MICROSOLV

Common Names of HPLC Column Diameters - HPLC Primer

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HPLC columns are available in a wide range of internal diameters, each suited for different flow rates, sample loads, and analytical needs. Over time, the chromatography community has adopted a series of informal “common names” that correspond to specific ID ranges.

These terms help analysts communicate method scaling, sensitivity considerations, and instrument compatibility more easily.

Capillary LC Columns

Capillary columns are designed for extremely low-flow separations where solvent consumption must be minimized and detector sensitivity is critical.

- Internal diameter: 300 µm – 1.0 mm
- Typical uses: nano-LC, micro-LC, trace-level analysis

These columns require specialized low-flow pumps and reduced-dead-volume fittings.

Micro-Bore Columns

Micro-bore columns represent the narrowest diameters commonly used on standard LC platforms.

- Internal diameter: 1.0 mm
- Advantages: lower solvent consumption, increased analyte concentration at detection

Micro-bore formats are often used in MS-focused or sensitivity-critical methods.

Narrow-Bore Columns

Narrow-bore columns strike a balance between efficiency and ease of use.

- Internal diameter: 2.1 mm
- Benefits: compatibility with UHPLC systems, lower flow rates, reduced mobile-phase usage

This is one of the most common ID choices for LC-MS workflows.

Mid-Bore / Solvent-Saver Columns

The “solvent saver” category is frequently used for routine LC where analysts want to reduce solvent costs while maintaining robustness.

- Internal diameter: 3.0 mm
- Applications: pharmaceutical assays, general-purpose reversed-phase methods

These columns offer lower backpressure than narrower IDs and good reproducibility.

Analytical Columns

Analytical-bore columns are the industry standard for most HPLC methods.

- Internal diameter: 4.6 or 4.0 mm
- Use cases: legacy methods, USP monographs, routine QC

Their higher sample capacity and tolerance for varied injection volumes make them extremely versatile.

Semi-Prep Columns

Semi-preparative formats enable purification of milligram-scale quantities while retaining analytical-style operation.

- Internal diameter: 7.8 – 21.2 mm
- Purpose: preparative fraction collection with moderate loading

These are commonly used in method scale-up and purification labs.

Preparative Columns

Preparative HPLC supports larger solute loads for production-scale purification.

- Internal diameter: up to 3 inches
- Characteristics: higher flow rates and larger injection volumes

Used for isolating compounds in gram-scale quantities.

Process-Scale Columns

Process-scale columns are designed for industrial purification where material demand is high.

- Internal diameter: greater than 3 inches
- Applications: pharmaceutical manufacturing, large-scale separations

These systems require specialized equipment and engineered flow distribution.

Conclusion

HPLC column internal diameters are grouped into widely recognized naming categories—from capillary and micro-bore to process-scale.

These designations help chromatographers quickly identify appropriate columns for sensitivity, scale, and method requirements. Understanding these categories ensures efficient method development and proper column selection.

Common Name	Internal Diamter
Capillary LC	300 um - 1.0 mm
Micro-bore	1.0 mm

Narrow-bore	2.1 mm
Mid-bore / Solvent Saver	3.0 mm
Analytical	4.0 or 4.6 mm
Semi-Prep	7.8 - 21.2 mm
Preparative	up to 3 inches
Process Scale	over 3" inches

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