



UL 60079-7

STANDARD FOR SAFETY

Explosive atmospheres – Part 7:
Equipment protection by increased
safety "e"

UL Standard for Safety for Explosive Atmospheres – Part 7: Equipment Protection by Increased Safety "e", UL 60079-7

Fifth Edition, Dated February 24, 2017

Summary of Topics

This revision of ANSI/UL 60079-7 dated June 3, 2021 is being issued to update the title page to reflect the reaffirmation of its ANSI approval and to update the membership list. No changes in requirements have been made.

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 requirements are substantially in accordance with Proposal(s) on this subject dated March 19, 2021.

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

FEBRUARY 24, 2017
(Title Page Reprinted: June 3, 2021)



ANSI/UL 60079-7-2017 (R2021)

1

UL 60079-7

**Standard for Explosive Atmospheres – Part 7: Equipment Protection by
Increased Safety "e"**

First Edition – December, 2002

Second Edition – March, 2007

Third Edition – Not Printed

Fourth Edition – October, 2008

Fifth Edition

February 24, 2017

This ANSI/UL Standard for Safety consists of the Fifth Edition including revisions through June 3, 2021.

The most recent designation of ANSI/UL 60079-7 as a Reaffirmed American National Standard (ANS) occurred on June 3, 2021. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page, or Preface. The National Difference Page and IEC Foreword are also excluded from the ANSI approval of IEC-based standards.

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>.

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.

COPYRIGHT © 2021 UNDERWRITERS LABORATORIES INC.

This is a preview. Click here to purchase the full publication.

No Text on This Page

CONTENTS

Preface (UL)	7
National Differences	9
FOREWORD	11
1 Scope	19
1DV.1 Modification of Clause 1, first paragraph to replace with the following:	19
1DV.2 Modification of Clause 1, eighth paragraph to replace with the following:	20
1DV.3 Addition of 1DV.3.1.....	20
2 Normative references	20
2DV Modification of Clause 2 references to replace with the following:	20
3 Terms and definitions.....	24
3DV Modification of Clause 3 to replace with the following:.....	24
3.13.1DV Modification of Clause 3.13.1, Note 1 to replace with the following:	26
3.13.2DV Modification of Clause 3.13.2, to Add Note 2 as follows:	26
3.19DV Modification of Clause 3.19, Note 1 to replace with the following:	27
4 Constructional requirements	28
4.1 Level of Protection.....	28
4.1DV Modification of Clause 4.1 to replace with the following:	28
4.2 Electrical connections	28
4.3 Clearances	36
4.3ADV.1 Addition of the following Clause 4.3ADV.1 after the fourth paragraph:.....	36
4.4 Creepage distances.....	37
4.4.1DV.1 Modification of Clause 4.4.1, third paragraph to replace with the following:	37
4.4.1DV.2 Modification of Clause 4.4.1, NOTE 1 to replace with the following:	37
4.4.1ADV.1 Addition of the following Clause 4.4.1ADV.1 after NOTE 2:	37
4.5 Printed wiring boards with conformal coating, Level of Protection “ec”.....	46
4.6 Solid electrical insulating materials.....	46
4.7 Windings.....	47
4.8 Temperature limitations	48
4.9 Wiring internal to equipment	50
4.10 Degrees of protection provided by enclosures.....	50
4.10.1DV Modification of Clause 4.10.1 to replace with the following	50
4.10.2DV Modification of Clause 4.10.2 to replace with the following:	51
4.11 Fasteners.....	52
4.11DV.1 Modification of Clause 4.1 to replace with the following:	52
4.12ADV.1 Addition of Clause 4.12ADV.1 as follows:	52
5 Supplementary requirements for specific electrical equipment	52
5.1 General	52
5.2 Electrical machines.....	52
5.3 Luminaires, hand lights, or caplights	62
5.4 Analog measuring instruments and instrument transformers	73
5.5 Transformers other than instrument transformers.....	75
5.6 Supplementary requirements for equipment incorporating cells and batteries	75
5.7 General purpose connection and junction boxes	84
5.8 Resistance heating equipment (other than trace heating systems).....	84
5.9 Supplementary requirements for fuses	88
5.10 Other electrical equipment.....	89
5.10DV Modification of Clause 5.10 to replace with the following:.....	89
6 Type verifications and type tests.....	89
6.1 Dielectric strength.....	89
6.2 Rotating electrical machines.....	90

6.3	Luminaires	92
6.4	Measuring instruments and instrument transformers	99
6.5	Transformers other than instrument transformers	100
6.6	Verification and tests for cells and batteries of Level of Protection “eb”	100
6.7	Verification and tests for cells and batteries of Level of Protection “ec”	103
6.8	General purpose connection and junction boxes	103
6.9	Resistance heating equipment	104
6.10	Terminal insulating material tests	104
7	Routine verifications and routine tests	106
7.1	Dielectric tests	106
7.2	Dielectric tests for batteries	106
7.3	Inter-turn overvoltage tests	106
8	Ex Component certificates	106
8.1	General	106
8.2	Terminals	106
9	Marking and instructions	107
9.1	General marking	107
9.1DV.1	Modification of Clause 9.1, first paragraph to replace with the following:	107
9.2	Ex Component enclosures	108
DV.1	Modification of Clause 9.2, first paragraph and NOTE to replace with the following:	108
9.3	Instructions for use	109
9.4	Warning markings	110
10	Documentation	111
10DV	Modification of Clause 10 to replace with the following:	111

Annex A (normative) Temperature determination of electrical machines – Methods of test and of calculation

A.1	General	112
A.2	Determination of maximum service temperatures	112
A.2.1	Rotor temperature – normal operation	112
A.2.2	Winding temperature – normal operation	112
A.3	Determination of maximum surface temperatures	113
A.3.1	General	113
A.3.2	Locked rotor tests	113
A.4	Optional calculation of maximum surface temperature	114
A.4.1	General	114
A.4.2	Rotor temperature	114
A.4.3	Stator temperature	114
A.5	Determination of t_E time	114
A.6	Arduous starting conditions	115
A.7	Motors operated with a converter	115

Annex B (normative) Type tests for specific forms of resistance heating devices or resistance heating units (other than trace heater)

B.1	Resistance heating devices subjected to mechanical stresses	116
Annex B.1DV	Modification of Clause B.1 to replace with the following	116
B.2	Resistance heating devices or units intended for immersion	116
B.3	Resistance heating devices or units having hygroscopic insulating material	116
B.4	Verification of limiting temperature of resistance heating devices (other than trace heaters)	116
B.4.1	General	116
B.4.2	Safety devices	116
B.4.3	Resistance heating unit of stabilized design	117
B.4.4	Heating device with temperature self-limiting characteristic	117

Annex C (informative) Cage motors – Thermal protection in service**Annex D (informative) Resistance heating devices and units – Additional electrical protection**

D.1	Objective.....	119
D.2	Method of protection	119

Annex E (informative) Combinations of terminals and conductors for general purpose connection and junction boxes

E.1	General.....	120
E.2	Maximum dissipated power method.....	120
E.3	Defined arrangement method.....	120

Annex F (normative) Dimensions of copper conductors**Annex G (normative) Test procedure for T5 (only 8 W), T8, T10 and T12 lamps**

G.1	Asymmetric pulse test.....	123
G.1.1	General.....	123
G.1.2	Test procedure.....	123
G.2	Asymmetric power test.....	125
G.2.1	General.....	125
G.2.2	Test procedure.....	125

Annex H (normative) Alternative separation distances for Level of Protection “ec” equipment under controlled environments

H.1	General.....	129
	Annex H.1DV.1 Modification of Annex H1, second paragraph to add NOTE after first bullet item as follows:.....	129
H.2	Specific Conditions of Use.....	129
	Annex H.2DV Modification of Annex H2 to replace with the following:.....	129
H.3	Control of pollution access.....	130
H.4	Voltage limitation	130
H.5	Control of overvoltages and transient protection	130
H.6	Alternative separation distances	130

Annex I (informative) Application, installation, and testing considerations for Level of Protection “ec” asynchronous machines

I.1	Surface temperature.....	132
I.2	Starting.....	132
I.3	Rated voltage and surface discharges	133

Annex J (informative) Luminaires incorporating LEDs

J.1	LEDs for EPL Gb	134
J.2	LEDs for EPL Gc	134

Bibliography

No Text on This Page