PTWS 610: 1 rows of 6 vessels + 2 additional stirred vessels - electronically speed control for the stirring drive - vibration absorbing design - easy manual sampling due to staggered start option - easy for automation - includes testing method filing system.

The PTWS 610, is the **six plus two** version dissolution bath offering all-in-one design which affords easy and safe handling for correct tool height and sampling positions, unique instrument design and handling security. The ideal instrument for all USP <711/724> and EP <2.9.3/4> applications for which manual and/or automated operation is required due to its staggered stirrer start option.

Tablet dissolution testing is one of the most important tests during development and manufacturing of solid dosage forms, transdermals, ointments and creams, suppositories etc. Nearly all international pharmacopoeias describe a dissolution test instrument, in which at least 6 samples should be tested. The test vessel design, stirring speed range, temperature range and accuracy, stirrer design and relevant tolerances are clearly specified.

Today the instrument operator of such an instrument expects not only conformity with the

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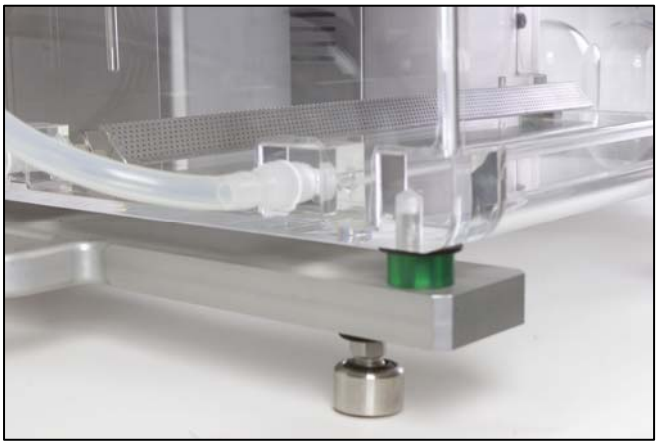
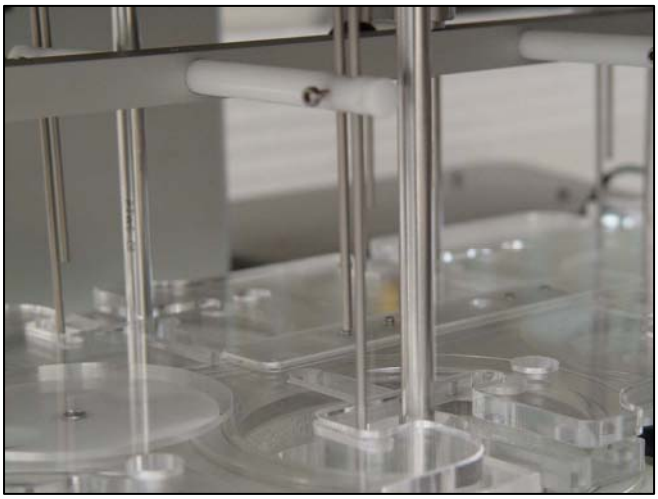
pharmacopoeia description, but also easy operation and accessibility to the test vessels. This means a dissolution bath should offer both good manual access as well as automation facilities. The PTWS 610 offers both.



All test vessels are placed in 6+2 rows and it is easy to remove spent samples and refill with solvent. The clear-view U-shaped Plexiglas water bath and the central drainage tap make sure that the bath can be cleaned any time should this be required. The solid design of the bath and the same clearance of the bath frame to any of the vessels inside it, ensures a perfect temperature distribution throughout. A built-in water diffuser distributes the heated media inside the bath. The bath itself rests on ***vibration absorbers***. This avoids any vibration transfer from either inside the instrument or even from external equipment placed on the same bench surface. Dissolution tests using USP Prednisone RS Tablets have clearly shown that vibration which exceed 0.00254 mm displacement has a tremendous influence to the release rate.



For automation the PTWS 610 can be equipped with an **EPE Auto Sampling manifold** system. If so it has to be equipped also with the synchronous manual **Tablet Drop Magazine** which inserts all 6 samples at the same time whenever the test conditions are in the valid operational range (temperature / speed).
If the EPE sampling system is attached the PTWS 610 can be equipped with the **ITM External Temperature Probes** to record both bath and individual vessel temperature as well as a pH-probe to measure pH values before and after a test.

The new mono-shaft design means you only change the stirrer inserts. The shafts are simply placed into the drive system, calibrated once and then remain there with no need for further adjustment. Regardless of tool choice, the head can be moved up so as to allow easy removal of the test vessels from the bath. This illustration shows the shafts equipped with stainless steel paddle blades.

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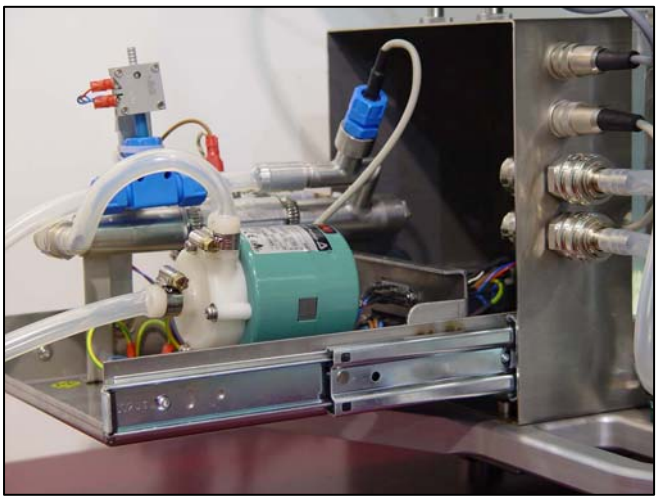

A total of 8 immersion positions operate within the PTWS 610 system. They are mainly for the "Paddle-over-Disk" methods and adjust the drive head automatically. Another unique labour-saving design feature is the easy access pump and heating system as well as the power connection as shown here. Both are located at either side of the instrument. This means that there is no need to move the bath from its position should the instrument need to be qualified or maintained.

Within the pump housing unit, the built-in circulation pump is *spring loaded for* ***totally vibration-free*** operation. The measurable vibration is even lower than those systems which use a separate heating system placed to the same bench. Incorrect settings of the bath are monitored, a warning is displayed if the temperature or speed is outside the target settings or even the water level is too low.

The traffic light information centre clearly shows the operator the status of the instrument,

running well = **green light** - slight problem = **yellow** or out of specification = **red**. All this is automatically logged; the log file can be printed any time using the built-in thermo printer.

The PHARMA TEST PTWS 610 tablet dissolution tester exceeds all technical requirements which are required by USP <711/724>, FDA, <2.9.3/4> European-, Japanese- and German Pharma-copoeias.

Testing Method Filing: additionally, the instrument can file testing methods which include information about stirring speed, sampling timing, duration time of EPE sampling probe inside the media etc. The number of testing methods filed on an USP memory stick is nearly unlimited. The user access administration of the filing system protects the system from unauthorised actions. Using the built-in printer a print out of a short OQ as well as an instrument log report and settings is possible at the end of a run. This is a useful way to print and store hard copy run time logs of dissolution runs in compliance with current GMP practise.

The PTWS 610 Tablet Dissolution Instrument offers…

- Instrument suitability test prior to any test start or during a run: SST test.
- Auto-control to ensure correct water level, pump flow, tool speed and bath temperature.

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- User Access Control and Access Level Administration
- Testing Method Filing system (more than 200 files can be stored)
- Vertical and horizontal adjustment facilities of water bath, vessels, and stirrer drive.
- No position change of drive head when changing stirring tools due to new mono-shaft design
- 8 selectable drive head immersion positions to suit different stirring tools, like position 1 for USP/EP Apparatus 1 and 2, Pos. 2 for Paddle over Disc (Disc diameter 40mm), Pos. 3 for Paddle of Disc (Disc diameter 60mm), etc.
- Staggered stirrer start option, necessary for manual operation as stirrers should start not before the sample is at the bottom of the vessel. Push down the stirrer shaft and rotation starts
- Water bath placed on vibration absorbers and spring loaded assembly of pump to ensure vibration free dissolution testing.
- U-shaped water bath design for long life security including central drainage tap
  Clear LCD screen to display actual operational status; traffic light information to highlight any errors. Menu driven stirrer speed entry for the stirrer drive, display of actual speed of the stirrer drive motor
- Visible and acoustic alert informs the user of any action which should be taken with the instrument.
- Fully automated self check and re-adjustment of stirrer drive and bath thermostat as soon as any change has been detected.
- Programmable heater start and stop time: saves energy.
- Electronically controlled central drive system lifting device.
- Easy access to all 8 test vessels.
- Low evaporation vessel cover as standard supply.
- Very short pre-heating time and narrow temperature accuracy limits of temperature control due to new stainless steel vibration free water bath diffuser jet.
- Heater safety system includes Thermo-Switch, Thermo-Fuse and Flow-Sensor
- Additional vessels to take either reference standard or blank media.
- Built-in instrument log; files all changes and calibration data during duty cycle time of the instrument: prints content onto the built-in printer.
- Calibration menu for stirrer speed, bath temperature, pH-probe.
- RS-232 interface for full externally controlled operation and instrument data transfer.
- Manual temperature sensor probe to read temperature of each vessel prior to and after a run; during operation the probe is placed into the reference vessel for continuous monitoring
- OQ/PQ auto information, performance sequence programmable.
- Instrument housing made out of stainless steel, always clean, GLP conforming.

Options:

- Optional **ITM** individual temperature measurement device can be attached to the EPE auto sampling system: monitors temperature of medium in each vessel.
- Optional **EPE** auto sampling manifold system and manual Tablet Drop Magazine, sample drop and auto-sampling at the same time for all 12 vessels
- Optional automated synchronous **T**ablet **D**rop **M**agazine.
- Optional pH-probe to read pH value of each vessel prior to and after a test run.
- External Buzzer connected to I/O port (Option)
- UV protected glass vessels
- Mini-Vessel set including Mini-Paddle Stirrer

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- Various Tablet Sinkers
- Suppository Dialysis Cell **PTSW 0** for suppository dissolution testing
- Baskets in accordance to USP/EP apparatus 1, also gold plated with 10, 40 or 100 mesh sizes
- Felopine Basket option
- Paddle over Disc options
- Trans-dermal patch tool option
- Ointment tool option (EP Extraction Cell)
- Intrinsic Dissolution Test Assembly
- Sampling manifold (filtered), PT-MDS
- Calibration kit, includes optical tachometer, digital thermometer, wobble meter - all certified
- USP calibrator tablets and standards

How does the PTWS 610 operate ?

Simply press a key to move the instrument's drive housing upwards. Free access to all vessels for filling or cleaning. The automated self-adjustment system of the vessels inside the water bath cover ensures correct positioning of the vessels with respect to the stirrer axis. All stirrers start either simultaneously or staggered when the PTWS 610 is used for manual sampling. Enter stirring speed for the stirrer drive, bath temperature, product information, sampling sequences or call an existing Testing Method from Method File. Press Start to run the test. The big LCD screen will inform which fault has been detected, like low water level - temperature outside the tolerance - insufficient pump flow etc., while the information automatically is filed in the instrument's log.

Red - **yellow** - and **green** "traffic" lights inform the user from anywhere in the laboratory of the instrument's status. Yellow will light up if any specification is slightly outside the limits but with no major problem for the correct performance of the dissolution run. The red light comes on as soon as any critical fault has been found which would surely question the validity results of test results, such as incorrect stirrer position etc.

For automated sampling the EPE electrical sampling probe manifold may be used. It can be added by a trained technician at any time to the instrument. 6+2 stainless steel sampling probes, each with its own filter, are moved into the media for the sampling time duration and removed after. They may also stay inside the vessels during the entire test, if the users prefers to do so. A computer controlled dissolution system will be able to control all instrument parameters and record the instrument output data. The ITM individual vessel temperature monitoring system can be added to the EPE. As long as the EPE will remain inside the dissolution vessels the actual media temperature in each vessel will be measured and recorded. Using an EPE electrical sampling probe manifold need the use of the TDM Tablet Drop Magazine

The PHARMA TEST tablet dissolution instruments can be used in compliance to apparatus 1, 2, 5 and 6 of the USP and European Pharmacopoeia.

Testing Method Storage Management

The PTWS310/610/1210 Series of Tablet Dissolution Testers offers a unique Testing Method Data Management System which uses an USB memory stick to file the programmed testing

description (Method). A method includes information of stirring speed, bath temperature, sampling sequences, sample probe immersion time, tool type, total testing time, user name, date, time, etc. All this information can be entered using the keyboard of the PTWS instrument or an external PC. The data are filed with an USB memory stick and so can be transferred to another PTWS Dissolution Bath easily. If transferred the methods have to be registered for the serial number of the new bath first before they can be used.

This feature includes in addition User Access Control. Different access rights can be allowed to a user group, such as Method Development, Instrument Qualification and Calibration, etc. A Quick-Start option allows to use the PTWS Dissolution Bath without to enter a valid Password.

Technical Data PTWS 610:

Display:	LCD Digital Display (10 x 10 cm illuminated) for RPM, temperature, time, timer and pH (optional) functions
Keyboard:	Function and alpha-numeric keys
Acoustic Signal:	Programmable acoustic signal for operator information
Interface:	1 RS-232 port 1 TTL relay port to connect a PTFC 2 Fraction collector and a pump 1 pH-probe port
Printer:	Built-in Thermo Printer, prints test log as well as OQ information
Speed control:	Adjustable from 25 rpm - 250 rpm
Accuracy:	± 2% of set speed typically < 1%
Temperature control:	750 W heater and pump system, protected against overheating and "no water" operation", adjustable from about 25°C - 45°C, water diffuser for even water distribution all over the bath
Accuracy:	± 0.2° C inside the water bath
Water circulation:	Water circulated through special diffusion system
pH measurement :	0.05 - 9.00 (Option)
Accuracy:	± 0.02 pH units
Number of stirred vessels:	6 vessels for buffer / medium
Additional stirred vessels:	2 vessels to take Reference Standard or refilling media
Heat-Up:	Energy saving, programmable, "auto start" heater function
Sleeping Mode:	Programmable Heater Off time
Calibration:	Built-in calibration procedures for speed, temperature control and pH-probe, OQ/PQ sequence programmable including alarm indicator
Stirrer wobble:	Better than 0.2 mm total run out
System tools:	Mono-shaft stirrer design, USP Apparatus 1, 2, 6 tool adapter, cream cell, trans-dermal patch tools - each tool individually coded
Vibration:	Water bath and pump system on vibration-free mounts.
Vibration inside vessel:	vibration at the vessel flange < 0.2 mm/s @ 50 Hz
Vessel Centring:	Auto centring inside the bath cover, easily aligned bath using centring tools
Test Vessels:	1 litre USP vessels supplied with individual number coding

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Evaporation:	Tablet Drop Magazine covers all vessels and includes suitable tool / sampling tube cut outs
Certification:	All components certified to USP / EP requirements
CE / EMC Certification:	All CE / EMC Certification provided with delivery
Validation:	All IQ & OQ paperwork included

Automation:

- Using UV/VIS spectrophotometer with multiple-cell-changer. Interfacing via WinDiss32 Dissolution Software Program to most commonly available UV/VIS spectrometer types, like SA500 or Agilent 8453 Diode Array having 6 to 8 cell changers, or conventional UV/VIS monochromatic spectrophotometers, preferable double beam and scanning versions

Sampling System:

- Sample fractions using the PTFC 2 Fraction Collector which can be connected directly to the PTWS 610 or the ASP2000 Sample Handling System which requires the control by the WinDiss32 Software. For the media transfer either a peristaltic or piston pump are used.
- PTFC 2 is controlled by the PTWS 610 built-in electronics - no software required !

Dimensions and Weights:

Net weight: 75 kg
Gross weight: 100 kg
Packaging: 900 mm x 650 mm x 750 mm

Pharma Test reserves the right to make technical changes without any prior notice.

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Print-out while start up - logging sequence 2 minutes

```
PTA DISSOLUTION TEST INSTRUMENT TYP PTWS300 S/N: 10710
Product: Muster                          Batch: 007
Start Test: 04-19-2002 15:48             Test End: 04-19-2002 15:54
Nom. Speed:   50 rpm                     Nom. Bath Temperatur: 37.0 °C
pH Meter: not activated                  Test-Start Condition: all correct
Operator: PT
Info: Test

Wait for Corr. Par.: 04-19-2002 15:48
1. Start                                 04-19-2002 15:48
rpm:   50       Temp: 37.0 °C

2. Interval  1:          2min  04-19-2002 15:49
rpm:   50       Temp: 36.9 °C

T1: 36.5     T5: 36.2
T2: 36.2     T6: 36.4
T3: 36.4     T7: 37.0
T4: 37.0     T8: 36.3

3. Interval  2:          2min  04-19-2002 15:51
rpm:   50       Temp: 37.0 °C

T1: 36.8     T5: 36.2
T2: 36.2     T6: 36.7
T3: 36.7     T7: 37.2
T4: 37.2     T8: 36.5

End Runtime-Report ERRORS: 2
```

Printed and filled OQ Forms

Page 1/2

PTA DISSOLUTION TEST INSTR. TYP PTWS300 S/N: 10710
INSTALLATION at: 16.04.2002 OQ at: 19.04.2002
LAST INSTRUMENT QUALIFICATION at: 19.04.2002

Set-Speed 050 rpm TOL. ± 4 % Meas.: 50 rpm (OK) (NOK)
Set Bath Temp. 37.0 °C TOL. ± 0.5 °C Meas.: 37.1 °C (OK) (NOK)
Set Vessel Tem. 37.0 °C TOL. ± 0.5 °C Meas.: 36.8 °C (OK) (NOK)
Set pH1 Read. 6.80 pH TOL. ± 0.05 pH Meas.: 6.81 pH (OK) (NOK)
Set pH2 Read. 2.00 pH TOL. ± 0.05 pH Meas.: 2.02 pH (OK) (NOK)
Set pH3 Read. 7.00 pH TOL. ± 0.05 pH Meas.: 7.00 pH (OK) (NOK)
Pump Volume 1.5 L/min TOL. ± 0.5 L Meas.: 1.54 L/min (OK) (NOK)

Wobble PADDLE (P) TOL. ± 0.50 mm
Meas. Wobble P1 - P8 P1 - 0.01 P2 - 0.01 P3 - 0.00 P4 - 0.02
P5 - 0.02 P6 - 0.01 P7 - 0.01 P8 - 0.02 (OK) (NOK)

Wobble Baskets (B) TOL. ± 0.50 mm
Meas. Wobble B1 - B8 B1 - 0.01 B2 - 0.01 B3 - 0.01 B4 - 0.01
B5 - 0.01 B6 - 0.03 B7 - 0.02 B8 - 0.01 (OK) (NOK)

Centricity PADDLE (P) TOL. ± 1.00 mm
Meas. Centr. P1 - P8 P1 - 0.5 P2 - 0.5 P3 - 0.5 P4 - 0.5
P5 - 0.5 P6 - 0.5 P7 - 0.5 P8 - 0.5 (OK) (NOK)

Centricity Baskets (B) TOL. ± 1.00 mm
Meas. Centr. B1 - B8 B1 - 0.5 B2 - 0.5 B3 - 0.5 B4 - 0.5
B5 - 0.5 B6 - 0.5 B7 - 0.5 B8 - 0.5 (OK) (NOK)

LEVEL PADDLE (P) TOL. ± 1 °
Meas. Level P1 - P8 P1 - 0° P2 - 0° P3 - 0° P4 - 0°
P5 - 0° P6 - 0° P7 - 0° P8 - 0° (OK) (NOK)

LEVEL Baskets (B) TOL. ± 1 °
Meas. Level B1 - B8 B1 - 0° B2 - 0° B3 - 0° B4 - 0°
B5 - 0° B6 - 0° B7 - 0° B8 - 0° (OK) (NOK)

Page 2/2

Depth Setting PADDLE (P) TOL. ± 2.00 mm
Meas. Depth P1 - P8 P1 - 25.0 P2 - 25.1 P3 - 25.0 P4 - 25.1
P5 - 24.1 P6 - 25.0 P7 - 25.1 P8 - 25.0 (OK) (NOK)

Depth Setting Baskets (B) TOL. ± 2.00 mm
Meas. Depth B1 - B8 B1 - 25.0 B2 - 25.1 B3 - 25.1 B4 - 25.2
B5 - 25.0 B6 - 25.0 B7 - 25.0 B8 - 25.0 (OK) (NOK)

* TOL. = tolerance MEAS. = measured OK = pass NOK = fail

List of Instruments and Reference Materials used to perform Qualification:

Speed Control Handy digit tachometer calibrated at 02.09.2002
Temperature Testo 112 digit. thermom. calibrated at 15.02.2002
Wobbling Uhr calibrated at 05.09.2001
Centricity + Level digit. caliper calibrated at 15.11.2001
Depth Control " calibrated at "
pH1 6.80 Puffer Batch No. 02/11452
pH2 2.00 " Batch No. 01/37825
pH3 7.00 " Batch No. 01/11753

Instrument OQ done by: _____ date: 16.04.02

Dissolution Test Instrument Ready For Use (YES) (NO) Signature:

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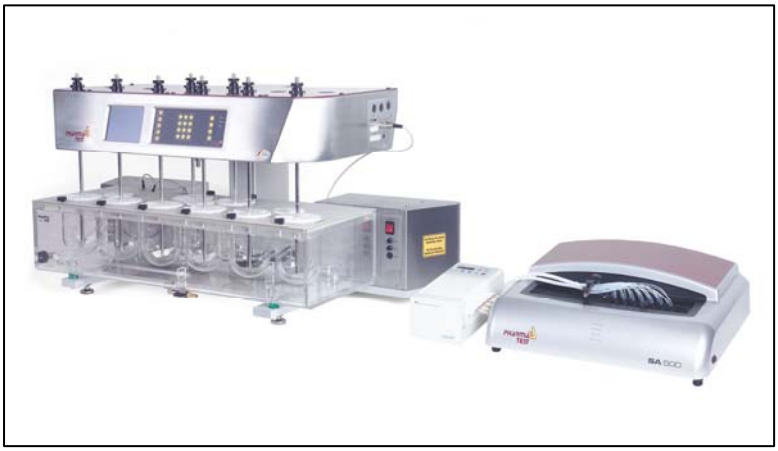
Automation incorporating the PTWS 610…

On-line Systems - closed loop

This popular configuration is elaborate, but allows real time calculation of results using the WinDiss32 Dissolution Software and is by definition PC controlled.



With the SA500 diode array photometer, a 6- or 8-cell-changer for 10x10 mm path length cuvettes, and pump, the basic automation elements are entered into the program structure. This data, once installed will cause the software to further interrogate the user as to the configuration of the automation elements (wizard technology). Taking the spectrophotometer as an example, the program needs information as to whether there is a cuvette changer or not and if so, then is it a 6 to 8-way one. This is vital information as the blank medium has to be compared to the reference cell, and zeroed at the appropriate wavelength. In the case of the 8-cell changer the blank medium is normally selected to be transferred to cell 7, with the standard (for concentration calculation) in cell 8. This means that the medium can be compared to the reference cell and zeroed at the start of each measurement sequence. After the zero has been established the measurement sequence is then cell 8, followed by cells 1 to 6.

There are many spectrophotometer and auto sampler drivers available for connection to Pharma Test dissolution systems, even on-line HPLC, ask us..

Keeping the cost sensible….

We, at Pharma Test have opted to take the work out spectrometer selection and accessory hunting by offering complete systems which have not only differing degrees of sophistication but which also offer affordable options to cover all budgets.

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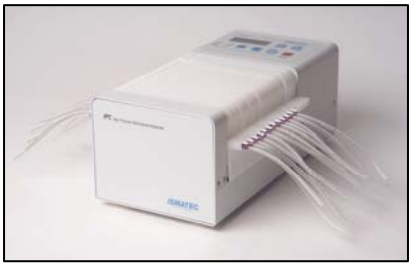
Suitable Pumps

Peristaltic or Piston Pump



CAT Piston Pump

Suitable Spectrophotometer with cell changers

UV/VIS Diode Array Types:

- SA500 with 8-cell-changer for 10x10mm path length cuvettes, fibre optic system - flow cells for 0.1 - 10 mm path length
- Agilent 8453 with 8-cell-changer

other UV/VIS Spectrophotometer Types:

- T70 UV/VIS spectro-photometer with 8-cell changer, Perkin Elmer Lambda with 8-cell changer, Analytic Jena Specord, Varian Carry 50, Cecil,

Principle of Operation

The operator describes the operational procedure within the wizard driven software. Then the system will flag when the samples have to be introduced; after this point, the dissolution system works automatically. Prior to the measuring time the pump will be started and circulate the solvent through a 5 or 10 micron filter. During a measurement the pump is stopped temporarily and data is read and stored by the PC. The same is repeated for any programmed measuring cycle. As well as the measured absorbance, speed, temperature and pH-values (optional) are recorded. The selectable option to run a reference standard solvent, (which is measured in each cycle) or the entry of a theoretical maximum absorbance is available. Running a standard offers some advantages as results that may be influenced by a less than optimum light source, evaporation or temperature influences are corrected by the reference measurement. At the end of a run the operator creates his report and chooses which data that he needs to have printed. As all results remain filed within the system, a batch comparison statistical analysis can be performed at any time.

For further information about dissolution automation ask for our WinDiss32 Dissolution software flyer or for demo version.

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