

Difference Between a Union and an Adapter - HPLC Primer

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Overview

Unions and adapters are common connectors used in HPLC systems to join tubing, fittings, and various instrument components. Although they may appear similar, each serves a distinct purpose in the fluid path.

Understanding when to use a union versus an adapter ensures proper compatibility, reduces leaks, and maintains chromatographic performance.

What Is a Union?

Purpose

- A union is used to connect two components that share the same thread size and thread count.

Key Characteristics

- Ideal when both sides of the connection use identical port geometry
- Typically lower cost than adapters
- Can join different types or sizes of tubing as long as the port threads match
- When connecting different tubing diameters, this is often called a reducing union

When to Use

- Straight, consistent connection between identical threaded components
 - Most routine, low-complexity HPLC tubing joins
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What Is an Adapter?

Purpose

- An adapter is used to connect two different thread sizes or port configurations.

Key Characteristics

- “Adapts” one thread type to another (e.g., 1/4-28 to 10-32)
- Can include connections like Luer fittings or other specialty interfaces
- Used when components originate from different instrument designs or systems

When to Use

- Transitioning between mismatched thread geometries
 - Connecting components from different manufacturers or systems
 - When a union cannot be used because threads do not match
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Practical Differences

Cost

- Unions are significantly less expensive than adapters.

Functionality

- Unions — Same threads on both sides
- Adapters — Different threads on each side

System Impact

- Unions generally create the simplest, lowest-dead-volume connection
- Adapters add versatility at the expense of cost and potentially increased internal volume

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