

The Maximum Errors Tolerated by Norm ISO-8655 and Gilson Specifications

Some clarification must be made concerning the position of Gilson according to the maximum errors tolerated by ISO-8655. Numerous people have questioned themselves as to which set of tolerances to apply. ISO-8655 gives the technical specifications that must be respected by a pipette at the level of the nominal volume only, whereas Gilson gives tolerances fitted to all volumes. For its pipettes, Gilson has specifications much more severe than the norm, in order to guarantee optimum performance from your precision instrument.

The performance of your pipette is defined for both the nominal and minimum volumes.

Gilson strictly applies the methodology imposed by the norm but has different specifications as a function of the selected volume, for a given model, contrary to the norm which specifies the same error, whatever volume is selected.

The norm is the result of a compromise reached by the members of the ISO technical committee. **Gilson** transmitted its reservations concerning the maximum tolerated errors and **considered that the maximum tolerated errors were not strict enough to guarantee the performance levels required by these precision instruments**, especially for applications in the domains of research, diagnostics, and quality control. It is for this reason that a note was added to paragraph 7.4 of the final version of the norm ISO 8655-2, so that everyone will take this point into consideration:

“It is recognized that the errors of measurement of intermediate volumes in the useful volume range of a variable-volume piston pipette may be considerably better than those specified for the nominal volume of the piston pipette.”

Example

Pipetman® P1000 has a systematic error of 3 µL at its minimum volume and 8 µL at its maximum volume. ISO 8655 specifies a systematic error of 8 µL for a 1000 µL pipette regardless of the selected volume. Which amounts to saying that in the course of an experimental protocol comprising of 20 samples of 200 µL, the maximum error according to Gilson specifications will be 60 µL and 160 µL according to ISO 8655, a difference of 100 µL. To illustrate the above proposition we have included a graph showing the comparison between the maximum errors tolerated by Gilson and ISO 8655.

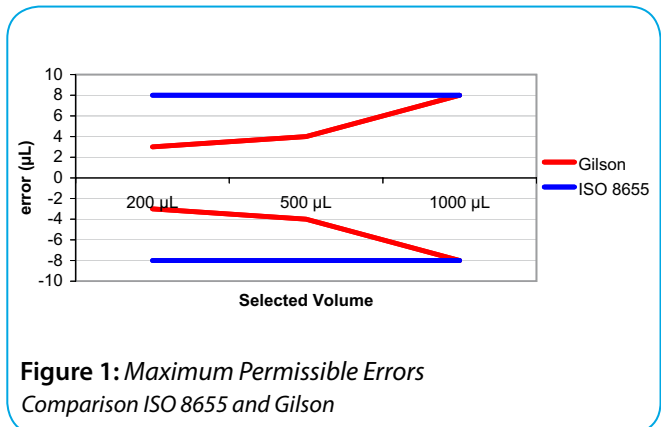


Figure 1: Maximum Permissible Errors Comparison ISO 8655 and Gilson

Thus, a pipette may be judged to conform to the norm ISO 8655, but not to conform to Gilson Specifications. Therefore, we are not able to guarantee that a pipette performs in accordance with the tolerances given in ISO 8655 and by extension the coherence of our client's experimental results. As a consequence we strongly recommend to have Pipetman®, Pipetman Concept®, Pipetman® Ultra, DISTRIMAN®, MICROMAN® and REPETMAN® adjusted according to Gilson Specifications.

You will find on the back of this document, a table comparing Gilson Specifications with ISO 8655, so that you can take into account the loss of performance of your pipette if you estimate that you only need conformity with the norm ISO 8655.

Of course, Gilson is entirely at your disposition if you require any additional explanation regarding this matter.



Pipetman® P Pipetman® Neo Pipetman Ultra®

Model (Reference)	Volume (μ L)	Maximum Permissible Errors			
		Gilson		ISO 8655	
		Systematic error (μ L)	Random error (μ L)	Systematic error (μ L)	Random error (μ L)
P2 (F144801)	Min. 0.2	± 0.024	≤ 0.012	± 0.08	≤ 0.04
P2N (F144561)	0.5	± 0.025	≤ 0.012	± 0.08	≤ 0.04
U2 (F21021)	Max. 2	± 0.030	≤ 0.014	± 0.08	≤ 0.04
P10 (F144802)	Min. 1	± 0.025	≤ 0.012	± 0.12	≤ 0.08
P10N (F144562)	5	± 0.075	≤ 0.030	± 0.12	≤ 0.08
U10 (F21022)	Max. 10	± 0.100	≤ 0.040	± 0.12	≤ 0.08
P20 (F123600)	Min. 2	± 0.10	≤ 0.03	± 0.20	≤ 0.10
P20N (F144563)	5	± 0.10	≤ 0.04	± 0.20	≤ 0.10
U20 (F21023)	10	± 0.10	≤ 0.05	± 0.20	≤ 0.10
	Max. 20	± 0.20	≤ 0.06	± 0.20	≤ 0.10
P100 (F123615)	Min. 10	± 0.35	≤ 0.10	± 0.80	≤ 0.30
P100N (F144564)	20	± 0.35	≤ 0.10	± 0.80	≤ 0.30
U100 (F21024)	50	± 0.40	≤ 0.12	± 0.80	≤ 0.30
	Max. 100	± 0.80	≤ 0.15	± 0.80	≤ 0.30
P200 (F123601)	Min. 20	± 0.50	≤ 0.20	± 1.60	≤ 0.60
P200N (F144565)	50	± 0.50	≤ 0.20	± 1.60	≤ 0.60
U200 (F21025)	100	± 0.80	≤ 0.25	± 1.60	≤ 0.60
	Max. 200	± 1.60	≤ 0.30	± 1.60	≤ 0.60
P1000 (F123602)	Min. 100	± 3	≤ 0.6	± 8	≤ 3.0
P1000N (F144566)	200	± 3	≤ 0.6	± 8	≤ 3.0
U1000 (F21026)	500	± 4	≤ 1.0	± 8	≤ 3.0
	Max. 1000	± 8	≤ 1.5	± 8	≤ 3.0
P5000 (F123603)	Min. 1000	± 12	≤ 3	± 40	≤ 15
and	2000	± 12	≤ 5	± 40	≤ 15
U5000 (F21027)	Max. 5000	± 30	≤ 8	± 40	≤ 15
P10ml (F161201)	Min. 1 mL	± 30	≤ 6	± 60	≤ 30
and	2 mL	± 30	≤ 6	± 60	≤ 30
U10ml (F21028)	5 mL	± 40	≤ 10	± 60	≤ 30
	Max. 10 mL	± 60	≤ 16	± 60	≤ 30

Except for Pipetman Neo.

Only for Pipetman Neo.

Pipetman Ultra® Multichannel

Model (Reference)	Volume (μ L)	Maximum Permissible Errors			
		Gilson		ISO 8655	
		Systematic error (μ L)	Random error (μ L)	Systematic error (μ L)	Random error (μ L)
8x20 (F21040)	Min. 1	± 0.10	≤ 0.08	± 0.40	≤ 0.20
and	2	± 0.10	≤ 0.08	± 0.40	≤ 0.20
12x20 (F21041)	10	± 0.20	≤ 0.10	± 0.40	≤ 0.20
	Max. 20	± 0.40	≤ 0.20	± 0.40	≤ 0.20
8x300 (F21042)	Min. 20	± 1.00	≤ 0.35	± 8.00	≤ 3.00
and	30	± 1.00	≤ 0.35	± 8.00	≤ 3.00
12x300 (F21043)	150	± 1.50	≤ 0.60	± 8.00	≤ 3.00
	Max. 300	± 3.00	≤ 1.00	± 8.00	≤ 3.00

Pipetman Concept®

Model (Reference)	Volume (μ L)	Maximum Permissible Errors			
		Gilson		ISO 8655	
		Systematic error (μ L)	Random error (μ L)	Systematic error (μ L)	Random error (μ L)
C10 (F31012)	Min. 0.5	± 0.040	≤ 0.013	± 0.120	≤ 0.080
	1	± 0.025	≤ 0.012	± 0.120	≤ 0.080
	5	± 0.060	≤ 0.020	± 0.120	≤ 0.080
	Max. 10	± 0.080	≤ 0.025	± 0.120	≤ 0.080
C100 (F31013)	Min. 5	± 0.35	≤ 0.10	± 0.80	≤ 0.30
	10	± 0.30	≤ 0.10	± 0.80	≤ 0.30
	50	± 0.38	≤ 0.12	± 0.80	≤ 0.30
	Max. 100	± 0.40	≤ 0.15	± 0.80	≤ 0.30
C300 (F31014)	Min. 20	± 0.80	≤ 0.16	± 4.00	≤ 1.50
	30	± 0.70	≤ 0.20	± 4.00	≤ 1.50
	150	± 0.90	≤ 0.23	± 4.00	≤ 1.50
	Max. 300	± 1.05	≤ 0.30	± 4.00	≤ 1.50
C1200 (F31015)	Min. 100	± 2.5	≤ 0.4	± 16.0	≤ 6.0
	120	± 2.4	≤ 0.4	± 16.0	≤ 6.0
	600	± 3.6	≤ 0.8	± 16.0	≤ 6.0
	Max. 1200	± 6.0	≤ 1.2	± 16.0	≤ 6.0
C5000 (F31016)	Min. 500	± 10	≤ 2	± 40	≤ 15
	2500	± 15	≤ 4	± 40	≤ 15
	Max. 5000	± 25	≤ 7	± 40	≤ 15
C10ml (F31017)	Min. 1 mL	± 25	≤ 4	± 60	≤ 30
	5 mL	± 30	≤ 8	± 60	≤ 30
	Max. 10 mL	± 50	≤ 12	± 60	≤ 30

Pipetman Concept® Multichannel

Model (Reference)	Volume (μ L)	Maximum Permissible Errors			
		Gilson		ISO 8655	
		Systematic error (μ L)	Random error (μ L)	Systematic error (μ L)	Random error (μ L)
8x10 (F31032)	Min. 1	± 0.04	≤ 0.02	± 0.24	≤ 0.16
	and 5	± 0.08	≤ 0.04	± 0.24	≤ 0.16
12x10 (F31042)	Max. 10	± 0.10	≤ 0.06	± 0.24	≤ 0.16
8x100 (F31033)	Min. 10	± 0.25	≤ 0.14	± 1.60	≤ 0.60
	and 50	± 0.50	≤ 0.20	± 1.60	≤ 0.60
12x100 (F31043)	Max. 100	± 0.80	≤ 0.25	± 1.60	≤ 0.60
8x300 (F31034)	Min. 30	± 1.00	≤ 0.18	± 8.00	≤ 3.00
	and 150	± 1.50	≤ 0.38	± 8.00	≤ 3.00
12x300 (F31044)	Max. 300	± 2.40	≤ 0.60	± 8.00	≤ 3.00

Pipetman® 8X200

Model (Reference)	Volume (μ L)	Maximum Permissible Errors			
		Gilson		ISO 8655	
		Systematic error (μ L)	Random error (μ L)	Systematic error (μ L)	Random error (μ L)
8x200 (F161004)	Min. 20	± 0.50	≤ 0.25	± 3.20	≤ 1.20
	50	± 0.50	≤ 0.25	± 3.20	≤ 1.20
	100	± 1.00	≤ 0.50	± 3.20	≤ 1.20
	Max. 200	± 2.00	≤ 1.00	± 3.20	≤ 1.20

Pipetman® F

Model (Reference)	Volume (µL)	Maximum Permissible Errors			
		Gilson		ISO 8655	
		Systematic error (µL)	Random error (µL)	Systematic error (µL)	Random error (µL)
F2 (F123770)	2	± 0.08	≤ 0.03	± 0.08	≤ 0.04
F5 (F123771)	5	± 0.10	≤ 0.04	± 0.125	≤ 0.075
F10 (F123772)	10	± 0.10	≤ 0.05	± 0.12	≤ 0.08
F20 (F123604)	20	± 0.20	≤ 0.06	± 0.20	≤ 0.10
F25 (F123775)	25	± 0.25	≤ 0.075	± 0.50	≤ 0.20
F50 (F123778)	50	± 0.40	≤ 0.15	± 0.50	≤ 0.20
F100 (F123784)	100	± 0.80	≤ 0.25	± 0.80	≤ 0.30
F200 (F123605)	200	± 1.60	≤ 0.30	± 1.60	≤ 0.60
F250 (F123787)	250	± 3.00	≤ 0.75	± 4.00	≤ 1.50
F300 (F123788)	300	± 3.50	≤ 0.75	± 4.00	≤ 1.50
F400 (F123789)	400	± 3.60	≤ 0.80	± 4.00	≤ 1.50
F500 (F123790)	500	± 4.00	≤ 1.00	± 4.00	≤ 1.50
F1000 (F123606)	1000	± 8.00	≤ 1.30	± 8.00	≤ 3.00
F5000 (F123607)	5000	± 30.00	≤ 8.00	± 40.00	≤ 15.00

Microman®

Model (Reference)	Volume (µL)	Maximum Permissible Errors			
		Gilson		ISO 8655	
		Systematic error (µL)	Random error (µL)	Systematic error (µL)	Random error (µL)
M10 (F148501)	Min. 1	± 0.09	≤ 0.03	± 0.20	≤ 0.10
	5	± 0.10	≤ 0.03	± 0.20	≤ 0.10
	Max. 10	± 0.15	≤ 0.06	± 0.20	≤ 0.10
M25 (F148502)	Min. 3	± 0.25	≤ 0.08	± 0.70	≤ 0.30
	10	± 0.27	≤ 0.08	± 0.70	≤ 0.30
	Max. 25	± 0.30	≤ 0.10	± 0.70	≤ 0.30
M50 (F148503)	Min. 20	± 0.34	≤ 0.20	± 0.70	≤ 0.30
	Max. 50	± 0.70	≤ 0.30	± 0.70	≤ 0.30
M100 (F148504)	Min. 10	± 0.50	≤ 0.20	± 1.50	≤ 0.60
	50	± 0.75	≤ 0.30	± 1.50	≤ 0.60
	Max. 100	± 1.00	≤ 0.40	± 1.50	≤ 0.60
M250 (F148505)	Min. 50	± 1.50	≤ 0.30	± 6.00	≤ 2.00
	100	± 1.70	≤ 0.30	± 6.00	≤ 2.00
	Max. 250	± 2.50	≤ 0.50	± 6.00	≤ 2.00
M1000 (F148506)	Min. 100	± 3.00	≤ 1.60	± 12.00	≤ 4.00
	500	± 5.00	≤ 2.50	± 12.00	≤ 4.00
	Max. 1000	± 8.00	≤ 4.00	± 12.00	≤ 4.00

Repetman®

Repet-Tip model (Reference)	Volume (µL)	Maximum Permissible Errors			
		Gilson		ISO 8655	
		Systematic error (µL)	Random error (µL)	Systematic error (µL)	Random error (µL)
100 Non-sterile (F164510) Sterile (F164515)	Min. 1	± 0.16	≤ 0.12	± 1	≤ 1
	10	± 0.16	≤ 0.2	± 1	≤ 1
	50	± 0.60	≤ 0.5	± 1	≤ 1
	Max. 100	± 1.00	≤ 0.5	± 1	≤ 1
500 Non-sterile (F164520) Sterile (F164525)	Min. 5	± 0.45	≤ 0.3	± 5	≤ 3
	50	± 0.45	≤ 0.5	± 5	≤ 3
	250	± 2.25	≤ 1.25	± 5	≤ 3
	Max. 500	± 4.5	≤ 1.25	± 5	≤ 3
1250 Non-sterile (F164530) Sterile (F164535)	Min. 12.5	± 1	≤ 0.44	± 10	≤ 4
	125	± 1.13	≤ 0.75	± 10	≤ 4
	625	± 3.75	≤ 1.88	± 10	≤ 4
	Max. 1250	± 7.5	≤ 1.88	± 10	≤ 4
2500 Non-sterile (F164540) Sterile (F164545)	Min. 25	± 2	≤ 0.625	± 16	≤ 8
	250	± 2	≤ 1	± 16	≤ 8
	1250	± 6.25	≤ 2.25	± 16	≤ 8
	Max. 2500	± 12.5	≤ 2.5	± 16	≤ 8
5000 Non-sterile (F164550) Sterile (F164555)	Min. 50	± 4	≤ 0.75	± 30	≤ 15
	500	± 4	≤ 1.5	± 30	≤ 15
	2500	± 12.5	≤ 3.75	± 30	≤ 15
	Max. 5000	± 25	≤ 4	± 30	≤ 15
12.5 ml Non-sterile (F164560) Sterile (F164565)	Min. 125	± 6.25	≤ 1.57	± 50	≤ 30
	1250	± 6.25	≤ 3.13	± 50	≤ 30
	6250	± 25	≤ 9.38	± 50	≤ 30
	Max. 12.5 mL	± 50	≤ 10	± 50	≤ 30
25 ml Non-sterile (F164570) Sterile (F164575)	Min. 250	± 7.5	≤ 3.13	± 125	≤ 75
	2500	± 7.5	≤ 6.25	± 125	≤ 75
	12.5 mL	± 37.5	≤ 18.75	± 125	≤ 75
	Max. 25 mL	± 75	≤ 20	± 125	≤ 75
50 ml Non-sterile (F164580) Sterile (F164585)	Min. 500	± 15	≤ 6.25	± 250	≤ 125
	5000	± 15	≤ 12.5	± 250	≤ 125
	25 mL	± 75	≤ 37.5	± 250	≤ 125
	Max. 50 mL	± 150	≤ 40	± 250	≤ 125

Sterile / Endotoxin-free

DistriTIP®

DistriTips model (Reference)	Volume (µL)	Maximum Permissible Errors			
		Gilson		ISO 8655	
		Systematic error (µL)	Random error (µL)	Systematic error (µL)	Random error (µL)
125 µL Micro (F164100) Micro ST (F164130)	Min. 2	± 0.100	≤ 0.080	± 0.20	≤ 0.10
	5	± 0.125	≤ 0.075	± 0.20	≤ 0.10
	Max. 10	± 0.200	≤ 0.100	± 0.20	≤ 0.10
1250 µL Mini (F164110) Mini ST (F164140)	Min. 20	± 0.80	≤ 0.20	± 1.50	≤ 0.60
	50	± 1.00	≤ 0.40	± 1.50	≤ 0.60
	Max. 100	± 1.00	≤ 0.60	± 1.50	≤ 0.60
12.5 mL Maxi (F164120) Maxi ST (F164150)	Min. 200	± 6.00	≤ 1.00	± 12.00	≤ 4.00
	500	± 7.50	≤ 1.50	± 12.00	≤ 4.00
	Max. 1000	± 10.00	≤ 2.50	± 12.00	≤ 4.00

ST means Sterilized.

www.gilson.com | sales@gilson.com | service@gilson.com | training@gilson.com

Gilson, Inc. World Headquarters | 3000 Parmenter Street | P.O. Box 620027 | Middleton, WI 53562-0027 USA
Tel: (1) 800-445-7661 or (1) 608-836-1551 | Fax: (1) 608-831-4451

Gilson S.A.S. | 19, avenue des Entrepreneurs | BP 145, F-95400 Villiers-le-Bel, France
Tel: (33-1) 34 29 50 00 | Fax: (33-1) 34 29 50 20

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