

**Springs**

**彈簧**

**IVEX**

**優杰科工程股份有限公司**

**懸臂彈簧 CANTILEVER SPRING**  
**螺旋彈簧 HELICAL SPRING**  
**斜圈彈簧 CANTED COIL SPRING**

# IVEX SPRING

## 優杰科彈簧

**IVEX** Engineering specializes in high-performance precision springs, including Cantilever Springs, Helical Springs, and Canted Coil Springs.

Our springs deliver reliable force, durability, and performance for demanding applications—from spring-energized sealing systems to EMI shielding and electrical conductivity.

Each spring is customizable in size, material, and surface finish to meet specific engineering needs.

With strong technical expertise and advanced manufacturing capabilities, Ivex provides high-quality, cost-effective spring solutions with fast lead times for global industries.

Contact us to discover how Ivex can enhance your next application.

**在** 優傑科工程，我們專注於高性能精密彈簧的設計與製造，產品包含 懸臂彈簧、螺旋彈簧 與 斜圈彈簧。

這些彈簧廣泛應用於密封系統元件、EMI電磁屏蔽、導電結構等關鍵領域。

我們提供多種尺寸、材質與電鍍表面處理的客製化選項，確保穩定性能與長期可靠性。

憑藉專業工程與製造能力，優傑科為各大產業提供高品質、具競爭力且交期迅速的彈簧解決方案。我們在全球各地皆有見證我們實績的客戶，歡迎與我們聯繫，讓優傑科協助您成就下一個優質的彈簧解決方案。



Cantilever Spring  
懸臂彈簧



Helical Spring  
螺旋彈簧



Canted Coil Spring  
斜圈彈簧

What are IVEX Springs for?  
優杰科彈簧的作用為何?

**01**

SEALING  
COMPONENT  
密封件元件

P. 3

**02**

ELECTRIC POWER  
TRANSFER  
電力傳輸

P. 6

**03**

EMI SHIELDING  
電磁波干擾屏蔽

P. 7

**04**

MECHANICAL  
PROPERTIES  
特殊機械性能

P.10



01

SEALING  
COMPONENT  
密封件元件

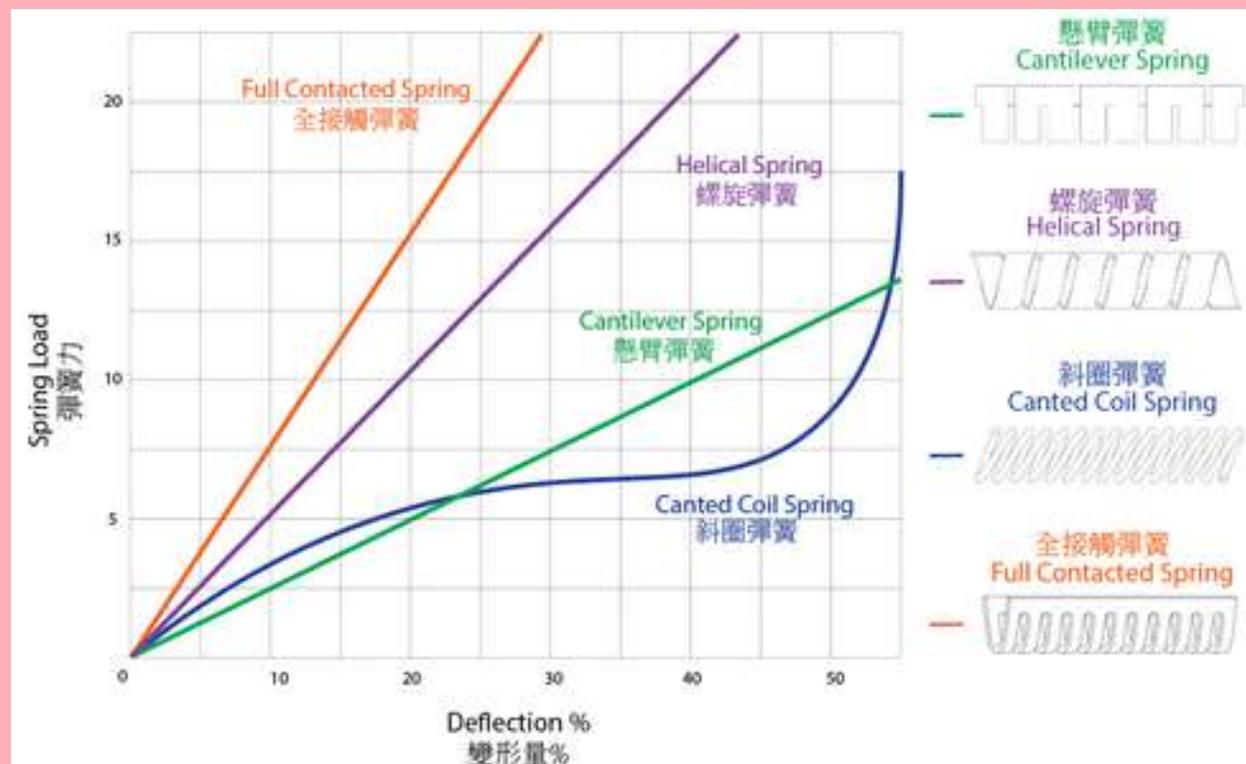
## SEALING COMPONENT 密封件元件

Springs come in different sizes and forms. To choose the right spring for your sealing application, it is essential to understand the characteristics of each spring. The load versus deflection graph illustrates the behavior of each type of spring. Too much spring force can result in premature wear or excessive friction, and too little spring force can lead to seal malfunction or poor contact in conductivity applications. The graph below compares the behavior of Cantilever Springs, Helical Springs, Canted Coil Springs and Full Contacted Spring which can help to navigate the direction to choosing the right spring for your sealing application.

每種形式的彈簧有對應的物性特質，在為您的密封件應用選擇合適的彈簧時，首先必須了解每種彈簧的特性。以下彈簧力 vs. 變形量的圖表說明了每種類型彈簧的特質。如果彈簧的力量太大可能會導致密封件過早磨損或位移的問題，而彈簧力不足可能會導致密封失效或在導電的應用中缺乏接觸點。下圖比較了懸臂彈簧、螺旋彈簧、斜圈彈簧和全接觸彈簧的物性特質，有助於您選擇最合適的彈簧。

### SPRING LOAD VS. DEFLECTION

彈簧力 vs. 變形量



● The graph is for general comparison purposes, the actual spring load can vary depending on the thickness, sizes and material of the actual spring.  
此圖僅用於一般彈簧比較說明，實際的彈簧力量可因材料、尺寸、厚度等因素受影響。

## CANTILEVER SPRING

### 懸臂彈簧



The Cantilever Spring has a large deflection range and is commonly used in spring energized seals. The V shape design is compressed during installation and provides spring load at the ends of the tabs. It is a great choice for medium load applications under static or low speed and is the preferred choice for reciprocating applications.

懸臂彈簧具有較大的變形範圍，最常使用於彈簧密封件上。V形的彈簧設計協助油封在密封的過程撐開密封套，助於更緊密的密封。它是在中等壓力之靜態或低速應用下的絕佳選擇。適用於公差較大和對心不良的密封溝槽。

### Sealing Application 密封應用場合

- Reciprocating radial and face sealing
- Slow speed rotary dynamic application
- Dynamic application up to 260 °C (500 °F)
- 往復式機溝的軸心與活塞密封
- 表面密封適於內壓或外壓的應用環境
- 動態密封使用溫度可達260 °C (500 °F)

## HELICAL SPRING

### 螺旋彈簧



The Helical spring has a high load spring with smaller deflection range. It distributes the load evenly across each individual band. It is commonly used for medium to high load applications under static and is recommended for vacuum and cryogenic sealing application. Helical spring can also be used by itself for other purposes, such as, EMI shielding or electricity conductivity reasons. Not suitable for wide gland tolerances, eccentricity, or misalignment.

螺旋彈簧能夠在小範圍的變形量下，承受較高的壓力。它能將力量平均地分佈在每個單獨的圈線上。在密封件的應用上，它通常用於中到高壓力之靜態應用，非常適用於真空或低溫密封環境。螺旋彈簧本身也可以用於其他目的，例如 EMI 屏蔽或導電應用。不適用於公差較大和對心不良的密封溝槽。

### Sealing Application 密封應用場合

- Static radial and face sealing
- High pressure environment
- Reciprocating or slow speed rotary dynamic application
- 靜態徑向和表面密封
- 高壓環境
- 往復或低速旋轉動態應用

## CANTED COIL SPRING

### 斜圈彈簧



The Canted Coil Spring has a unique curve with a very flat spring rate in a specific working deflection range. It can be customized into different spring loads. As the seal jacket wears, the force stays constant. It is typically used in dynamic with light to medium load application. Suitable for wide tolerance and glands. The design of the spring allows the spring to also perform outstanding tasks on its own such as electricity conductivity, EMI shielding, as well as mechanical fastening (locking, latching, and holding).

斜圈彈簧具有獨特的曲線，在特定的變形量範圍內具有非常穩定的彈簧力量。它可以依照彈簧設計，訂製不同的彈簧負載。在密封件的應用上，隨著密封套的磨損，彈簧力可以依然保持穩定。它通常用於輕到中壓力之動態應用；常見用於摩擦敏感的應用。適用於公差較大的密封溝槽。獨特斜圈彈簧的設計使彈簧能夠執行其他優異的功能，例如導電、EMI屏蔽以及機械連接，包含鎖定、閉鎖和保持。

### Sealing Application

#### 密封應用場合

- Friction sensitive applications
- Reciprocating radial and face sealing
- Moderate speed rotary dynamic application
- Dynamic application up to 260 °C (500 °F)
- 摩擦敏感應用
- 往復徑向和表面密封
- 中速旋轉動態應用
- 動態應用溫度可達 260 °C (500 °F)

- If you are not sure which spring is the best for you, please contact us.  
若您不確定適合您的彈簧，歡迎與我們聯繫。



02

ELECTRIC POWER  
TRANSFER

電力傳輸

## ELECTRIC POWER TRANSFER

### 電力傳輸

Electrical conductivity is a material's ability to conduct electric current. The higher the ability to transfer electric power, the lower the electrical resistivity. IVEX's Spring designs provide excellent electric power transfer under any level of current over long periods. Helical Springs and Canted Coil Springs are excellent choices for electric conductivity applications. Since Helical Spring has a high spring load, it stays in shape even with rectangular groove. As for Canted Coil Spring, the form of the spring allows it to have multiple points of contact which contribute to consistent conductivity even on uneven surfaces. Additionally, its mechanical properties allow it to work in applications with multiple insertions and removals, more info on page 10.

The material, dimension, spring force and plating are the keys to electric power transfer. Electricity conductivity is highly correlated with EMI shielding effectiveness which will be further explained in the following section. Ivex's engineering team can advise you on the best solution for your application.

優杰科彈簧的設計可在任何電流量下提供出色的電力傳導功能。電導率代表了材料傳導電流的能力。傳輸電力的能力越高，電阻率越低。螺旋彈簧和斜圈彈簧擁有優越的電力傳導功能，是在導電應用之下的絕佳選擇。輕巧、簡易的設計有助於減少安裝與設計的複雜度。由於螺旋彈簧具有較高的承載力，即使溝槽有方形的轉角，也能維持彈簧的形狀。而斜圈彈簧具有多個接觸點，彈簧的設計能夠在即使不平均的表面上，維持導電性質。此外，其斜圈彈簧的性能能夠使用在多次插入和移除的應用中，更多相關斜圈彈簧的機械功能請參閱P. 10。

傳輸電力的關鍵在於彈簧的材質、尺寸、負載力量和電鍍，而導電與電磁波干擾(EMI)屏蔽效能有著很大的關係，導電效能越高電磁波干擾(EMI)屏蔽效能越好。

### Application Examples 應用範例



Electric Vehicles  
電動汽車



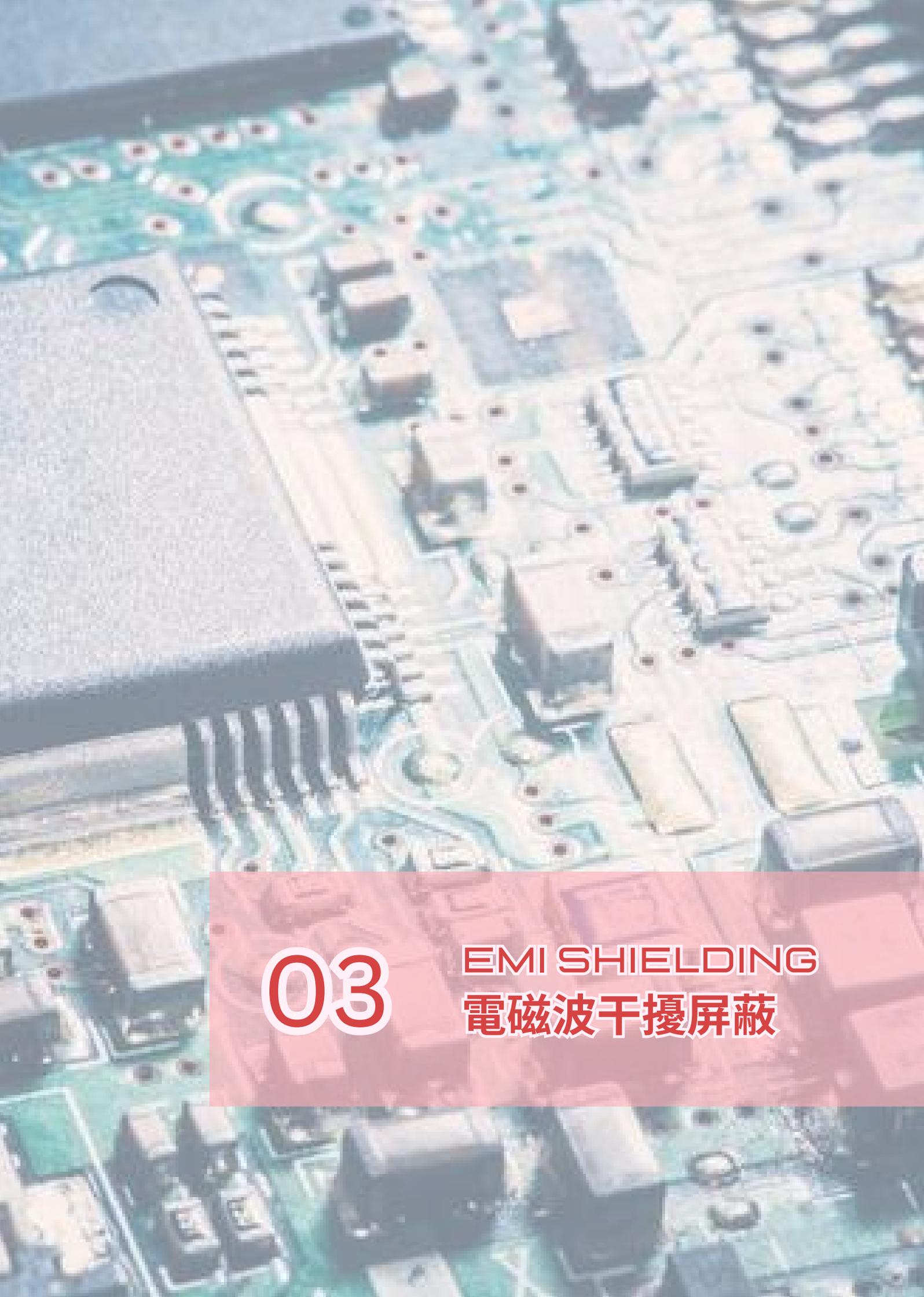
Wind Energy  
Turbines  
風力發電應用



Semi Conductor  
Devices  
半導體設備



Robotic Arms  
機械手臂



03

EMI SHIELDING  
電磁波干擾屏蔽

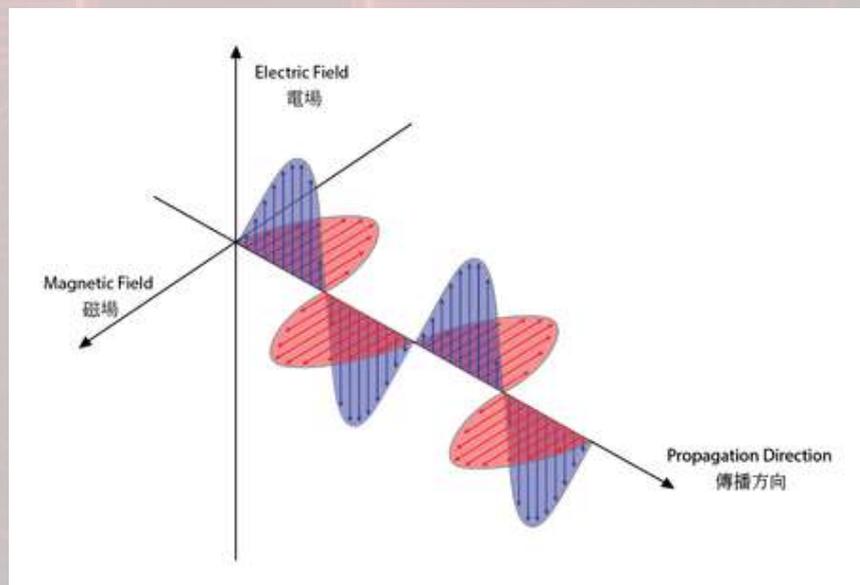
## EMI SHIELDING 電磁波干擾屏蔽

Electromagnetic interference (EMI) and radio frequency interference (RFI) is the electronic emission (unwanted noise) generated by an external source that disrupts electronic devices, radio systems and other systems used in critical applications. EMI/RFI can be occurred from natural occurrences (lighting, auroras, solar flares) and manmade (cellular networks, AM/FM radio waves, power transmission lines, etc). EMI/RFI shielding is a vital matter to prevent system failures in aerospace, automotive, military and many other industries.

電磁波干擾 (EMI) 和射頻干擾 (RFI) 是指在傳導或電磁場所產生的電壓或電流，導致降低或損壞電子設備、無線電系統和其他系統的性能。EMI/RFI 分為自然干擾源（閃電、極光..等噪音）及人為干擾源（電視、AM/FM 無線電波、雷達、導航等）。如果沒有適當的屏蔽裝置，設備裝置很容易被 EMI/RFI 破壞或導致故障。EMI/RFI 屏蔽已成為航太、汽車、軍事和許多其他行業中，防止系統故障的重要元素。

EM wave contains 2 components: **electric component** and **magnetic component** that are perpendicular to each other.

電磁波包含兩個元素：  
**電場**和**磁場** - 電磁輻射以波的方式在空間中傳播，傳播垂直於電場與磁場的方向



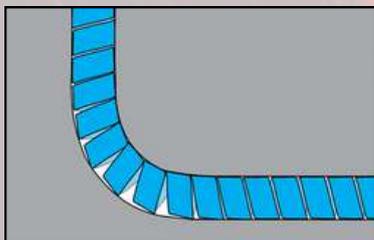
## IVEX'S EMI/RFI SHIELDING SOLUTION 優杰科EMI/RFI 屏蔽解決方案

Your devices could easily be damaged or cause malfunction without proper shielding against them. Many shielding devices suffer from weight, heat, and low flexibility. Ivex's Helical and Canted Coil Springs can protect your devices from harmful EMI and RFI even under poor conditions such as shock and vibration. Helical and Canted Coil Springs have multiple contact points which provide consistent conductivity to achieve the superior EMI/RFI shielding performance. It is an excellent option to reduce maintenance costs and design complexity while achieving EMI/RFI shielding performance.

許多屏蔽裝置都被重量、熱能管理問題和低靈活性等難題限制，而優杰科的彈簧能提供簡易、輕巧且安裝容易的EMI屏蔽方案。優杰科的螺旋彈簧和斜圈彈簧即使在衝擊和振動等惡劣的條件下，也可以保護您的設備免受有害的EMI/RFI 影響。螺旋彈簧和斜圈彈簧具有多個接觸點，可提供一致的導電性，以達到卓越的 EMI/RFI 屏蔽性能。此外，它還是降低維護成本和設計複雜的絕佳選擇。

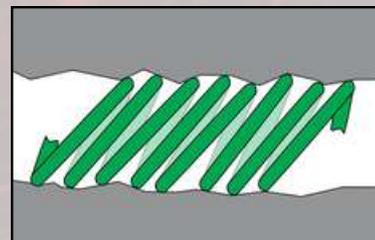
**Helical spring remains in spiral shape and maintains consistent contact even in grooves with sharp corners.**

螺旋彈簧即使在有尖銳轉角的溝槽下，也能維持彈簧該有的螺旋形狀，有助於穩定的接觸。



**Canted coil spring can ensure stable contact with the hardware even on uneven surfaces.**

斜圈彈簧的設計即使在表面不平滑的硬件上也能保持穩定的接觸，確保EMI/RFI屏蔽效果。



- The diagrams are for illustration purposes only. 以上圖示僅用於說明目的，並非實際尺寸。

## MATERIAL SELECTION FOR EMI/RFI SHIELDING

### 電磁波干擾屏蔽材質選擇

Conductive materials prevent the electric components while material with high magnetic permeability blocks out the magnetic components.

高導電性能的材料能阻擋電場方向的波，而高導磁率的材料能阻擋磁場方向的波。

#### Materials to shield electric component:

**Silver** is the most efficient at reducing electric field due to excellent conductivity and resistance to corrosion. However, it has a higher cost therefore it is generally used in surface coating with electroplating or as an alloying component. Taking costs and shield efficiency into consideration, **copper and aluminum metals** are more commonly used for shielding electric components.

#### 屏蔽電場能量的材料：

銀具有優異的導電性和耐腐蝕性，是降低電場最有效的材料。但其成本較高，因此一般用於電鍍表面塗層或作為合金成分。考慮到成本和屏蔽效益，銅和鋁金屬更常用於屏蔽電場。

#### Materials to shield magnetic component:

**Carbon steel alloys and iron nickel alloys** have good shielding properties against magnetic components of EM/RF waves. Carbon steel alloys include stainless steel and mild carbon steel, and iron nickel alloys include mu-metal. These materials have a high magnetic permeability which predominantly shields with absorption mechanism.

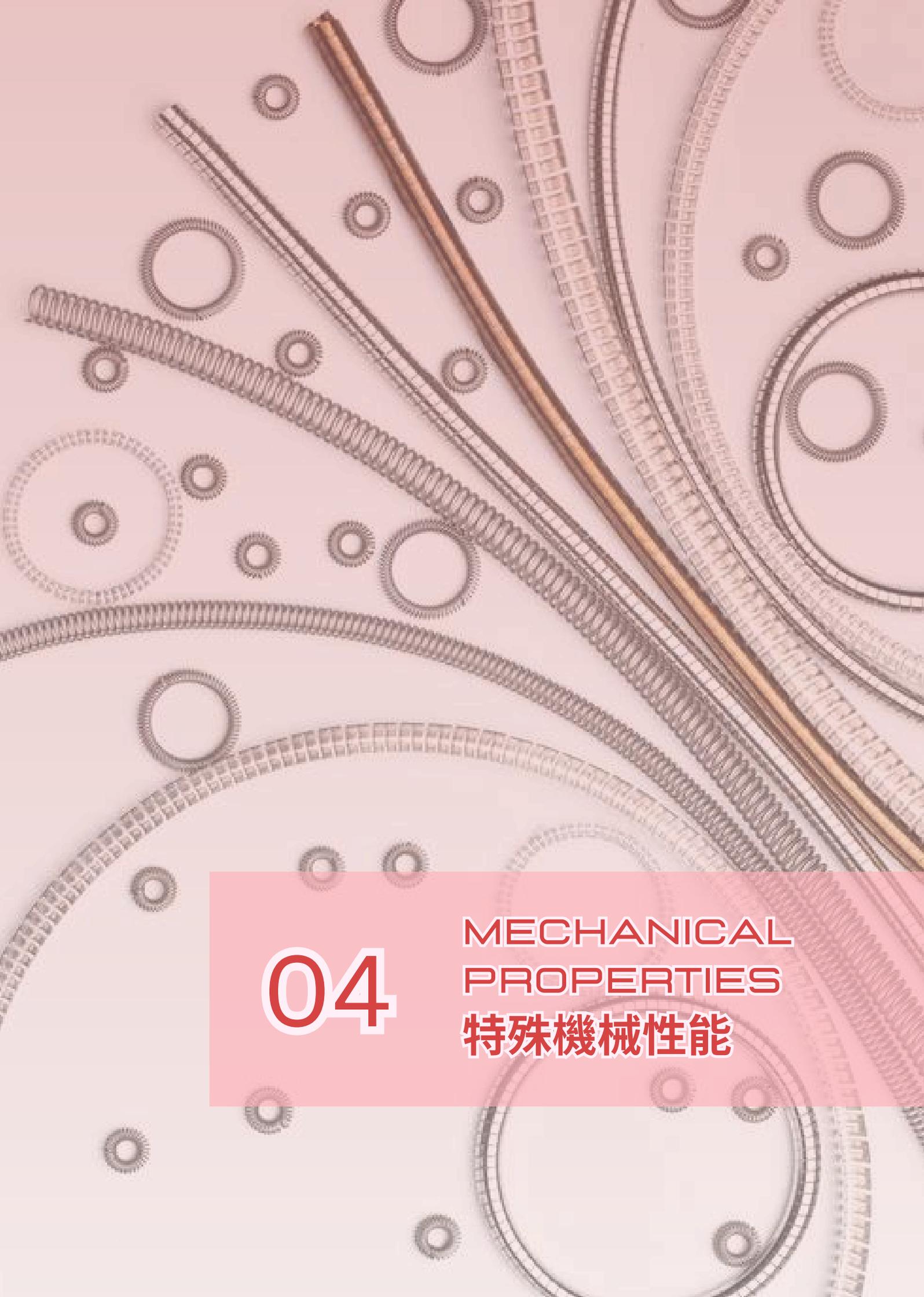
#### 屏蔽磁場能量的材料：

碳鋼合金（包括不銹鋼和低碳等）和鐵鎳合金（包括高導磁合金）對磁場具有良好的屏蔽性能。這些材料具有高磁導率，主要是以吸收磁場波的方式來預防干擾。

### Standard material for EMI Shielding 標準屏蔽EMI材料：

The standard materials to shield against EMI/RFI are **copper alloy and stainless steel**. Copper has almost the same electrical conductivity as silver which can easily be used unplated. On the other hand, stainless steel can be plated with other conductive materials to achieve high conductivity and corrosion resistance at the same time.

以屏蔽 EMI/RFI 的角度來看，彈簧的標準材料是銅合金和不銹鋼。銅的電導率幾乎與銀相同，所以無需電鍍即可使用。另一方面，不銹鋼可以電鍍其他導電較好的材料，同時達到高導電性、耐腐蝕性以優異的 EMI/RFI 屏蔽效果。



04

MECHANICAL  
PROPERTIES  
特殊機械性能

## MECHANICAL PROPERTIES FOR CANTED COIL SPRING

### 斜圈彈簧的特殊機械性能：



Ivex's Canted Coil Springs provide a solution for complex mechanical fastening applications. With the unique spring characteristics, the canted coil spring has fascinating mechanical capabilities: Locking, Latching and Holding. Based on the required spring force and application, we can customize the wire diameter, width, and height of the spring.

優杰科的斜圈彈簧為複雜的機械連接難題提供了解決方案。藉由獨特的斜圈設計理念，斜圈彈簧提供出色的機械特性：鎖定、閉鎖和保持。根據所需的彈簧力和應用，我們可以自製彈簧的線徑、寬度和高度。

#### Fastening Tasks:

- **Locking:** to indefinitely secure two components together without breaking or damaging the parts
- **Latching:** to temporary secure two components together and allow multiple removal and insertion cycles
- **Holding:** to clutch and align two components together through the control of spring force

#### 機械固定功能：

- **鎖定:** 在不會破壞或損壞設備下，永久的將兩個元件固定在一起
- **閉鎖:** 將兩個元件臨時固定在一起並達到多次插入和移除的循環
- **保持:** 通過彈簧力的控制將兩個元件夾緊並對齊在一起

This function is not exclusive to the other properties, one canted coil spring can perform EMI shielding, connecting and electricity conducting at the same time. The design of the spring helps to minimize the complexity of systems without affecting the overall performance outcome.

優杰科的斜圈彈簧可以同時發揮EMI屏蔽、連接和導電的功能。斜圈彈簧的設計在不影響整體性能結果的情況之下，有效降低系統設備的複雜性。

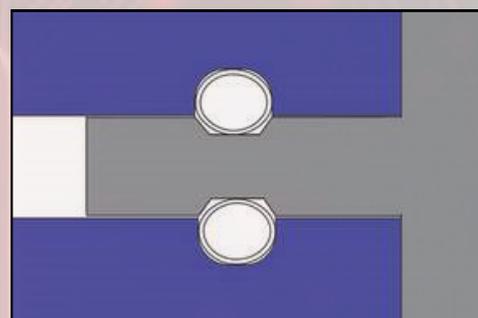
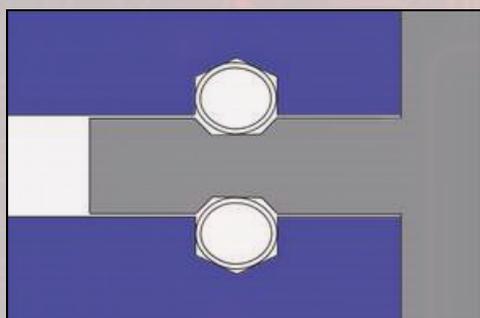
## TYPICAL GROOVE IN THE INDUSTRY

### 一般常見溝槽設計

Latching purposes

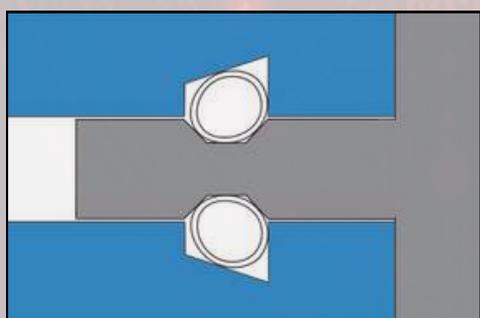
閉鎖功能溝槽

The grooves for latching purposes are also often used for **EMI shielding and electric power transfer**.  
閉鎖功能設計的溝槽通常也用於**電力傳輸與EMI屏蔽應用**



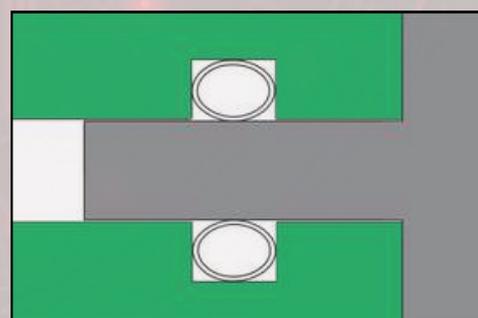
Locking purposes

鎖定功能溝槽

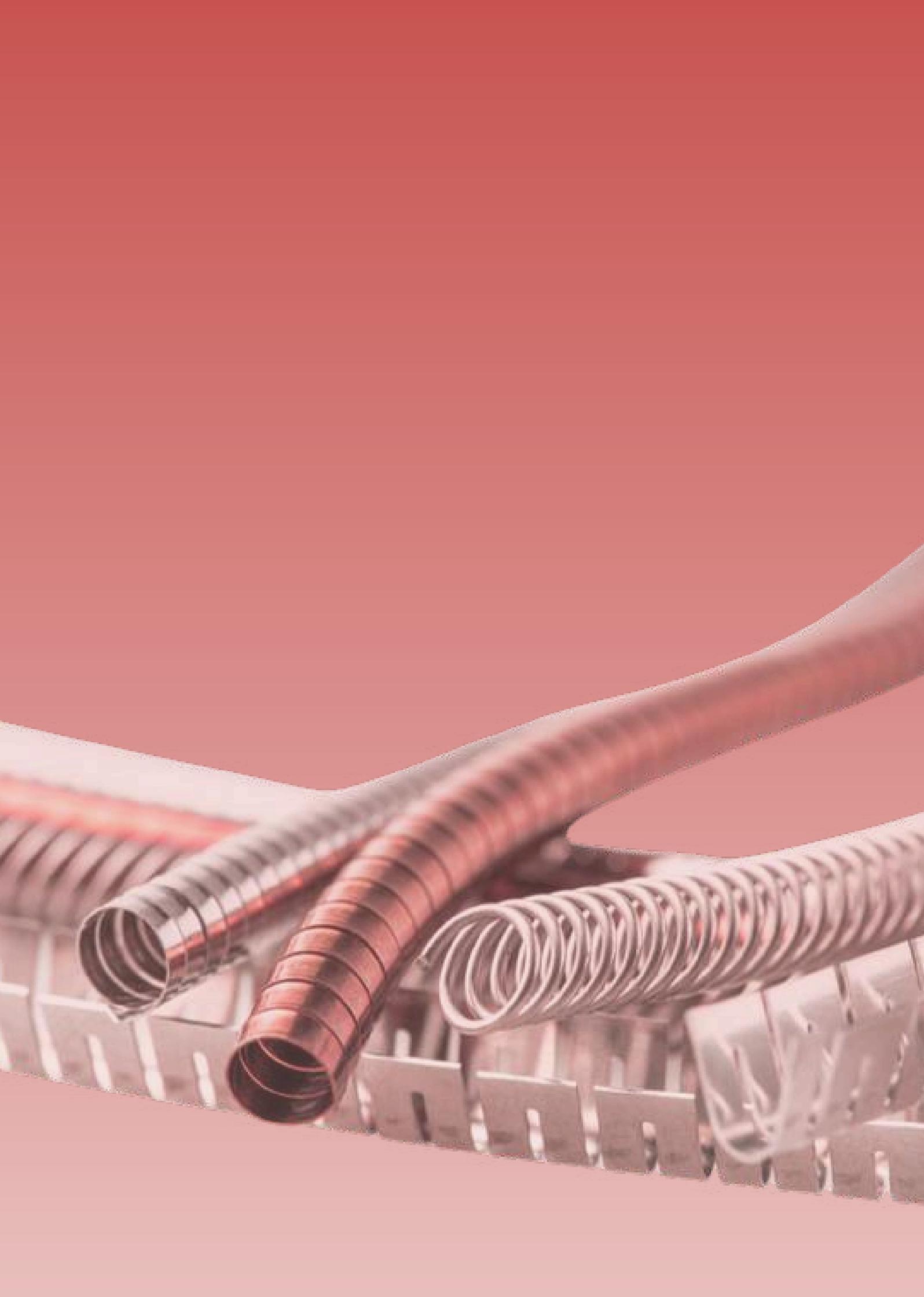


Holding purposes

保持功能溝槽



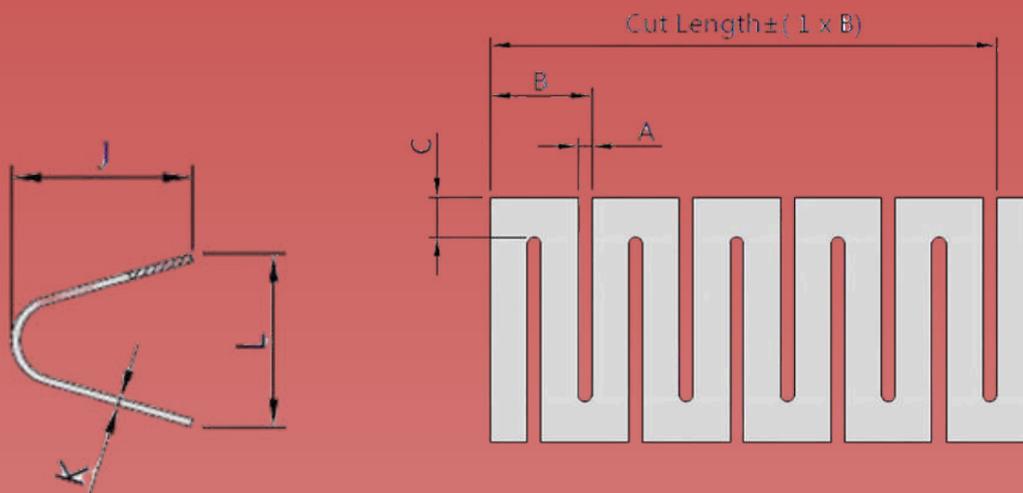
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# CANTILEVER SPRING

## 懸臂彈簧





MTL 材質: 301 SS | 316 SS | Hastelloy C276

Size Chart 尺寸表

Item No.	Metrics (mm)						Inches (")					
	A	B	C	L	J	K	A	B	C	L	J	K
SS - PV000	0.50	1.90	0.50	1.20	1.30	0.08	0.020	0.075	0.020	0.047	0.051	0.003
SS - PV100	0.50	2.40	0.50	2.00	2.00	0.12	0.020	0.094	0.020	0.079	0.079	0.005
SS - PV200	0.50	2.90	1.30	2.80	2.80	0.15	0.020	0.114	0.051	0.110	0.110	0.006
SS - PV300	0.50	3.80	1.60	4.50	4.30	0.20	0.020	0.150	0.063	0.177	0.169	0.008
SS - PV400	0.50	5.00	2.00	6.50	6.00	0.25	0.020	0.197	0.079	0.256	0.236	0.010
SS - PV500	0.90	6.90	2.40	9.00	8.50	0.25	0.035	0.272	0.094	0.354	0.335	0.010

MTL 材質: Elgiloy

Size Chart 尺寸表

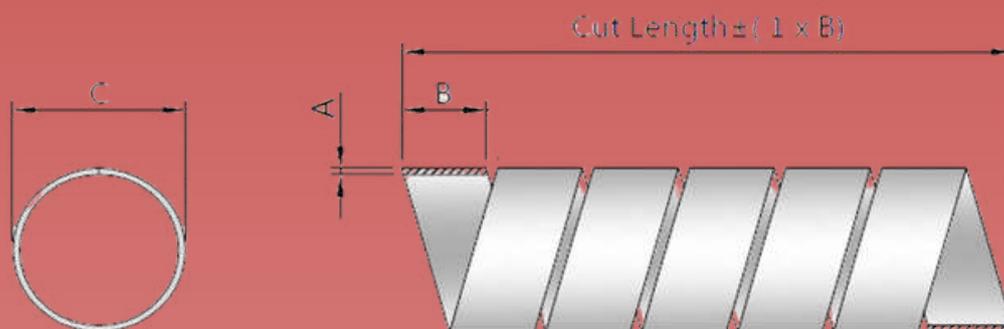
Item No.	Metrics (mm)						Inches (")					
	A	B	C	L	J	K	A	B	C	L	J	K
SS - PV000	0.50	1.90	0.50	1.20	1.30	0.08	0.020	0.075	0.020	0.047	0.051	0.003
SS - PV100	0.25	2.03	0.76	1.80	2.03	0.12	0.010	0.080	0.030	0.071	0.080	0.005
SS - PV200	0.28	2.54	1.02	2.57	2.67	0.15	0.011	0.100	0.040	0.101	0.105	0.006
SS - PV300	0.51	3.81	1.40	4.39	4.06	0.20	0.020	0.150	0.055	0.173	0.160	0.008
SS - PV400	0.64	5.08	1.91	6.22	5.97	0.25	0.025	0.200	0.075	0.245	0.235	0.010
SS - PV500	0.89	5.08	3.81	8.08	9.14	0.50	0.035	0.200	0.150	0.318	0.360	0.020

- Other sizes, materials, and length are available upon requests.  
如有其他尺寸、材料與長度的需求，歡迎與我們聯絡。

# HELICAL SPRING

## 螺旋彈簧





Size Chart 尺寸表						
Item No.	Metrics (mm)			Inches (")		
	A	B	C	A	B	C
SS - PH000	0.05	0.50	1.25	0.002	0.020	0.049
SS - PH100	0.08	1.00	2.00	0.003	0.039	0.079
SS - PH200	0.08	1.00	2.60	0.003	0.039	0.102
SS - PH300	0.12	1.50	4.00	0.005	0.059	0.157
SS - PH400	0.15	2.20	5.00	0.006	0.087	0.197
SS - PH500	0.15	2.20	6.00	0.006	0.087	0.236
SS - PH600	0.15	2.20	7.00	0.006	0.087	0.276
SS - PH700	0.30	3.10	8.00	0.012	0.122	0.315

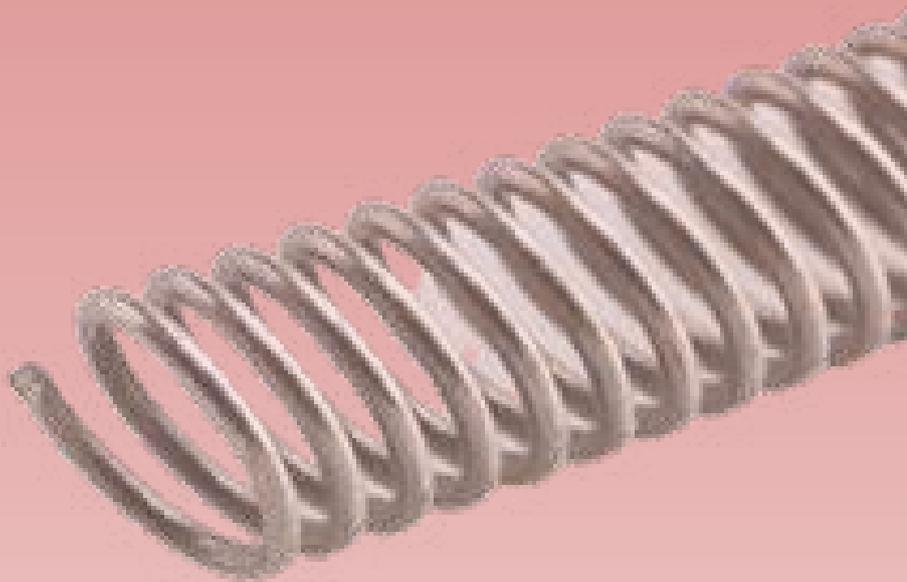
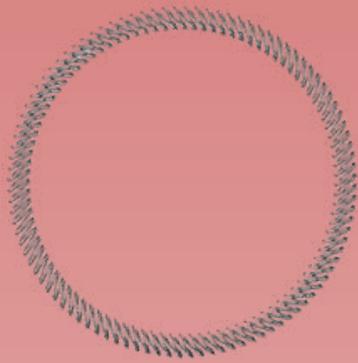
- Material**  
材料
- 301SS – Standard
  - 316SS
  - 17/7PH
  - Elgiloy

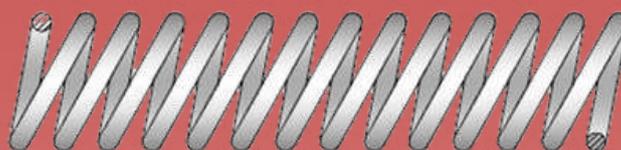
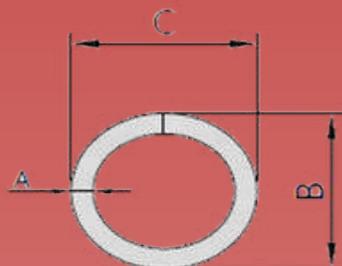
- Plating**  
電鍍
- Silver
  - Gold
  - Nickel

• Other sizes, materials, length and plating are available upon requests.  
如有其他尺寸、材料、長度與電鍍的需求，歡迎與我們聯絡。

# CANTED COIL SPRING

## 斜圈彈簧




**Size Chart 尺寸表**

Series	Item No.	Metrics (mm)			Inches (")		
		A	B	C	A	B	C
132	SS - PC132 L	0.08	0.64	0.69	0.003	0.025	0.027
	SS - PC132 M	0.09	0.64	0.69	0.0035	0.025	0.027
	SS - PC132 MH	0.11	0.66	0.71	0.0045	0.026	0.028
	SS - PC132 H	0.13	0.66	0.71	0.005	0.026	0.028
000	SS - PC000 L	0.13	1.40	1.52	0.005	0.055	0.060
	SS - PC000 LM	0.15	1.40	1.52	0.006	0.055	0.060
	SS - PC000 M	0.18	1.30	1.42	0.007	0.051	0.056
	SS - PC000 H	0.20	1.22	1.32	0.008	0.048	0.052
100	SS - PC100 L	0.20	2.18	2.39	0.008	0.086	0.094
	SS - PC100 M	0.28	2.11	2.29	0.011	0.083	0.090
	SS - PC100 H	0.36	2.06	2.26	0.014	0.081	0.089
200	SS - PC200 L	0.28	2.92	3.15	0.011	0.115	0.124
	SS - PC200 M	0.36	2.90	3.10	0.014	0.114	0.122
	SS - PC200 H	0.41	2.87	3.10	0.016	0.113	0.122
300	SS - PC300 L	0.41	4.14	4.50	0.016	0.163	0.177
	SS - PC300 M	0.51	4.14	4.47	0.020	0.163	0.176
	SS - PC300 H	0.66	4.04	4.37	0.026	0.159	0.172
400	SS - PC400 L	0.51	5.46	6.05	0.020	0.215	0.238
	SS - PC400 M	0.66	5.46	5.99	0.026	0.215	0.236
	SS - PC400 H	0.79	5.46	5.84	0.031	0.215	0.230
500	SS - PC500 L	0.66	8.26	9.19	0.026	0.325	0.362
	SS - PC500 M	0.79	8.26	9.12	0.031	0.325	0.359
	SS - PC500 H	1.04	8.26	8.84	0.041	0.325	0.348

**Material  
材質**

- 302SS – Standard
- 316SS
- Hastelloy C276

**Plating  
電鍍**

- Silver
- Gold
- Nickel
- Tin

• Other sizes, materials, length and plating are available upon requests.  
 如有其他尺寸、材料、長度與電鍍的需求，歡迎與我們聯絡。

# MATERIAL SELECTION SUMMARY

## 材質選項大綱：

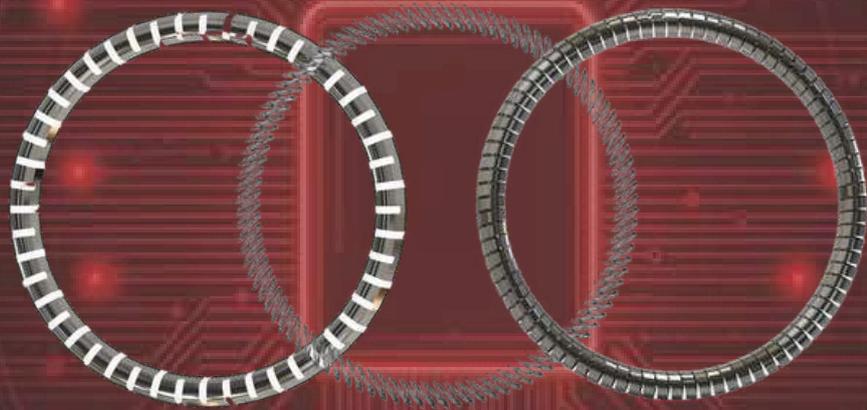
Material 材質	Cantilever or Full Contacted Spring 懸臂/ 全接觸彈簧	Canted Coil Spring 斜圈彈簧	Helical Spring 螺旋彈簧	MTL Code 材料代號
301 Stainless Steel 不鏽鋼	Standard 標準	No	Standard 標準	301
Hastelloy C276	Yes	Yes	Yes	276
17-7 PH Stainless Steel 不鏽鋼	No	No	Yes	177
Elgiloy or equivalent 或同等材料	Yes	Yes	Yes	ELG
302 Stainless Steel 不鏽鋼	No	Standard 標準	No	302
316 Stainless Steel 不鏽鋼	Yes	Yes	Yes	316
Beryllium Copper (BeCu) 鈹銅	No	Yes	Yes	BEC
Copper Chromium Zirconium (ZCC) 鉻鋇銅	No	Yes	Upon request	ZCC

Other materials are available upon requests.  
特殊材料的需求，歡迎與我們聯絡。

### ITEM NUMBER

**SS - PH - XXX X - XXXX - 301 - W**

Spring
PH - Helical  
PC - Canted Coil  
PV - Cantilever
Dash Size
L - Light load  
M - Medium load  
H - Heavy load  
(only for Canted Coil Spring)
Length (mm)
MTL CODE
Welded



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