



MZ-Gel SD^{plus} - General Care and Regeneration

MZ-Gel SD^{plus} is a proprietary development of MZ-Analysentechnik based on highly-crosslinked and totally porous high-performance styrene-divinyl-benzene copolymer. **MZ-Gel SD^{plus}** is tightly classed with a narrow pore size distribution and features both a long lifetime and extraordinary high column efficiencies.

The following technical note will help users to get the maximum out of the columns and to generate reproducible separations over and over again and to extend the lifetime of the columns to its maximum.

General Care

To extend column lifetime please consider the following suggestions:

1. As eluents, e.g., toluene, tetrahydrofuran or dimethylsulfoxide are used. Columns are usually shipped in tetrahydrofuran - please pay attention to recommendations for procedures for changing the eluent. All eluents should be filtered through a 0.2–0.45 µm membrane and degassed.
2. Filter samples through a 0.2–0.45 µm syringe filter before injection.
3. Use a guard column for contaminated samples.
4. The recommended flow rate for analytical columns (ID 7.7 mm) is 1.0 mL/min.
5. The maximum column pressure for continuous use is 150 bar - please adjust flow rate if necessary.
6. Preferentially store the column in toluene after application with nonpolar eluents and in the eluent after application with polar eluents (e.g., dimethylsulfoxide).
7. Use analytical grade solvents and stabilized tetrahydrofuran for all work.

Column regeneration

If despite all precautionary care the column gets clogged or contaminated, in some cases the performance of the column can be restored by removing contaminants from the sorbent bed or by regeneration of the phase. It is important, to locate the source of contamination before using the column again for the analysis of samples. Please follow the next steps to regenerate the column:

1. **Prepare fresh eluent:** in some cases the performance loss is traced to eluent contamination. Therefore, prepare fresh eluent and flush all liquid lines before using the column again. The eluent should be filtered through a 0.2–0.45 µm membrane and degassed prior to use.
2. **Cleaning of sorbent:** to remove contamination rinse the column with a minimum of 10 column volumes at 0.1 mL/min and 60° C as follows (if necessary, inverse flow direction):
 - 100 % tetrahydrofuran to remove non or medium polar organic compounds
 - 10 % methanol in tetrahydrofuran to remove polar organic compounds
 - convert column to storage condition with toluene

An adequate indicator for a clean column is a constant baseline. At constant temperature you should observe less than 2-3 mAU drift during a running time of 5 minutes with an isocratic run.
3. **Decompression of polymer bed:** the polymer consists of compressible spherical particles. The particles are deformed by a back pressure above 150 bar. Thus, a compression of the column bed and a further increase of pressure results. To decompress the column bed, shut off the pump and allow the polymer to “relax” for about 30 min. Invert the column and pump the eluent through the column with 0.1 mL/min overnight (viscous eluent at 60° C). Then return the column to normal operating conditions.
4. **Column replacement:** the above procedures will restore performance only in certain cases. Some organic contaminants are particularly refractory and may not respond to treatment. Under these circumstances, column replacement is necessary. It is highly advisable to locate the cause of the problem before installing a new column.