

This catalog lists the spring materials and the range of coil width that iConn Engineering regularly designs and manufactures. It also covers the basic functions and major advantages of canted coil springs in various applications.

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Canted Coil Springs For Mechanical or Electrical Connectors

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Product Range

iConn Engineering's canted coil springs can be categorized in terms of wire materials, wire diameters, and coil dimensions. The table on the right covers the range of canted coil springs we design and manufacture. iConn typically has no spring in stock and every part number is specifically designed and manufactured for each customer.



Figure 1. Canted coil springs in straight length or spring ring forms

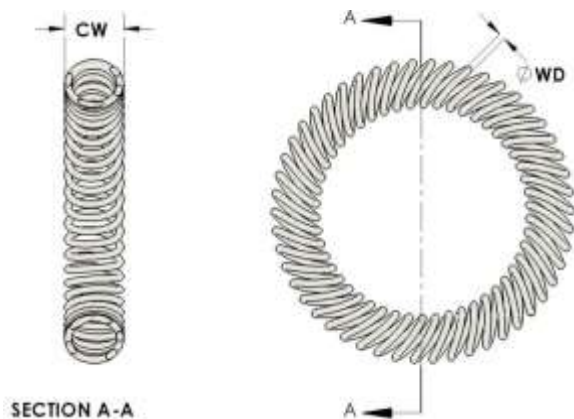
Our standard wire materials are stainless steel and copper alloy. Other materials can be specially ordered. Our lead time is from two weeks to four.

In order for springs to work as designed, spring gland dimensions must match the spring deployed. iConn can provide design proposals free of charge if you fill out the application data form (ADF) at the end of this catalog (Page 6). To avoid unnecessary failures, engineers at

iConn always ask for your dimensional restrictions, application medium, temperature variations, as well as electrical and mechanical requirements before proposing a spring solution.

Table 1. iConn's canted coil spring sizes and wire diameters

Wire Diameter (WD) (mm)	Spring Coil Width (CW) (mm)		
	Small	Medium	Large
0.08 to 0.5	0.4	1.5	2.5
0.5 to 1.0	2.5	4.2	6
1.0 to 1.8	6	9.5	20



iConn aims to enhance our customers' competitiveness with the most innovative connecting solutions. We look forward to our mutually beneficial collaborations.

iConn's Competitive Advantages

iConn Engineering employs the smartest engineers, the most advanced tools, and the best practice to provide superior design solutions. We guarantee the product quality and repeatability with the ISO 9001-2015 system.

Advanced Spring Technology

iConn applies three-dimensional computer aided design (3D CAD) to model and analyze spring configuration and capabilities. Each spring is virtually designed with finite element technique and its mechanical and electrical data are utilized to maximize design successes. We also offer fast prototyping services to support our worldwide customers.

Stringent Vendor Selection

iConn's vendors must pass strict qualification criteria and prototype inspections before approval. Materials must pass our proprietary purchasing specifications to meet the final product functionalities, and are always subject to strict incoming inspections. We also match material certifications to production lots in the quality documentation process for traceability.

Best Production Precision

Besides rigorous design and material control, our dimensional precision and repeatability are achieved with CNC machines and presubscribed inspections. The 3D modeling data enable iConn to maintain tight tolerance ranges, propelling iConn to the front of the spring industry.

Strict Quality Procedures

First article inspection, documented sampling schedules, and final inspections are enforced to ensure product qualities. Inspection reports are included in the documentation package. We ensure spring reproducibility and repeatability to protect our customers' best interests.

Uncompromised Customer Service

Communication is essential to any business success. iConn's sales team members diligently guide and provide uncompromised superior services. Engineering and Manufacturing routinely ensure the highest product qualities. Customer Service promptly follows up on order acknowledgment and progress update. Customer satisfaction is our first priority.

Canted Coil Spring Introduction

iConn Engineering is the world's leading innovative canted coil spring designer and manufacturer. Canted coil springs are sometimes called slanting or slanted coil springs. iConn provides unique and patentable connecting solutions for electrically conducting, radio frequency shielding, and mechanically force-targeted applications, serving virtually every major industry across the globe. Canted coil springs are often used in spring energized seals as well. Backed by the best mind, sophisticated design tools, and an ISO 9001 certified world-class manufacturing and quality system, iConn is dedicated to serve all your connecting, conducting, sealing, and shielding needs.

Canted coil springs are compressed on the side of coils, instead of vertically as in helical springs (Figure 2). The springs can be sold in the forms of straight length, or spring rings (Figure 1). Unlike helical springs, where the compression force linearly increases with the compression distance Δd (Spring Force = $k \times \Delta d$), canted coil springs maintain force plateaus after initial compressions regardless of compression distance. This feature enables a canted coil spring as the ideal connecting element in a force-constant connector or electrical conductor where targeted mating force and/or constant contact resistance are critical application requirements.

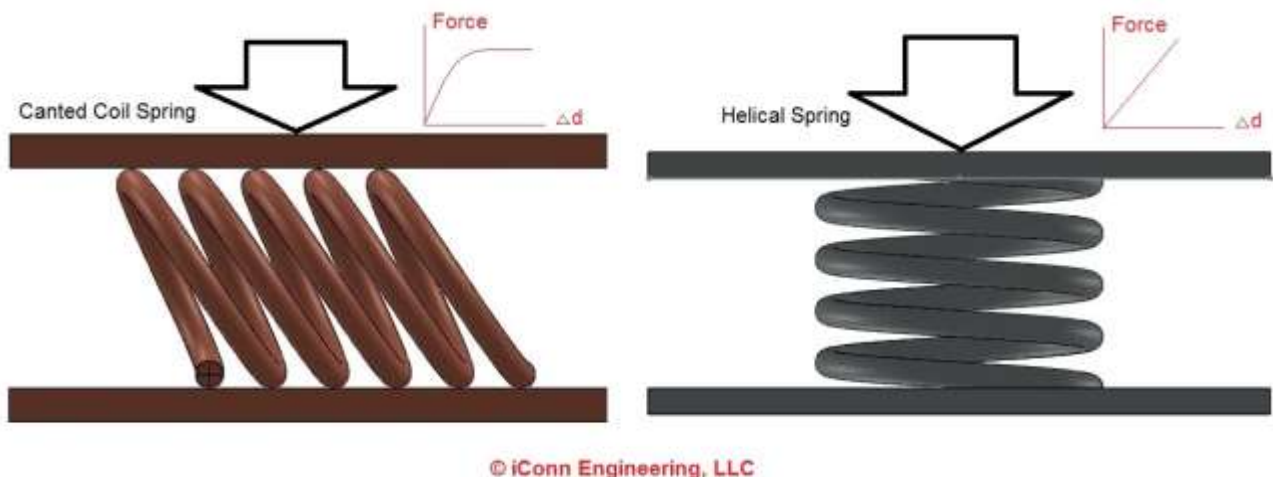


Figure 2. The differences of compression directions and force curve characteristics between a canted coil spring (left) and a helical spring (right)

Features and Advantages of Canted Coil Springs

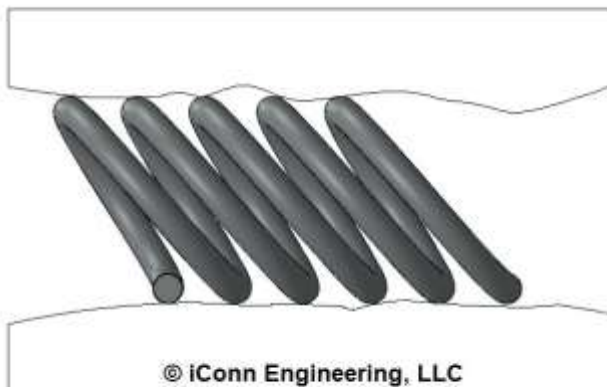
Dimensional tolerances are inevitable in the real world with thermally expanding/shrinking metal or plastic pieces, offsetted pistons, or unevenly finished surfaces. Canted coil springs solve the force variation problems with the unique **spring force plateau**, even when the spring compression range changes (Figure 2, left panel). Engineers at iConn pair each spring with specifically designed gland/groove dimensions to ensure the application functionalities. We also target the connector's engaging/disengaging force, and calculate the specific amount of electric current when necessary.

With the **simple** ease of **plug and play**, canted coil springs streamline the

connecting system by **decreasing space, simplifying connector assembly**, thereby **diminishing labor time, reducing materials**, and **saving manufacturing and maintenance cost**.

As aforementioned, the plateaus of the force curves provide **compensation for hardware imperfections** and piston misalignment (Figure 3). By exerting similar force on each coil, all coils of a canted coil spring buffer the unevenness of hardware, compensate for thermal variations, and exert similar force even with misalignment. The springs guarantee the connector's mechanical and electrical **consistency** and integrity. The coils also act to **clean** the surfaces when engaged.

A canted coil spring compensates for uneven surface...



and connector misalignment

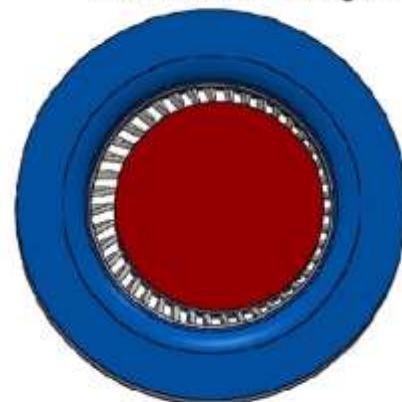


Figure 3. Canted coil springs compensate for surface unevenness, material thermal variations, or assembly misalignment while maintaining force consistencies

Mechanical applications

Canted coil springs must be installed in specifically designed glands to ensure dimensional and functional compatibilities. This requirement cannot be emphasized enough. When a mating component, for example, the piston in Figure 4, is plugged into the housing (blue), the spring is compressed vertically, generating a normal force to the piston. This force is pre-calculated at design time to control the connector's mating force. As a bonus, another

horizontal force can be designed to push Surfaces 1 and 2 tightly together.

Electrical Connectors

The electric capacity of each spring can be calculated to meet conducting requirements. With both electrical and mechanical functions, one canted coil spring can serve two purposes, lowering the number of components in the connector, saving space and materials, reducing assembly time, and decreasing system cost.

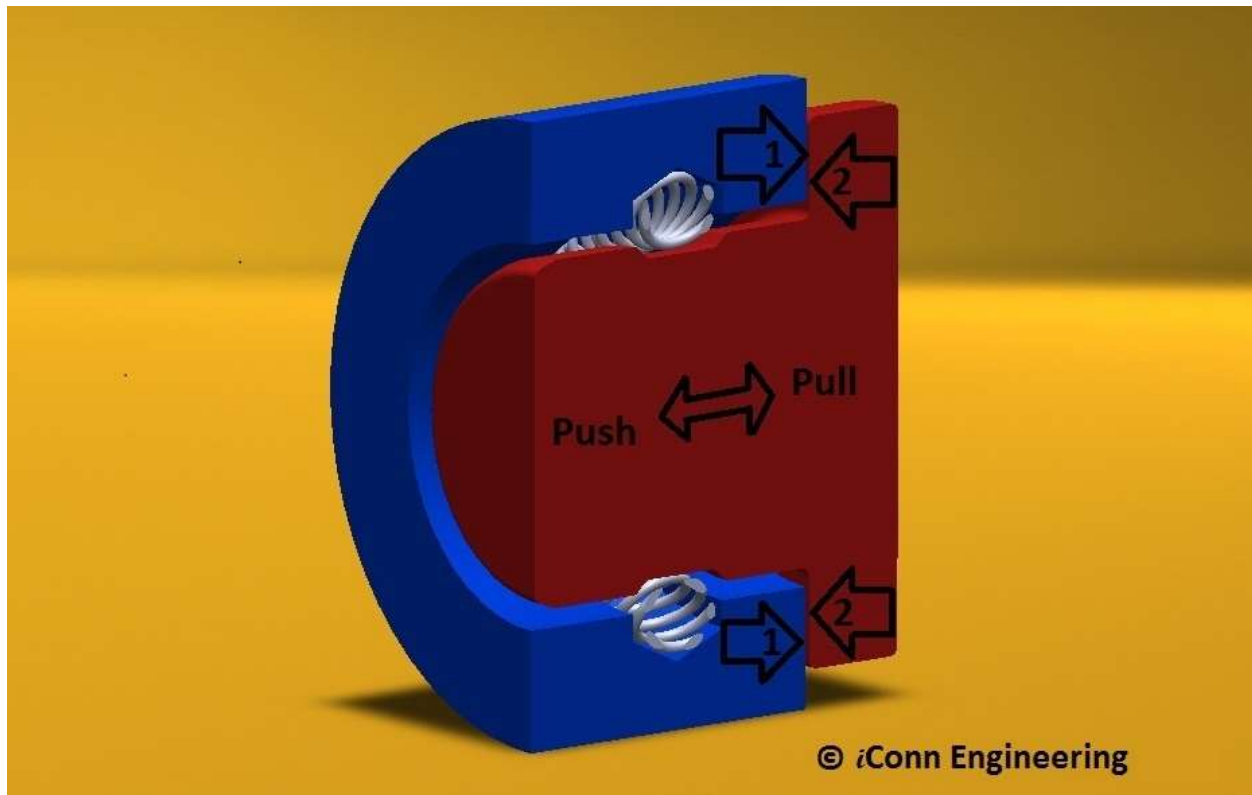


Figure 4. A simple canted coil spring connector multi-functionally pulls Surfaces 1 and 2 tightly together, prescribes specific amount of connecting and disconnecting force, and conducts pre-calculated amount of electric current

iConn is ISO 9001-2015 Certified

To facilitate spring design, please provide the specifics of your connecting needs:

iConn Engineering Canted Coil Spring Application Requirements

Your Information:		Date: _____	
Company: _____	Name: _____		
Address: _____	Title: _____		
Website: _____	Phone: _____		
	Email: _____		
Your Product Data: <input type="checkbox"/> Prototype Stage <input type="checkbox"/> Production Stage <input type="checkbox"/> Replacement			
Equipment Type: _____	Spring Qty: _____		Spring used:
Annual Spring Usage: _____			<input type="checkbox"/> Mechanically
Expected Production Date: _____			<input type="checkbox"/> Electrically
Your Application Conditions:			
Insertion Force: _____	<input type="radio"/> kg <input type="radio"/> lbs	Continuous Current: _____	<input type="checkbox"/> A <input type="checkbox"/> kA
Removal Force: _____	<input type="radio"/> gram <input type="radio"/> N	Short Circuit Current: _____	<input type="checkbox"/> A <input type="checkbox"/> kA
Compression Force: _____		Short Circuit Duration: _____	<input type="checkbox"/> Sec <input type="checkbox"/> mSec
Motion: <input type="checkbox"/> Static <input type="checkbox"/> Dynamic <input type="checkbox"/> Oscillatory		Δ temperature Rise: _____	<input type="checkbox"/> °C <input type="checkbox"/> °F
Mounting and Spring Type:			
<input type="checkbox"/> Piston Mounted Spring Ring	<input type="checkbox"/> Housing Mounted Spring Ring	<input type="checkbox"/> Spring in Length	Length: _____
Your Piston / Plug Info.:		Your Socket / Housing Info.:	
Diameter: _____	<input type="checkbox"/> mm <input type="checkbox"/> Inch	Diameter: _____	<input type="checkbox"/> mm <input type="checkbox"/> Inch
Tol: + _____	- _____	Tol: + _____	- _____
Groove Width: _____	± _____	Groove Width: _____	± _____
Groove Depth: _____	± _____	Groove Depth: _____	± _____
Material: _____		Material: _____	
Plating/Treatment: _____		Plating/Treatment: _____	
Surface Hardness: _____		Surface Hardness: _____	
<input type="checkbox"/> Piston groove can be modified		<input type="checkbox"/> Housing groove can be modified	

More comments if any:

Please email the filled form to: info@iconneng.com, or eng@iconneng.com