Glossary of Electrical Terminology

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arc resistance — The ability of a material to resist carbonizing when directly exposed to an arc. Commonly measured by its life in seconds in the ASTM D495 test. An important property in switch insulation.

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cantilever strength — The strength of a beam that is loaded at one end and supported at the other.

coefficient of thermal expansion — The fractional change in dimension of a material for a unit change in temperature.

composite — Is a combination of two or more materials, combined in such a way that individual materials are easily distinguishable. Most composites have both binders (matrix) and reinforcements.

corona — An electrical discharge caused by ionization of the gas surrounding a conductor when the voltage exceeds a certain critical value. Ozone is produced in an oxygen atmosphere and this attacks most electrical insulation.

creep distance — The distance along a surface of an insulator between one conductor and another.

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flashover vs. puncture (insulators) — A dielectric failure through the air around the insulator rather than through the insulation. A flashover failure is preferred when testing because it is nondestructive.

flexural strength — The strength of a material in bending. The load is applied to a beam supported at each end.

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IEC Tracking Test (Also Comparative Tracking Index) — A track test for low voltage applications (0 to 600 volts) that will discriminate between materials with low track resistance. All Glastic materials have the maximum value the test will measure.

Impact, notch Izod — A measure of how much energy is absorbed by a test specimen when broken by moving weight. This test relates to the brittleness of a material or its ability to withstand abuse.

impulse — A very short, high voltage potential applied to electrical equipment to simulate the effect of lightning or switching surges.

insulation resistance — The amount of leakage current that will flow through when a voltage is applied across a layer of insulation. It is determined by the voltage divided by the insulation resistance.

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laminate — A material made of layers bonded together.

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NEMA — National Electrical Manufacturers' Association

NEMA Standard Specification — In our context, NEMA Publication LI-1 covering industrial thermosetting laminates. Glastic makes laminates to meet industry-wide specifications GPO-1, -2, -3.

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oxygen index — A ranking of the ease of ignition of a material. A higher number means a greater percent of oxygen is necessary to make the material burn in a standard test.

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parallel electric strength — A measurement of the voltage necessary to cause a material to breakdown. Two holes are drilled through the material (usually two inches apart), electrodes are inserted, and the voltage is run up to breakdown. The material is stressed parallel to its laminations in the same way as it would be when components such as terminals are mounted on it.

permittivity — Indicates the ability of a material to store electrical energy when a voltage is applied to it. This may be considered a desirable property or an electrical loss depending on the application.

perpendicular electric strength (dielectric strength) — A measure of the maximum voltage that a material will withstand before breaking down. A material is sandwiched between two electrodes. If the sample is small, the air surrounding it may break down first, causing a flashover around the surface of the sample from one electrode to the other. To reduce this tendency, tests are frequently run in oil. The rate of rise of the voltage and how long it is applied are also important to the test and its results.

polyester, thermoset — A family of resins formed by the reaction of a dibasic organic acid and a polyhydric alcohol. Notable for fast cure, the unusual variety of processing methods available, and its combination of excellent physical, electrical, heat and chemical properties at reasonable cost. Particularly compatible with reinforcing glass fibers.

pultrusion — A continuous molding process for producing extrudable shapes with reinforced thermoset materials.

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specific gravity — The weight of a material compared to the weight of an equal volume of water.

strike distance —The shortest distance through the air from one conductor to another on a standoff insulator or bushing.

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temperature resistance — The ability of a material to maintain its properties at elevated temperatures.

thermal conductivity — The relative ability of a material to conduct heat.

thermoplastic — A plastic that can be formed or melted repeatedly when heated enough. The change with temperature is physical rather than chemical. Some examples are nylon, polycarbonate and polyethylene.

thermoset — A plastic that undergoes a non-reversible chemical reaction when it is cured. Subsequent heating will not melt it. Examples are polyester, phenolic, melamine, epoxy, and silicone.

track resistance, incline plane test — The ability of a material to resist the formation of a carbonized track when a high voltage is applied to it. Glastic uses the incline plane test (ASTMD 2303) for accelerated measurement of this property. Important when both the voltage and the surface leakage currents are high enough to effect some materials, particularly likely in wet and/or dirty conditions.

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Underwriters Laboratories — UL is an independent, non-profit testing organization for public safety.

UL flame resistance — The most widely used measurement of a material's ability to withstand high temperature before breaking into flame. There are many flame tests. The UL subject 94 flame test is perhaps the most widely used. There are three degrees of severity for thermosets, 94V-O, 94 V-1, 94 HB. 94 V-O indicates the most flame resistant materials.

UL indexing tests —The three major sources of electrically-caused fires are glowing wires, arcing parts, and tracking situations. The following tests rate materials in their resistance to these hazards: hot wire ignition, high amp arc ignition, and high voltage track rate.

UL temperature index — The temperature at which a material can be aged for 11,000 hours and have a physical or electrical property (usually flexural strength and dielectric strength respectively) reach half its original value.

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water absorption — (in an electrical insulation) Water absorption does not directly mean anything, but generally a material that absorbs little or no water will also be more dimensionally stable and have a smaller reduction of electrical properties when wet.

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