

**The bathroom furniture manufacturer Pelipal GmbH manufactures with whisper-quiet filter technology**



Looks good but can hardly be heard. This MultiStar purge air filter is acoustically barely audible at 35 dB(A).



Bernd Osterloh (r.), Production manager at Pelipal with Christian Horns (l.), Project manager of Höcker Polytechnik.

**Sssshhh!**

It is relatively difficult to explain how quiet, “Quiet” actually is. In any case, you should whisper when you explain it, so that you can hear just how quiet it is. A sound level of 35 dB(A) for example lies somewhere between whispering and the soft twittering of birds, a commercial vacuum cleaner is hard to miss with its 75 dB(A) and 115 dB(A) are not uncommon at rock concerts. Sometimes, there are things that one would have previously classified as loud, but are especially quiet - for example, a filter system. Höcker Polytechnik has achieved less than the magical 35 dB(A) limit and a total volume flow of 120,000 m<sup>3</sup>/h with a MultiStar vacuum filter system specially designed for noise reduction. This opens up completely new possibilities for companies who manufacture close to residential areas - meaning that three shift and weekend operation are possible.

**Premium quality bathroom furniture made in Schlangen - made by Pelipal**

Today near Paderborn, in the East Westphalian Schlangen, a whisper-quiet MultiStar filter does its job 24 hours a day at Pelipal GmbH. Pelipal GmbH is one of Europe’s leading manufacturers of bathroom furniture and with a range from economical entry level to exclusive luxury bathroom furniture with multiple design awards, it ensures a pleasant and functional atmosphere in the European bathroom world. The family run company was founded in 1906, has over 550 employees at various loca-

tions and has had its headquarters in Schlangen since 1967. While 50 years ago it was not necessarily a problem to operate in direct proximity to residential areas, in recent years the legal provisions, sensitivity to noise and, last but not least, the much more powerful machinery have made it difficult to manufacture in such locations. Pelipal actively deals with these challenges and along with its machinery has modernised the filter technology. The investment in an extremely quiet exhaust system is intended to create reserve capacity and allow Pelipal to expand its production capacity.

In 2016, the planning for the new filter system began. The existing MultiStar purging air filter system from Höcker Polytechnik had been providing perfect service at Pelipal for more than 12 years, but had hardly any reserve capacity for the future and more importantly: due to the construction and design, retrofitting of soundproofing components would not have been possible. A new filter system with reserve capacity and with all available noise reduction features was therefore absolutely necessary, since the only possible location of the filter was a mere 65 metres from the adjacent residential area.

## Perfect planning to get below the 35 dB(A) level

Sebastian Fella, one of the managing directors of the Pelipal Group, comments: "We have been mastering the challenge of modern production at our special geographical location for several decades. Modern, high performance machinery is particularly important to us, since it is precisely humid bathroom areas which place the highest demands on material processing - after all, our customers should enjoy the product for a long time. And in order to meet the demand of our customers in a timely manner, the expansion of production capacity was particularly important to us. The topics of extraction and dedusting were important subjects for discussion during planning; Christian Horns from Höcker Polytechnik and his team assisted us in this. Together, we had to work hard to design a work of art, a new filter system with a capacity of 120.000 m<sup>3</sup>/h that under no circumstances would exceed a noise level of 35 dB(A). Our Production Manager Bernd Osterloh together with the Düsseldorf Institute for Sound Technology, Room Acoustics and Thermal Insulation (ISRW) Dr. Ing. Klapdor GmbH and the exhaust specialists from Höcker Polytechnik formed a think tank and began with the planning. Every source of noise, from the motor to the rotary valve had to be encapsulated in sound boxes as far as possible, resonances in the filter housing were to be minimised by intensive sound insulation, all pipe-work required noise insulation and all this had to be assembled in a constructively perfect way. We have been using the new filter system since August 2017, it exhausts our machinery in an optimum way and works so quietly that operating noise is barely perceptible. All test measurements fell well below the level of 35 dB(A). Nothing now stands in the way of an expansion in production."

### MultiStar purge air filter with integrated energy saving features

Pelipal now operates a MultiStar purging air filter from Höcker Polytechnik with a filter surface of 1,244 m<sup>2</sup>. The required total volume flow of 120,000 m<sup>3</sup>/h are supplied by the six frequency controlled, energy efficient 37 kW fans (IE3) in the fan attachment module. An integrated heat recovery module with residual dust monitoring ensures additional economic gain, since the valuable heat energy of the dusty raw air extracted from the machines is largely retained. The filtered air is returned to the building during winter operation (residual dust content <0.1 mg/m<sup>3</sup> (H3) according to TRGS 553).

A rotary valve carries dust and chips out of the filter housing. The residual materials are then conveyed pneumatically to the silo via a 35 metre long transport line with integrated transport fan



The rotary valve (left) and the transport fan (right) were encapsulated in sound boxes.

(15 kW, IE3). A sound insulated end separator with flame proof rotary feeder operates on the silo.

In the background, a well thought-out PLC control ensures economic and safe operation of the MultiStar filter system. Höcker Polytechnik consistently makes good use of its experience from many projects in the furniture and kitchen industry.

### With planning, design and product selection for the MultiStar quiet filter

To operate such a system in whisper mode, however, is an ambitious and costly project. The reduction of all possible sources of noise was always in the foreground, from the planning through the design to the final assembly. Accordingly, piping with a considerably larger cross section was used to reduce flow noise. In addition, the pipes were provided with sound insulation. In terms of design, the straightest pipe routing was implemented. A sliding silencer reduced the wind noise of the outflowing air even further. 160 mm thick sound insulation reduces the development of resonance noise in the filter housing. Other noise generators such as rotary valve or transport fan were encapsulated in special sound boxes. Even if theoretically all sources of noise were subdued, in practice there can be some nasty surprises.

### Sound measurements passed with flying colours

The noise protection professionals from ISRW checked the noise levels immediately after commissioning and were pleasantly surprised by the

result. At the test points in the residential area, this MultiStar filter system achieved test values of less than 35 dB(A). Standing next to the filter system, you had to concentrate and hold your breath to hear any operating noise of the system. Planning, technology and implementation were a complete success with this whisper filter project.

This project was also an exciting challenge for Christian Horns, associated project manager of Höcker Polytechnik: "For more than 20 years we have been supporting Pelipal with our solutions for optimum manufacturing conditions and efficient machine dedusting. Planning a MultiStar filter system in such a way that it is practically imperceptible acoustically is, of course, not commonplace for us, but we know that it is feasible. During the Pelipal three week company holiday period, our installation team dismantled the old filter system and installed the new purge air filter with all sound insulating components. The cooperation with the Pelipal operations technicians and the ISRW sound acousticians was first class from the initial planning phase to commissioning. We knew that all of the required features and constructive details made the 35 dB (A) sound barrier possible, but excitement was in the air on the day of commissioning. We tested on a windless weekend to reduce the natural noise emissions and after the first measurements it was clear that Pelipal could use the additionally planned production capacity. The MultiStar filter is working below the required sound level and our efforts were well worthwhile. Thank you for this wonderful team spirit. The project was highly enjoyable."

[www.hoecker-polytechnik.de](http://www.hoecker-polytechnik.de)