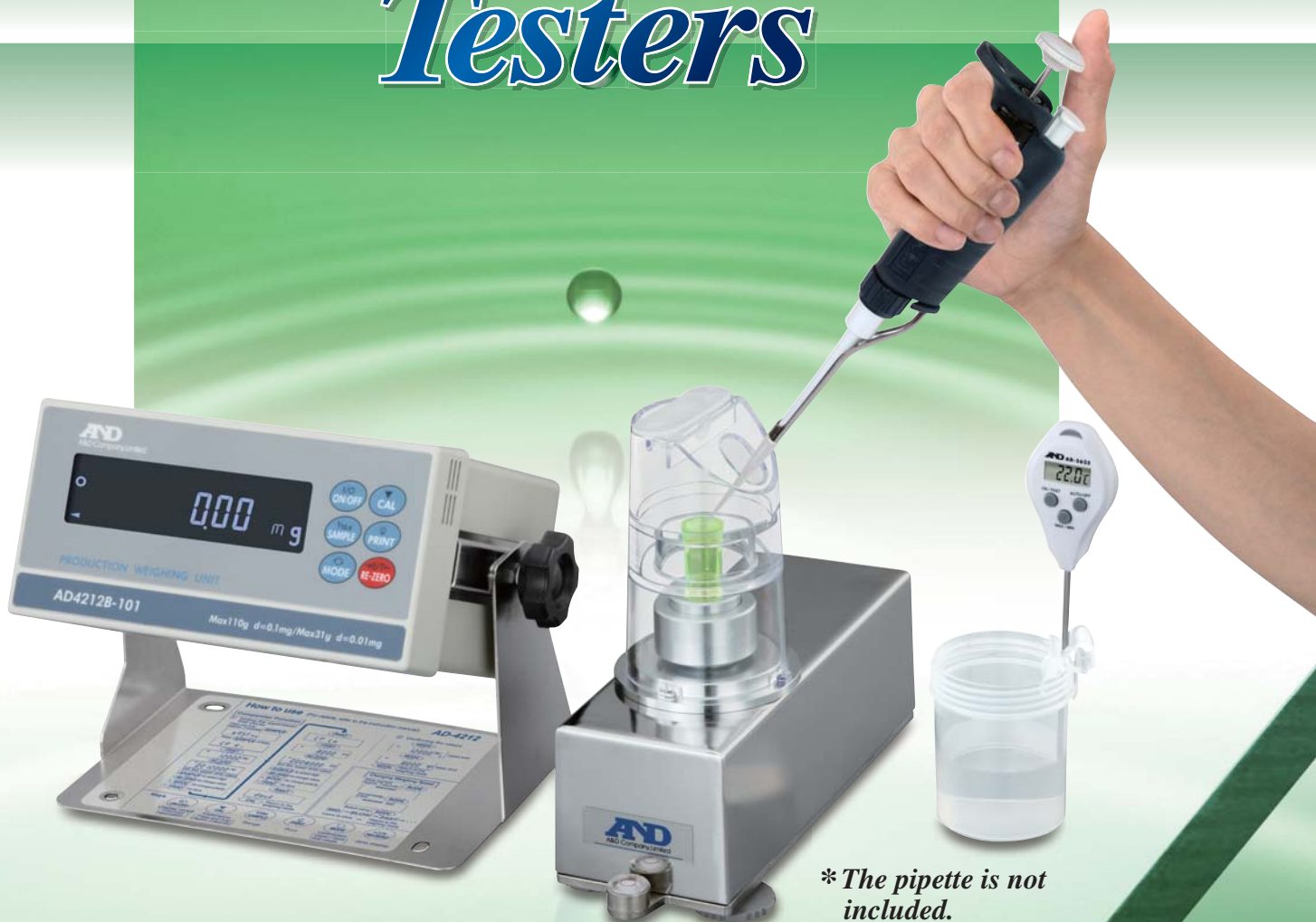


# Pipette Accuracy Testers



*\*The pipette is not included.*

*Are you sure your pipettes  
are still accurate?*



# Simple tests save you great costs!

With a balance, software, and accessories all in one carrying case, A&D's pipette accuracy tester provides everything you need for easy verification of the accuracies of your pipettes.

\* The pipette is not included.

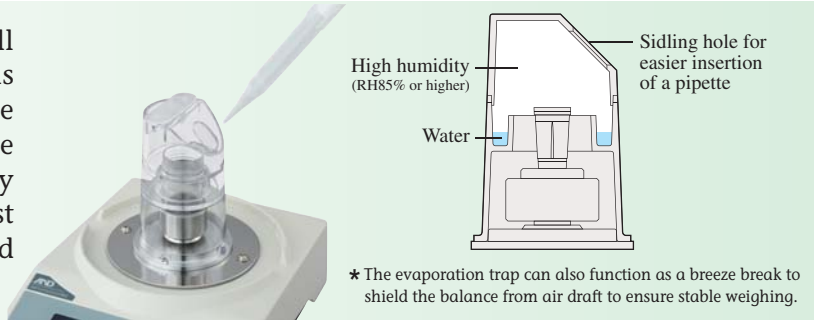


- Compliance with ISO8655 or any other specifications based on the “gravimetric method”\* \* See the last page
- Select from three models covering a wide volumetric range
- Easy test and data management using special WinCT-Pipette software
- Standard liquid thermometer and evaporation trap to ensure as precise measurements as possible
- Includes a calibration weight and tweezers for the balance

# Pipette Accuracy Testers

## Evaporation Trap

One of the difficulties in weighing a small quantity of liquid (e.g. 50  $\mu\text{L}$  or less) is controlling the environment to minimize errors due to loss of evaporation. The evaporation trap maintains high humidity inside and prevents evaporation of the test liquid. It is no longer necessary to set up and adjust the humidity of an entire room.



## Carrying Case

The pipette accuracy tester comes packed neatly in a portable carrying case, which is useful when performing on-site tests at distant places.



## WinCT-Pipette

### Setting Specifications

Enter the pipette volume and accuracy and repeatability specifications

Pipette Volume		Specifications	
Accuracy (+/-)	Absolute Error	50	( $\mu\text{L}$ )
	Relative Error	1.8	(%)
Repeatability	S.D.	0.6	( $\mu\text{L}$ )
	C.V.	1.2	(%)

### Measured Values

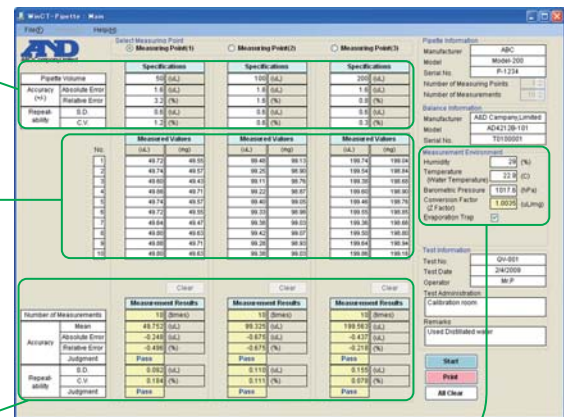
Displays the mass values transmitted from the balance and the volumetric values obtained using the Z (conversion) factor

No.	Measured Values	
	( $\mu\text{L}$ )	(mg)
1	49.72	49.55
2	49.74	49.57
3	49.60	49.43
4	49.88	49.71
5	49.74	49.57
6	49.72	49.55
7	49.84	49.47
8	49.80	49.63
9	49.88	49.71
10	49.80	49.63

### Measurement Results

Displays the test results and judgment results

Number of Measurements		Measurement Results	
Mean		49.752	( $\mu\text{L}$ )
Accuracy	Absolute Error	-0.248	( $\mu\text{L}$ )
	Relative Error	-0.496	(%)
	Judgment	Pass	
Repeatability	S.D.	0.092	( $\mu\text{L}$ )
	C.V.	0.184	(%)
	Judgment	Pass	



### Testing Environment

Enter the distilled water temperature and the barometric pressure to determine the Z (conversion) factor

Measurement Environment	
Humidity	29 (%)
Temperature (Water Temperature)	22.9 (C)
Barometric Pressure	1017.8 (hPa)
Conversion Factor (Z Factor)	1.0035 ( $\mu\text{L}/\text{mg}$ )
Evaporation Trap	<input checked="" type="checkbox"/>

## Printing Image

For recording purposes, test results can be output to a printer and printed in an A4 or letter-size report format.

Pipette Accuracy Test Results			
1. Pipette Information Manufacturer: ABC Model: Model 200 Serial No.: R-1234		2. Balance Information Manufacturer: ABC Company Limited Model: AD4212B-101 Serial No.: T0100001	
3. Measurement Environment Humidity: 29 (%) Temperature: 22.9 (C) Water Temperature: 22.9 (C) Barometric Pressure: 1017.8 (hPa) Conversion Factor (Z factor): 1.0035 ( $\mu\text{L}/\text{mg}$ ) Evaporation Trap: Used			
4. Specifications			
	Measuring Point (1)	Measuring Point (2)	Measuring Point (3)
Accuracy	Absolute Error: 1.8 ( $\mu\text{L}$ ) Relative Error: 3.2 (%)	Absolute Error: 1.8 ( $\mu\text{L}$ ) Relative Error: 3.2 (%)	Absolute Error: 1.8 ( $\mu\text{L}$ ) Relative Error: 3.2 (%)
Repeatability	S.D.: 0.6 ( $\mu\text{L}$ ) C.V.: 1.2 (%)	S.D.: 0.6 ( $\mu\text{L}$ ) C.V.: 1.2 (%)	S.D.: 0.6 ( $\mu\text{L}$ ) C.V.: 1.2 (%)
5. Measured Values			
	Measuring Point (1)	Measuring Point (2)	Measuring Point (3)
No.	( $\mu\text{L}$ ) (mg)	( $\mu\text{L}$ ) (mg)	( $\mu\text{L}$ ) (mg)
1	49.72 49.55	49.48 49.33	49.74 49.58
2	49.74 49.57	49.28 49.30	49.54 49.84
3	49.60 49.43	49.11 49.76	49.30 49.58
4	49.88 49.71	49.22 49.87	49.80 49.30
5	49.74 49.57	49.40 49.26	49.40 49.70
6	49.72 49.55	49.33 49.98	49.50 49.85
7	49.84 49.47	49.38 49.27	49.50 49.60
8	49.80 49.63	49.42 49.07	49.50 49.80
9	49.88 49.71	49.28 49.53	49.64 49.64
10	49.80 49.63	49.38 49.23	49.85 49.16
6. Measurement Results			
	Measuring Point (1)	Measuring Point (2)	Measuring Point (3)
Number of Measurements	10 (times)	10 (times)	10 (times)
Mean	49.752 ( $\mu\text{L}$ )	49.325 ( $\mu\text{L}$ )	49.563 ( $\mu\text{L}$ )
Accuracy	Absolute Error: -0.248 ( $\mu\text{L}$ ) Relative Error: -0.496 (%)	Absolute Error: -0.575 ( $\mu\text{L}$ ) Relative Error: -1.161 (%)	Absolute Error: -0.437 ( $\mu\text{L}$ ) Relative Error: -0.884 (%)
Judgment	Pass	Pass	Pass
Repeatability	S.D.: 0.092 ( $\mu\text{L}$ ) C.V.: 0.184 (%)	S.D.: 0.110 ( $\mu\text{L}$ ) C.V.: 0.223 (%)	S.D.: 0.108 ( $\mu\text{L}$ ) C.V.: 0.218 (%)
Judgment	Pass	Pass	Pass
7. Test Information Test No.: QV-001 Test Date: 202009 Operator: M.P. Test Administration: Calibration room Remarks: Used Distilled water			

## As a Training Kit...

It is a known fact that human factors often contribute more to erroneous measurements than the pipette accuracy itself. By visualizing the dispensed volumes and repeatability, pipette accuracy testers can be used as a good training tool for a novice to become a skilled pipette user.

## Specifications

	AD-4212B-PT	AD-4212A-PT	FX-300i-PT
Weighing Capacity*1	110 g / 31 g*2	110 g	320 g
Minimum Weighing Value	0.1 mg / 0.01 mg	0.1 mg	1 mg
Linearity	±0.2 mg / ±0.05 mg	±0.3 mg	±2 mg
Repeatability (Standard Deviation)	0.1 mg / 0.05 mg	0.15 mg	1 mg
Dimensions	Weighing unit : 80 (W) x 230 (D) x 200 (H) mm Display (with a stand) : 237 (W) x 150 (D) x 155 (H) mm		193 (W) x 262.5 (D) x 190 (H) mm
Standard Accessories*3	<ul style="list-style-type: none"> <li>• Instruction manual</li> <li>• Balance including the weighing pan unit, breeze break, AC adaptor and AC adaptor ID label</li> <li>• Calibration weight with a pair of tweezers</li> <li>• Evaporation trap</li> <li>• Sample cup with a holder (30 mL x 2 / 5 mL x 2)</li> <li>• Liquid thermometer</li> <li>• USB communications kit (USB converter, RS-232C cable, Instruction manual)</li> <li>• WinCT-Pipette (CD-ROM)</li> <li>• Carrying case with a shoulder belt and a key</li> </ul>		
AC Adaptor	Please confirm that the AC adaptor type is correct for your local voltage and power receptacle type.		
Power Consumption	Approx. 11VA (supplied to the AC adaptor)		
Carrying Case Dimensions	470 (W) x 150 (D) x 355 (H) mm		
Weight (With All Accessories in a Case)	Approx. 7.6 kg	Approx. 7.2 kg	Approx. 6.4 kg

\*1 When the balance weighing pan is used.

\*2 The AD-4212B-PT is equipped with a smart range function. The minimum weighing value will switch to 0.1 mg automatically when the mass value exceeds 31 g but returns to 0.01 mg by pressing the RE-ZERO (tare) key.

\*3 The standard accessories for the AD-4212B-PT / AD-4212A-PT / FX-300i-PT are different from those for the AD-4212B / AD-4212A / FX-300i.

## Pipette Specifications in accordance with ISO8655

Pipette Nominal Volume*4	ISO8655 Requirements (Gravimetric Method)					Balance Minimum Weighing Value	
	Maximum Permissible Error				Accuracy (Systematic Error)		Repeatability (Random Error)
	±%	±μL	%	μL			
(μL)						mg	
20	1.0	0.2	0.5	0.1		0.01	
50	1.0	0.5	0.4	0.2			
100	0.8	0.8	0.3	0.3			
200	0.8	1.6	0.3	0.6		0.1	
500	0.8	4.0	0.3	1.5			
1000	0.8	8.0	0.3	3.0			
2000	0.8	16	0.3	6.0			
5000	0.8	40	0.3	15.0			
10000	0.6	60	0.3	30.0			
Daily inspection, simplified verification						1*6	

### Corresponding Models

**AD-4212B-PT** \*5

**AD-4212A-PT**

**FX-300i-PT**

\*4 The maximum volume selectable for variable volume pipettes

\*5 The AD-4212B-PT can be used for the pipette volume range from 20 μL to 10000 μL

\*6 The minimum weighing value, 1mg, corresponds to approximately 1 μL. If a pipette volume is 1000 μL, a test can be performed with a resolution of 0.1%. If 200 μL, 0.5%.

Note) Make sure that the measurement environment is free from vibration, drafts and air from air conditioners.

## Gravimetric Method

The gravimetric method is the most common way of knowing the performance of variable-volume pipettes, in which pipette volume is determined based on the mass value of distilled water dispensed from the pipette.

**AND** ...Clearly a Better Value  
A&D Company, Limited

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Woburn, MA 01801  
Phone 781-665-1400  
Toll Free 1-800-517-8431

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