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Introduction

IEEE standards establish an authoritative common language that defines quality and sets technical criteria. By guaranteeing consistency and conformity through open consensus, IEEE standards add value to products, facilitate trade, drive markets, and ensure safety. That's why leading companies, organizations, and industries around the globe rely on them.

Critical components of this common language are the terms and definitions that are at the foundation of the vast body of IEEE standards. In the past decade alone, hundreds of terms—describing the latest tools, techniques, and best practices—have been added to the lexicon of IEEE standards.

In this newly updated *Authoritative Dictionary of IEEE Standards Terms*, professional experts and students alike will gain an in-depth understanding and appreciation for the breadth of coverage of IEEE standards terms and definitions not found in any other single source.

The seventh edition of IEEE 100 has been revised to include nearly 35 000 technical terms and definitions from over 800 standards—covering areas such as power and energy, communications, information technology, and transportation systems. In addition to an extensive list of widely used acronyms and abbreviations, this new edition also contains detailed abstracts of each term's associated standard(s). What's more, all definitions are augmented by a combination of indispensable information, including:

- ◆ Preferred and popular usage of each term
- ◆ Variations in meanings among different technical specialties
- ◆ Cross-indexing to related works
- ◆ Key explanatory notes for further term clarification

In preparing this latest edition of the Dictionary, we realized that the standards community desired more than just a compilation of IEEE standardized terms and definitions. They needed an authoritative resource created by the organization that develops and produces the standards from which the terms and definitions are derived—the IEEE. In addition, we determined the Dictionary needed to be not only user friendly, but also rich in information. In other words, it needed to be the *Authoritative Dictionary of IEEE Standards Terms*.

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slaves. The protocols of the VSB are fully asynchronous. The active master asserts a strobe signal indicating that a cycle is in progress. The responding slave acknowledges the master's signal. However, the responding slave can delay its acknowledgment for as long as it needs. The DTB cycle is generally divided into three phases: an address broadcast, zero or more data transfers, and then cycle termination.

(C/MM) 1096-1988w

V-series (ITU-TSS) A CCITT family of recommendations describing the connection of digital equipment to the analog public telephone network. (C) 610.7-1995, 610.10-1994w

VSWR *See:* voltage standing-wave ratio.

VT *See:* vertical tabulation character; voltage transformer.

V_{term} Terminator source voltage to be maintained under all load conditions. (C/BA) 896.2-1991w

V-terminal voltage Terminal voltage measured with a V network between each mains conductor and earth. *See also:* electromagnetic compatibility. (EMC/INT) [53], [70]

V2F A transaction that is originated at the VME64 (the Bridge acts as a VME64 slave), and has its destination at the Futurebus+ (the Bridge acts as a Futurebus+ master). (C/BA) 1014.1-1994w

vu (volume measurements of electrical speech and program waves) (pronounced "vee-you" and customarily written with lower case letters.) A quantitative expression for volume in an electric circuit. *Notes:* 1. The volume in vu is numerically equal to the number of decibels (dB) which expresses the ratio of the magnitude of the waves to the magnitude of reference volume. 2. The term vu should not be used to express results of measurements of complex waves made with devices having characteristics differing from those of the standard volume indicator. *See also:* standard volume indicator. (BT/AV) 152-1953s

vulnerability (surge testing for equipment connected to low-voltage ac power circuits) The characteristic of a device for being damaged by an external influence, such as a surge. (SPD/PE) C62.45-1992r

VXIbus VMEbus extensions for instrumentation.

(C/MM) 1155-1992

VXIbus instrument A message-based device that supports the VXIbus instrument protocols. (C/MM) 1155-1992

VXIbus subsystem A central timing module referred to as Slot 0, with up to 12 additional adjacent VXIbus modules. The VXIbus subsystem bus defines the lines on the P2 and P3 connectors. (C/MM) 1155-1992

W

WADEX See: word and author index.

wait (test, measurement, and diagnostic equipment) A programmed instruction that causes an automatic test system to remain in a given state for a predetermined period. (MIL) [2]

waiting, call See: call waiting.

waiting-passenger indicator (elevators) An indicator that shows at which landings and for which direction elevator-hall stop or signal calls have been registered and are unanswered. (EEC/PE) [119]
See also: control.

wait packet A packet with four high flags and four undefined data bytes, typically output by the controller after a *standBy* packet has been output. (C/MM) 1596.4-1996

wait state A condition in which a device or component is idle; for example, a central processor that is waiting for some event and not executing instructions. (C) 610.10-1994w

wait timeout period The time a master will wait after recognizing WT (wait) before terminating the connection. (NID) 960-1993

waiver (1) (nuclear power quality assurance) Documented authorization to depart from specified requirements. (PE/NP) [124]

(2) (software) A written authorization to accept a configuration item or other designated item that, during production or after having been submitted for inspection, is found to depart from specified requirements, but is nevertheless considered suitable for use as is or after rework by an approved method. Contrast: deviation; engineering change. See also: configuration control. (C) 610.12-1990

wake packet A packet with two low and two high flags as well as four undefined data bytes, typically generated by the processing of idle packets when leaving the *standBy* mode. (C/MM) 1596.4-1996

walk (1) (shaped pulse) The change in a timing point that occurs when the pulse height changes. (NPS) 300-1988r

(2) (in a pulse) The change in the timing (with respect to the initiating event) of a reference point on a pulse caused by a change in pulse amplitude. (NPS) 325-1996

walkie-talkie A two-way radio communication set designed to be carried by one person, usually strapped over the back, and capable of operation while in motion. See also: radio transmission. (EEC/PE) [119]

walk-off mode (laser maser) A mode characterized by successive shifts per reflection in the location of a maximum in the transverse field intensity. See also: transverse mode. (LEO) 586-1980w

walkout of reverse drain breakdown (metal-nitride-oxide field-effect transistor) An effect where the reverse current/voltage characteristic of the drain junction changes with time toward larger voltages as a function of applied bias. This effect is generally reversible. (ED) 581-1978w

walk-through (1) (software) A static analysis technique in which a designer or programmer leads members of the development team and other interested parties through a segment of documentation or code, and the participants ask questions and make comments about possible errors, violation of development standards, and other problems. (C) 610.12-1990

(2) A static analysis technique in which a designer or programmer leads members of the development team and other interested parties through a software product, and the participants ask questions and make comments about possible errors, violation of development standards, and other problems. (C/SE) 1028-1997

wall bushing (1) A bushing intended primarily to carry a circuit through a wall or other grounded barrier in a substantially horizontal position. Both ends must be suitable for operating in air. See also: bushing. (Std100) 49-1948w

(2) A bushing intended to be mounted on the wall (roof) of a building such as a Converter Valve Hall. Note: A wall or roof bushing may be outdoor, outdoor-indoor, or indoor bushing. (PE/TR) C57.19.03-1996

wall clock A clock that is on the wall. Note: A wall clock is typically referred to in order to demonstrate the difference between system time and real time. Synonym: wall time. See also: time-of-day clock. (C) 610.10-1994w

wall-mounted oven An oven for cooking purposes designed for mounting in or on a wall or other surface and consisting of one or more heating elements, internal wiring, and built-in or separately mountable controls. See also: counter-mounted cooking unit. (NESC/NEC) [86]

wall telephone set A telephone set arranged for wall mounting. See also: telephone station. (EEC/PE) [119]

wall time See: wall clock.

WAN See: wide area network.

wander (telecommunications) The long-term variations of the significant instants of a digital signal from their ideal position in time. The phrase "long-term" implies that these variations are of low frequency, less than 10 Hz. See also: scintillation. (COM/TA) 1007-1991r

wanted signal A signal that constitutes the object of the particular measurement or reception. (T&D/PE) 539-1990

warble-tone generator (alarm monitoring and reporting systems for fossil-fueled power generating stations). An audio-frequency oscillator, the frequency of which is varied cyclically at a subaudio rate over a fixed range. (PE/EDPG) 676-1986w

war game (computer graphics) A simulation game in which participants seek to achieve a specified military objective given preestablished resources and constraints; for example, a simulation in which participants make battlefield decisions and a computer determines the results of those decisions. See also: management game. (C) 610.3-1989w

warm-start A sequence of events performed to reset a running system. (C/MM) 1296-1987s

warm-up time (1) (power supplies) The time (after power turn on) required for the output voltage or current to reach an equilibrium value within the stability specification. (AES) [41]

(2) (nuclear power generating station) The time, following power application to a module, required for the output to stabilize within specifications. (PE/NP) 381-1977w

(3) (accelerometer) (gyros) The time interval required for a gyro or accelerometer to reach specified performance from the instant that it is energized, under specified operating conditions. (AES/GYAC) 528-1994

warning Advisory in a software user document that performing some action will lead to serious or dangerous consequences. Contrast: caution. (C/SE) 1063-1987r

warning whistle See: audible cab indicator.

WAROM See: word-alterable read-only memory.

warp (navigation aids) (loran) Variations of the propagation times for loran signals due to the variations of conductivity over land. Causes errors in the determination of absolute position. (AES/GCS) 172-1983w

washer See: collar.

Washington See: snatch block.

watchdog timer (1) (supervisory control, data acquisition, and automatic control) (station control and data acquisition) A form of interval timer that is used to detect a possible malfunction. (SWG/PE/SUB) C37.1-1987s, C37.100-1992

(2) A timer that prevents a computer program from looping endlessly or becoming idle because of program errors or equipment faults. Note: This is typically implemented by resetting the computer if the timer is not refreshed often enough. (C) 610.10-1994w

watchman's reporting system A supervisory system arranged for the transmission of a patrolling watchman's regularly recurrent report signals to a central supervisory agency from stations along his patrol route. *See also:* protective signaling. (EEC/PE) [119]

water-air-cooled machine A machine that is cooled by circulating air that in turn is cooled by circulating water. *Note:* The machine is so enclosed as to prevent the free exchange of air between the inside and outside of the enclosure, but not sufficiently to be termed airtight. It is provided with a water-cooled heat exchanger for cooling the ventilating air and a fan or fans, integral with the rotor shaft or separate, for circulating the ventilating air. *See also:* asynchronous machine. (PE) [9]

water-blocking tape A nonwoven synthetic tape impregnated with a swellable powder. Also called a water-swellable tape. Such tapes may also provide cushioning to absorb expansion of the cable core and may also be semiconducting. (PE/IC) 1142-1995

water conditions *See:* median water conditions; adverse water conditions; average water conditions.

water-cooled (A) (rotating machinery) A term applied to apparatus cooled by circulating water, the water or water ducts coming in direct contact with major parts of the apparatus. **(B) (rotating machinery)** In certain types of machine, it is customary to apply this term to the cooling of the major parts by enclosed air or gas ventilation, where water removes the heat through an air-to-water or gas-to-water heat exchanger. *See also:* asynchronous machine. (PE) [9]

water cooler (rotating machinery) A cooler using water as one of the fluids. (PE) [9]

water failure A failure in the active, shielded cable length that is below the waterline and which did not occur as a result of mechanical damage. (PE/IC) 1407-1998

waterfall model (software) A model of the software development process in which the constituent activities, typically a concept phase, requirements phase, design phase, implementation phase, test phase, and installation and checkout phase, are performed in that order, possibly with overlap but with little or no iteration. *Contrast:* spiral model; rapid prototyping; incremental development. (C) 610.12-1990

waterflow-alarm system (protective signaling) An alarm system in which signal transmission is initiated automatically by devices attached to an automatic sprinkler system and actuated by the flow through the sprinkler system pipes of water in excess of a predetermined maximum. *See also:* protective signaling. (EEC/PE) [119]

water hazard The abnormal presence of a quantity of water, either in the form of condensation, accumulation, flow, or spray; not postulated to be associated with any design basis event; and considered likely to cause the loss of desired function of electric equipment in nuclear power plants if it enters such equipment. (PE/NP) 833-1988r

water inertia time (hydraulic turbines) A characteristic time, usually taken at rated conditions, due to inertia of the water in the water passages from intake to exit defined as:

$$T_w = \frac{Q_r}{gH_r} \int \frac{dL}{A} \approx \frac{Q_r}{gH_r} \sum \frac{L}{A}$$

where

A = area of each section

L = corresponding length

Q_r = rated discharge

H_r = rated head

g = acceleration due to gravity

(PE/EDPG) 125-1977s

waterline failure A failure at the interface between air and the tank water to include the distance of the total water line variation. (PE/IC) 1407-1998

water load (high-frequency circuits) A matched termination in which the electromagnetic energy is absorbed in a stream of water for the purpose of measuring power by continuous-

flow calorimetric methods. *See also:* waveguide.

(AP/ANT) [35], [84]

Waterloo FORTRAN A programming language based on FORTRAN, characterized by its fast compilation, excellent diagnostic messages and debugging aids. *See also:* WATFIV. (C) 610.13-1993w

Waterloo FORTRAN V (WATFIV) An extension of WATFOR characterized by additional simplifications in the control (test and looping) constructs and the input/output structure. (C) 610.13-1993w

water-motor bell A vibrating bell operated by a flow of water through its water-motor striking mechanism. *See also:* protective signaling. (EEC/PE) [119]

waterproof electric blasting cap A cap specially insulated to secure reliability of firing when used in wet work. *See also:* blasting unit. (EEC/PE) [119]

waterproof enclosure An enclosure constructed so that any moisture or water leakage that may occur into the enclosure will not interfere with its successful operation. In the case of motor or generator enclosures, leakage that may occur around the shaft may be considered permissible provided it is prevented from entering the oil reservoir and provision is made for automatically draining the motor or generator enclosure. (IA/MT) 45-1998

waterproof machine (rotating machinery) A machine so constructed that water directed on it under prescribed conditions cannot cause interference with satisfactory operation. *See also:* asynchronous machine. (PE) [9]

water resistivity Resistance of water is expressed in Ω cm or Ω in. (T&D/PE) 957-1995

watertight (1) So constructed that moisture will not enter the enclosure. (NESC/NEC) [86]

(2) (power and distribution transformers) So constructed that water will not enter the enclosing case under specified conditions. *Note:* A common form of specification for watertight is: "So constructed that there shall be no leakage of water into the enclosure when subjected to a stream from a hose with a one-in nozzle and delivering at least 65 gal/min, with the water directed at the enclosure from a distance of not less than 10 ft for a period of five min, during which period the water may be directed in one or more directions as desired." (PE/TR) C57.12.80-1978r

watertight door-control system A system of control for power-operated watertight doors providing individual local control of each door and, at a remote station in or adjoining the wheelhouse, individual control of any door, collective control of all doors, and individual indication of open or closed condition. *See also:* marine electric apparatus. (EEC/PE) [119]

watertight enclosure An enclosure constructed so that a stream of water from a hose not less than 25 mm (1 in) in diameter under a head of 10 m (35 ft) from a distance of 3 m (10 ft) can be played on the enclosure from any direction for a period of 15 min without leakage. The hose nozzle shall have a uniform inside diameter of 25 mm (1 in). (IA/MT) 45-1998

water treatment equipment (thyristor) Any apparatus such as deionizers, electrolytic targets, filters, or other devices employed to control electrolysis, corrosion, scaling, or clogging in water systems. (IA/IPC) 428-1981w

water vapor The amount of water in parts per million by volume that is in the gaseous state and mixed with the insulating gas. Water vapor content may vary with temperature. *Synonym:* moisture content. (SWG/PE) C37.100-1992

water vapor content The amount of water in parts per million by volume (ppmv) that is in the gaseous state and mixed with the insulating gas. *Synonym:* moisture content. (SWG/SUB/PE) C37.122-1993, C37.122.1-1993, C37.100-1992

WATFIV *See:* Waterloo FORTRAN V.

WATS *See:* wide area telecommunications service.

watt (W) (1) (general) The unit of power in the International System of Units (SI). The watt is the power required to do