

**STANDARD FOR THE INSTALLATION, INSPECTION AND
TESTING OF INTRUSION ALARM SYSTEMS**

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Since that time, changes in the membership may have occurred.

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STANDARD FOR THE INSTALLATION, INSPECTION AND TESTING OF INTRUSION ALARM SYSTEMS

PREFACE

This is the Second Edition of CAN/ULC-S302, Standard for the Installation, Inspection and Testing of Intrusion Alarm Systems.

This Edition of the Standard was developed by the ULC Standards Subcommittee on Installation, Inspection and Testing of Intrusion Alarm Systems, and was formally approved by the ULC Standards Committee on Security and Burglar Alarm Equipment and Systems.

Only metric SI units of measurement are used in this Standard. If a value for measurement is followed by a value in other units in parentheses, the second value may be approximate. The first stated value is the requirement.

The requirements of this Standard contemplate that the installation, inspection and testing procedures described herein shall be conducted by qualified personnel acceptable to the responsible authority. Refer to Appendix A, Qualified Personnel.

Appendices A through H, identified as informative, are for informational purposes only.

In Canada, there are two official languages, English and French. All safety warnings must be in French and English. Attention is drawn to the possibility that some Canadian authorities may require additional markings and/or installation instructions to be in both official languages.

This Second Edition National Standard of Canada is based on, and now supersedes, the First Edition.

Attention is drawn to the possibility that some of the elements of this Canadian standard may be the subject of patent rights. ULC Standards shall not be held responsible for identifying any or all such patent rights.

Requests for interpretation of this Standard should be sent to ULC Standards. The requests should be worded in such a manner as to permit a “yes” or “no” answer based on the literal text of the requirement concerned.

The initiation of the review of this Standard will commence within 5 years of the date of publication, unless the Standard is identified as fitting within a stabilized category, whereby the review will commence within the appropriate time frame set out by ULC Standards.

This Standard is intended to be used for conformity assessment.

1 SCOPE

1.1 This Standard prescribes requirements for:

- A The installation of intrusion alarm systems;
- B The classification of extent of protection; and
- C The testing and inspection of intrusion alarm systems.

1.2 Intrusion alarm systems are categorized by *security level*. They are further grouped as suitable for protection of a particular class of property such as *premises, safes, or vaults*.

1.3 The selection of *security level* to be applied in a particular case shall be made by the *responsible authority (RA)*.

1.4 For system trouble, service response and guard response, refer to CAN/ULC-S301, Standard for Signal Receiving Centre Burglar Alarm Systems and Operations.

1.5 Existing intrusion alarm installations shall be deemed compliant with this Standard provided that all of the following are met:

- A They were in compliance with the First Edition of CAN/ULC-S302, Standard for Installation and Classification of Burglar Alarm Systems for Financial and Commercial Premises, Safes and Vaults, inclusive of Amendments 1, 2 and 3; and
- B The existing *control unit* is not replaced.

2 REFERENCE PUBLICATIONS

The documents shown below are referenced in the text of this Standard. Unless otherwise stated elsewhere in this Standard, such reference shall be considered to indicate the edition and/or revisions of the document available at the date on which the Committee approved this ULC Standard. All undated references shall be interpreted as referring to the latest edition of that document.

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- ASTM F1090-2006, Standard Classification for Bank and Mercantile Vault Construction

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- CSA C22.1-12, Canadian Electrical Code, Part I, Safety Standard for Electrical Installations

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- ANSI/SIA CP-01-2010, Control Panel Standard-Features for False Alarm Reduction

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- CAN/ULC-S301, Standard for Signal Receiving Centre Burglar Alarm Systems and Operations
- CAN/ULC-S304, Standard for Signal Receiving Centre and Premise Burglar Alarm Control Units
- ULC-S306, Standard for Intrusion Detection Units
- CAN/ULC-S321, Standard for Burglary Resistant Vault Doors and Modular Panels
- ULC-S330, Standard for Burglary Resistant Night Depositories
- ULC-S332, Standard for Burglary Resistant Glazing Material
- ULC-S529, Standard for Smoke Detectors for Fire Alarm Systems
- CAN/ULC-S530, Standard for Heat Actuated Fire Detectors for Fire Alarm Systems
- ULC/ORD-C634, Guide for the Investigation of Connectors and Switches for Use with Burglar Alarm Systems

3 GLOSSARY

Note: Terms used in this Standard that are in *italic print* are defined as follows:

3.1 **ACCESSIBLE OPENING** — An *opening* that is 5500 mm or less above either the ground or the roof of an adjoining building; or 4300 mm or less from directly or diagonally opposite windows, fire escapes, or roofs, or 900 mm or less from *openings*, fire escapes, etc., either in or projecting from the same adjacent wall, leading to other *premises*.

3.2 **ACTIVE COMMUNICATIONS** — A method of communications in which the integrity of the communication channel or channels are continuously monitored so as to identify to the *signal receiving centre* any fault or failure that could affect signal transmission and reception.

3.3 **ALARM SCREEN** — A window screen having a wired protective circuit of wire no larger than 0.13 mm² (26 AWG), which will be broken when cutting through the screen to create an *opening* within the protective screen.

3.4 **ARMED** — The state of a security *control unit* or *partition/area* where points/zones of the *partition/area* are fully protected and a transition on these points will result in an alarm from the *partition/area*.

3.5 **ARMING** — Activating a *partition* or all of the protection equipment at a protected *premises*.

3.6 **ARMING LEVEL** — The extent to which an area/*partition* or entire *control unit* is *armed* (protected). *Control units* may include a number of *arming levels*, such as off, stay, on, home, away, etc.

3.7 **AUTO ARMING** — The function of *arming* a security *control unit* or *partition/area* "on site" at a pre-defined time, without user intervention.

3.8 **AUTOMATED BANKING MACHINE (ABM)** — An unattended machine available to the public that will dispense cash, and may also accept deposits or perform other banking functions, when accessed by an authorized user. The cash and deposits are protected by a security container.

3.9 **BREAKABLE** — A *closure* that can be broken by simple means to create an *opening*.

3.10 **BUILDING WALL** — A wall of 200 mm or more in thickness constructed of solid stone or brick bonded with Portland cement mortar or monolithic concrete.

3.11 **BURGLARY RESISTANT GLAZING MATERIAL** — A clear, translucent, or opaque glazing material intended to resist attacks of the "hit and run" type in indoor or outdoor applications, used principally as a substitute for plate glass in *show windows* or show case panels.

3.12 **CASH DISPENSING UNIT (CDU)** — An attended machine, available to authorized employees of a financial institution and not to the public, that will dispense cash, and may also accept deposits or perform other banking functions, when accessed by such authorized persons. The cash and deposit are protected by a security container.

3.13 **CLOSURE** — The element, material or device used to cover or fill an *opening*. A *closure* is deemed moveable if it is removable without special tools, whether it was designed to be moved/removed or not.

3.14 **COMPLETE PROTECTION** — Protection of the entire *opening* to detect entry through it, in addition to the contacting of any moveable or removable portion of the *closure*.

3.15 **CONDUIT** — A raceway of circular cross-section used to run the *protective wiring* circuits. *Conduit* may be of the rigid metallic, rigid nonmetallic or electrical metallic tubing.

3.16 **CONNECTING WIRING** — Those conductors used to interconnect units of protection in an intrusion alarm system.

3.17 **CONTROL PANEL** — A device which provides the intrusion alarm system user with system status information and control functions. The *control panel* may be integral with, or remotely located from, the *control unit*.

3.18 **CONTROL UNIT** — Device(s), which provide the control, logic processing, and the termination points for the *protective wiring* circuits of an intrusion alarm system. These devices include, but are not limited to zone expanders, power supplies, communication devices, and keypads.

3.19 **DISARMING** — Deactivating a *partition* or all of the protection equipment at a protected *premises*.

3.20 **ELECTRICAL SUPERVISION** — Means whereby a fault condition, which would interfere with the operation of a circuit connected to a *control unit* is detected.

3.21 **GROUND FLOOR** — Any level of the protected *premises* which meets grade outside the building.

3.22 **GRADE LEVEL** — Any surface that meets the exterior of the *premises* that is deemed to be an accessible surface including the ground and all other accessible surfaces such as adjacent roofs.

3.23 **HARD-DRAWN COPPER WIRE** — Wire having an elongation of not more than 1% (7.6 mm for a 760 mm test length). The elongation is measured as the difference between the length with a load of 1 kg and the length when the load has been gradually increased to the point of rupture of the wire.

3.24 **INACCESSIBLE OPENING** — An *opening* more than 5500 mm above either the ground or the roof of an adjoining building; more than 4300 mm from directly or diagonally opposite windows, fire escapes, or roofs; or more than 900 mm from *openings*, fire escapes, etc., in or projecting from the same or adjacent wall, leading to other *premises*.

3.25 **INTERCONNECTING MEANS** — Wired or *wireless* connection between a *control unit*, modules and alarm initiating devices.

3.26 **NIGHT DEPOSITORY** — A container located within a building and connected by a metal chute to a depository head on the outside of the *building wall* to permit deposits. Refer to ULC-S330, Standard for Burglary Resistant Night Depositories.

3.27 **NON-BREAKABLE** — A *closure* that cannot be broken by simple means.

3.28 **OPENING** — Any point at which entry can be gained without cutting or tearing down any part of the *premises* structure with a clear cross-sectional area of greater than 620 cm² with the smallest dimension exceeding 150 mm.

3.29 **PARTIAL PROTECTION (of an opening)** — Protection of an *opening* by the contacting only of any moveable or removable portions of the *closure*.

3.30 **PARTITION** — A section of the protected *premises* that can be independently *armed* (protected) and disarmed. Examples of a *partition* may be an office, warehouse, *safe*, etc. These are frequently referred to as areas.

3.31 **PARTY WALL** — A single wall which is common to two separate *premises* within the same building or in adjoining buildings and which is not constructed as a *building wall*.

3.32 **PERIMETER CEILING** — A *suspended ceiling* above which *party walls* do not extend.

3.33 **POINT PROTECTION** — Protection added for the purpose of protecting a specific asset of value high enough to warrant the additional protection as determined by the *responsible authority (RA)* and specified by the *security practitioner*.

3.34 **PREMISES** — A facility which may or may not be protected by an intrusion alarm system.

3.35 **PROTECTION SCHEDULE** — The schedule in times of the day and days of the week (including holidays) at which the *armed* status of the system is changed.

3.36 **PROTECTIVE WIRING** — Any of the various recognized forms of conductor, such as conductive foil, open-wire lacing, grooved stripping, screens, and connectors and switches, used for protecting windows, doors, transoms, vents, skylights, walls, floors and ceilings. *Protective wiring* refers to installed wiring in which the wiring acts as the sensor.

3.37 **RADIO LINK** — A *wireless* communication channel or channels.

3.38 **REMOTE ACCESS** — The process by which a *control unit* is accessed by means other than permanently installed local devices.



3.39 *RESPONSIBLE AUTHORITY (RA)* — A person, firm, corporation, or organization responsible for application of the requirements of a standard, or for approving equipment, materials, an installation, or a procedure.

3.40 *SAFE* — A moveable container of iron, steel, or equivalent material, which is not intended to be a walk-in and the doors of which are equipped with a combination lock.

3.41 *SECURITY LEVEL* — An element of an arbitrary scale by which to classify the physical security objectives of a particular intrusion alarm system.

3.42 *SECURITY PRACTITIONER* — The technical expert responsible for the design and specification of the protection.

3.43 *SHOW WINDOW* — A fixed window intended for display purposes, constructed of clear or opaque plate glass, which is permanently secured in a wood or metal frame.

3.44 *SIGNAL RECEIVING CENTRE (SRC)* — A facility that receives alarm signals and at which trained personnel are on duty at all times.

3.45 *SPACE PROTECTION* — Interior *space protection* by devices such as photoelectric beams, movement detectors, and sound detectors.

3.46 *STANDBY CONDITION* — The ready-to-operate condition of the product existing prior to its being tripped or operated by an intrusion.

3.47 *STEP* — A distance of 0.76 ± 0.08 m.

3.48 *STOCKROOM OR STOCK CABINET* — A non-portable or permanently built-in construction of wood, metal, or masonry having a conventional door.

3.49 *STRATEGIC LOCATION* — The location for a detection device that provides the best incremental protection as determined by the *security practitioner*.

3.50 *STREET OR PUBLIC HIGHWAY* — *Streets* commonly used for through traffic – does not include alleys or courtways.

3.51 *SUSPENDED CEILING* — A non-structural ceiling installed below the structural ceiling or roof above the protected premise.

3.52 *TAMPERING* — Attempting to compromise the protection.

3.53 *TRAP* — A conductor fastened between the building structure and a screen, stripping, foiled or wired panel, fan, etc., so that the two cannot be separated without breaking the conductor.

3.54 *VALUABLES* — Items present on the *premises* that are determined by the *responsible authority (RA)* to be valuable and to require intrusion alarm system protection.

3.55 *VAULT* — A permanent, non-removable construction of iron, steel, brick, concrete, stone, tile, or similar masonry units permanently built into or assembled on the *premises* which is intended to be a walk-in and having an iron, steel or equivalent material door and frame with a combination lock. Refer to CAN/ULC-S321, Standard for Burglary Resistant Vault Doors and Modular Panels.

3.56 **VERY ACCESSIBLE OPENING** — An *accessible opening* with its sill below 2500 mm above grade, including all *openings* with a sill below 2050 mm above grade, where the grade is a roof, ledge, or other structure considered to be *accessible*.

3.57 **WIRELESS** — Alarm initiating devices and modules with RF *interconnecting means* in lieu of wired connections.

4 GENERAL REQUIREMENTS

4.1 Intrusion alarm systems covered by the Standard usually operate within the limits of Class 2 signal circuits as defined by the CSA C22.1, Canadian Electrical Code, Part I, Safety Standard for Electrical Installations.

4.2 Excess wiring within a separate building, garage, storeroom, or another floor outside of the protected area shall be connected in the circuit so that *tampering* with the wiring will not defeat the protection of the primary area.

4.3 All equipment of an intrusion alarm system shall comply with the requirements for the equipment as defined in the applicable ULC standards.

4.4 Installations of intrusion alarm systems shall have protection based on the protected *premises Security Level* with the appropriate recommended Communication Channel Security, Extent of Protection and Supervision of *Interconnecting Means* as shown in Tables 1, 2 and 3.

4.5 Installation records shall be kept as required in Section 16, Records and Training of Users, and be comprised of configuration details, a test and commissioning record verifying the system performance, transmission to the *signal receiving centre*, date of installation, battery date code and a diagram depicting the locations of all devices within *partitions* conforming to extent of protection classifications within this Standard.

4.6 The installation of the *control unit*, *control panel*, modules, ancillary devices, detection devices and wiring shall be done by qualified personnel. See Appendix A, Qualified Personnel.

4.7 All equipment to be installed as part of an intrusion alarm system shall be installed to comply with the requirements this standard and with manufacturers' installation instructions.

5 EXTENT OF PROTECTION

5.1 GENERAL

5.1.1 The extent of protection provided by an intrusion alarm system installed on a *premises* corresponds in ascending order to *security level* and is further defined as Extent 1, 2, 3 or 4 in accordance with the applicable requirements of Subsection 5.2, Extent of Protection on Premises. Refer to Table 4; Table 5; and Appendix E, Interpretations Affecting Extent of Protection.

5.1.2 Extent of Protection 1A, 1B, 1C and 1D correspond to applications within *Security Level* I. Extent of Protection 2, 3 and 4 correspond to applications at *Security Levels* II, III, and IV.

5.1.3 Specific methods for achieving an extent of protection are further identified, where applicable, by the principle method used, i.e. perimeter, *space protection*, sound detection or subdivision.

5.1.4 Subdivision is for use only in warehouse style applications of *Security Level* II or lower, in which full perimeter and or *space protection* is impractical.

5.1.5 Where the terms door, window, cover, etc. are used in this Standard, it is understood that reference is being made to perimeter doors, windows, covers, etc., where their movement or removal would create an *opening*.

5.1.6 More than one *ground floor* shall be considered to exist where direct access to grade is available from more than one floor of the premise.

5.1.7 The extent of protection on *safes* is classified as Partial or Complete as defined in Subsection 10.1, Safe Installation – Extent Partial, and Subsection 10.2, Safe Installation – Extent Complete. Extent partial is intended for application to *safes* at *Security Level I* or II. Extent complete is intended for application to *safes* at *Security Level III* or IV.

5.1.8 The extent of protection on *vaults* is classified as Partial or Complete as defined in Subsection 10.5, Vault Installation – Extent Partial and Subsection 10.6, Vault Installation – Extent Complete. Extent partial is intended for application to *vaults* at *Security Level III*. Extent Complete is intended for application to *vaults* at *Security Level IV*.

5.2 EXTENT OF PROTECTION ON PREMISES

5.2.1 Extent 1A

5.2.1.1 To be classified as Extent 1A, an intrusion alarm system shall comply with the requirements of Clauses 5.2.1.2 and 5.2.1.3.

5.2.1.2 *Partial protection* shall be installed on all *very accessible* doors.

5.2.1.3 A minimum of one motion detector shall be installed in a *strategic location* on the *ground floor*.

5.2.2 Extent 1B

5.2.2.1 To be classified as Extent 1B, an intrusion alarm system shall comply with the requirements of Clause 5.2.2.2 through 5.2.2.5.

5.2.2.2 *Partial protection* shall be installed on all doors and all *very accessible* windows and other *openings*.

5.2.2.3 A minimum of one motion detector shall be installed per 93 m² per floor in a *strategic location* on all floors below grade and on the *ground floor*, except as noted in Clause 5.2.2.4.

5.2.2.4 The requirements of Clause 5.2.2.3 may be waived for any floor on which *complete protection* is installed on all *very accessible openings*. See Clause 5.2.2.5.

5.2.2.5 Notwithstanding the requirements of Clause 5.2.2.4, a minimum of one motion detector shall be installed in a *strategic location*.

5.2.3 Extent 1C

5.2.3.1 To be classified as Extent 1C, an intrusion alarm system shall comply with the requirements of Clause 5.2.3.2 through 5.2.3.4.

5.2.3.2 *Complete protection* shall be installed on all doors, all *very accessible* windows and other *openings*.

5.2.3.3 *Partial protection* shall be installed on all accessible windows and other *openings* not included in Clause 5.2.3.2.

5.2.3.4 Motion detection shall be installed in *strategic locations* on all floors. A minimum of one detector per 93 m² of gross floor area per floor is required.

5.2.4 Extent 1D

5.2.4.1 To be classified as Extent 1D, an intrusion alarm system shall comply with one of Clauses 5.2.4.2 through 5.2.4.5.

5.2.4.2 PERIMETER METHOD: *Complete protection* shall be installed on all *accessible openings*.

5.2.4.3 SPACE PROTECTION METHOD: *Partial protection* shall be installed on all doors. In addition, *space protection* shall be installed in all sections of the *premises*, excluding washrooms, lavatories, clothes closets, dressing and alteration rooms, furnace and coal rooms, basements, and other sections of the *premises* where *valuables* are not stored. A minimum of one motion detector per 93 m² of gross floor area per floor is required.

5.2.4.4 SOUND DETECTION METHOD: *Partial protection* shall be installed on all *openings*. In addition, sound detection shall be installed on the perimeter of the protected area (with additional microphones located near all floor and ceiling *openings*) to comply with the requirements of Subsection 6.7, Sound Detectors.

5.2.4.5 SUBDIVISION METHOD: *Partial protection* shall be installed on all *accessible openings*. In addition, one or more invisible rays or channels of radiation shall be installed with the minimum overall length of the rays or channel equivalent to the longest dimensions of the protected area or areas to detect movement through the ray or channel at a rate of 1 *step* per second to comply with the requirements of Clause 6.6.4.

5.2.5 Extent 2

5.2.5.1 To be classified as Extent 2, an intrusion alarm system shall comply with one of Clauses 5.2.5.2 through 5.2.5.7.

5.2.5.2 PERIMETER METHOD: *Complete protection* shall be installed on all *accessible openings*. In addition, *partial protection* shall be installed on all *inaccessible openings*.

5.2.5.3 SPACE PROTECTION METHOD A: *Complete protection* shall be installed on all *accessible openings*. In addition, Space Detection shall be installed in all sections of the enclosed area, excluding washrooms, lavatories, clothes closets, dressing and alteration rooms, furnace and coal rooms, basements, and other sections of the *premises* where *valuables* are not stored. A minimum of one motion detector per 93 m² of gross floor area per floor is required.

5.2.5.4 SPACE PROTECTION METHOD B: *Partial protection* shall be installed on all *openings*. In addition, Space detection shall be installed in all sections of the enclosed area to comply with Subsection 6.5, Motion Detectors.

5.2.5.5 SOUND DETECTION METHOD A: *Complete protection* shall be installed on all *accessible openings*. In addition, a sound detection system shall be installed around the perimeter of the area (with additional microphones located near all floor and ceiling *openings*) to comply with the requirements of Subsection 6.7, Sound Detectors.

5.2.5.6 SOUND PROTECTION METHOD B: *Partial protection* shall be installed on all *openings*. In addition, a sound detection system shall be installed in all sections of the enclosed area to comply with the requirements of Subsection 6.7, Sound Detectors.

5.2.5.7 SUBDIVISION METHOD: *Complete protection* shall be installed on all *accessible openings*. In addition, a network of invisible rays or channels of radiation shall be installed to subdivide the floor space of each floor or separate section of the protected area into three approximately equal areas, or more, where necessary to provide at least one subdivision per 93 m² of floor space to detect movement through the rays or channels at a rate of 1 *step* per second to comply with the requirements of Clause 6.6.4.

5.2.6 Extent 3

5.2.6.1 To be classified as Extent 3, an intrusion alarm system shall comply with one of Clauses 5.2.6.2 through 5.2.6.4.

5.2.6.2 PERIMETER METHOD: *Complete protection* shall be installed on all *accessible openings*. In addition, *partial protection* shall be installed on all *inaccessible openings* and protection shall be installed on all party floors, *party walls*, and ceilings to comply with the requirements of Section 8, Protection of the Envelope of the Premises.

5.2.6.3 SPACE PROTECTION METHOD: *Complete protection* shall be installed on all *accessible openings*. In addition, *partial protection* shall be installed on all *inaccessible openings* and motion detection shall be installed in all sections of the enclosed area to comply with the requirements of Subsection 6.5, Motion Detectors.

5.2.6.4 SOUND DETECTION METHOD: *Complete protection* shall be installed on all *accessible openings*. In addition, *partial protection* shall be installed on all *inaccessible openings* and sound detection shall be installed in all sections of the enclosed area to comply with the requirements of Subsection 6.7, Sound Detectors.

5.2.7 Extent 4

5.2.7.1 To be classified as Extent 4, an intrusion alarm system shall comply with one of Clauses 5.2.7.2 through 5.2.7.4.

5.2.7.2 PERIMETER METHOD: *Complete protection* shall be installed on all *openings*. In addition, protection shall be installed on all floors, walls, and ceilings to comply with the requirements of Section 8, Protection of the Envelope of the Premises, except for that part of any *building wall* which is at least two stories above the roof of an adjoining building or at least two stories above *grade level*.

5.2.7.3 SPACE PROTECTION METHOD: *Complete protection* shall be installed on all *accessible openings*. In addition, *partial protection* shall be installed on all *inaccessible openings* and protection shall be installed on all party ceilings and floors not constructed of concrete, and on all *party walls* enclosing the *premises* to comply with the requirements of Section 8, Protection of the Envelope of the Premises, and motion detection shall be installed in all sections of the enclosed area to comply with the requirements of Subsection 6.5, Motion Detectors.

5.2.7.4 SOUND DETECTION METHOD: *Complete protection* shall be installed on all *accessible openings*. In addition, *partial protection* shall be installed on all *inaccessible openings* and protection shall be installed on all party ceilings and floors not constructed of concrete, and on all *party walls* enclosing the *premises* to comply with the requirements of Section 8, Protection of the Envelope of the Premises, and sound detection shall be installed in all sections of the enclosed area to comply with the requirements of Subsection 6.7, Sound Detectors.

5.3 EXTENT OF PROTECTION ON SAFES AND VAULTS

5.3.1 Extent Partial

5.3.1.1 Extent partial applies to *safes* and *vaults* protected by door contacts and other external means such as motion detection or a cabinet with tamper protection as described in Subsection 10.1, Safe Installation – Extent Partial and in Subsection 10.5, Vault Installation – Extent Partial.

5.3.2 Extent Complete

5.3.2.1 Extent Complete applies to *safes* and *vaults* extensively protected as described in Subsection 10.2, Safe Installation – Extent Complete and in Subsection 10.6, Vault Installation – Extent Complete.

5.3.2.2 To be classified as Extent Complete, the protection provided by an intrusion alarm system shall provide for ceiling, floor and wall protection to detect an attempted attack prior to entry.

5.3.2.3 To be classified as Extent Complete the protection for *safes* shall comply with the requirements of Subsection 10.2, Safe Installation – Extent Complete.

5.3.2.4 To be classified as Extent Complete the protection for *vaults* shall comply with the requirements of Subsection 10.6, Vault Installation – Extent Complete.

6 INSTALLATION OF INITIATING DEVICES

6.1 GENERAL

6.1.1 Detection devices shall comply with CAN/ULC-S306, Standard for Intrusion Detection Units.

6.1.2 Contacts and switches shall comply with ULC/ORD-C634, Guide for the Investigation of Connectors and Switches for Use with Burglar Alarm Systems.

6.1.3 Detection devices and contacts and switches shall be installed to comply with the requirements of this standard, and with manufacturers' installation instructions.

6.2 PROTECTIVE WIRING

6.2.1 General

6.2.1.1 *Protective wiring* shall be installed with 2-state or 3-state *electrical supervision* as appropriate to the assigned *security level*. See Subsection 13.9, Supervision of Wiring.

6.2.1.2 *Protective wiring* shall be kept at least 12 mm from other signal wires, pipes, *conduit*, fixtures, and other grounded objects.

6.2.1.3 *Protective wiring* shall be spaced at least 50 mm from electric light and power lines.

6.2.1.4 Wire conductors used for *protective wiring* shall be bare hard-drawn solid copper with a wire gauge not larger than 0.21 mm² (24 AWG).

6.2.1.5 When *protective wiring* is applied to a door, it shall extend to within 150 mm of the edge of the door at the top and sides and within 200 mm of the bottom of the door.

6.2.1.6 On wood door bases less than 250 mm high, single circuit concealed *protective wiring* is acceptable.

6.2.1.7 *Protective wiring* on overhead doors shall extend up to a maximum height of 4300 mm.

6.2.1.8 *Protective wiring* on doors shall be protected against mechanical damage up to a height of 2400 mm.

6.2.1.9 At the junction of double doors, the distance between *protective wiring* shall not exceed 150 mm.

6.2.2 Fine Wire

6.2.2.1 Film-coated fine wire used as *protective wiring* may be applied directly to wood doors and like surfaces in good condition and in dry locations.

6.2.2.2 Fine wire shall be fastened at intervals not exceeding 200 mm and shall be completely covered with hardboard, or similar non-conductive material.

6.2.3 Alarm Screens

6.2.3.1 *Alarm screens* shall be fully framed assemblies having fine wire installed in supports secured on centres of not more than 100 mm so that an alarm will result when an *opening* is made in the screen.

6.2.3.2 *Alarm screens* shall be treated to exclude moisture.

6.2.3.3 Wire used in *alarm screens* shall be film-coated solid copper with a wire gauge not larger than 0.08 mm² (28 AWG).

6.2.3.4 *Alarm screens* shall be installed so that removal will be detected before a clear *opening* of 50 mm is created.

6.2.3.5 An *alarm screen* covering the moveable portion of a *closure* provides *partial protection* for the *opening*.

6.2.3.6 An *alarm screen* covering the entire *opening* provides *complete protection* for the *opening*.

6.2.4 Laced Panels

6.2.4.1 Fine wires of film coated solid copper, with a wire gauge not larger than 0.21 mm² (24 AWG), shall be stapled at intervals not exceeding 200 mm and shall be covered with hardboard or similar non-conductive material to form a panel.

6.2.4.2 The wiring on the panels shall be installed with 2-state or 3-state *electrical supervision* as appropriate to the assigned *security level*. See Subsection 13.9, Supervision of Wiring.

6.2.4.3 Laced panels prepared to be mounted on a surface shall be trapped to the building structure at all four corners so that the *traps* will not be visible from the outside and so that the panels cannot be moved more than 50 mm without causing an alarm.

6.2.4.4 Laced panels prepared to be used as an enclosure shall be trapped to each other at all 8 corners so that the *traps* will not be visible from the outside and so that the panels cannot be moved more than 25 mm without causing an alarm.

6.3 CONTACTS

6.3.1 Contacts shall not permit a clear *opening*, at leading edge of the door, window or other *closure*, of more than 50 mm without causing an alarm.

6.3.2 Wiring to contacts shall be fastened to the building structure within 50 mm of the contact.

6.3.3 Where contacts are installed on a *closure* that has a normal amount of movement even when closed (e.g. overhead doors), the contacts shall be installed to require movement in excess of the maximum normal movement before an alarm is caused.

6.3.4 Where contacts are mounted on glass surfaces the adhesive used shall be in accordance with the manufacturers' instructions.

6.3.5 The terminal screws of contacts shall not be left exposed. Manufacturer supplied covers shall be used when installing surface type contacts.

6.4 FLOOR MATS

6.4.1 A floor mat may not be installed where the *security level* requires 3-state supervision of circuits.

6.4.2 A floor mat shall be installed under a carpet or rug or be otherwise concealed and shall not be installed between carpet and under-padding.

6.4.3 A floor mat used to provide *complete protection* of a window shall extend 760 mm to each side of the *opening* and 900 mm from the front of the *opening* or to a vertical barrier (such as a wall, *partition*, or the like).

6.4.4 A floor mat used for the protection of a stairwell shall be as wide as the stair tread and extend over three *steps*.

6.4.5 A floor mat shall not be installed directly on concrete or tile. Floor mats shall be installed over tar paper, heavy vinyl or paper as a hard base surface.

6.4.6 A floor mat may be used in lieu of a motion detector where *space protection* is not required.

6.5 MOTION DETECTORS

6.5.1 To provide *complete protection* for an *opening*, a motion detector shall be installed and adjusted to initiate an alarm when a person walks from the *opening* into the protected area a maximum of 2 *steps*, at a rate of one *step* per second, in addition to the installation of contacts on any moveable portion of the *closure*.

6.5.2 A motion detector installed to respond to the movement of a person walking not more than four consecutive *steps* in one direction at a rate of one *step* per second, provides *space protection* for the area covered by the detector.

6.5.3 An area to be protected by *space protection* shall be tested by a series of four-*step* trials. A sufficient number of detection units shall be installed so that, upon testing, an alarm will be caused in at least three out of every four such consecutive trials made moving progressively throughout the protected area.

6.5.4 A motion detector shall be installed in such a location that it will not be likely to become blocked, and in accordance with the manufacturer's instructions.