



NOVA SCOTIA
APPRENTICESHIP
AGENCY

NOVA SCOTIA
OCCUPATIONAL STANDARD
ELEVATING DEVICE MECHANIC
CLASS B

FORWARD

This occupational standard was developed by a committee of industry experts in the field led by a facilitator from the Nova Scotia Apprenticeship Agency. It has the following objectives:

- to describe and group the tasks performed by skilled workers;
- to identify which tasks are performed by skilled workers
- to develop instruments for use in the preparation of examinations and curricula for training leading to the certification of skilled workers;
- to facilitate the mobility of apprentices and skilled workers in Canada; and,
- to supply employers, employees, associations, industries, training institutions and governments with analyses of occupations.

Any questions, comments, or suggestions for changes, corrections, or revisions to this standard or any of its related products may be forwarded to:

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STRUCTURE OF THE OCCUPATIONAL STANDARD

To facilitate the understanding of the occupation, the work performed is divided into the following categories:

Description of the trade: an overview of the trade's duties

Essential Skills Summary: An overview of how each of the 9 essential skills is applied in this trade

Industry Expected Performance: description of the expectations regarding the level of performance of the tasks, including information related to specific codes, regulations and standards that must be observed

Pie Chart of Red Seal Examination Weightings: a graph which depicts the percentages of exam questions assigned to the major work activities

Task Matrix: a chart which outlines graphically the major work activities, tasks and sub-tasks of this standard

Major Work Activity (MWA): the largest division within the standard that is comprised of a distinct set of trade activities

Task: distinct actions that describe the activities within a major work activity

Task Descriptor: a general description of the task

Sub-task: distinct actions that describe the activities within a task

Performance Criteria: description of the activities that are done as the sub-task is performed

Range of Variables: elements and examples (not all inclusive) that provide a more in-depth description of a term used in the performance criteria, evidence of attainment, learning outcomes, or learning objectives

DESCRIPTION OF ELEVATING DEVICE MECHANIC

“Elevating Device Mechanic” is this trade’s official occupational title in Nova Scotia. This standard covers tasks performed by a Class A Elevating Device Mechanic whose occupational title has been identified by some provinces and territories of Canada under the following names:

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
Elevating Device Mechanic		✓											
Elevator Constructor and Mechanic									✓				
Elevator Devices Mechanic						✓				✓			

The following class A and B elevating device mechanic descriptions have been taken from the Nova Scotia Elevators and Lifts General Regulations:
<https://www.novascotia.ca/just/regulations/regs/ealgen.htm>

Class A Certificate of Competency:

- i. designates a mechanic working for or as a registered contractor in constructing, installing, altering, repairing, maintaining, servicing, inspecting, examining and testing elevating devices, and
- ii. covers all classes of elevating devices with the exception of passenger ropeways

Class B Certificate of Competency:

- i. designates a mechanic working for or as a registered contractor solely in constructing, installing, altering, repairing, maintaining, servicing, inspecting, examining and testing barrier-free lifts, and
- ii. is restricted to stair chair lifts, stair platform lifts and vertical platform lifts

ESSENTIAL SKILLS SUMMARY

Essential skills are needed for work, learning and life. They provide the foundation for learning all other skills and enable people to evolve with their jobs and adapt to workplace change.

Through extensive research, the Government of Canada and other national and international agencies have identified and validated nine essential skills. These skills are used in nearly every occupation and throughout daily life in different ways. The nine identified skills are:

- Reading
- Document Use
- Writing
- Oral Communication
- Numeracy
- Thinking
- Digital Technology
- Working with Others
- Continuous Learning

A series of CCDA-endorsed tools have been developed to support apprentices in their training and to be better prepared for a career in the trades. The tools can be used independently or with the assistance of a tradesperson, trainer, employer, teacher or mentor to:

- understand how essential skills are used in the trades;
- learn about individual essential skills strengths and areas for improvement; and
- improve essential skills and increase success in an apprenticeship program.

Tools are available online or for order at:

<https://www.canada.ca/en/services/jobs/training/initiatives/skills-success/tools.html>

The application of these skills may be described throughout this document within the competency statements which support each subtask of the trade. For a complete description of the nine essential skills for this trade, please visit: <https://www.jobbank.gc.ca/essentialskills>

ROLES AND OPPORTUNITIES FOR SKILLED TRADES IN A SUSTAINABLE FUTURE

Climate change affects all of us. Trades play a large role in implementing solutions and adjusting to changes in the world.

Throughout this standard, there may be specific references to tasks, skills and knowledge that clearly show this trade's role in a more sustainable future. Each trade has different roles to play and contributions to make in their own way.

For example:

- Construction tradespeople need to consider the materials they are using, building methods, and improvements to mechanical and electrical installations. There are important changes to codes and standards to help meet the climate change goals and commitments set for 2030 and 2050. Retrofits and new construction of low-energy buildings provide enormous opportunities for workers in this sector. Concepts, such as energy efficiency and regarding buildings as systems are foundational.
- Automotive and mechanical trades are seeing a shift towards the electrification of vehicles and equipment. As a result, new skills and knowledge will be required for tradespeople working in this sector. There are mandates for sales of new light-duty zero-emission vehicles (ZEV) in Canada, with the goal of achieving 100% ZEV sales by 2035. Due to this mandate, the demand for these vehicles is growing quickly among consumers and fleets. With this escalating demand, the need for skilled workers to maintain and repair these vehicles is also increasing.
- In industrial and resource sectors, there is pressure to move towards increased electrification of industrial processes. Many industrial and commercial facilities are also being upgraded to improve energy efficiency in areas such as lighting systems, and new production processes and technologies. There are also opportunities in carbon capture, utilization and storage (CCUS), as well as the production and export of low-carbon hydrogen.
- Trades in the service sector may also need to be aware of responsible sourcing, as well as efficient use of products and materials. New ways of working better are always a part of the job.

There are fast-moving changes in guidelines, codes, regulations and specifications. Many are being implemented for the purpose of energy efficiency and climate change. Those that affect specific trades may be mentioned within the standard. Examples of these guidelines and legislation include:

- The National Energy Code of Canada for Buildings (NECB).
- The Canadian Net-Zero Emissions Accountability Act (CNZEEA).

- Programs that encourage sustainable building design and construction such as Leadership in Energy and Environmental Design (LEED) and the Zero Carbon Building (ZCB) standards.
- The Montreal Protocol for phasing out R22 refrigerants.
- Energy efficiency programs such as ENERGY STAR.
- Principles of the United Nations Declaration for the Rights of Indigenous Peoples pertaining to energy sector development.

Apprentices and tradespeople need to increase their climate literacy and reinforce their own understanding of energy issues and environmental practices. It is important for them to understand why these changes are happening and their effect on trades' work. While individual tradespeople and apprentices may not be able to choose certain elements like; the architectural design of buildings, building material selection, regulatory requirements, use of electric vehicles and technologies, they must understand the impact of using these elements in their work. Impacts include using environmentally friendly products and following requirements related to the disposal and recycling of materials.

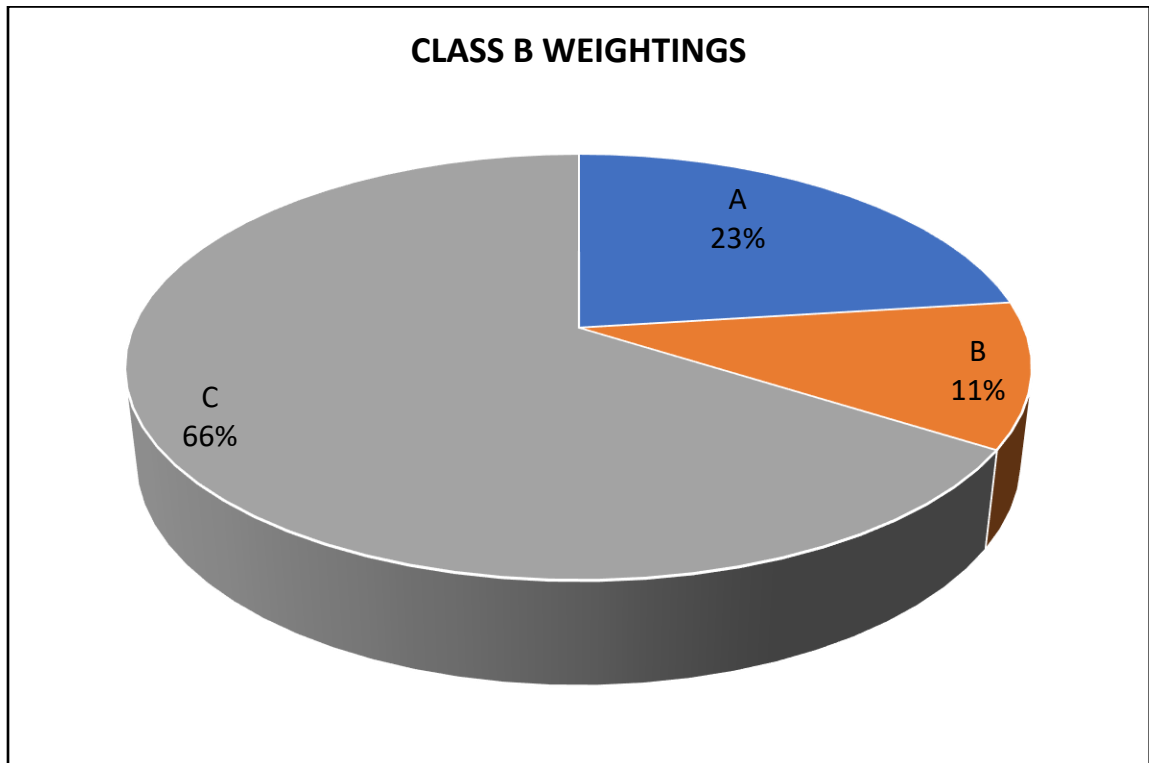
In apprenticeship, as well as in ongoing professional development, employers and instructors should encourage learning about these concepts, why they are important, how they are implemented, and the overarching targets they are aiming to achieve.

All in all, it's about doing the work better and building a better world.

INDUSTRY-EXPECTED PERFORMANCE

All tasks must be performed according to Nova Scotia regulations and standards. All health and safety standards must be respected and observed. Work should be performed efficiently and at a high quality without material waste or environmental damage. All requirements of the manufacturer specifications, employers and client expectations must be met. At a journey person level of performance, all tasks must be completed with minimal direction and supervision. As a journey person progresses in their career there is an expectation they continue to upgrade their skills and knowledge to keep pace with industry and promote continuous learning in their trade through mentoring of apprentices.

PIE CHART OF CERTIFICATION EXAMINATION WEIGHTINGS



MWA A	Performs Common Occupational Skills	23%
MWA B	Performs Routine Trade Tasks	11%
MWA C	Installs and Maintains Elevator Systems	66%

This pie chart represents a breakdown of the Nova Scotia provincial certification examination. The task matrix on the following pages indicate the breakdown of tasks and sub-tasks within each major work activity. Provincial certification examinations typically have between 100 and 150 questions. The Class B Elevating Device Mechanic Provincial certification exam has 100 questions.

ELEVATING DEVICE MECHANIC

TASK MATRIX

A – PERFORMS COMMON OCCUPATIONAL SKILLS

23%

Task A-1 Performs safety related functions 6%	A-1.01 Uses personal protective equipment (PPE) and safety equipment	A-1.02 Maintains a safe worksite	A-1.03 Performs lock-out/tag-out and zero-energy state procedures
	A-1.04 Performs access and egress procedures	A-1.05 Protects the environment	
Task A-2 Uses tools and equipment 8%	A-2.01 Uses hand and portable power tools	A-2.02 Uses mechanical measuring and testing devices	A-2.03 Uses electrical measuring and testing devices
	A-2.04 Uses ladders	A-2.05 Uses scaffolding	A-2.06 Uses work platforms
	A-2.07 Performs rigging, hoisting/lifting and moving equipment		
Task A-3 Organizes work and documentation 7%	A-3.01 Plans project tasks and procedures	A-3.02 Uses mechanical drawings	A-3.03 Interprets electrical schematics
	A-3.04 Applies acts, regulations, codes and manufactures specifications		
Task A-4 Uses communication and mentoring techniques 2%	A-4.01 Uses communication techniques	A-4.02 Uses mentoring techniques	

B – PERFORMS ROUTINE TRADE TASKS

11%

Task B-5 Performs trade activities 7%	B-5.01 Assembles work pieces	B-5.02 Performs leveling and alignment of components and systems	B-5.03 Uses mechanical fastening and retaining devices
Task B-6 Performs measuring and layout 4%	B-6.01 Prepares work area, tools and materials	B-6.02 Measures material and components	B-6.03 Lays out components

Please note: Task B-7, Performs rigging and hoisting/lifting and moving, is not a part of the Class B Occupational Standard. Instead, please refer to Sub-task 2.07, Performs rigging, hoisting/lifting and moving equipment, which is in Task A-2, Uses tools and equipment, under MWA A, Performs Common Occupational Skills.

C – INSTALLS AND MAINTAINS ELEVATOR SYSTEMS

66%

Task C-8 Installs and maintains runway equipment 20%	C-8.01 Installs counterweight and carriage guide systems	C-8.02 Installs carriage and counterweight assemblies	C-8.03 Maintains counterweight and carriage guide systems and assemblies
	C-8.04 Installs carriage and counterweight suspension means	C-8.05 Maintains carriage and counterweight suspension means	C-8.06 Installs runway door entrance assemblies
	C-8.07 Maintains runway door entrance assemblies	C-8.08 Installs travelling cables	C-8.09 Maintains travelling cables
	C-8.10 Installs runway wiring	C-8.11 Maintains runway wiring	C-8.12 Installs runway electrical components
	C-8.13 Maintains runway electrical components		

Task C-9 Installs and maintains pit equipment 7%	C-9.01 Installs pit hydraulic components	C-9.02 Maintains pit hydraulic components	C-9.03 Installs pit equipment
	C-9.04 Maintains pit equipment		
Task C-10 Installs and maintains machine/control room/space equipment 18%	C-10.01 Installs hydraulic control equipment	C-10.02 Maintains hydraulic control equipment	C-10.03 Installs traction control equipment
	C-10.04 Maintains traction control equipment	C-10.05 Installs governors	C-10.06 Maintains governors
	C-10.07 Installs machine/control room/space wiring and electrical components	C-10.08 Maintains machine/control room/space wiring and electrical components	
Task C-11 Installs and maintains carriage equipment 11%	C-11.01 Installs work platform	C-11.02 Installs carriage enclosure	C-11.03 Maintains carriage enclosure
	C-11.04 Installs barrier-free lift door operators	C-11.05 Maintains barrier-free lift door operators	

Task C-12
Performs testing and inspection of barrier-free lifts
10%

C-12.01 Performs pre-inspection procedures on barrier-free lifts

C-12.02 Performs initial inspection on barrier-free lifts

C-12.03 Performs mandated maintenance tests on barrier-free lifts

C-12.04 Performs return to service procedures on barrier-free lifts

MAJOR WORK ACTIVITY A

MWA A Performs common occupational skills

TASK A-1 Performs safety-related functions

Task Descriptor

Elevating device mechanics use PPE and safety equipment, maintain a safe work environment and perform other procedures for the purpose of preventing personal injury, equipment damage, environmental impact.

A-1.01 Uses personal protective equipment (PPE) and safety equipment

Essential Skills Reading, Thinking, Oral Communication

Performance Criteria

- 1.01.01 Organize **PPE** and **safety equipment**
- 1.01.02 Select **PPE** and **safety equipment** specific to job task
- 1.01.03 Recognize worn, damaged or defective **PPE** and safety equipment
- 1.01.04 Ensure fit of **PPE** and **safety equipment**
- 1.01.05 Ensure cables and straps for **PPE** are secured
- 1.01.06 Clean and store **PPE** and **safety equipment**

Range of Variables

PPE: safety glasses (face shield), respirators, hardhats, footwear, gloves, coveralls, personal monitors, fall protection, hearing protection, high-visibility and arc-flash clothing
safety equipment: lockout devices, fire extinguishers, gas detectors, fall protection equipment and devices

A-1.02**Maintains a safe worksite**

Essential Skills

Document Use, Oral Communication, Working with Others

Performance Criteria

- 1.02.01 Recognize and address **hazards**
- 1.02.02 Report unsafe working conditions and near misses
- 1.02.03 Handle and store hazardous materials according to WHMIS
- 1.02.04 Install **safety protection**
- 1.02.05 Identify and implement ventilation in workspace
- 1.02.06 Ensure clear path of access and egress
- 1.02.07 Test air quality of confined spaces
- 1.02.08 Follow confined space procedures and **jurisdictional regulations**
- 1.02.09 Follow safe work practices working around mobile and overhead cranes
- 1.02.10 Ensure cables and straps for monitoring equipment are secured

Range of Variables

hazards: poor housekeeping, improper use of **PPE**, lack of monitoring devices, improper rigging of material, improper hardware selection, poor air quality, poor ventilation, improper pre-use inspection, improper preparation for hot work

jurisdictional regulations: (OHS) Occupational Health and Safety Regulations, Workplace Hazardous Materials Information System (WHMIS)

safety protection: signage, barrier tape and barricades, **PPE**, monitors, proper training, designated spotter, guarding, warning devices (e.g. horns), rescue plan

PPE: safety glasses (face shield), respirators, hardhats, footwear, gloves, coveralls, personal monitors, fall protection, hearing protection, high-visibility and arc-flash clothing

A-1.03**Performs lock-out/tag-out and zero energy state procedures**

Essential Skills

Reading, Document Use, Thinking

Performance Criteria

- 1.03.01 Recognize and de-energize **energy potential** and confirm zero-energy state
- 1.03.02 Follow recognized standard operating procedure (SOP) for shutdown, lock-out and tag-out

Range of Variables

energy potential: machines, accumulators, suspended loads, pneumatic and hydraulic equipment, gravity, piping, pipe blockages, rotating equipment, stress, strain and/or tension, material memory (e.g. coiled cable, springs), electrical, thermal

A-1.04**Performs access and egress procedures**

Essential Skills	Thinking, Oral Communication, Reading
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Performance Criteria

- 1.04.01 Select **tools and equipment** for task
- 1.04.02 Perform mount/ascend and descend/dismount procedures in **work area**
- 1.04.03 Use required fall protection means
- 1.04.04 Verify appropriate **safety requirements**

Range of Variables

tools and equipment: barricades, unlocking devices, door wedge tools and access keys, PPE

work area: pit, runway, machine/control room/space, carriage top, working platform

safety requirements: government safety regulations, manufactures recommendations, approved industry standards

A-1.05 Protects the environment

Essential Skills	Reading, Thinking, Document Use
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Performance Criteria

- 1.05.01 Recognize **environmental hazards**
- 1.05.02 Report potential **environmental hazards**
- 1.05.03 Follow due diligence procedures to avoid contamination
- 1.05.04 Follow disposal procedures of hazardous material

Range of Variables

environmental hazards: contamination (water, air, soil), hazardous materials

TASK A-2 Uses tools and equipment

Task Descriptor

Elevating device mechanics use various tools and equipment to perform their work. This includes maintenance to ensure optimal efficiency and safe operation.

A-2.01 Uses hand and portable power tools

Essential Skills	Thinking, Numeracy, Continuous Learning
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Performance Criteria

- 2.01.01 Select required **hand and power tools**
- 2.01.02 Recognize worn, damaged or defective **hand and portable power tools**
- 2.01.03 Operate **hand and portable power tools**
- 2.01.04 Maintain **hand and portable power tools**

2.01.05 Store *hand* and *portable power tools*

Range of Variables

hand tools: wrenches, screwdrivers, measuring tools, hammers, pry bars, hand saws, pneumatic tools

portable power tools: grinders, power metal saws, drilling machines, wrenches (hydraulic, impact), portable hydraulic unit

A-2.02 Uses mechanical measuring and testing devices

Essential Skills Thinking, Numeracy, Continuous Learning

Performance Criteria

- 2.02.01 Select the required device or equipment
- 2.02.02 Use and maintain **mechanical measuring and testing devices**
- 2.02.03 Set up the device
- 2.02.04 Test the device
- 2.02.05 Adjust device operation as necessary
- 2.02.06 Identify device deficiencies

Range of Variables

mechanical measuring and testing devices: measuring tapes, scales, dividers, callipers, dial indicators, tachometers, gauges, micrometers

A-2.03 Uses electrical measuring and testing devices

Essential Skills Thinking, Numeracy, Continuous Learning

Performance Criteria

- 2.03.01 Select the required device or equipment
- 2.03.02 Use and maintain **electrical measuring and testing devices**
- 2.03.03 Set up the device
- 2.03.04 Test the device
- 2.03.05 Adjust device operation as necessary
- 2.03.06 Identify device deficiencies

Range of Variables

electrical measuring and testing devices: voltmeter, ammeter, megohmmeter, scales, callipers, multimeters, tachometers, oscilloscope

A-2.04 Uses ladders

Essential Skills	Reading, Document Use, Thinking
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Performance Criteria

- 2.04.01 Perform pre-use inspection on ladders
- 2.04.02 **Set up and use** ladders
- 2.04.03 Identify and remove from service unsafe, worn, damaged or defective ladders
- 2.04.04 Store ladders

Range of Variables

set up and use: securing footing, using tie-offs, ensuring height and positioning, observing load limits, guarding area, following government safety regulations, manufacturers' recommendations, approved industry standards

A-2.05 Uses scaffolding

Essential Skills	Reading, Document Use, Thinking
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Performance Criteria

- 2.05.01 Select scaffolding for the specific job
- 2.05.02 Perform pre-use inspection on scaffolding
- 2.05.03 **Set up and use** scaffolding
- 2.05.04 Identify and remove from service unsafe, worn, damaged or defective scaffolding
- 2.05.05 Disassemble and store scaffolding

Range of Variables

set up and use: observing load limits, erecting scaffolding, guarding area, following government safety regulations, manufacturers' recommendations, approved industry standards

A-2.06 Uses work platforms

Essential Skills	Oral Communication, Document Use, Thinking
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Performance Criteria

- 2.06.01 Select the work platform for the specific job
- 2.06.02 Install work platform
- 2.06.03 Perform pre-use inspection and safety testing
- 2.06.04 **Operate the work platform**

Range of Variables

operate the work platform: following employer's procedures, manufacturers' specifications, CSA safety standards, Nova Scotia's regulation requirements

A-2.07**Performs rigging, hoisting/lifting and moving**

Essential Skills

Oral Communication, Working with Others, Thinking

Performance Criteria

- 2.07.01 Determines load
- 2.07.02 Selects rigging hoisting/lifting and moving equipment
- 2.07.03 Secures area
- 2.07.04 Sets up rigging, hoisting/lifting and moving equipment
- 2.07.05 Performs hoist/lift and move
- 2.07.06 Maintains rigging, hoisting/lifting and moving equipment

TASK A-3 Organizes work and documentation

Task Descriptor

Elevating device mechanics organize projects in order to safely and efficiently use materials, labour, tools and equipment. They interpret drawings, plans and specifications to identify required resources. Prior to starting they must plan their tasks, identify environmental conditions, identify workplace hazards, prepare the worksite and organize the materials and supplies needed.

A-3.01**Plans project tasks and procedures**

Essential Skills

Thinking, Document Use, Working with Others

Performance Criteria

- 3.01.01 Determine **scope of job**
- 3.01.02 Develop a safety plan
- 3.01.03 Gather **documents**
- 3.01.04 Determine tools and equipment
- 3.01.05 Identify required **materials**
- 3.01.06 Produce field drawings and sketches
- 3.01.07 Coordinate work with other trades
- 3.01.08 Estimate time to complete job
- 3.01.09 Complete required **documentation**

Range of Variables

scope of job: labour and equipment requirements

documents: work orders, Safety Data Sheets (SDS), safety documents, manuals, standard operating procedure (SOP), drawings

materials: consumables, parts, rigging, hoisting/lifting equipment

documentation: Maintenance Control Program (MCP) logbook, timesheets

A-3.02 Uses mechanical drawings

Essential Skills Document Use, Numeracy, Thinking

Performance Criteria

- 3.02.01 Determine and recognize locations of equipment, components and parts
- 3.02.02 Identify clearances
- 3.02.03 Interpret and cross-reference specifications, technical manuals and **drawings**
- 3.02.04 Perform trade-related calculations
- 3.02.05 Identify **symbols** found on drawings
- 3.02.06 Request revisions to **drawings**

Range of Variables

drawings: civil/site, engineered, architectural, mechanical (elevating device layout), structural, electrical, shop, field, sketches, as-builts, working, installation
symbols: hydraulic, welding, pneumatic, electrical, piping

A-3.03 Interprets electrical schematics

Essential Skills Document Use, Thinking, Numeracy

Performance Criteria

- 3.03.01 Determine location and layout of equipment and devices
- 3.03.02 Identify symbols found on electrical schematics
- 3.03.03 Identify power requirements
- 3.03.04 Interpret and cross-reference information on plans and contract specifications
- 3.03.05 Determine if schematics and specifications are current
- 3.03.06 Request revisions to schematics

A-3.04 Applies Acts, regulations, codes and manufactures specifications

Essential Skills Document Use, Reading, Thinking

Performance Criteria

- 3.04.01 Apply **acts, regulations, and jurisdictional orders**
- 3.04.02 Apply **prescribed codes**
- 3.04.03 Apply manufactures specifications

Range of Variables

acts, regulations, and jurisdictional orders: Nova Scotia Apprenticeship Act, Elevators and Lifts Act, Elevators and Lifts General Regulations, Occupational Health and Safety Act, NSAA EDM Trade Regulation, Active jurisdictional Orders and Bulletins

prescribed codes: Canadian Electrical Code S38, ASME A17, CSA B355 – Code for Persons with Physical Disabilities, CSA

TASK A-4 Uses communication and mentoring techniques

Task Descriptor

Learning in the trades is done primarily in the workplace with tradespeople passing on their skills and knowledge to apprentices, as well as sharing knowledge among themselves. Apprenticeship is, and always has been, about mentoring – learning workplace skills and passing them on. Because of the importance of this to the trade, this task covers the activities related to communication in the workplace and mentoring skills.

A-4.01 Uses communication techniques

Essential Skills	Reading, Writing, Oral Communication
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Performance Criteria

- 4.01.01 Demonstrate **communication practices** individually or in a group
- 4.01.02 Listen using **active listening** practices
- 4.01.03 Receive and respond to feedback on work
- 4.01.04 Explain and provide feedback
- 4.01.05 Use questioning to improve communication
- 4.01.06 Participate in safety and information meetings
- 4.01.07 Confirm understanding of information

Range of Variables

communication practices: verbal communication techniques, written communication techniques, electronic communication techniques, hand signal techniques

active listening: hearing, interpreting, reflecting, responding, paraphrasing, questioning

A-4.02 Uses mentoring techniques

Essential Skills	Oral Communication, Working with Others, Continuous Learning
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Performance Criteria

- 4.02.01 Demonstrate performance of a skill to a learner
- 4.02.02 Set up conditions required for a learner to develop proficiency in a skill
- 4.02.03 Assess and give feedback
- 4.02.04 Support apprentices in pursuing technical training opportunities

MAJOR WORK ACTIVITY B

MWA B Performs routine trade tasks

TASK B-5 Performs trade activities

Task Descriptor

Elevating device mechanics perform routine trade tasks to optimize the efficiency and life expectancy of equipment.

B-5.01 Fabricates and assembles work pieces

Essential Skills Numeracy, Document Use, Thinking

Performance Criteria

- 5.01.01 Identify **fabrication requirements** and **materials**
- 5.01.02 Identify fit and assembly requirements
- 5.01.03 Lay out work pieces
- 5.01.04 **Perform fabrication** of work pieces
- 5.01.05 Inspect fabricated work pieces

Range of Variables

fabrication requirements: size, strength, materials, weight

materials: ferrous and non-ferrous

perform fabrication: cutting, drilling, sanding, grinding

B-5.02 Performs leveling and alignment of components and systems

Essential Skills Thinking, Numeracy, Digital Technology

Performance Criteria

- 5.02.01 Select and use **leveling and alignment tools**
- 5.02.02 Level and alignment **components**
- 5.02.03 Record leveling and alignment data

Range of Variables

leveling and alignment tools: levels (optical, laser, spirit), piano wire, plumb bob

components: rails, hydraulic jacks, brackets, sills

B-5.03 Uses mechanical fastening and retaining devices

Essential Skills	Numeracy, Document Use, Thinking
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Performance Criteria

- 5.03.01 Select fastening and retaining devices
- 5.03.02 Select and apply chemical fasteners
- 5.03.03 Achieve predetermined torque or tensioning
- 5.03.04 Select and verify thread pitch (imperial or metric) on fastener
- 5.03.05 Select **fluids and compounds** associated with threaded fasteners
- 5.03.06 Clean, chase, drill and tap threads
- 5.03.07 Restore threads

Range of Variables

tools and equipment: torque wrenches, impact wrenches, hydraulic tensioning devices, hand tools (snap-ring pliers, riveting tools)

fluids and compounds: lubrication, thread lockers, gap filling compounds, sealants

TASK B-6 Performs measuring and layout

Task Descriptor

Elevating device mechanics ensure installation of equipment by utilizing precision measuring tools and measuring practices to lay out and assemble components and systems.

B-6.01 Prepares work area, tools and materials

Essential Skills	Numeracy, Digital Technology, Document Use
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Performance Criteria

- 6.01.01 Acclimatize optical precision, measuring, layout and leveling tools
- 6.01.02 Verify optical precision, measuring, layout and leveling tools
- 6.01.03 Prepare material to be measured
- 6.01.04 Clean and prepare **work area**

Range of Variables

work area: table, floor, wall, component (both inside and outside)

B-6.02 Measures material and components

Essential Skills	Numeracy, Writing, Document Use
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Performance Criteria

- 6.02.01 Select and use **measuring tools and equipment**
- 6.02.02 Read and interpret measurements
- 6.02.03 Transfer measurements to **components**, work area and material

6.02.04 Take *inside and outside measurements*

Range of Variables

measuring tools and equipment: tape measures, calipers, micrometers

inside and outside measurements: diameters, bores, lengths, thicknesses

components: runway, pit and machinery space equipment

B-6.03 Lays out components

Essential Skills Numeracy, Digital Technology, Document Use

Performance Criteria

6.03.01 Select and use **layout tools** and equipment

6.03.02 Transfer measurements from benchmark and datum points to work area

6.03.03 Transfer measurements from drawings to work material

Range of Variables

layout tools: straightedges, squares, combination sets, surface plates, scribes, hermaphrodite calipers, dividers, trammels, prick and centre punches, angle plates, parallels, v-blocks, surface gauges, layout dye

Please note: Task B-7, Performs rigging and hoisting/lifting and moving, is not a part of the Class B Occupational Standard. Instead, please refer to Sub-task 2.07, Performs rigging, hoisting/lifting and moving equipment, which is in Task A-2, Uses tools and equipment, under MWA A, Performs Common Occupational Skills.

MAJOR WORK ACTIVITY C

MWA C Installs and maintains elevator systems

TASK C-8 Installs and maintains runway equipment

Task Descriptor

Class B elevating device mechanics install and maintain runway equipment on barrier-free lifts and are restricted to stair chair lifts, stair platform lifts and vertical platform lifts in accordance with government safety regulations, manufacturers' recommendations and approved industry standards.

C-8.01 Installs counterweight and carriage guide systems

Essential Skills Numeracy, Thinking, Document Use

Performance Criteria

- 8.01.01 Install plumb lines
- 8.01.02 Survey runway (to determine rail position and clearance)
- 8.01.03 Position machine
- 8.01.04 Install rail brackets or pit steel
- 8.01.05 Install guide rails
- 8.01.06 Adjust and align rails

C-8.02 Installs carriage and counterweight assemblies

Essential Skills Oral Communication, Thinking, Document Use

Performance Criteria

- 8.02.01 Assemble platform and counterweight frames
- 8.02.02 Install **carriage** and isolation
- 8.02.03 Install sheaves and suspension hitches
- 8.02.04 Install safety devices
- 8.02.05 Attach guiding means
- 8.02.06 Balance carriage for temporary operation

Range of Variables

carriage: stair chairs, platform lifts

C-8.03 Maintains counterweight and carriage guide systems and assemblies

Essential Skills Writing, Thinking, Document Use

Performance Criteria

- 8.03.01 Inspect carriage and counterweight assemblies
- 8.03.02 Clean, lubricate and verify operation of carriage top and bottom guiding means
- 8.03.03 Clean, lubricate and verify operation of carriage and counterweight safety devices
- 8.03.04 Reassemble and adjust safety devices

C-8.04 Installs carriage and counterweight suspension means

Essential Skills Oral Communication, Thinking, Document Use

Performance Criteria

- 8.04.01 Inspect and install **suspension means**
- 8.04.02 Establish runby clearances

- 8.04.03 Install compensating ropes and chains
- 8.04.04 Terminate suspension means
- 8.04.05 Tension **suspension means**
- 8.04.06 Install and adjust keepers/guards

Range of Variables

suspension means: wire rope, elastomeric belts, aramid fiber

C-8.05 Maintains carriage and counterweight suspension means

Essential Skills Writing, Thinking, Document Use

Performance Criteria

- 8.05.01 Inspect **suspension means** for **condition**
- 8.05.02 Check carriage and counterweight runby
- 8.05.03 Verify tension of **suspension means**
- 8.05.04 Inspect compensating ropes and chains
- 8.05.05 Inspect terminating suspension means
- 8.05.06 Lubricate wire ropes
- 8.05.07 Replace carriage and counterweight suspension means

Range of Variables

suspension means: wire rope, elastomeric belts, aramid fiber

condition: loss of diameter, broken wire, rouging

C-8.06 Installs runway door entrance assemblies

Essential Skills Document Use, Numeracy, Thinking

Performance Criteria

- 8.06.01 Establish elevation of finished floors
- 8.06.02 Build, align and install door frames
- 8.06.03 Install runway doors and **components**
- 8.06.04 Adjust door clearances

Range of Variables

components: hangers, locks, unlocking means, closers, door guides, rollers, safety retainers

C-8.07 Maintains runway door entrance assemblies

Essential Skills Writing, Thinking, Document Use

Performance Criteria

- 8.07.01 Examine and test the mechanical operation of runway doors and **components**
- 8.07.02 Clean and lubricate door entrance assemblies
- 8.07.03 Adjust, repair and/or replace runway doors and components

Range of Variables

components: hangers, locks, unlocking means, closers, door guides, rollers, safety retainers

C-8.08 Installs travelling cables

Essential Skills Document Use, Numeracy, Working with Others

Performance Criteria

- 8.08.01 Determine length of travelling cables
- 8.08.02 Install **hanger suspension methods**
- 8.08.03 Hang the travelling cables
- 8.08.04 Determine size of loop
- 8.08.05 Install travelling cable protection means

Range of Variables

hanger suspension methods: spool, strain gauge and wedge

C-8.09 Maintains travelling cables

Essential Skills Writing, Thinking, Document Use

Performance Criteria

- 8.09.01 Inspect travelling cables suspension means
- 8.09.02 Inspect travelling cables for wear and damage

C-8.10 Installs runway wiring

Essential Skills Reading, Document Use, Thinking

Performance Criteria

- 8.10.01 Determine the location and method for **wire raceways**
- 8.10.02 Determine sizing and number of conductors
- 8.10.03 Select the size and material
- 8.10.04 Plan wire raceway, conduit and fittings
- 8.10.05 Mount trough and/or conduit
- 8.10.06 Ground and bond the electrical circuit

Range of Variables

wire raceways include: trough or conduit

C-8.11 Maintains runway wiring

Essential Skills Writing, Thinking, Document Use

Performance Criteria

- 8.11.01 Inspect the trough and conduit covers and fittings
- 8.11.02 Inspect the grounding and bonding points

C-8.12 Installs runway electrical components

Essential Skills Reading, Document Use, Thinking

Performance Criteria

- 8.12.01 Determine location of the **runway switches**
- 8.12.02 Pull runway wiring branch circuits
- 8.12.03 Mount **runway switches**
- 8.12.04 Ground and bond the electrical circuit
- 8.12.05 Wire **runway switches**

Range of Variables

runway switches: pit, final limit, direction limit, terminal speed monitoring, access and stop

C-8.13 Maintains runway electrical components

Essential Skills Writing, Thinking, Document Use

Performance Criteria

- 8.13.01 Inspect and test the **runway switches**
- 8.13.02 Inspect the grounding and bonding points
- 8.13.03 Repair, replace and/or adjust **runway switches**

Range of Variables

runway switches: pit, final limit, direction limit, terminal speed monitoring, access and stop

TASK C-9 Installs and maintains pit equipment

Task Descriptor

Class B elevating device mechanics install and maintain pit equipment on barrier-free lifts and are restricted to stair chair lifts, stair platform lifts and vertical platform lifts in accordance with government safety regulations, manufacturers' recommendations and approved industry standards.

C-9.01 **Installs pit hydraulic components**

Essential Skills Document Use, Thinking, Numeracy

Performance Criteria

- 9.01.01 Verify layout
- 9.01.02 Assemble and install the **required components**
- 9.01.03 Install the **jack unit**
- 9.01.04 Plumb the jack unit
- 9.01.05 Measure and connect the oil lines
- 9.01.06 Install fittings, valves and **auxiliary safety devices**

Range of Variables

required components: casing, ram, PVC

jack unit: above-ground, in-ground

auxiliary safety devices: flow control, plunger grippers

C-9.02 **Maintains pit hydraulic components**

Essential Skills Writing, Thinking, Document Use

Performance Criteria

- 9.02.01 Inspect **oil collection means**
- 9.02.02 Examine PVC encapsulation
- 9.02.03 Examine **cylinder protection means**
- 9.02.04 Verify integrity of the cylinder head packing
- 9.02.05 Examine the integrity of the oil lines and the supports
- 9.02.06 Inspect and test fittings, valves and **auxiliary safety devices**
- 9.02.07 Guard against mechanical stored energy

Range of Variables

oil collection means: scavenger pump, overflow pail

cylinder protection means: cathodic

auxiliary safety devices: flow control, plunger grippers

C-9.03 **Installs pit equipment**

Essential Skills	Thinking, Numeracy, Document Use
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Performance Criteria

- 9.03.01 Install **sheaves**
- 9.03.02 Install counterweight guards
- 9.03.03 Install ladders
- 9.03.04 Install pit channels
- 9.03.05 Adjust sheaves and tensioning assemblies
- 9.03.06 Install spring, elastomeric or oil buffers and stands
- 9.03.07 Verify seismic components

Range of Variables

sheaves: compensating, governor

C-9.04 Maintains pit equipment

Essential Skills	Writing, Thinking, Document Use
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Performance Criteria

- 9.04.01 Check and verify stop switch
- 9.04.02 Clean, lubricate and adjust sheaves and tensioning assemblies
- 9.04.03 Check and adjust carriage counterweight runbys
- 9.04.04 Verify buffer oil level
- 9.04.05 Verify pit lighting and receptacle
- 9.04.06 Inspect buffers, stands and pit channels for damage
- 9.04.07 Verify the integrity of the counterweight guards and ladders
- 9.04.08 Verify seismic components

TASK C-10 Installs and maintains machine/control room/space equipment

Task Descriptor

Class B elevating device mechanics install and maintain machine/control room/space equipment on barrier-free lifts and are restricted to stair chair lifts, stair platform lifts and vertical platform lifts in accordance with government safety regulations, manufacturers' recommendations and approved industry standards.

C-10.01 Installs hydraulic control equipment

Essential Skills	Document Use, Working with Others, Thinking
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Performance Criteria

- 10.01.01 Verify layout and clearances
- 10.01.02 Set and mount equipment
- 10.01.03 Install carriage positioning and ***monitoring devices***
- 10.01.04 Adjust and test equipment operation

Range of Variables

monitoring devices: encoders, tachometers, tape reader

C-10.02 Maintains hydraulic control equipment

Essential Skills Writing, Thinking, Document Use

Performance Criteria

- 10.02.01 Inspect and clean controller components, ***ancillary components*** and carriage positioning and monitoring devices
- 10.02.02 Repair or replace controller components, ***ancillary components*** and carriage positioning and monitoring devices
- 10.02.03 Adjust and test controller components, ***ancillary components*** and carriage positioning and monitoring device operation

Range of Variables

ancillary components: dispatchers, selectors

C-10.03 Installs traction control equipment

Essential Skills Document Use, Working with Others, Thinking

Performance Criteria

- 10.03.01 Verify controller ratings and clearances
- 10.03.02 Set and mount equipment
- 10.03.03 Install carriage ***positioning and monitoring devices***
- 10.03.04 Adjust and test equipment operation

Range of Variables

positioning and monitoring devices: encoders, tachs

C-10.04 Maintains traction control equipment

Essential Skills	Writing, Thinking, Document Use
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Performance Criteria

- 10.04.01 Inspect and clean controller components, **ancillary components** and carriage positioning and monitoring devices
- 10.04.02 Repair or replace controller components, ancillary components and carriage positioning and monitoring devices
- 10.04.03 Adjust and test controller components, **ancillary components** and carriage positioning and monitoring device operation
- 10.04.04 Inspect, clean and lubricate machine and related equipment

Range of Variables

ancillary components: dispatchers, selectors

C-10.05 Installs governors

Essential Skills	Document Use, Thinking, Reading
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Performance Criteria

- 10.05.01 Verify equipment rating
- 10.05.02 Mount and align governor
- 10.05.03 Install governor rope and fastenings
- 10.05.04 Test, calibrate and verify operation

C-10.06 Maintains governors

Essential Skills	Writing, Thinking, Document Use
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Performance Criteria

- 10.06.01 Clean and lubricate governors and components
- 10.06.02 Repair and replace governors and components
- 10.06.03 Test, calibrate and verify operation

C-10.07 Installs machine/control room/space wiring and electrical components

Essential Skills	Thinking, Document Use, Working with Others
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Performance Criteria

- 10.07.01 Verify and terminate all required **electrical connections**
- 10.07.02 Verify rated electrical **protection devices**
- 10.07.03 Add/remove temporary jumpers

10.07.04 Complete wiring to *permanent devices*

Range of Variables

electrical connections: brake, motor, governor, travelling cable, runway switches and encoder

protection devices: fuses and circuit breakers

permanent devices: safety, door lock and ascending carriage overspeed device circuits

C-10.08 Maintains machine/control room/space wiring and electrical components

Essential Skills Writing, Thinking, Document Use

Performance Criteria

- 10.08.01 Inspect the condition and integrity of connections, contacts, leads, relays, contactors, solid state components, electrical protective devices, and overload and overheat protection devices
- 10.08.02 Repair or replace defective wiring and components
- 10.08.03 Adjust and test power and control equipment

TASK C-11 Installs and maintains carriage equipment

Task Descriptor

Class B elevating device mechanics install and maintain carriage equipment on barrier-free lifts and are restricted to stair chair lifts, stair platform lifts and vertical platform lifts in accordance with government safety regulations, manufacturers' recommendations and approved industry standards.

C-11.01 Installs work platforms

Essential Skills Working with Others, Oral Communication, Document Use

Performance Criteria

- 11.01.01 Verify device for the specific job
- 11.01.02 Verify attachment points
- 11.01.03 Erect carriage sling
- 11.01.04 Verify operation of safeties
- 11.01.05 Observe load limits and balance

C-11.02 Installs carriage enclosure

Essential Skills Working with Others, Oral Communication, Document Use

Performance Criteria

- 11.02.01 Construct cab, walls, ceiling, floor, apron and carriage top railing
- 11.02.02 Mount handrails, lighting and fans
- 11.02.03 Install carriage operating panel, position indicator and direction arrows
- 11.02.04 Install **emergency systems** and **accessories**

Range of Variables

emergency systems: emergency lighting, communication system, annunciator

accessories: carriage readers, cameras, touch screens, protective padding

C-11.03 Maintains carriage enclosure

Essential Skills Writing, Thinking, Document Use

Performance Criteria

- 11.03.01 Inspect and repair cab, walls, ceiling, floor, apron and carriage top railing
- 11.03.02 Inspect and repair handrails, lighting and fans
- 11.03.03 Inspect, test and repair carriage operating panel, position indicator and direction arrows
- 11.03.04 Inspect, test and repair **emergency systems** and accessories

Range of Variables

emergency systems: emergency lighting, communication system, annunciator

accessories: carriage readers, cameras, touch screens, protective padding

C-11.04 Installs barrier-free lift door operators

Essential Skills Document use, Working with Others, Numeracy

Performance Criteria

- 11.04.01 Verify device configuration and voltages
- 11.04.02 Set clutch, pick-up rollers and restrictor assemblies
- 11.04.03 Mount and align components
- 11.04.04 Terminate electrical connections
- 11.04.05 Verify and adjust door forces and clearances

C-11.05 Maintains barrier-free lift door operators

Essential Skills Writing, Thinking, Document Use

Performance Criteria

- 11.05.01 Repair and replace clutch, pick-up rollers and restrictor assemblies
- 11.05.02 Adjust and test clutch, pick-up restrictor assemblies

- 11.05.03 Adjust and test electrical components
- 11.05.04 Verify and adjust door forces and clearances

TASK C-12 Performs testing and inspection of barrier-free lifts

Task Descriptor

Class B elevating device mechanics perform testing and inspections on barrier-free lifts to ensure public safety and are restricted to stair chair lifts, stair platform lifts and vertical platform lifts. Initial inspections and other mandated inspections are to be performed in the presence of the authority having jurisdiction in accordance with government safety regulations, manufacturers' recommendations and approved industry standards.

C-12.01 Performs pre-inspection procedures on barrier-free lifts

Essential Skills	Document Use, Writing, Thinking
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Performance Criteria

- 12.01.01 Complete elevator pre-inspection checklist and field data reports
- 12.01.02 Execute manufacturers' testing procedures
- 12.01.03 Remove device from temporary operation
- 12.01.04 Remove all temporary jumpers
- 12.01.05 Test and verifying all safety and door lock circuits
- 12.01.06 Set ***door operations***
- 12.01.07 Set contract, ***levelling and inspection speeds***
- 12.01.08 Test and verify all ***communication systems***

Range of Variables

door operations: opening and closing speeds and closing force
levelling and inspection speeds: valves and drives
communication systems: alarm bells, annunciators and phones

C-12.02 Performs initial inspection on barrier-free lifts

Essential Skills	Document Use, Working with Others, Oral Communication
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Performance Criteria

- 12.02.01 Provide completed *Passenger and Freight Elevator Pre-Inspection Checklist*
- 12.02.02 Demonstrate manufacturers' submitted testing procedures
- 12.02.03 Test all safety and door lock circuits
- 12.02.04 Verify ***door operations***
- 12.02.05 Verify contract, ***levelling and inspection speeds***
- 12.02.06 Test and verifying all ***communication systems***
- 12.02.07 Verify removal of all temporary jumpers

Range of Variables

door operations: opening and closing speeds, closing force

levelling and inspection speeds: valves, drives

communication systems: alarm bells, annunciators, phones

C-12.03 Performs mandated maintenance tests on barrier-free lifts

Essential Skills	Document Use, Writing, Thinking
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Performance Criteria

- 12.03.01 Remove device from public operation
- 12.03.02 Execute required testing procedures for Category 1, 3 and 5 tests
- 12.03.03 Test all safety and door lock circuits
- 12.03.04 Verify door operations
- 12.03.05 Verify contract, levelling and inspection speeds
- 12.03.06 Test and verifying all communication systems
- 12.03.07 Verify removal of all temporary jumpers

Range of Variables

door operations: opening and closing speeds, closing force

levelling and inspection speeds: valves, drives

communication systems: alarm bells, annunciators, phones

C-12.04 Performs return to service procedures on barrier-free lifts

Essential Skills	Document Use, Writing, Thinking
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Performance Criteria

- 12.04.01 Verify fusing and electrical protective devices
- 12.04.02 Verify removal of all temporary jumpers and wiring
- 12.04.03 Verify **device operation**
- 12.04.04 Verify safety and door lock circuits
- 12.04.05 Record data in maintenance log
- 12.04.06 Remove all temporary signage and barricades

Range of Variables

device operation: contract, levelling, inspection speeds, doors

APPENDIX A TOOLS AND EQUIPMENT

Digital Voltmeter: Category III or Category IV rated

Door wedge tool

Hand tools: screwdrivers, wrenches, sockets

Runway door unlocking devices

PPE: gloves, glasses, work boots, face mask

Rope gauges

Tachometer

APPENDIX B GLOSSARY

Lunar Key: runway door unlocking device