Presented by:
Kirk Thordobson

CFAA ALBERTA TECHNICAL SEMINAR 2013

ISOLATION MODULES (ISO’S)
• WHAT’S IT ALL ABOUT?
• WHAT IS AN ISOLATION MODULE (ISO)?
• THE TWO TYPES OF ISOLATION MODULES.
• FIRE ALARM BASICS.
• WHERE TO INSTALL ISO’S.
• VERIFICATION AND TESTING.
• QUESTIONS.
WHATS IT ALL ABOUT?

SYSTEM INTEGRITY AND SURVIVABILITY

THERE IS AN EXPECTATION THAT A FIRE ALARM SYSTEM WILL AUTOMATICALLY OR MANUALLY PERFORM TO WARN OCCUPANTS IN A FIRE EMERGENCY.
LESSONS LEARNED?

• 1995

• FATAL HIGH-RISE FIRE

• 2 FOREST LANEWAY, NORTH YORK, ONT
LESSONS LEARNED?

• SIX PEOPLE DIED!

• THE ISSUE OF FAILURE OF THE LIFE SAFETY SYSTEMS EARLY ON AT THE START OF THE FIRE WAS EXAMINED.

• FAILURE OF THE EXIT LIGHTING
• FAILURE OF THE EMERGENCY LIGHTING
• FAILURE OF THE FIRE ALARM ANNUNCIATION
• FAILURE OF THE FIRE ALARM SIGNALLING
• FAILURE OF THE VOICE COMMUNICATION SYSTEM
WHAT IS AN ISOLATION MODULE?

• “A DEVICE USED IN DATA COMMUNICATION LINKS FOR WIRE-TO-WIRE SHORT CIRCUIT FAULT PROTECTION”.

• THINK OF AN ISOLATION MODULE AS SIMILAR TO A GROUND FAULT INTERRUPTOR IN YOUR HOME.
BASIC ISO FUNCTION

DATA IN

DATA OUT

ISOLATION MODULE

SHORT CIRCUIT

NORMAL
TWO BASIC ISO TYPES

• DATA COMMUNICATION LINK (DCL) OR SIGNALLING LINE CIRCUIT (SLC)

• RESIDENTIAL IN-SUITE NOTIFICATION APPLIANCE CIRCUIT (NAC) (SIGNALLING)
TYPES OF FIRE ALARM SYSTEMS OUT THERE

- 120 V AC 3-WIRE WARNING SYSTEM
- CONVENTIONAL FIRE ALARM SYSTEM
- ADDRESSABLE FIRE ALARM SYSTEM
120 V AC 3 WIRE WARNING SYSTEM

- RUDIMENTARY
- NO CONTROL PANEL
- NON SUPERVISED
- NO EMERGENCY BACKUP BATTERIES
- LIMITED LIFE SAFETY
3 WIRE WARNING SYSTEM

NO ISOLATION MODULES REQUIRED.
CONVENTIONAL TECHNOLOGY

Wiring is installed in a supervised manner either Class A, or Class B with an End of Line (EOL) device.

IDC = INITIATING DEVICE CIRCUIT (IDC)
NAC = NOTIFICATION APPLIANCE CIRCUIT (NAC)
CONVENTIONAL TECHNOLOGY

ALARM: ZONE 1

FACP

F

IDC CLASS B

EOL

FIRE!

NAC CLASS B

Any device on IDC activates
= ANNUNCIATION OF ZONE IN ALARM ONLY

IDC = INITIATING DEVICE CIRCUIT (IDC)
NAC = NOTIFICATION APPLIANCE CIRCUIT (NAC)
Open Circuit Trouble conditions are annunciated as Zone Trouble only.

**CONVENTIONAL TECHNOLOGY**

**FACP**

**TROUBLE: ZONE 1**

**IDC ZONE 1 CLASS B**

**NAC CLASS B**

**EOL**

**IDC = INITIATING DEVICE CIRCUIT (IDC)**

**NAC = NOTIFICATION APPLIANCE CIRCUIT (NAC)**
CONVENTIONAL TECHNOLOGY

Wire to Wire short circuit condition = ANNUNCIATION OF ZONE IN ALARM.

IDC = INITIATING DEVICE CIRCUIT (IDC)
NAC = NOTIFICATION APPLIANCE CIRCUIT (NAC)
ALARM: ZONE 1 ELEC ROOM SMOKE DETECTOR device 003

Any device on DCL activates = ANNUNCIATION OF INDIVIDUAL ADDRESS

DCL = DATA COMMUNICATION LINK (DCL)  
NAC = NOTIFICATION APPLIANCE CIRCUIT (NAC)
TROUBLE: Zone 1 Manual Station 004 – No response.

Loss of communication - trouble for each device not reporting to control unit.

DCL = DATA COMMUNICATION LINK (DCL)
NAC = NOTIFICATION APPLIANCE CIRCUIT (NAC)
ADDRESSABLE TECHNOLOGY

TROUBLE: 001, 002, 003, 004 - No response.

Wire to Wire short circuit condition = FAILURE OF DCL

DCL = DATA COMMUNICATION LINK (DCL)
NAC = NOTIFICATION APPLIANCE CIRCUIT (NAC)
ADDRESSABLE TECHNOLOGY

ISOLATION MODULES MAYBE REQUIRED, BUT WHERE?
DIFFERENCE BETWEEN THE CAN/ULC-S524-01 AND THE 06 VERSION?
INTENT IS STILL THE SAME!

SYSTEM INTEGRITY AND SURVIVABILITY
INSTALLATION STANDARDS

NATIONAL STANDARD OF CANADA

CAN/ULC-S524-06

INSTALLATION OF FIRE ALARM SYSTEMS
“Where a data communication link utilizing active field devices or supporting field devices serves more than one National Building Code of Canada required fire alarm zone, a fault within one fire alarm zone shall not prevent the normal operation of other input or output field devices in another fire alarm zone, except as noted in Clause 4.2.8”.

IN ALBERTA USE THE ALBERTA BUILDING CODE (ABC) ZONES
MYTH!

ADDRESSABLE FIRE ALARM SYSTEMS DO NOT REQUIRE ZONES
ANNUNCIATOR & ZONE INDICATION

• ABC 2006 ARTICLE 3.2.4.8.

SEPARATE ZONE INDICATION

• EACH STOREY.

• “THAT PORTION OF A BUILDING THAT IS SITUATED BETWEEN THE TOP OF ANY FLOOR AREA AND THE TOP OF THE FLOOR NEXT ABOVE IT, AND IF THERE IS NO FLOOR ABOVE IT, THAT PORTION BETWEEN THE TOP OF SUCH FLOOR AND THE CEILING ABOVE IT”
• EACH FLOOR AREA IN NON SPRINKLERED BUILDING TO A MAX OF **2,000** SQUARE METERS.

• EACH FLOOR AREA IN A SPRINKLERED BUILDING TO THE AREA LIMITS SPECIFIED IN NFPA 13-(2002).
  • **4831m²** (52,000ft²) in a sprinklered, light or ordinary hazard building.

MAY OR MAY NOT HAVE PHYSICAL FIRE SEPARATION
• EACH SHAFT REQUIRING SMOKE DETECTORS (E.G. STAIR SHAFT).

• AIR HANDLING SYSTEM REQUIRED TO BE EQUIPPED WITH SMOKE DETECTORS (DUCT SMOKE ON SUPPLY FAN).
• EACH CONTAINED USE AREA (E.G. JAIL).

“A SUPERVISED AREA CONTAINING ONE OR MORE ROOMS IN WHICH THE OCCUPANT MOVEMENT IS RESTRICTED TO A SINGLE ROOM BY SECURITY MEASURES NOT UNDER THE CONTROL OF THE OCCUPANT”
• EACH IMPEDED EGRESS ZONE (E.G. PSYCHIATRIC UNIT)
  • “A SUPERVISED AREA IN WHICH OCCUPANTS HAVE FREE MOVEMENT BUT REQUIRE THE RELEASE, BY SECURITY PERSONNEL, OF SECURITY DOORS AT A BOUNDARY BEFORE THEY ARE ABLE TO LEAVE THE AREA, BUT DOES NOT INCLUDE A CONTAINED USE AREA”.
ZONE: HOSPITAL AND NURSING HOMES

• FIRE COMPARTMENT REQUIRED BY SENTENCE 3.3.3.5.(2) (HOSPITALS AND NURSING HOMES).
  • FLOOR AREA CONTAINING SLEEPING ROOMS DIVIDED INTO TWO FIRE COMPARTMENTS EACH NOT MORE THAN 1,000 SQUARE METERS.
WATER FLOW

• ABC 2006 SENTENCE 3.2.4.15.(3)
• EACH SPRINKLER WATER FLOW SWITCH
WHAT ABOUT………..

ZONES:

• ELEVATOR SHAFTS?
• 2 HOUR VERTICAL FIRE SEPARATIONS? (OTHER THAN EXIT STAIRS)

YES… UNDER THE ABC 1990
NO…UNDER THE ABC 1997 & 2006
• CAN/ULC-S527-99 “Standard for Control Units For Fire Alarm Systems”

• 3.11.2.1 (c) requires the ability to simultaneously display a minimum of 8 input zones (Can be achieved in conjunction with LEDs for example).
ZONES ARE AREAS

- FOR ISOLATION MODULE REQUIREMENT - BUILDING CODE ZONES APPLY TO AREAS NOT DEVICES.
ZONE EXCEPTIONS FOR ISO’S.

CAN/ULC-S524-06

4.2.8

- DUCT SMOKES
- SPRINKLER DEVICES

DOES NOT REQUIRE ELECTRICAL ISOLATION FROM DEVICES IN SAME ZONE.
SPRINKLER DEVICES IN EXIT STAIRWELL

ZONE 1
- MANUAL STATION
- SUPervisory VALVE
- FLOW SWITCH

ZONE 2
- SMOKE DETECTOR
- SUPERVISORY VALVE
- FLOW SWITCH

ZONE 3
- SMOKE DETECTOR
- SUPERVISORY VALVE
- FLOW SWITCH

LEGEND
- SMOKE DETECTOR
- MANUAL STATION
- ISOLATION MODULE

CAN/ULC-S524-2013
FIRE ALARM AND SPRINKLER
ZONES MAY BE DIFFERENT
### PERFORMANCE TABLE 1
**CAN/ULC-S524-06**

<table>
<thead>
<tr>
<th>ABNORMAL OPERATING CONDITION IN A LINK AT THE SAME LOCATION</th>
<th>DATA COMMUNICATION LINK (DCL) STYLES</th>
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<td>DCLA</td>
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<td>Single Open</td>
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<td>Single Ground</td>
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<td>Wire to Wire Short</td>
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<td>Wire to Wire Short &amp; Ground</td>
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<td>Open and Ground</td>
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<td>Loss of Communication</td>
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</table>

**LEGEND**

- **T** = Trouble indication at the *control unit*.
- **S** = Trouble indication at the *control unit* and alarm receipt capability during abnormal operation.
- **S1** = Trouble indication at the *control unit* and alarm receipt capability (beyond the isolated fault section of the link) during abnormal operation.
DATA COMMUNICATION LINK

- THE DATA CHANNEL BETWEEN CONTROL UNITS AND/OR TRANSPONDERS AND ANNUNCIATORS
- THE FIRE ALARM NETWORK

- ACTIVE AND SUPPORTING FIELD DEVICES
- ADDRESSABLE FIRE ALARM DEVICES
Capacity of addressable devices: 300 Device Max Limit per loop - or as per manufacture.

2 loops shown

Legend
- ADDRESSABLE MANUAL STATION
- ADDRESSABLE SMOKE DETECTOR
- ADDRESSABLE HEAT DETECTOR

NO ISOLATION MODULES REQUIRED.

Data Communication Link Table 3
Addressable Devices
Capacity of addressable devices:
200 Device Limit per loop - or as per manufacture.
2 loops shown

NO ISOLATION MODULES REQUIRED.
Capacity of addressable devices: 300 Device Limit per loop – or as per manufacture. 2 loops shown

Data Communication Link Table 3
Addressable Devices

ISOLATION MODULES REQUIRED.

DCLC

LEGEND

ADDRESSABLE MANUAL STATION
ADDRESSABLE SMOKE DETECTOR
ADDRESSABLE HEAT DETECTOR
5.14.1 Note: Where available, fault isolation modules should be located in a fire separated electrical room.

5.14.2 Fault isolation modules shall be utilized when entering and leaving each fire alarm zone, as required by the National Building Code of Canada.
5.14.3 Fault isolation modules, shall be located in a separate enclosure, visible and accessible at all times, located beyond the last device serving that floor area.

5.14.4 Fault isolation modules incorporated in a field device shall be mounted in accordance with the requirements of the field device.
• Does not require additional dedicated fault isolation modules.
EXAMPLE: Smoke detectors installed to release door hold open devices at zone boundaries.

LEGEND

MH MAGNETIC HOLDER

= SMOKE DETECTOR WITH ISOLATION BASE
5.14.5

Install on each side of fire separation.

Fault isolation module pairs

LEGEND
- ADDRESSABLE MANUAL STATION
- ADDRESSABLE SMOKE DETECTOR
- ADDRESSABLE HEAT DETECTOR
- FAULT ISOLATION MODULE
- DATA COMMUNICATION LINK

FIRE ALARM CONTROL PANEL OR TRANSPONDER
Do not install the fault isolation modules back to back that would allow the fire to spread between zones.
OFFSET THE FAULT ISOLATION MODULES

LEGEND

ISO FAULT ISOLATION MODULE

ZONE 1

ZONE 2

400mm
NO FIRE SEPARATIONS

5.14.7

ONE ISOLATION IN BETWEEN ZONE BOUNDARIES.

Legend:
- Addressable smoke detector
- Addressable heat detector
- ISO Fault isolation module
Fault isolation modules serving multiple devices in a single exit.

**LEGEND**
- **ISO**: Fault Isolation Module
- **SMOKE DETECTOR**
- **MANUAL STATION**

**EXIT STAIR SHAFT**

5.14.8

ZONE 1

ZONE 2

STAIR
5.14.9

Isolation modules require an identifying label on the cover plate or field device.
APPLICATION: INCORRECT!

DCL CLASS A OR B

ISO

CLASS B

DCL FIELD DEVICES

FACP
APPLICATION: HYBRID

CLASS A DCL

ISO

CLASS B DCL

DCL MUST PASS THROUGH ISOLATION MODULE

ISO

ZONE 2

Located in fire separated electrical room where possible

ISO

ZONE 1

ISO

CLASS B DCL

FACP

LEGEND

ISO

ISOLATION MODULE
APPLICATION: RETROFIT

ZONE 2

CLASS B DCL

ZONE 1

CLASS A DCL

LOCATE ISOLATION MODULES IN CONTROL UNIT OR ADJACENT TERMINAL PANEL

CLASS B DCL

LEGEND

ISO
ISOLATION MODULE

FACP

53
LIMITATIONS

• DEVICES THAT CAN BE INSTALLED IN BETWEEN ISOLATION MODULES VARIES WITH THE MANUFACTURER.
  • SOME ARE LIMITED ONLY BY THE DCL CARD, OTHERS MAY BE 20 OR 25 DEVICES.
  • SOME DCL CARD’S MAY OR MAY NOT HAVE BUILT IN ISOLATION.
SUITE ISOLATION MODULES

• NOT THE SAME AS DCL ISOLATION MODULES
  – HOWEVER, SERVE THE SAME PURPOSE

• USED FOR NOTIFICATION APPLIANCE CIRCUITS (NAC’S) IN RESIDENTIAL APPLICATIONS
• Alberta Building Code (ABC) 2006
• 3.2.4.18. (10) “Residential Suite Audibility”.

SUITE ISOLATION MODULES
AUDIBILITY OF ALARM SYSTEMS

Audible signal devices within a dwelling unit or a suite of residential occupancy shall be connected to the fire alarm system.

- In a manner such that a single open circuit at one device will not impair the operation of other audible signal devices on that same circuit that serve the other dwelling units or suites of residential occupancy, or

- On separate signal circuits that are not connected to the devices in any other dwelling unit, public corridor or suite of residential occupancy."
### ATTRIBUTION TO ACCEPTABLE SOLUTIONS

- ABC 2006
- Division A
- Part 4
- Table 4.2.1.1.
- 3.2.4.18.

<table>
<thead>
<tr>
<th>Acceptable Solutions</th>
<th>Objectives and Functional Statements</th>
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<td>[F11-OS1.5]</td>
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<tr>
<td>(14)</td>
<td>[F11-OS1.5]</td>
</tr>
</tbody>
</table>
OBJECTIVES

• ABC 2006, DIV A, PART 2
• 2.2.1.1. 1) The objectives of the code.
  • OS1 Fire Safety
  • OS1.5 – “persons being delayed in or impeded from moving to a safe place during a fire emergency.”
• ABC 2006, DIV A, PART 3
• 3.2.1.1. 1) Objectives are achieved by acceptable solutions in Division B, to allow the following functions.
  • F11- “To notify persons, in a timely manner, of the need to take action in an emergency.”
  • F81- “To minimize the risk of malfunction, interference, damage, tampering, lack of use or misuse.”
INTENT OF 3.2.4.18(10)

TO LIMIT THE PROBABILITY THAT DISCONNECTED AUDIBLE SIGNAL DEVICES WILL INTERFERE WITH THE ABILITY OF DEVICES IN OTHER SPECIFIED AREAS, PUBLIC CORRIDORS OR SUITES TO SOUND AN ALARM.
INTENT OF 3.2.4.18(10)

WHICH COULD LEAD TO PERSONS IN AREAS OUTSIDE THE DWELLING UNIT OR SUITE NOT BEING PROMPTLY NOTIFIED OF A FIRE SITUATION.
INTENT OF 3.2.4.18(10)

WHICH COULD LEAD TO DELAYS IN THE EVACUATION OR MOVEMENT OF PERSONS TO A SAFE PLACE, WHICH COULD LEAD TO HARM TO PERSONS.
Method #1

• IN SUITE DEVICES: ONE CIRCUIT TO EACH SUITE (CLASS A OR B)
  • NO FIRE ALARM ISOLATOR
  • SIGNAL SILENCING DEVICE IN SUITE OR AUTOMATIC SUITE SILENCING
• CORRIDOR DEVICES: SEPARATE CIRCUIT PER FLOOR (CLASS A OR B)
Method #2

• IN SUITE DEVICES: ONE CIRCUIT PER FLOOR - CLASS A WIRING ONLY
  • NO FIRE ALARM ISOLATOR
  • SIGNAL SILENCING DEVICE IN SUITE OR AUTOMATIC SUITE SILENCING

• CORRIDOR DEVICES: SEPARATE CIRCUIT PER FLOOR (CLASS A OR B)
Method # 3

- IN SUITE DEVICES: ONE CIRCUIT PER FLOOR - CLASS A OR B WIRING FEED
  - FIRE ALARM ISOLATOR – CLASS A (IN-SUITE)
  - SIGNAL SILENCING DEVICE IN SUITE OR AUTOMATIC SUITE SILENCING
- CORRIDOR DEVICES: SEPARATE CIRCUIT PER FLOOR (CLASS A OR B)
The corridor audible circuit must be separate from other floors and from the dwelling units as per ABC Clauses 3.2.4.18.(11)(a) & (b). The circuit can be wired as Class A or B.

Typical Floor Plan.
Ten Units Per Floor.
Condo Apartments.
METHOD ONE

- Each Unit on a separate circuit – 3.2.4.18.(10)(b)

Typical Floor Plan. Ten Units Per Floor. Condo Apartments.
• Class A wiring (return loop circuit) – 3.2.4.18.(10)(a)

METHOD TWO

Typical Floor Plan. Ten Units Per Floor. Condo Apartments.
METHODOLOGY THREE
(preferred)

• Class A or B wiring c/w isolator modules located outside of suite. Class A wiring between isolators & suite devices – 3.2.4.18.(10)(a)

Typical Floor Plan.
Ten Units Per Floor.
Condo Apartments.
Audible signal devices are not supervised! (was allowed in previous ABC 1997; is no longer acceptable).

Typical Floor Plan. Ten Units Per Floor. Condo Apartments.
3.3.4 OPERATIONAL TESTS FOR DCL

• IMPOSE GROUND FAULT
  • CONFIRM GROUND FAULT
  • CONFIRM TROUBLE AND ALARM CONDITIONS.

• IMPOSE OPEN CIRCUIT FAULT (CLASS A)
  • CONFIRM WIRING TROUBLE FAULT (OPEN)
  • CONFIRM ALARM CONDITION.

• IMPOSE A WIRE-TO-WIRE SHORT CIRCUIT.
  • CONFIRM WIRING TROUBLE FAULT (SHORT)
  • CONFIRM ALARM FROM ANOTHER ZONE.
CAN/ULC-S537-04

C4. DATA COMMUNICATION LINK TEST
(Reference: Clause 3.2.6, Subsection 3.3.4-Note)

<table>
<thead>
<tr>
<th>Control Unit or transponder location:</th>
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<tbody>
<tr>
<td>Control Unit or transponder identification:</td>
<td></td>
<td></td>
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<tr>
<td>Data communication link identification:</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>NO</th>
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<tr>
<td>A</td>
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<tr>
<td>Each system abnormal condition specified in Table 1, Abnormal System Condition, tested for each data communication link at the control unit or transponder.</td>
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<td>Tests for alarm and trouble received under a single ground fault condition conducted on each conductor of that data communication link independently.</td>
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<td>Each conductor in a data communication link, Class A (DCLA) tested for the capability of providing an alarm signal on each side of a single open circuit fault condition.</td>
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<td>Where a data communication link serves devices on more than one floor area, impose a wire-to-wire short circuit fault within each floor area and confirm receipt of trouble and alarm condition from another floor area.</td>
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<td>Where fault isolation modules are installed in data communication links serving field devices, wiring shorted on the isolated side annunciation of the fault confirmed, and then a device on the source side operated, and activation confirmed at the control unit or transponder.</td>
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<td>Where fault isolation in data communication links is provided between control units or transponders, the field wiring shorted between each pair of control units or transponders, in turn, annunciation of the fault confirmed and operation outside the shortened section confirmed.</td>
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NOTE: For Item C4, one page is required for each data communication Link in the system.
### C6.2 INDIVIDUAL DEVICE RECORD

**Building Name:** ____________________________  **Date:** ________________

Device Legends and Notes are listed in Appendix C6.1 Field Device Testing-Legend and Notes

<table>
<thead>
<tr>
<th>Location</th>
<th>Device</th>
<th>Address</th>
<th>Correctly Installed</th>
<th>Missing Device</th>
<th>Requires Service</th>
<th>Alarm Confirmed</th>
<th>Annunciator Confirmed</th>
<th>Supervision Confirmed</th>
<th>Remarks</th>
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ANNUAL INSPECTION

NATIONAL STANDARD OF CANADA

CAN/ULC-S536-04

INSPECTION AND TESTING OF FIRE ALARM SYSTEMS

Underwriters' Laboratories of Canada

Council of Canada
5.6 OPERATION TESTS FOR DCL

• IMPOSE OPEN CIRCUIT FAULT
  • CONFIRM WIRING TROUBLE FAULT (OPEN).
• IMPOSE A WIRE-TO-WIRE SHORT CIRCUIT.
  • CONFIRM WIRING TROUBLE FAULT (SHORT)
  • CONFIRM ALARM IN ANOTHER ZONE.

• YES, EVEN ON AN ANNUAL BASIS!
E2.10 DATA COMMUNICATION LINK TEST

(Reference: Subsection 5.1.5, 5.6-Note)

| Control unit or transponder location: |  |
| Control unit or transponder identification: |  |
| Data communication link identification: |  |

| A | Confirm that a trouble signal is received at the control unit or transponder under an open loop fault for each data communication link (DCL). | Yes □ | No □ | N/A □ |
| B | Where fault isolation modules are installed in data communication links serving field devices, wiring shall be shorted on the isolated side, annunciation of the fault confirmed, and then a field device on the source side shall be operated, and activation confirmed at the control unit or transponder. | Yes □ | No □ | N/A □ |
| C | Where fault isolation in data communication links is provided between control units or transponders and between transponders, introduce a short circuit fault and confirm annunciation of the fault and operation outside the shorted section between each pair of: |  |
|   | (i) Control unit to control unit | Yes □ | No □ | N/A □ |
|   | (ii) Control unit to transponder | Yes □ | No □ | N/A □ |
|   | (iii) Transponder to transponder | Yes □ | No □ | N/A □ |
E 3.2 INDIVIDUAL DEVICE RECORD

Device Legends and Notes are listed in Appendix E 3.1 Field Device Testing-Legend and Notes

<table>
<thead>
<tr>
<th>Location</th>
<th>Device</th>
<th>Address</th>
<th>Correctly Installed</th>
<th>Missing Device</th>
<th>Requires Service</th>
<th>Alarm Confirmed</th>
<th>Annunciator Confirmed</th>
<th>Supression Confirmed</th>
<th>Remarks</th>
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Thank You

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