



Advantages of Synthetic Elastic Extension Springs Over Metal and Alloy Extension Springs

The purpose of this white paper is to explain how rubber and latex synthetic elastic extension springs provide advantages in the industrial workspace for many different applications and processes.

What are Elastic Extension Springs?

The concept of an elastic extension spring is relatively simple though far lesser known than the standard design of a metal coiled extension spring.

While the familiarity with traditional coiled metal springs is widespread, the distinctiveness of elastic extension springs lies in their core—synthetic rubber, latex, or akin stretchable synthetic materials.

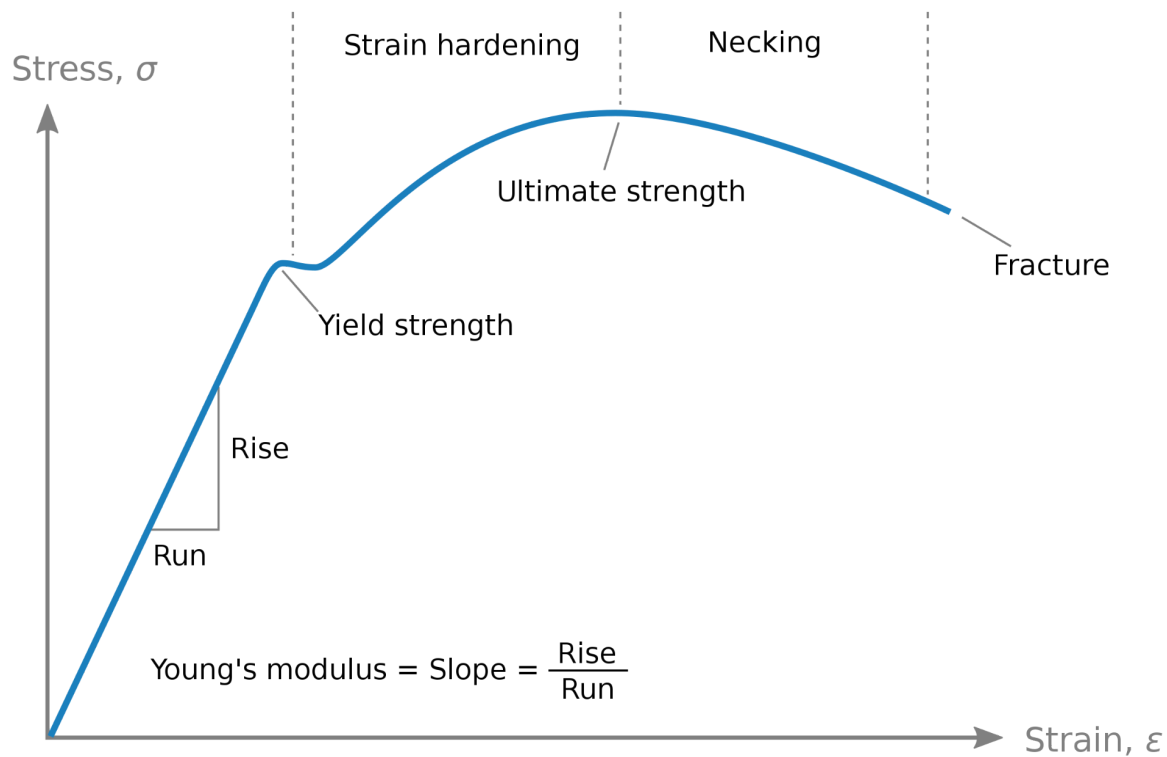
Because of its natural elasticity, elastic extension springs do not require a coil structure to extend. The synthetic rubber allows the “band” portion of the spring to deform elastically, oftentimes to a longer length without becoming inelastic or losing form.

Engineering at the Core

The engineering principles governing elastic extension springs are rooted in the material properties of synthetic rubbers and latex fibers. Elasticity, a measure of a material's ability to deform and return to its original shape when subjected to external forces, is pivotal. Synthetic elastic materials exhibit a high degree of elasticity, making them ideal for applications demanding repeated extension and retraction without permanent deformation, as well as longer stretches. Metal springs typically do not stretch elastically beyond roughly 50-75% of their original length.

To quantify elasticity, engineers often rely on the Young's modulus, a material property that characterizes the stiffness of a material.

Young's modulus is defined as: $E = \sigma/\epsilon$



At near-zero stress and strain, the stress–strain curve is linear, and the relationship between stress and strain is described by Hooke's law that states stress is proportional to strain. The coefficient of proportionality is Young's modulus. The higher the modulus, the more stress is needed to create the same amount of strain; an idealized rigid body would have an infinite Young's modulus.

The lower the Young's modulus, the more compliant and elastic the material. Synthetic elastomers, due to their relatively low Young's modulus, possess exceptional stretchability while maintaining their elastic behavior.

That being said, it is still possible to manufacture extension spring polymers that are more resistant to stretching. This is necessary for applications where an object's movement needs to be more highly restrained.

Advantages Unveiled

Enhanced Flexibility and Absorption: Synthetic elastic extension springs showcase remarkable flexibility. Their inherent ability to elongate without losing their elastic nature is a testament to their superiority in absorbing shock and vibrations. This makes them indispensable in scenarios where impact absorption is crucial for safety and system longevity.

Tailored Load-Bearing Capacity: One of the defining features of elastic extension springs is their adjustable load-bearing capacity. By altering the material's thickness and composition, engineers can fine-tune the spring's response to varying loads. This versatility ensures optimal performance in diverse industrial applications.

Corrosion Resistance: Traditional metal springs are often susceptible to corrosion, which compromises their performance and lifespan. In stark contrast, synthetic elastic extension springs exhibit innate corrosion resistance, a feature that significantly extends their operational life and reduces maintenance requirements.

Noise Dampening: The inherent noise-dampening properties of synthetic materials provide these springs with superior noise reduction capabilities. This makes them invaluable in applications where noise control is imperative, such as within precision equipment or machinery.

The 3X Springs Advantage

Elastic extension springs made from latex or other synthetics may appear similar in structure to a standard tubular resistance band. The applicability of this instrument can vary based on the needs of the industry it is used in. Its usefulness becomes more widespread when considering the enhanced ability of this spring type to undergo more stress while incurring less strain.

3X Springs has been a pioneer in the manufacturing and production of industrial elastics since the early 2000s. One of the prime features of a 3X Springs Elastic Extension Spring is its design, which features a protective non-elastic sleeve wrapped around the synthetic material.

This sleeve is applied to the instrument with as much slack as is needed to stay intact and allow the latex a lengthwise stretch up to approximately 400% of its length at rest.

In addition to shielding the spring from external damage from abrasion or rugged environments, the sleeve also stops the synthetic's stretch capacity short of the point wherein it would incur too much stress and hasten its wear or render it permanently deformed.

Conclusion: Elevating Engineering Paradigms

In conclusion, the ascendance of synthetic elastic extension springs ushers in a new era of engineering possibilities. These springs, born from the marriage of innovative materials and meticulous engineering, showcase a myriad of advantages—from enhanced flexibility and tailored load-bearing capacity to corrosion resistance and noise dampening capabilities. As industries continue to evolve, embracing such cutting-edge engineering solutions becomes imperative for optimizing performance and efficiency across a wide spectrum of applications.

For more information or to explore our range of high-quality extension springs, please contact us at 1-801-776-3322 or email us at sales@3xsprings.com.

