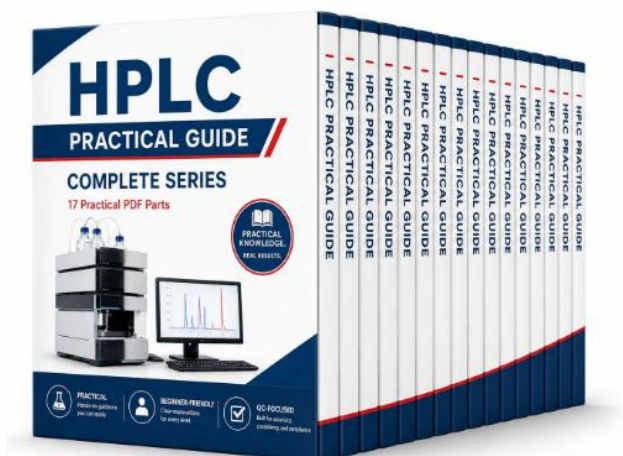


HPLC PRACTICAL GUIDE

Sample Preview

Selected pages from the full 17-part HPLC Practical Guide series



What this preview shows

This preview is designed to show the style, structure, and practical approach of the full paid series. It includes selected beginner-friendly explanations, practical thinking boxes, troubleshooting logic, and sample tables.

By Mohammad Abu Alrub

Get the Complete Series:

<https://hplcpracticalguide.com>

What You Will See in This Preview

This sample preview gives a short look at how the complete HPLC Practical Guide series explains HPLC concepts, chromatogram interpretation, and troubleshooting in a practical beginner-friendly way.

Complete Series Snapshot

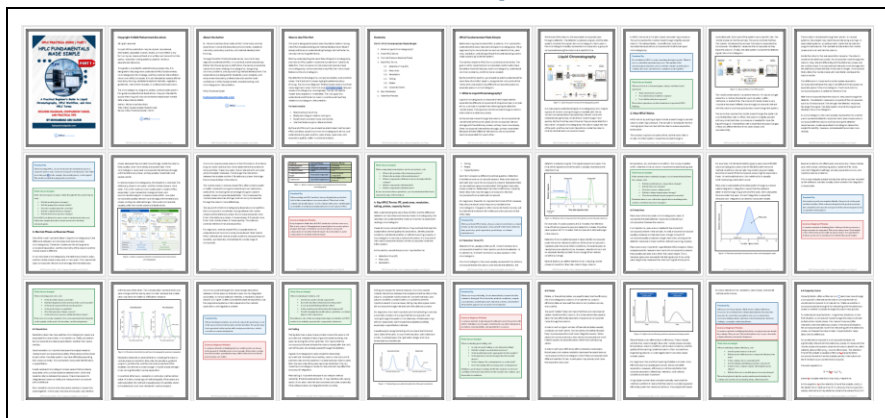
The complete HPLC Practical Guide series includes 17 PDF parts with 531 content pages, 76 figures, 185 tables, and 274 color-coded practical learning boxes, including Practical Tips, Common Beginner Mistakes, Think Like an Analyst boxes, and Key Lessons.

- A simple introduction to HPLC fundamentals.
- Practical explanations connected to real chromatogram thinking.
- Examples of Practical Tip and Think Like an Analyst boxes.
- A sample of peak problem troubleshooting logic from Part 14.
- Editable-style tables that show how the full series organizes practical checks.

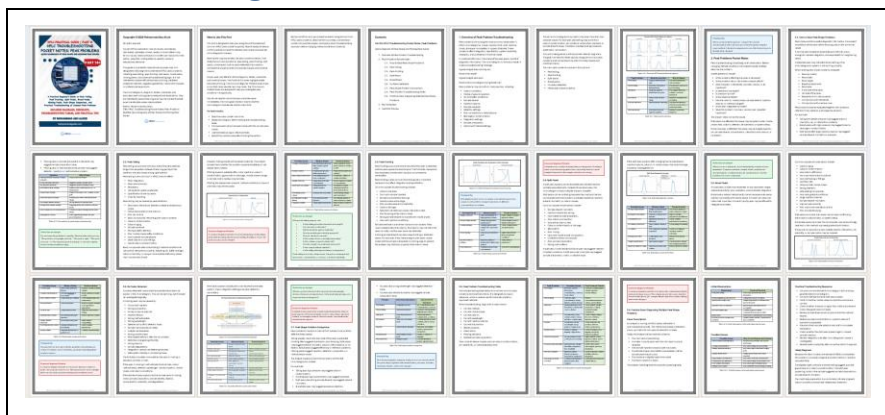
Full 17-Part PDF Series: What's Included

Part 1: HPLC Fundamentals Made Simple
Part 2: Mobile Phase Reservoirs and Solvents
Part 3: Pump and Flow Rate
Part 4: Injector and Autosampler
Part 5: Column and Stationary Phase
Part 6: Detector Basics: UV and PDA
Part 7: Data System and Peak Integration
Part 8: Column Chemistry and Separation Logic
Part 9: Starting, Running, and Shutting Down the HPLC System
Part 10: System Suitability in HPLC
Part 11: Assay Determination by HPLC
Part 12: Related Substances and Impurity Testing
Part 13: HPLC Method Development Basics
Part 14: Troubleshooting: Peak Problems
Part 15: Troubleshooting: Baseline, Retention, and Pressure Problems
Part 16: Career and Interview Readiness
Part 17: HPLC Practice Cases

A Quick Look Inside Part 1: HPLC Fundamentals Made Simple



A Quick Look Inside Part 14: Troubleshooting Peak Problems



Sample from Part 1: What Is Liquid Chromatography?

Liquid chromatography is a separation technique used to separate the different components of a liquid sample. In simple terms, a sample is injected into a flowing liquid called the mobile phase. This liquid carries the sample through a column that contains a stationary phase.

As the sample moves through the column, its components do not all travel at the same speed. Some compounds interact strongly with the stationary phase, so they move more slowly. Other compounds interact less strongly, so they move faster. Because of these different interactions, the components become separated from each other.

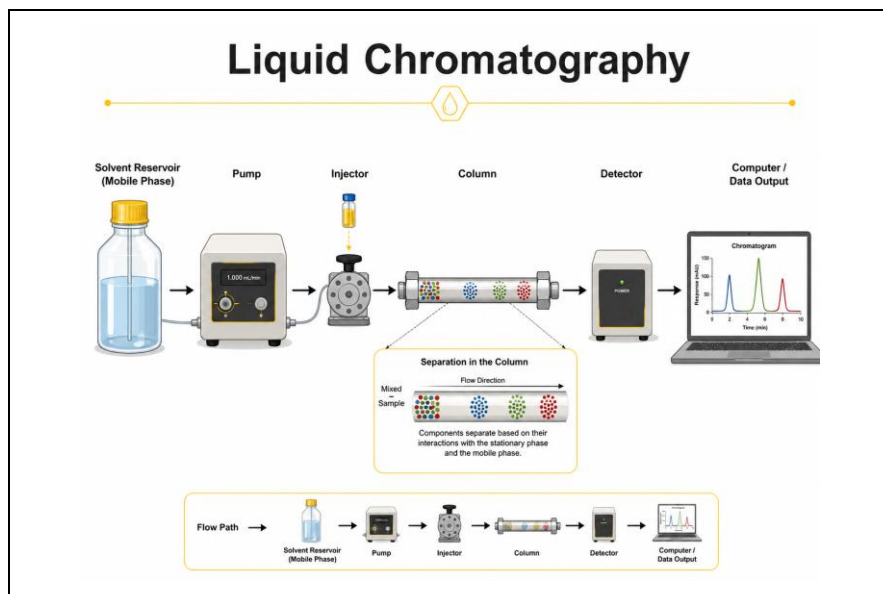


Figure 1.1. Basic flow path of a liquid chromatography system.

A simple way to understand liquid chromatography is to imagine a group of runners moving through a crowded path. Some runners interact more with obstacles and move slowly, while others move through quickly. By the end, they become separated from each other.

Sample Practical Thinking Boxes

The full series uses practical boxes to help beginners connect definitions to laboratory thinking. These boxes are designed to make the reader ask better questions when reviewing HPLC results.

Practical Tip

Do not think of HPLC as only a machine that gives peaks. Think of it as a controlled separation process. The quality of the chromatogram depends on how well the sample, mobile phase, column, flow rate, and detector conditions work together.

Think Like an Analyst

When you look at a chromatogram, always ask three basic questions:

- What entered the system?
- How did it interact with the column?
- How did the detector respond?

These three questions are the foundation of practical HPLC thinking.

Common Beginner Mistake

Many beginners try to memorize HPLC terms without connecting each term to a visual feature on the chromatogram. A practical analyst should ask whether the term is related to time, peak size, peak separation, peak shape, or column performance.

Sample from Part 1: Retention Time (RT)

Retention time, usually written as RT, is the time taken for a compound to travel from the injection point to the detector. In simple terms, it is the time at which a peak appears in the chromatogram.

On a chromatogram, the x-axis usually represents time. When a compound leaves the column and reaches the detector, the detector produces a signal. This signal appears as a peak. The time at the highest point of the peak is usually reported as the retention time.

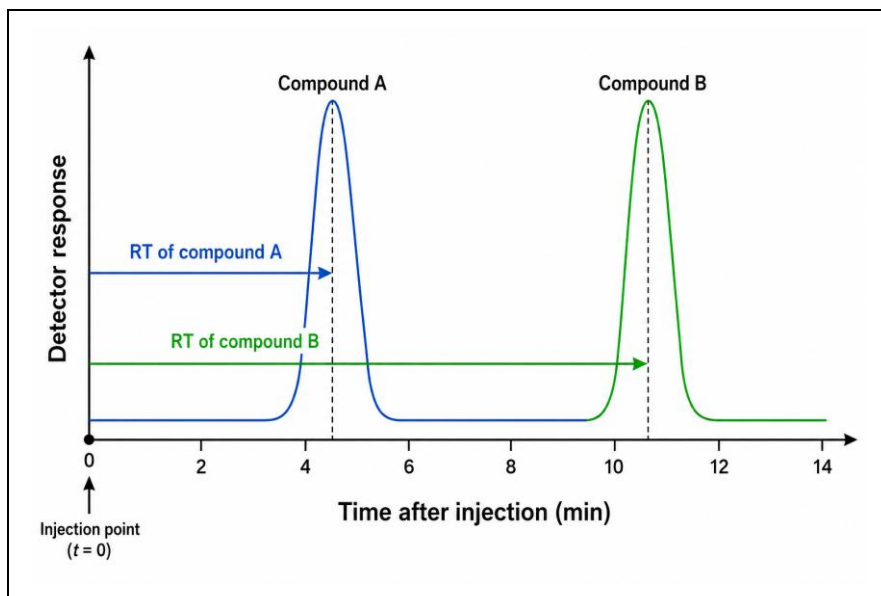


Figure 1.4. Retention time is measured from the injection point to the peak maximum.

Think Like an Analyst

If the retention time suddenly changes, do not immediately blame the column. Ask whether the mobile phase composition, flow rate, column type, temperature, or pH preparation changed first.

Sample from Part 14: Peak Problem Troubleshooting

Peak problems are among the most common issues seen in HPLC chromatograms. A peak may tail, front, split, become broad, disappear completely, or appear distorted. These problems affect integration, quantitation, system suitability, resolution, and confidence in the final result.

In practical HPLC work, the shape of the peak gives important diagnostic information. The chromatogram is not only a result; it is also a troubleshooting message.

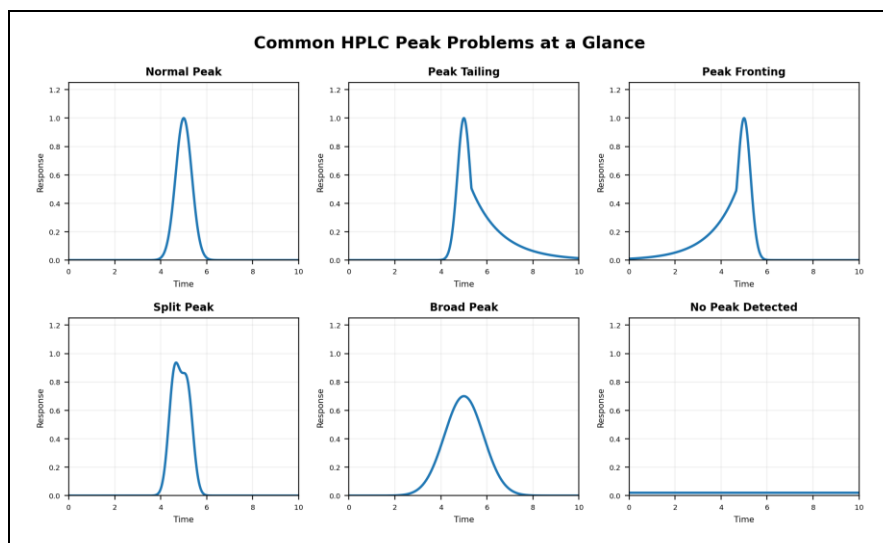


Figure 14.1. Common HPLC peak problems at a glance.

Practical Tip

When a peak problem appears, compare the current chromatogram with a previous good chromatogram using the same method. Historical comparison is one of the fastest ways to identify what changed.

Sample Editable Table: Peak Problem Overview

Peak Problem	What It Looks Like	Why It Matters
Peak tailing	Long tail after the peak apex	May affect integration and resolution
Peak fronting	Peak rises early with a distorted front	May indicate overload or poor focusing
Split peak	One peak appears divided into two parts	May suggest injection, column, or solvent mismatch
Broad peak	Peak is wide and less sharp	Reduces sensitivity and resolution
No peak detected	Expected peak is missing	May indicate injection, detection, preparation, or method problem
Mixed problems	More than one issue appears together	Requires systematic diagnosis

Table 14.1. Peak problem overview.

This type of table helps the learner move from visual observation to practical interpretation. Instead of changing method conditions randomly, the analyst first describes the symptom and then decides what to check.

Think Like an Analyst

Do not name the problem too quickly. First describe what you see: “The peak has a long right-side tail,” “The peak is split,” “The peak is broad,” or “The expected peak is missing.” A clear description leads to better troubleshooting.

Sample Editable Table: First Troubleshooting Questions

Question	Why It Helps
Is the problem in standard, sample, or blank?	Helps locate the source
Is only one peak affected?	Suggests analyte-specific issue
Are all peaks affected?	Suggests system or method issue
Did retention time change?	Points to flow, mobile phase, pH, or temperature
Did pressure change?	Points to blockage, leak, column, or flow path
Did sample diluent change?	Strong diluent can distort peaks
Did injection volume change?	Large injections can overload or distort peaks
Is integration correct?	Some apparent problems are data processing issues

Table 14.2. First questions for peak shape troubleshooting.

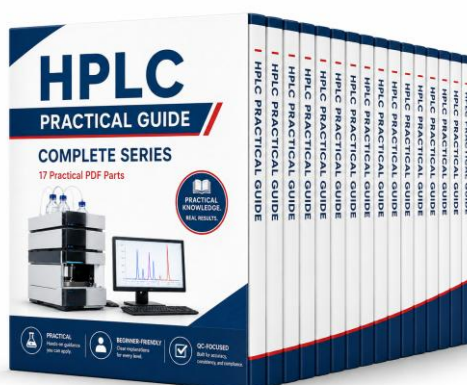
Practical Message

A good troubleshooting workflow starts with observation, comparison, and simple checks before changing the method. This is the practical logic used throughout the complete series.

Continue Your HPLC Learning

This preview gives only a small sample of the full 17-part HPLC Practical Guide series. The complete series is designed to help beginners build practical confidence step by step, from basic HPLC concepts to troubleshooting, system suitability, assay, impurities, method development, career readiness, and practice cases.

Get access to the full 17-part HPLC Practical Guide series:



hplcpracticalguide.com

For questions or feedback about the HPLC Practical Guide series, contact:

contact@hplcpracticalguide.com

