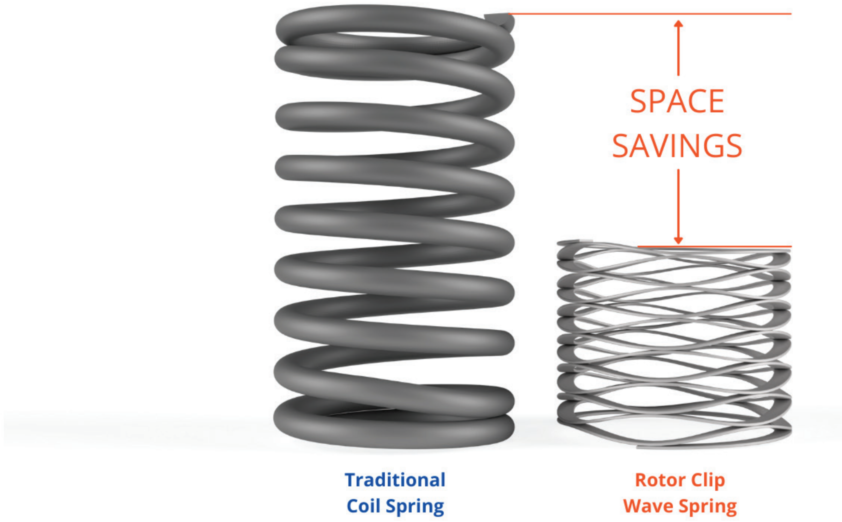
The Wave Spring Advantage

When considering a spring element for your technical application, it is worth comparing the familiar and traditional spring options to another innovative spring element, a wave spring. Most engineers have experience with traditional coil or disc springs, whilst wave springs remain somewhat of a mystery. Flat wire wave springs offer the best balance of size and spring force and in many applications, offers considerable advantages over their more traditional and well-known counterparts.



One of the main reasons to specify wave springs is the impressive force-to-work height ratio as they can produce the same or even greater forces as coil springs, whose work heights are up to twice as large. These axial space savings are perhaps the most immediately visible advantages of flat-wire wave springs. In static applications, a wave spring will typically need just 50% of the work height of coil springs to deliver an equivalent force. In dynamic applications, the work height advantage is typically about 30% less than the static applications, but still substantial. Wave springs can also save space in the radial direction compared to using disc or coil springs with larger diameters.

Wave springs can ensure a largely constant force over a large spring travel. Their deflection curves have wider, flatter linear force region than either coil or disc springs. Spring elements typically exhibit both linear and non-linear force behaviors, depending on their deflection. This linear behavior can be graphically shown on the spring's load-deflection curve. In general, the broader and flatter linear region of the curve, the easier it is to hit specific spring force requirements. Wave springs have a clear advantage in this department. They typically have a linear force between 30 and 70% deflections. Both coil and disc spring have much narrower linear force. Predictable spring forces can be a big benefit in many applications.

Another benefit of wave springs complete elimination of torsional loads. Whenever you compress a coil spring to its work height, loads are not just in the axis of compression but also torsional. These torsional loads can cause the pre-loaded component to rotate in use, potentially resulting in excess wear. Torsional loads can also decrease the spring working load. Whilst many applications can suffer from this rotational wear problem, wave springs don't have this issue. Their wave forms can only compress axially.

Compared to a traditional disc spring, multi-turn wave springs offer far more travel. One multi-turn wave spring can easily replace the assemblies that use multiple disc springs to achieve the necessary travel. Replacing a stacked disc spring assembly with one wave spring can result in both cost and quality benefits. Not only will the single spring cost less to install, but it also reduces the chance of assembly error.

Wave springs can also be used to preload bearings, eliminate axial endplay, and minimize vibration. Applying a permanent thrust load to a bearing assembly is important for secure and successful installation. The bearing preload process extends component lifetime by eliminating unnecessary clearances, creating high stiffness, and reducing noise and vibration.

Unlike stamped produces, which require tooling, wave springs can be customized by changing the parameters of the coiling equipment. This ability allows you to specify custom wave springs without worrying about cost or delays associated with custom tooling. This capability is yet another cost factor weighing in favor of wave springs.

This unique spring element is the clear winners in a wide variety of engineered systems and in applications with high performance requirements.

For more on wave springs, visit www.rotorclip.com or contact info@rotorclip.com