Compression Spring Design and General Considerations

There are a number of design Condisderations to consider when working with compression springs. Let us first consider stress, set and weight as important considerations in establishing a custom spring design which need to be understood at the outset.

Compression Spring Stress

The dimensions, along with the load and deflection requirements, determine the stresses in the spring. When a compression spring is loaded, the coiled wire is stressed in torsion. The stress is greatest at the surface of the wire; as the spring is deflected, the load varies, producing a range of operating stress. Stress and stress range govern the life of the spring. The higher the stress range, the lower the maximum stress must be to attain comparable life. Relatively high stresses may be used when the stress range is low or if the spring is subjected solely to static loads.

In designing compression springs the space allotted governs the dimensional limits of a spring with regard to allowable solid height and outside and inside diameters. These dimensional limits, together with the load and deflection requirements, determine the stress level. It is extremely important to consider carefully the space allotted to insure that the spring will function properly to begin with, thereby avoiding costly design changes. Wider outside diameters will reduce stress as will increasing the length by increasing the number of coils. Given an outside diameter, using smaller wire sizes will further reduce stress; however, the result will be lighter compression loads.

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