

# QIAGEN Supplementary Protocol

---

## Evaluating pipetting accuracy of the EZ1<sup>®</sup> Advanced XL using the EZ1 Advanced XL Test Card

This protocol is designed to evaluate the pipetting accuracy of the EZ1 Advanced XL. The EZ1 Advanced XL pipets either 100  $\mu$ l or 500  $\mu$ l of water from one set of tubes to another. Pipetting accuracy should be within defined specifications of  $\pm 8$   $\mu$ l for 100  $\mu$ l, corresponding to pipetted volumes in the range of 92–108  $\mu$ l and  $\pm 40$   $\mu$ l for 500  $\mu$ l, corresponding to pipetted volumes in the range of 460–540  $\mu$ l. The protocol also describes how to test the tip adapters for liquid leaks.

**IMPORTANT:** Please read the *EZ1 Advanced XL User Manual*, paying careful attention to the safety information, before beginning this procedure. The EZ1 Advanced XL is intended to be used only in combination with QIAGEN kits indicated for use with the EZ1 Advanced XL instrument for the applications described in the kit handbooks.

### Equipment and reagents to be supplied by user

When working with chemicals, always wear a suitable lab coat, disposable gloves, and protective goggles. For more information, consult the appropriate material safety data sheets (MSDSs), available from the product supplier.

- EZ1 Advanced XL Test Card (cat. no. 9018706)
- 14 Sarstedt microcentrifuge tubes (1.5 ml) with caps (e.g., tubes and caps supplied with EZ1 Kits)
- 14 Sarstedt microcentrifuge tubes (2 ml) without caps (e.g., tubes supplied with EZ1 Kits)
- Calibrated laboratory balance, with minimum resolution of 0.001 g and minimum accuracy of 0.001 g
- Deionized water
- Disposable gloves

### Important points before starting

- The EZ1 Advanced XL should be positioned on a level workbench.
- Ambient temperature should be in the range of 15–30°C.



# Procedure

## Volume validation

1. **Label and weigh 14 microcentrifuge tubes (1.5 ml) together with the corresponding caps. Record the weight for each set of tube and cap.**

2. **Insert the EZ1 Advanced XL Test Card completely into the card slot of the EZ1 Advanced XL.**

3. **Switch on the EZ1 Advanced XL.**

The power switch is located at the left rear of the instrument.

4. **Press "START" to display the protocols menu.**

5. **Press "1" for the 100  $\mu$ l Protocol or "2" for the 500  $\mu$ l Protocol.**

6. **Press any key to proceed through the text shown in the display and start worktable setup.**

The text summarizes the following steps which describe the loading of the worktable. Wear gloves when loading the required items on the worktable.

7. **Remove the caps from the labeled, weighed 1.5 ml tubes, and load the opened tubes into the first row.**

8. **Fill the fourteen 2 ml tubes (without caps) with approximately 1 ml water. Load the filled, opened tubes into the fourth row (back row).**

9. **Load 14 tip holders containing filter-tips into the second row.**

10. **Close the EZ1 Advanced XL door.**

11. **Press "START" to start the protocol.**

The automated procedure takes 2 min.

12. **When the protocol ends, the display shows "Protocol finished". Open the EZ1 Advanced XL door.**

13. **Press "ESC" to return to the main menu.**

14. **Remove the labeled tubes from the first row (front row), and cap them securely with the corresponding weighed caps.**

15. **Weigh the closed tubes and record the weights.**

The weights can be recorded in the test report on pages 5 and 6.

16. **Calculate the difference in weight of each tube by subtracting the weight of the empty tube and cap, recorded in step 1.**

17. Calculate the accuracy of pipetting. If the difference in weight is in the range of 92–108 mg for the “100 µl Protocol” or 460–540 mg for the “500 µl Protocol”, then the accuracy is within the defined specifications. If the accuracy is not within the defined specifications, contact QIAGEN Instrument Service.

1 mg = 1 µl water. The weight range of 92–108 mg corresponds to 92–108 µl water and the weight range of 460–540 mg to 460–540 µl. The table on the next page gives an example.

**Table 1. Example of the first 6 of 14 weight-measure results and calculation of pipetted volume\***

Tube	Weight before run (g)	Weight after run (g)	Difference (g)	Pipetted volume (µl)
1	1.4004	1.9049	0.5045	504.5
2	1.4028	1.9044	0.5016	501.6
3	1.3934	<b>1.8989</b>	0.5055	505.5
4	1.4018	<b>1.9053</b>	0.5035	503.5
5	1.4078	<b>1.9127</b>	0.5049	504.9
6	1.4060	1.9005	0.4945	494.5

\* Example only. Actual results may differ from those shown. Fourteen results will be obtained in total using the EZ1 Advanced XL.

18. To run another pipetting accuracy protocol, carry out step 1 of the protocol, and then follow the protocol from step 4. Otherwise close the EZ1 Advanced XL door, and switch off the EZ1 Advanced XL. Save the 1.5 ml and 2 ml tubes for use in the leakage test.

Steps 2 and 3 are not necessary when running another protocol. Skip these steps.

19. Clean the EZ1 Advanced XL.

Follow the maintenance instructions in the *EZ1 Advanced XL User Manual*.

## Leakage test

1. Insert the EZ1 Advanced XL Test Card completely into the card slot of the EZ1 Advanced XL.
2. Switch on the EZ1 Advanced XL.  
The power switch is located at the left rear of the instrument.
3. Press “START” to display the protocols menu.
4. Press “3” to choose the leakage test.
5. Press any key to proceed through the text shown in the display and start worktable setup.

The text summarizes the following steps which describe the loading of the worktable. Wear gloves when loading the required items on the worktable.

- 6. Load 14 opened 1.5 ml tubes into the first row (front row).**
- 7. Fill fourteen 2 ml tubes (without caps) with approximately 1 ml water. Load the filled, opened tubes into the fourth row (back row).**
- 8. Load 14 tip holders containing filter-tips into the second row.**
- 9. Close the EZ1 Advanced XL door.**
- 10. Press "START" to start the protocol.**

The automated procedure takes 12 min. The instrument will wait for 10 min to check the tightness around the O-rings.

- 11. When the protocol ends, the display shows "Protocol finished". Open the EZ1 Advanced XL door.**

- 12. Check that the tips did not drip during the test.**

The results of the test can be recorded in the test report on page 6.

- 13. Close the EZ1 Advanced XL door before pressing "ESC" to return to the main menu.**

- 14. To run another leakage test, follow the protocol from step 4. Otherwise close the EZ1 Advanced XL door, and switch off the EZ1 Advanced XL.**

Steps 1, 2, and 3 are not necessary when running another protocol. Skip these steps.

- 15. Clean the EZ1 Advanced XL.**

Follow the maintenance instructions in the *EZ1 Advanced XL User Manual*.

# Test report for pipetting accuracy of the EZ1 Advanced XL

The results of the volume validation and leakage test can be recorded here by the user for the operational qualification of the EZ1 Advanced XL.

## Instrument and operator

**Instrument:** EZ1 Advanced XL

**Serial number:** \_\_\_\_\_

**Location:** \_\_\_\_\_

**Test operator:** \_\_\_\_\_

**Test date:** \_\_\_\_\_

# Volume validation

## Pipetting 100 $\mu$ l of water

**Specification:** Pipetted volumes must be between **92  $\mu$ l** and **108  $\mu$ l**.

Tube	Weight before run (g)	Weight after run (g)	Difference (g)	Pipetted volume ( $\mu$ l)	Passed	Failed
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						

## Pipetting 500 $\mu$ l of water

**Specification:** Pipetted volumes must be between 460  $\mu$ l and 540  $\mu$ l.

Tube	Weight before run (g)	Weight after run (g)	Difference (g)	Pipetted volume ( $\mu$ l)	Passed	Failed
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						

## Leakage test

**Specification:** The tips must not drip during the test.

Channel	Tips dripped during the run	Passed	Failed
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			



# Equipment used

## Laboratory balance

Brand: \_\_\_\_\_  
Model: \_\_\_\_\_  
Range: \_\_\_\_\_  
Accuracy: \_\_\_\_\_  
Serial no.: \_\_\_\_\_  
Last calibration date: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

For up-to-date licensing information and product-specific disclaimers, see the respective QIAGEN kit handbook or user manual. QIAGEN kit handbooks and user manuals are available at [www.qiagen.com](http://www.qiagen.com) or can be requested from QIAGEN Technical Services or your local distributor. Material safety data sheets (MSDS) for any QIAGEN product can be downloaded from [www.qiagen.com/Support/MSDS.aspx](http://www.qiagen.com/Support/MSDS.aspx).

Trademarks: QIAGEN®, EZ1® (QIAGEN Group).

MA67 Apr-09 © 2009 QIAGEN, all rights reserved.

[www.qiagen.com](http://www.qiagen.com)

Canada = 800-572-9613

Ireland = 1800 555 049

Norway = 800-18859

China = 0086-21-3865-3865

Italy = 800-787980

Singapore = 65-67775366

Denmark = 80-885945

Japan = 03-6890-7300

Spain = 91-630-7050

Australia = 1-800-243-800

Finland = 0800-914416

Korea (South) = 1544 7145

Sweden = 020-790282

Austria = 0800/281010

France = 01-60-920-930

Luxembourg = 8002 2076

Switzerland = 055-254-22-11

Belgium = 0800-79612

Germany = 02103-29-12000

Mexico = 01-800-7742-639

UK = 01293-422-911

Brazil = 0800-557779

Hong Kong = 800 933 965

The Netherlands = 0800 0229592

USA = 800-426-8157



---

Sample & Assay Technologies