Electrical Safety Authority

# Technical Guidelines

# for

# Section 6. Approval of electrical equipment

# Section 7. Approval of plans, drawings and specifications for installation work

# Section 8. Inspection and approval of construction

Version 1.2

Ontario Regulation 22/04

**Electrical Distribution Safety**

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**Legal Disclaimer**

**This document contains GUIDELINES ONLY to assist members of the industry in interpreting Ontario Regulation 22/04 - Electrical Distribution Safety -made under subsection 113(1) of Part VIII of the Electricity Act, 1998.These guidelines do not have the force of law. Where there is a conflict between these guidelines and any legislation or regulation which may apply, the relevant law prevails.**

**Retention periods stated in guidelines set out the minimum period for which referenced documents are to be retained. Each distributor needs to make its own assessment of the appropriate retention period for specific documents based on its assessment of risk factors and potential liability.**

# 1.0 General

## 1.1 Purpose

The purpose of this Guideline is to clarify and interpret the requirements outlined in various sections of Regulation 22/04 "Electrical Distribution Safety". The sections of the Regulation outlined in this Guideline include:

- Section 6.0, "Approval of electrical equipment" – the requirements *distributors* are to follow **for approving equipment for use on new construction and on repairs to existing distribution systems**
- Section 7.0, "Approval of plans, drawings and specifications for installation work" – the requirements distributors are to follow **when designing installations that form part of their distribution systems.**
- Section 8.0, "Inspection and approval of construction" – the requirements distributors are to follow **prior to putting any new construction or repairs to distribution systems into use.**

This Guideline references sections 4, 5, 6, 7, 8, and 9 of the Regulation, as they relate to the distributor's ability to meet the requirements of each section. This Guideline along with the Regulation provides a complete explanation of the requirements for the design, construction and equipment certification of electrical distribution systems.

As a condition to using its distribution systems, each distributor will need to engage an auditor on an annual basis to prepare an audit report and demonstrate compliance with sections 4, 5, 6, 7 and 8 of the Regulation. The checklists included in the appendices of this Guideline will assist in highlighting those areas where documentation will need to be available for audit purposes.

This Guideline along with the Regulation and other appropriate standards form the basis on which the ESA will assess the safety of the electrical distribution installations within the Province of Ontario.

## 1.2 Table of Contents

## 1.3 Definitions

**1.3.1 "ancillary equipment"** means electrical installations (not located in buildings, or rooms in buildings, used as offices, washrooms, cafeterias, warehouses, garages, machine shops and recreational facilities) that are operating at 750 Volts or below to support but are not a direct part of a *distribution system* such as sump pumps, SCADA equipment, strip heating, etc.;

**1.3.2 "approved equipment"** means equipment that meet rule 2-024 of the Electrical Safety Code or that has been purchased, tested and inspected in accordance with industry standards, or equipment specification, or *Good Utility Practice* and procedures of the distributor and an assurance of safety of the equipment equivalent to rule 2-024 of the Electrical Safety Code is provided;

**1.3.3 "Authority"** means the Electrical Safety Authority;

**1.3.4 "authorized person"** means a *competent person* authorized by a distributor to have access to areas containing, or structures supporting, energized apparatus or conductors. O. Reg.22/04;

**1.3.5 "barriered"** means separated by clearances, burial, separations, spacings, insulation, fences, railings, enclosures, structures and

other physical barriers, signage, markers or any combination of the above (Reg.22/04);

**1.3.6** **"Certificate"** means a certificate issued by a *professional engineer*, ESA or a *qualified person* identified in the distributor's construction verification program, that the construction meets the safety standards set out in Section 4 of the Regulation;

**1.3.7** **"certificate of approval"** means the certificate issued by a professional engineer or ESA confirming that a plan or Standard Design meets the safety standards set out in section 4 of the Regulation and provided to the distributor;

**1.3.8** **"certification organization"** means an organization accredited by the Standards Council of Canada;

**1.3.9** **"Certified Test Report"** means a report that contains sufficient information to allow the distributor's competent person to approve the electrical equipment. The report shall provide sufficient information to ensure the equipment meets or exceeds the applicable industry standard or distributor developed equipment specification. A Certified Test Report must be signed by a P.Eng or an Engineer where the licensure's obligation to public safety of the home jurisdiction are substantially equivalent to those required by Ontario.

**1.3.10** **"competent person"** means a person who,

(a)is qualified because of knowledge, training and experience,

(i) to perform specific work, or

(ii) to organize work and its performance,

(b)has knowledge of any potential or actual danger to health or safety in the workplace in relation to the work, and

(c) is familiar with section 113 of the Act and the regulations made under it, and with the *Occupational Health and Safety Act* and the regulations made under that Act, that apply to the work. O. Reg.22/04;

**1.3.11** **"construction verification"** means the inspection, approval and documentation of any new construction or repairs to *distribution systems* including replacements of part or portion of a distribution system, *like-for-like replacements*, and *legacy construction* replacement with respect to the safety standards set out in Section 4 of the Regulation;

**1.3.12** **"contractor"** means any person who performs work on electrical equipment or an electrical installation. O. Reg.22/04;

**1.3.13** **"disconnecting means"** means a device, group of devices or other means whereby the conductors of a circuit can be disconnected from their source of supply. O. Reg.22/04;

**1.3.14 "distribution line" or "line"** means an electricity distribution line, transformers, plant or equipment used for conveying electricity at voltages of 50,000 volts or less (Reg.22/04);

**1.3.15 "distribution station"** means an enclosed assemblage of equipment, including but not limited to switches, circuit breakers, buses and transformers, through which electrical energy is passed for the purpose of transforming one primary voltage to another primary voltage. O. Reg.22/04;

**1.3.16 "distribution system"** means a system for distributing electricity, and includes any structures equipment or other things used by a *distributor* for that purpose;

**1.3.17 "distributor"** means a person who owns or operates a *distribution system* in the service territory defined in the electricity distribution license issued by the Ontario Energy Board (OEB);

**1.3.18 "effectively grounded"** means permanently connected to earth through a ground connection of sufficiently low impedance and having sufficient current-carrying capacity to prevent the building up of voltages that may result in undue hazard to persons. O. Reg.22/04;

**1.3.19 "electrical installation"** means the installation, repair, replacement, alteration or extension of any wiring or electrical equipment that forms part of a distribution system (Reg.22/04);

**1.3.20 "ESC"** means the Electrical Safety Code referred to in Ontario Regulation 164/99;

**1.3.21 "equipment" or "electrical equipment"** means any apparatus, device or material used for the distribution of electricity, including materials that are non-electric in origin *(refer to the Regulation for the complete definition of "electrical equipment"*(Reg.22/04);

**1.3.22 "field evaluation agency"** means an organization accredited by the Standards Council of Canada and recognized by the Electrical Safety Authority (ESA) as being qualified to carry out a safety evaluation of electrical equipment that is limited in scope to essential safety considerations;

**1.3.23 "Good Utility Practice"** means any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry in North America during the relevant time period, or any of the practices, methods and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good practices, reliability, safety and expedition. Good utility practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather to be acceptable practices, methods, or acts generally accepted in North America (DSC);

**1.3.24 "hazard"** means a potential for injury to a person or property;

**1.3.25** **"legacy construction"** means existing construction built in accordance with *Good Utility Practice*, that does not meet current Standard Designs;

**1.3.26** **"like-for-like replacement"** means the replacement of one piece of electrical equipment (one assembly) under all conditions, or a part or portion of a line under emergency conditions, on an existing distribution system that maintains as a minimum the characteristics and functionalities of the original installation;

**1.3.27** **"line upgrade"** means the replacement or significant improvement of an existing *distribution line*;

**1.3.28** **"live"** means electrically connected to a source of voltage difference or electrically charged so as to have a voltage different from that of the earth O. Reg.22/04;

**1.3.29** **"no undue hazard"** for the purpose of approving equipment for use in the distribution system where indicated in this Guideline means that:

- energized parts of the equipment are **insulated or *barriered,***
- the equipment has sufficient **mechanical strength** to withstand the loads imposed on it by the intended application in the distribution system,
- the equipment has **grounding provision** so that it can be *effectively grounded* where required,
- the equipment design and construction has no unprotected **sharp edges**, or dangerous **moving parts**,
- the equipment electrical characteristics and protection minimize the possibility of **excessive temperature, fire or explosion** under expected operation conditions;

**1.3.30** **"no undue hazard"** for the purpose of *construction verification* of an *electrical installation* where indicated in this Guideline means that:

- metal parts that are not intended to be energized and that are accessible to unauthorized persons are adequately grounded,
- *live* parts are adequately insulated or *barriered*,
- the installation meets the minimum CSA clearances from buildings, signs and ground or barriers are installed to protect,
- the structure has adequate strength

where adequate means in accordance with *Good Utility Practice*;

**1.3.31** "**ownership demarcation point"** means the point,

(a) at which the distributor's ownership of a distribution system, including connection assets, ends at the customer, and

(b) that is not located beyond,

i. the first set of terminals located on or in any building, or
ii. an electrical room or *vault* in a building where the electrical room or *vault* is of tamperproof construction, bears a sign to indicate that it is an electrical room or *vault* and is accessible only to *authorized persons* (Reg.22/04);

**1.3.32 "plan"** means the drawings and instructions that are prepared for the construction of new or modified *distribution system* that have been reviewed and approved by a *professional engineer* or ESA;

**1.3.33 "primary distribution line"** means a distribution line conveying electricity at more than 750 volts but not more than 50,000 volts phase to phase; O. Reg.22/04

**1.3.34 "professional engineer"** means a person who holds a license or temporary license under the Professional Engineers Act (Reg. 22/04);

**1.3.35 "putting a system into use"** means making an *electrical installation* forming part of the electrical *distribution system* available for service;

**1.3.36 "qualified person"** means a person identified in a *construction verification* program developed by the distributor and approved by ESA for the purpose of inspection and approval of construction;

**1.3.37 "record of inspection"** means a record prepared by a *professional engineer*, ESA, or a *qualified person* identified in the distributor's *construction verification* program, detailing the inspection of a constructed or repaired portion of an electrical distribution system with respect to the safety standards set out in section 4 of the Regulation;

**1.3.38 "Regulation"** means the Ontario Regulation 22/04 – Electrical Distribution Safety;

**1.3.39 "safety standards"** means the safety standards set out in section 4 of the Regulation;

**1.3.40 "secondary distribution line"** means an electricity distribution line conveying electricity at 750 volts or less phase to phase. O. Reg.22/04;

**1.3.41 "Standard Designs"** means the standards such as standard design drawings, standard design specifications, technical specifications, and construction standards that have been reviewed and approved by a *professional engineer* or ESA for use by a *distributor* and that the *distributor* uses on an ongoing basis for the construction, operation, and maintenance of its distribution system;

**1.3.42 "Utility Advisory Council (UAC)"** means an advisory body formed to provide advice to ESA specific to the Electrical Distribution Safety Regulation governing the distribution of electricity in Ontario;

**1.3.43 "vault"** means an isolated enclosure, either above or below ground, with fire-resistant walls, ceilings and floors in which transformers and other *electrical equipment* are housed. O. Reg. 22/04, s. 1.

**1.3.44 "work instruction"** means the assembly of *Standard Designs* into drawings and instructions prepared by a *competent person* in accordance with the distributor's job planning process used for the installation of new or modified *electrical equipment* that forms part of a *distribution system*.

## 2.0 Approval of Electrical Equipment

The purpose of this section of the Guideline is to clarify and interpret the requirements outlined in section **6.0 of *Regulation* 22/04** "Electrical Distribution Safety". Section 6.0, "Approval of electrical equipment" contains the requirements *distributors* are to **follow for approving equipment for use on new construction and on repairs to existing *distribution systems***.

### 2.1 General

#### 2.1.1 What is required under Section 6 of *Regulation* 22/04?

Section 6 of *Regulation* 22/04 requires that *equipment* to be used for the construction of new or the repair and extension of existing *distribution systems* after February 11, 2005 be *approved equipment*. This new requirement may constitute a major change for the *distributors* depending on their existing *equipment* approval program.

#### 2.1.2 Is it the expectation that all *equipment* must be formally approved.

Recognizing the diverse nature of the electrical *equipment* utilized and the impact various components can have on the overall safety of the *distribution system*, ESA expects, as a minimum, all major *equipment,* listed below, to be formally approved:

- Transformers
- Conductors
- Load break switches, including single and three phase units (air, SF6, oil, vacuum insulated, solid dielectric, etc)
- Reclosing switches
- Switchgears
- Insulators
- Protective devices and lightning arrestors
- Poles
- Station breakers

ESA in consultation with the *Utility Advisory Council* (UAC) may establish timelines for other *equipment* to be formally approved. In the meantime, *distributors* must approve, as a minimum, distribution *equipment*, other than those listed above, in accordance with *Good Utility Practice* as outlined in this Guideline. *Distributors* are encouraged to follow major *equipment* approval processes, especially for mechanical load bearing *equipment* (eg. bolts) whenever possible.

*Equipment* approval under *Good Utility Practice* is to include supporting documentation by a *competent person* that the *equipment* is

suitable for a specific application in the *distributor's distribution systems* and the *equipment* presents *no undue hazard* to persons or property.

### 2.1.3 What are the choices available to *distributors* for *equipment* approval?

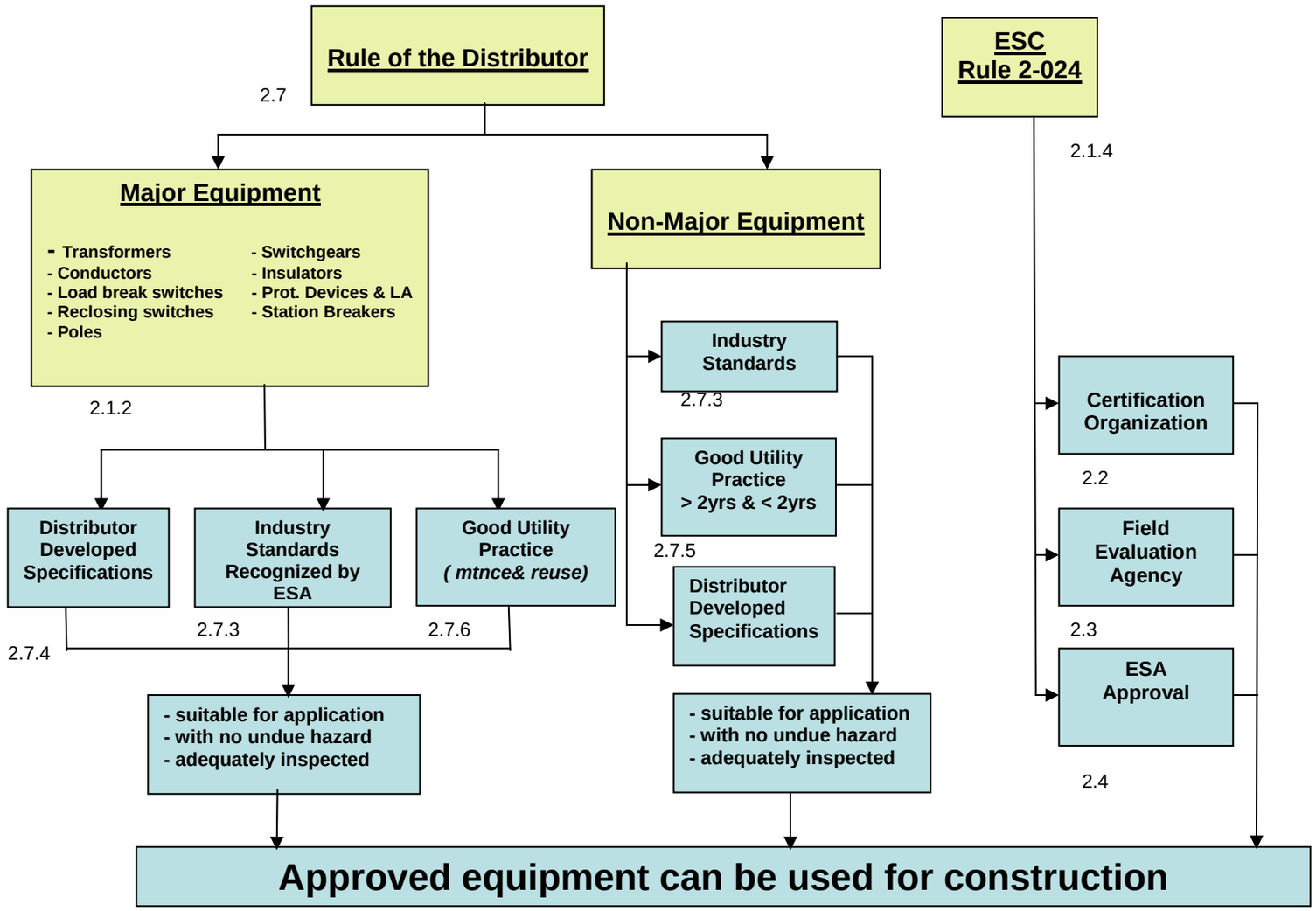
Two avenues are available to *distributors* for the approval of *equipment* for use on *distribution systems*:

1. The *equipment* design and construction meets the conditions of Rule 2-024 of the *ESC* (*Regulation* Section 6(1)(a), see Appendix A for rule 2-024); or

2. The *equipment* has been purchased, tested and inspected under the Rule of the Distributor in accordance with standards, specification, or *Good Utility Practice* and procedures of the *distributor* and an assurance of safety of the *equipment* equivalent to rule 2-024 of the Electrical Safety Code is provided. (*Regulation* Section 6(1)(b), see Appendix A for rule 2-024).

The various options for approving *equipment* are illustrated below and are discussed in more details in this Guideline. It is expected that most *distributors* will follow the Rule of the Distributor**. The *distributor* may choose any combination of the following options for approving *equipment*.**

## 2.1.3 Equipment Approval



### 2.1.4 What are the three options offered by Rule 2-024 of the *ESC*?

Rule 2-024 of the Electric Safety Code provides the following three options for approving *equipment* for use on *distribution systems*:

1. The *equipment* is certified by a *certification organization*; or
2. The *equipment* is field evaluated and approved by an accredited *field evaluation agency*; or
3. The *equipment* is field evaluated and approved by ESA.

## 2.2 Certification of *Equipment*

**What conditions must be met for *equipment* to be certified?**

Rule 2-024 (1) contains four conditions for *equipment* to be certified:

1. A *certification organization* has issued a report certifying that the *equipment* conforms to applicable standards;
2. The report is available to ESA from the *certification organization*;
3. The *equipment* purchased complies with all standards of design and construction and all terms and conditions set out in the report; and
4. The *equipment* bears the *certification organization's* mark for use in Canada.

### 2.2.1 To what standards does *equipment* need to be certified to?

To certify *equipment* for use in Ontario, a recognized Canadian standard for the *equipment* must be utilized for the certification process. Appendix B lists the CSA standards for *electrical equipment*. As part of this option Standards prepared by other agencies and organizations for *electrical equipment* and adopted as Canadian standards can also be utilized for certification.

### 2.2.2 What organizations are recognized in Ontario for certifying *equipment*?

*Electrical equipment* can only be approved by agencies that have been accredited by the Standards Council of Canada to approve and certify *electrical equipment*. A list of recognized *certification organizations* can be found on the ESA website and in ESA Bulletin 2-7-16 (Appendix C).

### 2.2.3 How does a *distributor* know that *equipment* is certified?

Once the *certification organization* has tested and certified that the *equipment* meets the conditions of the appropriate Canadian standard, the *certification organization* prepares a report detailing compliance with the conditions of the standard and attaches a mark or label to the *equipment* indicating Canadian approval. ESA Bulletin 2-7-16 provides details of the appropriate certification marks (Appendix C)

## 2.3 Field Evaluation of *Equipment*

**What are the conditions associated with the use of field-evaluated *equipment*?**

Rule 2-024(2) allows a *field evaluation agency* to examine and approve *equipment*. Field evaluation of *equipment* is limited in scope to the essential safety considerations.

Under this sub-rule *equipment* is approved if:

- An accredited *field evaluation agency* has examined the *equipment* or a sample and found that it conforms to applicable standards and it presents *no undue hazard* to persons or property;
- A label is affixed to the *equipment* marking its approval for use in either Ontario or Canada; and
- Where the *field evaluation agency* has examined a sample, the *equipment* is of the same design and construction as that of the sample.

### 2.3.1 What organizations are recognized in Ontario for performing field evaluation and approval?

Only agencies that have been accredited by the Standards Council of Canada to approve electrical *equipment* in the field and are recognized by ESA can be utilized. A list of recognized *field evaluation agencies* can be found on the ESA web site and is included in ESA Bulletin 2-7-16 (Appendix C).

### 2.3.2 Where does a field evaluation take place?

Field evaluation is a term applied to the evaluation of the *equipment* outside of a certification program. Field evaluation can occur at the manufacturer's facilities, *distributor's* facilities or at the point of installation.

### 2.3.3 What standards are applied to complete field evaluations?

Section 3 of ESC specifies that the *field evaluation agency* shall follow the conditions as outlined in Special Publication SPE 1000-99 prepared by the Canadian Standards Association and entitled "Model Code For the Field Evaluation of Electrical *Equipment*".

The Model Code requires that the field evaluation takes into account the safety requirements of <u>any applicable standards</u> that apply to the *electrical equipment* and that the *equipment* in the intended application, present *no undue hazard* to persons or property.

### 2.3.4 How does a *distributor* know that a piece of *equipment* has been field approved?

A label indicating approval is attached to the *equipment* after the *field evaluation agency* has determined that the *equipment* meets the safety requirements for the *electrical equipment*. ESA Bulletin 2-7-16 provides details of the appropriate field evaluation marks (Appendix C).

## 2.4 <u>ESA Approval of *Equipment*</u>

**What are the conditions associated with use of ESA for approval?**

Rule 2-024(3) allows for approval of the *equipment* by ESA.

Under this sub-rule *equipment* is approved if:

- ESA has examined it or a sample and found that it conforms to the Code and presents *no undue hazard* to persons or property;
- The *equipment* bears a label affixed by ESA;
- Any fees payable in respect to the examination has been paid;
- Where ESA has only examined a sample, the *equipment* is the same design and construction as the sample.

The examination of electrical *equipment* by ESA under sub-rule (3) is equivalent to approval by a *field evaluation agency*. The details included in the previous section for *field evaluation agencies* apply to approval by ESA.

## 2.5 Qualifying Tests

**When qualifying tests are required, what are the options for providing appropriate testing information?**

Where qualifying tests are required for *equipment* approval, the *field evaluation agency* or ESA may accept reports or other evidence of testing from:

- a certification organization;
- a testing organization;
- a *professional engineer*; or
- other responsible *competent person*.

At the time of performing the field evaluation the *field evaluation agency* will request the required test documentation. It will be the *distributor's* responsibility to provide the information requested. In many instances, the manufacturer will be able to provide the data without further testing being required.

## 2.6 Sub-rule 2-024(5)

**When does sub-rule 2-024(5) of the *ESC* apply to distribution *equipment*?**

In general this sub-rule does not apply to distribution *equipment*.

The intent of this rule is to provide ESA inspectors, inspecting installations under an "inspection permit", with some latitude for *equipment* that may not be certified or field tested but that forms part of the installation. This rule allows inspectors the latitude to accept the *equipment* if they are able to determine that the device present *no undue hazard* to persons or property.

## 2.7 Rule of the *Distributor*

### 2.7.1 What safety requirements are to be met for electrical *equipment* approved under a rule of the *distributor*?

Section 6(1)(b) of *Regulation* 22/04 allows for the *distributor* to utilize *equipment* on the *distribution system* that has been approved as part of a rule of the *distributor*. The rule is to provide assurance of the safety of the *equipment* equivalent to the requirements under rule 2-024 of the ESC.

Assurance equivalent to the requirements under rule 2-024 is achieved if the design and construction of the *equipment* meets the requirements of applicable standards and presents *no undue hazard* to persons or property.

### 2.7.2 Under the rule of the *distributor*, how can the *distributor* provide assurance of *equipment* safety equivalent to rule 2-024?

The manner in which the *distributor* provides assurance of the *equipment* safety equivalent to rule 2-024 can vary depending on the *equipment* under consideration. The documentation associated with *equipment* approvals and internal processes along with the annual audit will help to demonstrate equivalency of the *equipment* approval process.

Assurance of safety equivalent to rule 2-024 can be achieved by using *equipment* that complies with one of the following:

- A review by a distributor's *competent person* of a *Certified Test Report* ensuring applicable industry standards are met or exceeded which are recognized by ESA, including an assurance that the *equipment* presents *no undue hazard* to persons or property; or
- A review by a distributor's *competent person* of a *Certified Test Report* ensuring *distributor* developed *equipment* specifications approved by a *professional engineer* for major equipment or a *competent person* for non-major equipment are met or exceeded for a specific use on the *distribution system* including an assurance that the *equipment* presents *no undue hazard* to persons or property; or
- A validation by a distributor's *competent person* of a good working history (minimum of 2 years worth of experience) of the *equipment* (other than **new** major *equipment*) under *Good Utility Practice* where *equipment* is for specific use on the *distribution system* including an assurance that the *equipment* presents *no undue hazard* to persons or property; or
- *professional engineer* provides an assurance that the *equipment* presents *no undue hazard* to persons or property.

### 2.7.3 Industry Standards - How are industry standards used under the Rule of the *Distributor*?

Industry standards include *equipment* standards that are generally recognized as being appropriate for distribution *equipment*. *Equipment* standards recognized by ESA include those prepared by industry groups such as CSA, ASTM, NEMA, IEEE, ANSI, IEC, AEIC, CEA and others.

Where applicable industry standards exist, the *distributor* may use *equipment* that has been manufactured and tested in accordance to the applicable industry standards. Where

required, the *distributor* is to obtain the applicable *Certified Test Report* from the manufacturer and make them available to ESA upon request.

A list of most commonly used *equipment* standards is shown in Appendix D of this Guideline.

### 2.7.4 *Distributor* Developed Specifications - What is required for *distributor*-developed specifications under the rule of the *distributor*?

Where suitable industry standards do not exist, or where the *distributor* chooses to introduce variations to industry standards, the *distributor* may develop its own *equipment* specifications. Specifications developed by the *distributor* are to include the appropriate electrical and physical parameters and qualifying tests that the manufacturer must use to design and test the *equipment* for use on the *distribution system*.

When developing *equipment* specifications, the *distributor* should research available industry standards and consult with the *equipment* manufacturers to confirm the standards that are to be used to manufacture and test the *equipment*. This consultation may assist the *distributor* in finalizing the details and approval of the specifications.

Major *equipment* specifications developed by a *distributor* must be reviewed and approved by a *professional engineer*. *Equipment* specifications developed by the *distributor* for *equipment*, other than major *equipment* as listed in section 2.1.2 of this Guideline, may be developed and approved by a *competent person*.

When *equipment* is manufactured based on specifications developed by the *distributor*, the *distributor* is to obtain the applicable *Certified Test Report* from the manufacturer and make them available to ESA upon request.

### 2.7.5 *Good Utility Practice* for Non-Major *Equipment* - How and when can *Good Utility Practice* be used to approve *equipment* under the rule of the *distributor*?

For *equipment* other than the major *equipment* listed in Section 2.1.2 of this Guideline, the *distributor* may approve *equipment* under the *Good Utility Practice*. Examples of such *equipment* could be:

- parts to be used for repairs of existing *equipment;* or
- replacement of existing *equipment*.

Under *Good Utility Practice*, the *distributor* may approve non-major *equipment* with supporting documentation that it has been in use for at least two years in specific applications in existing, comparable distribution systems with good safety performance.

Other non-major *equipment* may be approved for use on a trial basis for less than 2 years when a *competent person* has provided a supporting documentation that the *equipment* is suitable for a specific application in the *distributor's distribution systems* and that the

*equipment* presents *no undue hazard* to persons or property. After two successful years, such new *equipment* may be approved under *Good Utility Practice*.

### 2.7.6 *Good Utility Practice* for Major *Equipment* used for Maintenance or Reuse: How and when can *Good Utility Practice* be used to approve major equipment for the purpose of maintaining or reusing existing *electrical equipment* under the rule of the *distributor*?

For major *equipment* the *distributor* may approve used or pre-regulation *equipment* under *Good Utility Practice*. Examples of such *equipment* could be:

- parts to be used for repairs of existing *equipment*; or
- replacement of existing *equipment*; or
- new installations

To ensure the safe performance of used equipment for maintenance or reuse the LDC shall implement a process for used equipment .

- For equipment to be returned to inventory the process shall include the inspection of used equipment. The inspection will be completed and documented by the *competent person* to confirm that there is *no undue hazard.*
- For equipment to be sent for testing (to confirm equipment functionality) or to be repaired (where the repair does **not** affect the ability of the equipment to fail in a safe manner **or** the repair meets or exceeds the manufacturer's design) the process shall include the inspection of used equipment. The inspection will be completed and documented by a *competent person* to confirm that there is *no undue hazard*. If the repair or work may affect the ability of the equipment to fail in a safe manner *Good Utility Practice* may not be used (See Rule 2-024 or Section 2.72 for approval options).

### 2.7.7 How can a *distributor* integrate *approved equipment* with its *Standard Designs*?

In most instances, the *equipment* used for construction of a *distribution system* is part of a list of standard stock items (or bill of material) that the *distributor* may have specified in its *Standard Designs*. To ensure that only *approved equipment* is used in construction, the *distributor* is encouraged to develop and maintain standard bills of material solely comprised of *approved equipment*, listing as a minimum the mechanical and electrical characteristics of *equipment* to be used for each *Standard Design.*

As a way of providing assurance that the *equipment* presents *no undue hazard* to persons or property, in approving *Standard Designs* the *distributor's professional engineer* or ESA may also certify that *equipment*, specified in the associated bills of materials, if formed solely of approved material, are approved for specific applications noted in the *Standard Designs* and present *no undue hazard* to persons or property.

### 2.7.8 What elements could be included in a *distributor's equipment* approval system?

The *distributor* could include the following elements in its *equipment* approval system:

- **outline of the *equipment* approval process** used by the *distributor* for the approval of *equipment*;
- **listing of all *equipment*** approved for use on the *distribution system*, including relevant parameters, industry standards or *distributor's* specifications (this could be a hard copy or part of a computerized system);
- **copy of major *equipment* specifications** developed or utilized by the *distributor* and used to manufacture *equipment* including testing requirements;
- **approval** documentation that states the method of approval (including but not limited to *Certified Test Reports*, Good Utility Practice, *certification organization*, etc…) and that the *equipment* is suitable for use on the *distribution system* and present *no undue hazard* to persons or property; and
- **inspection procedures** that are adequate for the purpose based on the quality assurance appropriate for the *distributor*; this quality assurance could range from a fully integrated quality assurance program or simple checklists for *equipment* received.

## 2.8 Documentation

**How long do records of *equipment* approval need to be kept?**

The retention of *equipment* approval documentation is required while the *equipment* remains approved for use in new construction or for repairs to existing systems. Sufficient information is required to confirm that the *equipment* is approved and meets the safety requirements. Sample approval sheets are included in Appendix E.

## 2.9 Appendices for Equipment Approval

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|---|---|
| **Appendix A** | **Electrical Safety Code Rule 2-024** |
| **Appendix B** | **CSA Standards Related to Electricity Distribution** |
| **Appendix C** | **ESA Bulletin 2-7-16** |
| **Appendix D** | **Examples of common Industry Standards** |
| **Appendix E** | **Sample Equipment Approval Sheet** |
| **Appendix F** | **Equipment Approval Check List** |

# Appendix A
# Electrical Safety Code Rule 2-024

**2-024 Approval of Electrical Equipment**

(1) Subject to the other provisions of this Rule, electrical equipment is deemed to be approved if:

(a) A certification organization has issued a report certifying that the equipment conforms to the applicable standards for the equipment;

(b) The report referred to in clause (a) is available to the Inspection Department from the certification organization;

(c) The equipment complies with all standards of design and construction and all terms and conditions set out in the report; and

(d) The equipment bears the certification organization's mark, which identifies equipment, certified for use in Canada.

(2) As an alternative to Subrule (1) electrical equipment is deemed to be approved if:

(a) A field evaluation agency has examined the equipment or a sample and has found that it conforms to the applicable standards for the equipment and presents no undue hazard to persons or property;

(b) The equipment is within the scope of Section 3 of the Code, and within the field evaluation agency's accreditation under the *Standards Council of Canada Act* and recognized by the Inspection Department;

(c) The equipment bears a label approved for use in either Ontario or Canada affixed by the field evaluation agency, and

(d) Where the field evaluation agency has examined only a sample, the equipment is of the same design and construction as the sample.

(3) As an alternative to Subrule (1) electrical equipment is deemed to be approved if:

(a) The inspection department has examined the equipment or a sample, found that it conforms to this Code and presents no undue hazard to persons or property;

(b) The equipment bears a label affixed by the inspection department;

(c) Any fees payable to the inspection department in respect of the examination have been paid; and

(d) Where the examination and testing was of only a sample, the equipment is of the same design and construction as the sample.

(4) Where testing is required for the purposes of subrule (3), the inspection department may accept reports or other evidence of testing from a certification organization, a testing organization, a professional engineer, or other responsible qualified person.

(5) Electrical equipment that is used in or connected to an electrical installation may be inspected under Rule 2-004, and it shall be deemed to be approved if:

(a) the installation and equipment pass the inspection; and

(b) persons or property would be adequately protected from any undue electrical shock or fire hazard as a result of the inspection.

(6) No person shall affix to any electrical equipment an approval label that was not issued for that equipment.

**SECTION 3 - FIELD EVALUATION OF ELECTRICAL EQUIPMENT**

**3-000 Scope.** This Section applies to the approvals of electrical equipment in accordance with Subrules (2) and (3) of Rule 2-024 and is supplementary to or amendatory of other requirements of this Code.

**3-002 Standards.** Sections 1 through 6 of Special Publication SPE 1000-99 prepared by the Canadian Standards Association and entitled "Model Code For the Field Evaluation of Electrical Equipment", is adopted as part of this regulation with the following amendments:

Delete clauses 4.27, 4.28.1, 4.29, and 4.30.
**Replace clause 1.7 (e) with:** Components that will require further evaluation as part of a complete assembly, such as switches, relays, and timers.
**Add clause 4.1.2.8:** Switches and controls shall comply with the requirements of CSA Standards CAN/CSA-C22.2 No. 14 and C22.2 No. 24, 55, 111, and 156, as applicable.
**Add clause 4.1.3.3:** Transformers shall comply with the requirements of CSA Standard C22.2 No. 66 and CAN/CSA-C22.2 No. 47, as applicable.
**Add clause 4.1.4.8:** Motors shall be of types suitable for the particular application of the equipment and shall comply with the applicable requirements of CSA Standard C22.2 No. 100.
**Add clause 4.1.6.3:** Receptacles for attachment plugs shall comply with the requirements of CSA Standard CAN/CSA-C22.2 No. 42 and the Canadian Electrical Code, Part I, as applicable.
**Replace clause 4.23.3 with:** Electrolytic or other special types of capacitors, and capacitors intended for connecting directly across the line, shall comply with the requirements for capacitors as specified in CSA Standard C22.2 No. 8.

## Appendix B
## CSA Standards Related to Electricity Distribution

Conductors
CAN/CSA- C22.2 No. 38-05, Thermoset-Insulated Wires and Cables (Tri-National standard, with UL 44 and ANCE NMX-J-451)

C22.2 No. 52-96, Underground Service-Entrance Cables

CAN/CSA-C22.2 No. 75-08, Thermoplastic-Insulated Wires and Cables (Tri-National standard, with UL 83 and NMX-J-010-ANCE-2008)

C22.2 No. 123--08 Metal Sheathed Cables

C22.2 No. 124-04, Mineral-Insulated Cable

C22.2 No. 129-05 Neutral Supported Cable

CAN/CSA-C22.2 No. 131-07 Type TECK 90 Cable

CAN/CSA-C68.1-92, Specifications for Impregnated Paper-Insulated Metallic-Sheathed Cable, Solid Type (Adoption of AEIC Specification CS1-90)

CAN/CSA-C68.5-07, Primary Shielded and Concentric Neutral Cable for Distribution Utilities

C68.10-08, Shielded Power Cable for Commercial and Industrial Applications, 5-46 kV

Bare Conductor
C49.2-1975, Compact Aluminum Conductors Steel Reinforced (ACSR)

C49.3-1977, Aluminum Alloy 1350 Round Wire, All Tempers, for Electrical Purposes

C49.5-1978, Compact Round Concentric-Lay Aluminum Stranded Conductors (Compact ASC)

CAN/CSA-C60104-03, Aluminum-Magnesium-Silicon Alloy Wire for Overhead Line Conductors

CAN/CSA-C60888-03, Zinc-Coated Steel Wires for Stranded Conductors

CAN/CSA-C600889-03, Hard-Drawn Aluminum Wire for Overhead Line Conductors

CAN/CSA-C61089-03, Round Wire Concentric Lay, Overhead Electrical Stranded Conductors

CAN/CSA-C61232-03, Aluminum-Clad Steel Wires for Electrical Purposes

Terminations & Splices
CAN/CSA-C22.2 No. 198.2-05 Sealed Wire Connector Systems (Tri-National standard, with UL 486D and NMX-J-519-ANCE-05)

Switches
C22.2 No. 58-M1989 High-Voltage Isolating Switches

C22.2 No. 193-M1983 High Voltage Full-Load Interrupter Switches

Switchgear
C22.2 No. 31-04 Switchgear Assemblies

Enclosures
CAN/CSA-C50052-99 Cast Aluminum Alloy Enclosures for Gas-Filled High-Voltage Switchgear and Controlgear

CAN/CSA-C50064-99 Wrought Aluminum and Aluminum Alloy Enclosures for Gas-Filled High-Voltage Switchgear and Controlgear

CAN/CSA-C50068-99 Wrought Steel Enclosures for Gas-Filled High-Voltage Switchgear and Controlgear

CAN/CSA-C50069-99 Welded Composite Enclosures of Cast and Wrought Aluminum Alloys for Gas-Filled High-Voltage Switchgear and Controlgear

CAN/CSA-C50089-99 Cast Resin Partitions for Metal-Enclosed Gas-Filled High-Voltage Switchgear and Controlgear

Insulators
CAN/CSA-C156.1-M86, Ceramic and Glass Station Post Insulators

CAN/CSA-C156.3-M86, Test Methods for Station Post Insulators

CAN/CSA-C411.1-M89, AC Suspension Insulators

CAN/CSA-C411.4-98, Composite Suspension Insulators for Transmission Applications

CAN/CSA-C1325-99, Insulators for Overhead Lines with Nominal Voltage Above 1000V - Ceramic o r Glass Insulator Units for D.C. Systems - Definitions, Test Methods Acceptance Criteria

CAN/CSA-C62155-06, Hollow Pressurized and Unpressurized Ceramic and Glass Insulators for Use in Electrical Equipment

Connectors
C57-98, Electric Power Connectors for Use in Overhead Line Conductors

Lightning Arrestors
CAN/CSA-C233.1-87, Gapless Metal Oxide Surge Arresters for Alternating Current Systems

Transformers
Distribution
CAN/CSA-C2.1-06, Single-Phase and Three-Phase Liquid-Filled Distribution Transformers

CAN/CSA-C2.2, Pole-Mounted, Single-Phase Distribution Transformers for Electric Utilities

C199-08, Three-Phase Network Distribution Transformers

CAN/CSA-C227.3-06, Low-Profile, Single-Phase, Pad-Mounted Distribution Transformers with Separable Insulated High-Voltage Connectors

CAN/CSA-C227.4-06, Three-Phase, Pad-Mounted Distribution Transformers with Separable Insulated High-Voltage Connectors

C301.1-06, Single-Phase Submersible Distribution Transformers

C301.2-06, Three-Phase Submersible Distribution Transformers

Power
CAN/CSA-C88-M90, Power Transformers and Reactors

CAN/CSA-C88.1-96, Power Transformer and Reactor Bushings

Dry-Type
CAN/CSA-C22.2 No. 47-M90 Air-Cooled Transformers (Dry-Type)

C9-02, Dry-Type Transformers

Instrument
CAN3-C13-M83, Instrument Transformers

CAN3-C13.1-M79, Capacitor Voltage Transformers

CAN/CSA-C60044-1-07, Instrument Transformers - Part 1: Current Transformers

CAN/CSA-C60044-2-07, Instrument Transformers - Part 2: Inductive Voltage Transformers

CAN/CSA-C60044-3-07, Instrument Transformers - Part 3: Combined Transformers

CAN/CSA-C60044-5-07, Instrument Transformers - Part 5: Capacitor Voltage Transformers

CAN/CSA-C60044-6-07, Instrument Transformers - Part 6: Requirements for Protective Current Transformers for Transient Performance

CAN/CSA-C60044-7-07, Instrument Transformers - Part 7: Electronic Voltage Transformers

CAN/CSA-C60044-8-07, Instrument Transformers - Part 8: Electronic Current Transformers

Capacitors
C22.2 No. 190-M1985, Capacitors for Power Factor Correction

CAN/CSA-C60871-1-03, Shunt Capacitors for A.C. Power Systems having a Rated Voltage above 1000 v - Part 1: General – Performance, Testing and Rating – Safety Requirements – Guide for Installation and Operation

CAN/CSA-C60871-2-03, Shunt Capacitors for A.C. Power Systems having a Rated Voltage above 1000 v -Part 2: Endurance Testing

**MISC.**

C22.2 No. 41-M1987 Grounding and Bonding Equipment

C22.2 No. 201-M1984 Metal-Enclosed High Voltage Busways

C22.2 No. 249-96 Standard Tests for Determining Compatibility of Cable -Pulling Lubricants with Wire and Cable

CAN/CSA-C50-97, Insulating Oil, Electrical for Transformers and Switches

C83-96, Communication and Power Line Hardware

CAN/CSA-C71-1-99, Insulation Coordination - Part 1: Definitions, Principles and Rules

CAN/CSA-C71-2-98, Insulation Coordination Part 2-Application Guide

CAN/CSA-O15-05, Utility Wood Poles & Reinforcing Stubs

CAN/CSA-A14-07 Concrete Poles

**Appendix C**
**ESA Bulletin 2-7-20**

## Approval of Electrical Equipment

*Rule 2-024*

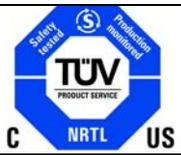
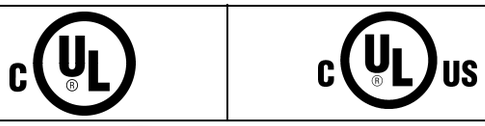
The Ontario Electrical Safety Code recognizes certification organizations accredited by the Standards Council of Canada to approve electrical equipment. Only equipment bearing one of the marks or labels shown in the drawings is approved.

Equipment to meet the requirements of the Ontario Electrical Safety Code must be approved to Canadian standards. This is signified by the "C" outside the Entela, ETL, MET, OMNI, QAI, TUV America, TUV Rheinland and UL marks. The “NRTL/C” shown with one Canadian Standards Association mark, and the “cULus” shown with one Underwriters Laboratories mark, indicate the equipment with those marks is also compliant with United States standards.

A Canadian Standards Association mark with "NRTL" only, and Underwriters Laboratories mark without the “c” at the eight o’clock position, indicates the equipment is compliant with United States standards.

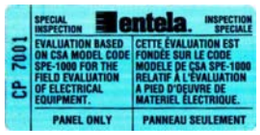
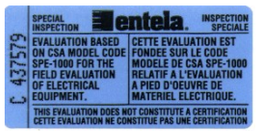
## CERTIFICATION MARKS ACCEPTABLE UNDER THE ELECTRICAL SAFETY CODE

**ESA Bulletin 2-7-20**

| | |
|---|---|
| **Canadian Standards Association (CSA)** |  |
| **Entela** |  |
| **Intertek Testing Services** |  |
| **Met Laboratories Inc. (MET)** |  |
| **OMNI Environmental Services Inc.** |  |
| **Quality Auditing Institute** |  |
| ***QPS*** |  |
| ***TUV America*** |  |
| **TUV Rheinland** |  |
| **Underwriters Laboratories Inc. (UL)** |  |
| **Underwriters' Laboratories of Canada (ULC)** |  |

## FIELD EVALUATION MARKS ACCEPTABLE UNDER THE ELECTRICAL SAFETY CODE

**ESA Bulletin 2-7-20**

| | |
|---|---|
| CANADIAN STANDARDS ASSOCIATION (CSA) |  |
| ELECTRICAL SAFETY AUTHORITY (ESA) |     **See Note **See Note |
| ENTELA |   ** See Note |
| INTERTEK TESTING SERVICES |  |
| QUALITY AUDITING INSTITUTE (QAI) |  |
| QPS |   ** See Note |
| TUV AMERICA |  |
| TUV RHEINLAND (TUV) |  |
| UNDERWRITERS LABORATORIES OF CANADA (ULC) |  |

** NOTE - " PANEL ONLY" label identifies that the panel has been evaluated to the SPE-1000. It does not cover equipment that is added or connected to the panel.

**Component Marks Acceptable under the Electrical Safety Code which are specifically used on component parts that are part of a larger product or system**

**ESA Bulletin 2-7-20**

| | |
|---|---|
| Canadian Standard Association (CSA) |  |
| Underwriters Laboratories Inc. (UL) |   |

Note: Electrical components bearing these marks may have restrictions on their performance or may be incomplete in construction, and are intended to be used as part of a larger approved product or system. The Component Recognition marking is found on a wide range of products, including some switches, power supplies, printed wiring boards, some kinds of industrial control equipment and thousands of other products.

**ESA Bulletin 2-7-20**

| Certification Organization | Contact Information |
|---|---|
| CANADIAN STANDARDS ASSOCIATION (CSA) | Phone Number: 416-520-6442<br>E-mail: specialinspection@csa-international.org or jim.robinson@csa-international.org<br>Web address: www.csa-international.org |
| ELECTRICAL SAFETY AUTHORITY (ESA) | Phone Number: 613-271-1489 or 1-800-559-5356<br>Fax Number: 613-271-6441 or 1-800-559-5358<br>E-mail: field.evaluation@electricalsafety.on.ca<br>Web address: www.esapa.biz |
| ENTELA | Phone Number: 416-241-8427<br>Fax Number: 416-241-0682<br>E-mail: info@entela.com<br>Web Address: www.entela.com |
| INTERTEK TESTING SERVICES | Phone Number: 905-678-7820<br>Fax Number: 905-678-7131<br>E-mail: wkole@etlsemko.com<br>Web Address: www.etlsemko.com |
| QPS | Phone Number: 416-241-8857 or 1-877-746-4777<br>Fax Number: 416-241-0682<br>E-mail: info@qps.ca<br>Web Address: www.qps.ca |
| QUALITY AUDITING INSTITUTE (QAI) | Phone Number: 416-707-1343<br>E-mail: sharris@qai.org<br>Web Address: www.qai.org |
| TUV AMERICA | Phone Number : 303-696-1TUV (888)<br>Fax Number: 303-696-3978<br>E-Mail: rludin@tuvam.com<br>Web Address: www.TUVamerica.com |
| TUV RHEINLAND (TUV) | Phone Number: 416-733-3677<br>Fax Number: 416-733-7781<br>E-Mail: skraemer@us.tuv.com<br>Web Address: www.us.tuv.com |
| UNDERWRITERS LABORATORIES OF CANADA (ULC) | Phone Number: 1-866-937-3852<br>Fax Number: 416-757-8727<br>E-Mail: customerservice@ulc.ca<br>Web Address: www.ulc.ca |

**Appendix D**
**Examples of common Industry Standards**

IEEE Std 386-1995, IEEE Standard for Separable Insulated Connector Systems for Power Distribution Systems Above 600V

IEEE Std C62.11-1999, IEEE Standard for Metal-Oxide Surge Arresters for Alternating Current Power Circuits

ANSI/IEEE Std C57.12.44-2000, IEEE Standard Requirements for Secondary Network Protectors

ANSI/IEEE Std C37.46-2001, American National Standard Specifications for Power Fuses and Fuse Disconnecting

ANSI/IEEE Std C57.12.40-2000 American National Standard for Secondary Network Transformers—Subway and Vault Types (Liquid Immersed)—Requirements

IEEE Std C37.71-2001 IEEE Standard for Three-Phase Manually Operated Subsurface and Vault Load Interrupting Switches for Alternating-Current Systems

IEEE Std C37.60-2003 IEEE Standard Requirements for Overhead, Pad Mounted, Dry Vault, and Submersible Automatic Circuit Reclosers and Fault Interrupters for alternating current systems up to 38 kV

NEMA Standards Publication No. WC 5-1992/ICEA S-61-402 Thermoplastic-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy

NEMA Standards Publication No. WC 7-1988/ICEA S-66-524 Cross-Linked-Thermosetting-Polyethylene-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy

NEMA Standards Publication No. WC 8-1988/ICEA S-68-516 Ethylene-Propylene-Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy

ANSI/ICEA Publication No. S-70-547-2000 Standard for Weather-Resistant Polyethylene Covered Conductors

ANSI/ICEA Publication No. S-76-474-2000 Standard for Neutral-Supported Power Cable Assemblies With Weather-Resistant Extruded Insulation Rated 600 Volts

AEIC CS1-90 Specifications for Impregnated Paper-Insulated Metallic-Sheathed Cable, Solid Type

AEIC CS5-94 Specifications for Cross-linked Polyethylene Insulated Shielded Power Cables Rated 5 Through 46 kV

AEIC CS6-87 Specifications for Ethylene Propylene Rubber Insulated Shielded Power Cables Rated 5 Through 69 kV

ASTM B 2 –2000 Standard Specification for Medium-Hard-Drawn Copper Wire

ASTM B 3 –2001 Standard Specification for Soft or Annealed Copper Wire

ASTM B 8 –2004 Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft

ASTM B 230 –1999 Standard Specification for Aluminum 1350-H19 Wire for Electrical Purposes

ASTM B 231 –2004 Standard Specification for Concentric-Lay-Stranded Aluminum 1350 Conductors

ASTM B 232 –2001 Standard Specification for Concentric-Lay-Stranded Aluminum Conductors, Coated-Steel Reinforced (ACSR)

ASTM B 400 –2004 Standard Specification for Compact Round Concentric-Lay-Stranded Aluminum 1350 Conductors

ASTM B 496 –2004 Standard Specification for Compact Round Concentric-Lay-Stranded Copper Conductors

ASTM D 1248 –2004 Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable

IEEE Std 48-2003 IEEE Standard Test Procedures and Requirements for Alternating-Current Cable Terminations 2.5 kV Through 765 kV

IEEE Std 404-1993 IEEE Standard for Cable Joints for Use With Extruded Dielectric Cable Rated 5000-138 000 V and Cable Joints for Use With Laminated Dielectric Cable Rated 2500-5000 000 V

ANSI C119.4-1991 American National Standard for Electric Connectors – Connectors for Use Between Aluminum-to-Aluminum or Aluminum-to-Copper Bare Overhead Conductors

CEA LWIWG-01 (96) "Dead-end/Suspension Composite Insulator for Overhead Distribution Lines“

CEA LWIWG-02 (96) "Line Post Composite Insulator For Overhead Distribution Lines"

CEA LWIWG-03 (96) "Guy Composite Insulator for Guy Wires" CEA DTWG-01 (99) "Pole Mounted Single Phase Distribution Transformers"

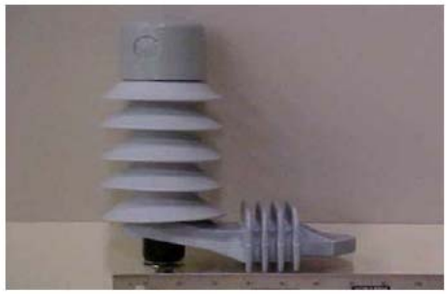
CEA DTWG-01 (99) "Pole Mounted Single Phase Distribution Transformers"

CEA DTWG-02 (99) "Low-Profile, Single Phase, Dead-Front Pad-Mounted Distribution Transformers"

CEA DTWG-03 (99) "Three Phase, Dead-Front Pad-Mounted Distribution Transformers"

## Appendix E
## Sample Equipment Approval Sheet

| | | |
|---|---|---|
| KITCHENER-WILMOT HYDRO INC. | **Purchasing Specification**<br>**Arrester-Dist Class 12KV** | **38A 055 001** |



**KWHydro Inc. Information:**

| | |
|---|---|
| New Part# | 38A055001 |
| Old Part# | 38A5502 |
| Category | Arrester |
| Description | Arrester-Dist Class 12KV |
| Unit of Measure | ea |
| Location | |
| GL Category | IN30 |
| Stocking Type | S |

**Supplier Information:**

| Vendor Number-Name | Manufacturer/ID# | Part Number |
|---|---|---|
| 5029 – Bel Volt | | UHS12060A1A1A1A |
| 5150 – Grafton | | 217610-7514 |

**Technical Information:**

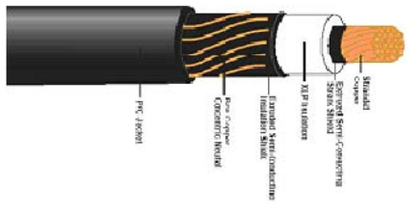
- **Arrester, MOV Type, Heavy-duty Distribution Class, Polymer, 12 kV duty cycle, 10.2 kV MCOV** – used on O/H and U/G 13.8 kV distribution system for protection of transformers, pole mounted reclosers and load break switches. The arrester shall have the following properties:
  - Arrester class – heavy duty distribution
  - Non-fragmenting housing
  - Upper terminal hardware – c/w wire clamp, nut and protective cap
  - Mounting hardware - insulated base bracket with isolator
  - Lower terminal hardware – c/w ground lead isolator, nut and wire clamp
  - Wire clamps shall be suitable for No. 4 AWG stranded copper wire

- **Standards**: *ANSI/IEEE C62.11-1999* ***or*** *CSA C233.1-87*
- **Approved Products**: *Joslyn cat# ZHP012-0000100, Ohio Brass cat# PDV-100 213510-7314, Cooper cat# UHS1206-0A1A-1A1A*
- **Approved Alternatives**:
- **Notes:** 1. *See Surge Arrester selection chart.*
  2. *Type Test Report required for approval.*
     - *Joslyn ZHP Arresters Type test report available in File# 6530-91-2*
     - *Cooper Varistar Arresters Type test report available in File# 6530-91-2*
     - *Ohio Brass PDV Arresters Type test report available in File# 6530-91-2*
- **Current Status:** [ ] CSA Certified [ ] UL Listed [ ] Other certification

**Prepared by: K. Blakeman**
**Tech. Spec by: G. Cameron**
**Approved by: Larry Duthie** _____ **1 of 1** **12/02/04**
**Approved by: Lloyd Frank** _____
***Signature on File*** **Rev Nbr-0**

## Appendix E
## Sample Equipment Approval Sheet

| | | |
|---|---|---|
| KITCHENER-WILMOT HYDRO INC. | **Purchasing Specification**<br>**Wire-Primary #1 1/c 15kV XLPEI CN** | **38W 095 000** |



**KWHydro Inc. Information:**

| | |
|---|---|
| New Part# | 38W095000 |
| Old Part# | 38W8675 |
| Category | Wire |
| Description | Wire-Primary #1 1/c 15kV XLPEI |
| Unit of Measure | Metre |
| Location | |
| GL Category | IN30 |
| Stocking Type | S |

**Supplier Information:**

| Vendor Number-Name | Manufacturer/ID# | Part Number |
|---|---|---|
| 5012 – Nexans | Nexans | 567123 |

**Technical Information:**

- **Cable, PVC Jacketed, Concentric Neutral, TRXLPE Insulated, 100% Insulation Level, 1/C, #1 AWG Cu, 15 kV** – used for 13.8kV primary underground residential distribution. The cable shall be manufactured in accordance with KWHydro spec C38.
- **Standards**: *CSA C68.3-97*
- **Approved Products**: *Nexans 567123*
- **Approved Alternatives**:
- **Notes**: *1. Cable must be CSA certified*
  *2. Reel measures 68"x32"x40" – Capacity 1500m*
- **Current Status:** [ **x** ] CSA Certified[ ] UL Listed [ ] Other certification

**Prepared by: K. Blakeman**
**Approved by: Larry Duthie _____** **1 of 1** **12/02/04**
**Approved by: Lloyd Frank _____**
**Tech Spec by: G. Cameron**
***Signature on File*** **Rev Nbr-0**

**Appendix F**
**Equipment Approval Check List**

| Item | Comply | | Comments |
|---|---|---|---|
| | Yes | No | |
| | | | |
| | | | |
| **Listing of all approved *equipment* is maintained and available** | | | |
| | | | |
| **Specifications for major *equipment* have been identified and approved by *a professional engineer,* if required, and copies are available** | | | |
| | | | |
| **Required test results are available** | | | |
| | | | |
| ***Equipment* approval is documented with signature of a *competent person* confirming that there are *no undue hazards*** | | | |
| | | | |
| **Quality Assurance is documented and followed** | | | |
| **Process exists for approval under *Good Utility Practice*** | | | |
| | | | |
| | | | |
| | | | |

## 3.0 Design – Approval of plans, drawings and specifications

The purpose of this section of the Guideline is to clarify and interpret the requirements outlined in **section 7.0 of *Regulation* 22/04** "Electrical Distribution Safety". Section 7.0, "Approval of plans, drawings and specifications for installation work" contains **the requirements *distributors* are to follow when designing installations that form part of their *distribution systems.***

### 3.1 General

#### 3.1.1 What is required under section 7 of *Regulation* 22/04?

Starting February 11, 2005 under section 7 of the *Regulation*, before beginning work on an *electrical installation* that is or may form part of a *distribution system*, or effecting repairs (other than *like-for-like* and maintenance with *legacy construction* subject to authorization by a professional engineer), alterations or extensions of an existing *distribution system*

- a *plan* must be reviewed and approved by a *professional engineer* or ESA and a *certificate of approval* provided to the *distributor*;

**or**

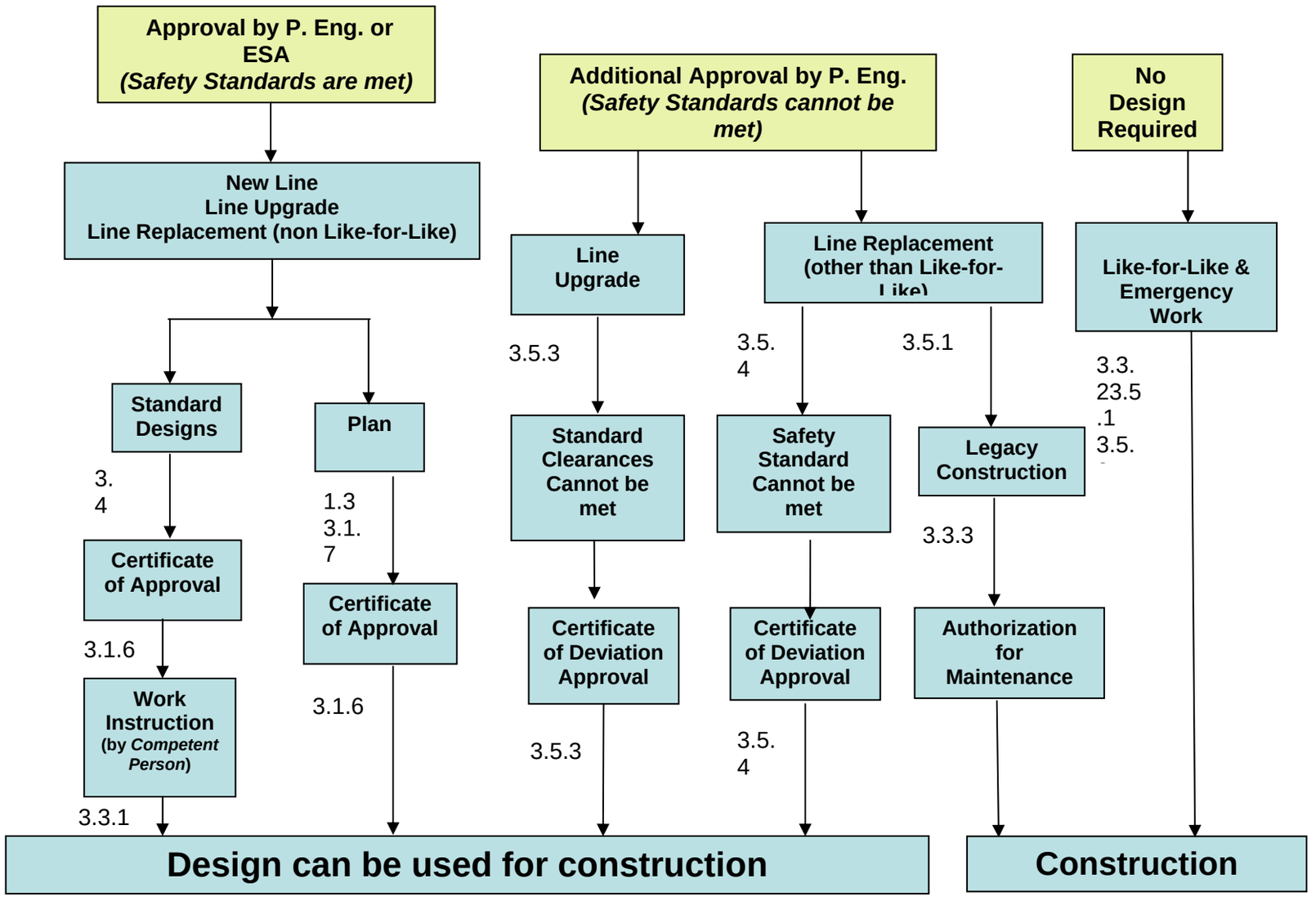
- *a work instruction* must be based on *Standard Designs* that have been reviewed and approved by a *professional engineer* or ESA and for which *certificates of approval* have been provided to the *distributor*.

After approval, the *Regulation* allows the *distributor* to utilize *Standard Designs* for work on *distribution systems* without further design approvals being required by a *professional engineer* or ESA. The *distributor* may prepare *work instructions* using its own approved *Standard Designs* in accordance with its job planning process.

#### 3.1.2 Flow Chart for Section 7 of Regulation 22/04

See flow chart on following page.

## 3.1.2 Design Approval Flow Chart



### 3.1.3 What specific work does section 7 of the *Regulation* apply to?

Section 7 of the *Regulation* comes into effect February 11, 2005 and applies to:

- all new construction by the *distributor*, or by third party, where the construction will become part of the *distribution system*;
- repair work except for work under *like-for-like replacement* or repair work on *legacy construction* ,subject to authorization by a *professional engineer*;
- alterations and extensions (*line up-grades*, rebuilds, attachments);
- *ancillary equipment* and wiring (sump pumps, SCADA, strip heating, etc).

Installations designed and built by third parties that will eventually become part of the *distribution system* are required to meet the *safety standards* of the *Regulation*. For example, third party installations for subdivisions in addition to meeting the requirements of the *distributor* are to meet the *safety standards* of the *Regulation*. More specifically, *plans* are to be approved by a *professional engineer* and *work instructions* must be based on *Standard Designs* that have been approved by a *professional engineer* or ESA.

**Third party attachments** such as telecommunication equipment, street lighting, decorations, signs etc. are not part of the *distribution system*. However, to the extent these attachments may affect the safety of the *distribution system* they may be indirectly subject to the *Regulation*. Hence, prior to authorizing third party attachments, the *distributor* is to ensure that attachments to its *distribution systems* meet the safety requirements of the *Regulation*.

Authorizing the third party attachments may be as simple as confirming that the equipment installations that are being proposed by a third party are consistent with the distributor's *Standard Designs*. Alternately, the authorization may require detailed evaluation, by the *distributor* or the third party, to determine whether the attachments meet the safety requirements. In granting approval for attachments, the distributor is to note limitations and requirements that are relevant to its applicable *Standard Designs* or to the *plan* submitted.

### 3.1.4 What part of the *distribution system* is subject to the *Regulation*?

The *distribution systems* refer to systems that are owned by the *distributor* operating at 50,000 Volts or less and extend from the fence of the transformer station and ends at the *ownership demarcation point* with each

customer. If the *distributor* owns a station where the primary voltage is less than 50,000 volts – the station is subject to the *Regulation.*

The *ownership demarcation point* for each class of customer may vary depending on the *distributor's* policy as identified in the *distributor's* Conditions of Service. The *Electrical Safety Code (ESC)* applies to equipment beyond the *ownership demarcation point* except for the *distributor's* distribution transformer and pole, revenue metering equipment and associated equipment, current transformers, voltage transformers and remote terminal units.

### 3.1.5 What are the safety standards required by the *Regulation*?

The focus of the *Regulation* is the safety of the electrical *distribution system* as outlined in section 4(2) of the *Regulation*:

"*All distribution systems and the electrical installations and electrical equipment forming part of such systems shall be designed, constructed, installed, protected, used, maintained, repaired, extended, connected and disconnected so as to reduce the probability of exposure to electrical safety hazards"*.

The safety standards that must be met for various types of *distribution systems* are provided in the following sections of the *Regulation*:

- Section 4(3) for ***ancillary equipment***
- Section 4(4) for **overhead *distribution systems***
- Section 4(5) for **underground *distribution systems*** and
- Section 4(6) for ***distribution station*.**

The safety standards contained in these sections can generally be summarized as:

- operating electrical *equipment* must be maintained **in proper operating condition,**
- **adequate space** must be provided around electrical *equipment* for proper operation and maintenance,
- energized conductors and *live* parts must be **insulated or *barriered,***
- metal parts that are not intended to be energized and that are accessible to unauthorized persons must be *effectively* ***grounded,***
- structures supporting energized conductors and *live* parts must have **sufficient strength** to withstand the loads imposed on the structure by electrical *equipment* and weather loadings,
- specific to underground designs:
    - parts of the underground system in proximity to the inside walls of a **swimming pool** must be installed in such a way

to minimize the possibility of **voltage gradients** in the swimming pool
    - parts of the *distribution system* in proximity to **propane tanks and natural gas pipelines** must be installed in such a way as to minimize the possibility of **explosions** under normal circumstances and operating conditions
- **ancillary** systems are to have a means of safe **disconnection** and installed to **minimize** the possibility of contributing or causing **fire** or **explosion**.

The safe work practices, including installation of temporary grounding for the purpose of de-energizing equipment as part of the Work Protection Code, that are to be followed by *competent persons* when working on *electrical equipment* are not part of this *Regulation*.

### 3.1.6 What constitutes a *certificate of approval*?

A *certificate of approval* can be:

- A *professional engineer*'s signature on the *plan* or *Standard Designs*. The engineer is to indicate their professional standing by the use of P. Eng, or with the application of their seal and note or a stamp that the *safety standards* required by *Regulation* 22/04 are met (see sample stamp in Appendix A); or
- Placement of a stamp on the *plan* or *Standard Designs* indicating certification for the purposes of meeting the *safety standards* of *Regulation* 22/04 and signed by a representative of ESA; or
- Provision of a separate document forming a *certificate of approval* signed by a *professional engineer* with note of their professional standing or signed by a representative of ESA (see sample forms in Appendix A).

Where a *professional engineer* approves a deviation from the *safety standards*, the *professional engineer* will provide a *certificate of deviation approval* to the *distributor*.

### 3.1.7 How can a *distributor* be assured that their *plans* and *Standard Designs* meet the *safety standards*?

*Distributors* can assure themselves that their *plans* and *Standard Designs* meet the safety standards by:

- meeting or exceeding the requirements of the applicable National Standards or Code; or
- ensuring that the installation work is based on *Standard Designs* (that have the associated *certificates of approval*) and in accordance with the *distributor's* job planning process; or
- submitting *plans* and/or *Standard Designs* for approval by a *professional engineer* or ESA.

## 3.2 National Standards and Codes

### 3.2.1 If *distributors* are going to build to National Standards or Code what do they need to follow?

Section 5 of the *Regulation* states that the *safety standards* are deemed to be met when the minimum requirements specified in existing National Standards or Code are adhered to.

Table 3-1 is a listing of National Standards or Code as outlined in the *Regulation*. *Distribution systems* designed and constructed that meet the requirements contained within these National Standards or Code, are deemed to have met the requirements of the *safety standards*.

**Table 3-1**
**National Standards or Code**

| Application | National Standards | | Electrical Safety Code |
|---|---|---|---|
| <750 V Ancillary Systems | N/A | | Rules 2-100 to 86-402 |
| Overhead *Distribution Lines* Forming Part of The Distribution System | CSA C22.3 No. 1 Overhead Systems | or | Rules 2-100 to 2-204 All of Sections 3, 4, 10, 12, 14, 18, 26, 28, 36, 75, 80, 84 |
| Underground *Distribution Lines* Forming Part of The Distribution System | CSA C22.3 No. 7 | Or | Rules 2-100 to 2-404 and All of Sections 3, 4, 10, 12, 14, 18, 26, 28, 36, 75, 80, 84 |
| *Distribution Stations* | NESC C2 (IEEE) | Or | Rules 2-100 to 2-404 and All of Sections 3, 4, 10, 12, 14, 18, 26, 28, 36, 75, 80, 84 |

## 3.3 *Work instruction* – Methods to prepare

### 3.3.1 How is a *work instruction* prepared using *Standard Designs*?

A *work instruction* is the assembly of *Standard Designs* into drawings and instructions that provide sufficient details for the installation work. The *work instruction* may reference single *Standard Designs* for a simple installation (service entrance) or a series of *Standard Designs* for more complex installations (line re-build).

The preparation of a *work instruction* must be completed by a person competent in the proper application of the *Standard Designs* in accordance with the *distributor's* job planning process. No further approval of the design is required by the *Regulation*, provided the *work instruction* is solely comprised of *Standard Designs*, already certified.

**3.3.2 In many instances, installation work is currently not supported by a formal *work instruction*. Can this practice continue?**

Yes, this practice can continue as long as the installation work is to *Standard Designs* or is exempt from the requirements of section 7 of the *Regulation*.

Examples of installations that would not require a formal *work instruction* could be:

- a line crew installing a new pole or series of poles with poles constructed according to *Standard Designs*; or
- a crew installing a new transformer, a cable, a splice or a riser in accordance with *Standard Designs;*
  or
- a crew replacing a damaged pole under emergency conditions;
  or
- a crew replacing a pole and the associated framing under a pole change out program.

**3.3.3 Under what conditions can *legacy construction* be used?**

*Legacy construction*, subject to the authorization by *a professional engineer* can be used when maintaining a portion of *line* where current *Standard Designs* would be problematic (e.g. repair or replacement of existing box construction).

**3.3.4 If a *distributor* does <u>not</u> use *Standard Designs* how do**
**3.3.5 they prepare a *plan*?**

If a *distributor* does not use *Standard Designs* the *distributor* must prepare a *plan* and have it reviewed and approved by a *professional engineer* or ESA.

## 3.4 ***<u>Standard Designs</u>***

**3.4.1 What benefit does a *distributor* have to develop its own *Standard Designs*?**

A *distributor* may use *Standard Designs* to meet all its construction requirements that occur on an ongoing basis. By utilizing *Standard*

*Designs* construction work can proceed in a more effective manner and approval from a *professional engineer* or ESA may not be required.

The *distributor* can prepare *work instructions* using the approved *Standard Designs* in accordance with its job planning process.

### 3.4.2 What methods are available for a *distributor* to develop its own *Standard Designs*?

A number of choices exist for the development of *Standard Designs*. These choices include:

- Have competent staff develop the *Standard Designs* utilizing industry standards and application guides
- Have a *professional engineer*, including third parties, develop the *Standard Designs*
- Purchase and adopt *Standard Designs* from another *distributor*.

Once developed, *Standard Designs* will require a *certificate of approval* to be prepared by a *professional engineer* or ESA.

### 3.4.3 If a *distributor* purchases *Standard Designs* from another *distributor* do the *Standard Designs* need to be approved by a *professional engineer* or ESA for use on the *distributor's distribution system*?

*Certificates of approval* for *Standard Designs* are specific for use in a given *distributor's distribution system*. The *certificate of approval* is not transferable between *distributors*, except as noted below.

The *distributor's Standard Designs* are to be used in conjunction with the *distributor's* job planning process. For some *distributors* this process may include design guidelines, application standards, engineering bulletins and approved materials forming part of a more comprehensive job planning and construction process. In all cases, approval of *Standard Designs* is understood to be in the context of the design and construction system that is specific for each *distributor*.

*Standard Designs* can be purchased with a *certificate of approval* if a *professional engineer* on behalf of the vendor certifies that the *Standard Designs* applied in the purchaser's *distribution system* will meet the safety requirements of the *Regulation*. To allow *Standard Designs* to be sold as certified for use by another *distributor* the *Standard Designs* should include sufficient information to facilitate the proper application of the *Standard Designs* in the purchaser's *distribution system*.

*Standard Designs* purchased without a *certificate of approval* for use in the purchaser's *distribution system*, require approval by a *professional engineer* or ESA.

### 3.4.4 If a group of *distributors* jointly develop *Standard Designs* and submit them to ESA, is ESA's approval applicable to each *distributor*?

ESA can approve the *Standard Designs* for use by each *distributor* provided sufficient documentation is made available that allows ESA to determine that the application of the *Standard Designs* is identical in each *distribution system*.

In any case, each *distributor* will be responsible to ensure that the *Standard Designs* are properly applied by *competent persons* in accordance with the *distributor's* job planning process.

### 3.4.5 What is the process for revising *Standard Designs*?

A revision of any part of *Standard Designs* is subject to the same approval requirements as that of an original. All revisions, including those prepared by a *competent person*, are to be reviewed and approved by a *professional engineer* or ESA.

### 3.4.6 What control system can a *distributor* use to manage its *Standard Designs*?

A system to manage the *Standard Designs* is required to ensure that only approved standards are utilized for the standard construction and repair of the *distribution system*. The *distributor* is responsible for developing and implementing a document control system for its *Standard Designs*.

The complexity of the system is the choice of the *distributor* and can range from a simple paper file to a computerized system.

Items that could be incorporated in a document control system include:

- specification name or standard drawing title
- date developed and by whom
- signature of approving authority (*professional engineer* or ESA)
- revision block with signature space for approval of revisions
- application information noting any limitations if appropriate
- acceptance of the standard as that of the *distributor* (can be done by title block)
- an index listing titles of approved standard drawings and standard specifications utilized by the *distributor*

- the *certificate of approval*s for the set of *Standard Designs*, or a stamp on each of the *Standard Designs*.

## 3.5 Repairs, Alterations and Extensions of an Existing *Distribution system*

### 3.5.1 Is there any planned installation work that does not require design approval?

Section 7(7) of the *Regulation* states that the requirements of section 7 do not apply for work on *electrical installations* that involves the replacement of one piece of electrical equipment with another piece of *equipment* of the same voltage and characteristics. This section allows the *like-for-like replacement* of limited equipment on the *distribution system*.

Examples where this exception may apply could be:

- the replacement of defective *equipment* with similar *equipment* (failed transformer, damaged switchgear, rotten pole);
- the replacement of substandard with standard single components (insulators, poles, cross arms, conductors);
- replacement of a single assembly such as a pole and the associated material;
- repair work on *legacy construction* subject to authorization by a *professional engineer*.

In all such instances, the requirements for the *construction verification* process will apply as set out in section 8 of the *Regulation*.

### 3.5.2 What happens under emergency conditions?

During emergency situations, in the interest of continuity of supply, work may proceed without *plans* or *work instructions* under the *like-for-like* exception to section 7 of the Regulation. Repairs made during emergency conditions are to follow the requirements of Section 9(2) of the *Regulation* in that a part or portion of the *distribution system* can be replaced with similar construction as long as *no undue hazard* to the safety of any person is created.

For work to proceed under these conditions a *competent person* prior to putting the system into service shall ensure there are *no undue hazards* and will follow the requirements of the *distributor's construction verification* program.

### 3.5.3 Is it possible to upgrade a *distribution line* where the standard clearances cannot be achieved?

Deviation from the standards for clearances and separations outlined in rule 5(2), and 5(3) of the *Regulation* may be permitted when the *distribution lines* are upgraded.

Under Clause 9(1) of the *Regulation* the *distributor* may still put an upgraded installation (that does not meet the standards for clearances and separations) into use if a *professional engineer* certifies that:

- the reason for failing to meet the standards was a lack of space and
- the failure to meet standards will not materially affect the safety of any person or property.

All upgrading work is subject to the requirements of Section 7 of the *Regulation.* When the standard clearances cannot be met, a *professional engineer* is to prepare the *certificate of deviation approval* for such *plans* or *work instructions*, and include the above statements and provide it to the *distributor*.

### 3.5.4 If a *distributor* replaces a part or portion of a *line* with similar construction, what conditions apply?

When a part or portion of a *line* is to be replaced that involves the planned replacement of multiple components the design process is to be followed as set out in Section 7 of the *Regulation*.

In some instances, the *distributor* may replace a part or portion of an existing *line* with similar construction that does not meet the *safety standards* set out in section 4 of the *Regulation.* In such instances the deviation as allowed in Section 9(2) of the *Regulation* may be applied:

- When a plan or a work instruction is required, a *professional engineer* will prepare a certificate of deviation approval and provide it to the *distributor* noting the variation from the safety standard and clearly stating that *no undue hazard* to any person is created by the construction.
- When a plan or a work instruction is not available for *like-for-like replacement*, emergency work, or *legacy construction* subject to authorization by a *professional engineer*, a *competent person* will clearly state in the Certificate that *no undue hazard* to any person is created by the construction.

## 3.6 Approval of *plans* and *Standard Design* by ESA

### 3.6.1 How does the approval by ESA work?

Unless a *distributor* utilizes *plans* or *Standard Designs* that are approved by a *professional engineer*, the *distributor* must submit *plans* or its *Standard Designs* to ESA for approval in accordance with section 7(2)(b) of the *Regulation* prior to construction. When submitting *plans* or its *Standard Designs* to ESA the *distributor* should allow sufficient time for the ESA approval process.
The purpose of the ESA review is to approve *plans* or *Standard Designs* with respect to the *safety standards* as outlined in the *Regulation*. Hence, ESA will not approve the integrity of the *plans* or *Standard Designs* for other parameters such as efficiency or cost effectiveness.

*Distributors* are encouraged to evaluate all options for approval of their *plans* or *Standard Designs*, as it may be more cost effective to obtain approval from a *professional engineer*, other than ESA, as the third party could also provide review and approval of many other aspects.

### 3.6.2 What information is required by ESA for approval of a *plan*?

The following is a suggested list of information that a *distributor* could include in its submission to ESA of proposed drawings and instructions:

- A covering letter including the *distributor's* name and contact name, project name and address, a description of the project, supply voltage, and proposed construction start date;
- A copy of the site *plan* indicating the location of the construction relative to buildings, structures, roads, property lines and equipment in proximity of the proposed construction, along the proposed route;
- A complete single line diagram including all affected primary feeders and distribution, protective device ratings, transformer ratings, conductor type and sizes, underground cable types and sizes, available fault current, and switching devices;
- *Equipment* layout drawings including dimensions of elevation and profile views that clearly indicate the electrical and physical clearances of the proposed electrical *equipment*, and fencing arrangements where required;
- List of approved *equipment* or reference information for major distribution *equipment* which includes: transformers, conductors, load break switches, reclosing switches, switchgear, insulators, protective devices, lightning arrestors, poles and station breakers. The information provided is to be adequate to allow ESA to determine the suitability of the *equipment* for use on the *distribution system*;
- Grounding details;
- Co-ordination study of protective devices;

- Certified construction drawings of structures such as poles, tower bases and underground structures such as cable chambers and *vaults*.

The information provided to ESA will vary depending on the nature of the project being constructed.

### 3.6.3 What information is required by ESA for approval of a *distributor's Standard Designs*?

The following is a suggested list of information to be submitted to ESA for approval of a *distributor's Standard Designs*:

- A covering letter including the *distributor's* name and contact name, a description of the *Standard Design* and its application;
- *Equipment* layout drawings including dimensions and views that clearly indicate the electrical and physical clearances of the electrical *equipment*;
- Grounding details; as required by National Standards or Code;
- List of approved *equipment* or reference information for major distribution *equipment* which includes: transformers, cables and wires, load break switches, reclosing switches, switchgear, insulators, protective devices, lightning arrestors, poles and station breakers. The information provided is to be adequate to allow ESA to determine the suitability of the *equipment* for use on the *distribution system*;
- Certified construction drawings of major structures such as poles, tower bases and underground structures such as cable chambers and *vaults* including sufficient details to confirm the structural integrity of the intended application.

To facilitate the review and approval process in a timely fashion the *distributor* should submit all required documentation as a complete package. The *distributor* may contact ESA to obtain quotes for approval of specific installation *plans* or *Standard Designs*.

## 3.7 Non- Compliance: What happens if a *distributor* is in non-compliance with section 7 of the *Regulation*?

If a *distributor* has been given notice by ESA of non-compliance with section 7 (1) of the *Regulation* and fails to remedy the non-compliance within the time set out in the notice, then the *distributor* is required to submit all further *plans* or *Standard Designs* to ESA for approval.

Except where allowed under the Appeal Process, no other means is available for approval of installation *plans* or *Standard Designs* until the non-compliance is remedied. *(Refer to Appeal Process Regulation).*

## 3.8 Documentation

### 3.8.1 How long do the *Standard Designs* and applicable *certificates of approval* need to be kept?

The *distributor* shall retain its *Standard Designs* along with the applicable *certificates of approval* as long as the *Standard Designs* remain approved for use on the *distributor's distribution system*.

### 3.8.2 How long do *plans, work instructions,* and *certificates of approval* need to be kept?

To ensure compliance with the *Regulation* an audit process has been included in the *Regulation*. The *Regulation* requires an auditor acceptable by ESA to audit the *distributor's* compliance with section 7 on an annual basis (in addition to sections 4, 5, 6 and 8).

The *distributor* shall retain *plans*, *work instructions*, and *certificates of approval* for a period of one year after the annual audit following construction completion.

The *distributor* shall make available completed *plans*, *work instructions*, *Standard Designs* and all relevant *certificates of approval* to ESA upon request for the period noted above.

## 3.9 Appendices for Design:

| | |
|---|---|
| **Appendix A** | **Sample Certificates of Approval** |
| **Appendix B** | **Design Checklist** |

**Appendix A**
**Sample *Certificates of Approval***

**Sample wording – stamp**

**Certificate of Approval**
**The installation work covered by this document meets the safety requirements of Section 4 of Regulation 22/04**

_____ _____
**Name** **Date**

_____
**Signature & Professional Designation**

**Certificate of Deviation Approval**
**The installation work covered by this document meets the safety requirements of Section 4 of Regulation 22/04 with the following deviations**

_____
_____
_____

_____ _____
**Name** **Date**

_____
**Signature & Professional Designation**

**Sample wording – separate document:**

**Certificate of Approval**
**This is to certify that the installation work covered by these documents for *add the name of distributor* meet the safety standards of Section 4 Regulation 22/04.**

Drawings and Specifications forming part of this plan:

| Document Name | Reference Number or Issue Date |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

_____ _____
**Name** **Date**

_____
**Signature & Professional Designation**

**Appendix B**
**Design Checklist**

| | Comply | | Comments |
|---|---|---|---|
| | **Yes** | **No** | |
| ***Certificates of approval* exist for all *plans*** | | | |
| ***Certificates of approval* exist for all *Standard Designs*** | | | |
| ***Work instructions* are prepared by *competent persons*** | | | |
| ***Competent persons* for the assembly *of work instructions* are identified by the *distributor*** | | | |
| **Conditions where *like-for-like* are applied** | | | |
| | | | |
| **Copies of *Standard Designs* are available to *competent persons*, as appropriate** | | | |
| **System exists for the management of *Standard Designs* and contains the following:** | | | |
| • **Listing of *Standard Designs*** | | | |
| • **Copies of *Standard Designs*** | | | |
| • ***Certificates of approval*** | | | |
| • **Revision process** | | | |
| | | | |
| **For the audit period, copies of installation *plans, work instructions, Standard Designs* and associated *certificates of approval* are available** | | | |
| **Record retention policy requires installation *plans, work instructions* and *certificates of approval* to be maintained for a minimum of one year after audit completion** | | | |
| **Process exists for approval of third party attachments** | | | |
| | | | |

## 4.0 Construction Verification – Inspection and approval of construction

The purpose of this section of the Guideline is to clarify and interpret the requirements outlined in **section 8.0 of *Regulation* 22/04** "Electrical Distribution Safety". Section 8.0, "Inspection and approval of construction" contains the **requirements *distributors* are to follow prior to putting any new construction or repairs to *distribution systems* into use.**

### 4.1 General

#### 4.1.1 What is required by Section 8 of *Regulation* 22/04?

After February 11, 2005, the date section 8 of the *Regulation* comes into effect, before putting any new construction or repairs of *distribution systems* into use, the *distributor* is to:

- ensure the construction is inspected;
- confirm that only *approved equipment* was utilized in the construction;
- prepare a *record of inspection*; and
- complete a *Certificate*.

#### 4.1.2 What is meant by "putting a *distribution system* into use"?

*Putting a system into use* means after completion of the work or portion of the work to construct, repair or modify an electrical installation forming part of the electrical *distribution system*, it is placed back into full service or is made available for service.

For new construction the system is available for service when the construction reaches a stage where it can be used to distribute electrical energy. For modifications and repairs to existing systems the system is available for service when it can be returned to normal use.

**Examples:**

***Live* line work:** The *line* remains energized while performing the construction work. Certification that the installation meets the *safety standards* will be required prior to removing the work site protection.

**Energizing part of a project:** For projects such as a voltage conversion or a *line upgrade* in which equipment is connected to a new primary circuit at various stages, a partial inspection and certification is required prior to each portion being made available for service.

**Back up Power Supply:** A new *line* constructed for a back up supply may or may not be energized immediately. The *line* can be inspected when the construction is finished and can be made available for service once the *Certificate* is completed.

#### 4.1.3 Flow Chart for Section 8 of Regulation 22/04

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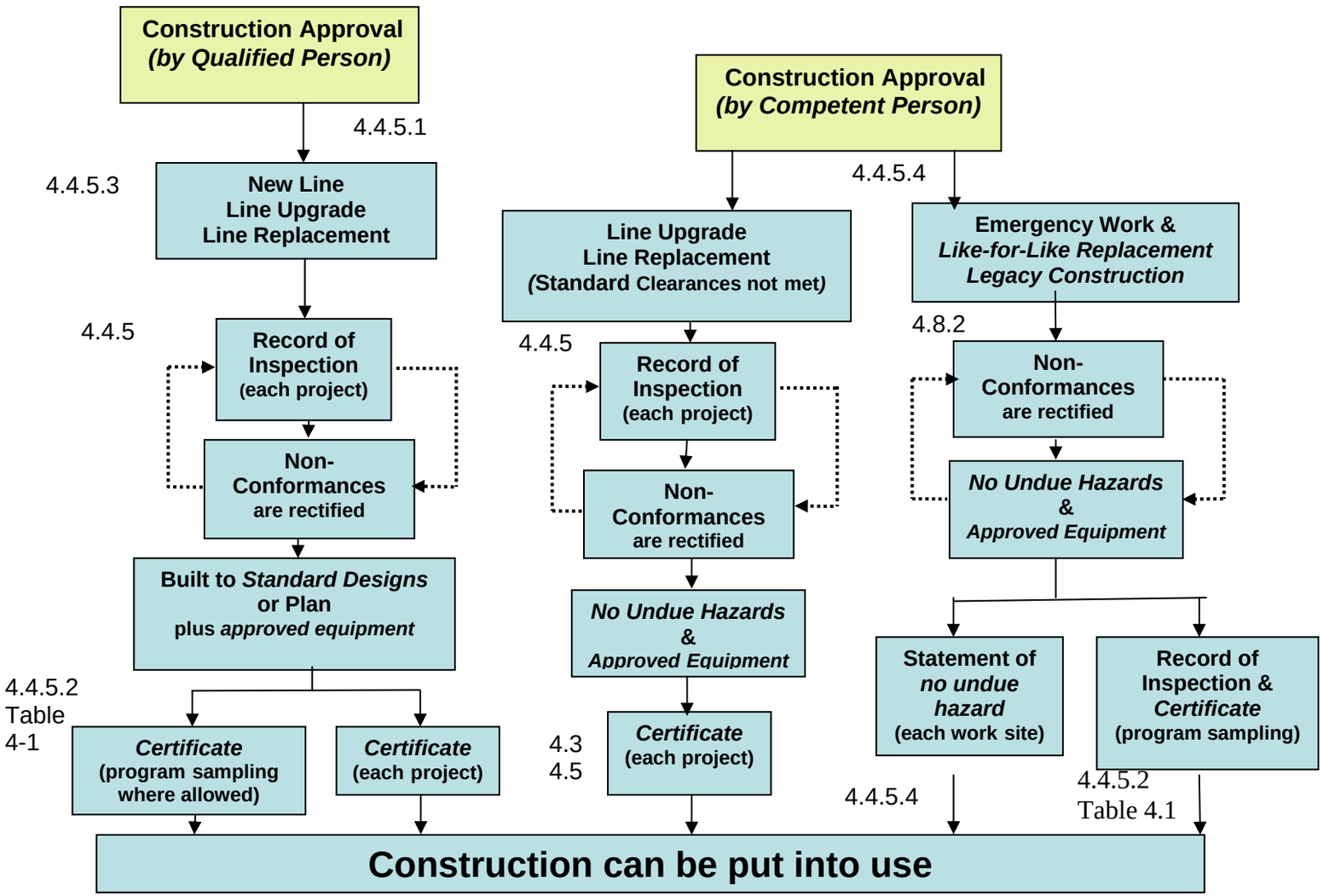
## 4.1.3 Construction Verification and Approval



#### 4.1.4 What are the *safety standards* required by the *Regulation*?

The *safety standards* are outlined in section 4 of the *Regulation*. A summary of these requirements is included in section 3.1.5 of this Guideline.

#### 4.1.5 For the purpose of the *Regulation* who can carry out an inspection of construction?

The *Regulation* allows three options for the inspections of construction:

- by a *professional engineer*; or
- by a *qualified person*; or
- by ESA, at the request of the *distributor*.

### 4.2 Inspection by a *professional engineer*

#### 4.2.1 What does a *professional engineer* need to do to complete an inspection?

To complete an inspection of the distribution construction a *professional engineer* is required to:

- carry out the inspection;
- ensure that *approved equipment* was utilized for the construction; and
- prepare a *record of inspection*.

#### 4.2.2 Completing the inspection

The *professional engineer* will visit the construction site and prepare a record of the inspection.

Where a *professional engineer* determines that:

- the installation is not in accordance with the *plan* or *Standard Designs*; or
- equipment utilized for the installation is not approved; or
- the installation does not meet the *safety standards*

the deficiencies should be noted in the *record of inspection* and provided to the d*istributor* to initiate the required corrective actions. Once the *professional engineer* is satisfied that the corrective actions have been taken and the construction meets the *safety standards*, the *professional engineer* can finalize the *record of inspection*.

#### 4.2.3 What constitutes a *record of inspection*?

A *record of inspection* is to include sufficient description to identify the work and equipment inspected.

A typical *record of inspection* can be the construction drawings with any compliance or deficiencies with respect to the *safety standards* noted, dated, and initialed by the *professional engineer*.

### 4.3 *Certificate* issued by a *professional engineer*

Once satisfied that the construction and equipment inspected meets the *safety standards* the *professional engineer* can prepare the *Certificate* including:

- name and signature of the inspecting *professional engineer*;
- name of the *distributor* that owns the system;
- confirmation that the construction meets the *safety standards*; and
- date of certification.

The *Certificate* can be a separate document or can be a stamp and signature added to the *record of inspection* and/or construction drawings (Sample *Certificates in Appendix A).*

### 4.4 Inspection under a *construction verification* program

#### 4.4.1 General

The *Regulation* allows *qualified persons* to inspect construction as part of the *construction verification* program developed by the *distributor* and approved by ESA. The purpose of the *construction verification* program is to outline the process that the *distributor* will use to confirm that the construction completed is in accordance with the *plans*, *work instructions* or *Standard Designs* and that the *equipment* utilized for the construction is approved by the *distributor*.

#### 4.4.2 What constitutes a *construction verification* program?

A *construction verification* program as a minimum entails:

- identification of *qualified and competent persons*;
- minimum standards for conducting an inspection and completing the *record of inspection*; and
- process to complete the *Certificate*.

The process and documentation of inspection and certification may vary depending on the type of construction completed. Please see appendix C for a sample generic *construction verification* program.

### 4.4.3 Approval of *construction verification* program by ESA:

The *distributor's construction verification* program requires approval by ESA. The following information is to be provided to ESA for approval:

- Name of the *distributor* and contact person,
- Overview of the verification program outlining:
  - Listing of persons or positions qualified for inspection and the position qualifications. An up-to-date list of qualified persons should be readily available upon request.
  - Copy of instructions outlining the verification program for planned and emergency construction, the requirements for an inspection report and *Certificate.*
  - Identification under what conditions sampling will be used for inspection, if at all
  - Sample *Certificate* or method of certification.

### 4.4.4 How does a *distributor* determine *qualified persons* for its *construction verification* program?

*Qualified persons* for the purpose of *construction verification* are those persons who are qualified because of knowledge, training, and experience with the specific *plans, work instructions* or applications of *Standard Designs* utilized by the *distributor* to construct its *distribution system*.

Positions within the *distributor's* organization that require qualifications appropriate for inspection are suitable for identification in the *construction verification* program. Positions such as Design Technicians, Crew Leaders, Superintendents, Inspectors, etc. are examples of positions qualified for the inspection and approval of construction.

The *distributor* may specify within its *construction verification* program the work that various positions are qualified to inspect and approve under the *Regulation*. For instance, it may be appropriate to qualify a Superintendent to inspect and approve all construction while limiting a Service Technician to inspect service entrances and meter installations.

### 4.4.5 Completing a *Record of inspection*

*Regulation* 22/04 requires the inspection of all construction on the *distribution system* including repairs both planned and emergency. The following sections provide the *distributor* with options for completing *records of inspection*.

Regardless of the method chosen to complete the *record of inspection*, the *distributor* is to develop and maintain standard processes and documentation to record the relevant information. The processes and

documentation are to provide sufficient details to confirm the compliance of the construction to the *plan*, *work instruction* or *Standard Designs* and to confirm that *approved equipment* was used.

#### 4.4.5.1 What are the options available for inspecting construction and preparing a *record of inspection*?

The options available to the *distributor* for the inspection of construction are outlined in Table 4 – 1.

#### 4.4.5.2 When a sampling program is used for inspection what is required?

When sampling is included in the *construction verification* program the *distributor* is required to include in its program the following;

- All construction covered by a sampling program shall be performed and verified by *competent persons*, having received training associated with safe conditions as they apply to the *Regulation;*
- Individual *Certificates* are not required for work inspected as part of a sampling program;
- The *distributor* is satisfied that the work sites are left in a safe condition upon completion of the work;
- Safe condition means that the site presents *no undue hazard;*
- *Distributor* will inspect a sample of the sites and *records of inspection* prepared to demonstrate that the safety requirements of the *Regulation* have been met;
- a *Certificate* will be prepared documenting all the sites covered, not just the sites that were sampled.

Examples of where sampling could be utilized include programs such as; pole replacement programs, replacement of faulty components, installation of secondary services, etc. The *distributor* shall provide in their *construction verification* program, submitted to ESA, the minimum sampling ratios of work where sampling is proposed.

**Table 4 - 1**

| **Type of Work** | **Work Documentation** | **Record of Inspection** | ***Certificate*** |
|---|---|---|---|
| New Construction<br><br>Upgrade | *Plan*<br>*Work instruction*<br>*Standard Designs* | *Qualified person* inspects in accordance with the *distributor's* schedule which can include sampling and notes compliance with *plan, work instruction or Standard Designs* and use of *approved equipment* | *Certificate* issued for each project or work type(where sampling is allowed) |
| Planned replacement (other than for *legacy construction*) | *Standard Designs*<br>*Work instruction*<br>*Like-for-like* | *Qualified person* inspects each site and records compliance with *Standard Designs* or *work instructions* and use of *approved equipment*<br>Or<br>*Competent person* inspects each site(or sampling) to confirm safe condition upon work completion. Completion of work is recorded. | For sites inspected by *qualified person*-*Certificate* issued<br><br>or<br>For sites inspected by *competent person* - sample inspection by a *competent person* for quality assurance and *Certificate* issued for all sites. |
| Emergency<br>and<br>*legacy construction*<br>replacement | *Like-for-like*<br>*Part or portion*<br>*Legacy construction* | For emergency work - *competent person* inspects each site to confirm safe condition upon work completion. Confirmation of safe condition recorded in specified location<br>or<br>For emergency work – *competent person* inspects each site to confirm safe condition upon work completion. Completion of work recorded.<br><br>For legacy construction replacement - *competent person* inspects each site and confirms safe condition upon work completion. | For emergency work where the confirmation of safe condition has been recorded in a specified location, the confirmation of inspection of safe condition forms the *Certificate*.<br>or<br>For emergency work where only the completion of work has been recorded - sample inspection to verify quality assurance and *Certificate* issued for all sites.<br><br>For *legacy construction* replacement - *Certificate* issued for each project. |

#### 4.4.5.3 When a *qualified or competent( as applicable) person* is completing an inspection what is required?

When a *qualified person* is completing an inspection, to meet the requirements of the *construction verification* program the following components are to be included in the *record of inspection*:

***Equipment* Compliance:** The inspection is to confirm that the *equipment* used for the construction is approved. For instance, where the bill of material for the construction inspected is solely comprised of "*approved equipment*", the *equipment* can be deemed to meet the *Regulation*.

Where the *electrical equipment* does not comply with a code or standard under a rule of the *distributor*, the *equipment* is to meet any of the standards for approval of equipment set out in Rule 2-024 of the Ontario Electric Safety Code. (See Equipment Approval Section 2.0)

**Construction Compliance:** For planned work, the inspection is to confirm that the construction was completed in accordance with the *plan, work instruction* or with the *Standard Designs* for the work.

The *qualified person* may confirm construction compliance by identifying those installations inspected that were constructed in accordance with the *plan, work instruction* or *Standard Designs*. The use of "as constructed drawings" may be appropriate for this purpose. In addition to changes in dimensions, the *qualified person* should note any alternative *Standard Designs* that were used for the construction to suit unforeseen field conditions.

Where a *qualified person* determines that portions of the construction are not in accordance with the associated *plan, work instruction* or *Standard Designs* or that an *undue hazard* exists, the *qualified person* should note the non-compliance in the *record of inspection* and advise the *distributor*. The *distributor's construction verification* program is to outline a process for resolving non-compliance and could include such items as reconstruction, modifications, creation of new *Standard Designs*, a *plan* approval by a *professional engineer*, etc.

Once the non-compliances have been rectified, a *qualified person* can prepare a *Certificate*.

#### 4.4.5.4 What is required when a *competent person* is confirming that the site is left in a safe condition?

When a *competent person* is confirming that a site is left in a safe condition, to meet the requirements of the *construction verification* program the following is required:

- The *competent person* has inspected the site to confirm that the site presents *no undue hazards*.
- Indication of work completion or indication that the site is left in a safe condition is to be provided on the documentation as outlined in the *distributor's construction verification* program (i.e. on a work order, trouble report, time sheet, site drawing, *Standard Designs*, work log, dispatch log, etc.) and
- the documentation forms part of the *distributor's* normal workflow and document retention program.

#### 4.4.5.5 How is "work in progress" to be inspected?

In instances where portions of a project are being put into service or require inspection prior to completion of the project (such as the inspection of underground cables prior to backfilling), the *distributor* may follow a progressive inspection approval process.

Where the *distributor* follows a progressive inspection approval process, the *distributor* is to secure a series of *records of inspection* and partial *Certificates* coupled with a final *Certificate* at the end of the project for any work not previously certified.

#### 4.4.5.6 What are the requirements for the inspection of third party construction on the *distribution system*?

Third party construction falls into two classifications:

- construction that will form part of the *distribution system* such as new *lines* and
- work added onto a *distribution system* such as communication equipment.

For third party construction such as new *lines* that will form part of the *distribution system* the *distributor* should ensure that the construction has followed the approved *plan* and that any variation is noted for resolution by the constructor. A *Certificate* is to be issued prior to placing the system into use.

**Third party attachments** such as telecommunication equipment, street lighting, decorations, signs etc. are not part of the *distribution system*. However, to the extent they may affect the safety of the *distribution system* they may be indirectly subject to the *Regulation*. In authorizing third party attachments, the *distributor* is to ensure that the proposed attachments to its *distribution systems* meet the safety requirements of the *Regulation.*

For third party construction, the *distributor* should ensure that the construction is in compliance to its *Standard Designs* or to an approved *plan*. The *distributor* could inspect the site using a *qualified person* or require assurance of construction compliance to *Standard Designs* or to approved *plan* from the third party. Any variation from *Standard Designs* or *plan* should be noted for resolution by the owner in the *record of inspection*.
Once the inspection record has been prepared and all non-compliances have been rectified the *distributor* can prepare and issue a *Certificate(*)*. The purpose of the *Certificate* is to ensure that there is no negative impact on the *distribution system* by the third party installation and does not require the approval of the third party's equipment by the *distributor*. In these installations, it is likely that the construction will be placed into service by the third party prior to a *Certificate* being issued.

When a distributor determines during the course of its operation that a third party attachment does not comply to its *Standard Designs* or approved *plan,* the distributor should advise the third party of the non-compliances and could pursue additional remedial solutions through its attachment agreements. Where the third party does not rectify the non-compliance within a reasonable time, the distributor may notify an appropriate regulator or ESA, who in turn may carry out its own investigation.

*(*) Note: The issuance of a Certificate by the distributor is subject to the cooperation afforded by the third party.*

## 4.5 *Certificate* issued under a *Construction verification* program

### 4.5.1 What should be included in a *Certificate* issued under a *construction verification* program?

Once satisfied that the *equipment* is approved and the installation is in accordance with the *plan, work instruction, Standard Designs,* or *legacy construction* authorized by a *professional engineer;* a *qualified person* can prepare a *Certificate*.

The *Certificate* should include:

- identification of the construction inspected;
- confirmation that the construction is in accordance with the *plan, work instruction, Standard Designs,* or *legacy construction* authorized by a *professional engineer,* including the use of *approved equipment*;
- job classification, name, and signature of the *qualified person* completing the *Certificate*; and
- date of certification.

Sample *Certificates* are illustrated in Appendix A.

However, in recognition that *line* repair or replacement work that is done under emergency conditions ("trouble calls") or for maintenance purposes in accordance with *legacy construction(* subject to the authorization of a *professional engineer)* may not have a *certificate of approval*, all such work would require a *record of inspection* and a *Certificate* by a *competent person*. *Competent persons* preparing *Certificates* are to be identified as *qualified persons* in the *construction verification* program.

The *Certificate* can be a separate document or a stamp on associated documents such as the inspection report and/or construction drawings.

## 4.6 Documentation

### 4.6.1 How long does *construction verification* documentation need to be kept?

The *distributor* is to retain the *records of inspection* and *Certificates* and make them available to ESA upon request for a period of at least one year after the annual audit, following construction completion.

However, the *distributor* is encouraged to consider maintaining the audit documentation for longer periods of time consistent with its existing documentation retention processes.

## 4.7 Inspection and Approval by ESA

### 4.7.1 What are the conditions associated with inspection and certification by ESA?

Upon request by the *distributor*, the inspection and approval of construction can be carried out by ESA.

The purpose of the ESA inspection is to review the construction with respect to the *safety standards* as outlined in section 4 of the *Regulation* and to ensure that *approved equipment* is used. ESA will not approve the integrity of the construction for other parameters such as efficiency or cost effectiveness. ESA will prepare a *record of inspection* and if satisfied that the construction meets the *safety standards* will provide a *Certificate* to the *distributor*.

The *distributor* should allow sufficient time for the coordination of inspection and approval by ESA in their job planning.

## 4.8 Deviation from the Required Standards

The *Regulation* allows construction to vary from the *safety standards* under specific situations. Where a *distributor* intends to follow its *construction verification* program, the *distributor* is to outline its process for handling these situations.

### 4.8.1 Insufficient Space

Where a portion of a *distribution system* is upgraded and does not meet the standards for clearances and separations as specified in the National Standards or Code (see section 3.2), the *distributor* may still put the system into use if a *professional engineer* certifies that:

- the reason for failing to meet the standards was a lack of space; and
- the failure to meet the standards will not materially affect the safety of any person or property.

The *distributor* is to retain the engineer's *certificate* of deviation approval.

### 4.8.2 Replacement of part or portion of a *line* under *emergency conditions* or for maintenance in accordance with *legacy construction* subject to the authorization by a *professional engineer*:

Under special conditions, Section 9(2) of the *Regulation* allows a part or portion of an existing *distribution system* to be replaced with a similar part or portion that does not meet the *safety standards* required by the *Regulation*, as long as the *distributor* ensures that the construction does not create any undue hazard to the safety of any person.

*Like-for-like replacement*, line repair or replacement work done under emergency conditions (trouble calls), or maintenance in accordance with legacy construction subject to authorization of a professional engineer, are exempted from the requirements of Section 7 of the *Regulation*. However,

such work is to be inspected by a *competent person* to confirm that it presents *no undue hazards*.

**Appendices for Construction Verification**

| | |
|---|---|
| **Appendix A** | **Sample *Certificates*** |
| **Appendix B** | ***Construction Verification* Checklist** |
| **Appendix C** | **Generic *Construction Verification* Program** |

## Appendix A
## Sample Certificates

**Sample wording for stamp – Professional Engineer:**

**Certificate**
**This is to certify that the construction as recorded in this drawing meets the requirements of the safety standards of Regulation 22/04**

_____ _____
**Name** **Date**

_____
**Signature & Professional Designation**

**Sample wording for stamp – Qualified Person**

**Certificate**
**This is to certify that the construction as recorded in this drawing is consistent with the approved plan, Standard Designs, or work instruction and that approved equipment has been used:**

_____ _____
**Name** **Date**

_____ _____
**Signature** **Position**

**Sample wording for separate form –**

**Professional Engineer**

**Certificate**

**This is to certify that the construction recorded on these documents for *add name of distributor* meet the safety standards as per Section 4 of Regulation 22/04.**

| Document Name | Reference Number or Issue Date |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |

**Name** _____ **Date** _____

_____

**Signature & Professional Designation**

**Qualified Person**

**Certificate**

**This is to certify that the construction recor these documents for *add name of utility* is co with the approved plan, Standard Designs, instruction or legacy construction and that a equipment has been used**

| Document Name | Reference Number or I |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |

**Name** _____ **Date** _____

_____

**Signature** **Position**

## Appendix B
## Checklist Inspection and Approval of Construction

| Item | Comply | | Comments |
|---|---|---|---|
| | **Yes** | **No** | |
| ***Record of inspection*** **completed** | | | |
| • **Approved *plan* has been followed** | | | |
| • ***Standard Designs*** **applied correctly** | | | |
| • ***Approved equipment*** **used** | | | |
| • ***Like-for-like*** **or *legacy construction*** **subject to authorization by *a professional engineer*** **presents *no undue hazard*** | | | |
| ***Certificates*** **completed** | | | |
| • **Construction identified** | | | |
| • **Construction confirmed in compliance with *safety standards*** **or *for like-for-like*** **or *legacy construction*** **subject to authorization by a *professional engineer*** **confirmed *no undue hazard*** | | | |
| • **Any progressive inspections have been documented and partial *Certificates*** **completed** | | | |
| • **Signed and dated** | | | |
| ***Competent*** **and *qualified persons*** **have received training on the *distributor's construction verification*** **program** | | | |
| **System determined for logging "site safe" on time sheets, dispatch log, etc. is identified in the *distributor's construction verification*** **program** | | | |
| **Audit Type Points** | | | |
| ***Certificates*** **available for all construction** | | | |
| ***Construction verification*** **program exists and approved by ESA** | | | |
| ***Qualified persons*** **have followed the requirements of *the construction verification*** **program** | | | |
| **Process exists for up-dating list of *qualified persons*** | | | |
| **For the audit period, copies of *the record of inspections*** **&** ***Certificates*** **are available** | | | |

## Appendix C
## Generic *Construction Verification* Program

This generic program outlines the major areas that a *distributor* should consider in developing its *construction verification* program. Depending on the individual program complexity, there may not be the need for the distributor to include in its program all sections or options outlined below.

**1.0 Statement of Purpose:**

1.1 To outline how the *distributor* will meet the *construction verification* requirements set out in the *Regulation 22/04*.

1.2 To ensure that construction follows *plans, work instruction, Standard Designs*, or *Legacy Construction* and that only *approved equipment* is used.

**2.0 *Qualified Person* or *Competent Persons* for the Purpose of the *Construction Verification* program**

2.1 Outline the positions or names of individuals that are qualified to inspect and approve construction of the *distributor's distribution systems*. Although names of the individual are not required, an up-to-date list of positions or individual names should be available upon request by ESA or for audit purposes.

2.2 Provide the qualifications of each position in support of the above.

2.3 If applicable, the *distributor* should outline the type of construction each position is qualified to inspect and approve.

2.4 List the competent positions or persons that are qualified to inspect and approve emergency work, *like-for-like replacement, and legacy construction*( subject to authorization by a *professional engineer*) replacement.

**3.0 Process for Completing Inspection:**

3.1 Outline when the inspection for various types of work is to be completed (at end of job, group inspection, etc)

3.2 What documentation forms a *record of inspection* for the various types of work to be inspected (as constructed drawings, service orders, listing of orders, trouble calls, etc)

3.3 Instructions on how to manage the *records of inspection* and where these will be filed

3.4 Instructions for completing a *record of inspection* of construction and noting *equipment* compliance

**4.0 Resolving Non-Compliance:**

4.1 Outline a process for resolving non-compliances including who to consult within the organization and levels of authority with respect to resolution of non-compliances

4.2 Instructions on how to record non-compliances and resolutions.

**5.0 Sampling of emergency work and *like-for-like replacements*:**

5.1 Outline what types of work sampling will be used for and the proposed sampling rate

5.2 Outline the sampling program including:

5.2.1 All construction covered by a sampling program to be performed and verified by *qualified* or *competent persons*,

5.2.2 Note when *Certificates* are required. Individual *Certificates* are not required for each work site inspected as part of a sampling program but *Certificates* are to be prepared documenting the sites covered by the sampling.

5.2.3 Statement that the *distributor* is satisfied that the work sites are left in a safe condition upon completion of the work

5.2.4 Safe condition means that the site presents *no undue hazard*

5.2.5 Distributor will inspect a sample of the sites and prepare *records of inspection* to demonstrate that the *safety standards* of the *Regulation* have been met

5.3 Identify where confirmation from the field of safe condition will be recorded, by whom and what signature, if any, is required (dispatch, time sheets, work instruction etc)

5.4 Proof that the record forms part of the document retention program.

***6.0* Process for completing *Certificate***

6.1 Outline when *Certificates* are to be completed

6.2 Instructions on how to complete a *Certificate*

6.3 Provide examples of *Certificates* by types of construction

6.4 Identify where the *Certificate* will be filed (on the drawing as a stamp, in job file, etc.)

**7.0 Work in Progress:**

7.1 Outline when interim inspection is to be done

7.2 Outline how to incorporate interim *records of inspection* with the final *Certificate*

**8.0 Third Party Inspection:**

8.1 Outline the process to approve requests for attachments by a third party

8.2 Outline the process to inspect third party attachments – inspection by the *distributor* or by third party and documentation provided

8.3 Mechanism for resolving non-conformances by a third party.

8.4 Final *record of inspection* noting resolution of non-conformances

8.5 How and where the final *record of inspection* and *Certificate* will be filed

9.0 **Training:**

9.1 Indicate the training to be provided to each *competent* or *qualified person* in the *distributor's construction verification* program.

*9.2* Maintain records of training provided to each *competent* and *qualified persons*

**Summary of Revisions**

**September 30, 2005**
Section 2.9 Appendix C. Updated to reflect most current ESA Bulletin 2-7-20 Approval of Electrical Equipment Rule 2-024

**September 15, 2008**
The following sections were revised.
1.3.9 Certified Test Report
2.1 2 Is it the expectation that all *equipment* must be formally approved?
2.7.2 Under the rule of the *distributor*, how can the *distributor* provide assurance of *equipment* safety equivalent to rule 2-024?
2.7.5 Good Utility Practice for Non-Major Equipment
2.7.6 Good Utility Practice for Major Equipment used for Maintenance or Reuse
2.7.8 What elements could be included in a distributor's equipment approval system?
Appendix B CSA Standards Related to Electricity Distribution
Minor spelling, grammatical and dated references were corrected or updated.