



# **UL 80079-36**

## **STANDARD FOR SAFETY**

**Explosive Atmospheres – Part 36: Non-Electrical Equipment for Explosive Atmospheres – Basic Method and Requirements**



UL Standard for Safety for Explosive Atmospheres – Part 36: Non-Electrical Equipment for Explosive Atmospheres – Basic Method and Requirements, UL 80079-36

First Edition, Dated June 2, 2021

### **Summary of Topics**

***This editorial revision of ANSI/UL 80079-36 dated June 23, 2021 corrects Clause [5.1DV](#) to add a Special Note to denote the legislative markup in paragraphs 5, 6, and 7 are part of the ISO standard formatting; Clause [6.4.2.1 DV.1](#) to replace “Group 1” with “Group I”; and Clause [11.5DV](#) Example to add Zone reference.***

***UL 80079-36 is an adoption of ISO/IEC 80079-36, First Edition, issued by ISO/IEC February 2016 and Corrigendum 1 issued October 2019. Please note that the National Difference document incorporates all of the U.S. national differences for UL 80079-36.***

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.

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

**JUNE 2, 2021**  
(Title Page Reprinted: June 23, 2021)



**ANSI/UL 80079-36-2021**

1

**UL 80079-36**

**Standard for Explosive Atmospheres – Part 36: Non-Electrical Equipment  
for Explosive Atmospheres – Basic Method and Requirements**

**First Edition**

**June 2, 2021**

This ANSI/UL Standard for Safety consists of the First Edition including revisions through June 23, 2021.

The most recent designation of ANSI/UL 80079-36 as an American National Standard (ANSI) occurred on June 2, 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.**

No Text on This Page

**CONTENTS**

|   |           |
|---|-----------|
| <b>Preface (UL)</b> .....   | <b>7</b>  |
| <b>National Differences</b> .....   | <b>11</b> |
| <b>FOREWORD</b> .....   | <b>13</b> |
| <b>INTRODUCTION</b> .....   | <b>15</b> |
| 1 Scope .....   | 17        |
| 1DV Modification of Clause 1 to replace with the following:.....                                  | 17        |
| 2 Normative references .....  | 21        |
| 2DV Modification of Clause 2 references to replace with the following: .....                      | 22        |
| 3 Terms and definitions.....  | 23        |
| 3.1.1DV.1 Modification of Clause 3.1.1, Note 2 to replace with the following:.....                | 23        |
| 3.4DV Deletion of Clause 3.4, it does not apply.....  | 26        |
| 3.7DV Modification of Clause 3.7 to replace with the following: .....                             | 26        |
| 3.12ADV Addition of Clause 3.12.....  | 27        |
| 4 EPL and equipment groups.....   | 27        |
| 4.1 EPL .....   | 27        |
| 4.1DV.1 Modification of Clause 4.1 to add the following after the 2 <sup>nd</sup> paragraph:..... | 28        |
| 4.2 Group I .....   | 28        |
| 4.3 Group II .....  | 29        |
| 4.4 Group III .....   | 29        |
| 4.5 Equipment for specific explosive gas atmospheres.....   | 29        |
| 5 Ignition hazard assessment.....   | 30        |
| 5.1 General requirements .....  | 30        |
| 5.1DV Modification of Clause 5.1 to replace with the following: .....                             | 30        |
| 5.2 Procedure of ignition hazard assessment .....   | 31        |
| 6 Assessment of possible ignition sources and control means .....                                 | 34        |
| 6.1 General .....   | 34        |
| 6.2 Hot surfaces.....   | 34        |
| 6.3 Flames and hot gases (including hot particles).....   | 38        |
| 6.4 Mechanically generated sparks and hot surfaces .....  | 38        |
| 6.5 Electrical ignition sources except stray current.....   | 42        |
| 6.6 Stray electric currents, cathodic corrosion protection .....                                  | 42        |
| 6.7 Static electricity .....  | 42        |
| 6.8 Adiabatic compression and shock waves.....  | 45        |
| 6.9 Exothermic reactions, including self-ignition of dusts .....                                  | 45        |
| 7 Additional considerations .....   | 46        |
| 7.1 Dust deposits and other material in the gap of moving parts.....                              | 46        |
| 7.2 Dust deposits and other material in the flame arresters incorporated in the equipment ....    | 46        |
| 7.3 Opening times of enclosures .....   | 46        |
| 7.4 Non-metallic enclosures and non-metallic parts of the equipment.....                          | 46        |
| 7.5 Removable parts .....   | 47        |
| 7.6 Materials used for cementing.....   | 47        |
| 7.7 Light transmitting parts.....   | 47        |
| 7.8 Stored energy .....   | 48        |
| 8 Verification and tests .....  | 48        |
| 8.1 General .....   | 48        |
| 8.2 Determination of the maximum surface temperature.....   | 48        |
| 8.3 Mechanical tests.....   | 51        |
| 8.4 Additional tests of non-metallic parts of the equipment relevant for explosion protection..   | 52        |
| 9 Documentation .....   | 54        |

|        |   |    |
|--------|---|----|
| 9.1    | Technical documentation.....  | 54 |
| 9.2    | Conformity with the documentation .....   | 55 |
| 9.2DV  | Modification of Clause 9.2 to replace with the following: .....                     | 55 |
| 9.3    | Certificate .....   | 55 |
| 9.3DV  | Modification of Clause 9.3 to replace with the following: .....                     | 55 |
| 9.4    | Responsibility for marking .....  | 55 |
| 10     | Instructions .....  | 56 |
| 10DV   | Modification of Clause 10, third bulleted item to replace with the following: ..... | 56 |
| 11     | Marking .....   | 56 |
| 11.1   | Location .....  | 56 |
| 11.2   | General.....  | 57 |
| 11.2DV | Modification of Clause 11.2 to replace with the following: .....                    | 57 |
| 11.3   | Warning markings .....  | 58 |
| 11.4   | Marking on very small equipment .....   | 59 |
| 11.4DV | Modification of Clause 11.4 to replace with the following: .....                    | 59 |
| 11.5   | Examples of marking.....  | 59 |
| 11.5DV | Modification of Clause 11.5 to replace with the following: .....                    | 59 |

## **Annex A (informative) Methodology for confirming the EPL**

|       |   |    |
|-------|---|----|
| A.1   | Methodology for confirming the EPL of Group I.....          | 61 |
| A.1.1 | EPL Ma .....  | 61 |
| A.1.2 | EPL Mb .....  | 61 |
| A.2   | Methodology for confirming the EPL of Group II and III..... | 61 |
| A.2.1 | EPL Ga and Da .....   | 61 |
| A.2.2 | EPL Gb and Db .....   | 61 |
| A.2.3 | EPL Gc and Dc .....   | 61 |

## **Annex B (informative) Explanation of the ignition hazard assessment procedure**

|         |  |    |
|---------|--|----|
| B.1     | Overview .....   | 62 |
| B.1.1   | General .....  | 62 |
| B.1.1DV | Modification of B.1.1 to replace with the following: .....     | 62 |
| B.1.2   | Reporting with the help of a table .....                       | 62 |
| B.2     | Assessment Procedure .....                                     | 62 |
| B.3     | Assessment Steps .....   | 63 |
| B.3.1   | Identification of Ignition Hazards.....                        | 63 |
| B.3.2   | Determination of measures .....                                | 64 |
| B.3.3   | Concluding ignition hazard estimation and categorisation ..... | 65 |
| B.3.4   | Determination of the EPL .....                                 | 66 |

## **Annex C (informative) Examples of ignition hazard assessment**

|     |   |    |
|-----|---|----|
| C.1 | General remarks.....  | 67 |
| C.2 | Examples for common cases demonstrating the use of the scheme ..... | 67 |
| C.3 | Example of an ignition hazard assessment for a pump.....            | 74 |
| C.4 | Example of an ignition hazard assessment for an agitator .....      | 78 |

## **Annex D (normative) Charging tests with non-conductive materials**

|       |                             |    |
|-------|-----------------------------|----|
| D.1   | General.....                | 84 |
| D.2   | Principle of the test ..... | 84 |
| D.3   | Samples and apparatus.....  | 84 |
| D.4   | Procedure .....             | 85 |
| D.4.1 | Conditioning .....          | 85 |



|   |    |
|---|----|
| D.4.2 Determination of the most efficient charging method ..... | 85 |
|---|----|

## **Annex E (informative) Consideration of misuse which can reasonably be anticipated during ignition hazard assessment procedure**

|  |    |
|--|----|
| Annex EDV Modification of Annex E title to replace with the following: Consideration of <u>reasonably foreseeable</u> misuse <del>which can reasonably be anticipated</del> during ignition hazard assessment procedure..... | 89 |
| E.1 General.....   | 89 |
| E.2 Identification and analysis of the ignition hazards.....   | 89 |
| E.3 First assessment of the ignition hazards .....   | 89 |
| E.4 Determination of safety measures .....   | 89 |
| E.5 Final assessment of the ignition hazards.....  | 89 |

## **Annex F (informative) Development of different types of incendive electrostatic discharges**

## **Annex G normative) Protection concepts of types of protection "d", "p" and "t" acceptable for non-electrical equipment**

## **Annex H (informative) Volume dependence of auto-ignition temperature**

|   |    |
|---|----|
| Annex HDV Delete Annex H. This Annex does not apply ..... | 92 |
|---|----|

## **Annex I (informative) Relationship between Equipment protection levels (EPLs) and zones**

|   |    |
|---|----|
| Annex IDV Modification of Annex I to replace with the following: .....            | 94 |
| Table I.1DV Modification of Annex I, Table I.1 to replace with the following..... | 94 |

## **Bibliography**

No Text on This Page

## Preface (UL)

This UL Standard is based on ISO/IEC Publication 80079-36: First edition, Explosive Atmospheres – Part 36: Non-Electrical Equipment for Explosive Atmospheres – Basic Method and Requirements. ISO/IEC publication 80079-36 is copyrighted by the IEC.

This edition has been issued to satisfy UL Standards policy.

This is the UL Standard for Safety for Explosive Atmospheres – Part 36: Non-Electrical Equipment for Explosive Atmospheres – Basic Method and Requirements.

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 36: Non-Electrical Equipment for Explosive Atmospheres – Basic Method and Requirements, UL 80079-36 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:

| <b><u>NAME</u></b>    | <b><u>COMPANY</u></b>                |
|-----------------------|--------------------------------------|
| *B. Zimmermann, Chair | R Stahl Inc.                         |
| *T. Adam              | FM Approvals LLC                     |
| R. Allen              | Honeywell 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         |
| *J. Chambers          | UL LLC                               |
| R. Chalmers           | Industrial Scientific Corp.          |
| *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.           |
| M. Dona               | Beach Energy                         |
| 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              |