

Dictionary of Composite Materials Technology

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1,1-Dibutylurea A polymerizable substance, also known as N,N-dibutylurea. When copolymerized with simple urea and formaldehyde it yields thermoplastic resins.

Dicarboxylic Acids A family of organic acids containing two carboxylic ($-\text{COOH}$) groups. Those of greatest importance in the plastics industry are the adipic, azelaic, glutaric, pimelic, sebacic, and succinic acids and their esters, which are used in the production of alkyd and polyester resins.

Dication A doubly charged cation.

Dicetyl Ether A lubricant used on molds for processing plastics.

Dichloride An organic compound or inorganic salt containing two chlorine atoms.

Dichloromethane See METHYLENE CHLORIDE.

Dicing The process of cutting thermoplastic strands or sheets into pellets for further processing.

DICY Abbreviation for DICYANDIAMIDE.

Dicyandiamide (DICY) The widely used but incorrect name for the dimer of cyanamide, or cyanoguanidine, which is used mainly in the production of melamine, but also as a curing agent for epoxy resins.

Dicyclopentadiene A readily available olefin found in the off-streams of ethylene cracking units. See also DICYCLOPENTADIENE RESINS.

Dicyclopentadiene Resins A class of matrix resins used with structural reinforcements, e.g., with glass mat for truck parts.

Didecyl Ether A lubricant for plastics molding and processing.

DIDP Abbreviation for *di-isodecyl phthalate*.

Die (1) A steel block containing an orifice through which plastic is extruded, shaping the extrudate to the desired profile. See also EXTRUDER DIE. (2) The recessed block into which plastic material is injected or pressed, shaping the material to the desired form. The term *cavity* is more often used.

Die Blades In extrusion, deformable members attached to a die body which determine the slot opening and which are adjusted to produce uniform thickness across the film or sheet produced.

Die Cone See TORPEDO.

Die Cutting The process of cutting shapes from sheets of plastic by pressing a shaped knife edge into one or several layers of sheeting. The dies are often called steel rule dies, and pressure is applied by hydraulic or mechanical presses. Also known as *BLANKING* and *DINKING*.

Die, Extrusion An orifice placed at the exit end of extruder barrel through which the resin emerges and is formed.

Dielectric (1) A very weak conductor of electricity; the ability of a material to resist the flow of an electrical current. (2) In radio-frequency heating operations, the term is used for the material being heated.

Dielectric Absorption An accumulation of electrical charges within the body of an imperfect dielectric material when it is placed in an electrical field.

Dielectric Breakdown The voltage required to cause an electrical failure of breakthrough of the insulation.

Dielectric Constant (ϵ) (1) That property of a dielectric which determines the electrostatic energy stored per unit volume for unit potential. (2) The ratio of the capacity of a condenser having a dielectric material between the plates to that of the same condenser when the dielectric is replaced by a vacuum. Also known as *PERMITTIVITY* and *SPECIFIC INDUC-*

TIVE CAPACITY. It is expressed as:

$$\epsilon = \frac{C_p}{C_o} = \frac{Q}{C_o V}$$

Dielectric Curing Curing of a thermosetting resin by the passage of an electric charge, produced from a high-frequency generator, through the resin.

Dielectric Dissipation Factor The cotangent (or tangent) of the dielectric phase angle or the tangent of the dielectric loss angle, represented by the symbol δ .

Dielectric Failure The failure of an element in a dielectric circuit that exists when an insulating element becomes conducting.

Dielectric Heating The process of heating poor conductors of electricity (dielectrics) by means of high-frequency electrical currents. The thermoplastic composite to be heated forms the dielectric of a condenser to which is applied a high-frequency (20-to-80 mc) voltage. The heat is developed within the material rather than being brought to it from the outside, and hence the material is heated more uniformly throughout. Also known as *ELECTRONIC HEATING*, *RF HEATING*, *RADIO FREQUENCY HEATING*, *HIGH-FREQUENCY HEATING*. See also *MICROWAVE PROCESSING*.

Dielectric Heat Sealing A sealing process widely used for thermoplastics with sufficient dielectric loss, in which the film is dielectrically heated and pressed against another film by an applicator which serves as one element of a condenser. The other element comprises a platen. Frequencies employed range up to 200 mc per second, although those of 30 mc and below are most often used to avoid technical problems. See also *HEAT SEALING*.

Dielectric Loss A loss of energy which eventually produces a rise in temperature of a dielectric placed in an alternating electrical field.

Dielectric Loss Angle The difference between ninety (90) degrees and the dielectric phase angle. Also known as *DIELECTRIC PHASE DIFFERENCE*.

Dielectric Loss Factor The product of the dielectric constant and the tangent of the dielectric loss angle. Also known as *DIELECTRIC LOSS INDEX*.

Dielectric Loss Index See *DIELECTRIC LOSS FACTOR*.

Dielectric Loss Tangent The ease or difficulty with which molecular ordering occurs. Materials having a higher dielectric loss tangent have molecules which must move in an atmosphere of high viscosity.

Dielectric Phase Angle The angular difference in phase between the sinusoidal alternating potential difference applied to a dielectric and the component of the resulting alternating current having the same period as the potential difference. The angle is often symbolized by the Greek θ (theta), the cosine of which is the power factor.

Dielectric Phase Difference See *DIELECTRIC LOSS ANGLE*.

Dielectric Power Factor The cosine of the dielectric phase angle (or sine of the dielectric loss angle).

Dielectric Strength A measure of the voltage required to puncture a material, expressed in volts per mil of thickness. The voltage figure used is the average root-mean-square voltage gradient between two electrodes at which electrical breakdown occurs under prescribed conditions of test. It is expressed as volts at which an insulator breaks down, divided by the thickness in mils (0.001 in.).

Dielectric Test The application of a higher than rated voltage for a specified time, in order to determine the capability of insulating materials to withstand breakdown.