



UL 771

Underwriters Laboratories Inc. Standard for Safety

Night Depositories



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UL Standard for Safety for Night Depositories, UL 771

Ninth Edition, Dated October 6, 2006

Summary of Topics

This revision of ANSI/UL 771 is being issued to reflect the reaffirmation of the ANSI approval of the standard.

Text that has been changed in any manner or impacted by UL's electronic publishing system is marked with a vertical line in the margin. Changes in requirements are marked with a vertical line in the margin and are followed by an effective date note indicating the date of publication or the date on which the changed requirement becomes effective.

The revised requirements are substantially in accordance with Proposal(s) on this subject dated November 5, 2010.

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Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at <http://csds.ul.com>.

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INTRODUCTION

1 Scope

1.1 These requirements cover the construction and security of night depository entrances. The units are intended to permit the deposit of cash, checks, and similar items, from outside a building into a chute connected to a depository within the building.

1.2 A night depository is intended primarily for protection against theft of deposits by:

- a) Fishing the deposits from the depository;
- b) Trapping the deposits by preventing them from entering the depository, and then extracting the deposits; and
- c) Entering the night depository by force with the aid of common burglary tools.

1.3 The term "product" as used in this standard refers to all night depositories or any part thereof covered by this standard unless specifically noted otherwise.

2 General

2.1 Components

2.1.1 Except as indicated in 2.1.2, a component of a product covered by this standard shall comply with the requirements for that component. See Appendix A for a list of standards covering components used in the products covered by this standard.

2.1.2 A component is not required to comply with a specific requirement that:

- a) Involves a feature or characteristic not required in the application of the component in the product covered by this standard, or
- b) Is superseded by a requirement in this standard.

2.1.3 A component shall be used in accordance with its rating established for the intended conditions of use.

2.1.4 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

2.2 Units of measurement

2.2.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

2.3 Undated references

2.3.1 Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as referring to the latest edition of that code or standard.

3 Glossary

3.1 For the purpose of this standard the following definitions apply.

3.2 CIRCUITS, ELECTRICAL:

a) **HIGH-VOLTAGE** – A circuit involving a potential of not more than 600 volts and having circuit characteristics in excess of those of a low-voltage circuit.

b) **LOW-VOLTAGE (POWER LIMITED)** – A circuit involving a potential of not more than 30 volts alternating current (AC), rms, 42.4 volts direct current (DC) or AC peak, and providing not more than 100 volt-amperes (VA) rated output. The 100 VA limit shall be provided by the design of the transformer, a fixed impedance, a noninterchangeable fuse, nonadjustable manual reset circuit protective device, or a regulating network.

3.3 **FISHING** – The introduction into the night depository chute of any form of lines, wires, or similar devices, to which one or more hooks or other devices may be attached that may be manipulated so as to hook a deposit bag or deposit envelope, and then remove the bag or envelope through the chute and into the outside opening.

3.4 **FORCING** – The use of pry bars, screwdrivers, wrenches, and similar tools, to enlarge an opening, or to create an opening by breaking out or distorting a part, to gain access to the deposit bags or envelopes.

3.5 **LINE-VOLTAGE** – The voltage at any field-connected source of supply nominally 50 – 60 hertz (Hz); 115, 208, or 230 volts.

3.6 **SECONDARY DEFENSE DEVICE** – An optional device that is activated when the depository head is:

a) Removed by forcible methods from the building structure in which it is installed or from its enclosure or

b) Infiltrated by forcible methods.

When activated, the secondary defense device closes off the chute connecting the depository head to the receiving chest, or other receptacle (such as a safe), preventing access to the deposits.

3.7 **TRAPPING** – The use of a device or materials that may be introduced into a night depository in such a manner as to avoid casual detection (as by a depositor) and that prevents the deposit bag or deposit envelope from entering the chute, so that it is capable of being withdrawn with the deposit from the entrance after the depositor has left.

4 Instructions and Drawings

4.1 Each unit shall be provided with installation instructions and drawings that shall include the following information:

- a) Typical installation drawing layouts and complete representative installation wiring diagram for the product(s) indicating recommended locations and wiring methods that shall be in accordance with the National Electrical Code, ANSI/NFPA 70.
- b) A concise description of the operation, testing, and proper maintenance procedures for the product(s).
- c) Replacement parts, such as lamps or batteries, shall be identified in the instructions by a part number, manufacturer's model number, or the equivalent.

4.2 The instructions shall be incorporated on the inside of the product, on a separate sheet, or as part of a manual. When not included directly on the product, the instructions or manual shall be referenced in the marking information on the product. See 61.1.

CONSTRUCTION

ASSEMBLY

5 General

5.1 All parts of the night depository entrance shall be constructed and assembled so that any unit or part is capable of being repaired or replaced as intended by authorized and instructed service personnel.

5.2 A night depository incorporating electrical features shall be constructed to be installed in accordance with the applicable provisions of the National Electrical Code, ANSI/NFPA 70.

5.3 The night depository entrance shall be designed or shielded to reduce the accumulation of dust, snow, ice, or rain within the night depository, that could interfere with its intended operation during severe weather conditions.

5.4 Deposit bags or envelopes furnished with the night depository shall not be of such size and shape that, when filled, could become wedged in the deposit passageways.

5.5 A night depository intended for bag deposits shall be equipped with a locked entrance.

5.6 A secondary defense device in its normal inactivated position shall not restrict the normal passage of deposits through the depository head and chute into the receiving chest or other receptacle. See Tests of Secondary Defense Device, Section 36.

5.7 When a night depository is provided with a secondary defense device, the removal, by forcible methods, of the depository head from the building structure in which it is installed or from its enclosure, or the infiltration of the depository head by forcible methods, shall activate the secondary defense device to close off the resulting access to the receiving chest or other receptacle in a manner that prevents removal of the deposits. See Tests of Secondary Defense Device, Section 36.

6 Protection of Service Personnel

6.1 Uninsulated parts that result in a risk of electric shock or operate at high-voltage and that are made accessible by opening or removing a cover, door, panel, or other closure on or within the product (see 7.4.1) shall be provided with guards over the parts to reduce the risk of service personnel unintentionally touching them during servicing of the product. See also 6.2, 6.3, and 7.2.1 – 7.4.4.

6.2 A guard shall be provided for a part that must be in motion during servicing operations, and that presents a pinching, snagging, cutting, or other risk of unintentional contact with moving parts that may cause injury to persons when made accessible by opening or removing a cover, door, panel, or other closure of the product to provide access to the interior of the product. See also 6.3 and 7.2.1 – 7.4.4.

6.3 If the guard mentioned in 6.1, 6.2, and 7.4.1 must be removed during servicing of the parts specified in 6.1 and 6.2, the guard shall be constructed and arranged so that it is removable and replaceable with hand-operated fasteners or hand tools.

7 Enclosures

7.1 General

7.1.1 The frame and enclosure of a unit shall have the strength and rigidity to resist total or partial collapse and the attendant reduction of spacings, loosening or displacement of the parts, or other defects. See Mechanical Strength Tests for Enclosures, Section 40. See also 9.1 and 9.2.

7.1.2 An operating part, such as a gear mechanism, light-duty relay, and similar device shall be enclosed to reduce the risk of malfunction from dust or other material that is capable of impairing its intended operation.

7.1.3 The mounting means of an enclosure shall be accessible without disassembly of any operating part of the product. Removal of a completely assembled panel to mount the enclosure is not considered to be disassembly of an operating part.

7.1.4 An enclosure of a product containing other than power limited circuits shall be constructed to reduce the risk of emission of flame, molten metal, flaming or glowing particles, or flaming drops. See Ignition Through Bottom-Panel Openings Tests, Section 58.

7.1.5 A construction using a nonflammable bottom in accordance with 7.9.2, or an individual barrier under a component or group of components or assemblies, as specified in Figure 7.1, is to be evaluated as complying with the requirement in 7.1.4. See 7.9.3.

Exception: Material or assemblies classified as V-1 or better are not required to comply with this requirement. See the Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances, UL 94.

7.2 Accessibility of uninsulated live parts and moving parts

7.2.1 Uninsulated live parts and moving parts of a product shall be located or enclosed so that protection is provided against risk of electric shock or injury to persons from unintentional contact with such parts. Insulated brush caps do not require an additional enclosure. See 7.9.6 and 7.9.7.

7.2.2 Any part of the external enclosure of a product to be removed for operator servicing shall be removed before the product is examined in connection with the requirement in 7.2.1.

7.2.3 Fan blades, blower wheels, pulleys, belts, and similar parts, shall be enclosed or guarded to reduce the risk of injury to persons. See 7.2.5. The scroll of a centrifugal blower may be used as a guard for the blower wheel.

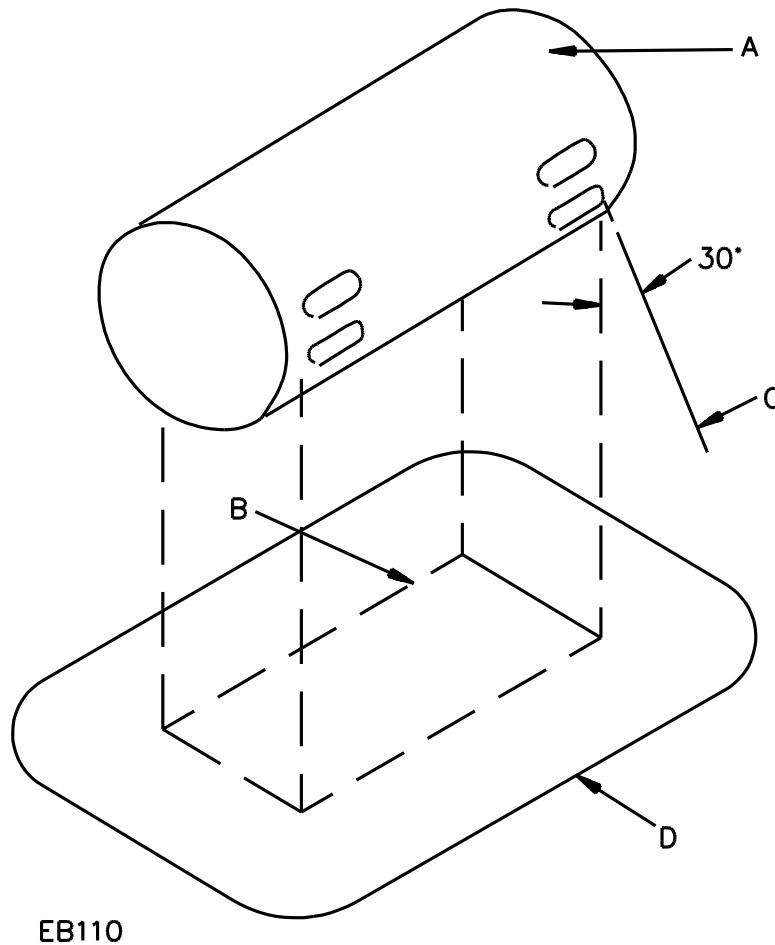
7.2.4 An interlocking mechanism that operates to disconnect power to a motor when a cover or panel is removed or opened for access to moving parts complies with the requirement of 7.2.3. See 7.3.1 – 7.3.3.

7.2.5 The degree of protection required in 7.2.3 is based upon the general construction and the intended use of the product. The location where the product is intended to be used is considered when evaluating the acceptable degree of exposure of mechanical parts. Other factors taken into consideration in evaluating the acceptability of exposed moving parts are:

- a) The degree of exposure;
- b) The sharpness of the moving parts;
- c) The risk of unintentional contact with the moving parts;
- d) The speed of movement of those parts; and
- e) The risk of fingers, arms, or clothing being drawn into the moving parts, such as at points where belts travel onto a pulley or where moving parts close in a pinching or shearing action.

7.2.6 An automatic cycling device, such as an overcurrent device, thermal protector, or similar component, that starts or restarts a motor driving a moving part such as those described in 7.2.3, requires the use of a guard if the part is exposed during operating adjustments or the changing of replaceable parts, or if the part is accessible without requiring the use of tools.

Figure 7.1
Location and extent of barrier



A. The entire component under which a barrier (flat or dished, with or without a lip or other raised edge) of noncombustible material is to be provided. The sketch above is of a metal enclosed component with ventilating openings to show that the protective barrier is required only for those openings from which flaming parts emit. If the component or assembly does not have its own noncombustible enclosure, the area to be protected is the entire area occupied by the component or assembly.

B. Projection of the outline of the area of (A) which needs a bottom barrier vertically downward onto the horizontal plane of the lowest point on the outer edge (D) of the barrier.

C. Inclined line that traces out an area (D) on the horizontal plane of the barrier. Moving around the perimeter of the area (B) which needs a bottom barrier, this line projects at a 5-degree angle from the line extending vertically at every point around the perimeter of (A) and oriented to trace out the largest area, except that the angle may be less than 5-degrees if the barrier or portion of the bottom cover contacts a vertical barrier or side panel of noncombustible material, or if the horizontal extension of the barrier (B) to (D) exceeds 6 inches (150 mm).

D. Minimum outline of the barrier, except that the extension B – D need not exceed 6 inches (150 mm) (flat or dished, with or without a lip or other raised edge). The bottom of the barrier may be flat or formed in any manner if every point of area (D) is at or below the lowest point on the outer edge of the barrier.

7.3 Interlocks and protective devices

7.3.1 An interlock provided for the purpose of protecting an operator or service personnel against risk of electric shock or unintentional contact with moving parts that may cause injury to persons shall be of a type or in such a location that it requires an intentional operation to bypass.

7.3.2 The bypass means specified in 7.3.1 shall be such that the interlock is self-restoring when the unit is returned to intended operation.

7.3.3 A protective device provided to remove a stored-energy charge from an internal circuit shall operate automatically when the circuit is de-energized.

7.4 Covers

7.4.1 Thumbscrews; finger latches, screwdriver-, wrench-, and coin-operated latches; magnetic and spring latches that cannot be unintentionally bumped open; and similar parts that result in holding of a door, cover, or support of a panel may be provided for securing doors, covers, and panels that are not opened or removed for operator servicing if supplementary guards, as described in Protection of Service Personnel, Section 6, are provided. Such panels are not to be opened or removed for the application of the probe specified in 7.9.6 in connection with the investigation of the accessibility of live or hazardous moving parts. See also 7.2.3.

7.4.2 An enclosure cover shall be hinged, sliding, pivoted, or similarly attached if it provides access to fuses or any other overcurrent protective device, the intended functioning of which requires renewal, or if it is necessary to open the cover in connection with the intended operation of the product.

Exception: A hinged cover is not required as specified in 28.5.

7.4.3 If the fuse(s) enclosed is intended to provide protection to portions of internal circuits, such as may be used on a separate printed wiring board or circuit subassembly to prevent circuit damage resulting from a fault, a hinged cover is not required. The word "CAUTION" and the following or equivalent marking shall be indicated on the cover if risk of electric shock can be caused: "Circuit Fuse(s) – To Prevent Electric Shock Disconnect Power Prior To Servicing."

7.4.4 If a hinged cover is required, it shall be provided with a latch, or catch to hold it closed. The hinged cover of a product intended to be installed where it will be accessible to other than authorized personnel shall be provided with a key lock or with a fastener requiring a tool for removal. See 28.6.

7.5 Cast metal

7.5.1 The thickness of cast metal for an enclosure shall be as indicated in Table 7.1. See also the Mechanical Strength Tests for Enclosures, Section 40.

Exception: Cast metal of lesser thickness may be used if, after consideration of the shape, size, and function of the enclosure, it is determined to provide equivalent mechanical strength.

Table 7.1
Cast-metal electric enclosures

Use, or dimensions of area involved ^a	Minimum thickness			
	Die-cast metal,		Cast metal of other than the	
	inch	(mm)	inch	(mm)
Area of 24 square inches (155 cm ²) or less and having no dimension greater than 6 inches (152 mm)	1/16	1.6	1/8	3.2
Area greater than 24 square inches or having any dimension greater than 6 inches	3/32	2.4	1/8	3.2
At a threaded conduit hole	1/4	6.4	1/4	6.4
At an unthreaded conduit hole	1/8	3.2	1/8	3.2
^a The area limitation for metal 1/16 inch (1.6 mm) thick may be obtained by the provision of reinforcing ribs subdividing a larger area.				

7.6 Sheet metal

7.6.1 The thickness of sheet metal used for the enclosure of a unit shall be no less than that indicated in Table 7.2 or 7.3. See also the Mechanical Strength Tests for Enclosures, Section 40.

Exception: Sheet metal of lesser thickness may be used if, after consideration of the shape, size, and function of the enclosure, it is determined to provide equivalent mechanical strength. See also 7.6.2.

Table 7.2
Minimum thickness of sheet metal for electrical enclosures of carbon steel or stainless steel

Without supporting frame ^a		With supporting frame or equivalent reinforcing ^a		Minimum thickness, inches (mm)			
Maximum width, ^b inches (cm)	Maximum length, ^c inches (cm)	Maximum width, ^b inches (cm)	Maximum length, inches (cm)	Uncoated [MSG] (cm) (cm)		Metal coated [GSG] (cm) (cm)	
4.0 10.2	Not limited	6.25 15.9	Not limited	0.020 (0.51)		0.023 (0.58)	
4.75 12.1	5.75 14.6	6.75 17.1	8.25 21.0	[24]		[24]	
6.0 15.2	Not limited	9.5 24.1	Not limited	0.026 (0.66)		0.029 (0.74)	
7.0 17.8	8.75 22.2	10.0 25.4	12.5 31.8	[22]		[22]	
8.0 20.3	Not limited	12.0 30.5	Not limited	0.032 (0.81)		0.034 (0.86)	
9.0 22.9	11.5 29.2	13.0 33.0	16.0 40.6	[20]		[20]	
12.5 31.8	Not limited	19.5 49.5	Not limited	0.042 (1.07)		0.045 (1.14)	
14.0 35.6	18.0 45.7	21.0 53.3	25.0 63.5	[18]		[18]	
18.0 45.7	Not limited	27.0 68.6	Not limited	0.053 (1.35)		0.056 (1.42)	
20.0 50.8	25.0 63.5	29.0 73.7	36.0 91.4	[16]		[16]	

Table 7.2 Continued

Without supporting frame ^a		With supporting frame or equivalent reinforcing ^a		Minimum thickness, inches (mm)			
Maximum width, ^b inches (cm)	Maximum length, ^c inches (cm)	Maximum width, ^b inches (cm)	Maximum length, ^c inches (cm)	Uncoated [MSG] (cm) (cm)	Metal coated [GSG] (cm) (cm)		
22.0 55.9	Not limited	33.0 83.8	Not limited	0.060 (1.52)	0.063 (1.60)		
25.0 63.5	31.0 78.7	35.0 88.9	43.0 109.2	[15]	[15]		
25.0 63.5	Not limited	39.0 99.1	Not limited	0.067 (1.70)	0.070 (1.78)		
29.0 73.7	36.0 91.4	41.0 104.1	51.0 129.5	[14]	[14]		
33.0 83.8	Not limited	51.0 129.5	Not limited	0.080 (2.03)	0.084 (2.13)		
38.0 96.5	47.0 119.4	54.0 137.2	66.0 167.6	[13]	[13]		
42.0 106.7	Not limited	64.0 162.6	Not limited	0.093 (2.36)	0.097 (2.46)		
47.0 119.4	59.0 149.9	68.0 172.7	84.0 213.4	[12]	[12]		
52.0 132.1	Not limited	80.0 203.2	Not limited	0.108 (2.74)	0.111 (2.82)		
60.0 152.4	74.0 188.0	84.0 213.4	103.0 261.6	[11]	[11]		
63.0 160.0	Not limited	97.0 246.4	Not limited	0.123 (3.12)	0.126 (3.20)		
73.0 185.4	90.0 228.6	103.0 261.6	127.0 322.6	[10]	[10]		

^a A supporting frame is a structure of angle or channel or a folded rigid section of sheet metal which is rigidly attached to and has essentially the same outside dimensions as the enclosure surface and which has sufficient torsional rigidity to resist the bending moments which may be applied via the enclosure surface when it is deflected. Construction that is considered to have equivalent reinforcing may be accomplished by designs that will produce a structure that is as rigid as one built with a frame of angles or channels. Construction considered to be without supporting frame includes:

- 1) A single sheet with single formed flanges (formed edges),
- 2) A single sheet which is corrugated or ribbed, and
- 3) An enclosure surface loosely attached to a frame, for example, with spring clips.

^b The width is the smaller dimension of a rectangular sheet metal piece which is part of an enclosure. Adjacent surfaces of an enclosure may have supports in common and be made of a single sheet.

^c For panels which are not supported along one side, for example, side panels of boxes, the length of the unsupported side shall be limited to the dimensions specified unless the side in question is provided with a flange at least 1/2 inch (12.7 mm) wide.

Table 7.3
Minimum thickness of sheet metal for electrical enclosures of aluminum, copper, or brass

Without supporting frame ^a		With supporting frame or equivalent reinforcing ^a		Minimum thickness, inches (mm)	
Maximum width, ^b inches (cm)	Maximum length, ^c inches (cm)	Maximum width, ^b inches (cm)	Maximum length, ^c inches (cm)		
3.0 7.6	Not limited	7.0 17.8	Not limited	0.023	0.58
3.5 8.9	4.0 10.2	8.5 21.6	9.5 24.1		
4.0 10.2	Not limited	10.0 25.4	Not limited	0.029	0.74
5.0 12.7	6.0 15.2	10.5 26.7	13.5 34.3		
6.0 15.2	Not limited	14.0 35.6	Not limited	0.036	0.91
6.5 16.5	8.0 20.3	15.0 38.1	18.0 45.7		
8.0 20.3	Not limited	19.0 48.3	Not limited	0.045	1.14
9.5 24.1	11.5 29.2	21.0 53.3	25.0 63.5		
12.0 30.5	Not limited	28.0 71.1	Not limited	0.058	1.47
14.0 35.6	16.0 40.6	30.0 76.2	37.0 94.0		

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Table 7.3 Continued

Without supporting frame ^a		With supporting frame or equivalent reinforcing ^a		Minimum thickness, inches (mm)	
Maximum width, ^b inches (cm)	Maximum length, ^c inches (cm)	Maximum width, ^b inches (cm)	Maximum length, inches (cm)		
18.0 45.7	Not limited	42.0 106.7	Not limited	0.075	1.91
20.0 50.8	25.0 63.5	45.0 114.3	55.0 139.7		
25.0 63.5	Not limited	60.0 152.4	Not limited	0.095	2.41
29.0 73.7	36.0 91.4	64.0 162.6	78.0 198.1		
37.0 94.0	Not limited	87.0 221.0	Not limited	0.122	3.10
42.0 106.7	53.0 134.6	93.0 236.2	114.0 289.6		
52.0 132.1	Not limited	123.0 312.4	Not limited	0.153	3.89
60.0 152.4	74.0 188.0	130.0 330.2	160.0 406.4		
^a A supporting frame is a structure of angle or channel or a folded rigid section of sheet metal which is rigidly attached to and has essentially the same outside dimensions as the enclosure surface and which has sufficient torsional rigidity to resist the bending moments which may be applied via the enclosure surface when it is deflected. Construction that is considered to have equivalent reinforcing may be accomplished by designs that will produce a structure which is as rigid as one built with a frame of angles or channels. Construction considered to be without supporting frame includes: 1) A single sheet with single formed flanges (formed edges), 2) A single sheet which is corrugated or ribbed, and 3) An enclosure surface loosely attached to a frame, for example, with spring clips. ^b The width is the smaller dimension of a rectangular sheet metal piece which is part of an enclosure. Adjacent surfaces of an enclosure may have supports in common and be made of a single sheet. ^c For panels which are not supported along one side, for example, side panels of boxes, the length of the unsupported side shall be limited to the dimensions specified unless the side in question is provided with a flange at least 1/2 inch (12.7 mm) wide.					

7.6.2 A sheet metal member to which a wiring system is to be connected in the field shall have a thickness of not less than:

- a) 0.032 inch (0.81 mm) for uncoated steel,
- b) 0.034 inch (0.86 mm) for galvanized steel, and
- c) 0.045 inch (1.14 mm) for nonferrous metal.

7.7 Screens and expanded metal

7.7.1 Screens and expanded metal used as a guard, enclosure, or part of an enclosure shall comply with the requirements of 7.7.2 – 7.8.1 and the Mechanical Strength Tests for Enclosures, Section 40.

Exception: When removal of a screen or expanded metal mesh used as a guard, enclosure, or part of an enclosure does not result in a risk of fire, electric shock, or unintentional contact with hazardous moving parts, the requirements of 7.7.2 – 7.8.1 do not apply.

7.7.2 Perforated sheet steel and sheet steel used for expanded-metal mesh shall not be less than 0.042 inch (1.07 mm) thick [0.046 inch (1.17 mm) for zinc-coated] when the mesh openings or perforations are 1/2 square inch (3.23 cm²) or less in area, and shall not be less than 0.080 inch (2.03 mm) thick [0.084 inch (2.13 mm) for zinc-coated] for larger openings.

Exception: When the indentation of a guard or enclosure does not alter the clearance between uninsulated live parts and grounded metal so as to impair performance or reduce spacings below the minimum values required, 0.021 inch (0.53 mm) expanded-steel mesh or perforated sheet steel [0.024 inch (0.61 mm) for zinc-coated] is permissible when:

- a) The exposed mesh on any one side or surface of the protected device has an area not more than 72 square inches (465 cm²) and has no dimension greater than 12 inches (305 mm) or*
- b) The width of a protected opening is not greater than 3-1/2 inches (89 mm).*

7.7.3 The wires of a steel screen shall not be smaller than No. 16 AWG (1.3 mm²) if the screen openings are 1/2 square inch (3.23 cm²) or less in area and shall not be smaller than No. 12 AWG (3.3 mm²) for larger screen openings.

7.8 Nonmetallic

7.8.1 If nonmetallic material is used for an enclosure, it shall be evaluated in accordance with 7.8.2 and shall have a wall thickness not less than 1/16 inch (1.6 mm).

7.8.2 Among the factors taken into consideration when evaluating a nonmetallic enclosure are:

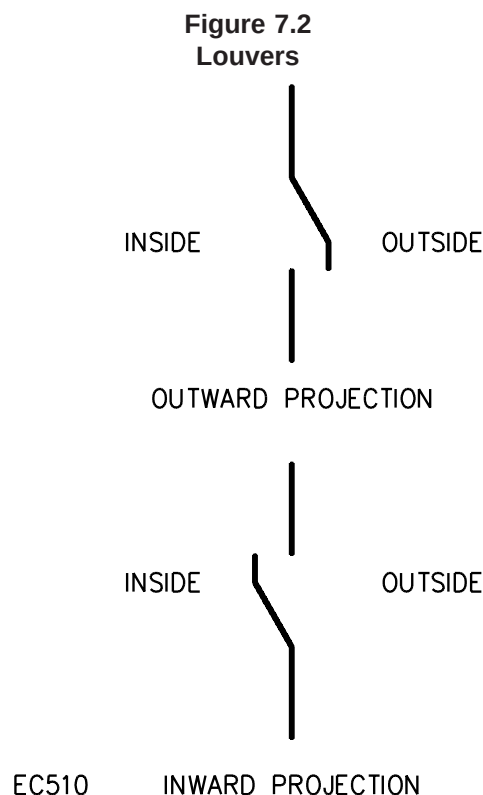
- a) Mechanical strength;
- b) Resistance to impact;
- c) Moisture-absorptive properties;
- d) Flammability and resistance to ignition from electrical sources;
- e) Dielectric strength, insulation resistance, and resistance to arc tracking; and
- f) Resistance to distortion and creeping at temperatures to which the material may be subjected.

All these factors are evaluated with regard to aging. See also the Mechanical Strength Tests for Enclosures, Section 40; the Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances, UL 94; and the Standard for Polymeric Materials – Use in Electric Equipment Evaluations, UL 746C.

7.9 Openings

7.9.1 Openings in the sides of the enclosure shall be sized and located so that entry of a foreign object that could cause risk of fire or electric shock is prevented, and contact with internal parts by persons is prevented (see 7.2.1 – 7.2.6, 7.9.6, and 7.9.7). Louvers are not prohibited from being used when shaped to outwardly deflect external falling objects. See Figure 7.2 for examples of louver designs.

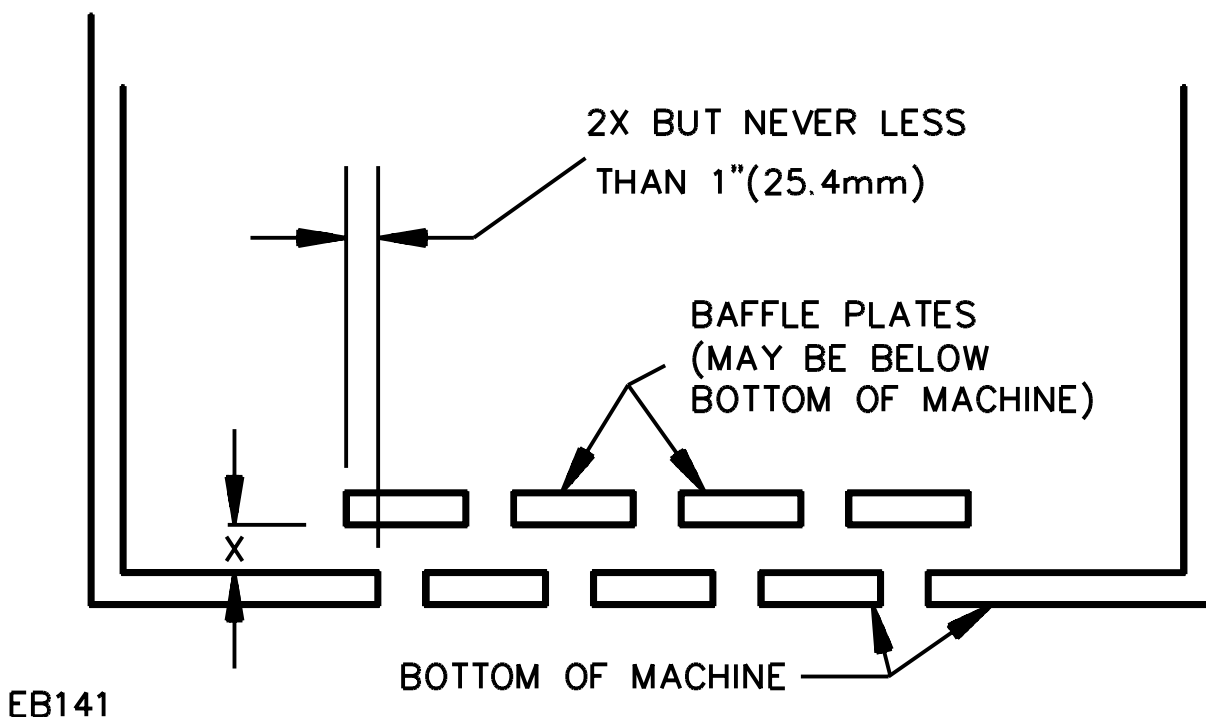
7.9.2 Openings may be provided in the bottom panels or protective pans under areas containing materials not classified at least V-1 (see the Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances, UL 94) if constructed in a manner that prevents materials from falling directly from the interior of the product onto the supporting surface or any other location under the product. Figure 7.3 illustrates a type of baffle that complies with this requirement. A second construction that may be used is a 0.040-inch (1.02-mm) thick, sheet-steel bottom panel in which 5/64-inch (2.0-mm) maximum round holes are spaced not closer than 1/8 inch (3.2 mm) center-to-center. Other constructions shall comply with the requirements of the Ignition Through Bottom-Panel Openings Tests, Section 58.



7.9.3 The bottom of the enclosure under areas containing only materials classified as at least V-1 (see 7.1.5) may have openings not larger than 1/16 square inch (40.3 mm²).

7.9.4 Except as noted in 7.9.5, an enclosure housing fuses or any other overload protective devices and provided with openings shall afford protection against the emission of flame or molten metal.

Figure 7.3
Baffle



7.9.5 There is no limitation on the size or number of openings in areas:

- a) Containing PVC, TFE, CTFE, FEP, neoprene insulated wire cable;
- b) Containing plugs and receptacles; and
- c) Under impedance-protected or thermally protected motors.

7.9.6 An opening that does not permit entrance of a 1-inch (25.4-mm) diameter rod shall be sized and arranged so that a probe, as illustrated in Figure 7.4, cannot be made to contact an uninsulated live electrical part (other than low-voltage) or hazardous moving part when inserted through the opening in a straight or articulated position.

7.9.7 An opening that permits entrance of a 1-inch (25.4-mm) diameter round rod may be used under the condition described in Figure 7.5.