

Comparison of Column Performance between Yamazen and Other Manufacturer

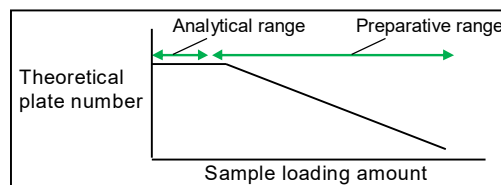
Performance of a column is determined by not only theoretical plate number but also peak shape. Peak shape tells how well the column is packed. A poorly packed column causes peak fronting and/or tailing, resulting into a poor separation with more fractions contaminated in the prep-scale sample run. A column which produces the good peak shape is a good column to use for the sample separation in the prep-scale.

Columns Tested and Separation Method

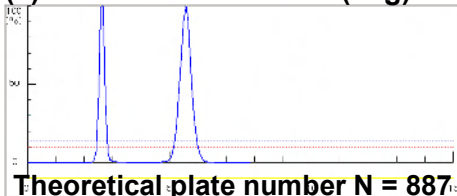
<p>A. Yamazen Universal Column Premium Silica Gel, L-size ID: 26mm Packed height: 125mm Packed weight: 40g Particle size: 30μm</p> <p>B. Yamazen Universal Column Premium Silica Gel, M-size ID: 20mm Packed height: 85mm Packed weight: 16g Particle size: 30μm</p> <p>C. Company FS Si-50 size60 ID: 27mm Packed height: 100mm Packed weight: 30g Particle size: 50μm</p>	<p>Flow rate: A, C; 20ml/min B; 10ml/min Detection: UV (254nm) Sample: Methyl-<i>p</i>-hydroxybenzoate Butyl-<i>p</i>-hydroxybenzoate</p> <p>Note: To avoid any possible effect on column performance by using different manufacturers' silica gels we selected a sample which has almost same selectivity with each column. (Selectivity $\alpha \approx 1.6$)</p> <p>Sample loading amount: Shown at chromatograms (7)~(12) and those chromatograms at B on the second page. (1)~(6): 0.125mg per 1g of silica gel for each peak was loaded. The sample used with (1)~(3) consists of only 1 component, and that with (4)~(6) does 2 components. (4)A: 10mg, (5)B: 4mg, (6)C: 7.5mg Sample loading method: Direct loading onto separation column for (1)~(6). Loading onto Inject column for (7)~(12).</p>
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Comparison of Theoretical Plate Number

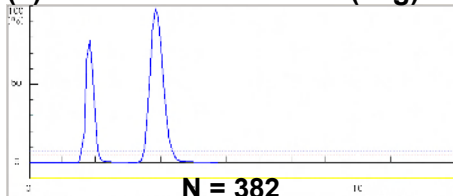
The theoretical plate number of each column was calculated as one of the factors to evaluate the column performance. The theoretical plate number was calculated running a sample in the analytical scale. See the figure on the right.



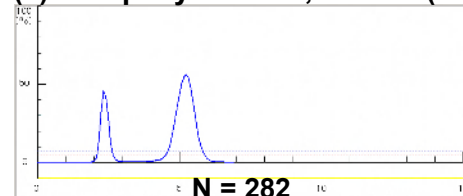
(1) Yamazen Premium L (40g)



(2) Yamazen Premium M (16g)

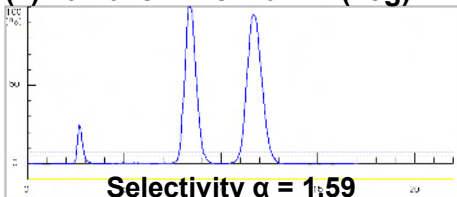


(3) Company FS SI50, size 60 (30g)

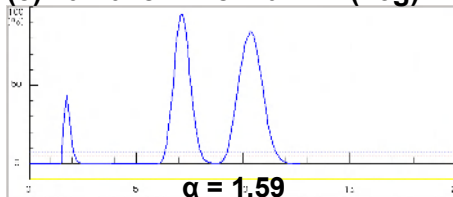


Selectivity α of the selected sample

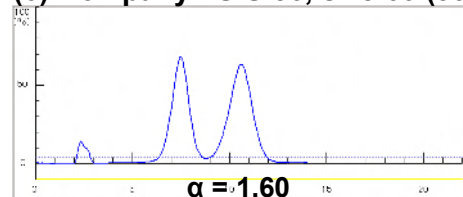
(4) Yamazen Premium L (40g)



(5) Yamazen Premium M (16g)



(6) Company FS SI50, size 60 (30g)

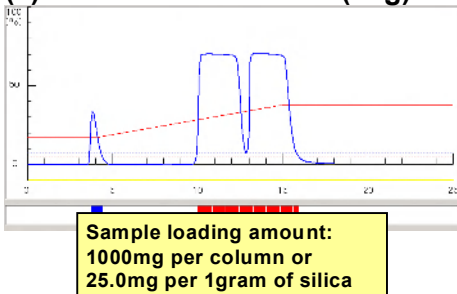


This sample has the almost same selectivity of $\alpha=1.6$ with Yamazen's silica gel and FS's silica gel. That means we can do a fair comparison of column performance as to the sample loading amount on Yamazen's column and FS's column.

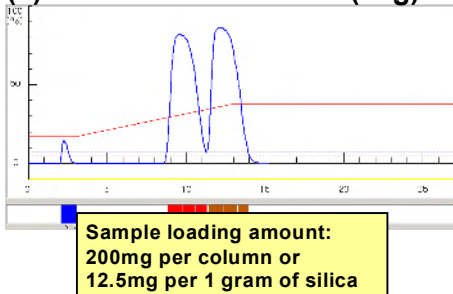
Max. Sample Load to achieve the Resolution of $R_s=1$

Sample loading amount was increased up to the point where resolution of $R_s=1$ is still achieved. If more sample is loaded, adjacent sample peaks would start getting overlapped each other.

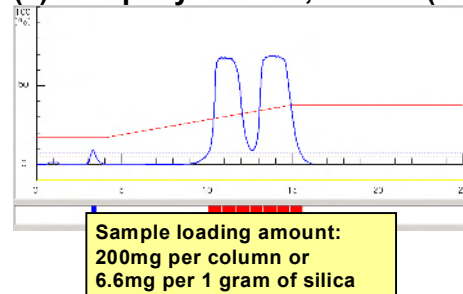
(7) Yamazen Premium L (40g)



(8) Yamazen Premium M (16g)



(9) Company FS SI50, size 60 (30g)

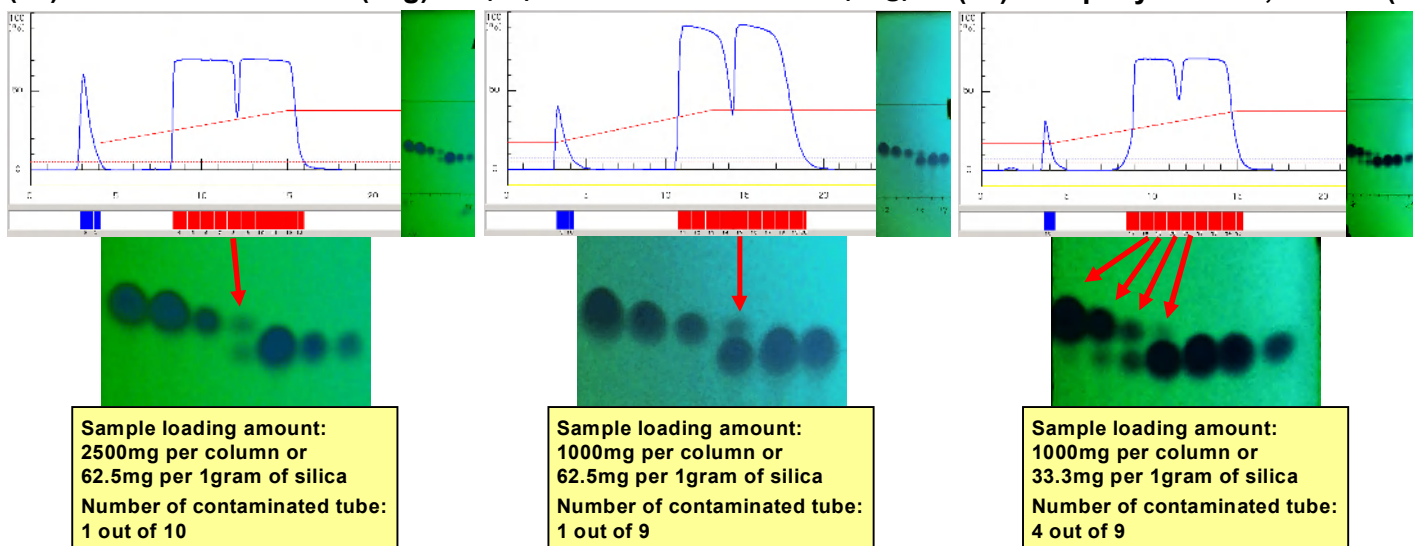


■ Examination of Column Performance under the Overloaded Condition

A. Comparison of Max. Sample Loading Amount based on Peak Shape

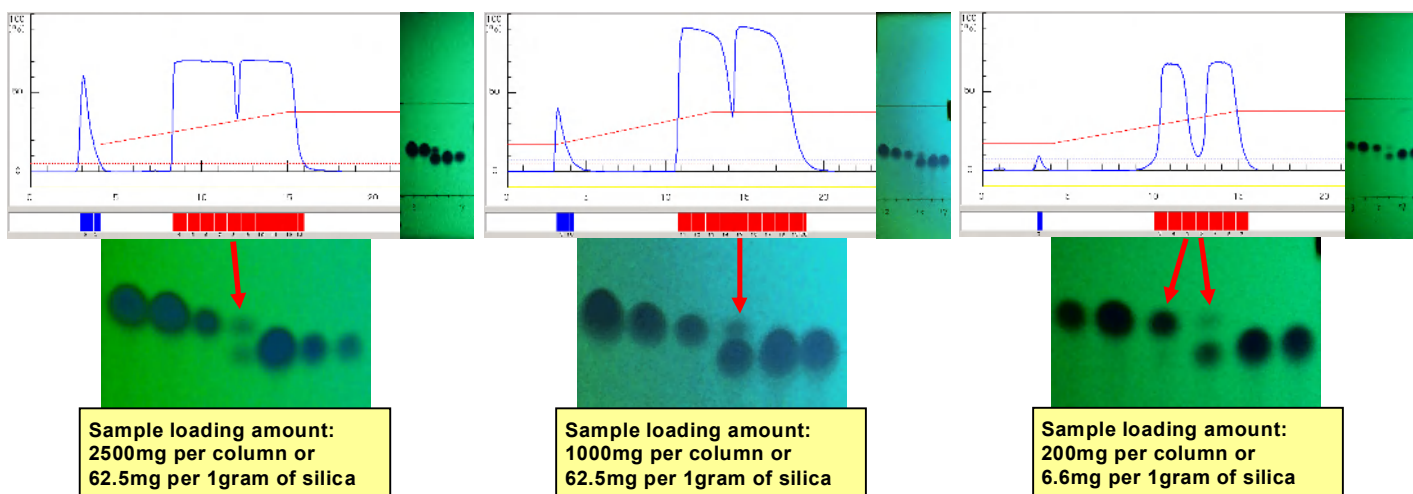
Monitoring and reviewing the peak shape of each column, we increased sample loading amount for each column to the maximum, and checked how many fraction tubes were contaminated and how well the test sample was separated.

(10) Yamazen Premium L (40g) (11) Yamazen Premium M (16g) (12) Company FS SI50, size 60 (30g)



B. Comparison of Max. Sample Loading Amount determined by the Number of Contaminated Fraction Tube

The maximum sample loading amount was determined on the condition that there are two or less contaminated fraction tubes.



Sample loading amount for Yamazen columns are about 10 times greater than that for FS's column comparing by either same size column or per 1 gram of silica gel.

Test result of above "A" tells that there is no need to purify the fractions again if Yamazen's high performance columns are used. Sample separation can be carried out efficiently with the use of Yamazen's columns.

Test result of above "B" tells that a drastic column down-sizing is possible if Yamazen's high performance columns are used as compared with FS's columns.

Moreover, Yamazen Smart Flash, the automated flash system calculates the maximum sample loading amount for each column selected and assures the best sample separation by taking full advantage of the high performance of Yamazen columns.



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