

# Flash Chromatography Introduction

The technique of flash chromatography has advanced considerably since it began in the 1970s with self-packed glass columns that relied on gravity for flow. Instrumentation today automates and speeds the purification, and pre-packed disposable cartridges eliminate the time spent packing. However, the one area of flash chromatography that has seen little advancement is the heart of the separation, the silica

## Flash Silica Technology

Most cartridges today are packed with the same 40–63µm irregular shaped silica that was used for self-packed glass columns in the 1970s. The benefit of this type of silica is that it is inexpensive and generates low backpressure while providing a marginal level of resolution. Grace, as a silica manufacturer, supplies this same grade of silica to many of the flash manufacturers. However, as a silica manufacturer, and a company with a breadth of chromatography products and knowledge, Grace is advancing the field of flash chromatography by introducing innovative silica and cartridge manufacturing.

## GraceResolv™ Silica

Grace developed a new grade of DAVISIL® silica that dramatically increases resolution and capacity without an increase in backpressure. The silica used in the GraceResolv™ cartridges is smaller in particle size than traditional flash silicas but has a more narrow particle size distribution and very few fine particles. As in HPLC, the smaller particles generate greater efficiencies in the packed column, increasing resolution. The narrow particle size distribution allows the cartridge to be packed with higher efficiencies and the reduction in fines allows all of this to happen without a change in backpressure.



GraceResolv™ silica also undergoes a proprietary process to remove metals from the silica surface. Surface metals cause mixed-mode interactions that lead to peak tailing and a loss of resolution. GraceResolv™ silica has 50% less surface metals than standard irregular silica used today in flash cartridges. This makes a dramatic difference in resolution especially for metal chelator compounds.

## GraceResolv™ High-Resolution Flash Cartridges

The advantage of the silica used in our cartridges is guaranteed with a rigorous quality assurance program. Each GraceResolv™ cartridge undergoes over 15 tests, from silica to packed cartridge, to ensure unvarying lot-to-lot performance. A chromatographic test is performed to ensure that the columns are well packed and meet our efficiency, resolution, and peak symmetry specifications.



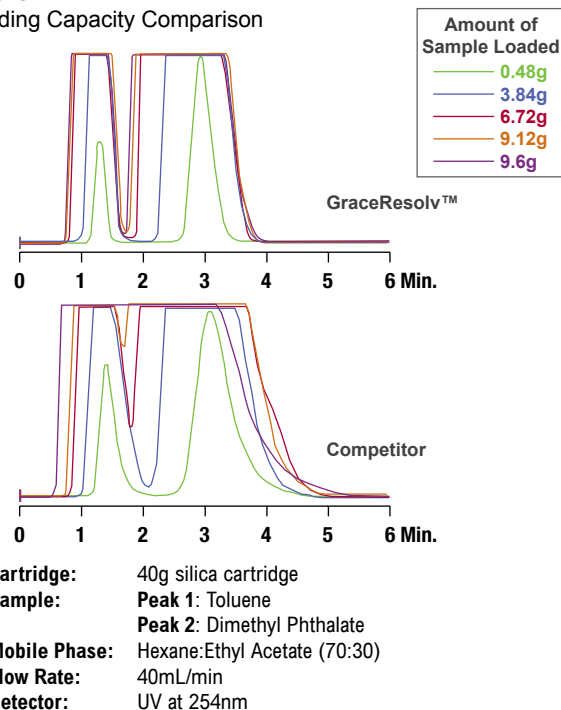
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## Experiment

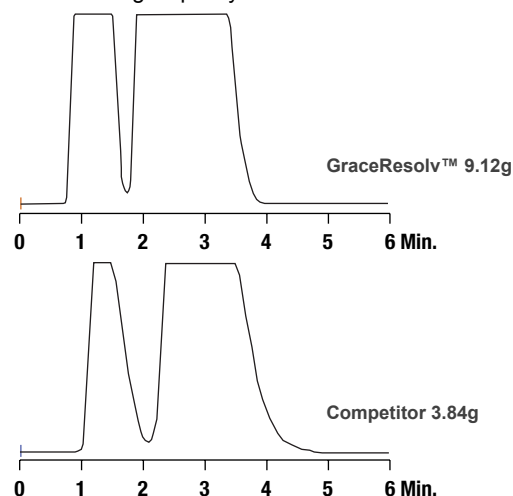
### Loading Capacity Study

The loading capacity of a GraceResolv™ 40g cartridge and a leading competitor's 40g cartridge were compared using the purification of a sample mixture containing Dimethyl Phthalate and Toluene as an example. The testing determined maximum loading capacity with baseline resolution.

**Figure 1.**  
Loading Capacity Comparison



**Figure 2.**  
Maximum Loading Capacity with Baseline Resolution



## Results

This experiment demonstrates how the improved silica technology in GraceResolv™ cartridges and efficient column packing improve the resolution of the separation and allow higher sample loading at high product purity.