

# **UL 674**

# STANDARD FOR SAFETY

Electric Motors and Generators for Use in Hazardous (Classified) Locations



UL Standard for Safety for Electric Motors and Generators for Use in Hazardous (Classified) Locations, UL 674

Fifth Edition, Dated May 31, 2011

#### **Summary of Topics**

This revision to ANSI/UL 674 dated December 28, 2020 includes the withdrawal and replacement of UL 508C with UL 61800-5-1 in Annex  $\underline{B}$  and CSA standards referenced in Annex B as well as their corresponding entries in Annex  $\underline{A}$ .

As noted in the Commitment for Amendments statement located on the back side of the title page, CSA, UL, and ANCE are committed to updating this harmonized standard jointly. CSA and UL will issue revisions to this standard bearing their date of issue. ANCE will incorporate the same revisions of the standard bearing the same date of issue as the CSA and UL pages.

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 new and revised requirements are substantially in accordance with Proposal(s) on this subject dated September 11, 2020.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form by any means, electronic, mechanical photocopying, recording, or otherwise without prior permission of UL.

UL provides this Standard "as is" without warranty of any kind, either expressed or implied, including but not limited to, the implied warranties of merchantability or fitness for any purpose.

In no event will UL be liable for any special, incidental, consequential, indirect or similar damages, including loss of profits, lost savings, loss of data, or any other damages arising out of the use of or the inability to use this Standard, even if UL or an authorized UL representative has been advised of the possibility of such damage. In no event shall UL's liability for any damage ever exceed the price paid for this Standard, regardless of the form of the claim.

Users of the electronic versions of UL's Standards for Safety agree to defend, indemnify, and hold UL harmless from and against any loss, expense, liability, damage, claim, or judgment (including reasonable attorney's fees) resulting from any error or deviation introduced while purchaser is storing an electronic Standard on the purchaser's computer system.

No Text on This Page



Association of Standardization and Certification NMX-J-652-ANCE First Edition



CSA Group CSA C22.2 No. 145-11 Third Edition



Underwriters Laboratories Inc. UL 674 Fifth Edition

# Electric Motors and Generators for Use in Hazardous (Classified) Locations

May 31, 2011

(Title Page Reprinted: December 28, 2020)



#### **Commitment for Amendments**

This standard is issued jointly by the Association of Standardization and Certification (ANCE), the Canadian Standards Association (operating as "CSA Group"), and Underwriters Laboratories Inc. (UL). Comments or proposals for revisions on any part of the standard may be submitted to ANCE, CSA Group, or UL at any time. Revisions to this standard will be made only after processing according to the standards development procedures of ANCE, CSA Group, and UL. CSA Group and UL will issue revisions to this standard by means of a new edition or revised or additional pages bearing their date of issue. ANCE will incorporate the same revisions into a new edition of the standard bearing the same date of issue as the CSA Group and UL pages.

### Copyright © 2018 ANCE

Rights reserved in favor of ANCE.

#### ISBN 978-1-55491-633-7 © 2018 Canadian Standards Association

All rights reserved. No part of this publication may be reproduced in any form whatsoever without the prior permission of the publisher.

This Standard is subject to review within five years from the date of publication, and suggestions for its improvement will be referred to the appropriated committee. To submit a proposal for change, please send the following information to inquiries@csagroup.org and include "Proposal for change" in the subject line: Standard designation (number); relevant clause, table and/or figure number; wording of the proposed change; and rationale for the change.

To purchase CSA Group Standards and related publications, visit CSA Group's Online Store at store.csagroup.org or call toll-free 1-800-463-6727 or 416-747-4044.

## Copyright © 2020 Underwriters Laboratories Inc.

UL's Standards for Safety are copyrighted by UL. Neither a printed nor electronic copy of a Standard should be altered in any way. All of UL's Standards and all copyrights, ownerships, and rights regarding those Standards shall remain the sole and exclusive property of UL.

This ANSI/UL Standard for Safety consists of the Fifth Edition including revisions through December 28, 2020. The most recent designation of ANSI/UL 674 as an American National Standard (ANSI) occurred on December 28, 2020. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page (front and back), or the Preface.

The Department of Defense (DoD) has adopted UL 674 on November 6, 1987. The publication of revised pages or a new edition of this Standard will not invalidate the DoD adoption.

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 <a href="https://csds.ul.com">https://csds.ul.com</a>.

To purchase UL Standards, visit UL's Standards Sales Site at http://www.shopulstandards.com/HowToOrder.aspx or call toll-free 1-888-853-3503.

## **CONTENTS**

ace		
1	Scope	
2	Conditions for Use	
3	Normative References	
4	Dated and Undated References	
<del>4</del> 5	Definitions	
6	Components	
7	Units of Measurement	
8	Terminology	
9	Zone and Group Equivalency	
	9.1 Class I, Zone 1, Group IIA	
	9.2 Class I, Zone 1, Group IIB	
	9.3 Class I, Zone 1, Group IIB+H2	
	9.4 Zone 20 and 21	
10	Enclosures	
	10.1 Material	
	10.2 Porosity in castings	
	10.3 Thickness	
	10.4 Strength	
11	Joints in Enclosure	
•	11.1 General	
	11.2 Groups C and D locations	
	11.3 Group B locations	
	11.4 Class II Locations	
	11.5 Class I and II Locations – Main poles and interpoles of D.C. motors	
10		
12	Holes in Enclosure	
13	Shaft Openings	
	13.1 General	
	13.2 Groups F and G locations	
	13.3 Group E locations	
14	Drain and Breather Plugs in Enclosure	
15	Air-Gap Gauge Plugs in Enclosure	
16	Devices with Operating Rods or Spindles	
17	Protection Against Corrosion	
	17.1 General	
	17.2 Submersible sewage-pump motor	
18	Materials Applied to Joint Surfaces	
19	Field-Wiring Connections	
	19.1 Permanently connected motors	
	19.2 Field wiring leads	
	19.3 Equipment grounding terminals and leads	
20	Cord-Connected Motors	
	20.1 General	
	20.2 Terminal enclosure.	
	20.3 Conductor seal	
	20.4 Packing gland	
	20.5 Strain relief	
	20.6 Bonding for grounding	
	20.7 Equipment grounding	
_	20.8 Attachment of threaded parts	
21	Assemblies of Equipment	
	21.1 General	

	21.2 Electric drake	29
22	External Fans and Fan Guards	29
	22.1 Materials	29
	22.2 Fan-cooled motor	
23	Gasoline Submersible Motors	
	23.1 General	
	23.2 Lubrication	
	23.3 Mechanical seal	
24	Leakage Detectors	
27	24.1 Submersible sewage-pump motor	
	24.2 Cord-connected submersible sewage-pump motor	
25	Maximum External Surface Temperatures	
26	Devices for LimitingExternal Surfaces Temperatures	
27		
21	Spacings	۱ ک م
	27.1 Motors rated 1500 volts or less	
00	27.2 Motors rated more than 1500 volts	
28	Test Voltages and Test Conditions	
29	Instrumentation – Temperature Measurements	
30	Variable-Frequency Inverter-Drive Motors	
31	Temperature Tests – General	
32	Temperature Tests on Sinewave Power for Single Speed or Multi-Speed Motors	
	32.1 Normal temperature test	
	32.2 Running-overload test	
	32.3 Running-overload to burnout test	
	32.4 Single-phasing test	
	32.5 Locked-rotor test	
	32.6 72-Hour locked-rotor test	
	32.7 Air test	
	32.8 Dry-dust blanket test	
	32.9 Moist-dust blanket test – Group G locations	
33	Temperature Tests for Variable-Frequency Inverter-Drive Motors	
	33.1 Normal temperature test	
	33.2 Running-overload test	
	33.3 Running-overload to burnout test	
	33.4 Locked-rotor test	39
	33.5 Air test	39
	33.6 Dry-dust blanket test	39
	33.7 Moist-dust blanket test – Group G locations	
	33.8 Tests on fan-duty and air-over motors with temperature-limiting devices	40
34	Dielectric-Voltage Withstand Test	
35	Dust-Penetration Test	41
36	Explosion Test	42
	36.1 General	
	36.2 Explosion pressure test	
	36.3 Flame propagation test	
	36.4 Exceptions for non-standard joints	
37	Over Pressure Test on Enclosures	
38	Tests on Temperature-Limiting Devices for Limiting External Surface Temperature	
	38.1 Arc-rupturing tests for thermal cut-off device in D.C. motor circuit	
	38.2 Temperature-limiting device in the motor-control circuit	
	38.3 Overload test	
	38.4 Endurance test	
	38.5 Calibration test	
39	Secureness Test on Conduit Hubs	
40	Electrical-Resistance Test	
41	Accelerated-Aging Test on Bushings	

42	Cord-Pull Test	46
43	Rough-Usage Test	46
44	Drop Test	46
45	Gasoline-Leakage Test	47
46	Non-Metallic Fans and Fan Guards Test	47
	46.1 General	47
	46.2 Conductivity test	47
	46.3 Accumulation of static electricity test	48
47	Pull Test on Tubes	
48	Sealing Compounds Test	49
49	Low Ambient-Duty Motors	50
	49.1 General	50
	49.2 Construction	50
	49.3 Explosion test	50
	49.4 Drop test on lead seal	50
	49.5 Manufacturing and Production Tests – Dielectric Voltage-Withstand Test	51
50	Grounding-Continuity Test	52
51	Markings	52
	(normative) Standard References  (informative) Standards for components	
B1	Component Standards	83
Annex C	(normative) Construction for Waiver of Explosion Tests	
C1	Explosion tests per the exception to 36.1.2	84
C2	Joints	
	C2.1 General	84
	C2.2 Threaded Joints	84
	C2.3 Bolts in Joint Width	84
	C2.4 Through-bolts	84
C3	Shaft Openings	84
	C3.1 Class I Locations	84

No Text on This Page