



# **UL 60079-30-1**

## **STANDARD FOR SAFETY**

**Explosive Atmospheres – Part 30-1:  
Electrical Resistance Trace Heating –  
General and Testing Requirements**



UL Standard for Safety for Explosive Atmospheres – Part 30-1: Electrical Resistance Trace Heating – General and Testing Requirements, UL 60079-30-1

First Edition, Dated May 5, 2017

### **Summary of Topics**

***This revision of ANSI/UL 60079-30-1 dated August 11, 2021 is being issued to update the title page to reflect the most recent designation as a Reaffirmed American National Standard (ANS). No technical changes have been made.***

***UL 60079-30-1 is an adoption of IEC/IEEE 60079-30-1, First Edition, issued by the IEC September 2015. Please note that the National Difference document incorporates all of the U.S. national differences for UL 60079-30-1.***

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 requirements are substantially in accordance with Proposal(s) on this subject dated May 28, 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

**MAY 5, 2017**  
(Title Page Reprinted: August 11, 2021)



**ANSI/UL 60079-30-1-2017 (R2021)**

1

**UL 60079-30-1**

**Standard for Explosive Atmospheres – Part 30-1: Electrical Resistance**

**Trace Heating – General and Testing Requirements**

**First Edition**

**May 5, 2017**

This ANSI/UL Standard for Safety consists of the First Edition including revisions through August 11, 2021.

The most recent designation of ANSI/UL 60079-30-1 as a Reaffirmed American National Standard (ANS) occurred on August 11, 2021. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page. 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.**

No Text on This Page

## CONTENTS

<b>Preface (UL)</b> .....	<b>5</b>
<b>National Differences</b> .....	<b>7</b>
<b>FOREWORD</b> .....	<b>9</b>
<b>INTRODUCTION</b> .....	<b>15</b>
1 Scope .....	17
1DV Modification of Clause 1 to replace with the following:.....	17
2 Normative references .....	22
3 Terms and definitions.....	23
4 General requirements.....	29
4.1 General .....	29
4.2 Mechanical strength.....	30
4.3 Terminations and connections .....	30
4.4 Circuit protection requirements for branch circuits .....	30
4.5 Temperature requirements .....	31
5 Testing .....	34
5.1 Type tests .....	34
5.2 Routine tests .....	58
6 Marking .....	59
6.1 Product markings for trace heaters.....	59
6.1DV Modification of Clause 6.1 to replace with the following: .....	59
6.2 Markings for field assembled components .....	60
7 Documentation requirements .....	60
7.1 General .....	60
7.1DV.1 Modification of Clause 7.1, second paragraph to replace with the following: .....	60
7.2 Circuit design documentation .....	61
7.3 Trace heating system documentation .....	61
7.4 Instructions for installation of trace heating system .....	62
7.5 Instructions for commissioning.....	63
7.6 Instructions for maintenance / repair or modification .....	63
<b>Annex A (informative) Type test matrix for EPLs Gb/Gc/Db/Dc(Refer to IEC 60079-14 for the relationship of EPLs to Zones)</b>	
<b>Annex B (informative) Checklist for installation</b>	
<b>Annex C (normative) Trace heater product design verification methodology</b>	
C.1 General.....	67
C.2 Design methodology and selection of trace heaters .....	67
C.3 Stabilized design calculations .....	67
C.4 Trace heater performance and equilibrium conditions .....	68
C.5 Heat loss calculations.....	70
C.6 Heat loss design safety factor .....	71
C.7 Maximum temperature determination .....	72
C.7.1 Theoretical pipe and sheath temperature calculations – Metallic applications .....	72
C.7.2 Theoretical vessel and sheath temperature calculations – Metallic applications.....	73

C.7.3 Sheath temperature – metallic applications utilizing a temperature limiter control sensing the trace heater sheath or an artificial hot spot .....	74
C.7.4 Theoretical sheath temperature calculations – Non-metallic applications .....	74
C.7.5 Sheath temperature – non-metallic applications utilizing a temperature limiter control sensing the trace heater sheath or an artificial hot spot .....	75

#### **Annex D (normative) Requirements for Division 1 and Division 2 trace heating systems**

D.1 Application .....	77
D.2 General .....	77
D.3 Terminations and connections .....	77
D.4 Control and temperature requirements .....	77
D.4.1 General .....	77
D.4.2 Stabilized design .....	77
D.4.3 Controlled design .....	78
D.4.4 Requirements for protective device in Divisions 1 and 2 .....	78
D.5 Type tests .....	78
D.5.1 Division 1 trace heating equipment .....	78
D.5.2 Division 2 equipment .....	79
D.6 Marking .....	79
D.7 Instructions – Installation requirements .....	79

#### **Annex E (normative) Type test matrix for Division 1 and 2 explosive atmospheres**

#### **Bibliography**

## Preface (UL)

This UL Standard is based on IEC/IEEE Publication 60079-30-1: first edition Explosive Atmospheres - Part 30-1: Electrical Resistance Trace Heating – General and Testing Requirements. IEC publication 60079-30-1 is copyrighted by the IEC.

These materials are subject to copyright claims of IEC and UL. No part of this publication may be reproduced in any form, including an electronic retrieval system, without the prior written permission of UL. All requests pertaining to the Explosive Atmospheres – Part 30-1: Electrical Resistance Trace Heating – General and Testing Requirements 60079-30-1 Standard should be submitted to UL.

**Note – Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.**

The following people served as members of STP 60079 and participated in the review of this standard:

NAME	COMPANY
*B. Zimmermann, Chair	R Stahl Inc.
*T. Adam	FM Approvals LLC
R. Allen	Honeywell International Inc.
J. Anderson	Thermon Mfg Co.
D. Ankele	UL LLC
P. Becker	Nvent
S. Blais	Emerson/Appleton Group
K. Boegli	KBB Consulting
R. Brownlee	Pepperl + Fuchs Inc.
D. Burns	Shell P&T — Innovation / R&D
R. Chalmers	Industrial Scientific Corp.
*J. Chambers	UL LLC
*C. Coache	National Fire Protection Association
*M. Cole	Hubbell Canada LP
M. Coppler	LabTest Certification Inc.
*R. Deadman	UL LLC
*K. Dhillon	LabTest Certification Inc.
T. Dubaniewicz	NIOSH
G. Edwards	Det-Tronics
M. Egloff	Montana Tech, University of Montana
M. Ehrmann	R Stahl Inc
D. El Tawy	Siemens Energy
A. Engler	Det Norske Veritas DNV
M. Fillip	National Oilwell Varco
W. Fiske	Intertek
Z. Fosse	DEKRA Certification Inc
G. Gurinder	Gurinder Garcha Consulting
D. Grady	Talema Group
J. Hickie	Caterpillar Inc.
R. Holub	DuPont
E. Hong	Solar Turbines Inc.