



*Alliance for Batteries Technology, Training and Skills*

*2019-2023*

## **Quality Engineer in Battery Industry**

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## Quality Engineer in Battery Industry

A battery quality engineer is responsible for ensuring the quality of batteries and battery systems during the development and production phases. They work with a team of engineers and scientists to establish and maintain quality standards and procedures for the design, development, and production of batteries and battery systems. They are responsible for identifying, analyzing, and preventing defects in the batteries and systems, and for implementing quality control measures to ensure that the products meet the required specifications.

### ESCO Occupations - [ESCO - Occupations - European Commission \(europa.eu\)](http://data.europa.eu/esco/occupation/30c0943c-caa1-411d-b273-26f475971273)

| ID       | NAME             | Concept URI                                                                                                                                                         |
|----------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2149.2.7 | quality engineer | <a href="http://data.europa.eu/esco/occupation/30c0943c-caa1-411d-b273-26f475971273">http://data.europa.eu/esco/occupation/30c0943c-caa1-411d-b273-26f475971273</a> |

### Context

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|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Minimum EQF</b>     | 4/5/6/7                                                                                                                                                                                                                                                                                                                                  |
| <b>Value Chain</b>     | Raw Materials and Processing<br>Cell and Components Manufacturing<br>Modules and Packs<br>Battery Integration<br>Operation<br>Second Life<br>Recycling                                                                                                                                                                                   |
| <b>Departments</b>     | Production and Maintenance<br>Quality                                                                                                                                                                                                                                                                                                    |
| <b>Specialisations</b> | Other job roles that are more specialised but based on this<br>Quality control engineer<br>Supplier quality engineer<br>Quality engineers - general<br>General quality role experience, skills<br>General quality role traits<br>Quality control team roles<br>Quality postproduction team roles<br>Quality management system team roles |

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|  | Future skills - Quality<br>Quality Engineer<br>Quality Planner Battery Assembly<br>Process Quality Engineer<br>Quality Process Engineer<br>Quality Launch Engineer |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Cross-sectoral Specific Competence

| Name                                | Type<br>(S/K) | Description/Context                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Level        | ESCO                                 |
|-------------------------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------------------------------|
| Agile                               | K             | <ul style="list-style-type: none"> <li>- Implementing of quality standards in the organization and continuous improvement</li> <li>- Solving quality issues</li> <li>- Initiating and implementing corrective and preventive actions</li> <li>- Contribution in Product- and Process FMEAs</li> </ul>                                                                                                                                                                                                                                                                                                      | Expert       | ICT project management methodologies |
| Automation                          | K             | <ul style="list-style-type: none"> <li>- Initiation, maintenance and development projects according to Quality Plan</li> <li>- Planning and execution of measures for process monitoring and process control</li> <li>- Coordinate the implementation capabilities of the machine, process and evaluation</li> </ul>                                                                                                                                                                                                                                                                                       | Expert       | operate automated process control    |
| Product Quality Assurance           | K             | <ul style="list-style-type: none"> <li>- Implementing of quality standards in the organization and continuous improvement</li> <li>- Operating according to quality plan</li> <li>- Contribution in Product- and Process FMEAs</li> <li>- Providing accurate and complete registration data in SQMS</li> <li>- Participation in project meetings and reporting of quality related items.P90</li> <li>- Follow up on the audit – implementation of quality improvement plan and monitoring of effectiveness</li> <li>- Ensure workflows and processes are in line with testing and control plans</li> </ul> | Expert       | quality assurance methodologies      |
| Clean/Dry Room Procedure/Validation | S             | <ul style="list-style-type: none"> <li>- Coordinate the implementation capabilities of the machine, process and evaluation, both during the start-up of the project and in series</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                               | Practitioner | maintain manufacturing rooms         |
| Audits                              | S             | <ul style="list-style-type: none"> <li>- Implement internal auditing process to ensure constant readiness for external audits in production area and process adherence</li> <li>- Implement internal Quality Monitoring Processes,</li> </ul>                                                                                                                                                                                                                                                                                                                                                              | Expert       | conduct workplace audits             |

|                                       |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                              |
|---------------------------------------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------------------|
|                                       |   | <p>including Torque Monitoring, Assembly Process Monitoring, New Supplier Monitoring, Initial Sample Inspection, and Layered Audit</p> <ul style="list-style-type: none"> <li>- Lead company through internal and 3rd party audits</li> <li>- Focus on processes and systems, as well as guiding through audits, this position is responsible for ensuring our systems and processes both comply with and reinforce policies and procedures</li> </ul>                                                                                                                                                                                                                                                       |        |                              |
| Process Improvement (Engineering)     | S | <ul style="list-style-type: none"> <li>- Conceptualize, develop, implement, and optimize quality systems and processes to support</li> <li>- Ensure complete and effective root cause analysis and corrective action implementation making necessary recommendations and improvements where needed manufacturing</li> <li>- Initiating and implementing corrective and preventive actions</li> </ul>                                                                                                                                                                                                                                                                                                         | Expert | identify process improvement |
| Inspect Quality of Product / Sampling | S | <ul style="list-style-type: none"> <li>- Sample part inspections of in house parts. Initiating and coordinating the first sample, providing accurate and complete registration data in SQMS</li> <li>- Implement Quality Circles within production area to ensure quality is produced and maintained</li> <li>- Conceptualize, develop, implement, and optimize quality systems and processes</li> <li>- Document and track all non-conformities; define, implement, and maintain all non-conformity countermeasures</li> <li>- Experience in QM systems</li> <li>- Perform testing on different equipment and on the final product</li> <li>- Validating and implementing new inspection methods</li> </ul> | Expert | inspect quality of product   |
| Analysis Methods (root cause)         | K | <ul style="list-style-type: none"> <li>- Prepare Failure Mode Effect Analysis (FMEA), process flow diagrams, and process control plans for assigned programs, revising as needed</li> <li>- Review and analyse CMM layout reports, recommending process changes as required</li> <li>- Non-Conformance Tracking (MRB)</li> <li>- Supplier Corrective Action Requests (SCAR)</li> <li>- Corrective Action and Preventive Action (CAPA)</li> <li>- Supplier Quality Scorecard (SQC)</li> <li>- Cost of Poor Quality (COPQ)</li> </ul>                                                                                                                                                                          | Expert | analysis methods             |

|                      |   |                                                                                                                                                                                                                                                                                                                                                                                                          |              |                                                   |
|----------------------|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------------------------------------------|
| Standard/isation     | S | <ul style="list-style-type: none"> <li>- Ensure the Quality system is prepared for International Organization for Standardization (ISO)</li> <li>- Implementing of quality standards in the organization and continuous improvement</li> <li>- Ensure the Completed Vehicle Inspection Standards (CVIS) are incorporated in standard work</li> <li>- Implement standard compliance procedures</li> </ul> | Expert       | adhere to standard procedures                     |
| Production Processes | K | <ul style="list-style-type: none"> <li>- Understanding of the various stages involved in battery production, including casting, plastic moulding, metal stamping, and metal forming.</li> </ul>                                                                                                                                                                                                          | Practitioner | production process                                |
| Project Management   | K | <ul style="list-style-type: none"> <li>- The Competence to plan, organize, and oversee complex projects in the battery industry, ensuring that all project elements are completed on time and within budget. This includes managing resources, risk management, and stakeholder communication.</li> </ul>                                                                                                | Practitioner | project management principles; project management |

### Sector Specific Competence

| Name            | Type (S/K) | Description/Context                                                                                                | Level  | ESCO            |
|-----------------|------------|--------------------------------------------------------------------------------------------------------------------|--------|-----------------|
| Battery Testing | S          | <ul style="list-style-type: none"> <li>- Battery operation and performance parameters and their testing</li> </ul> | Expert | battery testers |

### Soft Competence

| Name                            | Type (S/K) | Description/Context                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Level        | ESCO                           |
|---------------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------------------------|
| Problem Solving/Troubleshooting | S          | <ul style="list-style-type: none"> <li>- Tasked with advanced levels of process troubleshooting, root cause analysis as well as driving the necessary improvements to completion</li> <li>- Institute permanent corrective actions to address and contain concerns related to both customer and internal issues</li> <li>- Prepare Failure Mode Effect Analysis (FMEA), process flow diagrams, and process control plans for assigned programs, revising as needed</li> <li>- Demonstrated ability with problem-solving methodologies including 8-D, 5-why, Ishikawa, DMAIC</li> </ul> | Expert       | problem solving & troubleshoot |
| Communication                   | K          | <ul style="list-style-type: none"> <li>- ability of individuals and organizations to effectively and efficiently exchange information and ideas related to battery technology, design,</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                      | Practitioner | communication                  |

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|  |  | production, and use. This includes effective listening and speaking skills, written communication skills, intercultural competence, and the use of appropriate technology and tools. |  |  |
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### General Transversal Competence

| Name | Type (S/K) | Description/Context | Level | ESCO |
|------|------------|---------------------|-------|------|
|      |            | -                   |       |      |

### Academic Competence (can be taken from University programme)

| Name                             | Type (S/K) | Description/Context | Level  | ESCO                   |
|----------------------------------|------------|---------------------|--------|------------------------|
| Engineering                      | K          | - University level  | Expert | engineering principles |
| Mechanical Engineering           | K          | - University level  | Expert | mechanical engineering |
| Electrical Engineering (systems) | K          | - University level  | Expert | electrical engineering |