



UL 680

STANDARD FOR SAFETY

Emergency Vault Ventilators and Vault-Ventilating Ports

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Summary of Topics

This revision to ANSI/UL 680 is being issued to update the title page to reflect the reaffirmation of ANSI approval. No changes in requirements are involved.

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INTRODUCTION

1 Scope

1.1 These requirements cover emergency vault ventilators and vault-ventilating ports for installation in a wall.

1.2 Emergency vault ventilators are intended to provide fresh air to persons locked in the vault by accident or during a robbery.

1.3 Vault-ventilating ports are intended for connection to an outside ventilating system that provides circulating air while the vault is open.

1.4 These requirements are intended to evaluate the integrity of electrical wiring and components and to establish burglary resistant ratings. The ratings, based on the net working time to effect entry, are as follows:

- a) Class M – 1/4 hour;
- b) Class 1 – 1/2 hour;
- c) Class 2 – 1 hour; and
- d) Class 3 – 2 hours.

1.5 When installed in either a vault door or modular panel that complies with the requirements in the Standard for Burglary Resistant Vault Doors and Modular Panels, UL 608; or a reinforced concrete wall according to the manufacturer's instructions and the Standard Classification for Bank and Mercantile Vault Construction, ASTM F 1090, the products covered by these requirements do not affect the burglary resistance of the vault wall.

1.6 These requirements do not cover protection against entry by attacks with a burning bar (thermal lance) or explosives.

1.7 These units are intended to be installed in accordance with the provision of the National Electrical Code, NFPA 70. However, it is intended that inspection authorities having jurisdiction be consulted before installation of electrical connections.

1.8 Products covered by these requirements are intended for installation in vaults that are used for the storage of valuables, and that are protected by special security measures that cannot be forced using normal rescue equipment, and require waiting for a time-lock or similar device to release entrapped individuals.

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 When a value for measurement is followed by a value in other units in parentheses, the first stated value is the requirement.

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 Instructions

3.1 A copy or draft of the operating and installation instructions intended to accompany each product as produced is to be used as a reference in the examination and test of the product.

3.2 The instructions shall include such directions and information as deemed by the manufacturer of the product to be required for proper and safe installation, maintenance, operation, and use of the product.

3.3 The instructions shall specify that conduit used for electrical connections shall not form a direct path through the wall, and shall be offset at least once and preferably twice.

CONSTRUCTION

4 General

4.1 A unit shall be constructed so that it is not capable of readily being rendered mechanically inoperative from outside the vault.

4.2 A vault-ventilating port shall be provided with a visual indicator that will indicate when the port is in the closed position. An emergency vault ventilator shall incorporate a visual indication that indicates the location of the unit to a person inside the vault.

4.3 Direct communication shall be provided through an emergency vault ventilator for voice communication and passage of small tools, food, and similar items, from outside the vault.

4.4 An emergency vault ventilator shall be capable of delivering not less than 10 cubic feet per minute (4.7 dm³/s) of air into the vault and expelling an equal amount of air simultaneously.

4.5 An emergency vault ventilator shall provide a minimum opening of 2 square inches (12.9 cm²) for natural ventilation, should the electric power fail.

5 Electric Shock

5.1 Any part that is exposed only during operator servicing shall not present the risk of electric shock. See Electric Shock Current Test, Section 30.

6 Frames and Enclosures

6.1 A unit shall be provided with one or more enclosures to afford protection against accidental contact with uninsulated live parts and reduction of spacings, loosening, or displacement of electrical parts.

6.2 Operating parts, such as gear mechanisms, light-duty relays, and similar devices, shall be protected against fouling by dust or other material which affects their intended operation.

6.3 The thickness of cast metal for an enclosure shall be as indicated in Table 6.1.

Table 6.1
Cast-metal 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 (155 cm ²) or having any dimension greater than 6 inches (152 mm)	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) in thickness shall be obtained by the provision of reinforcing ribs subdividing a larger area.				

6.4 The thickness of sheet metal for an enclosure shall not be less than indicated in Tables 6.2 and 6.3. At any point where conduit or metal-clad cable is to be attached, sheet metal shall be of such thickness or shall be formed or reinforced so that it has the stiffness at least equivalent to that of an uncoated flat sheet of steel having a minimum thickness of 0.053 inch (1.35 mm).

6.5 Ventilating openings in an enclosure, including perforated holes, louvers, and openings protected by means of wire screening, expanded metal, or perforated covers, shall be of such size or shape that no opening permits passage of a rod having a diameter of 33/64 inch (13.1 mm).

Exception: When the distance between uninsulated live parts and the enclosure is greater than 4 inches (102 mm), larger openings are permitted provided that no opening permits passage of a rod having a diameter of 49/64 inch (19.4 mm).

6.6 An enclosure housing fuses or any other overload protective device and provided with ventilating openings shall provide protection against the emission of flame or molten metal.

6.7 Perforated sheet metal and sheet metal used for expanded-metal mesh shall be at least:

- a) 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 (323 mm²) or less in area and
- b) 0.080 inch (2.03 mm) thick, [0.084 inch (2.13 mm) for zinc-coated] for larger openings.

Exception: If the indentation of a guard or enclosure will not alter the clearance between uninsulated live parts and grounded metal so as to impair intended operation of the product or reduce spacings below the minimum values required, 0.021-inch (0.53-mm) expanded-metal mesh or perforated sheet metal [0.024-inch (0.61-mm) if zinc-coated] may be used, provided that:

- a) The exposed mesh on any side or surface of the device so protected has an area of not more than 72 square inches (4.6 dm²) and has no dimension greater than 12 inches (305 mm) or*
- b) The width of an opening so protected is not greater than 3-1/2 inches (89 mm).*

6.8 The wires of a screen shall not be smaller than:

- a) No. 16 AWG [0.051 inch (1.29 mm) diameter] when the screen openings are 1/2 square inch (323 mm²) or less in area and
- b) No. 12 AWG [0.081 inch (2.05 mm) diameter] for larger screen openings.

6.9 A compartment enclosing electrical parts shall not be open to the support on which the unit rests.

Table 6.2
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	
Maximum width, ^b inches (cm)	Maximum length, ^c inches (cm)	Maximum width, ^b inches (cm)	Maximum length, ^c inches (cm)	Uncoated, inch (mm) [MSG]	Metal coated, inch (mm) [GSG]
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]
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 which is as rigid as one built with a frame of angles or channels. Construction considered to be without supporting frame includes:

- 1) 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.

Table 6.2 Continued on Next Page