
Unit Descriptor	This unit covers the knowledge, skills and attitude required to operate injection moulding machine. It specifically includes the tasks of using tools and fittings, recognizing plastic raw materials, running injection moulding machine, setting mould, setting parameter, and performing trial run.
Nominal Hours	**120 hours**
Elements of Competency	**Performance Criteria** **Bold and underlined** terms are elaborated in the range of variables
1. Use tools and fittings	1.1 Necessary **tools and fittings** are identified 1.2 Selected tools are used
2. Recognize plastic raw materials	2.1 **Types of plastic raw materials** are identified 2.2 **Thermoplastic materials** are recognized 2.3 **Thermoset plastics** are recognized 2.4 Process temperature chart for the plastic materials is interpreted 2.5 Advantage and disadvantages of plastic materials are recognized
3. Run injection moulding machine	3.1 **Types of Injection moulding machine** are identified 3.2 Technical Specification and machine outline are recognized 3.3 **Units of an Injection moulding machine** are identified 3.4 **Accessories for IMM** are recognized. 3.5 **Safety symbols and instructions** on machine are interpreted and followed 3.6 Basic operational principle is interpreted 3.7 Machine is operated as per instruction
4. Set mould	4.1 Mould is selected as per product and machine specification 4.2 Physical condition of selected mould is checked 4.3 Selected mould is set on clamping unit
5. Set Parameter	5.1 Human Machin Interface (HMI) of plastic Injection Moulding Machine is explored 5.2 **Parameters** of injection moulding machine are recognized as per mould and product 5.3 Parameters are set on machine interface
6. Perform Trial run	6.1 Machine is set to manual mode 6.2 Parameters are checked 6.3 Operational sequence is interpreted and maintained 6.4 Trial run is performed

Range of Variables	
Variable	**Range** (May include but not limited to:)
1. Tools and fittings	1.1 Alen key set 1.2 Screw driver set 1.3 Open end wrench 1.4 Pipe wrench 1.5 Pliers set 1.6 Adjustable wrench 1.7 Hammer 1.8 Tester 1.9 Torque wrench 1.10 Steel wire rope 1.11 I-bolt 1.12 D-clamp 1.13 U-Clamp 1.14 Brass rod 1.15 Footrest
2. Types of plastic raw materials	2.1 Thermoplastic 2.2 Thermoset plastic
3. Thermoplastic materials	3.1 General purpose 3.1.1 Polyethylene (PE) 3.1.2 Polypropylene (PP) 3.1.3 Polystyrene (PS) 3.1.4 Acrylonitrile Butadiene Styrene (ABS) 3.1.5 Polyvinyl chloride (PVC) 3.1.6 Polymethyl Methacrylate (PMMA) 3.1.7 Polyethylene Terephthalate (PET) 3.1.8 Cellulose Acetate (CA) 3.1.9 Polytetrafluoroethylene (PTFE) 3.2 Engineering materials 3.2.1 Poly Amide (PA) 3.2.2 Poly carbonate (PC) 3.2.3 Poly Oxy Methylene (POM) 3.2.4 Poly Butylene Terephthalate (PBT) 3.3 Super Engineering materials 3.3.1 Poly ether ether ketone (PEEK) 3.3.2 Polyamide Imide (PAI)
4. Thermoset plastic	4.1 Melamine formaldehyde (MF) 4.2 Urea Formaldehyde (UF) 4.3 Phenol Formaldehyde (PF) 4.4 Epoxy (EP) 4.5 Unsaturated Polyester (UP)
5. Types of Injection moulding machine	5.1 Hydraulic 5.2 Electric 5.3 Hybrid

6. Units of an Injection moulding machine	6.1 Control panel 6.2 Injection Unit 6.1.1 Screw barrel with heater 6.1.2 Hopper 6.1.3 Hydraulic manifold 6.1.4 Hydraulic motor 7. Clamping Unit 7.1.1 Clamping platens 7.1.2 Tie bar 7.1.3 Toggle 7.1.4 Ejector unit 7.1.5 Hydraulic manifold 7.1.6 Hydraulic pump 7.1.7 Hydraulic motor
8. Accessories for IMM	8.1 Cooling tower 8.2 Chiller 8.3 Hopper loader 8.4 Hopper drier 8.5 Robotic arm
9. Safety symbols and instructions	7.1 Warning 7.2 Mandatory action 7.3 Caution 7.4 Prohibition
10. Parameters	10.1 Temperature 10.2 Pressure 10.3 Speed 10.4 Time 10.5 Position
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent and recent and meet the requirements of the current version of the unit of competency.	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 Set mould 1.2 Set Parameter
2. Underpinning knowledge	2.1 Plastic materials types and Process Temperature Chart 2.2 Identification of Plastic (Non-laboratory) 2.3 Advantage and disadvantages of plastic materials 2.4 Injection moulding machine (IMM) and types 2.5 Technical Specification and Machine outline of IMM 2.6 Units of IMM 2.7 Operation principle of IMM 2.8 Safety symbol and instructions on IMM 2.9 Basic operational principle of IMM 2.10 Moulds and mould types 2.11 Human Machin Interface (HMI) of IMM 2.12 Parameters of IMM 2.13 Operational Sequence of IMM 2.14 Trial run

3. Underpinning skill	3.1 Using tools and fittings 3.2 Recognizing plastic raw materials 3.3 Running injection moulding machine 3.4 Setting mould on IMM 3.5 Setting parameter 3.6 Performing trial run
4. Required attitude	4.1 Commitment to occupational safety and health. 4.2 Promptness in carrying out activities. 4.3 Sincere and honest to duties. 4.4 Eagerness to learn the document preparation process. 4.5 Tidiness and timeliness. 4.6 Environmental concerns. 4.7 Respect for the rights of peers, subordinates and seniors at the workplace. 4.8 Communication with peers, subordinates and seniors in the workplace. 4.9 Keeps a clean and orderly workplace and equipment.
5. Resource implication	5.1 Relevant tools, Equipment, software and facilities needed to perform the activities. 5.2 Required learning materials.
6. Methods of assessment	6.1 Written test 6.2 Demonstration 6.3 Oral questioning
7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited center. 7.2 Assessment should be done by NSDA certified/ nominated assessor
Accreditation Requirements Training Providers must be accredited by National Skills Development Authority (NSDA), 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 qualification under NSQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.	

Unit Code Title	**OU-LE-PIMMO-02-L2-V1: Prepare for production**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to prepare for production. This specifically includes the tasks of following OSH, performing trial run of new product, preparing to continue running production.
Nominal Hours	**40 Hours**
Elements of Competency	**Performance Criteria** **Bold & Underlined** terms are elaborated in the Range of Variables)
1. Follow OSH	1.1 **Personal Protective Equipment (PPE)** is collected and used 1.2 Occupational Safety and Health (OSH) is observed and maintained
2. Prepare machine for production	2.1 Machine is selected as per product and mould 2.2 Mould is set on machine 2.3 Ejector is adjusted according to mould/ product. **2.4** Core pulling system is adjusted according to mould/ product
3. Perform trial run of new product	3.1 Raw material is loaded on hopper as per product 3.2 Parameter is set as per product 3.3 Trial run is performed 3.4 Product is checked as per product specification 3.5 Corrective measures are taken to meet the product quality standard and confirmed with supervisor.
4. Prepare to continue running production	4.1 Machine, mould and materials are taken over from previous shift operator 4.2 Parameters are checked and maintained as per SOP 4.3 QC process chart is taken over from previous shift operator 4.4 Shift production information is collected from supervisor
Range of Variables	
Variable	**Range** (may include but not limited to):

1. Personal Protective Equipment (PPE)	1.1 Apron 1.2 Hand gloves 1.3 Earplug 1.4 Mask 1.5 Hair net 1.6 Safety shoe
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 Set mould on machine 1.2 Set parameter as per product 1.3 Performed trial run 1.4 Took over machine, mould and materials from previous shift operator
2. Underpinning knowledge	2.1 Personal Protective Equipment (PPE) 2.2 Occupational Safety and Health (OSH) 2.3 Product specification 2.4 QC process chart 2.5 Shift production information
3. Underpinning skills	3.1 Following OSH 3.2 Performing trial run of new product 3.3 Preparing to continue running production
4. Required attitudes	4.1 Commitment to occupational safety and health. 4.2 Promptness in carrying out activities. 4.3 Sincere and honest to duties. 4.4 Eagerness to learn the document preparation process. 4.5 Tidiness and timeliness. 4.6 Environmental concerns. 4.7 Respect for the rights of peers, subordinates and seniors at the workplace. 4.8 Communication with peers, subordinates and seniors in the workplace. 4.9 Keeps a clean and orderly workplace and equipment.
5. Resource implication	The following resources must be provided: 5.1 Workplace (actual or simulated). 5.2 Tools, equipment and physical facilities appropriate to perform activities. 5.3 Materials consumable to perform activities.

6. Methods of assessment	Methods of assessment may include but not limited to: 6.1 Written test 6.2 Demonstration 6.3 Oral questioning
7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited center. 7.2 Assessment should be done by NSDA certified/ nominated assessor
Accreditation Requirements Training Providers must be accredited by National Skills Development Authority (NSDA), 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 qualification under NSQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.	

Unit Code and Title	**OU-LE-PIMMO-03-L2-V1: Carryout Plastic Product Production**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to carry out plastic product production. This specifically includes the tasks of ensuring raw material for production, operating production, and implementing housekeeping at workplace.
Nominal Hours	**20 Hours**
Elements of Competency	**Performance Criteria** **Bold & Underlined** terms are elaborated in the Range of Variables
1. Ensure raw material for production	1.1 Production target is ensured from shift supervisor 1.2 Quantity of raw material is checked for production
2. Operate production	2. 1 Set cycle time for production sequence is maintained 2. 2 Operation standard and QC process chart are followed 2. 3 Parameters are reviewed in case of **product defects** 2. 4 Flashes are trimmed if required
3. Implement housekeeping at workplace	3.1 Raw materials are placed on designated place 3.2 Accessories are kept as per SOP 3.3 Finished products are kept as per SOP 3.4 Rejected products are kept as per SOP 3.5 Flashes are managed as per SOP

Range of Variables	
Variable	**Range** (may include but not limited to):
1. Product defects	1.1 Surface finishing defect 1.2 Flash 1.3 Dimension accuracy 1.4 Bubble 1.5 Weld line 1.6 Voids 1.7 Warpage 1.8 Sink mark 1.9 Shrinkage 1.10 Oil mark 1.11 Flow mark 1.12 Water mark 1.13 Burning 1.14 Silver strike 1.15 Shot-short/ inadequate injection 1.16 Black spot 1.17 Release mark

	1.18 Color defect 1.19 Crazing
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 Production target is ensured from shift supervisor 1.1 Parameters are reviewed in case of product defects
2. Underpinning knowledge	2.1 Production target 2.2 Cycle time for production sequence 2.3 QC Process chart 2.4 Parameters 2.5 Product defects and remedies 2.6 Flashes
3. Underpinning skills	3.1 Ensuring raw material 3.2 Operating production
4. Required attitudes	4.1 Commitment to occupational safety and health. 4.2 Promptness in carrying out activities. 4.3 Sincere and honest to duties. 4.4 Eagerness to learn the document preparation process. 4.5 Tidiness and timeliness. 4.6 Environmental concerns. 4.7 Respect for the rights of peers, subordinates and seniors at the workplace. 4.8 Communication with peers, subordinates and seniors in the workplace. 4.9 Keeps a clean and orderly workplace and equipment.
5. Resource implication	The following resources must be provided: 5.1 Workplace (actual or simulated). 5.2 Tools, equipment and physical facilities appropriate to perform activities. 5.3 Materials consumable to perform activities.
6. Methods of assessment	Methods of assessment may include but not limited to: 6.1 Written test 6.2 Demonstration 6.3 Oral questioning

7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited center. 7.2 Assessment should be done by NSDA certified/ nominated assessor

Accreditation Requirements

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Unit Code and Title	**OU-LE-PIMMO-04-L2-V1: Perform Post-Production Activities**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to perform post-production activities. This specifically includes the techniques for attaching accessories, stacking products, generating reports, performing work handover, and cleaning working area.
Nominal Hours	**20 Hours**
Elements of Competency	**Performance Criteria** **Bold & Underlined** terms are elaborated in the Range of Variables
1. Attach accessories	1.1 Sticker and/or label is attached as per product requirement 1.2 **Accessories** are attached as per product requirement
2. Stack products	2.1 Good products are kept as per product requirement 2.2 Bad products are kept on designated place
3. Generate reports	3.1 Machine actual count verses physical product quantity report is generated 3.2 Defective product quantity report is generated 3.3 Flash and purging quantity report is generated 3.4 Reports are handed over to shift supervisor
4. Perform Work Handover	4.1 Machine, mould and materials are handed over to next shift operator on running condition 4.2 QC process chart is Handed over to next shift operator 4.3 Any abnormality related to machine, mould and product quality are informed to next shift operator
5. Clean working area	5.1 Machine is cleaned as per SOP 5.2 Mould is cleaned as per SOP 5.3 Auto loader filter is cleaned as per SOP 5.4 Hopper magnate is cleaned as per SOP 5.5 Machine surrounding area is cleaned as per SOP 5.6 Any materials on floor are collected and handed over to material section with report.
Range of Variables	
Variable	**Range** (may include but not limited to):

1. Accessories	1.1 Bucket handle 1.2 Jug lid 1.3 Rack cap 1.4 Stopper 1.5 Gasket 1.6 Ribbon 1.7 Foil
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of the current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 Attached accessories 1.2 Stacked products 1.3 Generated reports 1.4 Handed over machine, mould and materials to next shift operator on running condition 1.5 Cleaned working area
2. Underpinning knowledge	2.1 Sticker and label 2.2 Accessories of products 2.3 Good and bad products 2.4 Machine actual count verses physical product quantity report 2.5 Defective product quantity report 2.6 Flash and purging quantity report 2.7 QC process chart 2.8 Standard Operating Process (SOP)
3. Underpinning skills	3.1 Attaching accessories 3.2 Stacking products 3.3 Generating reports 3.4 Performing Handover 3.5 Cleaning working area
4. Required attitudes	4.1 Commitment to occupational safety and health. 4.2 Promptness in carrying out activities. 4.3 Sincere and honest to duties. 4.4 Eagerness to learn the document preparation process. 4.5 Tidiness and timeliness. 4.6 Environmental concerns. 4.7 Respect for the rights of peers, subordinates and seniors at the workplace. 4.8 Communication with peers, subordinates and seniors in the workplace. 4.9 Keeps a clean and orderly workplace and equipment.

5. Resource implication	The following resources must be provided: 5.1 Workplace (actual or simulated). 5.2 Tools, equipment and physical facilities appropriate to perform activities. 5.3 Materials consumable to perform activities.
6. Methods of assessment	Methods of assessment may include but not limited to: 6.1 Written test 6.2 Demonstration 6.3 Oral questioning
7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited center. 7.2 Assessment should be done by NSDA certified/ nominated assessor

Accreditation Requirements

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Development of Competency Standard

The Competency Standards for National Skills Certificate in Plastic Injection Moulding Machine Operation, Level-2 is developed by NSDA on 13-17 November 2022.

List of Members

S/N	Name and Address	Position in the committee
1.	Mohammad Shahidullah, Lecturer, BIPET, Cell: 01974094201, Email: shahidullahmcam@gmail. com	Member
2.	Md. Altaf Hossain, Lecturer, BIPET, Cell: 01927923022, Email: altaf19501950@gmail.com	Member
3.	Mohammad Jafar Ikbal, Trainer & Manufacturing Expert (Plastic), BIPET, Cell : 01717578381, Email : jafar.rfl@gmail.com	Member
4.	Mr. Bimol Chandra Das. Asst. Production Manager. Bengal Polymer Wars Ltd. Cell: 01936009453. 01642115713, Email: bimouldas2995@gmail.com	Member
5.	MD Abul Kalam, injection moulding machine operator, Luna Polimar, Cell: 01949379145, Email: mdraselahmed191@gmail.com	Member
6.	Md.Raju Ahmed, Injection Moulding Machine Operator, Zihan Toy Ind, Cell:01777443823, Email: rajukhan.magura@gmail.com	Member
7.	Md. Faruk Mia, Injection Moulding Machine Operator, Luna Polymer, Cell: 01914734099, Email: nostojibonfaruk@gmail.com	Member
8.	Soumitra Mondal, Assistant Secretary, BPGMEA, Cell: 01521241994, Email: smbpgmea@gmail.com	Member
9.	Mahbub Huda, Consultant, Specialist, NSDA, Email: huda73@gmail.com, Mobile: 01735490491.	Member

Validation of Competency Standard

The Competency Standards for National Skills Certificate in Plastic Injection Moulding Machine Operation, Level-3 is validated by NSDA on 19 December 2022.

Members of the SCVC

S/N	Name and Address	Position in the committee	Signature and Date
1.	Md. Abdur Razzaque, Chairman, LEISC, 38 Tipu Sultan Road, Dhaka-1203, Mobile: 01819-245588, Email: smc3155@gmail.com	Chairperson	
2.	Shamim Ahmed, President, BPGMEA, Paltan Tower, 87 Purana Paltan Line, Dhaka. Cell: 01711542273, Email: Shamim.tvt@gmail .com	Member	
3.	KM Iqbal Hossain, Vice President, BPGMEA, Paltan Tower, 87 Purana Paltan Line, Dhaka. Cell:01713030289, Email: iqbalhossain1954@gmail.com	Member	
4.	Engr. Md. Shahidul Haque, Principal, BIPET, Paltan Tower, 87 Purana Paltan Line, Dhaka. Cell: 01711462710, Email: shahidulhaque2009@hotmail.com	Member	
5.	Mohammad Shahidullah, Lecturer, BIPET, Cell: 01974094201, Email: shahidullahmcam@gmail. com	Member	
6.	Mohammad Jafar Ikbal, Trainer & Manufacturing Expert (Plastic), BIPET, Cell: 01717578381, Email: jafar.rfl@gmail.com	Member	
7.	Soumitra Mondal, Assistant Secretary, BPGMEA, Cell: 01521241994, Email: smbpgmea@gmail.com	Member	
8.	Mahbub Huda, Consultant, Specialist, NSDA, Email: huda73@gmail.com, Mobile: 01735490491.	Member	