



Static dilution systems DIL 544 and DIL 554 for filter leakage testing in the validation of cleanrooms.

The DIL 544 and DIL 554 dilution systems have been specially designed for use in cleanrooms and are intended for the defined reduction of the particle number concentration when measuring with cleanroom particle counters.

Aerosol conditioning by dilution is a crucial step for the optimal measurement of aerosols. Numerous aerosol measuring instruments have a limited operating range with regard to particle number concentration. The typical maximum measuring concentration of cleanroom counters (ISO 21501-4, ISO/CD 19676) is well below 100 particle/cm³. Overly high concentrations can lead to an incorrect evaluation in terms of particle size and particle number concentration (coincidence error).

Applications

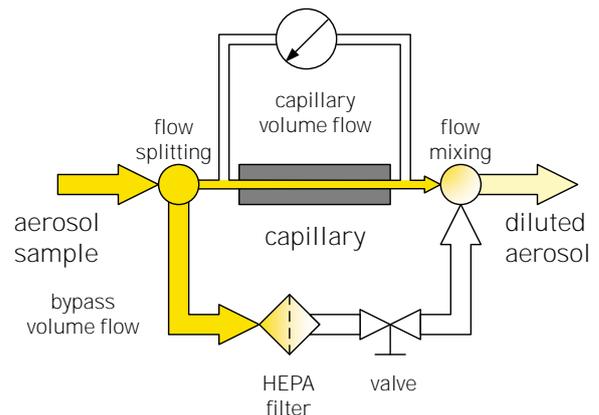
- filter leakage testing in cleanrooms
- validation of cleanroom technical facilities
- extension of the operating range of aerosol-analytical instruments

Features

- mobile (battery operated, compact design, low weight)
- compatible with numerous cleanroom particle counters
- stable, defined dilution over prolonged periods
- disinfestable housing (stainless steel)

Principle of operation

Both DIL 544 and DIL 554 are connected directly to a cleanroom particle counter via a hose. Therefore, the sampling volume flow is generated by the cleanroom counter. Inside the dilution systems, the aerosol sample is divided into two partial volume flows. From one partial volume flow (bypass), all particles are removed using a HEPA filter. Subsequently, both volume flows are recombined, whereby the particle number concentration at the outlet of the dilution system is reduced.



Operating principle of the DIL 544 and DIL 554 static dilution systems.

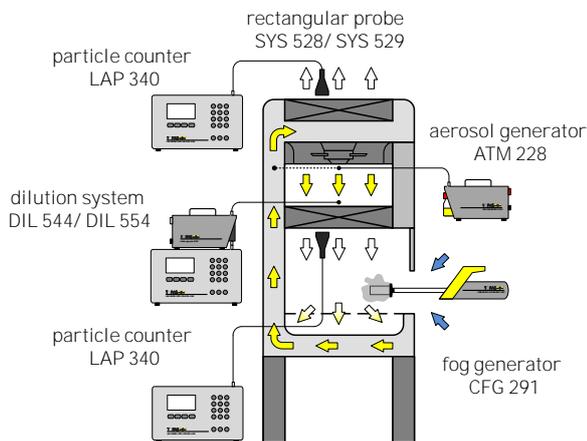


Specifications

Details

To ensure a defined dilution, the volume flows (bypass and capillary) in the dilution system used must be kept constant. Therefore, the pressure loss across the bypass is readjusted. In the DIL 544 system, this is done automatically by a servomotor. A manual readjustment is necessary for the dilution system DIL 554.

A typical application for DIL 544 and DIL 554 is the leakage test of a built-in filter, e.g. within a safety workbench. In this case, the systems are used in combination with a cleanroom particle counter to determine the particle number concentration of the test aerosol upstream of the filter inlet.



Typical use of DIL 544 or DIL 554 in leakage testing of a safety cabinet.

Various options are available for the cleanroom-compatible dilution systems DIL 544 and DIL 554:

model	specification*
DIL 544	28,3 L/min; 1:100; automatic; 10 mm
DIL 554	28,3 L/min; 1:100; manual; 10 mm
DIL 554/H	56,6 L/min; 1:100; manual; 10 mm
DIL 554/T	28,3 L/min; 1:100; manual; 8 mm
DIL 554/Z	28,3 L/min; 1:10; manual; 10 mm

* volume flow, dilution, adjustment, connector diameter

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Accessories (optional)

- anti-static tubing
- replacement HEPA filter

References

Makris et al. (2024) Experimental comparison of aerosol transmission in displacement ventilation and mixing ventilation in a meeting scenario. *Int. J. Vent.*, 24, 53-75. doi: 10.1080/14733315.2024.2406153

Schumann et al. (2023) Experimental analysis of airborne contaminant distribution in an operating room with different ventilation schemes. *Build. Environ.*, 244, 110783, doi: 10.1016/j.buildenv.2023.110783

Hofer et al. (2022) Exposure of operating room surgical staff to surgical smoke under different ventilation schemes. *Indoor Air.*, 32, doi: 10.1111/ina.12947

Technical specifications

volume flow rate	DIL 544: 28,3 L/min DIL 554: (28,3; 50; 56,6) L/min
dilution factor	DIL 544: 100 DIL 554: 100 oder 10
operational adjustment	DIL 544: automatic DIL 554: manual (handwheel)
operating medium	air (other on request)
system pressure loss	ca. 600 Pa
connector	10 mm (outer diameter)
power supply	9 V battery (power supply unit optional)
noise emission	not relevant
dimensions (w × h × d)	120 × 195 × 300 mm
weight	DIL 544: 3,1 kg DIL 554: 3,2 kg
normative references	ISO 14644-3, GMP Annex 1, DIN 1946-1, ISO/CD 19676

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QMS certified according
to DIN EN ISO 9001.



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