Hydrogen Maintenance Mechanic

The Hydrogen Maintenance Mechanic is responsible for the inspection, diagnostics, and troubleshooting of hydrogen systems in automotive and mobility applications. Their main activities include checking high-pressure hydrogen circuits, testing communication systems, and ensuring compliance with strict safety standards. They work at the interface between onboard hydrogen systems and external refuelling infrastructure, performing preventive maintenance and verifying system efficiency—without directly manipulating or replacing hydrogen storage tanks.

Key responsibilities involve performing leak detection and high-voltage isolation, using diagnostic software, interpreting system logs, and conducting maintenance on fuel cell systems. Essential competences include green competences (hydrogen efficiency, safety procedures), digital competences (diagnostic software, system log analysis), soft competences (continuous learning, responsibility under high-risk conditions), transversal competences (safety in high-voltage and pressurised systems), and sector-specific competences (fuel cell systems maintenance, hydrogen refuelling interface diagnostics).

ESCO Mapping

https://esco.ec.europa.eu/select-language?destination=/node/1

ID	NAME	Concept URI
7231.10	Vehicle technician	http://data.europa.eu/esco/occupation/4ad4024e-d1d3-4dea-b6d1-2c7948111dce

Context

EQF Level	4/5
Departments	Production and Maintenance

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Green Competences

ID	Name	Type	Description	Level	ESCO
C038	Perform leak detection and pressure testing	Skill	Use dedicated tools to perform leak checks in high-pressure hydrogen circuits. ▪ Set up and execute sniff, pressure-decay and bubble tests ▪ Calibrate and use high-pressure gauges and sensors ▪ Document parameters/thresholds against OEM specs ▪ Isolate area and escalate when limits are exceeded ▪ Re-test to verify integrity after repair	3	Link
C039	Hydrogen consumption and efficiency evaluation	Knowledge	Assess hydrogen usage and system efficiency using diagnostics and sensor data. ▪ Explain stack/auxiliaries factors affecting consumption ▪ Analyse trends from flow meters and controller logs ▪ Differentiate normal vs abnormal patterns across duty cycles ▪ Evaluate ambient/load effects on efficiency ▪ Recommend optimisation actions based on findings	3	Link

Digital Competences

ID	Name	Type	Description	Level	ESCO
C099	Use diagnostic software	Skill	Operate vehicle diagnostic tools to monitor H_2 system communication (CAN/OBD). ▪ Connect to ECUs and establish secure sessions ▪ Read/clear DTCs and capture live data ▪ Run guided tests and parameterisations ▪ Export logs and compile diagnostic reports ▪ Maintain software versions and access rights	3	Link
C100	Interpret system logs	Knowledge	Interpret logs from fuel control units and H_2 sensors, including DTCs.	3	Link

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ID	Name	Type	Description	Level	ESCO
	and fault codes		▪ Describe DTC families for fuel-cell/H_2 subsystems ▪ Correlate timestamps across multiple controllers ▪ Identify root causes using freeze-frame data ▪ Assess severity/criticality for safety decisions ▪ Recommend data-driven diagnostic paths		

Soft Skills

ID	Name	Type	Description	Level	ESCO
C152	Continuous learning	Knowledge	Stay updated on H_2 technologies, standards and diagnostic tools. ▪ Track updates to applicable standards and OEM bulletins ▪ Review field cases and lessons learned ▪ Evaluate new diagnostic methods/tools ▪ Share knowledge via toolbox talks and notes	1	Link
C153	Take responsibility	Skill	Work safely under strict procedures for H_2 maintenance. ▪ Perform pre-work risk assessments ▪ Enforce lockout/tagout and zone demarcation ▪ Document deviations and near-misses ▪ Stop work when conditions are unsafe	3	Link

Transversal Competences

ID	Name	Type	Description	Level	ESCO
C192	Perform high-voltage system isolation	Skill	Safely disconnect and secure HV systems before work. ▪ Follow OEM HV shutdown procedures ▪ Use CAT III/IV tools and PPE ▪ Verify de-energised state with approved meters	3	Link

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ID	Name	Type	Description	Level	ESCO
			▪ Tag and secure connectors and work area		
C193	Hydrogen system safety awareness	Knowledge	Understand risks and legal limits when near pressurised H_2 vessels. ▪ Explain H_2 properties (diffusion/flammability) ▪ Recognise ventilation and detection requirements ▪ Identify prohibited operations near tanks ▪ Comply with site permits and local regulations	2	Link

Sector Specific

ID	Name	Type	Description	Level	ESCO
C269	Maintain fuel cell systems	Skill	Conduct diagnostics, replacement and calibration of fuel-cell components. ▪ Replace filters/humidifiers/auxiliaries ▪ Calibrate sensors/valves and check flows ▪ Execute stack conditioning procedures ▪ Validate performance post-maintenance	3	Link
C270	Diagnose hydrogen refuelling interfaces	Skill	Check and diagnose the vehicle–dispenser interface. ▪ Test communication/handshake between vehicle and dispenser ▪ Inspect receptacles, seals and check valves ▪ Verify pressure/temperature compensation logic ▪ Resolve alignment/locking malfunctions	2	Link

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