

E Ring

External. Radially applied as for bowed type. Prongs spaced at about 120° to ensure contact in deep groove for increased thrust capacity.



Spring clip

Radially assembled ring with large bearing shoulder. Applications similar to E ring type.



Crescent

External. Applied radially over shaft resistant to impact and vibration.



Snap ring

External. Radially assembled into groove without special tools.



Spring ring external

Plain retaining without lugs. Provide positive locking with any small clearance. Axially assembled.



Spring ring internal

As for external.



Wire formed retainer

Internal. Of round or rectangular cross section to fit into a prepared groove. Not very efficient as it seats at only a few points in the groove and therefore tends to shake loose.



Push on fix

External. Designed with arched rim and inclined prongs. Applied axially to give tight assembly free of end play. No groove required.



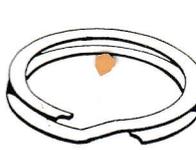
Push on fix

External. Flat rim with shorter prongs. Same application as above.



Spirolox internal

Spiral wound ring of two or more turns of rectangular section strip. Assembled by separating the coils and spiralling into prepared groove. Resists heavy thrust loads.



Spirolox external

As for internal.



Push on fix

External. Axially applied to rotating shaft or stud of soft material. No end play. No groove required. Triangular body is dished to ensure tight assembly.



Grip ring

External, axially applied and adjustable on plain shaft. Can be assembled and removed repeatedly. No groove required.



Push in fix

Internal. For tight assemblies free of end play in bores. No groove required.



Rectangular push on fix

External for shafts. Designed for tight fit without digging on to soft surfaces. No groove required.



Round push on fix

External for studs. For die cast and light assemblies. Has large retaining shoulder to resist thrust loads. No damage to surface.



Round push on fix

External for studs. For die cast and light static assemblies.



Bowed or locking prong ring

External for shafts. Radial assembly into prepared groove by means of two prongs. Acts as a spring as well as a retainer.



Bowed ring

External for shafts. Radial assembly into prepared groove. Has larger bearing shoulder than above. Also acts as a spring.



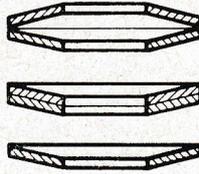
'C' Type ring

External for shafts. Radial assembly into prepared groove.



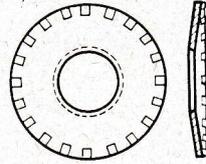
Belleville washer

Not a washer in the true sense, this is a heat treated, conical disc designed to act as a spring by deflecting between the conical and flat positions. May be used in multiples, either back to back in series or stacked in parallel to increase spring action.



Serrated cone washer

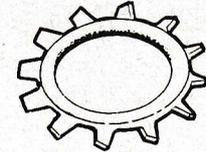
A variation of the cone washer, it has serrations or teeth on the lower periphery which grip the sheet metal to prevent slipping.



Toothed lock washers

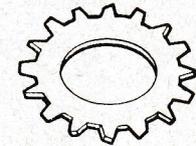
Folded rim type

External. A modification of the standard 'Shakeproof' lock washer. Has a folded rim which provides greater body thickness to resist flattening of the curved teeth under extreme loading. May also be used as an oil seal.



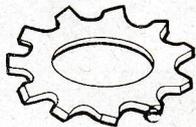
Alternate twisted tooth type

External. The teeth have been alternately twisted to provide clockwise and anti-clockwise locking action. It provides a method of retaining the relative positions of the workpieces.



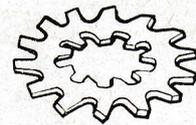
Standard external type

This type should be used wherever possible as the teeth are on the largest radius which provides greater torsional resistance. The fastener's head should be large enough to contact the teeth.



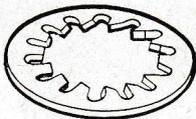
Internal-external type

Used where a larger bearing surface is required or as an insert between two adjustable pieces to maintain the adjustment after setting.



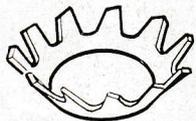
Internal type

This type is recommended for use under small head screws or where it is desirable to hide the teeth for appearance sake.



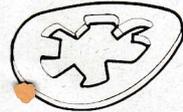
Conical or countersunk type

Available with external and internal teeth. Designed for use with flat or oval countersunk heads of 82 or 100° angles.



Waved type internal

Both internal and external are waved to provide additional spring take up.



Waved type external



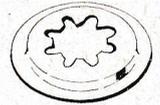
Dome type toothed periphery

The teeth of the periphery prevent movement while the internal teeth bite into the bolt head or nut. Recommended for use with soft or thin materials.



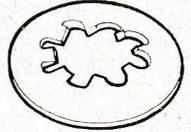
Dome type plain periphery

Plain periphery type is recommended for use with soft or thin materials where the surface must not be damaged by the biting teeth. Washer distributes the load over a wider area.



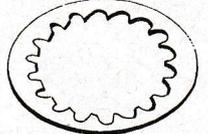
Dished type plain periphery

Similar in action to dome type but dishing provides resilience in holding. Recommended for use with thin or soft materials where the surface must not be damaged by teeth.



Pipe type

Designed to lock nuts having extreme internal diameter in proportion to the tooth size.



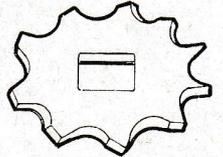
Dished type toothed periphery

This type has four broad teeth on the periphery to prevent movement while the internal teeth bite into the bolt head or nut. Recommended for use with soft or thin materials where considerable force and resilience are required for holding. Also used for oversize or elongated holes.



Irregular hole type

A standard external 'Shakeproof' washer provided with a square or specially shaped hole for keying to shafts or screw shanks to prevent relative movement.



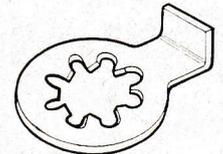
Terminal type

Provided with a terminal tag to form a combined terminal and lock washer.



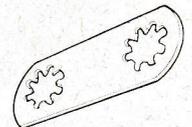
Tab type

Has a specially formed tab section to act as a functional or standard member or as a self-retaining device to hold the washer in a fixed position during assembly.



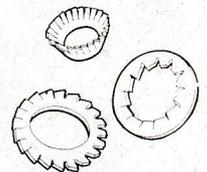
Locking plate type

Designed to eliminate the need for separate lock washers. Available in several styles.



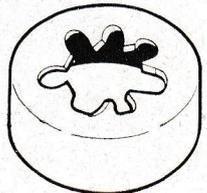
'Fan Disc' lock washers

These differ from the 'Shakeproof' types by the fact that the angled teeth overlap to prevent flattening even when fully compressed. The greater the pressure applied, the deeper the teeth bite into the bolt head or nut. Types shown include internal, external and countersunk.



Cup type

Designed to retain a sealing grommet under the washer. Provides a sealing method in addition to the required locking action.



Cup washers

For decorative purposes or to provide an additional bearing surface under the heads of countersunk screws.

