Why Use a Tolerance Ring?
BENEFITS OF TOLERANCE RINGS

- Reduced cost
- Improved vibration characteristics
- Secure mounting across a large operating temperature range
- Elimination of complex machining operations
- Relaxed tolerances on mating components
- Compensates for angular misalignment

- Easily assembled
- Torque overload protection
- Consistent assembly forces
- Increased product life
- Allows rework
- Increased product reliability

RENCOL® Tolerance Rings
Will solve your design engineering problems!

We have extensive in house design, test and R&D capabilities and can send customised samples upon request.
WHAT IS A TOLERANCE RING?

The RENCOL® Tolerance Ring is a radial spring component that is used to join mating cylindrical parts in a unique, economical, and mechanically efficient way. Manufactured from high quality spring/carbon steel and alloys it is a frictional fastener capable of handling the mounting of bearings, torque transfer, torque overload protection and axial slip between mating components.

Types of RENCOL® Tolerance Ring

**HV Rings (Housing Variable)**
The HV style ring is “open” in the free state so that when installed inside a bore the ring will conform to that bore and be self-retaining. The ring sits in the housing with waves on the inside to be compressed by the outer diameter of the mating part.

**HVL Rings (Housing Variable Light)**
The HVL style may be described as a very light duty HV style ring. It is often characteristic of this ring to not have a circular shape in free state. This ring is generally used as a bearing mount where bearings are required to ‘float’ axially.

**HVT Rings (Housing Variable Tabbed)**
Tabbed rings have extra parts of material that extend at 90 degrees off the plannish. These tabs help to prevent the tolerance ring “walking out” in high vibration environments.

**SV Rings (Shaft Variable)**
SV style rings have a free-state diameter smaller than the shaft diameter over which they are to be installed, so that when mounted to the shaft, the rings conform to and become self-retaining on the shaft. The ring sits on the shaft with waves on the outside to be compressed by the bore of the housing.

**Multiplex Rings**
Single piece ring but with two or three sets of waves in parallel giving increased performance. This simplifies the machining requirements on mating components.

**Flanged Rings**
HV ring with flanged end (a protruding rim that surrounds the circumference of the material) used for axial load control or limiter, for example in steering column collapse mechanisms.

**Crown Rings**
A crown ring can be a SV or HV style ring with fingers instead of waves, these fingers are designed to withstand large tolerances and absorb vibrations/movement. This type of ring is generally used for large radial clearances of less than or equal to 3mm.
## COMPETING SOLUTIONS

### Engineered Fastening

<table>
<thead>
<tr>
<th></th>
<th>Circlip</th>
<th>Threads</th>
<th>Press fit</th>
<th>Adhesive</th>
<th>Tolerance Ring</th>
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<tr>
<td>Re-workability</td>
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<td>✔️</td>
<td>✗</td>
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<td>✔️</td>
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### Bearing Mount

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<tr>
<th></th>
<th>Rubber boot</th>
<th>Press fit</th>
<th>Adhesive</th>
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<tbody>
<tr>
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<tr>
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### Torque Transfer

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<th></th>
<th>Keyway</th>
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<tr>
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### Torque Overload Protection

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<tr>
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<th>Mechanical Clutch</th>
<th>Sensor / Electronics</th>
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### Axial Slip

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<tr>
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<th>Ball sleeve</th>
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<td>✗</td>
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</tr>
</tbody>
</table>
# Tolerance Ring

## Common Uses

### Engineered Fastening

The RENCOL® Tolerance Ring allows a simple consistent joint of cylindrical parts using dissimilar materials without the complications and cost of adhesive, secondary machining operations or machined detail, such as splines or threads. The Tolerance Ring sits between the two components resulting in an engineered fastening.

### Bearing Mount

When mounting a bearing the RENCOL® Tolerance Ring sits between the application housing and the outer race of the bearing. The wave forms of the Tolerance Ring act as springs generating a controlled retention force between the outer race of the bearing and application housing.

### Torque Transfer

In a torque transfer application the RENCOL® Tolerance Ring sits between the driving shaft and the gear/pulley. The amount of torque is controlled by the design characteristics of the Tolerance Ring. The Tolerance Ring is an inexpensive solution which eliminates the need for costly machining operations such as keyways.

### Torque Overload Protection

In a torque overload application the RENCOL® Tolerance Ring sits between the driving shaft and the driven gear/pulley. The application slips at a predetermined torque level controlled by the design characteristics of the Tolerance Ring. The Tolerance Ring acts as an inexpensive slip clutch protecting expensive mechanisms such as gear boxes and motors from damaging torque overload situations.

### Axial Slip

In an axial slip application the RENCOL® Tolerance Ring is used to join two components which are required to move in relation to each other. The level of axial slip force is controlled by the design characteristics of the Tolerance Ring which can be designed to either offer smooth consistent axial slip forces or to slip at a pre-determined shock force.
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