NATIONAL COUNCIL FOR TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING

JANUARY 2023

PROPOSED OCCUPATIONAL STANDARDS

OCCUPATION: NEW-ENERGY VEHICLE TECHNICIAN

LEVEL: NTA 5

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ABBREVIATIONS

ABS	Anti-lock Braking System
BMS	Power Battery Management System
CBET	Competency Based Education and Training
CNG	Compressed Natural Gas
DMA	Driving Motor Assembly
ESP	Electronic Stability Program
EV	Electric Vehicle
HEV	Hybrid Electric Vehicle
LNG	Liquefied Natural Gas
MCU	Motor Control Unit
NACTVET	National Council for Technical and Vocational Education and Training
NOS	National Occupational Standards
OS	Occupational Standards
PHEV	Plug-in Hybrid Electric Vehicle
TET	Technical Education and Training
TVET	Technical and Vocational Education and Training

GLOSSARY OF TERMS

Circumstantial Knowledge:	Detailed knowledge, which allows the decision-making in regard to different circumstances and cross cutting issues.
Competence:	The ability to use knowledge, understanding, practical, and thinking skills to perform effectively to the workplace standards required in employment.
Competency:	A description of the ability one possesses when able to perform a given occupational task effectively and efficiently.
Competency-based Education:	An instructional programme that derives its content from validated tasks and bases assessment on the learner's performance.
Curriculum:	A description or composite of statements about "what is to be learned" by the trainee/student in a particular instructional programme; a product that states the "intended learning outcomes".
Educational/Training Programme:	The complete curriculum and instruction (what and how) that is designed to prepare a person for employment in a job or other particular performance situation.
Occupation:	A specific position requiring the performance of specific tasks – essentially the same tasks are performed by all employees having the same title. (Example: baker)
Occupational Area:	This is a broad grouping of related jobs. (Example: food service)
Occupational Competence:	The application of knowledge and skills that consistently meet the standards required by the work context.
Occupational Standards:	Specific requirements of competences people are expected to demonstrate in a particular occupational area, including knowledge and relevant attitudes. They also act as a performance tool of assessment of the prescribed outcomes.
Occupational/Job Analysis:	A process used to identify the tasks that are important to employees in any given occupation**.**
Performance Criteria:	Indicate expected end results or outcomes in the form of evaluative statements.
Skills:	The ability to perform occupational tasks with a high degree of proficiency within a given occupation. Skill is conceived of as a composite of three completely interdependent components: cognitive, affective, and psychomotor.

Standards:	A set of statements, which if proved true under working conditions, means that an individual is meeting an expected level and type of performance.
Task Analysis:	The process of analysing each task to determine the steps, circumstantial knowledge, attitudes, performance standards, tools and materials needed, as well as safety concerns required for the employees performing it.
Task:	A work activity that has a definite beginning and ending, is observable or measurable, and consists of two or more definite steps that leads to a product, service, or decision.
Underpinning Knowledge:	Crucial knowledge that an individual must acquire in order to demonstrate competences that are associated in performing a given task.
Verification Process:	The process of having experts review and confirm the importance of the task (competency) statements identified through occupational analysis. Other questions, such as the degree of task learning difficulty are also frequently asked. This process is also sometimes referred to as validation.

1.0. INTRODUCTION

Technical Education and Training (TET) is one of the most important education sub-sectors in Tanzania, responsible for developing a skilled workforce to support the country's industrialization economic agenda. Tanzania's *Development Vision 2025* intends to raise the country's economy to a middle-income status. This requires a skilled workforce that is aligned with the needs of the public and private sectors of the economy. The National Council for Technical Education has begun the job of drafting Occupational Standards that will eventually be adopted as National Occupational Standards for TET in order to ensure that it meets the needs of the labour market and the country's economic agenda.

National Occupational Standards (NOS) are performance criteria that are matched with labour market demands. Each National Occupation Standard describes functions, performance standards, and knowledge/understanding for one important function or task. They combine skills, knowledge, and attitudes to describe best practice. They are useful tools for establishing job roles, personnel recruiting, supervision, and appraisal, as well as TET standards. They're also helpful for benchmarking and harmonizing qualifications on a national and international level. Standards, in general, provide a solid framework for high-quality TET that is labour market-relevant, current, and consistent in delivery across all public and private institutions.

However, it must be noted that, Occupational Standards and Training standards/qualifications standards are different. Occupational standards are defined in terms of activities performed by a person in a selected occupation (e.g., an electrical engineer designs electrical wiring circuits, performs troubleshooting in electrical wiring, etc.) and they are usually defined by employers following procedures agreed upon by all stakeholders. Education and training standards are developed from the activities defined in occupational standards, and they include learning objectives to ensure that the necessary skills and knowledge are developed by a person to enable him or her to function at an agreed level in an occupation. Education and Training standards are used to define curricula in training institutions. It is however critical that there must be a direct link between the occupational standards and the training standards to respond to the demands of the labour market.

In TET delivery, Tanzania adopted the Competence Based Education and Training (CBET) approach. The CBET approach focuses on providing learners with the skills and knowledge required to meet the occupational standards. Occupational standards are thus the starting point for developing competency-based training (CBET) programmes. TET institutions will be required to benchmark their curricula with relevant occupational standards.

Occupational Standards are developed based on a given occupation's current and future demands. As a result, they serve as a means of bridging the gap between the worlds of employment and technical education and training (TET).

The New-Energy Vehicle Technician Occupation has its own set of occupational standards. The document explains how the occupational standards were developed, as well as the scope, the occupational profile in the form of DACUM charts, and the Occupational Standards.

2.0. OCCUPATIONAL STANDARD DEVELOPMENT PROCESS

The Occupational standards development process began with an examination of major documents that guide Tanzanian skill development. The 10-year National Skills Development Strategy (2016-2026) was one of the documents reviewed, and it outlined six (6) economic sectors that should be prioritized when developing skills development programmes.

These sectors include: Transport and Logistics, Tourism and Hospitality, Agribusiness, Construction, Energy and ICT. NACTE labour market reports were also used in the literature review to determine the skills demand in the Tanzanian labour market as a whole.

After the literature review, a workshop comprised of expert workers and educators with substantial knowledge and experience in the occupation conducted an occupational analysis utilizing the DACUM approach to produce the occupational profile. The analysis resulted in DACUM Charts, which are attached as **Appendix 1** to this document.

The occupational standards were then developed. Experts in Occupational Analysis and the Development of Occupational Standards facilitated the workshop. Interviews, online surveys, and a stakeholder forum were used to validate the Occupational Standards. Engineers, supervisory technicians on the job, and experienced New-Energy Vehicle Technicians were key informants in the survey to discover occupational trends. This information was used to gain insight from the workplaces regarding trends and changes in the profession, including how well graduates are prepared for working in the occupation. A total of ... online surveys were completed by experts from the labour market across the country. Apart from the surveys aiding in defining the scope for the occupational analysis, they also served to engage a wide cross-section of experts in the occupation. Apart from this, the stakeholders' forum was attended by ... participants from different parts of the country representing various companies.

3.0. THE SCOPE AND OVERVIEW OF THE OCCUPATION STANDARDS FOR NEW-ENERGY VEHICLE TECHNICIANS

The standards cover a broad range of duties and tasks that can be performed by a New-Energy Vehicle Technician. However, the occupational standards are not meant to replace individual job descriptions.

Instead, they are to be used for guidance in defining skill levels and knowledge for the technician in specific settings or positions. The New-Energy Vehicle Technician may perform tasks in a number of key areas of the occupational standards, but not necessarily in all areas. For example, in large operations, other individuals may be employed or designated to perform specific tasks.

The New-Energy Vehicle Technician may work under the supervision of engineers to inspect, repair, and maintain electric vehicles and alternative-fueled internal combustion locomotives. In the workshop, technicians complete a variety of maintenance work, such as high voltage system inspections, as well as dismantling, maintaining and rebuilding work on complete power system and electrical systems of new energy vehicles.

Generally, the New-Energy Vehicle Technician performs the following responsibilities:

a) New energy vehicle high voltage system inspection

b) New energy vehicle body electrical system inspection

c) New energy vehicle chassis system inspection

d) New energy vehicle high voltage power system maintenance

e) New energy vehicle braking system maintenance

f) New energy vehicle suspension system maintenance

g) New energy vehicle steering system maintenance

h) New energy vehicle high voltage power system overhaul

i) New energy vehicle body electrical system overhaul

j) New energy vehicle chassis system overhaul

k) Multi-fuel power system overhaul for new energy vehicles

The Occupational Standards have been clustered into NTA qualification levels, i.e. NTA level 4, 5 and 6.

4.0. VALIDITY PERIOD

Due to the rapid development of technology, the validity period of occupational standards is 3-5 years. The review will proceed in the same manner as the one before it, with new occupational standards being developed based on current trends of the labour market.

5.0. OCCUPATIONAL STANDARDS

5.1 OCCUPATIONAL STANDARDS FOR NEW-ENERGY VEHICLE TECHNICIAN - NTA 5

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	HIGH VOLTAGE POWER SYSTEM MAINTENANCE	**DUTY NO.**	501
TASK TITLE	CLEARANCE OF NEW ENERGY VEHICLE FAULT CODE	**TASK NO.**	5011
PERFORMANCE CRITERIA	The person performing this task must be able to clear fault codes in accordance with technical requirements and the manufacturer's maintenance manuals.		
RANGE STATEMENT	The task can be performed in an automotive maintenance workshop under the supervision of new energy vehicle senior technicians or automotive engineer/mechanical engineers. The tools and equipment to be used include: 1. Full set of vehicle toolbox; 2. Isolation barrier; 3. High voltage safety warning signs; 4. Power supply/charging post; 5. New energy vehicle fault diagnostic apparatus and accessory; 6. Personal protective equipment, such as insulating shoes, goggle, insulating gloves and gloves.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Observe the preventive measures for health and safety during working; 2. Select appropriate tools and equipment for the task; 3. Identify data link connectors; 4. Connect the diagnostic machine; 5. Scan the vehicle; 6. Read the fault code; 7. Record the fault code; 8. Explain the fault code; 9. Read the data flow; 10. Clean the code; 11. Check the performance; 12. Clean the tools, equipment and workplaces; 13. Safely arrange and store the tools and equipment.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1. Develop a maintenance plan; 1.2 Perform online diagnostics. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The reasons for not taking preventative maintenance; 2.2 Preventative maintenance plan and its importance; 2.3 Principles of automotive fault code generation; 2.4 The importance of determining fault codes. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Strategies and operating procedures for vehicle diagnosis and fault removal;

	3.2 Fault codes associated with vehicle malfunctions. **4.0 Essential Skills** The person performing this task must be able to explain the following: 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Fault codes are cleared in accordance with technical requirements and manufacturer's manuals.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of operating machines and tools; 2. Safety operation of measuring instruments; 3. Occupational health and safety.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	HIGH VOLTAGE POWER SYSTEM MAINTENANCE	**DUTY NO.**	501
TASK TITLE	MEASUREMENT OF INSULATION RESISTANCE	**TASK NO.**	5012
PERFORMANCE CRITERIA	The person performing this task must be able to correctly measure the insulation resistance of the specified component/system in accordance with technical requirements and the manufacturer's maintenance manual.		
RANGE STATEMENT	The task can be performed in an automotive maintenance workshop under the supervision of new energy vehicle senior technicians or automotive engineer/mechanical engineers. The tools and equipment to be used include: 1. Full set of vehicle toolbox; 2. Isolation barrier; 3. High voltage safety warning signs; 4. Insulating mat; 5. Tramegger; 6. Multimeters; 7. Vehicle lift; 8. Personal protective equipment, such as insulating shoes, goggle, insulating gloves and gloves.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Observe the preventive measures for health and safety during working; 2. Select appropriate tools and equipment for the task; 3. Perform high voltage cut-off; 4. Check the tramegger; 5. Make direct measurements of the insulation resistance of high voltage components with an ohmmeter; 7. Disconnect the power battery high voltage harness; 8. Check the multimeter; 9. Indirectly measure the power battery insulation resistance with a multimeter; 10. Perform high voltage power-up; 11. Clean the tools, equipment and workplaces; 12. Safely arrange and store the tools and equipment.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Perform high voltage cutoff; 1.2 Indirectly measure the power battery insulation resistance with a multimeter; 1.3 Measure the insulation resistance of passive high voltage components directly with a tramegger; 1.4 Use and measure the insulation resistance; 1.5 Perform high voltage power-up; 1.6 Check the maintenance manual. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The role of insulation resistance and the consequences of insulation failure; 2.2 Working principle of the tramegger; 2.3 Detection principle of power battery insulation.

	3.0 Theories The person performing this task must be able to explain the following: 3.1 Selection of insulation measuring tools; 3.2 Operating policies and procedures for insulation measurements. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Insulation resistance is measured i in accordance with technical requirements and manufacturer's manuals.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of operating machines and tools; 2. Safety operation of measuring instruments; 3. Occupational health and safety.

<table>
<tr><td>OCCUPATION</td><td>NEW-ENERGY VEHICLE TECHNICIAN</td><td>OCCUPATION CODE</td><td></td></tr>
<tr><td>DUTY TITLE</td><td>HIGH VOLTAGE POWER SYSTEM MAINTENANCE</td><td>DUTY NO.</td><td>501</td></tr>
<tr><td>TASK TITLE</td><td>INSPECTION OF HIGH VOLTAGE SYSTEM INTERLOCKS</td><td>TASK NO.</td><td>5013</td></tr>
<tr><td>PERFORMANCE CRITERIA</td><td colspan="3">The person performing this task must be able to perform the inspection of the high voltage interlocks in accordance with technical requirements and manufacturer's specifications and the manufacturer's specifications.</td></tr>
<tr><td>RANGE STATEMENT</td><td colspan="3">The task can be performed in a dedicated workshop for new energy vehicles under the supervision of senior technicians or new-energy vehicle engineers.
The tools and equipment to be used include:
1. Full set of vehicle toolbox;
2. Insulation detector;
3. Insulating mat;
4. Isolation barrier;
5. High voltage safety warning signs;
6. Multimeters;
7. Lifting machine;
8. Vehicle blocker;
9. Diagnostic apparatus;
10. Personal protective equipment for high voltage, such as insulating boots, goggle and insulating gloves.</td></tr>
<tr><td colspan="4">EVIDENCE REQUIREMENT</td></tr>
<tr><td colspan="2">PRACTICAL PERFORMANCE</td><td colspan="2">UNDERPINNING KNOWLEDGE</td></tr>
<tr><td colspan="2">The person performing this task must be able to do the following:
1. Select appropriate tools and equipment for the task;
2. Observe health and high voltage safety protections when on duty;
3. Check the harness state;
4. Read the fault code with diagnostic apparatus;
5. Perform high voltage cutoff;
6. Check the integrity of the high voltage interlock circuit;
7. Perform high voltage power-up;
8. Clean the tools, equipment and workplaces;
9. Arrange and store the tools and equipment.</td><td colspan="2">Detailed knowledge about:
1.0 Methods
The person performing this task must be able to explain how to:
1.1 Use the diagnostic apparatus correctly;
1.2 Perform high voltage cutoff;
1.3 Check the integrity of the high voltage interlock circuit;
1.4 Perform high voltage power-up;
1.5 Check the maintenance manual.

2.0 Principles
The person performing this task must be able to explain the following principles:
2.1 New energy vehicle high voltage system interlock principle.

3.0 Theories</td></tr>
</table>

	The person performing this task must be able to explain the following: 2.1 High voltage system components for new energy vehicles; 2.2 Operating policies and procedures for circuit integrity checking; 2.3 Operating policies and procedures for interlock circuit checking. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	High voltage system interlock checks are performed in accordance with technical requirements and manufacturer's specifications.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of operating machines and tools; 2. Safety operations of measuring instruments; 3. Occupational health and safety.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	HIGH VOLTAGE POWER SYSTEM MAINTENANCE	**DUTY NO.**	501
TASK TITLE	REPLACEMENT OF POWER BATTERY	**TASK NO.**	5014
PERFORMANCE CRITERIA	The person performing this task must be able to replace power batteries in accordance with technical requirements and manufacturer's specifications.		
RANGE STATEMENT	The task can be performed in a dedicated workshop for new energy vehicles under the supervision of senior technicians or new-energy vehicle engineers. The tools and equipment to be used include: 1. Full set of vehicle toolbox; 2. Insulation detector 3. Insulating mat; 4. Isolation barrier; 5. High voltage safety warning signs; 6. Multimeters; 7. Lifting machine; 8. Power battery lifting bracket; 9. Vehicle blocker; 10. Diagnostic apparatus; 11. Personal protective equipment for high voltage, such as insulating boots, goggle and insulating gloves.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select appropriate tools and equipment for the task; 2. Observe health and high voltage safety protections when on duty; 3. Read data streams and fault codes with the diagnostic apparatus; 4. Perform high voltage cutoff; 5. Disassemble the power battery; 6. Install the power battery; 7. Perform high voltage power-up; 8. Clean the tools, equipment and workplaces; 9. Arrange and store the tools and equipment.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Use the diagnostic apparatus; 1.2 Perform high voltage safety cutoff; 1.3 Mechanically disassemble & reassemble power batteries; 1.4 Perform high voltage safe power-up; 1.5 Check the maintenance manual. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Power supply principle of high voltage power battery; 2.2 Charge and discharge principle; 2.3 Battery management system (BMS).

	3.0 Theories The person performing this task must be able to explain the following: 3.1 Composition and structure of power battery; 3.2 Power battery removal and installation steps. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Power batteries are replaced in accordance with technical requirements and manufacturer's specifications.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of operating machines and tools; 2. Safety operations of measuring instruments; 3. Occupational health and safety.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	BRAKING SYSTEM MAINTENANCE	**DUTY NO.**	502
TASK TITLE	IBOOSTOR MAINTENANCE	**TASK NO.**	5021
PERFORMANCE CRITERIA	The person performing this task must be able to maintain the electrically controlled power assist system (Iboostor) in the braking system of the new energy vehicle in accordance with technical requirements and the manufacturer's maintenance manuals.		
RANGE STATEMENT	The task can be performed in a dedicated workshop for new energy vehicles under the supervision of senior technicians or new-energy vehicle engineers. The tools and equipment to be used include: 1. Full set of new energy vehicle maintenance toolbox; 2. Slope/ramp; 3. Vehicle blocker; 4. Diagnostic apparatus; 5. Personal protective equipment such as insulating mats, insulating shoes, goggles, insulating gloves.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select appropriate tools and equipment; 2. Comply with safety rules and regulations; 3. Stop the vehicle; 4. Check for leaks in the electronically controlled power assist system; 5. Check the electrically controlled power assist system; 6. Check the circuit diagram of the electrically controlled power assist system operation; 7. Identify the diagnostic code; 8. Adjust the brake actuator travel; 9. Test the pedal travel sensor operating state values; 10. Clean the tools, equipment and workplaces; 11. Arrange and store the tools and equipment.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Verify that the electrically controlled power assist system (Iboostor) is working properly; 1.2 Maintain the electrically controlled power assist system; 1.3 Test the electrically controlled power assist system; 1.4 Check the circuit diagrams and maintenance manuals for the vehicle. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Working principle of the electrically controlled power assist system (Iboostor); 2.2 Working principle of the pedal travel sensor; 2.3 Braking energy recovery principle. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Electrically controlled power assist system components and operation on new energy vehicles;

	3.2 Electrically controlled power assist system maintenance. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The electrically controlled power assist system (Iboostor) is maintained in accordance with the manufacturer's manual and technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of operating machines and tools; 2. Safety operations of measuring instruments; 3. Occupational health and safety; 4. Waste disposal methods.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	BRAKING SYSTEM MAINTENANCE	**DUTY NO.**	502
TASK TITLE	MAINTENANCE OF HYDRAULIC BRAKING SYSTEM	**TASK NO.**	5022
PERFORMANCE CRITERIA	The person performing this task must be able to overhaul hydraulic braking system in accordance with technical requirements and the manufacturer's maintenance manuals.		
RANGE STATEMENT	The task can be performed in a dedicated workshop for new energy vehicles under the supervision of senior technicians or new-energy vehicle engineers. The tools and equipment to be used include: 1. Full set of vehicle toolbox; 2. Slope/ramp; 3. Air compressors; 4. Vehicle washers; 5. Vehicle blocker; 6. Diagnostic apparatus; 7. Personal protective equipment, such as safety shoes, goggles and gloves; 8. Stethoscope; 9. Braking dynamometer; 10. Braking fluid tester.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Observe safety rules and regulations in the performance of their duties; 2. Select appropriate tools and equipment for the task; 3. Hoist vehicles; 4. Check the braking system for leaks; 5. Check the braking fluid; 6. Replace the braking fluid hose; 7. Maintain/Replace the braking master cylinder; 8. Maintain/Replace the wheel braking sub-pump; 9. Fill the braking fluid; 10. Discharge the braking fluid; 11. Test the braking performance; 12. Clean the tools, equipment and workplaces;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Check hydraulic brakes; 1.2 Discharge the braking fluid; 1.3 Fill the braking fluid; 1.4 Adjust the brake; 1.5 Test the braking performance; 1.6 Check the automotive maintenance manual. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Working principles of hydraulic braking system; 2.2 Operating policies and procedures for maintaining hydraulic braking systems; 2.3 Disposal of old brake fluid.

13. Arrange and store the tools and equipment.	**3.0 Theories** The person performing this task must be able to explain the following: 3.1 Vehicle braking system functions; 3.2 The role of braking fluid; 3.2 Braking fluid classification, differences and effects; 3.3 Effect of braking clearance. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Operation skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The hydraulic braking system is maintained in accordance with the manufacturer's specifications and technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1 Safety operation of operating machines and tools; 2 Safety operations of measuring instruments; 3 Occupational health and safety.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	BRAKING SYSTEM MAINTENANCE	**DUTY NO.**	502
TASK TITLE	MAINTENANCE OF PNEUMATIC BRAKING SYSTEM	**TASK NO.**	5023
PERFORMANCE CRITERIA	The person performing this task must be able to overhaul pneumatic braking system in accordance with technical requirements and the manufacturer's maintenance manuals.		
RANGE STATEMENT	The task can be performed in a dedicated workshop for new energy vehicles under the supervision of senior technicians or new-energy vehicle engineers. The tools and equipment to be used include: 1. Full set of vehicle toolbox; 2. Slope/ramp; 3. Air compressor; 4. Vehicle washers; 5. Vehicle blocker; 6. Diagnostic apparatus; 7. Personal protective equipment, such as safety shoes, goggles and gloves; 8. Stethoscope; 9. Braking dynamometer; 10. Braking fluid tester.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Observe the preventive measures for health and safety during working; 2. Prepare tools and equipment required for the task; 3. Hoist vehicles; 4. Check the braking system for leaks; 5. Check for air leaks; 6. Tighten bolts and nuts; 7. Replace the braking booster; 8. Adjust the brake pedal clearance; 9. Maintain the air control valve; 10. Test the braking performance; 11. Clean the tools, equipment and workplaces; 12. Arrange and store the tools and equipment.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Check the pneumatic brake; 1.2 Discharge the braking system; 1.3 Adjust the brake; 1.4 Test the braking performance; 1.5 Check the automotive maintenance manual. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Working principle of the pneumatic braking system. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Vehicle braking system functions;

	3.2 Braking system category; 3.3 Structure of pneumatic braking system; 3.4 Pneumatic braking system failure modes and their manifestations; 3.5 Operating policies and procedures for maintaining pneumatic braking systems. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Operation skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The pneumatic braking system is maintained in accordance with the manufacturer's specifications and technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of operating machines and tools; 2. Safety operations of measuring instruments; 3. Occupational health and safety.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	BRAKING SYSTEM MAINTENANCE	**DUTY NO.**	502
TASK TITLE	MAINTENANCE OF DRUM BRAKES	**TASK NO.**	5024
PERFORMANCE CRITERIA	The person performing this task must be able to maintain and repair drum brakes in accordance with technical requirements and manufacturer's maintenance manuals.		
RANGE STATEMENT	The task can be performed in a dedicated workshop for new energy vehicles under the supervision of senior technicians or new-energy vehicle engineers. The tools and equipment to be used include: 1. Full set of vehicle toolbox; 2. Slope/ramp; 3. Air compressor; 4. Vehicle washers; 5. Vehicle blocker; 6. Diagnostic apparatus; 7. Personal protective equipment, such as safety shoes, goggles and gloves; 8. Stethoscope; 9. Braking dynamometer; 10. Braking fluid tester.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select appropriate tools and equipment for the task; 2. Observe safety rules and precautions during the task implementation; 3. Hoist vehicles; 4. Check the braking system for leaks; 5. Remove the tire; 6. Separate the braking drums; 7. Check the braking pad assembly; 8. Maintain the wheel braking sub-pump; 9. Change the braking pad; 10. Reinstall the braking drums; 11. Reinstall the tires; 12. Fill the braking fluid; 13. Discharge the braking system air; 14. Adjust the brake; 15. Test brake operation;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Overhaul drum brakes; 1.2 Discharge the braking system air; 1.3 Adjust the brake; 1.4 Test the braking performance; 1.5 Check the automotive maintenance manual. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Maintenance operation processes and procedures for drum brake maintenance; 2.2 Brake shoe friction pad thickness standard. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Vehicle braking system functions;

16. Clean the tools, equipment and workplaces; 17. Arrange and store the tools and equipment.	3.2 Braking system category; 3.3 Structure of drum brakes; 3.4 Failure modes of drum brakes; 3.5 Inspection points for brake shoes; 3.6 Assembly and adjustment of drum brakes. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The drum brake is maintained in accordance with the manufacturer's specifications and technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of operating machines and tools; 2. Safety operations of measuring instruments; 3. Waste disposal methods.

<table>
<tr><td>OCCUPATION</td><td>NEW-ENERGY VEHICLE TECHNICIAN</td><td>OCCUPATION CODE</td><td></td></tr>
<tr><td>DUTY TITLE</td><td>BRAKING SYSTEM MAINTENANCE</td><td>DUTY NO.</td><td>502</td></tr>
<tr><td>TASK TITLE</td><td>MAINTENANCE OF DISC BRAKES</td><td>TASK NO.</td><td>5025</td></tr>
<tr><td>PERFORMANCE CRITERIA</td><td colspan="3">The person performing this task must be able to maintain and repair disc brakes in accordance with technical requirements and manufacturer's maintenance manuals.</td></tr>
<tr><td>RANGE STATEMENT</td><td colspan="3">The task can be performed in a dedicated workshop for new energy vehicles under the supervision of senior technicians or new-energy vehicle engineers.
The tools and equipment to be used include:
1. Full set of vehicle toolbox;
2. Slope/ramp;
3. Air compressor;
4. Vehicle washers;
5. Vehicle blocker;
6. Diagnostic apparatus;
7. Personal protective equipment, such as safety shoes, goggles and gloves;
8. Stethoscope;
9. Braking dynamometer;
10. Braking fluid tester.</td></tr>
<tr><td colspan="4">EVIDENCE REQUIREMENT</td></tr>
<tr><td colspan="2">PRACTICAL PERFORMANCE</td><td colspan="2">UNDERPINNING KNOWLEDGE</td></tr>
<tr><td colspan="2">The person performing this task must be able to do the following:
1. Select appropriate tools and equipment for the task;
2. Observe safety rules and precautions during the task implementation;
3. Hoist vehicles;
4. Check the braking system for leaks;
5. Remove the tire;
6. Separate the braking calipers;
7. Check the braking caliper assembly;
8. Maintain the wheel braking sub-pump;
9. Change the braking caliper;
10. Reinstall the braking calipers;
11. Reinstall the tires;
12. Fill the braking fluid;
13. Discharge the braking system air;
14. Adjust the brake;
15. Test brake operation;</td><td colspan="2">Detailed knowledge about:
1.0 Methods
The person performing this task must be able to explain how to:
1.1 Overhaul disc brakes;
1.2 Discharge the braking system air;
1.3 Adjust the brake;
1.4 Test the braking performance;
1.5 Check the automotive maintenance manual.

2.0 Principles
The person performing this task must be able to explain the following principles:
2.1 Brake friction pad thickness standard;
2.2 Brake disc failure determination.

3.0 Theories
The person performing this task must be able to explain the following:
3.1 Vehicle braking system functions;</td></tr>
</table>

16. Clean the tools, equipment and workplaces; 17. Arrange and store the tools and equipment.	3.2 Braking system category; 3.3 Structure of disc brakes; 3.4 Failure modes of disc brakes; 3.5 Maintenance operation processes and procedures for disc brake system maintenance; 3.6 Assembly and adjustment of disc brakes. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The disc brake is maintained in accordance with the manufacturer's specifications and technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of operating machines and tools; 2. Safety operations of measuring instruments; 3. Waste disposal methods.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	BRAKING SYSTEM MAINTENANCE	**DUTY NO.**	502
TASK TITLE	HAND BRAKE MAINTENANCE	**TASK NO.**	5026
PERFORMANCE CRITERIA	The person performing this task must be able to overhaul the hand brake in accordance with technical requirements and the manufacturer's maintenance manuals.		
RANGE STATEMENT	The task can be performed in a dedicated workshop for new energy vehicles under the supervision of senior technicians or new-energy vehicle engineers. The tools and equipment to be used include: 1. Full set of vehicle toolbox; 2. Slope/ramp; 3. Air compressor; 4. Vehicle washers; 5. Vehicle blocker; 6. Diagnostic apparatus; 7. Personal protective equipment, such as safety shoes, goggles and gloves; 8. Stethoscope; 9. Braking dynamometer; 10. Braking fluid tester.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select appropriate tools and equipment; 2. Comply with safety rules and regulations; 3. Stop the vehicle; 4. Check the braking system for leaks; 5. Check the hand brake mechanism; 6. Change the braking pad; 7. Replace/Adjust the hand brake cable; 8. Adjust the hand brake; 9. Test the hand braking performance; 10. Clean the tools, equipment and workplaces; 11. Arrange and store the tools and equipment.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Check the hand brake; 1.2 Test the hand braking performance; 1.3 Adjust the hand brake; 1.4 Consult the new energy vehicle maintenance manual. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Working principle of the hand braking system. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Hand braking system functions of the vehicle; 3.2 Braking system category;

	3.3 Hand brake structure and failure modes; 3.4 Maintenance operation processes and procedures for hand braking system. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The hand brake is maintained in accordance with the manufacturer's specifications and technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of operating machines and tools; 2. Safety operations of measuring instruments; 3. Waste disposal methods.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	BRAKING SYSTEM MAINTENANCE	**DUTY NO.**	502
TASK TITLE	ELECTRONIC HANDBRAKE MAINTENANCE	**TASK NO.**	5027
PERFORMANCE CRITERIA	The person performing this task must be able to repair the electronic hand brake in accordance with technical requirements and the manufacturer's maintenance manuals.		
RANGE STATEMENT	The task can be performed in a dedicated workshop for new energy vehicles under the supervision of senior technicians or new-energy vehicle engineers. The tools and equipment to be used include: 1. Full set of vehicle toolbox; 2. Slope/ramp; 3. Air compressor; 4. Vehicle washers; 5. Vehicle blocker; 6. Diagnostic apparatus; 7. Personal protective equipment, such as safety shoes, goggles and gloves; 8. Stethoscope; 9. Braking dynamometer; 10. Braking fluid tester.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select appropriate tools and equipment; 2. Comply with safety rules and regulations; 3. Stop the vehicle; 4. Check the braking system for leaks; 5. Check the electronic hand brake relay; 6. Identify the diagnostic code; 7. Clear the electronic hand brake fault code; 8. Adjust the electronic hand brake clearance; 9. Test the electronic hand brake operation; 10. Clean the tools, equipment and workplaces;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Operate the electronic hand brake; 1.2 Check and adjust the electronic hand brake; 1.3 Diagnose and troubleshoot electronic hand brake faults; 1.4 Test the electronic hand brake performance; 1.5 Check the circuit diagrams and maintenance manuals for the new energy vehicle. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Working principle of the electronic hand brake system. **3.0 Theories**

11. Arrange and store the tools and equipment.	The person performing this task must be able to explain the following: 3.1 Braking system category; 3.2 The function of the electronic handbrake system; 3.3 Electronic hand brake system structure and failure modes; 3.4 Maintenance operation processes and procedures for electronic hand brake performance. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The electronic hand brake is maintained in accordance with the manufacturer's specifications and technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1 Safety operation of operating machines and tools; 2 Safety operations of measuring instruments; 3 Waste disposal methods.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	SUSPENSION SYSTEM MAINTENANCE	**DUTY NO.**	503
TASK TITLE	SUSPENSION SPRINGS MAINTENANCE	**TASK NO.**	5031
PERFORMANCE CRITERIA	The person performing this task must be able to maintain suspension springs in accordance with technical requirements and manufacturer's specifications.		
RANGE STATEMENT	The task can be performed under the supervision of senior technicians or new-energy vehicle engineers/automotive engineers at a dedicated new energy vehicle station in the automotive maintenance workshop. The tools and equipment to be used include: 1. Full set of vehicle toolbox; 2. Slope/ramp; 3. Air compressor; 4. Vehicle washers; 5. Vehicle blocker; 6. Diagnostic apparatus; 7. Stethoscope; 8. Braking dynamometer; 9. Braking fluid tester; 10. Spring compressor; 11. Personal protective equipment such as safety helmets, insulating shoes, goggles, insulating gloves.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select appropriate tools and equipment for the task; 2. Observe health and safety regulations in the performance of their duties; 3. Check steel plate springs; 4. Check coil springs; 5. Check the torsion bars; 6. Adjust the torsion bar; 7. Test the suspension springs; 8. Clean the tools, equipment and workplaces; 9. Arrange and store the tools and equipment.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Maintain the suspension springs; 1.2 Check the maintenance manual for the vehicle; 1.3 Check the automotive maintenance manual. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Working principle of valve spring: **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Suspension system structure; 3.2 Maintenance operation processes and procedures for suspension springs.

	4.0 Essential Skills The person performing this task must have the following skills: 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Suspension springs are maintained in accordance with technical requirements and manufacturer's specifications.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of operating machines and tools; 2. Safety operations of measuring instruments; 3. Waste disposal methods.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	SUSPENSION SYSTEM MAINTENANCE	**DUTY NO.**	503
TASK TITLE	SUSPENSION BUSHING MAINTENANCE	**TASK NO.**	5032
PERFORMANCE CRITERIA	The person performing this task must be able to maintain the suspension bushing in accordance with technical requirements and manufacturer's specifications.		
RANGE STATEMENT	The task can be performed in a dedicated workshop for new energy vehicles under the supervision of senior technicians or new-energy vehicle engineers. The tools and equipment to be used include: 1. Full set of vehicle toolbox; 2. Slope/ramp; 3. Air compressor; 4. Press machine; 5. Vehicle washers; 6. Vehicle blocker; 7. Diagnostic apparatus; 8. Braking dynamometer; 9. Personal protective equipment, such as safety shoes, goggles and gloves.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Comply with safety and health regulations; 2. Select appropriate tools and equipment for the task; 3. Check or replace spring bushings; 4. Check or replace fork rod bushings; 5. Check or replace the balancer bushings; 6. Check or replace swing arm bushings; 7. Check or replace the balance rod bushings; 8. Check or replace the shock absorber bushings; 9. Check or replace bump stop bushings; 10. Check or replace body mounted bushings;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Check or replace suspension bushings; 1.2 Use the press machine; 1.3 Check the automotive maintenance manual. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Suspension bushing principle. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Suspension system components; 3.2 Operating policies and procedures for suspension bushings maintenance.

11. Clean the tools, equipment and workplaces; 12. Properly arrange and store the tools and equipment.	**4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Suspension bushings are maintained in accordance with technical requirements and manufacturer's specifications.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of work tools; 2. Safety operations of measuring instruments; 3. Waste disposal methods.

<table>
<tr><td>OCCUPATION</td><td>NEW-ENERGY VEHICLE TECHNICIAN</td><td>OCCUPATION CODE</td><td></td></tr>
<tr><td>DUTY TITLE</td><td>SUSPENSION SYSTEM MAINTENANCE</td><td>DUTY NO.</td><td>503</td></tr>
<tr><td>TASK TITLE</td><td>SHOCK ABSORBERS MAINTENANCE</td><td>TASK NO.</td><td>5033</td></tr>
<tr><td>PERFORMANCE CRITERIA</td><td colspan="3">The person performing this task must be able to maintain the shock absorber in accordance with technical requirements and manufacturer's specifications.</td></tr>
<tr><td>RANGE STATEMENT</td><td colspan="3">The task can be performed in an automotive maintenance workshop under the supervision of new energy vehicle senior technicians or automotive engineer/mechanical engineers.
The tools and equipment to be used include:
1. Full set of vehicle toolbox;
2. Slope/ramp;
3. Air compressor;
4. Press machine;
5. Shock absorber testing machine
6. Vehicle cleaning agent;
7. Vehicle blocker;
8. Diagnostic apparatus;
9. Braking dynamometer;
10. Personal protective equipment, such as safety shoes, goggles and gloves;</td></tr>
<tr><td colspan="4">EVIDENCE REQUIREMENT</td></tr>
<tr><td colspan="2">PRACTICAL PERFORMANCE</td><td colspan="2">UNDERPINNING KNOWLEDGE</td></tr>
<tr><td colspan="2">The person performing this task must be able to do the following:
1. Comply with safety and health regulations;
2. Select appropriate tools and equipment for the task;
3. Check the shock absorber;
4. Replace the shock absorber;
5. Test the shock absorber;
6. Clean the tools, equipment and workplaces;
7. Arrange and store the tools and equipment.</td><td colspan="2">Detailed knowledge about:
1.0 Methods
The person performing this task must be able to explain how to:
1.1 Replace the suspension dampers;
1.2 Use the shock absorber testing machine;
1.3 Check the automotive maintenance manual.

2.0 Principles
The person performing this task must be able to explain the following principles:
2.1 Working principle of shock absorbers;
2.2 Effect of shock absorber parameters on smoothness.

3.0 Theories
The person performing this task must be able to explain the following:
3.1 Suspension system components;</td></tr>
</table>

	3.2 Operating policies and procedures for maintaining shock absorbers. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The shock absorber is maintained in accordance with technical requirements and manufacturer's specifications.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of work tools; 2. Safety operations of measuring instruments; 3. Waste disposal methods.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	SUSPENSION SYSTEM MAINTENANCE	**DUTY NO.**	503
TASK TITLE	SUSPENSION ARMS MAINTENANCE	**TASK NO.**	5034
PERFORMANCE CRITERIA	The person performing this task must be able to maintain the suspension arm in accordance with technical requirements and manufacturer's specifications.		
RANGE STATEMENT	The task can be performed in an automotive maintenance workshop under the supervision of new energy vehicle senior technicians or automotive engineer/mechanical engineers. The tools and equipment to be used include: 1. Full set of vehicle toolbox; 2. Slope/ramp; 3. Specialized tools for suspension springs; 4. Shock absorber testing machine; 5. Vehicle washers; 6. Vehicle blocker; 7. Diagnostic apparatus; 8. Personal protective equipment, such as safety shoes, goggles and gloves;		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Comply with safety and health regulations; 2. Select appropriate tools and equipment for the task; 3. Check the fork rod arms; 4. Maintain the fork rod arms; 5. Check the cantilever; 6. Maintain the cantilever; 7. Arrange and store the tools and equipment; 8. Clean the tools, equipment and workplaces.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Check and maintain the cantilever; 1.2 Check the circuit diagrams and maintenance manuals for the new energy vehicle. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Structure of the suspension arm. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Suspension arm type; 3.2 Various suspension arm characteristics; 3.3 Operating policies and procedures for suspension arms Inspection. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Communication skills;

	4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The suspension arm is maintained in accordance with technical requirements and manufacturer's specifications.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of operating tools; 2. Safety operations of measuring instruments; 3. Waste disposal methods.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	SUSPENSION SYSTEM MAINTENANCE	**DUTY NO.**	503
TASK TITLE	AIR SUSPENSION SYSTEMS MAINTENANCE	**TASK NO.**	5035
PERFORMANCE CRITERIA	The person performing this task must be able to maintain the air suspension system in accordance with technical requirements and manufacturer's specifications.		
RANGE STATEMENT	The task can be performed in an automotive maintenance workshop under the supervision of new energy vehicle senior technicians or automotive engineer/mechanical engineers. The tools and equipment to be used include: 1. Full set of vehicle toolbox; 2. Slope/ramp; 3. Air compressor; 4. Press machine; 5. Pressure gauges; 6. Shock absorber testing machine; 7. Vehicle washers; 8. Vehicle blocker; 9. Diagnostic apparatus; 10. Personal protective equipment, such as safety shoes, goggles and gloves.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Comply with safety and health regulations in the performance of their duties; 2. Select appropriate tools and equipment for the task; 3. Check air suspension components; 4. Check the air spring; 5. Check air suspension; 6. Check the shock absorber; 7. Maintain control valves; 8. Test air suspension performance; 9. Clean the tools, equipment and workplaces; 10. Arrange and store the tools and equipment.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Inspect and maintain air suspension system components; 1.2 Check the circuit diagrams and maintenance manuals for the new energy vehicle. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Working principle of air suspension systems. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Air suspension system components; 3.2 Operating policies and procedures for air suspension system maintenance.

	4.0 Essential Skills The person performing this task must have the following skills: 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The air suspension system is maintained in accordance with technical requirements and manufacturer's specifications.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of work tools; 2. Safety operations of measuring instruments; 3. Waste disposal methods.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	SUSPENSION SYSTEM MAINTENANCE	**DUTY NO.**	503
TASK TITLE	ELECTRONIC SUSPENSION SYSTEMS MAINTENANCE	**TASK NO.**	5036
PERFORMANCE CRITERIA	The person performing this task must be able to maintain the electronic suspension system in accordance with technical requirements and manufacturer's specifications.		
RANGE STATEMENT	The task can be performed in an automotive maintenance workshop under the supervision of new energy vehicle senior technicians or automotive engineer/mechanical engineers. The tools and equipment to be used include: 1. Full set of vehicle toolbox; 2. Slope/ramp; 3. Specialized tools for suspension springs; 4. Shock absorber testing machine; 5. Vehicle washers; 6. Vehicle blocker; 7. Diagnostic apparatus; 8. Personal protective equipment, such as safety shoes, goggles and gloves.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Comply with safety and health regulations; 2. Select appropriate tools and equipment for the task; 3. Check air suspension components; 4. Maintain the suspension electronic control unit; 5. Test electronic suspension performance; 6. Properly arrange and store the tools and equipment; 7. Clean the tools, equipment and workplaces.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Inspect and maintain electronic suspension system components; 1.2 Check the circuit diagrams and maintenance manuals for the new energy vehicle. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Working principle of the electronic suspension system; 2.2 Operating policies and procedures for electronic suspension system maintenance. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Electronic suspension system components;

	3.2 Operating policies and procedures for electronic suspension system maintenance. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The electronic suspension system is maintained in accordance with technical requirements and manufacturer's specifications.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of work tools; 2. Safety operations of measuring instruments; 3. Waste disposal methods.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	STEERING SYSTEM MAINTENANCE	**DUTY NO.**	504
TASK TITLE	STEERING MECHANISM MAINTENANCE	**TASK NO.**	5041
PERFORMANCE CRITERIA	The person performing this task must be able to maintain the steering mechanism in accordance with technical requirements and manufacturer's specifications.		
RANGE STATEMENT	The task can be performed in an automotive maintenance workshop under the supervision of senior technicians or automotive engineer/mechanical engineers. The tools and equipment to be used include: 1. Full set of vehicle toolbox; 2. Slope/ramp; 3. Air compressor; 4. Press machine; 5. Level meter; 6. Optical wheel positioner; 7. Electronic wheel positioner; 8. Vehicle washers; 9. Vehicle blocker; 10. Diagnostic apparatus; 11. Personal protective equipment, such as safety shoes, goggles and gloves; 12. Pressure gauges; 13. Pipe wrench.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Observe the preventive measures for safety during working; 2. Select appropriate tools and equipment; 3. Check steering system components; 4. Check the steering system for leaks; 5. Fix steering system leaks; 6. Adjust the steering gearbox; 7. Tighten bolts and nuts; 8. Fill up the steering fluid; 9. Clean the tools, equipment and workplaces; 10. Arrange and store the tools and equipment.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Maintain the steering system; 1.2 Check the automotive maintenance manual. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Working principles of steering systems; 2.2 Operating policies and procedures for maintaining steering systems. 2.3 Electric power steering principle; 2.4 Steering angle sensor principle. **3.0 Theories**

	The person performing this task must be able to explain the following: 3.1 Steering system components; 3.2 Steering system operation; 3.3 Possible faults in the steering system and restorative maintenance. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The steering system is maintained in accordance with technical requirements and manufacturer's specifications.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of operating machines and tools; 2. Safety operations of measuring instruments; 3. Waste disposal methods.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	STEERING SYSTEM MAINTENANCE	**DUTY NO.**	504
TASK TITLE	STEERING LINKAGE MAINTENANCE	**TASK NO.**	5042
PERFORMANCE CRITERIA	The person performing this task must be able to maintain the steering linkage in accordance with technical requirements and manufacturer's specifications.		
RANGE STATEMENT	The task can be performed in an automotive maintenance workshop under the supervision of senior technicians or automotive engineer/mechanical engineers. The tools and equipment to be used include: 1. Full set of vehicle toolbox; 2. Slope/ramp; 3. Air compressor; 4. Press machine; 5. Level meter; 6. Optical wheel positioner; 7. Electronic wheel positioner; 8. Vehicle washers; 9. Vehicle blocker; 10. Diagnostic apparatus; 11. Personal protective equipment, such as safety shoes, goggles and gloves; 12. Pressure gauges.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Observe the preventive measures for safety during working; 2. Select appropriate tools and equipment for the task; 3. Check the steering linkage; 4. Replace the ball joint; 5. Repair the steering pitman arm; 6. Replace the steering longitudinal rod; 7. Replace the steering damper; 8. Replace the steering tie rod; 9. Replace tie-rod ends; 10. Repair the steering mechanism box; 11. Adjust the steering column; 12. Align the steering wheel; 13. Clean the tools, equipment and workplaces;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Maintain the steering system linkage; 1.2 Check the maintenance manual for the vehicle. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Working principle of the steering system; 2.2 Steering angle conversion; 2.3 Steering operation transfer. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Steering system components; 3.2 Steering system operation;

14. Arrange and store the tools and equipment.	3.3 Operating policies and procedures for maintaining steering linkages. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Customer service skills; 4.2 Teamwork skills; 4.3 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Steering system linkages are maintained and repaired in accordance with technical requirements and manufacturer's specifications.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of operating machines and tools; 2. Safety operations of measuring instruments; 3. Waste disposal methods.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	STEERING SYSTEM MAINTENANCE	**DUTY NO.**	504
TASK TITLE	WHEEL ALIGNMENT	**TASK NO.**	5043
PERFORMANCE CRITERIA	The person performing this task must be able to perform wheel alignment in accordance with technical requirements and manufacturer's specifications.		
RANGE STATEMENT	The task can be performed in an automotive maintenance workshop under the supervision of senior technicians or automotive engineer/mechanical engineers. The tools and equipment to be used include: 1. Full set of vehicle toolbox; 2. Slope/ramp; 3. Air compressor; 4. Press machine; 5. Level meter; 6. Optical wheel positioner; 7. Electronic wheel positioner; 8. Vehicle washers; 9. Vehicle blocker; 10. Diagnostic apparatus; 11. Personal protective equipment, such as safety shoes, goggles and gloves; 12. Pressure gauges; 13. Pipe wrench.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select appropriate tools and equipment for the task; 2. Observe the preventive measures for health and safety during working; 3. Check the steering angle; 4. Adjust the dip angle; 5. Adjust the rear dip angle; 6. Adjust the front and rear beams; 7. Check the angle of deviation; 8. Replace the steering pin; 9. Clean the tools, equipment and workplaces; 10. Arrange and store the tools and equipment.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Perform wheel alignment; 1.2 Adjust the steering column; 1.3 Check the automotive maintenance manual. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Wheel alignment angle; 2.2 Steering angle. **3.0 Theories** The person performing this task must be able to explain the following:

	3.1 Operating policies and procedures for wheel alignment angle measurement; 3.2 Operating policies and procedures for wheel alignment angle adjustment; 3.3 Operating policies and procedures for replacing steering pins. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Wheel alignment is performed in accordance with technical requirements and manufacturer's specifications.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of operating machines and tools; 2. Safety operations of measuring instruments; 3. Waste disposal methods;

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	STEERING SYSTEM MAINTENANCE	**DUTY NO.**	504
TASK TITLE	MAINTENANCE OF ELECTRIC POWER STEERING SYSTEMS	**TASK NO.**	5044
PERFORMANCE CRITERIA	The person performing this task must be able to maintain the electric power steering system in accordance with technical requirements and manufacturer's specifications.		
RANGE STATEMENT	The task can be performed in an automotive maintenance workshop under the supervision of senior technicians or automotive engineer/mechanical engineers. The tools and equipment to be used include: 1. Full set of vehicle toolbox; 2. Slope/ramp; 3. Air compressor; 4. Press machine; 5. Level meter; 6. Vehicle washers; 7. Vehicle blocker; 8. Multimeters; 9. Diagnostic apparatus; 10. Personal protective equipment, such as safety shoes, goggles and gloves; 11. Pressure gauges; 12. Pipe wrench.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select appropriate tools and equipment for the task; 2. Observe the preventive measures for health and safety during working; 3. Check the torque sensor; 4. Check the steering motor; 5. Check the steering; 6. Check the electric power steering controller; 7. Check the electric power steering controller harness; 8. Read the electric power steering controller parameters; 9. Clean the tools, equipment and workplaces;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Check the torque sensor; 1.2 Check the steering motor; 1.3 Check the steering; 1.4 Check the electric power steering controller; 1.5 Check the electric power steering controller harness; 1.6 Read the electric power steering controller parameters; 1.7 Check the maintenance manual for the vehicle; 1.8 Check the circuit diagram of the vehicle. **2.0 Principles** The person performing this task must be able to explain the following principles:

10. Arrange and store the tools and equipment.	2.1 Working principle of electric power steering system; 2.2 Maintenance of the electric power steering system. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Components for electric power steering systems; 3.2 Operating policies and procedures for maintaining electric power steering systems. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The electric power steering system is maintained in accordance with technical requirements and manufacturer's specifications.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of operating machines and tools; 2. Safety operations of measuring instruments; 3. Waste disposal methods.

TABLE 1: DACUM CHARTS FOR NEW-ENERGY VEHICLE TECHNICIAN - NTA 4

DUTIES	TASKS	ENABLERS
1.0 High voltage power system maintenance	1.1 Clearance of new energy vehicle fault code. 1.2 Measurement of insulation resistance. 1.3 Inspection of high voltage system interlocks. 1.4 Replacement of power battery.	**General skills and knowledge** · Cooperation with others using communication skills and submission of reports to the superiors · Utilization of vehicle maintenance manuals · Skills and knowledge of vehicle high voltage power systems · High voltage system components and elements · Reading of the circuit diagrams · High voltage safety protection **Tools and equipment** · Full set of vehicle toolbox; · Insulation detector · Insulating mats · Isolation barrier · High voltage safety warning signs · Multimeters · Lifting machine · Power battery lifting bracket · Vehicle blocker · Diagnostic apparatus · Personal protective equipment for high voltage, such as insulating boots, goggle and insulating gloves. **Materials** · Resistance, power battery, high voltage harness, wire harness connector **Requirements for employees** · Teamwork spirit, time management competence and honesty and trustworthiness
2.0 Braking system maintenance	2.1 Iboostor maintenance. 2.2 Maintenance of hydraulic braking system. 2.3 Maintenance of pneumatic braking system.	**General skills and knowledge** · Cooperation with others using communication skills and submission of reports to the superiors · Use of the manufacturer's manual

DUTIES	TASKS	ENABLERS
	2.4 Maintenance of drum brakes. 2.5 Maintenance of disc brakes. 2.6 Hand brake maintenance. 2.7 Hand brake maintenance.	· Skills and knowledge in automotive braking systems · Machine elements · Interpretation of technical drawings · Basic materials science **Tools and equipment** · Full set of new energy vehicle maintenance toolbox · Personal protective equipment, such as insulating shoes, goggle, insulating glove · Jacks and wheel chocks **Materials** · Braking pads, braking blocks, braking discs, braking drums, wheel speed sensors, pedal travel sensors, braking fluid **Requirements for employees** · Teamwork spirit, integrity, time management and commitment
3.0 Suspension system maintenance	3.1 Suspension springs maintenance. 3.2 Suspension bushing maintenance. 3.3 Shock absorbers maintenance. 3.4 Suspension arms maintenance. 3.5 Air suspension systems maintenance. 3.6 Electronic suspension systems maintenance.	**General skills and knowledge** · Cooperation with others using communication skills and submission of reports to the superiors · Use of the manufacturer's manual · Skills and knowledge in vehicle steering systems · Steering component · Interpretation of technical drawings · Basic materials science · Basic automotive electrician **Tools and equipment** · Personal protective equipment, such as safety shoes, goggles, gloves, hearing protection device, safety helmet · Full set of vehicle toolbox · Optical wheel positioner · Electronic wheel positioner · Multimeters · Diagnostic apparatus

DUTIES	TASKS	ENABLERS
		Materials · Steering hydraulic oil **Requirements for employees** · Teamwork spirit, integrity, time management and commitment
4.0 Steering system maintenance	4.1 Steering mechanism maintenance. 4.2 Steering linkage maintenance. 4.3 Wheel alignment. 4.4 Maintenance of electric power steering systems.	**General skills and knowledge** · Cooperation with others using communication skills and submission of reports to the superiors · Use of the manufacturer's manual · Skills and knowledge in vehicle steering systems · Steering component · Interpretation of technical drawings · Basic materials science · Basic automotive electrician **Tools and equipment** · Personal protective equipment, such as safety shoes, goggles, gloves, hearing protection device, safety helmet · Full set of vehicle toolbox · Optical wheel positioner; · Electronic wheel positioner · Multimeters · Diagnostic apparatus **Materials** · Steering hydraulic oil **Requirements for employees** · Teamwork spirit, integrity, time management and commitment