AMERICAN NATIONAL STANDARD

ANSI/ISA-12.02.02-2014

Recommendations for the Preparation, Content, and Organization of Intrinsic Safety Control Drawings

Approved 8 September 2014

ANSI/ISA-12.02.02-2014, Recommendations for the Preparation, Content, and Organization of Intrinsic Safety Control Drawings

ISBN: 978-0-876640-98-2

ISA
67 Alexander Drive
P.O. Box 12277
Research Triangle Park, North Carolina 27709

Preface

This preface, as well as all footnotes and annexes, is included for information purposes and is not part of ANSI/ISA-12.02.02-2014.

This document has been prepared as part of the service of ISA toward a goal of uniformity in the field of instrumentation. To be of real value, this document should not be static but should be subject to periodic review. Toward this end, the Society welcomes all comments and criticisms and asks that they be addressed to the Secretary, Standards and Practices Board; ISA; 67 Alexander Drive; P. O. Box 12277; Research Triangle Park, NC 27709; Telephone (919) 549-8411; Fax (919) 549-8288; E-mail: standards@isa.org.

The ISA Standards and Practices Department is aware of the growing need for attention to the metric system of units in general, and the International System of Units (SI) in particular, in the preparation of instrumentation standards. The Department is further aware of the benefits to USA users of ISA standards of incorporating suitable references to the SI (and the metric system) in their business and professional dealings with other countries. Toward this end, this Department will endeavor to introduce SI-acceptable metric units in all new and revised standards, recommended practices, and technical reports to the greatest extent possible. *Standard for Use of the International System of Units (SI): The Modern Metric System*, published by the American Society for Testing & Materials as IEEE/ASTM SI 10-97, and future revisions, will be the reference guide for definitions, symbols, abbreviations, and conversion factors.

It is the policy of ISA to encourage and welcome the participation of all concerned individuals and interests in the development of ISA standards, recommended practices, and technical reports. Participation in the ISA standards-making process by an individual in no way constitutes endorsement by the employer of that individual, of ISA, or of any of the standards, recommended practices, and technical reports that ISA develops.

CAUTION — ISA DOES NOT TAKE ANY POSITION WITH RESPECT TO THE EXISTENCE OR VALIDITY OF ANY PATENT RIGHTS ASSERTED IN CONNECTION WITH THIS DOCUMENT, AND ISA DISCLAIMS LIABILITY FOR THE INFRINGEMENT OF ANY PATENT RESULTING FROM THE USE OF THIS DOCUMENT. USERS ARE ADVISED THAT DETERMINATION OF THE VALIDITY OF ANY PATENT RIGHTS, AND THE RISK OF INFRINGEMENT OF SUCH RIGHTS, IS ENTIRELY THEIR OWN RESPONSIBILITY.

PURSUANT TO ISA'S PATENT POLICY, ONE OR MORE PATENT HOLDERS OR PATENT APPLICANTS MAY HAVE DISCLOSED PATENTS THAT COULD BE INFRINGED BY USE OF THIS DOCUMENT AND EXECUTED A LETTER OF ASSURANCE COMMITTING TO THE GRANTING OF A LICENSE ON A WORLDWIDE, NON-DISCRIMINATORY BASIS, WITH A FAIR AND REASONABLE ROYALTY RATE AND FAIR AND REASONABLE TERMS AND CONDITIONS. FOR MORE INFORMATION ON SUCH DISCLOSURES AND LETTERS OF ASSURANCE, CONTACT ISA OR VISIT WWW.ISA.ORG/STANDARDSPATENTS.

OTHER PATENTS OR PATENT CLAIMS MAY EXIST FOR WHICH A DISCLOSURE OR LETTER OF ASSURANCE HAS NOT BEEN RECEIVED. ISA IS NOT RESPONSIBLE FOR IDENTIFYING PATENTS OR PATENT APPLICATIONS FOR WHICH A LICENSE MAY BE REQUIRED, FOR CONDUCTING INQUIRIES INTO THE LEGAL VALIDITY OR SCOPE OF PATENTS, OR DETERMINING WHETHER ANY LICENSING TERMS OR CONDITIONS PROVIDED IN CONNECTION WITH SUBMISSION OF A LETTER OF ASSURANCE, IF ANY, OR IN ANY LICENSING AGREEMENTS ARE REASONABLE OR NON-DISCRIMINATORY.

ISA REQUESTS THAT ANYONE REVIEWING THIS DOCUMENT WHO IS AWARE OF ANY PATENTS THAT MAY IMPACT IMPLEMENTATION OF THE DOCUMENT NOTIFY THE ISA STANDARDS AND PRACTICES DEPARTMENT OF THE PATENT AND ITS OWNER.

ADDITIONALLY, THE USE OF THIS DOCUMENT MAY INVOLVE HAZARDOUS MATERIALS, OPERATIONS OR EQUIPMENT. THE DOCUMENT CANNOT ANTICIPATE ALL POSSIBLE APPLICATIONS OR ADDRESS ALL POSSIBLE SAFETY ISSUES ASSOCIATED WITH USE IN HAZARDOUS CONDITIONS. THE USER OF THIS DOCUMENT MUST EXERCISE SOUND PROFESSIONAL JUDGMENT CONCERNING ITS USE AND APPLICABILITY UNDER THE USER'S PARTICULAR CIRCUMSTANCES. THE USER MUST ALSO CONSIDER THE APPLICABILITY OF ANY GOVERNMENTAL REGULATORY LIMITATIONS AND ESTABLISHED SAFETY AND HEALTH PRACTICES BEFORE IMPLEMENTING THIS DOCUMENT.

THE USER OF THIS DOCUMENT SHOULD BE AWARE THAT THIS DOCUMENT MAY BE IMPACTED BY ELECTRONIC SECURITY ISSUES. THE COMMITTEE HAS NOT YET ADDRESSED THE POTENTIAL ISSUES IN THIS VERSION.

NAME	COMPANY
T. Adam, Chair	FM Approvals
M. Coppler*, Managing Director	Det Norske Veritas Certification Inc.
N. Abbatiello	Speer Equipment Inc.
R. Allen	Honeywell Inc.
S. Arnold	Ametek Drexelbrook
R. Brownlee	Pepperl & Fuchs
S. Czaniecki	Endress + Hauser Canada
A. Engler*	Det Norske Veritas DNV
G. Garcha	GE Power & Water
J. Genre	Industrial Scientific Corp.
G. Kozinski	GE Infrastructure Sensing
R. Masek	CSA Group
J. McCormick	Siemens Process Analytics
J. Miller	Detector Electronics Corp.
S. Nguyen*	Siemens Milltronics Ltd.
A. Page	Consultant
R. Parks	Intertek
T. Patel	Littelfuse, Inc.
B. Saxinger	BW Technologies by Honeywell
B. Schaefer	UL LLC
T. Schnaare	Rosemount Inc.
J. Thomas	Schlumberger
L. Vlagea	General Monitors
T. Woods	GE Oil & Gas

* One vote per company

The following people served as members of ISA12:

NAME	COMPANY
T. Schnaare, Chair	Rosemount Inc.
W. Lawrence, Vice Chair	FM Approvals LLC
M. Coppler, Managing Director	Det Norske Veritas Certification Inc.
R. Allen	Honeywell Inc.
D. Ankele	UL LLC
K. Boegli	Phoenix Contact
D. Burns	Shell P&T – Innovation / R&D
C. Casso	Nabors Industries
M. Dona	Santos Ltd.
T. Dubaniewicz	NIOSH
D. El Tawy	Solar Turbines, Inc.
W. Fiske	Intertek
G. Garcha	GE Power & Water
R. Holub	The DuPont Company Inc.
P. Kovscek	Industrial Scientific Corporation
J. Kuczka	Killark
E. Leubner	Eaton's Crouse-Hinds Business
N. Ludlam	FM Approvals Ltd.
E. Massey	Baldor Electric Company
J. Miller	Detector Electronics Corporation
A. Page	Consultant
R. Seitz	Artech Engineering
R. Sierra	USCG
M. Spencer	Columbia Gas Transmission
R. Wigg	E-x Solutions International Pty. Ltd.

This document was approved for publication by the ISA Standards and Practices Board on 20 August 2014.

NAME	COMPANY
E. Cosman, Vice President	The Dow Chemical Company
D. Bartusiak	ExxonMobil Chemical Company
P. Brett	Honeywell Inc.
J. Campbell	Consultant
B. Dumortier	Schneider Electric
D. Dunn	Consultant
J. Federlein	Federlein & Assoc. Inc.
J. Gilsinn	Kenexis Consulting
E. Icayan	Atkins
J. Jamison	Spectra Energy Ltd.
K. P. Lindner	Endress + Hauser Process Solutions AG
V. Maggioli	Feltronics Corp.
T. McAvinew	Instrumentation and Control Engineering, LLC
V. Mezzano	Fluor Corp.
C. Monchinski	Automated Control Concepts Inc.
R. Reimer	Rockwell Automation
N. Sands	DuPont
H. Sasajima	Azbil Corp.
T. Schnaare	Rosemount Inc.
J. Tatera	Tatera & Associates Inc.
I. Verhappen	Industrial Automation Networks Inc.
W. Weidman	WCW Consulting
J. Weiss	Applied Control Solutions LLC

M. Wilkins	Yokogawa IA Global Marketing USMK
D. Zetterberg	Chevron Energy Technology Co.

Contents

This page intentionally left blank.

1 Scope

1.1 This document provides guidance in the preparation of control drawings for intrinsically safe apparatus, associated apparatus, and intrinsically safe systems.

1.2 This document is intended to be used in conjunction with ANSI/UL 913, Standard for Safety, Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations, and ANSI/ISA-60079-11, Explosive Atmospheres – Part 11: Equipment protection by intrinsic safety “i”.

1.3 This document is not intended to include guidance for the design or installation of intrinsically safe equipment or systems.

1.4 A similar philosophy may be applied in the preparation of nonincendive field wiring control drawings, with appropriate modifications to address differences in the National Electrical Code®, NFPA 70, and applicable standards.

2 Purpose

This document has been formulated to provide guidance for, and to promote the uniformity of, manufacturers' control drawings for intrinsically safe apparatus, associated apparatus, and intrinsically safe systems.

3 Definitions

3.1
control drawing
a drawing or other document provided by the manufacturer for the intrinsically safe or associated apparatus, detailing the electrical parameters to allow for interconnections to other circuits or apparatus

3.2
entity concept
a method used to determine acceptable combinations of intrinsically safe apparatus and associated apparatus through the use of intrinsically safe parameters assigned to connection facilities

3.3
entity parameters
C_i: maximum equivalent internal capacitance of the apparatus which is considered as appearing across the connection facilities

I_{max} or I_i: maximum current (peak a.c. or d.c.) that can be applied to the connection facilities of apparatus without invalidating the type of protection

L_i: maximum equivalent internal inductance of the apparatus which is considered as appearing at the connection facilities

V_{max} or U_i: maximum voltage (peak a.c. or d.c.) that can be applied to the connection facilities of apparatus without invalidating the type of protection

P_i: maximum power that can be applied to the connection facilities of apparatus without invalidating the type of protection

C_a or C_o: maximum capacitance that can be connected to the connection facilities of the apparatus without invalidating the type of protection