



Technical Guideline for

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

Ontario Regulation 22/04

Electrical Distribution Safety

January 12, 2005

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.

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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 “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;
- 1.3.10 “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;
- 1.3.11 “contractor”** means any person who performs work on electrical equipment or an electrical installation. O. Reg.22/04;
- 1.3.12 “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;
- 1.3.13 “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);
- 1.3.14 “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;
- 1.3.15 “distribution system”** means a system for distributing electricity, and includes any structures equipment or other things used by a *distributor* for that purpose;
- 1.3.16 “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);

- 1.3.17 “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;
- 1.3.18 “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);
- 1.3.19 “ESC”** means the Electrical Safety Code referred to in Ontario Regulation 164/99;
- 1.3.20 “equipment” or “electrical equipment”** means any apparatus, device, 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);
- 1.3.21 “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;
- 1.3.22 “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);
- 1.3.23 “hazard”** means a potential for injury to a person or property;
- 1.3.24 “legacy construction”** means existing construction built in accordance with *Good Utility Practice*, that does not meet current Standard Designs;
- 1.3.25 “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;
- 1.3.26 “line upgrade”** means the replacement or significant improvement of an existing *distribution line*;
- 1.3.27 “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;

1.3.28 “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;

1.3.29 “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*;

1.3.30 “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);

1.3.31 “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;

1.3.32 “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

- 1.3.33 “professional engineer”** means a person who holds a license or temporary license under the Professional Engineers Act (Reg. 22/04);
- 1.3.34 “putting a system into use”** means making an *electrical installation* forming part of the electrical *distribution system* available for service;
- 1.3.35 “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;
- 1.3.36 “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;
- 1.3.37 “Regulation”** means the Ontario Regulation 22/04 – Electrical Distribution Safety;
- 1.3.38 “safety standards”** means the safety standards set out in section 4 of the Regulation;
- 1.3.39 “secondary distribution line”** means an electricity distribution line conveying electricity at 750 volts or less phase to phase. O. Reg.22/04;
- 1.3.40 “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;
- 1.3.41 “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;
- 1.3.42 “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.
- 1.3.43 “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 **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.**

2.1 **General**

2.1.1 **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*

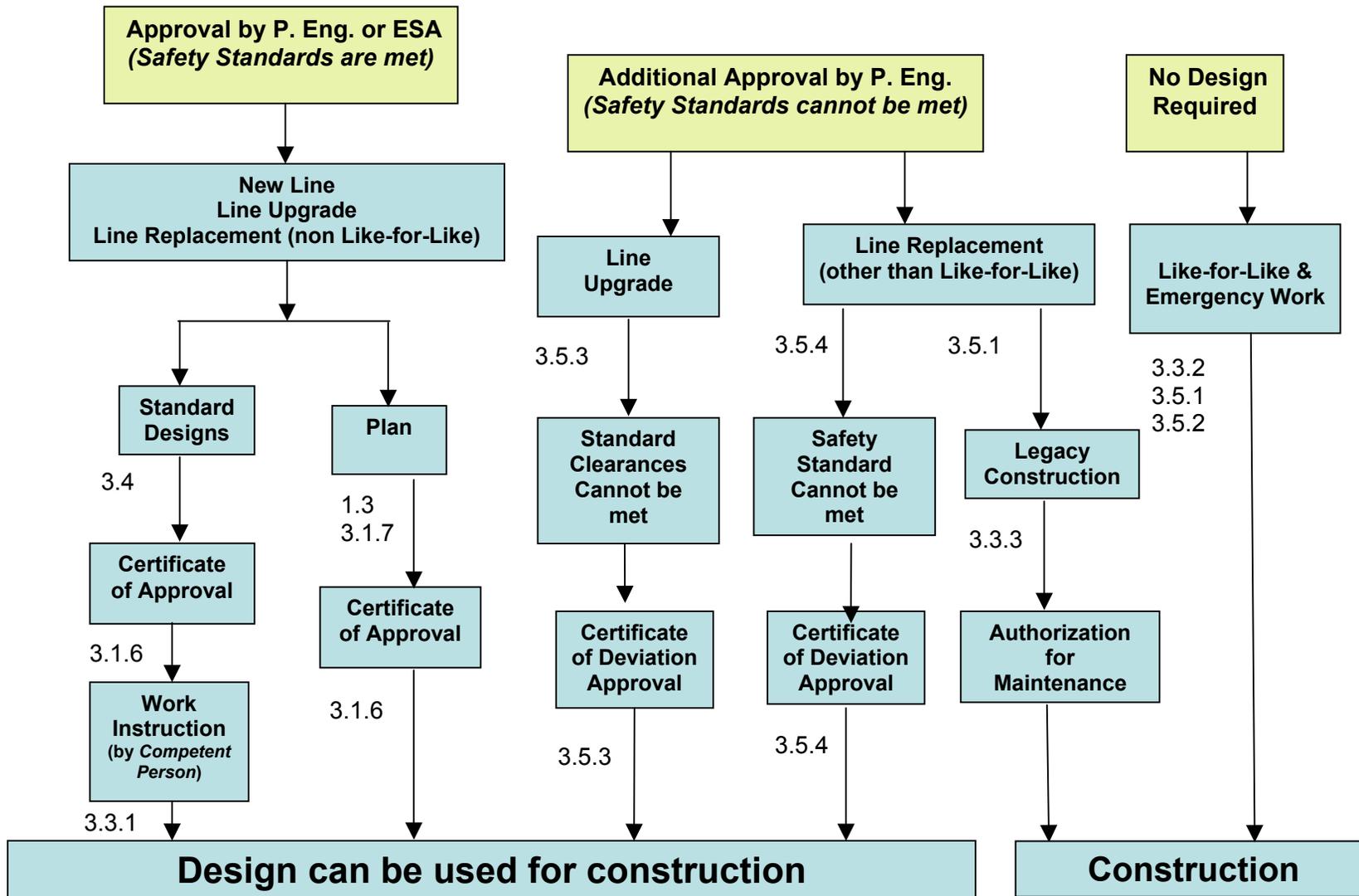
- a *plan* must be reviewed and approved by a *professional engineer* or ESA and a *certificate of approval* provided to the *distributor*;
- or**
- a *work instruction* must be based on *Standard Designs* that have been reviewed and approved by a *professional engineer* or ESA and for which *certificates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

2.1.2 **Flow Chart for Section 7 of Regulation 22/04**

See flow chart on following page.

3.1.2 Design Approval Flow Chart



2.1.3 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.

2.1.4 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.

2.1.5 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*.

2.1.6 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*.

2.1.7 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.

2.2 National Standards and Codes

2.2.1 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 <i>Distribution Lines</i> 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 <i>Distribution Lines</i> 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
<i>Distribution Stations</i>	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

2.3 Work instruction – Methods to prepare

2.3.1 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.

2.3.2 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.

2.3.3 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).

2.3.4 If a *distributor* does not use *Standard Designs* how do 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.

2.4 Standard Designs

2.4.1 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.

2.4.2 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.

2.4.3 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.

2.4.4 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.

2.4.5 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.

2.4.6 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 approvals* for the set of *Standard Designs*, or a stamp on each of the *Standard Designs*.

2.5 **Repairs, Alterations and Extensions of an Existing *Distribution system***

2.5.1 **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*.

2.5.2 **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.

2.5.3 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*.

2.5.4 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.

2.6 Approval of plans and Standard Design by ESA

2.6.1 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.

2.6.2 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.

2.6.3 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*.

2.7 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*).

2.8 **Documentation**

2.8.1 **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*.

2.8.2 **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.

2.9 **Appendices for Design:**

Appendix A
Appendix B

Sample Certificates of Approval
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	

**Appendix B
Design Checklist**

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

