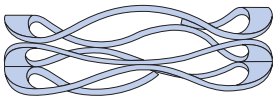
Bore Diameter: (See housing diameter)

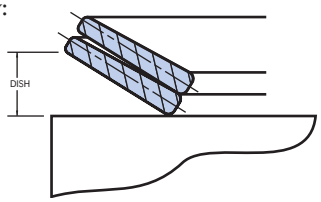
Centrifugal Capacity (N): A mathematical expression for determining the speed (in revolutions per minute, rpm) at which a retaining ring will loose cling on the groove.

Cling: A value that signifies the amount of "interference fit" between a retaining ring and its groove.

Crest-To-Crest®: Term used to identify a Smalley Flat Wire Compression spring in a "Series" configuration, having a sinusoidal waveform. The wave contour in each 360° turn provides a peak to valley relationship that decreases spring rate proportionally to the number of turns.

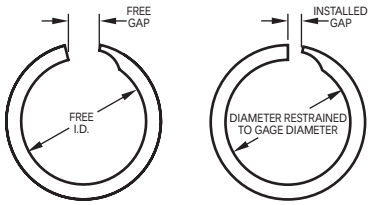


Dish: This ring dimension is the height difference in the ring cross section's axis of symmetry between O.D. and I.D. as illustrated below:



Edgewinding: Smalley's manufacturing method of circle coiling rectangular section flat wire on edge.

Free Gap: The distance between the "Free Ends" of a ring or spring as it rests in its free state.



Gap Type: Defines the physical split between the ends in a wave spring.

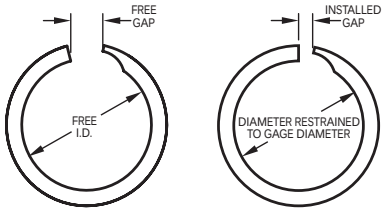
Hardness: The resistance of a material to plastic deformation, usually by indention.

Helix: (see pitch)

Housing Diameter (D_H): Also referred to as "bore" diameter. This dimension represents the inside diameter of the assembly where an internal retaining ring is installed.

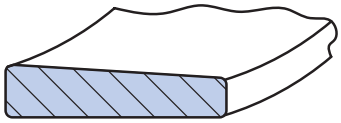
Hydrogen Embrittlement: A condition where hydrogen is absorbed within the internal grain structure of metal tending to make it susceptible to cracking and failure, particularly under sustained loads. Environments such as hydrogen sulfide (H_2S) or processes such as electroplating or pickling can induce hydrogen embrittlement.

Installed Gap: (see Free Gap) This ring dimension is the distance between the ring ends while the ring is restrained at a specific gage diameter. Recommended as a more precise method of control over a free gap.

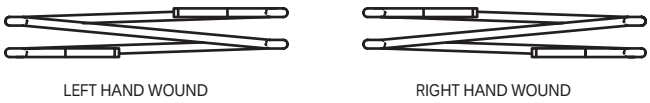


Installation Stress (S_C) or (S_E): Mathematical expression based on a radial strain. Useful in determining how far a Smalley retaining ring can be expanded or contracted during installation.

Keystone: Derived from the definition of a "wedge" shaped stone. This term, illustrated below, refers to the "wedge" shaped cross section as a result of edgewinding flat wire.

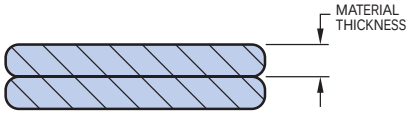


Left Hand Wound: Also referred to as "reverse wound", design term signifying the counter-clockwise winding direction of a pitched coil.

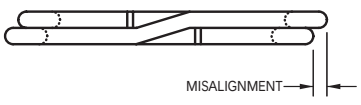


Linear Expander: Term used to identify a straight length of flat wire having a sinusoidal waveform. Used as a compression spring in both axial and radial applications.

Material Thickness (t): Also referred to as "wire" thickness. This dimension, as illustrated below, is useful in determining the overall ring thickness.

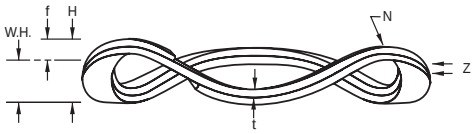


Misalignment: Also referred to as "skew", this ring dimension is the radial variance of a multiple turn retaining.



Modulus of elasticity (E): A measure of the rigidity of a material.

Nested: Term used to identify a Smalley Flat Wire Compression Spring in a "Parallel" configuration, having a sinusoidal waveform. The wave contour in each 360° turn matches (nests), increasing the spring rate proportionally to the number of turns.



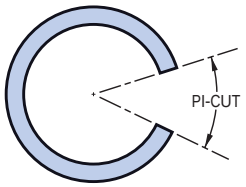
Number of Turns (n): The number of 360° turns of flat wire formed in a retaining ring or wave spring.

Offset: As illustrated below, this design feature is a bend in the material at the gap. This provides flat and parallel surfaces for ease of installation.

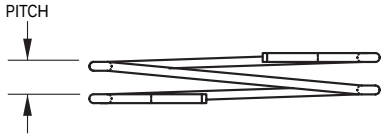
Overlap Type: Defines the physical overlap of the ends in a wave spring.

Permanent Set: A ring that has been expanded or contracted to a point where its elastic properties have been exceeded and does not return to its original diameter is said to have taken "permanent set".

Pi-Cut Ends: Term signifying a particular ring design where the ends have been cut in an angular direction from the center of the ring as illustrated below.



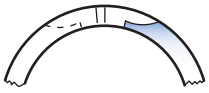
Pitch: Also referred to as helix, this ring dimension is the distance between two adjacent layers of the retaining ring.



Radial Wall (b): Width of a retaining ring when measured from inside to outside edge.

Radius Notch: (see Removal Notch)

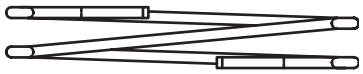
Removal Notch: Also referred to as a "radius notch" or "scallop", this standard Smalley Retaining Ring design feature is used to facilitate removal of the ring from its groove by means of a screwdriver or similar type tool.



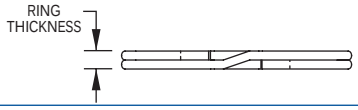
Residual Stress: Stress induced by a cold working process such as edgewinding. It may or may not be beneficial, depending upon the application.

Reverse Wound: (see left hand wound)

Right Hand Wound: Design term signifying the clockwise direction that a Smalley Retaining Ring is normally wound. (also see Left Hand Wound)



Ring Thickness (T): Total thickness of an edgewound retaining ring. It may be determined by multiplying the material thickness by the number of turns and adding in the keystone value.



Rod Diameter: (see shaft diameter)

Safety Factor (K): Mathematical constant used in many design formulas to account for theoretical inaccuracies.

Scallop: (see Removal Notch)

Shaft Diameter (D_S): This dimension represents the outside diameter of the assembly where an external retaining ring is installed.

Shear Strength (S_S): An index of the quality of a material through a mathematical expression which divides the force required to shear a material by its cross-sectional area.

Stress Relieve: Low temperature heat treatment for removing any residual stresses induced by edgewinding and/or forming.

Tensile Strength: An index of the quality of a material through a mathematical expression which divides the material's load capacity in tension by its original cross-sectional area. Particularly accurate for spring steels, as there is only a small difference between ultimate tensile strength and yield strength.

Thrust Load Capacity (P_G) or (P_R): Overall capacity of an assembly to withstand a given value of thrust load in pounds. The limitation being the lesser of two mathematical calculations: ring thrust load capacity (P_R) or groove thrust load capacity (P_G).

Yield Strength (S_y): The stress at which a material exhibits initial plastic deformation.

WAVO®: Single turn round wire wave spring.