



Canadian Standards Association
Mississauga, Ontario
To the Part I Committee

Subject No. 3079 **MODIFIED** Chair: M.S. Anderson Date: January 22, 2004

Title: Conductors & Disconnecting Means for Fire Pumps, Rules 32-200 to 32-208

Submitted by: A. Tsisserev of City of Vancouver on May 27, 2002.

Proposal: Request for an Amendment to the following rules in Subsection “Fire Pumps”:

ATTENTION TO THE S/C MEMBERS:

This subject has been modified as the result of the recent Fire Pumps Task Force meeting and in light of the negative comments submitted by the Part I members. The amended proposal incorporates recommendations of the Task Force (all product related requirements have been removed; and a number of TIL’s have been developed for the equipment - based on the proposed wording) and reflects concerns presented by the Part I members in their objections to the original proposal.

Ark Tsisserev.

Request (specifically worded):

A1) To amend Rule 32-200 to read as follows:

“32-200 Conductors (see Appendix B)

Conductors from the emergency power source generator to a fire pump shall be:

- (a) Copper and shall have ampacity not less than:**
 - (i) 125% of the full load current rating of the motor, where an individual motor is provided with the fire pump; and**
 - (ii) 125% of the sum of the full load currents of the fire pump, jockey pump, and the fire pump auxiliary loads, where two or more motors are provided with the fire pump; and**
- (b) Be protected against fire exposure to provide ensure continued operation for not less than 1 h in compliance accordance with requirements of the National Building Code of Canada”**

A2) To add Appendix B Note on Rule 32-200 to read as follows:

(Ark's note: present title of 32-200 has a reference to the Appendix B Note on this Rule, however there is no Note on this Rule in Appendix B)

Note on Rule 32-200:

“Intent of this rule is to protect the feeder conductors between a fire pump and an emergency power source from fire damage.

The National Building Code of Canada requires that conductors supplying a life and fire safety equipment be protected against exposure to fire to ensure continued operation of this equipment for a period not less than 1 h.

NFPA 20 also mandates protection against possible damage by fire of circuits feeding fire pumps against possible damage by fire.

The intent of this rule is to protect feeder conductors that supply a fire pump from the emergency generator in order to ensure operation of these conductors under their exposure to fire. The following example illustrates acceptable methods for achieving this protection: Acceptable protection could be achieved by the following methods:

- a) Using mineral insulated cables conforming to fire rating requirements as specified in Clause 5.3 of the CSA Standard C22.2 No. 124 “Mineral Insulated Cable”;
- b) Embedding the raceway containing fire pump feeder conductors in not less than 50 mm of concrete;
- c) Installing the raceway containing fire pump feeder conductors in a shaft enclosure or service space of at least 1hour fire resistance construction.

Specific requirements pertaining to the fire resistance rating of a material or an assembly of materials can be found in subsection 3.1.7 of the National Building Code of Canada or in the appropriate Provincial/Territorial Legislation.”

A3) To amend Rule 32-204 by deleting ~~current wording of~~ Subrule (3) and ~~replacing it with the following wording:~~ and by adding the following wording to Subrule (1):

32-204(31) “A separate service box conforming to Rule 32-206 shall be permitted for fire pump equipment. for the fire pump equipment shall conform to Rule 32-206”;

A4) To add new Rule 32-206 to read as follows:

“32-206 Disconnecting Means and Overcurrent Protection.

- (1) No device capable of interrupting the fire pump circuit, other than a circuit breakerswitch specifically approved for fire pump service, shall be placed between the service box and a fire pump transfer switch or a fire pump controller.
- (2) The circuit breakerswitch referred to in Subrule (1) shall be labelled in a conspicuous, legible, and permanent manner identifying it as the fire pump power supply.
- (3) The circuit breakerswitch referred to in Subrule (1) shall be permitted to be used as a separate service box ~~in accordance with described in~~ Rule 32-204.

(4)(4) Where the circuit breakerswitch conforming to this rule is installed in an emergency supply circuit between the emergency ~~generator power source~~ and the fire pump transfer switch, the rating or setting of the circuit breaker overcurrent protection for the fire pump feeder shall comply with rule 28-200. for the fire pump feeder shall be permitted to be selected to:

~~(a) carry the sum of the locked rotor current of the motor(s) and the full load current of the associated fire pump accessory equipment for a period between 8 seconds and 20 seconds, and~~

~~(b)(a) _____ have the instantaneous short circuit characteristic set at not less than the sum of the full load current of the associated fire pump accessory equipment and 20 times the full load current of the motor(s)~~

~~(5) Where the locked rotor current as specified in Subrule (4) is not marked on a motor, 600% of the rated current of the motor shall be considered to be locked rotor current.~~

~~(6)(5) Where the switch-circuit breaker conforming to this rule is installed in a normal supply circuit upstream of the fire pump controller, the rating or setting of the circuit breaker shall be not less than the overcurrent protection that is provided integral with the fire pump controller. from the fire pump controller, the overcurrent protection of the fire pump feeder shall have only the instantaneous trip with a short circuit characteristic set at not less than the sum of the full load current of the associated fire pump accessory equipment and 21 times the full load current of the motor(s)”~~

(A5) To renumber current Rule 32-206 as Rule 32-208.

(A6) To delete current Rule 32-208.

(A7) To add Appendix B Note on newly added Rule 32-206 to read as follows:

Appendix B Note on Rule 32-206: “ The intent of this rule is to only allow a circuit breakerswitch specifically approved for a fire pump service to be installed upstream from the fire pump controller in a normal power supply circuit, or upstream from the fire pump transfer switch in an emergency power supply circuit. It is also intended by this rule that this circuit breakerswitch could be used as a fire pump service box when permitted by Rule 32-204. When this circuit breakerswitch is installed in the emergency power supply circuit, upstream from the fire pump transfer switch, then the circuit breaker overcurrent protection provided by requirements of Subrule (4) should be able to allow the fire pump operate up to with the locked rotor current condition for the period not exceeding 20 seconds. This time limit will allow an emergency generator to provide necessary power to the required fire pumps while supplying all other loads connected to the generator. Specific requirements for the locked rotor current tripping time between 8 seconds and 20 seconds may be also found in Clause 7-4.4 of NFPA 20. It is intended that compliance with rule 28-200 could be met by selecting overcurrent protection in conformance with Table D16.

~~The intent of Subrule (4) is to allow the setting of the instantaneous trip for the overcurrent protection installed in the switch to be 20 times of the full load current. When this The circuit breakerswitch is installed in the normal power supply circuit, upstream from the fire pump controller, should have a rating /then only the instantaneous trip setting that is coordinated with the integral overcurrent protection of the fire pump controller in such a manner that the upstream overcurrent device does not disconnect the circuit prior to the operation of the fire pump controller overcurrent protection. is intended to be provided by Subrule (6), as a complete combined locked rotor current and~~

~~instantaneous short circuit protection of the fire pump equipment is incorporated in the fire pump controller specifically approved for a fire pump service. It is intended by Subrule (6) that the instantaneous trip should be set at 21 times of the full load current in order to be co-ordinated with the instantaneous trip installed in the fire pump controller and set at 20 times”.~~

Note: Clause 7-4.3.3 of NFPA 20(1999) requires that the controller have an instantaneous trip setting of not more than 20 times the full load current. Clause 7-4.4 of NFPA 20 requires that a fire pump controller carry locked rotor current for a period of 8 to 20 seconds.

(A8) To delete reference to Appendix B from title to Rule 32-210 (as there is no Note in Appendix B on this rule)

Reasons for request:

- (1) To reflect requirements for protection of conductors with the NBC and NFPA 20 and to correlate this requirements with the NEC (Article 695.6);
- (2) To clarify provisions for disconnecting means and overcurrent protection upstream from a fire pump controller and from a fire pump transfer switch, to correlate these provisions with the requirements for O/C protection in the standard for a fire pump controller (7-4.3 and 7-4.4 of NFPA 20).

Supporting Information:

There are numerous arguments by the electrical designers, installers and fire protection experts on the subject of conductors’ protection. Installations range from fire pump feeders being protected from the normal power supply, emergency power supply, both or completely unprotected. The proposed amendment will clarify the requirements and will assist in applying a uniform approach for fire pump installations, consistent with the NBC, NEC and NFPA 20.

Requirements of the current Rule 32-208 have been continuously questioned by the designers and installers, as these requirements are not co-ordinated with the NFPA 20, are not clearly defined whether they are applied for O/C installed in the switch, in the fire pump controller, in the emergency or normal power supply circuit.

The proposed amendment will clarify the intent of the O/C and will correlate the requirements with the NFPA 20.

Subcommittee Deliberations: Five of the eleven members responded in agreement and although there was a poor submissions of voters, there was a clear consensus.

Subcommittee Recommendation: To accept the proposal.