

Ashvin Patel, Ph.D.



Figure 1. CD14 with two AutoMags installed (one on each side to provide maximum flexibility and throughput).

Introduction

Teledyne Hanson offers its valued customers the AutoMag magazine as an option for the Vision Elite 8 and CD14 dissolution testers. This magazine is designed to accommodate technological advancements and increased regulatory requirements. Its development involved rigorous testing in our engineering and analytical laboratory to ensure precision, repeatability, and accuracy.

The AutoMag magazine is a very powerful accessory that, when connected to a dissolution system and a Vision® AutoPlus™ autosampler, allows for automatic sampling volume at predefined time intervals, automatic drop of dosage forms in all vessels with ADD covers, temperature monitoring inside each vessel, media replacement, and it ensures samples are always taken from the USP sampling zone. This sampling location—including the depth—at which the samples must be withdrawn before further analysis, is defined by the procedures detailed by the United States Pharmacopeia (USP) *General Chapter <711> Dissolution*.¹

Background

Teledyne Hanson is a pioneer and manufacturer of dissolution testers such as the CD14, the Vision G2 Elite 8™, and the Classic 6™. Except for the Classic 6, the other two testers can be installed with an AutoMag.

A SuperMag magazine (Figure 2) is also available for customers working with small volume vessels, like the 150 mL, and 250 mL vessels (part of the Chinese Pharmacopeia) in addition to 1 L vessels. The difference is that the SuperMag allows you to manually change the position of the sampling probe to accommodate those smaller vessels.



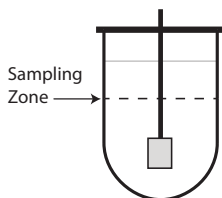
Vision G2 Elite 8

SuperMag

Figure 2. The Vision G2 Elite 8 with the SuperMag accessory

When Teledyne Hanson dissolution systems are equipped with magazines, they allow users to automatically set sampling probe depths with the touch of a button.

United States Pharmacopeia (USP) *General Chapter <711>* specifies the sampling zone where samples are to be withdrawn during dissolution testing. Analysts are instructed to "...withdraw between the surface of the *Dissolution Medium* and the top of the rotating basket or blade, not less than 1 cm from the vessel wall."¹ When the dissolution medium is not replaced after collecting each sample during dissolution profile testing, the depth of the sampling probe must be set to meet the USP sampling zone requirements.



Automated sample introduction and automatic sampling provide an advantage over manual sampling because the automated techniques can improve accuracy, increase efficiency, save time while offering better data management. As described in the USP *General Chapter <1092> The Dissolution Procedure: Development and Validation*, the automated sampling probes shall be validated against standard procedure.²

Procedure

Teledyne dissolution systems have predefined one-touch buttons that allow users to select from the Sampling menu (Figure 3) to automatically set sampling probe depths that meet USP sampling zone requirements..

Labels	Sampling Mode Collect Only	Rack Type 16x100 mm
Dissolution	Rinse Volume 10 mL	Tester Offset Time 0:00:00
Sampling	Collect Volume 10 mL	Media Replace 10 mL
Options		Magazine Travel 97 mm
Events		

Figure 3. Starting Magazine Travel for 500 mL media with Apparatus II (paddles).

Analysts can program fully automated test procedures for sample introduction and sample collection for a single time point and for profile testing. Step-by-step instructions are provided in the *Vision G2 AutoPlus Autosampler and AutoFill Collector User Guide* (Rev G-12)³ for Vision eight-vessel testers, and in the *CD14 Comparative Dissolution Tester and CD AutoPlus Autosampler User Guide* (Rev B-31)⁴ for CD14 dissolution testers.

If the setup options for the autosampler remains at their preset setup values (Table 1), and if at each time during analysis an equal volume of fresh dissolution media is replaced after sample collection, there is no need to change any of the setup options.

Vessel capacity	Dissolution Media volume	Apparatus	SuperMag/ AutoMag travel distance
1 Liter	500 mL	I (Basket)	86 mm
1 Liter	500 mL	II (Paddle)	97 mm
1 Liter	900 mL	I (Basket)	61 mm
1 Liter	900 mL	II (Paddle)	72 mm
Small volume†	150 mL	Mini paddles	86 mm
Chinese Small Volume †	250 mL	Mini paddles	60 mm

† SuperMag only

Table 1. Preset values for magazine sampling.

In case replacement of the dissolution medium is not performed after the sample is pulled, the Auto-Probe depth may require adjustment to maintain the proper sampling zone per USP requirements. Fortunately, this can be done easily using Teledyne Hanson systems, where the flexibility to enter the required setting is provided by our Protocols setup menu. At the Setup menu, access Protocols, then touch the Events tab (Figure 4). At Events, enter a different magazine travel distance using the values shown in Table 2.

Labels	0:10:00 Sample	0:39:00 Magazine Travel = 103
Dissolution	0:19:00 Magazine Travel = 99	0:40:00 Sample
Sampling	0:20:00 Sample	0:59:00 Magazine Travel = 105
Options	0:29:00 Magazine Travel = 101	1:00:00 Sample
Events	0:30:00 Sample	

Figure 4. Magazine Travel distance parameters set for different sampling probe depths.

Time Minutes	Events	500 mL with paddles	500 mL with baskets	900 mL with paddles	900 mL with baskets
		Magazine Travel distance set in the Events tab			
10	Magazine Travel	97 mm	86 mm	72 mm	61 mm
19	Magazine Travel	99 mm	88 mm	74 mm	63 mm
29	Magazine Travel	101 mm	90 mm	76 mm	65 mm
39	Magazine Travel	103 mm	92 mm	78 mm	67 mm
59	Magazine Travel	105 mm	94 mm	80 mm	69 mm

Table 2. Magazine travel distances.

For every 10 mL sample, an increase of 2 mm in depth is required for each time point. To avoid time conflicts for the AutoPlus, the timing of the depth increase should align with sampling time points and should take place about 1 minute prior to when sampling occurs. Once setup using the Protocols menu is complete, the autosampler probes will lower to their set values.

References:

1. United States Pharmacopeia (2022). *General Chapter, <711> Dissolution*. USP-NF. Rockville, MD: United States Pharmacopeia.
2. United States Pharmacopeia (2022). *General Chapter, <1092> The Dissolution Procedure: Development and Validation*. USP-NF. Rockville, MD: United States Pharmacopeia.
3. Teledyne Hanson Research. *Vision G2 AutoPlus Autosampler and AutoFill Collector User Guide*, 61-108-010, Rev G-12, June 2019.
4. Teledyne Hanson Research. *CD14 Comparative Dissolution Tester and CD AutoPlus Autosampler User Guide*, 75-108-800, Rev B-31, May 2021.

About Teledyne Hanson

Teledyne Hanson is a global technology company specializing in test instruments for the pharmaceutical industry. Founded by the innovator of modern dissolution test technology, Teledyne Hanson helps ensure that the world's pharmaceuticals are pure, safe, and effective by manufacturing equipment that sets the global standard for quality, innovation, and long-term value. Teledyne Hanson instruments are used by scientists in over 75 countries worldwide and are supported by the industry's top customer service team. For more information, please visit teledynehanson.com.

Teledyne Hanson
9810 Variel Ave, Chatsworth, California, 91311 USA
Phone: (818) 882-7266



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