



U.S. LIGHTING & TRAFFIC

## GLOSSARY OF TERMS

## **A**

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### **AASHTO**

American Association of State Highway and Transportation Officials. Governing body responsible for the following pole specification: "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals."

### **ACORN NUT**

Decorative anchor bolt nut with enclosed rounded top.

### **AGENT**

Representative of manufactured products and responsible for communication, sales and service of customers within a specified region.

### **AISC**

American Institute of Steel Construction

### **ALLOWABLE STRESS**

Maximum permissible stress as defined by design criteria.

### **ALLOY**

A compound mixture consisting of one or more base elements (metal) to achieve desired physical or mechanical properties. Examples of different aluminum alloys are as follows:

**6063**: Standard pole and arm shaft material.

**4043**: Standard aluminum welding electrode.

**5356**: Standard aluminum welding electrode.

**6061**: Special pole and arm shaft material.

**356**: Standard flange base casting material.

### **ALUMINUM**

A silver-white non-ferrous metallic element whose features and physical properties include: a good resistance to temperature variations, high reflectivity, resistance to oxidation, ductility, light weight, and recyclable.

### **ANCHOR BASE**

See "Fixed Base"

### **ANCHOR BOLT**

Threaded steel rod embedded into concrete and used to connect the pole to the foundation.

### **ANODIZING**

The process of coating a metallic surface electrolytically. This process normally involves the combination of electrical current and chemical bath in which the material's surface or "skin" is altered to form a protective shield for the remaining material

**ANSI**

American National Standards Institute

**APPROVAL DRAWING**

Formal drawing submitted to customer for their review to determine acceptability of product.

**ARCHITECTURAL COATING**

Special finish coating designed to give the appearance of concrete, marble, granite or sandstone.

**ARGON**

Inert gas element utilized as a shielding component of "gas metal arc welding" (GMAW) or "metal inert gas welding" (MIG). Generally utilized when welding aluminum or like materials.

**ARM**

A single extension of any cross section used to mount a single fixture.

**ARM RISE**

The vertical distance from the center line of the simplex connection to the center line of the arm end.

**ARTIFICIAL AGING**

Process of heating and cooling a material in a controlled manner to develop desired mechanical properties. (See also heat treat).

**ASTM**

American Society for Testing and Materials

**ASTRO BRACKET**

Device used to attach a traffic signal to the pole or mast arm. Normally rigid mounted, but can also be free swinging.

**AWS**

American Welding Society

**AXIAL FORCE**

Force along the longitudinal axis of a member. When designing a foundation this figure relates to the weight of a structure plus any added devices or equipment.

**B**

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**BACK-UP-BAR**

Steel bar used to secure the handhole cover.

**BACK-UP-RING**

Steel ring used for full-penetration welded connections.

**BACKPLATE**

Border surrounding traffic signal heads.

**BANNER ARMS**

Two parallel pipe extensions bolted along the pole shaft used to mount a special banner.

**BASE COVER**

See "Full Base Cover"

**BASE FLANGE**

Cast component welding to the bottom of the pole shaft used to connect the structure to the foundation. (Also called base casting and shoe base).

**BASE PLATE**

Steel plate welded to the bottom of the pole shaft used to connect the structure to the foundation.

**BASE REACTIONS (POLE)**

Shear force, axial force, and bending moment occurring at the pole base, used for foundation design.

**BEARING PLATE**

Steel plate attached to the bottom of an anchor bolt designed to prevent bolt pull-out.

**BEND RADIUS**

The radial dimension corresponding to the curvature of a bent member, usually measured from the inside surface.

**BENDING MOMENT**

The product of a wind force or weight force multiplied by its distance from a section.

**BOLT**

Metal rod or pin used for fastening objects together that usually has a head at one end and a screw thread at the other.

**BOLT CHORD**

Dimension measured between two adjacent anchor bolts which do not intersect the center line of the foundation. This dimension may vary between each individual chord.

**BOLT CIRCLE**

Dimension measured from one anchor bolt to another which intersects the center line of the pattern. This dimension will remain equal for all bolts, regardless of quantity of bolts.

**BOLT COVER**

A decorative cast cover usually fastened to the base flange covering the anchor bolt.

**BOLT LOAD**

Force along the axis of a bolt.

**BOLT PROJECTION**

Length of anchor bolt extending above the foundation surface.

**BREAKAWAY COUPLING**

Device used to connect the pole to the anchor bolts, and designed to fracture when the pole is impacted by a vehicle. The main purpose being to assure passenger safety.

**BULLHORN**

Steel pipe formed with a 90 degree upward bend used to mount fixtures, speakers, cameras, etc.

**BUMP FORMED**

Method of manufacturing a flat steel plate into structural shape. The plate is bent by a brake press usually at equal spacings, forming the desired shape.

**BUTT WELD**

Circumferential weld joint used to connect two shaft sections or a shaft to a plate with or without a back-up ring.

American Institute of Steel Construction

**C**

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**C-HOOK**

Steel rod formed into shape of a "C" and used for wire support or handling purposes.

**C.B.C**

Canadian Building Code

**C.S.A**

Canadian Standards Association

**C.S.R.**

(Combined Stress Ratio) Summation of ratios of applied stresses over allowable stresses. Included stresses are bending, shear and axial.

**C.W.B.**

Canadian Welding Bureau

**CAD**

Computer-Aided Design

**CAGE PLATFORM**

A platform that consists of formed steel tubing, support angles and steel grating to safely support a service person and a cluster of lighting fixtures.

**CALCULATIONS**

Formal structural analysis to be presented to the customer, proving adequacy of the structure to the design criteria requirements.

**CAMBER**

Curving of sign structure chords, mast arms or poles during the manufacturing process. The curved displacement from center line is equal and opposite to the deflection expected in the field. The structure, therefore, appears straight after loads are applied.

**CANTILEVER**

Structure fixed at one end and free at the other. A pole is a vertical cantilever and a mast arm is a horizontal cantilever.

**CASTING**

Product which is manufactured by means of molding in a form with a molten alloy.

**CERTIFICATION**

A document containing a confirmation that the product and/or design meets or exceeds some specifically stated conditions.

**CITY SCAPE**

Unique design style in traffic control and lighting structures incorporating modular components.

**CLAMSHELL BASE**

A 2-piece shell base bolted around the pole base after installation.

**CLEARANCE**

The vertical distance from the roadway surface to the lowest point of an overhanging device.

**COATING**

Process of covering a product with one of or a combination of the following: galvanizing, painting and/or metallizing.

**COBRA HEAD**

Generic term for some street lighting fixtures.

**COIL MATERIAL**

Any steel which is rolled into coil form after processing from the mill.

**COMMISSION**

A fee paid to a representative for transacting a piece of business or performing a service.

**CONTROLLER CABINET**

Metal cabinet that houses components used to operate the electrical system. Components could include items such as terminal strips, timers, and circuit breakers.

**COR-TEN**

Trade name by United States Steel Company for high strength, low alloy, self-weathering steel. This material has enhanced atmospheric corrosion resistance when compared with ordinary carbon steels. The enhanced corrosion resistance may permit the use of t

**COUPLING**

Internally threaded steel fitting used for wiring access and attachment of controller cabinets, junction boxes or other related devices.

**CRITERIA**

A written specification used to control the design of a structure.

**CROSSARM**

A length of steel tubing or angle that attaches to a pole shaft with provisions for mounting a single row of lighting fixtures.

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**DAMPER**

Mechanical device used to eliminate or reduce harmonic vibrations. (See also vibration damper and harmonic vibrations).

**DAVIT**

Radial formed pole/luminaire arm.

**DEAD LOAD**

Total weight of structure and all added appurtenances.

**DEFLECTION**

Movement of the pole and/or arm, expressed as a displacement or rotation, resulting from dead loads or other applied loads.

**DERATE**

Recognizing a material's loss of physical or mechanical properties due to a manufacturing process such as welding.

**DIE CASTING**

The process where molten metal is forced under pressure into the cavity of a mold to form a desired shape such as a base flange or base casting.

**DRAG COEFFICIENT**

A numerical factor used in wind force calculations. This factor is applied to the projected area of a structural member, lighting fixture, traffic signal, or other component to account for its shape.

**DRILL PATTERN**

Layout of hole size and spacing for a given fixture.

**DUPLEX RECEPTACLE**

Electrical component generally used in conjunction with Valmont festoon box.

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**EFFECTIVE PROJECTED AREA (EPA)**

Area of a given fixture and/or structure resisting wind force (projected area x appropriate drag coefficient).

**ELEVATION**

The distance which something is above or below sea level, ground level or other referenced surface. (i.e., highway, foundation, etc.)

**ELLIPTICAL**

Having the shape of an oval.

**EMBEDDED POLE**

Pole fixed into concrete or compacted soil by means of an extended portion.

**EXTRUSION**

The process of forcing material through a die to form a desired cross-section shape.

**F**

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**FASTENER**

A part used to attach or secure two components together. (i.e., bolt, nut, screw, etc.)

**FERRULE**

See "Tenon"



**FESTOON BOX**

Enclosure welded to a structure to accommodate the mounting of an electrical component.

**FINIAL**

A sculptured ornament located at pole top or end of arm.

**FINIAL CAP**

Cast or spun decorative pole top cap.

**FINISH**

A protective and usually decorative coating applied to structures and their components. (i.e., galvanizing, prime painting, finish painting, etc.)

**FIXED BASE**

Type of pole-to-foundation attachment not designed to breakaway if impacted by a vehicle.

**FIXTURE**

A lighting fixture, which provides artificial light.

**FLOOD LIGHT**

A lighting unit for projecting a broad beam of light. Used in parking lots, sports fields, and other area lighting applications.

**FLUTING**

The formation of rounded grooves using rollers or other means to create a decorative motif on the shaft or column.

**FORCE**

Vector quantity that tends to produce stress and deflection in the structure to which it is applied.

**FOUNDATION**

The earth-embedded support element for a pole structure, normally consisting of concrete, steel reinforcing bars and anchor bolts.

**FRANGIBLE BASE**

Pole base that is designed to breakaway when struck by a vehicle. (See also "Breakaway Coupling", "Transformer Base" and "Slip Base")

**FULL BASE COVER**

Decorative shroud used to enclose the base plate and anchor bolts.

## **G**

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### **GALVANIZE**

A zinc coating applied by a hot dip process or other approved method.

### **GASKET**

A natural or synthetic rubber seal used between piece parts to prevent the intrusion of moisture.

### **GAUGE**

A whole number representing an equivalent decimal thickness. (i.e., 11 = 0.1196, 7 = 0.1793, 3 = 0.2391)

### **GROMMET**

A natural or synthetic rubber ring placed in drilled wireway holes to prevent chafing or damage to wires.

### **GROUNDING**

Provision on pole for connecting a cable which makes an electrical connection with the earth.

### **GROUT**

A mortar used for filling space between the bottom of the pole baseplate and the top of the foundation.

### **GUSSET**

Steel plate used to strengthen a welded connection.

### **GUST FACTOR**

A numerical factor, usually 1.3, applied to a constant wind velocity to account for an instantaneous outburst of wind

## **H**

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### **HANDHOLE**

Reinforced opening providing internal access to a structure.

### **HARMONIC VIBRATION**

A sustained back-and-forth motion of a member moving the same distance in opposite directions.

### **HEAT TREAT**

Process of heating and cooling a material in a controlled manner to develop different mechanical properties.

**HEIGHT COEFFICIENT**

A numerical factor applied to the design wind pressure to account for the increased wind pressure experienced due to smoother flow of air at higher elevations above ground.

**HIGH MAST**

Structures designed to light a large area by providing a point of fixture attachment higher than an average area lighting structure. A high mast pole is usually equipped with a lowering device system.

**HINGED POLE**

Structure design allowing ease of pole top access using a hinge by which the pole top can be lowered to ground level.

**I**

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**IMPACT ATTENUATOR**

A device used on a safety climbing cable to reduce the severity of the jolt encountered when a falling person reaches the end of the safety belt lanyard.

**ISOMETRIC DRAWING**

A drawing in which three faces of a solid object are shown with the lines parallel to the edges and drawn in true length.

**ISOTACH**

A line on a map connecting points of equal wind speed. A gust factor is usually applied to the isotach wind speed.

**J**

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**J-HOOK**

Steel rod formed into the shape of a "J" used for wire support or handling purposes.

**JACKING LUGS**

Steel nuts welded to a pole shaft to facilitate the process of slip fitting pole sections together.

**JAM POLE**

See "Laminated Shaft"

## **K**

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### **KEEPER PLATE**

A thin steel plate (usually 20, 22 or 28 gauge) used to keep the connecting bolts of a slip base assembly in place.

### **KIP**

Unit of measure equivalent to 1000 pounds.

### **KSI**

Kips per Square Inch

## **L**

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### **LAMINATED SHAFT**

Tapered steel tube resulting from firmly pressing together two separate tubes, one inside the other, to increase wall thickness.

### **LIGHTNING ROD**

Metallic rod attached to a pole structure creating a continuous conducting path to the ground to diminish the destructive effects of lightning.

### **LIQUID COAT**

Finish applied to a material in a liquid form.

### **LIQUIDATED DAMAGES**

The determination of liability by means of agreement or litigation as to the amount of indebtedness.

### **LMA**

Luminaire Mast Arm

### **LOCK WASHER**

A split washer used to prevent loosening by exerting pressure on a nut.

### **LOCKNUT**

A nut tightened down on another, or a nut so constructed that it locks itself when tightened. Both types are used to prevent loosening.

### **LOWERING DEVICE**

Apparatus capable of lowering fixtures to ground level for ease of maintenance.

### **LUG WASHER**

Steel plate washer used in transformer base connections.

**LUMINAIRE**

A complete lighting unit.

**M**

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**MAGNETIC PARTICLE INSPECTION**

A non-destructive method of detecting cracks and other discontinuities at or near the surface in ferromagnetic materials (ASTM E709).

**MANDREL FORMED**

The manufacturing process used to produce round tapered tubes by forming steel coil around a mandrel.

**MAST ARM**

The horizontal member of a structure typically used to support luminaries, traffic signals or roadway signs.

**MILD STEEL**

Comparatively soft and easily worked steel capable of being extended or shaped.

**MILL/MATERIAL CERTIFICATION**

An official document issued by the steel mill stating the physical and chemical properties of the material supplied.

**MOMENT**

A force multiplied by the distance to the point of rotation. (See "Bending Moment")

**MOMENT OF INERTIA**

Physical property of a structural cross section used in the calculations of stresses and deflections. It is the summation of the products of element areas, multiplied by the square of their distance from a referenced line.

**MOUNTING HEIGHT**

Vertical distance to a particular part of a pole structure. (i.e., luminaire mounting height)

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**NEMA**

National Electrical Manufacturers Association

**NEMA BOX**

An enclosure mounted to a pole used for breaker switches and terminal blocks. The name is derived from an enclosure being rated by the National Electrical Manufacturers Association.

**NIPPLE**

Externally threaded steel fitting used for wiring access and attachment of controller cabinets, junction boxes or other related devices.

**NUT COVER**

A decorative cast cover usually fastened to the pole covering the anchor bolt.

**NUT HOLDER**

A small bracket usually welded to the inside of a pole, designed to hold a 0.5 in. square nut used for grounding purposes.

**O**

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**O-RING**

A ring made from natural or synthetic rubber, used as an air-tight or water-tight seal.

**OBSTRUCTION LIGHT**

A light mounted on a structure to warn aircraft of its presence.

**OCTAGONAL POLE**

A pole having an eight-sided cross section.

**ONE-PIECE SLIPOVER BASE**

A one-piece shell base, which slips over the pole during installation.

**OPTICON**

Control device acting as a switch upon sensing motion or light.

**ORIENTATION**

The position of an appurtenance relative to the circumferential cross section of a pole/arm as measured in degrees from a reference point. (See also "Radial Index")

**OVERTURNING MOMENT**

Bending moment at the pole base used for foundation analysis. (See also "Bending Moment")

**OXIDATION**

The chemical reaction of a material when exposed to oxygen.

## **P**

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### **P.E.C**

Photo Electric Cell (See also "Opticon")

### **P.S.I.**

Pounds per Square Inch

### **PAINTING SYSTEM**

A series of processes involved in producing a desired finish.

### **PANEL BOX**

See "Controller Cabinet"

### **PARAPET**

A low retaining wall on a bridge or highway. Mounting poles on parapets usually requires special anchor bolt patterns.

### **PED POLE**

A pole designed to support pedestrian signal heads.

### **PIPE**

A hollow steel cylinder manufactured to a specific nominal inside diameter, wall thickness and yield strength.

### **PLANS**

The portion of the contract document that depicts the project requirements by the use of drawings or illustrations.

### **POLE**

The vertical member of a structure.

### **POLE TOP PLATE**

A steel plate mounted to the top of a pole.

### **POLYCARBONATE**

A lightweight thermoplastic that is used in the production of some traffic signal housings and back plates. Polycarbonate traffic signals have a high impact strength and are generally lighter in weight than a comparable aluminum traffic signal head.

### **POWDER COAT**

An electrostatically applied dry powder coating, oven-baked for a smooth, durable finish.

### **PRODUCTION DRAWING**

An illustration showing all of the details and information necessary to manufacture the product.

**PROJECTED AREA**

The surface area subjected to wind pressures.

**PROJECTION**

Length of anchor bolt protruding beyond the top of a foundation.

**R**

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**RADIAL INDEX**

An illustration showing the orientation of appurtenances. (See also "Orientation")

**RAKE**

The incline of a pole shaft from the vertical. A pole shaft is usually raked back to account for the deflection in the pole that will be caused by dead loads.

**REBAR**

Deformed steel reinforcing bar.

**RECORD DRAWING**

Formal drawing provided to customer showing final manufactured product.

**RIV-NUT**

Metal fastener serving as the female threaded portion of a bolted connection. This device is a blind nut which is very comparable in function to a household molley. Primarily used for luminaire arm attachment.

**S**

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**S.O. CHORD**

Sun and oil resistant electrical connection.

**SAFETY BELT**

Component of pole climbing device strapped around a person's body and attached to the safety cable.

**SAFETY CABLE**

Component of climbing device fixed at both ends of the pole structure providing attachment for the safety belt.



**SAG**

The distance a wire or cable droops from its attachment point. Usually expressed as a percentage of the span length.

**SBC**

Standard Building Code

**SECTION MODULUS**

Physical property of a structural cross section used in the calculation of stresses. The section modulus is the ratio of the moment of inertia to the farthest distance from the neutral axis.

**SETBACK**

Distance from the roadway edge to the location of the pole.

**SFBC**

South Florida Building Code

**SHEAR FORCE**

Force within a member that acts perpendicular to the axis of the member.

**SHOE BASE**

See "Fixed Base"

**SHOEBOX**

Slang term used for describing a rectangular shaped outdoor lighting fixture.

**SIGN STRUCTURE**

Structure designed to support signs, signals or other devices. These structures may be of the cantilever type or the bridge type.

**SIMPLEX CONNECTION**

A bolted flange connection rigidly attaching an arm to a pole shaft.

**SLEEVE**

An additional layer of steel wrapped around a specific area of a pole shaft serving one of two purposes: 1) enhancing corrosion resistance on embedded type poles at ground level; and 2) adding to, reinforcing, or replacing a pole's structural characteristics.

**SLIP BASE ASSEMBLY**

Device used to connect the pole to the anchor bolts, designed to breakaway when the pole is impacted by a vehicle. The main purpose being to assure passenger safety.

**SLIP FITTER**

A short piece of pipe/tube used as the internal portion of a connection.

**SLIP-FIT CONNECTION (pole/arm splice)**

A type of connection between two tapered shafts. The top section is designed to fit over the top of the lower section a specified distance, creating a tight friction connection.

**SLOPE**

As pertaining to deflection: angular deviation from a chosen line (usually the center line of the pole or arm) expressed in degrees or in inches per foot.

**SMA**

Signal Mast Arm

**SPAN WIRE POLE**

A pole used to support wires or cables from which traffic signals or signs are suspended. (Also called "Strain Pole")

**SPECIFICATIONS**

An organized listing of requirements for materials, products, design or testing. Specifications can be published nationally (i.e., AASHTO, ASTM, etc.); locally (i.e., state, city, county, etc.); or per project.

**SPINNING PROCESS**

Manufacturing process in which a straight non-tapered tube is spun about the longitudinal axis while forming bars and/or forming wheels produce a desired taper or shape.

**SPOKE ARM**

Luminaire mounting bracket designed with straight arms, with no upturn or upsweep from the point of attachment.

**STATIC LOAD**

A constant or non-varying load.

**STEPS**

Removable headed bolts fastened to pole shafts used for climbing.

**STRAIN**

Change in length of an object in one direction per unit of undisturbed length.

**STRAIN POLE**

See "Span Wire Pole"

**STRESS**

The internal force per unit area within a member, usually expressed in pounds per square inch (PSI).

**STRUCTURAL BASE**

A base welded to the shaft and contributes to the structural integrity of the pole.

## **T**

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### **TAMPER RESISTANT SCREW**

A screw with a specially designed head that requires a unique screw driver or wrench for removal or placement.

### **TAPER**

Continuous gradual reduction of a shaft's diameter along its length from base to top. Taper is usually expressed in inches of diameter per foot of length.

### **TAPPING**

The formation of an internal screw thread in a hole by means of a tap.

### **TEMPLATE**

A guide or pattern used for the proper placement of anchor bolts or drilled holes.

### **TENON**

Short length of pipe or tubing used to mount luminaries, signals or brackets.

### **TETHER**

A second wire on a span wire pole used to hold the bottom of signals or signs in place when being acted upon by a wind force. The addition of this second wire increases the stress in the pole support.

### **TORQUE**

The product of a force multiplied by the distance to the point of rotation causing a twisting action or twisting moment on a particular body. (See also "Torsional Moment")

### **TORSIONAL MOMENT**

Action of external forces causing twist in a structure. (See also "Torque")

### **TRANSFORMER BASE**

Steel or aluminum box-type assembly placed under a pole and used for wiring access or as a breakaway device (aluminum only).

### **TRANSMISSION POLE**

A pole structure designed to carry high voltage power lines over great distances.

### **TRUSS ARM**

Arm style that incorporates two main supporting members with one or more struts between them. This type of arm is most commonly used for Luminaire pipe arms that exceed eight foot in length.

### **TUBE**

Generic term used for hollow steel shafts.

**TURN OF THE NUT METHOD**

A method described in the AISC Steel Construction Manual for the proper method of tightening nuts on bolts.

**TURNKEY**

Responsibility of a single contractor or representative to supply and install materials completed and ready for operation for an entire project.

**U**

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**U-BOLT**

Type of bolt that is shaped in the form of a "U" and threaded on both ends.

**ULTRA COATING**

Finish coating system offered by Valmont that provides a maximum corrosion resistance finish and backed by a ten year warranty.

**UPRIGHT**

Slang term referring to the vertical pipe portion of a sports lighting cage.

**V**

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**VEHICLE POLE**

A pole designed to support vehicular and/or ped signal heads.

**VIBRATION DAMPER**

A device that is placed on or inside a pole or arm to reduce or prevent harmonic vibration caused by wind

**W**

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**WIND LOADING**

Live load pressures of wind acting on a structure.

**WIND SPEED**

Velocity of wind (MPH) noted either as a basic/isotach speed or as a gust/maximum velocity.

**WROUGHT ALLOY**

The compound mixture of base elements which form a material whose physical and mechanical properties favor wrought (beaten into shape) manufacturing processes.

## **X**

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### **XTREME™ BASE**

A base made of elastomeric polyurethane material. It may be either clamshell or slipover type base.

## **Y**

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### **YIELD**

The stress in a material at which plastic deformation occurs.

### **YIELD MOMENT**

The moment in a pole or arm that will cause the member to yield