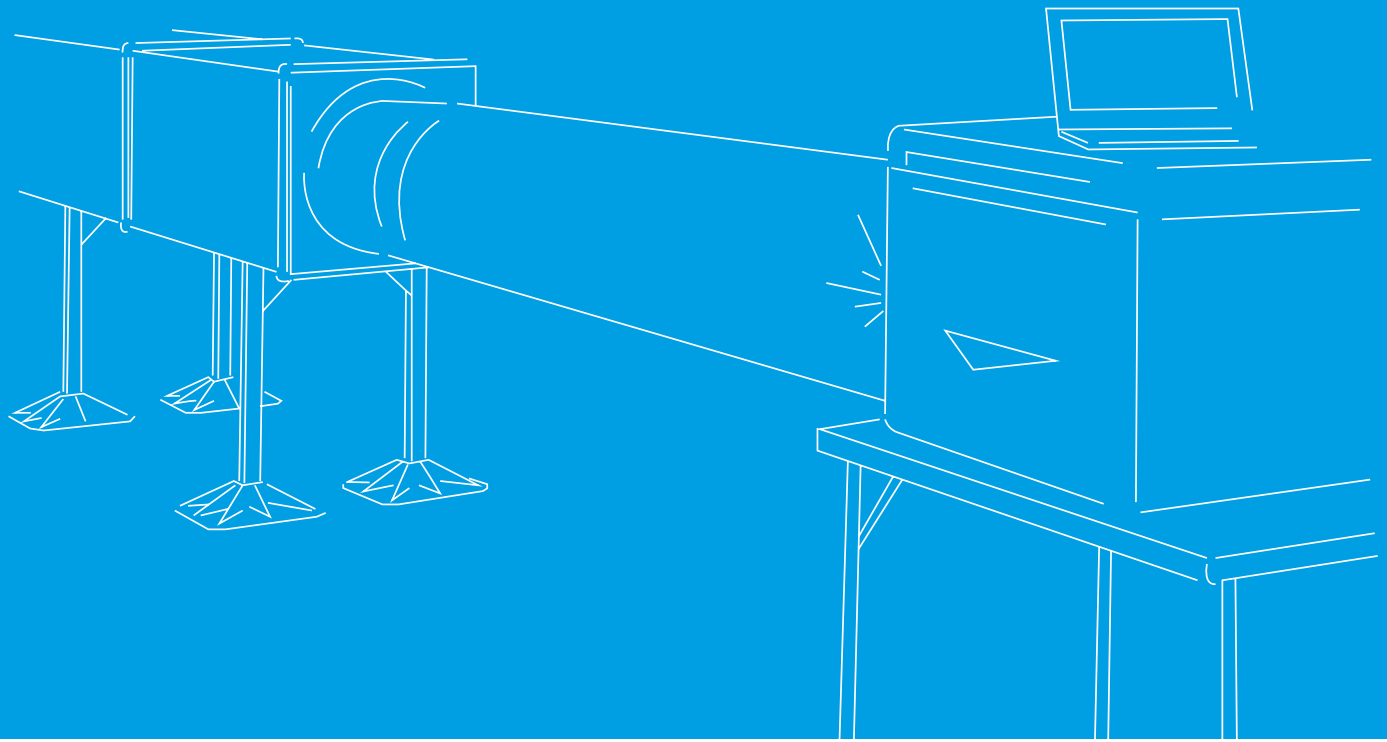
mez-AEROSEAL
AIR DUCT DIAGNOSTICS & SEALING

MEZ-AEROSEAL

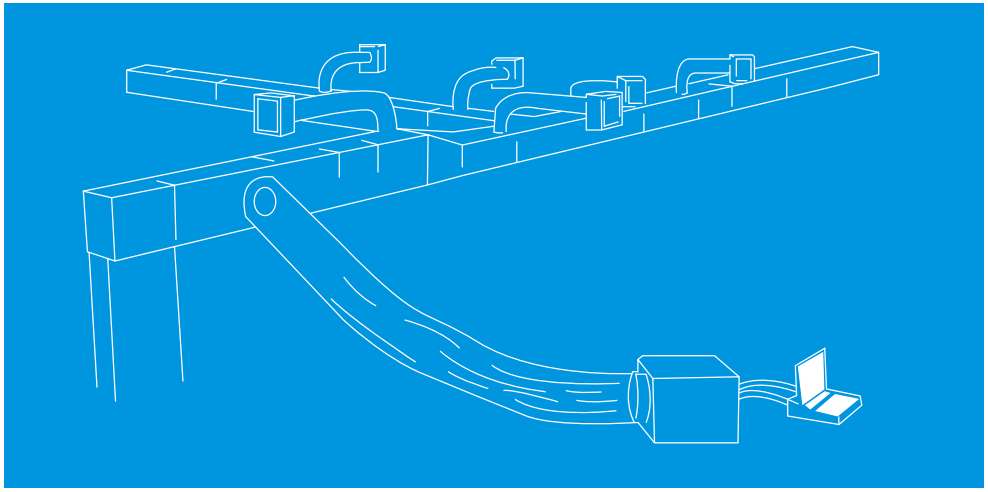
THE NEW AIR TIGHTNESS CLASS FOR DUCTWORK



WHAT IS MEZ-AEROSEAL?

MEZ-AEROSEAL is a breakthrough technology for subsequent sealing of already installed air duct systems from the inside out and can therefore be used on existing air ducts and newly installed systems.

The patented AEROSEAL process was developed in the 1990s on behalf of the US government at the University of Berkeley in California and has ever since proved its worth, initially in the residential sector, in North America.



HOW DOES MEZ-AEROSEAL WORK?

For the AEROSEAL process, a sealant is transformed into a gasous state using heated compressed air. These aerosolized particles travel through the air duct system seeking leakage that is located throughout the ductwork. The adhesive duct sealing particles attach directly onto the edges of any leakage, effectively sealing it without coating the inside of the ductwork. As the air stream makes a sharp turn to exit through a leak, the particles collide with and adhere to the leak edges. One leak after another up to a diameter of 1.5 cm are sealed and withstand a pressure of up to 2,000 Pa.

WHAT NEEDS TO BE CONSIDERED WHEN USING MEZ-AEROSEAL?

The process itself needs only a few steps. In preparation, all inlets and outlets of the air duct system are sealed with foam plugs or metal plates and are taped over with MEZ-DUCT-WRAP. The connections of the air duct to ventilation and air handling units, fans or heat exchangers are disconnected and built-in sensors are taped over, so that no particles of the sealant can get into these components. On the other hand silencers and dampers don't have to be removed as long as they are completely open.

Then, the air duct is connected to the MEZ-AEROSEAL equipment by the use of a transparent plastic hose.

ADVANTAGE 1: TIGHT AIR DUCTS

Limited access to the duct system due to the characteristics of the building, leaks that are made up of many small leaks, and lots of other reasons make searching for leaks in the air duct system extremely difficult.

When sealing with MEZ-AEROSEAL none of this matters. When it comes to sealing ductwork, MEZ-AEROSEAL achieves results such as otherwise can only be achieved in the case of very elaborately sealed air ducts. Due to the high efficiency of subsequent sealing it is possible to achieve or to be well below the requirements for tightness class D, as per EN 1507, EN 12237, EN 12599, Eurovent or DW144 TM1.

MEZ-AEROSEAL lowers the leakage of air duct systems in no time **by an average of 90%**.

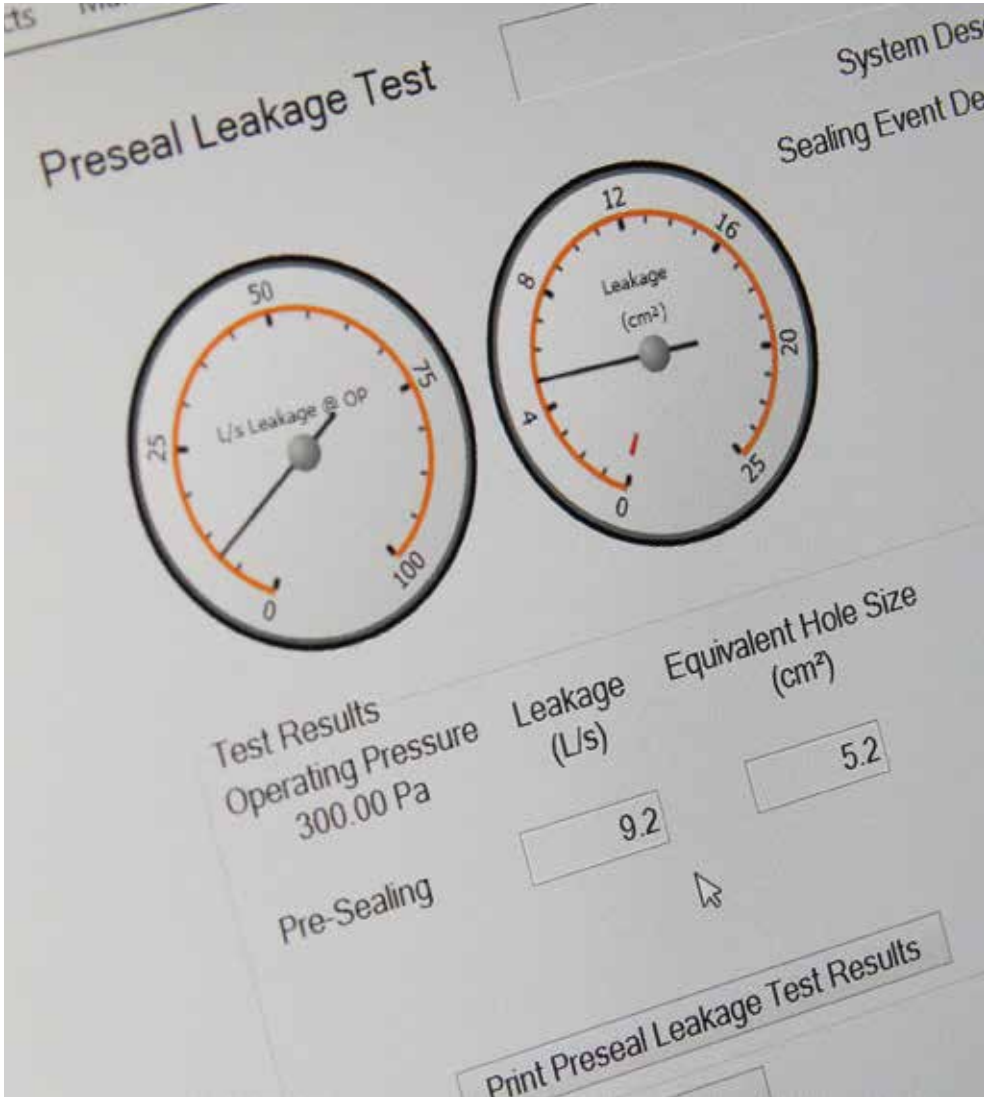
ADVANTAGE 2: SPEED

MEZ-AEROSEAL also convinces users by the rapidity of the sealing process since no long-term building work is necessary and the building or building sections in question (eg: in existing hotels) can be used again immediately. To apply the process, 2 or 3 service technicians are sufficient - this results in reduced time and staff expenses and would not be possible with conventional sealing methods.

ADVANTAGE 3: INCREASE OF COMFORT AND HYGIENE

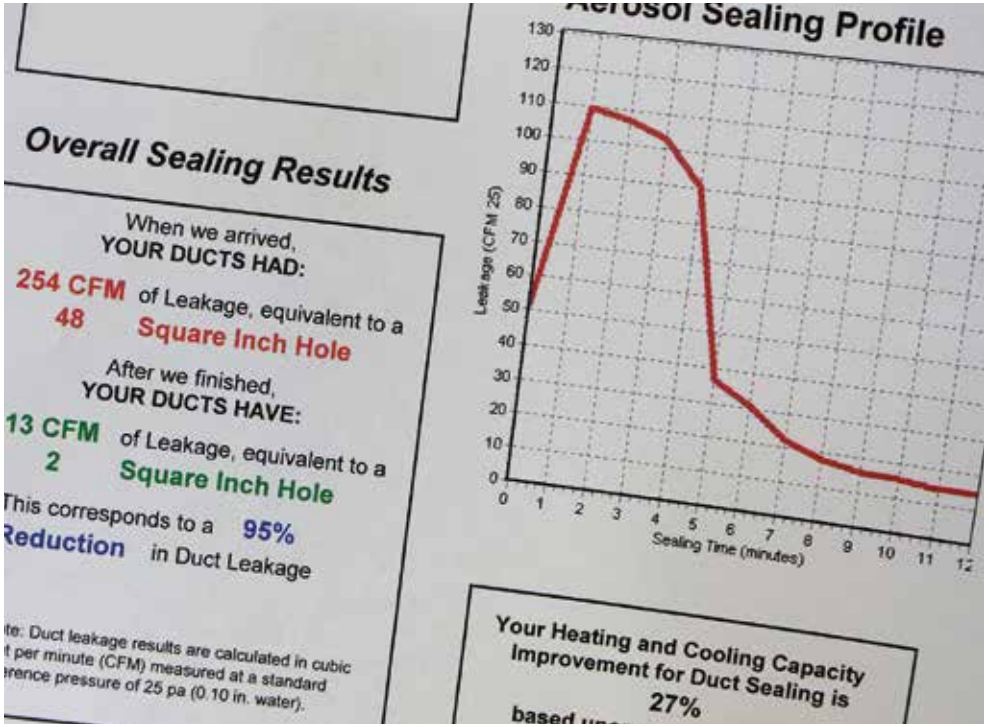
Besides achieving unprecedented air tightness, MEZ-AEROSEAL also leads to a substantial increase in the level of comfort of buildings, since the heating or cooling loss through leaks is greatly reduced and thus an even distribution of heat and cold is guaranteed throughout the building.

Another advantage of the AEROSEAL technology is the increase of hygiene. The sealant meets the requirements of the hygiene guideline VDI 6022 and has no negative health aspects. It may thus be used in all buildings such as schools, hospitals and other public facilities.



ADVANTAGE 4: DOCUMENTATION

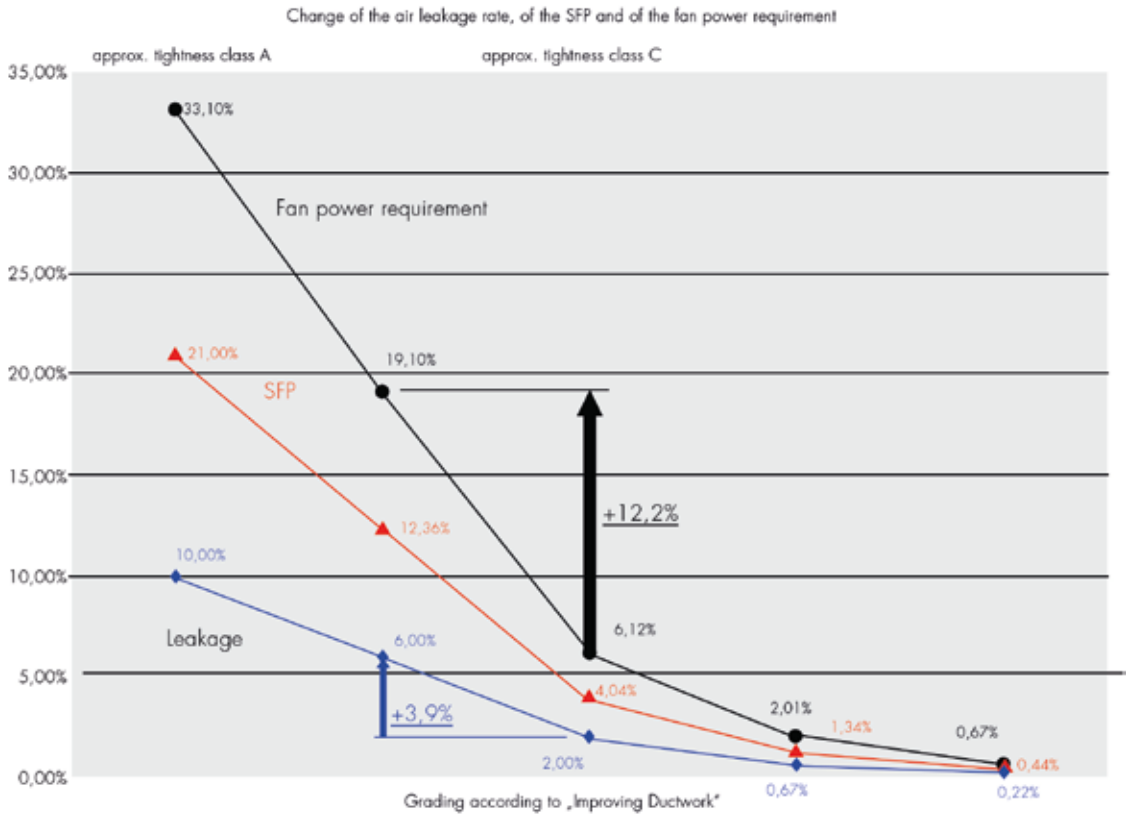
Before and after sealing with MEZ-AEROSEAL, the total leakage of the system in question is determined and noted in a certificate which the customer receives after the intervention. Also, the percentage of the reduction of leakage is stated.



ADVANTAGE 5: ENERGY SAVINGS

The energy savings targets laid down in the European „Energy Performance of Buildings Directive" (EPBD) 2002/91 is to be implemented through the Energy Saving Ordinance and in addition by standards and guidelines. In the case where the **tightness class of the air duct system is unknown, leakage of up to 15%** can be expected; for tightness class A, the figure is still 6%.

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 value (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

MODEL – LEAKAGE LOSSES

Initial situation:

Imagine you were carrying air in a leaky bucket of a certain size, and wondering how often it would run dry in a given period of time.

If you transfer this model to a common air duct size (1000 x 500 x 1500 mm = 750 l volume) with 4.5 m^2 of surface at 250 Pa system pressure, this can be represented pictorially as follows.

Hourly air volume leakage for tightness classes A to D

Example: Component volume 750 l, component surface 4.5 m2, 250 Pa

Tightness class	Example of 15 % leakage of the volume flow	A	B	C	D
Test pressure in Pa:		250	250	250	250
Surface in m^2:		4,5	4,5	4,5	4,5
Max. air leakage rate in $m^3/s * m^2$:		0,0009773	0,0003258	0,0001086	0,0000362
Air leakage rate in m^3/s:		0,0044	0,0015	0,0005	0,0002
Air leakage rate in m^3/h:		15,8321	5,2774	1,7591	0,5864
Air leakage rate in l/s:		4,3978	1,4659	0,4886	0,1629
Air leakage rate in l/h:	39.580	15.832	5.277	1.759	586
					
Component volume	52,5 x	21 x	7 x	2,3 x	0,78 x

ENERGY SAVINGS CALCULATION

In order to be able to estimate more precisely the effects of the sealing of air duct systems, MEZ-TECHNIK has developped together with French ventilation specialist Rémi Carrié (ICEE Lyon) a model for energy savings calculation. Based on 4 combined calculation methods, the approximate payback time of the sealing job can be calculated upfront. However, a reduction of the energy demand respectively the operating costs of the system is not guaranteed per se, if the system was not correctly designed or operated before sealing, retrofit and re-commissioning.

EXTRACT OF MEZ-AEROSEAL PROJECTS

MEZ-AEROSEAL projects	Surface air ducts overall (m^2)	Leakage overall (l/s)		Air tightness class (Average)		Reduction of leakage overall
		Before MEZ-AEROSEAL	After MEZ-AEROSEAL	Before MEZ-AEROSEAL	After MEZ-AEROSEAL	
Nursing home and community centre, Ottnang/Austria	707	94	5	B	D	95%
Retirement home „Franziskus", Linz/Austria	288	124	13	B	D	89%
Cardiology Clinic Filip Vtori, Skopje/Macedonia	7.366	10.831	345	A	D	97%
Production building IST METZ GmbH, Nürtingen/Germany	182	130	4	A	D	97%
Residential/Commercial/Hospital building Merkurhof, Rapperswil/Switzerland	436	77	22	B	D	72%
Apartment building, Montreuil/France	834	622	64	Ca. A	C	90%
Office building Conseil Général Gironde, Bordeaux/France	288	861	66	3,1*<A	B	92%
University Paris Ouest, Nanterre/France	2.079	2.787	217	1,4*<A	C	92%
Shopping centre Vill'up, Paris/France	1.186	1.424	78	1,2*<A	C	95%
Nursery, Les Ulis/France	346	914	66	2,7*<A	B	93%
Maternity Hospital „Casablanca Félicité", Paris/France	1.350	1.661	88	1.3*<A	C	95%
Nanotechnological laboratory « Campus Institut Mines Télécom », Evry/France	165	140	4	A	D	97%

CASE STUDY: Cardiology Clinic Filip Vtori

The air duct systems of the newly built cardiosurgery „Filip Vtori" were strongly leaky, caused by the quality of the air ducts and their installations. Many rooms didn't receive a sufficient amount of air. Also, hygienically 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.

Date:	09. - 19.11.2015
MEZ-AEROSEAL Partner:	MEZ-TECHNIK GmbH & ACO-AEROSEAL (Switzerland)
Target:	Compensate shortcomings of the ventilation system and ensure the building's opening in a timely manne
Preseal leakage:	Air tightness class A and worse
Postseal leakage:	Air tightness class D
Reduction of leakage:	in between 93 and 98%

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 40.000 servers. For fire prevention reasons, the level of oxygen in the air is reduced to 15% (normal value is around 20,95%), which corresponds to conditions as found in altitudes of around 4.000 m (~1.300 feet).

City:	Fetsund, Norwegen
Datum:	July/September 2015
MEZ-AEROSEAL Partner:	MEZ-TECHNIK GmbH
Executing company:	GK Norge AS
Target:	Sealing of Munters Air Handling Units to air tightness below air tightness class D
Preseal leakage:	approx. 18 - 70 l/s
Postseal leakage:	approx. 2,5 - 5 l/s
Reduction of leakage:	approx. 85 - 93%

CASE STUDY: Nursery Les Ulis

The air duct systems of the building were tested on tightness well after the delivery of the new construction. The test results showed that the system were considerably leaky and that tightness targets could not be met (2-3 x tightness class A instead of tightness class B). The primary challenge of this project was that the air duct systems are located behind a suspended ceiling that is not demountable. Therefore, access was really limited and company SOGESTFA was contacted to seal the ducts from the inside using MEZ-AEROSEAL.

City:	Essonne, France
Date:	24 November 2015
MEZ-AEROSEAL Partner:	SOGESTFA
Target:	Achievement of air tightness class B
Preseal leakage:	Average of 130,5 l/s
Postseal leakage:	Average of 9,8 l/s
Reduction of leakage:	Average of 92%

CASE STUDY: University Paris Ouest Nanterre

During the commissioning of the installations (25 „chimneys" including 168 riser ducts made of Promat / caclium silicate), the customer measured leakages of 50% in between the fans and the outlets. After that, the customer contacted MapClim, air treatment specialist and MEZ-AEROSEAL partner since 2015, to reduce the existing leakage in the duct work.

City:	Paris, France
Date:	18 January - 12 February 2016
MEZ-AEROSEAL Partner:	MapClim
Target:	Reducing leakage from 2 x air tightness class A to an air tightness class B
Preseal leakage:	2786,5 l/s (corresponds to 2 x class A)
Postseal leakage:	217,2 l/s (corresponds to class C)
Reduction of leakage:	92%

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.

City:	Lausanne, Switzerland
Building:	Training laboratory at EPFL Lausanne
Date:	03. - 05.03.2015
MEZ-AEROSEAL Partner:	MEZ-TECHNIK GmbH
Target:	Improvement energy efficiency and reduction of whistling and draft
Reduction of leakage:	94,1% in average on 10 air duct sections

MEZ-AEROSEAL PARTNERS

Great Britain

Ireland

Germany

Austria

Belgium

Finland

France

Liechtenstein

New Zealand

Poland

Switzerland

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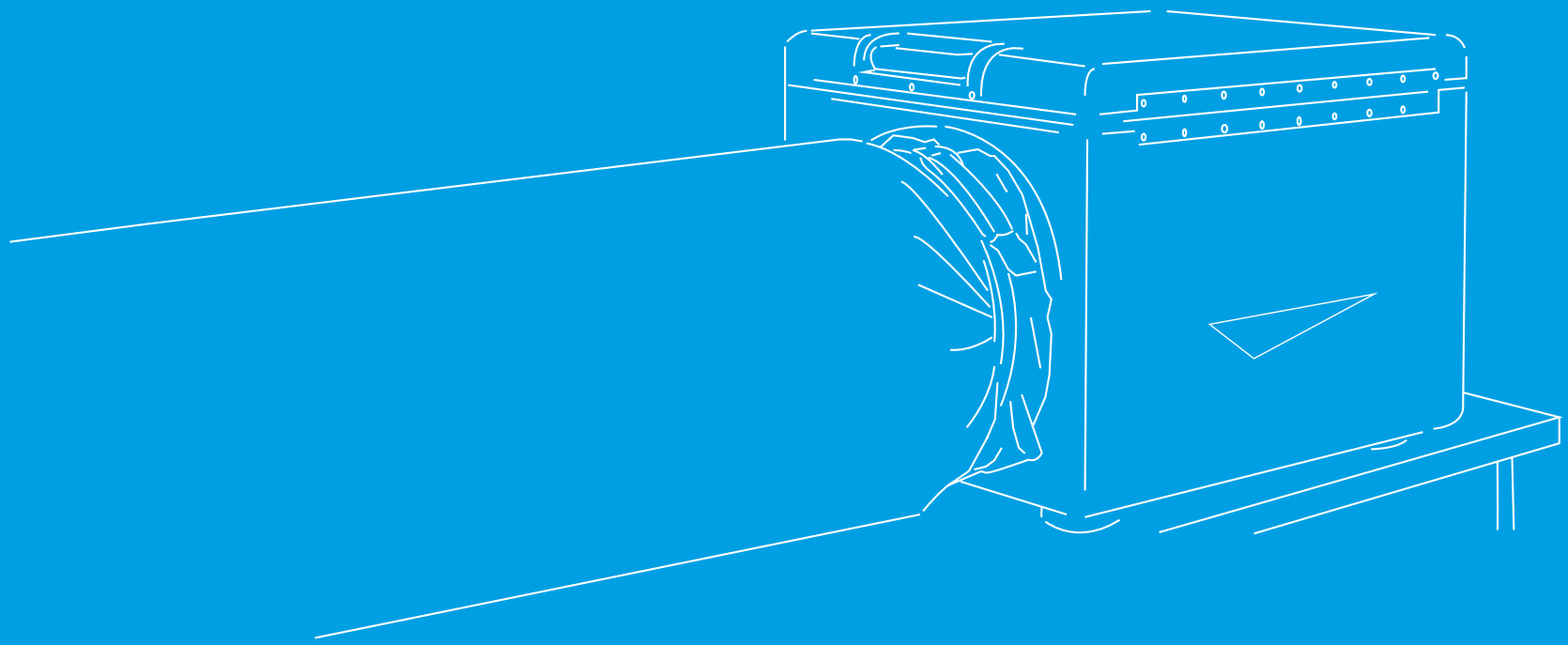

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