L'INDUSTRIE DE L'ALARME INCENDIE AU QUÉBEC
CE QUE VOUS DEVRIEZ SAVOIR

Mardi 10 novembre 2009
Montréal Québec Canada
The top ten things an Authority Having Jurisdiction needs to know about fire alarm system inspections
November 10, 2009
David Sylvester
Morrison Hershfield
How can we continue to keep Canada fire safe?

ITS ALL ABOUT RELIABLE LIFE SAFETY SYSTEMS

• Stay Up to date on Code and Standard Requirements
• Develop intuitive scripts for field review
• Interact with other AHJ and Stake holders
• Develop Efficient Reliable Witness Tests
Organize or Agonize

Perform a Pre-Site Document Review
What do you look for prior to site review?

• Record Drawings
• Complete CAN/ULC-S537-04 Verification Report
• Complete CAN/ULC-S536-04 Annual Report
What do you look for prior to site review?

• Standard Report must be completed
• *Building name, address, and date of inspection*
• *Fire alarm system manufacturer, model and type*
• *Fire alarm technician printed name and signature*
We are unable to confirm the fire alarm technician; Allan (0) is part of the continuing training program of the Canadian Fire Alarm Association as he is not a current registered technician.
The CFAA Search Engine

The CFAA Technician Registry

To confirm a Technician's registration, enter BOTH a complete surname and a complete technician number below. Include the hyphen in position three of the number. For example:

Surname: smith
Number: 19-93123

The search is non-case-sensitive.

(Your internet browser must be JavaScript-enabled and must allow pop-ups. If the search does not work, read this.)

<table>
<thead>
<tr>
<th>Important Information About The CFAA Search Engine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical users of this search facility</td>
</tr>
<tr>
<td>How current is the online database?</td>
</tr>
<tr>
<td>Surname &amp; Number Search Constraints</td>
</tr>
<tr>
<td>Expired Registrations</td>
</tr>
<tr>
<td>Security and Confidentiality</td>
</tr>
</tbody>
</table>
What do you look for prior to site review?

- *Is the Fire Alarm fully functional or have deficiencies?*

- *All the control unit test results are completed, device legend, a record of each device and circuit on the fire alarm system is provided*

- *Recordings include time delay readings on water flow detection devices and sensitivity measurement on smoke detectors.*
What do you **look** for prior to site review?

- Technician Qualifications
- Sequence of operation of the fire alarm system
- Print-out of Central Processor Unit’s Points List
Recommended Gear
For Witness Testing
Completed System

AHJ GEAR
- Clip Board
- Intuitive Test Script
- Two Way Radios
- PC Tablet with Codes & Standards
- Digital Camera
- Complete Test Report

TECHNICIAN GEAR
- Hand Tools & Ladder
- CAN/ULC-S537-04 Report & Standard
- Two Way Radios
- Listed Smoke Test Equipment
- Manometer
- Listed Heat Tester
How can we continue to keep Canada fire safe?

ITS ALL ABOUT RELIABLE LIFE SAFETY SYSTEMS

- Stay Up to date on Code and Standard Requirements
- Develop intuitive scripts for field review
- Interact with other AHJ and Stake holders
- Organize or Agonize
Test and Inspect 1997 or 2004?
CAN/ULC-S537-04
Verification of Fire Alarm Systems

CAN/ULC-S536-04
Inspection and Testing of Fire Alarm Systems
CAN/ULC-S536-04

Inspection and Testing of Fire Alarm Systems
What Version of S536 was this test conducted to?
What Version of S536 was this test conducted to?
Do You Look for These?

A Certificate is Not a Complete Report
• (Article 6.3.2.2.) - Must be in conformance with CAN/ULC-S536-04 “Standard for the Inspection and Testing of Fire Alarm Systems”
• Fire Alarm Certificates by themselves are not acceptable.
• Div. B Article 6.3.2.1. - Performed by qualified personnel in compliance with the requirements of Div. C Clause 1.2.1
### Rodan's Report on Device Records

<table>
<thead>
<tr>
<th>Location</th>
<th>Device Type</th>
<th>Correct Install</th>
<th>Alarm Oper</th>
<th>Annunciation</th>
<th>Circuit #</th>
<th>Sensitivity</th>
<th>Flow Delay</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Closet 1A</td>
<td>SFD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Supports 1&lt;sup&gt;st&lt;/sup&gt; FLR Fire Devices</td>
</tr>
<tr>
<td>Corr. Adj. Room 1A</td>
<td>S</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Janitor’s Closet 1C</td>
<td>HT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adj. East Stair</td>
<td>M</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Corr. Adj. Room 123</td>
<td>S</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Adj. Fire Panel</td>
<td>SFD</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>Isolates 1&lt;sup&gt;st&lt;/sup&gt; FLR Fire Devices</td>
</tr>
</tbody>
</table>

**Building XYZ**

**First Floor**

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**Supporting Field Device**

**Conventional Field Device**

**FLOOR 1**

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**E3.2 INDIVIDUAL DEVICE RECORD**

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**Provide Full and Complete Report**
## S537-04 Report Review

### Samples

<table>
<thead>
<tr>
<th>Indicate type of battery tests performed:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) Required supervisory load for 24 h followed by the required full load operation; or</td>
</tr>
<tr>
<td>(ii) A silent test by using the load resistor method may be used for the full duration test (refer to appendix F1, Silent Test); or</td>
</tr>
<tr>
<td>(iii) Silent accelerated test (refer to Appendix F2, Silent Accelerated Test); or</td>
</tr>
<tr>
<td>(iv) A battery capacity meter test (refer to appendix F3, Battery Capacity Meter Test); or</td>
</tr>
<tr>
<td>(v) In lieu of the above battery tests, replace the battery with a new set having a current date code, Ah capacity and type as recommended by the manufacturer.</td>
</tr>
</tbody>
</table>

| Q | Record calculated battery capacity (refer to Appendix F4.1-C). |
|-----------------------------------------|
| R | Record battery terminal voltage after completion of tests. |
| S | Battery voltage not less than 85% of its rating after tests. | YES | NO | √ | N/A |
| T | Generator provides power to AC circuit serving the fire alarm system. | YES | 𝑀 | N/A | √ |
| U | Trouble condition at the emergency generator shall result in an audible common trouble signal and a visual indication at the required annunciator. | YES | NO | N/A | √ |

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### Report Page 4

- Item N indicates the batteries are date coded January 10, 2008, this conflicts with the date code indicated on the inspection report. Please explain.
- Item Q requires to be completed.
- Item R requires to be completed.
### Field Device Testing Legend

- Section E3.1 does not indicate the detector sensitivity range.
- There are no devices indicated for supporting field device such as monitor or relay modules.
Identify the Correct Reference Standard

• Don’t accept just the **paper certificate**
  Ensure CFAA Technicians provide a complete report
  Check for technician name & CFAA # provided and signed
Manual Station

Entrance
Ground
Isolation &
Annunciation
All Conductors of a fire alarm system installed in a non-combustible building shall be

32-102 (1) Installed in a metal raceway of a totally enclosed type OR

CONDUIT CONNECTIONS
All Conductors of a fire alarm system installed in a non-combustible building shall be Incorporated in a flexible metal raceway
Incorporated in a cable, having a metal armour or sheath
Did the Electrical Contractor install a bond to ground wire in the flexible raceway?
Ground Fault Test at the Entrance Door
The **Ground Fault Test**

3.3.1.3 Each circuit shall be *inspected* and *tested* to confirm operability, including the following functions, as applicable (refer to Appendix C3, Field Device and Related Circuits-Test and Inspection):

- A *Class A circuits* serving conventional *field devices* shall be *tested* for the capability of initiating an *alarm signal* on each side of an *open circuit fault* condition at an electrically remote point in the circuit; and

**Ground fault**: Each circuit shall be *tested* at the electrically furthest *field device* for *ground fault* indication at the *control unit* or *transponder*. *Ground fault* shall not result in normal to off-normal status change indication on that circuit.
C3. FIELD DEVICE AND RELATED CIRCUITS – TEST AND INSPECTION

(Reference: Clauses 3.3.1.1, 3.3.1.3, Subsections 3.3.1, 3.3.2, 3.3.3)

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Correct field termination and wiring size.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Correct circuit polarities.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>An open circuit fault on a conventional device circuit causes a trouble signal.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Removal of any active or supporting field device circuit causes a trouble signal.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>One contact device and one non-contact device tested for operation and annunciation at the control unit or transponder, when using a field verifying device.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Class A circuits serving conventional field devices tested for the capability of providing an alarm signal on each side of an open circuit fault connection at an electrically remote point in the circuit.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Ground fault indications occur when tested at the electrically furthest field device, and do not result in normal to off-normal status change conditions.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>Field device at the electrically furthest point from the power source (in every circuit) receives rated power in accordance with manufacturer’s specifications.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>Replaceable over-current devices are of correct rating.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>Wire type and gauge in accordance with equipment manufacturer’s installation wiring at all system termination points.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Efficient Reliable Witness Test

• Test the manual station at the entrance door first
• If it is installed in the glazing test for
  – Ground fault
  – Open Circuit
  – Ground and Short
  – DCL Short Circuit isolation (if addressable)
Save lives by ensuring the stability and reliability of the supervised circuits

Manual Station at Entrance Door

- Test the manual station at the entrance door first
- If it is installed in the glazing test for
  - Ground fault
  - Open Circuit
  - Ground and Short
  - DCL Short Circuit isolation (if addressable)
  - **Correct Annunciation**
Manometer Testing

The Difficult to Access Duct Smoke Detector
Manometer Test – The Duct Smoke

Controller & Detector Mounted in Tandem
Air Duct Smoke Detectors
The “Where is a Duct Detector Required”? Document-OBC an air handling system shall be designed to prevent the circulation of smoke upon a signal from duct type smoke detector if the air handling system

a) serves more than one storey,

b) serves more than one suite in a storey

c) serves more than one fire compartment required by Sentence 3.3.3.5.(2) or

d) is not provided with fire-dampers as permitted by Sentence 3.1.8.8.(8)
3.2.4.12 (1)(a)
Serves more than one storey,

FIGURE 24
INSTALLATION OF AIR DUCT TYPE SMOKE DETECTORS
(Reference: Clause 5.8.2)
• Inspected and tested to confirm operability
• Rated for the air duct size and installed correctly for the air duct system
• The positive air flow and/or differential pressure at the sampling tubes is within the manufacturer’s specified limits
Procedure for testing duct mounted smoke detectors

- Verify that the detector will respond to smoke in the duct airflow
- The pressure differential should be measured across the sampling tubes (exhaust & intake) using a manometer.
Procedure for testing duct mounted smoke detectors

• Apply smoke directly to the detector head to initiate an alarm.

• The sampling and exhaust tubes may need to be blocked off for this test and then reopened afterwards.

Note: A “smoke bomb” is not a recommended test method for ionization duct smoke detectors.
• The positive air flow and/or differential pressure at the sampling tubes is within the manufacturer’s specified limits
<table>
<thead>
<tr>
<th>DEVICE</th>
<th>DESCRIPTION</th>
<th>TYPE</th>
<th>MODEL NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>Manual Pull Station</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RHT</td>
<td>Heat Detector, Restorable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HT</td>
<td>Heat Detector, Non-restorable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>Smoke Detector</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sensitivity Test Method or Test Equipment:</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td></td>
<td>Model/Method:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Manufacturer Sensitivity Range:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sensitivity Range:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RI</td>
<td>Remote Indicator Unit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DS</td>
<td>Duct Smoke detector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--</td>
<td>Other Type of Detector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SFD</td>
<td>Supporting Field Device (Monitor)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FS</td>
<td>Sprinkler Flow Switch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SS</td>
<td>Sprinkler Supervisory device</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--</td>
<td>Other Supervisory Devices (Low Pressure, Low Water, Low Temperature, Power Loss, etc.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EM</td>
<td>Fault Isolation Module</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Bell</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>Horn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>Visible Signal Device</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SP</td>
<td>Cone Type Speaker</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HSP</td>
<td>Horn Type Speaker</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AD</td>
<td>Ancillary Device</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ET</td>
<td>Emergency Telephone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EOL</td>
<td>End-of-Line Resistor</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
NOTE 4: Duct smoke detector pressure differential should be confirmed and recorded in the remarks column.

FIGURE 25
INSTALLATION OF AIR DUCT TYPE SMOKE DETECTORS

(Reference: Clause 5.8.8)
C6.2 INDIVIDUAL DEVICE RECORD

(Reference: C6.1)

Building Name: ____________________________  Page ___ Of ___

Date: ____________________________

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

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>DEVICE</th>
<th>*CORRECTLY INSTALLED PER SECTION 5, VERIFICATION PROCEDURE - FIELD DEVICES</th>
<th>*REQUIRES SERVICE, REPAIRS, CLEANING OR MISSING</th>
<th>*ALARM OPERATION CONFIRMED</th>
<th>*ANNUNCIATION INDICATION CONFIRMED</th>
<th>*ZONE CIRCUIT NUMBER OR ADDRESS</th>
<th>*SUPERVISION OF WIRING DEVICE CONFIRMED</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahu 22 22 floor</td>
<td>DS</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>99</td>
<td></td>
<td></td>
<td>015&quot; H2O (inches of water)</td>
</tr>
</tbody>
</table>
Manometer Test – The Duct Smoke

Check the CAN/ULC-S537-04 Report

• Find the Duct Smoke that is located in the highest most awkward to access location
  • Look for Manometer readings
  • Open Circuit test
  • Correct annunciation “S.F.2 2”
  • DCL Short Circuit isolation (if addressable)

Ensure reliability of the Duct Smoke Detector
Supervisory Valve Tag

Supervisory Value Monitoring & Annunciation
- Does the valve tag match the zone Indication?
A sprinkler head operates just before the point where collateral damage from water would likely do less damage than the fire. It would be of little value to cause release at an earlier point of fire growth.

(2) Sprinkler system shall be electrically supervised
5.8.2.1 Each shut-off valve position supervisory switch shall be tested to determine that within two turns of the valve handle, or when the stem of the valve has moved 20% from its normal position, it shall result in an audible common trouble signal and a visual indication.
5.8.2.2 Each low pressure supervisory device shall be inspected and tested to confirm the operability of the following functions, as applicable:

A  A decrease of pressure beyond the set limit results in an audible trouble signal and a visual indication; and

B  The low pressure (kPa) setting at which the device initiates a trouble signal and the upper pressure setting where the device is no longer activated shall be recorded.
Confirm the Shut-Off Valve Position
Supervisory Switch Tag matches the Annunciator

- Test the Supervisory Valves first
  - Use a Dictaphone or a Digital camera with voice memo
  - Does the valve tag match the zone Indication?

Ensure Supervisory Valve Annunciation is Correct
Smoke Detectors Are Sensitive
Smoke Detectors Are Sensitive

5.4.1.5 Each smoke detector sensitivity measurement and if applicable, the cleaning date shall be recorded on the individual device record.

NOTE 1: Smoke detector sensitivity confirmation or measurement should be recorded in the remarks column.
Smoke Detectors Are Sensitive

<table>
<thead>
<tr>
<th>DEVICE</th>
<th>DESCRIPTION</th>
<th>TYPE</th>
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<td>Heat Detector, Non-restorable</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Smoke Detector

Sensitivity Test Method or Test Equipment:
Model/Method: ________________________________

Manufacturer Sensitivity Range:
Sensitivity Range: ___________________________

<table>
<thead>
<tr>
<th>DEVICE</th>
<th>DESCRIPTION</th>
<th>TYPE</th>
<th>MODEL NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>RI</td>
<td>Remote Indicator Unit</td>
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<td></td>
</tr>
<tr>
<td>DS</td>
<td>Duct Smoke detector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--</td>
<td>Other Type of Detector</td>
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<td></td>
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<tr>
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<td></td>
</tr>
<tr>
<td>H</td>
<td>Horn</td>
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<tr>
<td>SP</td>
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<td>HSP</td>
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<tr>
<td>AD</td>
<td>Ancillary Device</td>
<td></td>
<td></td>
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<td>ET</td>
<td>Emergency Telephone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EOL</td>
<td>End-of-Line Resistor</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Smoke Detectors Are Sensitive

- Calibrated to detect a pre-determined level of smoke density
Conventional Smoke Detector

CLEAN - NO SMOKE

Light Blocking Partition

Light absorbed by black or gray walls of sampling chamber.

SMOKE

Light scattered by smoke particles initiates alarm.

DIRT

Dirt will bias toward alarm or actually initiate alarm.
Conventional Smoke Detector

U.L.C. Window

<table>
<thead>
<tr>
<th>Obscuration (%)</th>
<th>Normal Sensitivity 2.5%</th>
<th>Actual Sensitivity 1.5%</th>
<th>Actual Sensitivity 0.8%</th>
<th>Actual Sensitivity 0.65%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0%</td>
<td>DIRT</td>
<td>DIRT</td>
<td>DIRT</td>
<td></td>
</tr>
<tr>
<td>0.5%</td>
<td>DIRT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5%</td>
<td></td>
<td></td>
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<td>2.0%</td>
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<td>2.5%</td>
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<tr>
<td>3.5%</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>4.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Common Smoke Detector Testing Tool

- Sprayed directly into detectors
- Oily residue attracts dirt and dust
- Contaminates detectors
A magnet test does not prove the detector sensitivity

- Addressable systems can print out the sensitivity test results
- Just ask for it

Confirm the sensitivity tests are documented in the Verification Reports
New methods to determine Intelligibility
Intelligibility Audibility & Perception

Fire alarm system digitized voice applications - pros and cons - Are the voice messages being designed and programmed into the system in consultation with the local chief fire official (CFO) for consistency with a required fire safety plan? For example, the systems are being designed and installed under the Building Code. Is the CFO consulted for compatibility with a need to obtain an approved Fire Safety Plan?

Answer: It depends on the Jurisdiction and the Engineer of Record
Question ? – What is Intelligibility

• The capability of being understood or comprehended.
Question ? – What is AUDIBILITY –

- A measure of loudness of a sound.
- When used with respect to fire alarm systems, audibility is regarded as the evacuation signal level above background noise.
There is a proven method to determine intelligible signals
Common Intelligibility Scale

- The capability of being understood or comprehended.

<table>
<thead>
<tr>
<th></th>
<th>EXCELLENT</th>
<th>GOOD</th>
<th>FAIR</th>
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<tbody>
<tr>
<td>CIS</td>
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<td>0.87</td>
<td>0.78</td>
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<tr>
<td>RASTI</td>
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<td>0.75</td>
<td>0.60</td>
</tr>
<tr>
<td>STI</td>
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<tr>
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<table>
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<tr>
<th></th>
<th>POOR</th>
<th>BAD</th>
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<tbody>
<tr>
<td>CIS</td>
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<td>0.00</td>
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<tr>
<td>STI</td>
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<td>0.00</td>
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<tr>
<td>%ALcons</td>
<td>14.9</td>
<td>33.6</td>
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</tbody>
</table>
Speaker Basics

- Speakers are “point sources” of sound
- Sound radiates outward in all directions creating a spherical sound pattern.
- The sound pressure is spread over an increasingly larger surface area as the sound moves away from the source.

Maximum Theoretical Coverage Angle
• The drop in SPL is referred to as the “Inverse Square Law,” and originates from the fact that as the diameter of the sound-sphere doubles, the surface area increases by a factor of four.
Sound Pressure Level Decreases With Distance

Source = 93dB @ 10' (reference location)

dB and Distance Chart
Speech Pattern “An Emergency Has Been Reported” with Reverberation
4.0 Periodic Inspections and Tests Monthly

- Monthly
  - Voice page one zone on a rotational basis
• Temporary Or Intermittent Sound Sources

2001

TEMPORARY OR INTERMITTENT SOUND SOURCES - Sound sources which may cause peaks and valleys in sound levels such as a flushing toilet, running shower, stereo, television, portable air conditioner, traffic or exterior construction noise.

2006

TEMPORARY OR INTERMITTENT SOUND SOURCES — Sound sources which may cause peaks and valleys in sound levels. Refer to Appendix C4, Ambient Noise Level Measurements.
C4.1 Precautions are necessary to achieve consistent ambient sound level measurements. Temporary or intermittent sound sources such as a flushing toilet, running shower, stereo, television, traffic or exterior construction noise may cause peaks and valleys in sound levels. Ambient sound level measurements should be recorded when these sounds are absent or are at their lowest level. The building heating, ventilating, and air conditioning (HVAC) system should be running during the test with the fan speed set on high. Portable air conditioners installed within the suite should be in the “off” position during the tests. Occupants of the suite under test should refrain from talking or from other activities that may affect the readings. Measurements should be taken during a normal workday period.
C6.3 SIGNALLING DEVICE SOUND LEVEL MEASUREMENT

(Reference: Clause 5.10.1-C)

Building Name: __________________________

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

<table>
<thead>
<tr>
<th>ZONE</th>
<th>LOCATION</th>
<th>AMBIENT</th>
<th>ALARM SIGNAL</th>
<th>REMARKS</th>
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Intelligibility Audibility & Perception

• New methods to determine Intelligibility
  • SPL meters must be calibrated
  • Audibility is regarded as the evacuation signal level above background noise
  • Intelligibility means the capability of being understood or comprehended
  • Signalling Device Sound Level Measurement must be provided in the CAN/ULC-S537-04 Report
Placement Supervision & Smoke Detectors
5.4.1.2 Each *smoke detector* shall be *tested* for operation by introducing smoke or simulated smoke to the detecting chamber in accordance with the manufacturer's instructions.
Introduce Smoke into each Detector

C6.2 INDIVIDUAL DEVICE RECORD

(Reference: C6.1)

Building Name: ________________________________________  Page ____ Of ____

Date: __________________________________________

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

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>DEVICE</th>
<th>*CORRECTLY INSTALLED PER SECTION 5, VERIFICATION PROCEDURE - FIELD DEVICES</th>
<th>*REQUIRES SERVICE REPAIRS, CLEANING OR MISSING</th>
<th>*ALARM OPERATION CONFIRMED</th>
<th>*ANNUNCIATION INDICATION CONFIRMED</th>
<th>*ZONE CIRCUIT NUMBER OR ADDRESS</th>
<th>*SUPERVISION OF WIRING DEVICE CONFIRMED</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>
• If we bag it the magnet test will show 100% performance
Conventional Smoke Detector

CLEAN - NO SMOKE

Light absorbed by black or gray walls of sampling chamber.

SMOKE

Light scattered by smoke particles initiates alarm.

DIRT

Dirt will bias toward alarm or actually initiate alarm.
The Magnet Test Is Useless

• Don’t accept the magnet test
  • Ensure they use ULC listed Smoke
  • Check to see the smoke is manufacturer listed also
Sequence of Operation – Owner Responsibility?
Ancillary Devices As They Apply To Fire Alarm Systems

- FIRE PUMP MONITORING
- FAN CONTROL
- SMOKE CONTROL
- GENERATOR MONITORING
- DOOR HOLD OPEN
- ACCESS CONTROL
- CCTV
- ELEVATOR RECALL
Ancillary Devices HVAC

Diagram showing the components of a HVAC system, including fan coil unit, supply air, control valves, heating and cooling systems, and a MACH-Stat controller.
Fire Alarm Fan Shut Down
Access Control-Maglocks

SUPPORTING FIELD DEVICE — An active field device that monitors and/or controls other field devices on a separate circuit and reports the status of the separate circuit to a control unit and/or transponder.

Field Control Relays for Maglock Release

Magnetically Locked Door Released from Fire Alarm System
Sequence of Operation – Owner Responsibility?

- Test a complete sequence with no bypass condition
- Have all building service providers involved
- Determine if the sequence of operation noted is the same as the one performed in the real world.
- Allow for building staff to also understand “how it really works”
Central Station
Signals to Fire Department

ACME Alarm Monitoring Station
Fire and Security Monitoring

ACME Alarm Monitoring Station
Central Station Issues

- Discuss application and installation requirements for “Central Stations.”
- Acceptance criteria for “Central Stations” to provide signals to fire department.
- CAN/ULC-S561 Installation and Services for Fire Signal Receiving referenced in the OBC
Central Station Issues

- Central Station is an assembly of interconnected pieces of equipment designed and installed to transmit, receive and monitor a signal from a fire alarm system.
Article 3.2.4.7. of the OBC mandates that the fire department must be notified upon:

1. Initiation of the 1st stage (alert signal) in a 2 stage fire alarm system

2. Activation of a water flow-indicating device of a fire alarm system

3. Activation of any fire alarm initiating device of a single stage fire alarm system installed in a building of assembly occupancy with an occupant load exceeding 300.
OBC also requires that any abnormal supervisory condition of the sprinkler system (connected to a building fire alarm system) must be transmitted to a fire signal receiving centre (to a central station)

Sentence 3.2.4.7. (4) of the OBC states that notification of the fire department must be provided via a Fire Signal Receiving Centre that conforms to CAN/ULC-S561, standard for “Installation and Services for Fire Signal Receiving Centres and Systems”
REMOTE CONNECTION — A connection on the control unit or transponder which provides status information to remote receiving equipment or fire signal receiving centre.
<table>
<thead>
<tr>
<th>Installation by an electrical contractor</th>
<th>Installation by a Listed Central station (“shared service” installation, or “full service”)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire Alarm Control Panel</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transmitter → Communication system → Protective receiving centre/monitoring station</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>“Full service” central station (installation and monitoring) conforming to ULC S561 and listed by the ULC in accordance with ULC certificate “central station” Fire Protective Signaling service”</td>
<td></td>
</tr>
</tbody>
</table>
### E2.1 CONTROL UNIT OR TRANSPONDER TEST
*(Reference: Clauses 5.1.3, 5.2.2.1)*

<table>
<thead>
<tr>
<th>Control unit or transponder location:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control unit or transponder identification:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GG</th>
<th>Record the name and telephone number of the fire signal receiving centre</th>
<th>Name:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Telephone:</td>
</tr>
</tbody>
</table>

| HH | Operation of the fire signal receiving centre disconnect means results in a specific trouble indication at the control unit, transponder an transmits a trouble signal to the fire receiving centre. | Yes □ No □ N/A □ |

ACME Alarm Monitoring Station
- Test Central Station Monitoring as per CAN/ULC-S537-04

- Check for the E2.1 CONTROL UNIT test scrip is complete

- Fire Signal Receiving Centre Name & Telephone #
Top Ten Things To Know When Reviewing Fire Alarms Systems Installations

THANK YOU FOR YOUR TIME

David Sylvester, Morrison Hershfield