Part 1: Smoke Alarms

Topics of discussion:

- What’s new in Residential Smoke Alarms
- Photoelectric vs. Ionization
Most Provinces now require...

- Smoke Alarm in Every Bedroom
- All Smoke Alarms must have Battery Backup
- Smoke Alarms must have a Silence Button
- Change in Temporal Horn Pattern

And in Ontario....

- All Smoke Alarms must have visual component
3.2.4.22. Smoke Alarms

(1) Except as permitted by Sentence (6), smoke alarms conforming to CAN/ULC-S531, “Smoke Alarms”, shall be installed in each dwelling unit and, except for care or detention occupancies required to have a fire alarm system, in each sleeping room not within a dwelling unit.

(2) At least one smoke alarm shall be installed on each storey and mezzanine of a dwelling unit.

(3) On any storey of a dwelling unit containing sleeping rooms, a smoke alarm shall be installed in,

(a) each sleeping room, and

(b) a location between the sleeping rooms and the remainder of the storey, and if the sleeping rooms are served by a hallway, the smoke alarm shall be located in the hallway.

(4) A smoke alarm shall be installed on or near the ceiling.

(5) Except as permitted by Sentence (6), smoke alarms required by Sentence (1) shall,

(a) be installed with permanent connections to an electrical circuit,

(b) have no disconnect switch between the overcurrent device and the smoke alarm, and

(c) in case the regular power supply to the smoke alarm is interrupted, be provided with a battery as an alternative power source that can continue to provide power to the smoke alarm for a period of not less than seven days in the normal condition, followed by 4 min of alarm.

(6) …

(7) …

(8) If more than one smoke alarm is required in a dwelling unit, the smoke alarms shall be wired so that the actuation of one smoke alarm will cause all smoke alarms within the dwelling unit to sound.

(9) A smoke alarm required by Sentence (1) shall be installed in conformance with CAN/ULC-S553, “Installation of Smoke Alarms”.

(10) …

(11) …

(12) …

(13) Smoke alarms described in Sentence (1) shall have a visual signaling component conforming to the requirements in 18.5.3. (Light, Color and Pulse Characteristics) of NFPA 72, “National Fire Alarm and Signaling Code”.

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Fires originating in bedrooms account for the 2nd highest causes of fire deaths in the home.
“As a result of extended power outages that occurred in both Ontario and the Maritimes in 2003, various provinces expressed concern over the lack of Code provisions requiring a secondary power supply to smoke alarms in residential occupancies. The risk of fire increases during power outages as building occupants rely more on candles for light and portable exposed-flame appliances for cooking and heating.”
“in case the regular power supply to the smoke alarms is interrupted, be provided with a battery as an alternative power source that can continue to provide power to the alarm for a period of not less than seven days in normal condition followed by 4 minutes of alarm”
3.2.4.20 Smoke Alarms

Rationale

“(8) Smoke Alarms that do not have a manually operated silencing device incorporated within the circuitry are prone to tampering and disconnection due to false alarm or annoyance.”
“(10) Except as permitted by Sentence (11), a manually operated silencing device shall be incorporated within the circuitry of a smoke alarm installed in a dwelling unit so that it will silence the signal emitted by the smoke alarm for a period of no more than 10 min. after which the smoke alarm will reset and again sound the alarm is the level of smoke in the vicinity is sufficient to reactuate the smoke alarm.”
520 Hz mixed Signal more effective waking people than current 3,100 Hz

Requires larger speaker and more power to drive so it will require significant modifications of current product.

Better at penetrating barriers (walls, doors, etc.)
Amended requirements cover a range of areas, including:

- Requirements residential suites for visual fire alarms to be installed in all public corridors of multi-unit residential buildings and in all multi-unit
- Requirements for all smoke alarms in all buildings, including houses, to include a visual component
- Requirements for an elevator or other barrier-free access to be provided between storeys in most buildings, with some exemptions for small residential and business occupancy buildings
- Requirements for power door operators to be provided at entrances to a wider range of buildings, and at entrances to barrier-free washrooms and common rooms in multi-unit residential buildings
- Updated requirements for barrier-free washrooms and universal washrooms
- Requirements for barrier-free access to public pools and spas
- Updated requirements for accessible and adaptable seating spaces in public assembly buildings such as theatres, lecture halls and places of worship

For more information on new requirements, see Overview of Updated Accessibility Requirements.

http://www.mah.gov.on.ca/Page10546.aspx
Alarm Placement

**ALL SMOKE ALARMS MUST HAVE “VISUAL SIGNALLING”**

Mandatory Placement of Alarms

- **2014 - Battery Back up**
  - All smoke and CO units
  - Smoke alarms in each bedroom

- **2015 - "Visual Signalling"**
  - In all smoke alarm locations

* Check local codes for CO placement
30. Article 3.2.4.22. of Division B of the Regulation is amended by adding the following Sentences:

(13) *Smoke alarms required by Sentence (1) shall have a visual signaling component conforming to the requirements in 18.5.3. (Light, Color and Pulse Characteristics) of NFPA 72, “National Fire Alarm and Signaling Code”.*

(14) The visual signaling component required by Sentence (13) need not:

(a) be integrated with the *smoke alarm provided it is interconnected to it*,
(b) be on battery backup, or
(c) have synchronized flash rates, when installed in a *dwelling unit*.

(15) The luminous intensity for visual signaling components required by Sentence (13) that are installed in sleeping rooms shall be a minimum of 175 cd.
NEW!

ONTARIO BUILDING CODE

EFFECTIVE JAN 1ST, 2015

VISUAL SIGNALLING DEVICES
NOW REQUIRED

ASK AT THE COUNTER FOR DETAILS

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Several jurisdictions in Ontario are considering making heat detectors in garages mandatory as well. When a fire originates in the garage, it can be fully involved before interior smoke alarms sound.
# Wireless Technology

**Wireless enabled alarms communicate with each other...**

![Diagram showing wireless communication between alarms.](image)

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<th>FEATURES</th>
<th>BENEFITS</th>
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<td>Wireless Installation</td>
<td>Replace one existing hardwired alarm with Onelink and then wirelessly connect up to 18 Onelink alarms (battery) - when one sounds they all sound - no additional wiring</td>
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<tr>
<td>Battery Back-up</td>
<td>2 AA batteries included - operates during power outages</td>
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<td>Photoelectric Technology</td>
<td>Most sensitive to smoldering fires and reduces false alarms caused by cooking smoke and shower steam</td>
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<td>EZ Access Battery Door</td>
<td>No need to remove alarm from the ceiling to change battery</td>
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<td>Mute/Test &amp; Low Battery Warning Silence</td>
<td>Mutes unwanted alarms immediately and also tests alarm function</td>
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Wireless Technology

• 120Vac / AA Battery Back-up / Wireless interconnect & Battery Only

• Easily expand an existing interconnected 120V AC system by replacing one alarm in the series with this alarm.

• Add additional battery-operated First Alert ONELINK Enabled Alarms to expand without wires

• Optipath 360 Technology – Patented photoelectric smoke sensing design

• Spread Spectrum Horn – Easier for elderly with normal hearing loss to hear

• Two Latching features – Alarm latch and Low Battery latch

• Two Silence Features – Silence low battery chirp for up to 8 hours or, temporary silence nuisance alarm conditions

• 10-year warranty
The average home will have 16 connected devices and sensors in 2015.

13% of homes should have energy management systems.

Source: GSMA, Vision of Smart Home Report, 2014
Introducing … Onelink

Onelink
Wi-Fi Smoke & Combo Alarms

Always Protected
A 2-in-1 wireless combination smoke & carbon monoxide alarm, equipped with a 10 year battery that lasts the life of the alarm. No annoying low battery chirps in the middle of the night. No wobbling on a ladder to replace batteries. Premium protection that just works.

Always Connected
Remote access to your alarm means you will be notified in the event of a smoke or carbon monoxide emergency in your home from anywhere. From the palm of your hand, you will be alerted to the type and location of danger and can call 911 directly from the app.
Onelink Interconnectivity

Onelink Wifi Smoke / CO interconnects with existing hardwired smoke and CO alarms turning existing smoke and CO alarms into totally connected home.
Micro Design

• Photoelectric smoke and fire detection technology
• Piercing loud 85 dB swoop sound siren
• Advanced micro technology
• Long life lithium CR2 battery included
• Easy installation
• Built in test/silence button with LED indicator
• Only 1.9 inches in diameter x 2 inches tall (approximate)
• 10 year limited warranty

Easier for elderly & hard of hearing to hear due to lower frequency
Changing Batteries without having to remove the alarm from the mounting bracket greatly reduces the chance of accidents due to falls, as it doesn’t require removal of wiring harness to gain access to battery compartment.

Studies done by the U.S. Fire Administration show that adults over the age of 65 have death rates 2.5 times that of the general population in home fires

http://fireservice.blog.nfpa.org/pub-ed/
Property Management – New Slim Line

PR710B

10 Year Sealed Battery Smoke Alarm
• Low profile slim design
• 10 year sealed lithium powercell prevents battery theft
• Tamper proof design
• Photoelectric smoke sensing technology
• Silence Feature
• 10 year End of Life signal

PRC710B

10 Year Sealed Battery Combo Smoke/CO Alarm
• Same features as above

The alarm has a sealed battery to inhibit tampering with alarm – preventing the removal of batteries from a smoke alarm ensures continuous protection
Some of the main reasons smoke alarms need to be replaced are environmental. Over time they become contaminated with airborne pollutants.

Vacuuming the alarm a couple of times a year greatly reduces the effect of above.
Pushing the test button mimics what would happen IF smoke were to enter the sensing chamber, but if the screen around the chamber is contaminated it will hinder the entry of smoke!

Pushing the test button of a 20 year old smoke alarm will likely cause it to activate. This can give people a false sense of security if smoke is unable to penetrate the debris built up around the sensing chamber.
Many people think that smoke enters the alarm here. This opening is where the horn is located.

Smoke actually enters an alarm around the circumference! So if a smoke source is held too close to the cover, it may take the alarm quite some time to sound.
Flaming vs. Smoldering – Cause & Frequency

Experts divide home fires into the following categories:

• **Flaming Fires** result from the burning of items such as flammable liquids, wood or paper, or from open flames such as candles that ignite other items. These fires produce more flames than smoke.
• **Smoldering Fires** most often occur when smoking materials such as cigarettes, are left unattended. These fires produce minimal amounts of flames, but large quantities of smoke.

National Fire Incident Reporting System (NFIRS) data shows that 93% of all residential fires are flaming fires and that flaming fires account for 75% of residential fire deaths.
Both photoelectric and ionization alarms must pass identical tests to obtain third party approval. They are both designed to alarm in time to give sufficient time for egress. An ionization alarm may respond sooner in a fast flaming fire than a photoelectric, but that time is crucial in a fast flaming fire. On the other hand, a ionization may respond some time after a photoelectric in a slow smoldering fire, but at that point the conditions have not likely become untenable.

For best protection, use both types of smoke alarm technologies.

For best protection, it is recommended both (ionization and photoelectric) technologies be used in homes. In addition to individual ionization and photoelectric alarms, combination alarms that include both technologies in a single device are available.
The best solution is to have dual technology alarms.

• Dual photoelectric and ionization smoke sensing technologies
• Single button test / silence
• Low battery warning
• EZ Access battery door
• 9V Battery included
• Optional theft prevention lock
• Microprocessor technology – Unit runs daily self check on all alarm functions
• 10 year warranty

SA302CNA
Smoke enters the alarm around the perimeter. Hold aerosol spray about 2 feet away from alarm and spray parallel to the wall or ceiling.
Part 2: Carbon Monoxide Alarms

- The characteristics of Carbon Monoxide
- Features of Carbon Monoxide Alarms
Sources of Carbon Monoxide

THE WATER HEATER IS ONE OF THE MOST COMMON SOURCES OF CARBON MONOXIDE HAZZARD IN THE HOME

Potential Sources of Carbon Monoxide in the Home:

- Chimney
- Furnace
- Attached Garage
- Fireplace
- Water Heater
- Indoor Grilling
- Range Hood
- Clothes Dryer
- Portable Heater
CO alarms that meet this standard will have been tested for a designed lifespan of at least 3 years and require either an automatic device or a marked replacement date to indicate that the designed lifespan has been exceeded.

NO Audible or Visual WARNINGS, (No Digital Displays), at 30 ppm for 30 DAYS

MUST ALARM at:
- 70 ppm ..... anytime between 60 and 240 Minutes, (4 hours)
- 150 ppm ... anytime between 10 and 50 Minutes
- 400 ppm ... anytime between 4 and 15 Minutes

Alarms have a “weighted” response – the higher PPM of CO the sooner they have to alarm

- Most important location is in hallway close to bedrooms so it can be heard if it alarms while occupants are sleeping.

- An alarm installed close to furnace or fuel burning appliance may not be heard if bedroom doors are closed or ambient sound level exceeds remote alarm.

- Optimum coverage is to install a CO alarm on every level.
Carbon Monoxide Legislation

MINISTRY OF COMMUNITY SAFETY & CORRECTIONAL SERVICES

See site below for complete details

http://www.mcscs.jus.gov.on.ca/english/FireMarshal/CarbonMonoxideAlarms/QuestionsandAnswers/OFM_COAlarms_QandA.html#P59_4811
The Provincial Codes are based on the 2010 National Building Code. The highlights regarding CO Alarms are:

- Required for any building that has a fuel burning appliance or attached garage.
- They are required to conform to CAN/CSA-6.19. If the alarm has a cUL certification, this means it must reference CSA-6.19. cUL alone is not enough.
- No disconnect switch between breaker and alarm.
- Must be installed outside the bedrooms, no more than 5 m from each bedroom door. If you have bedrooms on different floors, the CO Alarms should be interconnected. I don’t believe the code insists that they be interconnected with smoke alarms, but if you are using a combo, obviously the need to be.
Alerts occupants to low levels, allowing investigation before the alarm is programmed to sound and peak level memory for fire services use in the event of an incident.
For CSA 6.19-01 approval, CO alarms must meet or exceed a 3 year length of life test.

The minimum requirement is for a sticker to be affixed to the alarm indicating when it’s life expectancy has been exceeded.

BRK CO Alarms will now begin to “chirp” once it’s life expectancy of 7 - 10 years has be surpassed. (It is more dangerous to have a CO alarm that you think is working than to not have one at all)
The following list of substances at high levels may cause a nuisance alarm:

- Methane
- Propane
- Iso-butane
- Ethylene
- Alcohol
- Iso-propanol
- Benzene
- Toluene
- Ethyl acetate
- Hydrogen
- Hydrogen sulfide
- Sulfur Dioxides
- Most aerosol sprays
- Alcohol based products
- Paint thinners
- Solvents
- Adhesives
- Hair Spray
- After Shave
- Perfume
- Auto exhaust
- Some cleaning agents

The ammonia from pet urine can also cause CO alarms to sound.