



Canadian Standards Association
Mississauga, Ontario
To the Part I Committee

Subject No. 3079

Chair: M.S. Anderson

Date: January 10, 2003

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 (specifically worded):

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

“32-200 Conductors (see Appendix B)

Conductors from the emergency 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) protected against fire exposure to ensure continued operation for not less than 1 h in accordance with requirements of the National Building Code of Canada”

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

Note on Rule 32-200:

“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. 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 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.”

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

32-204(3) “A service box for the fire pump equipment shall conform to Rule 32-206”;

- 4) 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 switch 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 switch 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 switch referred to in Subrule (1) shall be permitted to be used as a service box in accordance with Rule 32-204.
- (4) Where the switch conforming to this rule is installed in an emergency supply circuit between the emergency generator and the fire pump transfer switch, rating or setting of the overcurrent protection 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) 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) Where the switch conforming to this rule is installed in a normal supply circuit upstream 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)”

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

- (6) To delete current Rule 32-208.

(7) 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 switch 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 switch could be used as a fire pump service box when permitted by Rule 32-204. When this switch is installed in the emergency power supply circuit, upstream from the fire pump transfer switch, then the overcurrent protection provided by requirements of Subrule (4) should be able to allow the fire pump operate with the locked rotor current 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.

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 switch is installed in the normal power supply circuit, upstream from the fire pump controller, then only the instantaneous trip setting 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”.

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.

Chair’s Comments: I support the proposal and I concur with the supporting information comments.

Subcommittee Deliberation: Nine of the eleven members responded in agreement with the submission, there were a couple of comments as follows:

-Leave the original wording for Rule 32-200 "from an emergency power source" rather than the proposed wording of "emergency generator". If a separate service box were used to supply the fire pump then the rule for supply from an emergency generator would not be applicable.

-Change wording in Subrule 32-206(6) from "..instantaneous trip with a short circuit characteristics set.." to "..instantaneous trip short circuit characteristic set..". The existing wording could create some confusion as to where we are talking about traditional short circuit protection as per Rule 14-102 as a separate item to the instantaneous trip setting issue. It also would promote consistent wording used elsewhere.

Subcommittee Recommendation: The Chair is agreement as they do not change the intent of the proposal. The proposal should reflect these minor corrections.

I declare Subcommittee consensus for the proposal with the corrections.