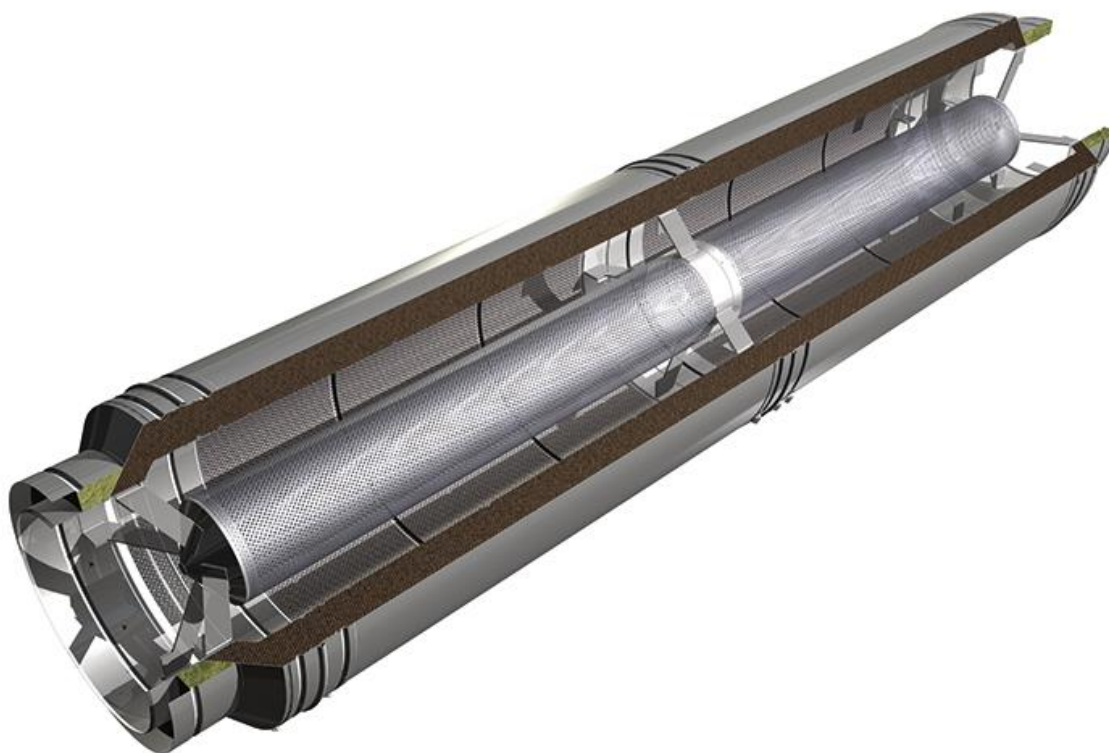


Schiedel Metaloterm

SILENCERS FOR FLUE SYSTEMS





A range of silencers installed on a Metaloterm Flue System

Noise Reduction within the Industry

The first thoughts about safety at work are always about physical injury prevention as well as inhaling fumes, hazardous substances, etc. However, **Occupational Noise**, which is the amount of acoustic energy received by an employee of a company, can cause permanent damage if it is continuous.

In the UK, The Control of Noise at Work Regulations 2005, came into effect for all industries from April 2008, which is quite late when you consider that the harm hearing loss can cause. Harm such as Tinnitus, which is the perception of noise in the ear or head, caused by a problem with the inner ear.

The sustaining of high noise levels can also mask warning signals, prevent concentration and vital communication.

Most authorities around the world have agreed that noise becomes dangerous when it's higher than 85 decibels during a typical 8-hour work shift. However, noises under 85 decibels can also cause issues with the general public who are in and around the working environment.

An example below shows the different examples of noise levels in decibels - the definition of noise is sound that is unpleasant or causes disturbance.

10	Pin Dropping	70	Dishwasher	85	Passing diesel truck
20	Rustling Leaves	75	Vacuum Cleaner	100	Handheld drill
40	Computer	80	Garbage disposal	140	Jet-engine at take-off
50	Refrigerator			170	Safety airbag
60	Air Conditioner			180	Rocket launch

Reduction

If a noise can't be reduced by engineering the equipment, then acoustic quieting is required. This is the process of dampening vibrations from machinery and systems such as flue systems.

With the increasing demand for noise attenuation, the demand for noise reduction from flues and chimneys in marine and industrial situations mean that many companies have developed their own silencer programmes. These tend to be combined with flue systems to have a product range which is reducing sound at the design stage

Why noise reduction?

Not all noise is the same. Sound is pulsating air; how often it pulsates indicates the frequency. Normally different sources have a different profile over the frequencies. For example, flue gas noise and noise from boilers or generators tend to be at different frequencies - which demand different types of silencers.

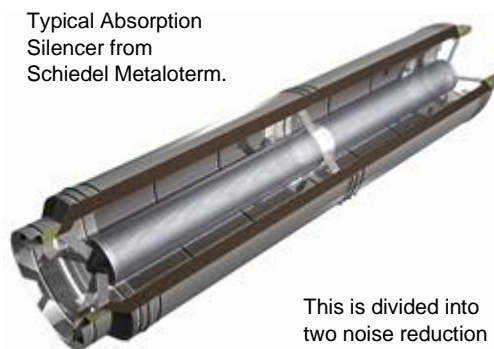
Flow noise will occur in flue system where the velocity of the flue gases exceeds 20 m/s. This will influence the sound spectrum, which means that different types of silencers can be combined for installations to achieve the best results.

The following are the main types of silencers suitable for flue systems from generators and boilers, etc.

Absorption Silencers

Higher frequencies can be reduced by absorption of the sound by using material such as a mineral wool. Put simply, an Absorption Silencer does what it says and “absorbs” the sound within the insulation.

The silencer performs over a broad frequency range in the middle and higher frequencies. The human ear is sensitive to these range of frequencies. These silencers are commonly installed close to the point of termination, as this helps attenuation of flow noise for the end of the exhaust, before entering the atmosphere.



Typical Absorption Silencer from Schiedel Metaloterm.

This is divided into two noise reduction levels: 25 and 35 dB

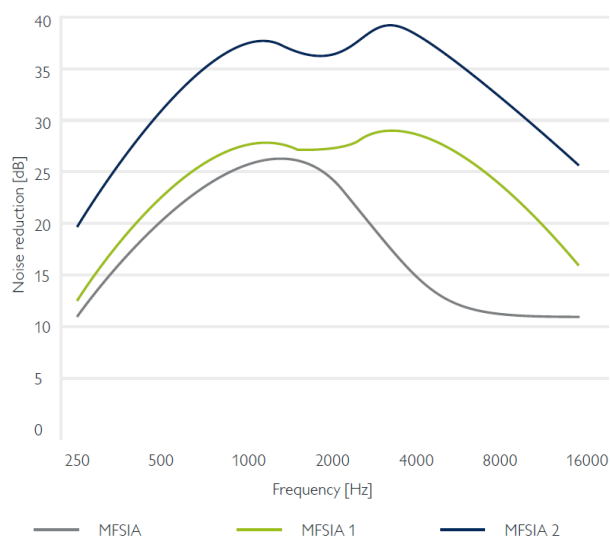
To reduce sound in the lower frequencies, and therefore getting an overall reduction, a resonance silencer is required. Combinations of silencers mean that the noise intensity can be drastically reduced over the full frequency range.

Absorption Silencer													
Ø	100	130	150	180	200	250	300	350	400	450	500	600	
H	620	620	620	800	800	800	1160						
A	200	230	250	280	300	350	400						
kg	5	6	6.5	9	10	12	20	22	25	28	30	35	
SAP	162661	162662	162663	162664	162665	162666	162667	162668	162669	162670	162671	162672	

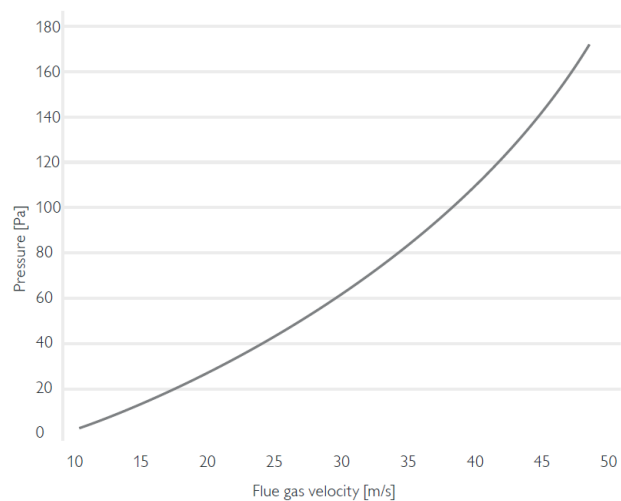
Absorption Silencer 25 dB													
Ø	100	130	150	180	200	250	300	350	400	450	500	600	
L	600	750	750	1000	1250	1250	175	1750	1750	2000	2000	2000	
A	225	255	275	305	325	375	425	475	525	575	625	725	
kg	8	10	11	15	20	24	49	55	60	79	86	100	
SAP	162673	162674	162675	162676	162677	162678	162679	162680	162681	162682	162683	162684	

Absorption Silencer 35 dB													
Ø	100	130	150	180	200	250	300	350	400	450	500	600	
L	1000	1000	1000	1250	1500	1500	2500	2500	2500	3000	3000	3000	
A	225	255	275	325	325	375	425	475	525	575	625	725	
Kg	11	13	14	20	24	28	68	76	84	117	127	146	
SAP	162685	162686	162687	162688	162689	162690	162691	162692	162693	162694	162695	162696	

Average performance



Pressure drop



- Performance chart is an average measurement over all diameters.
- The insertion loss is measured according to ISO 7235: 2003
- The insertion loss can deviate due to temperature or special installation situations.
- Back pressure is approx. 300 Pa at 15m/s or 2300 Pa at 50 m/s
- Back pressure can vary with temperature and gas velocity, please contact us for advice

EXTRA OPTIONS

- Brackets (installation direction to be specified on order)
- Radial / axial inlet
- Radial / axial outlet
- (certified) spark arrestor
- Flanged

STANDARD OPTIONS

- Condensate drain
- Lifting eyes

Resonance Silencer

A typical Resonance Silencer is designed to neutralise the low frequency noise generated by diesel engines, boilers, CHP units etc.

The silencer itself is divided into separate sections which are interconnected. The flue gasses pass through the centre of the silencer and the sound generated from these gasses has varying frequencies. These different frequencies rebound off the inside of the resonator and tend to cancel each other out causing the noise to reduce. Also, the silencers expand the flue gasses therefore reducing sound.

Resonance Silencers are commonly installed close to the sound generating source, such as a boiler or engine, thus preventing the low frequency noise spreading through the full length of the exhaust system.



Metaloterm® resonance silencers are divided into two noise reduction levels on average are between 20 and 30 dB.

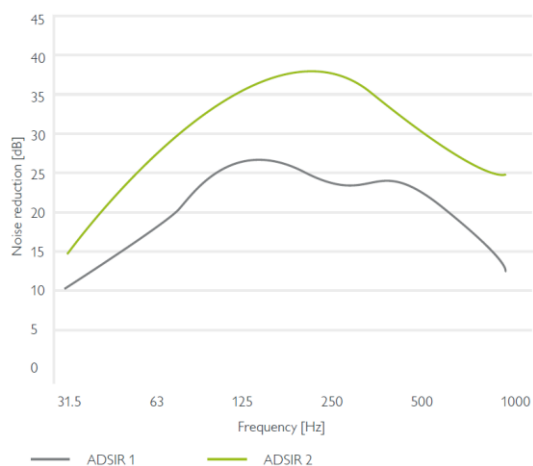
Resonance Silencer 20 dB

Ø	100	130	150	180	200	250	300	350	400	450	500	600
L	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200
A	400	450	500	600	650	700	850	950	1000	1100	1150	1350
kg	20	25	27	33	38	46	47	71	84	98	122	156
SAP		162697	162699		168438						168439	

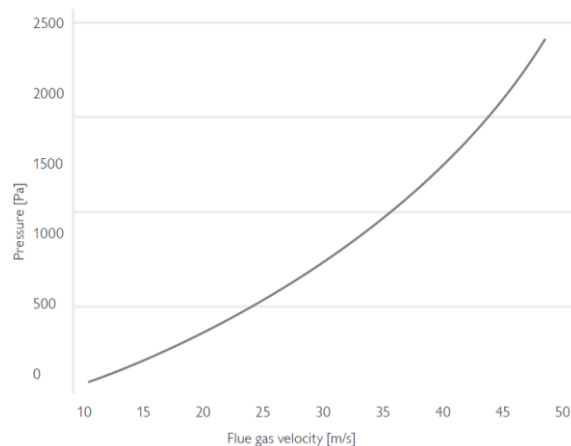
Resonance Silencer 20 dB

Ø	100	130		150	180	200	250	300	350	400	450	500
L	2200	2200	2200	2200	2200	2400	2600	2800	3000	3200	3400	3600
A	550	650	750	800	850	1000	1000	1100	1200	1300	1350	1550
Kg	45	55		70	75	85	115	125	140	160	185	230
SAP		168440				162709	168442	162709			168443	

Average performance



Pressure drop



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EXTRA OPTIONS

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STANDARD OPTIONS

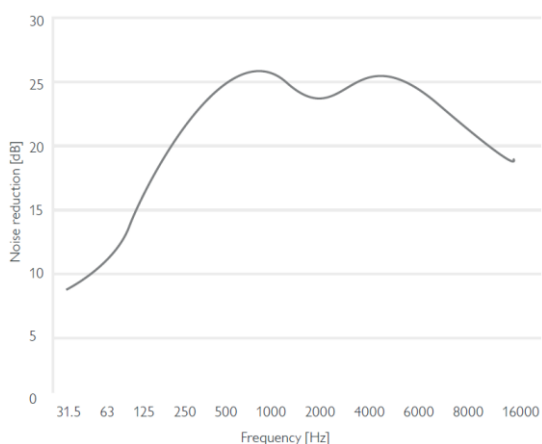
- Condensate drain
- Lifting eyes

Combining Silencers

In projects where two separate silencers are not applicable, especially when space is at a premium, a combination type silencer can be used, as they are based on a combination of the resonance and absorption principle, providing excellent sound reduction across the entire frequency range.

Combination silencer 25 dB													
Ø	100	130	150	180	200	250	300	350	400	450	500	600	
L	1870	1870	1870	2120	2370	2620	3120	3370	3870	4370	4620	4870	
A	400	500	525	575	625	675	875	975	1050	1100	1225	1325	
Kg	45	55	70	75	85	115	125	140	160	185	230	305	

Average performance



- Performance chart is an average measurement over all diameters.
- The insertion loss is measured according to iso 7235: 2003
- The insertion loss can deviate due to temperature or special installation situations.
- Back pressure is approx. 20 Pa at 15m/s or 200 Pa at 50 m/s
- Back pressure can vary with temperature and gas velocity, please contact us for advice
- For installation AD wall-brackets of a larger diameter can be used.

Combinations of different silencer types

Alternatively, if a flue system is modular in design, then the various types of silencers can be implemented in one exhaust system, resulting in excellent acoustic performance of the total system.

It is recommended that you choose a supplier with special calculation software, which will allow you to calculate the final noise level by input of the sound spectrum and the silencer type.

Also, the calculation should allow you to input the silencer specification, and also the desired final noise level to make the correct choice.

Conclusion

When looking for a silencer for commercial use, there are several aspects to look at.

- Look at twin wall and pre-insulated variants in stainless steel.
- Single system from start to end, with integrated silencers. No extra flanges.
- Silencers which are equipped with easy connections to existing flue system
- Lightweight properties, as these will complement the existing weight of a flue system, which also help with reducing vibrations to surrounding structures
- Look for system with internal thermal expansion to avoid constructing expensive compensators and avoiding the need for flexible mounting kits.

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