

SAMPLE ONLY SELECTED PAGES

[CompanyName]

[CompanyAddress]

[CompanyPhone]

Electrical Construction

Quality Manual

Operating Policies of the [CompanyName] Quality System

Management acceptance

This quality manual has been reviewed and excepted

Endorsed By: (Name / Title)			
Signature:		Date:	[Date]

Documents provided by [CompanyName] disclose proprietary information as well as copyright information registered with the U.S. Patent and Trademark Office. Please hold these documents in confidence and do not share them with other organizations, even if you do not charge a fee. Submittal of documents does not transfer copyright ownership.

QUALITY MANUAL

TABLE OF CONTENTS

1. Quality System Management and Responsibilities	7
1.1. Overview	7
1.2. [CompanyName] Quality Policy	7
1.3. Quality Duties, Responsibilities, and Authority	7
1.4. Quality System Performance Measures	10
1.5. Customer Satisfaction Performance Measures	10
1.6. Exceptions	10
2. Project Quality Assurance/Quality Control Plan	11
2.1. Overview	11
2.2. [CompanyName] Project License and Qualification Requirements	11
2.3. Project Personnel and Qualifications	11
2.4. Project Quality Assurance/Quality Control Plan	14
2.5. Identification of Quality Controlled Work Tasks	14
2.6. Project Quality Inspection and Test Plan	14
2.7. Project Quality Communications Plan	14
2.8. Project Quality Training Plan	14
2.9. Customer Training On Operation and Maintenance	15
2.10. Project Records and Documentation Plan	15
2.11. Project Audit Plan	15
3. Contract Specifications	16
3.1. Overview	16
3.2. Contract Technical Specifications	16
3.3. Contract Drawings	16
3.4. Contract Submittals	16
3.5. Customer Submittal Approval	18
3.6. Contract Warranty	19
3.7. Contract Review and Approval	19
4. Design Review and Control	20
4.1. Overview	20
4.2. Design Input Review	20
4.3. Project Design Quality Assurance/Quality Control Plan	20
4.4. Design Progress Reviews	21
4.5. Design Output Verification and Approval	21
5. Project-Specific Quality Standards	22
5.1. Overview	22
5.2. Regulatory Codes	22

5.3. Industry Quality Standards	22
5.4. Material and Equipment Specifications.....	24
5.5. Work Process Specifications.....	24
5.6. Controlled Material Identification and Traceability	24
5.7. Measuring Device Control and Calibration.....	25
5.8. [CompanyName] Quality Standards	25
5.9. Application of Multiple Sources of Specifications	25
6. Project Purchasing	27
6.1. Overview.....	27
6.2. Qualification of Outside Organizations and Company Departments	27
6.3. Quality Responsibilities of Key Subcontractor and Supplier Personnel.....	28
6.4. Requirements for Subcontractor QC Plan	29
6.5. Subcontractor and Supplier Quality Policy	29
6.6. Project Subcontractor and Supplier List	30
6.7. Purchase Order Requirements	30
6.8. Project Purchase Order Approvals.....	30
7. Process Controls.....	31
7.1. Overview.....	31
7.2. Project Startup and Quality Control Coordination Meeting.....	31
7.3. Preparatory Project Quality Assurance/Quality Control Plan Planning.....	31
7.4. Weekly Quality Planning and Coordination Meetings.....	32
7.5. Process Control Standards.....	32
7.6. Daily Quality Control Report.....	34
7.7. Monthly Quality Control Report.....	34
8. Inspections and Tests	35
8.1. Overview.....	35
8.2. Required Work Task Quality Inspections and Tests.....	35
8.3. Material Inspections and Tests	35
8.4. Work in Process Inspections.....	36
8.5. Work Task Completion Inspections	36
8.6. Inspection of Special Processes	37
8.7. Independent Measurement and Tests	37
8.8. Commissioning Functional Acceptance Tests.....	37
8.9. Hold Points for Customer Inspection.....	37
8.10. Quality Inspection and Test Specifications.....	37
8.11. Inspection and Test Acceptance Criteria	38
8.12. Inspection and Test Status.....	38
8.13. Independent Quality Assurance Inspections	39
8.14. Inspection and Test Records.....	39
8.15. Project Completion and Closeout Inspection	40
9. Nonconformances and Corrective Actions	41
9.1. Overview.....	41

9.2. Nonconformances	41
9.3. Corrective Actions	42
10. Preventive Actions	43
10.1. Overview	43
10.2. Identify Preventive Actions for Improvement	43
10.3. Train Preventive Actions for Improvement	43
11. Quality System Audits	45
11.1. Overview	45
11.2. Project Quality System Audit	45
11.3. Company-wide Quality System Audit	45
12. Record and Document Controls.....	47
12.1. Overview	47
12.2. Quality System Documents	47
12.3. Document Controls.....	47
12.4. Record Controls	48
13. Appendix.....	50
13.1. Definitions of Terms	50
14. Forms	53

ELECTRICAL QUALITY POLICY

[CompanyName] is committed to quality. Our objective is to safely deliver 100 percent complete construction projects that meet all contract and customer expectations the first time, every time. Our commitment to quality means:

- Every [CompanyName] employee is responsible for fully implementing and complying with all provisions of the [CompanyName] quality system.
- Our quality standards meet or exceed all applicable regulations, codes, industry standards, and manufacturer specifications as well as with our customers' contract and individual requirements.
- We stand behind our work. We inspect every work task to assure conformance to the project requirements. Should problems be found, we correct them.
- We are always improving. All employees receive regular training to make systematic improvements to remove quality risks and enhance quality performance.

We conduct our work with dignity and respect for the customer, our subcontractor and supplier partners, and ourselves.

Selected Pages

2. PROJECT QUALITY ASSURANCE/QUALITY CONTROL PLAN

2.1. OVERVIEW

After [CompanyName] is awarded a contract to carry out a construction project, the President 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 System is operating effectively.

2.2. [COMPANYNAME] PROJECT LICENSE AND QUALIFICATION REQUIREMENTS

The Quality Manager identifies 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.

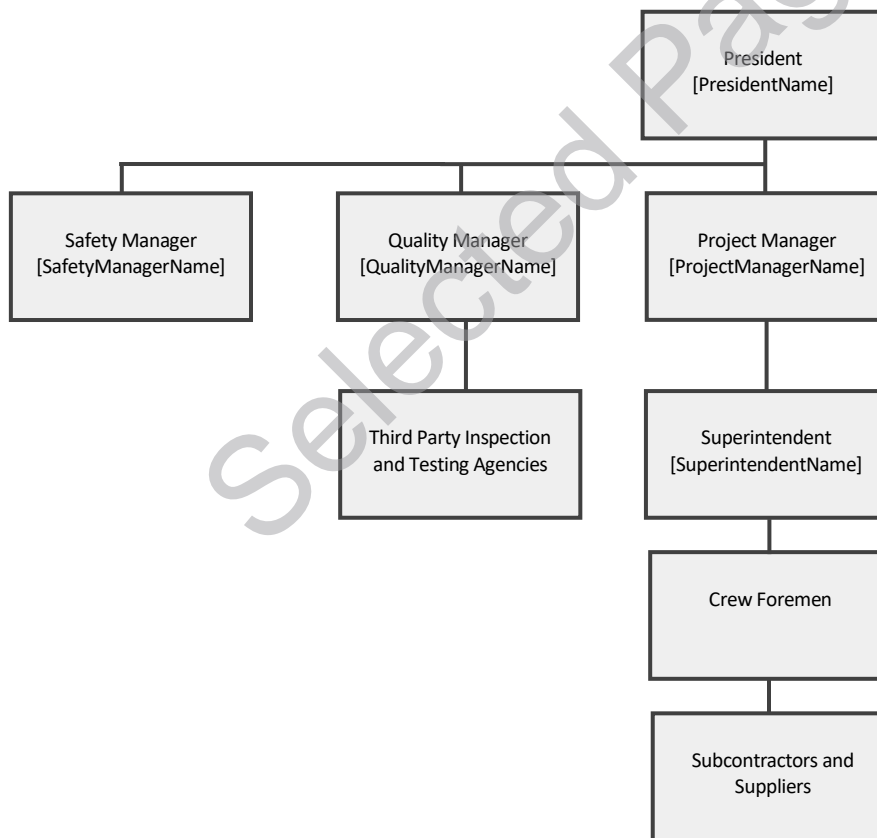
2.3. PROJECT PERSONNEL AND QUALIFICATIONS

2.3.1. PROJECT ORGANIZATION CHART

The President 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.

When a person with authority is unavailable only a person with higher authority may assume the responsibility of the unavailable person.

The President 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 President forms a project management team consisting of:

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

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

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

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.

2.3.3.2. PERSONNEL CERTIFICATION REQUIREMENTS

Personnel certifications are required for the following:

Certification or License Title	Reference Standard No.	Reference Standard Title
Electrical testing technician	NETA	International Electrical Testing Association / National Institute for Certification in Engineering Technologies
Telecom. Installers	CWTA	Society of Cable Telecommunications Engineers
Telecom. Installers	CWTA	Telecommunications Industry Association
Telecom. Installers	CWTA	International Association for Radio, Telecommunications and Electromagnetics, Inc.
Electricians	CEA	Associated Builders and Contractors
Electricians	EITI	Electrical Training Institute

Electricians	IEEE Canada	International Brotherhood of Electrical Workers
Electricians	CECA	Independent Electrical Contractors Association
Electricians	CECA	National Electrical Contractors Association

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 System, Project Quality Assurance/Quality Control Plan, and quality standards.

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

- The [CompanyName] Quality System
- The [CompanyName] Quality Policy

- 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 system 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

5. PROJECT-SPECIFIC QUALITY STANDARDS

APPLICABLE REGULATIONS, INDUSTRY, and COMPANY STANDARDS

5.1. OVERVIEW

[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.

5.2. REGULATORY CODES

All [CompanyName] construction 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
- Applicable Fuel and Gas Code
- Applicable Mechanical Code
- Applicable Plumbing Code
- Additional regulations specified by the customer contract

The Quality Manager identifies regulatory requirements that apply to a specific project on the Project Quality Assurance/Quality Control Plan.

The Superintendent had jobsite access to relevant codes and government regulations.

5.3. INDUSTRY QUALITY STANDARDS

All [CompanyName] construction 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 on the Project Quality Assurance/Quality Control Plan when it is not otherwise specified by the contract, contract technical specifications, or approved drawings.

5.3.1. REGULATORY CODES AND INDUSTRY STANDARDS

Description	Reference Standard No.	Reference Standard Title
Telecommunication system grounding and bonding	CAN/CSA T527-94	Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications
Preparation of record drawings including documentation on cables and termination hardware	ANSI/TIA/EIA-606-A	Administration Standard for the Telecommunications Infrastructure
Termination of UTP cables	ANSI/TIA/EIA-606-A	Commercial Building Telecommunications Cabling Standard
Telecommunication system labeling	BETS	Administration Standard for the Telecommunications Infrastructure
Installation of fire alarm and signaling systems	C22.2 NO. 208-03 (R2013)	National Fire Alarm and Signaling Code
Installation of telecommunications cabling and pathway systems	CAN/CSA T529-95	Commercial Building Telecommunications Cabling Standard
Location of manual fire alarm stations	CAN/CSA-ISO/IEC 10181-7-00 (R2013)	Life Safety Code
Modification of an existing fire alarm system	CAN/ULC-S537 CAN/ULC-S536	Standard for Safeguarding Construction, Alteration, and Demolition Operations
Telecommunications pathways	CEC	Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications
Mounting height of wall-mounted outlet and switch boxes	CEC IEC 60364	Accessible and Usable Buildings and Facilities
Lightning Protection installation	CSA C22	Standard for the Installation of Lightning Protection Systems
Grounding of systems	CSA C22	Recommended Practice for Grounding of Industrial and Commercial Power Systems
System electrical installation	CSA C22.1	National Electrical Code
Cables not installed in conduit or wireways	CSA C22.1	National Electrical Code
Installation of signal and control circuits	CSA C22.1	National Electrical Code
Conduit installation	CSA C22.1	National Electrical Code
Cable tray installation	CSA C22.2 No. 126.1-09	Cable Tray Installation Guidelines
Warning Sign placement	CSA Z462	Standard for Electrical Safety in the Workplace
Telecommunications grounding	EIA	Commercial Building Standard for Telecommunications Pathways and Spaces
Installation of equipment support frames	EIA	Commercial Building Standard for Telecommunications Pathways and Spaces
Installation of control panel	EN 54	Standard for Control Units and Accessories for Fire Alarm Systems
Underground fiber optic cabling installation	TIA-968-B/CS-03	Standard for Physical Location and Protection of Below Ground Fiber Optic Cable Plant
Splicing and general conductor installation	Z 462	National Electrical Code

Install Control devices and protective devices	Z 462	National Electrical Code
Grounding and bonding requirements	Z 462	National Electrical Code
Workmanship	Z 462	National Electrical Code

5.4. MATERIAL AND EQUIPMENT 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.

The Quality Manager ensures that purchase orders for listed materials and equipment include the relevant specifications as specified in section 6.7 Purchase Order Requirements.

Only approved materials are used in the construction process.

5.5. 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.

5.6. CONTROLLED MATERIAL IDENTIFICATION AND TRACEABILITY

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.

5.7. MEASURING DEVICE CONTROL AND CALIBRATION

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.

5.8. [COMPANYNAME] QUALITY STANDARDS

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

The Quality Manager identifies supplemental requirements for [CompanyName] Quality standards that apply to a specific project on the Project Quality Assurance/Quality Control Plan.

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] construction activities conform to the company quality standards.

5.9. 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 customer
- 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

Should multiple sources of conflicting specifications apply to a project, the Quality Manager defines the standards that apply to the specific project on the Project Quality Assurance/Quality Control Plan.

Selected Pages

8. INSPECTIONS AND TESTS

ASSURE COMPLIANCE

8.1. OVERVIEW

Inspections are necessary to verify that work processes and results conform to both contract requirements and [CompanyName] quality standards.

Qualified personnel inspect every project throughout the construction process. Additional reviews validate the accuracy of the field quality inspections and ensure that the quality standards apply uniformly.

An inspection and test plan defines the quality inspections and tests required for a specific project.

Personnel may only inspect work activities for which they have been qualified by the Quality Manager.

8.2. REQUIRED WORK TASK QUALITY INSPECTIONS AND TESTS

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

Tasks are divided into two categories:

- Discrete Tasks are standard type of work where a completion inspection is performed one time at the completion of a phase of work.
- Process Tasks are tasks where completion inspections are performed continuously. Continuous inspections are required when there is a limited window of time to perform a completion inspection before the next task begins. Process tasks may also be characterized by independent monitoring of a work process, such as welding, where the observer verifies conformance to work procedures.

Process tasks undergo additional quality controls that continuously monitor compliance to specifications.

Independent quality audits are conducted to verify that the task quality controls are operating effectively.

Construction projects may execute a work task multiple times in a project, in which case a series of quality inspections are required for each work task.

8.3. MATERIAL INSPECTIONS AND TESTS

Material quality inspections and tests ensure that purchased materials meet purchase contract quantity and quality requirements.

8.3.1.1. MATERIAL RECEIVING INSPECTION

The Superintendent inspects or ensures that a qualified inspector inspects materials prior to use for conformance to project quality requirements. The receiving inspection includes a verification that the

Correct material has been received

The material is identified and meets the traceability requirements for the material

Material certifications and/or test reports meet the specified requirements

Materials are tested and approved for the specific application

The Superintendent ensures that each work task that uses the source inspected materials proceed only after the material has been accepted by the material quality inspection or test.

8.3.1.2. SOURCE INSPECTIONS

Source quality inspections are required when quality characteristics cannot or will not be verified during subsequent processing. The Quality Manager determines if a source inspection is necessary to validate supplier quality before materials are delivered to the project jobsite.

The Superintendent ensures that each work task that uses the source inspected materials proceed only the material has been accepted by the source inspection.

8.4. WORK IN PROCESS INSPECTIONS

Work in process quality inspections continuously verify compliance project quality standards beginning at the start of a work task, as work is conducted, and continues until the work task is complete.

8.4.1.1. INITIAL JOB-READY INSPECTIONS

For each work task, the Superintendent or a qualified inspector performs job-ready quality inspections to ensure that work activities begin only when they should begin. Job-ready quality inspections verify that conditions conform to the project quality requirements.

8.4.1.2. INITIAL WORK IN PROCESS INSPECTION

For each work task, the Superintendent or a qualified inspector performs an initial work in process inspection when the first representative portion of a work activity is completed.

8.4.1.3. FOLLOW-UP WORK IN PROCESS INSPECTIONS

The Superintendent or a qualified inspector performs ongoing work in process quality inspections to ensure that work activities continue to conform to project quality requirements. Punch Items

If the Superintendent or inspector observes an item for correction prior to a work task completion inspection, the item is identified for correction. During the work task completion inspection each punch item correction is verified.

Any outstanding punch items remaining after the work task completion inspection is deemed a nonconformance.

8.4.2. ADDITIONAL INSPECTION REQUIREMENTS FOR PROCESS TASKS

For each process task, a qualified person inspects the ongoing completion work for conformance to project quality requirements. This is in addition to discrete task completion inspections that are performed one time at the end of a phase of work.

The continuous monitoring inspections are conducted before starting other work activities that may interfere with an inspection.

8.5. WORK TASK COMPLETION INSPECTIONS

For each work task, the Quality Manager or a qualified inspector inspects the completion of each work task to verify that work conforms to project quality requirements.

Completion quality inspections are performed for each work task. Completion quality inspections are conducted before starting other work activities that may interfere with an inspection.

Any outstanding punch items remaining after the work task completion inspection is deemed a nonconformance.

8.6. INSPECTION OF SPECIAL PROCESSES

The Quality Manager identifies special processes where the results cannot be verified by subsequent inspection or testing and determines if continuous work in process inspections are required. For these special processes, a qualified inspector continuously inspects the work process.

8.7. 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:

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

8.8. COMMISSIONING FUNCTIONAL ACCEPTANCE TESTS

A functional test is performed on each functional system. A qualified inspector performs functional acceptance tests to verify that a system meets predetermined acceptance criteria including:

- The equipment and systems operate as intended
- The equipment and systems perform as intended
- Documentation for operation and maintenance is complete

Each functional test has a documented testing procedure that includes:

- Step-by-step work instructions for conducting the test
- Data recording requirements
- Acceptance criteria
- A determination of pass or fail

8.9. HOLD POINTS FOR CUSTOMER 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 customer approval.

8.10. QUALITY INSPECTION AND TEST SPECIFICATIONS

Specifications for each inspection or test are clearly understood before the inspection or test is performed including:

- Items to be inspected/tested
- Inspections/tests to be performed
- Testing schedule frequency
- Specification references including contract drawing identification number and version, if applicable, and/or contract technical specification number and version, if applicable
- Performing party
- Witness parties
- Certificates required
- Checklists/procedures
- Reference standards

8.11. INSPECTION AND TEST ACCEPTANCE CRITERIA

Inspections assess conformance of materials or work for each work task to project quality requirements, including applicable:

- Contract technical specification
- Contract drawings
- Approved shop drawings
- Approved product submittals
- Approved allowances and unit prices
- Product identification requirements
- Approved submittals
- [CompanyName] quality standards

The material or completed work task is accepted only when it meets all project quality requirements.

8.11.1. INSPECTION AND TESTING STANDARDS

Description	Reference Standard No.	Reference Standard Title
Direct-current high-potential test for conductors	IEEE 400.2-2013	Guide for Field Testing of Shielded Power Cable Systems Using Very Low Frequency (VLF)
Visual and mechanical inspections and electrical tests	NETA	Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems
Ground rod resistance to ground	IEEE 81	Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
Telecommunications cabling inspection, verification, and performance tests	CAN/CSA T529-95	Commercial Building Telecommunications Cabling Standard
Optical fiber end-to-end attenuation tests	CAN/CSA T529-95	Optical Fiber Cabling Components Standard
Fiber optic cables power budget and bandwidth	IEC 60811-301 Ed. 1.0 b	FOTP-78 Optical Fibers - Part 1-40: Measurement Methods and Test Procedures – Attenuation
Intercommunication system intelligibility test	ISO/TR 4870:1991	Method for Measuring the Intelligibility of Speech Over Communication Systems
Optical time domain reflectometer tests	IEC 60811-301 Ed. 1.0 b	FOTP-78 Optical Fibers - Part 1-40: Measurement Methods and Test Procedures - Attenuation
Ground resistance testing	IEEE 81	Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
Preliminary and acceptance testing	CAN/ULC-S524-01	National Fire Alarm and Signaling Code
Carbon monoxide detector testing	CSA 6.19-01 (R2011)	Single and Multiple Station Carbon Monoxide Alarms
Testing of duct smoke detectors	CAN/ULC-S524-01	National Fire Alarm and Signaling Code
Combustible gas detector preliminary and acceptance testing	IEC 60079-29-4 Ed. 1.0 b	Performance Requirements for Combustible Gas Detectors

8.12. INSPECTION AND TEST STATUS

The status of each quality control inspection or test is clearly marked by tape, tag, or other easily observable signal to ensure that only items that pass quality inspections is accepted.

For each quality-controlled work task, the Quality Manager determines the appropriate method of identification to show inspection and test status.

For each quality-controlled material, the Quality Manager determines the appropriate method for identifying quality inspection and test status.

8.13. INDEPENDENT QUALITY ASSURANCE INSPECTIONS

The Quality Manager and/or qualified inspectors perform independent quality assurance inspections that verify that task quality controls are operating effectively.

The Quality Manager selects a representative portion of task completion inspections performed by the Superintendent. Those tasks are independently inspected by the Quality Manager and/or qualified inspectors. The findings are compared to the findings of the inspections performed by the Superintendent. Any deviations are addressed by corrective actions and preventive actions as necessary.

8.14. INSPECTION AND TEST RECORDS

8.14.1. INSPECTION RECORDS

The Quality Manager prepares an inspection form for each work task. The Quality Manager lists on the form checkpoints for heightened awareness including:

- Initial job-ready inspection requirements
- Inspection and tests
- Work in process inspection requirements
- Completion quality inspections
- Other quality requirements as necessary to reduce quality risks

The person responsible for the inspection, records work task inspection results on the work task inspection form.

8.14.2. TEST RECORDS

Test result data include as appropriate:

- Reference to the inspection and test plan item
- Description or title of the inspection activity
- Drawing identification number and version, if applicable
- Technical specification number and version, if applicable
- Location of the inspection activity
- Acceptance criteria
- Nonconformances
- Validation that nonconformances are corrected, reinspected or retested, and confirmed to meet Quality System requirements.
- Any open items to be completed later.
- Inspector's name and signature indicating compliance with all requirements of the Quality System
- Quality rating scores as appropriate
- Date of inspection or test
- Certificate, if applicable
- Conspicuous statement of final result as either "CONFORMS" or "DOES NOT CONFORM"

8.15. PROJECT COMPLETION AND CLOSEOUT INSPECTION

8.15.1. PRE-FINAL [COMPANYNAME] INSPECTION

Near the end of the project, or a milestone established in the Project Quality Inspection and Test Plan, the Quality Manager will inspect the completed project and verify conformance to contract specifications.

The Quality Manager records nonconforming items.

The Superintendent assigns a planned date by which the deficiencies will be corrected. The date may be assigned for all items or individual items as necessary. After corrections have been made, the Superintendent verifies the completion of each item.

Then the Quality Manager conducts a follow-up inspection and verifies that all nonconforming items have been corrected to meet contract specifications. Any remaining deficiencies are recorded and managed as nonconformances.

When the pre-final [CompanyName] inspection process is complete, the Quality Manager then notifies the customer that the project is ready for the customer's final inspection. The customer is also notified of any remaining nonconformances and their planned resolution.

8.15.2. PRE-FINAL CUSTOMER INSPECTION

If the customer performs a pre-final inspection, the Quality Manager records nonconforming items and assigns a planned date by which the deficiencies will be corrected.

The Superintendent assigns a planned date by which the deficiencies will be corrected. The date may be assigned for all items or individual items as necessary. After corrections have been made, the Superintendent verifies the completion of each item.

After corrections have been made, the Quality Manager will conduct a follow-up inspection and verify that all nonconforming items have been corrected to meet contract specifications. Any remaining deficiencies are recorded and then managed as nonconformances.

When the pre-final customer inspection process is complete, the Quality Manager then notifies the customer that the project is ready for the customer's Final inspection. The customer is also notified of any remaining nonconformances and their planned resolution.

8.15.3. FINAL ACCEPTANCE CUSTOMER INSPECTION

If the customer performs a final inspection, the Quality Control Manager, Superintendent, and Project Manager will participate in the inspection. The Quality Manager records nonconforming items and assigns a planned date by which the deficiencies will be corrected. The date may be assigned for all items or individual items as necessary. After corrections have been made, the Superintendent verifies the completion of each item.

After corrections have been made, the Quality Manager will conduct a follow-up inspection and verify that all nonconforming items have been corrected to meet contract specifications. Any remaining deficiencies are recorded managed as nonconformances.

When the final customer inspection process is complete, the Quality Manager then notifies the customer that the project is ready for the customer's follow-up verification. The customer is also notified of any remaining nonconformances and their planned resolution.

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 System 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 affect 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.

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.

Heightened awareness during quality inspections verifies and documents compliance with the corrective action improvement items. A qualified Superintendent inspects corrective actions during regular quality inspections and records observations on the quality inspection form.

The Superintendent notifies affected subcontractors and suppliers of selected preventive action training requirements.

The Superintendent evaluates the effectiveness of the improvements. The Quality Manager reviews improvement results recorded on quality inspection records and monthly field reviews. When the Quality Manager determines that the improvement actions are effective, the item is no longer treated as a preventive action.

14. FORMS

[CompanyName] Inspection and Test Plan and Log	54
[CompanyName] Controlled Materials Form	55
[CompanyName] Material Inspection and Receiving Report	56
[CompanyName] Daily Production Report	57
[CompanyName] Work Task Inspection Form	58
[CompanyName] Nonconformance Report	59

Selected Pages

[CompanyName]
Inspection and Test Plan and Log

Project Number	Project Name	
[PROJECTNUMBER]	[PROJECTNAME]	

Item	Spec Section Number	Spec Section Title	Applicable Standard	Inspections & Tests Description	# Of Tests /Inspections Reqd.	Time Schedule/ Frequency	Inspection/Test By (All tests verified by Superintendent and/or QC Manager)	Sample Reqd. Yes/No	Unique characteristics of QC Service
1.									
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									

[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] Nonconformance Report

Nonconformance Report Control ID	Project ID	Project Name
	[ProjectNumber]	[ProjectName]
Preparer Signature/ Submit Date		Quality Manager Signature / Disposition Date
Description of the requirement or specification		
Description of the nonconformance, location, affected area, and marking		
Disposition	<input type="checkbox"/> Replace <input type="checkbox"/> Repair <input type="checkbox"/> Rework <input type="checkbox"/> Use As-is	
	Approval of disposition required by customer representative? Yes <input type="checkbox"/> No <input type="checkbox"/>	
	Customer approval signature /date: _____	
Corrective Actions	<input type="checkbox"/> Corrective actions completed Name/Date: _____ Customer acceptance of corrective actions required? Yes <input type="checkbox"/> No <input type="checkbox"/> Name/Date: _____	
Preventive Actions		
	<input type="checkbox"/> Preventive actions completed Name/Date: _____	