[CompanyName]

HVAC & Plumbing
Quality Assurance/Quality Control Plan

[ProjectName]
[ProjectNumber]

Management acceptance

This Construction Quality Assurance/Quality Control Plan has been reviewed and accepted.

Endorsed By: (Name / Title)	[QualityManagerName], Quality Manager		
Signature:	*[QualityManagerName]*	Date:	[Date]
Version	1.0	Notes	Initial Issue

SIGNATURE SHEET

Plan Preparer

This [CompanyName] Project Quality Assurance/Quality Control Plan was prepared in accordance with the contract specifications and requirements of the [CompanyName] Quality Program and approved by:

[QualityManagerName] / [Date]

[QualityManagerName], Quality Manager /Date

Approval by Company Officer

This [CompanyName] Project Quality Assurance/Quality Control Plan is approved by:

[SeniorManagerName] / [Date]

[SeniorManagerName], Senior Manager /Date

Plan Concurrence

[CompanyName] Project Quality Assurance/Quality Control Plan concurrence by:

[ProjectManagerName] / [Date]

[ProjectManagerName], Project Manager /Date

[SuperintendentName] / [Date]

[SuperintendentName], Superintendent /Date

PROJECT-SPECIFIC QUALITY PLAN

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G. Personnel Qualifications and Technical Certifications

[CompanyName] ensures that only knowledgeable, capable employees carry out the planning, execution, and control of the project.

We train our employees in quality standards and procedures based on project requirements as well as their job positions. Then we validate their capabilities before they are assigned to carry out their quality job responsibilities on the project. Ongoing monitoring of performance continually validates the qualifications of each employee.

The Quality Manager qualifies employee capabilities to ensure that they are capable of completely carrying out their assigned quality responsibilities including the following capabilities:

- Knowledge of Company quality standards
- Knowledge of job responsibilities and authority
- Demonstrated skills and knowledge
- Demonstrated ability
- Demonstrated results
- Required training
- Required experience

The Quality Manager also evaluates independent contractor personnel on the same standards that apply to employees.

HVAC and Plumbing Personnel Certification Requirements

Personnel certifications are required for the following:

Plumbing Personnel Certifications and Licenses		
Certification or License Title	**Reference Standard No.**	**Reference Standard Title**
Canadian Welding Association	G40.20-13/G40.21-13	General requirements for rolled or welded structural quality steel / Structural quality steel
Industry Training Authority (ITA) Canada	Red Seal Certification	Interprovincial Red Seal Certification for Plumbers
IAPMO Certification	SSA Program or ACE IT Program	Plumbing code compliance certification

HVAC Personnel Certifications and Licenses		
Certification or License Title	**Reference Standard No.**	**Reference Standard Title**
Certification or License Title	Reference Standard No.	Reference Standard Title

Welders for Structural Steel	G40.20-13/G40.21-13	Structural Welding Code - Reinforcing Steel
Welders for Boilers and Piping	ASME BPVC SEC IX	Welding and Brazing Qualifications
Refrigerant Recovery Technician	EPA 608	Refrigerant Handling Certification

J. PROJECT QUALITY SPECIFICATIONS

Fulfilling customer contract expectations is a primary objective of the [CompanyName] Quality System. To ensure that customer expectations will be fulfilled, [CompanyName] clearly defines the requirements for each contract before it is approved.

The Project Manager ensures that the information in customer contracts clearly defines customer expectations and that the necessary details are provided to set requirements for construction.

[CompanyName] personnel and subcontractors and suppliers are accountable for compliance to standards-based written specifications.

To achieve expectations reliably and consistently, specifications are clearly spelled out, not only for results but also for processes. Specifications apply to materials, work steps, qualified personnel and subcontractors and suppliers, safe work rules, and environmental work conditions.

Standards ensure that results are specified rather than left to discretionary practices.

All [CompanyName] construction activities comply with generally accepted good workmanship practices and industry standards.

COMPLIANCE WITH CANADIAN HVAC AND PLUMBING INDUSTRY STANDARDS

Codes that may apply to this project include those listed below.

Canadian HVAC Regulatory Codes and Industry Standards		
Description	**Reference Standard No.**	**Reference Standard Title**
Color coding of piping systems	CSA B51-14	Scheme for Identification of Piping Systems
Installation of metal ductwork	ASHRAE	HVAC Duct Construction Standards Metal and Flexible
Installation of radon ductwork	ASTM D2564	Solvent-Cemented Joints with PVC Pipe and Fittings
Ductwork cleaning	ASHRAE 62.1	Ventilation for Acceptable Indoor Air Quality
Installation of air terminal units	ASHRAE 90.1	Energy Standard for Buildings Except Low-Rise Residential Buildings
Fuel oil system installation	CSA B139-19	Installation Code for Oil-Burning Equipment
Canadian Plumbing Regulatory Codes and Industry Standards		
Description	**Reference Standard No.**	**Reference Standard Title**
National Building Code (NBC)	ULC S101	Fire Endurance Tests for Building Construction
Gas Fitter Certificate	CSA B149.1	Natural Gas and Propane Installation Code

Installation of Oil Systems	CSA B139-19	Installation Code for Oil-Burning Equipment
Backflow Prevention	ISO 14367	Backflow Prevention Devices
Disinfection of Water Storage Facilities	AWWA C652	Procedures for Disinfection of Water Storage Facilities
Plastic Pipe Installation	CSA B1800-18	Plastic Non-Pressure Pipe Compendium

K. Material Inspection Traceability and Quality Controls

Products and materials are controlled to assure the use of only correct and acceptable items. Controls include identification of the inspection status. Materials that require lot control traceability and the method of traceability are listed on the Controlled Materials form included as an exhibit in this subsection.

Identification of Lot Controlled Materials

The Quality Manager determines types of project materials that require quality controls.

For each type of quality-controlled material, the Quality Manager determines lot control traceability requirements, if any, and specifies the means of lot identification. Identification methods may include physical labels, tags, markings and/or attached certification documents.

When lot-controlled materials are received, the Superintendent verifies that materials have the specified lot identifications.

The Superintendent maintains lot identification at all production phases from receipt, through production, installation, or assembly, to final completion. Acceptable methods for preserving lot identification include physically preserving observable lot identifications, recording the lot identification on a work task quality inspection form or other work record, or collecting the physical lot identifier as a record along with supplemented with location.

If lot-controlled materials are without lot identification, the Superintendent deems the materials as nonconforming and segregates them and/or clearly marks them to prevent inadvertent use. The

company purchased materials. If any customer property is lost, damaged, or otherwise found to be unsuitable for use [CompanyName] will report this to the customer.

Material Receiving and Inspection

When lot-controlled materials are received, the Operations Manager inspects the materials and verifies that materials have the specified lot identifications. Received materials are listed on the Material Receiving and Inspection Report form or Metals Materials Receiving, and Inspection form included as an exhibit in this subsection.

Material quality inspections and tests ensure that purchased materials meet purchase contract quantity and quality requirements. The Superintendent inspects or ensures that a qualified inspector inspects materials prior to use for conformance to project quality requirements.

The Superintendent ensures that each work task that uses the source inspected materials proceeds only

requirements and standards. This includes handling, storage, protection from natural elements, and reducing risks of damage.

Completed work is protected from damage as specified by government regulations, contract technical specifications, industry standards, or product installation instructions.

The Quality Manager identifies supplemental protection requirements that apply to a specific project when they are necessary to assure quality results.

[CompanyName]
Material Inspection and Receiving Report

Contract ID	Contract Name	Purchase Order No.	Supplier	Bill of Lading No.	Date
[ProjectNumber]	[ProjectName]				

Item No.	Stock/Part No.	Description	Quantity Received	Condition	Marking	Accept	Conditional Use	Reject
						☐	☐	☐
						☐	☐	☐
						☐	☐	☐
						☐	☐	☐
						☐	☐	☐
						☐	☐	☐

Receiving Quality Control

ACCEPTANCE

Listed items have been accepted by me or under my supervision

☐Conform to contract specifications EXCEPT as noted herein or on supporting documents.
☐Received in apparent good condition EXCEPT as noted

Signature of authorized person and date: _____

EXCEPTIONS:

M. Inspection and Test Plan

The Quality Inspection and Test Plan form lists inspections and tests (other than work task inspections) that will be performed on this project.

Results of inspections and tests will be recorded on the Inspection and Test Form.

Form exhibits are included as an exhibit in this subsection.

Canadian HVAC and Plumbing Inspection and Testing Standards

Inspection and testing standards that may apply to this project include those listed below.

Canadian HVAC Inspection and Testing Standards		
Description	**Reference Standard No.**	**Reference Standard Title**
Ductwork Leakage Test	CAN/ULC-S110-18	HVAC Air Duct Leakage Test Manual
Heat Trace Cable System Test	CSA C22.2 No.138-19	Testing for Electrical Resistance Heat Tracing
HVAC System Balancing	ASHRAE 111	Testing, Adjusting, and Balancing of Environmental Systems
Canadian Plumbing Inspection and Testing Standards		
Description	**Reference Standard No.**	**Reference Standard Title**
Non-Potable Water Systems	CSA B128.1/B128.2-18	Design and Installation/Maintenance and Field Testing
Pressure Equipment Safety	AB 516	Pressure Equipment Safety Regulation
Disinfection of Water Systems	AWWA C651-14	Procedures for Disinfecting Water Mains

Calibration of Inspection, Measuring, and Test Equipment

The Quality Manager determines inspection, measuring, and test equipment that will be controlled, calibrated, and maintained.

The Quality Manager evaluates the project requirements and determines if there are measuring devices that require controls to assure quality results.

For each type of device, the Quality Manager identifies:

- Restrictions for selection
- Limitations on use.
- Calibration requirements including the frequency of calibration. All calibrations must be traceable to national measurement standards.

When a measurement device is found not to conform to operating tolerances, the Quality Manager validates the accuracy of previous measurements.

[CompanyName]
Inspection and Test Plan and Log

Project Number	Project Name	
[ProjectNumber]	[Project Name]	

Technical Specification Section	Scheduled Activity	Inspection/Test Required	Inspected/ Tested By	Location Of Inspection/Test On/Off Site		Date Conducted	Date Sent to Engineer	Accepted/ Rejected

[CompanyName]
Test Equipment Calibration Plan and Log

Project ID	Project Name	Preparer	Date	
[ProjectNumber]	[ProjectName]			

Type of measuring device	Calibration Type and Frequency	Measuring Device ID	Calibrated By/ Calibration Date	Calibration certificate #	Next Calibration Due Date
					Project Start

[CompanyName]

Quality Manual

Operating Policies of the
[CompanyName] Quality Program

Management acceptance

This Quality Manual has been reviewed and accepted

Endorsed By: (Name / Title)	[PresidentName], President		
Signature:	*[PresidentName]*	Date:	[Date]
Version	1.0	Notes	Initial Issue

QUALITY MANUAL

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PROJECT QUALITY MANAGEMENT

The Senior Manager forms a team consisting of a Quality Manager, Project Manager, and Superintendent.

First, the Quality Manager assembles a set of project specifications that includes customer specifications and requirements, regulations, industry standards, product instructions, and [CompanyName] quality standards. [CompanyName] operating policies assure compliance to the project specifications.

The Quality Manager evaluates personnel, subcontractors and suppliers, materials, and suppliers, and ensures that only those that are capable and qualified are included on the project. Training is provided to ensure that all personnel involved understand their project work task requirements as well as their quality responsibilities and authorities.

The subcontractors and suppliers, Superintendent, and Quality Manager use inspection checklists to monitor conformance of each work task to the project specifications before, during, and at completion. Laboratory and functional tests are performed to assure performance results.

Should quality nonconformances occur, they are systematically segregated, controlled, and corrected. Improvements are made to prevent recurrences.

Throughout the project, the Quality Manager performs on-site quality audits to ensure that the [CompanyName] Quality Program is operating effectively.

2. PROJECT QUALITY ASSURANCE/QUALITY CONTROL PLAN

2.1. OVERVIEW

After [CompanyName] is awarded a contract to carry out a construction project, the Senior Manager forms a team consisting of a Quality Manager, Project Manager, and Superintendent.

First, the Quality Manager develops a set of project specifications that align project requirements with customer specifications and requirements, regulations, industry standards, product instructions, and [CompanyName] quality standards.

The Quality Manager evaluates personnel, subcontractors and suppliers, materials, and suppliers, and ensures that only those that are capable and qualified are included on the project. Training is provided to ensure that all personnel involved in the project understand their quality responsibilities and authorities.

The Quality Manager then details how the quality is controlled throughout the construction process through a quality inspection and test plan that specifies requirements and pass/fail criteria for quality inspections and tests. [CompanyName] operating policies assure compliance to the project specifications.

Throughout the project, the Quality Manager performs on-site quality audits to ensure that the [CompanyName] Quality Program is operating effectively.

2.2. [COMPANYNAME] PROJECT LICENSE AND QUALIFICATION REQUIREMENTS

The Quality Manager identifies the company license and qualification credentials required by contract specifications and government regulators. The Quality Manager obtains records, certificates, and license records that provide verification of [CompanyName] credentials.

2.2.1.1. Required Company Licenses and Certifications

The Quality Manager defines quality-related company credentials for each project work task that affects quality.

2.3. Project Personnel and Qualifications

2.3.1. Project Organization Chart

The Senior Manager defines the organization chart for the project. The organizational chart includes job titles, names of assigned personnel, and organizational and administrative interfaces with the customer. The organization chart defines lines of authority as indicated by solid connection; dotted lines indicate lines of communication. The lines of authority preserve independence of quality control personnel from the pressures of production.

The Senior Manager appoints qualified persons to each project management job position with specific quality responsibilities and authorities. The Senior Manager assesses the qualifications of each person before the appointment is made.

The Senior Manager keeps a record of the appointment and signs the document. The person accepts the appointment by signing a declaration as a competent person.

Work steps for maintaining appointment of key project personnel are specified in Standard Operating Procedure 2.3.2 Appointment of Key Project Personnel.

2.3.3. Personnel Qualifications

The Quality Manager qualifies employee capabilities to ensure that they are capable of completely carrying out their assigned quality responsibilities including the following capabilities:

- Knowledge of Company quality standards
- Knowledge of job responsibilities and authority
- Demonstrated skills and knowledge
- Demonstrated ability
- Demonstrated results
- Required training

- Required experience

The Quality Manager also evaluates independent contractor personnel on the same standards that apply to employees.

2.3.3.1. Required Licenses and Certifications

The Quality Manager defines quality-related credentials for each project job position that affects quality.

2.4. Project Quality Assurance/Quality Control Plan

Before project work begins, the Project Manager prepares a construction process plan that defines the sequence of each work task and related quality inspections. The construction process plan is documented through an integrated and coordinated set of documents that includes:

- A schedule consisting of a sequence of each work task and activities required to complete a project
- The customer contract (Section 3 Contract Specifications) including contract technical specifications and contract drawings
- Required quality inspections and tests (Section 8.2 Required Work Task Quality Inspections and Tests) and the project Quality Inspection and Test Plan when required
- The Contract Submittal Schedule (Section 3.4.1 Contract Submittal Schedule)

2.5. Identification of Quality Controlled Work Tasks

The Quality Manager identifies each phase of construction work task that requires separate quality controls. Each work task triggers a set of requirements for quality control inspections before, during and after work tasks.

2.8. Project Quality Training Plan

The Quality Manager ensures that all employees receive training relevant to their quality responsibilities.

The Quality Manager ensures that all subcontractors and suppliers receive training on relevant elements of the [CompanyName] Quality Program, Project Quality Assurance/Quality Control Plan, and quality standards.

The Quality Manger identifies the training needs of all personnel performing activities that affect quality. Training topics may include:

- The [CompanyName] Quality Program
- The [CompanyName] Quality Policy
- Operating policies identified in the Quality Manual
- Quality standards cited in the Quality Manual, or project documents, or records
- Relevant quality standard operating procedures

2.9. Customer Training On Operation and Maintenance

During the project closeout phase, the Quality Manager trains customers on the operation and maintenance of the completed project, including as applicable:

- A review of as-built drawings
- Installed product identification and warranty requirements
- A review of documentation regarding start-up, operation, and shutdown
- Normal adjustments and maintenance requirements
- Limitations on use

2.10. Project Records and Documentation Plan

The Quality Manager identifies the quality records that will be maintained during the planning and execution of the project. Considerations include:

- Contract requirements for maintaining records
- The size of the project
- Types of activities
- The complexity of processes and their interactions
- The competence of personnel
- The duration of the project
- The need to demonstrate completion of work
- The need to demonstrate due diligence for Quality Program related activities
- Balancing the cost and benefits of maintaining the record

2.11. Project Audit Plan

The Quality Manager identifies the frequency of project quality audit that will be conducted during the project and the job position that will conduct the audits. Considerations include:

- The size of the project
- The complexity of processes and their interactions
- The duration of the project

9. NONCONFORMANCES AND CORRECTIVE ACTIONS

9.1. OVERVIEW

Should a nonconformance be identified by an inspection there is a systematic method to control the item, correct it, and ensure that project quality is not adversely impacted by the event.

A nonconformance is any item that does not meet project specifications or [CompanyName] Quality Program requirements.

9.2. NONCONFORMANCES

9.2.1. MARKING OF NONCONFORMANCES AND OBSERVATIONS

When the Quality Manager, Superintendent, inspector, or customer identifies a nonconformance or an observation, the item is quickly and clearly marked by tape, tag, or other easily observable signal to prevent inadvertent cover-up.

9.2.3. NONCONFORMANCE REPORT

9.2.3.1. RECORDING OF NONCONFORMANCES

If nonconformances or observed items exist by the work task completion inspection, the Superintendent or inspector records the nonconformances on a nonconformance report.

The Superintendent sends the nonconformance report to the Quality Manager.

9.2.3.2. QUALITY MANAGER DISPOSITION OF NONCONFORMANCE REPORTS

When the Quality Manager receives a Nonconformance Report, he or she assesses the effect the reported nonconformance has on form, fit, and function. The Quality Manager may assign a disposition of either:

REPLACE: The nonconformance can be brought into conformance with the original specification requirements by replacing the nonconforming item with a conforming item.

REPAIR: The nonconformance can be brought into conformance with the original requirements through completion of required repair operations.

REWORK: The nonconformance can be made acceptable for its intended use, even though it is not restored to a condition that meets all specification requirements. The Quality Manager may specify standards that apply to the completion of rework. Rework nonconformances must be approved by the customer.

USE AS-IS: When the nonconforming item is satisfactory for its intended use. Any use as-is items that do not meet all specification requirements must be approved by the customer.

9.2.4. Correction of Nonconformances

The Superintendent verifies that corrective actions eliminate the nonconformance to the requirements of the original specifications or as instructed by the disposition of the nonconformance report, and then removes, obliterates, or covers the nonconformance marker.

Furthermore, the Superintendent ensures that previously completed work is reinspected for similar nonconformances and corrective actions are taken to avert future occurrences (see section 9.3 Corrective Actions).

9.3. Corrective Actions

9.3.1. Control of Corrective Actions

When a nonconformance is found, the Superintendent ensures that:

- Previously completed work is reinspected for similar nonconformances
- Corrective actions are taken to avert future occurrences

9.3.2. Corrective Action Training

The Superintendent initiates corrective action training to address quality nonconformances. Personnel and subcontractors and suppliers performing or inspecting work participate in the training.

HVAC Inspection Checklist

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Heating// Ventilating// and Air Conditioning (HVAC) - Air Outlets and Inlets 23.37.00

Project:	Phase:	Contract#:	Subcontractor:	Crew:

Compliance Verification

- ☐ Compliance with initial job-ready requirements
- ☐ Compliance with material inspection and tests
- ☐ Compliance with work in process first article inspection requirements
- ☐ Compliance with work in process inspection requirements
- ☐ Compliance with Task completion inspection requirements
- ☐ Compliance with inspection and test plan
- ☐ Compliance with safety policies and procedures

Reported Nonconformances and incomplete items:

YES	NO	***Heightened Awareness Checkpoints***
☐	☐	Appearance of Air Outlets and Inlets approved by the ARCHITECT prior to ordering and installation
☐	☐	Registers// grills// and diffusers are compatible with wall and ceiling systems
☐	☐	Air Outlets and Inlets clean of dirt// dust// rubbish// and debris
☐	☐	Air Outlet and Inlet connections to duct work is airtight
☐	☐	Additional supports provided for registers// grills// and diffusers in drop-in ceiling tile systems
☐	☐	Internal fans are mounted with vibration isolators
☐	☐	Drive belts properly tensioned
☐	☐	Ventilators installed with clearance for inspection and maintenance
☐	☐	Gravity Ventilators installed level and plumb
☐	☐	Ventilator mountings weatherproof

Scores and Completion Sign-off

Field Mgmt.-91.45.01

Quality **5 4 3 2 1** *Notes:*

On-Time **5 4 3 2 1** *Notes:*

Safety **5 4 3 2 1** *Notes:*

Sign and date*: Cell # / ID #:: _____ Signed: _____ Date: _____

Task has been has been verified complete and in compliance with contract drawings and specifications except for non-conformances and incomplete items reported above.

Quality Score	*5 = 100% NO problems*	*4 = 1 minor problems*	*3 = Hotspot or 2-3 minor*	*2 = 6+ or major problems*	*1 = Excessive problems*
On-Time Score	*5 = On Time*	*4 = Late*	*3 = Late by 1 day*	*2 = Late by 2 days*	*1 = Late more than 2 days*
Safety Score	*5 = 100% NO problems*	*4 = 1 minor problem*	*3 = Hotspot or 2-3 minor*	*2= 4+ or major problem*	*1= Injury*

PLUMBING INSPECTION CHECKLIST

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Plumbing - Plumbing Insulation 22.07.00

Project:	Phase:	Contract#:	Subcontractor:	Crew:

Compliance Verification

- ☐ Compliance with initial job-ready requirements
- ☐ Compliance with material inspection and tests
- ☐ Compliance with work in process first article inspection requirements
- ☐ Compliance with work in process inspection requirements
- ☐ Compliance with Task completion inspection requirements
- ☐ Compliance with inspection and test plan
- ☐ Compliance with safety policies and procedures

Reported Nonconformances and incomplete items:

YES	NO	***Heightened Awareness Checkpoints***
☐	☐	Plumbing and equipment tested and operational before applying Insulation
☐	☐	Area to be insulated is free of rust// scale// dirt// and moisture
☐	☐	Adhesive/Anchors/Staples/Wrapping utilized is compatible with Insulation type
☐	☐	Insulation through penetrations maintains fire rating of structure
☐	☐	Insulation protected from chafe at all supports and contact points
☐	☐	Insulation protected from weathering and moisture intrusion
☐	☐	Operation of valves and actuators not hindered by insulation
☐	☐	Insulation joints sealed
☐	☐	Cladding applied in high abuse/traffic areas
☐	☐	Openings/Holes caused by testing closed/repaired

Scores and Completion Sign-off

Field Mgmt.-91.45.01

Quality **5 4 3 2 1** *Notes:*

On-Time **5 4 3 2 1** *Notes:*

Safety **5 4 3 2 1** *Notes:*

Sign and date*: Cell # / ID #:: _____ Signed: _____ Date: _____

Task has been has been verified complete and in compliance with contract drawings and specifications except for non-conformances and incomplete items reported above.

Quality Score	*5 = 100% NO problems*	*4 = 1 minor problems*	*3 = Hotspot or 2-3 minor*	*2 = 6+ or major problems*	*1 = Excessive problems*
On-Time Score	*5 = On Time*	*4 = Late*	*3 = Late by 1 day*	*2 = Late by 2 days*	*1 = Late more than 2 days*
Safety Score	*5 = 100% NO problems*	*4 = 1 minor problem*	*3 = Hotspot or 2-3 minor*	*2= 4+ or major problem*	*1= Injury*