



MEZ-AEROSEAL
**THE NEW AIR TIGHTNESS
CLASS FOR DUCTWORK**

MEZ-AEROSEAL THE TECHNOLOGY



AEROSEAL is a unique technology for efficient and effective sealing of already installed air duct system from inside out.

As integral component in the construction of new ventilation systems, maximum air tightness requirements for installed systems can be guaranteed as well as achieved.

It doesn't matter if you have to deal with restructuring or retrofit, AEROSEAL seals the air duct system fast, efficient and the required air tightness class can be achieved. The patented AEROSEAL process was developed in the 1990s at the University of Berkeley/California. This technology **has been successfully applied in more than 125.000 air duct systems**, in residential as well as commercial buildings, all over the world.

Since 2015 MEZ-AEROSEAL sets new standards for the tightness of air duct systems all over Europe and overseas.

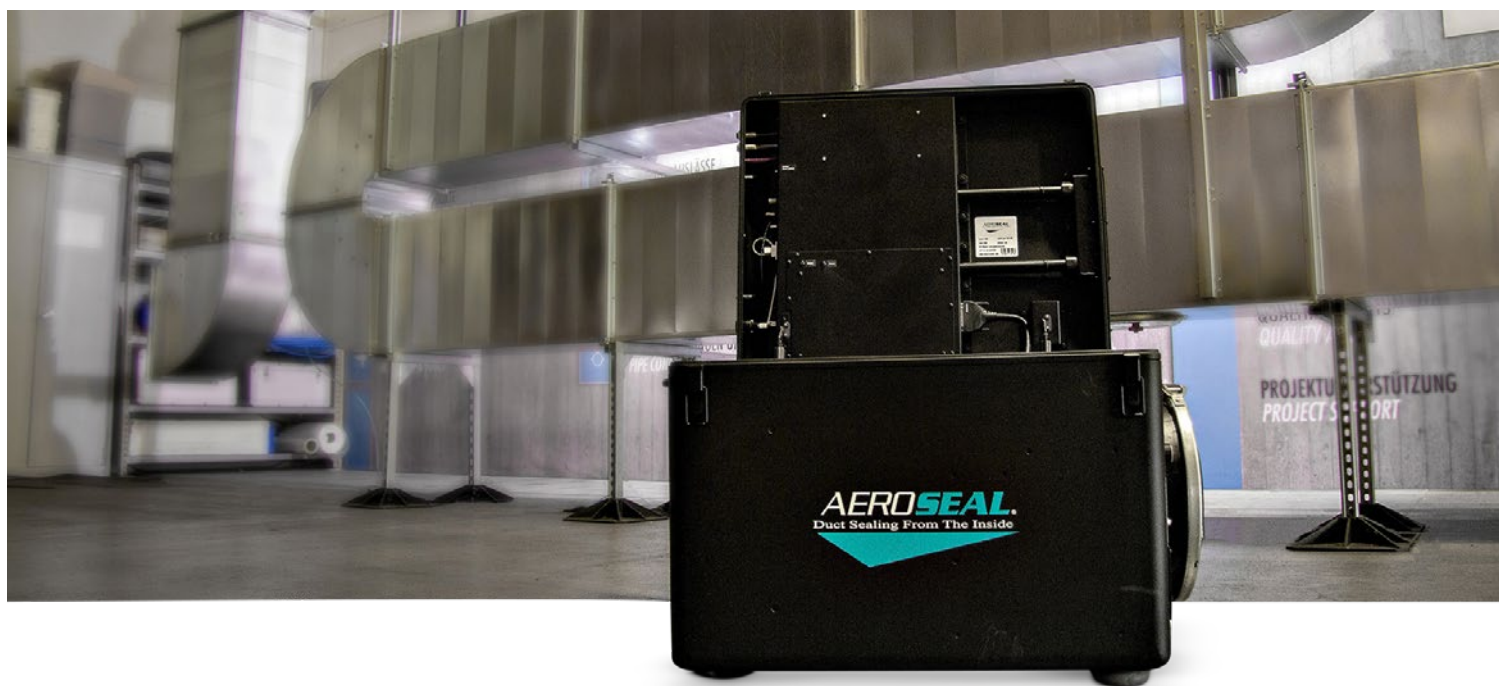
How does AEROSEAL work?

The sealant, which is soluble in water, is transformed into a gaseous state using heated compressed air. The aerosolized particles seal the whole leakage of the ventilation system. One leak after another up to a diameter of 1.5 cm are sealed and withstand a pressure of up to 2.000 Pa.



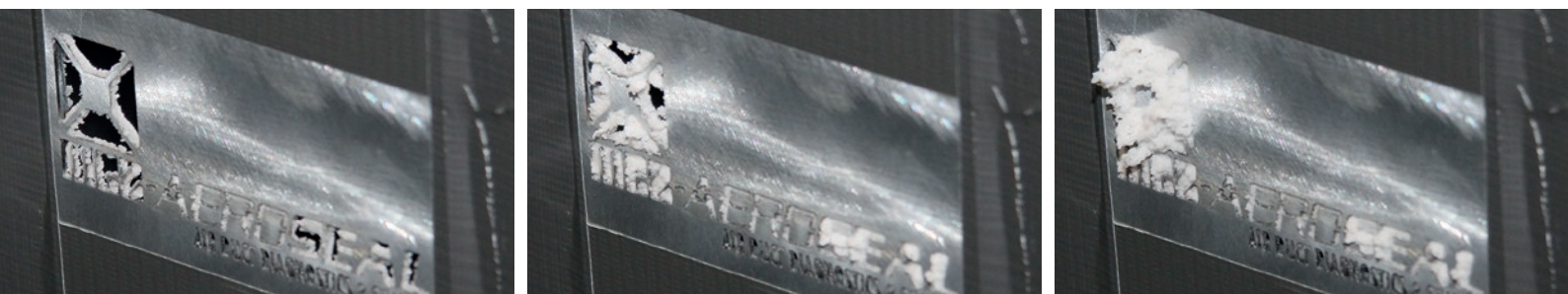
MEZ-AEROSEAL

WHY IS AEROSEAL THE NEW AIR TIGHTNESS CLASS?



Due to limited access of already installed air duct systems and the fact that small and individual leakages are the problem, the sealing of those systems has been extremely difficult as well as inefficient so far. As a result of the achievement of air tightness class C or D for a ready installed air duct system was usually not possible.

With AEROSEAL you are able to guarantee air tightness class D. The sealant, transported by the air flow, seeks for leakages within the air duct system and attaches directly onto the edges of those. Using this process you are able to achieve results like you would only achieve with welded or very elaborately sealed air ducts.



Even a significant undercut of the requirements of air tightness class D according to EN 1507, EN 12237, EN 12599, Eurovent or DW144 TM1 is possible.



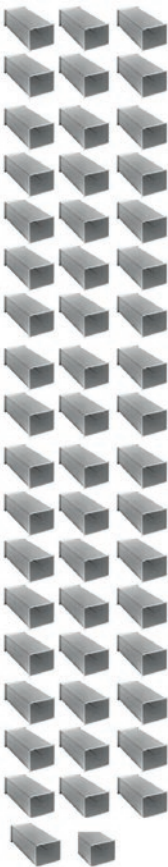
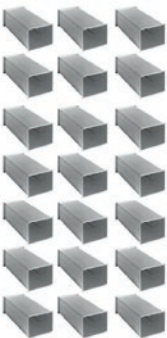





MODEL **LEAKAGE LOSSES**

As an illustration of the amount of leakage in air duct systems you may use following model as basis:

- A common air duct size of 1.000 x 500 x 1.500 mm
- = 750 l volume
- = 4,5 m² surface
- and a system pressure of 250 Pa

air tightness classes and leakages can be depicted as following.

Leak air volume per hour

EN 16798-3	ATC 6*	ATC 5	ATC 4	ATC 3	ATC 2	ATC 1
Air tightness class	2,5 x A	A	B	C	D	
Test pressure in Pa	250	250	250	250	250	
Surface in m ²	4,5	4,5	4,5	4,5	4,5	
Max. air leakage rate in m ³ /s * m ²	0,0019546	0,0009773	0,0003258	0,0001086	0,0000362	
Air leakage rate in m ³ /s	0,0088	0,0044	0,0015	0,0005	0,0002	
Air leakage rate in m ³ /h	31,6642	15,8321	5,2774	1,7951	0,5864	
Air leakage rate in l/s	8,7956	4,3978	1,4659	0,4886	0,1629	
Air leakage rate in l/h	39,580	15.832	5.277	1.759	586	
approx. %	15%	6%	2%	0,67%	0,22%	
						
						
Component volume	52,5 x	21 x	7 x	2,3 x	0,78 x	

* ATC 6 = default according to EN 16798-3 if air tightness class is unknown



FOR ALL PEOPLE INVOLVED **A WIN-WIN SOLUTION**



Planners can guarantee that the whole air duct system complies with the air tightness requirements of the respective standards. Meanwhile an air tightness test according to EN 12599 will be much easier.



Air Duct Manufacturers which meet the air tightness requirements of EN 1507 or EN 12237 through their in-house quality assurance or the use of high quality products in the manufacturing, don't have to deal with defects caused by the assembly.



HVAC contractors can easily fulfil and prove the required air tightness class in the course of the installation. Complex and expensive rework is not necessary.



Operators and User benefit from an optimal and energy-efficient system operation.



Facility Managers and Energy Efficiency Consultants get an easy and effective method to optimise leaking existing air ducts and to reduce energy costs.



ADVANTAGE 1 **SPEED**

Our MEZ-AEROSEAL process enables an extremely fast project execution, due to the fact that no long-term construction works are necessary.

The affected building or section within the building (for example in existing hotels) can be used again immediately. **Per day, you can seal 5 rectangular duct lines or up to 600 m line length or approx. 2.700 m² of duct surface.**

To apply AEROSEAL, 1 - 2 service technicians are sufficient.

When sealing during the installation of new air duct systems, the section by section application and recording guarantees **a fulfillment of the required air tightness class for the whole system** and eliminates delays of the project progression due to rectifications.





ADVANTAGE 2 **INCREASE OF COMFORT & HYGIENE**

- Heat loss or the loss of cooling caused by leaky ductwork will be minimised
- An equal distribution of pretreated air in the whole building will be guaranteed
- No more noise generation caused by leakages
- Odour due to leaky ductwork is not a problem anymore
- The general indoor air hygiene will be improved



Leichtungsresultate insgesamt

Als wir die Arbeit aufnahmen

WURDEN IHRE LUFTLEITSYSTEME:

mit einer Leckage, was einem Loch einer Größe von

90.4 cm² entspricht.

Abschluss unserer Arbeiten

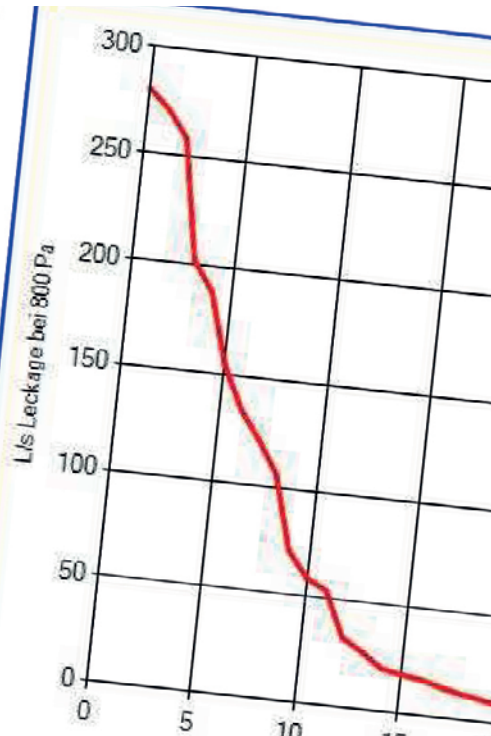
WURDEN IHRE LUFTLEITSYSTEME:

mit einer Leckage, was einer Größe von

2.1 cm² entspricht.

bedeutet eine Reduzierung der Luftleitsysteme

Die Ergebnisse der Leckage werden angegeben und berechnet bei einem Druck von 800 Pa.



ADVANTAGE 3 DOCUMENTATION

Before and after sealing with AEROSEAL the total leakage of the affected systems is determined and noted in a certificate, which documents the sealing process.

The average reduction of the leakage is more than 90%.

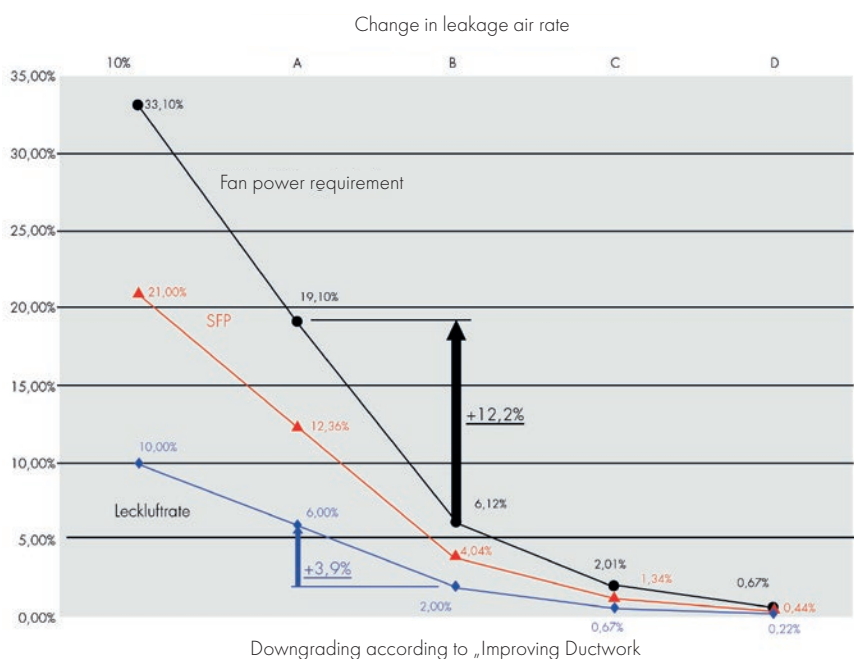




ADVANTAGE 4 ENERGY EFFICIENCY

The average leakage of air duct systems in Europe is between **15 and 30%**. In case of unknown air tightness class, the leakage according to EN 16798 Part 3 is 15%, **even at air tightness class A it's still 6% of the air flow.**

As a result of that the potential of energy saving is up to 50% of the specific fan power. In buildings with a high air exchange rate, like hospitals, pharmaceutical industry, hotels or first class offices, the payback period of the sealing is quite short, partially within one year.



Example: Illustration of theoretical relation between air leakage rate and fan power requirement:

Fan power requirement increases by 3 times compared to the air leakage rate.

The SFP (specific fan power) according to EN 13779 can be reduced by the reduction of the air leakage rate. This allows a compliance with the guidelines of EnEV 2014.





MEZ-AEROSEAL CASE STUDIES

Extract of MEZ-AEROSEAL Projects

Project	Total surface of air duct system (m ²)	Total leakage (l/s)		Air tightness class (average)		Total reduction of the leakage
		Before	After	Before	After	
Nursing home and community center	707	94	5	B	D	95%
Retirement home „Franziskus“	288	124	13	B	D	89%
Cardiology Clinic Filip Vtori	7.366	10.831	345	A	D	97%
Production building IST METZ GmbH	182	130	4	A	D	97%
Apartment building	834	622	64	Ca. A	C	90%
Office building Conseil Général Gironde	288	861	66	3,1*<A	B	92%
University Paris Ouest	2.079	2.787	217	1,4*<A	C	92%
Shopping Center Vill'up	1.186	1.424	78	1,2*<A	B	93%
Maternity hospital „Casablanca Félicité“	1.350	1.661	88	1,3*<A	C	95%
Nursery	346	914	66	2,7*<A	B	93%
Nanotechnological laboratory „Campus Institut Mines Télécom“	165	140	4	A	D	97%

CASE STUDY

HERZKLINIK FILIP VTORI



The air duct systems of the newly built cardiosurgery „Filip Vtori“ were strongly leaky, caused by the poor quality of the air ducts and their installations. Many rooms didn't receive a sufficient amount of air. Also, hygienical problems caused by uncontrolled air flows were to expect. The deficiencies of the ventilation system delayed the building's opening, so that the customer had to stay longer than originally planned in the old building, which caused high costs for rent.

The target of this project was to compensate shortcomings of the ventilation system and ensure the building's opening in a timely manner.

Place

Skopje, Macedonia

Date

09. - 19.11.2015

MEZ-AEROSEAL Partner

Cooperation between MEZ-TECHNIK GmbH and ACO-AEROSEAL Switzerland

Preseal leakage

Air tightness class A and worse

Postseal leakage

Air tightness class D

Reduction of leakage

in between 93% and 98%

Result

The entire ventilation system was sealed. The system mainly consisted of rectangular ducts with flanged connections. Due to the size of the building, ducts runs of up to 120 meters length were sealed per sealing event. Thanks to MEZ-AEROSEAL, the delay of the building's opening could be minimized and the ventilation system now works without any limitations.

Customer quote

„Our hospital is equipped with the newest high efficiency HVAC system also using renewable energy sources. So we cannot afford losing this efficiency through leaky air ducts. Thanks to MEZ-AEROSEAL we have now solved all hygienic, energetic and performance related problems at once. Furthermore, an additional delay of the building's opening could be avoided“

- Dr. Zan Mitrev (Customer & Cardiovascular Surgeon)





CASE STUDY **DIGIPLEX DATA-CENTER**

The Digiplex Data-Center in Fetsund near Oslo is an ultramodern server farm with a total surface of 4.200 m². The two three-storey, air cooled buildings, have a capacity for 20.000 servers. For fire prevention reasons, the level of oxygen in the air is reduced to 15%.

Target of this job was the sealing of 36 Air Handling Units to air tightness below air tightness class D.

Place	Fetsund, Norwegen
Date	July/September 2015
MEZ-AEROSEAL Partner	MEZ-TECHNIK GmbH
Executing company	GK Inneklima AS
Preseal leakage	approx. 18 - 70 l/s
Postseal leakage	approx. 2,5 - 5 l/s
Reduction of leakage	approx. 85 - 93%
Result	The leakage of the Air Handling Units could be reduced by about 90% in average. As a consequence, the DeOX system can now run at only 70% of its capacity, which results in an essential reduction of the operating costs.





CASE STUDY HOSPITAL WELS

In the hospital in Wels/Austria, the fans of an air duct system built in 2002 were exchanged. In this context, the main ductwork sections were brought to the current state-of-the-art level concerning air tightness using MEZ-AEROSEAL. At the time the hospital was built, an air tightness class B was common in hospital construction. So the duct system was delivered as ordered. As part of the fan retrofit, the main ducts between the air handling unit and the post-treatment-zones were controlled and sealed.

Target was to reduce the leakage losses and increase the energy efficiency of the air duct system.

Place	Hospital Wels-Grieskirchen
Date	17. + 24.03.2017
MEZ-AEROSEAL Partner	Ing. August Lengauer GmbH & Co. KG
Preseal leakage	642,7 l/s at 1.000 Pa in total
Postseal leakage	24,1 l/s at 1.000 Pa in total
Reduction of leakage	96% on average
Result	After sealing with MEZ-AEROSEAL, the maximum permissible leak air of air tightness class D could be reached (initial value was an air tightness class B; target was air-tightness class C). Through the considerably higher air tightness, leak air in the amount of 2.225 m ³ /h (365 days per year / 24 hours per day) can be saved. The redevelopment of the air duct systems amortizes within only one year.





CASE STUDY RED-LINE SUBWAY STATION ON AL BIDDA, QATAR

30 sealed air duct sections during the first on-site deployment in Doha: with regard to the FIFA World Cup 2022 in Qatar, an immense construction activity is in progress right now. A whole new subways system is currently built in Doha, the capital of Qatar.

Some of the new subway stations are already in the final phase of the construction. During this stage, it was noted that the ventilation systems as well as the modest quality of the air ducts led to high leakage rates – even though all ducts have been generously prepared from the outside with sealant. The builders recognized the need of tight air ducts and were prepared to invest money as well as

the necessary work, to get to the point where the ventilation system delivers performance and benefits according to the specified parameters.

None of the tested sections fulfilled the specified air tightness class C. All sections were between air tightness class A and 3 x A. The leakage rate was caused by many small leaks (mainly at the corner connections), which is perfect for the usage of MEZ-AEROSEAL.

At the section with the highest leakage rate, the leakage **could be reduced from 1.600 l/s to 20 l/s in just seven hours.**

Place

Doha, Qatar

Date

December 2017 - July 2018

MEZ-AEROSEAL Partner

Cooperation between MEZ-TECHNIK GmbH and ACO-AEROSEAL Switzerland

Preseal leakage

5.627 l/s

Postseal leakage

564 l/s

Reduction of leakage

92% in average





CASE STUDY EPFL LAUSANNE

EPFL in Lausanne is a University for engineers and architects and was founded in 1969. It includes 5 Schools, 2 Colleges, 1 Transdisciplinary Entity, 28 Institutes and 354 Laboratories. MEZ-AEROSEAL was used to seal 3 floors of a training laboratory, in order to remedy whistling ducts, draft and lack of energy efficiency. The project included horizontal and riser ducts for supply and return air. The modern and architecturally sophisticated building doesn't have any drop ceilings. Therefore the leaky air from the duct systems could be heard and felt by its visitors.

The target was to improve the energy efficiency and a reduction of whistling and draft.

Place

Lausanne, Switzerland

Date

03. - 05.03.2015

MEZ-AEROSEAL Partner

MEZ-TECHNIK GmbH

Reduction of leakage

94,1% in average on 10 air duct sections

Result

The leakage of the treated ducts could be reduced by an average of 94,1%, and the noise pollution and the unpleasant draft could be remedied.



HOW DOES THE PROCESS WORK?

1. In order to prepare the air duct system all inlets and outlets, depending on the requirements, need to be closed with steel plates, foam, sealing balloons or MEZ-DUCT-WRAP.
2. Connections of the air duct system to ventilation systems, fans or heat exchangers need to be disconnected and installed sensors need to be protected/covered. (Silencers, fire and volume dampers can stay within the duct system.)
3. Afterwards the system will be connected with the MEZ-AEROSEAL equipment using a transparent plastic tube.
4. Prior to the sealing process a leakage test will be performed to determine the current leakage rate.
5. The sealant will be injected via the machine into the system and seals the leakages step by step.
6. After the sealing process a second leakage test will be performed to measure the leakage rate again and a certificate will be issued as well.
7. All uninstalled components can be reinstalled and connected.
8. The system can already be operated again two hours after the sealing or adjustment.

WHAT ARE THE CHARACTERISTICS OF THE SEALANT?

- The sealant is non toxic, non flammable mix of water and Polyvinylacetat (PVAC/PVA)
- Remains flexible, Durability of + 30 years
- Temperature resistance approx. -29°C - +249°C
- Hardly inflammable according to UL and B - s1,d0
- Corresponds to several relevant standards such as UL, VDI, EN, FDA, NSF
- VOC tested, Certified Low VOC Compliant with LEED V4 and DGNB (level 4)
- Fire damper tested
- Can be used for fire rated smoke exhaust ducts, sheet metal and silicate ducts (PROMAT) as confirmed by German Ministry for construction

GERMANY OUR PARTNERS



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Diagnostik und Abdichtung von
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EUROPA OUR PARTNERS





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