



Luftmeister

# THERE IS STILL AIR FOR IMPROVEMENT

Efficiency for your ventilation technology



Our innovations have won us numerous awards that we are proud of:



Top 10 in the competition DENEFF Perpetuum 2019



1st winner of the Environmental Technology Award Baden-Württemberg in the category measurement technology/Industry 4.0



1st winner of the German Design Award in the Energy category



1st winner of the Freiburg innovation award

## Luftmeister® – ein preisgekrönter Pionier

Founded in 2016, Luftmeister has provided efficient ventilation solutions in over 600 projects:

- through a unique, **patented sensor solution** that delivers precision in volume flow detection even in difficult installation situations
- through the “**air energy meter**”, which is also patented and measures both air flow and heat flow
- through our expertise, with which we develop the perfect solution for your ventilation processes and implement it technically on site

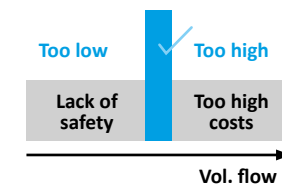
Top-class **awards** reflect this success.

## Why is the air volume flow a central efficiency lever?

Over 60% of all ventilation systems have an air volume flow rate that is significantly too high, on average by as much as 15%. This not only results in a waste of fan power, but also costly excessive heating or further air treatment.

Luftmeister continuously records the volume flow, even under difficult flow conditions. By regulating the flow rate to the required level, high cost contributions are saved. Luftmeister also ensures that the required minimum air volume is always maintained –

**Efficiency and safety** for your ventilation supply!



# Luftmeister®- Patented technology

In practice, there are numerous challenges to overcome when the air volume flow is to be recorded. The air ducts in question are not always circular, but often rectangular and, above all, only have short straight sections. As a result, the flow is distributed very unevenly over the cross-section; the specialist speaks of **asymmetrical flow profiles**.

Luftmeister has patented several inventions that meet this challenge. Firstly, flow probes have been developed whose geometry ensures that all flow vectors along the length of the probe are taken into account.



The Luftmeister probes are installed on site in suitable positions of the cross-sectional and **hosed together symmetrically**, so that the optimum pneumatic mean value is fed to the differential pressure sensor system.

Luftmeister has also further refined the calibration method (in accordance with DIN EN ISO 12599) for on-site adjustment. In an equally **patented calibration procedure**, in addition to a close-meshed flow profile (see graphic below) the distribution of the density and the inconstancy of the volume flow during the calibration period are recorded and compensated for.

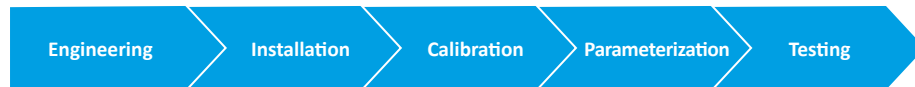
m/s	Pkt.	1	2	3	4	5	6	7	8	9	10
Pkt.	Abst.	21,85	65,55	109,25	152,95	196,65	240,35	284,05	327,75	371,45	415,15
1	19	-0,8	-0,7	-0,6	-0,5	-0,7	-0,5	-0,7	-0,5	-0,6	-0,8
2	57	-0,6	0,6	0,2	0,2	0,6	-0,6	-0,7	-0,7	-0,5	-0,7
3	94	-0,6	0,4	0,7	0,2	0,4	-0,6	-0,4	-0,4	-0,6	-0,6
4	132	-0,8	0,5	1,7	1,9	1,6	0,5	-0,5	-0,7	-0,5	-0,6
5	170	-0,8	0,9	2,2	3,2	3,7	2,9	0,3	-0,6	-0,5	-0,4
6	207	0,5	1,3	2,1	3,3	3,9	4,3	2,1	0,3	-0,4	-0,3
7	245	0,1	1,9	1,6	4,0	3,9	4,4	2,5	1,2	-0,4	-0,2
8	283	0,1	1,7	1,0	3,5	3,9	3,9	2,4	1,0	-0,2	0,1
9	320	0,0	0,7	1,4	3,4	4,0	2,6	1,4	0,5	0,1	0,3
10	358	0,4	0,1	1,2	2,2	2,9	2,8	1,6	0,7	0,3	0,1

Each application is also equipped with the appropriate, robust and long-term stable transmitter. Optionally, continuous **density compensation** can be carried out - crucial for highly variable process conditions. If both low and high volume flows need to be recorded, a **sensor cascade** is applied.

## „Volume flow“ – measure precisely where others have no solution

Whether long or short inlet lengths, whether clean supply air or aggressive or polluted exhaust air. Whether measuring solution for indoor or outdoor use, with or without ATEX, in small, large or very large air ducts:

Luftmeister looks at the entire relevant application, develops a suitable concept – and then responsibly completes the measurement solution on site with installation, calibration, parameterization and signal testing.



### Volume flow examples from our Luftmeister practice:

- High-precision, laboratory-calibrated measuring sections for research projects, clean room supply air or burner air mass flow
- Robust measuring solution for aggressive exhaust air in the semiconductor, chemical or pharmaceutical industry
- Equipment for large ducts and exhaust air stacks
- Court-proof verification of volume flows
- Measuring solutions for air handling units with or without internal ring nozzles

## Air balance and air distribution – Efficiency for production ventilation

If a different amount of air is fed into a production hall than is discharged, overpressure or underpressure is created. During the entire heating period, cold outside air enters or expensively heated hall air flows out into the outside area.



The Luftmeister efficiency solution consists of continuously recording all relevant supply and and exhaust air volume flows and to always ensure **air balance** via the BMS.

At the same time, most production halls have areas of poor air supply. Luftmeister determines the actual, decentralized distribution of supply and exhaust air on site and – as far as technically possible and in consultation with the operator – carries out an **“air redistribution”**. So that the expensive conditioned air is used as effectively as possible.





## Air recirculation systems are particularly quickly rewarding efficiency candidates

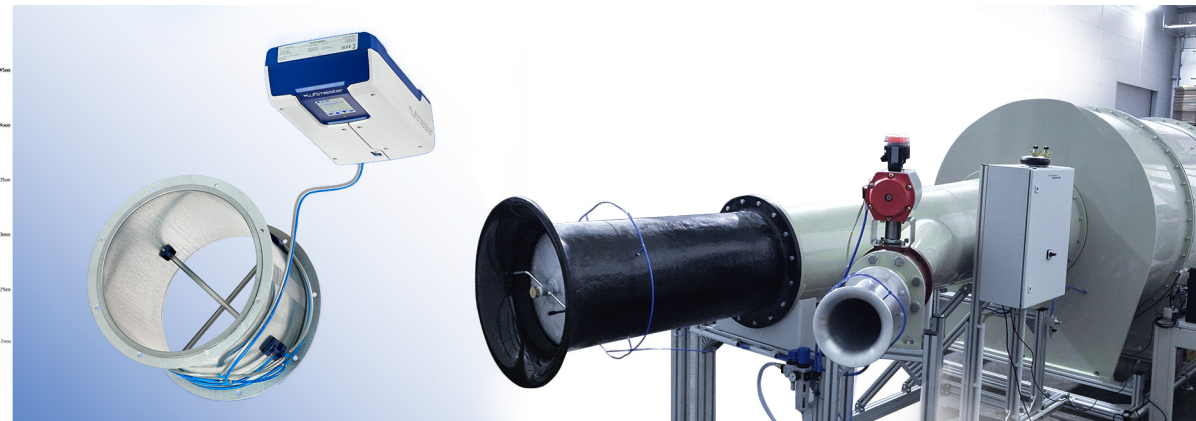
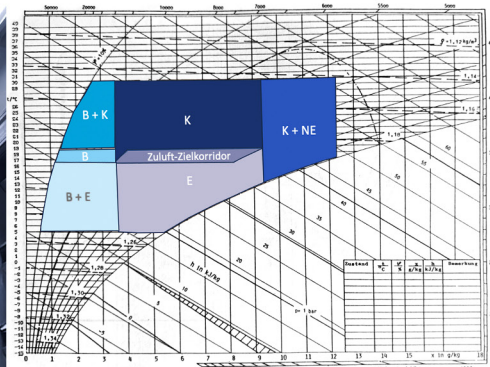
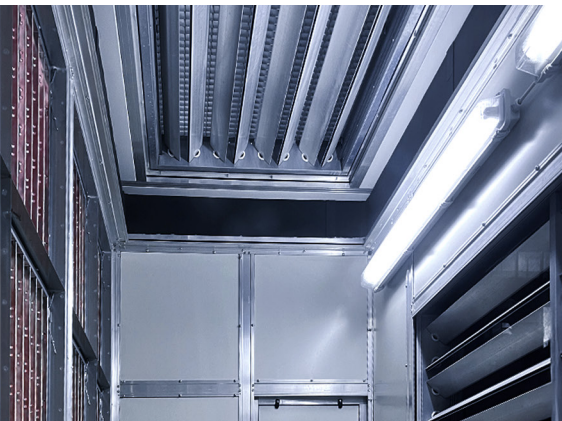
Many existing systems are recirculation systems, where part of the exhaust air is mixed with the outside air in a mixing chamber. Experience shows that only very rarely an efficient mixing ratio is achieved. As a rule, the **proportion of outside air** is regularly set noticeably too high, which causes high additional heating costs over the entire heating period.

In many recirculation systems, the Luftmeister solution consists of continuous recording of the outside air and supply air volume flow, whereby the appropriate fresh air rate can be regulated. Larger recirculation systems also justify an “h-x control”, in which **fresh air and recirculated air always “run” in the optimum mass flow ratio** to each other – in order to continuously bring the mixed air condition optimally close to the supply air target corridor. This results in considerable savings in operating costs.

## Laboratory calibrated measuring sections – for test bench, R&D and precision applications

In some cases, maximum precision plays a central role – for example, when the **air volume flow, air mass flow or air heat flow** is required in a test field or research facility. The same applies to air consumption applications that require legal-to-trade approval, or, for example, in burner air mass flow measurement for large gas burners. Last but not least, supply air measuring sections are required in clean rooms so that air exchange is always verifiable, but also to ensure that the expensive cleanroom supply air is always kept below the waste level.

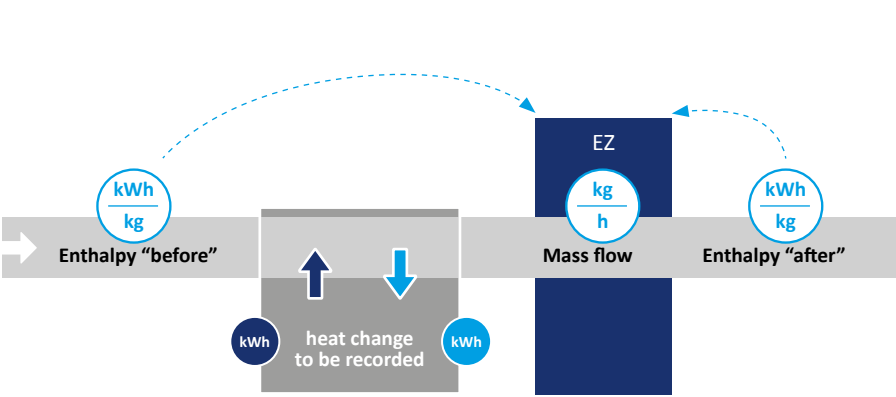
Luftmeister operates a high-precision **volume flow calibration laboratory** for this purpose. calibration laboratory. This is where the patented measuring sections (double blade, Venturi or others) are precisely calibrated and adjusted for **optimum precision** in demanding applications!



# Patented: the air energy meter

In addition to the efficiency lever „volume flow“, the **air heat flow** is a key parameter for optimized air-handling systems.

Luftmeister responds to this need with the patented “air energy meter” (EZ), which measures not only the air flow rate (mass flow) but also the heat content (enthalpy). This means that the **thermal capacity** and (as a meter) the heat and cooling supply on the air side are available as measured data.



**Thermal capacity** (kW) = mass flow  $\left(\frac{kg}{h}\right) \times$  (enthalpy after – enthalpy before)

If thermal capacity > 0, then: kWh

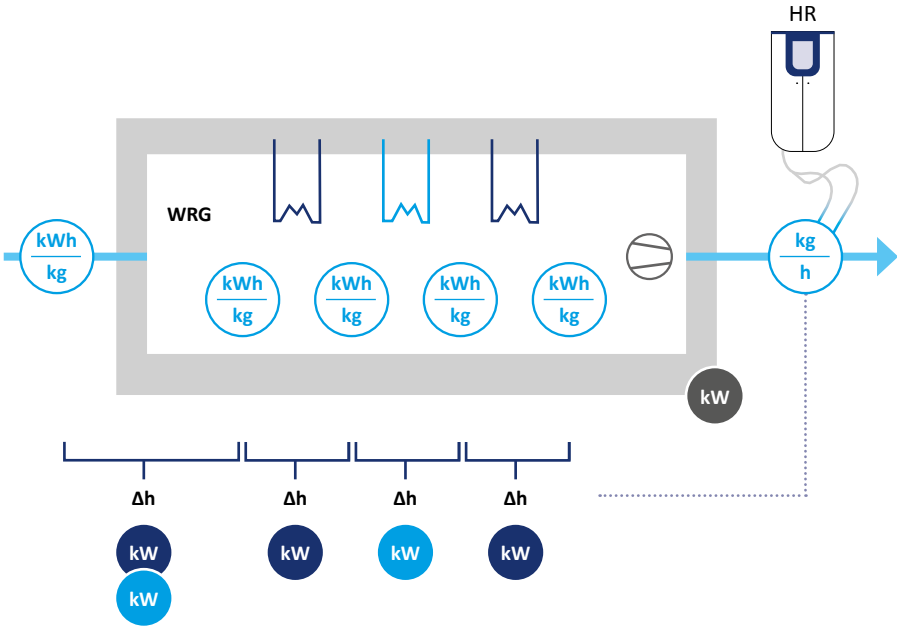
**Thermal energy** (kWh) = accumulated capacity

If thermal capacity < 0, then: kWh

The mass flow rate can be recorded either by installing the probe and calibrating on site, see page 3, or as a laboratory-calibrated measuring section, see page 5. The air energy meter is at the same time a **multi-channel measuring transducer, multi-channel data logger and multi-counter** (air volume, heating and cooling quantity on the air side).

# Efficiency controlling for air-handling units (AHU) or heat recovery (HR)

Medium-sized and larger existing AHU systems (from approx. 20,000 m<sup>3</sup>/h) are responsible for high operating costs. Luftmeister detects the efficiency gaps by using an air energy meter measuring the **thermal capacity of each air treatment stage** as well as all relevant temperatures, humidity and differential pressures (the air energy meter thus becomes a multi-energy meter, which is also patented). Special attention is always paid to **heat recovery** (HR).



A subsequent **Luftmeister analysis of all measurement data** shows which adjustments need to be made to the control system. On this basis optimized control continuously cuts operating costs

## The ideal companion for air system renewal

Numerous existing AHU systems will have to be replaced in the coming years. Operators, engineering offices and energy managers are well advised to consider the relevant data on the **“old system behavior”**: What sectional and total volume flows were run? Which pressures had to be built up? What pressure drops occurred during the treatment stages? What thermal capacities were run in the heat recovery units, the heaters, coolers, etc.?

A Luftmeister measuring system provides this data as well as that of the subsequent new system. This supports the design of the new system as well as **efficient control and energy management** (measurement data-based comparison of comparison of “old” versus “new”).

## Energy-related AHU key figures for energy management

When analyzing air conditioning systems, energy management often only looks at the auxiliary parameter “power consumption”. However, key figures **recorded on the air side** are much more informative.

Luftmeister measuring systems provide all the relevant information adapted to the specific system – in order to provide **all energetic key figures**, e.g.

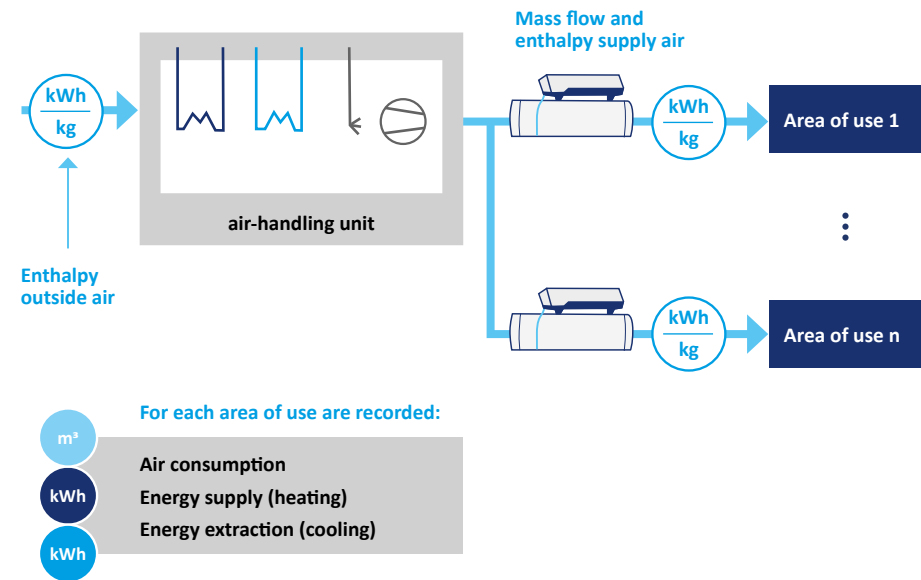
- Share of heat recovery in total heating
- Air volume (m<sup>3</sup>) per supply area (m<sup>2</sup>)
- Fan performance:  
Air volume (m<sup>3</sup>) per energy (kWh electrical)
- Average volume flow actual versus target



## AHU consumption recording per cost center

Active energy management is supported by consumption meters. This also applies to air systems with their high operating costs: only if the “air users” can achieve lower costs through their consumption behavior, they are motivated for savings!

With Luftmeister measuring systems installed in the supply air ducts the consumption variables air volume, heat and cold air supply are recorded and used for a **cost center charge**, in accordance with standards (DIN 94701 and VDI 2077-4). If costs are to be separated (several companies or tenants are supplied by the same Air handling system, Luftmeister also provides approved legal-to-trade solutions for this purpose.







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Luftmeister®

- ✓ ENSURES THE VOLUME FLOW
- ✓ AVOIDS WASTE AT THE SAME TIME
- ✓ UNCOVERS GAPS IN AIR HANDLING EFFICIENCY
- ✓ OPTIMALLY SUPPORTS ENERGY MANAGEMENT