

## PressureMAX: the high-pressure solution for Tier 4 engine cooling

Multi-Wing's new PressureMAX impeller is designed specifically to help engine manufacturers meet the emissions standards mandated by Tier 4 in the U.S. and Stage III B Standards for Nonroad Engines in Europe. The innovative blade design is engineered to deliver 20 percent more pressure than a standard airfoil fan at normal engine speeds.

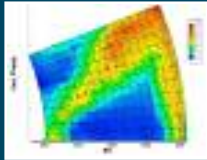
Because it also delivers 5-7 percent more efficiency over airfoil blades, the PressureMAX provides the added capability of sound reduction and fuel savings. And with virtually zero blade deflection, the PressureMAX's narrow profile makes it the perfect fit for engine compartments with a limited cooling envelope. The PressureMAX: high pressure performance in a high efficiency design, and all in a narrow-profile fan.

## The Tier 4 engine-cooling challenge

Tier 4 emissions standards call for stringent reductions in particulate matter (PM) and nitrogen oxide (NOx) levels, resulting in unprecedented challenges for cooling packages. Higher heat rejection requirements, higher ambient temperatures and air treatment technologies that occupy up to 25% of the engine compartment create the need for narrow-profile axial fans that generate higher static pressures in a limited cooling envelope.

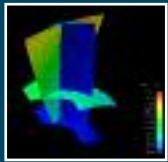
## The innovation behind the PressureMAX

Multi-Wing's R&D process delivers the engine-cooling fan that Tier 4 built



Multi-Wing's long-term investment in new technologies has pushed our Research and

Development team beyond conventional fan designs, allowing them to engineer advanced blade profiles that target specific air-moving challenges like the demand for higher pressure in a high efficiency blade profile.



Using Computational Fluid Dynamics and other innovative technologies, we can study the performance of

specific sections of a fan blade, and then optimize that performance for the targeted design criteria.



We use Flow Diagnostics to determine key variables including

mean velocity, turbulence intensity, and the effect of contraction ratio in the working section of the fan blade. This process is integral in developing cutting-edge features like the PressureMAX's zero blade deflection.



This wealth of performance data and geometric requirements

allow Multi-Wing's Research & Development team to design an exact scale model of a fan blade from a 3D file using our in-house Rapid Prototyping Machine.



Each model goes through exhaustive wind tunnel analyses at our global R&D facility, which are complemented by a

battery of evaluations including spin burst tests and rigorous field tests using strain gauge stress measurements.



Multi-Wing innovation is driven by our customer partnerships and is supported by our unsurpassed experience and

aerodynamic research and development. Tier 4 presented a layered air-moving challenge for our customers using off-highway diesel engines, and Multi-Wing responded with the PressureMAX.





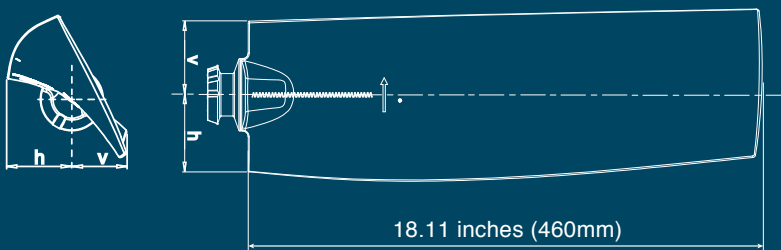
## Technical Specifications

### Dimensions

No. of hub positions	Diameter Range
5	24.5-42" (627-1065mm)
6	26-43" (660-1098mm)
7	26-43.5" (668-1106mm)
8	30-46.5" (748-1186mm)
9	26-44" (682-1120mm)
12	30-47" (762-1200mm)
16	33-51" (857-1295mm)

Pitch	25°	30°	32.5°	35°	37.5°	40°	45°	50°
Leading edge $v \pm 4$	37	41	43	45	47	49	53	56
Trailing edge $h \pm 4$	50	54	56	57	59	61	63	65

Dimensions shown in millimeters



### Design Features: PressureMAX

- Adjustable pitch settings at: 25°, 30°, 32.5°, 35°, 37.5°, 40°, 45° and 50°.
- Available in diameters between 627 and 1295 millimeters, or 24.5 and 51 inches.
- Hub sizes: 5, 6, 7, 8, 9, 12 and 16 blades, symmetrically arranged, each available in a range of bore/fixing configurations.

### Materials

The hub parts are as standard manufactured in a pressure die cast silumin alloy EN AC-AL Si12 Cu1 (Fe).

The fan blades are available in PAG gray: Glass-reinforced polyamide (nylon).

We reserve the right to change materials of manufacture. The values for the mechanical properties are mean values and can be subject to variations due to the use of different suppliers.

## Quality assured

Our high quality standards have been cultivated through strategic partnerships in our value chain, and we control all processes from innovation to production and distribution. We earned ISO 9001: 2008 certification and comply with the document-handling elements of ISO/TS 16949. Around the corner and around the world, Multi-Wing delivers results you can trust.

## Frequently Asked Questions

### What kind of pressure does the PressureMAX generate?

Multi-Wing developed the PressureMAX specifically for the off-highway diesel engine market to handle the high heat rejection requirements that result from Tier 4 emissions standards. The PressureMAX's unique blade design generates up to 20 percent more static pressure than standard airfoil fans, which is vital in a Tier 4 engine compartment.

### Is the PressureMAX a high efficiency fan?

The PressureMAX joins Multi-Wing's airfoil and sickle blade profiles as a high efficiency, heavy-duty fan. In fact, the PressureMAX blade design is 5-7 percent more efficient than standard airfoil fans, saving horsepower and fuel.

### How does the PressureMAX compare to low-noise blade profiles?

Multi-Wing's PressureMAX was adapted from our low-noise airfoil profile blade designs. High efficiency is the result of reduced turbulence across the blade surface, and airflow turbulence results in increased fan noise. The PressureMAX's high efficiency profile reduces air flow turbulence across the profile, resulting in a lower noise signature.

### Is the PressureMAX a narrow profile fan?

Developed for Tier 4 engine compartments, the PressureMAX's narrow axial depth and zero blade deflection make it the ideal blade profile for tight installation spaces.

### What is the diameter range for the PressureMAX?

The PressureMAX's available diameter range is 627 to 1295 millimeters, or 24.5 to 51 inches.

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