

The Difference Between Disc Springs and Belleville Washers

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Disc Springs and Belleville Washers are both conically shaped spring washers typically made from spring steels and designed to be loaded axially. Both can provide a higher degree of force in a relatively compact area as compared to coil springs or wave springs. While the terms “Disc Springs” and “Belleville Washers” are often used interchangeably, there are some technical, design, and application differences between the two products:

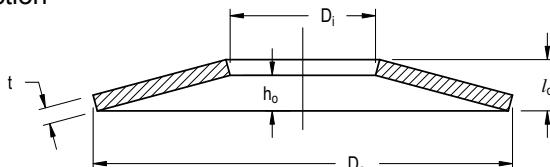
TECHNICAL DISTINCTIONS BETWEEN DISC SPRINGS AND BELLEVILLE WASHERS		
	Disc Springs	Belleville Washers
Typical Applications	Preloading, dynamic loading / cycling, predictable fatigue life important	Static Applications (Bolt fastening primarily)
Typical Materials	High carbon steel < 1.25mm, Alloy steel \geq 1.25mm	High carbon steel
Thickness	0.2mm - 14mm	Tend to be thicker for a given OD
Standard Units	Metric	Imperial / Metric
Force Requirements	Force / deflection curves specified and calculated	Static force / torque can be specified or no force specification
Governed by International Standards	DIN EN 16983 & 16984 (previously DIN 2093 & 2092)	DIN 6796



Belleville Washers are primarily used in heavy duty applications fastened together with a bolt where the load is considered static. Disc Springs can be statically loaded either continuously or intermittently, or dynamically subjected to continuous load cycling. Unlike Belleville Washers, Disc Springs are designed specifically to provide a repeatable force-travel relationship, and have a long and predictable fatigue life in dynamic or cycling applications. Disc Springs are commonly found in a variety of applications including pressure controls and regulators, vehicle braking systems, valves, shock absorbers, clutches, friction assemblies, and joints where thermal / weight cycling occurs. Disc Springs can be used as a single piece, or combined together into different configurations in stacks to achieve the desired force-deflection performance.

A defined list of standard Disc Spring sizes and associated load and deflection characteristics is available in DIN EN 16983 (formerly DIN 2093).

Selecting the most appropriate Disc Spring or Disc Stack configuration can be challenging. It is recommended that designers partner with experts in [Disc Spring Application Engineering](#) to determine the optimum Disc Spring for a particular application.



For information about fatigue life of Disc Springs, read the SPIROL White Paper:
[How to Calculate the Estimated Fatigue Life of Disc Springs](#)





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Please refer to www.SPIROL.com for current specifications and standard product offerings.

SPIROL Application Engineers will review your application needs and work with you to recommend the optimum solution. One way to start the process is to visit our **Optimal Application Engineering** portal at SPIROL.com.

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