

D A C U M

PROFILE

MANUFACTURING TECHNICIAN: Fabrication Industries



Panel Members:

Lou Callahan, Office Manager, Production Control & Logistics, General Motors-Baltimore Assembly

Joe Bondinell, Area Manager for Pickling, Washing and Annealing, International Steel Group

Joe Beck, Building Maintenance Supervisor, Solo Cup

Gordon Lord, Operations Manager, The Kirk-Habicht Company

Rick Stapleford, Manufacturing Manager, Lean Expert, Terumo Medical Corporation

Tom Jackson, Manufacturing Engineer, Terumo Medical Corporation

Glen Knott, Manufacturing Manager, American Metal Fabricators, Inc.

Duncan Brown, Manager Lean Office, American Metal Fabricators, Inc.

Mike Unfried, Manufacturing Specialist, MarquipWardUnited

Timothy Euler, Manufacturing Manager, Sheet Metal & Fabrication, Northrop Grumman Corporation

David Root, Manager, Manufacturing Assembly, Northrop Grumman Corporation

Lindsay Gallagher, Manufacturing Engineer, Northrop Grumman Corporation

Terry Hurd, Manufacturing Engineering Team Leader, Mack Trucks, Inc.

Eric Mitchell, Electrical Engineer, General Motors-Baltimore Assembly

George J. Mikulski, Production Maintenance Partnership Coordinator, General Motors-Baltimore Assembly

Facilitator: **Dennis M. Faber**

TIME Center

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The **Manufacturing Technician** follows safety and environmental guidelines in utilizing a variety of production equipment to create new products/components from raw materials or assemble and fabricate new products/components from manufactured parts. S/he may identify and prepare raw materials for production, set-up and adjust production equipment, operate and troubleshoot the equipment, monitor manufacturing processes, check product quality, finish the product and perform minor maintenance on production equipment. S/he provides and analyzes production data for monitoring and reporting purposes. S/he leads or participates in safety initiatives, process improvement, quality improvement, or product development teams. S/he interacts with other team members, engineers, production staff, supervisors and customers to perform their job responsibilities and help improve the company's competitiveness.

DUTIES:



----- **TASKS** -----

A.	MAINTAIN A SAFE AND PRODUCTIVE WORK AREA	Perform required inspections (environmental, safety) A-1	Document inspection results A-2	Follow equipment operation guidelines (safety and production) A-3	Suggest processes/procedures that support a safe and effective work environment A-4	Meet safety and health requirements for maintenance, installation and repair of equipment A-5	Participate in emergency drills A-6	Identify unsafe conditions A-7		
		Participate in incident and hazard investigations A-8	Implement health, safety, and environmental programs, projects, policies, and procedures A-9		Monitor equipment and operator performance A-10	Correct unsafe conditions A-11	Train others to use the equipment safely (safety and production) A-12	Provide safety orientation and training for other employees A-13	Participate in job safety and health analyses for jobs, equipment, and processes A-14	
		Conduct preventive inspections A-15	Recommend safety procedures in new production processes A-16							
B.	MAINTAIN QUALITY AND IMPLEMENT CONTINUOUS IMPROVEMENT PROCESSES	Check calibration of gauges and other data collection equipment B-1	Inspect materials during the production process to determine their quality/condition B-2		Document inspection and quality testing results B-3	Assist in developing production improvement goals B-4	Suggest product and process improvements B-5	Make adjustments to maintain required quality level B-6	Solve process and product problems B-7	Perform required internal quality audit activities B-8
		Evaluate prototypes for manufacturability (DFA, DFM, FMEA) B-9	Conduct research on new products B-10							
C.	CORRECT THE PRODUCT OR PROCESS TO MEET QUALITY STANDARDS	Communicate quality problems to appropriate person C-1	Suggest actions to correct quality problems C-2	Report performance and training issues affecting quality C-3	Take action for sub-standard products C-4	Document/record process outcomes and trends C-5	Implement corrective action(s) C-6	Analyze problems to determine preferred corrective action C-7		
D.	MANUFACTURE PRODUCT TO MEET CUSTOMER NEEDS	Meet customer needs/requirements D-1	Check that materials, tools, equipment and other resources are available for the production process D-2		Set-up equipment D-3	Perform and monitor the production process and output D-4	Inspect the product to insure it meets specifications D-5	Document product and process compliance with customer/product requirements D-6	Prepare product for internal or external shipping or distribution D-7	Package materials and products for internal or external distribution D-8
		Monitor adherence to materials location plan D-9	Document materials movement and inventory count D-10	Assist in developing new tooling and fixtures D-11						
E.	MAINTAIN EQUIPMENT, TOOLS, AND WORKSTATIONS	Perform housekeeping activities E-1	Monitor equipment indicators to insure correct operation E-2	Perform preventive maintenance according to SOPs and PM schedules E-3	Perform minor/routine repairs on equipment E-4	Provide training on equipment operations and maintenance E-5	Assist with/prepare PM schedules and SOPs E-6			

F.	COMMUNICATE WITH CO-WORKERS AND/OR EXTERNAL CUSTOMERS TO ENSURE PRODUCTION MEETS BUSINESS REQUIREMENTS	Communicate safety, training and job-specific information F-1	Communicate material specifications and requirements F-2	Communicate quality requirements and issues F-3	Interact with auditors F-4	Communicate product and production requirements/specifications F-5	Interface with external customers F-6	Interface with vendors and suppliers F-7	Conduct meetings F-8	Conduct informal presentations F-9
G.	COORDINATE WORK TEAMS	Provide training to other employees G-1	Set team goals G-2	Make job assignments G-3	Coordinate work flow with team members and other work groups G-4	Act as liaison between management, engineering, and workers G-5	Develop work schedules/milestones G-6	Resolve conflicts or issues within the work group G-7		

Entry Level.....Full Performance.....Lead Technician

Knowledge and Skills

Manufacturing Processes

- Discrete Manufacturing
 - Metal Forming
 - Plastics Forming
 - Thermoplastics
 - Machining
 - Metal Cutting & Welding
 - Materials: Metals, Alloys, Polymers, Ceramics, Composites
 - Surface Treatments & Coatings
- Process Optimization
 - SOP's, GMP's, GLP's
 - Lean Manufacturing
 - Six Sigma
 - Statistical Process Control
- Push Vs. Pull Manufacturing
- Project Management-basic
- Assembly

Product/Process Control & Improvement

- Lean Manufacturing
 - 5S/ Visual Factory
 - Set-Up Reduction
 - Manufacturing Cells
 - Problem Solving Tools
 - Root Cause Analysis
 - Pareto Charts
 - Wishbone Diagrams
 - Others
 - 8 D Problem Solving Methodology
 - Value Stream Mapping
 - Error Proofing
 - Six Sigma
- Work Improvement Teams
- Waste Reduction
- Research—Product Development & Improvement
- New Product Development—Experimenting, Prototyping, Trial Runs

Operation & Preventive Maintenance of Mechanical Systems & Components:

- Production Equipment—Discrete
- Conveyors

- Lubrication
- Shafts, Alignment, Bearings
- Power Transmission
- Drives
- Pneumatics
- Hydraulics
- Thermodynamics
- Compressors
- Pumps
- Motors

Electricity & Electronics

- Bench Assembly & Repair
- Electro-Mechanical
 - Servo's, Motors, Motor Controls
 - Hydraulics & Pneumatics
 - Mechanical Power Transmission
 - Vacuum Systems & Components
 - Mechanisms, Linkages, Levers
 - Transducers & Instrumentation
 - Thermocouples

- Automated Controls & Robotics-basics

Blueprints & Schematics

- Prepare Sketches & Working Drawings
- Interpret Prints, Schematics, Diagrams
 - Mechanical
 - Electrical
 - Assembly
 - Process Flow Diagrams
 - CAD Drawings
 - Process Maps
- Computer-Aided Design
 - Interpret CAD Drawings
 - Update & Edit Drawings—required by some
 - Create CAD drawings—required by some

Logistics & Inventory Control

- Lean Manufacturing
 - Inventory Kanbans
- Material Handling Requirements
- Material Storage & Movement
- Waste & Scrap Handling
- Stock Rotation Requirements

- Cycle Counts
- Interpret Change Orders, Bills Of Materials, Work Orders, And Similar Documents

Safety & Environmental Assurance

- Regulatory Requirements
 - OSHA
 - MOSH
 - EPA
 - NFPA
 - DOT
 - Others
- Hazardous Material Handling & Disposal (HAZMAT)
- Hazardous Material Communication (HAZCOM)
- Company Policies & Procedures
 - Confidentiality
 - Security
 - Proprietary Information
 - Ethical Behavior
- Training & Certification Requirements
- Environmental Impact Awareness
- Safety Audits

- Emergency/Disaster Plans
- Delivering Safety Training
- MSDS Information
- Ergonomics
- Homeland Security requirements—ISG—port-related

Industrial Controls & Instrumentation

- PLC's—basics
- CNC Equipment
- CNC Programming—required by some

Quality Assurance

- Lean Manufacturing
 - Quality Function Deployment
 - Problem Solving Tools
 - Root Cause Analysis
 - Pareto Charts
 - Fishbone Diagrams
 - Others
- Inspection
 - Visual
 - Automated Vision Inspection Systems
 - Vibration Analysis
 - Infrared
 - Ultrasonic

- Non-Destructive Testing
- Tribology
- Calibration
- Quality Tools
 - Total Quality Management
 - Statistical Process Control
 - Assessments & Audits
 - FMEA
 - Control Charts
- Documentation—Manual & Electronic
- Defining Performance Expectations
- Bench Marking & Best Practices
- Sampling, Testing & Analysis
- Corrective & Preventive Actions

Industrial Maintenance

- Lean Manufacturing
 - Total Productive Maintenance
- Preventive & Predictive Maintenance Schedules
- Computerized Maintenance Management Systems (CMM)—data entry
 - Maximo
 - SAP

Industrial Measurement

- Analog & Digital
 - Gauges
 - Rules
 - Precision Measuring Tools
 - Balances & Scales
 - Test Equipment
 - Inspection Equipment
 - Analytic Instruments
- Computerized Measurement Equipment—(CMM Machine) required by some
- Metric System

Computer Skills

- Data entry
- Office Suite—MS Word & Excel
- E-mail
- Internet Browsers

Tools and Equipment

1. Hand and power tools
2. Precision measuring tools
3. Material handling equipment
 - a. Fork lifts
 - b. Walkies
 - c. Cranes
 - d. Scissor lifts
4. Computer
5. Safety equipment
 - a. Personal protective equipment
 - b. Fire suppression equipment
6. Cleaning equipment (including sandblasters)
7. MSDS
8. Scopes and meters
 - a. Multi-meters
 - b. Electrical
 - c. Microscope
9. Electrostatic Discharge (ESD) equipment
10. Communication tools
 - a. Walkie talkies
 - b. E-mail
11. Calculators
12. CNC equipment
13. Manual production equipment (various types)
14. Welding and burning equipment
 - a. MIG
 - b. TIG
 - c. ARC
 - d. Plasma
 - e. Oxyacetylene
15. PLC interface
16. Sheet metal equipment
 - a. Punch press
 - b. Drill press
 - c. Shears
 - d. Press brake
- e. Rolls
- f. Hardware/ arbor press
17. Hardware
 - a. Nuts and bolts
 - b. Rivets
 - c. Fasteners
18. Layout tools
 - a. Squares
 - b. Protractors
 - c. Scribes
 - d. Compasses



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