QUALITY CONTROL INSPECTOR

A DEEP DIVE FOR SKILLS-BASED HIRING

REV: 04/04/16

SKILLFUL
A MARKLE INITIATIVE

Occupation Overview: Quality Assurance Technicians

Foundational Competencies

- **Quality Control Analysis:** Conducting tests and inspections of products, services, or processes to evaluate quality or performance.
- **Active Listening:** Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.
- **Critical Thinking:** Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions, or approaches to problems.
- **Monitoring:** Monitoring/assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.
- **Coordination:** Adjusting actions in relation to others' actions.
- **Operation Monitoring:** Watching gauges, dials, or other indicators to make sure a machine is working properly.
- **Judgment and Decision Making:** Considering the relative costs and benefits of potential actions to choose the most appropriate one.
- **Writing:** Communicating effectively in writing as appropriate for the needs of the audience.
- **Complex Problem Solving:** Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.
- **Time Management:** Managing one's own time and the time of others.

Occupation-Specific Competencies

- **Microsoft Office:** Ability to create and utilize documents using programs such as Microsoft Word, Excel, PowerPoint, and Outlook.
- **Machine Tools:** Certification and/or competency with machine tools such as power grinders, milling cutters, drill presses, lathes, calipers, tool dies, and their dial indicators.
- **Manufacturing Standards:** Understanding of ISO 9000 and 9001 Standards, CMM, DOE, FMEA, Minitab, and process control.
- **Industrial Design:** Ability to create and/or use schematic diagrams, blueprints, and sketching for industrial design.
- **Manufacturing Processes:** Understanding Six Sigma processes at a green or black belt levels, Kaizen, and lean manufacturing.
- **Mathematics:** Competency in manipulating numbers, quantities, shapes, and spaces.
- **Lab Research Methodology:** Experience with laboratory research, procedures, and equipment with sample preparation, aseptic, and clean room experience, GMP, and GLP.
- **Electrical/Mechanical Labor:** Mechanical and/or electrical knowledge of circuit testers, AC/DC drives and motors, cabling, fiber optics, calibration, and components of technical orders.
- **Packaging:** Understanding of labeling and packaging in package design, as well as receiving, shipping, order entries, and distribution center operations.
- **Product Inspection:** Experience with product inspection and testing according to failure analysis and compliance with customer specifications.

Job Description (Example)

Inspect, test, sort, sample, or weigh nonagricultural raw materials or processed, machined, fabricated, or assembled parts or products for defects, wear, and deviations from specifications. May use precision measuring instruments and complex test equipment.

- Test chemical or physical characteristics of materials or products.
- Read work orders or other instructions to determine product specifications or materials requirements and review blueprints or other instructions to determine operational methods or sequences.
- Monitor equipment operation to ensure proper functioning and to ensure that products are not flawed.
- Analyze test results.
- Measure dimensions of completed products or work pieces to verify conformance to specifications and weigh finished products.
- Evaluate quality of materials or products.

Activities (Example List)

- Inspect, test, or measure materials, products, installations, or work for conformance to specifications.
- Measure dimensions of products to verify conformance to specifications, using measuring instruments such as rulers, calipers, gauges, or micrometers.
- Read blueprints, data, manuals, or other materials to determine specifications, inspection and testing procedures, adjustment methods, certification processes, formulas, or measuring instruments required.
- Record inspection or test data such as weights, temperatures, grades, or moisture content, and quantities inspected or graded.
- Mark items with details such as grade or acceptance-rejection status.
- Notify supervisors or other personnel of production problems.
- Discard or reject products, materials, or equipment not meeting specifications.
- Collect or select samples for testing or for use as models.
- Write test or inspection reports describing results, recommendations, or needed repairs.

Prioritized Foundational Competencies: Quality Assurance Technicians

Most Common Required Competencies

1	**Time Management:** Managing one's own time and the time of others; able to set the right priorities and revise priorities as conditions change (e.g., critical piece finishes and needs inspection); able to work on and assess the quality of multiple products and components at the same time; focusing on the task at hand, ideally with a sense of urgency; hits time goals when required.
2	**Coordination:** Adjusting actions in relation to others' actions and conditions; being in the right place at the right time (if an important piece finishes, stop current work and go examine it); scanning for opportunities to help others and helping when appropriate; adjusting to the environment (e.g., respond to unexpected customer needs, seek help with unusual non-conformances).
3	**Operation Monitoring:** Watching gauges, dials, or other indicators to make sure a machine is working properly; verifying the soundness of instruments before using; assessing results relative to the appropriate standard; ideally, basic familiarity with statistical processing control (SPC); responding to abnormal or out of control results either personally or with others' help as appropriate.

Most Common Break Point Competencies

1	**Judgment and Decision Making:** Considering the relative costs and benefits of potential actions; knowing when to ask for help and escalate concerns (often); distinguishing between a serious, repeated pattern and one off anomalies; escalating serious issues quickly; sharing important information, not hiding or ignoring it; knowing what decisions to make and what to pass on superiors or other staff.
2	**Time Management:** *See previous.*
3	**Active Listening:** Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times (key during shift change); internalizing information and applying to the job; adjusting work to what one hears; not dismissing what other people tell you; showing interest (e.g., look at the talker).

Most Preferred Competencies

1	**Critical Thinking:** Identifying the strengths and weaknesses of alternative solutions, conclusions, or approaches to problems; thinking about how to improve things (continuous improvement); creating and sharing ways to make things better (e.g., re-arrange machines, use new tool); having an independent perspective; able to see the big picture (the end-to-end process, factory as a whole).
2	**Quality Control Analysis:** Conducting tests and inspections of products, services, or processes to evaluate quality or performance; reliably performing tasks and gaining the trust of others; reading and verifying SPC (statistical process control); able to interpret key quality data and take the appropriate action (e.g., take corrective action personally or advise superiors of significant issue).
3	**Active Listening:** *See previous.*

Most Hard-to-Find Competencies

1	**Active Listening:** *See previous.*
2	**Critical Thinking:** *See previous.*
3	**Quality Control Analysis:** *See previous.*

Most Evolving Competencies

1	**Quality Control Analysis:** Evolution driven by specifications getting tighter, customers wanting more, better, faster and cheaper, increased automation (e.g., cameras replacing ring gauges); changes make it move valuable to know newer tools (e.g., cameras), how to interpret digital data, not machine readings, and setting up and monitoring newer automated quality tools.
2	**Critical Thinking:** Evolution driven by customers wanting more, better, faster and cheaper; market pressures make it more valuable to constantly think about how to operate better (continuous improvement); new tools and technologies (e.g., cameras) expand the set of options creating more ways to make things better.
3	**Complex Problem Solving:** Evolution driven by specifications getting tighter and customer demands; changes make it more valuable to think holistically about the work being done (make the process better, make the factory as a whole operate better); staff on the floor know best how the current systems work and thus well positioned to identify problems and ideally having ideas on how to improve things.

Prioritized Occupation-Specific Competencies: Quality Assurance Technicians

Most Common Required Competencies	
1	**Product Inspection:** Experience with product inspection and testing according to failure analysis and compliance with customer specifications; compare product to the relevant standards (e.g., regulatory or industry standards, customer specifications) and accurately identify non-conformances; select the right tool to use to test for quality and know how to use that tool.
2	**Microsoft Office:** Ability to utilize documents using desktop productivity programs such as Microsoft Word, Excel, PowerPoint, and Outlook; input data accurately and consistently to software programs given company protocols; retrieve the right files and data given the situation; ideally, basic familiarity with Minitab or other data analysis software.
3	**Packaging:** Understanding of labeling and packaging in package design, as well as receiving, shipping, order entries, and distribution center operations; handling products with care when moving around internally ("don't drop the product"); ideally, basic familiarity with lot control principles (first in, first out, for example); understanding packaging requirements given company standards and the order.

Most Common Break Point Competencies	
1	**Product Inspection:** *See previous.*
2	**Packaging:** *See previous.*
3	**Microsoft Office:** *See previous.*

Most Preferred Competencies	
1	**Product Inspection:** *See previous.*
2	**Manufacturing Standards:** Basic familiarity with ISO standards and relevant industry-specific standards FDA, SQF (safe quality food), AS9100 (aerospace).
3	**Manufacturing Processes:** Basic understanding of one or more commonly-used manufacturing processes including Six Sigma, Kaizen, lean manufacturing, DOE, FMEA, process control, DMEAIC, and 5S; ideally, understand standard and basic familiarity about how to apply and use.

Most Hard-to-Find Competencies	
1	**Manufacturing Processes:** *See previous.*
2	**Manufacturing Standards:** *See previous.*
3	**Product Inspection:** *See previous.*

Most Evolving Competencies	
1	**Manufacturing Standards:** Evolution driven by changing standards (e.g., ISO revised in 2015), variability in how companies apply (standards specify "what" more than "how"), and global trade (other countries and foreign companies have their own standards); evolution makes it more valuable to know popular standards (e.g., ISO) and how to meet customers' unique standard needs.
2	**Machine Tools:** Evolution driven by improved tools, precision demands, automation, IT, and transition from analog to digital; changes enhance value of knowing how to use metrology machines (caliper, CMM, cameras) and knowing how to set-up and use the newer equipment.
3	**Product Inspection:** Evolution driven by increasing customer demands for customization, precision and cost reduction; changes increase the value of being able to ensure standard adherence even in unusual circumstances (e.g., Chinese company has unique standards).

Work Scenarios: Quality Assurance Technicians

Scenario: First Article Inspection	List of Competencies
Ken's company closed a sale for a plastic dials order for sprinkler control units. Monday morning, Ken arrives and logs into the ERP system to locate, download and print the quality plan for the new dials from the file library. Ken reviews the plan with his manager to cover a few specific changes to the frequency of quality inspections and allowable size of defects. The customer requested these changes as a result of problematic air bubbles visible in the last order. On the floor, a production technician produces a sample piece for Ken to inspect. The test piece meets the specification. To complete a thorough inspection, Ken places it on a light table and discovers an imperfection causes a strange light diffusion. Ken alerts the production tech who adjusts the injection press and provides a new sample piece. This piece meets all specifications and is tagged as the first article to remain at the station. Ken completes the first article inspection sheet and gathers the necessary signatures from the production tech and operations tech in order to begin. Ken gives the go-ahead to begin the production run and files a copy of the first article inspection.	• *Coordination* • *Quality Control Analysis* • *Critical Thinking* • *Time Management* • Product Inspection • Manufacturing Standards • Manufacturing Processes

Scenario: Regular Ongoing Inspection	List of Competencies
Janet arrives for her afternoon shift and meets for 15 minutes with her fellow quality inspector, Ken, who's leaving. He informs her of the 4 current production runs on the floor and highlights a malfunctioning injection press that's operating below maximum efficiency. Janet visits each active workstation and reviews the work order, quality plan, and process log results. Operations appear to be running smoothly based on log results so Janet goes to the quality lab to collect her tool cart. She checks it for multiple sizes of calipers, scales, rulers and sample components needed to check items for fit. Based on the quality plans used for today's runs, Janet performs short-interval inspections every 30-minutes and full-box inspections every two hours. Janet starts her inspections on an order of phone cases; she weighs a case, measures the dimensions and checks the color using a spectrophotometer. Next, she inspects a station scheduled for full-box inspection that requires she remove and inspect all 20 clamshell headphone cases inside. Janet repeats this process of ongoing and short-interval inspection until her shift ends, making notes in the process logs as she goes.	• *Time Management* • *Quality Control Analysis* • *Operating Monitoring* • Product Inspection • Machine Tools • Packaging • Manufacturing Standards

Scenario: Defect Discovery	List of Competencies
Roberta has been performing inspections and found no quality issues until coming across an item with out of specification thickness measurements in a run producing vehicle dashboards. She records the discrepancy in the process log and notes that this puts the run outside the acceptable defect rate %. This station is now operating in a "yellow" status for the cycle. Roberta continues her checks at other stations and returns for the next short-interval control check 30-minutes later. She finds another defective dashboard. Since the station was in "yellow" status for one cycle, this issue now creates a red flag and requires Roberta to shut down work. The production team becomes upset due to the slowdown. She shows them the process log and explains they need to halt production until they can identify the root cause and extent of the issue. She notes this will save time and money on the order overall. A production tech discovers too much material is being injected into the machine, causing the thickness discrepancy. A few tweaks are made and a quality dashboard is made. Roberta follows the steps for a new first article inspection and gets the order running again.	• *Time Management* • *Critical Thinking* • *Complex Problem Solving* • Quality Control Analysis • Product Inspection • Machine Tools • Manufacturing Standards

Scenario: Operator Training	List of Competencies
On a bi-weekly basis Frederick meets with different members of the production staff to provide training on quality control best practices. Each time he performs a training, the focus is on a different aspect of quality control for a product or machine, the goal is to help advance everyone's knowledge. This week Frederick is working to teach two production technicians about the importance of material purity. He starts by explaining how contaminants in the production materials can cause inconsistencies in the strength, shape, and color of finished products and cost the company time and money. Next, he sets a goal for the production technicians to check that the material hoppers are covered every time they approach an active production station throughout the day.	• *Coordination* • *Operating Monitoring* • *Active Listening* • Manufacturing Standards • Manufacturing Processes • Product Inspection

Occupation Deep Dive: Quality Assurance Technicians

Job Titles Within This Occupation

- Quality Inspector
- Quality Control Inspector
- Quality Assurance Specialist
- Quality Control Technician
- Quality Assurance Inspector
- Quality Assurance Technician
- Quality Specialist
- Quality Technician

Certification and Education Preferences (Example)

- Certified Composites Technicians
- Certified Quality Improvement Associate
- Certified Weigher's License

Tools Used (Example List)

- Calipers
- Capability Maturity Model (CMM)
- Micrometers
- Blueprints
- ISO 9001 Standards
- Good Manufacturing Practices (GMP)

Other Relevant Foundational Competencies

1	Reading Comprehension
2	Speaking
3	Social Perceptiveness
4	Operation and Control
5	Mathematics
6	Active Learning
7	Systems Evaluation
8	Persuasion
9	Systems Analysis
10	Learning Strategies
11	Instructing
12	Management of Personnel Resources
13	Negotiation
14	Service Orientation
15	Operations Analysis
16	Troubleshooting
17	Science
18	Management of Material Resources
19	Management of Financial Resources
20	Equipment Selection
21	Programming
22	Technology Design
23	Equipment Maintenance
24	Repairing
25	Installation

Other Relevant Occupation-Specific Competencies

1	General Data Techniques
2	Equipment Maintenance/Repair
3	Auditing
4	General Database
5	Hand Tools
6	Physical Inspection and Quality Assurance
7	Material Moving and Transport
8	Data Entry
9	Welding
10	Machinery
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