

Sounds of Silence:
Zeppelin's Patented Anti-Honking Systems



We solve complex challenges with flying colors

We always did. Ever since the development of the legendary airships, the name Zeppelin has been associated throughout the world with technical perfection. The task then was to find the optimum method of processing aluminium in order to conquer the skies with ease. The pioneer of modern aviation has become a trendsetter in the construction of silo systems in aluminium or stainless steel. Zeppelin stands for innovation based on tradition.

Zeppelin – your powerful partner

... when it comes to storage, conveying or blending

The success of companies which process high-quality polymers rises and falls with the quality of the raw material handling. Those seeking profitable solutions put their trust in Zeppelin – and in the experience of an internationally successful industrial corporation. As a system supplier, Zeppelin covers a wide range of bulk handling requirements, from storage and blending silos to conveying systems and all the relevant components.



Components and conveying systems made by Zeppelin:
from diverter valves and rotary feeders to elutriators and pipelines.

Research and development for your success:
in the world's largest Technology Center for testing bulk solids future is planned – in your own interest.



Optimum functionality to fulfill your individual requirements:
turnkey silo plants – for storage or blending purposes – complete with all accessories, fit smoothly into your overall concept.

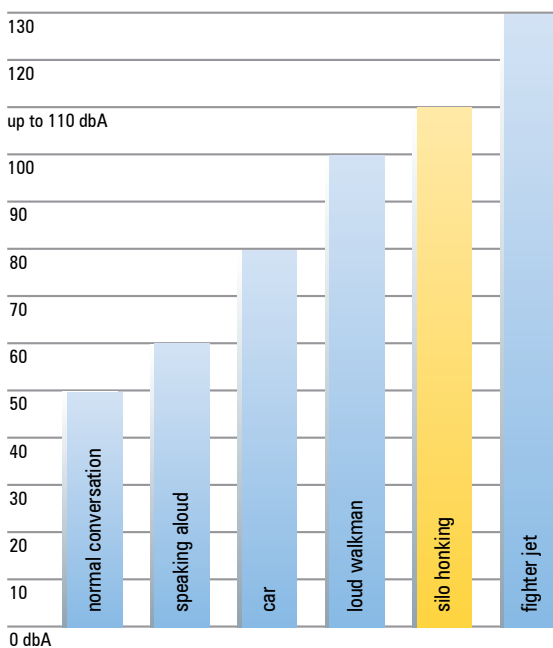


Honking silos can become a problem

The phenomenon of honking silos has driven quite a few plant operators to despair. Silo plants located close to residential areas or in an industrial area with strict environmental and noise protection regulations and which are not equipped with an anti-honking system might be shut down by the authorities.

Another problem is the so-called quaking of silos during discharge of bulk solids. The shocks which arise in intervals of 5 - 30 seconds may have fatal effects on the silo, the foundation or on the steel structure.

The following diagram gives you an impression of the extreme annoyance due to noise caused by honking silos:



Good for you if you have never heard of it!

Honking of silos is a phenomenon which depends on the bulk solids and not on the silo. In other words, vibrations or even honking may occur depending on the flow characteristics of the bulk solids and the corresponding wall friction angle. In general, bulk solids which generate dynamic loads during discharge from the silo may produce noise. The bigger the silo and corresponding pressures – the higher the risk of honking.

Anti-honking system required	PET	PA	PBT	PP	PE	PVC	TiO ₂
recommended	X	X	X				X
not necessary				X	X	X	

The table above lists some bulk solids and their risk of producing noise. Certainly, the risk depends on several factors, e.g. the silo capacity, its material and surface, and on the composition, type and the temperature of the bulk solids (subject to change).



Intelligent silo technology

Patented solutions by the silo specialist:

For anti-honking systems a general distinction must be made between silos for storing powders or pellets as well as between new silos and retrofitted ones. As silo specialist, Zeppelin provides economic and process-reliable solutions for all requirements.

Of course, preventing the problem before it occurs is the most economical solution. Therefore, Zeppelin has developed a patented system especially for new silos which are designed for the storage of problematic bulk solids.

Wall plates with structure:

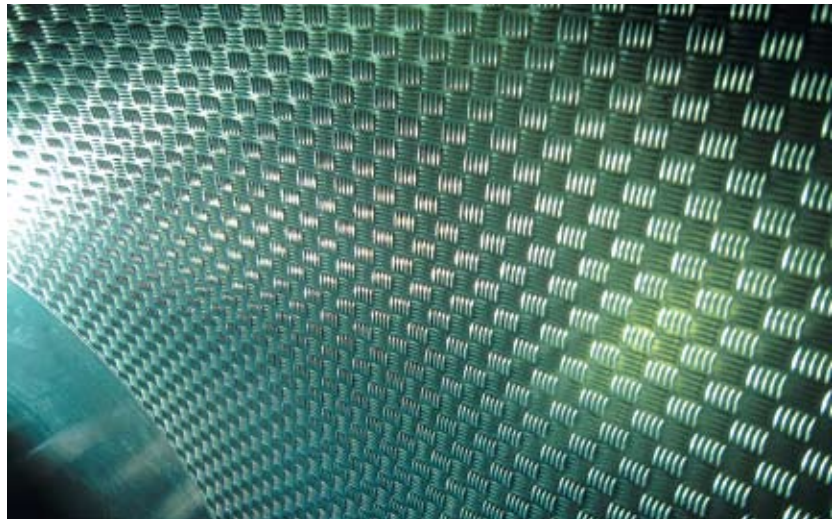
In order to avoid honking, the cylindrical shell of new silos is partly manufactured from checkered plate or structured plate. The checkered surface showing to the interior of the silo alters the flow characteristics of the bulk solids during discharge – a so-called shear zone will develop near the silo wall. For retrofitting existing silos, plates will be mounted internally to the silo wall, which also creates a shear zone. This solution is appropriate for free-flowing pellets as well as for powders.



Also suitable for retrofitting: honking silos can even subsequently be equipped with gophered plate.

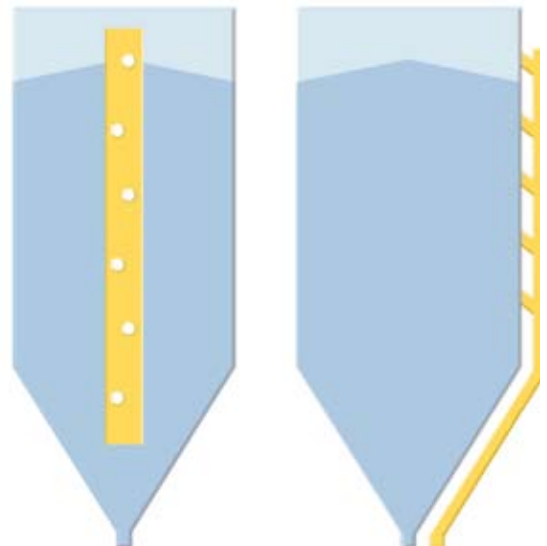


Thanks to the structured surface of the plate the wall friction coefficient is changed.



Looking into the interior of a silo: By installing checkered plates, a shear zone near the silo wall is created – and honking is avoided.

Discharge pipes can be used in various different ways. Precise knowledge of the flow characteristics of the bulk solids is the key to selecting the optimum solution for each individual case.



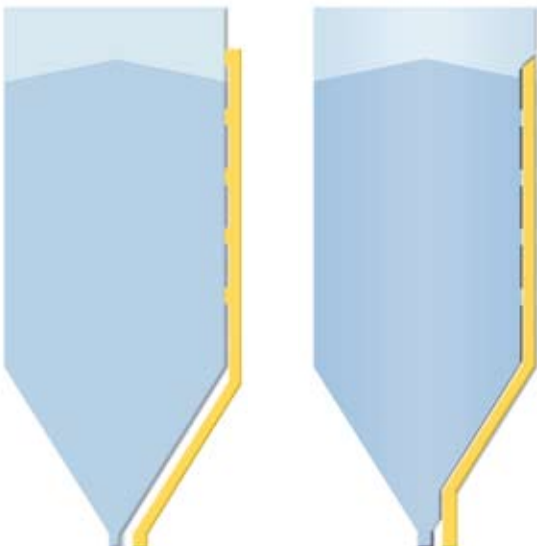
Nothing is impossible!

Discharge pipes – suitable for subsequent installation

Another possibility for refurbishing a silo is the installation of discharge pipes. This alternative, however, is very expensive and only appropriate for free-flowing bulk solids. For all cohesive products – and, thus, for nearly all fine-grained powders – the product cannot be discharged via the discharge pipes.

The discharge pipes are mounted centrally or fixed to the inside or outside silo wall. The product will then be extracted from the upper section of the silo, thus reducing the pressure on the flowing bulk solids significantly.

However, by discharging from the upper part, the bulk solids which have been fed last into the silo are drawn off first – creating a funnel flow. This solution is therefore not adequate for bulk solids that age quickly. Furthermore, this solution requires sufficient clearance beneath the silo to connect the various outlets.



Count on our experience!

Whatever bulk solids and requirements you have – in case of honking problems, talk to the true specialists only. With decades of experience at hand, Zeppelin will always provide you with the optimum solution for your individual case. Thanks to the combination of economic efficiency and reliability, you can always rely on Zeppelin, guaranteed by our full service program. See for yourself!



Research and development

From explosion protection via ageing of bulk solids, protection against abrasion to the degassing behavior of bulk solids and tests of the flow behavior: in our Technology Center and our laboratories you have the future under control.



Logistics advisor

Whether concepts for outsourcing, logistics systems for forwarders or optimizing of existing silo plants – we always plan for the long term. And you are prepared for tomorrow's markets.



Complete service from the very beginning to the end

We take care of the complete organization – starting with the architect to the foundation works and the authorities. Or, from supplying static calculations to training your staff.



Range of services

Concept development – economical solutions – modification of silos. Complete satisfaction of our clients at long term is our motto – including interesting financing and leasing conditions.

The Zeppelin Group of companies: All specialists under one roof

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