

American National Standard

for power systems –
insulation coordination

ANSI C92.1-1982



american national standards institute, inc.
1430 broadway, new york, new york 10018



Documents

Document Sharing Hub

ANSI®
C92.1-1982
Revision of
ANSI C92.1-1971

American National Standard for Power Systems – Insulation Coordination

Secretariat

**Institute of Electrical and Electronics Engineers
National Electrical Manufacturers Association**

Approved April 12, 1982

American National Standards Institute, Inc

American National Standard

An American National Standard implies a consensus of those substantially concerned with its scope and provisions. An American National Standard is intended as a guide to aid the manufacturer, the consumer, and the general public. The existence of an American National Standard does not in any respect preclude anyone, whether he has approved the standard or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standard. American National Standards are subject to periodic review and users are cautioned to obtain the latest editions.

The American National Standards Institute does not develop standards and will in no circumstances give an interpretation of any American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute.

CAUTION NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken to reaffirm, revise, or withdraw this standard no later than five years from the date of publication. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute.

Published by

American National Standards Institute
1430 Broadway, New York, New York 10018

Copyright © 1982 by American National Standards Institute, Inc
All rights reserved.

No part of this publication may be reproduced in any form,
in an electronic retrieval system or otherwise, without
the prior written permission of the publisher.

Printed in the United States of America

A1M1082/5

Foreword

(This Foreword is not a part of American National Standard C92.1-1982.)

This standard is a major revision of the previous standard, ANSI C92.1-1971, and presents the process of insulation coordination. Two discrete areas are addressed: self-restoring and non-self-restoring insulation. The statistical procedure of insulation coordination is applicable only for self-restoring insulations.

The basic lightning impulse insulation levels (BIL) and the basic switching impulse insulation levels (BSL) for self-restoring insulations are statistically defined as the crest value of a lightning or switching impulse test voltage at which the insulation exhibits a 90% withstand probability (or a 10% flashover probability). The distribution of lightning or switching overvoltages is defined by a single value that is the crest value of an overvoltage having a 2% probability of being exceeded. The statistical or probabilistic method for insulation coordination allows for insulation failures to occur and attempts to quantify the probability of an insulation flashover. This method statistically compares the voltage stresses on the insulation with the strength of the insulation.

The conventional method for insulation coordination presently required for non-self-restoring insulations consists of comparing the conventional BIL or BSL with the maximum lightning or switching overvoltage. The probability of a flashover is not calculated using the conventional method.

For purposes of insulation coordination, maximum system voltages above 1 kV are divided into three voltage classes:

Medium Voltage. Greater than 1 kV and equal or less than 72.5 kV.

High Voltage. Greater than 72.5 kV and equal to or less than 242 kV.

Extra-High and Ultra-High Voltage. Greater than 242 kV.

This standard, although applicable to the three voltage classes, places primary emphasis on voltages greater than 242 kV. For the purposes of insulation coordination, extra-high and ultra-high voltages are considered one class. Work on the medium and high voltage classes is now in progress in cooperation with the equipment committees and, upon completion, this standard will be revised.

This standard applies only to phase-to-ground insulation except for some definitions. Future revisions will treat phase-to-phase insulation and also the area of the lightning chopped wave insulation strength.

In the development of this standard, IEC Publication 71-1, Insulation Coordination, Part 1: Terms, Definitions, Principles, and Rules, 1976, was used as the primary guide. The major differences between this standard and the IEC standard are as follows:

- (1) Maximum system voltages of 550 and 800 kV are used instead of 525 and 765 kV
- (2) Values of BILs and BSLs of 825 and 900 kV are used instead of 850 and 950 kV
- (3) Values of BILs or BSLs above 1800 kV increase in increments of 125 kV, whereas in the IEC standard, increments of 150 kV are used
- (4) The terms BIL and BSL are maintained in this standard, whereas the IEC standard uses the term rated lightning (or switching) impulse withstand voltage
- (5) In this standard, the specific combination of values of BIL and BSL for an apparatus is not specified. In the IEC standard, a specific set of values of BIL are tied to each value of BSL

Suggestions for improvement and revision of this standard will be welcome. They should be sent to the National Electrical Manufacturers Association, 2101 L Street, NW, Suite 300, Washington, D.C. 20037.



This standard was processed and approved for submittal to ANSI by American National Standards Committee on Insulation Coordination, C92. Committee approval of the standard does not necessarily imply that all committee members voted for its approval. At the time it approved this standard, the C92 Committee had the following members:

A. R. Hileman, Chairman
J. J. Kark, Secretary
D. D. Wilson, Recording Secretary

<i>Organization Represented</i>	<i>Name of Representative</i>
American National Standards Committee on National Electrical Safety Code, C2 (Liaison)	William J. Meese
American National Standards Committee on Static Power Converting Equipment, C34 (Liaison)	R. J. Moran
American National Standards Committee on Power Switchgear, C37 (Liaison)	C. L. Wagner
American National Standards Committee on Standards for Capacitors, C55 (Liaison)	R. D. McClain
American National Standards Committee on Transformers, Regulators, and Reactors, C57 (Liaison)	Saul Bennon
American National Standards Committee on Surge Arresters, C62 (Liaison)	A. G. Yost
American National Standards Committee on Techniques for Dielectric Tests, C68 (Liaison)	John M. Moran
American National Standards Committee on Apparatus Bushings Standardization, C76 (Liaison)	W. F. Giles
American National Standards Committee on Preferred Voltage Ratings for AC Systems and Equipment, C84 (Liaison)	J. M. Ladden
Electric Light and Power Group.	Raymond Allustiarti S. H. Grimmett E. P. Paulochick C. L. Rudasill R. A. Seel C. C. Smith K. G. Adgate (Alt) J. C. Dutton A. R. Hileman W. C. Lauth D. J. Melvold E. A. Neal D. R. Smith C. L. Wagner D. D. Wilson P. L. Bellaschi (Alt) D. R. Shankle (Alt)
Institute of Electrical and Electronics Engineers	
International Electrotechnical Commission, Committees 28 and 28A (Working Group 1) on Insulation Coordination (Liaison)	R. C. Mierendorf
National Electrical Manufacturers Association	Saul Bennon A. M. Bruning F. J. Ellert R. F. Lawrence L. C. McConnell A. G. Yost Zeno Neri (Alt) F. D. Rampey Merle J. Beachy E. C. Starr John R. Ruff
Tennessee Valley Authority	
U.S. Department of Agriculture, Rural Electrification Administration.	
U.S. Department of the Interior, Bonneville Power Administration	
U.S. Department of the Navy	



Documents

Document Sharing Hub