

Agilent Dissolution Testing Solution

UV-VIS Spectroscopy for Dissolution Testing

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Topics

Introduction to Agilent's UV-visible history and offerings

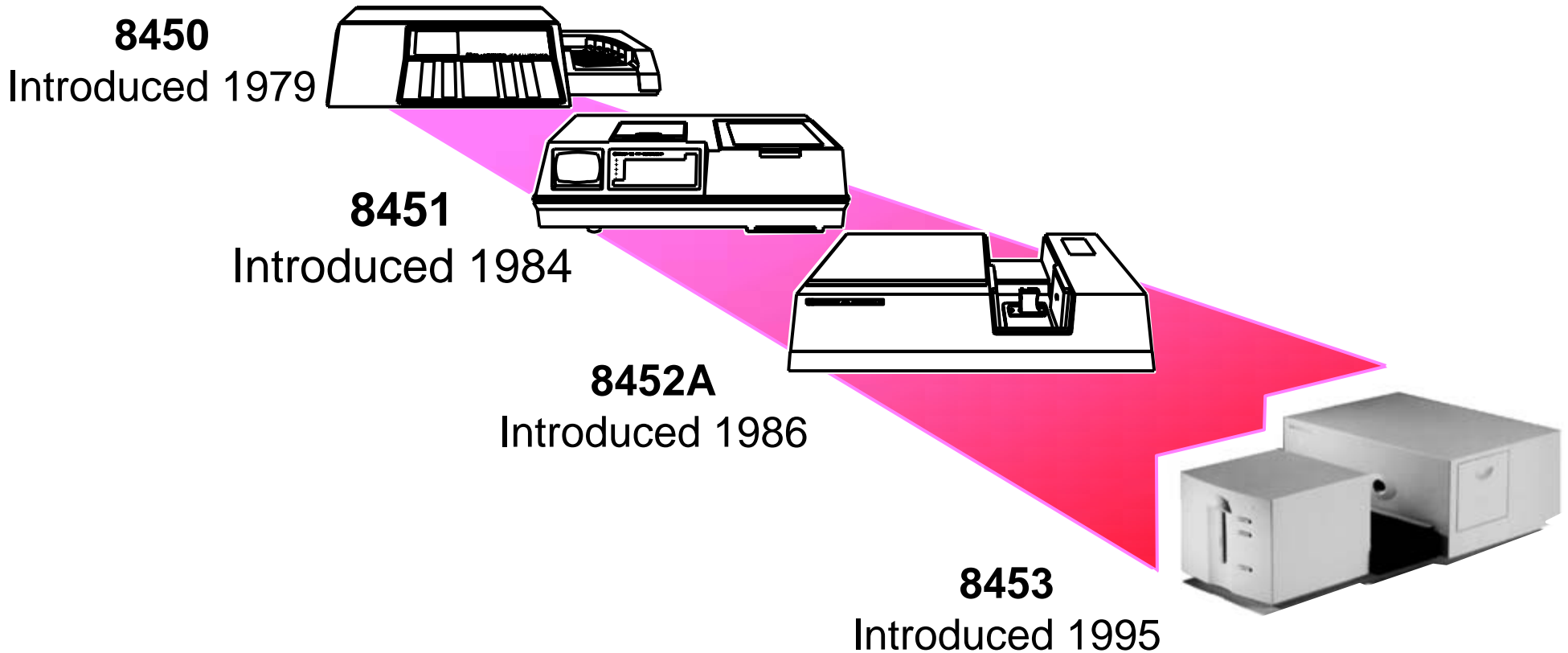
Instrument Technology and Software architecture

Dissolution Testing Systems

Demo of a Dissolution Method Setup

Questions and Answers

Agilent (HP) UV-Visible Spectroscopy Systems Spectrophotometer History



Product Offerings to Customers Solutions

- Working and fully tested system
- Instrument and accessories
- PC hardware and software
- Instrument communication
- Compliances Services for IQ/OQ/PV
- Accessories and supplies for UV-visible Spectroscopy



Agilent UV-Visible Spectroscopy Systems

The 8453 Spectrophotometer

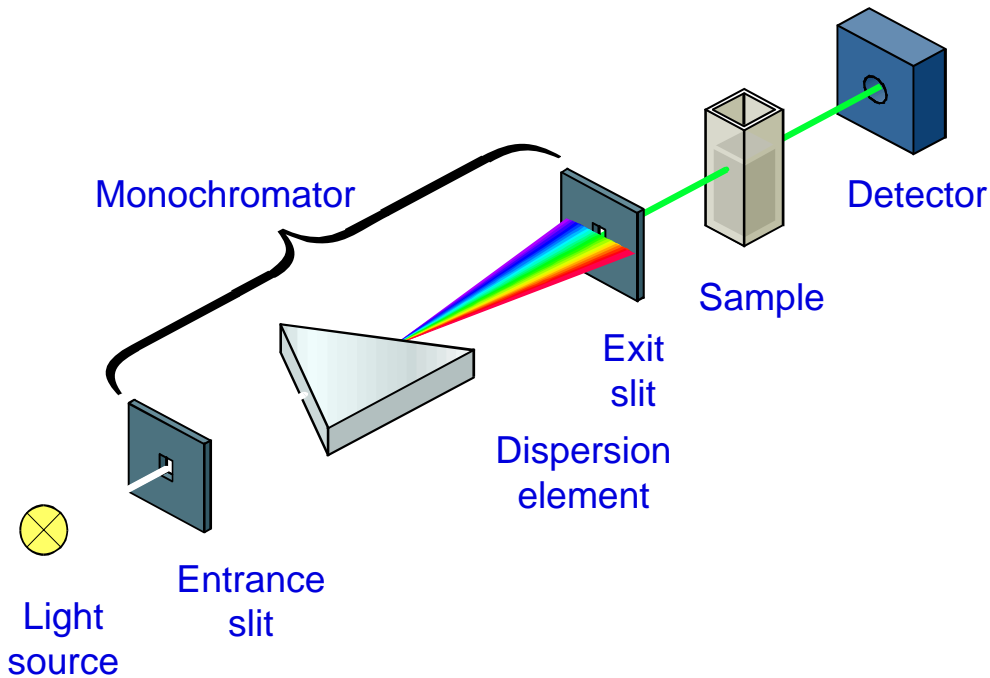
Agilent 8453 UV-Vis Spectrophotometer

- 190-1100nm Wavelength Range
- 1nm Slit Width, 1nm Sampling Interval
- 0.1 second Full Spectrum Scan
- Fully EP & USP compliant
 - > improved Resolution, lower Stray Light
- Instrument logbooks
 - > GLP

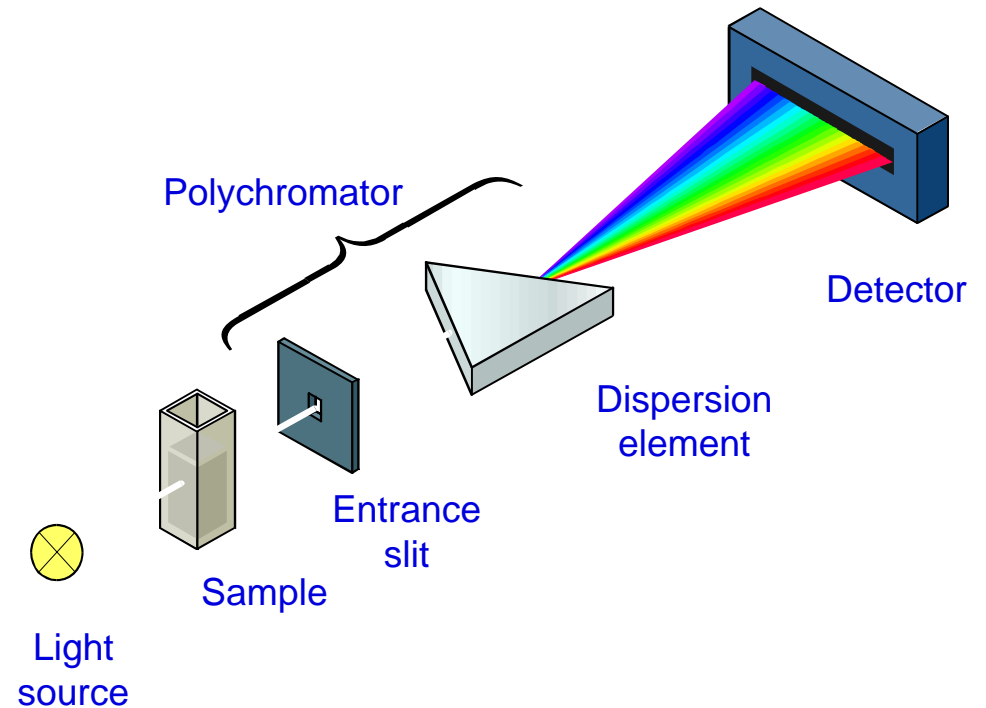


Spectrophotometer Instrument Design

Conventional Single-beam Spectrophotometer



Diode Array Spectrophotometer



Diode-Array Advantages

The diode array advantages are resulting from the different design of diode array instruments

- Simple mechanical and optical design
- Open sample area
- Fixed arrangement of grating and detectors
- Fast acquisition of complete spectra
- Statistics

Open Sample Area

Reversed Optics

Room light cannot reach detectors

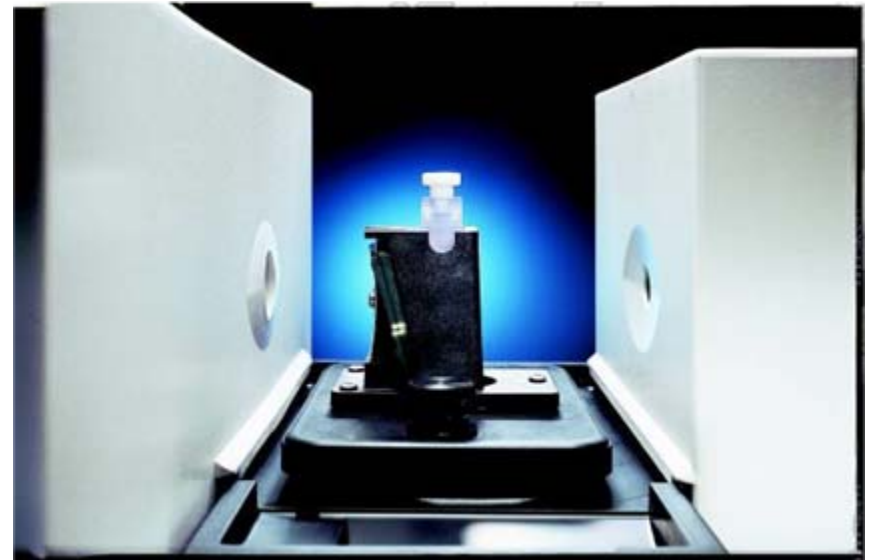
- narrow “acceptance angle” after sample
- geometry of spectrograph

Easy and convenient access

- better productivity
- Less error prone

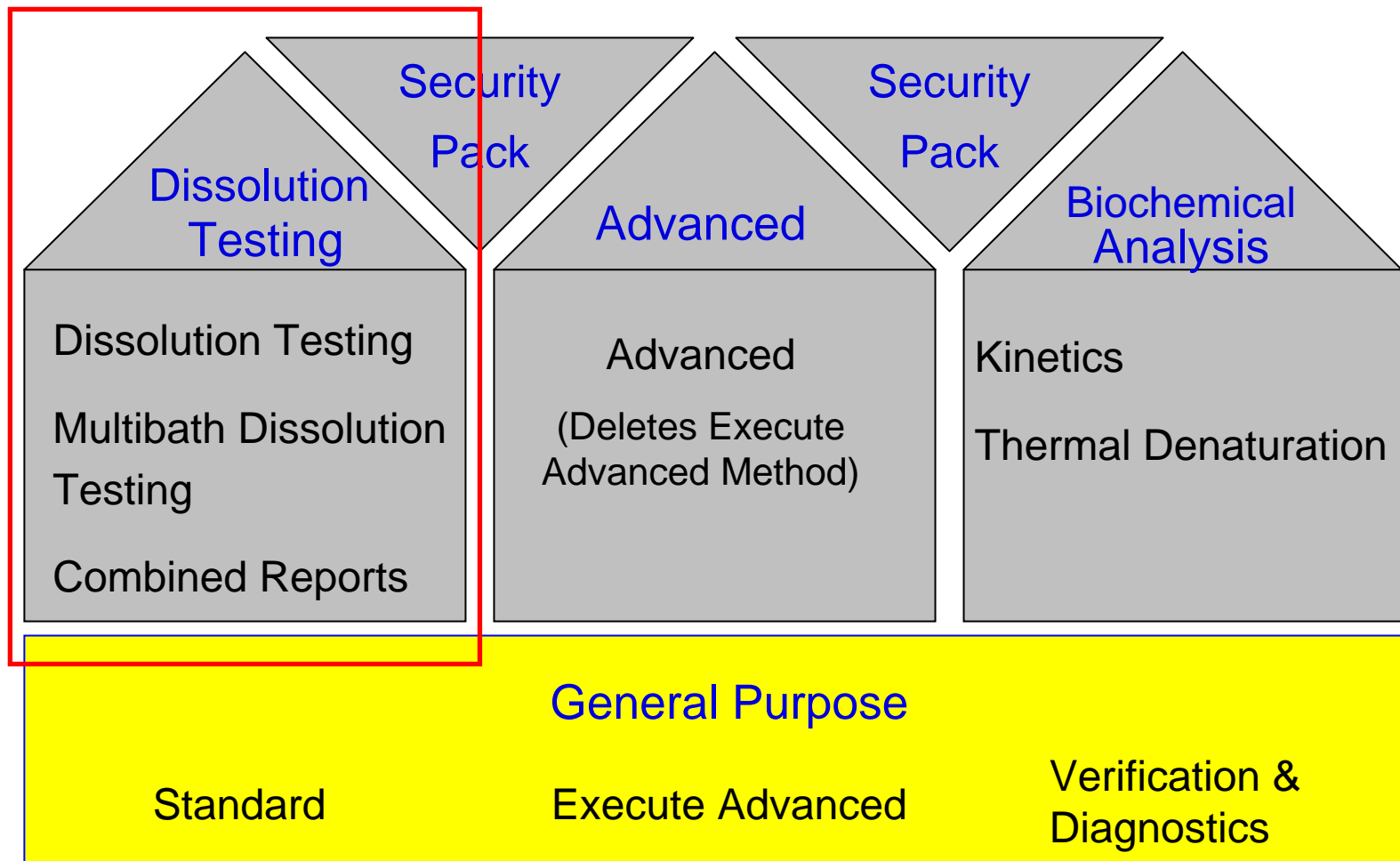
Easy installation of accessories

- room light is not a problem
- Simple installation of accessories



Agilent UV-Visible Spectroscopy Systems

The ChemStation Software Mode Structure



Dissolution Testing System Overview



The Agilent Dissolution Testing System is based on:

- 8453 Spectrophotometer
- ChemStation for UV-Visible Spectroscopy

It is designed for:

- Compatibility
- Scalability
- Flexibility
- Ease-of-learning and Ease-of-use
- GLP, cGMP



Automated Dissolution Testing

What can be automated ?

Partners

- | Dissolution bath
- | Vessel washing and filling
 - è Tablet dropping

Agilent

- | Sampling system
 - è Transfer from vessel to measurement system
- | Measurement system
 - è Analytical measurement on sample
- | Data evaluation / report generation
- | Conversion of measured parameters
 - è Output of dissolution results

Dissolution Testing Mode Main Screen

845x UV-Visible System[1] (Online) [TK]

File Edit Method Measure Instrument Dissolution Math View Mode Config Help

Clear

Method: Mode:

Dissolution Ready

Result:

Next Cycle:

Remain Time:

Sampling

Profile: Prednisone

Sample Spectra

Dissolution Results Table: Prednisone

Time	Ves_1	Ves_2	Ves_3	Ves_4	Ves_5	Ves_6	Ctrl(Ves_7)	Average	StdDev	RStdDev	Min
0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	102.2	0	0	0	0
5	11.01	15.23	13.53	11.53	12.14	10.98	102.1	12.404	1.6775	13.523	10.980
10	22.93	25.71	24.85	23.35	23.56	21.22	102.0	23.605	1.5634	6.6235	21.216
15	30.25	32.04	32.10	30.94	30.42	28.33	101.9	30.681	1.3927	4.5393	28.333
20	35.63	36.80	36.96	36.26	35.64	33.84	102.2	35.855	1.1349	3.1654	33.838
25	39.75	40.60	41.55	40.36	39.35	37.74	101.9	39.893	1.2965	3.2501	37.744
30	43.19	43.73	45.00	43.93	42.62	41.08	102.1	43.259	1.3294	3.0730	41.084
40	48.95	49.15	50.55	49.39	48.09	47.39	101.8	48.919	1.0936	2.2355	47.385
50	53.36	53.54	55.10	53.91	52.41	52.26	102.1	53.432	1.0428	1.9517	52.263
60	56.84	56.41	58.49	57.85	56.11	56.49	101.7	57.031	0.93211	1.6344	56.113
80	62.78	63.20	65.22	64.25	62.59	63.79	103.0	63.639	0.98996	1.5556	62.592
100	67.17	67.36	69.10	68.13	66.23	67.50	102.2	67.581	0.96762	1.4318	66.226
120	70.48	70.66	73.29	72.82	70.87	72.34	103.9	71.743	1.2221	1.7035	70.477

8453 Dissolution Testing Features

Compatibility to 3rd Party

Control/monitoring of dissolution baths of all major manufacturers via "bath drivers"

- Distek, VanKel, Hanson, Erweka, Sotax, Pharmatest
- drivers supplied by bath manufacturer

Remotely controllable for integration with robotic systems

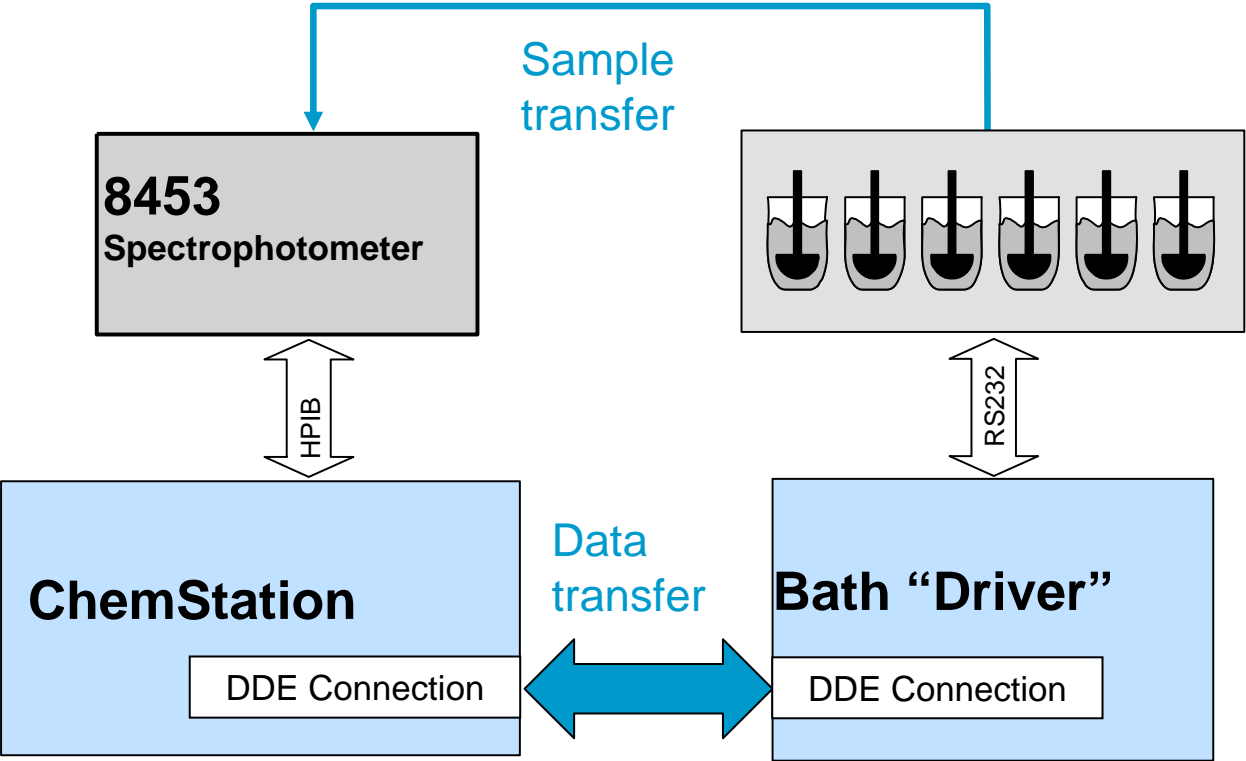
- Caliper Multidose

Basic compatibility with LIMS system

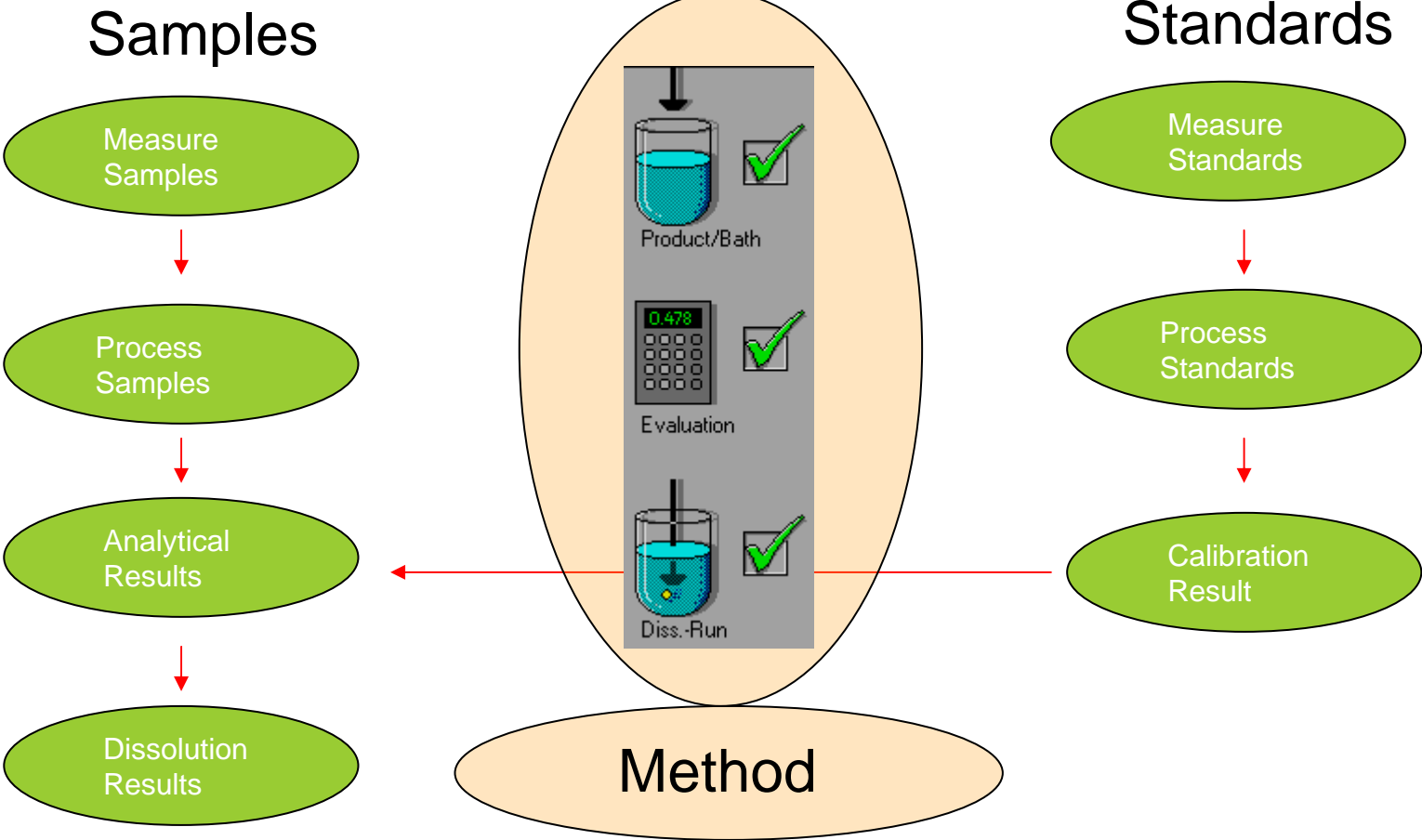
- User definable report formats can be "printed" to file for easy transfer into LIMS systems

Provides truly integrated total solutions

8453 Dissolution Testing Bath Driver Concept



Data Evaluation Model



Dissolution Testing Mode

Single Component Quantification

Standard

- Unlimited number of standards
- Choice of four calibration curve types
- Single, average or three-point background correction

Advanced

- Any combinations of wavelengths
- Any spectral processing (e.g. derivative + smooth)
- Least squares or Maximum Likelihood fit
- Single or multi-wavelength values

Dissolution Testing Mode

Multi-component Quantification

Advanced (only)

- Unlimited number of standard spectra
 - Any spectral processing (e.g. derivative)
 - Calibration with pure component standards or with mixed component standards
 - Least squares or Maximum Likelihood fit
 - Graphical and statistical evaluation tools
 - standard deviation for each analyte
 - the standard deviation of calibration
- è **Can eliminate the need for chromatographic separation**

8453 Dissolution Testing Scalability

Off-line

- Manual
- Sipper
- Autosampler

On-line

- Multicell based sampling
- Valve based sampling
- Multibath with up to four baths
 - Each bath is independent and may run a different method

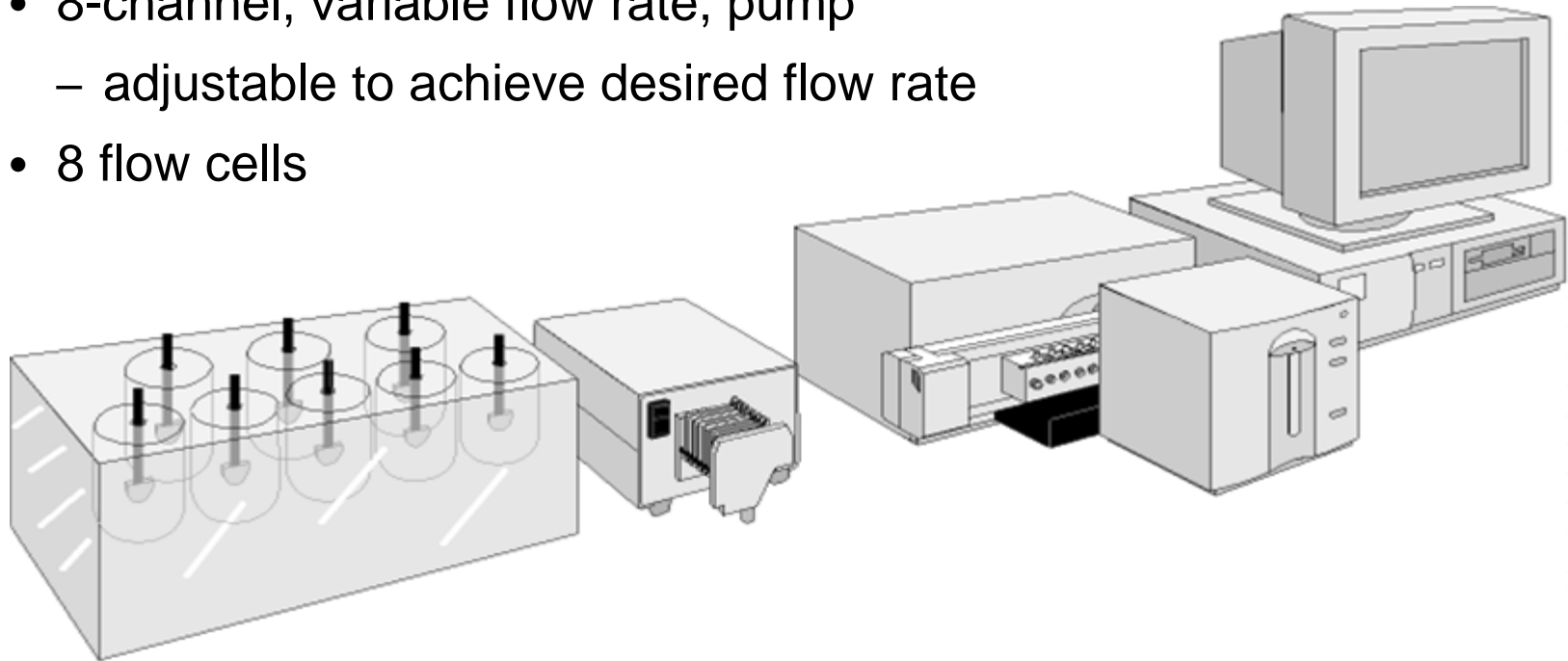
UV-
visibleChemStation
dissolution run time
control

Fully automated

- In combination with Caliper MultiDose

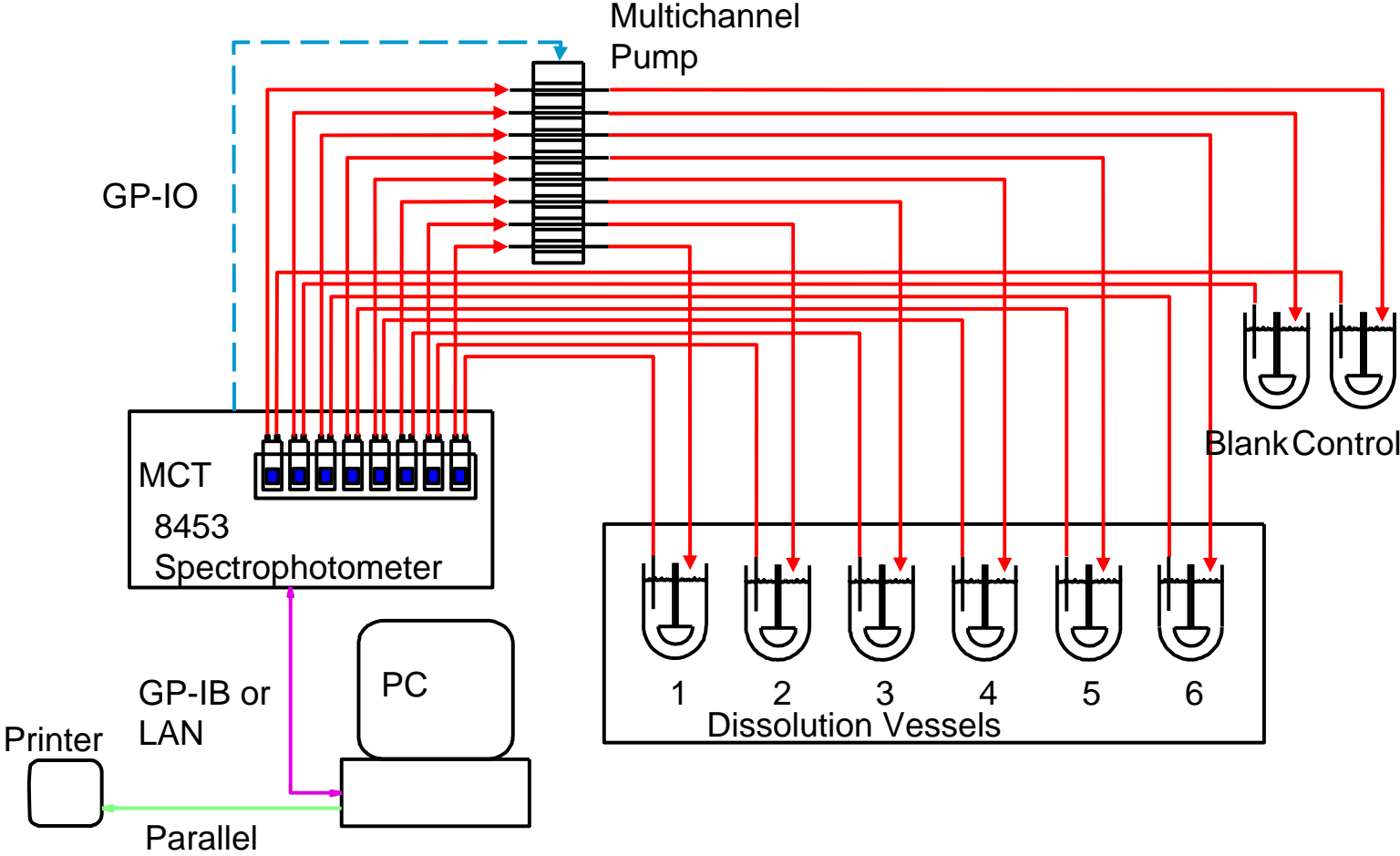
8453 Dissolution Testing Single Bath Multicell Sampling System

- 8-position multicell transport
 - enables six vessels, blank and control measurement at every measurement cycle
- 8-channel, variable flow rate, pump
 - adjustable to achieve desired flow rate
- 8 flow cells



8453 Dissolution Testing

Single Bath Multicell Sampling System



8453 Dissolution Testing Single Bath Multicell Sampling System

Advantages

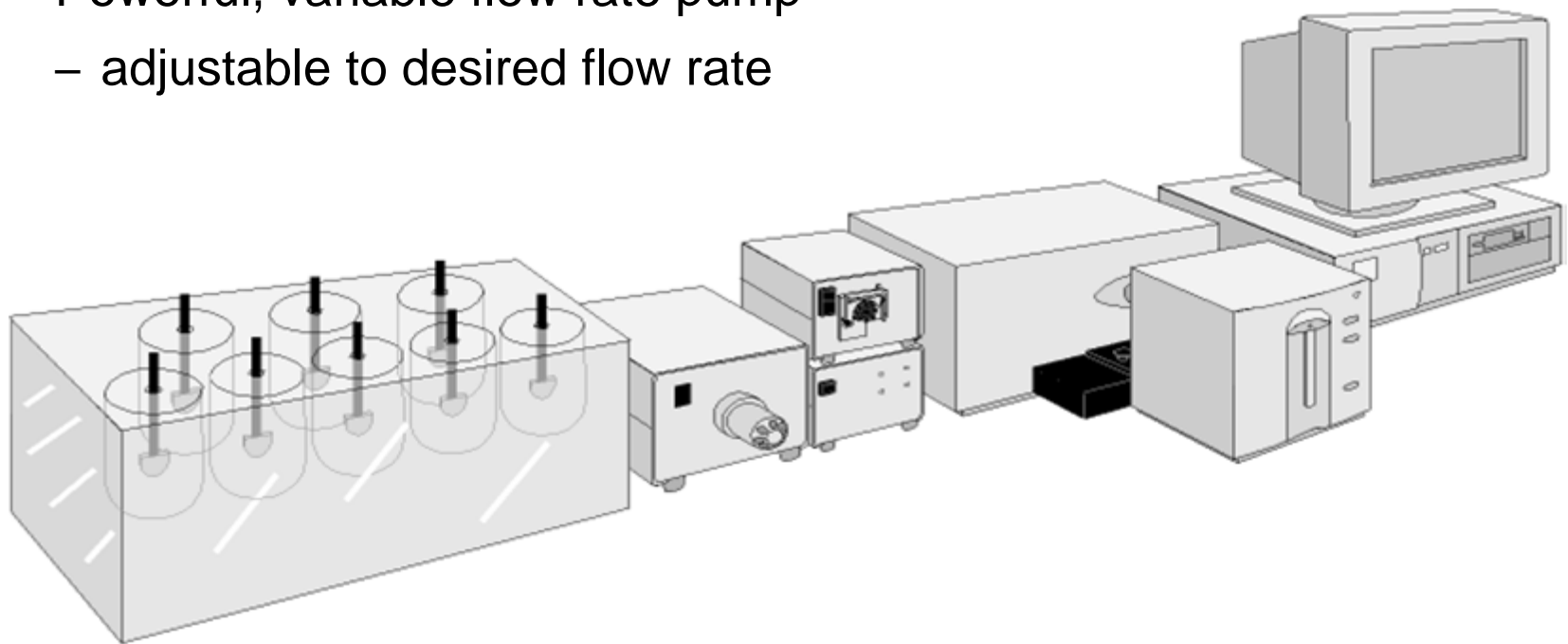
- Fast cycle time (< 2 min)
- No lost medium
- Simultaneous sampling
(compatible with "basket" method)

Disadvantages

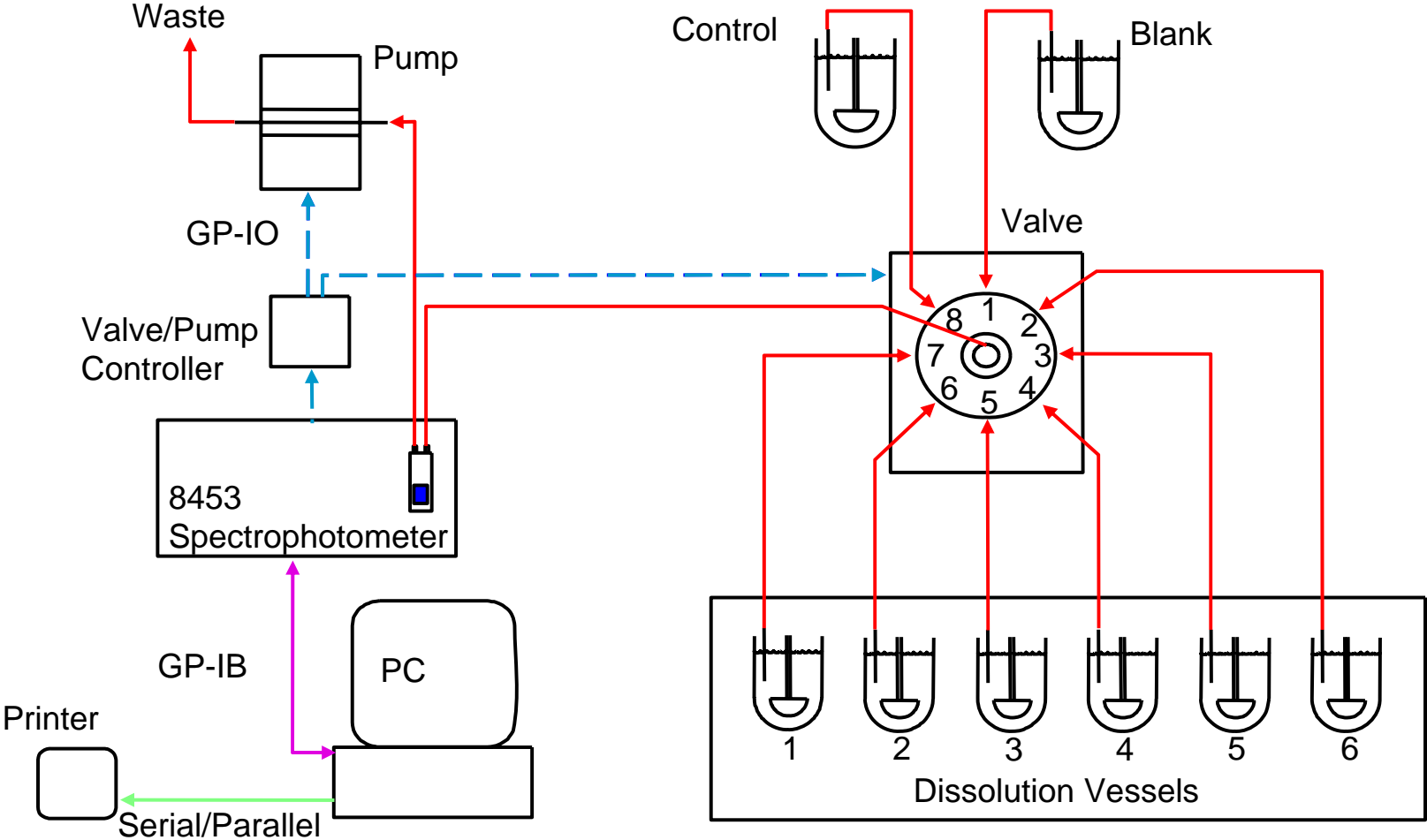
- Multiple flow cells
- Most expensive sampling system

8453 Dissolution Testing Valve Sampling System

- 8-port valve
 - now improved for better reliability
- Powerful, variable flow rate pump
 - adjustable to desired flow rate



8453 Dissolution Testing Valve Sampling System



8453 Dissolution Testing Valve Sampling System

Advantages

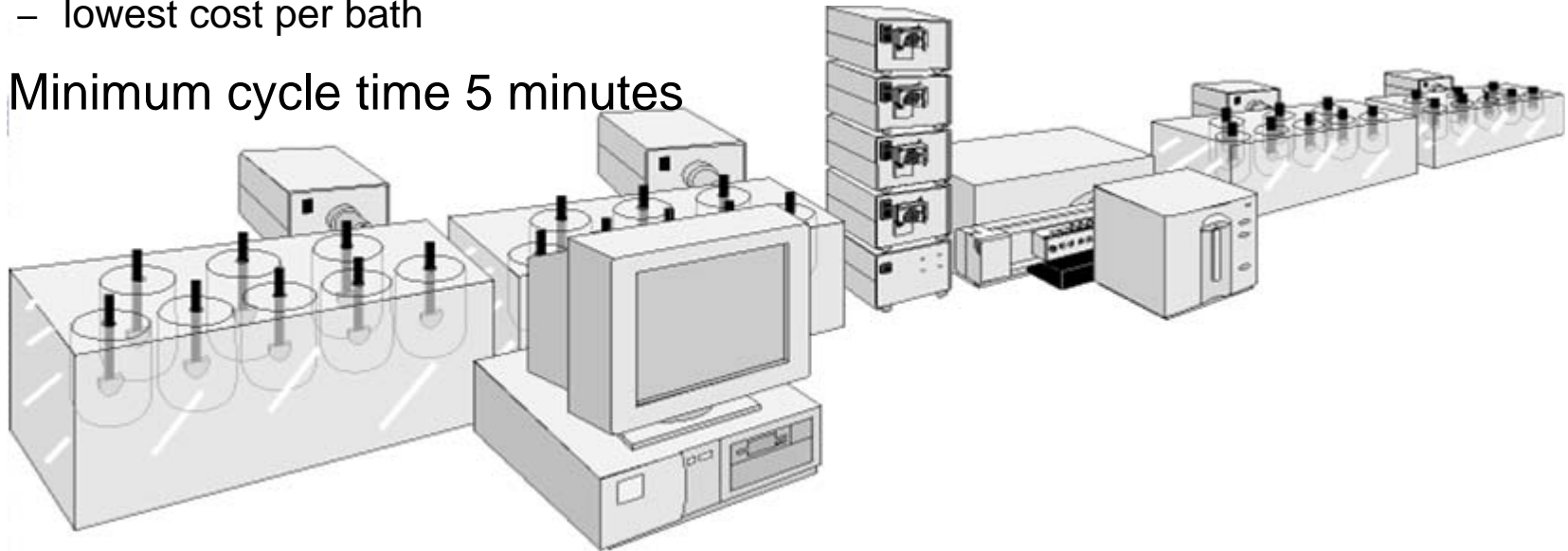
- Single cell
- Reliable
- Lowest cost

Disadvantages

- Relatively slow (5, 7.5 or 10 min cycle)
- Lost medium
- Potential sample carryover
- Vessel-to-vessel delay
(may be incompatible with "basket" method)

8453 Dissolution Testing Multi-bath Sampling System

- Multi-bath Valve System
 - One 8-port valve/pump system per bath
- Multicell transport used to measure on multiple baths
- Up to four baths
 - lowest cost per bath
- Minimum cycle time 5 minutes



Agilent Dissolution Systems Summary

Rich Data Analysis features

- Full Spectral Acquisition support
- Match Factor for Sample Integrity checking
- Multi-ingredient Formulation Analysis
- Excipient Corrections

On-line Control and Monitoring

- Open System Architecture via bath driver

Flexibility and Scalability

- Sampling System independent Method

Security Pack Software for 21 CFR Part 11 compliance

Wrap-up E-Seminar Questions

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