

[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:	<i>[QualityManagerName]</i>	Date:	[Date]
Version	1.0	Notes	Initial Issue

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[CompanyName] Quality Manual	Section 2

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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 CONSTRUCTION QUALITY PLAN

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J. CONSTRUCTION PROJECT QUALITY SPECIFICATIONS

[CompanyName] personnel, 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.

REGULATORY CODES

All [CompanyName] activities comply with the relevant regulations. The Quality Manager identifies regulatory requirements applicable to the jurisdictions served, including:

- Applicable Federal regulations
- Applicable State regulations
- Applicable building codes and local addenda to building codes
- Applicable Fire Code
- Additional regulations specified by the purchaser contract

The Quality Manager identifies regulatory requirements that apply to a specific project. The Superintendent had jobsite access to relevant codes and government regulations.

MATERIAL SPECIFICATIONS

The Quality Manager ensures that all types of materials and equipment that affect quality are identified and controlled.

The Quality Manager evaluates the expected use of materials and equipment and identifies types of materials and equipment that may affect project quality. For each item, the Quality Manager sets specifications for their intended use, including:

- Compliance to contract requirements
- Compliance to code and industry standards and listing requirements
- Structural integrity
- Performance
- Durability
- Appearance
- Product identification for traceability.

The Quality Manager identifies controlled material and equipment that apply to the project. Only approved materials are used in the construction process.

EQUIPMENT SPECIFICATIONS

The selection and use of equipment are controlled to assure the use of only correct and acceptable equipment on the project.

The Quality Manager determines specifications of required equipment that affect quality and the specifications of quality-controlled equipment.

When equipment is received, the Superintendent verifies that equipment is as specified.

WORK PROCESS SPECIFICATIONS

The Quality Manager ensures that work processes are controlled to ensure that the specified requirements are met. When appropriate, the Quality Manager will specify project quality standards for work processes that may include:

- References to documented procedures such as manufacturer's installation instructions
- Procedures for carrying out process steps
- Methods to monitor and control processes and characteristics
- Acceptability criteria for workmanship
- Tools, techniques, and methods to be used to achieve the specified requirements.

[COMPANYNAME] QUALITY STANDARDS

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

The Quality Manager identifies supplemental requirements for industry standards that apply to a specific project when it is not otherwise specified by the contract, contract technical specifications, or approved drawings.

[CompanyName] quality standards supplement contract requirements when they are necessary to ensure quality.

When [CompanyName] quality standards differ from industry standards or product manufacturer instructions, the Quality Manager justifies that the standard reliably achieves quality results and then documents the justification.

All [CompanyName] activities conform to the company quality standards.

COMPLIANCE WITH HVAC/MECHANICAL INDUSTRY STANDARDS

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

Description	Reference Standard No.	Reference Standard Title
Installation of underground ductwork	ACCA Manual 4	Installation Techniques for Perimeter Heating & Cooling

Ductwork cleaning	ASHRAE 62.1	Ventilation for Acceptable Indoor Air Quality
Color coding of all piping systems	ASME A13.1	Scheme for the Identification of Piping Systems
Field welded joints	ASME B31.3	Process Piping
Soldered joints	ASME B31.5	Refrigeration Piping and Heat Transfer Components
Installation of radon ductwork	ASTM D 2855	Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings
Brazed joints	AWS B2.2/B2.2M	Specification for Brazing Procedure and Performance Qualification
Radiant floor heating system installation	HYI-400	Radiant Floor Heating
Fuel oil system installation	NFPA 31	Standard for the Installation of Oil-Burning Equipment
Installation of air terminal units	NFPA 90A	Standard for the Installation of Air Conditioning and Ventilating Systems
Installation of metal ductwork	SMACNA 1966	HVAC Duct Construction Standards Metal and Flexible
Installation of duct supports for sheet metal ductwork	SMACNA 1966	HVAC Duct Construction Standards Metal and Flexible

COMPLIANCE WITH PLUMBING INDUSTRY STANDARDS

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

Description	Reference Standard No.	Reference Standard Title
Concrete gravity sewer piping installation	ACPA 01-103	Concrete Pipe Installation Manual
Pipe jacking operations and installations	AREMA Eng. Man	Manual for Railway Engineering
Beveling, alignment, heat treatment, and inspection of weld	ASME B31.1	Power Piping
Soldered joints	ASME B31.5	Refrigeration Piping and Heat Transfer Components
Standard Practice for Underground Installation of Thermoplastic Pressure Piping	ASTM D 2774	Standard Practice for Underground Installation of Thermoplastic Pressure Piping
Brazed joints	AWS B2.2/B2.2M	Specification for Brazing Procedure and Performance Qualification
Disinfection of water mains and piping	AWWA C651	Standard for Disinfecting Water Mains
Disinfection of water storage facilities	AWWA C652	Disinfection of Water-Storage Facilities
Backflow preventers installation	ICC IPC	International Plumbing Code

Installation of fixtures for use by the physically handicapped	ICC/ANSI A117.1	Accessible and Usable Buildings and Facilities
Installation of pipe hangers, inserts and supports	MSS SP-58	Pipe Hangers and Supports - Materials, Design and Manufacture, Selection, Application, and Installation
Corrosion protection coatings for buried pipe and fittings	NACE SP0169	Control of External Corrosion on Underground or Submerged Metallic Piping Systems
Installation of oil-fired water heater	NFPA 31	Standard for the Installation of Oil-Burning Equipment
Installation of gas-fired water heater and gas piping	NFPA 54	National Fuel Gas Code
Site Preparation, Excavation, and Backfill Specification	PIP CVS02100	Site Preparation, Excavation, and Backfill Specification
Installation of High-Density Polyethylene (HOPE) Piping	PIP PNSC0036	Installation of High-Density Polyethylene (HOPE) Piping
Installation of plastic pipe where in compliance with NFPA	PPFA-01	Firestopping: Plastic Pipe in Fire Resistive Construction

APPLICATION OF MULTIPLE SOURCES OF SPECIFICATIONS

Should multiple sources of specifications apply to a work task, the higher level of specification applies. When there are equal levels of specifications that conflict, the specifications are applied in this order:

- Submittals approved by the purchaser
- Contract technical specifications
- Contract drawings
- Government regulations that exceed requirements of items below
- [CompanyName] quality specifications, including subcontract specifications
- [CompanyName] Quality Manual
- Product installation instructions
- Industry standards
- Generally accepted practices

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 Superintendent treats the material according to the company policy for nonconformances. Only the Quality Manager can re-identify or re-certify the materials.

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 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 after the material has been accepted by the material quality inspection or test.

EQUIPMENT INSPECTIONS

All equipment is inspected and maintained daily or prior to use based on manufacturer's instructions. This includes all equipment whether in use or not while on the jobsite.

The Superintendent ensures that each work task that uses equipment proceeds only after the equipment has been accepted by the equipment quality inspection or test.

The equipment inspection includes a verification of the following:

- Equipment is in good working condition and that there is no need for repair
- Equipment maintenance has been performed to meet manufacturer's specifications
- Equipment is safe to use

PRESERVATION AND PROTECTION OF MATERIALS AND COMPLETED WORK

[CompanyName] will preserve and protect work in process, completed work, component parts, materials, and when applicable, delivery to the destination to maintain compliance with project 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.

MATERIAL AND EQUIPMENT STORAGE

The Superintendent ensures all materials and equipment will be delivered, stored, handled, and maintained in a manner that protects them from damage, moisture, dirt, and intrusion of foreign materials.

Delivery of materials and equipment will be planned according to the work progress to minimize storage on site, where there are higher possibilities of damages and deterioration of materials.

Preventive maintenance based on the manufacturer's recommendations will be performed on all stored materials and equipment if required.

If preventive maintenance is required:

- The Superintendent or qualified receiving inspector will record the item(s) on the Material and Equipment Receiving Inspection form and note that preventive maintenance is required
- Tag or label the material / equipment
- Record, on the tag or label, the type of preventive maintenance required, how often preventive maintenance is to be performed, and the date it was performed

Stored materials will be segregated to prevent cross contamination and limit losses should a delivery be rejected.

The Superintendent surveys stored materials and equipment during daily jobsite reviews to verify preventive maintenance requirements are being performed as required, and to identify if any material any material and/or equipment that have incurred damage or otherwise become defective and therefore unfit for use.

MEASURING AND TEST EQUIPMENT CONTROL AND CALIBRATION

The Quality Manager evaluates the project requirements and determines if there are measuring and test equipment 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.

UTILIZATION OF MEASURING AND TEST EQUIPMENT

Measuring and testing equipment utilized will be appropriate to the work performed and in good repair and working condition. At prescribed intervals, or prior to each use, all MTE and devices used for inspection or testing shall be calibrated and adjusted against certified equipment having a known valid relationship to nationally recognized standards. When no national standards exist, the basis employed for calibration shall be documented. The Quality Manager shall:

- Identify MTE and provide a tag, sticker, or other suitable means to show the calibration status.
- Maintain calibration records and maintain traceability of calibrated equipment. Calibration documentation shall provide traceability by demonstrating an unbroken chain of calibration or comparisons linking them to relevant national standards or physical constants.

MTE that will be controlled, calibrated, and maintained is listed on a Test Equipment Calibration Plan and Log form included in the Forms section at the end of the manual.

If MTE is found to be out of calibration, the equipment and the tests performed with the out-of-calibration equipment shall be evaluated. The equipment shall be tagged and segregated (if space permits) and shall not be used until it has been calibrated, repaired, and found acceptable for use. If it cannot be repaired, the equipment shall be properly dispositioned. If the results of the testing performed with the equipment are not valid, a nonconformance shall be written.

Calibration and control measures are not required for commercial equipment such as rulers, tape measures, and if such equipment is not used for Quality Control or quality verification purposes and provides the required accuracy.

**[CompanyName]
Controlled Materials Form**

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

Contract Section/ Activity ID	Material	Intended Use (If description is necessary)	Lot Traceability Requirements	Method for identification of Approved Inspection Status

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[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
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Receiving Quality Control								
<p>ACCEPTANCE</p> <p>Listed items have been accepted by me or under my supervision</p> <p><input type="checkbox"/> Conform to contract specifications EXCEPT as noted herein or on supporting documents.</p> <p><input type="checkbox"/> Received in apparent good condition EXCEPT as noted</p> <p>Signature of authorized person and date: _____</p>								
<p>EXCEPTIONS:</p>								

**[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

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L. CONSTRUCTION INSPECTION AND TEST PLAN

The Quality Manager prepares quality inspection and test plans for a project that identifies:

- Each required quality inspection and/or test
- Inspection and test specifications for each required quality inspection or test
- Hold points for purchaser quality inspection
- Specification requirements for each quality inspection and test

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. An Inspection and Test Plan and Log form exhibit is included as an exhibit in this subsection.

INDEPENDENT MEASUREMENT AND TESTS

The Quality Manager ensures that quality tests that apply to a specific project are clearly identified. Tests for a project include:

- Purchaser required quality tests as specified by the contract, contract technical specifications, contract drawings, and approved submittals.
- Additional quality tests necessary to assure quality results.

HOLD POINTS FOR PURCHASER INSPECTION

The Superintendent stops work when reaching a hold point specified on the inspection and test plan. The Superintendent ensures that work proceeds only with purchaser approval.

HVAC/MECHANICAL INSPECTION AND TESTING STANDARDS

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

Description	Reference Standard No.	Reference Standard Title
HVAC ductwork tests	SMACNA 1143	HVAC Air Duct Leakage Test Manual
Test heat trace cable system	IEEE 515	Standard for the Testing, Design, Installation, and Maintenance of Electrical Resistance Heat Tracing for Industrial Applications
HVAC testing, adjusting, and balancing	AABC MN-1	National Standards for Total System Balance

PLUMBING INSPECTION AND TESTING STANDARDS

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

Description	Reference Standard No.	Reference Standard Title
Plumbing pipe weldments	ASME B31.1	Power Piping
Plumbing system tests	ICC IPC	International Plumbing Code
Vertical pump tests	HI 2.6	Vertical Pump Tests
Compressor and instrumentation tests	ASME PTC 10	Performance Test Code on Compressors and Exhausters

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**[CompanyName]
Testing Plan and Log**

Project ID	Project Name	CONTRACTOR

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
DIV 22 PLUMBING							
221116 Domestic Water Piping		Roughing-in Piping Inspection					
221116 Domestic Water Piping		Test for leaks and defects					
221119 Domestic Water Piping Specialties		Test each reduced-pressure-principal backflow preventer according to local standards and device's reference standards					
221316 Sanitary Waste and Vent Piping		Roughing-in Inspection (H)					
221316 Sanitary Waste and Vent Piping		Final Inspection (H)					
221316 Sanitary Waste and Vent Piping		Test sanitary drainage and vent piping according to procedures of local authorities					
221413 Storm Drainage Piping		Roughing-in Inspection (H)					
221413 Storm Drainage Piping		Final Inspection (H)					
221413 Storm Drainage Piping		Test storm drainage according to procedures of local authorities					
223400 Fuel-Fired Domestic Water Heaters		Inspect components, assemblies and equipment installations, including connections					
223400 Fuel-Fired Domestic Water Heaters		Leak Test after installation and charging of system					

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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
223400 Fuel-Fired Domestic Water Heaters		Operational Test after electrical circuitry has been energized					
223400 Fuel-Fired Domestic Water Heaters		Test and adjust controls and safeties					
224700 Drinking Fountain & Water Cooler		Water Cooler Testing after electrical circuitry has been energized					
224700 Drinking Fountain & Water Cooler		Test and adjust controls and safeties					

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**[CompanyName]
Testing Plan and Log**

Project ID	Project Name	CONTRACTOR

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
DIV 23 HVAC							
230593 Testing, Adjusting and Balancing		Balancing Air Systems – Constant-volume air systems and variable air volume systems					
230593 Testing, Adjusting and Balancing		Balancing Hydronic Piping Systems: Constant-flow Variable-flow Primary-secondary					
230593 Testing, Adjusting and Balancing		Testing, adjusting and balancing equipment: Motors Boilers Heat-transfer coils					
231123 Natural Gas Piping		Test, inspect and purge natural gas according to the International Fuel Gas Code and local authority					
232113 Hydronic Piping		Test hydronic piping					
232300 Refrigerant Piping		Test refrigerant piping, specialties and receivers					
232300 Refrigerant Piping		Test high- and low-pressure piping of each system separately					
233113 Metal Ducts		Leakage Test in compliance with SMACNA's HVAC Air Duct Leakage Test Manual. Test no less than 25 percent of total installed duct area for each designated pressure class					
233300 Air Duct Accessories		Test and Inspect Air Duct Accessories					
233423 HVAC Power Ventilators		Test and Inspect HVAC Power Ventilators					

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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
235216 Condensing Boilers		Installation and startup inspections					
235216 Condensing Boilers		Leak Test: hydrostatic test					
235216 Condensing Boilers		Operational Test for proper motor rotation and unit operation					
235216 Condensing Boilers		Test and adjust controls and safeties					
237223.19 Packaged Indoor Fixed Plate Energy Recovery Units		Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation					
237413 Packaged Outdoor Central Station Air-Handling Units		Test Packaged Outdoor Central Station Air-Handling Units for compliance with requirements					
237413 Packaged Outdoor Central Station Air-Handling Units		Operational Test to confirm proper motor rotation and unit operation					
237413 Packaged Outdoor Central Station Air-Handling Units		Test and adjust controls and safeties					
218239 Cabinet Unit Heaters		Operational Test to confirm proper motor rotation and unit operation					
218239 Cabinet Unit Heaters		Test and adjust controls and safeties					

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**[CompanyName]
Inspection and Test Plan and Log**

Project Number	Project Name	
[ProjectNumber]	[ProjectName]	(All tests verified by Superintendent and/or QC Manager)

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
DIV 23 HVAC							

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**[CompanyName][CompanySuffix]
Testing Agency Test and Inspection Report**

Date of Issue/Report ID	Project Name	Project Number
	[ProjectName]	[ProjectNumber]
Name, address, telephone, and email address of testing agency		
Dates and locations of samples and tests or inspections		
Description of the Work and test and inspection method		
Identification of product and Specification Section.		
Complete test or inspection data		
Test and inspection results and an interpretation of test results.		
Record of temperature and weather conditions at time of sample-taking and testing and inspection.		
Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements		
Name and signature of laboratory inspector.		
Recommendations on retesting and reinspecting.		

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**[CompanyName][CompanySuffix]
Testing & Inspection Results Log**

Project ID	Project Name	Preparer		Date	
[ProjectNumber]	[ProjectName]				
Report ID /Date of Issue	Description of Inspection / Test	Report Date	Results		Type of Corrective Action
			Approved	Rejected	

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[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:	<i>[PresidentName]</i>	Date:	[Date]
Version	1.0	Notes	Initial Issue

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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 Quality Manager then details how the quality is controlled throughout the construction process through a listing of all work task inspections and tests that will be performed.

As the project proceeds and prior to starting each construction work task, the Superintendent coordinates detailed quality requirements and resources, working conditions, and communicates them through a meeting with all interested parties. The Superintendent amends work task inspection checklists with items for heightened awareness based on the concerns of all parties.

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.

As the project proceeds and prior to starting each construction task, the Superintendent coordinates detailed requirements and resources, site conditions, and communicates them through a meeting with all interested parties. The Superintendent amends inspection specific checklists with items for heightened awareness based on the concerns of all parties.

The subcontractors and suppliers and Superintendent use the quality inspection forms to monitor execution of the construction process through a series of quality inspections before, during, and at the completion of each construction task. Laboratory and functional tests are performed to assure performance results.

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

Throughout the project there are standard operating procedures and forms for creating, maintaining, and controlling quality documents and records.

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 assesses the qualification requirements for each position on the project organization chart, qualifications of each person, and then appoints only qualified persons to the project organization.

2.3.2. APPOINTMENT OF KEY PROJECT PERSONNEL

The Senior Manager forms a project management team consisting of:

- A Quality Manager
- A Project Manager
- A Superintendent
- A Quality Manager (if required)

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.

2.6. PROJECT QUALITY INSPECTION AND TEST PLAN

The Quality Manager prepares quality inspection and test plans for a project that identifies:

- Each required quality inspection and/or test
- Inspection and test specifications for each required quality inspection or test
- Hold points for customer quality inspection
- Specification requirements for each quality inspection and test

2.7. PROJECT QUALITY COMMUNICATIONS PLAN

After [CompanyName] is awarded a contract, the Project Manager plans the methods of communications among the customer, subcontractors, and suppliers and [CompanyName].

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.

9.2.2. CONTROL THE CONTINUATION OF WORK

After the item is marked, the Superintendent determines if work can continue in the affected area:

CONTINUE WORK: When continuing work does not adversely affect quality or hide the defect, work may continue in the affected area while the disposition of the item is resolved. The Superintendent may place limitations on the continuation of work.

STOP WORK ORDER: When continuing work can adversely affect quality or hide the defect, work must stop in the affected area until the disposition of the item resolved. The Superintendent identifies the limits of the affected area. The Superintendent quickly and clearly identifies the boundaries of the stop work area.

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

The Quality Manager identifies requirements for corrective actions with respect to frequency, severity, and detectability of quality nonconformances items found during and after completion of work activities.

When a solution requires changes to [CompanyName] quality standards, the Quality Manager makes modifications as necessary by making changes to:

- Material specifications
- Personnel qualifications
- Subcontractor and Supplier qualifications
- Company standards
- Inspection processes

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.

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11. QUALITY PROGRAM AUDITS

AUDITS and IMPROVEMENT

11.1. OVERVIEW

Audits ensure that the elements of the [CompanyName] Quality Program are functioning as intended.

11.2. PROJECT QUALITY PROGRAM AUDIT

The Quality Manager conducts monthly Project Quality Program audits that verify proper operation of the Quality Program on a project. At least monthly, the Quality Manager audits:

- Quality Program framework
- Quality Program management and responsibilities
- Customer contract specifications
- Design control
- Project-specific quality standards
- Project purchasing
- Process control plans
- Inspections and tests
- Nonconformances and corrective actions
- Preventive actions
- Quality records and documents

The Quality Manager takes corrective actions to ensure compliance with Quality Program requirements. The effectiveness of changes is then evaluated and documented.

Requirements for managing audit nonconformances are addressed in section 9.2 Nonconformances.

11.3. COMPANY-WIDE QUALITY PROGRAM AUDIT

At least annually, the Quality Manager audits the suitability and effectiveness of the [CompanyName] Quality Program.

The audit assesses:

- [CompanyName] quality improvement activities
- Customer performance evaluations and satisfaction measurement results
- Quality performance measures
- Monthly field reviews
- Internal and external Quality Audit results
- Process performance and product conformance results
- Preventive and corrective action status
- Follow up on actions from previous Management Reviews

- Other changes (i.e., business climate, scope of work changes, etc.) that could affect the Quality Program

Changes are initiated to improve Quality Program performance. The Quality Manager documents Quality Program changes in the [CompanyName] Quality Assurance Manual, initiates needed improvements, and assesses their effectiveness.

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HVAC INSPECTION CHECKLIST

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Project:	Phase:	Contract#:	Subcontractor:	Crew:
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<p><u>Compliance Verification</u></p> <p><input type="checkbox"/> Compliance with initial job-ready requirements</p> <p><input type="checkbox"/> Compliance with material inspection and tests</p> <p><input type="checkbox"/> Compliance with work in process first article inspection requirements</p> <p><input type="checkbox"/> Compliance with work in process inspection requirements</p> <p><input type="checkbox"/> Compliance with Task completion inspection requirements</p> <p><input type="checkbox"/> Compliance with inspection and test plan</p> <p><input type="checkbox"/> Compliance with safety policies and procedures</p> <p>Reported Nonconformances and incomplete items:</p>	<p><u>YES NO Heightened Awareness Checkpoints</u></p> <p><input type="checkbox"/> <input type="checkbox"/> Appearance of Air Outlets and Inlets approved by the ARCHITECT prior to ordering and installation</p> <p><input type="checkbox"/> <input type="checkbox"/> Registers// grills// and diffusers are compatible with wall and ceiling systems</p> <p><input type="checkbox"/> <input type="checkbox"/> Air Outlets and Inlets clean of dirt// dust// rubbish// and debris</p> <p><input type="checkbox"/> <input type="checkbox"/> Air Outlet and Inlet connections to duct work is airtight</p> <p><input type="checkbox"/> <input type="checkbox"/> Additional supports provided for registers// grills// and diffusers in drop-in ceiling tile systems</p> <p><input type="checkbox"/> <input type="checkbox"/> Internal fans are mounted with vibration isolators</p> <p><input type="checkbox"/> <input type="checkbox"/> Drive belts properly tensioned</p> <p><input type="checkbox"/> <input type="checkbox"/> Ventilators installed with clearance for inspection and maintenance</p> <p><input type="checkbox"/> <input type="checkbox"/> Gravity Ventilators installed level and plumb</p> <p><input type="checkbox"/> <input type="checkbox"/> Ventilator mountings weatherproof</p>
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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.

<u>Quality Score</u>	5 = 100% NO problems	4 = 1 minor problems	3 = Hotspot or 2-3 minor	2 = 6+ or major problems	1 = Excessive problems
<u>On-Time Score</u>	5 = On Time	4 = Late	3 = Late by 1 day	2 = Late by 2 days	1 = Late more than 2 days
<u>Safety Score</u>	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 Fixtures 22.40.00

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Plumbing - Plumbing Insulation 22.07.00

Project:	Phase:	Contract#:	Subcontractor:	Crew:
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<u>Compliance Verification</u>	<u>YES NO Heightened Awareness Checkpoints</u>
<input type="checkbox"/> Compliance with initial job-ready requirements	<input type="checkbox"/> <input type="checkbox"/> Plumbing and equipment tested and operational before applying Insulation
<input type="checkbox"/> Compliance with material inspection and tests	<input type="checkbox"/> <input type="checkbox"/> Area to be insulated is free of rust// scale// dirt// and moisture
<input type="checkbox"/> Compliance with work in process first article inspection requirements	<input type="checkbox"/> <input type="checkbox"/> Adhesive/Anchors/Staples/Wrapping utilized is compatible with Insulation type
<input type="checkbox"/> Compliance with work in process inspection requirements	<input type="checkbox"/> <input type="checkbox"/> Insulation through penetrations maintains fire rating of structure
<input type="checkbox"/> Compliance with Task completion inspection requirements	<input type="checkbox"/> <input type="checkbox"/> Insulation protected from chafe at all supports and contact points
<input type="checkbox"/> Compliance with inspection and test plan	<input type="checkbox"/> <input type="checkbox"/> Insulation protected from weathering and moisture intrusion
<input type="checkbox"/> Compliance with safety policies and procedures	<input type="checkbox"/> <input type="checkbox"/> Operation of valves and actuators not hindered by insulation
Reported Nonconformances and incomplete items:	<input type="checkbox"/> <input type="checkbox"/> Insulation joints sealed
	<input type="checkbox"/> <input type="checkbox"/> Cladding applied in high abuse/traffic areas
	<input type="checkbox"/> <input type="checkbox"/> 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.

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