



The BB 42 - 73 mm blower – In the fight against Covid-19

From the first idea to the first usage at customer's applications

It was during the first lockdown in April 2020 when one of the MAE's engineers was sitting at home in Germany and following the news reporting the dramatic situation in Italy's hospitals. They were showing the lack of respirator system used to treat the corona patients. As a manufacturer of motors and blowers, the MAE engineer asked himself – 'Why not design and manufacture a blower needed for a respirator?'

A suitable small motor design already existed in the MAE portfolio – the BL 42, and suitable fan components were available from our USA sister business DFS, plus an existing controller design within Dunkermotoren.

The idea was born to use these existing components and combine them to create a new blower design for use in hospital respirators.

The MAE BL 42 motor was designed for professional hairdryers. The fan stage from DFS was used already in industrial applications worldwide and the Dunkermotoren controller was in production in combination with the Dunkermotoren BG 45 KI motor. The Dunkermotoren / MAE management was excited when the idea was brought to their attention. MAE's Engineering team took over the lead on the project. Besides the fact that all MAE engineers have been working from home-offices they managed to work on this new product via remote working and online team sessions.

The BL 42 motor which was designed as a 230 VAC motor was recalculated and adjusted to work at 24 VDC. A new motor housing was designed to allow the assembling of the existing fan housing and hall sensors have been added to the stator design to allow a precise control of the motor. The DFS fan stage was reworked to fit the motor shaft of the BL42 motor. In parallel Dunkermotoren engineering proved and tested the BGE 45 KI controller already with



the new blower prototype which was built in record time to achieve proof-of-concept, with rigorous testing for functionality and proof of controller design with 40.000 rpm motor speed.

While the entire project and close cooperation were a new situation for all team members, the collaborative efforts produced a great result.

During the test phase of the new blower, other competitor products were bench-marked, and the team were convinced that the blower behaved excellently except one parameter - acceleration time, where we realized were a little slower. The acceleration is very important for a ventilator as the blower must follow exact the breathing pattern of the patient. Despite having limited prior experience with this ventilation application, three months after the first idea we provided the initial blower sample to a potential Italian customer.

It turned out that that due to the design principal of the BL 42 motor as a cup motor we cannot accelerate and decelerate fast enough to follow the breathing rate of a patient. This was the design disadvantage compared with our competitors which are using internal rotor motor designs to drive the fan stage.

Now it was clear the blower cannot be used in a ventilation machine, but the test showed that the blower has superior performance benchmarked with competitor products when it comes to:

- Excellent air-performance
- Minimal temperature increase of the working air outlet
- Low noise emission
- High speed operation up to 45.000 rpm
- Power to size & weight ratio
- Simple design which reduces the production cost
- Simple manufacturing process

MAE has now sampled various customers looking to utilize the above properties of the new blower in different medical and industrial applications. MAE received very encouraging customer feedback and the first 2000-piece production order was received before Christmas



from a customer using the blower in a portable air disinfection system fighting Covid-19 in ambulances, hospitals and other critical environments.

Thanks to huge team effort MAE managed to ship the first production batch to this customer Dec. 30, 2020.

MAE failed with the original idea but thanks to the very good overall product performance and positive feedback from customers which have tested the BB 42 blower, MAE believes that the BB 42 blower will become a long-term success.

Not all work is done yet.

There are still ideas to improve the blower performance and engineering is working on fine tuning of the product. The production line to build the blower must be industrialized. In parallel Dunkermotoren will develop a new integrated controller for the BB 42 blower.

With the BB 42 a new product derived from a fast R&D response has now entered the market.

This speed of concept to realization was made possible by close cooperation and the resources available to an organization like AMETEK, where three business units could harness the available tools to deliver a great result.

Are you are interested in the BB 42 - 73 mm for your application? If so, please get in contact with MAE. We look forward to helping deliver the perfect solution for your system requirements!

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