

Original SCHNORR® disc springs

The characteristic benefits of original SCHNORR® disc springs include:

- ① Load deflection curves of straight, progressive or degressive character according to the selection of spring arrangement and dimension.
- ② Simple adjustment of the spring stack length by the addition or removal of individual springs, thus altering the spring stack characteristic.
- ③ Efficient use of space with high spring forces obtainable with small deflections.
- ④ Largely self damping, particularly with parallel stacking.
- ⑤ No setting or fatigue under normal loads.
- ⑥ Long service life
- ⑦ Flexibility in application of the disc springs can lead to a reduction in stock levels.

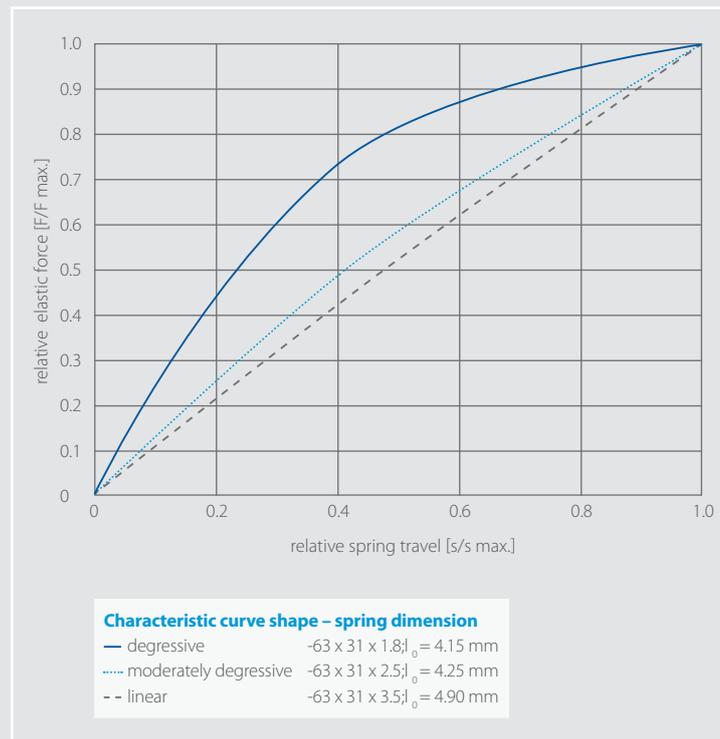
By means of these characteristics, the original SCHNORR® disc spring has developed such a wealth of application areas that nowadays there is scarcely an engineering area where it is not used.



Effect of spring forces

The importance of disc springs on machines and control systems is very often underestimated. At the same time, each impact on the behaviour of these components may give rise to a malfunction or even failure of entire facilities.

Classification of the various spring type is often carried out according to the kind of load. The disc spring has a special place in the range of springs commonly available. By changing its geometric parameters it is possible to provide individual springs with characteristic curves from linear to strongly degressive according to the application needs.

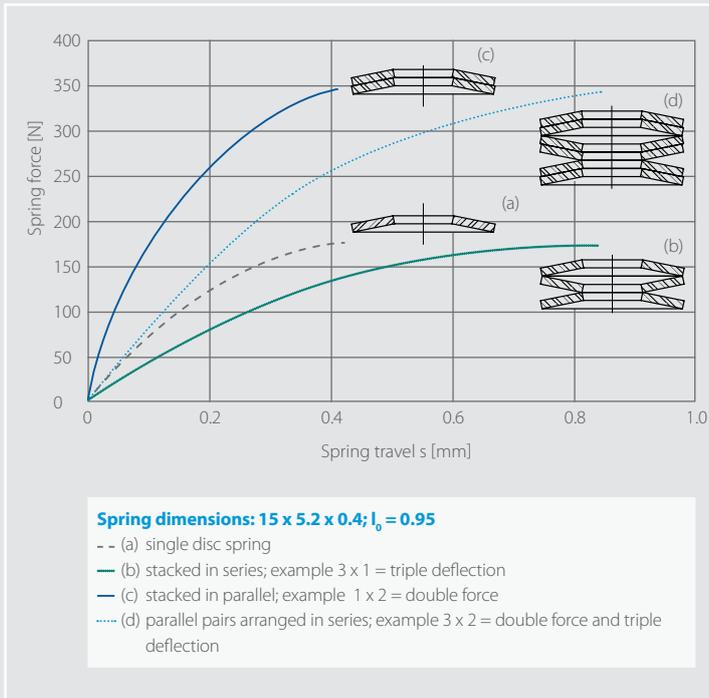


A key advantage of the disc spring is that it can raise a high elastic force with a small spring travel. That is why it is used very often to store potential energy. Apart from this virtual static use, it is also often used in dynamic applications.

When using disc springs under sinusoidal oscillating loads, fatigue strength and time yield diagrams are available in order to enable a safe design. Wherever possible the spring arrangement applied should achieve a fatigue life in excess of 2 million cycles. Fundamental to the successful application of a disc spring under these conditions is observing the minimum preload requirements and that the springs are correctly guided.

SCHNORR® fatigue life estimates are based on a sinusoidal load input. For applications where step input (i.e. impact) is seen SCHNORR® can advise on fatigue life according to application.

The conical shape of the disc spring allows single springs to be combined in different ways. As a result, the characteristic of a spring combination can be varied in almost any way desired. In principle the following possibilities exist. In spring columns with single springs stacked in series, the spring deflections add up with constant load (b). In spring columns with springs stacked in parallel, the forces add up at the same deflection (c). In spring columns with combinations of serial and parallel stacking, various characteristic curves can be realized (d).



If disc springs of different thickness are stacked in a suitable way, then even progressive characteristic curves can be realized. For this, either several disc springs of different material thickness or identical disc springs with intermediate rings of different thickness or different layering types are used.

Due to this flexibility in the characteristic curve design, the disc spring can be used in a very wide spectrum.

Do you require assistance in specifying the correct disc spring either standard or special to your exact requirements?

Our engineering team will be pleased to help you in designing the most suitable disc spring solution according to your specifications.

The earlier we are involved in the development process, the better we can support you with our expertise.

What should one look for when selecting disc springs?

The price of incorrect selection with warranty claims and loss of reputation is very often more than the initial cost of a quality disc spring in the first place. In order to help you, we think the following are the most important criteria:

- ① Does the manufactured version comply with the quality requirements? On pages 8 and 9 you will find various manufacturing processes. One should pay attention to using a quality which complies with the requirements. We would be glad to advise you on the correct selection.
- ② Is the disc spring preset? Some suppliers in the low-price segment try to save this step. As a result, the disc spring will take a set after the first load.
- ③ Was a suitable material selected? In case of high temperatures or hostile environment, special materials need to be specified (see page 37).
- ④ Was a suitable surface treatment selected for corrosion protection (see page 40)?

Should individual consulting and design be carried out? We would be glad to support you with our experience and know-how.