# Column Hardware Guide

ENGINEERED TO MEET YOUR CHROMATOGRAPHY NEEDS

IDEX HEALTH & SCIENCE

BIOTECH FLUIDICS

Intelligent Solutions for Life®

Fluidics | Optics | Consumables | Assemblies

# ULTIMATE EFFICIENCY

IDEX Health & Science's column hardware products are designed for customers who seek ultimate performance and efficiency. Our column hardware allows you to achieve optimal and repeatable results consistently in your chromatographic separations, and they are ideal for a broad range of Liquid Chromatography (LC) applications, including biopharmaceutical, protein characterization, and proteomics applications. High quality column hardware provides superior separation performance and is a crucial factor in reproducibility of chromatographic data.

# OUR COLUMN HARDWARE PRODUCTS

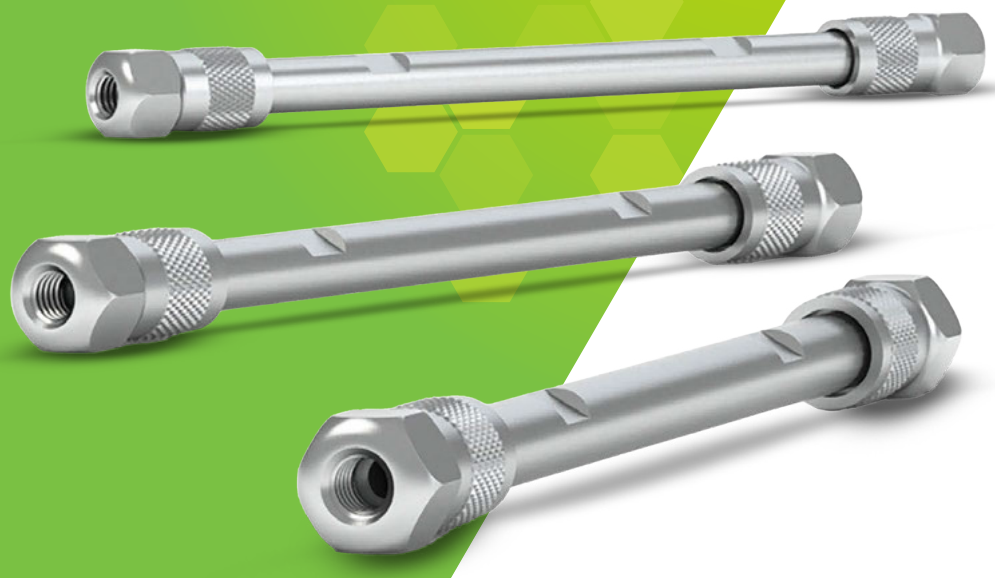
From normal phase to reversed-phase LC, from Ion Chromatography to SFC, our column hardware serves small molecules and large biopharmaceutical applications. We offer a wide array of column hardware products to optimize your flow path. Our stainless steel columns feature an Isobore™ internal surface finish, surpassing the standard LC grade tubing with an ID surface roughness of less than 10 µinch (0.25 µm) $R_a$. This advanced finish minimizes wall effects and can substantially enhance column efficiency.

# KEY CHARACTERISTICS OF OUR COLUMN HARDWARE

IDEX Health & Science column hardware systems meet a wide range of application requirements from low to high pressure. Our systems cover pressure ratings from 5,000 psi to 25,000 psi, comprising a wide variety of materials, including stainless steel, PEEK, and PEEK-lined stainless steel.

## MATERIAL CHARACTERISTICS

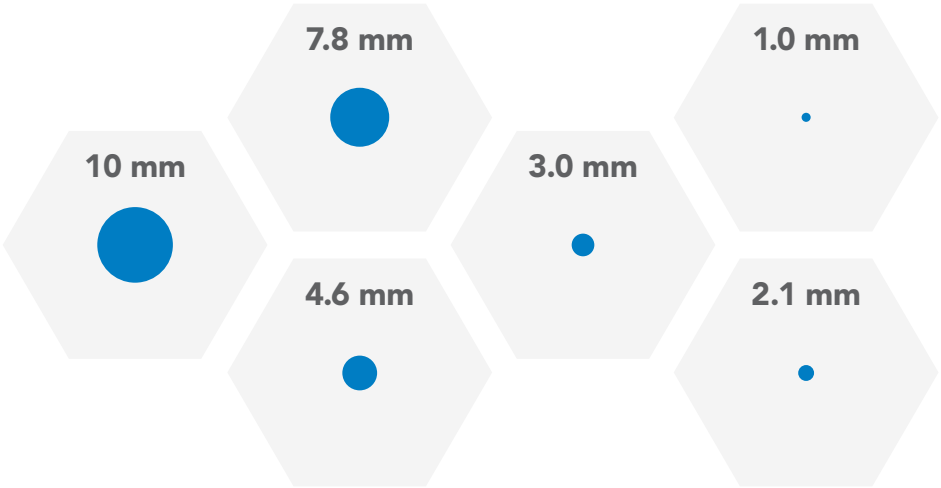
- Composition
- Concentricity
- Surface Finish
- Roundness
- Cleanliness
- Dimensional Tolerance
- Luster



# COLUMN HARDWARE DESIGNED FOR YOUR SPECIFIC DIMENSIONS

## DIAMETERS

- Microbore HPLC: 1 mm ≤ ID ≤ 2.1 mm
- Narrow(small)-bore column HPLC: 2.1 mm < ID < 4 mm
- Normal-bore column HPLC: 4 mm ≤ ID ≤ 5 mm
- Semi-preparative column HPLC: 5 mm < ID ≤ 10 mm



# COLUMN HARDWARE PRODUCT BENEFITS

IDEX Health & Science offers a wide range of column hardware systems and materials to help you tackle any HPLC and UHPLC separation challenges.

25,000 psi (2,758 bar)

## 1.0 mm ID

- Stable to ≤ 25 kpsi
- Bioinert (metal-free) PEEK-lined stainless steel
- Consistent, smooth surface to reduce fronting effects
- Withstands temps ≤ 80°C
- Can be continually subjected to 25 kpsi for hundreds of injections without sample peak degradation

20,000 psi (1,379 bar)

## IsoBar™

- Stable to ≤ 20 kpsi
- Threaded tube
- Isobore™ internal surface finish
- Drop-in frit
- All metal design for UHPLC

15,000 psi (1,034 bar)

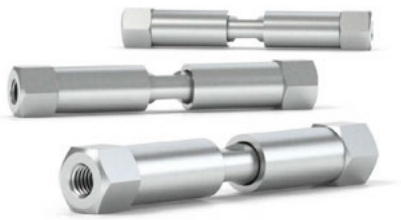
## BioVersal™

- Stable to ≤ 15 kpsi
- Bioinert (metal-free) PEEK-lined stainless steel
- Removable frit assemblies
- Excellent column durability over hundreds of injections
- Improved pressure handling capability over conventional PEEK columns

Continued...

# COLUMN HARDWARE PRODUCT BENEFITS (CONT.)

15,000 psi
(1,034 bar)



## MODULAR

- Stable to ≤ 15 kpsi
- Threaded tube
- Frit-cap design

10,000 psi
(689 bar)

## COMPRESSION

- Stable to ≤ 10 kpsi
- Non-threaded tube
- Not recommended for applications > 10 kpsi
- Drop-in frit
- Available in Isobore™ grade

8,000 psi
(552 bar)

## BioSafe

- Stable to ≤ 8 kpsi
- Bioinert (metal-free)
- Precision-machined from PEEK
- Surface finish: < 10 µin $R_a$

5,000 psi
(345 bar)

# 1.0 mm COLUMN HARDWARE

## EXCELLENT DURABILITY FOR MICROBORE APPLICATIONS

Our 1.0 mm bioinert column hardware is designed for robustness when packing columns for microbore applications. The unique column technology utilizes IDEX Health & Sciences patented PEEK-lined stainless steel. The PEEK-lined stainless-steel lining provides a metal-free pathway and the structural integrity to pack small particle substrates under extreme pressures. It also provides a consistent and smooth surface to reduce the fronting effects common with microbore stainless steel column tubes. Microbore columns are recommended for applications that have a limited sample amount or when a short analysis time is required.

## CAPABILITIES

- PEEK-lined stainless steel lining column hardware for bioinert (metal-free) applications up to 25,000 psi (1,724 bar, 172 MPa)
- Structural integrity to pack small particle substrates up to 40,000 psi (2,760 bar)
- In operation, 1.0 mm column withstands temperatures up to 80°C
- Can be continually subjected to 25,000 psi (1,720 bar) for hundreds of injections without sample peak degradation

### RELATED COMPONENTS

- BioVersal™ Valve
- BioVersal™ Sample Loops
- StabiliX™ Degassing Vacuum Pump

Click to learn more at:
idex-hs.com/1mmcolumnhardware

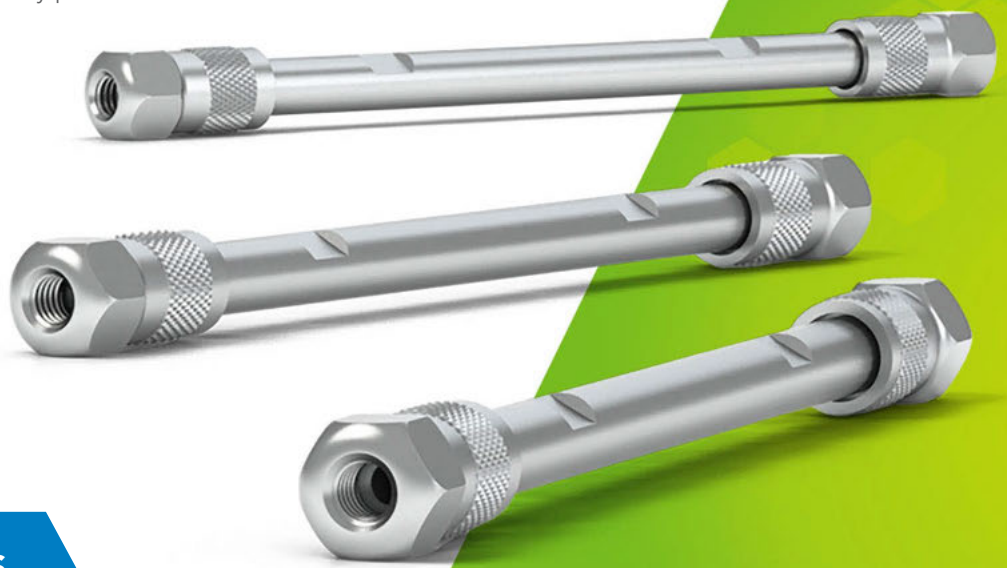
# IsoBar COLUMN SYSTEMS

## HIGH-STRENGTH, METAL DESIGN IDEAL FOR UPLHC

Our IsoBar column systems are ideal for UHPLC applications. The column family delivers a leak-proof, reliable, all-metal design with threaded end fittings for the most demanding operating requirements.

## CAPABILITIES

- Rated to 20,000 psi (1,379 bar; 104 MPa)
- Proven format for <2 µm stationary phase
- Can handle high temperatures of 80°C and higher
- Available in 2.1 mm to 4.6 mm internal diameters



### RELATED COMPONENTS

- Packing Adapters
- Column Tubes
- End Fittings
- Frit Caps

Click to learn more at:
idex-hs.com/isobarcolumns

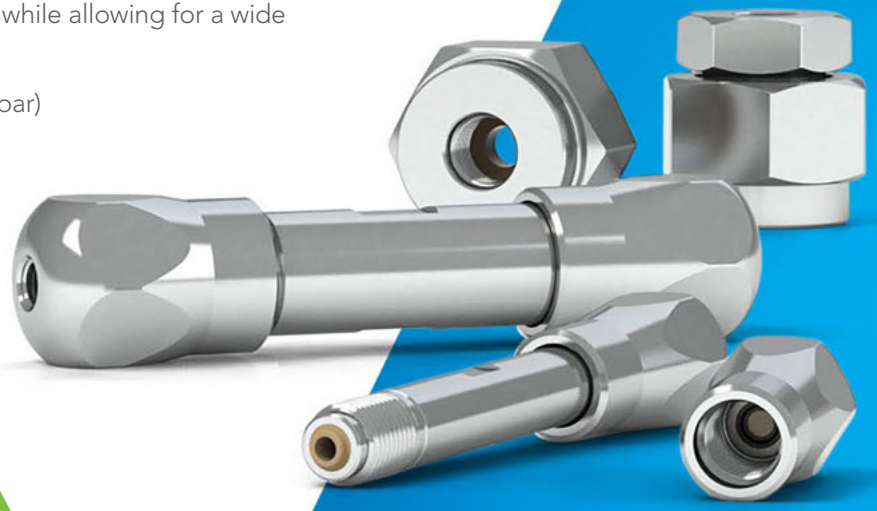
# BioVersal™ COLUMN SYSTEMS

## BIOINERT PEEK-LINED STAINLESS STEEL FOR BIOSEPARATIONS

Our BioVersal™ columns are biocompatible and precision-machined from PEEK material. This bioinert hardware helps with challenging biopharmaceutical and ion chromatography applications that require metal-free columns.

## CAPABILITIES

- PEEK-lined SST column hardware for bioinert (metal-free) applications up to 15,000 psi (1,034 bar, 103 MPa)
- Combines the strength of our stainless steel UHPLC column (IsoBar) with the chemical inertness of PEEK polymer
- Eliminates unwanted surface interactions while allowing for a wide range of pH and solvent conditions
- Packing pressure rating 20,000 psi (1,379 bar)
- IDEX Health and Science offers a wide range of bioinert fluidic components for the entire sample flow path
- 2.1 mm and 4.6 mm



### RELATED COMPONENTS

- Film Degasser
- BioVersal™ Valve
- BioVersal™ Sample Loops
- MarvelX™ & MarvelXACT™ Connections

Click to learn more at:
idex-hs.com/bioinertcolumns

# MODULAR COLUMN SYSTEMS

## GUARANTEED HIGH-PRESSURE SEALING

Our Modular Column hardware guarantees a high-pressure seal between the tubing and end fitting and proper seating of the frit. The frit is contained in a cap that slides over the column, forming a leak-free and gap-free seal. All modular column tubes are made from 316-grade stainless steel. Modular column products are best suited for applications bridging the space between HPLC and UHPLC technologies.

## CAPABILITIES

- Operates at pressures up to 15,000 psi (1,034 bar; 103 MPa)
- Precision machined from corrosion resistant 316 stainless steel
- Available in inner diameters from 2.1 mm to 10.0 mm IDs and various lengths

### RELATED COMPONENTS

- Packing Adapters
- Column Tubes
- End Fittings
- Frit Caps

Click to learn more at:
idex-hs.com/modularcolumns

# COMPRESSION COLUMN SYSTEMS

## OPTIMAL PERFORMANCE FOR LC APPLICATIONS

Compression hardware relies on the ferrule to swage or attach to the tubing to maintain the high-pressure seal. Our LC Column Tubes are designed for HPLC applications specifically. All compression tubes are made from a 316-grade stainless steel finish.

## CAPABILITIES

- Operates at pressures up to 10,000 psi (689 bar; 69 MPa)
- Consistent and repeatable manufacturing process
- Leak-free frits improve system efficiency and are available in standard stainless steel with some titanium and PEEK
- Surface finish improves column efficiency and performance by providing an extremely smooth, flat, and clean surface; it also features a surface finish with typical values around 8 µin $R_a$
- End fittings are available in multiple port geometries and are manufactured from stainless steel to match the tube and act to secure the frit and connect to the tubing
- Available in inner diameters from 2.1 mm to 10.0 mm

### RELATED COMPONENTS

- Packing Adapters
- Column Tubes
- End Fittings
- Frit Caps

Click to learn more at:
idex-hs.com/compressioncolumns

# BioSafe™ COLUMN SYSTEMS

## BIOINERT AND PRECISION-MACHINED FROM PEEK

Our BioSafe™ columns are bioinert and precision-machined from PEEK material. They are ideal for use in challenging biopharmaceutical and ion chromatography applications that require metal-free columns.

## CAPABILITIES

- Completely bioinert for optimal results in sensitive applications
- Available with PEEK (several size options available)
- Convenient, strong-threaded design that is stable at pressures up to 8,000 psi (552 bar; 55 MPa)
- High-efficiency connections and surface finish for optimum performance
- Available in inner diameters of 2.1 mm and 4.6 mm

### RELATED COMPONENTS

- Packing Adapters
- Column Tubes
- End Fittings
- Frit Caps

Click to learn more at:
idex-hs.com/biosafecolumns

# SELECT THE PERFECT COLUMN HARDWARE FOR YOUR APPLICATION

## COMPARE KEY FEATURES & SPECIFICATIONS

| | BioVersal 1.0 mm | IsoBar™ | BioVersal™ | Modular Analytical | Modular SemiPrep | Compression | BioSafe™ |
|---|---|---|---|---|---|---|---|
| **Pressure Ratings** | 25 ksi (1,724 bar) operating 40 ksi (2,758 bar) packing | 20 ksi (1379 bar) | 15 ksi (1,034 bar) operating 20 ksi (1,379 bar) packing | 15 ksi (1,034 bar) | 15 ksi (1,034 bar) | 10 ksi (689 bar) | 8 ksi (552 bar) |
| **Column Tube** | 316SS/ Natural PEEK | 316 SST | 316 SST/ Natural PEEK | 316 SST | 316 SST | 316 SST | PEEK (Black) |
| **Internal Diameter (mm)** | 1.0 | 2.1, 3.0, 4.0, 4.6 | 2.1, 4.0, 4.6 | 2.1, 3.0, 4.0, 4.6, | 7.8, 10.0 | 2.1, 3.0, 4.0, 4.6, 7.8, 10.0 | 2.1, 4.6 |
| **Length (cm)*** | 3, 5, 7.5, 10, 15 | 2, 2.5, 3, 5, 7.5, 10, 15, 25 | 3, 3.3, 5, 7.5, 10, 15, 20, 25, 30 | 3, 3.3, 5, 7.5, 10, 12.5, 15, 20, 25, 30 | 3, 3.3, 5, 7.5, 10, 12.5, 15, 20, 25, 30, 50 | 3, 5, 7.5, 10, 12.5, 15, 20, 25, 30 | 3, 3.3, 5, 10, 12.5, 20, 25, 30 |
| **End Fittings** | 316 SST | 316 SST | Nitronic 60 | 316 SST | 316 SST | 316 SST | Black PEEK |
| **Frit** | | | | | | | |
| **Frit Porosity (µm)** | 0.5 | 0.5, 2.0 | 0.5, 2.0 | 0.5, 2.0 | 0.5, 2.0 | 0.5, 2.0 | 2.0 |
| **Frit Material** | PEEK | 316 SST or Ti | PEEK or Ti | 316 SST; Ti for select size/pore ratings | 316 SST; Ti for select size/pore ratings | 316 SST; Ti for select size/pore ratings | PEEK |

**Typical industry lengths are provided for the various IDs. Please contact us for more information.*

## COMPONENTS

All of our Column Systems are also available for purchase as individual components, as outlined in this section. Additionally, we may offer other component sizes as standalone options.

# FRITS

We offer frits manufactured from four different materials: PEEK, stainless steel, UHMWPE, and titanium. All our frits are designed with exceptional uniform porosity and a long filtration life.

## CAPABILITIES

- Outer diameter of the frit matches the tube inner diameter
- Thickness: 1/32 inch to 1/8 inch
- Pore rating: Standard offering of 0.5 µm and 2.0 µm with some products available from 0.2 µm up to 10 µm
- Material: Stainless steel, titanium, PEEK, UHMWPE
- Function: Retains packing media in the column

Click to learn more at:
idex-hs.com/frits

# COLUMN TUBES

Our high-pressure column tubes include biocompatible PEEK selections as well as seamless stainless steel. Our tubes are manufactured to precise tolerances to ensure product consistency.

## CAPABILITIES

- Internal diameters: 1.0 mm to 10.0 mm
- Material: Stainless steel or PEEK-lined stainless steel
- Length: 2 cm to 50 cm
- Function: Analytical or semi-preparatory scale

Click to learn more at:
idex-hs.com/columntubes

# END FITTINGS

Our line of column end fittings are designed to withstand high pressures and be leak-free.

## CAPABILITIES

- Port geometries: Compatible with Valco®, Parker, and Waters® style connections
- Material: Stainless steel or PEEK to match the tube
- Function: Secures frit, provides ports to connect 1/16" OD tubing
- MarvelX™ / MarvelXACT™ Assemblies: Not dependent on the port geometry and can be used on a variety of columns without sacrificing performance due to dead space.

Click to learn more at:
idex-hs.com/endfittings

# GUARD COLUMNS

Our guard cartridges and holders allow rapid replacement of guard cartridges. Ideal in high-volume production, our cartridges are easy to assemble and pack. Available as stand-alone or integral Modular holders. The integral holders attach directly to the inlet of our Modular Columns without the need for fittings or tubing. Our guard columns extend the life of your analytical pathway by removing particulates and highly adsorptive compounds from the sample. This design offers several advantages over the conventional "stand-alone" holders, including:

## CAPABILITIES

- Reduced dead volume
- User-friendly, compact design
- Increased lifetime of analytical columns
- Simple to assemble and pack

Click to learn more at:
idex-hs.com/guardcolumns

# PACKING ADAPTERS

Our packing adapters connect our column hardware to high-pressure column packing reservoirs. The adapters are designed for safe, easy removal and replacement of the PEEK sealing ring. Modular packing adapters, IsoBar, and compression columns are available for inner diameters from 2.1 mm to 10.0 mm. Adapters are available for each of our column product families.

Click to learn more at:
idex-hs.com/packingadapters

# PEEK ColumnSaver™ PRECOLUMN FILTER

Our ColumnSaver™ filters offer all the protection of conventional precolumn filters at a third of the cost. With convenient direct connect design, changeover time is measured in seconds; no tools or wrenches are needed. The ColumnSaver™ PEEK body contains a stainless steel filter element designed for maximum filtration of particulate matter with minimal dead volume or back pressure.

Click to learn more at:
idex-hs.com/precolumnfilters

# MarvelX™ & MarvelXACT™ CONNECTIONS

## TROUBLE-FREE UHPLC CONNECTIONS

Our expertly designed MarvelX™ and MarvelXACT™ connection systems take the guesswork out of your process by eliminating the risk of under- and over-tightening, with our patented torque-limiting mechanism. It seals at the bottom of the port, without complex techniques, which significantly reduces required torque and enables many more connects and disconnects — ensuring a perfect connection every time. Built with sturdy, bioinert PEEK / PEEKsil™ and stainless steel, MarvelXACT™ can be connected and disconnected more than 100 times.

## CAPABILITIES

- No risk of under- or over-tightening with torque limiting mechanism
- Face sealing ensures zero dead volume
- Minimize carryover, peak broadening, and peak tailing
- Finger-tight to 19,000 psi
- 100+ connects and disconnects
- No training or instructions needed to make a perfect connection every time
- Bioinert BioVersal™ PEEK lined stainless steel and PEEKsil™ configurations available

Click to learn more at:
idex-hs.com/marvelxbrochure

Click to learn more at:
idex-hs.com/marvelxactbrochure

# ISO-PREP™ GUARD HOLDERS AND CARTRIDGES

Our Iso-Prep™ Guard Holders and cartridges are a key part of any preparative separation system, designed to protect valuable prep columns with no degradation of peak shape or plate count. The high-performance guard protects columns in two ways: First, it acts as a filter, trapping particles in the frits. Second, when the guard cartridge is packed with the same material as the prep column, it removes compounds that irreversibly adsorb to the packing material.

## CAPABILITIES

- Valuable preparative column protection
- Negligible back pressures even at flow rates of 100 mL/min
- High-performance sample distribution mechanism
- Relative retention times (RRT) are virtually identical for the column with and without the guard system
- Available in 21.2 mm and 30.0 mm internal diameters

Click to learn more at:
idex-hs.com/isoprepguard

Click to learn more at:
idex-hs.com/isoprepguardscraper

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