

Thermo Scientific Well Plates for Chromatography

The Thermo Scientific™ WebSeal™ system is a comprehensive range of PP well plates with or without glass inserts and sealing mats. This chapter of the catalog should help to decide, whether well plates are an option to glass or plastic vials as sample container for chromatography applications and if yes: which product to choose.

In order to give a qualified recommendation here, four critical questions about the application have to be answered:

- 1) Can the autosampler be equipped with well plates? (autosampler compatibility)
- 2) Is the sample compatible with the well plate material? (solvent compatibility and stability)
- 3) Are seals for plates available, which meet the requirements? (cross contamination, evaporation rates, piercability)
- 4) Which product is the right one for the application?
 - a. Basic plates, economical, but limited solvent compatibility
 - b. Mid range plates, CERTIFIED, good solvent compatibility
 - c. Premium plates, excellent solvent stability, inert, "like a glass vial" usage

- 1) Modern autosamplers offer racks and handling systems for well plates in order to:
 - Handle more samples in less time
 - Improve the handling of large number of sample sequences
 - Use a compact footprint container system with less space consumption per cm²
 - Provide low volume/high recovery cavity.
 – The design of our plates is compatible in terms of the base footprint with those autosamplers capable of using ANSI/SBS standards.
 The standards set the most important dimensions with tolerances for 96-well and 384-well microplates.
 ANSI: American National Standards Institute
 SBS: Society for Biomolecular Sciences
 - As the height is not controlled by these standards and autosamplers may have limitations on which plates may be used. (see Autosampler Compatibility Table on page 2-109)
 - The internal well profile allows processing of small volumes but the correct profile must be selected (flat-, U- or V-profile)
 - The wall profile does not encourage the capillary "wicking" of solvent from the well during storage and processing.

- 2) Are there disadvantages of today's plastic well plates compared to glass vials, which have been the standard for decades and offer all the required inertness, freedom of blank values and solvent stability need for a reproducible HPLC and/or GC analysis?

The container of choice has to be:

- Inert to the solvent and sample
- Adds nothing to the sample due to extraction or contamination
- Can be sealed to prevent evaporation of solvent and sample

Glass inserts are resistant to all organic solvents, stable at temperatures of over 350°C, have high clarity, extremely low organic extractible profile and structural rigidity, but:

- Strong acids may extract ions from the glass by a process of hydrolytic extraction
- Although structurally rigid the glass is sensitive to shock and abrupt temperature changes, causing the glass to crack.

Polypropylene is seen as the plastic material of choice when storing liquid sample in aqueous/organic mixtures due to its wide chemical compatibility with alcohols, acetonitrile and other common HPLC solvents (see Chemical Resistance Reference Chart on page 2-103), but:

- Plastic Additives may be found in the material which aid moulding and solvents. Download Technical Notes from www.thermoscientific.com/webseal

- Moulding Technology uses releasing agents which allow products to be produced more quickly but these may contaminate samples.

- 3) Chromatography predominantly requires organic solvents as the eluent or solvent for the samples. Therefore the container of choice was for decades a glass vial with a closure, which provides on the sample side an inert surface (normally fluorinated) for sample integrity and on the other hand a soft, piercable rigidity for simple and reliable needle handling (often silicone). The techniques vary in requirements with the major differences in sample handling being between gas chromatography and liquid chromatography.
 - Tapes and adhesive foils are an economical alternative for standard applications with a limited contamination risk from the glue formulation.
 - WebSeal mats are made of chromatography proved silicone available with or without PTFE layer for an inert and safe seal of the plates. For better piercability and in order to meet most autosampler injection systems they are available pre-slit as well.
 - For applications requiring a sealing mat, select the microplate product that best fits your sample size, find the diameter of the wells and select a mat with plugs of the same diameter.

4) We present a new range of well plates which exactly meets the requirements of today's chromatographer using an autosampler for plates. All the advantages of sample handling via a plate are combined with the security for reliable results and the experience of decades as market leader in autosampler vials & closures. Our plate portfolio contains products for every type of application and offers solutions from a simple standard routine analysis up to very special and challenging sample handling problems.

Why go with less than a product from the market leader in vials and closures?

We offer:

- Plates and seals for standard and routine applications, chromatography tested, made from resins which show excellent HPLC solvent resistance and low background noise, especially with polar solvents
- CERTIFIED plates and seals for reliable analysis, the new industrial standard for chromatography plates, lowest background, lowest extractable rates, proved by a certificate with our best and established sealing mats.
- Glass covered PP plates, where an inert surface is required, for minimized sample adsorption on the plastic wall and constant quantification results from cavity to cavity, independent from the type of analyte.
- Plates with glass inserts for a convenient "like a glass vial" usage, with all the benefits and quality arguments you know from your "normal autosampler vial". Here you have the choice of a well plate handling with sealing mats or - alike a normal vial - with individual closures for every glass insert – only with its own transport "rack" and ready to use.

