

Glossary of Optical Terminology



A

Δ

Symbol for prism.

When following a number, it denotes the units known as prism diopters.

A

Horizontal dimension of the boxing system rectangle that encloses a lens or lens opening.

Accelerator

An additive to a polishing slurry that is used to increase the efficiency of the slurry.

Accurate sag formula

See *Formula, accurate sag*.

Actual power

See *Power, actual*.

Adapter, offset block

A small metal device used on a lens that has been blocked off center.

It is used for the purpose of transferring pressure back to the center of the lens so that unwanted prism may be avoided.

Add

See *Addition, near*.

Addition, near

The power that a lens segment has in addition to that power already present in the main portion of the lens.

Alignment, standard

An impersonal standard, independent of facial shape, for the alignment of spectacle frames.

Allowance, vertex power

The amount by which the front surface curvature of a lens must be flattened in order to compensate for a thickness-related gain in power

Angle, apical

The angle formed by the junction of two nonparallel prism surfaces.

Angle, effective diameter

The angle from the zero-degree side of the 180-degree line to the axis of the effective diameter.

The angle is referred to by the letter **X** and is measured using the right lens.

Angle of deviation

The difference between the angle of incidence and the angle of refraction.

Angle , pantoscopic

1. In standard alignment, that angle by which the frame front deviates from the vertical (*lower rims farther inward than upper rims*) when the spectacles are held with the temples horizontal.
2. In fitting, that angle which the frame front makes with the frontal plane of the wearer's face when the lower rims are closer to the face than the upper rims (*opposite retroscopic angle*).

(*Synonym: Pantoscopic tilt.*)

Angle, retroscopic

That angle which the frame front makes with the frontal plane of the wearer's face when the lower rims are farther from the face than the upper rims (*opposite pantoscopic angle*).

(*Synonym: Retroscopic tilt.*)

Anisometropia

A condition in which one eye differs significantly in refractive power from the other.

Antireflection coating

See *Coating, antireflection*.

Antiscratch coating

See *Coating, antiscratch*.

Aperture

An opening or hole that admits only a portion of light from a given source or sources.

Aperture, lens

The portion of the spectacle frame that accepts the lens

(*Synonym: Lens opening*.)

Apex

The junction point at which the two nonparallel surfaces of a prism meet.

Aphakic

A person whose crystalline lens has been removed.

Aspheric

A nonspherical surface.

An aspheric lens surface generally decreases in power peripherally in order to correct for aberrations found in the periphery of a lens.

Aspheric, full-field

An aspheric lens that begins its asphericity where the small central spheric region leaves off.

It continues in its asphericity all the way to the edge of the lens blank.

Aspheric lenticular

See *Lenticular, aspheric*.

Astigmatism

The presence of two different curves on a single refracting surface on or within the eye.

This causes light to focus as two line images instead of a single point.

Axis, of a cylinder

An imaginary reference line used to specify cylinder or spherocylinder lens orientation and corresponding to the meridian perpendicular to that of maximum cylinder power.

Axis, prism

The base direction of an ophthalmic prism, expressed in degrees.

Axis, optical

That line which passes through the center of a lens on which the radii of curvature of the front and back surfaces fall.

B

B

The vertical dimension of the boxing system rectangle that encloses a lens or lens opening.

Back base curve

See *Curve, back base*.

Back cut

See *Cut, back*.

Back vertex power

See *Power, back vertex*.

Ball gauge

See *Gauge, ball*.

Bar gauge

See *Gauge, bar*.

Base

In a prism, the edge of maximum surface separation opposite the apex.

Base curve

See *Curve, base*.

Base down

Vertical placement of prism such that the base is at 270 degrees on a degree scale.

Base in

Horizontal placement of prism such that the base is toward the nose.

Base out

Horizontal placement of prism such that the base is toward the side of the head.

Base up

Vertical placement of prism such that the base is at 90 degrees on a degree scale.

Baume´ degrees

A system used to quantify the concentration of a slurry based on the specific gravity of the slurry;

$^{\circ}\text{Be}' = 145 - 145/\text{SG}$, where SG = specific gravity.

BCD

Boxing center distance.

See *Distance, boxing center*.

$^{\circ}\text{Be}'$

An abbreviation for degrees Baume´.

Bell gauge

See *Gauge, bell*.

Bevel

The angled edge of the spectacle lens.

Bevel, pin

Synonym for safety bevel.

Bevel, safety

1. To remove the sharp interface between lens surface and the sharp point of the bevel apex.
2. The smoothed interface between the lens surface and bevel surface and the smoothed lens bevel apex.

Bevel, V

A lens edge configuration having the form of a V across the whole breadth of the lens edge.

Bicentric grind

Synonym for slab-off.

Bifocals

Lenses having two areas for viewing, each with its own focal power.

Usually the upper portion of the lens is for distance vision, the lower for near vision.

Bifocal, blended

A bifocal lens constructed from one piece of lens material and having the demarcation line smoothed out so as not to be visible to an observer.

Bifocal, curved-top

A bifocal lens having a segment that is round in the lower portion and gently curved on the top of the segment.

Bifocal, Executive

American Optical's trade name for the Franklin-style bifocal.

Bifocal, flat-top

A bifocal with a segment that is round in the lower half but flat on the top.

Bifocal, Franklin

A bifocal having a segment that extends the entire width of the lens blank.

Bifocals, round seg

A bifocal with a segment that is perfectly round.

The width of the segment is usually 22 mm, but may be larger (*usually 38 mm*).

Blank, finished lens

A lens having both front and back surfaces ground to the desired powers, but not yet edged to the shape of the frame.

Blank geometric center

See *Center, blank geometric*.

Blank, rough

A lens-shaped piece of glass with neither side having the finished curvature.

Both sides must yet be surfaced in order to bring the lens to the desired power and thickness.

Blank seg drop

See *Drop, Blank seg*.

Blank seg inset

See *Inset, blank seg*.

Blank, semifinished lens

A lens with only one side having the desired curvature.

The second side must yet be surfaced in order to bring the lens to its desired power and thickness.

Blended myodisc

See *Lens, blended myodiisc*.

Block

That which is attached to the surface of a lens in order to hold it in place during the surfacing or edging process.

Block mark

See *Mark, block*

Blocker

The device used to place a block on the lens in order to hold the lens in place during the surfacing or edging process.

Blocking bodies

Surfacing blocks used in conjunction with pitch.

Blocking, finish

The application of a holding block to an ophthalmic lens so that it may be edged to fit a frame.

Blocking, off-center

The practice of placing the surfacing lens block at the desired location for the major reference point of the lens.

Off-center blocking does not grind prism for decentration.

Blocking, on-center

The practice of placing the surfacing block at the blank geometric center of the lens and moving the major reference point of the lens to its desired location by grinding prism for decentration.

Blocking, simplified on-center

The practice of using sinesquared methods to move the optical center horizontally.

The surfacing block is centered horizontally, but positioned vertically above the seg top by an amount equal to the seg drop.

Blocking, surface

The application of a holding block to an ophthalmic lens so that one side may be ground to the correct curvature and polished.

Blocks, glass

A small, thick disk used to hold a glass lens in place during the surfacing process.

These are generally 43 mm in diameter and may be adapted for use in blocking plastic lenses.

Blocks, plastic

A curved disk used to hold a plastic lens in place during the surfacing process.

These blocks vary in diameter, but are normally larger than glass blocks to prevent lens flex during processing.

Box-o-Graph

A flat device containing grids and slides used in the measurement of pattern and edged lens size.

Boxing center

See *Center, boxing*.

Boxing center distance

See *Distance, boxing center*.

Boxing system

See *System, boxing*.

Bridge

The area of the frame front between the lenses.

Burn, polishing

A lens surface defect that looks like a blister or a small group of blisters on the lens surface.

Polishing burn may be the result of a polishing pad that has not been sufficiently wetted with polish.

C

C

The horizontal width of a lens at a level halfway between the two horizontal tangents of the top and bottom of the lens shape.

(Synonym: Datum length.)

Carrier

The optically unusable outer portion of a lenticular lens that “carries” the optically usable central portion.

Cataract

A loss in clarity of the crystalline lens of the eye, which results in reduced vision or loss of vision.

Center, boxing

The midpoint of the rectangle that encloses a lens in the boxing system.

Center, Blank geometric

The physical center of a semi-finished lens blank or an uncut finished lens blank.

The blank geometric center is the center of the smallest square or rectangle that completely encloses the lens blank.

Center, datum

The midpoint of the datum length (*C dimension*) of a lens along the datum line.

Center, geometric

1. The boxing center.
2. The middle point on an uncut lens blank.

Center, optical

That point on an ophthalmic prescription lens through which no prismatic effect is manifested.

Center., reading

That point on a lens at the reading level that corresponds to the near PD.

Center, seg optical

That location on the segment of a bifocal lens that shows zero prismatic effect when there is no refractive power in the distance portion of the lens.

Centers

Three short, replaceable, cylinder-shaped pieces that fit into a surfacing block and serve as pivot points during fining and polishing.

Centrad (∇)

A unit of measurement of the displacement of light by a prism.

One centrad is the prism power required to displace a ray of light 1 cm from the position it would otherwise strike on the area of a circle having a 1 m radius.

Centration

The act of positioning a lens for edging such that it will conform optically to prescription specifications.

Chart, prism

A circular chart used to find the sum of two prismatic effects graphically.

This sum is expressed with the amount given in prism diopters and the base direction given in degrees.

Charts, surfacing

Synonym for surfacing tables.

Chiller

A refrigerator unit used for cooling generator coolant, fining or polishing slurry, or blocking alloy in the ophthalmic surfacing laboratory.

Chord

A straight line intersecting two points of an arc.

Chord diameter

See *Diameter, chord*.

Clock, seg

Designed like a conventional lens measure except that the three points of contact are closely spaced.

Coating, antiscratch

A thin, hard coating applied to plastic lens surfaces in order to make them more resistant to scratching.

Coating, antireflection

A thin layer or series of layers of material applied to the surface of a lens for the purpose of reducing unwanted reflections from the lens surface and thus increasing the amount of light that passes through to the eye.

Collector, mist

A vacuum system installed above the generator grinding chamber, which removed droplets of generator coolant caused by the rapidly spinning grinding wheel that would otherwise form a mist.

Colmascope

An instrument that utilizes polarized light to show strain patterns in glass or plastic.

Compensated lap tool

See *Tool, compensated lap*.

Compensated pad

See *Pad, tool compensated*.

Compounding (of prism)

The process of combining two or more prisms to obtain the equivalent prismatic effect expressed as a single prism.

Concave

An inward-curved surface.

Convergence

1. An inward turning of the eyes, as when looking at a near object.
2. The action of light rays traveling toward a specific real image point.

Convex

An outward-curved surface.

Coolant

A recirculating liquid used to cool and lubricate the lens/grinding wheel interface during the grinding process.

Coolant manifold

See *Manifold, coolant*.

Countersink curve

See *Curve, countersink*.

Cover lens

See *Lens, cover*.

CR-39

A registered trademark of Pittsburgh Plate Glass Co. for an optical plastic known as Columbia Resin 39.

It is the standard material from which conventional plastic lenses are made.

Cribbing

The process of reducing a semifinished lens blank to a smaller size in order to speed the surfacing process or reduce the probability of difficulty in surfacing.

Cross curve

See *Curve, cross*.

Cross fitting

A reference point 2 to 4 mm above the major reference point on progressive addition lenses.

The fitting cross is positioned in front of the pupil.

Cross power

A schematic representation on which the two major meridians of a lens or lens surface are depicted.

Curvature

The reciprocal of the radius of curvature of a curved surface, quantified in m⁻¹, abbreviated by R.

Curve, back base

The weaker back-surface curve of a minus cylinder-form lens.

When the lens is a minus cylinder-form lens, the back base curve and the toric base curve are the same.

Curve, base

The surface curve of a lens that becomes the basis from which the other remaining curves are calculated.

Curve, countersink

For the manufacture of semifinished bi- and trifocal lenses, the countersink curve is that curve which is ground into the main lens in the area where the segment is to be placed.

The countersink curve matches the back curve of the bi-or trifocal segment.

When the segment is placed on the countersink curve of the main lens, the two may then be fused together.

Curve, nominal base

A 1.53-index-referenced number assigned to the base curve of a semifinished lens.

For moderately powered crown-glass lenses the needed backsurface tool curve may be found by subtracting the nominal base curve from the prescribed back vertex power.

Curve, tool

The 1.53-index-referenced surface power of a lap tool used in the fining and polishing of ophthalmic lenses.

Curve, true base

Synonym for true power.

Cut, back

In generating, the practice of beginning with the back edge of the lens and making only a partial grinding cut across the surface.

This prepares the lens for a deep, full sweep across the surface of the lens from the front edge and avoids tearing a chunk off the back edge of the lens.

Cutter, lap

A machine used to cut a lap tool to its correct curvature.

Cutter, template

A lap cutter that uses individual templates to guide the accurate cutting of the lap tool.

Template cutters will cut laps with especially low base curves and saddleback tools, which many standard lap cutters are not able to do.

Cylinder

A lens having a refractive power in one meridian only and used in the correction of astigmatism.

D

D

An abbreviation for diopter of refractive power.

See also *Diopter, lens*.

Datum center

See *Center, Datum*.

Datum center distance

See *Distance, datum center*.

Datum line

See *Line, datum*.

Datum system.

See *System, datum*.

DBC

See *Distance between center*.

DBL

Distance between lenses.

DCD

Datum center distance.

Decentration

1. The displacement of the lens optical center or major reference point away from the boxing or datum center of the frame's lens aperture.
2. The displacement of a lens optical center away from the wearer's line of sight for the purpose of creating a prismatic effect.

Decentration, block

The distance a lens surfacing block is moved from the blank geometric center of a lens.

Degrees Baume´

See Baume´ degrees.

Depth, mid-datum

The depth of the lens measured through the datum center.

Depth, reading

The vertical position in the lens through which the wearer's line of sight passes when reading.

Depth, seg

The longest vertical dimension of the lens segment.

Depth, sagittal (sag)

The height or depth of a given segment of a circle.

Diameter, chord

The diameter of a lens used for calculating lens thickness.

Chord diameter = $ED + (A + DBL - PD)$.

Diameter, effective

Twice the longest radius of a frame's lens aperture as measured from the boxing center.

Abbreviated ED.

Difference, frame

In the boxing system, the difference between frame A and frame B dimensions, expressed in millimeters.

Diopter, lens (D) Unit of lens refractive power, equal to the reciprocal of the lens focal length in meters.

Diopter, prism (Δ)

The unit of measurement that quantifies prism deviating power, one prism diopter (1Δ) is the power required to deviate a ray of light 1 cm from the position it would otherwise strike at a point 1 m away from the prism.

Disk, trueing

An abrasive disk that may be selectively spun across certain areas of a spinning spherical lap tool for the purpose of bringing that tool back to its proper curvature.

Dissimilar segs

See *Segs, dissimilar*.

Distance between centers

In a frame or finished pair of glasses, the distance between the boxing (*geometric*) centers.

Distance between lenses

1. In the boxing system, the distance between the two boxed lenses as positioned in the frame.

[*Synonym: datum minimum between lenses (MBL)*]

2. In the datum system, the distance between lenses in the frame as measured at the level of the datum line.

Distance, boxing center

Synonym for distance between centers.

Distance, frame center

Synonym for distance between centers.

Distance, geometric center

The distance between the boxing (*geometric*) centers of a frame.

Distance, interpupillary (PD)

The distance from the center of one pupil to the center of the other when either an infinitely distant object is being viewed (*distance PD*) or a near object is being viewed (*near PD*).

Distance, near centration

The distance between the geometric centers of the near segments.

Distance, vertex

The distance from the back surface of the lens to the front of the eye.

Divergence

The action of light rays going out from a point source.

Dress

To resharpen the cutting surface of a grinding wheel.

Drop, blank seg

The vertical distance from the blank geometric center to the top of the multifocal segment.

Drop, seg 1.

The vertical distance from the major reference point (MRP) to the top of the seg when the seg top is lower than the MRP. 2.

The vertical distance from the datum line to the top of the seg when the seg top is lower than the datum line (*laboratory usage*).

(*Antonym: seg raise*.)

E

ED

Effective diameter.

Edger

The piece of machinery used to physically grind the uncut lens blank to fit the shape of the frame.

Edger, hand

A grinding wheel made especially for grinding lenses by hand.

Effective diameter

See *Diameter, effective*.

Effective diameter angle

See *Angle, effective diameter*.

Effective power

See *Power, effective*.

Elliptical error

See *Error, elliptical*.

Emery

An impure form of aluminum oxide containing certain iron oxides.

Emery, rough

A commonly used term for a coarse abrasive used to obtain a curve on a glass lens that is beyond the range of the generator.

The term is a misnomer, because the abrasive is really carborundum, not emery.

Equithin

A term used by the Varilux Corporation when referring to the use of yoked prism for thickness reduction on a pair of Varilux progressive-addition lenses.

See also *Prism, yoked*.

Equivalent, spherical

The sum of the spherical component and one-half of the cylinder component of an ophthalmic lens prescription.

Error, elliptical

The slight deviation of a lens surface away from a sphere and toward an ellipse that occurs during lens generating when using a cup-shaped generator wheel.

Executive bifocal

See *Bifocal, Executive*.

Executive water ring

See *Ring, Executive water*.

Extender

An additive to a polishing slurry, used to reduce the amount of cerium needed in the slurry.

Eyesize

1. In the boxing system, the dimension.
2. In the datum system, the datum length.

Eyewire

The rim of the frame that goes around the lenses.

F

F

Often used in equations to denote lens refractive power in diopters.

Alternate symbol for F is D.

FEA

FEA Industries, an optical lab located outside Philadelphia known for its fast, efficient, accurate service, quality and price.

Fiber ring

See *Ring, fiber*.

Fining

In surfacing, the process of bringing a generated lens surface to the smoothness needed so that it will be capable of being polished.

Finishing

The process in the production of spectacles that begins with a pair of uncut lenses of the correct refractive power and ends with a completed pair of spectacles.

Finished lap tool

See *Tool, finished lap*.

Finished lens

See *Lens, finished*.

Fitting cross

See *Cross, fitting*.

Flat-top bifocal

See *Bifocal, flat-top*.

Focal point

See *Point, focal*.

Focal power

See *Power, focal*.

Form, minus cylinder

The form a prescription takes when the value of the cylinder is expressed as a negative number.

Form, plus cylinder

The form a prescription takes when the value of the cylinder is expressed as a positive number.

Formula, accurate sag

$$s = r - \sqrt{(r^2 - y^2)},$$

where **r** is the radius of curvature of the surface and **y** is the semidiameter of the chord.

Formula, lensmaker's

A formula used to find the dioptric power of a surface from radius of curvature or vice versa, which states that $D = (n_1 - n)/r$, where **D** = lens refractive power in diopters, **n₁** is the refractive index of the lens, and **n** is the refractive index of the media surrounding the lens.

Now, since there is only one letter **n** in the equation, **n** is used to denote the refractive index of the lens instead of **n₁**.

For a lens surface in air this becomes $D = (n - 1) / r$

Formula, sine-squared

A formula used to obtain the "power" of an oblique cylinder in the 180-degree meridian.

Frame center distance

See *Distance, frame center*.

Frame difference

See *Difference, frame*.

Frame, combination

1. A frame having a metal chassis with plastic top rims and temples.
2. A frame having some major parts of plastic construction and some of metal.

Frame PD

See *PD, frame*.

Franklin bifocal

See *Bifocal, Franklin*.

Front vertex power

See *Power, front vertex*.

Full-field aspheric

See *Aspheric, full-field*.

G

Gauge, ball

A zero-in gauge consisting of a small metal ball of known diameter, mounted on a handle.

Gauge, bar

A type of sag gauge that has three contact points on the end of three “legs,” which pass through a bar and contact the lap or lens surface.

Gauge, bell

A type of sag gauge used to measure spherical surfaces and having a domelike outer rim and a movable center pin.

The circular rim contacts the spherical surface and the pin measures how steep or flat that surface is.

Gauge, center thickness

A device used to measure the thickness of a semifinished lens while it is mounted on a lens surfacing block.

Gauge, lap

One of a set of flat pieces of metal, usually brass, having one edge that is precision-cut to a known radius of curvature.

The lap gauge is used as a standard and is placed against a surface in order to determine whether or not the surface in question is true to the standard.

Gauge, prism

A device used to measure thickness differences at two opposite points on a lens blocked for surfacing.

Using thickness differences, the amount of prism present in the lens is determined.

Gauge, saddle

A type of zero-in gauge that uses a cylindrical pin of known length and is steadied on the generator ram with a saddlelike mounting.

Gauge, zero-in

An object of known thickness, such as a ball or pin, which is used to assure an exact distance between generator wheel and lens center.

The zero-in gauge is needed when using a manual or semi-automatic lens generator.

Common types are a saddle gauge and a ball gauge.

Geometric center

See *Center, geometric*.

GCD

Geometric center distance.

Generating

The process of rapidly cutting the desired surface curvature onto a semifinished lens blank.

Generator marks

See *Marks, generator*.

Generator ring

See *Ring, generator*.

Generator wheel

See *Wheel, generator*.

Geometric center distance

See *Distance, geometric center*.

Glazing

1. The insertion of lenses into a spectacle frame.
2. The clogging of empty spaces between the exposed abrasive particles of an abrasive wheel, resulting in reduced grinding ability.

Grayness

A lens surface defect caused by incomplete polishing.

Grind, bicentric

Synonym for slab-off.

Gripper pad

See *Pad, gripper*.

H

Hand edger

See *Edger, hand*.

Hand stone

See *Stone, hand*.

Height, seg

The vertically measured distance from the lowest point on the lens or lens opening to the level of the top of the seg.

Hide- α -Bevel

Tradename for an edge-grinding system that produces a shelf effect behind the bevel on thick-edged lenses.

Hollow tool

See *Tool, hollow*.

Hydrometer

An instrument used to measure the specific gravity of a liquid. In surfacing, the specific gravity of an abrasive slurry is measured in degrees Baume´.

Hyperopia

Farsightedness.

Imbalance, vertical

A differential vertical prismatic effect between the two eyes.

At near this can be induced by right and left lenses of unequal powers when the wearer drops his or her eyes below the optical center of the lenses.

Implant, intraocular lens

A plastic lens placed inside the eye as a replacement for a crystalline lens that lost its clarity.

Index, refractive

The ratio of the speed of light in a medium (*such as air*) to the speed of light in another medium (*such as glass*).

Inset

The amount of lens decentration nasally from the boxing (*or datum*) center of the frame's lens aperture.

(Antonym: *outset*.)

Inset, blank seg

The horizontal distance from the blank geometric center to the center of the multifocal segment.

Inset, net seg

The amount of additional seg inset (or outset) required to produce a desired amount of horizontal prismatic effect at near, added to the normal seg inset required by the near **PD**.

Inset, seg

The lateral distance from the major reference point to the geometric center of the segment.

Inset, total

The amount the near segment must move from the boxing (*or datum*) center to place it at the near **PD** (*near centration distance*).

Intermediate

The area of a trifocal lens between the distance viewing portion and the near portion.

Interpupillary distance

See *Distance interpupillary*.

Intraocular lens implant

See *Implant, intraocular lens*.

Iseikonic lenses

See *Lenses, iseikonic*.

K

Knife-edge

A plus lens ground to an absolute minimum thickness such that the edge of the lens is so thin that it has a knifelike sharpness to it, i.e., an edge thickness of zero.

L

Laminated lens

See *Lens, laminated*.

Lap

A tool having a curvature matching that of the curvature desired for a lens surface.

The lens surface is rubbed across the face of the tool and, with the aid of pads, abrasives, & polishes, the lens surface is brought to optical quality.

Lap cutter

See *Cutter, lap*.

Lap gauge

See *Gauge, lap*.

Lap tool

See *Tool, lap*.

Layout

The process of preparing a lens for blocking and edging or surfacing.

Layout marker

See *Marker*.

Length, datum

The horizontal width of a lens or lens opening as measured along the datum line.

Lens, blended myodisc

A minus lens, lenticular in design, with the edges of the bowl blended so as to improve the cosmetic aspect of the lens.

Lens center locator

See *Locator, lens center*.

Lens, cover

A thin lens that is temporarily glued to the surface of a semifinished blank in order to protect the surface of the lens and facilitate accurate grinding, as in the case of a slab-off grind on a glass lens.

Lens, finished

A spectacle lens that has been surfaced on both front and back to the needed power and thickness.

A finished lens has not been edged for a spectacle frame, but is still in uncut form.

Lens, laminated

An ophthalmic lens that is made up of more than one layer.

Examples include polarized lenses, lenses that have a glass front and a polyurethane back surface, and plastic bifocal lenses made from front and back sections in order to bypass conventional surfacing procedures.

Lens, meniscus

A lens having a convex front surface and a concave back surface.

Lens, mineral

Synonym for glass lens.

Lens, minus cylinder form

A lens ground such that it obtains its cylinder power from a difference in surface curvature between two back surface meridians.

Lens, minus lenticular

A high-minus lens that is lenticular in design, having a central area containing the prescribed refractive power and a peripheral carrier that is plus in power for maximum edge thinning.

Lens, multidrop

A high-plus, full field aspheric lens in which the surface power drops rapidly as the edge of the lens is approached.

Lens, myodisk

1. Traditional definition: a high-minus lens that is lenticular in design, having a central area containing the prescribed refractive power and a peripheral carrier that is plano in power. The front curve is either plano in power or very close to plano.
2. General usage: any high-minus lens that is lenticular in design.

Lens, photochromic

A lens that changes its transmission characteristics when exposed to light.

Lens, plus cylinder form

A lens ground so that it obtains its cylinder power from a difference in surface curvature between two front surface meridians.

Lens, progressive-addition

A lens having optics that vary in power gradually from the distance to near zones.

Lens, reverse-slab

A slab-off lens that has base-down prism below the slab line, instead of base-up.

Reverse-slab lenses are usually precast plastic.

Lens, single-vision

A lens with the same sphere and/or cylinder power throughout the whole lens, as distinguished from a multifocal lens.

Lens size

See *Size, lens*.

Lensmaker's formula

See *Formula, lensmaker's*.

Lenses, iseikonic

A lens pair with their curvatures and thicknesses specially chosen in order to produce a difference in image magnification between the left and right eyes.

Also known as size lenses.

Lensmeter

The instrument used for finding power and prism in spectacle lenses.

Lenticular

A high-powered lens with the desired prescription power found only in the central portion.

The outer carrier portion is ground so as to reduce edge thickness and weight in minus prescriptions and center thickness and weight in plus prescriptions.

Lenticular, aspheric

A lenticular lens whose optically usable central portion has a front surface with a changing radius of curvature.

The farther from the center of the lens, the longer the front surface radius of curvature becomes.

Lenticular, negative

A high-minus lens that has had the peripheral portion flattened for the purpose of reducing weight and edge thickness.

(Synonym: *myodisc*.)

Lenticular, spheric

A lenticular lens whose optically usable central portion has a front surface that does not vary in curvature, but is entirely spherical.

Level, reading

A synonym for reading depth.

See *Depth, reading*.

Line, datum

A line drawn parallel to an halfway between horizontal lines tangent to the lowest and highest edges of the lens.

Loading

Occurs when plastic lens material gets in between the diamond grit of a generator or edger wheel, causing a glazing effect and decreased cutting ability.

Locator, lens center

A device that finds and spots the blank geometric center of a round lens.

M

Major reference point

See *Point, major reference*.

Manifold, coolant

The part of the lens generator that divides the incoming coolant into separate streams of fluid, which are directed onto the grinding wheel for purposes of cooling, cleaning and lubrication.

Marker

A centering device used to position a lens accurately and stamp it with reference lines for use in lens blocking.

Mark, block

A surface defect on a plastic lens caused by pressure from the block or heat from the blocking alloy.

Marks, generator

A surface defect on a lens that consists of parallel, curved marks across the surface of the lens caused by the generator wheel.

Marks, swirl

A lens surface defect that indicates that a larger grain of abrasive material was trapped in the pad and scratched the surface in a swirl pattern.

MBL

Minimum between lenses.

MBS

Minimum blank size.

See *Size, minimum blank*.

Measure, lens

A small, pocket-watch-sized instrument for measuring the surface curve of a lens.

(Also called lens clock, lens gauge.)

Meniscus

A lens form having one concave and one convex surface.

Meniscus lens

See *Lens, meniscus*.

Meridian, axis

The meridian of least power of a cylinder or spherocylinder lens; for a minus cylinder the least minus meridian, for a plus cylinder the least plus meridian.

Meridian, major

One of two meridians in a cylinder or spherocylinder lens.

These meridians are 90 degrees apart and correspond to the maximum and minimum powers in the lens.

Meridian, power

The meridian of maximum power of a cylinder or spherocylinder lens; for a minus cylinder the most minus meridian, for a plus cylinder the most plus meridian.

Method, monocentric

A surfacing technique for Franklin-style (*Executive*) lenses that grinds the lens with no seg inset and no seg drop.

Method, near-prism reduction

A surfacing technique for Franklin-style (*Executive*) lenses that grinds the lens in such a way as to reduce the horizontal prismatic effect at the reading center caused by the distance lens.

Method, optically poor

A surfacing technique for Franklin-style (*Executive*) lenses that grinds the lens with a seg drop, but in grinding for decentration completely ignores the location of the seg optical center.

Method, preferred (flat-top style) inset

A surfacing technique for Franklin-style (*Executive*) lenses that grinds the lens with the customary seg inset and seg drop characteristic of flattop bifocal lenses.

Method, zero inset

A surfacing technique for Franklin-style (*Executive*) lenses that grinds the lens with no seg inset, but with the customary seg drop.

Mid-datum depth

See *Depth, mid-datum*.

Minimum between lenses

The datum system equivalent of the boxing distance between lenses.

Minus cylinder form

See *Form, minus cylinder*.

Minus cylinder-form lens

See *Lens, minus cylinder form*.

Minus lenticular lens

See *Lens, minus lenticular*.

Mist collector

See *Collector, mist*.

Monocentric method

See *Method, monocentric*.

MRP

Major reference point.

Multifocal

A lens having a sector or sectors where the refractive power is different from the rest of the lens, such as bifocals or trifocals.

Mushroom tool

See *Tool, mushroom*.

Myodisc

See *Lens, myodisc*.

Myopia

Nearsightedness.

N

Nasal

The side of a lens or frame that is toward the nose (*inner edge*).

NBC

Nominal base curve.

Near power

See *Power, near*.

Near prism reduction method

See *Method, near prism reduction*.

Near Rx

The net power resulting from the combination of the add power and the distance power.

Net seg inset

See *Inset, net seg*.

Neutralize

To determine the refractive power of a lens.

Nominal base curve

See *Curve, nominal base*.



OC

Optical center.

OD

Latin, oculus dexter (*right eye*).

Off-center blocking

See *Blocking, off-center*.

Offset block adapter

See *Adapter, offset block*.

On-center blocking

See *Blocking, on-center*.

Opening, lens

The portion of the spectacle frame that accepts the spectacle lens.

(*Synonym: lens aperture*).

Optical axis

See *Axis, optical*.

Optical center

See *Center, optical*.

Optically poor method

See *Method, optically poor*.

Orange peel

A surface defect on a lens that looks like the peel of an orange and is caused by watery polishing compound.

OS

Latin, oculus sinister (*left eye*).

Outset

The amount of lens decentration temporally from the boxing (*or datum*) center of the frame's lens aperture.

(*Antonym: inset*).

Overhand

The portion of an off-center-blocked semifinished lens that is farthest away from the lens block and may prove to be problematic during the surfacing process.

P

Pad, gripper

A friction-grip fitting/polishing pad system that eliminates difficulty in stripping the pad from the tool.

By using a special backing on the tool, the pad sticks to the backing.

Pad press

See *Press, pad*.

Pad, tool-compensating

A pad that lengthens the radius of curvature of a convex tool, flattening the tool and causing it to grind a slightly weaker minus curve.

Pan, hand

A large, round metal tub containing a rotating spindle that spins concave or convex lap tools.

Used to hand-work a lens surface.

Pantoscopic angle or tilt

See *Angle, pantoscopic*.

PD Interpupillary distance

The distance from the center of one pupil to the center of the other.

PD, binocular

The interpupillary distance specified as a single number, without reference to the center of the frame.

PD, distance

The wearer's interpupillary distance specified for a situation equivalent to when the wearer is viewing a distant object.

PD, frame

Synonym for distance between center.

PD, monocular

Half the interpupillary distance as specified for each eye individually with the center of the frame's bridge as a reference point.

PD, near

The interpupillary distance as specified for a near viewing situation.

Pellon

A brand of material used for polishing pads reputed to hold polish within the pad microstructure while still allowing the individual polishing particles to roll and polish.

Phoria

The direction of the line of sight of one eye with reference to that of the partner eye when fusion is interrupted as when one eye is covered.

Photochromic lens

See *Lens, photochromic*.

Plano

A term referring to a lens of lens surface having zero refracting power.

Pliers, chipping

Pliers used to chip or break away the outer portions of an uncut or semifinished lens in order either to reduce its size or bring it into the rough shape needed to approximate the finished shape.

Plus cylinder form

See *Form, plus cylinder*.

Plus-cylinder-form lens

See *Lens, plus cylinder form*.

Point

One-tenth of a millimeter of lens thickness.

Point, distance centration

A British equivalent of the major reference point.

Point, focal

A point to or from which light rays converge or diverge.

Point, major reference

The point on a lens where the prism equals that called for by the prescription.

Polishing

The last step in bringing a lens surface to its needed state of optical clarity.

Polishing rouge

See *Rouge, polishing*.

Polish, water

Synonym for an orange-peel lens surface defect.

Polycarbonate

A strong, plastic lens material often used for safety eyewear.

Power cross

See *Cross, power*.

Power, actual

Synonym for true power.

Power, back vertex

The reciprocal of the distance in air from the rear surface of the lens to the second principal focus, which serves as a specific measure of the power of a lens.

Power, compensated

Back vertex power that has been converted to a 1.53-index frame of reference.

Used for the purpose of finding a 1.53-index-referenced tool curve for a lens with a different index of refraction.

Power, effective

1. The vergence power of a lens at a designated position other than that occupied by the principal point of the lens itself
2. That power lens required for a new position which will replace the original reference lens and yet maintain the same focal point.

Power, focal

A measure of the ability of a lens or lens surface to change the vergence of entering light rays.

Power, front vertex

The reciprocal of the distance in air from the front surface of a lens to the first principal focus.

Power, near

The sum of the distance power and the near add.

(*Synonym: near Rx.*)

Power, nominal 1.

An estimate of total lens power, calculated as the sum of front and back surface powers.

(*Not to be confused with nominal base curve.*)

Power, refractive

The dioptric value that accurately described the ability of a lens or lens surface to converge or diverge light.

For a lens surface in air the refractive power is expressed as:

$$D = (n - 1) / r$$

refractive index of the lens material and *r* is the radius of the surface expressed in meters.

Power, true

The 1.53-index-referenced curvature of the base curve of a lens.

True power is found by using a lens clock or santometer (sag gauge) that is 1.53-index-referenced.

Precoat

A spray or brush-on liquid that, when applied to a lens, protects the surface during processing and/or makes the adhesion of a block to the lens possible.

Preferred (flat-top style) inset method

See *Method, preferred (flat-top style) inset*.

Prentice's rule

See *Rule, Prentice's*.

Press, pad

A machine used to press a pad onto a lap tool. There are two types of pad presses.

One type presses a fining or polishing pad onto the lap tool with moderately heavy pressure.

The second type uses extremely high pressure to press a metal pad onto a lap tool.

Prism

That part of an optical lens or system that deviates the path of light.

Prism axis

See *Axis, prism*

Prism chart

See *Chart, prism*.

Prism gauge

See *Gauge, prism*.

Prism ring

See *Ring, prism*.

Prism, Rx

Prism in an ophthalmic lens prescription that has been called for by the prescribing doctor.

Prism table

See *Table, prism*.

Prism wedge

See *Wedge, prism*.

Prism, yoked

Base-down prism of equal value ground on both right and left lenses of a progressive or Franklin-style lens for the purpose of reducing lens thickness.

Progressive-addition lens

See *Lens, progressive-addition*.

Protractor, lens

A millimeter grid on a 360-degree protractor used in the lens centration process for both surfacing and finishing.

R

R-compensated segs

See Segs, R-compensated.

Raise, seg 1.

The vertical distance from the major reference point to the top of the seg when the seg top is higher than the MRP. 2.

The vertical distance from the datum line to the top of the seg when the seg top is higher than the datum line (*laboratory usage*).

(Antonym: seg drop.)

Reading center

See *Center, reading*.

Reading depth

See *Depth, reading*

Reading level

See *Level, reading*

Reduced thickness

Thickness of a medium divided by its refractive index.

Refraction

1. The bending of light by a lens or optical system.
2. The process of determining the needed power of a prescription lens for an individual.

Refractive index

See *Index, refractive*.

Refractive power

See, *refractive. Power*

Removal, stock

The thickness of semifinished lens material that must be removed to bring the lens to its desired thickness.

Resolving (of prism)

The process of expressing a single prism as two prisms whose base directions are perpendicular to each other but whose combined effect equals that of the original prism.

Retrosopic angle or tilt

See *Angle, retrosopic*.

Reverse-slab lens

See *Lens, reverse-slab*.

Rim

See *Eyewire*.

Rimless

Having to do with frames (mountings) that hold lenses in place by some method other than eyewires.

Most rimless mountings have two points of attachment per lens.

Ring, Executive water

A hollow, coolant-cooled mold, which casts blocking alloy into the shape of a fiber ring so that the glass Franklin-style (*Executive*) lens can be generated successfully.

Ring, fiber

A ring that fits around the glass block and against the lens during the generating process.

Its purpose is to level the lens, assuring that no unwanted prism is ground in during generating.

Ring, generator

A ring that fits around a surfacing block and is thick on one side and thin on the other.

The ring causes the blocked lens to tilt by a known amount during the generating process in order to create a specific amount of prismatic effect.

See also *Wedge, prism*.

Rings, prism blocking

Rings used in conjunction with 43-mm glass blocks for the purpose of molding prism into the block, eliminating the need for prism rings or prism wedges during generating.

Ring, Utex

A special fiber ring with a section cut out.

This ring allows Utex multifocal lenses to be generated even though the front surface of the lens segment “humps up.”

Ring, Water

A hollow device that fits around the lens block on the surface blocker.

It is connected to circulating coolant or cold running water and causes the lens block and alloy to chill, “freezing” the alloy.

Rouge, polishing

Iron oxide used in the polishing of ophthalmic glass surfaces.

Rough-in

An extra step in the fining of some lenses to remove roughness present after generating.

Roughing

Using a lap tool and rough abrasive to generate a curve on a lens blank.

Round-seg bifocal

See *Bifocal, round-seg*.

Rule, Prentice's

A rule which states that the decentration of a lens in centimeters times the power of the lens is equal to the prismatic effect ($\Delta = cD$).

Rx prism

See *Prism, Rx*.

S

Saddle gauge

See *Gauge, saddle*.

Safety bevel

See *Bevel, safety*.

Sag

A synonym or abbreviation for sagittal depth.

See also *Depth, sagittal*.

Sagittal depth

See *Depth, sagittal*.

Sag tables

See *Tables, sag*.

Score

To cut parallel grooves into the surface of a lap tool at regular intervals for the purpose of allowing slurry to flow under a lens more easily when fining on the bare surface of the lap tool.

Scratch

A furrowed-out line that has jagged edges.

Seg

See *Segment*.

Seg clock

See *Clock, seg*.

Seg depth

See *Depth, seg*.

Seg drop

See *Drop, seg*.

Seg height

See *Height, seg*.

Seg inset

See *Inset, seg*.

Seg optical center

See *Center, seg optical*.

Seg width

See *Width, seg*.

Segment (seg)

An area of a spectacle lens with power differing from that of the main portion.

Segs, dissimilar

A method of correcting vertical imbalance at near that uses different bifocal segment styles for the right and left eyes.

Segs, R-compensated

A method for correcting vertical imbalance at near that uses ribbonstyle bifocal segments which have been modified so that the segment optical center for one lens is high in one segment, and low in the other.

Semidiameter

Diameter divided by 2.

In ophthalmic optics, semidiameter refers to half of the chord for the arc of a given surface and is used in calculating the sagittal depth of the surface.

Semifinished blank

See *Blank, semifinished*.

Semifinished lap tool

See *Tool, semifinished lap*.

Shop, back

Synonym for surfacing laboratory.

Shop, front

Synonym for finishing laboratory.

Simplified on-center blocking

See *Blocking, simplified on-center*.

Sine-squared formula

See *Formula, sine-squared*.

Single-vision lens

See *Lens, single-vision*.

Size, lens

1. In the boxing system, the A dimension of a lens or lens opening.
2. In the datum system, the datum length of a lens.

Size lenses

See *Lenses, iseikonic*.

Size, minimum blank

The smallest lens blank that can be used for a given prescription lens and frame combination.

Slab-off

Grinding a portion of a lens so as to add a second optical center.

Often used to create vertical prism in the lower portion of one lens for the purpose of alleviating vertical imbalance at near.

Sleek

A furrowed-out line on a lens, which resembles a scratch but whose edges are smooth instead of jagged.

Slurry

Particles suspended in a liquid.

In surfacing, abrasive particles are suspended in the fining and polishing slurries.

Sphere

A lens having a single refractive power in all meridians.

Spherical equivalent

See *Equivalent, spherical*.

Spheric lenticular

See *Lenticular, spheric*.

Sphero-cylinder

The combination of sphere and cylinder powers into a single lens.

Spotting

The placing of spots on a lens with a lensmeter in such a manner that the lens will be oriented correctly for axis and positioned for major reference point and horizontal meridian locations.

Standard alignment

See *Alignment, standard*.

Stock, trueing

A long, rectangular abrasive stick that can be (**1**) held against certain areas of a spinning spherical lap tool for the purpose of bringing that tool back to its proper curvature, or (**2**) held against an edger or generator wheel to expose more of the diamond-cutting surface and “sharpen” the wheel. There are different types of abrasive sticks for different purposes.

Stock, lens

1. An inventory of lenses.
2. The material from which a semifinished blank is made, as in the amount of stock removal required to bring the blank to its needed thickness.

Stock removal

See *Removal, stock*.

Stone

1. An abrasive grinding wheel.
2. To sharpen the cutting ability of a grinding wheel by honing it with an abrasive stick.

Stone, hand

Synonym for hand edger.

Surfacing

The process of creating the prescribed refractive power, prism, and major reference point location on a lens by generating the required curves and bringing the surface to a polished state.

Surfacing charts

See *Tables, surfacing*.

Surfacing tables

See *Tables, surfacing*.

Swarf

Accumulated waste material present as a result of the grinding process.

Swirl marks

See *Marks, swirl*.

System, boxing

A system of lens measurement based on the enclosure of a lens by horizontal and vertical tangents to form a box or rectangle.

System, datum

A system of lens measurement that defines the lens or eyesize as being the width of the lens along the datum line.

System, GOMAC

A European Economic Community standard incorporating portions of both the boxing and datum systems.

T

Table, Fry's

A table developed by Glenn Fry to determine the appropriate base curve for a lens of any given refractive power.

Table, prism

A table used to convert combined horizontal and vertical prismatic effects into a single, new prism.

Amount is expressed in prism diopters and base direction in degrees.

Tables, sag

A set of tables used for finding sagittal depth when surface power and lens diameter are known.

Tables, surfacing

Tables supplied by a lens manufacturer for the purpose of helping the surfacing laboratory accurately determine the tool curves and lens thicknesses needed in order to grind lenses to the specified back vertex power.

Take-off

Synonym for stock removal.

Tangent

For a right triangle, the ratio of the side opposite the angle considered to the side adjacent:

opp

tan = _____ .

adj

Template cutter

See *Cutter, template*.

Temporal

The area of a lens or frame that is toward the temples (*outer edge*).

Tool, compensated lap

A surfacing lap tool that has been cut with a radius of curvature so as to allow for a correctly curved surface after the lap pad has been applied to the lap.

Tool curve

See *Curve, tool*.

Tool, finished lap

A lap tool that has been purchased from the supplier after having already been cut to the correct curvature.

Tool, hollow

A spherical concave tool used to fine and polish spherical convex lens surfaces.

It is called a hollow tool because the concave surface on the top of the tool appears to be hollowed out.

This type of tool is used on sphere machines only.

Tool, lap

A tool used for fining and polishing lens surfaces.

The tool used must have a surface identical in curvature to that of the lens for which it is to be used; that is, if the lens surface is convex, the tool must be concave.

Tool, mushroom

A spherical convex lap tool used to find and polish spherical concave lens surfaces.

This type of tool is shaped like a mushroom and is used on sphere machines only.

Tool, semifinished lap

A lap tool with an approximate base and cross curve molded onto the tool.

A semifinished tool with rough curves close to the needed finished curves is chosen and then the tool is cut to the desired curvature.

Tool, uncompensated lap

A surfacing lap tool that has been cut without taking lap pad thickness into consideration.

It is of the correct curvature without a pad, but will be slightly off with fining or polishing pads in place.

Toric

A surface having separate curves at right angles to one another.

Toric base curve

See *Curve, toric base*.

Toric transposition

See *Transposition, toric*.

Total inset

See *Inset, total*.

Transposition, toric

The process of transposing a prescription from the form in which it is written to another form, such as from a plus to a minus cylinder form.

Trifocals Lenses

having three areas of viewing, each with its own focal power.

Usually the upper portion is for distance viewing, the lower for near, and the middle or intermediate portion for distance in between.

True

1. To reshape the cutting surface of a worn grinding wheel so that it cuts at the angles and in the manner originally intended.
2. To bring a pair of glasses into a position of correct alignment.
3. In surfacing, when using a hand pan, a step following roughing and smoothing, using a somewhat finer grade of abrasive in order to bring the lens to an exact curve.

True base curve

See *Curve, true base*.

Trueing

See *True*.

True power

See *Power, true*.

Trueing disk

See *Disk, trueing*.

Trueing stick

See *Stick, trueing*.

U

Ultex ring

See *Ring, Ultex*.

Ultraviolet

Rays having a wavelength somewhat shorter than those at the violet end of the visible spectrum.

Uncompensated lap tool

See *Tool, uncompensated*.

Uncut

A lens that has been surfaced on both sides but not yet edged for a frame.

V

V-bevel

See *Bevel, V*.

Vertex distance

See *Distance, vertex*.

Vertex power allowance

See *Allowance, vertex power*.

Vertical imbalance

See *Imbalance, vertical*.

W

Water polish

See *Polish, water*.

Water ring

See *Ring, water*.

Wave

A defect in lens surface curvature, which causes a slight, irregular variation in the surface power.

Wedge, prism

A wedge of known thickness and angle placed at one side of a chucked lens for the purpose of causing the lens to tilt, resulting in a specific amount of prismatic effect.

See also *Ring, prism*.

Wheel, electroplated

An abrasive wheel made by electrolytically depositing metal on the wheel in such a manner as to encompass diamond particles.

This type of wheel is often used to grind plastic lenses.

Wheel, generator

A cup-shaped wheel with a diamond impregnated rim, small cutter blades, or both, that is used to rapidly cut or grind a specifically curved surface onto a lens.

Wheel, roughing

An edger or cribber wheel that rapidly cuts a lens to near its finished size.

Width, seg

The size of a bi- or trifocal segment measured horizontally across its widest section.

Y

Yoked prism

See *Prism, yoked*.

Younger blended myodisc

See *Lens, blended myodisc*.

Younger Seamless

Trade name for a blended bifocal made by Younger Optics.

Z

Zero-cut

A generator sweep across a lens surface with the generator set for zero stock removal.

The purpose of a zero-cut is to smooth out the lens surface, or to remove unwanted prism.

Unwanted prism will show up as a partial cut across the lens surface.

Zero-in gauge

See *Gauge, zero-in*.

Zero inset method

See *Method, zero inset*.

Zone, blended

The blurred area between distance and near areas on an “invisible” bifocal. (Not to be confused with the progressive zone of a progressive-add lens.)

Zone, progressive

That portion of a progressive-addition lens between the distance and near portions where lens power is gradually increasing.