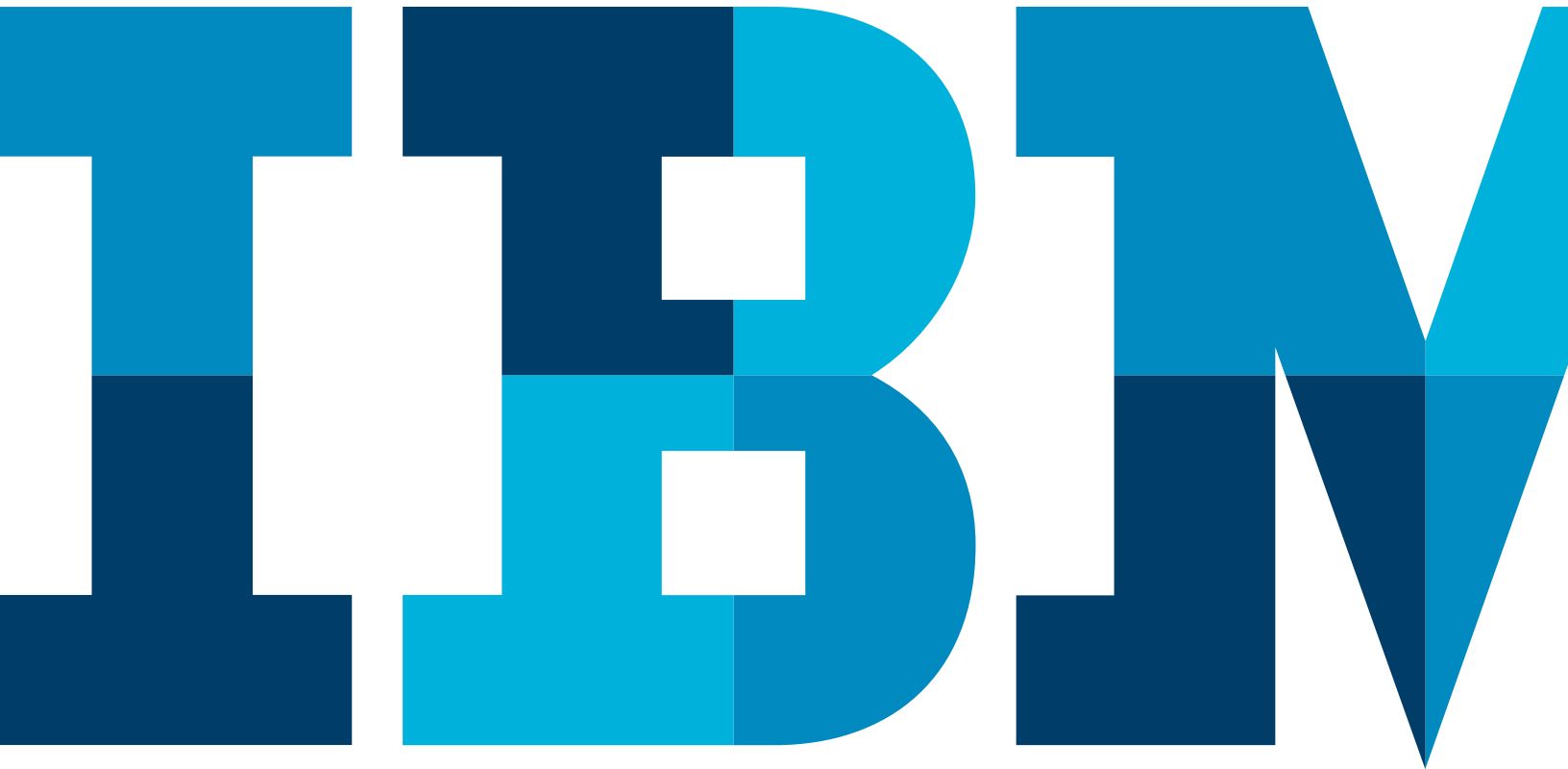


Manufacturing Job Skills & Competencies Framework

A framework to address skills required and bridge skill gap within manufacturing industry.



IBM recognizes that as a Manufacturer, you face some of the most critical talent and skills management issues of any organization. These issues may sometimes appear tactical, but can also have wide ranging impact on the successful and continuing operations of the overall business. Through a structured approach to capturing the skills and talent required, you can capture, recognize and manage risk against such issues as:

- Innovation
- Major product version updates
- Vendor certification and support
- Global competition for business and talent
- Cost and expense management
- Compliance and quality (regulatory, security, ISO/ CMMI, environmental, OSHA, etc.)
- Supply chain management

In an organization it may be easy to answer a question such as “How many printers do we have?” or “Where are they?”, but the same cannot be said when asked of knowledge, skills or people. Using a Job and Competency Framework, you will be able to lay a foundation for answering:

- How many people and who and where are the ones with critical skills for a new product project?
- How can we improve a critical process by improving people performance?
- What is our mission critical knowledge and where does that institutional memory reside?
- What skills based SLAs can we drive our vendors to deliver?
- What is our capability to migrate from one version of a product or manufacturing technique to the next?

For more than 20 years, the IBM Kenexa Talent frameworks has been deployed in many organizations to help them - either independently or as part of a larger HR strategy - improve learning, development and performance of a company’s most critical components. Using the content library is a rapid and robust way to customize your organizationally aligned competencies and job profiles.

IBM offers Job Skills & Competencies across 18 different industries. This is but one of those libraries. Kenexa offers complete solutions to support your Talent Management requirements including cloud based software to manage your workforce Job Skills & Competencies, Employee Self-Assessment, Manager Assessment, Skills Gap analysis and more.

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Manufacturing Job Competencies Framework

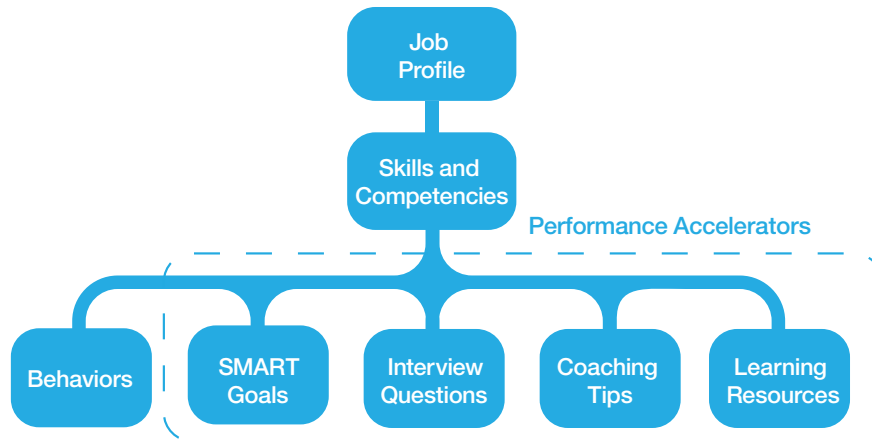


Figure 1: Job Competency Architecture

Types of Skills and Competencies

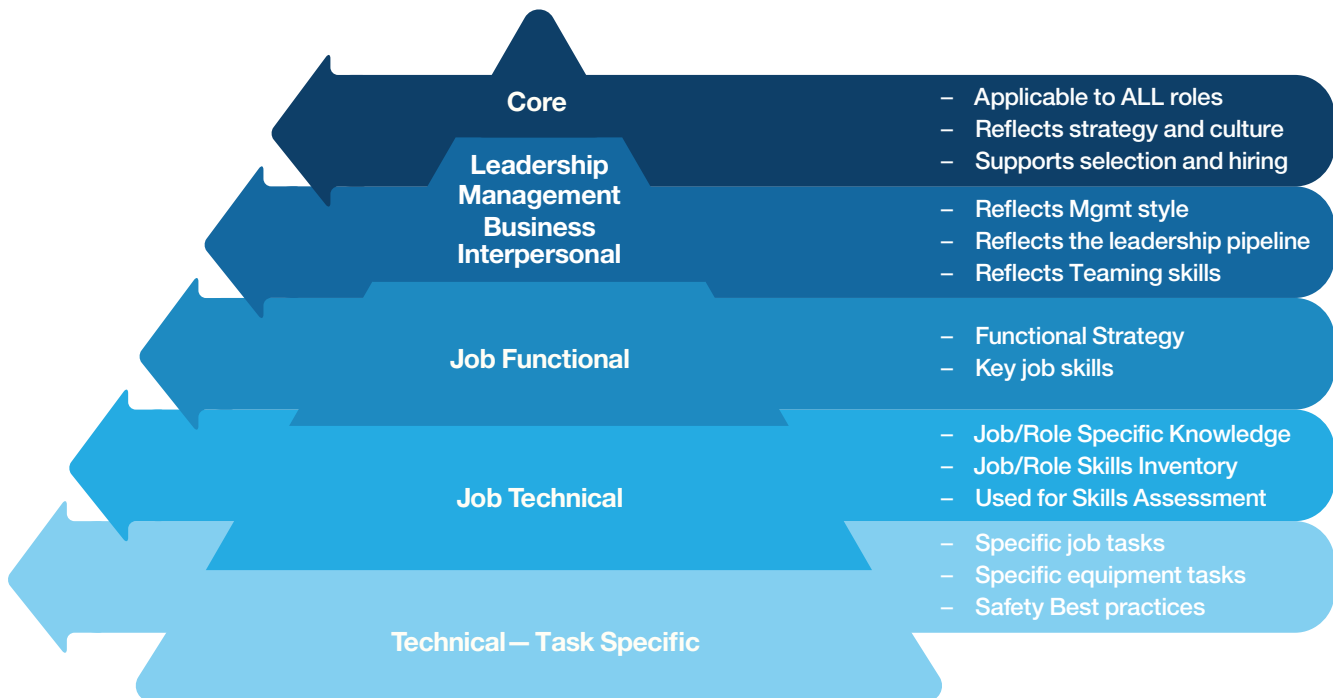


Figure 2: Competency: A combination of knowledge, skills and abilities (KSAs) describing the demonstrable indicators of proficiency.

Manufacturing Jobs Framework Overview

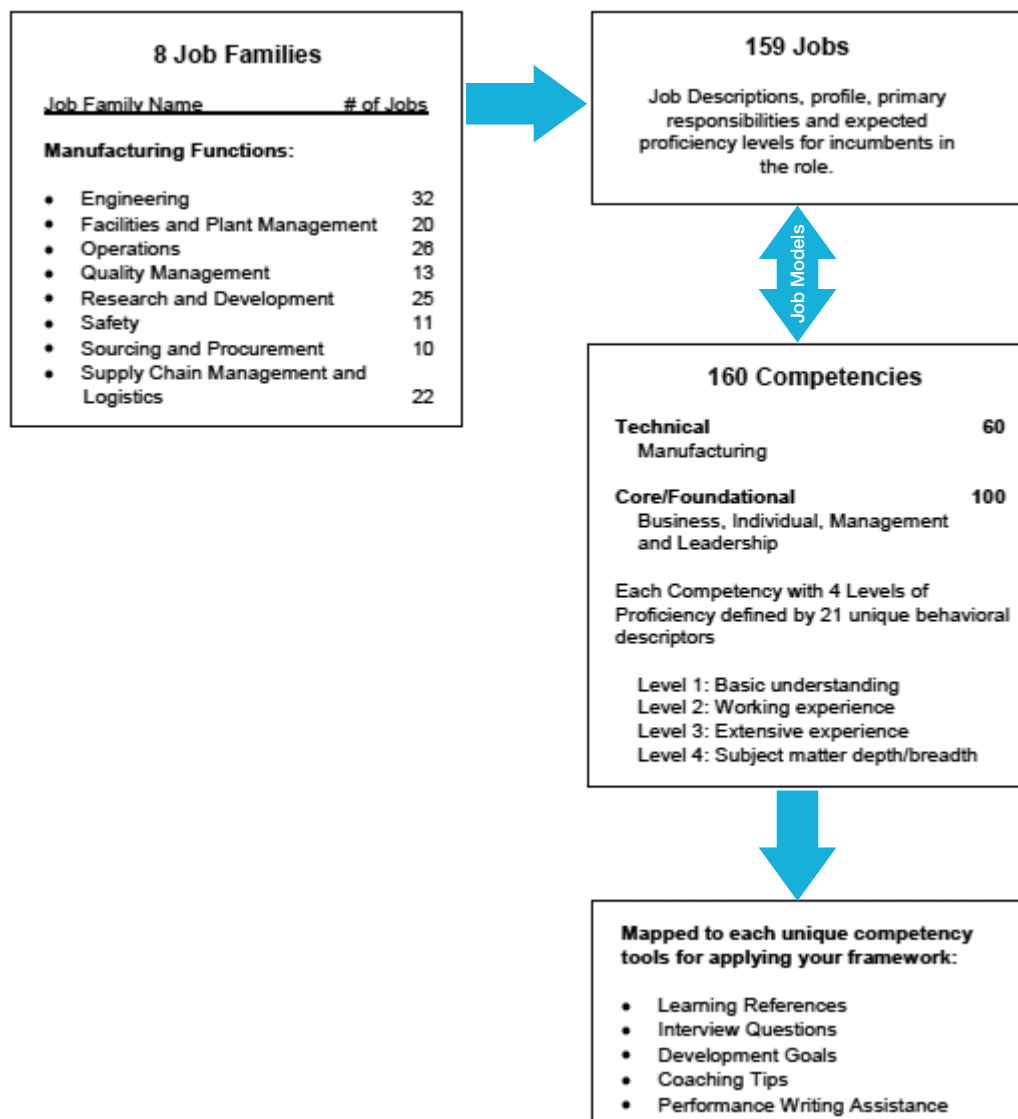


Figure 3: Manufacturing Jobs Framework Overview: Description of job families, job models and competencies.

Manufacturing Job Family and Job Titles

Job Family	Job Titles
<p>Engineering Engineering support for manufacturing operations. Technology and systems engineering.</p>	<p>Engineering Director Engineering Fellow Engineering Manager Field Service Manager Industrial Engineer, Senior Manufacturing Engineer Manager Mechanical Engineering Manager Mechanical Engineer, Senior Production Engineering Manager Production Engineer, Senior Engineering Project Manager Electrical Engineer Tool/Die Design Engineer Human Factors Engineer Engineer, Senior Certification Engineer Environmental Engineer Industrial Engineer Project Engineer Field Service Engineer, Senior Mechanical Engineer Mechanical Engineering Supervisor Mechanical Engineering Technician, Senior Manufacturing Engineer Production Engineer Production Engineering Supervisor Reliability Engineer Engineer, Junior Field Service Engineer Industrial Engineer, Junior Mechanical Engineer, Junior Manufacturing Engineer, Junior Mechanical Engineering Technician Production Engineer, Junior Drafter Mechanical Engineering Technician, Junior</p>

<p>Facilities & Plant Management</p> <p>Management, maintenance and construction of manufacturing facilities, associated infrastructure and manufacturing equipment.</p>	<p>Facilities Director Plant General Manager Emergency Manager Plant Manager Project Manager, New Plant Plant Maintenance Manager Plant Operations Manager Security Manager Power Supply Engineer Equipment Maintenance Manager Facility Engineer Plant Supervisor Shift Engineer Electrical Specialist Emergency Response Coordinator Equipment Maintenance Specialist Security Specialist Electrician Facilities Support Technician General Laborer</p>
<p>Manufacturing Research & Development:</p> <p>Research, development and testing of products and processes; manufacturing sciences, technology and systems engineering.</p>	<p>Product Design Director Director of Deployment Product Development Director Research & Development Director Design Manager Materials Engineer, Senior Regulatory Affairs Manager Research & Development Manager Strategic Product Planning Manager Design Engineer, Senior Materials Engineer Product Engineer, Senior Product Development Engineering Manager Product Development Manager Process Engineer, Senior R&D Supervisor Design Engineer Packaging Engineer Materials Engineer, Junior Process Associate, Senior Process Engineer Product Engineer Product Development Supervisor Testing Technician, Senior Process Associate Product Engineer, Junior Testing Technician</p>

Manufacturing Operations

Day-to-day production and actual manufacturing of products or components. Waste management.

- Operations Director
- Manufacturing Manager
- Operations Manager
- Process Research Manager
- Process Manager
- Electro-Mechanical Assembly Technician, Senior
- Operations Engineer
- Industrial Engineering Technician, Senior
- Mechanical Assembly Technician, Senior
- Manufacturing Technician, Senior
- Production Manager
- Process Specialist
- Production Support Specialist, Senior
- Capacity Planner
- Configuration Analyst
- Electro-Mechanical Assembly Technician Supervisor
- Estimator, Senior
- Industrial Engineering Technician
- Inspector
- Mechanical Assembly Technician, Supervisor
- Model Maker
- Manufacturing Technician, Junior
- Numerical Tool and Process Control Programmer
- Operations Research Analyst
- Production Supervisor
- Production Support Specialist
- Production Trainer
- Robotics Technician
- Shift Supervisor
- Technical Communicator
- Tool and Die Maker
- Production Team Leader
- Assembly Technician
- Electro-Mechanical Assembly Technician
- Mechanical Assembly Technician
- Machine Feeder and Off bearer
- Machine Operator/Machinist
- Production Helper
- Punch Press Operator
- Recycling and Reclamation Worker
- Electronics Technician

<p>Quality Management</p> <p>Implementation, support, and management of practices for assuring that products and processes adhere to specifications and standards. Internal quality audits.</p>	<p>Quality Director Six Sigma Executive Continuous Improvement Consultant Quality Control Systems Manager Quality Manager Quality Assurance Engineer Instrumentation/Calibration Technician, Senior Lean Manufacturing Manager Quality Technician, Senior Quality Analyst, Senior Six Sigma Black Belt Instrumentation/Calibration Technician Lean Manufacturing Cost Accountant Lean Manufacturing Engineer Quality Technician Quality Team Leader Quality Analyst Supplier Quality Analyst Six Sigma Green Belt Quality Coordinator Quality Analyst, Junior</p>
<p>Safety</p> <p>Development, implementation and management of practices to assure safety of the manufacturing facility and staff and security of the intellectual property.</p>	<p>Chief Privacy Officer Manufacturing Security Director Safety Director Manufacturing Security Manager Safety Manager Dangerous Goods Safety Advisor Environment Protection Manager Health and Safety Specialist Materials Handling Specialist Manufacturing Security Associate Pollution Control Specialist Safety Analyst Safety Administrator Safety Technician</p>

<p>Supply Chain Management & Logistics</p> <p>Production planning and expediting; materials management; transportation to and from the plant; shipping, receiving and traffic management.</p>	<p>Distribution Director Logistics Management Director Supply Chain Director Distribution Manager Import/Export Manager Production Planning Manager Supply Chain Manager Supplier Quality Manager Transportation Manager Warehouse Manager Inventory Manager Logistics Planning Manager Materials Planner Supply Chain Specialist, Senior Supply Manager Distribution Center Supervisor Logistics Analyst Materials Coordinator Supply Chain Specialist Traffic/Rate Analyst Crater/Packer Dispatcher Inventory Control Clerk Logistics Clerk Packaging Machine Operator Shipping/Receiving Clerk Traffic Clerk Truck and Tractor Operator Warehouse Worker</p>
<p>Sourcing and Procurement</p> <p>Procurement of raw materials, components and services for manufacturing.</p>	<p>Global Sourcing Director Commodity Manager Purchasing Manager Purchasing Agent, Senior Purchasing Agent, New Product Purchasing Supervisor Purchasing Associate Purchasing Clerk, Senior Commodity Buyer Purchasing Clerk</p>
<p>3D Printing - Additive Manufacturing</p> <p>Design, development and implementation of 3D printing / Additive manufacturing processes, technologies and facilities for product manufacturing and delivery.</p>	<p>Engineering Program Manager- 3D printing Mechanical Engineer - 3D printing Materials Engineer - 3D printing Pre-Sales Application Engineer - 3D printing Service Engineer - 3D printing Engineering Technician - 3D printing Production Repair Technician - 3D printing</p>

Plant Manager – Sample Job

Job Title	Plant Manager
Job Band ID	3
Job Family	Facilities and Plant Management
Job Definition	Manages all aspects of operations and infrastructure maintenance for a large manufacturing facility.
Job Responsibility 1	Develops strategic and tactical plans; oversees processes to run facility and manage staff in accordance with regulatory procedures and ethical standards.
Job Responsibility 2	Negotiates and oversees infrastructure service agreements with local government, service providers and utilities.
Job Responsibility 3	Creates strategies and support systems for preventative maintenance tasks and managing large or critical work orders.
Job Responsibility 4	Ensures communication and cooperation among all plant functions and with other plants or locations.

Plant Manager – Job Bands

Job Band ID	Job Band Name	Job Band Description
1	Executive Management	Vision, policy, strategy and direction setting; Enterprise and industry view; Driving organizational goals
2	Senior Management	Strategy formulation; Vision implementation; Operational responsibility; Cost and risk management; Enterprise view
3	Management; Senior Level Consulting	Functional, technical or process leadership; Management of multiple teams; High complexity and ambiguity; Tactical responsibilities
4	First Line Management; Senior Professional	Team or technical supervision; Expertise and experience with complex technical activities; Project management and consulting
5	Team Leadership; Technical Professional	Difficult technical tasks; Implementation experience; Self-sufficiency; Small project responsibility; Technical supervision
6	Technician, Trainee, Administrator	Routine technical or administrative tasks; Follows procedures; Operates under supervision

Plant Manager – Skills + Competencies at Core, Functional and Technical levels

Competencies		Plant Manager
Competencies Per Job		51
Competency Code	Competency Name	Proficiency
Business B0050	Knowledge of Organization	3 – Extensive experience
B0100	Operational Functions	3 – Extensive experience
B0150	Products and Services	3 – Extensive experience
B0300	Core Application Systems	3 – Extensive experience
B0470	Risk Management	3 – Extensive experience
B0500	Business Case Justification	3 – Extensive experience
B1020	Planning: Tactical, Strategic	2 – Working experience
B1030	Quality Management	3 – Extensive experience
B1050	Process Management	3 – Extensive experience
B1070	Employee Health and Safety	3 – Extensive experience
Individual I0350	Problem Solving	3 - Extensive experience
I0480	Effective Communications	3 - Extensive experience
I0600	Coaching Others	2 - Working experience
I0700	Decision Making and Critical Thinking	3 - Extensive experience
I0900	Influencing	3 - Extensive experience
I1000	Managing Multiple Priorities	3 - Extensive experience
Management M0050	Leadership	3 - Extensive experience
M0450	Performance Management	2 - Working experience
Func/Tech TMFG0000	Manufacturing Industry	3 - Extensive experience
TMFG0020	Manufacturing Standards, Procedures, Policies	3 - Extensive experience
TMFG0060	Manufacturing Regulatory Environment	3 - Extensive experience
TMFG0070	Manufacturing Safety	3 - Extensive experience
TMFG0080	Environmental Protection	3 - Extensive experience
TMFG0085	ISO 14001 (Environment)	3 - Extensive experience
TMFG0090	ISO 9001 (Quality Management)	2 - Working experience

TMFG0095	Forecasting	3 - Extensive experience
TMFG0100	MANUFACTURING PROCESSES	2 - Working experience
TMFG0110	Lean Manufacturing	1 - Basic understanding
TMFG0200	Supply Chain Management In Manufacturing	2 - Working experience
TMFG0240	Supplier Management (TMFG)	1 - Basic understanding
TMFG0300	Logistics Management	2 - Working experience
TMFG0405	Product Design Life Cycle	2 - Working experience
TMFG0500	ENGINEERING - MANUFACTURING	1 - Basic understanding
TMFG0600	Plant Operation & Maintenance	3 - Extensive experience
TMFG0610	Plant Facilities Management	3 - Extensive experience
TMFG0615	Plant Security	3 - Extensive experience
TMFG0620	Manufacturing Equipment	3 - Extensive experience
TMFG0625	Emergency Management	3 - Extensive experience
TMFG0800	MANUFACTURING OPERATIONS	3 - Extensive experience
TMFG0840	Change Control (Manufacturing)	3 - Extensive experience
TMFG0850	Problem Management Process (TMFG)	3 - Extensive experience
TMFG0860	Service Request Management Process (TMFG)	2 - Working experience
TMFG0870	Contingency and Disaster Recovery Management	3 - Extensive experience
TMFG0880	Production Training	2 - Working experience
TMFG0900	MANUFACTURING TECHNOLOGIES & SYSTEMS	3 - Extensive experience
TMFG0910	Manufacturing Application Systems	2 - Working experience
TMFG0950	Robotics/Computer Controlled Machinery	1 - Basic understanding

Let's Look
At This Skill

Plant Operation and Maintenance – Proficiency Levels and Behavioral Indicators for Competency Assessment

Consistent Skill Code	Competency Code: TMFG0600	Competency Name: Plant Operation & Maintenance
Competency Description	Knowledge of day-to-day and strategic issues, operational requirements and management of a manufacturing facility.	
Level 1 - Basic understanding	<ul style="list-style-type: none"> ◦ Identifies major activities of, and services provided by, the operations function. ◦ Locates and interprets standard and management reports on plant activities. ◦ Describes characteristics of a well-run manufacturing plant. 	
Level 2 - Working experience	<ul style="list-style-type: none"> ◦ Identifies overall daily, weekly, monthly and annual production requirements. ◦ Explains routine workflow, resource requirements, dependencies and criticalities. ◦ Describes diverse systems and technologies used in manufacturing operations. ◦ Explains the day-to-day operations of a large manufacturing facility. ◦ Describes major operations functions and systems and their interrelationships. 	
Recommended Proficiency Level	Level 3 - Extensive experience	<ul style="list-style-type: none"> ◦ Describes all major production runs and their criticalities. ◦ Consults on operations routing and back-up capabilities. ◦ Participates in planning for automating operations and retooling of an assembly line. ◦ Analyzes plant floor operations; identifies trends and implements corrective actions as necessary. ◦ Participates in the evaluation and selection of plant operations and maintenance systems. ◦ Elaborates on key aspects of effective and efficient operation and workload optimization.
	Level 4 - Subject matter depth and breadth	<ul style="list-style-type: none"> ◦ Has significant experience managing multiple and distributed manufacturing plants. ◦ Establishes, implements and enforces premises security programs. ◦ Designs and plans the operation and integration of multiple manufacturing plants. ◦ Monitors industry trends and marketplace experiences relevant to manufacturing plant operations. ◦ Evaluates productivity and cost-effectiveness of operations, workflow and equipment. ◦ Discusses industry benchmarks and trends; identifies characteristics of high performers in industry.

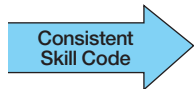
Plant Operation and Maintenance – Learning References

Competency Code: TMFG0600		Competency Name: Plant Operation & Maintenance
Learning References	5	
Book	BK-6031: Oliver Wight ABCD Checklist for Operations Excellence, The	
Book	BK-6011: Supply Chain Collaboration	
Organization	ORG-SME: Society of Manufacturing Engineers (SME)	
Organization	ORG-IENET: Institute of Industrial Engineers	
Vendor	VND-BIN: Business Industrial Network	

Plant Operation and Maintenance – Development Statements (SMART Goals)

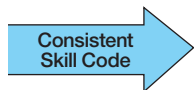
Competency Code: TMFG0600		Competency Name: Plant Operation & Maintenance
Development Statement Group	Development Statement Name	Development Statement Description
Qualitative	Analyzing Plant Floors	Analyze plant floor operations and layouts every quarter. Implement corrective actions as necessary to improve operations.
Quantitative	Emerging Manufacturing Trends	Conduct job analysis and salary survey activities for 3 business units within the next month.
Quantitative	Evaluating Plant Systems	Design an organizational compensation program (e.g. executive compensation) in one month.
Quantitative	Improving Plant Productivity	Evaluate the effectiveness and competitiveness of an existing compensation program in 3 weeks.
Qualitative	Production Line Back-Up Capabilities	Solve 85% of compensation issues (e.g. pay structure) raised by the organization's management team each month next year.

Plant Operation and Maintenance – Coaching Tips



Competency Code: TMFG0600		Competency Name: Plant Operation & Maintenance
Coaching Tip Group	Coaching Tip Name	Coaching Tip Description
Professional Development	Automating Plant Duties	How can you automate some of your plant duties to boost your productivity?
Vigilance	Documenting Plant Security Standards	Document security standards for the plant environment and ensure compliance to these standards.
Relationship Building	Meeting with Plant System Vendors	Meet with vendors in person to discuss their plant operations and maintenance systems.
Planning	Plan for Facilities-Related Events	Develop plans to ensure that critical work efforts get done in the event of a facilities-related malfunction.
Improving Operations	Reviewing Plant Workflow for Inefficiencies	Review the workflow of the plant environment to identify inefficiencies.

Plant Operation and Maintenance – Interview Questions



Competency Code: TMFG0600		Competency Name: Plant Operation & Maintenance
Interview Question Group	Interview Question Name	Interview Question Description
Results	Analyzing Plant Floor Operations	Tell me about your contributions to analyzing plant floor operations. What did you look at and what trends did you identify?
Problem	Challenges with Back-Up Capabilities	Tell me about a challenge your organization faced when implementing back-up capabilities for their production lines.
Solution	Evaluating and Selecting Plant Maintenance Systems	How did your organization evaluate and select plant maintenance systems?
Fit	Experience in Operating Manufacturing Plants	Describe your experience in operating manufacturing plants.
Solution	Opportunity to Automate Operations	How would you identify an opportunity to automate manufacturing operations? How would you go about this process?



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