

TRAINING REGULATIONS

AUTOMOTIVE WIRING HARNESS ASSEMBLY NC II



AUTOMOTIVE MANUFACTURING 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
AUTOMOTIVE WIRING HARNESS ASSEMBLY NC II**

SECTION 1 AUTOMOTIVE WIRING HARNESS ASSEMBLY NC II QUALIFICATION

The AUTOMOTIVE WIRING HARNESS ASSEMBLY NC II Qualification consists of competencies that a person must achieve to select and classify materials and parts for assembly of wiring harness; perform cutting and stripping of electrical wires; perform crimping and soldering of terminals and perform tying, taping and finishing of assembly wires.

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

The Units of Competency comprising this Qualification include the following

| CODE NO. | BASIC COMPETENCIES |
|-----------------|--|
| 500311105 | Participate in Workplace Communication |
| 500311106 | Work in Team Environment |
| 500311107 | Practice Career Professionalism |
| 500311108 | Practice Occupational Health and Safety Procedures |

| CODE NO. | COMMON COMPETENCIES |
|-----------------|--|
| ALT311202 | Perform Mensuration and Calculation |
| ALT742201 | Read, Interpret and Apply engineering Drawings |
| ALT723201 | Apply Appropriate Sealant/Adhesive |
| ALT723205 | Perform Shop Maintenance |

| CODE NO. | CORE COMPETENCIES |
|-----------------|--|
| ALT827324 | Select and classify materials and parts for assembly of wiring harness |
| ALT827325 | Perform cutting and stripping of electrical wires |
| ALT827326 | Perform crimping and soldering of terminals |
| ALT827327 | Perform tying, taping and finishing of assembly wires |

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

- **Automotive Wiring Harness Assembler**

SECTION 2 COMPETENCY STANDARDS

This section gives the details of the contents of the basic, common and core units of competency required in AUTOMOTIVE WIRING HARNESS ASSEMBLY NC II.

BASIC COMPETENCIES

UNIT OF COMPETENCY : PARTICIPATE IN WORKPLACE COMMUNICATION

UNIT CODE : 500311105

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to gather, interpret and convey information in response to workplace requirements.

| ELEMENT | PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables |
|--|--|
| 1. Obtain and convey workplace information | 1.1 Specific and relevant information is accessed from appropriate sources 1.2 Effective questioning , active listening and speaking skills are used to gather and convey information 1.3 Appropriate medium is used to transfer information and ideas 1.4 Appropriate non- verbal communication is used 1.5 Appropriate lines of communication with supervisors and colleagues are identified and followed 1.6 Defined workplace procedures for the location and storage of information are used 1.7 Personal interaction is carried out clearly and concisely |
| 2. Participate in workplace meetings and discussions | 2.1 Team meetings are attended on time 2.2 Own opinions are clearly expressed and those of others are listened to without interruption 2.3 Meeting inputs are consistent with the meeting purpose and established protocols 2.4 Workplace interactions are conducted in a courteous manner 2.5 Questions about simple routine workplace procedures and matters concerning working conditions of employment are asked and responded to 2.6 Meetings outcomes are interpreted and implemented |
| 3. Complete relevant work related documents | 3.1 Range of forms relating to conditions of employment are completed accurately and legibly 3.2 Workplace data is recorded on standard workplace forms and documents 3.3 Basic mathematical processes are used for routine calculations 3.4 Errors in recording information on forms/ documents are identified and properly acted upon 3.5 Reporting requirements to supervisor are completed according to organizational guidelines |

RANGE OF VARIABLES

| VARIABLE | RANGE |
|---------------------------|---|
| 1. Appropriate sources | 1.1 Team members 1.2 Suppliers 1.3 Trade personnel 1.4 Local government 1.5 Industry bodies |
| 2. Medium | 2.1 Memorandum 2.2 Circular 2.3 Notice 2.4 Information discussion 2.5 Follow-up or verbal instructions 2.6 Face to face communication |
| 3. Storage | 3.1 Manual filing system 3.2 Computer-based filing system |
| 4. Forms | 4.1 Personnel forms, telephone message forms, safety reports |
| 5. Workplace interactions | 5.1 Face to face 5.2 Telephone 5.3 Electronic and two way radio 5.4 Written including electronic, memos, instruction and forms, non-verbal including gestures, signals, signs and diagrams |
| 6. Protocols | 6.1 Observing meeting 6.2 Compliance with meeting decisions 6.3 Obeying meeting instructions |

EVIDENCE GUIDE

| | |
|--|---|
| <p>1. Critical aspects of competency</p> | <p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Prepared written communication following standard format of the organization 1.2 Accessed information using communication equipment 1.3 Made use of relevant terms as an aid to transfer information effectively 1.4 Conveyed information effectively adopting the formal or informal communication |
| <p>2. Underpinning knowledge and attitudes</p> | <ul style="list-style-type: none"> 2.1 Effective communication 2.2 Different modes of communication 2.3 Written communication 2.4 Organizational policies 2.5 Communication procedures and systems 2.6 Technology relevant to the enterprise and the individual's work responsibilities |
| <p>3. Underpinning skills</p> | <ul style="list-style-type: none"> 3.1 Follow simple spoken language 3.2 Perform routine workplace duties following simple written notices 3.3 Participate in workplace meetings and discussions 3.4 Complete work related documents 3.5 Estimate, calculate and record routine workplace measures 3.6 Basic mathematical processes of addition, subtraction, division and multiplication 3.7 Ability to relate to people of social range in the workplace 3.8 Gather and provide information in response to workplace Requirements |
| <p>4. Resource implications</p> | <ul style="list-style-type: none"> 4.1 Fax machine 4.2 Telephone 4.3 Writing materials 4.4 Internet |
| <p>5. Methods of assessment</p> | <ul style="list-style-type: none"> 5.1 Direct Observation 5.2 Oral interview and written test |
| <p>6. Context of assessment</p> | <ul style="list-style-type: none"> 6.1 Competency may be assessed individually in the actual workplace or through accredited institution |

UNIT OF COMPETENCY : **WORK IN TEAM ENVIRONMENT**

UNIT CODE : **500311106**

UNIT DESCRIPTOR : This unit covers the skills, knowledge and attitudes to identify role and responsibility as a member of a team.

| ELEMENT | PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables |
|---|--|
| 1. Describe team role and scope | 1.1 The <i>role and objective of the team</i> is identified from available <i>sources of information</i> 1.2 Team parameters, reporting relationships and responsibilities are identified from team discussions and appropriate external sources |
| 2. Identify own role and responsibility within team | 2.1 Individual role and responsibilities within the team environment are identified 2.2 Roles and responsibility of other team members are identified and recognized 2.3 Reporting relationships within team and external to team are identified |
| 3. Work as a team member | 3.1 Effective and appropriate forms of communications used and interactions undertaken with team members who contribute to known team activities and objectives 3.2 Effective and appropriate contributions made to complement team activities and objectives, based on individual skills and competencies and <i>workplace context</i> 3.3 Observed protocols in reporting using standard operating procedures 3.4 Contribute to the development of team work plans based on an understanding of team's role and objectives and individual competencies of the members. |

RANGE OF VARIABLES

| VARIABLE | RANGE |
|-------------------------------|--|
| 1. Role and objective of team | 1.1 Work activities in a team environment with enterprise or specific sector 1.2 Limited discretion, initiative and judgment maybe demonstrated on the job, either individually or in a team environment |
| 2. Sources of information | 2.1 Standard operating and/or other workplace procedures 2.2 Job procedures 2.3 Machine/equipment manufacturer's specifications and instructions 2.4 Organizational or external personnel 2.5 Manufacturer/supplier instructions 2.6 Quality standards 2.7 OHS and environmental standards |
| 3. Workplace context | 3.1 Work procedures and practices 3.2 Conditions of work environments 3.3 Legislation and industrial agreements 3.4 Standard work practice including the storage, safe handling and disposal of chemicals 3.5 Safety, environmental, housekeeping and quality guidelines |

EVIDENCE GUIDE

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|---|---|
| <p>1. Critical aspects of competency</p> | <p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Operated in a team to complete workplace activity 1.2 Worked effectively with others 1.3 Conveyed information in written or oral form 1.4 Selected and used appropriate workplace language 1.5 Followed designated work plan for the job 1.6 Reported outcomes |
| <p>2. Underpinning knowledge and attitude</p> | <ul style="list-style-type: none"> 2.1 Communication process 2.2 Team structure 2.3 Team roles 2.4 Group planning and decision making |
| <p>3. Underpinning skills</p> | <ul style="list-style-type: none"> 3.1 Communicate appropriately, consistent with the culture of the workplace |
| <p>4. Resource implications</p> | <p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> 4.1 Access to relevant workplace or appropriately simulated environment where assessment can take place 4.2. Materials relevant to the proposed activity or tasks |
| <p>5. Methods of assessment</p> | <p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 5.1 Observation of the individual member in relation to the work activities of the group 5.2 Observation of simulation and or role play involving the participation of individual member to the attainment of organizational goal 5.3. Case studies and scenarios as a basis for discussion of issues and strategies in teamwork |
| <p>6. Context for assessment</p> | <ul style="list-style-type: none"> 6.1 Competency may be assessed in workplace or in a simulated workplace setting 6.2 Assessment shall be observed while task are being undertaken whether individually or in group |

UNIT OF COMPETENCY : PRACTICE CAREER PROFESSIONALISM

UNIT CODE : 500311107

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes in promoting career growth and advancement.

| ELEMENT | PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables |
|--|--|
| 1. Integrate personal objectives with organizational goals | 1.1 Personal growth and work plans are pursued towards improving the qualifications set for the profession 1.2 Intra- and interpersonal relationships is are maintained in the course of managing oneself based on performance <i>evaluation</i> 1.3 Commitment to the organization and its goal is demonstrated in the performance of duties |
| 3 Set and meet work priorities | 2.1 Competing demands are prioritized to achieve personal, team and organizational goals and objectives. 2.2 <i>Resources</i> are utilized efficiently and effectively to manage work priorities and commitments 2.3 Practices along economic use and maintenance of equipment and facilities are followed as per established procedures |
| 3 Maintain professional growth and development | 3.1 <i>Trainings and career opportunities</i> are identified and availed of based on job requirements 3.2 <i>Recognitions</i> are -sought/received and demonstrated as proof of career advancement 3.3 <i>Licenses and/or certifications</i> relevant to job and career are obtained and renewed |

RANGE OF VARIABLES

| VARIABLE | RANGE |
|---------------------------------------|--|
| 1. Evaluation | 1.1 Performance Appraisal 1.2 Psychological Profile 1.3 Aptitude Tests |
| 2. Resources | 2.1 Human 2.2 Financial 2.3 Technology 2.3.1 Hardware 2.3.2 Software |
| 3. Trainings and career opportunities | 3.1 Participation in training programs 3.1.1 Technical 3.1.2 Supervisory 3.1.3 Managerial 3.1.4 Continuing Education 3.2 Serving as Resource Persons in conferences and workshops |
| 4. Recognitions | 4.1 Recommendations 4.2 Citations 4.3 Certificate of Appreciations 4.4 Commendations 4.5 Awards 4.6 Tangible and Intangible Rewards |
| 5. Licenses and/or certifications | 5.1 National Certificates 5.2 Certificate of Competency 5.3 Support Level Licenses 5.4 Professional Licenses |

EVIDENCE GUIDE

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| <p>1. Critical aspects of competency</p> | <p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Attained job targets within key result areas (KRAs) 1.2 Maintained intra - and interpersonal relationship in the course of managing oneself based on performance evaluation 1.3 Completed trainings and career opportunities which are based on the requirements of the industries 1.4 Acquired and maintained licenses and/or certifications according to the requirement of the qualification |
| <p>2. Underpinning knowledge and attitudes</p> | <ul style="list-style-type: none"> 2.1 Work values and ethics (Code of Conduct, Code of Ethics, etc.) 2.2 Company policies 2.3 Company-operations, procedures and standards 2.4 Fundamental rights at work including gender sensitivity 2.5 Personal hygiene practices |
| <p>3. Underpinning skills</p> | <ul style="list-style-type: none"> 3.1 Appropriate practice of personal hygiene 3.2 Intra and Interpersonal skills 3.3 Communication skills |
| <p>4. Resource implications</p> | <p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> 4.1 Workplace or assessment location 4.2 Case studies/scenarios |
| <p>5. Method of assessment</p> | <p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 5.1 Portfolio Assessment 5.2 Interview 5.3 Simulation/Role-plays 5.4 Observation 5.5 Third Party Reports 5.6 Exams and Tests |
| <p>6. Context for assessment</p> | <ul style="list-style-type: none"> 6.1 Competency may be assessed in the work place or in a simulated work place setting |

UNIT OF COMPETENCY : **PRACTICE OCCUPATIONAL HEALTH AND SAFETY PROCEDURES**

UNIT CODE :

500311108

UNIT DESCRIPTOR :

This unit covers the outcomes required to comply with regulatory and organizational requirements for occupational health and safety.

| ELEMENT | PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables |
|-------------------------------|--|
| 1. Identify hazards and risks | 1.1 Safety regulations and workplace safety and hazard control practices and procedures are clarified and explained based on organization procedures 1.2 Hazards/risks in the workplace and their corresponding indicators are identified to minimize or eliminate risk to co-workers, workplace and environment in accordance with organization procedures 1.3 Contingency measures during workplace accidents, fire and other emergencies are recognized and established in accordance with organization procedures |
| 2. Evaluate hazards and risks | 2.1 Terms of maximum tolerable limits which when exceeded will result in harm or damage are identified based on threshold limit values (TLV) 2.2 Effects of the hazards are determined 2.3 OHS issues and/or concerns and identified safety hazards are reported to designated personnel in accordance with workplace requirements and relevant workplace OHS legislation |

| ELEMENT | PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables |
|------------------------------|---|
| 3. Control hazards and risks | 3.1 Occupational Health and Safety (OHS) procedures for controlling hazards/risks in workplace are consistently followed 3.2 Procedures for dealing with workplace accidents, fire and emergencies are followed in accordance with organization OHS policies 3.3 Personal protective equipment (PPE) is correctly used in accordance with organization OHS procedures and practices 3.4 Appropriate assistance is provided in the event of a workplace emergency in accordance with established organization protocol |
| 4. Maintain OHS awareness | 4.1 Emergency-related drills and trainings are participated in as per established organization guidelines and procedures 4.2 OHS personal records are completed and updated in accordance with workplace requirements |

RANGE OF VARIABLES

| VARIABLE | RANGE |
|-------------------------|---|
| 1. Safety regulations | May include but are not limited to: 1.1 Clean Air Act 1.2 Building code 1.3 National Electrical and Fire Safety Codes 1.4 Waste management statutes and rules 1.5 Philippine Occupational Safety and Health Standards 1.6 DOLE regulations on safety legal requirements 1.7 ECC regulations |
| 2. Hazards/Risks | May include but are not limited to: 2.1 Physical hazards – impact, illumination, pressure, noise, vibration, temperature, radiation 2.2 Biological hazards- bacteria, viruses, plants, parasites, mites, molds, fungi, insects 2.3 Chemical hazards – dusts, fibers, mists, fumes, smoke, gasses, vapors 2.4 Ergonomics <ul style="list-style-type: none"> • Psychological factors – over exertion/ excessive force, awkward/static positions, fatigue, direct pressure, varying metabolic cycles • Physiological factors – monotony, personal relationship, work out cycle |
| 3. Contingency measures | May include but are not limited to: 3.1 Evacuation 3.2 Isolation 3.3 Decontamination 3.4 (Calling designed) emergency personnel |
| 4. PPE | May include but are not limited to: 4.1 Mask 4.2 Gloves 4.3 Goggles 4.4 Hair Net/cap/bonnet 4.5 Face mask/shield 4.6 Ear muffs 4.7 Apron/Gown/coverall/jump suit 4.8 Anti-static suits 4.9 Hard hat |

| VARIABLE | RANGE |
|--|--|
| 5. Emergency-related drills and training | 5.1 Fire drill 5.2 Earthquake drill 5.3 Basic life support/CPR 5.4 First aid 5.5 Spillage control 5.6 Decontamination of chemical and toxic 5.7 Disaster preparedness/management |
| 6. OHS personal records | 6.1 Medical/Health records 6.2 Incident reports 6.3 Accident reports 6.4 OHS-related training completed |

EVIDENCE GUIDE

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|---|--|
| <p>1. Critical aspects of competency</p> | <p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Explained clearly established workplace safety and hazard control practices and procedures 1.2 Identified hazards/risks in the workplace and its corresponding indicators in accordance with company procedures 1.3 Recognized contingency measures during workplace accidents, fire and other emergencies 1.4 Identified terms of maximum tolerable limits based on threshold limit value- TLV. 1.5 Followed Occupational Health and Safety (OHS) procedures for controlling hazards/risks in workplace 1.6 Used Personal Protective Equipment (PPE) in accordance with company OHS procedures and practices 1.7 Completed and updated OHS personal records in accordance with workplace requirements |
| <p>2. Underpinning knowledge and attitude</p> | <ul style="list-style-type: none"> 2.1 OHS procedures and practices and regulations 2.2 PPE types and uses 2.3 Personal hygiene practices 2.4 Hazards/risks identification and control 2.5 Threshold Limit Value -TLV 2.6 OHS indicators 2.7 Organization safety and health protocol 2.8 Safety consciousness 2.9 Health consciousness |
| <p>3. Underpinning skills</p> | <ul style="list-style-type: none"> 3.1 Practice of personal hygiene 3.2 Hazards/risks identification and control skills 3.3 Interpersonal skills 3.4 Communication skills |
| <p>4 Resource implications</p> | <p>The following resources must be provided:</p> <ul style="list-style-type: none"> 4.1 Workplace or assessment location 4.2 OHS personal records 4.3 PPE 4.4 Health records |
| <p>5 Method of assessment</p> | <p>Competency must be assessed through:</p> <ul style="list-style-type: none"> 5.1 Portfolio Assessment 5.2 Interview 5.3 Case Study/Situation |
| <p>6 Context for assessment</p> | <p>6.1 Competency may be assessed in the work place or in a simulated work place setting</p> |

COMMON COMPETENCIES

UNIT OF COMPETENCY: **PERFORM MENSURATION AND CALCULATION**

UNIT CODE **:** **ALT311202**

UNIT DESCRIPTOR **:** This unit includes identifying caring, handling and use of 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 <i>measuring instrument</i> 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 <i>Calculation</i> 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 must kept free from corrosion 3.2 Measuring instruments not dropped to avoid damage 3.3 Measuring instruments cleaned before and after using. |

RANGE OF VARIABLES

| VARIABLE | RANGE |
|--------------------------|---|
| 1. Measuring instruments | Measuring instruments includes: 1.1 Multi-tester 1.2 Vernier caliper (Out,inside) 1.3 Push-pull gage. 1.4 Thickness gauge 1.5 Steel ruler 1.6 Torque Gauge |
| 2. Calculation | Kinds of Part Mensuration include: 2.1 Area 2.2 Inside diameter 2.3 Circumference 2.5 Length 2.6 Thickness 2.7 Outside diameter 2.8 Taper 2.9 Out of roundness 2. 10 Oil clearance 2.11 Oil clearance |

EVIDENCE GUIDE

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|---|--|
| 1 Critical aspects 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 2.2 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 3.1 Performing calculation by Addition, Subtraction, Multiplication and Division 3.2 Visualizing objects and shapes 3.3 Interpreting formula for volume, area, perimeter and other geometric figures |
| 3 Resource implications | The following resources must 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 must be assessed through: 5.1 Observation with questioning 5.2 Written or oral examination 5.3 Interview 5.4 Demonstration with questioning |
| 6. Context for assessment | 6.1 Competency elements must be assessed in a safe working environment 6.2 Assessment may be conducted in a workplace or simulated environment |

EVIDENCE GUIDE

| | |
|---|--|
| 1 Critical aspects 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 2.3 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 3.4 Performing calculation by Addition, Subtraction, Multiplication and Division 3.5 Visualizing objects and shapes 3.6 Interpreting formula for volume, area, perimeter and other geometric figures |
| 4. Resource implications | The following resources must 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 must 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 6.2 Assessment may be conducted in a workplace or simulated environment |

UNIT OF COMPETENCY : **READ, INTERPRET AND APPLY ENGINEERING DRAWINGS.**

UNIT CODE : **ALT742201**

UNIT DESCRIPTOR : This unit deals with identifying, interpreting and applying automotive mechanical assembly engineering manuals / specifications in accordance with requirements of the job.

| ELEMENT | PERFORMANCE CRITERIA |
|---|---|
| 1. Identify and access engineering manuals / specifications | <i>Italicized</i> terms are elaborated in the Range of Variables 1.1 Appropriate manuals 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 Vehicle assembly manual 1.3 Vehicle quality standard manual 1.4 Vehicle specification manual |

EVIDENCE GUIDE

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|---|---|
| 1. Critical aspects of competency | Assessment requires evidence that the candidate: 1.1 Identified and accessed manual/specification 1.2 Interpreted manuals 1.3 Applied information in manuals 1.4 Stored manuals |
| 2. Underpinning knowledge and attitudes | 2.1 Types of manuals used in automotive industry 2.2 Identification of symbols used in the manuals 2.2 Identification of units of measurements 2.3 Unit conversion |
| 3. Underpinning skills | 3.1 Reading and comprehension skills required to identify and interpret automotive manuals and specifications 3.2 Accessing information and data |
| 4. Resource Implications | The following resources must be provided: 4.1 All manuals/catalogues relative to Automotive 4.2 Work order 4.3 Actual vehicle or simulator |
| 5. Method of assessment | Competency must be assessed through: 5.1 Observation with questioning 5.2 Interview |
| 6. Context for 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 : APPLY APPROPRIATE SEALANT/ADHESIVE

UNIT CODE : ALT723201

UNIT DESCRIPTOR : This competency unit covers the selection and application of sealant/adhesives.

| ELEMENT | PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables |
|---|--|
| 1. Identify appropriate Sealant/adhesive | 1.1 Sealant/adhesive is selected in line with job requirements and manufacturer's specification 1.1 Sealant/adhesive checking is performed to ensure that product is fit for use. |
| 2. Prepare surface for Sealant/adhesive application | 2.1 Surface materials are identified as per construction 2.2 Surface is cleaned and free of moisture, dust and other foreign matters to ensure maximum adhesion or seal. |
| 3. Apply sealant/adhesive evenly | 3.1 Sealant/adhesive is applied evenly on the surface in line with manufacturer's specification 3.2 Excess sealant/adhesive is removed by sanding or scrapping 3.3 Tools and equipment used to apply sealant/adhesive are appropriate to job requirements 3.4 Safety are observed and PPE are worn in accordance with industry SOP 3.5 Hazards associated with the use of sealant and adhesives are identified. |
| 4. Store/Dispose of sealant/adhesive | 4.1 Sealant/adhesive are stored as per prescribed procedure 4.2 Waste are disposed as per workshop SOP |

RANGE OF VARIABLES

| VARIABLE | RANGE |
|------------------------------|--|
| 1. Sealant/Adhesive | Sealant/adhesive includes: 1.1 Form in Place Gasket (FIPG) 1.2 Ribbon Sealer 1.3 Hametite 1.4 Silicon Body sealer 1.5 Prestite for Auto and Auto Aircon |
| 2. Adhesive/Sealant checking | Adhesive/Sealant checking includes: 2.1 Expiry date 2.2 Free of contamination 2.3 Cap/Covers 2.4 Tightly closed 2.5 Concentration |
| 3. Tools and equipment | Tools and equipment include: 3.1 Putty knife 3.2 Scraper 3.3 Compressor 3.4 Steel brush 3.5 Paint brush 3.6 Rubber hammer 3.7 Hand tools Personal protective equipment include: 3.8 Gloves 3.9 Apron 3.10 Safety shoes 3.11 Goggles 3.12 Gas mask |
| 4. Safety | Safety includes: 4.1 Ventilation 4.2 Handling of Flammable/Irritating substances 4.3 Use of Personal Protective Equipment |
| 5. Hazards | Hazard includes: 5.1 Fumes 5.2 Skin irritation 5.3 Burns |

EVIDENCE GUIDE

| | |
|--|---|
| 1. Critical aspects of competency | Assessment requires evidence that the candidate: 1.1 Identified appropriate sealant/adhesives 1.2 Prepared surface for sealant/adhesive 1.3 Applied sealant/adhesive 1.4 Stored unused or dispose of used sealant/adhesive |
| 2. Underpinning knowledge and attitude | 2.1 OH & S regulations 2.2 Safe handling of sealant/adhesive 2.3 Industry code of practice 2.4 Procedures in sealant/adhesive application 2.5 Procedures in interpreting manuals |
| 3. Underpinning skills | 3.1 Handling sealant/adhesive 3.2 Applying sealant/adhesive 3.3.Sanding the surface 3.4 Use of tools, equipment 3.5 Mixing of body filler and epoxy base and hardener |
| 4. Resource implications | The following resources must be provided: 4.1 Materials relevant to the activity 4.2 Appropriate tools and equipment 4.3 Real or simulated workplace |
| 5. Method of assessment | Competency must be assessed through 5.1 Observation with questioning 5.2 Interview related to: <ul style="list-style-type: none"> • Safe and correct use of tools and equipment • Application of adhesive/sealant |
| 6. Context of assessment | 6.1 Competency elements must be assessed in a safe working environment 6.2 Assessment may be done in a workplace or simulated environment |

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 materials are also incorporated in this competency

| ELEMENT | PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables |
|---|--|
| 1. Inspect/clean tools and work area | 1.1 Cleaning solvent used as per workshop/tools <i>cleaning requirement</i> 1.2 <i>Work area</i> 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. Cleaning requirement | 1.1 Cleaning solvent 1.2 Inventory of supplies, tools, equipment, facilities 1.3 List of electricians/technicians 1.4 Rags 1.5 Broom 1.6 Map 1.7 Pail 1.8 Used oil container 1.9 Oiler 1.10 Dust/waste bin |
| 2. Work Area | Work areas include: 2.1 Workshop areas for assembly of automotive vehicle and/or outdoor power equipment 2.2 Open workshop and enclosed, ventilated office area 2.3 Other variables may include workshop with: <ul style="list-style-type: none"> • Mess hall • Wash room • Comfort room |

EVIDENCE GUIDE

| | |
|---|--|
| 1. Critical aspects of competency | Assessment requires evidence that the candidate: 1.1 Cleaned workshop tools/facilities 1.2 Maintained equipment, tools and facilities 1.3 Disposed wastes and used lubricants/fluid as per required procedure |
| 2. Underpinning knowledge and attitudes | 2.1 5S or TQM 2.2 Service procedures 2.3 Relevant technical information 2.4 Safe handling of Equipment and tools 2.5 Vehicle safety requirements 2.6 Workshop policies 2.7 Personal safety procedures 2.8 Fire Extinguishers and prevention 2.9 Storage/Disposal of Hazardous/flammable materials 2.10 Positive Work Values (Perseverance, Honesty, Patience, Attention to Details) |
| 3. Underpinning skills | 3.1 Handling/Storing of tools/equipment/supplies and material 3.2 Cleaning grease/lubricants 3.3 Disposing of wastes and fluid 3.4 Preparing inventory of s/m and tools and equipment 3.5 Monitoring of s/m and tools/equipment |
| 4. Resource implications | The following resources must be provided: 4.1 Workplace: Real or simulated work area 4.2 Appropriate Tools & equipment 4.3 Materials relevant to the activity |
| 5. Method of assessment | Competency must be assessed through: 5.1 Written/Oral Questioning 5.2 Demonstration 5.3 Assessment of underpinning knowledge and practical skills may be combined. |
| 6. Context of assessment | 6.1 Competency must be assessed on the job or simulated environment. 6.2 The assessment of practical skills must take place after a period of supervised practice and repetitive experience. |

CORE COMPETENCIES

UNIT OF COMPETENCY: SELECT AND CLASSIFY MATERIALS/PARTS FOR ASSEMBLY OF WIRING HARNESS

UNIT CODE : ALT827324

UNIT DESCRIPTOR : This competency unit covers the ability to select and identify materials/parts of a wiring harness in accordance with the company procedure. This competency also includes the delivery of the materials/parts to assembly line

| ELEMENT | PERFORMANCE CRITERIA |
|--|---|
| | <i>Italicized terms</i> are elaborated in the Range of Variables |
| 1. Read and understand job sheet | 1.1 Job sheets and manual instructions are understood and followed correctly |
| 2. Select and classify materials/parts for the job | 2.1 Materials/parts list is read and interpreted to establish requirements for the job in accordance with the instructions or job sheets to company standard operating procedures 2.2 Materials/parts are picked-up by matching part number, wire gages/sizes, appearance, color of electrical wires in the warehouse bin/container and floor stack areas |
| 3. Deliver materials/parts to assembly line | 3.1 Appropriate handling equipment are used ensuring for the safety and maintaining proper identification of materials /components when delivered to assembly line 3.2 Materials/parts are delivered into their respective working station in accordance with the company's assembly station area/layout |

RANGE OF VARIABLES

| VARIABLE | RANGE |
|---|--|
| 1. Manuals | 1.1 Materials/Parts List 1.2 Engineering Manuals like assembly process 1.3 Standard Operation Sheet |
| 2. Company standard operating procedure | 2.1 Job order 2.2 Requisition slip 2.3 Wearing of personal protective equipment such as apron, gloves, gas mask, goggles, ear plug |
| 3. Handling Equipment | 3.1 Plastic "Tote" bins 3.2 Push carts 3.3 Wire Spool |

EVIDENCE GUIDE

| | |
|--|--|
| <p>1. Critical aspects of competency</p> | <p>Assessment requires evidence that the candidate:</p> <p>1.1 Obtained parts and materials for the job.</p> <p>1.2 Interpreted materials/parts list and job order with the requirements for the job.</p> |
| <p>2. Underpinning knowledge and attitudes</p> | <p>1.1 Wiring harness assembly terminology</p> <p>1.2 Types and sizes of harness wires</p> <p>1.3 Wiring harness parts/components</p> <p>1.4 Use and application of personal protective equipment for crimping and soldering</p> <p>1.5 Use of appropriate handling equipment</p> <p>1.6 Safe work practices and procedures</p> <p>1.7 Positive Work values (Perseverance, Honesty, Attention to details)</p> |
| <p>2. Underpinning skills</p> | <p>3.1 Undertaking material preparation</p> <p>3.2 Reading and interpreting routine information on written job instructions, specifications and standard operating procedures</p> <p>3.3 Following oral instruction</p> <p>3.4 Speaking and listening skills</p> <p>3.5 Reading and writing skills</p> |
| <p>4 Resource implications</p> | <p>The following resources MUST be provided:</p> <p>4.1 Workplace: Real or simulated work area</p> <p>4.2 Appropriate Tools & equipment</p> <p>4.3 Materials relevant to the activity</p> <p>4.4 The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials</p> |
| <p>5 Method of assessment</p> | <p>Competency MUST be assessed through:</p> <p>5.1 Observation with questioning</p> <p>5.2 Portfolio</p> |
| <p>6 Context of assessment</p> | <p>6.1 Competency may be assessed on the job or simulated environment.</p> <p>6.2 The assessment of practical skills must take place after a period of supervised practice and repetitive experience.</p> |

UNIT OF COMPETENCY: PERFORM CUTTING AND STRIPPING OF ELECTRICAL WIRES

UNIT CODE : ALT827325

UNIT DESCRIPTOR : This competency unit covers the ability to perform cutting and stripping of electrical wires to specification that forms as a part of electrical harness of an automotive vehicle

| ELEMENT | PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables |
|---|---|
| 1. Select and use tools and equipment / machine | 1.1 Tools and equipment are selected to meet job requirements. 1.2 Tools and equipment are checked to ensure they are in good working order. 1.3 Appropriate cutting/stripping machines are selected and used in accordance with OH&S requirements |
| 2. Cut and strip electrical wires | 2.1 Electrical wires are cut to the prescribed or specified length using cutting machines 2.2 Insulators from both ends are removed/stripped by use of stripping machine 2.3 Workflow and production output are recorded and maintained |
| 3. Inspect cut and strip portion | 2.1 Inspection procedure is undertaken to standard operating procedures 2.2 Inspection results are reported/recorded to standard operating procedures as required |
| 4. Clean up the area | 4.1 At the end of the shift, cleaning up of working area is done to maintain cleanliness and orderliness of the shop floor area |

RANGE OF VARIABLES

| VARIABLE | RANGE |
|-------------------------|---|
| 1. Cutting machines | 1.1 Automatic cutting machine 1.2 Manual cutting machine |
| 2. Stripping machines | 2.1 Motor driven stripper 2.2 Manual stripping machine |
| 3. Inspection Procedure | 3.1 Visual 3.2 Mechanical or electric with pre-setup equipment |

EVIDENCE GUIDE

| | |
|---|--|
| 1. Critical aspects of competency | Assessment requires evidence that the candidate: Performed cutting and stripping process in accordance with company procedures |
| 2. Underpinning knowledge and attitudes | 2.1 Read and interpret job order 2.2 Wiring harness assembly terminology 2.3 Types and sizes of harness wires 2.4 Wiring harness parts/components 2.5 Use and application of personal protective equipment 2.6 Safe work practices and procedures 2.7 Positive Work Values (Honesty, Perseverance, Attention to Details) |
| 3. Underpinning skills | 3.1 Accessing, interpreting and applying technical information 3.2 Using relevant tools and equipment safely 3.3 Applying maintenance procedures 3.4 Speaking and listening skills 3.5 Reading and writing skills 3.6 Using and interpreting measurements |
| 4. Resource implications | The following resources MUST be provided: 4.1 Workplace: Real or simulated work area 4.2 Appropriate Tools & equipment 4.3 Materials relevant to the activity 4.4 Job order and related reference materials |
| 5. Method of assessment | Competency MUST be assessed through: 5.1 Direct observation with questioning 5.2 Portfolio |
| 6. Context of assessment | 6.1 Competency may be assessed on the job or simulated environment. 6.2 The assessment of practical skills must take place after a period of supervised practice and repetitive experience. |

UNIT OF COMPETENCY : PERFORM CRIMPING AND SOLDERING OF TERMINALS

UNIT CODE : ALT827326

UNIT DESCRIPTOR : This competency unit covers the ability to perform crimping and soldering of terminal plate into electrical wires to specification that forms as a part of electrical harness of automotive vehicles

| ELEMENT | PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables |
|------------------------------------|--|
| 1. Prepare materials for soldering | 1.1 Materials preparation instructions are followed 1.2 Materials are prepared using correct tools and equipment , materials and procedures 1.3 Materials are prepared to specifications using instruction or standard operating procedures |
| 2. Crimp terminals | 2.1 Terminals of different kinds are connected to the wire stripped by crimping parts on terminals by use of crimping machine 2.2 Workflow and production output are recorded and maintained |
| 3. Solder materials | 3.1 Correct soldering techniques , procedures, materials and soldering tools are selected 3.2 Materials to be jointed, mounted, shaped are to specification using standard operating procedures 3.3 Solder is applied using correct and appropriate techniques 3.4 Where appropriate, excess material is removed using correct tools and techniques 3.5 Procedures for the protection of components are observed according to standard operating procedures. |
| 4. Inspect crimp and solder joints | 4.1 Inspection procedure is undertaken to standard operating procedures 4.2 Inspection results are reported/recorded to standard operating procedures as required |
| 5. Clean up the area | 5.1 At the end of the shift, cleaning up of working area is done to maintain cleanliness and orderliness of the shop floor area |

RANGE OF VARIABLES

| VARIABLE | RANGE |
|-------------------------|--|
| 1. Materials | 1.1 Solder – solid, resin core and plate 1.2 Flux – resin or powder |
| 2. Instruction | 2.1 Verbal 2.2 Written job sheet |
| 3. Tools and equipment | 3.1 Soldering irons 3.2 Cutters 3.3 Brushes 3.4 Files 3.5 Soldering tips 3.6 Solder syringes 3.7 Holding devices |
| 4. Soldering techniques | 4.1 Soldering plate by immersion 4.2 soft soldering 4.3 Manual soldering 4.4 High reliability |
| 5. Inspection Procedure | 5.1 Visual 5.2 Mechanical or electric with pre-setup equipment |

EVIDENCE GUIDE

| | |
|---|---|
| 1. Critical aspects of competency | Assessment requires evidence that the candidate: 1.1 Prepared materials for crimping and soldering 1.2 Crimped terminals and soldered materials 1.3 Inspected crimp and soldered joints |
| 2. Underpinning knowledge and attitudes | 2.1 Cleaning solutions and properties and cleaning procedures 2.2 Use and application of personal protective equipment for crimping and soldering 2.3 Parts and functions of crimping machine 2.4 Safe work practices and procedures 2.5 Method of solder preparation 2.6 Properties of fluxes and their applications/uses 2.7 Heat and damage protection procedures 2.8 Soldered joint testing and inspection procedures 2.9 Reworking procedures and precautions. 2.10 Positive Work values (Perseverance, Honesty, Attention to details) |
| 3. Underpinning skills | 3.1 Performing routine soldering process 3.2 Performing routine crimping process 6.1 Undertaking material preparation 6.2 Reading and interpreting routine information on written job instructions, specifications and standard operating procedures 3.5 Following oral instruction |
| 4. Resource implications | The following resources MUST be provided: 4.1 Battery to be tested can be separated or to be taken from vehicle 4.2 Appropriate tools and equipment 4.3 Materials relevant to the activity 4.4 The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials |
| 5. Method of assessment | Competency MUST be assessed through 5.1 Observation with questioning 5.2 Portfolio |
| 6. Context of assessment | Competency must be assessed on-the-job. |

UNIT OF COMPETENCY : **PERFORM TYING, TAPING AND FINISHING OF ASSEMBLY WIRES**

UNIT CODE : **ALT827327**

UNIT DESCRIPTOR : This competency unit covers the ability to perform tying, taping and finishing of assembly wires as part of assembly process on forming board to specification that forms as a part of electrical harness of an automotive vehicles

| ELEMENT | PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables |
|--|---|
| 1. Prepare materials for the job | 1.1 Materials are prepared in accordance with <i>instructions</i> 1.2 Materials are prepared using tools, equipment, materials and procedures appropriate to the task 1.3 Materials are prepared to specifications using instruction or standard operating procedures |
| 2. Perform tying, taping and finishing on assembly wires | 2.1 Materials to be tied, taped and finished are to specification using standard operating procedures 2.2 <i>Tying, taping and finishing</i> of assembly wires process is applied using appropriate tools and techniques 2.3 Where appropriate, excess material is removed using correct tools and techniques 2.4 Procedures for the protection of components are observed according to standard operating procedures. 2.5 Workflow and production output are recorded and maintained to standard operating procedures |
| 3. Inspect jointed assembly wires | 3.1 <i>Inspection procedure</i> is undertaken to standard operating procedures 3.2 Inspection results are reported/recorded to standard operating procedures as required |
| 4. Clean up the area | 4.1 Cleaning up of working area is done to maintain cleanliness and orderliness of the shop floor area |

RANGE OF VARIABLES

| VARIABLE | RANGE |
|--------------------------------|--|
| 1. Instruction | 1.1 Verbal 1.2 Written job sheet |
| 2. Tying, taping and finishing | 2.1 Tying is done using plastic cable type and with varying sizes 2.2 Taping is done using a PVC type tape 2.3 Finishing is practically cleaning of terminals with flux and testing of continuity. |
| 3. Inspection Procedure | 3.1 Visual 3.2 Mechanical or electric with pre-setup equipment |

EVIDENCE GUIDE

| | |
|---|--|
| 1. Critical aspects of competency | Assessment requires evidence that the candidate performed tying, taping and finishing of assembly wires in accordance with company procedures. |
| 2. Underpinning knowledge and attitudes | 2.1 Cleaning solutions and properties and cleaning procedures 2.2 Use and application of personal protective equipment for tying, taping and finishing operations 2.3 Safe work practices and procedures 2.4 Method of joint soldering preparation 2.5 Properties of fluxes and their applications/uses 2.6 Heat and damage protection procedures 2.7 Soldered joint testing and inspection procedures 2.8 Reworking procedures and precautions. 2.9 Positive Work values (Perseverance, Honesty, Attention to details) |
| 3. Underpinning skills | 3.1 Performing routine tying, taping and finishing process 3.2 Undertaking material preparation 3.3 Reading and interpreting routine information on written job instructions, specifications and standard operating procedures 3.4 Following oral instruction |
| 4. Resource implications | The following resources MUST be provided: 4.1 Assembly Forming board/jig 4.2 Appropriate tools and equipment 4.3 Materials relevant to the activity 4.4 The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials |
| 5. Method of assessment | Competency MUST be assessed through 5.1 Direct observation with questioning 5.2 Portfolio |
| 6. Context of assessment | Competency must be assessed on-the-job |

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 AUTOMOTIVE WIRING HARNESS ASSEMBLY NC II.

3.1 CURRICULUM DESIGN

Course Title: **AUTOMOTIVE WIRING HARNESS ASSEMBLY**

NC Level **NC II**

Nominal Training Duration: **18 Hours** (Basic Competencies)
 20 Hours (Common Competencies)
 96 Hours (Core Competencies)

Course Description:

This course is designed to enhance the knowledge, skills and attitudes of an individual in the field of automotive wiring harness assembly in accordance with industry standards. It covers competencies such as: select and classify materials and parts for assembly of wiring harness; perform cutting and stripping of electrical wires; perform crimping and soldering of terminals and perform tying, taping and finishing of assembly wires.

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

BASIC COMPETENCIES

| Unit of Competency | Learning Outcomes | Methodology | Assessment Approach |
|---|---|--|---|
| 1. Participate in workplace communication | 1.1 Obtain and convey workplace information 1.2 Participate in workplace meeting and discussions 1.3 Complete relevant work related documents | <ul style="list-style-type: none"> • Group discussion • Interaction • Lecture • Reportorial | <ul style="list-style-type: none"> • Written test • Practical/ performance test • Interview |
| 2. Work in a team environment | 2.1 Describe and identify team role and responsibility in a team. 2.2 Describe work as a team member. | <ul style="list-style-type: none"> • Group discussion • Case studies • Simulation | <ul style="list-style-type: none"> • Written test • Observation • Simulation • Role playing |
| 3. Practice career professionalism | 3.1 Integrate personal objectives with organizational goals 3.2 Set and meet work priorities 3.3 Maintain professional growth and development | <ul style="list-style-type: none"> • Interactive lecture • Structure activity • Simulation • Demonstration • Self-paced instruction | <ul style="list-style-type: none"> • Role play • Interview • Written examination |

| Unit of Competency | Learning Outcomes | Methodology | Assessment Approach |
|---|--|--|--|
| 4. Practice occupational health and safety procedures | 4.1 Identify hazards and risks 4.2 Evaluate hazards and risks 4.3 Control hazards and risks 4.4 Maintain occupational health and safety awareness | <ul style="list-style-type: none"> • Interactive lecture • Simulation • Symposium • Group dynamics • Film viewing | <ul style="list-style-type: none"> • Situational analysis • Interview • Practical examination • Written exam • Portfolio assessment |

COMMON COMPETENCIES

| Unit of Competency | Learning Outcomes | Methodology | Assessment Approach |
|---|--|---|---|
| 1. Perform mensuration and calculation | 1.1 Select measuring instruments 1.2 Carry out measurements and calculation 1.3 Maintain measuring instruments | <ul style="list-style-type: none"> • Lecture/ Demonstration • Practical exercises • Simulation | <ul style="list-style-type: none"> • Written test • Oral questioning • Direct observation |
| 2. Read, interpret and apply engineering manuals/specifications | 2.1 Identify/access engineering manuals / specification 2.2 Interpret manual 2.3 Apply information in manual 2.4 Store manuals | <ul style="list-style-type: none"> • Lecture/ Demonstration • Dual training | <ul style="list-style-type: none"> • Direct observation • Interview |
| 3. Apply appropriate sealant/adhesive | 4.1 Identify appropriate sealant/adhesive 4.2 Prepare surface for sealant / adhesive application 4.3 Store unused and dispose used sealant/adhesive | <ul style="list-style-type: none"> • Lecture/ Demonstration • Dual training • Distance learning | <ul style="list-style-type: none"> • Written test • Oral questioning • Direct observation • Interview • Project method |
| 4. Perform shop maintenance | 5.1 Inspect/clean tools and work area 5.2 Store/arrange tools and shop equipment 5.3 Dispose waste/used lubricants 5.4 Report damaged tools/equipment | <ul style="list-style-type: none"> • Lecture/ Demonstration • Dual training • Self-paced (modular) | <ul style="list-style-type: none"> • Written test • Direct observation • Interview • Practical exercises |

CORE COMPETENCIES

| Unit of Competency | Learning Outcomes | Methodology | Assessment Approach |
|--|--|---|---|
| 1. Select and classify materials / parts for wiring harness assembly | 1.1 Read and understand job sheet 1.2 Select and classify materials/parts for the job 1.3 Deliver materials/parts to assembly line | <ul style="list-style-type: none"> • Demonstration • Discussion • Dual training • Distance learning | <ul style="list-style-type: none"> • Demonstration of practical skills • Direct observation • Interview |
| 2. Perform cutting and stripping of electrical wires | 2.1 Select and use tools and equipment/machine 2.2 Cut strip electrical wires 2.3 Inspect cut and strip portion 2.4 Clean up the area | <ul style="list-style-type: none"> • Demonstration • Discussion • Dual training • Distance learning | <ul style="list-style-type: none"> • Demonstration of practical skills • Direct observation • Interview |
| 3. Perform crimping and soldering of terminals | 3.1 Prepare materials for soldering 3.2 Crimp terminals 3.3 Solder materials 3.4 Inspect crimp and solder joints 3.5 Clean up the area | <ul style="list-style-type: none"> • Demonstration • Discussion • Dual training • Distance learning | <ul style="list-style-type: none"> • Written examination • Demonstration of practical skills • Direct observation • Interview |
| 4. Perform tying, taping and finishing of assembly wires | 4.1 Prepare materials for jointing 4.2 Joint assembly wires 4.3 Inspect jointed assembly wires 4.4 Clean up the area | <ul style="list-style-type: none"> • Demonstration • Discussion • Dual training • Distance learning | <ul style="list-style-type: none"> • Written examination • Demonstration of practical skills • Direct observation • Interview |

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:

- can communicate both orally and in writing; and
- physically and mentally fit

This list does not include specific institutional requirements such as educational attainment, appropriate work experience, and others that may be required of the trainees by the school or training center delivering the TVET program.

3.4 TOOLS, EQUIPMENT AND MATERIALS AUTOMOTIVE WIRING HARNESS ASSEMBLY NC II

Recommended list of tools, equipment and materials for the training of 20 trainees for AUTOMOTIVE WIRING HARNESS ASSEMBLY NC II

| TOOLS | | EQUIPMENT | | MATERIALS | |
|---------|------------------------|-----------|--|-----------|--------------------------------------|
| QTY | | QTY | | QTY | |
| 4 units | Soldering gun/iron | 1 unit | Crimping machine | 20 pcs. | Apron |
| 4 sets | Wire strippers/cutters | 1 unit | Automatic or manual cutting machine | 20 pcs. | Goggles |
| | Brushes | 1 unit | Motor-driven or manual stripping machine | 20 sets. | Gloves |
| 4 pcs | Files | 1 unit | Wiring board | 4 sets | Solder – solid, resin core and plate |
| 4 pcs | Soldering tips | | | 4 sets | Flux – resin or powder |
| 4 sets | Solder syringes | | | 50 rolls | PVC tape |
| 1 set | Holding devices | | | assorted | Plastic cable tie |
| 5 sets | Hand tools | | | 1 lot | Automotive wires (assorted sizes) |
| | | | | 1 lot | Terminal lugs (assorted) |

3.5 TRAINING FACILITIES AUTOMOTIVE WIRING HARNESS ASSEMBLY NC II

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 assembly of automotive wiring harness.

| 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** | - | - | 183.00 |

**** Area requirement is equivalent to 30% of the total teaching/learning areas**

3.6 TRAINERS' QUALIFICATION AUTOMOTIVE/LAND TRANSPORT SECTOR

AUTOMOTIVE WIRING HARNESS ASSEMBLY NC II TRAINER QUALIFICATION (TQ II)

- Must be a holder of AUTOMOTIVE WIRING HARNESS ASSEMBLY NC II
- Must have undergone training on Training Methodology II (TM II) ¹
- Must be computer literate
- Must be physically and mentally fit
- Must have at least 2 years job/industry experience²
- Must be a civil-service eligible or holder of appropriate professional license issued by the Professional Regulatory Commission (for government positions)

¹ 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

² 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 AUTOMOTIVE WIRING HARNESS ASSEMBLY NC II, 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 AUTOMOTIVE WIRING HARNESS ASSEMBLY NC II 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 Select and Classify Materials / Parts for Wiring Harness Assembly
 - 4.2.2 Perform Cutting and Stripping of Electrical Wires
 - 4.2.3 Perform Crimping and Soldering of Terminals
 - 4.2.4 Perform Tying, Taping and Finishing of Assembly Wires
- 4.3 Upon 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 Graduates of formal, non-formal and informal including enterprise-based training programs.
 - 4.5.2 Experienced workers (wage employed or self employed)
- 4.6 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 ASSEMBLY)**

| | | | | | | | | |
|----------------------------|---|--|--|---|--|--|-----------------------------------|---|
| CORE COMPETENCIES | Install/Fit out Electrical Parts to Engine Assembly | Install/Fit out Electronic Units to Body Interior Components | Install/Fit out Electrical Parts & Electronic Units to Dash Board Instrument Panel | Install/Fit out Electrical Parts to Exterior and Engine Compartment | Install/Fit out Audio and Video Systems | Perform Headlight Focus Aiming Operation | | |
| | Rectify Faults on Installed electrical Parts to Engine Assembly | Rectify Faults on Installed Electrical Parts and Electronic Units to Body Interior | Rectify Faults on Installed Electrical Parts and Electronic Units to Dash Instrument Panel | Rectify Faults on Installed Electrical Parts to Exterior and Engine Compartment | Rectify Faults on Installed Audio and Video System | | | |
| | Assemble Mechanical Assemblies Using Jigs/ Fixtures | Mount/ Install Brake Fuel System | Mount/ Install Suspension Drive System | Mount/ Install Power Drive System | Install/Fit Trim Parts/Components | Perform Final Engine Run | Perform Wheel Alignment Operation | |
| | Perform Engine Hot Test | Rectify Assembly Faults on Assembled Mechanical Assemblies | Rectify Faults on Mounted/Installed Brake and Fuel System | Rectify Faults on Mounted/Installed Power Drive System | Rectify Faults on Mounted/Installed Suspension Drive Train | | | |
| | Select and Classify Materials/Parts for Wiring Harness Assembly | Perform Cutting and Stripping of Electrical Wires | Perform Crimping and Soldering Terminals | Perform Tying, Taping and Finishing of Assembly Wires | | | | |
| COMMON COMPETENCIES | Perform Mensuration and Calculation | Read, Interpret and Apply Engineering Manual and Specifications | Apply Appropriate Sealant/Adhesives | Perform Shop Maintenance | Move and Position Vehicle | | | |
| | | | | | | | | |
| BASIC COMPETENCIES | 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:
AUTOMOTIVE WIRING HARNESS ASSEMBLY NC II

DEFINITION OF TERMS

1. **Automotive Vehicles** These are motor vehicles whose gross vehicle weight is equal or less than 3,500 kgs. Powered by a gas or diesel engine. It could be a passenger car or a light utility vehicle
2. **Automotive Electrical Assembly Technician** Refers to an all around auto electrical assembly man that can perform all electrical assembly works from assembling of electrical assemblies to mounting and installation to automotive vehicle body.
3. **Adhesives** Substance used to hold gasket in place during assembly. It also maintains a tight seal by filling in small irregularities on a surface and prevents gasket from shifting due to vibration.
4. **Point of Fit** Refers to the assembly area where parts / materials / assemblies are used or consumed
5. **Electronics** Electrical assemblies, circuit and system that use electronic devices such as transistors and diodes
6. **Hardware Parts** Refers to bolts, nuts, screws, washers and other small parts
7. **Catalytic Converter** Emission The control device fitted in the exhaust system of an internal combustion engine. The converter reduces the toxicity of products of combustion by catalytic re-combination
8. **Assembly Manuals** Reference manuals with illustration or drawings of parts/components and its direction on how they are mounted or installed on the automotive vehicle or certain assemblies.
9. **Quality Inspection Manuals** Reference manuals with explanation on what quality standards have to be maintained in the conduct of assembling automotive vehicle
10. **Work Order** A work order is a form of instruction that is broadcasted either by manual or by electronic system by preceding stations to the next stations regarding on what model sequence to produce on a timely-structured manner.
11. **Job Requirements** Refers to specific specifications of model/variant to be assembled.
12. **Standard Operation Sheet** Is a listing of process elements arrange according to the assembly sequence for a given job requirements
13. **Fuel Injection** An electronic system that increases the performance ad fuel economy because it monitors engine conditions and provides the correct air/fuel mixture based on the engine's demand. It injects fuel directly into the cylinder head enabling more precise control over the quantity used.
14. **Jigs/fixtures** Kind of equipment that is used for sub-assembly operations in order to meet the desired dimensions and outcome of a certain assembly.
15. **Crimping** Joining two pieces of metal or other malleable material by deforming one or both of them to hold the other. The bend or

deformity is called the **crimp**.

Crimping is most extensively used in metalworking. It is not generally used of specialised connectors that are designed to be deformed, but only of workpieces. Crimping is commonly used to join bullets to their cartridge cases, and for rapid but lasting electrical connectors. Because it can be a cold-working technique, crimping can also be used to form a strong bond between the workpiece and a non-metallic component. Sometimes, a similar deformity created for reasons other than forming a join may also be called a crimp

16. Wiring harness

Wire harness also known as cable harness, cable assembly, wiring assembly or wiring loom; is a string of cables and/or wires which transmit informational signals or operating currents (energy). The cables are bound together by clamps, cable ties, sleeves, electrical tape, conduit, a weave of extruded string, or a combination thereof.

Commonly utilized in automobiles, as well as construction machinery, modern-day cable harnesses provide several advantages over loose wires and cables. For example, many aircraft, automobiles and spacecraft contain many masses of wires which would stretch over several kilometers if fully extended. By binding the many wires and cables into a cable harness, the wires and cables can be better secured against the adverse effects of vibrations, abrasions, and moisture. By constricting the wires into a non-flexing bundle, usage of space is optimized, and the risk of a short is decreased. Since the installer has only one harness to install (as opposed to multiple wires), installation time is decreased and the process can be easily standardized. Binding the wires into a flame-retardant sleeve also lowers the risk of electrical fires.

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- Aquaculture NC II
- Automotive Body Painting/Finishing NC II
- Automotive Body Repair NC II
- Automotive Engine Rebuilding NC II
- AUTOMOTIVE WIRING HARNESS ASSEMBLY NC II
- Bartending NC II
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