Thermo Scientific Finnpipette Performance Specifications

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Key words

- **ISO 8655** - Calibration standard for the piston operated volumetric devices
- **Factory Specifications** - Often more stringent requirements than the above ISO 8655, these are set by manufacturers in the development phase of a new product
- **Systematic error** - The difference between the dispensed volume and the selected volume of a pipette
- **Random error** - Error referring to the repeatability of pipetting
- **Pipetting Systems** - In liquid handling, pipettes and tips always form a pipetting system. Using a pipette with the pipette tip it was designed, developed and manufactured to fit to allow for ideal pipetting performance
- **ISO 9001** - Standard for Quality management systems
- **ISO 13485** - Quality management standard for medical devices



ISO 8655 Specifications

The ISO 8655 standard forms a guideline for industry and independent service companies concerning the entire calibration process of piston operated volumetric devices. The acceptance limits stated in the ISO standard are designed to be used by manufacturers, service companies as well as end users. The standard criteria are agreed to be sufficient for the use with the devices described therein.

The standard gives the maximum permissible limits for systematic and random error, also referred to as inaccuracy and imprecision, respectively. Systematic error is the difference between the dispensed volume and the selected volume of a pipette. The error is repeated in each measurement taken but can be eliminated if the error source, such as imperfect calibration or a change in the environment where the testing is performed, is identified. Random error, on the other hand, refers to the repeatability of the pipetting. It is caused by random factors including features of the pipette, laboratory practice and user experience.

Factory Specifications

All manufacturers, Thermo Fisher Scientific included, use their own factory performance specifications to describe the actual functionality of their pipettes. As the factory specifications are tighter than those required by the ISO 8655 standard, this is an acceptable practice in the industry. These specifications are provided for pipetting systems, which comprises both pipette and tip. Performance achievements may be different if using non-system tips. The Finnpipette performance has been tested using their system tip which are Thermo Scientific Finntips.

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The main difference between the factory and ISO 8655 specifications is that the factory error limits are testing volume dependent for variable volume pipettes. The ISO 8655 standard, on the other hand, gives the same error limits for the whole volume range of each pipette. The difference is especially noticeable in the lower volume error limits ensured by Thermo Scientific. For the mid and minimum volumes, the factory specifications are remarkably tighter than what is required by the ISO standard.With more stringent specifications, pipetting performance is guaranteed with the Finnpipettes.

To demonstrate the difference, ISO 8655 specifies a systematic error of 8 µL for a 1000 µL pipette regardless of the selected volume. Thermo Scientific F1 and F2 100-1000 µL pipettes are however given a systematic error of 1 µL at minimum and 6 µL at maximum volume. Thus, when pipetting a sample of 100 µL, the maximum permissible error according to Thermo Scientific factory specifications will be only 1% but 8% according to ISO 8655 (Table 1). The same applies for all Finnpipette models as demonstrated in Table 2

Quality matters

Your tip choice has a big impact on the pipetting performance, which is why Finnpipettes are designed for use with the Finntips. Both Finnpipettes and Finntips are manufactured from high quality raw materials, tested thoroughly and certified according to strict quality standards. Specifically, Thermo Fisher Scientific Oy is a company certified to the standards ISO 9001 and ISO 13485, taking quality matters seriously. Further, the pipetting systems comprising Finnpipettes and Finntips are CE-marked according to IVD Directive in Europe and intended for use in in-vitro diagnostics for transferring of liquids.

For further information on calibration of pipettes, refer to The Good Laboratory Pipetting Guide.

	Thermo Scientific Factory Specifications		ISO 8655 Specifications	
Volume	**Inaccuracy µl (%)**	**Imprecision µl (%)**	**Inaccuracy µl (%)**	**Imprecision µl (%)**
1000	±6,0 (±0,6%)	2,0 (0,2%)	±8,0 (±0,8%)	3,0 (0,3%)
500	±4,0 (±0,8%)	1,5 (0,3%)	±8,0 (±1,6%)	3,0 (0,6%)
100	±1,0 (±1,0%)	0,6 (0,6%)	±8,0 (±8,0%)	3,0 (3,0%)

Table 1. Comparison of the Thermo Scientific Factory Specifications, and ISO 8655 limits for Finnpipette F1 and F2 100-1000 µl models. Notice how remarkably the mid and min volume error limits differ between the Thermo Scientific Factory Specifications and ISO 8655.

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Finnpipette F2 Multichannel Pipettes

				Thermo Scientific Factory Calibration Specifications		ISO 8655 Calibration Specifications	
Cat. No.	Range	Channels	Volume (µL)	Inaccuracy (µL)	Imprecision (µL)	Inaccuracy (µL)	Imprecision (µL)
4662000	1.0-10 µL	8	10	±0,240	0,160	±0,240	0,160
			5	±0,200	0,150	±0,240	0,160
			1	±0,120	0,080	±0,240	0,160
4662010	5-50 µL	8	50	±0,75	0,35	±1,00	0,40
			25	±0,625	0,30	±1,00	0,40
			5	±0,25	0,10	±1,00	0,40
4662020	10-100 µL	8	100	±1,30	0,50	±1,60	0,60
			50	±1,25	0,60	±1,60	0,60
			10	±0,50	0,20	±1,60	0,60
4662030	30-300 µL	8	300	±3,0	0,9	±8,0	3,0
			150	±2,25	0,75	±8,0	3,0
			30	±1,5	0,6	±8,0	3,0
4662040	1.0-10 µL	12	10	±0,240	0,160	±0,240	0,160
			5	±0,200	0,150	±0,240	0,160
			1	±0,120	0,080	±0,240	0,160
4662050	5-50 µL	12	50	±0,75	0,35	±1,00	0,40
			25	±0,625	0,30	±1,00	0,40
			5	±0,25	0,10	±1,00	0,40
4662060	10-100 µL	12	100	±1,30	0,50	±1,60	0,60
			50	±1,25	0,60	±1,60	0,60
			10	±0,50	0,20	±1,60	0,60
4662070	30-300 µL	12	300	±3,0	0,9	±8,0	3,0
			150	±2,25	0,75	±8,0	3,0
			30	±1,5	0,6	±8,0	3,0
4662080	1.0-10 µL	16	10	±0,240	0,160	±0,240	0,160
			5	±0,200	0,150	±0,240	0,160
			1	±0,120	0,080	±0,240	0,160
4662090	5-50 µL	16	50	±0,75	0,35	±1,00	0,40
			25	±0,625	0,30	±1,00	0,40
			5	±0,25	0,10	±1,00	0,40



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