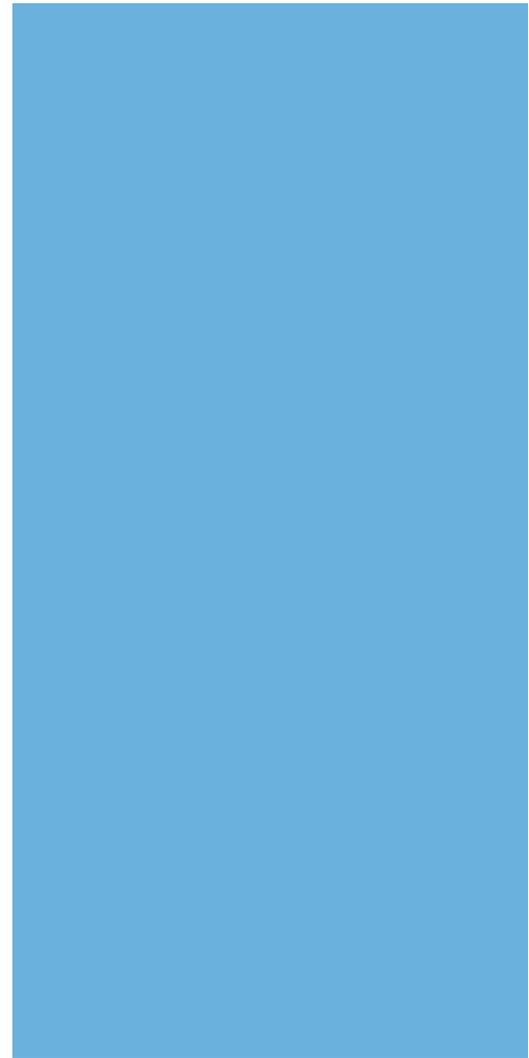


HyBlade[®] Made by ebm-papst Premium Hybrid Fan



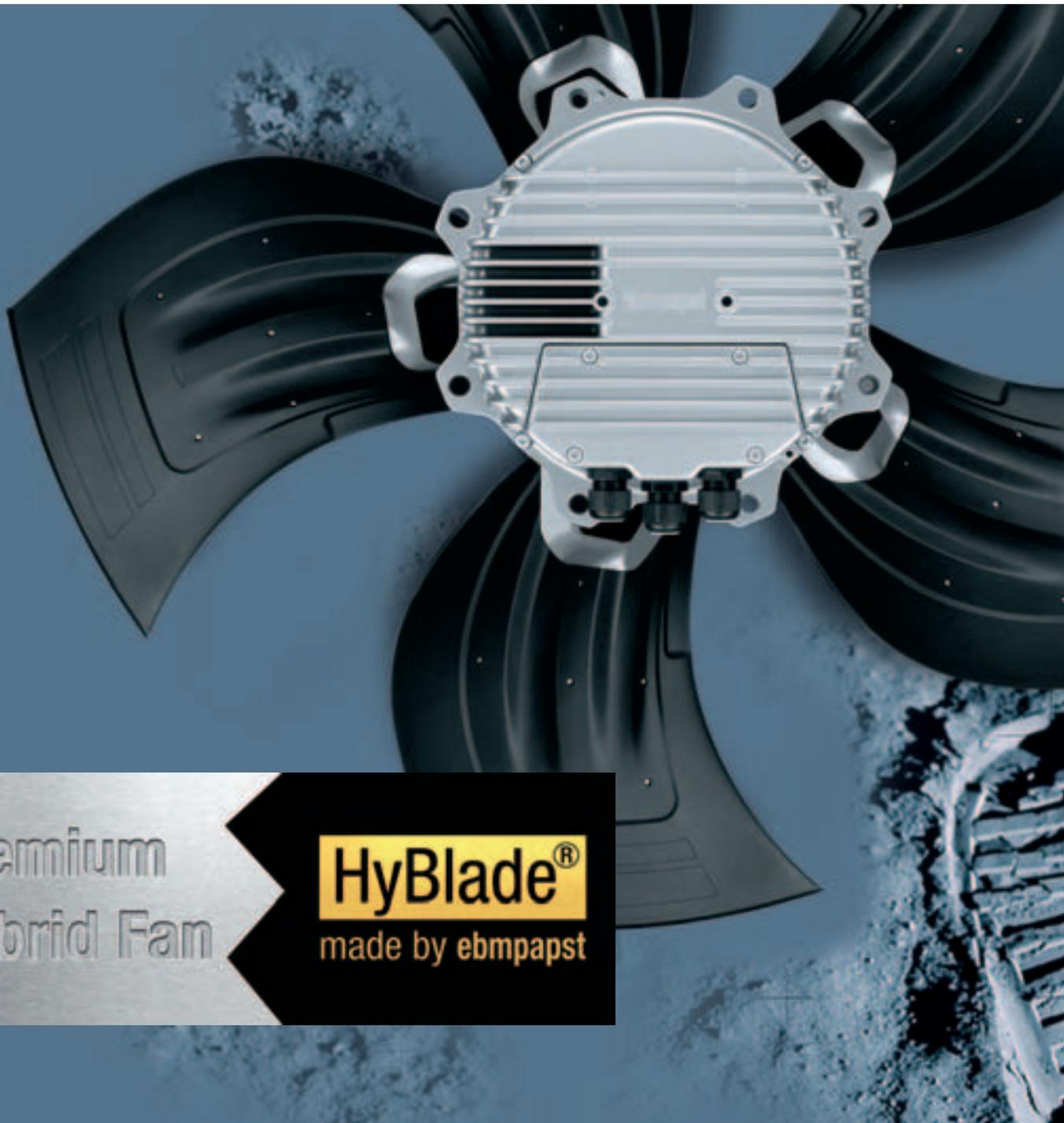
The New Composite Material
for Axial Fans

The engineer's choice

ebmpapst

HyBlade® Axial Fans: Incredibly Quiet, Amazingly Efficient

With HyBlade®, an innovative and at the present time also a unique hybrid structure for fan blades, ebm-papst is redefining the strengths of large axial fans! Entirely new standards are set by this combination of an aluminium supporting structure and a cladding or sleeve made of fibreglass-reinforced plastic. Above all, the optimised aerodynamic shape results in enormous noise reduction while significantly increasing the efficiency compared to conventional blades.



Premium
Hybrid Fan

HyBlade®
made by ebmpapst



We are taking the next step

The advantages of our large axial fans are really nothing new in the refrigeration and climate control business. After all, ebm-papst has long enjoyed a reputation in this segment for premium quality and premium performance. However, continuously rising requirements in practice demand of us that we never cease to conduct new research into fan technology capabilities. The primary requirements are for the maximum possible airflow rating at the lowest possible noise level.

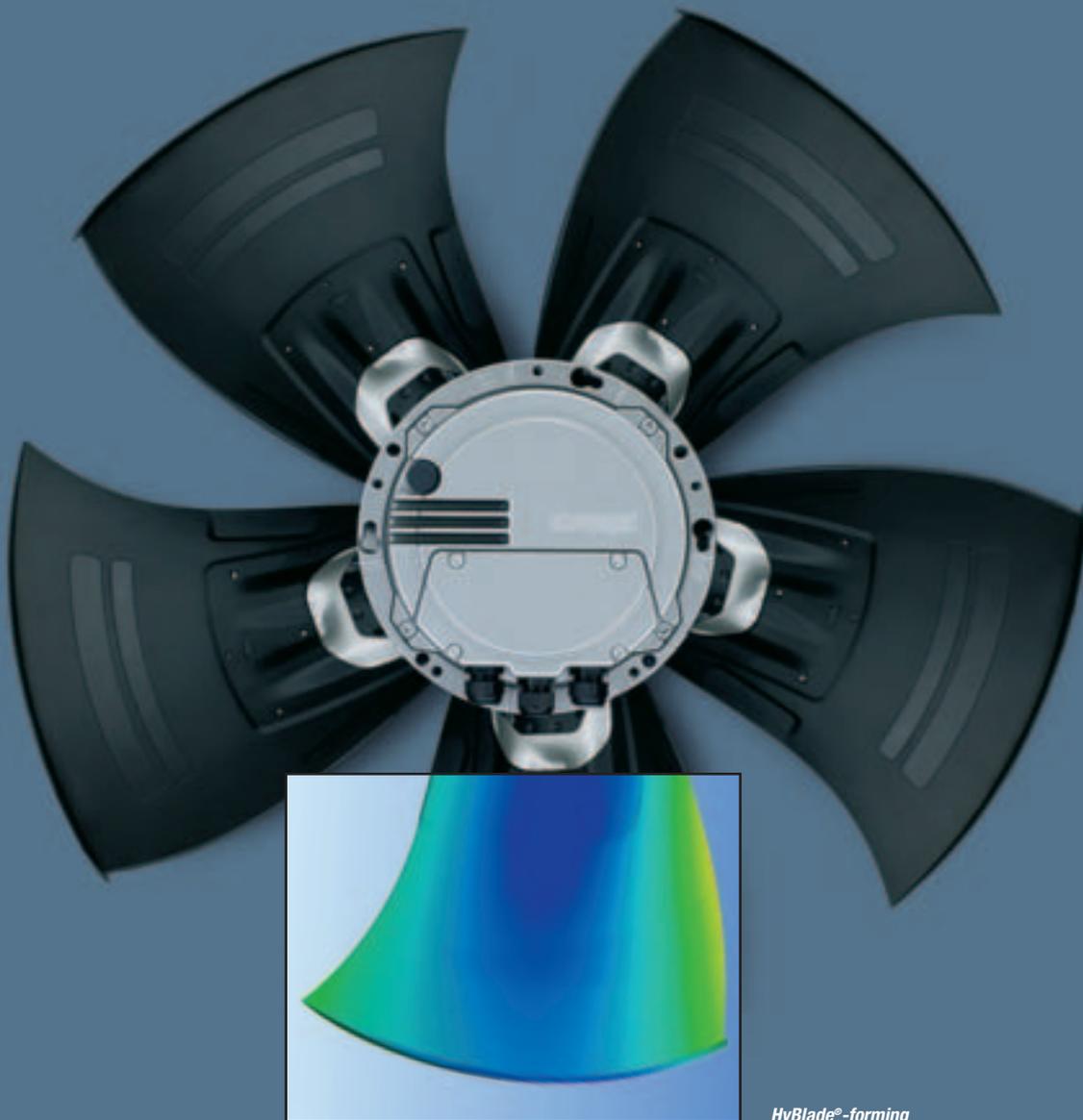
However, the specification profile our developers set themselves also included an optimised efficiency rating, improved corrosion protection, reduced weight and environmentally-aware production with a favourable energy-to-output ratio. For this reason, we are never satisfied with small facelifts or with an evolution of the familiar. For this next stage in development, we are taking a giant step forward. The outcome is genuinely impressive: HyBlade® – a term embodying the notion of raising the bar very long way indeed in many disciplines, and setting the next set of milestones for the fan technology sector.

HyBlade®

- ▶ **Massive weight reduction**
- ▶ **Ultra-efficient blade profiling**
- ▶ **Revolutionary noise reduction**
- ▶ **Substantial improvement in efficiency rating**
- ▶ **Significantly more environmentally compatible production**
- ▶ **Available in AC and EC technology**

Stability and Intelligence to the Power of Two: HyBlade® Meets EC Technology

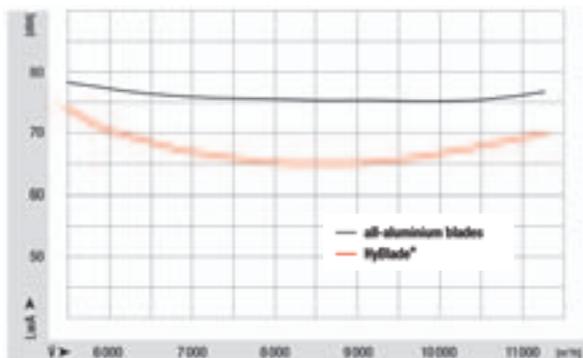
HyBlade® combines the benefits of two contrasting materials in an ultra-efficient manner. Through this intelligent combination, new advantages emerge, while existing benefits are further enhanced. Above all in conjunction with ebm-papst EC motor, HyBlade® fans become true pioneers of efficiency. Their limitless range of application has delivered firm evidence of how well this new technology is able to contend around the world.



HyBlade®-forming

One and one make one

Intensive research for improvements in the geometry of the blades of large axial fans has led to a revolutionary new hybrid concept. In the world of technology, “hybrid” always means a combination of different elements. The special feature of this is that even the initial elements can depict a functioning solution. However, only when they are combined do new, positive characteristics emerge from the original benefits.



Noise comparison

EC – the symbol of energy efficiency

EC technology is the key foundation of our energy-efficient motors: on average 30% less energy consumption, up to 70% for some applications – that is a word. The controllable drives are bus-compatible and besides saving energy achieve a superb level of efficiency of up to 90%. In addition, they are completely maintenance-free and have a much longer service life.



This is where HyBlade® really scores

The stability of an ultra-strong aluminium alloy inside combined with the lightness and unrestricted malleability of plastic on the outside – that is the ingenious combination which characterises HyBlade® technology. While the corrosion-resistant aluminium structure in the core of the HyBlade® blade assures a permanent connection with the rotor, the external sheath of fibreglass-reinforced plastic imbues the blade with an aerodynamically optimised shape.

First of all, this lightweight mantle initially has a substantial and positive impact on the total weight of the fan, and also helps to reduce noise levels through its favourable damping characteristics. The most important thing however is this: whereas sheet metal components can only be adapted by means of stamping, bending or embossing, plastics are no problem to turn into three-dimensional shapes. Optimisation of the blade design therefore no longer faces any obstacles – even down to the level of minute detail. Even winglets on the blade tips, of the kind now familiar from motor racing and aircraft design, are now an easy matter to accomplish. These have an aerodynamically favourable effect and minimise turbulence between blade and housing, thereby also enabling the fan to operate even more quietly and with a higher efficiency rating.

Overall impression: excellent

The outstanding characteristics of HyBlade® technology have also made a lasting impression with prominent independent institutions. In early 2008, HyBlade® was awarded the iF material award (iF International Forum Design GmbH), a prestigious award for excellent material solutions.



2008

First-Class Energy Balance: HyBlade® in Day-to-Day Operation

Whether dealing with the environment in a responsible manner, working on noise reduction or cutting down the volume of work involved – axial fans featuring HyBlade® technology demonstrate exemplary properties and future potential in every sector in which they operate. A factor gaining daily in importance is the positive primary and secondary “energy balance”, i. e. the product’s energy-saving credentials.



Power delivered in silence

The notion of environmental protection can be extended to include noise management. Particularly in the case of large axial fans which are frequently found outside buildings, plying their trade inside heat exchangers, it is important to keep noise characteristics as low as possible. Here, HyBlade® delivers real conviction through its tremendous ability to adapt blade geometry. The enormous flexibility of the glassfibre-reinforced plastic enables the blade to be adapted to suit very specific operational requirements. These new aerodynamic capabilities reduce noise levels to a minimum and help to make HyBlade® fans some of the quietest fans in their class.

Lightweight made easy

Another ace in your hand: ease of installation of HyBlade® fans! Yes indeed, it is remarkably easy to install HyBlade® fans. It is genuinely true to say that changing from conventional designs of fan to new fans equipped with HyBlade® technology is superbly uncomplicated. These devices share the same dimensions, mounting flanges and connections as previous models. This means that they are technically fully compatible and this makes the changeover process hassle-free. In this respect, the lighter weight of the assembled final units has an important role to play, enabling operating staff to make light work of installing this new equipment.



Advances in the field of environmental protection

As a global player, our company is very aware of its responsibility when it comes to dealing with the issues of global resources and climate change. Environmentally-aware engineering at ebm-papst is therefore by no means restricted to finding economical and efficient drive units but also embraces the entire service life of a product from manufacture through to recycling. With a substantially improved energy balance with regard to primary and secondary energy, HyBlade® makes a significant contribution to environmental protection. Firstly, the substantial reduction in weight of the finished fans also helps to cut down the fuel required to transport them to their intended destination. However, the really significant saving in energy is achieved during production of the eminently recyclable plastic raw material and the further processing operations which culminate in the finished product: in all respects, vastly superior to results achieved by comparable fans based on conventional designs.

Potential areas for energy savings – an example

The electrical energy required to generate one kilogram of primary aluminium is approx. 15.4 kWh; this does not take account of the use of fossil fuel (source: Material efficiency: potential savings during the manufacture and use of energy-intensive raw materials. Federal Ministry for Business and Employment). In contrast, it only requires approx. 1.8 to 1.9 kWh to produce one kilogram of plastic (PA6) (source: European Commission JRC, EU status Oct. 2006). These figures demonstrate clearly that technical innovation at ebm-papst by no means involves any increased use of resources. Quite the contrary!



HyBlade® vs. the elements – an endurance test

As you would expect, every new product at ebm-papst is tested heart and soul before it goes into volume production. Something which is particularly true of a new material compound previously never seen in the world, which is certainly true of this new HyBlade® technology. Our quality standards are therefore correspondingly high. In our research and testing facilities in Arizona, Singapore and Siberia, the design advantages and performance capabilities of hybrid technology are being load-tested under the most arduous conditions. Due to the fact that these locations experience extreme climatic conditions all year round, they provide ideal environments for our endurance tests.

Tested and found to be excellent

Whether subjected to continuous heat and UV radiation, icy cold or rapid temperature fluctuations in excess of 120 °C – HyBlade® technology clearly demonstrates its fabulous ability to contend with the most diverse conditions imaginable. Alongside long-term endurance tests and high speeds of well over three times the maximum operating points, they are also exposed to water, salt spray and chemicals, tests that the new hybrid fan blades have mastered with their outstanding corrosion resistance. Moreover, the material structure quite literally does not get into a flap when subjected to severe vibration and shock loadings. This ensures that HyBlade® fans are also able to contend with demanding applications and to deliver extraordinary quality standards, something for which ebm-papst is renowned.

Good Combination: the HyBlade® Product Range

The HyBlade® product range features a large number of combination options. For the main applications, being heating, ventilation, refrigeration and climate control, many different model sizes are available in either AC or EC motor variants. This ensures that the product range can be adapted to suit your individual requirements.



Ideal partners: HyBlade® and EC technology

The revolutionary characteristics of the hybrid structure include intelligent controllability, freedom from maintenance, a long service life and the excellent energy efficiency of EC drive technology. EC HyBlade® fans thus achieve an unrivalled overall level of economy.



	Fan diameter	Motor size	Number of pins
Type	mm	mm	
AC	500...990	110...138	4/6/8...6/8/12
EC	500...990	112...150	

HyBlade® axial fans – quieter and more efficient than ever before. Learn more about this revolutionary development for refrigeration and climate control technology. At the same time, inform yourself about what ebm-papst products and engineering services can contribute to the success of your applications. We look forward to hearing from you.

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