



INVICTA®

SPRING & WIRE COMPONENTS



www.invictaindia.com



ABOUT

As a team we focus on getting the job done right, first time, every time.

We understand that every successful company is based on exemplary customer service and you are only as good as your last job. Our drive to stay ahead of the rest is never ending.

We are a solution-based company, not just product based!

We look at ourselves as a customer service business that manufactures; not as a manufacturer who provides some customer service.

We are constantly investing in the latest technology and equipment so we can supply cutting edge products and stay on the leading edge of innovation.

We work on continuing to improve our business to meet customers' needs.

Using the latest machinery decreases set-up times, increases production rates, improves quality and can remove secondary operations. This means we can offer great quality parts that are on time at a globally competitive cost. We use state-of-the-art machinery through each step of the process, including primary production equipment (CNC coilers and wire formers), secondary equipment (table grinders and in-line ovens), tool making equipment (CNC mills), and inspection equipment (digital video measuring machines and force testers).

We hire employees that care about their work and our customers. We use apprenticeships to pass knowledge from our seasoned employees to our newer ones. Our employees take continuing education classes to expand and sharpen their skills. We have developed a culture where employees are comfortable to offer ideas to improve, to work together as a team, and to share their knowledge with each other.

Using best practices helps us to improve quality, reduce waiting time within and between processes and reduce costs.

Our quality policy is to continuously improve our processes to make purchasing custom springs and wire forms as easy and fast as possible for the customer. Our customers want fast quotes, quick order acknowledgments, speedy answers to their questions and delivery date changes in addition to good parts delivered on time. We look at improving the entire purchasing experience for our customers.

APPLICATION'S

AUTOMOBILE



HOME & OFFICE



RECREATION



AGRICULTURE



INDUSTRIAL



SPECIALTY PRODUCTS



Stock Springs

Invicta offers more than 25,000 stock spring designs to ensure you can select the right design from our extensive inventory and available for immediate delivery.

- Compression
- Extension
- Torsion
- Specialty Springs

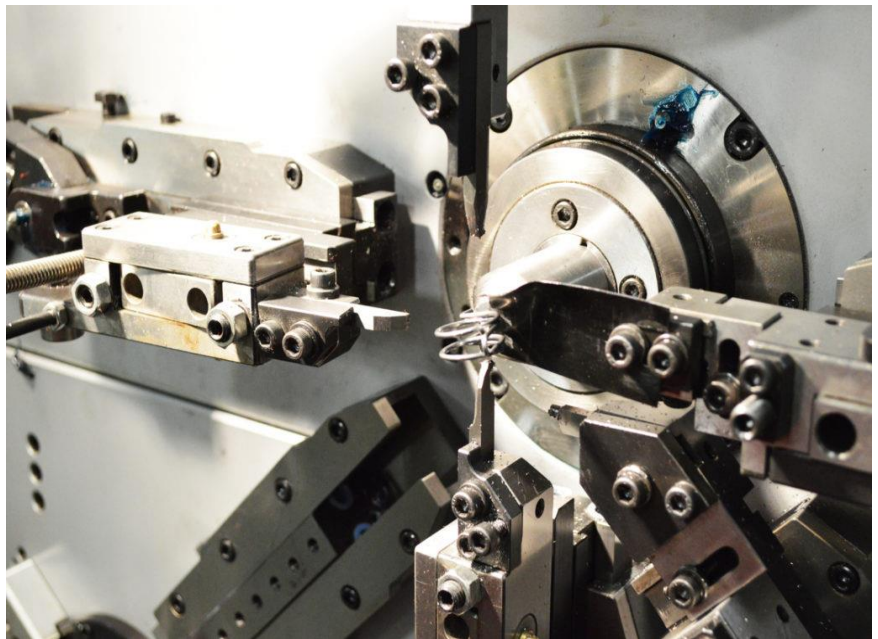


Invicta offers value added services included like plating, passivation, engineering and technical support, grinding, RoHS compliance, CAD downloads and more. Selection includes a wide range of compression, extension, torsion, wave, flat and specialty springs.

OUR QUALITY & TECHNOLOGY

INVICTA has proudly raised the bar in our industry with high-quality, INDIA-made precision products at mass-market prices. We are continually investing in the most up-to-the-minute technology, and are adept at engineering it ourselves when needed. Our training programs and commitment to quality are envied by industry competitors, as are our raw material relationships and lead times.

Being certified, we strive to deliver defect-free product 100% of the time. Our Quality Assurance Department has decades of experience in all aspects of product quality, including: statistical process controls (SPC), advanced product quality planning (APQP), failure analysis (FA), start-up processes and design implementations.



INVICTA has a full, in-house team for sub-assembly requirements and secondary work. We offer in-house grinding and color code capabilities along with other outside services, including shot-peening and plating to a wide range of industry specifications.

We inspect, test, re-inspect and test again. Nothing gets past our remarkably stringent quality assurance department. Our professional, experienced, and meticulously trained staff treat every spring as a reflection of how we conduct business. From small runs to tens of millions per year, the quality of our products remains the same..

PRODUCTS RANGE

WIRE FORMS

A wire form is essentially a shape formed from wire. Wire forms range from the most simple such as a straight piece of wire to a highly complex 3D shape. Common examples are bungy cord end hooks, sinker wires and “R-clips” but the range is only limited by one’s imagination.



COMPRESSION SPRINGS

The Compression Spring is designed to operate with a compression load, so the spring gets shorter as the load is applied to it. We can help you design your spring to suit its application and decide your required end type, from having the wind open to having the end accurately closed and ground on our CNC grinding machine, we can fulfill your needs. Our up to date design technology can design the compression spring to suit your requirements



TENSION/EXTENSION SPRINGS

Tension/extension spring – this spring is designed to operate with a tension load, so the spring stretches as the load is applied to it. Some of the examples of the range that we currently supply are garage door springs, horse float tailgate springs through to very small delicate computer tray return springs. We can assist you by advising on what type of spring and end formation will best suit your requirements, from single/double/triple loops to extended hooks with the opening best suited to your needs. What you require we can make.



TORSION SPRINGS

A **torsion spring** is a spring that works by torsion or twisting; that is, a flexible elastic object that stores mechanical energy when it is twisted. When it is twisted, it exerts a force (torque) in the opposite direction, proportional to the amount (angle) it is twisted. There are two types. A **torsion bar** is a straight bar of metal that is subjected to twisting (shear stress) about its axis by torque applied at its ends. The other type, a **helical torsion spring**, is a metal rod or wire in the shape of a coil that is subjected to twisting about the axis of the coil by sideways forces (bending movements) applied to its ends, twisting the coil tighter. This terminology can be confusing because in a helical torsion spring the forces acting on the wire are actually bending stresses, not torsional or shear stresses. Some of the examples of the range that we currently supply are large horse float tailgate torsion springs through to very small over head lighting retaining springs



TRAMPOLINE SPRING

(3" SPRING) The 3" Rebounder Spring is approximately 3" long from the inside of the hook on one end to the inside of the hook on the other end. It has about 15 coils and an outside diameter of about 7/8". The total overall length of the spring from the outside of each hook is approximately 3 1/2".

(5 1/2" SPRING) The 5 1/2" trampoline spring is approximately 5 1/2" long from the inside of the hook on one end to the inside of the hook on the other end. It has about 30 coils and an outside diameter of about 1". The total overall length of the spring from the outside of each hook is approximately 5 3/4".

(6 1/4" SPRING) The 6 1/4" trampoline spring is approximately 6 1/4" long from the inside of the hook on one end to the inside of the hook on the other end. It has about 35 coils and an outside diameter of about 1". The total overall length of the spring from the outside of each hook is approximately 6 3/4".

(7" SPRING) The 7" trampoline spring is approximately 7" long from the inside of the hook on one end to the inside of the hook on the other end. It has about 43 coils and an outside diameter of about 1". The total overall length of the spring from the outside of each hook is approximately 7 1/2".



(8" SPRING) The 8" trampoline spring is approximately 8" long from the inside of the hook on one end to the inside of the hook on the other end. It has about 51 coils and an outside diameter of about 1". The total overall length of the spring from the outside of each hook is approximately 8 1/2".

(9" SPRING) The 9" trampoline spring is approximately 9" long from the inside of the hook on one end to the inside of the hook on the other end. It has about 59 coils and an outside diameter of about 1". The total overall length of the spring from the outside of each hook is approximately 9 1/2".



(10" SPRING) The 10" competition trampoline spring is approximately 10" long from the inside of the hook on one end to the inside of the hook on the other end. It has about 67 coils and an outside diameter of about 1". The total overall length of the spring from the outside of each hook is approximately 10 1/2".



LINK CHAIN



Compression Springs

11 Series Available

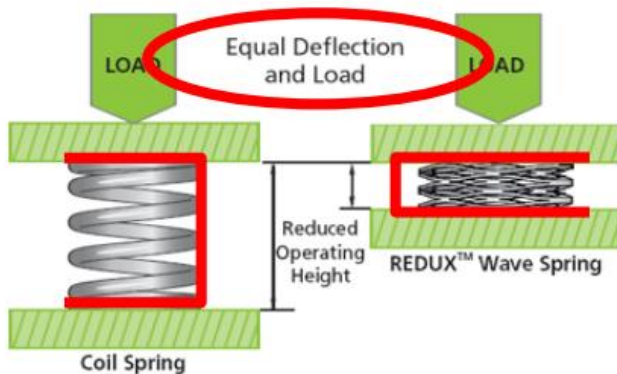
Series/Sizes	Function	Material
BANTAM™ Mini Series Free Length: .039"–.625"	Unique line of miniature springs that are offered in wire sizes .0040", .0045", .0050" and .0055".	<ul style="list-style-type: none"> • Elgiloy®
Instrument Series Free Length: .039"–2.087"	A wide range of size and rate combinations in a smaller, highly precise spring design.	<ul style="list-style-type: none"> • Music Wire • Type 302/304 Stainless Steel • Type 316 Stainless Steel
Life Pressure™ Series Free Length: .313"–6"	Offers lower spring rates or workable load ratings for a given length and diameter.	<ul style="list-style-type: none"> • Type 316 Stainless
Standard Series Free Length: .173"–11.417"	Widest selections of specifications	<ul style="list-style-type: none"> • Music Wire • Type 302/304 Stainless Steel • Type 316 Stainless Steel
HEFTY™ Die Springs Free Length: 1"–12"	Five color coded versions in various strengths.	<ul style="list-style-type: none"> • Music Wire/Oil-Tempered Chrome Silicon
MIL-SPEC MS24585 Free Length: .250"–1.5"	Achieve standardization objectives set by the U.S. Department of Defense.	<ul style="list-style-type: none"> • Music Wire • Stainless Steel
DIN-Plus Series DIN2098 Part 2 Free Length: .039"–2.063"	This smaller range of DIN2098 compression springs are made from stainless steel grade EN 10270-3-1.4310-NS.	<ul style="list-style-type: none"> • Passivated Stainless Steel
DIN-Plus Series DIN2098 Part 1 Free Length: .173"–39.961"	This series includes the more standard to larger range of DIN2098 compression springs made of spring steel grade EN 10270-1-SH.	<ul style="list-style-type: none"> • Plated Carbon Steel

Wave Springs

Series/Sizes	Function	Material
REDUX™ Wave Springs Free Height: .060"–2" Outside Dia.: .210"–1.707"	Offer optimum performance in reduced spatial environments.	<ul style="list-style-type: none"> Type 17-7 PH Stainless Steel



- Passivated & Corrosion Resistant
- Can be subjected to 650°F without loss of spring properties
- Magnetism similar to high carbon steel
- Other materials available
- Types of Ends
- Plain (wavy) ends
- Flat (shim) ends
- Single turn gap/overlap spring



- Reduced Height
- Saves **30% to 50%** of the compressed height versus a standard round wire spring
- Lighter
- Weight advantage versus a normal round wire compression spring. Reduce weight by as much as **50%**.
- Load and Deflection
- Similar to Compression Spring



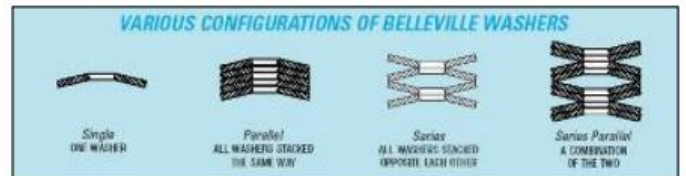
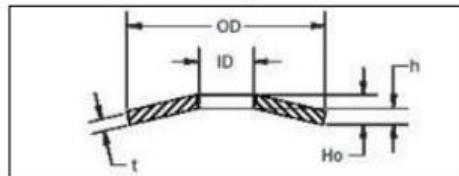
Belleville Washers

Series/Sizes	Function	Material
Belleville Washers Outside Dia.: .188"–3.75" Inside Dia.: .093"–2.06"	Enables to support high loads with relatively small deflections and solid heights.	<ul style="list-style-type: none"> 300 Series Stainless Steel



Other types of washers:

- Wave - Light loads, low deflection, limited radial space
- Slotted - Higher deflections
- Finger - Used for axial loading of bearings
- Curved - Used to absorb axial end play

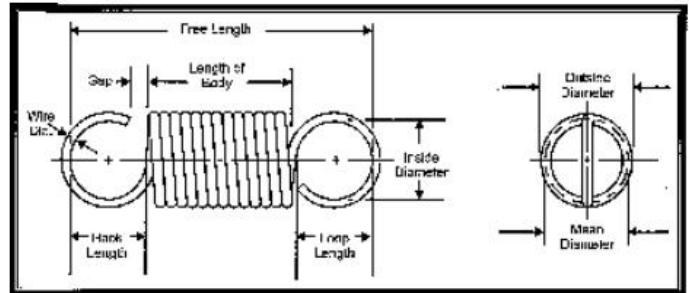
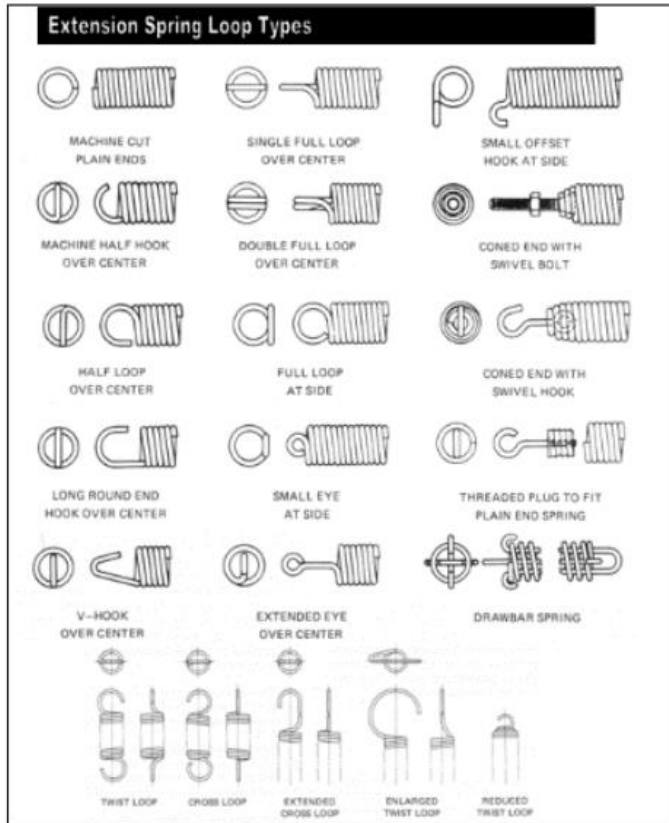


Extension Springs

3 Series Available

Series/Sizes	Function	Material
Instrument Series Free Length: .250"–1.181" Outside Dia.: .063"–.157"	A wide range of size and rate combinations in a smaller, highly precise spring design.	<ul style="list-style-type: none"> Music Wire Type 302/304 Stainless Steel Type 316 Stainless Steel
Standard Series Free Length: .311"–11.417" Outside Dia.: .098"–2"	Widest selections of specifications	<ul style="list-style-type: none"> Music Wire Type 302/304 Stainless Steel Type 316 Stainless Steel
MIL-SPEC MS24586 Free Length: .250"–1.5" Outside Dia.: .120"–1"	These products are part of the US Defense Standard.	<ul style="list-style-type: none"> Music Wire Type 302 Stainless Steel

Extension Springs



Torsion Springs

Series/Sizes

Function

Material

Standard Series

Work Over Rod: .059"—2.141"

Outside Dia.: .103"—2.141"

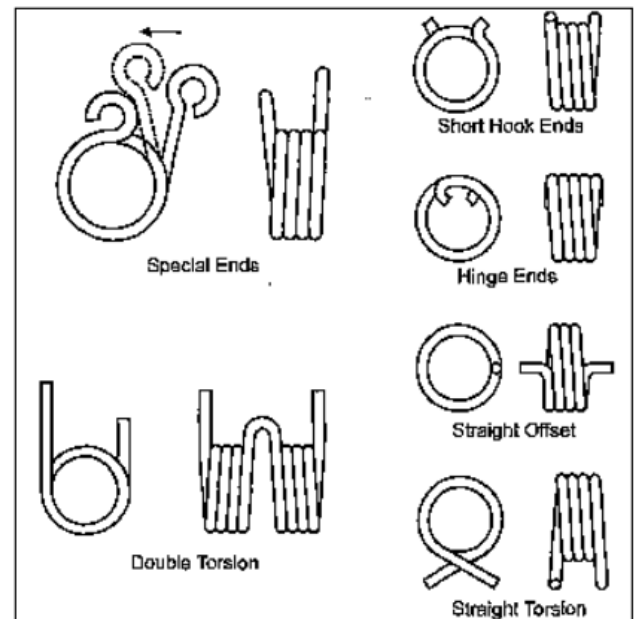
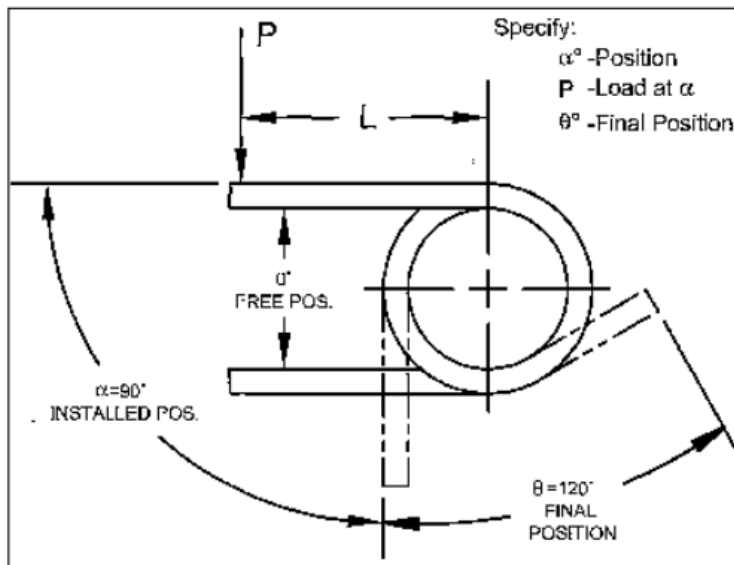
Leg Length: .375"—4.25"

Available in 7 Free Positions:
90°, 120°, 180°, 210°, 270°,
300°, 360°

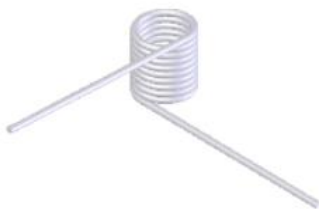
- Music Wire
- Type 302/304 Stainless Steel
- Type 316 Stainless Steel



Torsion Springs



Torsion Springs



Straight Legs



Straight Offset Ends



Short Hook Ends



Hinge Ends



Looped Ends



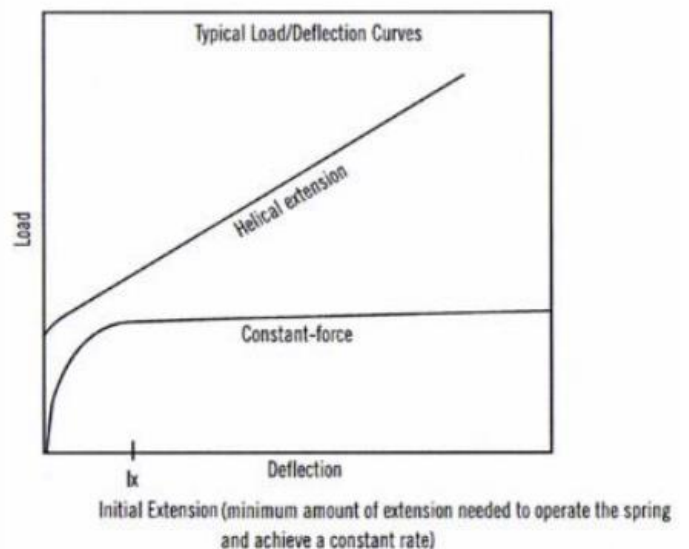
Double Torsion

Specialty Springs

Series/Sizes	Function	Material
Battery Springs AAA, AA, C and D Sizes Various Mount Types	Offer conical springs that are perfect for prototyping through large production runs.	<ul style="list-style-type: none"> • Music Wire • Beryllium Cooper
Continuous Length Extension Springs 12", 24", and 36" Lengths	Excellent for prototyping or when an extension spring needs to be configured quickly.	<ul style="list-style-type: none"> • Music Wire • Type 302 Stainless Steel
Drawbar Springs	Capable of withstanding loads far in excess of the compression springs closing force.	<ul style="list-style-type: none"> • Stainless Steel

Constant Force

Series/Sizes	Function	Material
Constant Force Springs Load Range: .23 lbs.–16.5 lbs. Material Widths: .25"–1.25"	Offers the advantage of a smooth operation across the operating range.	<ul style="list-style-type: none"> • Type 301 Stainless Steel

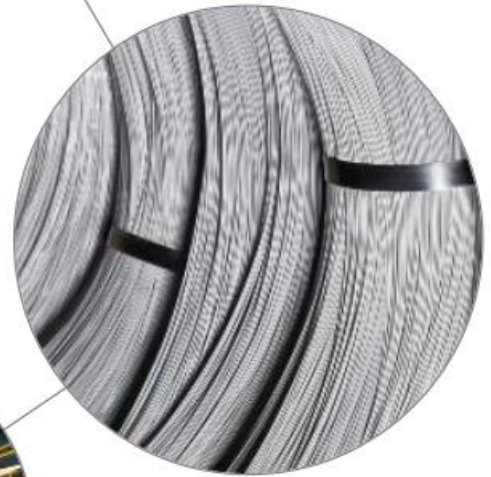


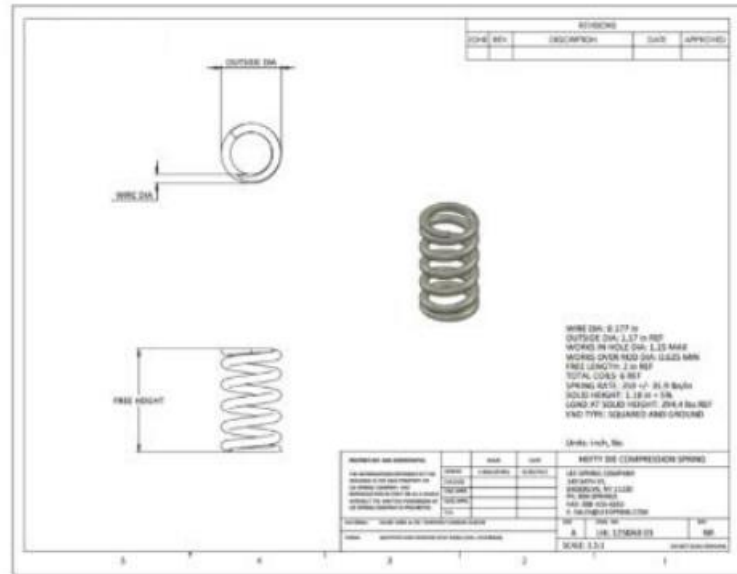
Custom Springs

Invicta offers extensive custom capabilities and engineering support from design through production. For more than one hundred years, Invicta has been offering a wide range of custom spring capabilities, design options, and extensive material and finish selections. With extensive experience working with various industries, Invicta can manufacture the right custom spring for your exact application.

If You Can Think It, We Can Make It!

Our expanding global presence and in-depth knowledge of the worldwide marketplace puts Invicta at the leading edge of creating market-specific solutions for customers' need





Machines and Manufacturing

Extensive Manufacturing Capabilities

- CNC Coilers
- Loopers
- Grinders
- Wire Forming Equipment
- In-house EDM tooling

Lean Manufacturing Systems

- Cellular Environment
- Pull Workflows
- JIT Deliveries

Short and Long Production Runs

- Prototypes
- Large Scale Runs
- Blanket Order Releases



Materials and Finishes

High Carbon Steels

Music Wire
Hard Drawn MB
Oil Tempered MB

Stainless Steels

Stainless Steel 302
Stainless Steel 304
Stainless Steel 316
Stainless Steel 17-7 PH

Alloy Steels

Oil Tempered Chrome Vanadium
Oil Tempered Chrome Silicon

Finishes and Services

Assembly
Color Coding
Electropolishing
Grinding
Heat Treating
Looping
Passivation
Powder Coding

Copper Alloys

Phosphor Bronze
Beryllium Copper
Monel 400
Monel K 500

Nickel Alloys

Inconel 600
Inconel 718
Inconel X750
Elgiloy
NiSpan C
Hastelloy (C276)

Composite

Ultem



Shot Peening
Spring Setting
Plating: Nickel, Zinc, Cadmium
Special Finishes (e.g Black Oxide)

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