

Performance Note

Typical peak area and retention time precision of a **Prominence** HPLC system

Demonstration of the system precision by checking the injection volume and retention time repeatability

Excellent system precision is one of the key factors for obtaining trustworthy quantitative results.

Good system precision plays an important role when it comes to judgement of out of specification results. Therefore it is advisable to check system precision on a regular base.

The following simple performance test using a 1 ppm Anthracene standard demonstrates the unique solvent delivery pump flow precision and column oven temperature precision, which are leading to excellent retention time precision. Last but not least the unmatched autosampler precision, which leads to excellent peak area repeatability, is contributing to the entire precision.

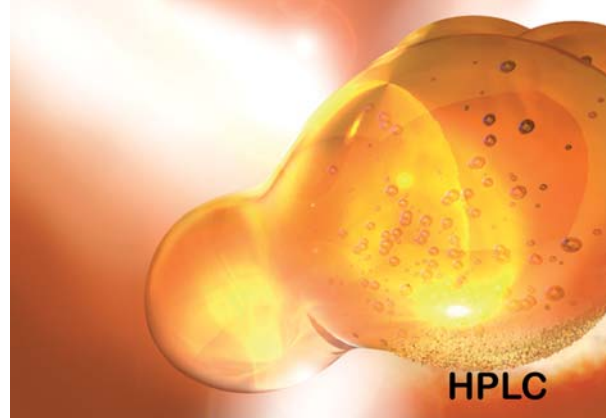
The following standard system configuration has been used to show the system precision based on 10 repetitive injections with particular injection volumes:

Degassing Unit:	DGU-20A3
Solvent Delivery Pump:	LC-20AB
Sample Injector:	SIL-20A
Column Oven:	CTO-20A
UV/VIS Detector:	SPD-20AV

The chromatographic conditions below have been used for the precision test:

Sample:	Anthracene 1ppm in H ₂ O/ACN (V/V = 25/75)
Mobile Phase:	Acetonitrile/Water (75/25)
Column:	VP-ODS 4,6 mm x 150 mm

Flow Rate:	1 ml/min (B CONC = 75 %)
Oven Temperature:	70 °C
UV Det. Wavelength:	251 nm



Prominence binary HPGE system used for the precision test

Test performance

After baseline stabilization a 1 µl test injection has been performed. The integration parameters have been optimized and target peak has been adopted to the compound table.

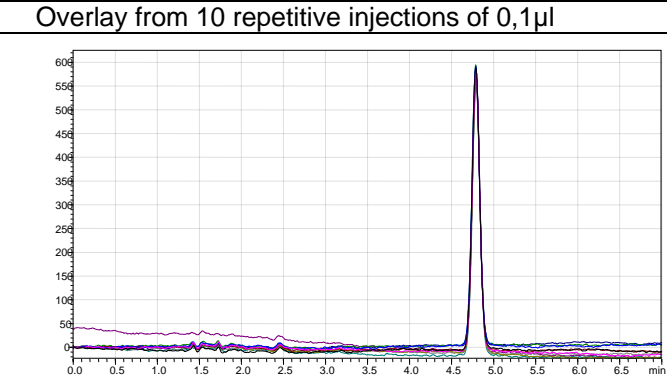
A batch table for injecting 10 repetitive injections of the following volumes: 0,1 µl, 1 µl, 10 µl and 100 µl has been created.

LCSolution, the software which controls the system has been set-up so that system precision is automatically calculated using some of the build in QA/QC calculations.

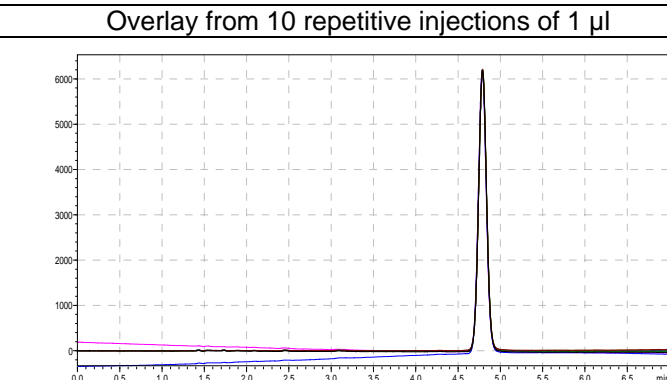
The results of each set of analyses are shown on the next page.

Results

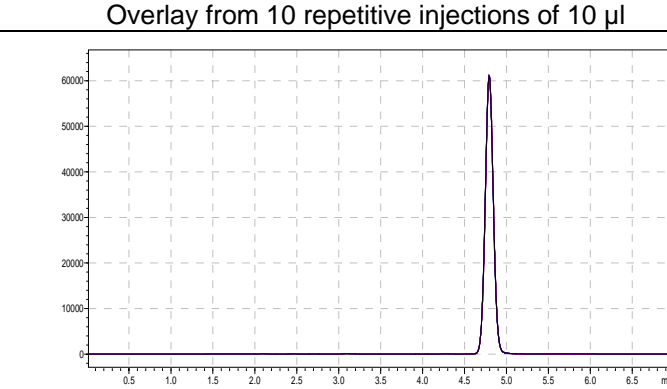
Inj. Vol. = 0.1 µl

Run	Peak Area	Retention Time	Overlay from 10 repetitive injections of 0,1µl 
1	3730	4.790	
2	3761	4.791	
3	3801	4.792	
4	3819	4.790	
5	3836	4.790	
6	3870	4.790	
7	3848	4.787	
8	3891	4.790	
9	3874	4.790	
10	3916	4.790	
Av	3835	4.790	
% RSD	1,519	0.026	

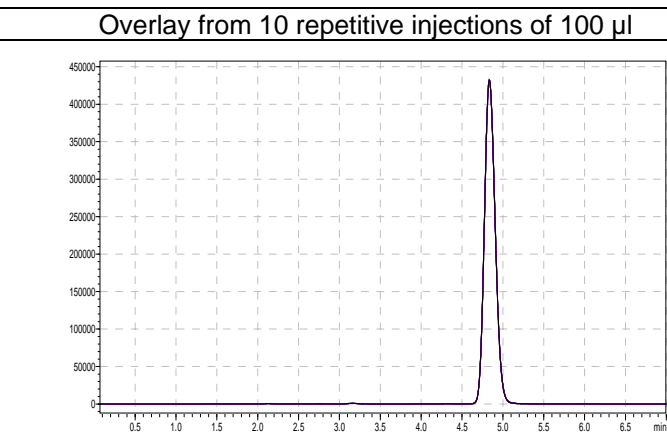
Inj. Vol. = 1 µl

Run	Peak Area	Retention Time	Overlay from 10 repetitive injections of 1 µl 
1	41325	4.789	
2	41300	4.790	
3	41281	4.789	
4	41405	4.790	
5	41394	4.786	
6	41329	4.790	
7	41301	4.789	
8	41393	4.789	
9	41250	4.786	
10	41437	4.789	
Av	41342	4.789	
% RSD	0.142	0.030	

Inj. Vol. = 10 µl

Run	Peak Area	Retention Time	Overlay from 10 repetitive injections of 10 µl 
1	416082	4.974	
2	415959	4.973	
3	415635	4.974	
4	416002	4.975	
5	415579	4.975	
6	415553	4.974	
7	415462	4.975	
8	415518	4.974	
9	415528	4.975	
10	415542	4.974	
Av	415686	4.974	
% RSD	0.053	0.013	

Inj. Vol. = 100 µl

Run	Peak Area	Retention Time	Overlay from 10 repetitive injections of 100 µl 
1	3999400	4.834	
2	4002904	4.834	
3	4001509	4.835	
4	4000120	4.835	
5	3999415	4.835	
6	3998454	4.834	
7	3998454	4.833	
8	3993631	4.834	
9	3997027	4.834	
10	3992513	4.834	
Av	3998343	4.834	
% RSD	0.077	0.012	

Conclusion

Compared with last generation autosampler the SIL-20A(C) provides new limits in terms of precision. From 1 µl up to the maximum injection volume of the standard configuration (up to 2 mL injection volume is possible with optional sample loop) the precision is far better than demanded for most of the current method acceptance criteria.

Such kind of system precision allows for better trend analysis in quality control so that the required actions can be taken to minimize risks and costs.

Beside this the good precision of small injection volumes allows for the achievement of better system efficiency leading further more to lower quantitation limits.

When comparing to the more conservative documented specifications:

LC-20AB Flow Precision < 0,1%RSD
>>>>Test Result: 0,03%RSD

SIL-20A Inj. Volume Repeatability < 0,3%RSD

>>>>Test Result: 0,053%RSD

It can easily be seen that the typical performance is far better than the documented specification.

The given specifications serve purely as technical information for the user.
No guarantee is given on technical specification of the described product and/or procedures.