



CE 7smart Flow-Through Systems



Our design fits everywhere



- Cell block with 7 flow-through cells for 6 test samples and 1 placebo, capsule shell or blank solution
- Simple medium change for changing pH during the test
- Five different cell types for tablets and capsules, powders and granulates, implants and suppositories
- Automatic test preparation functions
- Integrated cleaning functions after the end of each test
- Automated test systems for on-line UV/VIS or with off-line fraction collection
- Fully controlled by 21 CFR part 11 compliant WinSOTAX 98/NT/2000/XP dissolution software

Custom-designed systems for Dissolution Tests according to the Flow-Through Method (USP 4)

sotax

Dissolution Tests according to the Flow-Through Method (USP 4)



CE 7smart cell

In the flow-through method (USP apparatus 4) the test sample is located in a small-volume cell through which solvent passes at a temperature of 37°C. The eluate is filtered upon leaving the cell and then can be analyzed directly or collected in fractions. The most important method parameters are cell type and flow-through rate. The flow-through method permits constant optimal sink conditions due to the continuous flow of fresh solvent, rapid pH changes and continuous sampling. As a result, the tests show an improved in-vitro/in-vivo correlation. With the flow-through method there is no restriction in solvent volume. This means that the influence of poor sink conditions on the test can be avoided altogether by using larger volumes of solvent. The flow-through method is particularly recommended for poorly soluble products and modified release forms, needing a large amount of volume, as opposed to the restricted possibilities of the USP stirrer methods.

SOTAX CE 7smart Dissolution Tester

The CE 7smart was designed by incorporating the newest technology and was based on SOTAX 20 years experience as the pioneer in flow-through dissolution technology. The CE 7smart can be used with all dosage forms as different cell types are available. The CE 7smart unit is very compact and has been designed to offer optimal user-friendliness. The removable cell block can be fitted with 7 flow-through cells, which are independent of the test unit. These cells are prepared according to the test parameters selected for the release test. The tubeless filter heads are provided outside the system with filter materials: these are individually adjusted to the test samples and simply fitted onto the cells in the block. While one test is running, another cell block can be prepared. After the completion of a test, the inserted cell block is removed and the newly prepared block can be inserted.

Operation

The CE 7smart is equipped for manual operation as well as for external control with PC and WinSOTAX software, an RS 232 interface is provided for this purpose. It shows medium as well as bath temperature and the operational status on a display. Thus, entering test parameters and starting preprogrammed operational sequences such as test preparation, test start and cleaning cycles are easily performed. Individual functions can also be started and checked separately. The following operational functions are divided into three cycles:

- Test preparation
- Test
- Final cleaning

Each individual operational cycle is automatic. Operational steps do not need to be manually started. Each step can be individually activated by a single keystroke, in so doing displaying the current operational status in the operating field. The insertion of the prepared cell block equipped with filter heads is done manually. Then the system closes itself automatically and checks that the cell block is correctly positioned. The cells are preheated from the outside. Only when the medium temperature has reached the set value, can the flow-through test begin. The medium flows directly to the flow-through cells. The temperatures of the flowing medium and of the bath are monitored and displayed during the test. At the end of the test, the tubing system is flushed with de-ionized water and blown out.

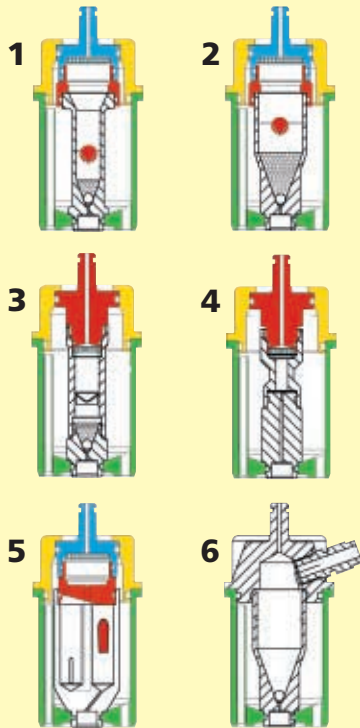
During manual operation, this operational cycle is started by one keystroke. In WinSOTAX controlled systems, this step is automatically integrated.



CE 7smart manual



Leakage monitor



Cell types



CY-7-50 Piston Pump

Features

The SOTAX CE 7smart Dissolution Testing system does not require any special maintenance. The protection window ensures a personal protection as well as any false manipulation. The cells are closed mechanically. In case of an overpressure in the system, due to filter obstruction, the overpressure ventilation comes into function. The leaking medium may be detected and measured by the optional leakage monitor. This provides an absolute separation between medium and bath. The bath is heated with robust electrical heating plate. The electronic control ensures the exact and constant temperature of the medium. The medium temperature is measured at the inlet of a flow-through cell and is shown on the display. A test can only start when this temperature corresponds with the programmed test temperature. Individual modules can be easily removed from the system for cleaning and maintenance.

Test conditions and pH changes

Superb reproducibility of individually selectable test conditions is a major feature of the CE 7smart dissolution system. These unique features (accurately standardized method parameters) of the test conditions are defined as follows:

- 5 different cell types.
- Cell equipment for laminar or turbulent flow-through conditions, with or without tablet carriers.
- Flow-through rate of the piston pump with a constant pulsation of 120 pulses per minute.
- Test temperature.

With the flow-through method, pH changes during a test are easy to perform. The requisite solvents with different pH values are prepared before the test. While the test is running, the supply system switches manually or automatically from one solvent to the next at the specified times: for example, changing from gastric to intestinal juice after one hour. Furthermore the medium change can follow in several steps: this simply executed medium change is highly reproducible with no restrictions on solvent volumes.

Cell types

The choice of cell type is an important parameter in the flow-through method and is individually determined according to the profile of requirements for each test sample. The various cell types all feature a relatively small cell volume (eg implant cell: only 1 ml). The system provides cells for tablets and capsules in two standard dimensions, cells for suppositories and soft gelatin capsules, and cells for powders/granulates and implants.

- | | |
|------------------------------------|---|
| 1) Tablet cell 12 mm | 4) Cell for implants |
| 2) Tablet cell 22.6 mm | 5) Cell for suppositories and soft gelatin capsules |
| 3) Cell for powders and granulates | 6) Temperature-Measuring Head |

The importance of the pump

In the flow-through method, the medium delivery pump is responsible for ensuring an important method parameter: the flow rate of the solvent. This must be constant, even if filter resistance at the cell outlet increases during a test. USP regulations also require a sinusoidal flow profile with a pulse action of 120 pulses per minute (+/- 10 pulses). Moreover with the piston pump adsorption/desorption problems are ruled out. All parts coming into contact with medium and samples are made of inert materials such as glass, stainless steel, Teflon, etc. SOTAX recommends the SOTAX CY-7 Piston Pump, which has been specially developed for the flow-through method. This efficient pump with 7 delivery channels is a precision-built instrument that optimally fulfills USP requirements. This efficient pump with 7 delivery channels is characterized by high operational safety, accuracy and long lasting performance.

Sampling and Evaluation

In release tests according to the stirrer methods (USP 1 + 2), samples are removed from the solvent volumes in the test vessels at predetermined intervals. The dissolved active substance concentrations are measured and evaluated as cumulative values in the test protocol. The flow-through method uses an unrestricted volume of solvent which continuously flows through the release cells. By a typical flow rate of 16 ml/min, about 1 liter of eluate emerges from each dissolution cell every hour. A special valve unit, the splitter, is used to reduce the accumulating volume. This reduced eluate volume is continually collected.

SOTAX CE 7smart Off-line System

This WinSOTAX controlled system makes it possible to perform routine tests with individual method programming. Performing these routine tests with individual method programming can easily be done with CE 7smart Off-line Dissolution system. A free selection of fraction times, fraction volumes and pH change is possible. Furthermore, samples evaluation with dilution, addition of reagents, etc. can be carried out either photometrically or using an HPLC system.

All test preparation, test running and cleaning functions are fully integrated into the dissolution system. Eluates are collected using the tube block on seven channels directly into the collection tubes of the SOTAX C 615 fraction collector. When the tube block passes to the next row of tubes, a cover is drawn directly over already filled tubes to prevent evaporation and contamination. The WinSOTAX software stores test methods and runs protocols of the main parameters in a test sequence.

SOTAX CE 7smart On-line System

CE 7smart On-line Dissolution system: In the open flow-through system, measurements are carried out at short intervals using a photometer system and then individually evaluated. WinSOTAX offers drivers for the major spectrophotometer brands used in the pharmaceutical industry.

CE 7smart Open System and Closed System

The Open System configuration uses a continuous supply of fresh medium. This configuration is recommended for low solubility active substances and a need to keep sink conditions. Using an open system allows the user to make pH changes very easily.

In the Closed System configuration, medium is circulated. This configuration is recommended for methods requiring less than 400ml of medium. It is also very effective with difficult product forms such as powders, pellets, suspensions and implants. This produces a release rate that is cumulative.

WinSOTAX Advanced Tablet Dissolution Software

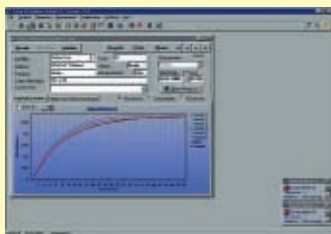
- Fast 32 Bit validated software for Windows NT/2000/XP.
- Modern, easy to operate user interface with a high level of data security and is fully 21 CFR part 11 compliant.
- Convenient handling as users see only menus and dialogs which conform to their hardware configuration and user rights.
- Controls temperature, splitter, fraction collector, UV/VIS spectrophotometric.
- Calculation of concentration and %dissolved including statistical functions.
- Interface for pH measurements and protocolling.
- Protocol of temperature, pH including statistical functions min./max., mean and standard deviation.
- Menu driven report generator to create tailor made reports.



CE 7smart Off-line



CE 7smart UV On-line



WinSOTAX Report

sotax