

FeTech

Precision Disc Springs & Belleville Washers

Prevent Disc Spring Failure.

Protect Critical Equipment.

BELLEVILLE WASHERS



ENGINEERING CATALOG

Prevent Disc Spring Failure. Protect Critical Equipment.

Precision Belleville washers, DIN 2093 disc springs and superalloy elastic components for preload control, leakage reduction and critical equipment reliability.

Product scope

DIN 2093 | Stainless | Heat-resistant | Inconel | Hastelloy | Titanium | Flange | Valve | Stacks
Bearing preload | DIN 6796 | Custom elastic components

Risk first

Preload loss, leakage and downtime reviewed before part selection.

Material depth

Spring steel, stainless, Inconel, Hastelloy, titanium and custom alloys.

Fast RFQ

Drawing review, sample discussion and practical engineering feedback.

HOW TO USE THIS CATALOG

Built for engineering review and RFQ follow-up

This catalog follows the buyer workflow: identify the failure risk, choose the product family, review the material path, then prepare an RFQ with enough technical detail for a fast answer.

01 Product range overview

DIN 2093, stainless, heat-resistant, nickel alloy, Hastelloy, titanium, flange, valve, stacks, bearing preload, DIN 6796 and custom parts.

02 Engineering notes

How Belleville washers work, how stacking changes load and travel, and what installation data matters.

03 Material selection

A practical matrix for temperature, corrosion, HPHT, weight and retained-load requirements.

04 Application guidance

Oil & gas, petrochemical, power, valve, offshore, aerospace and heavy machinery use cases.

05 RFQ worksheet

What to send before quotation: drawing, material, load, travel, quantity, temperature, media and inspection needs.

Catalog position

Use this PDF as a technical leave-behind after a buyer asks about disc springs, live loading washers, superalloy materials or custom preload components.

COMPANY PROFILE

A spring supplier focused on failure-risk reduction

FeTech Spring manufactures precision Belleville washers, DIN 2093 disc springs and engineered alloy spring components for critical industrial applications.

For buyers, a disc spring is rarely just a small part. In valves, bolted flanges, actuators and high-pressure equipment, poor preload retention can become leakage, downtime or a safety issue. The catalog is organized around that reality.

- 20+ patents and utility model patents supporting spring engineering and manufacturing know-how.
- Product range from standard DIN geometry to superalloy and custom elastic components.
- Material selection support for heat, corrosion, HPHT service and preload-loss risk.
- RFQ support through drawing review, application notes, sample discussion and production planning.

Buyer promise

More material depth

Spring steel, stainless, Inconel, Hastelloy and titanium.

More specification options

OD 6-1000 mm standard geometry and custom drawings.

More engineering context

Load, temperature, media and failure risk reviewed together.

PRODUCT RANGE

Core product families for industrial preload control

Use the overview to choose the right starting point before moving into material or application review.

Standard Disc Springs

DIN 2093, stainless steel and heat-resistant disc springs for compact high-load preload control.

Advanced Alloy Springs

Inconel, Hastelloy C-276, titanium and Nimonic 90 for corrosion, HPHT and retained-load service.

Specialized Assemblies

Flange live loading, valve spring stacks, bearing preload springs, DIN 6796 washers and custom parts.

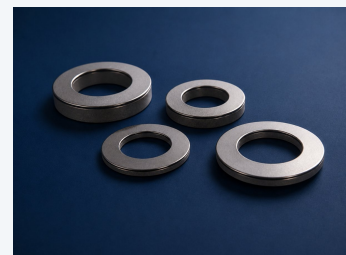
Family	Products	Typical buyer question
DIN / standard range	DIN 2093, stainless, heat-resistant, DIN 6796	Can I get a reliable standard part quickly?
Severe-service alloy range	Nickel alloy, Hastelloy C-276, titanium	Which material will keep load in this environment?
Application-built range	Flange, valve, stacks, bearing preload, custom	How should the spring be configured for this equipment?



Standard geometry



Advanced alloys

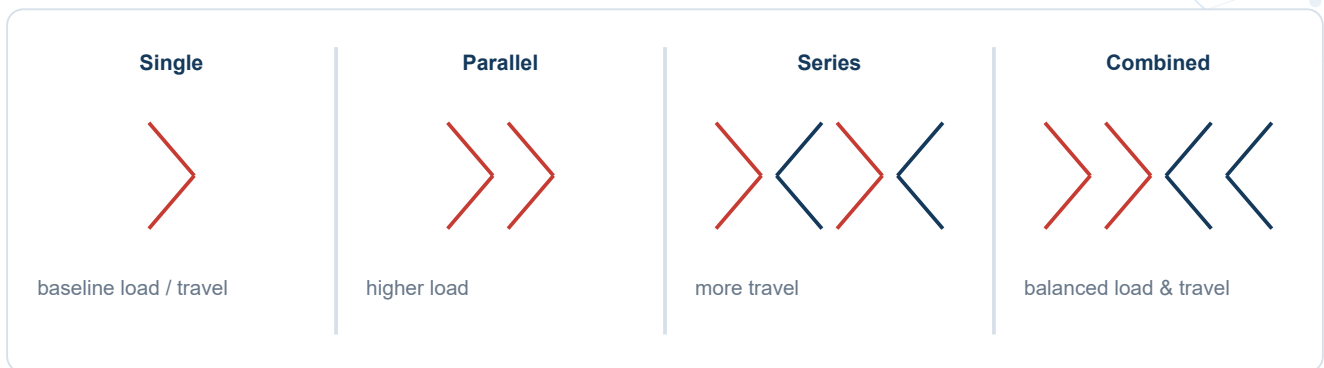


Live loading

ENGINEERING NOTES

How disc spring stacks change load and travel

A Belleville washer is a conical disc spring. It produces high load in a short axial space, and stack arrangement changes the working behavior.



Configuration	Effect	Buyer caution
Single disc	Baseline load and deflection.	Good for simple preload, but limited travel.
Parallel stack	Higher load in similar travel.	Friction and load sharing must be reviewed.
Series stack	More travel with lower rate.	Guidance and buckling risk become more important.
Combined stack	Balances load and travel.	Best reviewed from target curve and installation height.

For live loading or valve duty, do not select only from outside diameter. Share target load, working travel, temperature, media, cycle duty and available space so the stack can be checked as a system.

SELECTION WORKFLOW

Start from the failure mode, not only the drawing

The fastest RFQ discussions happen when the buyer can define why the spring matters in the equipment.

01 Define the risk

Preload loss, leakage, vibration, thermal relaxation, corrosion or safety margin.

02 Confirm the envelope

OD, ID, thickness, free height, available axial space and guidance condition.

03 Set load and travel

Target load at assembly, working deflection, allowable load loss and cycle duty.

04 Choose material path

Temperature, corrosion media, magnetic needs, weight and maintenance interval.

05 Prepare RFQ

Drawing, quantity, inspection requirements, surface finish and application background.

ONLINE SELECTION SUPPORT

Scan to use the Disc Spring Design Calculator

Use the online calculator for a first-pass review of spring geometry, material direction and application conditions before sending the final requirement to FeTech engineering.

01 Enter working conditions

Input dimensions, load/travel requirement, temperature, media and operating context.

02 Review material direction

Compare standard spring steel, stainless steel, Inconel, Hastelloy, titanium and heat-resistant options.

03 Confirm with engineering

Treat calculator output as preliminary. Final selection should be checked against drawings, tolerances and service risk.

Disc Spring Calculator

fetechnology.com/expertise

Recommended workflow

Scan the calculator, save the preliminary result, then send drawings or operating conditions for FeTech engineering confirmation.

PRODUCT FAMILIES

Standard DIN and corrosion-resistant springs

Each product family below includes the practical buying context: specification range, material path and application fit.



DIN 2093 Disc Springs

Standard Belleville spring range

DIN 2093 Groups A, B and C with standard spring steel, stainless steel and alloy upgrades.

Materials

51CrV4, 60SiCr7, 50CrVA, stainless steel, Inconel X-750, Inconel 718.

Applications

Power plant valves, industrial bolting, petrochemical live loading, heavy machinery.

OD 6-1000 mm

ID 3.2-127 mm

Thickness 0.2-16 mm

242 catalog sizes



Stainless Steel Disc Springs

Corrosion-resistant load control

Stainless Belleville washers for humid, chemical, outdoor and clean equipment conditions.

Materials

301, 304, 316, 630 / 17-4PH, 631 / 17-7PH and 632 / 15-7Mo.

Applications

Marine equipment, chemical valves, food/pharma machinery and corrosion-sensitive joints.

OD 6-1000 mm

304 / 316

630 / 631 / 632 PH

-240 C to +355 C

For exact force-deflection data, send drawing or target load/travel. Standard geometry can be adjusted by material, stack and surface finish.

PRODUCT FAMILIES

High-temperature and nickel alloy springs

Each product family below includes the practical buying context: specification range, material path and application fit.



Heat-Resistant Disc Springs

Load retention under thermal stress

High-temperature Belleville washers selected by retained load, not only peak temperature.

Materials

SKD61, H13 / 1.2344, 8407 Supreme, Inconel X-750 and cobalt alloy S816.

Applications

Power plant steam valves, furnace equipment, thermal bolting and energy systems.

- OD 6-1000 mm
- 8407 Supreme

- SKD61 / H13
- Up to +815 C by alloy



Nickel Alloy Disc Springs

HPHT and severe-service alloys

Nickel alloy springs for high temperature, corrosion, creep and preload-retention risks.

Materials

X-750 for relaxation resistance, 625 for corrosion media, 718 for strength, Nimonic 90 for creep review.

Applications

Offshore tools, HPHT valves, aerospace fuel controls and seawater process bolting.

- Inconel X-750
- Inconel 718

- Inconel 625
- Nimonic 90

For exact force-deflection data, send drawing or target load/travel. Standard geometry can be adjusted by material, stack and surface finish.

PRODUCT FAMILIES

Severe corrosion and lightweight alloy springs

Each product family below includes the practical buying context: specification range, material path and application fit.



Hastelloy C-276 Springs

Severe chemical corrosion

UNS N10276 nickel-molybdenum-chromium springs for chloride, acid and scrubber environments.

Materials

Hastelloy C-276 / Alloy C-276, selected mainly for corrosion resistance.

- UNS N10276
- Custom geometry

Applications

Chemical process equipment, acidic media bolting, pollution control and severe corrosion valves.

- Ni-Mo-Cr alloy
- Severe corrosion review



Titanium Alloy Springs

Lightweight corrosion resistance

TC4 / Ti-6Al-4V and TC6 components for lightweight, corrosion-resistant assemblies.

Materials

TC4 / Ti-6Al-4V and TC6 titanium alloy.

- TC4 / Ti-6Al-4V
- Density about 4.43-4.55 g/cm3

Applications

Aerospace preload systems, marine assemblies, medical equipment and precision mechanisms.

- TC6
- Custom load curves

For exact force-deflection data, send drawing or target load/travel. Standard geometry can be adjusted by material, stack and surface finish.

PRODUCT FAMILIES

Live loading and valve spring programs

Each product family below includes the practical buying context: specification range, material path and application fit.



Flange Washers / Live Loading

Preload loss and leakage control

Belleville washer systems for bolted flanges where gasket relaxation and thermal cycling matter.

Materials

17-7PH stainless steel, Inconel 718 and H13 tool steel.

Applications

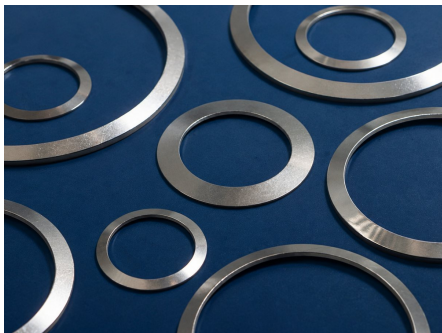
Refinery flanges, process piping, power plant bolting and leakage-sensitive joints.

17-7PH: 33 parts

Inconel 718: 37 parts

H13: 66 parts

Bolt size 5/16 in to 4 in



Valve Disc Springs

Sealing load and actuator stability

Valve spring stacks designed around load curve, travel, media and leakage consequence.

Materials

Spring steel, stainless steel, 17-7PH, Inconel 718, Inconel X-750 and high-temperature alloys.

Applications

Control valves, check valves, safety valves, live-loaded packing and actuator spring packs.

Custom stack design

High load retention

Packing load review

-200 C to +815 C by alloy

For exact force-deflection data, send drawing or target load/travel. Standard geometry can be adjusted by material, stack and surface finish.

PRODUCT FAMILIES

Disc spring stacks and bearing preload springs

Each product family below includes the practical buying context: specification range, material path and application fit.



Disc Spring Stacks

Series and parallel configurations

Stack assemblies tuned for target load, working travel, installation height and safety margin.

Materials

Spring steel, stainless steel, Inconel 625/718/X-750, Nimonic 90 and Hastelloy C-276.

Applications

Valve actuators, flange live loading, petrochemical bolting and overload protection.

- Single
- Parallel

- Series
- Combined stacks



Ball Bearing Disc Springs

Compact bearing preload

Disc springs for axial play control and stable preload in compact rotating equipment.

Materials

Spring steel, stainless steel, 17-7PH, Inconel X-750 and Inconel 718.

Applications

Ball bearings, electric motors, pumps, precision machinery and rotating assemblies.

- Custom OD / ID
- Compact force

- Axial play reduction
- Surface finish control

For exact force-deflection data, send drawing or target load/travel. Standard geometry can be adjusted by material, stack and surface finish.

PRODUCT FAMILIES

DIN 6796 washers and custom components

Each product family below includes the practical buying context: specification range, material path and application fit.



DIN 6796 Washers

Heavy-duty bolting washers

Disc spring washers for high-load bolted joints and industrial fastening.

Materials

Spring steel, stainless steel, H13, Inconel X-750 and Inconel 718.

M2-M30

d2 5-70 mm

Applications

Electrical connections, structural fastening, machinery vibration control and heavy-duty bolting.

d1 2.2-31 mm

628-172000 N



Customized Elastic Components

Built to drawing or working condition

Custom spring components engineered around drawings, target load curves and installation envelopes.

Materials

Spring steel, stainless steel, nickel alloy, cobalt alloy and project-specific metallurgy.

Prototype support

Material engineering

Applications

OEM assemblies, special preload systems, replacement programs and critical industrial mechanisms.

Batch production

Drawing-based review

For exact force-deflection data, send drawing or target load/travel. Standard geometry can be adjusted by material, stack and surface finish.

MATERIAL SELECTION

Match alloy choice to temperature, media and load retention

Material is not a label on the drawing. For critical service, it should be selected against the real working condition and the cost of failure.

Service driver	Recommended family	Typical grades	Notes for buyers
General industrial preload	Spring steel	51CrV4 / 60SiCr7 / 50CrVA	Cost-effective when corrosion and heat are controlled.
Corrosion / outdoor exposure	Stainless steel	304 / 316 / 630 / 631 / 632	Use when rust, moisture or clean operation affects service life.
High temperature	Hot-work steel / nickel alloy	SKD61 / H13 / 8407 / Inconel	Select by retained load across the maintenance interval.
HPHT / offshore	Nickel alloy	X-750 / 625 / 718 / Nimonic 90	Review media, creep, relaxation and failure consequence.
Severe chemical corrosion	Hastelloy	C-276 / UNS N10276	Best for chloride, acid and scrubber environments.
Weight-sensitive corrosion	Titanium	TC4 / TC6	Geometry must be recalculated due to lower modulus.

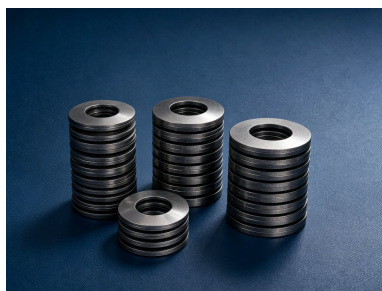
Practical rule: if the equipment can tolerate neither leakage nor unplanned shutdown, review the alloy one level earlier instead of waiting for field failure. The spring is a small cost compared with a flange leak, valve failure or lost production window.

APPLICATIONS

Where disc spring failure becomes business risk

The applications below are written from the buyer's side: what can go wrong, and what should be reviewed before production.

Industry	Common failure risk	FeTech review focus
Oil & gas / petrochemical	Leakage, preload loss, shutdown cost	Live loading, Inconel/Hastelloy options, valve stack stability.
Power generation	Thermal cycling, relaxation, valve leakage	Heat-resistant materials, stack travel and retained load.
Valve manufacturing	Packing relaxation, actuator drift	Load curve matching and compact stack design.
Offshore / marine	Chlorides, corrosion, maintenance access	316, 17-7PH, Inconel 625/718 and Hastelloy review.
Aerospace / precision	Weight, fatigue, tight envelopes	Titanium, Inconel, custom load curves and clean edge quality.
Heavy machinery	Vibration, impact, overload	DIN 2093, DIN 6796 and custom spring packs.



QUALITY AND PRODUCTION REVIEW

What FeTech checks before a spring becomes a shipment

A mature disc spring program controls more than dimensions. Material certificate, heat treatment, load behavior, edge condition and packaging all affect field performance.

01

Material and heat treatment

Grade, mill data and hardness/strength condition should match the service requirement.

02

Load and deflection behavior

Critical parts can be reviewed against target load and working travel before release.

03

Edge and surface condition

Deburring, contact surfaces and finishing affect fatigue behavior and installation reliability.

04

Packaging and traceability

Industrial buyers need parts to arrive identifiable, clean and protected from handling damage.

05

Sample support

Qualified engineering or purchasing projects can discuss standard samples; international freight may be covered by the buyer when applicable.

RFQ WORKSHEET

What to send for a faster quotation

If a drawing is available, send it first. If not, the following information is usually enough to begin a practical review.

Technical data

- Product type: DIN 2093 / DIN 6796 / flange washer / valve stack / custom part
- Dimensions: OD, ID, thickness, free height and available installation space
- Load target: assembly load, working deflection and allowable load loss
- Material or service condition: temperature, media, corrosion, magnetic or weight limits
- Quantity and lead time: prototype, sample batch, annual demand or urgent maintenance order

Commercial and file data

- Drawing format: PDF, DWG, DXF, STEP or clear sketch
- Surface finish: plain, black oxide, zinc, phosphate, passivation or special requirement
- Inspection: load test, hardness, material certificate or dimensional report
- Application notes: valve, flange, bearing, actuator, power plant, oilfield or OEM equipment
- Contact path: email, website form or WhatsApp for quick clarification

Request calculation or quotation support

Website: www.fetechspring.com/contact/ Email: sales@fetechspring.com WhatsApp: +86 186 7302 6556

NEXT STEP

Send the drawing, working condition or failed-part information.

FeTech Spring can review standard sizes, custom geometry, material upgrades and stack configurations for critical preload applications.



Standard range

DIN 2093, DIN 6796, stainless steel and heat-resistant disc springs.

Severe service

Inconel, Hastelloy C-276, titanium and Nimonic spring components.

Application review

Valve stacks, flange live loading, bearing preload and custom elastic parts.

For a faster technical answer, send these details if available

OD / ID / thickness / free height

Target load and working travel

Temperature, media and corrosion risk

Drawing, quantity and lead-time need

Request calculation or quotation support

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Send drawings or operating conditions for engineering review.

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