

High vacuum level in spectrometer



Overview

All mass spectrometers operate at very low pressure (high vacuum). This reduces the chance of ions colliding with other molecules in the mass analyzer. Any collision can cause the ions to react, neutralize, scatter, or fragment. All these processes will interfere with the mass. This Webinar discusses how vacuum technology is a fundamental component Mass Spectrometers. (1) A clean vacuum can be obtained and the background of. If a high vacuum provides a long mean free path exceeding the dimension of the chamber, ions can easily reach the detector. The table below summarizes common vacuum-related faults, their symptoms, and solutions. Constant low readings for C, P, S; Pump is hot, loud, smoking, or leaking oil; Loss of low wavelength intensity.



Article Content

Sep 15, 2025

Hi vaccum value

Try to use the menu "vacuum" and turn ON the gauge. If this doesn't help take a look behind the MSD, most time there is a box (depends on the vacuum gauge type you have) with a little green (ok) or red

Oct 21, 2025

Why Does MS Require High Vacuum?

If a high vacuum provides a long mean free path exceeding the dimension of the chamber, ions can easily reach the detector. QPMS is usually operated at around

May 06, 2026

Vacuum System : Shimadzu (Europe)

A turbomolecular pump is a clean vacuum pump suitable as the main pump of a mass spectrometer. The blades of a turbomolecular pump (TMP), rotating with high speed, for example 60,000 RPM, hit

Apr 23, 2026

Vacuum Technology for Mass Spectrometry Instruments

Beginning with the simple question "Why do we need vacuum" we will move on to discuss the types of vacuum technology typically used on mass specs, and then review the evolution of vacuum

Jun 16, 2026

Why Does MS Require High Vacuum?

This collision may happen in a short time with a low vacuum. We call the average distance of an ion's free flight without collision the "mean free path". If a high

Jun 03, 2026

What is the difference between a vacuum and a high

Learn the key differences between low and high vacuum, including pressure ranges, applications, and why the distinction is critical for your processes.

Apr 30, 2026

How Does A Mass Spectrometer Work?

Time of Flight (TOF) Mass Spectrometer – AQA As its name suggests, the principle of this spectrometer is a measurement of the time taken

Mar 22, 2026

Atomic Spectroscopy

The ranges of most interest for optical atomic spectroscopy are: ~ 2 - 20 μm mid-infrared (ir) 700 - 2000 nm near ir 400 - 700 nm visible 200 - 400 nm near ultraviolet (uv) 100 - 200 nm vacuum uv or far uv

Feb 10, 2026

High-Vacuum Pumps in Mass Spectrometers

We divided the realms of vacuum pressures into various ranges and described how the proper operation of a mass spectrometer required the correct vacuum in the right place at the right time.

Aug 12, 2025

Vacuum Ultra Violet Spectroscopy

If Vacuum Ultra Violet radiation is blocked by most of gases of the atmosphere, they can propagate partially through transparent gas such as nitrogen, hydrogen or totally through a vacuum. Therefore,

Sep 06, 2025

Mass Spectrometry and Ultra-High Vacuum

Mass spectrometers can only operate under reasonable vacuum conditions (high vacuum or ultrahigh vacuum, see table 1). Since mass separation is established by the particular trajectory of the

Jul 23, 2025

Spectrometer Vacuum Pump Troubleshooting: A Complete Guide for

Q1: Why does my vacuum spectrometer require a specific vacuum level for analyzing Carbon, Phosphorus, and Sulfur? A1: These elements have their most sensitive analytical emission spectral

Apr 25, 2026

Vacuum systems for analytical instruments

Vacuum systems for clean and reliable analytical environments Vacuum pumps play a crucial role in many types of analytical instruments by creating the correct

Jul 02, 2025

Four ways of finding vacuum leaks using helium

Detecting vacuum leaks at low vacuum levels Different vacuum processes and applications call for different leak rate requirements. Indeed, what is acceptable at

Nov 29, 2025

Hi vacuum value

Check the calibrant (PFTBA) level in the little glass bulb, is there still PFTBA left or do you need to refill it? Be sure the flow from the GC column is not too high, should be less than 2ml/min. Check your

May 05, 2026

Vacuum leak

Compare the current values of the pressures in the vacuum manifold with the values listed in Vacuum leak. If the current values are higher than normal, there might be an air leak. If the value for the UHV

Apr 02, 2026

5.1: Vacuum System

5.1: Vacuum System Page ID Table of contents No headers All mass spectrometers operate at very low pressure (high vacuum). This reduces the chance of ions

Dec 04, 2025

Allectra Notes for High Vacuum and UHV practice

To understand the challenges associated with achieving and working with High Vacuum (HV) and Ultra-High Vacuum (UHV) you need to examine the differences (at a molecular level) between the various

Apr 22, 2026

The Crucial Role of Vacuum in Mass Spectrometry

One of the cornerstones of this technique is the need for a high vacuum environment. In this article, we will explore why vacuum is needed in mass spectrometry, discussing the implications

Dec 09, 2025

Vacuum Systems in Mass Spectrometry: Enhancing Analytical

In a high-vacuum environment, ions experience minimal resistance from gas molecules, allowing for accurate measurement of their flight times and subsequent mass determination with exceptional

Aug 11, 2025

The Crucial Role of Vacuum in Mass Spectrometry

What are the typical vacuum levels required in mass spectrometry? Typically, mass spectrometry requires a high vacuum level ranging from 10^{-3} to 10^{-9} Torr, depending on the type

Jan 29, 2026

Helium mass spectrometer

Once the vacuum has reached the mass spectrometer operating pressure, any helium leakage will be measured. This test method applies to a lot of components that will operate under pressure: airbag

Mar 15, 2026

Check the vacuum pressure levels

For proper performance, operate the system at the proper vacuum levels. Poor vacuum levels can cause reduced sensitivity and reduced electron multiplier life.

May 17, 2026

High-Vacuum Pumps in Mass Spectrometers

High-Vacuum Pumps in Mass Spectrometers last regular installment of this column covered basic vacuum concepts relevant to mass spectrometry. We reviewed basic gas parameters, such as

May 07, 2026

Ultra-high vacuum

Ultra-high vacuum (often spelled ultrahigh in American English, UHV) is the vacuum regime characterised by pressure lower than about 1×10^{-9} torrs (1×10^{-9} mbar; 1×10^{-7} Pa). UHV

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