Dissolution Solutions – USP Apparatus 1 / 2 / 5 / 6

Background Information

Dissolution testing is performed to verify release rate characteristics of pharmaceutical drug products. It is utilized during development and as a quality control test to verify batch-to-batch consistency. There are 7 types of USP apparatus used for dissolution testing – these are formally recognized and harmonized by various regulatory agencies worldwide. The Agilent 708-DS model is used for the testing of USP Apparatus 1, 2, 5, and 6. The basket (App 1) and paddle (App 2) dissolution apparatus are the most commonly used throughout the world. These methods traditionally require the placement of individual dosage forms into 1-Liter glass vessels containing a fixed volume of fluid referred to as dissolution medium.

708-DS > "ROTATING" Dissolution Apparatus

- USP Apparatus 1 > Rotating Basket
- USP Apparatus 2 > Paddle
- USP Apparatus 5 > Paddle over Disk
- USP Apparatus 6 > Rotating Cylinder

Key questions to ask to make sure we provide the RIGHT "dissolution solution":

- What types of USP Apparatus are required?
- Do you perform manual or automated sampling?
- What type of filtration is required?
- How are your samples analyzed – UV-Vis or HPLC?
- Are you interested in a paperless, software solution for a 21-CFR-11 compliant environment?
- What type of qualification is required?

… see below for **complete sales guide** and other links:

Useful Links

Dissolution Sales Guide – complete questionnaire!
Dissolution Field Portal – internal
Online Dissolution Source Book – internal & external

Compliance for 21-CFR-11 environments

Dissolution Workstation Software provides PC control of Agilent's dissolution instrumentation and a secure platform to organize all user systems and methods.

Use the 280-DS IM with DWS to monitor **vibration** throughout the dissolution test >>>

708-DS Dissolution Apparatus

- **Flexibility –** while traditional dissolution is performed using a 1-Liter vessel, small volume (100 / 200mL) and large volume (2-Liter) conversions are available
- **Automated** – key testing functions such as dosage delivery (DDM), sampling, and temperature measurement are easily automated; this not only provides a productivity increase, but also *repeatable and consistent operation* – a key factor for dissolution testing.
- **Scalable System –** ***easily upgrade to varying levels of automation***
  - **Manual –** standalone **708-DS** for manual sampling … "basic"
  - **Semi-automated** – automate sampling & filtration with the **850-DS**
  - **Online** – add UV-Vis analysis with either the **Cary 8454** or **Cary 60**

850-DS Sampling Station

- Add unattended sampling, filtration, and cleaning to the dissolution process
- Especially useful for long dissolution tests and busy QA/QC laboratories

Cary 8454 and Cary 60 Online Solutions

- Automate UV-Vis sample analysis and reporting with two spectrophotometer options
- UV-ChemStation and Cary WinUV software provide ideal solutions for compliance

The Agilent Difference

- **Experience** – 40+ years of industry knowledge from VanKel to Varian to Agilent; we've been there from the beginning!
- **Support** – complete service, maintenance and qualification from our worldwide organization
- **Education / Training** – industry knowledge beyond the instrumentation; free online training and webinars on various topics.
- **Customer Resources** – free access to years of industry expertise and partnership in an online community
  - Dissolution Exchange – Learn. Solve. Discuss. Online repository of application notes, white papers, FAQs, webinars, etc.
  - Dissolution Discussion Group (DDG) – www.dissolution.com – free online forum for dissolution users to discuss issues

dissoGUARD Surveillance

Video recording system for 708-DS

Target customers

- Pharma QA/QC
- Pharma R&D

Types of Pharmaceutical Products

- Tablets / Capsules – immediate or extended release
- Transdermal patches (USP Apparatus 5 and 6)
- Topical formulations (Enhancer Cell) – gels, creams, etc.
- Intrinsic Dissolution – raw API

Agilent Technologies

Dissolution Solutions – USP Apparatus 3 / 7

Background Information

Dissolution testing is performed to verify release rate characteristics of pharmaceutical drug products. It is utilized during development and as a quality control test to verify batch-to-batch consistency. There are 7 types of USP apparatus used for dissolution testing – these are formally recognized by various regulatory agencies worldwide. For Apparatus 3 or 7, the dosage form is placed within a chamber through which media flows in alternating directions, or on/within numerous holders specifically designed for novel extended release dosage forms. The typical volume is 300 mL although both larger and smaller outer vessels are available. The sample rows allow for easy media changes which mimicking the pH changes of the GI tract.

"RECIPROCATING" Dissolution Apparatus

- **USP Apparatus 3** > Reciprocating Cylinder
  - 10 cm reciprocation distance
- **USP Apparatus 7** > Reciprocating Holder
  - 2 cm reciprocation distance

Compliance for 21-CFR-11 environments

Dissolution Workstation Software provides PC control of Agilent's dissolution instrumentation and a secure platform to organize all user systems and methods.

Key questions to ask to make sure we provide the RIGHT "dissolution solution":

- What types of products are tested?
- What types of USP Apparatus are required?
- Do you perform manual or automated sampling?
- What type of filtration is required for your products?
- How are your samples analyzed – UV-Vis or HPLC?
- Are you interested in a paperless, software solution for a 21-CFR-11 compliant environment?

… these are just the basics. A **complete sales guide** is available (link below).

Useful Links

Dissolution Sales Guide – complete questionnaire!
Dissolution Field Portal – internal
Online Dissolution Source Book – internal & external

BIO-DIS Reciprocating Cylinder – USP Apparatus 3

- Meets the requirements of USP/EP release rate testing for App 3 reciprocating cylinder
- Useful for simulating pH profile of GI tract by automatically moving sample from row-to-row
- Standard vessel volume is 300 mL; 100 mL and 1-Liter configurations also available.

Reciprocating Holder – USP Apparatus 7

- Meets harmonized Pharmacopeial requirements for Apparatus 7
- Accommodates a variety of sample holders including cylinders, disks, spring holders, rods
- Various volumes available including 50, 100 and 300 mL

850-DS Sampling Station

- Add unattended sampling, filtration, and cleaning to the dissolution process
- Especially useful for long dissolution tests and busy QA/QC laboratories

400-DS Automated Apparatus 7 > for Small Volume Dissolution

- Industry exclusive instrument for testing of novel dosage forms
- 5 or 10 mL systems include 13 sample cells plus integrated pump and sample collection
- Used for drug-eluting stents, contact lenses, drug-coated balloons and other medical devices

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  - Dissolution Discussion Group (DDG) – www.dissolution.com – free online forum for dissolution users to discuss issues

Target customers

- Pharma QA/QC
- Pharma R&D

Types of Pharmaceutical Products

- Tablets / Capsules – primarily extended/modified release
- Transdermal patches
- Beads / Particles / "Coated" dosage forms
- Medical devices / combination products (400-DS)

Agilent Technologies

Dissolution Qualification – 280-DS MQS

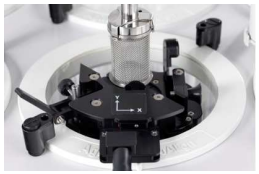
Background Information

Periodic qualification of the dissolution apparatus can currently be performed using one of two procedures – the USP Performance Verification Test (PVT), also referred to as Performance Qualification (PQ) or a Mechanical Calibration/Qualification (MQ). It is necessary for the customer to decide which procedure meets their internal requirements best. Agilent can provide either of these services for our own dissolution instruments as well as non-Agilent. The physical parameters measured by the 280-DS MQS are verified as part of both procedures.

These procedures are *typically* performed at 6-month intervals as prescribed by regulatory authorities. Each of these procedures refers to the qualification performed on USP Apparatus 1 (Rotating Basket) and USP Apparatus 2 (Paddles) type instruments. For Agilent's Dissolution Product Line, this includes the 708-DS model.

Where did the "MQ" come from?

Official Guidance from the US FDA was released in January 2010. The procedure itself (DPA-LOP.002) was made effective in June 2006. The ASTM procedure (E2503) is quite similar and is commonly referenced.



Customer support and application-related documents about dissolution qualification:

1. Proper Implementation of Enhanced Mechanical Calibration of Dissolution Apparatus 1 and 2 (White Paper)
2. MQ Edition of Practical Solutions Newsletter – summary of worldwide regulatory positions and what other laboratories are doing…
3. Agilent 280-DS MQS for Dissolution Apparatus 1 and 2: A User-friendly System with Software Built for 21 CFR Part 11 Compliance (Technical Note)
4. Redefining Dissolution Qualification (White Paper)

Useful Links

1. Dissolution Field Portal – internal
2. Online Dissolution Source Book – internal & external (*see 280-DS MQS on Page 22*)

280-DS Mechanical Qualification System (MQS)

- Two hardware modules – Instrument module and Vessel module – perform ALL required measurements for USP Apparatus 1 and 2 qualification
- Can be used internally (by FSEs or ASPs) or by the customer for periodic qualification or routine monitoring of dissolution instrumentation… the 280-DS can be sold to directly to customers or used to sell Dissolution Service contracts!
- Customers adhering to PQ (USP Performance Verification Test) or MQ (ASTM/FDA enhanced mechanical calibration) standards can utilize the 280-DS.
- Software controls the data acquisition and is perfect for trending performance in a 21-CFR-11 environment
- Differentiates Agilent from all dissolution competitors – no one has a device like the 280-DS… this is the perfect tool to break into competitively held accounts.

Not just for Agilent/Varian/VanKel models!

View the 280-DS MQS Compatibility Chart to see what models/brands of dissolution apparatus can be qualified with the 280-DS – *this is a **GREAT** way to break into competitively held accounts*!

Target customers

*Pharma QA/QC
*Pharma R&D
*Metrology
*Disso Service providers

How much can I save?

Use the online Cost Savings Calculator to show your customers the 280-DS benefits!

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  - Dissolution Discussion Group (DDG) – www.dissolution.com – free online forum for dissolution users to discuss issues

Small Volume Dissolution – 400-DS Apparatus 7

Background Information

The 400-DS sets the performance standard for small-volume drug-release testing of medical devices or combination products such as drug eluting stents (DES) or medicated contact lenses that release small amounts of active pharmaceutical ingredients (API) during a long period of time. Also used for testing extractables and leachables, and extended-release pharmaceutical products, the apparatus offers bathless heating, custom sample holders, integrated auto-sampling, media replacement and liquid handling capabilities.

What type of customer uses the 400-DS?

This instrument is used by companies making medical devices or "combination" products – devices that serve a purpose physically as well as contain an active pharmaceutical ingredient (API).

Compliance for 21-CFR-11 environments

The **400-DS Workstation Software** provides PC control of up to four (4) systems per PC and provides a secure platform to organize all user systems and methods.

Real World Applications using the 400-DS:

- Development and evaluation of accelerated drug release testing methods for a matrix-type intravaginal ring
- Investigating the in-vitro release properties of injectable suspension from a drug-eluting balloon-like spacer for paranasal sinusitis
- In vitro evaluation of a sirolimus-eluting stent using different release test methods

Useful Links:
Dissolution Sales Guide – complete questionnaire!
Dissolution Field Portal – internal
Online Dissolution Source Book – internal & external
(*see 400-DS on page 20*)

400-DS Apparatus 7 – for small volume dissolution testing

- Reciprocal movement (2 cm)
- 5 or 10 mL "closed" sample cells to prevent evaporative loss
- External jacket design to precisely control the internal temperature
- Visibility to the sample and holder within the cell
- Integrated sampling – includes built-in syringe pump and individual rows for sample collection; up to 13 samples per test
- **Exclusive Agilent product** – no other dissolution manufacturer can compete in this space for medical device applications; in some cases, the 400-DS competes with USP Apparatus 4 (the only type of USP Apparatus Agilent does not provide).

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  - Dissolution Discussion Group (DDG) – www.dissolution.com – free online forum for dissolution users to discuss issues

Target customers

- Pharma or medical device manufacturers
- Pharma R&D or QA/QC

Types of Products

- Drug-coated stents, balloons, pacemaker leads
- Medicated contact lenses
- Implants
- Other novel dosage forms

Agilent Technologies