

Benefits of 420 Chrome Stainless Steel Coiled Spring Pins

by Michael Pasko, applications engineer, SPIROL Connecticut

SPIROL invented the Coiled Spring Pin in 1948 – these can be used in many industries including automotive, medical, heavy equipment, military, aerospace and consumer products. In applications requiring a combination of high strength, superior fatigue life and corrosion resistance, 420 martensitic chrome stainless steel offers a host of technical benefits and provides an overall robust cost-effective solution.

Ref: FFT170225

All content © Fastener + Fixing Magazines, 2025.

This technical article is subject to copyright and should only be used as detailed below.

Failure to do so is a breach of our conditions and may violate copyright law.

You may:

- View the content of this technical article for your personal use on any compatible device and store the content on that device for your personal reference.
- Print single copies of the article for your personal reference.
- Share links to this technical article by quoting the title of the article, as well as a full URL of the technical page of our website – www.fastfixtechnology.com/technical
- Publish online the title and standfirst (introductory paragraph) of this technical article, followed by a link to the technical page of the website – www.fastfixtechnology.com/technical

You may NOT:

- Copy any of this content or republish or redistribute either in part or in full any of this article, for example by pasting into emails or republishing it in any media, including other websites, printed or digital magazines or newsletters.

In case of any doubt or to request permission to publish or reproduce outside of these conditions please contact: editor@fastfixtechnology.com

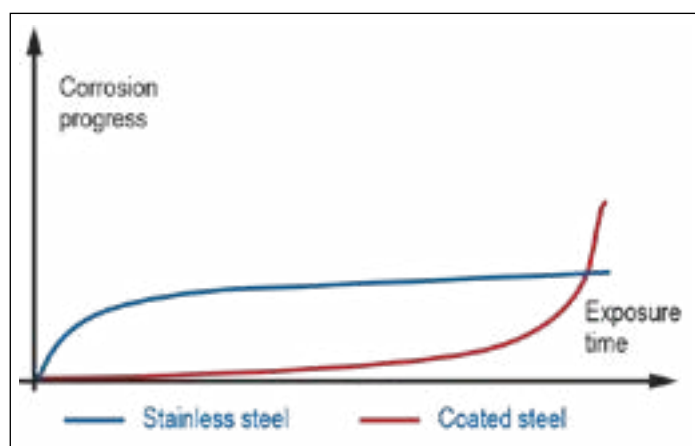
Benefits of 420 Chrome Stainless Steel Coiled Spring Pins

by Michael Pasko, applications engineer, SPIROL Connecticut

SPIROL invented the Coiled Spring Pin in 1948 – these can be used in many industries including automotive, medical, heavy equipment, military, aerospace and consumer products. In applications requiring a combination of high strength, superior fatigue life and corrosion resistance, 420 martensitic chrome stainless steel offers a host of technical benefits and provides an overall robust cost-effective solution.

SPIROL's 420 stainless steel Coiled Spring Pins are hardened to values approximating their high carbon steel equivalents and share the same minimum rated shear strength. This process also develops desired spring properties and fatigue resistance. Chrome stainless steel Coiled Pins also offer good corrosion protection against most common atmospheric and environmental conditions without the risk of rapid work hardening associated with 302/304 austenitic stainless steel. In most cases, 420 chrome stainless steel Coiled Spring Pins may be used as drop-in replacements for high carbon steel pins assuming galvanic potential has been considered relative to the host material.

When corrosion resistant Spring Pins are required, there are two common options – carbon steel with a sacrificial protective plating or coating, or stainless steel alloys which are inherently corrosion resistant. Platings and coatings provide excellent performance though they are consumed over time, whereas stainless steel provides a lifetime of protection providing free oxygen is available in the environment (free oxygen allows the fastener's protective chromium oxide layer to reform if damaged). For plated and coated parts, once the plating or coating is depleted, the carbon steel is left unprotected and rapidly corrodes.



This graph shows how time impacts the corrosion resistance of coated steel compared with stainless steel

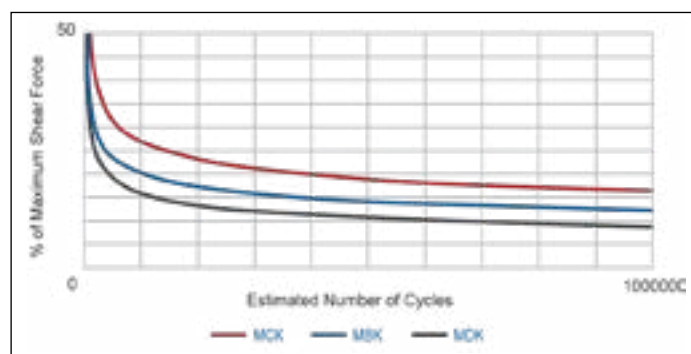
420 martensitic chrome stainless steel provides good corrosion resistance in a variety of environments, this includes resistance to normal atmosphere and humidity, steam, fresh water, alcohol, ammonia, alkalis, mild acids, petroleum products such as gasoline, oil or crude, as well as mild detergents and sterilising solutions.

While 302/304 austenitic stainless steel Coiled Pins provide excellent corrosion protection, this material is not an appropriate solution when the pin will be subject to dynamic loads, or where strength and fatigue

resistance must equal or exceed that of high carbon steel. Alternatively, 420 martensitic chrome stainless steel provides an exceptional combination of strength and fatigue resistance – in addition to its inherent corrosion resistance.

420 chrome stainless steel provides enhanced fatigue life – an important consideration given that Coiled Spring Pins are often intended to function as dynamic elements within many applications. A unique characteristic of Coiled Spring Pins is that their flexibility after installation protects host holes and assemblies by dampening vibration and shock loading. For the purpose of comparison, Coiled Pins of the same duty (i.e. material thickness) produced from material of equal dimensions, were tested in the three standard materials:

- + MBK – Standard duty, high carbon steel, plain finish
- + MCK – Standard duty, 420 chrome stainless steel, plain finish
- + MDK – Standard duty, 300 series austenitic stainless steel, plain finish



Data for comparative purposes only – conditions in this test do not infer performance benchmarks in any application as varied load, host materials, hole size and shear plane quality/clearance will impact performance

Resultant trend lines demonstrate 420 chrome stainless steels superiority in fatigue when tested at increasing percentages of assigned minimum double shear strength.

Summary

Coiled Spring Pins manufactured from 420 chrome stainless steel are an excellent material choice where high strength, moderate corrosion protection and superior fatigue life are critical. Additional benefits to consider include excellent cost savings and high wear resistance. 420 chrome stainless steel Coiled Spring Pins will also offer good tensile and creep strength at moderately elevated temperatures, they are oxidation and erosion resistant while also enabling improved component cleanliness as compared to high carbon steel.



Coiled Spring Pins are offered in light, standard and heavy duty to meet application-specific requirements