Verification of Fire Alarm Systems

WHAT?
WHY?
HOW?
This seminar covers the NBCC and ULC S537 requirements for verification of fire alarm systems.

It clarifies verification requirements for addition, modifications and replacement of the components comprising an existing fire alarm system.

The seminar also introduces the City of Vancouver criteria for verifications of fire alarm systems.
What is the Fire Alarm System Verification?

Verification is a unique procedure of commissioning, testing and inspection of a fire alarm system components and wiring interconnecting these components in order to confirm that the fire alarm system performs in accordance with the intended design, and that the system is installed in conformance with the NBCC, ULC S524 and the CE Code, Part I.
Why is verification of a fire alarm system is necessary?

- Verification of a fire alarm system is required by the NBCC.

Article 3.2.4.5. of the NBCC states the following:

3.2.4.5. Installation & Verification of Fire Alarm Systems

1) Fire alarm systems, including the voice communication capability where provided, shall be installed in conformance with CAN/ULC-S524, “Installation of Fire Alarm Systems.”

2) Fire alarm systems shall be verified in conformance with CAN/ULC-S357, “Verification of Fire Alarm Systems,” to ensure they are operating satisfactorily.
What components of a fire alarm system are subjected to the verification procedure?

All components that comprise a fire alarm system (initiating devices, control unit, annunciators, voice communication system, audible and visual signal devices) are subject to compliance with the verification requirements.
Components of a Typical Fire Alarm System

<table>
<thead>
<tr>
<th>Fire alarm initiating devices (input)</th>
<th>Control and processing equipment (interface)</th>
<th>Signal devices (output)</th>
</tr>
</thead>
<tbody>
<tr>
<td>smoke detector</td>
<td>CPU</td>
<td>audible signal device</td>
</tr>
<tr>
<td>heat detector</td>
<td></td>
<td>visual signage device</td>
</tr>
<tr>
<td>manual station</td>
<td>Annunciator</td>
<td>voice communication device</td>
</tr>
<tr>
<td>water flow device</td>
<td></td>
<td>..........................................................</td>
</tr>
<tr>
<td></td>
<td>CACF</td>
<td>ancillary devices:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(elevator homing door; door</td>
</tr>
<tr>
<td></td>
<td></td>
<td>hold open devices;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>electromagnetic locks;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>smoke control equipment,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>smoke venting equipment)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>..........................................................</td>
</tr>
<tr>
<td></td>
<td></td>
<td>signal to fire department</td>
</tr>
</tbody>
</table>

Note: All fire alarm components that are mandated to be electrically supervised (electrical supervision of wiring) are subjected to verification.
Electrical Supervision Required by ULC S524

- General

*Electrical supervision* of the wiring shall be provided to the following:

- Manual Stations;
- Fire Detectors;
- Water flow devices for water based fire protection systems;
- National Building Code of Canada required *supervisory devices* for water based fire protection systems;
- Audible signal devices;
- Visible signal devices;
- Voice communication equipment;
- Emergency telephone handsets;
- Primary power supplies and emergency power supplies;
- Power supplied to field devices;
- Annunciators;
- Display and control centre at the central alarm and control facility; and
- Common fault indication from the engine driven generator, as required by Clause 3.2.4.2.
Electrical Supervision of fire alarm systems devices

Electrical supervision is req’d by ULC S524. Description of ancillary equipment controlled by the fire alarm system is req’d by ULC S537.
Verification of fire alarm systems components that have been modified, added, altered or replaced.

(City of Vancouver Clarification Bulletin)
Verification of Fire Alarm Systems
Verification of Fire Alarm Systems

BULLETIN 2000-021-EL

APRIL 19, 2007

(Revised)

VERIFICATION OF FIRE ALARM SYSTEMS

Sentence 3.2.4.5.(2) of Division B of the Vancouver Building By-law requires that fire alarm systems installed in buildings must be verified to ensure satisfactory operation in conformance with CAN/ULC-S537. City of Vancouver acceptance criteria for organizations involved in verification of fire alarm systems is described in Bulletin 2003-009-EL.

Upon completion of the verification procedure, a verification report must be submitted to the Electrical Inspection Branch by an acceptable fire alarm verification organization. The fire alarm verification report must be provided with the Appendix C form (C1 FIRE ALARM SYSTEM VERIFICATION REPORT) completed and signed by a qualified person employed by the acceptable fire alarm verification organization. The referenced Appendix C form is a part of ULC-S537-04, and it has been amended for use in the City of Vancouver (see attachment 1 to this Bulletin).

When a fire alarm system (FAS) is connected to an acceptable central station (see Bulletin 2000-019-EL) a ULC Certificate “Central Station Fire Protective Signalling Service” must be completed as a part of verification report. A sample of this certificate is shown on Attachment 2 to this Bulletin.

When an existing FAS in the building is subjected to an addition or alteration (replacement of components, addition, modification, repair, adjustment to system hardware, or any change to software), then the extent of the FAS re-verification must be provided as follows:
Verification of Fire Alarm Systems

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VERIFICATION OF FIRE ALARM SYSTEMS

1. When a control unit, CACF or an annunciator has been replaced, repaired or modified on the existing FAS the entire FAS must be re-verified.

2. When a component or components of the existing single zone fire alarm system have been subjected to an addition or modification the entire FAS must be re-verified.

3. When fire alarm initiating devices have been added or modified in a fire alarm initiating zone (a manual station, a smoke detector, a flow switch or a heat detector), then that entire fire alarm initiating zone shall be re-verified. (See Notes).
Verification of Fire Alarm Systems

4. When audible signal devices have been added or modified in a fire alarm signalling zone (speakers, bells, vibrating gongs, etc.) then that entire fire alarm signalling zone shall be re-verified. (See Notes).

5. When an existing fire alarm system component (a field device, voice communication module, a control unit, annunciator, etc.) has been modified or replaced with a component from a different manufacturer, all existing and new/modified devices must be compatible. The requirement of Clause 3.1.4 of the Standard ULC S524-01 states that "All devices incorporated in a fire alarm system shall be compatible". Thus, such compatibility must be indicated on Appendix C form demonstrated by the verification organization by providing a compatibility test report from the ULC. The referenced test report must accompany each completed Appendix C form submitted in accordance with this Bulletin.
Verification of Fire Alarm Systems

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Notes:

1. Section 6 of ULC S537 provides specific verification requirements for modified fire alarm systems. Clause 6.2 of the ULC S537 offers a clarification for modified “conventional field devices” by indicating that where a conventional filed device is added or modifications are made to an existing input circuit or output circuit and the wiring is extended from an existing field device, the new device(s) as well as the existing device(s) connected on either side of the added or modified device and the end of the line for that circuit shall be verified for correct operation.

For the purpose of items 3 and 4 of this Bulletin, provision of Clause 6.2. of the ULC S537 is deemed to be acceptable to this office, when only a minor modification is made to an existing fire alarm initiating or signaling zone (i.e., replacement, relocation or addition of not more than 10% of conventional field devices in the zone).
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VERIFICATION OF FIRE ALARM SYSTEMS

Notes:
2. Conventional filed device is defined by the ULC S537 as follows:

“Conventional Field Device - A field device that is usually connected to the control unit on a common wiring circuit with other devices on the circuit provide common status change information (e.g. Fire alarm detection or signalling). Such devices cannot be uniquely identified by the control unit unless there is only one device on the circuit. (Refer to active field devices.)”

A.Z. Tsisserev, P.Eng.
CHIEF ELECTRICAL INSPECTOR AND
CITY ELECTRICIAN
Attachments 1 and 2
Verification of Fire Alarm Systems

APPENDIX C (INFORMATIVE) – FIRE ALARM SYSTEM VERIFICATION REPORTS
(Amended for use in the City of Vancouver)
(Reference: Subsection 3.1-Note, Clause 3.2.1, 3.2.2)

C1. FIRE ALARM SYSTEM VERIFICATION REPORT
(Reference: Clause 3.1.6, 3.1.7, 3.2.2)

<table>
<thead>
<tr>
<th>Electrical Permit # EL:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>New FAS</th>
<th>Existing FAS</th>
<th>(see Note 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>System Manufacturer:</th>
<th>Model Number:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Appendix C (Informative) – Fire Alarm System Verification Reports

(Amended for use in the City of Vancouver)

Reference: Subsection 3.1-Note, Clause 3.2.1, 3.2.2

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## C1. Fire Alarm System Verification Report

(Reference: Clause 3.1.6, 3.1.7, 3.2.2)

<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>System provides single-stage operation.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>System provides two-stage operation.</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>The entire fire alarm system has been verified in accordance with CAN/ULC-S537, standard for Verification of Fire Alarm Systems.</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>This is a partial verification for a partial occupancy.</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>E</td>
<td>Components of the existing Fire Alarm System have been modified or replaced with components from a different manufacturer and are compatible with the existing Fire Alarm System components. (see Note 2)</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>F</td>
<td>This is a partial verification for a fire alarm system that has been replaced in stages.</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>G</td>
<td>This is a verification of a portion of an existing fire alarm system verified in accordance with Section 6, System Modifications.</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
</tbody>
</table>
# Verification of Fire Alarm Systems

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>Installed in accordance with the design and CAN/ULC-S524, Standard for the Installation of Fire Alarm Systems.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>The <em>fire alarm system</em> documentation is on site and includes a description of the system.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>The <em>fire alarm system</em> is fully functional without deficiencies. (see Note 3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>The Fire Alarm System is connected to an acceptable central monitoring station via a supervised circuit of a ULC-listed transmitter approved for the purpose. If “Yes”, specify the name and location of the central monitoring station: and provide a copy of ULC “Central Station Fire Protective Signalling Service” Certificate No. issued for the address above. (Note: A sample of the ULC Certificate is shown on Attachment 2 to the Bulletin.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>Comments</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>A copy of this report will be given to the following, who is the owner or owner’s representative for this building: ___</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This is to certify that the information contained in this Fire Alarm System Verification Report is correct and complete.

Printed Name and Signature of Qualified Person(s)  Company  Telephone
conducting the Verification
(see list of acceptable verification organizations, Bulletin 2003-009-EL)

Notes:
1. Please, elaborate on the extent of verification of the existing F.A.S.:

2. If “Yes”, ULC Test Report must be attached in conformance with Item 5 of Bulletin 2000-021-EL (Revised).
3. Identified deficiencies relate to:
   (a) The existing portion of the FAS is not covered by the scope of work under electrical permit EL ____________.
       Yes  No
   (b) The newly installed FAS (or modified/added portion of the existing FAS.) Yes  No
PROTECTIVE SIGNALLING SERVICE

This Certifies that the Alarm Company whose name appears below is Listed by Underwriters’ Laboratories of Canada (ULC) and is authorized to install and monitor Protective Signalling Fire Alarm Systems in compliance with the requirements in ULC/ORD C693 for Protective Signalling Systems.

The Alarm Company named on this certificate bears the responsibility for the correctness of the system installation, periodic testing, maintenance and repair as well as the keeping of records respecting these activities.

It is also the responsibility of the Alarm Company to confirm that the equipment used in the installation is ULC Labelled and is suitable for the application. All required service is provided for in the care contract between the Alarm Company and the Occupant.

Underwriters’ Laboratories of Canada makes no representations or warranties, express or implied, that the alarm system will prevent any loss by fire, smoke, water damage or otherwise, or that the system will in all cases provide the protection for which it is installed or intended. This certificate is evidence that the installing dealer is monitored and maintained by a ULC Listed Monitoring Station and that the service is subject to quarterly field inspections by ULC Representatives. This certificate is to be posted at the Subscriber’s site and is valid only with a current maintenance contract.

ULC is not an insurer and does not assume or undertake to discharge any liability of the Alarm Company or any other party for any loss, which may result from failure of the equipment to correct installation, non-conformity with requirements, cancellation of this certificate or withdrawal of the Alarm Company from listing by ULC prior to the expiration date appearing on this certificate.

[Signature]
Regional Chief Engineer,
Underwriters’ Laboratories of Canada
### CFAA Technical Seminar
October 29, 2008

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**Listed Alarm Company**

<table>
<thead>
<tr>
<th>Location</th>
</tr>
</thead>
</table>

**Type of System**

<table>
<thead>
<tr>
<th>Rooftop</th>
<th>Water Flow</th>
<th>Level</th>
<th>Pressure</th>
<th>Water Temp</th>
<th>Cut Off Valves</th>
<th>Pump Sup.</th>
<th>Local FIA</th>
<th>Interconnection</th>
</tr>
</thead>
</table>

**Number of Risers**

<table>
<thead>
<tr>
<th>Issued: D M Y</th>
<th>Expires: D M Y</th>
<th>Maximum Term</th>
</tr>
</thead>
</table>

**Transmission Mode**

**Subscriber**

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**Maintenance**

System shall be examined and tested at least once each year.

**Representative**

<table>
<thead>
<tr>
<th>Date D M Y</th>
</tr>
</thead>
</table>

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**Signature**

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**Certification**

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**Compliance**

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**Safety**

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**Inspection**

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**Approval**

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**Verification**

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**Maintenance**

---

**Remediation**

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**Follow-up**

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