



# UL 844

## STANDARD FOR SAFETY

Luminaires for Use in Hazardous  
(Classified) Locations

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UL Standard for Safety for Luminaires for Use in Hazardous (Classified) Locations, UL 844

Thirteenth Edition, Dated June 29, 2012

### **Summary of Topics**

***This revision to ANSI/UL 844 dated October 11, 2021 is being issued to correct errors in -60°C Explosion Test Wording; [26.18](#) and [Table 28.1](#)***

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.

The revised requirements are substantially in accordance with Proposal(s) on this subject dated September 3, 2021.

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**ANSI/UL 844-2021**

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## **UL 844**

### **Standard for Luminaires for Use in Hazardous (Classified) Locations**

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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 <https://csds.ul.com>.

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## INTRODUCTION

### 1 Scope

1.1 These requirements cover fixed and portable luminaires for installation and use in hazardous (classified) locations, Class I, Divisions 1 and 2, Groups A, B, C, and D; Class II, Division 1, Groups E, F, and G; Class II, Division 2, Groups F and G; and Class III, Divisions 1 and 2, in accordance with the National Electrical Code, NFPA 70.

1.2 These requirements also cover luminaires for installation and use in Class I, Zones 1 and 2, Groups IIA, IIB, IIB plus Hydrogen, and IIC, and Zone 20, 21 and 22 hazardous (classified) locations in accordance with the National Electrical Code, NFPA 70.

1.3 These requirements cover luminaires for use only under the following atmospheric conditions:

- a) A minimum ambient temperature of minus 60°C (minus 58°F);
- b) An oxygen concentration not greater than 21 percent by volume; and
- c) A nominal barometric pressure of one atmosphere.

### 2 General

2.1 Luminaires for use in hazardous locations shall also comply with the applicable requirements for luminaires for use in unclassified locations.

2.2 Low-pressure sodium lamps shall not be used in a luminaire for use in Division 1 hazardous locations.

### 3 Components

3.1 Except as indicated in [3.2](#), a component of a product covered by this standard shall comply with the requirements for that component.

3.2 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.

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

3.4 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.

### 4 Units of Measurement

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

## 5 Undated References

5.1 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.

## 6 Class, Zone, and Group Equivalency

### 6.1 Class I, Zone 1, Group IIA

6.1.1 Luminaires intended to be marked in accordance with [74.4](#) shall comply with all the requirements for luminaires for use in Class I, Division 1, Group D hazardous (classified) locations.

### 6.2 Class I, Zone 1, Group IIB

6.2.1 Luminaires intended to be marked in accordance with [74.5](#) shall comply with all the requirements for luminaires for use in Class I, Division 1, Group C hazardous (classified) locations.

### 6.3 Class I, Zone 1, Group IIB plus hydrogen

6.3.1 Luminaires intended to be marked in accordance with [74.6](#) shall comply with all the requirements for luminaires for use in Class I, Division 1, Group B hazardous (classified) locations.

### 6.4 Class I, Zone 1, Group IIC

6.4.1 Luminaires intended to be marked in accordance with [74.7](#) shall comply with all the requirements for luminaires for use in both Class I, Division 1, Group A and Class I, Division 1, Group B hazardous (classified) locations.

### 6.5 Class I, Zone 2, Group IIA

6.5.1 Luminaires intended to be marked in accordance with [74.8](#) shall comply with all the requirements for luminaires for use in Class I, Division 2, Group D hazardous (classified) locations.

### 6.6 Class I, Zone 2, Group IIB

6.6.1 Luminaires intended to be marked in accordance with [74.9](#) shall comply with all the requirements for luminaires for use in Class I, Division 2, Group C hazardous (classified) locations.

### 6.7 Class I, Zone 2, Group IIB plus hydrogen

6.7.1 Luminaires intended to be marked in accordance with [74.10](#) shall comply with all the requirements for luminaires for use in Class I, Division 2, Group B hazardous (classified) locations.

### 6.8 Class I, Zone 2, Group IIC

6.8.1 Luminaires intended to be marked in accordance with [74.11](#) shall comply with all the requirements for luminaires for use in both Class I, Division 2, Group A and Class I, Division 2, Group B hazardous (classified) locations.

## 6.9 Zone 20 and 21

6.9.1 Luminaires intended to be marked in accordance with [74.14](#) shall comply with all the requirements for luminaires for use in Class II, Division I, Group E, F, or G hazardous (classified) locations.

## 6.10 Zone 22

6.10.1 Luminaires intended to be marked in accordance with [74.15](#) shall comply with all the requirements for luminaires for use in Class II, Division 2, Group F or G hazardous (classified) locations.

## 7 Luminaires Subject to Deposits of Combustible-Paint Residue

7.1 A luminaire marked in accordance with [74.25](#) shall comply with the requirements in [9.2](#), [24.1](#), [25.1](#), and [25.26](#) – [25.28](#).

## 8 Enclosure Types

8.1 An enclosure shall comply with the applicable requirements specified in [Table 8.1](#).

8.2 An enclosure that is intended for use in environmental conditions other than those defined in [Table 8.1](#), and that has a marked enclosure type designation, shall also comply with the applicable requirements for each enclosure type, as specified in the Standard for Enclosures for Electrical Equipment, Non-Environmental Considerations, UL 50; for example, Type 3, 4X, or 6.

**Table 8.1**  
**Enclosure types for hazardous locations**

Type number	Application	Requirements
7	Class I, Division 1, Group A, B, C, or D – Indoor Hazardous Locations – Air-Break Equipment	<a href="#">9.1</a> – <a href="#">9.3</a> , <a href="#">10.1.1</a> , <a href="#">10.1.2</a> , <a href="#">11.1.1</a> – <a href="#">11.4.3</a> , <a href="#">13.1.1</a> – <a href="#">13.1.4</a> , <a href="#">14.1.1</a> – <a href="#">14.2.2</a> , <a href="#">15.1</a> , <a href="#">16.1</a> , <a href="#">17.1.1</a> – <a href="#">17.1.18</a> , <a href="#">18.1</a> – <a href="#">21.2</a> , <a href="#">22.1</a> – <a href="#">23.2</a> , <a href="#">25.1</a> – <a href="#">25.21</a> , <a href="#">25.25</a> <sup>a</sup> – <a href="#">28.5</a> , <a href="#">30.1</a> – <a href="#">36.8</a> , <a href="#">74.1</a> – <a href="#">74.21</a> , <a href="#">74.25</a> – <a href="#">74.29</a> , <a href="#">74.32</a> – <a href="#">74.35</a>
9	Class II, Division 1, Group E, F, or G – Indoor Hazardous Locations – Air-Break Equipment	<a href="#">9.1</a> , <a href="#">9.2</a> , <a href="#">10.2.1</a> – <a href="#">10.2.3.2</a> , <a href="#">12.1</a> – <a href="#">12.7</a> , <a href="#">13.2.1</a> – <a href="#">13.2.4</a> , <a href="#">14.1.1</a> , <a href="#">14.3.1</a> , <a href="#">15.1</a> , <a href="#">16.1</a> , <a href="#">17.2.1</a> – <a href="#">20.2</a> , <a href="#">22.1</a> – <a href="#">23.2</a> , <a href="#">25.1</a> – <a href="#">25.28</a> , <a href="#">30.1</a> – <a href="#">34.3</a> , <a href="#">74.1</a> – <a href="#">74.3</a> , <a href="#">74.16</a> , <a href="#">74.17</a> , <a href="#">74.19</a> – <a href="#">74.21</a> , <a href="#">74.27</a> – <a href="#">74.29</a> , <a href="#">74.32</a> – <a href="#">74.34</a>
<sup>a</sup> Par <a href="#">25.25</a> is applicable only to luminaires intended and marked for use where Class I and Class II conditions may exist simultaneously.		

## PART I – LUMINAIRES FOR CLASS I, DIVISION 1, GROUPS A, B, C, AND D, AND CLASS II, DIVISION 1, GROUPS E, F, AND G LOCATIONS

### CONSTRUCTION

#### 9 Enclosure Material

9.1 The enclosure housing the electrical components shall be made of iron, steel, copper (see [9.3](#)), brass, bronze, or aluminum or its alloys containing not less than 80 percent aluminum or an acceptable nonmetallic material which complies with the requirements in [35](#), Non-Metallic Enclosure Materials Test. A metal such as zinc or magnesium, or their alloys, is not acceptable.

9.2 For a luminaire intended for use where subject to deposits of combustible-paint residue, all exposed metal parts likely to be struck during cleaning shall be made of bronze, brass, copper, or aluminum.

9.3 Copper shall not be used for an enclosure of a luminaire for use in Class I, Group A locations. A copper alloy shall not be used for an enclosure unless:

- a) The alloy is coated with tin, nickel, or other similar coating; or
- b) The copper content of the alloy is not over 30 percent.

## 10 Enclosure Thickness

### 10.1 Enclosures for Class I locations

10.1.1 The thickness of metal enclosure walls shall not be less than specified in [Table 10.1](#).

10.1.2 A machined or a threaded joint in the wall of a cast-metal enclosure shall have at least the thickness specified in [Table 10.1](#) through the overlap.

**Table 10.1**  
**Thickness of metal enclosure**

External enclosure dimensions				Minimum thickness, inch (mm)					
Diameter,		Area of any one surface,							
inches	(mm)	square Inches	(m <sup>2</sup> )	Cast brass, bronze, copper, malleable iron		Cast iron and aluminum <sup>a</sup>		Sheet steel	
22	(559)	480	(0.310)	0.093	(2.36)	0.125	(3.18)	0.067	(1.70)
30	(762)	620	(0.400)	0.093	(2.36)	0.125	(3.18)	0.093	(2.36)
60	(1524)	1500	(0.968)	0.125	(3.18)	0.187	(4.75)	0.125	(3.18)
Over 60	(1524)	Over 1500	(0.968)	0.187	(4.75)	0.250	(6.35)	0.187	(4.75)

<sup>a</sup> Includes sand-cast, permanent-mold, and die-cast aluminum and sheet aluminum.

#### 10.1.1.1 Glass

10.1.1.1.1 The thickness of a flat panel of glass, smooth or otherwise, shall not be less than specified in [Table 10.3](#). The thickness of a glass lens, glass that is curved or bent, and glass having other shapes shall also not be less than specified in [Table 10.3](#).

10.1.1.1.2 The minimum thickness of fluted, ribbed, or patterned glass is to be measured from a valley to the other side, or between valleys on opposite sides.

### 10.2 Enclosures for Class II locations

#### 10.2.1 Cast metal

10.2.1.1 Except as noted in [10.2.1.2](#), a cast-metal enclosure shall not be less than 1/8 inch (3.2 mm) thick at every point and not less than 1/4 inch (6.4 mm) thick at tapped holes for conduit.

10.2.1.2 Die-cast metal, except at threaded holes for conduit, may be:

- a) Not less than 3/64 inch (1.2 mm) thick for an area of 24 square inches (154.8 cm<sup>2</sup>) or less and having no dimension larger than 6 inches (152 mm). This area limitation may be obtained by the provision of reinforcing ribs subdividing a larger area;

b) Not less than 5/64 inch (2.0 mm) thick for an area larger than 24 square inches or having any dimension larger than 6 inches; and

c) Not less than 0.015 inch (0.38 mm) at the bottom of a circular ring having a width of not more than 3/32 inch (2.38 mm) and a diameter of not more than 1-1/2 inches (38.1 mm).

## 10.2.2 Sheet metal

10.2.2.1 The thickness of a sheet-metal enclosure shall not be less than that specified in [Table 10.2](#).

10.2.2.2 The length of surface in [Table 10.2](#) is considered to be:

- a) The diameter of a circular luminaire;
- b) The longest diameter of an elliptical luminaire;
- c) The longest side of a triangular luminaire;
- d) The diagonal of a rectangular luminaire; and
- e) The longest diagonal of a multisided luminaire.

**Table 10.2**  
**Thickness of sheet metal for Class II, Division 1 locations**

Maximum length of surface involved and use to which it is put	Minimum thickness of sheet metal, inch (mm)							
	Uncoated steel		Zinc-coated steel		Copper, brass, or aluminum			
At a point where conduit connection is made	0.032	(0.81)	0.034	(0.86)	0.040	(1.02)		
More than 26 inches (660 mm) long	If any wiring device is supported		0.026	(0.66)	0.029	(0.74)	0.032	(0.81)
	If no wiring device is supported		0.020	(0.51)	0.023	(0.58)	0.025	(0.64)
Not more than 26 Inches long	If any wiring device is supported		0.020	(0.51)	0.023	(0.58)	0.025	(0.64)
	If no wiring device is supported		0.016	(0.41)	0.019	(0.48)	0.020	(0.51)

## 10.2.3 Glass

10.2.3.1 The thickness of a flat panel of glass, smooth or otherwise, shall not be less than specified in [Table 10.3](#). The thickness of a glass lens, glass that is curved or bent, and glass having other shapes shall also not be less than specified in [Table 10.3](#).

10.2.3.2 The minimum thickness of fluted, ribbed, or patterned glass is to be measured from a valley to the other side, or between valleys on opposite sides.

**Table 10.3**  
**Minimum thickness of glass**

Exposed area of glass				Minimum thickness of glass					
More Than		Not More Than		Flat		Curved		With Concentric Ribs	
Inch <sup>2</sup>	(cm <sup>2</sup> )	Inch <sup>2</sup>	(cm <sup>2</sup> )	Inch	(mm)	Inch	(mm)	Inch	(mm)
0	(0)	150	(968)	0.083	(2.11)	0.083	(2.11)	0.083	(2.11)
150	(968)	500	(3226)	0.10	(2.54)	0.083	(2.11)	0.083	(2.11)
500	(3226)	1100	(7097)	0.14	(3.56)	0.10	(2.54)	0.10	(2.54)

## 11 Joints in Enclosures for Class I Locations

### 11.1 General

11.1.1 Joints in an enclosure shall comply with the applicable requirements in [11.1.1](#) – [11.4.3](#) and Section [26](#), Explosion Tests.

*Exception: This requirement does not apply to joints that comply with the requirements in Supplement [SB](#), Alternative Joints in Enclosures, and Supplement [SC](#), Alternative Explosion Tests.*

11.1.2 A joint in an enclosure shall be of the metal-to-metal, metal-to-glass, metal-to-polymeric, polymeric-to-polymeric, polymeric-to-glass, gasketed metal-to-glass or gasketed polymeric-to-glass type. A joint surface shall have an arithmetical average roughness of not more than 250 microinches (0.0064 mm) in accordance with the Standard for Surface Texture (Surface Roughness, Waviness, and Lay), ANSI/ASME B46.1.

11.1.3 A polymeric-to-polymeric joint shall be of the labyrinth or threaded type.

11.1.4 The determination of the free internal volume shall exclude potting compounds. The free internal volume of a lamp enclosure shall be determined without the lamp installed.

11.1.5 A feeler gauge utilized to measure the clearances specified in these requirements is to be 1/8 to 1/2 inch (3.2 to 12.7 mm) wide, with a 1/2-inch-wide gauge used if possible.

11.1.6 The width of a joint is to be measured with the mating parts in their most unfavorable position.

11.1.7 A joint shall be continuous; that is, it shall not be interrupted by an "O" ring groove or the like.

11.1.8 A gasket may be employed in a metal-to-glass or polymeric-to-glass joint if the gasket complies with the requirements in [11.1.11](#) – [11.1.13](#). The maximum clearance between the gasket and the metal, polymeric, or glass shall not be more than that specified in [11.2.1.1](#), [11.2.2.1](#) – [11.2.2.3](#), and [11.3.2](#) – [11.3.4](#).

11.1.9 A gasket shall not be employed in a metal-to-metal, metal-to-polymeric, or polymeric-to-polymeric joint, but may be employed adjacent to such a joint if it does not decrease the effectiveness of the joint.

11.1.10 The use of the gasket shall be limited to a joint that will not be disturbed during the installation or intended servicing of the equipment.

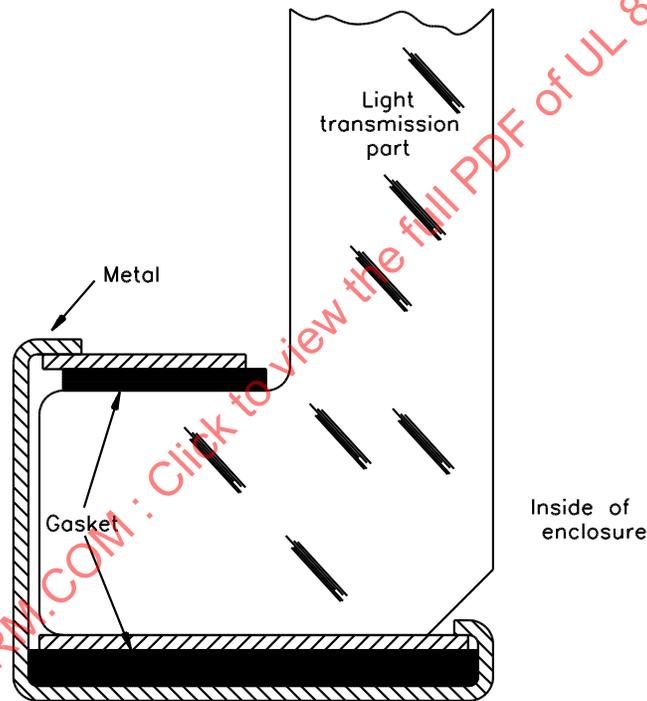
11.1.11 The requirement in [11.1.9](#) applies to a gasket in a metal-to-glass or polymeric-to-glass joint only; it does not apply to other types of gaskets such as those employed in an enclosure for specific environmental conditions. See [8.2](#).

11.1.12 A gasket shall be:

- a) A metal-covered type;
- b) Polytetrafluoroethylene; or
- c) Other material that has been investigated in accordance with Section [SA4.7](#), Accelerated Air-Oven Aging Test and found acceptable for the application.

11.1.13 A metal-covered gasket between a metal or polymeric part and a glass part shall be mechanically attached to the glass. There shall be no overlapping of the metal covering of the gasket on joint surfaces. An acceptable metal-covered gasket construction is illustrated in [Figure 11.1](#).

**Figure 11.1**  
**Metal-covered gasket construction**



S2440

11.1.14 A material that readily hardens upon aging or adheres to metal surfaces, or both, is not an acceptable gasket material. The attachment of a gasket by an adhesive or a cement is not acceptable.

11.1.15 If a gasket of polytetrafluoroethylene or a material having similar characteristics is used, it shall be installed to reduce the likelihood of cold flow of the gasket material.

11.1.16 A glass part, such as a cylindrical tube for enclosing a fluorescent lamp, may be sealed with a sealing compound that complies with Section [36](#), Tests For Sealing Compounds, and with other tests covered in this standard, without loosening or cracking. The length of compound seal shall not be less than 5/8 inch (15.9 mm).

## 11.2 Luminaires for Class I, Groups C and D locations

### 11.2.1 Straight and rabbet joints – lamp enclosure

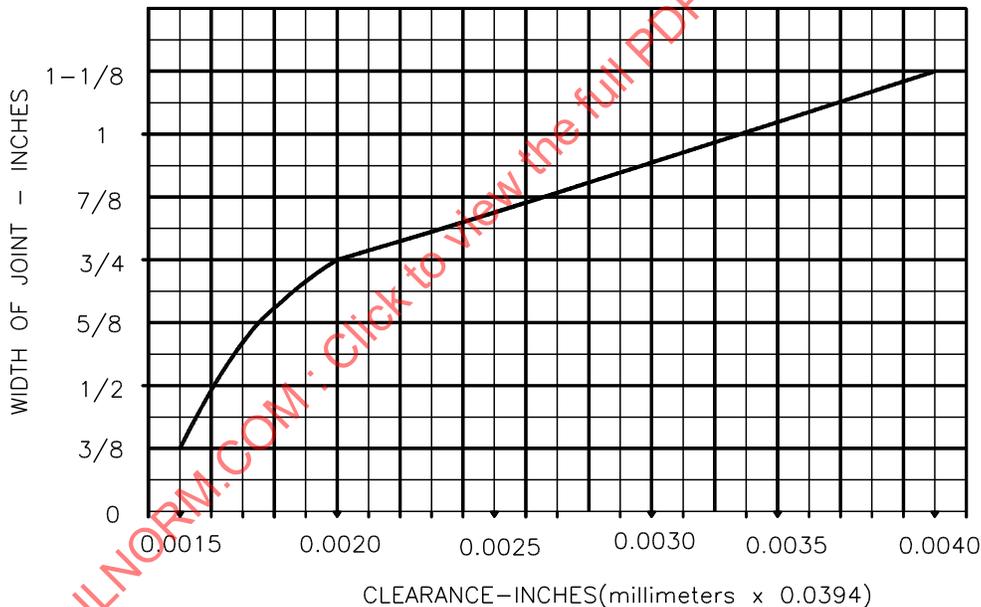
11.2.1.1 The width of a joint and the clearance shall be as shown in [Figure 11.2](#). The joint may be a rabbet construction as illustrated in [Figure 11.4](#) or a straight construction as illustrated in [Figure 11.5](#). For a 3/8 inch (9.50 mm) wide joint the clearance shall be less than 0.0015 inch (0.038 mm) or such that a 0.0015 inch-thick feeler gauge will not enter the required joint width more than 1/8 inch (3.2 mm) at any point.

*Exception No. 1: This requirement does not apply to a lamp enclosure having a vented section that complies with the requirements in [11.2.1.2](#) and [11.2.1.3](#).*

*Exception No. 2: This requirement does not apply if the lamp enclosure also serves as an enclosure for other parts. See [11.2.1.4](#).*

Figure 11.2

Relation between clearance and width of joint



S0859A

(See [11.2.1.1](#))

11.2.1.2 The lamp enclosure of a lighting luminaire may be provided with a venting section or sections to relieve internal explosion pressures. A joint in a vented enclosure may have a width of joint not less than 1/4 inch (6.4 mm) and a clearance of not more than 0.005 inch (0.13 mm) if the maximum explosion pressure developed during the explosion tests does not exceed 5 psig (34.5 kPa).

11.2.1.3 A venting section shall prevent the propagation of flame.

11.2.1.4 A luminaire enclosure that serves as both a lamp enclosure and an enclosure for other parts (such as a ballast, capacitor, or the like) shall comply with the requirements in [11.2.2.1](#). A lamp enclosure

is considered separate from another adjacent enclosure in a luminaire if means are provided, such as a seal or the equivalent, to prevent propagation of flame between the enclosures.

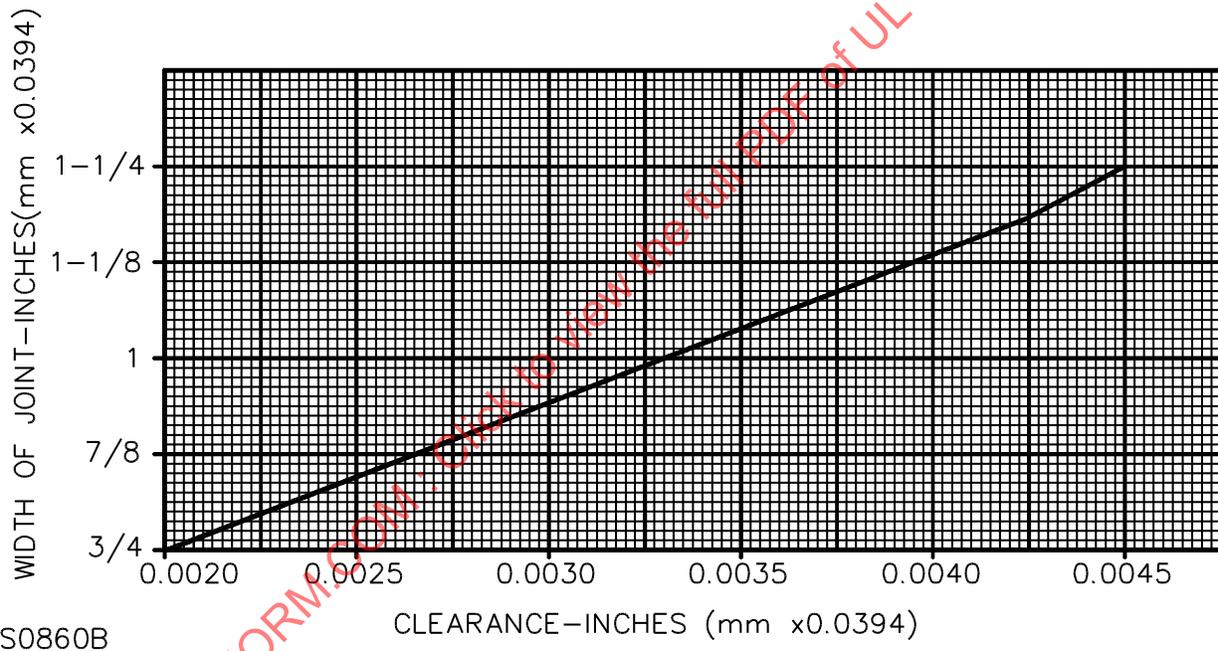
### 11.2.2 Straight and rabbet joints – enclosures other than lamp enclosures

11.2.2.1 Except as noted in [11.2.2.2](#) and [11.2.2.3](#), the width of a joint and the clearance, when assembled, shall be as specified in [Figure 11.3](#), and the width of a joint shall not be less than 3/4 inch (19.1 mm).

11.2.2.2 A rabbet joint may have a diametrical clearance at the axial section of not more than twice the clearance specified in [Figure 11.3](#) if neither the axial nor the radial section of the joint is less than 1/16 inch (1.6 mm) wide.

Figure 11.3

Relation between clearance and width of joint



S0860B

(See [11.2.2.2](#) and [11.2.2.3](#))

11.2.2.3 An enclosure having a free internal volume of 300 cubic inches (4.92 dm<sup>3</sup>) or less may have a 1/2-inch (12.7-mm) wide rabbet joint or a 3/8-inch (9.5-mm) wide flat joint if other details comply with (a) or (b), respectively.

a) One-half-inch wide rabbet joint (see [Figure 11.4](#)).

- 1) Neither the axial nor the radial section of the joint is less than 3/64 inch (1.2 mm) wide; and
- 2) The diametrical clearance of the axial section and the clearance of the radial section of the joint is not more than 0.002 inch (0.05 mm); and
- 3) The joint width measured from the inside of the enclosure to the nearest edge of each bolt clearance hole and elsewhere is not less than 1/2 inch.