



# Secondary Seals

---

## **Pierre McDonald**

Administrator / Chief Inspector - Electrical

Safety Services Branch

Alberta Municipal Affairs and Housing

**AEICTC May 2, 2007**

# Code Requirements

- ◆ Canadian Electrical Code Rules  
18-092(1), 18-108(1), 18-158(1)
- ◆ Secondary seals shall be provided, between devices containing a primary seal and conduit or cable seals, where failure of a single component in the device containing the primary seal could allow passage of process fluids.

# What is a Secondary Seal



A Secondary Seal is:

a seal that is designed to prevent the passage of process fluids at the pressure it will be subjected to upon failure of the primary seal.

- not the same as a conduit or cable seal

# Intent of Installing Sec. Seals

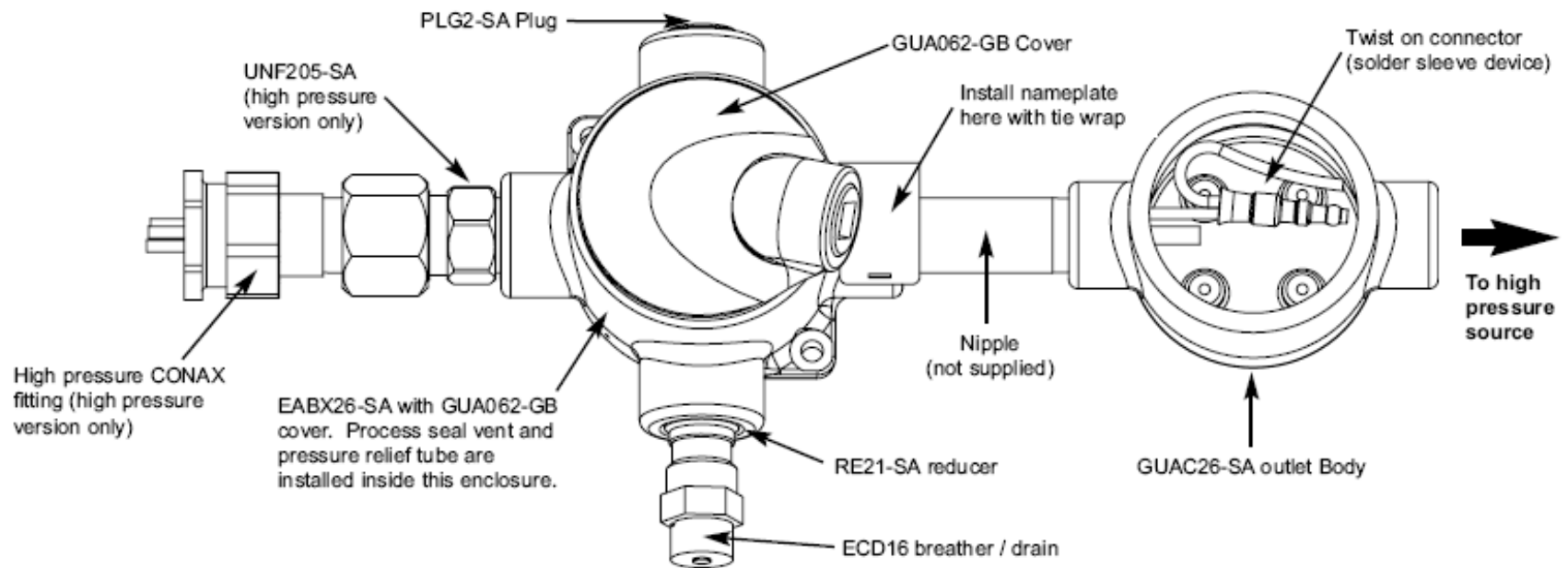
- ◆ Intended to prevent the flow of flammable fluids from devices connected directly to process fluid in the event that the Primary seal fails.
  - a seal that isolates process fluids from an electrical system and that has one side of the seal in contact with the process fluid.

# History

- ❖ December 2000, at a Natural Gas Compressor station
- ❖ Primary Seals failed leaking gas into the Motor connection box
- ❖ Pressure forced these fluids into an unclassified area resulting in catastrophic explosion (no fatality) [cec part 1](#)

## First on the Market

### TYPICAL INSTALLATION

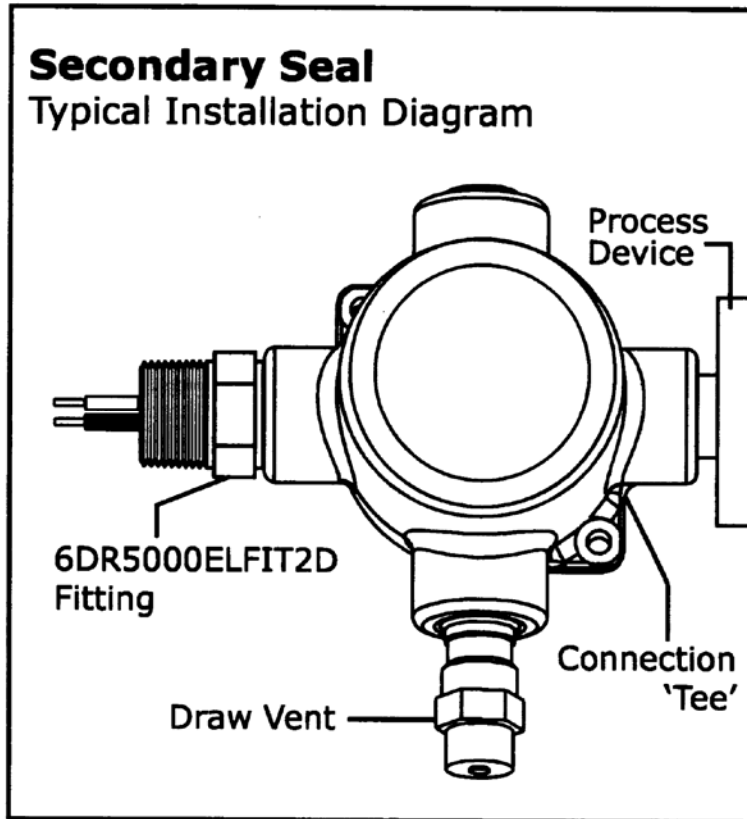


# Where it would be installed

The following slide shows a Rosemount pressure transmitter mounted on an Ethane pipeline that operates at 900-1260 psi.



## Another Sec. Seal



- ◆ Secondary seal rated for 1000 psi (as of Feb, 2007)

- ❖ CE Code Part I Committee accepted a recommendation to include within our code this secondary seal requirement (This was a committee decision)
- ❖ Despite the fact the requirement was a Part II problem and belongs with the manufactures

- ◆ The Electrical Technical Council formed a Task Group to deal with Secondary Seals and write a provincial Variance
- ◆ The intent of the Variance is to put back on the manufacturers the requirement to have End Devices certified

## ELECTRICAL SAFETY Variance

## STANDATA

February 14, 2007

CEC-18-092, 18-108, 18-158, 18-158, J18-108, J18-158 (rev-01)  
Page 1 of 2

### VARIANCE CANADIAN ELECTRICAL CODE

**SUBJECT:** Rules 18-092, 18-108, 18-158, J18-108, J18-158 – RE: Secondary Seals

#### Preamble

Installers and Safety Codes Officers have expressed concerns about when and where secondary seals are required.

Recent changes to the Canadian Electrical Code rules 18-092, 18-108, 18-158, J18-108 and J18-158 state:

- 1) Secondary Seals shall be provided, between devices containing a primary seal and conduit or cable seals, where failure of a single component in the device containing the primary seal could allow passage of process fluids.

The intent of these rules is to eliminate the possibility of process fluids (liquids or gases) from migrating under pressure through the electrical conduit, cable and wire systems in the event of a failure to the primary seal. It should be noted a standard conduit seal does not prevent the migration of process fluids under pressure.

Presently there is a standard (ANSI/ISA 12.27.01 Requirements for Process Sealing Between Electrical Systems and Flammable or Combustible Process Fluids) by which end devices which are exposed to process pressures can be certified to meet the requirements of these rules. Equipment complying with this Standard is eligible to include either the "Single Seal" or "Dual Seal" designation in the nameplate markings. Equipment with these markings are recognized as providing an "equivalent means of protection" and will eliminate the need for the additional sealing requirements for process-connected electrical equipment outlined in Subrule 1 of Rules 18-092, 18-108, 18-158, J18-108 and J18-158.

Currently most manufacturers have not certified their devices to the ANSI/ISA 12.27.01 standard, thus most devices such as pressure switches and flow devices have no nameplate markings in terms of acceptable seals meeting the intent of the new Section 18 and J18 Rules.

**Alberta**  
Municipal Affairs  
and Housing

Issue of this STANDATA is authorized by  
the Administrator



Pierre McDonald



SAFETY CODES COUNCIL

Alberta Municipal Affairs and Housing, Safety Services, 107 East, Clarence Place, 10155 - 102 Street, Edmonton, Alberta, Canada, T5J 0L4  
Safety Codes Council, Suite 800, 10707 - 100 Avenue, Edmonton, Alberta, Canada, T5J 3M4

## Alberta Variance available at:

[http://www.municipalaffairs.gov.ab.ca/ss\\_Electrical\\_STANDATA.htm](http://www.municipalaffairs.gov.ab.ca/ss_Electrical_STANDATA.htm)

# ALBERTA VARIANCE

An equivalent or greater degree of safety can be achieved without installing secondary seals as per Rules 18-092(1), 18-108(1), 18-158(1), J18-108(1) and J18-158(1) of the Canadian Electrical Code where end devices exposed to process pressures are installed bearing evidence of:

# ALBERTA VARIANCE

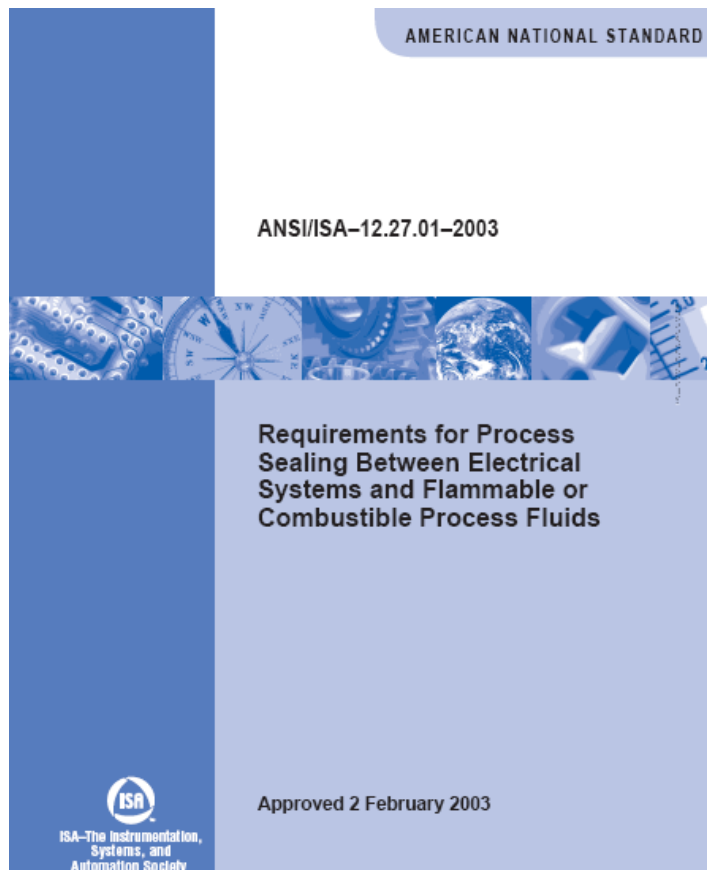
- a) Certification to ANSI/ISA 12.27.01, and are marked either “Single Seal” or “Dual Seal” accordingly; or

# ALBERTA VARIANCE



b) A manufacturers declaration declaring that:

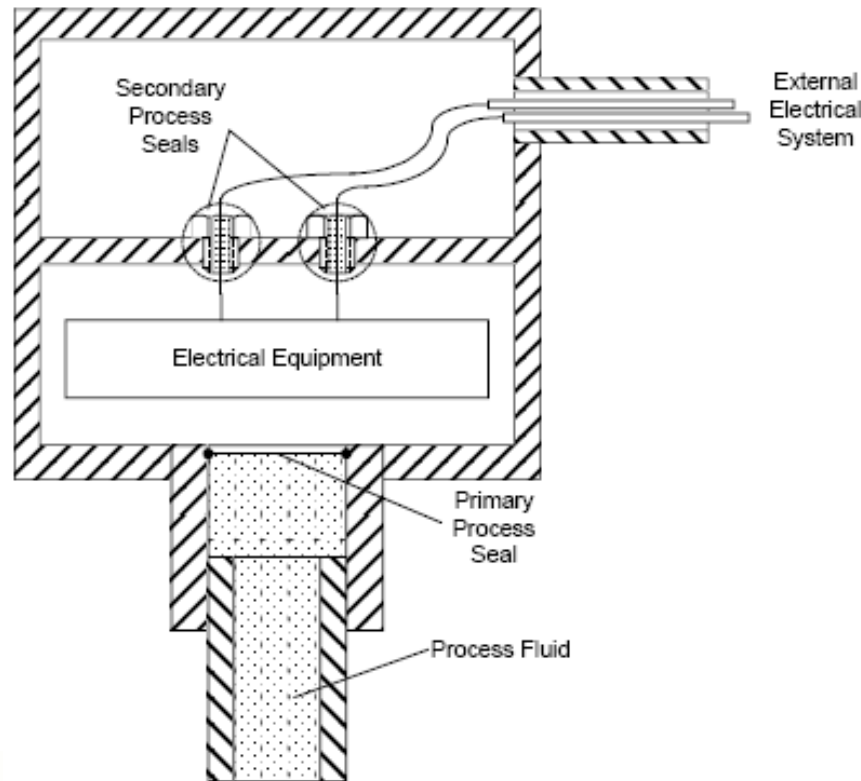
- ◆ end devices meet the requirements of ANSI/ISA 12.27.01 for “Single seal” or “Dual Seal”; and
- ◆ a file has been opened with a Certification Body to obtain certification to ANSI/ISA 12.27.01 by October 1, 2007.



## ANSI/ISA 12.27.03

### 2 Purpose

The purpose of this document is to provide construction and performance requirements for devices that incorporate process seals to eliminate the need for the additional sealing requirements included in ANSI/NFPA 70 : 2002 Sections 501.5(F)(3) and 505.16(E)(3)



# What Next?

- ◆ Task force working on STANDATA explanation for Secondary Seals
- ◆ Task force working on explanation for subrule 2 annunciation (make obvious)
- ◆ Task force working on Provincial Variance to subrule 2 annunciation

## Questions?