Manufacturing Career Cluster

1. Evaluate the nature and scope of the Manufacturing Career Cluster and the role of manufacturing in society and in the economy.

**MN 1.1:** Identify the role and major functions of manufacturing businesses.

*Sample Indicators:*
- Explain the importance of manufacturing to society.
- Identify the mission, major internal functions and structure of manufacturing businesses.
- Identify the customers, suppliers and stakeholders of manufacturing businesses, their roles and how they relate.
- Explain the major competitive challenges faced by manufacturing businesses.
- Identify and describe types of manufacturing systems.
- Analyze current trends in manufacturing systems.

**MN 1.2:** Describe how manufacturing businesses manage performance.

*Sample Indicators:*
- Explain how financial performance is measured.
- Explain how market performance is gauged.
- Explain how service and internal operations performance is determined.
- Explain how compliance and performance related to health, safety and environment are evaluated.

**MN 1.3:** Describe how changes outside the manufacturing business impact the manufacturing business.

*Sample Indicators:*
- Explain the impact of economic changes.
- Explain the impact of social changes.
- Explain the impact of technology changes.

**MN 1.4:** Explain the role of risk management in reducing risks and improving performance in manufacturing businesses.

*Sample Indicators:*
- Explain the objectives of risk-management programs.
- Explain the major types of loss exposure for manufacturing businesses.
- Explain the approaches for managing organizational risks.

**MN 1.5:** Identify the roles and functions of government in regulating and supporting manufacturing businesses.

*Sample Indicators:*
- Explain the roles in regulating domestic operations.
- Explain the roles in regulating international operations.
• Explain the roles in managing the infrastructures of manufacturing businesses.
• Explain the roles in health, safety and environmental management.


MN 2.1: Describe how manufacturing businesses manage customer relationships.
Sample Indicators:
• Identify needs and requirements of internal and external customers.
• Describe customer satisfaction and fulfillment of customer requirements.
• Explain how manufacturing businesses respond to customer problems and complaints.

MN 2.2: Describe how planning and budgeting are used to accomplish organizational goals and objectives.
Sample Indicators:
• Explain how work plans and budgets are used to allocate people and resources.
• Identify reports used to track performance and resources and explain how they are used.
• Explain how plans and budgets are revised to meet goals and objectives.

MN 2.3: Explain how planning is used to improve overall business performance.
Sample Indicators:
• Identify and describe the most critical performance problems that manufacturing businesses typically face.
• Describe how improvements are identified.

3. Comply with federal, state and local regulations to ensure worker safety and health and environmental work practices.

MN 3.1: Assess workplace conditions according to specified safety and health requirements.
Sample Indicators:
• Identify the types of risk of injury/illness at work.
• Identify those who are susceptible to risk of injury/illness at work.
• Describe ways to positively impact occupational safety and health.

MN 3.2: Following appropriate safety procedures, demonstrate methods to correct common hazards.
Sample Indicators:
• Identify and describe common hazards in the workplace.
• Identify and describe major sources of information about hazards in the workplace (e.g., MSDS, work procedures, exposure control plans, training materials, labels and signage).
• Identify sources of combustible/flammable materials, fire and emergencies to establish a fire safe environment.
• Interpret safety signs and symbols.
MN 3.3: Demonstrate safe workplace practices that promote personal and group health.

Sample Indicators:
- Identify procedures necessary for maintaining a safe work area.
- Identify methods to correct common hazards.
- Identify methods for disposing of hazardous materials.
- Demonstrate principles of safe physical movement to avoid slips, trips and spills.
- Inspect and use personal protective equipment (PPE).

4. Describe career opportunities and means to achieve those opportunities in each of the Manufacturing Career Pathways.

MN 4.1: Locate career opportunities in manufacturing that appeal to personal career goals.

Sample Indicators:
- Locate and interpret career information for at least one Career Pathway.
- Identify job requirements for Career Pathways.
- Identify educational and credentialing requirements for Career Clusters and Career Pathways.

MN 4.2: Match personal interests and aptitudes to manufacturing careers.

Sample Indicators:
- Identify personal interests and aptitudes.
- Compare personal interests and aptitudes with job requirements and characteristics of career selected.

MN 4.3: Identify pathways with common knowledge and skills that provide a worker with the potential for mobility.

Sample Indicators:
- Produce a crosswalk of related career knowledge and skills.
- Identify examples of businesses that provide the various jobs in this Career Cluster.

MN 4.4: Maintain personal certification and licensure requirements.

Sample Indicators:
- Ensure that documentation is available to appropriate personnel.
- Identify training requirements needed for certifications.
- Obtain all necessary training to obtain certification/licensure.

5. Describe government policies and industry standards that apply to manufacturing.

MN 5.1: Identify the major federal and state regulatory areas.

Sample Indicators:
- Identify specific health and safety laws and regulations that impact manufacturing and the major topics they address.
• Identify specific environmental management laws and regulations and the major topics they address.

MN 5.2: Explain how government agencies ensure compliance with environmental regulations and promote improved performance.
Sample Indicators:
• Provide examples of the major regulations and types of data used by government to measure and monitor performance.
• Provide examples of how manufacturing organizations ensure their compliance.
• Provide examples of consequences that manufacturing organizations suffer when they fail to comply.

MN 5.3: Demonstrate workplace activities that comply with safety, health and environmental policies and procedures.
Sample Indicators:
• Promote and maintain knowledge of organizational safety, health and environmental management policies and procedures.
• Follow organizational policies and procedures.
• Educate and orient other workers.
• Maintain a safe work area.
• Identify, describe and report workplace hazards.
• Perform and participate in regular audits and inspections.
• Provide and maintain documentation needed for compliance.
• Conduct and participate in accident/incident investigations.

MN 5.4: Demonstrate knowledge of rules and laws designed to promote safety and health and their rationale.
Sample Indicators:
• Identify key rights of employees related to occupational safety and health.
• Identify the responsibilities of employers related to occupational safety.
• Explain the role of government agencies in providing a safe workplace.

6. Describe workplace knowledge and skills common to manufacturing.

MN 6.1: Demonstrate the planning and layout processes (e.g., designing, print reading, measuring) used in manufacturing.
Sample Indicators:
• Read prints and use the information to play, lay out and produce parts or products.

MN 6.2: Summarize how materials can be processed using tools and machines.
Sample Indicators:
Use tools and the processes of cutting, shaping, combining, forming, etc. of materials to manufacture a part or product.

MN 6.3: Describe various types of assembling processes (e.g., mechanical fastening, mechanical force, joining, fusion bonding, adhesive bonding) used in manufacturing.
Sample Indicators:
- Apply appropriate fastening or joining procedure to the design and production of a manufactured part or product.

MN 6.4: Explain finishing processes (e.g., types of finishing materials, surface preparation, methods of application) used in manufacturing.
Sample Indicators:
- Select a finishing process for a product appropriate to the job it must perform, the environment in which it functions and its aesthetic appeal.

MN 6.5: Explain the processes of inspection and quality control used in manufacturing.
Sample Indicators:
- Perform continuous on line inspections to ensure that parts or products meet design specifications.
- Explain the importance of Lean Manufacturing and Six Sigma in achieving error-free production of goods and materials.

Health, Safety & Environmental Assurance Career Pathway (MN-HSE)

1. Demonstrate the safe use of manufacturing equipment.

MN-HSE 1.1: Train others to use equipment following safe production practices.
Sample Indicators:
- Give new operators a complete orientation of equipment.
- Make sure that all important information regarding equipment safety is communicated clearly and effectively.
- Make sure that maintenance workers obtain certification to train others in technical skills and knowledge where applicable.
- Make suggestions regarding training materials and content to appropriate parties.
- Use evaluations and feedback to improve training materials and methods.
- Make sure trainees have the correct tools to do the job during training.
- Conduct post-training evaluation to assure that workers can operate equipment safely.
- Use training and facilitation techniques appropriate for the audience.
- Document the quality and effectiveness of training.
MN-HSE 1.2: Suggest processes and procedures to support safety and effectiveness in the work environment.

Sample Indicators:
- Consult health and safety representatives to develop suggestions.
- Solicit operator feedback for use in creating a safer, more effective work environment.
- Make sure that suggestions for training improvement are documented and sent to the appropriate parties.

MN-HSE 1.3: Monitor equipment and operator according to workplace safety and compliance with both company and national regulations.

Sample Indicators:
- Perform monitoring responsibilities regularly.
- Report out-of-compliance or unsafe conditions immediately.
- Take corrective action on out-of-compliance or unsafe conditions.
- Check equipment to ensure it is operating according to specifications.
- Check tools for compliance with specifications.
- Perform environmental testing of workplace on a regular basis as required by company policy or regulation.
- Audit equipment to ensure there are no bypasses of safety guards.
- Follow hazardous materials procedures and policies such as Material Safety Data Sheet (MSDS) and "right to know."
- Follow good housekeeping procedures.
- Verify that safety and personal protective equipment (PPE) is available, performs correctly and has current certification.

MN-HSE 1.4: Maintain, install and repair equipment following required safety, health and environmental requirements.

Sample Indicators:
- Make regular safety communications to all employees.
- Review job safety analyses according to company policy.
- Follow hazardous materials procedures and policies such as Material Safety Data Sheet (MSDS) and "right to know."
- Perform environmental testing of workplace on a regular basis as required by company policy or regulation.
- Audit equipment to ensure there are no bypasses of safety guards.
- Verify that regulatory and company safety procedures are followed including lock-out/tag-out, confined space and ergonomics.
- Follow good housekeeping procedures.
- Verify that safety and personal protective equipment (PPE) is available, performs correctly and has current certification.

2. Develop safety plans for production processes that meet health, safety and environmental standards.

MN-HSE 2.1: Conduct health, safety and/or environmental inspections.
Sample Indicators:
- Make sure that audit records and documentation are complete and available.
- Use established procedures to conduct audits.
- Complete documentation related to audit.
- Use appropriate forums and format to report audit.
- Arrange for experts in situations needing additional credibility on an as-needed basis.
- Verify that audit was effective at identifying compliance and non-compliance issues.

MN-HSE 2.2: Suggest processes and procedures to support safety and effectiveness in the work environment.
Sample Indicators:
- Complete inspection reports accurately.
- Verify that corrective action reports or logs exist.
- Submit documentation to correct parties according to schedule.
- Verify that documentation includes all relevant information.

MN-HSE 2.3: Conduct area health, safety and/or environmental inspections.
Sample Indicators:
- Make sure that area inspection documentation is complete and available.
- Use procedures established to conduct area inspections.
- Use an appropriate forum and format to report area inspection documentation.
- Verify that inspections are thorough, timely and cover all relevant aspects of health, safety and/or environmental concerns.
- Verify that inspection includes visual inspections, as well as information gathered directly from workers.
- Arrange for relevant experts in situations needing additional credibility on an as needed basis.

MN-HSE 2.4: Submit inspection and audit findings to correct parties.
Sample Indicators:
- Verify that record of transmittal of inspection and audit findings is complete, accurate and includes all necessary signatures.
- Verify that inspection and audit findings are on file.
- Post inspection and audit findings appropriately to ensure accessibility to all relevant parties.

MN-HSE 2.5: Perform environmental and safety inspections following local, federal and company regulations.
Sample Indicators:
- Identify, report and monitor potential hazards in the workplace.
- Complete inspections according to company schedule and procedures.
- Review health, safety and environmental documentation and policies thoroughly and regularly.
MN-HSE 2.6: Perform environmental and safety inspections following local, federal and company regulations.

Sample Indicators:
- Identify, report and monitor potential hazards in the workplace.
- Complete inspections according to company schedule and procedures.
- Review health, safety and environmental documentation and policies thoroughly and regularly.

3. Demonstrate a safety inspection process to assure a healthy and safe manufacturing environment.

MN-HSE 3.1: Document regulatory compliance using accepted protocols.

Sample Indicators:
- Use approved schedules and specifications to complete regulatory compliance activities.
- Verify that compliance documentation meets all regulatory, legal and company standards.
- Verify that the current list of applicable regulations is accessible to all parties as required.
- Verify that compliance documentation is on file and accessible to all relevant parties.
- Maintain a system for filing the sign-off sheets for compliance.

MN-HSE 3.2: Communicate about company health, safety and environmental policies and procedures to a variety of audiences.

Sample Indicators:
- Make health, safety and environmental policies appropriately visible in the workplace.
- Use multiple methods to communicate policies and procedures.
- Maintain records of worker notification of policies and procedures on file.
- Deliver communication to correct parties in a timely manner.
- Obtain feedback from workers to determine effectiveness of communications.
- Use worker feedback to modify communication methods.

MN-HSE 3.3: Follow the steps to stop an unsafe work practice.

Sample Indicators:
- Modify manufacturing process to attain adequate levels of safety.
- Correct unsafe behavior immediately and communicate to correct parties.
- Use appropriate forum and format to document notice of unsafe practices.
- Use preventive maintenance or departmental safety audits to record corrective action for unsafe work practices.
- Update safety policies on a regular basis.
- Determine if observations and review of safety records show reduction in targeted injuries or unsafe behaviors.
- Give priority to avoiding unsafe practices when planning new manufacturing processes.
MN-HSE 3.4: Report violations to appropriate authorities.
**Sample Indicators:**
- Keep violation reports, including disciplinary action where appropriate, on file.
- Distribute violation reports to the responsible party.
- Follow the legal, regulatory and company policy to communicate violations to the proper authorities.
- Use the chain of command to ensure that corrective action is taken.
- Use the appropriate channels to report health, safety and environmental concerns.

MN-HSE 3.5: Prepare for health, safety and environmental emergencies.
**Sample Indicators:**
- Develop employee and fire emergency plans before emergencies occur.
- Implement employee and fire emergency plans during an emergency.
- Verify that emergency equipment is available and in working order.
- Take necessary action to ensure that employees are properly trained in emergency procedures.
- Use company policies and procedures to complete emergency drills.

MN-HSE 3.6: Recommend solutions that will eliminate unsafe or environmentally damaging practices.
**Sample Indicators:**
- Make sure all relevant parties are included in the development of safety solutions.
- Schedule follow-up meetings that include all appropriate parties to discuss solutions.
- Test and revise proposed solution(s) as necessary.
- Document suggestions and forward to correct parties.

4. Evaluate a system of health, safety and/or environmental programs, projects, policies or procedures to determine compliance.

MN-HSE 4.1: Analyze root causes or problems and prioritize problems that need to be addressed first.
**Sample Indicators:**
- Identify, document and communicate priorities clearly.
- Use appropriate data to prioritize goals and problems.
- Use specific situations to base selection of appropriate data analysis methods.
- Complete data analysis documentation accurately.
- Use input from workers and management to determine priorities.

MN-HSE 4.2: Analyze health, safety and/or environmental data.
**Sample Indicators:**
- Verify that analysis contains sufficient detail to meet applicable standards.
- Complete documentation of analysis accurately.
- Make raw data available for inspection.
• Compare company’s health, safety and/or environmental assurance trends against industry health, safety and/or environmental trends.
• Forward analysis to correct parties.
• Select appropriate analysis methods and use them properly.
• Use appropriate and accurate metrics and/or develop them for use in the analysis.
• Use charts, graphs, or tables to communicate data in written conclusions and plans.

MN-HSE 4.3: Select projects that address priorities identified to improve health, safety and/or environmental assurance.
Sample Indicators:
• Design projects to support and reinforce established company goals.
• Take necessary action to involve all relevant parties in the development of the project.
• Use scheduling methods to ensure timely development.
• Verify that project plans are complete, detailed and include the resource requirements.

MN-HSE 4.4: Describe policies and procedures for health, safety and/or environmental issues.
Sample Indicators:
• Attend workshops, conferences and other career development sessions.
• Take action to ensure that involvement in a professional society relevant to job activities is ongoing.
• Take action to ensure that up-to-date resources on health, safety and/or environmental assurance are accessible to all relevant parties.

MN-HSE 4.4: Benchmark health, safety and environmental or sustainability practices.
Sample Indicators:
• Gather appropriate information from recognized industry leaders.
• Arrange for independent evaluations of worksite health, safety and/or environmental assurance practices.
• Use benchmarking information as a basis for making recommendations.
• Conduct and document analysis comparing current practice against benchmark data.
• Use a variety of means to gather information regarding excellent health, safety and/or environmental assurance practices.

5. Evaluate continuous improvement protocols and techniques in health, safety and/or environmental practices.

MN-HSE 5.1: Advocate workplace safety in accordance with safety programs.
Sample Indicators:
• Make workplace safety posters and other relevant information visible.
• Identify, model, recognize and publicize manufacturing practices for health, safety and/or environmental assurance.
• Make sure that workers responsible for health, safety and/or environmental assurance are regularly present in manufacturing workplace to encourage good health, safety and/or environmental assurance practices.

**MN-HSE 5.2:** Suggest health, safety and/or environmental assurance programs to management and other workers.

Sample Indicators:
• Keep materials supporting health, safety and/or environmental assurance programs on file.
• Document suggestions supporting health, safety and/or environmental assurance.
• Forward suggestions supporting health, safety and/or environmental assurance to all relevant parties.
• Make suggestions based on an accurate assessment of employee needs and interests, requirements in the workplace and business objectives.
• Discuss data and statistical analysis with decision-makers.
• Hold meetings to advocate for health, safety and/or environmental assurance programs with all relevant parties.
• Use various methods to market benefits of high quality suggestions supporting health, safety and/or environmental assurance programs.

**MN-HSE 5.3:** Evaluate health, safety and/or environmental assurance programs.

Sample Indicators:
• Continuously maintain, evaluate and report recordable incidents of injury and other incidences of health, safety and/or environmental assurance.
• Maintain a log of health, safety and/or environmental assurance information.
• Communicate evaluations to correct parties in a timely manner.
• Use evaluations to improve the outcomes of health, safety and/or environmental assurance programs.
• Keep self-assessment studies on health, safety and/or environmental assurance programs on file.
• Compare health, safety and/or environmental assurance statistics with industry benchmarks or standards.

6. **Conduct job safety and health analysis for manufacturing jobs, equipment and processes.**

**MN-HSE 6.1:** Consult with outside sources about health, safety and/or environmental assurance aspects of jobs.

Sample Indicators:
• Maintain an accurate list of relevant outside sources.
• Make postings of current emergency contact information accessible to all relevant parties.
• Maintain a contact log.
MN-HSE 6.2: Develop job safety analysis for health, safety and environmental assurance programs.

Sample Indicators:
- Hold meetings to conduct job safety analysis with all relevant parties.
- Generate suggestions for job safety improvements.
- Document and analyze relevant data.
- Hold one-on-one and small group meetings with workers to identify job safety issues.
- Make observations at worksites on a regular basis to gather information for job safety analysis.

MN-HSE 6.3: Employ a variety of methods to gather information from employees about occupational hazards.

Sample Indicators:
- Observe employees on a regular basis for safe work behaviors and practices.
- Maintain records of employee interviews regarding occupational hazards.
- Publish and distribute safety reports and statistics to relevant parties.
- Provide a method for employees to report safety concerns to relevant parties.

MN-HSE 6.4: Suggest ways to eliminate hazards.

Sample Indicators:
- Keep suggestions for eliminating the hazard on file.
- Complete safety-related work orders in a timely manner.
- Communicate suggestions to correct parties.
- Make suggestions that are relevant and appropriate.

MN-HSE 6.5: Verify job safety analysis against experience on a regular basis.

Sample Indicators:
- Evaluate job safety analysis with relevant injury and worksite data.
- Interview employees to gain their input.

MN-HSE 6.6: Analyze an unsustainable manufacturing process and identify corrections.

Sample Indicators:
- Explain how health, safe and environmental assurance are core components in sustainable manufacturing systems.

7. Develop the components of a training program based on environmental health and safety regulations.

MN-HSE 7.1: Determine priorities for health, safety and/or environmental training needs.

Sample Indicators:
- Conduct analysis of health, safety and/or environmental tasks at the job level.
- Analyze health, safety and/or environmental records to identify training needs.
- Document results of training assessments.
• Use the analysis to develop training plans with clear objectives.
• Solicit worker input regarding training needs.

MN-HSE 7.2: Prepare health, safety and/or environmental training materials.
Sample Indicators:
• Use appropriate resources to ensure that content included in training materials meets industry, government and company standards.
• Work with appropriate personnel to ensure that the training materials include the correct content to meet the training needs.
• Develop and implement a system to ensure that training materials are updated continuously.
• Work with appropriate personnel and outside sources as needed to make sure that training materials are clear, worker-friendly and appropriate for the audience.
• Develop and implement a system to ensure that training materials are available and accessible to all relevant parties.

MN-HSE 7.3: Conduct health, safety and/or environmental training for employees.
Sample Indicators:
• Document employee records to show that training has been delivered.
• Develop a training schedule that facilitates participation of employees.
• Develop evaluations that indicate workers’ understanding of the training materials.
• Develop a system for verifying that appropriate workers receive training.
• Show how test results and certifications indicate effective training.

MN-HSE 7.4: Document required health, safety and/or environmental training.
Sample Indicators:
• Maintain training attendance records on file.
• Develop and maintain a training profile for each job.
• Maintain accurate records of test results and certifications achieved.
• Make documentation available on an as-needed basis to appropriate parties.
• Request feedback from trainees and document feedback that is received.
• Maintain confidentiality of the outcomes of the health, safety and/or environmental assurance training.

MN-HSE 7.5: Plan future health, safety and/or environmental training.
Sample Indicators:
• Make sure that appropriate content is included in training plans.
• Design training for the specific needs of individuals.
• Ask appropriate workers for input related to the content of the training.
• Design training plan to include effective evaluation and follow-up process.
• Include worker feedback when developing future training.
MN-HSE 7.6: Train other employees in safe practices and emergency procedures.
Sample Indicators:
- Verify that orientation meets all relevant laws, policies and regulations.
- Deliver safety instruction and updates on a regular schedule.
- Observe training to ensure it allows employees to raise safety concerns, ask questions and receive additional training.

Logistics and Inventory Control Career Pathway (MN-LOG)

1. Demonstrate positive customer service skills in regard to logistics and inventory control issues.

MN-LOG 1.1: Communicate material specifications and delivery schedules in a timely and accurate manner.
Sample Indicators:
- Make sure that communication reflects knowledge of material specifications.
- Communicate delivery schedules clearly.
- Make sure that communication shows knowledge of both customer and business needs.
- Make sure that communication is clear and relevant to material and delivery issues.
- Communicate in a timely and accurate manner to the correct parties.
- Evaluate, track and report back material and delivery issues to original communicator.
- Track and document material specifications and delivery schedules.
- Discuss and resolve on the job issues and concerns quickly.

MN-LOG 1.2: Communicate production requirements and product specifications.
Sample Indicators:
- Make sure that communication reflects knowledge of production requirements, levels and product specifications.
- Initiate communication cross-functionally as required to meet production requirements, product specifications, or other customer or business needs.
- Notify all parties of production issues and problems in a timely way.
- Make sure that communication to production and products is clear and relevant.
- Evaluate, track and report production and product issues back to original communicator.
- Track and document communications related to production requirements and product specifications as appropriate.

2. Demonstrate positive customer service skills in regard to logistics and inventory control issues.

MN-LOG 2.1: Check accuracy of order using prescribed verification procedures.
Sample Indicators:
- Document product count accurately.
- Verify that product matches the purchase order and description.
- Verify that documentation is accurate as to count and product.
- Review order to ensure that contract terms and conditions are met.
- Use company procedures to report information to correct parties.
- Verify that health, safety, environmental and government regulations are met.

MN-LOG 2.2: Package and unpack package materials and products.
Sample Indicators:
- Check container to verify that packing meets regulatory requirements.
- Check container to verify that packing has proper labeling and meets shipping and safety regulations.
- Store or dispose of packaging materials properly.
- Verify that contents of packages match receiving tickets.
- Verify that bill of lading matches items shipped.
- Use packaging and unpackaging methods that keep returns and claims for damaged and improperly packaged goods to a minimum.
- Verify that outgoing labels have all relevant information.
- Check incoming labels to ensure that they meet all requirements.

MN-LOG 2.3: Load and unload materials and products.
Sample Indicators:
- Use proper equipment and techniques safely.
- Store materials correctly in a proper location.
- Verify that correct carrier and method is used for shipment.
- Verify that product arrives at appropriate destination.
- Load or unload product safely and according to government regulations.
- Check containers to ensure that damage to or contamination of materials is minimal.

MN-LOG 2.4: Schedule transportation of products and materials to meet customer needs.
Sample Indicators:
- Verify that appropriate carrier or method is used to ship product.
- Make sure that product is shipped on time.
- Verify that health, safety, environmental and government regulations are met.
- Verify that no customer complaints are received about late partial shipments or damaged goods.
- Select the most cost-effective method to ship products.
3. Develop a safety inspection process to assure a healthy and safe manufacturing facility.

**MN-LOG 3.1:** Perform environmental and safety inspections or coordinate with a certified agent/service to ensure conformance to all relevant local, federal and company regulations.

*Sample Indicators:*
- Identify, report and monitor potential hazards in the workplace.
- Take corrective action to correct potential hazards.
- Review health, safety and environmental documentation and policies thoroughly and regularly.
- Ensure that inspections meet all relevant health, safety and environmental laws and regulations.
- Complete inspections according to company schedule and procedures.
- Document inspection records and store them correctly.

**MN-LOG 3.2:** Perform emergency drills as part of an emergency response team.

*Sample Indicators:*
- Confirm that first aid training and certification on emergency and first aid procedures are complete and up-to-date.
- Comply with company and regulatory policies and procedures to respond to emergencies.
- Document emergency drills and incidents according to company and regulatory procedures promptly.

**MN-LOG 3.3:** Identify unsafe conditions according to safety standards and report to proper authorities.

*Sample Indicators:*
- Identify, report and document conditions presenting a threat to health, safety and the environment.
- Identify corrective actions.

**MN-LOG 3.4:** Take corrective action following prescribed safety procedures.

*Sample Indicators:*
- Consult appropriate parties and take corrective actions following company procedures promptly.
- Track and report ongoing safety concerns until corrective action is taken.

**MN-LOG 3.5:** If in a management or supervisory position, train other employees in safe practices and emergency procedures following training orientation guidelines.

*Sample Indicators:*
- Verify that all topics and procedures are covered in orientation to facilitate employee safety.
- Observe orientation to ensure that it makes clear the need and processes for employees to raise safety concerns, ask questions and receive additional training.
- Use company requirements to document orientation.
- Verify that orientation meets all relevant laws, policies and regulations.
- Deliver safety instruction and updates on a regular schedule.
4. Manage inventory using logistics and control processes and procedures.

**MN-LOG 4.1**: Monitor location of materials during production process using a prescribed plan.

*Sample Indicators:*
- Verify that materials are accessible to workstations.
- Check that cycle counts for raw and finished goods meet established standards.
- Rotate raw materials and stock to minimize old and outdated inventory.
- Verify that materials move across the floor in an efficient and cost-effective way.
- Implement monitoring activities to prevent disruption of production flow.
- Distribute plan to correct parties in a timely way.

**MN-LOG 4.2**: Monitor placement of station materials to ensure production flow.

*Sample Indicators:*
- Check that materials and quantities needed for production are correctly placed.
- Verify that orders from production are being filled in a timely way.
- Make raw materials accessible to workstations.
- Rotate raw material stock to minimize old and outdated inventory.
- Prevent materials damage to a minimum by avoiding improper stationing or transport.
- Identify defective materials.
- Take appropriate action when defective materials are identified.

**MN-LOG 4.3**: Prepare documents that detail materials movement and inventory count.

*Sample Indicators:*
- Verify that production orders are accurate.
- Use the correct format to generate accurate reports for material movement and inventory count.
- Produce reports in a timely fashion and distribute them properly.
- Take accurate inventory.

**MN-LOG 4.4**: Establish lot sizes and reorder points to meet production requirements.

*Sample Indicators:*
- Check that production efficiencies are maintained.
- Keep obsolete finished products to minimum.
- Use re-order points to minimize back-orders.
- Check that proper storage levels are maintained.
- Keep order lead-time requirements reasonable.
- Maintain inventory levels to minimize inventory value.
- Maintain inventory of raw material and finished goods to meet customer demands.

**MN-LOG 4.5**: Conduct the on-site inventory to ensure productivity, safety, accuracy and teamwork.

*Sample Indicators:*
- Take inventory to ensure minimum interference to production within required timeframe.
• Make sure that inventory corrections are accurate and kept to a minimal.
• Carry out inventory activities safely.
• Keep inventory movement to a minimum during inventory count.
• Maintain cooperation while conducting inventory.
• Use correct unit of measure to record inventory results.
• Follow asset protection and business control procedures.
• Make recommendations to minimize unsustainable energy use and minimize negative environmental impacts.

**MN-LOG 4.6:** Report discrepancies in inventory audit.
**Sample Indicators:**
• Use company format to present inventory audit.
• Distribute audit reports in a timely way to the proper parties.
• Communicate all inaccuracies to proper parties.

**MN-LOG 4.7:** Identify causes of discrepancies in inventory audits.
**Sample Indicators:**
• Make sure that investigations into inventory inaccuracies are complete, timely and include indication of root cause.
• Maintain collaborative and supportive interactions between material handlers and inventory control.
• Follow company policy in the event of inventory shortage.
• Report inaccuracies to the proper parties.

**MN-LOG 4.8:** Adjust logistic processes and inventory in response to engineering changes.
**Sample Indicators:**
• Follow company procedures when making change notices.
• Provide documentation of change notices and their implementation.
• Communicate change notices clearly to proper parties.
• Complete follow-up on paperwork properly.
• Make sure that documentation approving the logistics change is in hand prior to implementation.
• Review storage and retrieval systems to determine if upgrades and replacement are warranted.

**Maintenance, Installation & Repair Career Pathway (MN-MIR)**

1. **Demonstrate maintenance skills and proficient operation of equipment to maximize manufacturing performance.**

   **MN-MIR 1.1:** Observe equipment operation during normal operating cycle to identify potential problems.
Sample Indicators:
- Perform observations of equipment regularly.
- Report all unusual behaviors or unsafe conditions immediately to appropriate personnel.
- Document all aspects of equipment operations.
- Make sure that all safety requirements are in place during observations.
- Observe equipment and process operations a number of times for consistency.
- Analyze equipment and process data regularly.

MN-MIR 1.2: Maintain up-to-date knowledge of all documentation related to equipment.
Sample Indicators:
- Make all relevant materials easily available.
- Use machine identifiers, equipment lists and process data to locate relevant information.
- Use all relevant databases in a timely manner.
- Retrieve relevant information to the requirements of the work to be performed from documents quickly.
- Use only information that is up-to-date.
- Discuss interpretations and questions on materials, specifications and diagnostics.

MN-MIR 1.3: Maintain information about equipment use and reliability.
Sample Indicators:
- Accurately maintain data on equipment life.
- Keep documentation up-to-date.
- Accurately document tool change data.
- Ensure that contact information on tool vendor is readily available.
- Gather information to identify the proper tool for maintenance and repair tasks.

MN-MIR 1.4: Maintain all relevant equipment operation and repair certifications.
Sample Indicators:
- Properly plan certifications and schedule them in advance.
- Make sure that only qualified personnel perform certifications.
- Document certifications properly and report them to the correct parties.
- Follow all applicable laws and regulations when performing equipment inspections and documenting them.
- Keep records current and accurate.
- Verify that level of detail of certification documentation is appropriate.
- Forward information related to tool and equipment obsolescence to certify the repair, rebuild, or replacement.

MN-MIR 1.5: Prepare maintenance and repair logs for shift-to-shift communication.
Sample Indicators:
- Complete documentation and make it accessible to all appropriate parties.
• Submit repair report and preventive maintenance reschedule on time.
• Clearly communicate all important information and status reports to the next shift.

**MN-MIR 1.6:** Set repair and maintenance priorities and schedule.

*Sample Indicators:*
• Make sure all parties agree on priorities, scheduling conflicts and tasks associated with repair and maintenance prior to shutdown.
• Take staffing requirements into account.
• Give operators appropriate lead-time when notifying them that maintenance is scheduled.
• Coordinate with other departments to ensure disruptions to the production line are minimized.
• Respond to reports of critical problems in a timely way.

**MN-MIR 1.7:** Suggest ways to prevent future equipment malfunctions.

*Sample Indicators:*
• Make suggestions based on appropriate and accurate data or observations made during repairs.
• Include information on operator responsibility for predictive and preventive maintenance in a training program.
• Document suggestions properly and include all supportive materials.
• Conduct a cost-benefit analysis that shows when to replace equipment based on energy savings and reduced environmental problems.

2. **Demonstrate the safe use of manufacturing equipment to ensure a safe and healthy environment.**

**MN-MIR 2.1:** Suggest processes and procedures to support safety and effectiveness in the work environment on a regular basis.

*Sample Indicators:*
• Consult health and safety representatives for suggestions.
• Solicit operator feedback to evaluate training and create a safer, more effective work environment.
• Make sure suggestions for training improvement are documented and sent to the appropriate parties.
• Make suggestions that address safety, quality and productivity issues.

**MN-MIR 2.2:** Monitor equipment and operator performance according to both company and national workplace safety regulations.

*Sample Indicators:*
• Verify that monitoring is being performed regularly.
• Report out-of-compliance or unsafe conditions immediately.
• Take corrective action when out-of-compliance or unsafe conditions exist.
• Check equipment to ensure it is operating according to specifications and that tools are checked for compliance with specifications.
• Forward accident and injury data to appropriate personnel for inclusion in OSHA recordables.
• Gather information on equipment use from operators to reveal existing or potential problems.
• Adjust equipment and processes as required.
• Accurately document all monitored data.

MN-MIR 2.3: Perform emergency drills as part of an emergency response team.
Sample Indicators:
• Confirm that first aid training and certification on emergency and first aid procedures are complete and up-to-date.
• Comply with company and regulatory policies and procedures to respond to emergencies.
• Document emergency drills and incidents according to company and regulator procedures promptly.

MN-MIR 2.4: Implement corrective action following safety protocols.
Sample Indicators:
• Identify corrective actions.
• Promptly consult appropriate parties about corrective actions and immediately take corrective actions following company procedures.
• Track and report ongoing safety concerns until corrective action is taken.

MN-MIR 2.5: Conduct safety, environmental and health audits as it relates to maintenance, installation and repair.
Sample Indicators:
• Make regular safety communications to all employees.
• Review job safety analyses regularly according to company policy.
• Explain the ramifications of failure to accurately follow hazardous materials procedures and policies such as Material Safety Data Sheet (MSDS) and "right to know."
• Confirm that environmental testing of workplace is performed on a regular basis as required by company policy or regulation.
• Confirm that equipment is audited to ensure there are no bypasses of safety guards.
• Verify that regulatory and company safety procedures are followed including lock-out/tag-out, confined space and ergonomics.
• Evaluate good housekeeping procedures.
• Verify that safety, environmental, health and personal protective equipment is available, performs correctly and has current certification.
3. Diagnose equipment problems and effectively repair manufacturing equipment.

**MN-MIR 3.1:** Gather equipment information and history that can assist in identifying and diagnosing problems.

*Sample Indicators:*
- Consult operator and operator logs to determine the symptoms of the problem.
- Check reports on equipment, repair and diagnostics for previous problems.
- Check equipment to identify problems.
- Gather the most appropriate information need to rapidly diagnose the problem.
- Consult appropriate and accurate sources of information including prints, OEM manuals, process diagrams and engineering department calibrations.

**MN-MIR 3.2:** Isolate system and component failure following diagnostic procedures.

*Sample Indicators:*
- Draw on available information, past experience, operator feedback and knowledge of equipment to identify possible causes of failure.
- Use visual inspection, observation of equipment during operations and disassembly of equipment to systematically gather information about the nature and possible causes of failure.
- Perform and repeat diagnostic tests as necessary to determine the symptoms of the problem.
- Make diagnosis in a timely and effective manner.
- Use manufacturer's performance specifications when evaluating equipment performance.
- Initiate procedure for isolating problems correctly and complete follow through properly.

**MN-MIR 3.3:** Identify root cause of problem using diagnostic procedures.

*Sample Indicators:*
- Use appropriate root cause identification process to determine contributing factors.
- Perform the correct tests and inspections on failed component(s).
- Analyzed data gathered through diagnostic procedures to develop a hypothesis regarding possible root causes.
- Repeat analysis until problem is solved.

**MN-MIR 3.4:** Develop corrective action plan to fix the problem.

*Sample Indicators:*
- Correctly specify all repairs and modifications required to address underlying causes.
- Use the action plan to address the need for timely repair.
- Include proper repair procedures, proper tools and parts and estimated time required for repair in the plan.
- Inform and involve the right people needed for the repair.
- Make sure that plan reflects production needs.
- Make sure that plan accounts for variables in schedule, staffing and availability of parts.
MN-MIR 3.5: Execute corrective action plan.

Sample Indicators:
- Use applicable safety procedures.
- Wear proper personal protective equipment (PPE).
- Follow existing repair procedures in accordance with OEM manuals or company procedures.
- Use correct disassembly, repair/replacement and reassembly procedures.
- Safety check equipment and perform a test run prior to return to production.
- Make sure that post-repair tests confirm that equipment performs to requirements.
- Complete repairs within specified time frames.
- Devote appropriate staffing and parts to effectively execute the plan.

MN-MIR 3.6: Document diagnosis, case history plan and repair outcome according to company protocols.

Sample Indicators:
- Perform documentation and verification according to company and department policies and procedures.
- Input documents and appropriate files into database before filing them or distributing to correct parties.
- Conduct post-repair review to determine if customer is satisfied.
- Adjust preventive maintenance schedule to reflect repairs made.
- Notify equipment manufacturer of any reliability and maintainability issues.

4. Investigate and employ techniques to maximize manufacturing equipment performance.

MN-MIR 4.1: Coordinate preparation for the installation, customization, or upgrading of equipment.

Sample Indicators:
- Provide appropriate input on equipment, environmental impact and material needs.
- Include the time, equipment and personnel required to do the job in the plan.
- Determine proper customization, upgrade needs and capacity limits.
- Obtain all appropriate approvals.
- Make sure that plan provides for the availability and use of proper materials and relevant vendor information.
- Make sure that plan anticipates the need for future modifications and likelihood of mechanical or operator errors.
- Make sure that plan addresses issues related to ergonomics, safety requirements and environmental impact.

MN-MIR 4.2: Obtain machine information from vendors related to proper installation, customization, or upgrade.

Sample Indicators:
- Determine availability of in-house personnel and outside contractors.
• Contact appropriate vendor personnel to determine facility, parts, equipment and materials needs prior to installation.
• Verify materials and parts against vendor specifications prior to initiating installation, customization, or upgrading equipment.
• Obtain needed information from vendors including safety and quality considerations.
• Ensure that accurate blueprints, specifications and documentation are available.
• Review maintenance manuals, check them for completeness and modify them as necessary.

MN-MIR 4.3: Install, customize, or upgrade equipment.
Sample Indicators:
• Follow all safety procedures.
• Organize tools, equipment and personnel efficiently to do the job.
• Follow blueprint and plan of action to customize or upgrade equipment.
• Perform follow-up to ensure completeness of installation.
• Complete equipment installation, customization, or upgrade to specification and schedule.

MN-MIR 4.4: Equip team with information and resources needed to complete task.
Sample Indicators:
• Schedule the proper workers to ensure effectiveness, efficiency and safety.
• Ensure that personnel are trained on the proper procedures and equipment maintenance.
• Involve vendors appropriately.

MN-MIR 4.5: Move or remove equipment following manufacturing protocols.
Sample Indicators:
• Schedule the proper workers to ensure effectiveness, efficiency and safety.
• Ensure that personnel are trained on the proper procedures and equipment maintenance.
• Involve vendors appropriately.
• Move or remove equipment completely, safely and according to company and vendor procedures.
• Verify that equipment works properly following its move.

MN-MIR 4.6: Test the equipment to ensure proper function after installation, customization, or upgrading.
Sample Indicators:
• Select proper testing procedures and methods.
• Administer test procedures and methods properly.
• Perform test safely.
• Interpret test results.
• Notify all appropriate parties that equipment is functioning properly.
• Make sure that equipment tests indicate that equipment performs to specification and meets safety standards.
5. Implement a preventative maintenance schedule to maintain manufacturing equipment, tools and workstations.

MN-MIR 5.1: Conduct a pre-job consultation with the person/people who requested the maintenance or repair.
Sample Indicators:
- Verify that preventive maintenance is performed to schedule and documented completely in a timely manner.
- Use the right procedures and forms to communicate repair needs to the correct parties.
- Follow-up to verify that necessary repair work was completed.
- Predict the results of failing to implement all elements of the preventive maintenance schedule.
- Follow all safety regulations when doing repairs.

MN-MIR 5.2: Verify supplies are available to perform preventative maintenance and routine repair.
Sample Indicators:
- Have necessary supplies available to perform preventive maintenance.

MN-MIR 5.3: Monitor equipment indicators to ensure it is operating correctly.
Sample Indicators:
- Compare equipment performance to optimal equipment operations on a regular schedule.
- Investigate and correct abnormal equipment conditions in a timely manner.
- Monitor equipment to ensure that the corrective action solved the problem.
- Keep equipment repair history complete, up-to-date and accurate.

MN-MIR 5.4: Document training of maintenance activities according to company maintenance regulations.
Sample Indicators:
- Conduct training in an effective and appropriate manner.
- Document and make available preventive maintenance training materials.
- Keep training records updated and readily available.
- Examine the relevancy of training for use of equipment, tools, materials and processes at the workstation.
- Provide cross-training when appropriate.
- Verify that training and training documentation meet all company and regulatory requirements.

MN-MIR 5.5: Maintain production schedules by completing daily housekeeping activities.
Sample Indicators:
- Store tools and materials safely in proper locations.
- Identify and report unsafe conditions promptly.
• Keep workstations clean and clear of safety hazards.
• Verify that scheduled housekeeping inspections are passed.
• Organize workstations to maximize efficiency.
• Verify that safety equipment is present and in proper working order.

6. Implement a preventative maintenance schedule to maintain manufacturing equipment, tools and workstations.

MN-MIR 6.1: Develop the maintenance schedule.
Sample Indicators:
• Schedule routine jobs that need to be completed in a timely way.
• Make sure that schedule is sufficiently flexible to include plans for fall-back if tasks take longer and to add fill-in work if tasks are shorter than expected.
• Use company procedures for production needs, output and critical equipment to schedule priorities.
• Verify that preventive maintenance requirements for all equipment are included in the schedule.
• Distribute scheduled task lists appropriately.
• Make sure that the schedule provides adequate time for preventive maintenance.

MN-MIR 6.2: Identify special maintenance and repair needs.
Sample Indicators:
• Ask operators appropriate questions to determine needs.
• Review tool and equipment histories to find evidence of intermittent or chronic problems.
• Refer to job safety analysis sheets as appropriate.
• Observe operators to verify that they are setting up and operating according to the job safety analysis.
• Review repair histories to see if correct repairs were done in the past.
• Review repair histories to determine current repair needs.
• Identify worn or malfunctioning equipment accurately and in a timely way to prevent breakdowns.

MN-MIR 6.3: Verify availability of workers and other resources based on schedules and inventory records.
Sample Indicators:
• Locate special tools and parts.
• Access existing preventive maintenance protocols from the preventive maintenance sheets.
• Make decisions on staffing requirements based on the tasks that need to be performed.
• Make sure that retooled parts meet specifications.
• Make sure that follow-up occurs to ensure that adequate supplies are maintained.
MN-MIR 6.4: Perform predictive and preventive maintenance procedures.

Sample Indicators:
- Follow procedures when handling and disposing hazardous materials.
- Follow safety procedures and wear/use proper personal protective equipment (PPE).
- Follow preventive maintenance sheets completely.
- Assign maintenance to trained workers to ensure that the job is performed safely and efficiently.
- Gather required parts, tools and equipment prior to starting the maintenance.
- Use required parts, tools and equipment to perform work safely and efficiently.
- Use company or department procedure to document and verify maintenance job.
- Use policy and procedures to maintain documentation.
- Direct documentation to the correct parties for processing.
- Perform maintenance on time.
- Perform housekeeping when job is finished.
- Use repair histories to revise preventive maintenance plan.

MN-MIR 6.5: Check that equipment is working to specifications prior to releasing the equipment to the operator.

Sample Indicators:
- Complete safety checklist thoroughly.
- Document results of safety checklist.
- Test run equipment to ensure that it is operating properly and safely.
- Take corrective measures if equipment is not operational.
- Communicate readiness of equipment to come back onto production to correct parties before departing the site.
- Use the preventive maintenance sheet to inspect and verify the appropriate items.

Manufacturing Production Process Development Career Pathway (MN-PPD)

1. Produce quality products that meet manufacturing standards and exceed customer satisfaction.

MN-PPD 1.1: Conduct in-depth investigation to identify customer needs.

Sample Indicators:
- Explain the impact of the customer's intended use of a product on every phase of the manufacturing process.
- Meet needs of both internal and external customers.
- Maintain liaison with customer contacts.
- Review, maintain and communicate customer needs and specifications.
- Identify issues that prevent proactive handling of customer needs.
MN-PPD 1.2: Verify that needed resources (capable machinery, required skill specification with number of persons and capacity of the machinery) are available for the production process.

Sample Indicators:
- Use work orders when handling raw materials, while setting up tools and equipment and when scheduling workers to maximize productivity.
- Properly report any discrepancies related to raw materials, tools/equipment and worker's abilities/availability.
- Identify consequences of not reporting discrepancies in production.

MN-PPD 1.3: Evaluate workers’ ability to manage critical elements of the production process.

Sample Indicators:
- Evaluate workers’ skills when setting up, programming and operating equipment required for production.
- Make proper repairs and adjustments to equipment prior to putting into service.
- Verify that the first piece or product meets both product specifications and production capacities.
- Examine how set-up procedures are documented for repeatability.
- Identify possible consequences resulting from failure to meet production standards.

MN-PPD 1.4: Monitor fabrication of the product using process control data.

Sample Indicators:
- Use process control data to ensure that the manufacturing process complies with standards.
- Make the manufacturing process cycle time meet customer and business needs.
- Identify possible consequences resulting from failure to perform operations safely.
- Verify that the product meets customer specifications.
- Complete and maintain product and process documentation, then forward to proper parties.
- Verify that production operations comply with all health, safety and environmental policies and procedures.
- Track and document communications related to production requirements and product specifications as appropriate.

MN-PPD 1.5: Inspect the product to verify that it meets specifications.

Sample Indicators:
- Verify the calibration of the testing equipment.
- Follow the established sampling plan and inspection policies/procedures.
- Predict consequences of failure to identify promptly any product and production process that do not meet specifications.
- Complete inspection documents accurately and forward them to proper parties.
- Following appropriate testing/production tools and procedures.
- Make adjustments needed to keep the production process within specifications.
- Make necessary adjustment in the manufacturing process in a timely manner.
MN-PPD 1.6: Document product and process to assure formal compliance with customer requirements.

*Sample Indicators:*
- Write compliance documents legibly in the appropriate format and store them in a safe, secure place.
- Complete compliance documentation, obtain sign off and forward to the proper parties.
- Distinguish between products that are labeled appropriately and products that are not appropriately labeled for compliance.
- Verify that final test results meet customer requirements.
- Take action to minimize negative customer feedback on quality issues.

MN-PPD 1.7: Check for specified quantities and proper documentation when preparing a final product for shipping or distribution.

*Sample Indicators:*
- Package materials to meet packaging and shipping specifications (including proper labeling).
- Complete package documentation and customer shipping instructions to accompany the product to the next destination.
- Communicate product availability to the proper parties in a timely manner.
- Check relevant information such as quantity, destination and packaging instructions against the work order.
- Verify that product is correctly stored or staged for shipping.
- Explain the significance of following all laws and regulations related to labeling, packaging and transport.
- Verify that material handling procedures are followed to prevent product damage.
- Track and document material specifications and delivery schedules.

MN-PPD 1.8: Monitor customer satisfaction.

*Sample Indicators:*
- Use appropriate data to measure customer satisfaction.
- Implement surveys and other customer data techniques in a timely manner.
- Report returned goods to appropriate parties for review.
- Review field failure and product life data in a timely manner.

2. Research, design and implement alternative manufacturing processes to manage production of new and/or improved products.

MN-PPD 2.1: Research new manufacturing processes.

*Sample Indicators:*
- Review current processes completely to determine any changes that are needed to meet customer requirements.
- Provide research to correct parties to confirm manufacturability.
• Confirm resource requirements accurately.
• Review project materials and processes thoroughly to establish cost estimates.
• Hold customer meetings to confirm customer specifications when appropriate.

MN-PPD 2.2: Create standard operating procedures (SOPs) for new process.
**Sample Indicators:**
• Identify new tooling and materials.
• Specify new training where required.
• Document new SOPs according to company procedure.
• Make sure that the correct parties review all new SOPs.
• Verify that SOPs meet customer specifications including cost effectiveness.

MN-PPD 2.3: Develop new tooling and fixtures.
**Sample Indicators:**
• Fabricate new tooling and fixtures according to design specifications.
• Properly document new tooling and fixtures development process with new material suggestions noted.
• Verify that new tooling and fixtures increase efficiency and cost effectiveness of the process.
• Verify that new tooling and fixtures result in improvement of product quality and a decrease in nonconformance.
• Verify that new tooling and fixtures result in an improved work environment for workers, increasing safety while reducing injuries and/or stress.

MN-PPD 2.4: Set up and program equipment for new processes.
**Sample Indicators:**
• Verify that new equipment or process works to specification and runs efficiently.
• Program equipment to maximize output and quality.
• Make sure that equipment program is concise and understandable by others.
• Set up equipment or process in a timely way.
• Continue test runs until product specifications and efficiency levels are met.
• Download equipment program and store correctly.

MN-PPD 2.5: Schedule and test new processes.
**Sample Indicators:**
• Verify that schedules for testing new processes are complete and detailed.
• Follow standard procedures when making a testing schedule.
• Conduct review on the new process to determine readiness for implementation.
• Verify that testing is specific and done on a timely basis.
• Include data on usefulness and efficiency with documentation of test results.
• Obtain proper approvals to implement the changes in process determined by the test results.
• Use new or updated processes according to specifications.
• Analyze data to identify potential problems.

MN-PPD 2.6: Monitor production performance data for new processes.
Sample Indicators:
• Use up-to-date charts and available statistics to properly document monitoring.
• Use the proper test equipment to monitor production performance.
• Perform the appropriate tests based on customer or manufacturer specifications or company policy.
• Communicate problems effectively to proper parties.
• Use appropriate measurements.
• Use results of capability studies to adjust product or process.

MN-PPD 2.7: Prepare documentation on new process according to business requirements.
Sample Indicators:
• Make sure that documentation is complete, accurate and legible.
• Use company procedures to complete documentation in a timely way.
• File documentation properly.
• Solicit input from workers to ensure that documentation is useful.

3. Monitor, promote and maintain a safe and productive workplace using techniques and solutions that ensure safe production of products.

MN-PPD 3.1: Perform environmental and safety inspections or coordinate with a certified agent/service to ensure conformance to all relevant local, federal and company regulations.
Sample Indicators:
• Identify, report and monitor potential hazards in the workplace.
• Take corrective action to correct potential hazards.
• Review health, safety and environmental documentation and policies thoroughly and regularly.
• Ensure that inspections meet all relevant health, safety and environmental laws and regulations.
• Completed inspections according to company schedule and procedures.
• Document inspection records and store them correctly.

MN-PPD 3.2: Participate in emergency response teams.
Sample Indicators:
• Confirm that first aid training and certification on emergency and first aid procedures are complete and up-to-date.
• Comply with company and regulatory policies and procedures to respond to emergencies.
• Document emergency drills and incidents according to company and regulatory procedures.

MN-PPD 3.3: Identify unsafe conditions according to safety standards and report to proper authorities.
Sample Indicators:
Identify, report and document conditions presenting a threat to health, safety and the environment.
Track and report ongoing safety concerns until corrective action is taken.

MN-PPD 3.4: Take corrective action following prescribed safety procedures.
Sample Indicators:
- Identify corrective actions.
- Consult appropriate parties/documents about corrective actions and take corrective actions following company procedures promptly.

MN-PPD 3.5: Complete training on safe practices and emergency procedures in a safety orientation.
Sample Indicators:
- Verify that all safety topics and procedures are covered in orientation.
- Use company requirements to document orientation.
- Verify that orientation meets all relevant laws, policies and regulations.
- Complete safety instruction and updates on a regular schedule.

4. Implement continuous improvement processes in order to maintain quality within manufacturing production.

MN-PPD 4.1: Perform periodic internal quality audit activities.
Sample Indicators:
- Complete all audit forms correctly in a timely manner.
- Forward forms to the correct parties.
- Verify that audit data is relevant and correct.
- Make sure that conformance to quality standards are properly assessed and documented.
- Include observation of operation in audit when appropriate to ensure performance meets specifications.
- Follow company and other required schedules and procedures to perform audit.

MN-PPD 4.2: Monitor calibration of data collection equipment.
Sample Indicators:
- Follow specifications to implement calibration schedule.
- Review documents and use thorough observation to check instrument certification during use.
- Recalibrate instruments that are out of calibration or refer them to the appropriate parties for recalibration or repairs immediately.

MN-PPD 4.3: Suggest process improvements on a regular basis.
Sample Indicators:
- Use observations and data analysis to generate potential improvements.
• Verify that suggestions communicate measurable and data-driven benefits to the company, its customers and its employees.
• Use proper procedures and documentation to make suggestions.
• Make sure that all suggestions show that all data was reviewed prior to making recommendation.

MN-PPD 4.4: Inspect materials at all stages of a process to determine quality or condition.
Sample Indicators:
• Follow schedule and procedures to complete sampling and inspection.
• Select and use inspection tools and procedures correctly.
• Inspect materials against specifications.
• Identify materials that do not meet specification.
• Take corrective action on out-of-specification material.
• Document inspection results properly.
• Report inspection results to correct parties.
• Use appropriate quality analysis and statistical techniques to analyze performance.

MN-PPD 4.5: Document the results of quality tests according to business requirements.
Sample Indicators:
• Check data forms to ensure that they are complete and accurate.
• Make sure that information is evaluated and interpreted correctly.
• Forward data to correct parties.
• Select and use appropriate analytical tools.
• Use proper format to record product and process outcomes within the specified timeframe.

MN-PPD 4.6: Restore or maintain quality by making process adjustments.
Sample Indicators:
• Make sure that appropriate corrective actions are identified and approvals received when needed.
• Make adjustments for corrections to eliminate deviations and bring the process back into control.
• Make adjustments in a timely manner.
• Document adjustments properly.

5. Develop procedures to create products that meet customer needs.

MN-PPD 5.1: Audit production process.
Sample Indicators:
• Collect all relevant data for the audit in a timely way.
• Use past production data and current production goals to evaluate audit data.
• Perform audits according to the proper schedule.
Communicate discrepancies to the proper parties in a timely way.
Make sure that audit report is complete including all supporting data and analyses.
Submit audit report according to company procedure.
Verify that problems are identified.

MN-PPD 5.2: Propose changes to improve products and processes.
Sample Indicators:
  • Make suggestions for improvement in a timely way.
  • Verify that product quality improves.
  • Verify that production time decreases.
  • Follow-up on proposals containing supporting materials for justifications with correct parties.
  • Use company procedures to make proposals.
  • Evaluate suggestions for effectiveness.
  • Verify that suggestions meet quality and safety standards.
  • Document proposals properly.
  • Implement proposed changes.

MN-PPD 5.3: Develop production improvement goals.
Sample Indicators:
  • Set realistic and attainable goals.
  • Make sure that goals meet technical standards.
  • Write goals that are specific, simple, understandable and measurable.
  • Verify that goals are consistent with business objectives.
  • Document goals according to company procedures.
  • Communicate goals to correct parties in a timely way.

MN-PPD 5.4: Inspect product for deviations from customer and product standard(s).
Sample Indicators:
  • Compare product to the correct customer and company standards.
  • Perform inspections according to company procedures in a timely way.
  • Verify that inspections completely and accurately identify deviation from specifications.
  • Document inspections properly according to customer specifications and company procedures.
  • Conduct inspections continuously to ensure that standards are maintained throughout the process.
  • Handle out-of-compliance product correctly according to company procedure.

MN-PPD 5.5: Correct product or process problems.
Sample Indicators:
  • Make corrections immediately upon identification of a problem.
  • Make corrections according to company procedures.
  • Identify underlying or root cause of problem.
• Address underlying or root cause of problem.
• Test corrective actions to determine if the problem is solved.
• Document problems and corrections properly.
• Communicate problems and corrections effectively to correct parties.
• Handle out-of-compliance product according to company procedure.
• Perform any rework or remediation needed to bring product into specifications in a timely way.

MN-PPD 5.6: Develop new work procedures according to production needs.

Sample Indicators:
• Discuss new work procedures or instructions with all stakeholders to ensure support for improvements.
• Verify that all stakeholders understand their role in process improvement changes.

Production Career Pathway (MN-PRO)

1. Diagnose production process problems and take corrective action to meet production quality standards.

MN-PRO 1.1: Communicate quality problems following the appropriate reporting process.

Sample Indicators:
• Review quality problems with production operators.
• Communicate quality problems promptly to appropriate parties.
• Use established processes to document quality problems.
• Summarize defect trends and report them to appropriate parties.

MN-PRO 1.2: Suggest or perform corrective actions to correct quality problems.

Sample Indicators:
• Make minor quality issues/adjustments immediately.
• Document quality issues or adjustments properly.
• Make sure that recommendations for action are clear, concise and supported by data.
• Make recommendations in a timely way to appropriate parties.
• Document follow-up activities and indicate that corrective action was taken.
• Document product quality following corrective action.

MN-PRO 1.3: Determine appropriate action for sub-standard product.

Sample Indicators:
• Execute quality control procedures to catch sub-standard products promptly within the defined quality systems.
• Document decisions regarding sub-standard products for future retrieval.
• Process sub-standard products according to company policy.
• Distribute documentation required for customers to appropriate parties.
MN-PRO 1.4: Identify trends using records of process outcomes.
Sample Indicators:
- Maintain records on quality process to appropriate standards.
- Chart outcomes of quality processes according to appropriate methods and standards.
- Check data on quality processes for accuracy.
- Analyze quality process performance data to identify trends.
- Report quality process performance data to appropriate parties in a timely way.

MN-PRO 1.5: Implement closed-loop corrective action to provide for ongoing production feedback.
Sample Indicators:
- Document evidence of corrective action in a timely manner.
- Report change resulting from the corrective action to appropriate parties in the correct format.
- Use spot checks to verify implementation of the corrective action.
- Store reports properly for the required amount of time.
- Perform ongoing audits to optimize the outcomes of the corrective actions.
- Examine previous documentation on similar process issues to identify possible solutions.

MN-PRO 1.6: Research energy consumption reduction in manufacturing.
Sample Indicators:
- Conduct analyses to reduce pollution or costly energy consumption.
- Identify and recommend improvements to reduce waste and pollution for a given production process.

2. Manage safe and healthy production working conditions and environmental risks.

MN-PRO 2.1: Perform environmental and safety inspections following local, federal and company regulations.
Sample Indicators:
- Identify, report and monitor potential hazards in the workplace.
- Take corrective action to correct potential hazards.
- Review health, safety and environmental documentation and policies thoroughly and regularly.
- Ensure that inspections meet all relevant health, safety and environmental laws and regulations.
- Complete inspections according to company schedule and procedures.
- Document inspection records and store them correctly.

MN-PRO 2.2: Perform emergency drills as part of an emergency response team.
Sample Indicators:
- Confirm that first aid training and certification on emergency and first aid procedures are complete and up-to-date.
- Comply with company and regulatory policies and procedures to respond to emergencies.
Document emergency drills and incidents according to company and regulatory procedures promptly.

**MN-PRO 2.3:** Identify unsafe conditions according to safety standards.  
*Sample Indicators:*  
- Identify, report and document conditions presenting a threat to health, safety and the environment.  
- Identify corrective actions.

**MN-PRO 2.4:** Implement corrective actions to follow safety protocols.  
*Sample Indicators:*  
- Consult appropriate parties about corrective actions and take corrective actions following company procedures promptly.  
- Track and report ongoing safety concerns until corrective action is taken.

**MN-PRO 2.5:** Monitor daily housekeeping activities.  
*Sample Indicators:*  
- Store tools and materials safely in proper locations.  
- Keep workstations clean and clear of safety hazards.  
- Verify that scheduled housekeeping inspections are passed.  
- Verify that safety equipment is present and in proper working order.

3. **Make continuous improvement recommendations based on results of production process audits and inspections.**

**MN-PRO 3.1:** Perform periodic internal quality audits using company audit procedures.  
*Sample Indicators:*  
- Perform audits in accordance with company and other required schedules and procedures.  
- Complete all audit forms correctly in a timely manner and forward to the correct parties.  
- Verify that audit data is relevant and correct.  
- Verify that conformance to quality standards are properly assessed and documented.  
- Include observation of operations to ensure performances meet specifications when appropriate.

**MN-PRO 3.2:** Check calibration of gauges and other data collection equipment.  
*Sample Indicators:*  
- Implement calibration schedule according to specifications.  
- Make thorough careful observations and review documentation to check instrument certification.  
- Recalibrate out-of-calibration instruments immediately or refer them to the appropriate parties for recalibration or repairs.
MN-PRO 3.3: Recommend process improvements based upon audits and inspections.
Sample Indicators:
- Use observation and data analysis to generate potential improvements.
- Communicate suggestions that are measurable and have data-driven benefits to the company, its customers and its employees.
- Use proper procedures and documentation to make suggestions.
- Assure that all data is reviewed prior to making suggestions.

MN-PRO 3.4: Inspect materials at all stages of process to determine quality or condition.
Sample Indicators:
- Sample and inspect in accordance with the schedule and procedures.
- Select correct inspection tools and procedures and use them correctly.
- Inspect materials against correct specifications.
- Identify materials not meeting specifications.
- Take corrective action on out-of specification material.
- Document inspection results properly and report them to the correct parties in a timely manner.

MN-PRO 3.5: Document the results of quality testing using reliable data.
Sample Indicators:
- Check data forms for completeness and accuracy.
- Evaluate and interpret information correctly.
- Forward data to correct parties.
- Select and use the appropriate analytical tools.

MN-PRO 3.6: Adjust processes to restore or maintain quality, based on data from audit or inspection reports.
Sample Indicators:
- Identify appropriate correction actions and make sure that approvals are received when needed.
- Make adjustments to eliminate deviations and bring the process back into control.
- Make adjustments and document them in a timely manner.

4. Coordinate work teams when producing products to enhance production process and performance.

MN-PRO 4.1: Provide training to other employees based on training needs.
Sample Indicators:
- Provide cross training as appropriate.
- Assess training needs on a regular basis.
- Identify new requirements and training issues.
- Use varied approaches to achieve training goals.
- Document training outcomes.

**MN-PRO 4.2**: Develop team goals to enhance performance.

*Sample Indicators:*
- Make goals specific, measurable and achievable.
- Align team goals to customer and business needs.
- Focus team goals to meet team objectives.
- Document team goals and share information with all parties.

**MN-PRO 4.3**: Make job assignments to avail the use of the best personnel in key assignments.

*Sample Indicators:*
- Make job assignments to match the skills needed for the work to be done and to maximize the use of available skills.
- Make job assignments to ensure that business and customer needs are met.
- Confirm that workers are notified of assignments effectively.

**MN-PRO 4.4**: Coordinate work flow with team members and other work groups.

*Sample Indicators:*
- Make sure that production schedules are met effectively.
- Notify team members of schedule requirements in a timely way.
- Make sure that production work flow runs efficiently.
- Take necessary action to minimize downtime.
- Explain the significance of relationships with others in facilitating work flow.
- Verify that workers actively participate in meetings and problem-solving groups.

**MN-PRO 4.5**: Communicate material specifications, production requirements, product specifications and delivery issues in a timely and accurate manner.

*Sample Indicators:*
- Initiate communication to meet product requirements, product specifications, or other customer or business needs cross-functionally as required.
- Evaluate, track and report production and product issues to original communicator.
- Communicate delivery schedules clearly and address any issues.
- Track and document material specifications and delivery schedules.

5. Demonstrate the safe use of manufacturing equipment.

**MN-PRO 5.1**: Train others to use equipment following safe production practices.

*Sample Indicators:*
- Give new operators a complete orientation of equipment.
Make sure that all important information regarding equipment safety is communicated clearly and effectively.

Make sure that maintenance workers obtain certification to train others in technical skills and knowledge where applicable.

Make suggestions regarding training materials and content to appropriate parties.

Use evaluations and feedback to improve training materials and methods.

Make sure trainees have the correct tools to do the job during training.

Conduct post-training evaluation to assure that workers can operate equipment safely.

Use training and facilitation techniques appropriate for the audience.

Document the quality and effectiveness of training appropriately.

MN-PRO 5.2: Recommend processes and procedures to support safety and effectiveness in the work environment.

Sample Indicators:
- Consult health and safety representatives to develop suggestions.
- Solicit operator feedback for use in creating a safer, more effective work environment.
- Make sure suggestions for training improvement are documented and sent to the appropriate parties.
- Make sure that content of suggestions addresses safety, quality and productivity issues.

MN-PRO 5.3: Maintain, install and repair equipment following required safety and health requirements.

Sample Indicators:
- Make regular safety communications to all employees.
- Review job safety analyses regularly according to company policy.
- Follow hazardous materials procedures and policies such as Material Safety Data Sheet (MSDS) and "right to know" accurately.
- Perform environmental testing of workplace on a regular basis as required by company policy or regulation.
- Audit equipment to ensure there are no bypasses of safety guards.
- Verify that regulatory and company safety procedures are followed including lock-out/tag-out, confined space and ergonomics.
- Follow good housekeeping procedures.
- Verify that safety and personal protective equipment (PPE) is available, performs correctly and has current certification.

MN-PRO 5.4: Monitor equipment and operator according to workplace safety and compliance with both company and national regulations.

Sample Indicators:
- Perform monitoring responsibilities regularly.
- Report out-of-compliance or unsafe conditions immediately.
- Take corrective action on out-of-compliance or unsafe conditions.
• Check equipment to ensure it is operating according to specifications.
• Check tools for compliance with specifications.
• Forward accident and injury data to appropriate personnel for inclusion in OSHA recordables.
• Gather information on equipment use from operators to reveal existing or potential problems.
• Adjust equipment and processes as required.
• Document all monitoring data accurately.

MN-PRO 5.5: Perform preventive maintenance and routine repair by contacting appropriate people and securing needed supplies.
Sample Indicators:
• Verify that preventive maintenance schedule or equipment is in place and updated as appropriate.
• Verify that preventive maintenance is performed to schedule and documented in a timely manner.
• Verify that necessary repair work is checked through follow-up.

Quality Assurance Career Pathway (MN-QA)

1. Evaluate production operations for product and process quality.

MN-QA 1.1: Monitor materials for quality at specified points throughout the production process.
Sample Indicators:
• Prepare detailed quality instructions for each operation.
• Record accurate information about material quality at each operation.
• Communicate quality information to all appropriate parties.
• Maintain accurate records of material movement necessary to ensure quality and traceability.

MN-QA 1.2: Test product sample for quality at each state of production.
Sample Indicators:
• Monitor sample results to ensure they comply with specifications.
• Report samples that do not conform to specification.
• Keep records of quality results as required by procedures or work instructions.
• Label and document samples that do not conform to standards.
• Indicate the samples that have been checked at each state.

MN-QA 1.3: Test the final product to determine if it meets quality specifications.
Sample Indicators:
• Make accurate records of inspections and tests readily available.
• Communicate approval and rejection results on a timely basis to appropriate parties.
• Make sure that all product specifications have been followed.
• Perform product audits according to defined plan.
• Review follow-up data to ensure customer satisfaction with finished product.
Obtain final documentation from all departments to effectively check product against specifications.

**MN-QA 1.4:** Document quality results at each state of production process.

*Sample Indicators:*
- Fill out proper records correctly for each stage of production.
- Verify that approval and rejections are in place as required on appropriate documentation.
- Verify that quality data meets specifications.
- Communicate final quality results to appropriate parties.
- Make sure that documentation is clear and complete.

2. **Recommend and implement continuous improvement in manufacturing processes.**

**MN-QA 2.1:** Identify potential quality improvements using analysis of data.

*Sample Indicators:*
- Apply quality tools properly to determine the source of potential quality problems.
* Reassess process capability continuously.
* Validate process and product measurement systems.
* Adjust process and product measurement systems as required.
* Report quality data to appropriate parties in a timely manner.

**MN-QA 2.2:** Monitor process capability at various stages of the production process.

*Sample Indicators:*
- Verify that processes meet manufacturer and other quality specifications.
- Verify that process meet company or customer capability requirements.
- Verify that process meets on-time delivery needs of the customer.
- Use approved procedures to report analyzed process capability data.
- Use results of capability studies to adjust product or process.
- Report results of capability studies to appropriate parties.
- Report environmental data and suggest improvements.

**MN-QA 2.3:** Monitor customer satisfaction using various forms of customer feedback.

*Sample Indicators:*
- Use appropriate data to measure customer satisfaction.
- Implement surveys and other customer data techniques in a timely manner.
- Report returned goods to appropriate parties for review.
- Include appropriate vendor certifications with customer documentation.
- Document on-time delivery data appropriately.
- Review field failures and product life data in a timely manner.
MN-QA 2.4: Measure and record product and process outcomes.
Sample Indicators:
- Use the proper format to record product and process outcomes within the approved timeframe.
- Use appropriate quality analysis and statistical technique to analyze performance.
- Report outcomes to all appropriate parties.

MN-QA 2.5: Participate in designing new work procedures based on identified needs or recommendations.
Sample Indicators:
- Translate recommendations for continuous improvement into new work instructions.
- Use the appropriate format to publish work instructions.
- Use the standard procedures to distribute work instructions.
- Discuss new work procedures or instructions with all stakeholders to ensure support for improvements.

MN-QA 2.6: Implement approved recommendations.
Sample Indicators:
- Make sure that recommendations for continuous improvement are clear, concise and based on data trends and patterns.
- Make recommendations in a way that draws support for process improvement.
- Provide information to ensure that all stakeholders understand their role in process improvement changes.
- Use documented and accepted process improvements to translate into revised work processes and procedures.

MN-QA 2.7: Check that the final product meets customer and business needs.
Sample Indicators:
- Verify that final test results meet customer requirements.
- Determine if product was produced within company time and cost parameters.
- Take action to minimize negative customer feedback on quality issues.

3. Coordinate work teams to create a product that meets quality assurance standards.

MN-QA 3.1: Provide training to other employees.
Sample Indicators:
- Provide cross training as appropriate.
- Assess training needs on a regular basis.
- Identify new requirements and training issues.
- Use varied approaches to achieve training goals.
- Document training outcomes.
MN-QA 3.2: Develop team goals to enhance performance.

Sample Indicators:
- Make goals specific, measurable and achievable.
- Align team goals to customer and business needs.
- Focus team goals to meet team objectives.
- Document team goals and share information with all parties.

MN-QA 3.3: Assign personnel to specific jobs based upon individual strengths and experience.

Sample Indicators:
- Make job assignments to match the skills needed for the work to be done and to maximize the use of available skills.
- Make job assignments to ensure that business and customer needs are met.
- Confirm that workers are notified of assignments effectively.

MN-QA 3.4: Coordinate work flow with team members and other work groups.

Sample Indicators:
- Make sure that production schedules are met effectively.
- Notify team members of schedule requirements in a timely way.
- Make sure that production work flow runs efficiently.
- Take necessary action to minimize downtime.
- Explain the significance of relationships with others in facilitating work flow.
- Verify that workers actively participate in meetings and problem-solving groups.

MN-QA 3.5: Communicate production requirements, material and product specifications and delivery requirements.

Sample Indicators:
- Track and document material specifications and delivery schedules.
- Notify all parties of production issues and problems in a timely way.
- Evaluate, track and report production and product issues back to original communicator.

4. Employ project management processes using data and tools to deliver quality, value-added products.

MN-QA 4.1: Conduct in-depth investigation to identify customer needs.

Sample Indicators:
- Meet those needs that differ between internal and external customers, as well as those needs that both share.
- Maintain contact with customer about the product aspects and its specifications to ensure thorough understanding of needs.
- Review, maintain and communicate customer needs and specifications.
- Address issues preventing customer needs from being met proactively.
**MN-QA 4.2:** Verify that needed resources are available for the production process.

*Sample Indicators:*
- Use work orders when handling raw materials, while setting up of tools and equipment and when scheduling workers to maximize productivity.
- Report any discrepancies related to raw materials, tools/equipment and workers abilities/availability properly.
- Identify consequences of not reporting discrepancies in production.

**MN-QA 4.3:** Set up equipment for the production process.

*Sample Indicators:*
- Make needed repairs and adjustments to equipment prior to putting into service.
- Verify that set-up meets process specifications of both internal and external customers.
- Verify that the first piece or production meets both product specifications and production capacities.
- Document set-up procedures to ensure repeatability.
- Identify possible consequences resulting from failure to meet ergonomic and other relevant health, safety and environmental standards.

**MN-QA 4.4:** Monitor fabrication of the product using process control data.

*Sample Indicators:*
- Use process control data to indicate that the manufacturing process complies with standards.
- Make the manufacturing process cycle time meet customer and business needs.
- Identify possible consequences resulting from failure to perform operations safely.
- Complete, maintain and forward product and process documentation to proper parties.
- Verify that production operations comply with all health, safety and environmental policies and procedures.

**MN-QA 4.5:** Inspect the product to verify that it meets specifications.

*Sample Indicators:*
- Verify the calibration of the testing equipment.
- Follow the established sampling plan and inspection policies/procedures.
- Identify product and production process that do not meet specifications.
- Complete inspection documents accurately and forward them to proper parties.
- Follow appropriate testing/production tools and procedures.
- Identify and communicate adjustments needed to bring the production process back into specification.
- Make necessary adjustment in the manufacturing process in a timely manner.
MN-QA 4.6: Document product and process to assure formal compliance with customer requirements.
Sample Indicators:
- Write compliance documents legibly in the appropriate format and store them in a safe, secure place.
- Complete compliance documentation, obtain "sign off," and forward to the proper parties.
- Label products for compliance and non-compliance appropriately.

MN-QA 4.7: Check for specified quantities and proper documentation when preparing a final product for distribution.
Sample Indicators:
- Package materials to meet packaging and shipping specifications (including proper labeling).
- Complete package documentation and customer shipping instructions to accompany the product to the next destination.
- Communicate product availability to the proper parties in a timely manner.
- Check relevant information such as quantity, destination and packaging instructions against the work order.
- Verify that product is correctly stored or staged for shipping.
- Explain the significance of following all laws and regulations related to labeling, packaging and transport.
- Verify that material handling procedures are followed to prevent product damage.

5. Perform safety inspections and training to ensure a safe and healthy workplace.

MN-QA 5.1: Perform environmental and safety inspections following local, federal and company regulations.
Sample Indicators:
- Identify, report and monitor potential hazards in the workplace.
- Take corrective action to correct potential hazards.
- Review health, safety and environmental documentation and policies thoroughly and regularly.
- Ensure that inspections meet all relevant health, safety and environmental laws and regulations.
- Complete inspections according to company schedule and procedures.
- Document inspection records and store them correctly.

MN-QA 5.2: Perform emergency drills as part of an emergency response team.
Sample Indicators:
- Confirm that first aid training and certification on emergency and first aid procedures are complete and up-to-date.
- Comply with company and regulatory policies and procedures to respond to emergencies.
- Document emergency drills and incidents according to company and regulatory procedures promptly.
MN-QA 5.3: Identify unsafe conditions according to safety standards.

Sample Indicators:

- Identify, report and document conditions presenting a threat to health, safety and the environment.
- Identify corrective actions.

MN-QA 5.4: Take corrective action following safety protocols

Sample Indicators:

- Consult appropriate parties about corrective actions and take corrective actions following company procedures promptly.
- Track and report ongoing safety concerns until corrective action is taken.

MN-QA 5.5: Train other employees in safe practices and emergency procedures following training orientation guidelines.

Sample Indicators:

- Verify that all topics and procedures are covered in orientation to facilitate employee safety.
- Observe orientation to ensure that it makes clear the need and processes for employees to raise safety concerns, ask questions and receive additional training.
- Use company requirements to document orientation.
- Verify that orientation meets all relevant laws, policies and regulations.
- Deliver safety instruction and updates on a regular schedule.

6. Implement continuous improvement processes to maintain quality products.

MN-QA 6.1: Perform periodic internal quality audit activities.

Sample Indicators:

- Complete all audit forms correctly in a timely manner.
- Forward forms to the correct parties.
- Verify that audit data is relevant and correct.
- Make sure that conformance to quality standards are properly assessed and documented.
- Include observation of operation in audit when appropriate to ensure performance meets specifications.
- Follow company and other required schedules and procedures to perform audit.

MN-QA 6.2: Monitor calibration of gauges and other data collection equipment.

Sample Indicators:

- Follow specifications to implement calibration schedule.
- Review documents and use thorough observation to check instrument certification.
- Recalibrate instruments that are out of calibration or refer them to the appropriate parties for recalibration or repairs immediately.
MN-QA 6.3: Suggest process improvements on a regular basis.
Sample Indicators:
- Use observations and data analysis to generate potential improvements.
- Verify that suggestions communicate measurable and data-driven benefits to the company, its customers and its employees.
- Use proper procedures and documentation to make suggestions.
- Make sure that all suggestions show that all data was reviewed prior to making a recommendation.

MN-QA 6.4: Inspect materials at all stages of process to determine quality or condition.
Sample Indicators:
- Follow schedule and procedures to complete sampling and inspection.
- Select and use inspection tools and procedures correctly.
- Inspect materials against correct specifications.
- Identify materials that do not meet specification.
- Take corrective action on out-of-specification material.
- Document inspection results.
- Report inspection results to correct parties.

MN-QA 6.5: Document the results of quality tests.
Sample Indicators:
- Check data forms to ensure that they are complete and accurate.
- Make sure that information is evaluated and interpreted correctly.
- Forward data to correct parties.
- Select and use correct analytical tools.

MN-QA 6.6: Adjust the process or product to restore or maintain quality.
Sample Indicators:
- Make sure that appropriate corrective actions are identified and approvals received when needed.
- Make adjustments to eliminate deviations and bring the process back into control.
- Make adjustments in a timely manner.
- Document adjustments properly.

7. Identify inspection processes that ensure products meet quality specifications.

MN-QA 7.1: Inspect materials against quality specifications.
Sample Indicators:
- Identify materials required for productions correctly.
- Reject non-conforming material.
- Document inspection results.
- Make sure that documentation records clearly indicate inspection and verification results.

**MN-QA 7.2:** Report material quality deviations to production.
*Sample Indicators:*
  - Report quality deviations to the correct parties in a timely fashion.
  - Describe quality deviations accurately.
  - Use the prescribed format to report quality deviations.

**MN-QA 7.3:** Release materials that meet specifications to production.
*Sample Indicators:*
  - Use production plan to implement release procedure.
  - Identify and label materials properly.
  - Verify that all approvals are obtained before releasing materials.
  - Document release approvals properly.
  - Store materials not ready for release or redirect them for other use.

**MN-QA 7.4:** Maintain supplier relationships to ensure quality of materials.
*Sample Indicators:*
  - Maintain positive business relationships with suppliers.
  - Maintain proper level of security and confidentiality in relationships with suppliers.
  - Make delivery of materials just in time to meet production needs.
  - Report information regarding cost and price to relevant parties.
  - Provide suppliers with detailed material specifications, procedures and processes to correct deviations.