

# TRAINING REGULATIONS

## PLASTIC MACHINE OPERATION NC III



### **AUTOMOTIVE (MANUFACTURING SUB-SECTOR)**

**TECHNICAL EDUCATION AND SKILLS DEVELOPMENT AUTHORITY**

East Service Road, South Superhighway, Taguig City, Metro Manila

*Technical Education and Skills Development Act of 1994  
(Republic Act No. 7796)*

**Section 22, “Establishment and Administration of the National Trade Skills Standards” of the RA 7796 known as the TESDA Act mandates TESDA to establish national occupational skill standards. The Authority shall develop and implement a certification and accreditation program in which private industry group and trade associations are accredited to conduct approved trade tests, and the local government units to promote such trade testing activities in their respective areas in accordance with the guidelines to be set by the Authority.**

The Training Regulations (TR) serve as basis for the:

1. Competency assessment and certification;
2. Registration and delivery of training programs; and
3. Development of curriculum and assessment instruments.

Each TR has four sections:

- Section 1 Definition of Qualification - refers to the group of competencies that describes the different functions of the qualification.
- Section 2 Competency Standards - gives the specifications of competencies required for effective work performance.
- Section 3 Training Standards - contains information and requirements in designing training program for certain Qualification. It includes curriculum design, training delivery; trainee entry requirements; tools, equipment and materials; training facilities; trainer's qualification; and institutional assessment.
- Section 4 National Assessment and Certification Arrangements - describes the policies governing assessment and certification procedure

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# TRAINING REGULATIONS FOR PLASTIC MACHINE OPERATION NC III

## SECTION 1 PLASTIC MACHINE OPERATION NC III QUALIFICATION

The PLASTIC MACHINE OPERATION NC III Qualification consists of competencies that a person must achieve to change equipment dies, prepare and start equipment for production and produce injection molded products. It also include competency to produce blow molded products. Likewise the person involved in this qualification is in-charge of overall equipment set-up and readiness-check for production operation.

This Qualification is packaged from the competency map of the Automotive Industry (Manufacturing sector) as shown in Annex A.

The Units of Competency comprising this Qualification include the following:

<b>Code No.</b>	<b>BASIC COMPETENCIES</b>
500311109	Lead workplace communication
500311110	Lead small teams
500311111	Develop and practice negotiation skills
500311112	Solve problems related to work activities
500311113	Use mathematical concepts and techniques
500311114	Use relevant technologies

<b>Code No.</b>	<b>COMMON COMPETENCIES</b>
ALT742201	Read, Interpret and Apply Engineering Drawings
ALT311202	Perform Mensuration and Calculation
ALT723203	Read, Interpret and Apply Specifications and Manuals
ALT723205	Perform Shop Maintenance

<b>Code No.</b>	<b>CORE COMPETENCIES</b>
ALT823308	Change Equipment Dies
ALT823309	Prepare and Start Equipment for Production
ALT823310	Produce Injection Molded Products
ALT823311	Produce Blow Molded Products

A person who has achieved this Qualification is competent to be:

- Plastic Machine Operation Team Leader; or
- Plastic Machine Operation Supervisor

## SECTION 2 COMPETENCY STANDARDS

This section gives the details of the contents of the basic, common and core units of competency required in PLASTIC MACHINE OPERATION NC III.

### BASIC COMPETENCIES

**UNIT OF COMPETENCY** : **LEAD WORKPLACE COMMUNICATION**

**UNIT CODE** : **500311109**

**UNIT DESCRIPTOR** : This unit covers the knowledge, skills and attitudes required to lead in the dissemination and discussion of ideas, information and issues in the workplace.

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b> <i>Italicized terms</i> are elaborated in the Range of Variables
1. Communicate information about workplace processes	1.1 Appropriate <b><i>communication method</i></b> is selected 1.2 Multiple operations involving several topics areas are communicated accordingly 1.3 Questions are used to gain extra information 1.4 Correct sources of information are identified 1.5 Information is selected and organized correctly 1.6 Verbal and written reporting is undertaken when required 1.7 Communication skills are maintained in all situations
2. Lead workplace discussions	2.1 Response to workplace issues are sought 2.2 Response to workplace issues are provided immediately 2.3 Constructive contributions are made to workplace discussions on such issues as production, quality and safety 2.4 Goals/objectives and action plan undertaken in the workplace are communicated
3. Identify and communicate issues arising in the workplace	3.1 Issues and problems are identified as they arise 3.2 Information regarding problems and issues are organized coherently to ensure clear and effective communication 3.3 Dialogue is initiated with appropriate personnel 3.4 Communication problems and issues are raised as they arise

## RANGE OF VARIABLES

VARIABLE	RANGE
1. Methods of communication	1.1 Non-verbal gestures 1.2 Verbal 1.3 Face to face 1.4 Two-way radio 1.5 Speaking to groups 1.6 Using telephone 1.7 Written 1.8 Internet

## EVIDENCE GUIDE

<p>1. Critical aspects of competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> <li>1.1 Dealt with a range of communication/information at one time</li> <li>1.2 Made constructive contributions in workplace issues</li> <li>1.3 Sought workplace issues effectively</li> <li>1.4 Responded to workplace issues promptly</li> <li>1.5 Presented information clearly and effectively written form</li> <li>1.6 Used appropriate sources of information</li> <li>1.7 Asked appropriate questions</li> <li>1.8 Provided accurate information</li> </ul>
<p>2. Underpinning knowledge</p>	<ul style="list-style-type: none"> <li>2.1 Organization requirements for written and electronic communication methods</li> <li>2.2 Effective verbal communication methods</li> </ul>
<p>3. Underpinning skills</p>	<ul style="list-style-type: none"> <li>3.1 Organize information</li> <li>3.2 Understand and convey intended meaning</li> <li>3.3 Participate in variety of workplace discussions</li> <li>3.4 Comply with organization requirements for the use of written and electronic communication methods</li> </ul>
<p>4. Resource implications</p>	<p>The following resources <b>MUST</b> be provided:</p> <ul style="list-style-type: none"> <li>4.1 Variety of Information</li> <li>4.2 Communication tools</li> <li>4.3 Simulated workplace</li> </ul>
<p>5. Method of assessment</p>	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> <li>5.1 Competency in this unit must be assessed through</li> <li>5.2 Direct Observation</li> <li>5.3 Interview</li> </ul>
<p>6. Context of assessment</p>	<ul style="list-style-type: none"> <li>6.1 Competency may be assessed in the workplace or in simulated workplace environment</li> </ul>



**UNIT OF COMPETENCY** : **LEAD SMALL TEAMS**

**UNIT CODE** : **500311110**

**UNIT DESCRIPTOR** : This unit covers the knowledge, skills and attitudes to lead small teams including setting and maintaining team and individual performance standards.

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b> <i>Italicized terms</i> are elaborated in the Range of Variables
1. Provide team leadership	1.1 <b>Work requirements</b> are identified and presented to team members 1.2 Reasons for instructions and requirements are communicated to team members 1.3 <b>Team members' queries and concerns</b> are recognized, discussed and dealt with
2. Assign responsibilities	2.1 Duties, and responsibilities are allocated having regard to the skills, knowledge and aptitude required to properly undertake the assigned task and according to company policy 2.2 Duties are allocated having regard to individual preference, domestic and personal considerations, whenever possible
3. Set performance expectations for team members	3.1 Performance expectations are established based on client needs and according to assignment requirements 3.2 Performance expectations are based on individual team members duties and area of responsibility 3.3 Performance expectations are discussed and disseminated to individual team members
4. Supervised team performance	4.1 <b>Monitoring of performance</b> takes place against defined performance criteria and/or assignment instructions and corrective action taken if required 4.2 Team members are provided with <b>feedback</b> , positive support and advice on strategies to overcome any deficiencies 4.3 <b>Performance issues</b> which cannot be rectified or addressed within the team are referenced to appropriate personnel according to employer policy 4.4 Team members are kept informed of any changes in the priority allocated to assignments or tasks which might impact on client/customer needs and satisfaction 4.5 Team operations are monitored to ensure that employer/client needs and requirements are met 4.6 Follow-up communication is provided on all issues affecting the team 4.7 All relevant documentation is completed in accordance with company procedures

## RANGE OF VARIABLES

VARIABLE	RANGE
1. Work requirements	1.1 Client Profile 1.2 Assignment instructions
2. Team member's concerns	2.1 Roster/shift details
3. Monitor performance	3.1 Formal process 3.2 Informal process
4. Feedback	4.1 Formal process 4.2 Informal process
5. Performance issues	5.1 Work output 5.2 Work quality 5.3 Team participation 5.4 Compliance with workplace protocols 5.5 Safety 5.6 Customer service

## EVIDENCE GUIDE

<p>1. Critical aspects of competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> <li>1.1 Maintained or improved individuals and/or team performance given a variety of possible scenario</li> <li>1.2 Assessed and monitored team and individual performance against set criteria</li> <li>1.3 Represented concerns of a team and individual to next level of management or appropriate specialist and to negotiate on their behalf</li> <li>1.4 Allocated duties and responsibilities, having regard to individual's knowledge, skills and aptitude and the needs of the tasks to be performed</li> <li>1.5 Set and communicated performance expectations for a range of tasks and duties within the team and provided feedback to team members</li> </ul>
<p>2. Underpinning knowledge</p>	<ul style="list-style-type: none"> <li>2.1 Company policies and procedures</li> <li>2.2 Relevant legal requirements</li> <li>2.3 How performance expectations are set</li> <li>2.4 Methods of Monitoring Performance</li> <li>2.5 Client expectations</li> <li>2.6 Team member's duties and responsibilities</li> </ul>
<p>3. Underpinning skills</p>	<ul style="list-style-type: none"> <li>3.1 Communication skills required for leading teams</li> <li>3.2 Informal performance counseling skills</li> <li>3.3 Team building skills</li> <li>3.4 Negotiating skills</li> </ul>
<p>4. Resource implications</p>	<p>The following resources <b>MUST</b> be provided:</p> <ul style="list-style-type: none"> <li>4.1 Access to relevant workplace or appropriately simulated environment where assessment can take place</li> <li>4.2 Materials relevant to the proposed activity or task</li> </ul>
<p>5. Method of assessment</p>	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> <li>5.1 Direct observations of work activities of the individual member in relation to the work activities of the group</li> <li>5.2 Observation of simulation and/or role play involving the participation of individual member to the attainment of organizational goal</li> <li>5.3 Case studies and scenarios as a basis for discussion of issues and strategies in teamwork</li> </ul>
<p>6. Context of assessment</p>	<ul style="list-style-type: none"> <li>6.1 Competency assessment may occur in workplace or any appropriately simulated environment</li> <li>6.2 Assessment shall be observed while task are being undertaken whether individually or in-group</li> </ul>

**UNIT OF COMPETENCY: DEVELOP AND PRACTICE NEGOTIATION SKILLS****UNIT CODE : 500311111****UNIT DESCRIPTOR** : This unit covers the skills, knowledge and attitudes required to collect information in order to negotiate to a desired outcome and participate in the negotiation.

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b> <i>Italicized terms</i> are elaborated in the Range of Variables
1. Plan negotiations	1.1 Information on <b><i>preparing for negotiation</i></b> is identified and included in the plan 1.2 Information on creating <b><i>non verbal environments</i></b> for positive negotiating is identified and included in the plan 1.3 Information on <b><i>active listening</i></b> is identified and included in the plan 1.4 Information on different <b><i>questioning techniques</i></b> is identified and included in the plan 1.5 Information is checked to ensure it is correct and up-to-date
2. Participate in negotiations	2.1 Criteria for successful outcome are agreed upon by all parties 2.2 Desired outcome of all parties are considered 2.3 Appropriate language is used throughout the negotiation 2.4 A variety of questioning techniques are used 2.5 The issues and processes are documented and agreed upon by all parties 2.6 Possible solutions are discussed and their viability assessed 2.7 Areas for agreement are confirmed and recorded 2.8 Follow-up action is agreed upon by all parties

## RANGE OF VARIABLES

VARIABLE	RANGE
1. Preparing for negotiation	1.1 Background information on other parties to the negotiation 1.2 Good understanding of topic to be negotiated 1.3 Clear understanding of desired outcome/s 1.4 Personal attributes 1.4.1 self awareness 1.4.2 self esteem 1.4.3 objectivity 1.4.4 empathy 1.4.5 respect for others 1.5 Interpersonal skills 1.5.1 listening/reflecting 1.5.2 non verbal communication 1.5.3 assertiveness 1.5.4 behavior labeling 1.5.5 testing understanding 1.5.6 seeking information 1.5.7 self disclosing 1.6 Analytic skills 1.6.1 observing differences between content and process 1.6.2 identifying bargaining information 1.6.3 applying strategies to manage process 1.6.4 applying steps in negotiating process 1.6.5 strategies to manage conflict 1.6.6 steps in negotiating process 1.6.7 options within organization and externally for resolving conflict
2. Non verbal environments	2.1 Friendly reception 2.2 Warm and welcoming room 2.3 Refreshments offered 2.4 Lead in conversation before negotiation begins
3. Active listening	3.1 Attentive 3.2 Don't interrupt 3.3 Good posture 3.4 Maintain eye contact 3.5 Reflective listening
4. Questioning techniques	4.1 Direct 4.2 Indirect 4.3 Open-ended

## EVIDENCE GUIDE

1. Critical aspects of competency	<p>Assessment requires evidence that the candidate:</p> <p>1.1 Demonstrated sufficient knowledge of the factors influencing negotiation to achieve agreed outcome</p> <p>1.2 Participated in negotiation with at least one person to achieve an agreed outcome</p>
2. Underpinning knowledge and Attitude	<p>2.1 Codes of practice and guidelines for the organization</p> <p>2.2 Organizations policy and procedures for negotiations</p> <p>2.3 Decision making and conflict resolution strategies procedures</p> <p>2.4 Problem solving strategies on how to deal with unexpected questions and attitudes during negotiation</p> <p>2.5 Flexibility</p> <p>2.6 Empathy</p>
3. Underpinning skills	<p>3.1 Interpersonal skills to develop rapport with other parties</p> <p>3.2 Communication skills (verbal and listening)</p> <p>3.3 Observation skills</p> <p>3.1 Negotiation skills</p>
4. Resource implications	<p>The following resources <b>MUST</b> be provided:</p> <p>4.1 Room with facilities necessary for the negotiation process</p> <p>4.2 Human resources (negotiators)</p>
5. Method of assessment	<p>Competency may be assessed through:</p> <p>5.1 Observation/demonstration and questioning</p> <p>5.2 Portfolio assessment</p> <p>5.3 Oral and written questioning</p> <p>5.4 Third party report</p>
6. Context of assessment	<p>6.1 Competency to be assessed in real work environment or in a simulated workplace setting.</p>

**UNIT OF COMPETENCY : SOLVE PROBLEMS RELATED TO WORK ACTIVITIES**

**UNIT CODE : 500311112**

**UNIT DESCRIPTOR :** This unit of competencies covers the knowledge, skills and attitudes required to solve problems in the workplace including the application of problem solving techniques and to determine and resolve the root cause of problems.

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b> <i>Italicized terms</i> are elaborated in the Range of Variables
1. Identify the problem	1.1 Variances are identified from normal operating parameters; and product quality 1.2 Extent, cause and nature are of the problem are defined through observation, investigation and <b>analytical techniques</b> 1.3 <b>Problems</b> are clearly stated and specified
2. Determine fundamental causes of the problem	2.1 Possible causes are identified based on experience and the use of problem solving tools / analytical techniques. 2.2 Possible cause statements are developed based on findings 2.3 Fundamental causes are identified per results of investigation conducted
3. Determine corrective action	3.1 All possible options are considered for resolution of the problem 3.2 Strengths and weaknesses of possible options are considered 3.3 Corrective actions are determined to resolve the problem and possible future causes 3.4 <b>Action plans</b> are developed identifying measurable objectives, resource needs and timelines in accordance with safety and operating procedures
4. Provide recommendation/s to manager	4.1 Report on recommendations are prepared 4.2 Recommendations are presented to appropriate personnel. 4.3 Recommendations are followed-up, if required

## RANGE OF VARIABLES

VARIABLE	RANGE
1. Analytical techniques	1.1 Brainstorming 1.2 Intuitions/Logic 1.3 Cause and effect diagrams 1.4 Pareto analysis 1.5 SWOT analysis 1.6 Gant chart, Pert CPM and graphs 1.7 Scattergrams
2. Problem	2.1 Non – routine process and quality problems 2.2 Equipment selection, availability and failure 2.3 Teamwork and work allocation problem 2.4 Safety and emergency situations and incidents
3. Action plans	3.1 Priority requirements 3.2 Measurable objectives 3.3 Resource requirements 3.4 Timelines 3.5 Co-ordination and feedback requirements 3.6 Safety requirements 3.7 Risk assessment 3.8 Environmental requirements



## EVIDENCE GUIDE

<p>1. Critical aspects of competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> <li>1.1 Identified the problem</li> <li>1.2 Determined the fundamental causes of the problem</li> <li>1.3 Determined the correct / preventive action</li> <li>1.4 Provided recommendation to manager</li> </ul> <p>These aspects may be best assessed using a range of scenarios / case studies / what ifs as a stimulus with a walk through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations that may have happened.</p>
<p>2. Underpinning knowledge</p>	<ul style="list-style-type: none"> <li>2.1 Competence includes a thorough knowledge and understanding of the process, normal operating parameters, and product quality to recognize non-standard situations</li> <li>2.2 Competence to include the ability to apply and explain, sufficient for the identification of fundamental cause, determining the corrective action and provision of recommendations <ul style="list-style-type: none"> <li>2.2.1 Relevant equipment and operational processes</li> <li>2.2.2 Enterprise goals, targets and measures</li> <li>2.2.3 Enterprise quality, OHS and environmental requirement</li> <li>2.2.4 Principles of decision making strategies and techniques</li> <li>2.2.5 Enterprise information systems and data collation</li> <li>2.2.6 Industry codes and standards</li> </ul> </li> </ul>
<p>3. Underpinning skills</p>	<ul style="list-style-type: none"> <li>3.1 Using range of formal problem solving techniques</li> <li>3.2 Identifying and clarifying the nature of the problem</li> <li>3.3 Devising the best solution</li> <li>3.4 Evaluating the solution</li> <li>3.5 Implementation of a developed plan to rectify the problem</li> </ul>

4. Resource implications	4.1 Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios / case studies / what ifs will be required as well as bank of questions which will be used to probe the reason behind the observable action.
5. Method of assessment	<p>Competency may be assessed through:</p> <p>5.1 Case studies on solving problems in the workplace</p> <p>5.2 Observation</p> <p>The unit will be assessed in a holistic manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations, which will include disruptions to normal, smooth operation. Simulation may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual workplace and will include walk through of the relevant competency components.</p>
6. Context of assessment	6.1 In all workplace, it may be appropriate to assess this unit concurrently with relevant teamwork or operation units.

**UNIT OF COMPETENCY: USE MATHEMATICAL CONCEPTS AND TECHNIQUES**

**UNIT CODE : 500311113**

**UNIT DESCRIPTOR :** This unit covers the knowledge, skills and attitudes required in the application of mathematical concepts and techniques.

<b>ELEMENT</b>	<b>Performance Criteria</b> <i>Italicized terms</i> are elaborated in the Range of Variables
1. Identify mathematical tools and techniques to solve problem	1.1 Problem areas are identified based on given condition 1.2 <b>Mathematical techniques</b> are selected based on the given problem
2. Apply mathematical procedure/solution	2.1 Mathematical techniques are applied based on the problem identified 2.2 Mathematical computations are performed to the level of accuracy required for the problem 2.3 Results of mathematical computation is determined and verified based on job requirements
3. Analyze results	3.1 Result of application is reviewed based on expected and required specifications and outcome 3.2 <b>Appropriate action</b> is applied in case of error

## RANGE OF VARIABLES

VARIABLE	RANGE
1. Mathematical techniques	May include but are not limited to: 1.1 Four fundamental operations 1.2 Measurements 1.3 Use/Conversion of units of measurements 1.4 Use of standard formulas
2. Appropriate action	2.1 Review in the use of mathematical techniques (e.g. recalculation, re-modeling) 2.2 Report error to immediate superior for proper action

## EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Identified, applied and reviewed the use of mathematical concepts and techniques to workplace problems
2. Underpinning knowledge	2.1 Fundamental operation (addition, subtraction, division, multiplication) 2.2 Measurement system 2.3 Precision and accuracy 2.4 Basic measuring tools/devices
3. Underpinning skills	3.1 Applying mathematical computations 3.2 Using calculator 3.3 Using different measuring tools
4. Resource implications	The following resources <b>MUST</b> be provided: 4.1 Calculator 4.2 Basic measuring tools 4.3 Case Problems
5. Method of assessment	Competency may be assessed through: 5.1 Authenticated portfolio 5.2 Written Test 5.3 Interview/Oral Questioning 5.4 Demonstration
6. Context of assessment	6.1 Competency may be assessed in the work place or in a simulated work place setting

**UNIT OF COMPETENCY: USE RELEVANT TECHNOLOGIES****UNIT CODE : 500311114****UNIT DESCRIPTOR** : This unit of competency covers the knowledge, skills, and attitude required in selecting, sourcing and applying appropriate and affordable technologies in the workplace.

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b> <i>Italicized terms</i> are elaborated in the Range of Variables
1. Study/select appropriate technology	1.1 Usage of different <b>technologies</b> is determined based on job requirements 1.2 Appropriate technology is selected as per work specification
2. Apply relevant technology	2.1 Relevant technology is effectively used in carrying out function 2.2 Applicable software and hardware are used as per task requirement 2.3 <b>Management concepts</b> are observed and practiced as per established industry practices
3. Maintain/enhance of relevant technology	3.1 Maintenance of technology is applied in accordance with the <b>industry standard operating procedure, manufacturer's operating guidelines</b> and <b>occupational health and safety procedure</b> to ensure its operative ability 3.2 Updating of technology is maintained through continuing education or training in accordance with job requirement 3.3 Technology failure/ defect is immediately reported to the concern/responsible person or section for <b>appropriate action</b>

## RANGE OF VARIABLES

VARIABLE	RANGE
1. Technology	May include but are not limited to: 1.1 Office technology 1.2 Industrial technology 1.3 System technology 1.4 Information technology 1.5 Training technology
2. Management concepts	May include but not limited to: 2.1 Real Time Management 2.2 KAIZEN or continuous improvement 2.3 5s 2.4 Total Quality Management 2.5 Other management/productivity tools
3. Industry standard operating procedure	3.1 Written guidelines relative to the usage of office technology/equipment 3.2 Verbal advise/instruction from the co-worker
4. Manufacturer's operating guidelines/ instructions	4.1 Written instruction/manuals of specific technology/equipment 4.2 General instruction manual 4.3 Verbal advise from manufacturer relative to the operation of equipment
5. Occupational health and safety procedure	5.1 Relevant statutes on OHS 5.2 Company guidelines in using technology/equipment
6. Appropriate action	6.1 Implementing preventive maintenance schedule 6.2 Coordinating with manufacturer's technician

## EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Studied and selected appropriate technology consistent with work requirements 1.2 Applied relevant technology 1.3 Maintained and enhanced operative ability of relevant technology
2. Underpinning knowledge	2.1 Awareness on technology and its function 2.2 Repair and maintenance procedure 2.3 Operating instructions 2.4 Applicable software 2.5 Communication techniques 2.6 Health and safety procedure 2.7 Company policy in relation to relevant technology 2.8 Different management concepts 2.9 Technology adaptability
3. Underpinning skills	3.1 Relevant technology application/implementation 3.2 Basic communication skills 3.3 Software applications skills 3.4 Basic troubleshooting skills
4. Resource implications	The following resources <b>MUST</b> be provided: 4.1 Relevant technology 4.2 Interview and demonstration questionnaires 4.3 Assessment packages
5. Method of assessment	Competency must be assessed through: 5.1 Interview 5.2 Actual demonstration 5.3 Authenticated portfolio (related certificates of training/seminar)
6. Context of assessment	6.1 Competency may be assessed in actual workplace or simulated environment



**COMMON COMPETENCIES  
(AUTOMOTIVE MANUFACTURING-PARTS MANUFACTURING)**

**UNIT TITLE: READ, INTERPRET AND APPLY ENGINEERING DRAWINGS.**

**UNIT CODE: ALT742201**

**UNIT DESCRIPTOR:** This unit deals with identifying, interpreting and applying specification from engineering blue prints or drawings that provides the measurements of the product and pattern that is to be produced.

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
	<i>Italicized</i> terms are elaborated in the Range of Variables
1. Identify and access engineering drawings/ specification	1.1 Appropriate <b>engineering drawings</b> are identified and accessed as per job requirements. 1.2 Version and date of drawing is checked to ensure correct specification and procedure are identified.
2. Interpret drawings	2.1 Relevant dimensions and sections of the drawings/ specifications are located in relation to the work to be conducted 2.2 Information in the manual are interpreted in accordance to industry practices
3 Apply information in the drawings & specifications	3.1 Engineering drawing is interpreted according to job requirements 3.2 Work steps are correctly identified in accordance with the specifications in the drawings. 3.3 Dimensional <b>data</b> and shape are applied according to the given task
4. Store drawings	4.1 The drawings and specification are stored properly to ensure prevention of damage, ready access and updating of information when required in accordance with company requirements

## RANGE OF VARIABLES

VARIABLE	RANGE
1. Engineering drawings	Kinds of drawings: 1.1 Casting drawing 1.2 Machining drawing 1.3 Project plan 1.4 Technical drawing
2. Data	Data includes but not limited to 2.1 Material specifications 2.2 Process specifications 2.3 Special instructions 2.4 Machining locating points 2.5 Clamping points 2.6 Amount of draft 2.7 Surface finish

## EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Identified and accessed drawings/specification 1.2 Interpreted drawings 1.3 Applied information in drawings 1.4 Stored drawings
2. Underpinning knowledge and attitudes	2.1 Types of drawings used in automotive manufacturing industry 2.2 Identification of symbols used in the drawings 2.3 Identification of units of measurements 2.4 Unit conversion 2.5 Attention to details, Perseverance, Honesty
3. Underpinning skills	3.1 Reading and comprehension skills required to identify and interpret engineering drawings and specifications 3.2 Accessing information and data
4. Resource implications	The following resources <b>MUST</b> be provided: 4.1 All drawings/engineering specifications relative to automotive manufacturing 4.2 Job order, requisitions 4.3 Product sample
5. Method of assessment	Competency <b>MUST</b> be assessed through: 5.1 Observation with questioning 5.2 Interview
6. Context of assessment	6.1 Assessment must be undertaken in accordance with the endorsed TESDA assessment guidelines 6.2 Assessment may be conducted in the workplace or a simulated environment.

## UNIT OF COMPETENCY: PERFORM MENSURATION AND CALCULATION

UNIT CODE: ALT311202

**UNIT DESCRIPTOR:** This unit includes identifying, caring for, handling, using and maintaining measuring instruments.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables
1. Select measuring instruments	1.1 Object or component to be measured is identified 1.2 Correct specifications are obtained from relevant source 1.3 Appropriate <b><i>measuring instrument</i></b> is selected according to job requirements
2. Carry out measurements and calculation	2.1 Measuring tools are selected in line with job requirements 2.2 Accurate measurements are obtained to job 2.3 <b><i>Calculation</i></b> needed to complete work tasks are performed using the four basic process of addition (+), subtraction (-), multiplication (x) and division (/). 2.4 Calculations involving fractions, percentages and mixed numbers are used to complete workplace tasks. 2.5 Numerical computation is self-checked and corrected for accuracy 2.6 Instruments are read to the limit of accuracy of the tool.
3. Maintain measuring instruments	3.1 Measuring instruments are kept free from corrosion 3.2 Measuring instruments are not dropped to avoid damage 3.3 Measuring instruments are cleaned before and after using.

## RANGE OF VARIABLES

VARIABLE	RANGE
1. Measuring instruments	Measuring instruments includes: 1.1 Multitester 1.2 Micrometer (In-out, depth) 1.3 Vernier caliper (Out, inside) 1.4 Dial Gauge with Mag. Std. 1.5 Straight Edge 1.6 Thickness gauge 1.7 Try square 1.8 Protractor 1.9 Height gauge 1.10 Steel rule 1.11 Shrink rule
2. Calculation	Kinds of part mensuration include: 2.1 Volume 2.2 Area 2.3 Displacement 2.4 Inside diameter 2.5 Circumference 2.6 Length 2.7 Thickness 2.8 Outside diameter 2.9 Taper 2.10 Out of roundness 2.11 Shrinkage allowance

## EVIDENCE GUIDE

1. Critical aspect of competency	Assessment requires evidence that the candidate: 1.1 Selected measuring instruments 1.2 Carried-out measurements and calculations. 1.3 Maintained measuring instruments
2. Underpinning knowledge and attitudes	2.1 Types of Measuring instruments and its uses 2.2 Safe handling procedures in using measuring instruments 2.3 Four fundamental operation of mathematics 2.4 Formula for Volume, Area, Perimeter and other geometric figures
3. Underpinning skills	3.1 Caring and Handling measuring instruments 3.2 Calibrating and using measuring instruments 3.3 Performing calculation by Addition, Subtraction, Multiplication and Division 3.4 Visualizing objects and shapes 3.5 Interpreting formula for volume, area, perimeter and other geometric figures
4. Resource implications	The following resources <b>MUST</b> be provided: 4.1 Workplace location 4.2 Measuring instrument appropriate to servicing processes 4.3 Instructional materials relevant to the propose activity
5. Method of assessment	Competency <b>MUST</b> be assessed through: 5.1 Observation with questioning 5.2 Written or oral examination 5.3 Interview 5.4 Demonstration with questioning
6. Context of assessment	6.1 Competency elements must be assessed in a safe working environment 6.1 Assessment may be conducted in a workplace or simulated environment

**UNIT TITLE: READ, INTERPRET AND APPLY SPECIFICATION AND MANUALS.**

**UNIT CODE: ALT723203**

**UNIT DESCRIPTOR:** This unit deals with identifying, interpreting and applying service specification manuals, maintenance procedure manuals and periodic maintenance manual.

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b> <i>Italicized</i> terms are elaborated in the Range of Variables
1. Identify and access manual/ specification	1.1 Appropriate <i>manuals</i> are identified and accessed as per job requirements. 1.2 Version and date of manual is checked to ensure correct specification and procedure are identified.
2. Interpret manuals	2.1 Relevant sections, chapters of manuals/specifications are located in relations to the work to be conducted 2.2 Information and procedure in the manual are interpreted in accordance to industry practices
3 Apply information in manual	3.1 Manual is interpreted according to job requirements 3.2 Work steps are correctly identified in accordance with manufacturer specification 3.3 Manual data is applied according to the given task 3.4 All correct sequencing and adjustments are interpreted in accordance with information contained on the manual or specifications
4. Store manuals	4.1 Manual or specification are stored appropriately to ensure prevention of damage, ready access and updating of information when required in accordance with company requirements

## RANGE OF VARIABLES

VARIABLE	RANGE
1. Manuals	Kinds of manuals: 1.1 Manufacturer's specification manual 1.2 Repair manual 1.3 Maintenance Procedure Manual 1.4 Periodic Maintenance Manual



## EVIDENCE GUIDE

<p>1. Critical aspects of competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> <li>1.1 Identified and accessed manual/specification</li> <li>1.2 Interpreted manuals</li> <li>1.3 Applied information in manuals</li> <li>1.4 Stored manuals</li> </ul>
<p>2. Underpinning knowledge and attitudes</p>	<ul style="list-style-type: none"> <li>2.1 Types of manuals used in automotive industry</li> <li>2.2 Identification of symbols used in the manuals</li> <li>2.3 Identification of units of measurements</li> <li>2.4 Unit conversion</li> </ul>
<p>3. Underpinning skills</p>	<ul style="list-style-type: none"> <li>3.1. Reading and comprehension skills required to identify and interpret automotive manuals and specifications</li> <li>3.1 . Accessing information and data</li> </ul>
<p>4 Resource Implications</p>	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> <li>4.1 All manuals/catalogues relative to Automotive</li> <li>4.2 Job order, requisitions</li> <li>4.3 Actual vehicle or simulator</li> </ul>
<p>5 Method of assessment</p>	<p>Competency must be assessed through:</p> <ul style="list-style-type: none"> <li>5.1 Observation with questioning</li> <li>5.2 Interview</li> </ul>
<p>6 Context of assessment</p>	<ul style="list-style-type: none"> <li>6.1 Assessment must be undertaken in accordance with the endorsed TESDA assessment guidelines</li> <li>6.2 Assessment may be conducted in the workplace or a simulated environment.</li> </ul>

**UNIT OF COMPETENCY : PERFORM SHOP MAINTENANCE**

**UNIT CODE : ALT723205**

**UNIT DESCRIPTOR :** This unit deals with inspecting and cleaning of work area including tools, equipment and facilities. Storage and checking of tools/ equipment and disposal of used supplies/materials are also incorporated in this competency.

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b> <i>Italicized terms</i> are elaborated in the Range of Variables
1. Inspect/clean tools and work area	1.1 Cleaning solvent used as per workshop/tools <b><i>cleaning requirement</i></b> 1.2 <b><i>Work area</i></b> is checked and cleaned 1.3 Wet surface/spot in work area is wiped and dried
2. Store/arrange tools and shop equipment	2.1 Tools/equipment are checked and stored in their respective shelves/location 2.2 Corresponding labels are posted and visible 2.3 Tools are safely secured and logged in the records
3. Dispose wastes/used lubricants	3.1 Containers for used lubricants are visibly labeled 3.2 Wastes/used lubricants are disposed as per workshop SOP
4. Report damaged tools/equipment	4.1 Complete inventory of tools/equipment is maintained 4.2 Damaged tools/equipment/facilities are identified and repair recommendation is given 4.3 Reports prepared has no error/discrepancy

## RANGE OF VARIABLES

VARIABLE	RANGE
1. Work area	Work areas include: <ol style="list-style-type: none"> <li>1.1 Workshop areas for servicing/repairing light and/or heavy vehicle and/or plant transmissions and/or outdoor power equipment</li> <li>1.2 Open workshop/garage and enclosed, ventilated office area</li> <li>1.3 Other variables may include workshop with:               <ul style="list-style-type: none"> <li>• Mess hall</li> <li>• Wash room</li> <li>• Comfort room</li> </ul> </li> </ol>
2. Cleaning requirement	<ol style="list-style-type: none"> <li>2.1 Cleaning solvent</li> <li>2.2 Inventory of supplies, tools, equipment, facilities</li> <li>2.3 List of mechanics/technicians</li> <li>2.4 Rags</li> <li>2.5 Broom</li> <li>2.6 Mop</li> <li>2.7 Pail</li> <li>2.8 Used oil container</li> <li>2.9 Oiler</li> <li>2.10 Dust/waste bin</li> </ol>
3. Manuals	<ol style="list-style-type: none"> <li>3.1 Vehicle/plant manufacturer specifications</li> <li>3.2 Company operating procedures</li> <li>3.3 Industry/Workplace Codes of Practice</li> <li>3.4 Product manufacturer specifications</li> <li>3.5 Customer requirements</li> <li>3.6 Industry Occupational Health and Safety</li> </ol>
4. Company standard operating procedure	Wearing of Personal protective equipment include: <ol style="list-style-type: none"> <li>4.1 Gloves</li> <li>4.2 Apron</li> <li>4.3 Goggles</li> <li>4.4 Safety shoes</li> </ol>

## EVIDENCE GUIDE

1. Critical aspects of competency	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> <li>1.1 Cleaned workshop tools/facilities</li> <li>1.2 Maintained equipment, tools and facilities</li> <li>1.3 Disposed wastes and used lubricants/fluid as per required procedure</li> </ul>
2. Underpinning knowledge and attitudes	<ul style="list-style-type: none"> <li>2.1 5 S or TQM</li> <li>2.2 Service procedures</li> <li>2.3 Relevant technical information</li> <li>2.4 Safe handling of equipment and tools</li> <li>2.5 Vehicle safety requirements</li> <li>2.6 Workshop policies</li> <li>2.7 Personal safety procedures</li> <li>2.8 Fire extinguishers and prevention</li> <li>2.9 Storage/disposal of hazardous/flammable materials</li> <li>2.10 Positive Work Values (Perseverance, Honesty, Patience, Attention to Details)</li> </ul>
3. Underpinning skills	<ul style="list-style-type: none"> <li>3.1 Handling/Storing of tools/equipment/supplies and material</li> <li>3.2 Cleaning grease/lubricants</li> <li>3.3 Disposing of wastes and fluid</li> <li>3.4 Preparing inventory of s/m and tools and equipment</li> <li>3.5 Monitoring of s/m and tools/equipment</li> </ul>
4. Resource implications	<p>The following resources <b>MUST</b> be provided:</p> <ul style="list-style-type: none"> <li>4.1 Workplace: Real or simulated work area</li> <li>4.2 Appropriate Tools &amp; equipment</li> <li>4.3 Materials relevant to the activity</li> </ul>
5. Method of assessment	<p>Competency <b>MUST</b> be assessed through:</p> <ul style="list-style-type: none"> <li>5.1 Written/Oral Questioning</li> <li>5.2 Demonstration</li> </ul>
6. Context of assessment	<ul style="list-style-type: none"> <li>6.1 Competency must be assessed on the job or in a simulated environment.</li> <li>6.2 The assessment of practical skills must take place after a period of supervised practice and repetitive experience.</li> </ul>

## CORE COMPETENCIES

### UNIT OF COMPETENCY: CHANGE EQUIPMENT DIES

**UNIT CODE** : ALT823308

**UNIT DESCRIPTOR** : This competency covers the removal and refitting of dies in preparation for production. It applies typically to the areas of the industry such as injection and blow molding.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgment.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables
1 Prepare to change dies	1.1 <b>Procedure</b> for machine close-down is followed and concerned personnel are informed as per workplace procedures. 1.2 Last-off samples are taken as required for die reports 1.3 Machine is shut down in accordance with workplace procedures and/or manufacturer's instructions 1.4 Isolating locks are activated, power is disconnected and relevant signage are posted as per workplace procedures 1.5 Dies or cores are selected to match product/ process specification 1.6 <b>Tools and equipment</b> are checked for safe, effective operation.
2 Change dies	2.1 Removal process is planned to ensure no injury to self or others, and damage equipment 2.2 Die is removed, cleaned and stored according to workplace procedures 2.3 Replacement die is fitted ensuring that locating devices and marks are matched and securing devices are installed and tightened to specification 2.4 Dies and immediate machinery are cleaned, corrosion protection applied if required.
3 Test fitting of dies	3.1 Machine is restarted as per procedure 3.2 Operation of die is checked against product quality specifications 3.3 Machine setting ranges is compared against documented requirements 3.4 First off sample is checked the for required standards 3.5 Settings and other production variables are fine-tuned as required 3.6 Variances between standard operating procedures and actual production run is noted 3.7 Workplace documentation is completed and reported to appropriate personnel.

4 Respond to problems	<p>4.1 Possible routine and non-routine <b>problems</b> in the equipment, materials or process are identified</p> <p>4.2 Problems needing action is determined according to workplace procedures</p> <p>4.3 Possible fault causes are determined according to workplace procedures</p> <p>4.4 Problems within area of responsibility are rectified using appropriate solutions</p> <p>4.5 Problems outside area of responsibility are reported to designated person.</p>
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## RANGE OF VARIABLES

VARIABLE	RANGE
1. Procedure	Procedure means all relevant: 1.1 Workplace procedures 1.2 Work instruction 1.3 Temporary instructions 1.4 Industry and government codes and standards
2. Tools and equipment	2.1 Hand carts and trolleys 2.2 hoist/lifting equipment 2.3 basic hand tools 2.4 PPE like gloves, hard hat, safety shoes
3. Problems	Typical problems include: 3.1 lack of cleaning leading to corrosion 3.2 Inadequate fitting 3.3 fine adjustments to optimize production

## EVIDENCE GUIDE

<p>1. Critical aspects of competency</p>	<p>It is essential that competence is demonstrated in the ability to perform a die-change which will put the injection molding machine back into full production of in-specification product in standard time.            Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> <li>1.1 Selected, installed and checked the performance of die and cores</li> <li>1.2 Located, interpreted and applied relevant information</li> <li>1.3 Maintained workplace records</li> <li>1.4 Identified and safely handled products and materials</li> <li>1.5 Applied safety precautions appropriate to the task</li> <li>1.6 Recognized potential situations requiring action and then implement appropriate action.</li> </ul>
<p>2. Underpinning knowledge and attitudes</p>	<ul style="list-style-type: none"> <li>2.1 Injection/blow molding materials, equipment and process</li> <li>2.2 Company's procedures and relevant regulatory requirements</li> <li>2.3 Explain:               <ul style="list-style-type: none"> <li>2.3.1 Impact of incorrect or faulty fitting</li> <li>2.3.2 Production workflow sequences</li> <li>2.3.3 Selection and use of equipment and procedures</li> <li>2.3.4 Hazards of the removal and fitting process and appropriate hazard control procedures</li> <li>2.3.5 The performance of dies</li> <li>2.3.6 Relevant information and workplace records</li> <li>2.3.7 Safety precautions appropriate to the task</li> </ul> </li> <li>2.4 Causes of faults like faulty equipment, inadequate fitting/adjustment and incorrect process variables like temperature and pressure.</li> </ul>
<p>3. Underpinning skills</p>	<ul style="list-style-type: none"> <li>3.1 Plan own work including predicting consequences and identifying improvements</li> <li>3.2 Using PPE, safe handling products and materials, reading relevant safety information and applying safety precautions appropriate to the task.</li> <li>3.3 Starting up equipment and making appropriate adjustments to bring process on line</li> <li>3.4 Taking samples when required and identifying product out of specifications</li> <li>3.5 Shutting down equipment in normal or abnormal circumstances</li> <li>3.6 Identifying factors which may affect product quality or production output and appropriate remedies</li> <li>3.7 Identifying and describing own role and role of others involved directly in the process</li> </ul>
<p>4. Resource implications</p>	<p>The following resources <b>MUST</b> be provided:</p> <ul style="list-style-type: none"> <li>4.1 Access to an operating plant or equipment</li> <li>4.2 Tools, equipment and workplace relevant with the requirements for the job.</li> <li>4.3 Supplies and consumable materials</li> <li>4.4 Engineering manuals relevant to the task to be performed</li> </ul>
<p>5. Method of assessment</p>	<p>Competency <b>MUST</b> be assessed through:</p> <ul style="list-style-type: none"> <li>5.1 Direct Observation with questioning</li> <li>5.2 Portfolio</li> </ul>
<p>6. Context of assessment</p>	<p>Competency may be assessed individually in the actual workplace or a simulated workplace environment.</p>



**UNIT OF COMPETENCY** : **PREPARE AND START EQUIPMENT FOR PRODUCTION**

**UNIT CODE** : **ALT823309**

**UNIT DESCRIPTOR** : This competency covers the pre-start preparations and start-up operations to bring a production machine from 'power-off' to first-off product and handover to the operator to continue the production run (for Injection and blow molding machine).  
This competency is typically performed by senior operators working either independently or as part of a work team.

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b> <i>Italicized</i> terms are elaborated in the Range of Variables
1. Perform pre-start checks	1.1 Emergency stops, guards, controls are checked in accordance with workplace <b>procedures</b> 1.2 Copy of the product data sheet is collected 1.3 Requirements for materials, quality, production run are identified 1.4 Head/die bolts, etc, are retightened as required 1.5 Equipment set-up is checked in accordance with workplace procedures
2. Carry out pre-start operations	2.1 Power is restored to the machine and ancillary equipment as per workplace procedures and/or manufacturer's instruction 2.2 Ancillary equipment/heater circuit is started up and the temperature and other controllers to the condition stated on the setup information card is set in accordance with workplace procedures and/or manufacturer's instruction 2.3 <b>Machine settings</b> is checked against setup information card and machine switch on in accordance with workplace procedures and/or manufacturer's instruction 2.4 <b>Machine</b> is brought to operational readiness in accordance with workplace procedures 2.5 Material is selected and loaded in accordance with workplace procedures 2.6 Machine is charged, purged and cleaned as required.
3. Start machine and hand over to operator	3.1 Machine is started and checked in accordance with workplace procedures and/or manufacturer's instruction 3.2 Machine is adjusted to bring to machine to operational speed/condition, as required 3.3 Machine is checked and ran until a quality product is obtained 3.4 Adjustments to machine and extra equipment is made in line to produce an acceptable product 3.5 Required adjustments are made to ensure the machine and its <b>upstream and downstream extra equipment</b> in line are in balance 3.6 Operator is given all necessary instructions and machine is handed over to the operator

## RANGE OF VARIABLES

VARIABLE	RANGE
1. Procedures	1.1 Workplace procedures 1.2 Work instructions 1.3 Instructions and relevant industry and government codes and standards
2. Machine setting	2.1 basic controls 2.2 shot size and correction capacity 2.3 injection speed 2.4 screw position 2.5 injection pressure 2.6 screw back time 2.7 melt decompress position 2.8 sprue break
3. Machine	3.1 Injection molding machine 3.2 Blow molding machine
4. Upstream and downstream extra equipment	4.1 Electrical, pneumatic, mechanical, electromechanical and hydraulic injection molding machines and components such as base, frame, feed hoppers and material supply mechanisms, barrel and screw plastification unit, injection units, die/mould tool 4.2 Additional equipment including chillers/cooling towers, die heating equipment, hopper driers, mixing hoppers, dehumidifying driers, air compressors, dosing machines, color blending equipment and conveyors where they are integral to the operation of the injection molder 4.3 Hand tools used in the injection molding process 4.4 Material loading equipment used for loading of raw materials like belt or steel conveyor 4.5 Relevant personal protective equipment like gloves, safety shoes, hard hat, face shield

## EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: <ul style="list-style-type: none"> <li>1.1 Performed pre-start checks</li> <li>1.2 Carried out pre-start operations</li> <li>1.3 Started machine and handed over to operator</li> </ul>
2. Underpinning knowledge and attitudes	2.1 Materials, equipment and process sufficient to recognize out-of-specification process problems and equipment 2.2 Company's procedures and relevant regulatory requirements 2.3 Explain: <ul style="list-style-type: none"> <li>2.3.1 machine construction</li> <li>2.3.2 machine safety interlocks and systems</li> <li>2.3.3 principles of operation</li> <li>2.3.4 machine controls, their identification and function</li> <li>2.3.5 impact of incorrect or faulty setup</li> <li>2.3.6 production workflow sequences</li> <li>2.3.7 correct selection and use of equipment and procedures</li> <li>2.3.8 hazards of the removal and fitting process and appropriate hazard control procedures</li> <li>2.3.9 the performance of dies and cores</li> <li>2.3.10 relevant information and workplace records</li> <li>2.3.11 safety precautions appropriate to the task</li> <li>2.3.12 distinguish between causes of faults like faulty equipment and standard process variables</li> </ul>
3. Underpinning skills	3.1 Plan own work including predicting consequences and identifying improvements 3.2 Starting up equipment and making appropriate adjustments to bring process on line 3.3 Taking samples when required and identifying product out of specification 3.4 Shut down equipment in normal or abnormal circumstances 3.5 Identifying factors which may affect standard product quality or production output 3.6 Identifying hazards of the materials and process and taking appropriate hazard control 3.7 Using PPE, safe handling products and materials, reading relevant safety information and applying safety precautions appropriate to the task 3.8 Reading and interpreting technical specifications and production schedules 3.9 Calculating cycle times and production rates. 3.10 Setting and interpreting numeric data 3.11 Verbal communication skills
4. Resource implications	The following resources <b>MUST</b> be provided: <ul style="list-style-type: none"> <li>4.1 Access to an operating plant or equipment</li> <li>4.2 Tools and equipment relevant to the activity</li> <li>4.3 Supplies and consumable materials</li> <li>4.4 Engineering manuals</li> </ul>
5. Method of assessment	Competency <b>MUST</b> be assessed through: <ul style="list-style-type: none"> <li>5.1 Direct Observation with questioning</li> <li>5.2 Portfolio assessment</li> </ul>
6. Context of assessment	Competency may be assessed individually in the actual workplace or a simulated workplace environment.

**UNIT OF COMPETENCY: PRODUCE INJECTION MOLDED PRODUCTS****UNIT CODE : ALT823310****UNIT DESCRIPTOR :** This competency covers the operation and adjustment of injection molding processes and the solving of non-routine problems. It does not cover die setting.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgment.

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b> <i>Italicized terms are elaborated in the Range of Variables</i>
1. Plan own work requirements	1.1 <b>Tools and equipment</b> and processes used for production process and upstream and downstream operations from production plan or request are identified in accordance with workplace procedures 1.2 Materials required are identified including additives as per production requirements 1.3 <b>Hazards</b> are recognized and appropriate hazard control / minimization methods are followed 1.4 Emergency stops, guards and controls are identified and checked in accordance with workplace <b>procedures</b> 1.5 Requirements for materials, quality, production and equipment checks are identified in accordance with workplace procedures 1.6 Materials, waste management and housekeeping needs are identified in accordance with workplace procedures
2. Check injection molding process setup	2.1 Equipment requirements are determined in accordance with workplace 2.2 Process is set to specifications as required 2.3 Injection molding equipment settings and adjustments are checked as required 2.4 Materials are checked as per job requirements 2.5 Nonconforming materials are discarded, or adjustments are made to the process 2.6 Date, batch and materials markings are set up to specifications, as required 2.7 Other pre-start checks are completed in accordance with procedures.
3. Operate and make adjustments as required to the injection molding process	3.1 Injection molding equipment is operated, noting <b>key variables</b> in accordance with procedures. 3.2 Controls/displays/terminals for production/process data are monitor in accordance with procedures. 3.3 Product/process quality is monitored in accordance with procedures 3.4 Adjustments are made to remedy faults and nonconformity to

	<p>standard as required</p> <p>3.5 Continuity of process is maintained in accordance with production requirements</p> <p>3.6 Scrap/trimming and other materials are collected and reprocessed/ discarded in accordance with procedures</p> <p>3.7 Equipment is cleaned, adjusted and lubricated as required</p> <p>3.8 Equipment is paused or stopped in an emergency, following workplace and emergency procedures.</p>
<p>4. Respond to problems</p>	<p>4.1 Possible <b><i>routine and non-routine problems</i></b> in the equipment, materials or process identified in accordance with procedures</p> <p>4.2 Problems needing action are determined in accordance with procedures</p> <p>4.3 Possible fault causes are determine in accordance with procedures</p> <p>4.4 Problems are rectified using appropriate solutions within area of responsibility</p> <p>4.5 Problems outside area of responsibility are reported to designated person.</p>

## RANGE OF VARIABLES

VARIABLE	RANGE
1. Tools and Equipment	1.1 Electrical, pneumatic, mechanical, electromechanical and hydraulic injection molding machines and components such as base, frame, feed hoppers and material supply mechanisms, barrel and screw plastification unit, injection units, die/mould tool 1.2 Additional equipment including chillers/cooling towers, die heating equipment, hopper driers, mixing hoppers, dehumidifying driers, air compressors, dosing machines, color blending equipment and conveyors where they are integral to the operation of the injection molder 1.3 Hand tools used in the injection molding process 1.4 Material loading equipment used for loading of raw materials like belt or steel conveyor 1.5 Relevant personal protective equipment like gloves, safety shoes, hard hat, face shield
2. Hazards	Typical hazards include: 2.1 Spills 2.2 Dusts/vapors 2.3 Hazardous materials 2.4 Manual handling hazards 2.5 Knife hazards
3. Procedures	3.1 Workplace procedures 3.2 Work instructions 3.3 Instructions and relevant industry and government codes and standards
4. Key variables	Key variables to be monitored include: 4.1 Operating temperature 4.2 speed 4.3 cycle time 4.4 output rate 4.5 concentration or dispersion of color 4.6 product weight 4.7 product wall thickness 4.8 product integrity and general conformance to specification / sample
5. Routine and non routine problems	Typical problems may include: 5.1 lack of cleaning leading to corrosion 5.2 Inadequate fitting 5.3 fine adjustments to optimize production

## EVIDENCE GUIDE

<p>1. Critical aspects of competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> <li>1.1 Identified critical materials properties and injection molding process characteristics in relation to the process requirements and the end product</li> <li>1.2 Planned own work process within workplace procedures and explained the reasons for the steps in the process</li> <li>1.3 Operated and made adjustments as required to the injection molding process</li> <li>1.4 Took appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identified problems to be reported</li> <li>1.5 Achieved production quality and output consistently</li> <li>1.6 Anticipated problems from process observations</li> <li>1.7 Resolved problems efficiently</li> <li>1.8 Ensured the process runs consistently and smoothly</li> </ul>
<p>2. Underpinning knowledge and attitudes</p>	<ul style="list-style-type: none"> <li>2.1 Knowledge of materials, equipment and process sufficient to recognize conditions which may lead to out of specification production.</li> <li>2.2 Company's procedures and relevant regulatory requirements</li> <li>2.3 Products, materials and material characteristics</li> <li>2.4 Behavior of materials in relation to heat, pressure and time</li> <li>2.5 Quality requirements at each production stage</li> <li>2.6 Function and operating principles of injection molding equipment, machine components and ancillary equipment</li> <li>2.7 Impact of machine speed, temperature, pressure, time during cycles on product quality and production output</li> <li>2.8 Nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which effect machine operation and product development</li> <li>2.9 Injection molding cycle and the importance of machine set up and warm up for effective processing of materials</li> <li>2.10 Safety procedures and the use of PPE in relation to handling materials, equipment</li> </ul>
<p>3. Underpinning skills</p>	<ul style="list-style-type: none"> <li>3.1 Planning own work including predicting consequences and identifying improvements</li> <li>3.2 Interpreting from production requests the correct selection and using equipment, materials, processes and procedures</li> <li>3.3 Maintaining output and product quality using appropriate instruments, controls, test information and readings</li> <li>3.4 Making adjustments to equipment operation to rectify variations in equipment operation</li> <li>3.5 Checking injection molding machine for correct set up to job specifications and implement adjustments or report deviations immediately</li> <li>3.6 Starting up equipment and make appropriate adjustments to bring process on line</li> <li>3.7 Taking samples when required and identify product out of</li> </ul>

	<p>specification</p> <p>3.8 Shutting down equipment in normal or abnormal circumstances</p> <p>3.9 Identifying hazards of the materials and process and implementing appropriate procedures for hazard control</p>
4. Resource implications	<p>The following resources <b>MUST</b> be provided:</p> <p>4.1 Access to an operating plant or equipment</p> <p>4.2 Tools, equipment and workplace relevant with the requirements for the job.</p> <p>4.3 A bank of case studies/scenarios</p> <p>4.4 Supplies and consumable materials</p> <p>4.5 Engineering manuals</p>
5. Method of assessment	<p>Competency <b>MUST</b> be assessed through:</p> <p>5.1 Direct Observation with questioning</p> <p>5.2 Portfolio assessment</p>
6. Context of assessment	<p>Competency may be assessed individually in the actual workplace or a simulated workplace environment.</p>



**UNIT OF COMPETENCY : PRODUCE BLOW MOLDED PRODUCTS****UNIT CODE : ALT823311****UNIT DESCRIPTOR :** This competency covers the operation and adjustment of blow molding processes and the solving of non-routine problems. This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgment

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b> <i>Italicized</i> terms are elaborated in the Range of Variables
1. Plan own work requirements	1.1 Equipment and processes used for production process and upstream and downstream operations are identified from production plan or request 1.2 Materials required including additives are identified based on work requirements 1.3 Hazards are recognized and appropriate hazard control/ minimization methods are followed 1.4 Emergency stops, guards and controls are identified and checked 1.5 Requirements for materials, quality, production and equipment checks are identified based on work requirements 1.6 Waste management and housekeeping needs are identified in accordance with workplace procedures and/or OH & S requirements.
2. Set up and conduct pre start checks	2.1 Equipment is set up to specifications 2.2 Blow molding equipment is set up and adjusted for shot size, parison control, die gap, temperature, screw speed, cycle speed, slow close setting (or cushion) and timing to specifications 2.3 Safety gates and guards are checked in their correct working positions and emergency stops are identified and checked as required 2.4 Equipment, raw material and mould are verified to match job requirement 2.5 Date, batch and material markings are set up according to procedures. 2.6 Other pre-start checks are complete according to procedures 2.7 Equipment is started up and 'dry run' is performed to warm hydraulics and components to operating temperature before production, as required.
3. Operate and make adjustments as required to the blow molding process	3.1. Condition of equipment is checked and raw materials is introduced as required 3.2. Blow molding equipment is operate and key variables noted in accordance with workplace procedures 3.3. Controls/displays/terminals for production/process data are monitored in accordance with workplace procedures 3.4. Product/process quality is monitored according to procedures 3.5. Adjustments are made to remedy faults and nonconformity to standard as required 3.6. Continuity of process is maintained in accordance with workplace procedures 3.7. Scrap/trimming and other materials are collected and reprocessed/discarded according to procedures 3.8. Equipment is cleaned, adjusted and lubricated as required 3.9. Logs and records are completed as required

	3.10. Equipment is paused or stopped in an emergency following standard operating procedures.
4. Respond to problems	<p>4.1. Possible routine and non-routine problems in the equipment, materials or process are identified in accordance with workplace procedures</p> <p>4.2. Problems needing action are determined in accordance with workplace procedures</p> <p>4.3. Possible fault causes are determine in accordance with workplace procedures</p> <p>4.4. Problems within area of responsibility are rectified using appropriate solutions</p> <p>4.5. Problems outside area of responsibility are reported to designated person.</p>

## RANGE OF VARIABLES

VARIABLE	RANGE
1. Equipment and tools	Equipment and tools may include and but not limited to: 1.1 Electrical, pneumatic, mechanical Electromechanical and hydraulic injection molding machines and components such as base, frame, feed hoppers and material supply mechanisms 1.2 Die/tool 1.3 Injection units 1.4 Chillers/cooling towers 1.5 Die heating equipment 1.6 Hopper driers, mixing hoppers, dehumidifying driers 1.7 Air compressors 1.8 Dosing and Brushing machines 1.9 Color blending equipment and conveyors 1.10 Barrel and screw plastification unit 1.11 Material loading equipment used for loading of raw materials 1.12 Hand tools used in the injection molding process 1.13 Personal protective equipment
2. Hazards	Typical hazards include: 2.1 Spills 2.2 Dusts vapors 2.3 Slip and fall, particularly due to split granules 2.4 Temperature 2.5 Hazardous substances 2.6 Moving equipment 2.7 Manual handling hazards
3. Procedures	3.1 Workplace procedures 3.2 Work instructions 3.3 Temporary instructions 3.4 Industry and government codes and standards
4. Key Variables	Key variables to be monitored include: 4.1 Operating temperature 4.2 speed 4.3 cycle time 4.4 output rate 4.5 concentration or dispersion of color 4.6 product weight 4.7 product wall thickness 4.8 product integrity and general conformance to specification / sample
5. Faults	Typical routine process problems include: 5.1 Equipment malfunction 5.2 Variations in temperature, pressure, speed, injection dwell and clamp times 5.3 Variations in materials or contamination of materials 5.4 Die damage 5.5 Routine blow molding faults-wall thinning, holes, poor surface finish, warping, poor color dispersion, ejection damaged, color contamination, black spots 5.6 Machine malfunction 5.7 Die/tooling problem 5.8 Variations in material and/or contamination of materials

## EVIDENCE GUIDE

<p>1. Critical aspects of competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> <li>1.1 Identified critical material properties and blow molding process characteristics in relation to the process requirements and the end product</li> <li>1.2 Planned own work process within workplace procedures and explained the reasons for the steps in the process</li> <li>1.3 Operated and made adjustments as required to the blow molding process</li> <li>1.4 Took appropriate action to observe equipment, materials and products for out of specification results and identified problems to be reported.</li> <li>1.5 Demonstrated consistent performance particularly to see that:             <ul style="list-style-type: none"> <li>1.5.1 production quality and output standards are met consistently</li> <li>1.5.2 problems are anticipated from process observations</li> <li>1.5.3 problems are efficiently resolved</li> <li>1.5.4 the process runs consistently and smoothly</li> </ul> </li> </ul>
<p>2. Underpinning knowledge and attitudes</p>	<ul style="list-style-type: none"> <li>2.1 Knowledge of the materials, equipment and process sufficient to recognize conditions which may lead to out of specification production.</li> <li>2.2 Company's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.</li> <li>2.3 Competence includes the ability for the practical completion of the job to:</li> <li>2.4 Operation of blow molding equipment and components</li> <li>2.5 Production workflow sequences and materials demand</li> <li>2.6 Reasons for checking process control panels and reporting readings which do not conform to the work instructions</li> <li>2.7 Purpose and requirements of 'dry running' before starting production</li> <li>2.8 Approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up</li> <li>2.9 Correct selection and use of equipment, materials, processes and procedures</li> <li>2.10 Hierarchy of control including engineering controls</li> <li>2.11 Impact of variations in raw materials and equipment operation in relation to final product</li> <li>2.12 Changes to materials at various stages of production</li> </ul>

3. Underpinning skills	<p>3.1 Planning own work including predicting consequences and identifying improvements</p> <p>3.2 Interpreting from production requests the correct selection and using of equipment, materials, processes and procedures</p> <p>3.3 Maintaining output and product quality using appropriate instruments, controls, test information and readings</p> <p>3.4 Making adjustments to equipment operation to rectify variations in equipment operation</p> <p>3.5 Checking blow molding machine for correct setup to job specifications and implement adjustments or report deviations immediately</p> <p>3.6 Starting up equipment and make appropriate adjustments to bring process on line</p> <p>3.7 Taking samples when required and identify product out of specification</p> <p>3.8 Shutting down equipment in normal or abnormal circumstances</p> <p>3.9 Identifying hazards of the materials and process and implement appropriate procedures for hazard control</p> <p>3.10 Reading and interpreting typical product specifications, job sheets and material labels as provided to operators.</p>
4. Resource implications	<p>The following resources <b>MUST</b> be provided:</p> <p>4.1 A bank of scenarios and questions</p> <p>4.2 Tools, equipment and workplace relevant with the requirements for the job.</p> <p>4.3 Supplies and consumable materials</p> <p>4.4 Engineering manuals</p>
5. Method of assessment	<p>Competency <b>MUST</b> be assessed through:</p> <p>5.1 Direct Observation with questioning</p> <p>5.2 Portfolio assessment</p>
6. Context of assessment	<p>Competency may be assessed individually in the actual workplace or a simulated workplace environment.</p>

## SECTION 3 TRAINING STANDARDS

These standards are set to provide technical and vocational education and training (TVET) providers with information and other important requirements to consider when designing training programs for PLASTIC MACHINE OPERATION NC III.

### 3.1 CURRICULUM DESIGN

Course Title: **PLASTIC MACHINE OPERATION**

NC Level **NC II**

Nominal Training Duration:       **20 Hours** (Basic Competencies)  
   **20 Hours** (Common Competencies)  
   **105 Hours** (Core Competencies)

Course Description:

This course is designed to enhance the knowledge, skills and attitudes of an individual in the field of automotive manufacturing in accordance with industry standards. It covers competencies such as: Change equipment dies; Prepare and start equipment for production and Produce injection molded products. It also include competency to produce blow molded products. Likewise the person involved in this qualification is in-charge of overall equipment set-up and readiness-check for production operation.

To obtain this, all units prescribed for this qualification must be achieved.

### BASIC COMPETENCIES

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Lead workplace communication	1.1 Communicate information about workplace processes. 1.2 Lead workplace discussions. 1.3 Identify and communicate issues arising in the workplace	<ul style="list-style-type: none"> <li>• Group discussion</li> <li>• Role Play</li> <li>• Brainstorming</li> </ul>	<ul style="list-style-type: none"> <li>• Observation</li> <li>• Interviews</li> </ul>
2. Lead small teams	2.1 Provide team leadership. 2.2 Assign responsibilities among members. 2.3 Set performance expectation for team members. 1.3 Supervise team performance	<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Demonstration</li> <li>• Self-paced (modular)</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstration</li> <li>• Case studies</li> </ul>
3. Develop and practice negotiation skills	1.1 Identify relevant information in planning negotiations 1.2 Participate in negotiations 1.3 Document areas for agreement	<ul style="list-style-type: none"> <li>• Direct observation</li> <li>• Simulation/role playing</li> <li>• Case studies</li> </ul>	<ul style="list-style-type: none"> <li>• Written test</li> <li>• Practical/performance test</li> </ul>
4. Solve workplace problem related to work activities	4.1 Explain the analytical techniques. 4.2 Identify the problem. 4.3 Determine the possible cause/s of the problem.	<ul style="list-style-type: none"> <li>• Direct observation</li> <li>• Simulation/role playing</li> <li>• Case studies</li> </ul>	<ul style="list-style-type: none"> <li>• Written test</li> <li>• Practical/performance test</li> </ul>

5. Use mathematical concepts and techniques	5.1 Identify mathematical tools and techniques to solve problem 5.2 Apply mathematical procedures/solution 5.3 Analyze results	<ul style="list-style-type: none"> <li>• Direct observation</li> <li>• Simulation/role playing</li> <li>• Case studies</li> </ul>	<ul style="list-style-type: none"> <li>• Written test</li> <li>• Practical/performance test</li> </ul>
6. Use relevant technologies	6.1 Identify appropriate technology 6.2 Apply relevant technology 6.3 Maintain/enhance relevant technology	<ul style="list-style-type: none"> <li>• Direct observation</li> <li>• Simulation/role playing</li> <li>• Case studies</li> </ul>	<ul style="list-style-type: none"> <li>• Written test</li> <li>• Practical/performance test</li> </ul>

## COMMON COMPETENCIES

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Read, Interpret and Apply Engineering Drawings	1.1 Identify and access engineering drawings/specification 1.2. Interpret drawings 1.3. Apply information in the drawings & specifications 1.4 Store drawings	<ul style="list-style-type: none"> <li>• Lecture/Demonstration</li> <li>• Dual training</li> </ul>	<ul style="list-style-type: none"> <li>• Direct observation</li> <li>• Interview</li> </ul>
2. Perform Mensuration and Calculation	2.1. Select measuring instrument and 2.2 Carry out measurement and calculations. 2.3. Maintain measuring instruments	<ul style="list-style-type: none"> <li>• Lecture/Demonstration</li> <li>• Simulation</li> <li>• Exercises</li> </ul>	<ul style="list-style-type: none"> <li>• Written test</li> <li>• Oral questioning</li> <li>• Direct observation</li> </ul>
3. Read, Interpret and Apply Specifications and Manual	3.1 Identify/accessed manuals and interpret data and specification 3.2 Apply information accessed in manual 3.3 Store manual	<ul style="list-style-type: none"> <li>• Lecture/Demonstration</li> <li>• Dual training</li> <li>• Distance Learning</li> </ul>	<ul style="list-style-type: none"> <li>• Written test</li> <li>• Direct observation</li> <li>• Project method</li> <li>• Interview</li> </ul>
5. Perform Shop Maintenance	4.1 Inspect/clean tools and work area 4.2 Store/arrange tools and shop equipment 4.3 Dispose wastes/used lubricants 4.4 Report damaged tools/equipment	<ul style="list-style-type: none"> <li>• Lecture/Demonstration</li> <li>• Dual training</li> <li>• Self paced (modular)</li> <li>• Simulation</li> </ul>	<ul style="list-style-type: none"> <li>• Written test</li> <li>• Direct observation</li> <li>• Demonstration</li> <li>• Interview</li> </ul>

## CORE COMPETENCIES

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Change equipment dies	1.1 Prepare to change dies 1.2 Change dies 1.3 Test fitting of dies 1.4 Respond to problems	<ul style="list-style-type: none"> <li>• Lecture/ Demonstration</li> <li>• Discussion</li> </ul>	<ul style="list-style-type: none"> <li>• Observation w/ questioning</li> <li>• Written</li> <li>• Portfolio</li> </ul>
2. Prepare and start equipment for production	2.1 Perform pre-start checks 2.2 Carry out pre-start operations 2.3 Start machine and hand over to operator	<ul style="list-style-type: none"> <li>• Lecture/ Demonstration</li> <li>• Discussion</li> </ul>	<ul style="list-style-type: none"> <li>• Observation w/ questioning</li> <li>• Written</li> <li>• Portfolio</li> </ul>
3. Produce injection molded products	3.1 Plan own work requirements 3.2 Check injection molding process setup 3.3 Operate and make adjustments as required to the injection molding process 3.4 Respond to problems	<ul style="list-style-type: none"> <li>• Lecture/ Demonstration</li> <li>• Discussion</li> </ul>	<ul style="list-style-type: none"> <li>• Observation w/ questioning</li> <li>• Written</li> <li>• Portfolio</li> </ul>
4. Produce blow molded products	4.1 Plan own work requirements 4.2 Set up and conduct pre start checks 4.3 Operate and make adjustments as required to the blow molding process 4.4 Respond to problems	<ul style="list-style-type: none"> <li>• Lecture/ Demonstration</li> <li>• Discussion</li> </ul>	<ul style="list-style-type: none"> <li>• Observation w/ questioning</li> <li>• Written</li> <li>• Portfolio</li> </ul>



### 3.2 TRAINING DELIVERY

The delivery of training should adhere to the design of the curriculum. Delivery should be guided by the 10 basic principles of competency-based TVET.

- The training is based on curriculum developed from the competency standards;
- Learning is modular in its structure;
- Training delivery is individualized and self-paced;
- Training is based on work that must be performed;
- Training materials are directly related to the competency standards and the curriculum modules;
- Assessment is based in the collection of evidence of the performance of work to the industry required standard;
- Training is based both on and off-the-job components;
- Allows for recognition of prior learning (RPL) or current competencies;
- Training allows for multiple entry and exit; and
- Approved training programs are nationally accredited.

The competency-based TVET system recognizes various types of delivery modes, both on and off-the-job as long as the learning is driven by the competency standards specified by the industry. The following training modalities may be adopted when designing training programs:

- The dualized mode of training delivery is preferred and recommended. Thus programs would contain both in-school and in-industry training or fieldwork components. Details can be referred to the Dual Training System (DTS) Implementing Rules and Regulations.
- Modular/self-paced learning is a competency-based training modality wherein the trainee is allowed to progress at his own pace. The trainer facilitates the training delivery
- Peer teaching/mentoring is a training modality wherein fast learners are given the opportunity to assist the slow learners.
- Supervised industry training or on-the-job training is an approach in training designed to enhance the knowledge and skills of the trainee through actual experience in the workplace to acquire specific competencies prescribed in the training regulations.
- Distance learning is a formal education process in which majority of the instruction occurs when the students and instructor are not in the same place. Distance learning may employ correspondence study, or audio, video or computer technologies.

### 3.3 TRAINEE ENTRY REQUIREMENTS

Trainees or students should possess the following requirements:

- Must possess the Plastic Machine Operation National Certificate II
- can communicate both orally and in writing;
- physically and mentally fit; and
- with experience in basic machining

### 3.4 TOOLS, EQUIPMENT AND MATERIALS PLASTIC MACHINE OPERATIONS NC III

Recommended list of tools, equipment and materials for the training of 20 trainees for PLASTIC MACHINE OPERATION NC III

TOOLS		EQUIPMENT		MATERIALS	
Qty.	Description	Qty.	Description	Qty.	Description
10 sets	Knives Files Scrapers Band saw, Hand saw	5 sets	Electric and/or powered routers, saw, drills drivers and sanders	1 set	Workplace procedure Work instruction Temporary instruction
		1 set	Hoist/jigs/lifting equipment	1 lot	Office supplies
		2 sets	Hand carts and trolley		
10 sets	Hand tools <ul style="list-style-type: none"> <li>• Screw drivers</li> <li>• Pliers</li> <li>• Wrenches</li> <li>• Sockets and drivers</li> </ul>	1 set	Bottom blow, top blow, needle blow, tail to tail blow, parison pre-blow and pre-squeeze, parison stretching and parison orientation type machines	20 sets	PPE <ul style="list-style-type: none"> <li>• Gloves</li> <li>• Respiratory mask</li> <li>• Face shield</li> <li>• Safety shoes</li> </ul>
		1 set	Die		
		1 set	Chillers/cooling towers		
		1 set	Die heating equipment		
		1 set	Hopper driers, mixing hoppers, dehumidifying driers		
		1 set	Air compressors		
		1 set	Dosing machines Color blending equipment and conveyors		
		1 set	Injection unit		
		1 set	Barrel and screw plastification unit		
		1 set	Material loading equipment		
		1 set	Electrical, pneumatic,		

	mechanical Electromechanical and hydraulic injection moulding machines and components such as base, frame, feed hoppers and material supply mechanisms
1 set	Measuring equipment
2 sets	Bufs and polishers

### 3.5 TRAINING FACILITIES PLASTIC MACHINE OPERATION NC III

The automotive workshop must be made of reinforced concrete or steel structure. The size must be suited on the requirements of the competencies. The class size of 25 students/trainees is reserved for the lecture room and the practical demonstration area for carrying out plastic machine operation training. Most of the learning activities such as plastic machine operation are performed in the workshop.

SPACE REQUIREMENT	SIZE IN METERS	AREA IN SQ. METERS	TOTAL AREA IN SQ. METERS
• Building (permanent)	12.00 x 32.00	-	384.00
• Student/Trainee Working Space	2.50 x 2.50 per student/trainee	6.25 per student	156.25
• Contextual Learning Laboratory	4.00 x 5.00	20.00	20.00
• Lecture Room	4.00 x 7.00	28.00	28.00
• Learning Resource Center	4.00 x 5.00	20.00	20.00
• Facilities/Equipment/ Circulation Area	-	-	<b>159.75</b>

### **3.6 TRAINERS' QUALIFICATION**

#### **AUTOMOTIVE/LAND TRANSPORT SECTOR**

##### **PLASTIC MACHINE OPERATION NC III**

##### **TRAINER QUALIFICATION (TQ III)**

- Must be a holder of PLASTIC MACHINE OPERATION NC III
- Must have undergone training on Training Methodology II (TM II) <sup>1</sup>
- Must be computer literate
- Must be physically and mentally fit
- Must have at least 2 years job/industry experience<sup>2</sup>
- Must be a civil-service eligible or holder of appropriate professional license issued by the Professional Regulatory Commission (for government positions only)

<sup>1</sup> This shall be changed to “:Must be a holder of Trainer Qualification Level II (TQII) or equivalent” upon promulgation by the TESDA Board of the TQ/AQ training regulations

<sup>2</sup> Optional. Only when required by the hiring institution

Reference: TESDA Board Resolution No. 2004 03

### **3.7 INSTITUTIONAL ASSESSMENT**

Institutional assessment is undertaken by trainees to determine their achievement of units of competency. A certificate of achievement is issued for each unit of competency.

## SECTION 4 NATIONAL ASSESSMENT AND CERTIFICATION ARRANGEMENTS

- 4.1 To attain the National Qualification of PLASTIC MACHINE OPERATION NC III, the candidate must demonstrate competence through assessment covering all the units of competency listed in Section 1. Successful candidates shall be awarded a National Certificate signed by the TESDA Director General.
- 4.2 Individual aspiring to be awarded the qualification of PLASTIC MACHINE OPERATION NC III must acquire Certificates of Competency (COC) in all the following core units of the Qualification. Candidates may apply for assessment in any accredited assessment center.
  - 4.2.1 Change Equipment Dies
  - 4.2.2 Prepare and Start Equipment for Operation
  - 4.2.3 Perform Plastic Machine Operation
- 4.3 Accumulation and submission of all COCs acquired for the relevant units of competency comprising a qualification, an individual shall be issued the corresponding National Certificate.
- 4.4 Assessment shall focus on the core units of competency. The basic and common units shall be integrated or assessed concurrently with the core units.
- 4.5 The following are qualified to apply for assessment and certification:
  - 4.5.1 Holder of PLASTIC MACHINE OPERATION NC II or equivalent qualification; or
  - 4.5.2 Graduates of formal, non-formal and informal including enterprise-based training programs.
  - 4.5.3 Experienced workers (wage employed or self employed)
- 4.5 The guidelines on assessment and certification are discussed in detail in the *“Procedures Manual on Assessment and Certification”* and *“Guidelines on the Implementation of the Philippine TVET Qualification and Certification System (PTQCS)”*

**COMPETENCY MAP- AUTOMOTIVE SECTOR  
MANUFACTURING SUB-SECTOR  
(Parts Manufacturing)**

**ANNEX A**

<b>CORE COMPETENCIES</b>	Develop and Manufacture Wood Pattern	Develop and Manufacture Polymer Pattern	Develop and Manufacture Assembled Plated Pattern	Develop and Manufacture Production Pattern	Perform General woodworking Machine Operations	Use and Maintain Measuring Instrument		
	Prepare & mix sand for metal molding	Produce Molds by Hand	Produce Cores by Hand	Operate Molding Machine	Operate Core-Making Machine	Pour Molten Metal to Molds	Use and Maintain Measuring Instrument	
	Operate melting furnaces (non-electric)	Operate Cupola Melting Furnace	Operate Electric Induction Melting Furnace	Fettle & Trim Metal Castings/Forgings	Perform Refractory Installation & Repair	Use & Maintain Measuring Instrument		
	Perform Engineering Measurement	Perform Precision Mechanical Measurement	Calibrate Measuring Equipment	Select and Control Inspection Processes and Procedure	Perform Product Inspection	Perform Basic Statistical Quality Control	Use Improvement Processes in Team Activities	
	Prepare Molds for Composites Production	Prepare Materials for Formulae	Assemble Materials and Equipment for Production	Operate Injection Molding Equipment	Operate Blow Molding Equipment	Monitor Process Operations	Finish Products and Components	
	Change Equipment Dies	Prepare and Start Equipment for Operation	Produce Injection Molded Products	Produce Blow Molded Products				
<b>COMMON COMPETENCIES</b>	Read & Interpret Engineering Drawings	Perform Mensuration and Calculation	Read, Interpret and Apply Specifications and Manuals	Perform Shop Maintenance				
<b>BASIC COMPETENCIES</b>	Receive and respond workplace communication	Work with Other	Demonstrate work values	Practice basic housekeeping procedures	Lead in workplace communication	Develop and practice negotiation skills	Use relevant technologies	Solve workplace problems related to work activities
	Participate in workplace communication	Work in team environment	Practice career professionalism	Practice occupational health and safety procedures	Lead small Team	Use mathematical concepts and techniques	Develop team and individual	Apply problem solving techniques in the workplace
	Plan and organize work	Utilize specialist communication skills						

Legend:  
PLASTIC MACHINE OPERATION NC III

## DEFINITION OF TERMS

1. **Die** A former used to give the required shape to the product and which is used under pressure. Dies are typically used in the extrusion, injection, blow moulding and general rubber sectors. Dies used which are not subject to pressure are referred to as 'moulds' in this Training Package.
2. **PPE** Personal Protective Equipment – the last line of defense against workplace hazards – includes things like safety boots, gloves, goggles, ear muffs.
3. **Routine Problems** To 'rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.
4. **OH & S** Occupational health and safety
5. **Composites** Products consisting of a polymer matrix and a continuous layered reinforcing media. The reinforcing media include fiber, filament and cloth. The product is generally hand or machine fabricated.
6. **Calibration** Instruments and other measuring equipment are calibrated to make sure the readings they yield are correct.  
To calibrate an instrument/item of equipment is a high level unit of competency.  
To check the calibration of an instrument/item of equipment is a routine part of using it and may be as simple as checking the date the calibration certificate expires.
7. **Engineering Control** A subset of the hierarchy of control.
8. **Hierarchy of Control** The preferred order of risk control measures from most to least preferred, that is:
  - elimination
  - substitution
  - engineering controls
  - administrative controls
  - personal protective equipment.
9. **Integral** Equipment which forms part of the operation of a main item of equipment is regarded as 'integral' to that main item.  
Examples include feed hoppers (and even blending feed hoppers) and heating and cooling devices.  
Typically equipment will be regarded as being 'integral' to the main item if:
  - it is close/attached to the main item
  - it has simultaneous operation with the main item
  - it does not require significant additional knowledge or skills.Equipment is not integral if it has independent operation of its own.

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