

IEEE 100

Arnold & Porter LLP Library - DC



10115272

THE
AUTHORITATIVE
DICTIONARY
OF IEEE STANDARDS TERMS

SEVENTH EDITION

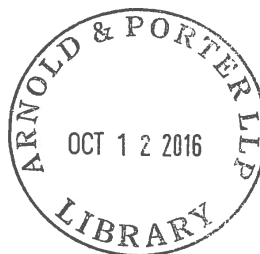


Published by
Standards Information Network
IEEE Press

Intel v. BeSang
IPR2023-00991
Exhibit 1022

IEEE 100
The Authoritative Dictionary of
IEEE Standards Terms

Seventh Edition



Published by
Standards Information Network
IEEE Press

Trademarks and disclaimers

IEEE believes the information in this publication is accurate as of its publication date; such information is subject to change without notice. IEEE is not responsible for any inadvertent errors.

Other tradenames and trademarks in this document are those of their respective owners.

*The Institute of Electrical and Electronics Engineering, Inc.
3 Park Avenue, New York, NY, 10016-5997, USA*

Copyright © 2000 by the Institute of Electrical and Electronics Engineers, Inc. All rights reserved. Published December 2000. Printed in the United States of America.

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.

To order IEEE Press publications, call 1-800-678-IEEE.

Print: ISBN 0-7381-2601-2

SP1122

See other standards and standards-related product listings at: <http://standards.ieee.org/>

The publisher believes that the information and guidance given in this work serve as an enhancement to users, all parties must rely upon their own skill and judgement when making use of it. The publisher does not assume any liability to anyone for any loss or damage caused by any error or omission in the work, whether such error or omission is the result of negligence or any other cause. Any and all such liability is disclaimed.

This work is published with the understanding that the IEEE is supplying information through this publication, not attempting to render engineering or other professional services. If such services are required, the assistance of an appropriate professional should be sought. The IEEE is not responsible for the statements and opinions advanced in this publication.

Library of Congress Cataloging-in-Publication Data

IEEE 100 : the authoritative dictionary of IEEE standards terms.—7th ed.
p. cm.

ISBN 0-7381-2601-2 (paperback : alk. paper)

1. Electric engineering—Dictionaries. 2. Electronics—Dictionaries. 3. Computer engineering—Dictionaries. 4. Electric engineering—Acronyms. 5. Electronics—Acronyms. 6. Computer engineering—Acronyms. I. Institute of Electrical and Electronics Engineers.

TK9 .I28 2000
621.3'03—dc21

00-050601

10-10-10
IEEE
11/11/01

essing, the max-
a subset of an



610.4-1990w

two or more

f 180 electrical

rectification.

EC/PE [119]

buted winding

haped and coil

(PE) [9]

neable mem-

nts of an elec-

mediate com-

re of anolyte

/EEC [119]

use of alter-

of the body,

rency for

(EMB) [47]

digits.

599-1985w

10.5-1990w

of diodes to

10-1994w

ins one or

Note: This

10-1994w

in which

ts, one of

accepted

erpolation

1.5-1990w

into two

ture. For

1 false.

4-1986w

to trans-

often, a

2-1984w

ect light

ic filter.

1984w

ng of a

g: elec-

) [119]

4) tech-

e types

uration

llowed

width

1997

those

. Con-

990w

die

die (1) A single piece of silicon that contains one or more circuits and is or will be packaged as a unit. *Note:* This is the plural form of die. *See also:* dice. (C) 610.10-1994w

(2) *See also:* semiconductor; clipping-in; chip.

(T&D/PE) 524-1992r

dielectric (surge arresters) A medium in which it is possible to maintain an electric field with little or no supply of energy from outside sources. (PE) [8]

dielectric constant (1) (dielectric) That property which determines the electrostatic energy stored per unit volume for unit potential gradient. *Note:* This numerical value usually is given relative to a vacuum. (IA) 54-1955w

(2) The real part of the complex dielectric constant.

(AP/ANT) 145-1993

(3) Relative permittivity (possibly complex).

(AP/PROP) 211-1997

dielectric dissipation factor (A) The cotangent of the dielectric phase angle of a dielectric material or the tangent of the dielectric loss angle. **(B)** The ratio of the loss index into the relative dielectric constant ϵ . *See also:* relative complex dielectric constant. (EM/PE) 286-1975

dielectric filling factor *See:* filling factor.

dielectric filter *See:* interference filter.

dielectric guide A waveguide in which the waves travel through solid dielectric material. *See also:* waveguide.

(EEC/PE) [119]

dielectric heater A device for heating normally insulating material by applying an alternating-current field to cause internal losses in the material. *Note:* The normal frequency range is above 10 megahertz. *See also:* interference. (IE) [43]

dielectric lens A lens made of dielectric material and used for refraction of radio-frequency energy. *See also:* waveguide; antenna. (Std100) [84]

dielectric loss (planar transmission lines) That contribution to the attenuation constant of a propagating mode on a planar transmission line that represents losses associated with the dielectric properties of the substrates (and overlays) materials involved, which may also include conduction mechanisms. (MTT) 1004-1987w

dielectric loss angle δ (rotating machinery) The angle whose tangent is the dissipation factor. (EM/PE) 286-1975w

dielectric loss factor The factor by which the product of a sinusoidal alternating voltage applied to a dielectric and the component of the resulting current having the same period as the voltage have to be multiplied in order to obtain the power dissipated in the dielectric. *See also:* loss factor. (PE/PSIM) 4-1995

dielectric loss filling factor *See:* filling factor.

dielectric phase angle (A) The angular difference in phase between the sinusoidal alternating voltage applied to a dielectric and the component of the resulting alternating current having the same period as the voltage. **(B)** The angle whose cotangent is the dissipation factor, or $\text{arc cot } \epsilon''/\epsilon'$. *See also:* relative complex dielectric constant; dielectric dissipation factor. (EM/PE) 286-1975

dielectric power factor The cosine of the dielectric phase angle (or the sine of the dielectric loss angle). (EM/PE) 286-1975w

dielectric rod antenna An antenna that employs a shaped dielectric rod as the electrically significant part of a radiating element. *Note:* The polyrod rod antenna is a notable example of the dielectric rod antenna when constructed of polystyrene. (AP/ANT) 145-1993

dielectric strength (general) (material) (electric strength-breakdown strength) The potential gradient at which electric failure or breakdown occurs. To obtain the true dielectric strength the actual maximum gradient must be considered, or the test piece and electrodes must be designed so that uniform gradient is obtained. The value obtained for the dielectric strength in practical tests will usually depend on the thickness of the material and on the method and conditions of test. (PE) [8]

301

difference amplifier

dielectric tests (1) (general) Tests which consist of the application of a voltage higher than the rated voltage, for a specified time to assure the withstand strength of insulation materials and spacing. These various types of dielectric tests have been developed to allow selectivity testing the various insulation components of a transformer, without overstressing other components; or to simulate transient voltages which transformers may encounter in service. *See also:* applied voltage tests; induced voltage tests; impulse test. (PE/TR) C57.12.80-1978r

(2) **(high voltage air switches)** Tests that consist of the application of a standard test voltage for a specific time and are designed to determine the adequacy of insulating materials and spacing. (SWG/PE) C37.34-1971s

(3) **(neutral grounding devices)** Tests that consist of the application of a voltage, higher than the rated voltage, for a specified time to prove compliance with the required voltage class of the device. (SPD/PE) 32-1972r

(4) Tests that consist of the application of a voltage higher than the rated voltage for a specified time for the purpose of determining the adequacy of insulating materials against breakdown, and for spacing under normal conditions. (PE/TR) C57.15-1999

dielectric waveguide A waveguide consisting of a dielectric structure. (MTT) 146-1980w

dielectric withstand voltages The maximum voltage that may be applied between line or phase terminals and the neutral or ground terminals (or the device enclosure) without causing electrical failure or breakdown of the device insulation. (SPD/PE) C62.62-2000

dielectric withstand voltage tests (x-radiation limits for ac high-voltage power vacuum interrupters used in power switchgear) Tests made to determine the ability of insulating materials and spacings to withstand specified overvoltages for a specified time without flashover or puncture. (SWG/PE/TR) C37.40-1981s, C57.12.80-1978r, 553-1981, C37.100-1992

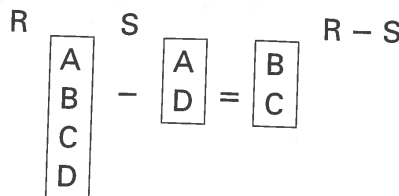
diesel-electric drive A self-contained system of power generation and application in which the power generated by a diesel engine is transmitted electrically by means of a generator and a motor (or multiples of these) for propulsion purposes. *Note:* The prefix diesel-electric is applied to ships, locomotives, cars, buses, etcetera, that are equipped with this drive. *Synonym:* oil-electric drive. *See also:* electric locomotive. (EEC/PE) [119]

diesel-generator unit An independent source of standby electrical power that consists of a diesel-fueled internal combustion engine (or engines) coupled directly to an electrical generator (or generators); the associated mechanical and electrical auxiliary systems; and the control, protection, and surveillance systems. (PE/NP) 387-1995

DIF *See:* data interchange format.

difference (1) (mathematics of computing) The result of a subtraction operation. (C) 1084-1986w

(2) **(data management)** A relational operator that combines two relations having identical attributes and results in a relation containing the tuples that are in the first but not the second relation. *Synonyms:* set difference; minus. *See also:* join; projection; union; selection; product; intersection.



difference

(C) 610.5-1990w

difference amplifier *See:* differential amplifier.

stated ambient temperature as the equipment standard specifies based on experience or accepted test data. This system may alternatively contain materials of any class, provided that experience or a recognized test procedure for the equipment has demonstrated equivalent life expectancy. The preferred temperature classification for a Class H insulation system is 180°C. *Class N.* A system utilizing materials having a preferred temperature index of 200 and operating at such temperature rises above stated ambient temperatures as the equipment standard specifies based on experience or accepted test data. This system may alternatively contain materials of any class, provided that experience or a recognized test procedure for the equipment has demonstrated equivalent life expectancy. The preferred temperature classification for a Class N insulation system is 200°C. *Class R.* A system utilizing materials have a preferred temperature index of 220 and operating at such temperatures above stated ambient temperatures as the equipment standard specifies based on experience or accepted test data. This system may alternatively contain materials of any class, provided that experience or a recognized test procedure for the equipment has demonstrated equivalent life expectancy. The preferred temperature classification for a Class R insulation system is 220°C. *Class S.* A system utilizing materials having a preferred temperature index of 240 and operating at such temperatures above stated ambient temperatures as the equipment standard specifies based on experience or accepted test data. This system may alternatively contain materials of any class, provided that experience or a recognized test procedure for the equipment has demonstrated equivalent life expectancy. The preferred temperature classification for a Class S insulation system is 240°C.

(PE/EM) 117-1974r

(4) An assembly of one or more dielectric materials used in a functional mode in the design of an electrical component or equipment, including adjacent components that may influence aging.

(DEI/RE) 775-1993w

(5) An assembly of insulating materials in association with the conductors and the supporting structural parts. All of the components described below that are associated with the stationary winding constitute one insulation system, and all of the components that are associated with the rotating winding constitute another insulation system.

— *Coil insulation with its accessories.* All of the insulating materials that envelop and separate the current-carrying conductors and their component turns and strands, and form the insulation between them and the machine structure; includes wire coating, varnish, encapsulants, slot insulation, slot fillers, tapes, phase insulation, polebody insulation, and retaining ring insulation when present.

— *Connection and winding support insulation.* All of the insulation materials that envelop the connections that carry current from coil to coil, and from stationary or rotating coil terminals to the points of external circuit attachment; and the insulation of any metallic supports for the winding.

— *Associated structural parts (insulation system).* Items such as slot wedges, space blocks, and ties that are used to position the coil ends and connections; any nonmetallic supports for the winding; and field-coil flanges.

— *Insulation class.* Divided into classes according to the thermal endurance of the system for temperature rating purposes. NEMA classes of insulation systems used in motors include Classes A, B, F, and H. These classes have been established in accordance with IEEE Std 1-1986. Other classes of insulation are constantly being developed for such use.

Insulation systems shall be classified as follows:

1) *NEMA Class A.* An insulation system (105°C temperature limit including a 40°C ambient or 65°C rise) that by experience or accepted test can be shown to have suitable thermal endurance when operating at the limiting Class A

temperature specified in the temperature rise standard for the machine under consideration.

2) *NEMA Class B.* An insulation system (130°C temperature limit including a 40°C ambient or 90°C rise) that by experience or accepted test can be shown to have suitable thermal endurance when operating at the limiting Class B temperature specified in the temperature rise standard for the machine under consideration.

3) *NEMA Class F.* An insulation system (155°C temperature limit including a 40°C ambient or 115°C rise) that by experience or accepted test can be shown to have suitable thermal endurance when operating at the limiting Class F temperature specified in the temperature rise standard for the machine under consideration.

4) *NEMA Class H.* An insulation system (180°C temperature limit including a 40°C ambient or 140°C rise) that by experience or accepted test can be shown to have suitable thermal endurance when operating at the limiting Class H temperature specified in the temperature rise standard for the machine under consideration.

(IA/PC) 1068-1996

(6) A system composed of solid insulating materials and insulating fluid. *Synonym:* system. (PE/TR) 1276-1997

(7) An assembly of insulating materials in a particular type of equipment. The class of the insulation system may be designated by letters, numbers, or other symbols. An insulation system class utilizes material having an appropriate temperature index and operates at such temperatures above stated ambient temperatures as the equipment standard specifies based on experience or accepted test data. The system may alternatively contain materials of any class, provided that experience or a recognized test procedure for the equipment has demonstrated equivalent life expectancy.

(IA/MT) 45-1998

insulation, thermal *See:* thermal insulation.

insulator (1) A device intended to give flexible or rigid support to electrical conductors or equipment and to insulate these conductors or equipment from ground or from other conductors or equipment. An insulator comprises one or more insulating parts to which connecting devices (metal fittings) are often permanently attached. (SWG/PE) C37.100-1981s

(2) Insulating material in a form designed to support a conductor physically and electrically separate it from another conductor or object. (NESC/T&D) C2-1997, C2.2-1960

(3) A device made of a material in which electrons or ions cannot be moved easily, hence preventing the flow of electric current. (C) 610.10-1994w

insulator arcing horn A metal part, usually shaped like a horn, placed at one or both ends of an insulator or of a string of insulators to establish an arcover path, thereby reducing or eliminating damage by arcover to the insulator or conductor or both. *See also:* tower. (T&D/PE) [10]

insulator arcing ring A metal part, usually circular or oval in shape, placed at one or both ends of an insulator or of a string of insulators to establish an arcover path, thereby reducing or eliminating damage by arcover to the insulator or conductor or both. *See also:* tower. (T&D/PE) [10]

insulator arcing shield (insulator grading shield) An arcing ring so shaped and located as to improve the voltage distribution across or along the insulator or insulator string. *See also:* tower. (T&D/PE) [10]

insulator arcover A discharge of power current in the form of an arc, following a surface discharge over an insulator. *See also:* tower. (T&D/PE) [10]

insulator cover Electrical protection equipment designed specifically to cover insulators. Examples: dead-end cover, pole-top cover, ridge-pin cover *Synonyms:* hood; pocketbook. *See also:* cover-up equipment. (T&D/PE) 516-1995

insulator grading shield *See:* insulator arcing shield.

insulator lifter A device designed to permit insulators to be lifted in a string to their intended position on a structure. *Synonyms:* insulator saddle; potty seat.

(T&D/PE) 524-1992r