

# Denyo's Proprietary Soundproof Design Technology – Mälie DCA-25MZ –

## A New Challenge, Beyond Extremely Low Noise

In recent years, Denyo has been committed to developing environmentally friendly products. As part of our efforts focusing on noise reduction, we have spearheaded the early introduction of not only low noise type but also ultra low noise and extremely low noise type products. While conventional product development emphasized soundproofing to prevent noise from coming out of the bonnet of machines, Denyo has utilized its longstanding expertise to develop products that directly address the source of noise, minimizing noise generation itself.

Over the past few years, noise regulations at construction sites have become stricter worldwide. Particularly in urban areas, attitudes towards noise from nighttime construction or power sources at event venues have become increasingly stringent among nearby residents and event attendees. Against this backdrop, Denyo has leveraged its proprietary soundproofing technology to launch a product development project for the Mälie Series DCA-25MZ, which features a noise level of 50dB or less, and fundamentally improves the structure of noise sources, making it even more specialized for quieter performance than extremely low noise type products.

## The Challenges and Achievements in Developing a Generator Even 1dB Quieter

**"Achieving low noise levels while maintaining efficient cooling airflow within the generator was our greatest challenge,"**

shared the developers of the Mälie DCA-25MZ.

Traditionally, engine generators relied on engine fans for cooling, which were a significant source of noise. Initially, the focus was on redesigning the cooling structure, considering the adoption of electric fans as an alternative cooling method. These electric fans, which do not directly connect to the engine, allowed for noise reduction independent of engine rotation. However, simply replacing the fans wasn't enough as it posed a risk of insufficient cooling and potential overheating. Balancing soundproofing with cooling performance was crucial for the success of this product development, and the developers faced considerable challenges in achieving this balance.



**DCA-25MZ**

**"We started with a single electric fan, but then tried arranging two in series."**

This optimal installation method proved to be the answer they were seeking. It enabled them to secure sufficient cooling airflow within the limited space inside the generator.

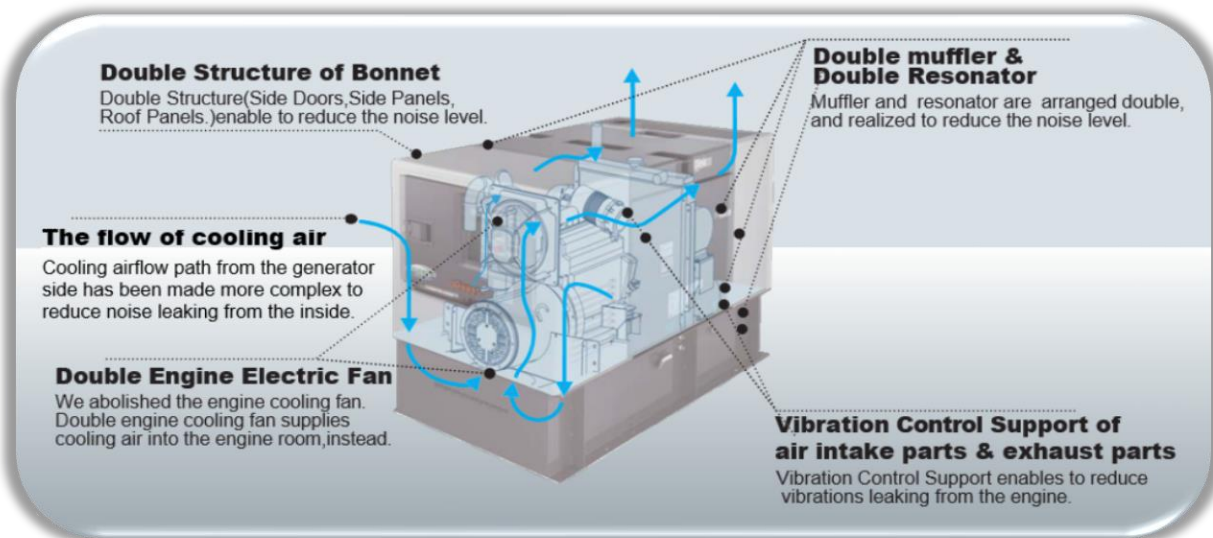
**Next, they tackled the challenge of achieving efficient airflow for cooling through further trial and error.**

They found that pushing cooling air from outside the generator towards the engine side was more effective than the traditional method of pulling air in through the engine fan and pushing it out through the radiator. They relocated the electric fans from the radiator side to the generator side, resulting in a different structure that efficiently cooled the interior of the generator. Additionally, increasing the size of the radiator reduced wind pressure and balanced the reduction of aerodynamic noise from the radiator fins with cooling performance. This approach maintained cooling efficiency while improving the sources of noise generation.



## Denyo's Proprietary Soundproof Design Technology Achieves Incomparable Silence

The Mälle DCA-25MZ has achieved a new level of quietness by minimizing noise sources and vibration-induced noise. The main proprietary technologies are as follows:



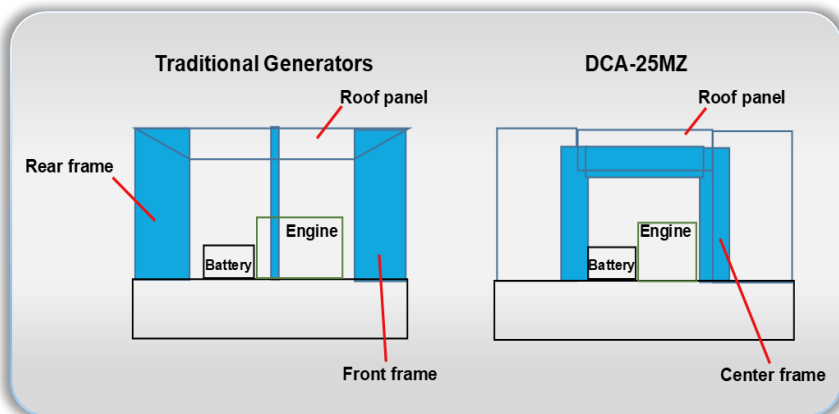
- The cooling airflow path from the generator side has been made more complex to reduce noise leaking from the inside.
- To reduce the volume of cooling and exhaust noise, a dual resonator and muffler system was adopted. This approach was taken not only to achieve lower noise levels as measured by sound meters but also to ensure a quieter perception by the human ear. Development methods were also applied to make it sound quieter to human senses.
- High-damping rubber materials were used for both the engine and the generator, absorbing shocks and reducing vibration transmission to the bonnet.

Additionally, vibration-damping supports were added to the muffler, air cleaner, and resonator, which are part of the engine's intake and exhaust system, further reducing vibration transmission to the bonnet.

- The bonnet frame structure was completely redesigned.

Unlike traditional bonnets that placed frames on the front and rear sides of the base frame, the DCA-25MZ features a center frame that surrounds the engine and an outer panel that creates a double structure.

This design minimizes gaps at the joints and seams, effectively suppressing engine vibration and noise.



## Message from the Developers to the Users

Throughout the development process, we considered many new technologies and elements. Ultimately, we believe that the most effective noise reduction was achieved by carefully revisiting and refining existing technologies and knowledge based on the experience of our predecessors. The Mälle DCA-25MZ is the result of building upon years of accumulated soundproof design technology with new innovations. We invite you to experience the next-level quietness of the Mälle series.