



**National Occupational Standard for**  
Manufacturing Worker

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## 2 A COMPETENCY FRAMEWORK FOR INDIVIDUALS WORKING IN THE BIO-ECONOMY

### 2.1 What is a National Occupational Standard?

In Canada, National Occupational Standards are industry-developed and validated documents that identify and group tasks/competencies associated with a particular occupation. They also describe the knowledge and skills that a worker must demonstrate to be considered competent.

The former Alliance of Sector Councils (TASC) outlined 11 guiding principles for creating National Occupational Standards (NOS). NOS for the Canadian bio-economy meet all 11 principles and are developed to meet the current and future human capital management needs of the Canadian bio-economy.

### 2.2 How are we defining a competency?

We define a competency as *a set of related behaviors that describe successful performance in a designated area. It is a behavioural expression of how people integrate knowledge, skills, attributes, and attitudes to produce a value-adding result in a defined situation.*

The competency statement includes a description that integrates skills, knowledge, and actions into a sequence of activities that deliver a value-added product or service.

**Performance Indicators** is the term we use for the behaviours grouped under each competency that describe the level of mastery the incumbent role must demonstrate when executing a task.

For this project, we have organized the competencies into four categories.

**Core Competencies** are those competencies that describe the "essence of the role" — that is, they are the one to three most critical competencies that may be applicable across multiple roles in a function or job family. All levels of personnel in this function would typically share them. These competencies may also act as qualifiers that differentiate the function from other functions.

**Technical Competencies** are those competencies related to specific roles or professions that enable an individual to work, function, and succeed in that role. They address the various responsibilities that job incumbents encounter in a role. For example, a surgeon's technical competencies would encompass multiple surgical tools, techniques, and conditions that could be part of the position. Similarly, technical competencies for a lawyer would contain various legal situations that they encounter in the context of a particular field of practice.

**Regulatory Competencies** are those competencies that describe compliance with prescribed practices and mandated obligations under applicable laws, regulations, and industry standards. They ensure that critical work processes are implemented and integrated into all work activities. They are of absolute importance where economic behaviours can impact human conditions.

**Personal/professional Competencies** are those competencies that enable an individual to be successful working with others and fulfilling their responsibilities in a work context. Personal and professional competencies are not necessarily role specific.

### 2.3 Levels of complexity of work

It is important to recognize how the complexity of work varies along an organizational continuum. At one end of this continuum is low-complexity, clearly-defined, task-driven work. At the other end of the continuum is work that is higher in complexity, not as well-defined, and requires higher-level thinking and decision-making skills and a greater degree of autonomy. Results are recognised over a longer period of time and are more difficult to assess.

Figure 1: Demonstrates how the level of complexity changes with the role responsibilities

Complexity Level	Examples of Work at Different Complexity Levels	Typical Roles/Titles
Most Complex	Construct and pursue worldwide strategic plans in large corporations.	CEOs of the largest trans-global corporations
	Construct and pursue worldwide strategic plans.	C-suite executives at multi-national organizations
	Lead the accumulated impact of multiple business units.	C-suite executive at large, multi-location organizations
	Optimize the function of a single business unit or corporate support staff.	General manager; plant manager
	Manage multiple, interdependent projects; balance resources among departments.	Engineering manager
	Plan and carry out sequential projects while considering contingencies and alternatives.	Maintenance manager
	Accumulate information to diagnose and anticipate problems; proactive; notice trends.	Maintenance technician
Least Complex	Follow predefined procedures; seek help when encountering an obstacle. The ability to anticipate problems is not expected.	Maintenance labourer

We define the complexity levels within the profiles at four levels:

**Foundational** — performance focus is on the execution of procedures and tasks involving own job role.

**Operational** — performance focus includes some discretion in the planning and executing of work. The work typically includes assessing the quality of the work outcomes and taking corrective action to ensure quality.

**Specialist** — performance focus is on translating goals and standards to team members and ensuring that work done under the person's responsibility area complies with all corporate standards.

**Strategic** — performance focus is on leading work and the accumulated impact of work in an independent business unit or across a whole organization. The impact of work at this level is often not visible until the medium to longer term.

The following example illustrates the different complexity levels within a profile.

<p><b>Competency Name: Research Ethics</b></p> <p><b>Competency Definition:</b> Exercises integrity and professionalism to ensure all research is performed responsibly in keeping with the ethical principles of beneficence and nonmaleficence.</p> <p>Competence at this level is demonstrated when the <b>Research Manager:</b></p>			
Performance Indicators			
Foundational	Operational	Specialized	Strategic
Diligently follows research procedures and protocols mandated by legitimate authorities and professional organizations.	Regularly monitors own actions and decisions to ensure they align with professional and organizational values.	Holds self and staff accountable to the organization's values, ensuring compliance with the policies and procedures related to scientific ethics and rules of conduct.	Fosters an organizational culture of integrity and ethical business practices by unwavering personal example.

## 2.4 Overview methodology for the development of national occupational standards

National occupational standards were developed using a multi-step process.

Step	Description	Result/Output
1	Identify critical roles in the bio-economy through primary and secondary research.	List of 50 key roles
2	Create draft profiles with critical competencies for the roles, performance, and knowledge indicators.	Draft profiles
3	Review the draft profiles with industry subject matter experts to refine the competencies, performance, and knowledge indicators.	Reviewed profile with design inputs from industry experts
4	Further validation and review by industry via online focus group.	Validated profiles by industry experts
5	Broader validation of the draft profiles via national online surveys.	Occupational Standards validated on a national level by experts from the different sectors
6	Addition of the Essential Skills and Canadian Language Benchmark (ES/CLB) ratings.	Nationally validated NOS profiles with ES/CLB profile for each NOS

### 3 MANUFACTURING WORKER COMPETENCY FRAMEWORK

#### 3.1 Competency diagram for Manufacturing Worker

Competencies		Competency Level				Competency Level Legend
		1	2	3	4	
<b>Core Competency</b>						1. Foundational
1	Document Management					
2	Machine Operation					2. Operational
<b>Technical Competencies</b>						3. Specialist/Manager
3	Execute Production Orders					
4	Continuous Improvement					
5	Materials Handling					
6	Equipment Use					
7	Preventative Maintenance (PM)					
8	Corrective Maintenance (CM)					
9	Quality Assurance					
10	Health and Safety Procedures					
11	Reporting					
12	Waste/Scrap Control					4. Expert/Executive
<b>Industry Regulatory Competencies</b>						
	No specific competencies identified					
<b>Personal and Professional Competencies</b>						
13	Accuracy					
14	Adaptability					
15	Communication					
16	Teamwork					
17	Attention to Detail					

### 3.2 Definition of occupation

The Manufacturing Worker performs various duties within the manufacturing sector. They may oversee or assist in running machinery and various machine work processes, including the assembly of various electro-mechanical components, in order to create products or value throughout various levels of the supply chain. They set up, run, or assist in running and/or maintaining various machines within their plant.

The Manufacturing Worker must follow established standard operating procedures (SOPs) and specifications to make products, optimize output, and maintain control in order to ensure quality. They may also troubleshoot problems and then either apply corrective actions or inform maintenance and/or other cross-functional staff of bigger issues in order to resume production as quickly as possible.

The role works in the following subsectors:

Applicable To	Bio-Health	Agri-Bio	Bio-Industrial	Bio-Energy

The level of complexity of the role is:

Span of Complexity Levels	Foundational	Operational	Specialist/ Management	Expert/Executive

### 3.3 Level of education, training or designations requirements

Typical Education Required	Secondary	College	Bachelor	Master	PhD
Typical Starting Experience	0–5 yrs.	5–10 yrs.	10–15 yrs.	15–20 yrs.	20+ yrs.

- High School diploma or General Educational Development (GED) Certification plus on-the-job training is the minimum
- College certificate/diploma or bachelor’s degree required for certain positions
- Apprenticeship of a year or more may be required to ensure the candidate can properly read and understand SOP instructions, operate the machine, and understand the basics of a production line
- Co-op program participation often preferred
- Completion of post-secondary (e.g., Polytechnics) pre-employment training in machining or a machine operator technical certificate may be required
- First Aid and Safety training may be required
- Must be able to lift heavy objects (over 20 kg), stand for eight hours, and work shift work (24/7 operation at certain companies)
- Aptitude for math, problem-solving, mechanics, electronics, and computer literacy is an asset

### 3.4 Core competencies list for Manufacturing Worker

#### 3.4.1 Document Management

Reviews, completes, and maintains all required documentation (cleaning logs, maintenance records, production records, product specifications, etc.), ensuring that they are complete, accurate, up-to-date, legible, and accessible for appropriate stakeholders.

Competency in this role is demonstrated when the individual:

- Checks specifications to find information on current and upcoming orders.
- Completes production records to satisfy quality and regulatory requirements.
- Updates inventory records as materials are moved from location to location.
- Documents any quality issues during production and stores them as per SOPs.
- Ensures accuracy of own documentation to provide decision-makers with accurate information.

**Knowledge required for competency at this level:**

- Working knowledge of company-specific documentation practices
- Knowledge of common office software
- Knowledge and application of good documentation practices (GDP)

### 3.4.2 Machine Operation

Sets up, operates, and changes over machine(s) in accordance with established procedures and guidelines in order to ensure efficient and safe operation and consistent high-quality production. Monitors processes and multiple pieces of equipment during operation, and reviews information from materials or the environment to detect/assess problems and ensure quality production.

Competency in this role is demonstrated when the individual:

- Reads and interprets specifications (work orders, drawings and/or blueprints, templates/samples) or follows verbal instructions.
- Adjusts machine settings to complete tasks accurately according to specifications and in a timely fashion.
- Performs pre-operation activities on one or more pieces of equipment to ensure proper start-up and operation.
- Follows appropriate procedures for changing over the machine to prepare for next order.
- Monitors output quality to ensure it is within acceptable limits.
- Cleans the machine and ensures that it is in safe and proper working order for the next shift.

**Knowledge required for competency at this level:**

- Working knowledge of operational monitoring and control processes
- Detailed knowledge of the process flows (inputs, outputs, materials, waste and, quality control)
- Knowledge of machine specific SOPs
- Knowledge of Workplace Hazardous Materials Information Systems (WHMIS) and Hazardous Materials (HAZMAT) procedures
- Knowledge of quality standards and procedures
- Knowledge about reducing, reusing, recycling, and storing work materials

### 3.5 Technical competencies list for Manufacturing Worker

#### 3.5.1 Execute Production Orders

Assists in the operation of the machine by supporting setup and change over activities and loading/unloading materials and products, etc., in order to ensure efficient and high-quality operations.

Competency in this role is demonstrated when the individual:

- Prioritizes and schedules the work in the most efficient order for the day, accounting for inventory, maintenance schedules, etc.
- Understands the work order and is able to meet the timelines as specified by leadership.
- Helps with machine setup by ensuring that materials and tools are correct, available, and ready to use.
- Loads materials and/or removes product to prevent bottlenecks from forming.
- Assists in the monitoring of production equipment, under direction, to ensure machine operation is within acceptable limits.
- Documents relevant information (e.g., inventory levels, production numbers, build records, etc.) in order to enable decision-makers to have reliable information for review.

**Knowledge required for competency at this level:**

- Knowledge of various communication styles
- Knowledge of various manufacturing environments
- Knowledge of organizational document and quality systems structure

- Knowledge of good record-keeping practices

### 3.5.2 Continuous Improvement

Participates in initiatives to improve current metrics in safety, productivity, expected costs, quality levels, and production time in order to meet customer requirement dates and manufacturing targets.

Competency in this role is demonstrated when the individual:

- Monitors product quality and/or outcomes to ensure desired result and identify potential improvements.
- Responds quickly to correct identified quality and rework issues.
- Analyzes samples to evaluate each step and continually improve goal attainment.
- Manages production and process controls of critical steps such as weight and measurement, time limits, in-process sample testing, and damage control.
- Follows cGMP standards.
- Provides feedback or assists in troubleshooting for problems in the manufacturing process.
- Provides inputs to process improvements to enhance manufacturability and productivity.

#### **Knowledge required for competency at this level:**

- Knowledge of cGMP and applicable ISO standards
- Detailed knowledge of product and/or project quality standards
- Working knowledge of practical and technical aspects of the work activities

### 3.5.3 Materials Handling

Moves, stores, controls, and protects the materials to reduce unit costs of production, maintain/improve product quality and working conditions, reduce damage, promote safety, productivity, and use of facilities, and control inventory.

Competency in this role is demonstrated when the individual:

- Ensures self and others use appropriate lifting and handling techniques according to Occupational Health and Safety (OHS) standards and SOPs.

- Assesses safest and most efficient way to move materials to appropriate destination(s).
- Selects appropriate equipment to aid in material handling, as required.
- Ensures the availability of the material to run the order.
- Follows quality processes to identify nonconforming materials.

**Knowledge required for competency at this level:**

- Understanding of Inventory control
- Knowledge of how to operate industrial vehicles
- Knowledge of manual handling techniques
- Working knowledge of safe work practices and procedures
- Knowledge reducing, reusing, recycling, and storing work materials
- Knowledge about waste disposal according to green practices
- Knowledge of WHMIS
- Knowledge of electrostatic discharge (ESD) best practices

#### 3.5.4 Equipment Use

Uses appropriate equipment (PPE, forklifts, hand-jacks, mobile wrapping stations, etc.) to aid in carrying out own and others' work in order to ensure that workflow and employee safety are maintained and/or enhanced.

Competency in this role is demonstrated when the individual:

- Reviews SOPs to help determine best equipment to use for various duties.
- Ensures equipment is in good working condition before using it in order to ensure own and others' safety.
- Ensures personnel (self and others) have appropriate training to use equipment and/or reviews manufacturer's instructions for equipment use.
- Utilizes equipment in a safe and appropriate manner to aid in own and others' duties to meet organizational business goals.

**Knowledge required for competency at this level:**

- Knowledge about various equipment (proper use, storage, maintenance, etc.)

- Knowledge of relevant SOPs for equipment
- Knowledge of Equipment Management Software may be required

### 3.5.5 Preventative Maintenance (PM)

Conducts Preventive Maintenance (PM) to lessen the likelihood of machine breakdowns, accidents, and the costs associated with each, as well as to prolong the life and proper operation of the machine.

Competency in this role is demonstrated when the individual:

- Reviews the Machine Manufacturer recommendations to help determine the appropriate requirements of PMs.
- Follows a PM checklist to ensure all work is completed.
- Makes minor repairs to machines such as changing or sharpening tools, and contacts an industrial mechanic as needed for large repairs.
- Creates/updates equipment maintenance log, adding information about the work that was done on the equipment (e.g., date of calibration, date and brief description of maintenance task, date of the next scheduled maintenance, additional observations, notes, or comments, etc.).
- Ensures the PM results are properly documented and reported.

#### **Knowledge required for competency at this level:**

- Safety consciousness and awareness
- Knowledge about preventive and corrective (reactive) maintenance
- Knowledge of maintenance software

### 3.5.6 Corrective Maintenance (CM)

Uses discretion and carries out minor corrective maintenance after a machine failure is detected, aiming to restore it to full operations (within the established tolerances or limits) quickly and safely.

Competency in this role is demonstrated when the individual:

- Informs the maintenance team of problems with machinery.

- Conducts troubleshooting activities during an unexpected shutdown.
- Localizes, isolates, and removes the failed machine or machine part for disposal or repair following the safety protocols, contacting the maintenance team if needed.
- Replaces the disposed of machine parts or installs a new part, contacting the maintenance team if needed.
- Reassembles, realigns, or adjusts the machine after the repair to ensure it is working properly.
- Ensures CM results are documented and reported.

**Knowledge required for competency at this level:**

- Knowledge of the different maintenance levels
- Knowledge of maintenance software

### 3.5.7 Quality Assurance

Performs quality inspections at multiple points during production to ensure the products meet standards for quality and specifications.

Competency in this role is demonstrated when the individual:

- Reviews specs and test results to ensure product quality meets product requirements.
- Ensures raw materials are correct and meet internal quality standards before loading into the machine.
- Selects output samples and checks them using appropriate methods (measuring dimensions, testing functionality, comparing to specifications, etc.).
- Maintains records of testing, information, and various metrics such as the number of defective products per day, etc.
- Prepares and submits reports to the quality manager.

**Knowledge required for competency at this level:**

- In-depth knowledge of quality standards and procedures
- Understanding of how to read specifications

### 3.5.8 Health and Safety Procedures

Ensures own and others' safety by following safety policies and procedures in order to reduce and/or eliminate workplace hazards and maintain a safe work environment.

Competency in this role is demonstrated when the individual:

- Reviews and follows all safety related SOPs to ensure a safe workplace.
- Ensures self and others use personal protective equipment (e.g., face masks, gloves, safety glasses, steel-toed boots, hearing protection, etc.).
- Inspects tools, materials, equipment, and machines prior to use for visible defects and informs appropriate personnel if damage found.
- Practices good housekeeping in own area to reduce risk of injury to self and others.
- Uses lockout/tag-out procedures when repairing/servicing tools and equipment.
- Reports health and safety hazards, injuries, or concerns, including any unsafe machine practices, damaged equipment, and workplace harassment to supervisors.

#### **Knowledge required for competency at this level:**

- Knowledge of OHS legislation relevant to the workplace
- Knowledge of accident and emergency procedures as per company policy
- Knowledge of organization's safety training requirements
- Knowledge of safe bending, carrying, and lifting procedures
- Knowledge of safe use, storage, and handling of tools, machines, and grounding procedures
- Knowledge of proper disposal and storage procedures
- Knowledge of SOPs for the machine(s) and Safe Work Procedures (SWP)
- Knowledge of WHMIS

### 3.5.9 Reporting

Takes information and presents it in an objective and succinct manner in order to inform colleagues, supervisors, and other specific target audiences about daily production, machine operation progress, accident/incident, quality inspection, maintenance (PM/CM), safety, etc.

Competency in this role is demonstrated when the individual:

- Prepares reports relating to safety in accordance with workplace requirements and relevant workplace OHS legislation.
- Completes quality inspection reports to note that inspections were performed and to highlight product and safety deficiencies.
- Prepares reports about the machine's maintenance history, including the preventive and/or corrective maintenance performed on each part of the machine during the time specified period.
- Completes downtime reports to explain the cause of delays.

**Knowledge required for competency at this level:**

- Knowledge of technical report writing

#### 3.5.10 Waste/Scrap Control

Ensures that SOPs, internal policies, and external requirements, are being followed in relation to waste/scrap reduction and handling and provides input for a structured approach to handling waste that may pose a threat to human health and/or the environment.

Competency in this role is demonstrated when the individual:

- Prepares documentation of materials ordered, materials used, and waste/scrap generated in order to ultimately reduce waste/scrap.
- Categorizes waste according to SOPs and determines if waste is hazardous and/or regulated by legislation to ensure compliance.
- Stores the waste according to the waste characteristics and storage requirements.
- Ensures all hazardous waste is labelled, stored, and/or sent to the correct location as per internal and external requirements to minimize harm to people and the environment.
- Keeps records to provide evidence that the waste is stored according to all requirements.

**Knowledge required for competency at this level:**

- Knowledge of all relevant SOPs
- Knowledge of Waste Management procedures

- Knowledge of WHMIS
- Knowledge of hazardous material (HAZMAT) procedures, if applicable

### 3.6 Industry regulatory competencies list for Manufacturing Worker

No specific Regulatory Competencies were identified.

### 3.7 Personal and professional competencies list for Manufacturing Worker

#### 3.7.1 Accuracy

Ensures accuracy of own and others' work by following all policies and procedures and checking work prior to, during, and after work is completed in order to ensure all requirements and specifications have been met to acceptable standards.

Competency in this role is demonstrated when the individual:

- Reviews all documentation relating to order prior to starting production to ensure correct materials and set-up are in place.
- Communicates with team members and ensures understanding of requirements to reduce potential for mistakes.
- Carefully observes the machine during production and inspects products as they exit the machine in order to make adjustments as needed.
- Carries out various quality control checks regularly and compares results to specs to ensure production is within acceptable limits.

#### **Knowledge required for competency at this level:**

- Knowledge of quality standards and procedures

#### 3.7.2 Adaptability

Fits into a constantly changing work environment by adapting to changes in tasks, assignments, and changing production priorities in order to ensure that high-quality products are delivered in a timely manner.

Competency in this role is demonstrated when the individual:

- Demonstrates openness to different ideas and perspectives by encouraging others to provide their perspectives in order to find potential improvements.
- Accepts that colleagues may do things differently and actively tries to work with them.
- Shows flexibility when applying guidelines or procedures to get the job done and meet organizational objectives.
- Recognizes that certain situations require different approaches and reacts appropriately.
- Adjusts priorities and plans in response to changing circumstances.
- Enthusiastically adopts new systems, procedures, and guidelines after careful consideration of facts.

**Knowledge required for competency at this level:**

- Self-awareness and self-management

### 3.7.3 Communication

Positively direct outcomes by delivering communication that results in a better understanding of goals and objectives, captures interest, direct actions, and gains support.

Competency in this role is demonstrated when the individual:

- Successfully interacts with a wide range of people in a professional and ethical manner and communicates information clearly and concisely.
- Improves understanding of information and decision-making through legible, concise, and clear writing.
- Discusses and ensures understanding of ongoing work with coworkers during shift changes to ensure a smooth transition between shifts.
- Uses specialized communications signals (hand signals, etc.) to effectively communicate with coworkers who are near noisy equipment, if required.
- Creates logbook entries and short notes (what happened during shifts, records of errors and damages) to coworkers in order to ensure continuity and understanding of daily activities.

**Knowledge required for competency at this level:**

- Understanding of effective communication models and techniques

**3.7.4 Teamwork**

Interacts with supervisors/lead hands and colleagues by participating actively and contributing to the capability of the team in order to achieve shared goals in a safe and efficient manner.

Competency in this role is demonstrated when the individual:

- Communicates in an honest, respectful, and sensitive manner, demonstrating mature, respectful, fair, and equitable behaviours in all interactions and situations.
- Participates in formal discussions about work processes or product improvements and offers ideas or suggests modified approaches that may provide improvements.
- Provides and receives feedback from others and engages in continuous improvement.
- Behaves professionally by being punctual and reliable, and understanding personal responsibility, contribution, and role.
- Effectively works together with other disciplines such as Quality (QA/QC), Engineering, and Process Development, etc.

**Knowledge required for competency at this level:**

- Knowledge of professional roles and ethics
- Knowledge of conflict resolution principles
- Understanding of the roles of various teams within their organization and their place within the multi-disciplinary team

**3.7.5 Attention to Detail**

Applies mental focus to their duties to ensure that work is accurate and error free and consistently pays attention to detail to ensure consistency of work and results in order to improve decision-making and achieve results or accomplish tasks/objectives.

Competency in this role is demonstrated when the individual:

- Maintains a checklist, schedule, calendar, etc. to ensure that small details are not overlooked and follows up to ensure quality of work product and/or actions are completed.
- Follows and completes work according to procedures and standards and double-checks the accuracy of information and work product to provide accurate and consistent work.
- Accurately completes tasks with close attention to all aspects of work and carefully controls for errors to minimize or eliminate them.
- Catches and corrects own and others' errors or omissions.

**Knowledge required for competency at this level:**

- Understanding of all company policies, procedures, and protocols

### 3.8 Essential Skills for Manufacturing Worker

Essential Skills (ES) are foundational skills required for all types of work. They are not technical skills, but the core skills people need to acquire knowledge and complete workplace tasks and daily activities.

Understanding the ES requirements for a role can allow individuals to compare their skills to those required, assist training/learning providers in developing appropriate supports to ensure ES levels are developed during training, and provide employers with an additional tool for determining who/how to place in particular roles.

Human Resources and Skills Development Canada has defined Essential Skills as follows:

- Reading
- Document Use
- Numeracy, which is further divided into:
  - Money math; Scheduling, budgeting, and accounting math; Measurement and calculation math; Data analysis math.
  - Several different factors related to estimations, including the presence of a set procedure, the number of items being estimated, the consequences of errors in estimation, the amount of information missing, and the accuracy required.
- Writing

- Oral Communication
- Thinking Skills, which are further divided into:
  - Problem Solving
  - Decision Making
  - Critical Thinking
  - Job Task Planning and Organizing
  - Finding Information
  - Significant Use of Memory
- Digital Skills
- Working with Others
- Continuous Learning

Most of the ES have levels based on complexity, and a role can be analyzed to determine the appropriate levels of ES. The exceptions are noted below:

- "Working with Others" does not have a complexity rating: it simply describes the ways in which the role would be required to interact with other people, either internally within the organization or externally (i.e., with clients, customers, or the public).
- "Continuous Learning" does not have a complexity rating: it describes the types of learning expected in the context of the role (e.g., on the job, being mentored by others, formal training as part of the job, etc.).

*NOTE: as of January 2020, ESDC was undertaking a comprehensive review of ES with the intent of adding additional skills, refining existing ones (particularly digital skills) and better aligning ES with similar approaches used in other countries. However the detail was not finalized in time to be used, therefore the profiles developed for this project follow existing standards as of December 2019.*

### 3.9 Canadian Language Benchmark for Manufacturing Worker

Canadian Language Benchmarks (CLB) are a 12-point scale for task-based language proficiency descriptors which were originally developed as a guide for measuring the teaching and assessment of English as a Second Language (ESL) learners in Canada. Since they

were originally developed, the Canadian Centre for Language Benchmarks (CCLB) has continued to refine CLB, and it now includes scales for both English and French language proficiency.<sup>1</sup>

The CLB has been validated against both the Common European Framework for Language (CEFL) and the American Council for the Teaching of Foreign Languages (ACTFL) benchmarks and is considered accurate for high-stakes evaluation<sup>2</sup>.

The ES levels for Oral Communication were developed with reference to the Canadian Language Benchmarks<sup>3</sup>. Comparative work to determine the alignment between the CLB and other Essential Skills has been ongoing, with recent work providing additional alignment with the ES for Oral Communication in both spoken and listening domains, Reading, Writing, and Document Use.<sup>4</sup>

CCLB has developed a set of crossover tables that align CLB ratings with ES ratings for reading, writing oral communication and document use.

**Manufacturing Worker ES/CLB Profile**

Essential Skills	Equivalent CLB Level	ES Level				
		1	2	3	4	5
Reading	Reading: 7–8	1	2	3	4	5
Document Use	Reading: 7–8 Writing: 5–6	1	2	3	4	5
Writing	Writing: 5–6	1	2	3	4	5
Oral Expression	Speaking: 9–10 Listening: 9–10	1	2	3	4	
Numeracy	n/a	1	2	3	4	5
Thinking Skills – Problem Solving	n/a	1	2	3	4	

<sup>1</sup> Centre for Canadian Language Benchmarks. Theoretical Framework for The Canadian Language Benchmarks And *Niveaux De Compétence Linguistique Canadiens*. CCLB. Ottawa 2015. p8

<sup>2</sup> Centre for Canadian Language Benchmarks. Canadian Language Benchmarks: English as a Second Language for Adults, CCLB. Ottawa 2012 p.II

<sup>3</sup> Essential Skills Research Group. Readers Guide to the Essential Skills. ESDC. Ottawa ND. p57

<sup>4</sup> Canadian Centre for Language Benchmarks. Relating Canadian Language Benchmarks to Essential Skills: A Comparative Framework. 2015, p3

Essential Skills	Equivalent CLB Level	ES Level				
		1	2	3	4	5
Thinking Skills – Decision Making	n/a	1	2	3	4	
Thinking Skills – Job/Task Planning and Organizing	n/a	1	2	3	4	
Thinking Skills – Significant Use of Memory	n/a	Types 1,2,3				
Thinking Skills – Finding Information	n/a	1	2	3	4	
Digital Skills	n/a	1	2	3	4	5
Working with Others	n/a	See Below				
Continuous Learning	n/a	See Below				

**Explanation of the Essential Skills and the Canadian Language Benchmark for Manufacturing Worker**

**Reading: ES 3 CLB: 7–8**

Manufacturing Workers are required to read documents related to production (schedules, work processes/standards, health and safety procedures, etc.), as well as other company policies, procedures, and directives. Documents can be multiple paragraphs to several pages long, and the information contained in them is used to guide the worker’s activities.

**Document Use: ES 2 CLB: Reading: 7–8, Writing: 5–6**

Manufacturing Workers are required to interpret documents (hard copy and digital) that may be textual, symbolic, numerical, or graphical in nature, and to use this information to take actions in their work. Work orders, blue prints, production schedules, work procedures/SOPs, safe work procedures, production reports, QA/QC reports, and similar documents are used on a regular basis. The information is usually straightforward and presented in standardized formats to ease interpretation.

**Writing: ES 2 CLB: 5–6**

Manufacturing Workers write relatively simple documents to record production, variances, quality issues, etc. These documents/reports are routine, standardized, and generally focused on presenting factual information to others (supervisors and managers) so that decisions can be made and actions taken.

**Oral Expression: ES 2 CLB: Speaking: 7–8, Listening: 7–8**

Manufacturing Workers are required to communicate effectively within the team (peers, immediate supervisors) to ensure safe and efficient operations. They may need to interpret information for others (e.g., discussing a fault condition on a machine with maintenance personnel). They communicate internally on matters specific to their jobs, and they are not generally the sole source of information; therefore, while clarity and accuracy are important, the Manufacturing Workers are usually not wholly responsible for information.

**Numeracy: ES 1 (Money Math: n/a, Scheduling, Budgeting and Accounting: n/a, Measurements: 1, Data Analysis: n/a)**

Manufacturing Workers require basic mathematical skills. They do not perform money math (e.g. sales, billing, etc.), nor do they take part in scheduling or budgeting activities. Workers may perform simple measurements and calculations using known measurement instruments, and the mathematical functions are simple. There are very few variables (all of which are well-defined), and there is a defined process for finding the answer.

**Thinking Skills:**

Thinking skills are subdivided into five domains:

- Thinking Skills — Problem Solving
- Thinking Skills — Decision Making
- Thinking Skills — Job/Task Planning and Organizing
- Thinking Skills — Finding Information
- Thinking Skills — Significant Use of Memory

- **Thinking Skills — Problem Solving: 2**

Manufacturing Workers have defined jobs with clear procedures for performing them. Problem solving is limited, with set procedures for known problems that can be solved easily.

- **Thinking Skills — Decision Making: 2**

Manufacturing Workers make relatively few decisions in the course of their work. Often the decision is to inform a supervisor of any issue that comes up. Poor decisions can usually be reversed, with some inconvenience but no long-lasting consequences (e.g., if a worker makes an incorrect adjustment to a machine setting, the error is usually spotted quickly and the machine can be reset without major disruption).

- **Thinking Skills — Job/Task Planning and Organizing: 1**

Manufacturing Workers have little discretion over the work they do. They do not have to plan work as their jobs are relatively consistent day to day, and the work they need to do is assigned by supervisors as required.

- **Thinking Skills — Finding Information: 1**

Manufacturing Workers source information from a limited number of known and readily available sources in the course of their work such as SOPs, policy documents, etc. The information included in these documents leaves little room for interpretation.

- **Thinking Skills — Significant Use of Memory: Types 1, 2, 3**

Manufacturing Workers must memorize information through one or all of the following methods:

- Purposeful memorization of procedures, codes, parts numbers, memorization through repetition (Type 1)
- Remembering information for brief periods, e.g., minutes or hours (Type 2)
- Unique events in which learning occurs from exposure (Type 3)

### **Digital Skills: ES 2**

Manufacturing Workers require basic digital skills to access information, enter data necessary for production reports, and perform basic administrative tasks. Any specialized software packages will be standardized and provided by the employer, and the required procedures for using them will be taught as well as usually captured in SOPs, so the worker does not require advanced digital skills.

**Working with Others: Work Contexts 2, 3, 4**

The following work contexts and functions are relevant to the Manufacturing Worker role:

- Works independently (Work Context 2)
- Works jointly with a partner or helper (Work Context 3)
- Works as a member of a team (Work Context 4)

**They are also involved in supervisory or leadership activities, as follows: Functions 1–3**

- Participate in formal discussions about work processes or product improvement (S/L Function 1)
- Have opportunities to make suggestions on improving work processes (S/L Function 2)
- Monitor the work performance of others (S/L Function 3)

**Continuous Learning: Types of Learning: 1, 2, 3 How Learning Occurs: 1, 2, 3, 4**

Type of learning may include:

- Training in job related health and safety (Type 1)
- Obtaining and updating credentials (Type 2)
- Learning about new equipment, procedures, products, and services (Type 3)

The learning may occur:

- As part of regular work activity (Context 1)
- From coworkers (Context 2)
- Through training offered in the workplace (Context 3)
- Through reading or other forms of self-study (Context 4):
  - At work
  - On worker's own time
  - Using materials available through work
  - Using materials obtained through a professional association or union
  - Using materials obtained on worker's own initiative

## 4 REFERENCES

### Gathering the data

The development of the National Occupational Standards started with a review of existing information for the role. This review process included: referencing books, job postings, websites, articles, and BioTalent Canada's existing skills profiles to create the first draft. After several iterations via written feedback, focus groups and a national survey with subject matter experts, the National Standards were developed. The following are sources consulted during the creation of the **Manufacturing Worker** profile:

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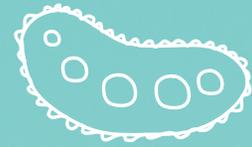
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During the research period, several job posting boards were reviewed for this profile.

# You already have a stellar team. Here's how to enhance their key skills.



## PROFESSIONAL DEVELOPMENT

- Essential Skills Fundamentals
  - Introduction to the Bio-economy, Reading, Writing, Numeracy, Document Use, Communication, Collaboration, Problem Solving
- Technical Skills Fundamentals
  - Scientific Report Writing, GLP, GCP, GMP, QA/QC



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