

Regionally based occupation standard

Standard format with proposed task/function groups

Occupation standard: Specialist for mechatronics of trucks and heavy vehicles

Occupation: Specialist for mechatronics of trucks and heavy vehicles

Sector: Mechanical Engineering (specific to national coding)

ISCO Level: III

Occupation description:

A specialist for mechatronics of trucks and heavy vehicles diagnoses, maintains, services, and repairs mechanical, electrical, electronic, hydraulic, pneumatic systems, devices, and other assemblies on the vehicle.

A specialist for mechatronics of trucks and heavy vehicles plans activities, prepares the necessary resources and space for performing tasks, receives the vehicle, diagnoses it using modern methods and equipment while using technical documentation, information, and communication systems. They perform tasks of control, adjustment, repair, replacement, and verification of mechanical, hydraulic, pneumatic, electrical, and electronic systems/devices/assemblies and additional equipment on the vehicle or, if necessary, refers the vehicle/assemblies to specialists.

They maintain work documentation and perform administrative and commercial tasks within their field. They communicate with superiors, colleagues, and service users (discussing and suggesting solutions according to the requirements) applying business communication rules. They implement and ensure quality standards, conduct health preservation procedures, workplace safety, environmental protection, and fire safety measures.

While performing work tasks, they use modern technologies, devices/instruments to measure all required parameters, as well as appropriate tools and equipment according to the manufacturer's instructions.

Work environment and conditions:

A specialist for mechatronics of trucks and heavy vehicles performs tasks in an auto service or in the field. Tasks are primarily performed in a standing position and, if necessary, at height and/or in confined spaces, in closed, semi-open, and open spaces. Work usually requires on-call duty, shift work, and fieldwork with extended working hours.

A specialist for mechatronics of trucks and heavy vehicles may work independently, coordinate a small team, and/or work under supervision. Tasks are performed under increased risk of mechanical injuries, burns, fall risk, electric shocks, exposure to increased electromagnetic radiation, harmful vapours, dust, loud noise, vibrations, temperature differences, and psychosocial stress. Due to the specifics of the work and the risks the specialist is exposed to, special attention is paid to the use of protective equipment: safety shoes with protective caps, protective gloves, safety goggles, face and eye shields (protective mask).

The employer may specify special conditions according to the risk assessment of the workplace.

Relation to other professions:

The profession of a specialist for mechatronics of trucks and heavy vehicles also relates to other profiles/qualifications within the same sector: technician in auto mechatronics, auto mechanic, and auto electrician.

In addition, a specialist for mechatronics of trucks and heavy vehicles can collaborate with other sectors and professions: service technicians working on equipment and machine maintenance, electricians, suppliers of spare parts and other materials, workers in the construction and transportation sectors.

GROUP OF TASKS/FUNCTIONS	KEY TASKS	ACTIVITIES
1. Analysis, planning, and work organization	1. Analysis, planning, and organization of work activities	1.1.1. Receives and analyzes the work order and technical documentation (technical-technological documentation, manuals, and instructions for work and maintenance, checklists, etc.), in accordance with the requirements of the work task. 1.1.2. Plans the time schedule for performing work in phases, in accordance with the requirements of the work task, in agreement with superiors. 1.1.3. Plans the necessary resources for carrying out work tasks in accordance with the relevant technical-technological documentation (human resources, materials, equipment, spare parts). 1.1.4. Organizes groups of workers/contractors responsible for carrying out the work. 1.1.5. Coordinates own activities with the activities of colleagues and business partners. 1.1.6. Organizes work in a sustainable manner, according to the principles of sustainability and energy efficiency.
2. Workplace preparation	2.1. Preparation of resources and workplace for performing tasks	2.1.1. Checks working conditions at the workplace in accordance with general health and safety measures (lighting, pollution, sources of physical danger, meteorological conditions...) taking into account the specific/individual needs of employees. 2.1.2. Prepares the workplace in accordance with the daily work plan and work priorities, following health and safety regulations and instructions. 2.1.3. Prepares tools, special tools, accessories, and machines (cranes), measuring devices necessary for performing the work task, in accordance with technical-technological documentation and technical legislation. 2.1.4. Prepares for work and prepares protective equipment and safety gear. 2.1.5. Maintains workplace hygiene, tools, and equipment after completing the work task.
3. Operational tasks	3.1. Reception of trucks and heavy vehicles	3.1.1. Receives information from the work order (vehicle type, registration, previous interventions, service book – when available). 3.1.2. Discusses with the driver about reported issues and symptoms of the malfunction. 3.1.3. Performs an external inspection of the vehicle for visible mechanical, electrical, and hydraulic deficiencies. 3.1.4. Performs initial vehicle diagnostics (connecting the vehicle to a scanner for errors and reading the errors). 3.1.5. Checks the engine operation and basic functions while idling, and if necessary, takes the vehicle for a test drive. 3.1.6. Documents observations and plans further maintenance activities. 3.1.7. Informs the client/superior about the initial findings and further procedures.
	3.2. Preventive maintenance of trucks and heavy vehicles	3.2.1. Conducts regular checks of the technical condition of vehicle systems in accordance with the manufacturer's instructions, read codes, and internal checklists. 3.2.2. Carries out periodic servicing of vehicle systems in accordance with the manufacturer's instructions, read codes, and internal checklists (checks/replaces oils, vehicle gas supply systems, coolant and brake fluid, AdBlue, air filters/purifiers, fuel, oil, cabin, gas filters...).

		<p>3.2.3. Checks and replaces vehicle components and assemblies as needed (exhaust system, power transmission system, steering system, braking system, tires...).</p> <p>3.2.4. Checks and adjusts wheel alignment as needed.</p> <p>3.2.5. Inspects the engine timing mechanism (drive belts and tensioners, chains and sprockets, valves, etc.) and acts in accordance with the manufacturer's instructions.</p> <p>3.2.6. Monitors and replaces elements of electrical and telemetry systems as needed (batteries, alternator, info-timing, pressure, temperature, and gas flow sensors) in accordance with the manufacturer's instructions.</p>
	<p>3.3. Diagnosis and inspection of faults in trucks and heavy vehicles</p>	<p>3.3.1. Performs visual and acoustic inspection of the vehicle to determine malfunctions of its elements, assemblies, and systems, based on information received from clients or a test drive.</p> <p>3.3.2. Conducts diagnostic operations, measures, and controls mechanical parameters of the vehicle using appropriate devices and software for diagnostics, as well as measuring and control tools and equipment, in stationary mode or while the vehicle is in motion.</p> <p>3.3.3. Tests electrical systems and verifies the functionality of the network of sensors and actuators.</p> <p>3.3.4. Determines the location, extent, and type of damage and failures of vehicle system elements and assemblies, in accordance with technical documentation and manufacturer instructions, based on the conducted diagnostics.</p> <p>3.3.5. Considers options for repairing or replacing faulty system elements and assemblies of vehicles or further analysis (based on diagnostic results, defined criteria, or supervisor instructions).</p>
	<p>3.4. Corrective maintenance of powertrain systems of trucks and heavy vehicles</p>	<p>3.4.1. Repairs or replaces engine and aggregate components (fuel supply system, combustion system, gas supply system, timing belt or chain...).</p> <p>3.4.2. Repairs or replaces transmission/power transfer system components (clutch, flywheel, gearbox – MT, AT, differential, half-shafts, drive wheels).</p> <p>3.4.3. Repairs the air cooling system.</p> <p>3.4.4. Repairs or replaces the exhaust gas system and DP filter.</p> <p>3.4.5. Tests engine power on a dynamometer after repair.</p> <p>3.4.6. Performs final inspection and test drive before vehicle handover.</p>
	<p>3.5. Corrective maintenance of hydraulic and pneumatic systems of trucks and heavy vehicles</p>	<p>3.5.1. Measures pressure and flow in systems.</p> <p>3.5.2. Identifies possible leaks in systems.</p> <p>3.5.3. Tests the functionality of hydraulic and pneumatic systems (lifting loads, cabin lifting, braking, etc.).</p> <p>3.5.4. Repairs or replaces damaged hydraulic and pneumatic components (compressors, hoses, lines, valves, air reservoir).</p> <p>3.5.5. Adjusts ventilation valves for optimal operation.</p> <p>3.5.6. Replaces damaged or faulty seals.</p> <p>3.5.7. Tests the entire hydraulic and pneumatic system after repair.</p>

4. Administrative tasks	3.6. Corrective maintenance of electrical systems of trucks and heavy vehicles	<p>3.6.1. Performs measurement of electrical parameters and compares them with standards and norms specified in the corresponding manuals.</p> <p>3.6.2. Localizes faults in electrical systems, electronic packages, and computer components.</p> <p>3.6.3. Checks the compliance of replacement part/element specifications according to the relevant codes and vehicle type.</p> <p>3.6.4. Carries out electrical work (disassembly/assembly, repair, replacement, parameter adjustment – calibration...) in the power supply system.</p> <p>3.6.5. Carries out electrical work on the engine starting system.</p> <p>3.6.6. Carries out electrical work on the fuel injection system.</p> <p>3.6.7. Replaces sensors (oil pressure sensors, airflow sensors, pressure and particle temperature sensors...) and actuators.</p> <p>3.6.8. Updates and calibrates the software of the CPU (central processing unit – central unit for control) and the control units of the individual systems on the vehicle</p> <p>3.6.9. Performs electrical work on electric and hybrid vehicles (de-energization/energization, replacement of high-voltage battery, voltage converter, electric motor).</p> <p>3.6.10. Conducts functionality testing of repaired or replaced parts.</p>
	3.7. Corrective maintenance of comfort systems and active and passive safety systems, signaling, and comfort systems of trucks and heavy vehicles	<p>3.7.1. Checks the physical condition of the system.</p> <p>3.7.2. Performs work on the comfort system (heating, ventilation, and air conditioning system, electric window lifters, central locking, seat adjustment, multimedia system and control units, cabin lighting...).</p> <p>3.7.3. Performs work on the active safety system (ABS anti-lock braking system, ESP – electronic stability control, braking assistance system (BA, EBA, BAS), driving assistance systems (ADAS), traction control system (ASR, TCS), cameras, distance sensors, cruise control, computer-assisted lane-keeping assistance...).</p> <p>3.7.4. Performs work on the passive safety system (airbags – AIRBAG, seat belts, rollover protection systems, automatic emergency call system – eCall).</p> <p>3.7.5. Performs work on the lighting and safety system (daytime running lights, brake lights, fog lights, stop lights, turn signals...).</p> <p>3.7.6. Conducts functionality testing of repaired or replaced parts.</p>
	4.1. Keeping work documentation	<p>4.1.1. Fills in and updates the daily and weekly work plan in accordance with prescribed templates and job requirements.</p> <p>4.1.2. Keeps records of work order statuses in accordance with organizational procedures, regulations, and designated templates.</p> <p>4.1.3. Fills in and updates the relevant documentation on completed activities in accordance with work tasks and organizational procedures.</p> <p>4.1.4. Keeps records of the condition of tools, equipment, and devices, as well as necessary corrective measures.</p> <p>4.1.5. Maintains records of inventory, consumption of materials, and spare parts.</p> <p>4.1.6. Organizes, archives, and stores documentation in accordance with applicable legislation, internal procedures, and existing digital processes.</p>

<p>5. Commercial tasks</p>	<p>5.1. Procurement of resources for work and pricing, promotion, and sales of services</p>	<p>5.1.1. Collects information on the availability, prices, and quality of materials, spare parts, tools, equipment, devices, and other work resources on the market.</p> <p>5.1.2. Prepares or participates in the preparation of offers for the execution of work, prepares specifications for materials, spare parts, and work, defines production deadlines, and estimates costs.</p> <p>5.1.3. Selects, purchases, and controls the necessary materials, spare parts, tools, equipment, devices, and other work resources.</p> <p>5.1.4. Calculates the executed work and services, sets the price, and prepares invoices and proformas.</p> <p>5.1.5. Promotes/participates in the promotion/sale of services.</p>
<p>6. Communication and cooperation with others</p>	<p>6.1. Communication with colleagues, clients, relevant institutions, and other participants in the work process</p>	<p>6.1.1. Communicates with superiors, colleagues, clients, relevant institutions, and others, applying verbal and non-verbal communication rules.</p> <p>6.1.2. Establishes and maintains internal and external communication in a professional and ethical manner, following business communication rules, in line with equality principles regarding gender, race, nationality, religion, culture, etc., using advanced ICT.</p> <p>6.1.3. Works in a group by correctly applying team work principles.</p> <p>6.1.4. Uses motivational techniques to establish good communication with others.</p> <p>6.1.5. Gives instructions to colleagues and the work group for carrying out the work task using clear and professional terminology.</p> <p>6.1.6. Resolves internal and external complaints and misunderstandings, using appropriate conflict resolution techniques.</p> <p>6.1.7. Reports to the superior about the completed work task using clear and professional (technical) terminology.</p>
<p>7. Quality assurance</p>	<p>7.1. Implementation of procedures for ensuring work quality in accordance with relevant standards and regulations</p>	<p>7.1.1. Applies technical regulations, quality, and other standards, internal procedures, and instructions in the execution of work tasks in compliance with legal regulations.</p> <p>7.1.2. Performs incoming control of materials, spare parts, tools, equipment, devices, and other work resources in accordance with regulations and specifications.</p> <p>7.1.3. Uses devices, tools, and equipment in accordance with the manufacturer's instructions.</p> <p>7.1.4. Performs control of completed work in phases and final checks in accordance with the work order/manufacturer's instructions/control plan.</p> <p>7.1.5. Eliminates identified deficiencies, resolves complaints to ensure the quality of completed work.</p> <p>7.1.6. Regularly attends professional educational courses/trainings on the application of standards, new techniques, and technologies, as well as training for the development of transferable/soft skills.</p> <p>7.1.7. Evaluates their own work and the work of colleagues, considering the specific nature of the work and the characteristics of employees (life stage, physical abilities, etc.).</p>
<p>8. Workplace and</p>	<p>8.1. Implementation of safety and occupational health</p>	<p>8.1.1. Applies relevant legal and internal regulations that govern health and safety, fire protection, and emergency management.</p> <p>8.1.2. Uses personal protective equipment in accordance with relevant standards and instructions.</p>

environmental protection	procedures and measures	<p>8.1.3. Implements measures for protection from electrical shock when working with electric and hybrid vehicles, in accordance with appropriate procedures and legal regulations.</p> <p>8.1.4. Conducts regular checks of personal protective equipment, tools, devices, and other work resources in accordance with relevant standards and instructions.</p> <p>8.1.5. Uses hazardous and potentially hazardous chemical agents in accordance with usage instructions, in order to preserve safety and health at work.</p> <p>8.1.6. Carries out the evacuation plan in case of an emergency, in accordance with appropriate procedures.</p> <p>8.1.7. Provides first aid in case of an accident, in accordance with appropriate procedures.</p>
	8.2. Implementation of procedures and measures for environmental protection	<p>8.2.1. Keeps the workplace clean and tidy in accordance with environmental protection measures.</p> <p>8.2.2. Carries out disposal, storage, and sorting of materials and chemical agents in a manner that does not harm the environment.</p> <p>8.2.3. Organizes/chooses, disposes, stores, and treats waste generated in the work process in accordance with environmental protection legislation and internal waste management procedures.</p> <p>8.2.4. Implements protective measures against the impact of any hazardous gases, toxins, vapors, highly flammable substances.</p> <p>8.2.5. Implements measures in case of chemical spills or leakage of any reagents and flammable substances.</p> <p>8.2.6. Uses energy and materials rationally and applies the principles of sustainable environmental development.</p>