



MALS – Frequently Asked Questions (FAQ)

General operation and baseline behavior

Why does the MALS baseline take time to stabilize after start up?

After start up, the instrument undergoes:

- Thermal equilibration of optics
- Wetting and stabilization of the flow cell
- Removal of dissolved gases from the mobile phase

Stable baselines typically require continuous, bubble free flow.

Why do air bubbles affect MALS more than concentration detectors?

Bubbles scatter light extremely efficiently and unpredictably. Even very small bubbles can cause:

- Sharp spikes
- Baseline jumps
- Angle specific artifacts

MALS detectors are therefore especially sensitive to dissolved gases and flow disruptions.

Why is regular system care critical for LenS₃ MALS performance?

Regular system care prevents poor data quality, long stabilization times, baseline noise, and frequent cleaning.

Mobile phase quality and filtration

How does mobile phase quality affect MALS performance?

MALS performance strongly depends on:

- Particle free solvents
- Proper filtration
- Adequate degassing

Particles and microbubbles both scatter light and directly increase noise.

Do I really need to filter all mobile phases, even HPLC grade solvents?

Yes. All mobile phases (organic, aqueous, and buffers) must be filtered because MALS is extremely sensitive to particles.

Even HPLC grade solvents can contain dust or microparticles that cause spikes, especially in the LALS signal.



What pore size filter is recommended for mobile phases?

- **Aqueous solvents:** 0.1 μm (PES membranes)
- **Organic solvents:** 0.2 μm (nylon or PTFE, depending on solvent)

Filtering twice is recommended for optimal cleanliness.

Filtration, pressure, and system protection



Why are post pump and post column filters required?

- Post pump filters remove particles from the pump and mobile phase before injection.
- Post column filters protect the LenS₃ flow cell from column shedding, which is especially common in aqueous SEC/GPC.

Both are essential for stable MALS baselines.



Why does system pressure increase over time?

Gradual pressure increases are usually caused by clogged frits or filters due to:

- Column shedding
- Pump seal wear
- Poor mobile phase quality
- Poor sample solubility

The guide recommends isolating components step by step to identify the source.

Common MALS baseline and signal issues



What causes unstable or saturated MALS baselines?

The most common cause is air bubbles or dirt in the flow cell. When present:

- LS signals may saturate
- Laser power drops
- Baselines do not stabilize

Adding controlled backpressure at the outlet helps remove bubbles (check with the provider for allowable limits).

If contamination is present, cleaning is required—either online solvent cleaning or thorough flow cell cleaning.



Why do I see spikes or noise, especially on the low angle detectors?

Spikes are caused by particles from:

- Column shedding (most common)
- Contaminated mobile phase
- Worn pump components
- Dirty system

Low angle detectors are more sensitive due to the angular dependence of scattering.



How do I identify the source of LS spikes?

Recommended sequence:

1. Replace the post column filter
2. Remove columns and run with a union
3. Replace mobile phase and post pump filter
4. Clean the system if spikes persist

This systematic approach isolates the contamination source.



What causes high baseline levels even with only eluent flowing?

High baseline levels indicate flow cell contamination caused by:

- Sample residues
- Crystallized salts
- Bacterial growth
- Air

The detector must be cleaned to restore original baseline levels.



Why do I see long term drift or slow baseline waves?

Common causes include:

- Poor room temperature control
- Inadequate ventilation
- Laser fan malfunction
- Thermal or solvent gradients

Environmental conditions should be checked before suspecting hardware issues.



What causes regular pulsations on all MALS channels?

Short term pulsations are usually due to pump pulsations, often caused by:

- Air in the system
- Check valve or pump head issues

A pulse dampener may be required in some installations.

Cleaning and preventive maintenance



How often should routine cleaning be performed?

Routine cleaning should be done regularly as part of preventive maintenance, especially after running challenging samples or salt containing eluents.



When is extensive (acid) cleaning necessary?

Extensive cleaning is only recommended for:

- Severe contamination
- Bacterial growth
- Salt crystallization
- Old or poorly maintained systems



Why is continuous low flow operation recommended in standby?

Maintaining a low flow (~ 0.1 mL/min) prevents:

- Salt crystallization
- Detector drying
- Baseline instability

Stopping flow with salt containing eluents is strongly discouraged.

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