



Canadian Standards Association
Mississauga, Ontario
To the Part I Committee

Subject No. 3080

Chair: V.G. Rowe

Date: February 25, 2003

Title: Correction of Terminology, Rule 18-072

Submitted by: George Lobay, Canada Dept. of Natural Resources – CANMET, 555 Booth Street, Ottawa, Ontario, K1A 0G1 on August 26, 2002

Proposal: Amend Rule 18-072 as follows:

In this request, ~~strikeout text~~ indicates existing Code text to be deleted; underlined text indicates text to be added to the Rule.

18-072 ~~Explosive Fluid~~ Flammable Liquid Seals

Electrical equipment containing ~~a an explosive fluid~~ seal intended to prevent ~~explosive fluids~~ flammable liquids from reaching the electrical housing or conduit system shall not be used at pressures in excess of the marked maximum working pressure (MWP).

Reasons for Request:

Although this Rule has been in the Code for a long time, what it is really referring to is flammable liquids. The use of the oddball term “explosive fluid” is wrong and misleading. There is only an explosion hazard if the vapours from flammable liquids mix with air; the liquid itself is not explosive. In fact there are fluids that do explode, like nitromethane and nitroglycerine (and many other explosives that happen to be liquids), but this rule isn’t talking about substances like that, since they are in quite a different category than flammable liquids.

This Rule is talking about installations in a hazardous locations context where there might for example be a pressure transducer installed in the wall of a pressure vessel containing a flammable solvent. The pressure transducer has to have a seal such that the flammable liquid cannot get in to the wiring system to which the transducer is connected.

Nowhere else in the Code is the term “explosive fluid” used. Everywhere else, the more usual and conventionally acceptable term “flammable liquid” is used.

By continuing to use this term we may be misleading the reader with this oddball terminology, which could give the idea the Rule isn’t about flammable liquids - which in fact it is.

In a sense this Rule really isn’t required at all. It says that you have to follow the installation instructions for the product. Such rules are not needed in the Code. I would have no objection if

this Rule was deleted. However, C22.2 No. 30 has performance requirements for liquid seals (see below) so deleting this clause would break the link between Part I and Part II for this type of device.

The NEC does not use this oddball terminology. I have included the relevant text from the NEC under the Supporting Information below. Actually, the NEC is a lot clearer about what is intended in this situation. The NEC explicitly requires that there be a secondary fluid seal to protect conduit systems in the event the primary seal fails. The CEC does not go this far and only requires that where such seals are used, they need to operate at, or less than, their working pressure ratings. There is no explicit Rule (that I can find) which requires that a secondary fluid seal, as described in NEC, be provided.

Unfortunately, because this wrong terminology has been around for a long time, it has propagated to other areas. CSA Standard C22.2 No. 30 clause 4.10.6 refers to “Explosive Fluid Seals” where again the correct term should be “Flammable Liquid Seals”. Also, Alberta Electrical Safety Information Bulletin (October 2001) uses this wrong terminology when discussing how pressure transducers should be selected.

I suppose there would be those who say this Rule, wrong as it might be, hasn’t caused any problems, so why change it now, but I disagree (obviously)

Supporting Information:

NEC 505.16(E)(3) states the following. I have used bold text to highlight the relevant areas.

(3) Canned Pumps, Process or Service Connections, and So Forth. For canned pumps, process or service connections for flow, pressure, or analysis measurement, and so forth, that depend upon a single compression seal, diaphragm, or tube to prevent flammable or combustible fluids from entering the electrical conduit system, **an additional approved seal, barrier, or other means shall be provided to prevent the flammable or combustible fluid from entering the conduit system** beyond the additional devices or means if the primary seal fails.

The additional approved seal or barrier and the interconnecting enclosure shall meet the temperature and pressure conditions to which they will be subjected upon failure of the primary seal, unless other approved means are provided to accomplish the purpose in the preceding paragraph.

Also, Rule 501.5 states the following.

501.5 Sealing and Drainage.

Seals in conduit and cable systems shall comply with 501.5(A) through (F). Sealing compound shall be used in Type MI cable termination fittings to exclude moisture **and other fluids** from the cable insulation.

FPN No. 1: Seals are provided in conduit and cable systems to minimize the passage of gases and vapors and prevent the passage of flames from one portion of the electrical installation to another through the conduit. Such communication through Type MI cable is inherently prevented by construction of the cable. **Unless specifically designed and tested for the purpose, conduit and cable seals are not intended to prevent the passage of liquids, gases, or vapors at a continuous pressure differential across the seal.**

Even at differences in pressure across the seal equivalent to a few inches of water, there may be a slow passage of gas or vapor through a seal and through conductors passing through the seal. See 501.5(E)(2). Temperature extremes and highly corrosive liquids and vapors can affect the ability of seals to perform their intended function.

Drains, vents, or other devices shall be provided so that primary seal leakage is obvious.

Chair's Comments:

I agree with the intent of the submitter's request in that I believe flammable is more consistent with section 18 than explosive. However in changing "fluid" to "liquid" I believe we have changed the intent of the rule. The dictionary definition of fluid applies to liquids and gases. In this situation we are concerned with sealing against both liquids and gases from process equipment. I propose the wording be modified as follows to include both.

18-072 ~~Explosive Fluid~~ Flammable Gas or Liquid Seals

Electrical equipment containing a ~~an explosive fluid~~ seal intended to prevent ~~explosive fluids~~ flammable gases or liquids from reaching the electrical housing or conduit system shall not be used at pressures in excess of the marked maximum working pressure (MWP).

Subcommittee Deliberations: There were a total of nine replies and one negative questioning whether this rule should be in the section on electrical seals. As this requirement applies to the seal on electrical devices such as pressure switches that prevents process gas or liquids from entering the electrical section of the device, the rule is correct in this location. The current sealing rules in Class I locations apply to the conduit seal.

Subcommittee Recommendation: The subcommittee recommendation is to accept the rule change as modified in the Chair's comments. Note that the submitter has balloted in favor of the Chair's comments as well.