NATIONAL BUREAU OF STANDARDS REPORT

5461

A GLOSSARY OF TERMS APPLICABLE IN THE SCIENCE OF FIRE PROTECTION

by

C. S. McCamy

U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

THE NATIONAL BUREAU OF STANDARDS

Functions and Activities

The functions of the National Bureau of Standards are set forth in the Act of Congress, March 3, 1901, as amended by Congress in Public Law 619, 1950. These include the development and maintenance of the national standards of measurement and the provision of means and methods for making measurements consistent with these standards; the determination of physical constants and properties of materials; the development of methods and instruments for testing materials, devices, and structures; advisory services to Government Agencies on scientific and technical problems; invention and development of devices to serve special needs of the Government; and the development of standard practices, codes, and specifications. The work includes basic and applied research, development, engineering, instrumentation, testing, evaluation, calibration services, and various consultation and information services. A major portion of the Bureau's work is performed for other Government Agencies, particularly the Department of Defense and the Atomic Energy Commission. The scope of activities is suggested by the listing of divisions and sections on the inside of the back cover.

Reports and Publications

The results of the Bureau's work take the form of either actual equipment and devices or published papers and reports. Reports are issued to the sponsoring agency of a particular project or program. Published papers appear either in the Bureau's own series of publications or in the journals of professional and scientific societies. The Bureau itself publishes three monthly periodicals, available from the Government Printing Office: The Journal of Research, which presents complete papers reporting technical investigations; the Technical News Bulletin, which presents summary and preliminary reports on work in progress; and Basic Radio Propagation Predictions, which provides data for determining the best frequencies to use for radio communications throughout the world. There are also five series of nonperiodical publications: The Applied Mathematics Series, Circulars, Handbooks, Building Materials and Structures Reports, and Miscellaneous Publications.

Information on the Bureau's publications can be found in NBS Circular 460, Publications of the National Bureau of Standards ($1.25) and its Supplement ($0.75), available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Inquiries regarding the Bureau's reports should be addressed to the Office of Technical Information, National Bureau of Standards, Washington 25, D. C.

NATIONAL BUREAU OF STANDARDS REPORT

NBS PROJECT		NBS REPORT
1002-30-4873	September 17, 1957	5461

A GLOSSARY OF TERMS APPLICABLE IN THE SCIENCE OF FIRE PROTECTION

by
C. S. McCamy

U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

A GLOSSARY OF TERMS APPLICABLE IN THE SCIENCE OF FIRE PROTECTION

ABSTRACT

A glossary is presented of terms used in the application of the science of fire protection.

PREFACE

Since prehistoric times man has sought to protect himself from the ravages of uncontrolled fire. In spite of the great progress that has been made toward greater security in this respect and the amount of attention this subject has received, there remains a general lack of uniformity and precision in the terminology of fire protection science. It is the object here, to formulate definitions of some of the terms applicable in this science.

In dealing with definitions it must be recognized that there are different kinds of definitions for different purposes. Descriptive definitions describe the present or past use of words. Such definitions are statements of fact, the truth of which can, in principle at least, be ascertained by comparing the stated definitions with observed usage. Prescriptive definitions, on the other hand prescribe the meanings of words. These definitions are not statements of fact, but are of the nature of invitations, commands, or conventions to employ words in specified ways and, therefore, can neither be true nor false.

One of the fundamental tasks of science is the development of clear and precise concepts and terminology. A major part of this task is the formulation and acceptance of prescriptive definitions. Although it may seem that a definition is "all a matter of words", it is an inescapable fact that the precise boundaries of the quantities to be treated in a given science are set down in the definitions of the names of those quantities. In the final analysis, the meaning of every hypothesis, theory, and statement of fact depends upon the definitions of the terms in which it is expressed.

Although prescriptive definitions may be neither true nor false, they may be good or bad according to how useful they can be in simplifying and systematizing statements of fact and theoretical propositions. Definitions of this kind must be judged, first of all, on the basis of usefulness. To be useful, the various definitions employed in a given area of science must, of course, be consistent with one another. There are obvious advantages to be gained by choosing definitions consistent with those already accepted in allied fields of science. In fact, it may be well worth while to seek a formal correspondence between the system of quantities and terms to be used and some existing system. If a complete formal correspondence exists between the mathematical relationships among quantities in the two systems, the whole mathematical treatment of the prior system may be applied to the subsequent system. The analogy between the classical dynamics of a damped harmonic oscillator and the electrical theory of a series R-L-C circuit is one of the better known examples of this concept. The correspondence in this case has for many years been usefully employed in solving problems. This principle of analogy is the basic principle of operation of a large class of computing machines.

Although, in principle, prescriptive definitions may be established quite arbitrarily, capricious disregard for existing general usage could bring about more confusion than clarification. In most cases, the best interests of science are served by choosing terms in general use and giving them useful technical meanings differing from the usual meanings mainly in precision and objectivity. As a general rule, this is the intended approach here.

General usage continually evolves in various ways. So it is with technical usage; as concepts develop and the qualities of nature become better known, the meanings of terms must be refined. Thus, it is not with the thought of ending the matter of definitions that the following terms have been defined, but rather with the hope of establishing a reasonable point of departure.

A GLOSSARY OF TERMS APPLICABLE IN THE SCIENCE OF FIRE PROTECTION

arc, n.
a sustained luminous electrical discharge formed when a break is made in an electric circuit which is carrying current.

burn, v.
intransitive: to undergo a persisting destructive change in essential properties as a result of high temperature or combustion

transitive: to cause something to burn in the sense defined above

burnable, adj.
capable of being burned under the stated or implied conditions

burning, n.
an instance of something being burned

burnt, adj.
having been burned

chain breaking, ∩.
the process of terminating the sequence of reactions involved in a chain reaction, usually by removing or modifying the chain carriers, the agents produced during the reaction and necessary for completion of the reaction

chain reaction, ∩.
a reaction in which one or more of the agents necessary to the reaction is produced by the reaction so as to permit like reactions

combustible, adj.
capable of undergoing combustion under the stated or implied conditions

combustion, n.
a chemical process, usually of a complex nature, which occurs mainly in the gas phase and which liberates energy, at a high rate in part by heat or light; an oxidation process is usually involved

explosive, n.
an explosive is a material which is capable of suddenly liberating the energy which it contains, causing a sudden increase in pressure or movement of matter in the surrounding medium.

fire, n.
burning regarded generally as a destructive agency

fire endurance, n.
the time period during which a structure resists fire according to a specified criterion and under specified conditions.

fireproof, adj.
capable of withstanding the effects of fire

Note: Since no known materials fulfill this defined and generally understood meaning, under all conditions, the use of this term is to be discouraged.

fire resistance, n.
the extent to which a material or structure resists the effects of fire

fire resistive, adj.
fire resistant, the preferable term

fire retardant, adj.
tending to retard the effects of fire to a lower degree than materials classified as fire resistant.

flame, n.
a body of gas or of matter in gaseous suspension undergoing combustion and usually emitting light as a consequence

flameproof, adj.
not being readily ignited by a flame nor able to propagate flame under the stated or implied conditions

flame propagation, n.
the movement of the combustion zone with respect to the unburnt gaseous fuel

Note 1: The combustion zone may be fixed with respect to other objects such as a burner or flame-holder.

Note 2: The movement of the boundary of the flame zone with respect to the solid or liquid fuel is called "flame spread."

flame spread, n.
the movement of the boundary of the flame zone with respect to the solid or liquid fuel

flammable, adj.
capable of supporting vigorous combustion and of being easily ignited under normal conditions

Note: Because of the possibility of confusion of the meanings of the prefix "in-", the term "inflammable" is not to be used.

fuel, n.
1) matter which undergoes exothermic reaction in a fire, thereby contributing a destructive effect

2) matter consumed by combustion to produce heat of power

3) when a rocket propellant is composed of two separate materials (a bipropellant system), the two materials may be called the "fuel" and the "oxidant."

ignite, v.
to initiate combustion

ignition, n.
the initiation of combustion

noncombustible, adj.
not combustible

nonflammable, adj.
not flammable

resistance, n.
the opposition offered by a substance or body to being affected by or allowing the passage of a specific effective agency

retard, v., transitive
to delay or impede the action of a specific effective agency

spark, n.
1) electrical spark: a sudden electrical discharge of extremely short duration between two objects separated by air or some similar medium, resulting from a high potential gradient

2) fire spark: a small, isolated, glowing particle

3) mechanical spark: a small, isolated, glowing particle produced upon impact between hard objects.

U. S. DEPARTMENT OF COMMERCE
Sinclair Weeks, *Secretary*

NATIONAL BUREAU OF STANDARDS
A. V. Astin, *Director*

THE NATIONAL BUREAU OF STANDARDS

The scope of activities of the National Bureau of Standards at its headquarters in Washington, D. C., and its major field laboratories in Boulder, Colorado, is suggested in the following listing of the divisions and sections engaged in technical work. In general, each section carries out specialized research, development, and engineering in the field indicated by its title. A brief description of the activities, and of the resultant reports and publications, appears on the inside front cover of this report.

WASHINGTON, D. C.

Electricity and Electronics. Resistance and Reactance. Electron Tubes. Electrical Instruments. Magnetic Measurements. Dielectrics. Engineering Electronics. Electronic Instrumentation. Electrochemistry.

Optics and Metrology. Photometry and Colorimetry. Optical Instruments. Photographic Technology. Length. Engineering Metrology.

Heat and Power. Temperature Physics. Thermodynamics. Cryogenic Physics. Rheology and Lubrication. Engine Fuels.

Atomic and Radiation Physics. Spectroscopy. Radiometry. Mass Spectrometry. Solid State Physics. Electron Physics. Atomic Physics. Nuclear Physics. Radioactivity. X-rays. Betatron. Nucleonic Instrumentation. Radiological Equipment. AEC Radiation Instruments.

Chemistry. Organic Coatings. Surface Chemistry. Organic Chemistry. Analytical Chemistry. Inorganic Chemistry. Electrodeposition. Gas Chemistry. Physical Chemistry. Thermochemistry. Spectrochemistry. Pure Substances.

Mechanics. Sound. Mechanical Instruments. Fluid Mechanics. Engineering Mechanics. Mass and Scale. Capacity, Density, and Fluid Meters. Combustion Controls.

Organic and Fibrous Materials. Rubber. Textiles. Paper. Leather. Testing and Specifications. Polymer Structure. Organic Plastics. Dental Research.

Metallurgy. Thermal Metallurgy. Chemical Metallurgy. Mechanical Metallurgy. Corrosion. Metal Physics.

Mineral Products. Engineering Ceramics. Glass. Refractories. Enameled Metals. Concreting Materials. Constitution and Microstructure.

Building Technology. Structural Engineering. Fire Protection. Heating and Air Conditioning. Floor, Roof, and Wall Coverings. Codes and Specifications.

Applied Mathematics. Numerical Analysis. Computation. Statistical Engineering. Mathematical Physics.

Data Processing Systems. SEAC Engineering Group. Components and Techniques. Digital Circuitry. Digital Systems. Analogue Systems. Application Engineering.

• Office of Basic Instrumentation

• Office of Weights and Measures

BOULDER, COLORADO

Cryogenic Engineering. Cryogenic Equipment. Cryogenic Processes. Properties of Materials. Gas Liquefaction.

Radio Propagation Physics. Upper Atmosphere Research. Ionospheric Research. Regular Propagation Services. Sun-Earth Relationships.

Radio Propagation Engineering. Data Reduction Instrumentation. Modulation Systems. Navigation Systems. Radio Noise. Tropospheric Measurements. Tropospheric Analysis. Radio Systems Application Engineering.

Radio Standards. Radio Frequencies. Microwave Frequencies. High Frequency Electrical Standards. Radio Broadcast Service. High Frequency Impedance Standards. Calibration Center. Microwave Physics. Microwave Circuit Standards.


NBS