AIRTECHNOLOGY / AMETEK®

# MILITARY VEHICLE ENGINE COOLING FANS



WHEN
**EXCEPTIONAL PERFORMANCE**
MATTERS

# MP4 RANGE OF MIXED FLOW FANS

## Description

Designed for high performance with low power consumption, the MP4 mixed flow fans are manufactured in cast aluminium alloy and have non-stall performance and non-overloading power characteristics, together with low noise emission levels.
The backward inclined impeller blades are particularly suited for use in dusty conditions in that the blades remain clean, thus avoiding loss of efficiency. With any fan application, the geometry of the individual installation can influence final performance; the details shown here represent results achieved when tested to BS 848 conditions.
Of compact robust construction and manufactured to meet the requirements of government defense equipment specifications, these units are especially suitable for military vehicle engine-cooling applications.
Depending on the complexity of the installation, mounting methods can be adapted to suit individual requirements.

## Mixed Flow Advantage

True mixed flow fan designs, such as the Airtechnology Group MP4 type, provide integrators with both axial and centrifugal air discharge options from the same fan within a more compact package. This is in contrast to alternate fan types, such as pseudo mixed flow, axial or centrifugal fans, which may have more restrictive installation limitations — for example, how close any obstruction can be to the fan outlet, which is not apparent with a true Mixed flow fan.

## Drive options

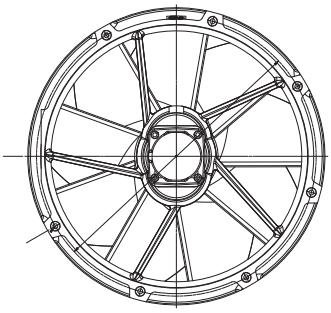
- Hydraulic
- Belt
- Shaft
- Electric

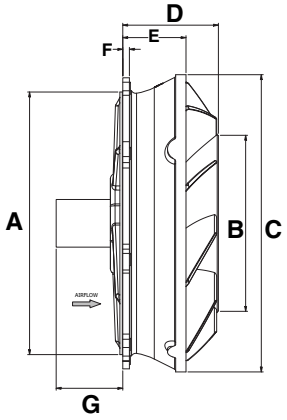
## Fan Types and Dimensions

The dimension details below include data from a typical hydraulic drive version (generally with an integral motor).
Corresponding details for direct drive and belt drive available on application.

The MP4 range comprises 3 standard fan sizes, designated 305, 380 and 475, each with alternative drive options, as indicated.

| Fan Type | Ø A | Ø B | Ø C | D | E | F | G | Nom.Oil Displacement |
|---|---|---|---|---|---|---|---|---|
| 305 | 358.0 | 233.0 | 403.0 | 141.0 | 99.0 | 10.0 | 84.0 | 5 |
| | | | | | | | 102.0 | 10 |
| 380 | 440.0 | 290.0 | 502.0 | 170.0 | 116.0 | 13.0 | 94.0 | 10 |
| | | | | | | | 125.0 | 12 |
| | | | | | | | 120.0 | 14 |
| | | | | | | | 125.0 | 16 |
| | | | | | | | 143.0 | 19 |
| 475 | 540.0 | 362.0 | 614.0 | 199.0 | 130.0 | 13.6 | 77.0 | 19 |
| | | | | | | | 147.0 | 23 |
| | | | | | | | 164.0 | 28 |






## Technical Data

**Performance:** See next page.

**Mounting Attitude:** Unrestricted. For hydraulic drive, consideration must be given to the positioning of drainage holes.

**Ambient Temperature Range:** Maximum +100°C; Minimum -40°C (but subject to hydraulic fluid used)

**Climatic Range:** Typically DEF STAN 00-35/MIL-STD-810

**Vibration:** Typically DEF STAN 00-35/MIL-STD-810

**Acceleration**: Typically DEF STAN 00-35/MIL-STD-810

**Shock**:Typically DEF STAN 00-35/MIL-STD-810

**Sand and Dust:** Typically DEF STAN 00-35/MIL-STD-810

**Fireproofness:** Manufactured from nonflammable materials. Fire resistant hydraulic fluids can be selected.

**Endurance:** Overhaul periods depend on the application power requirements.

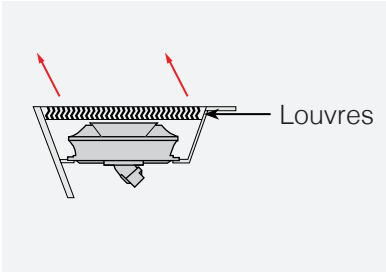
**Weights:** (Hydraulic drive version, nominal values):

305 MP4 – 18kg;
380 MP4 – 25kg;
475 MP4 – 40kg

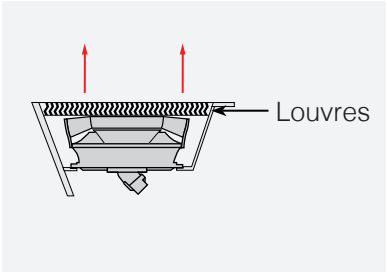
# APPLICATION FLEXIBILITY

Our MP4 type fans operate effectively with various discharge configurations, offering layout versatility to the vehicle cooling system designer not always available from other fan types.

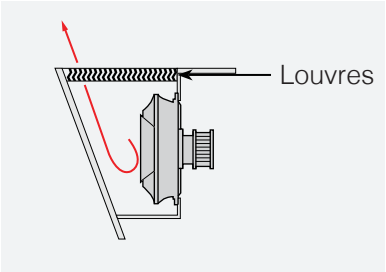
## Mixed Flow Discharge




## De-Swirling Axial Discharge



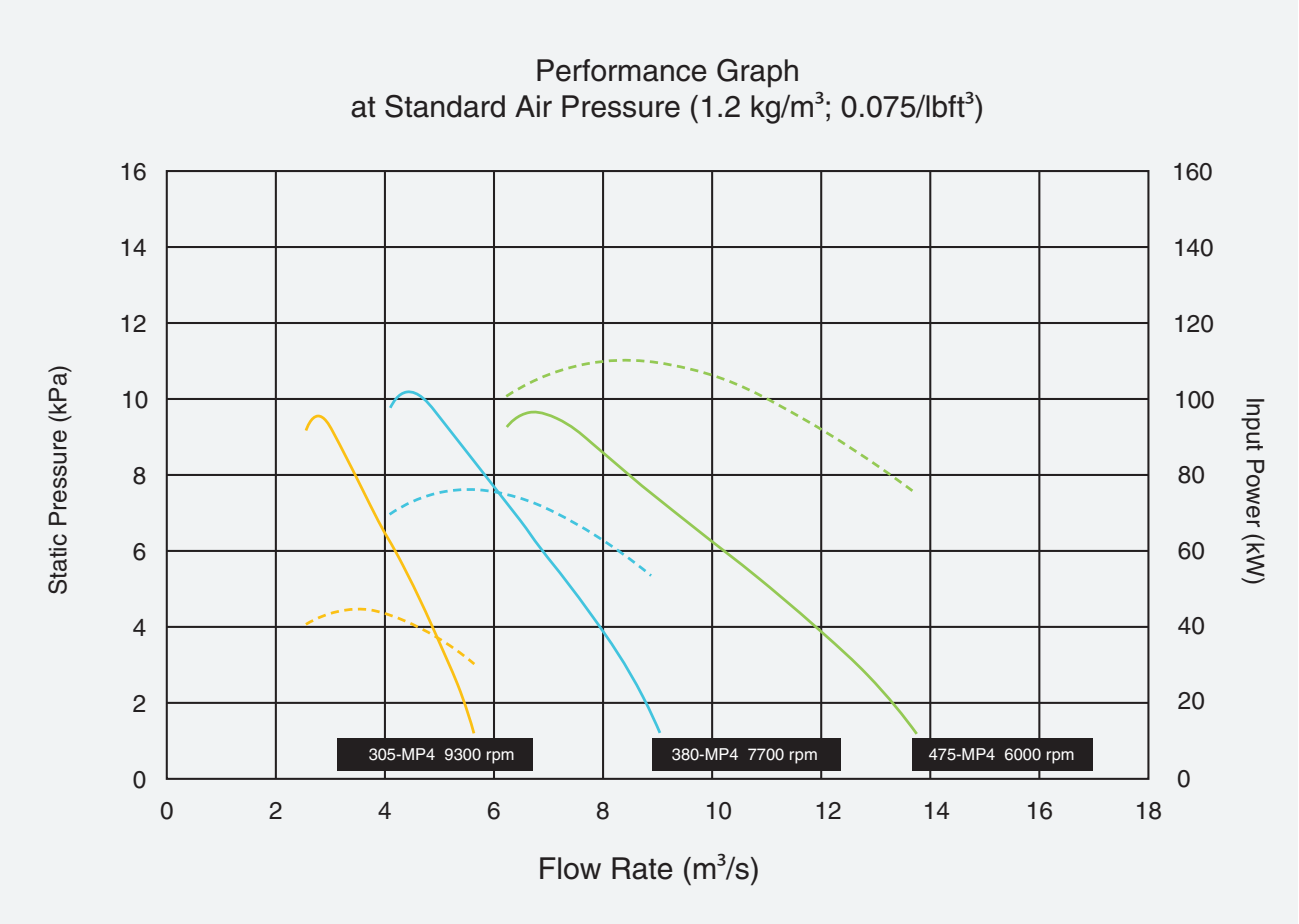

## Centrifugal Discharge




# MP4 PERFORMANCE CURVES

*last three numbers denotes motor type

| FAN DIAMETER | PART NUMBER | AIRFLOW at free delivery m³/s (CFM) | MAX PRESSURE kPa (in.w.g) | SPEED rev/min | INPUT (WATTS) | WEIGHT kg (lbs) |
|---|---|---|---|---|---|---|
| 305mm | 305-MP4* | 5.75 (12,184.3) | 9.29 (37.3) | 9300 | See table below | 18 (39.7) |
| 380mm | 380-MP4* | 9.15 (19,388.8) | 9.88 (39.7) | 7700 | See table below | 25 (55.1) |
| 475mm | 475-MP4* | 13.88 (29,411.7) | 9.37 (37.7) | 6000 | See table below | 40 (88.2) |



# INLET GUIDE VANE BOOST

## Description

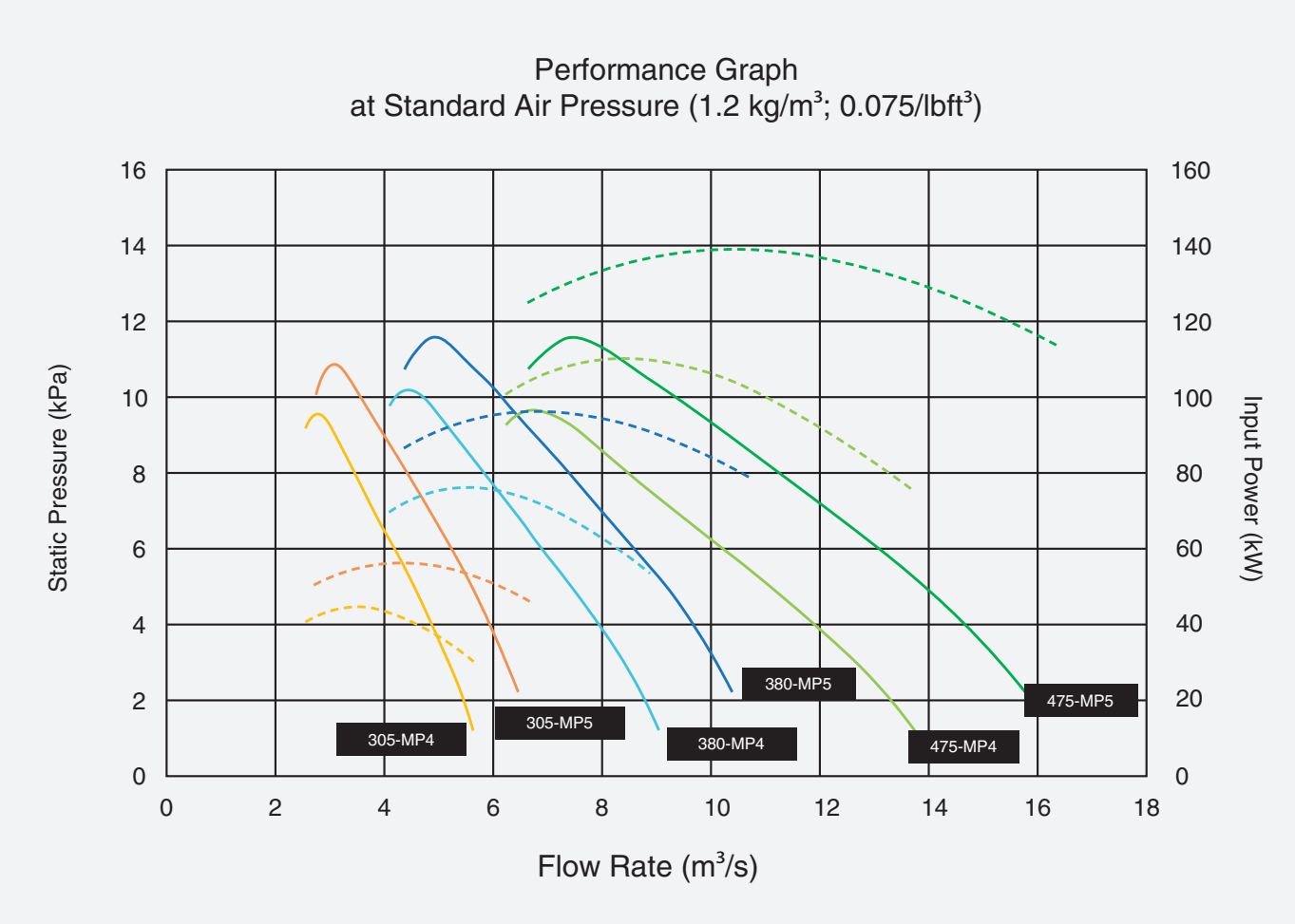
In addition to the gains in performance from increasing the fan speed, we wanted to improve performance even further, and so turned our attention to the fans Inlet guide vane (IGV).

With improved aerodynamics we have developed a standalone (modular) guide vane that can be attached to our existing fans to give an instant **15%** “boost” in performance. The graph below shows the gains made by incorporating our latest guide vane technology (MP5).
Performance gains for all three sizes running at increased speeds and with the addition of the new IGV.



## MP4/MP5 Performance Comparison

**MP5 speed same as MP4**

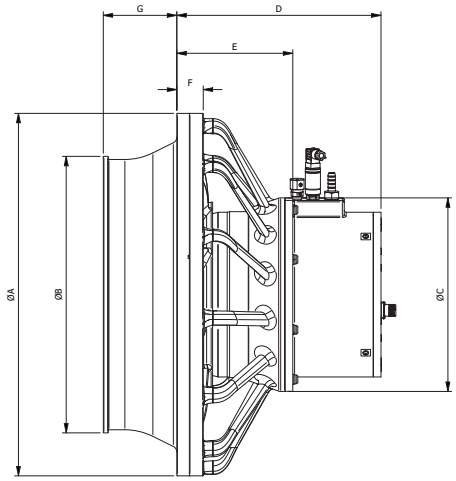


# HIGH VOLTAGE DC ENGINE COOLING FAN

## Description

AMETEK Airtechnology's latest electric cooling unit enables powerpack cooling for modern, electric, and hybrid-electric combat vehicles. Instead of a traditional hydraulic motor or a belt drive system, our latest offering uses a High-Voltage DC (HVDC) Motor to drive a fan.

The example shown here uses our standard 380-MP4 Mixed Flow Fan coupled with an Inlet Guide Vane (IGV) to give the performance shown in the performance graph below. The drive motor dimensions and speed are optimised to achieve the target aerodynamic performance. This flexibility allows us to tailor fan and motor combinations to your specific cooling and installation requirements.

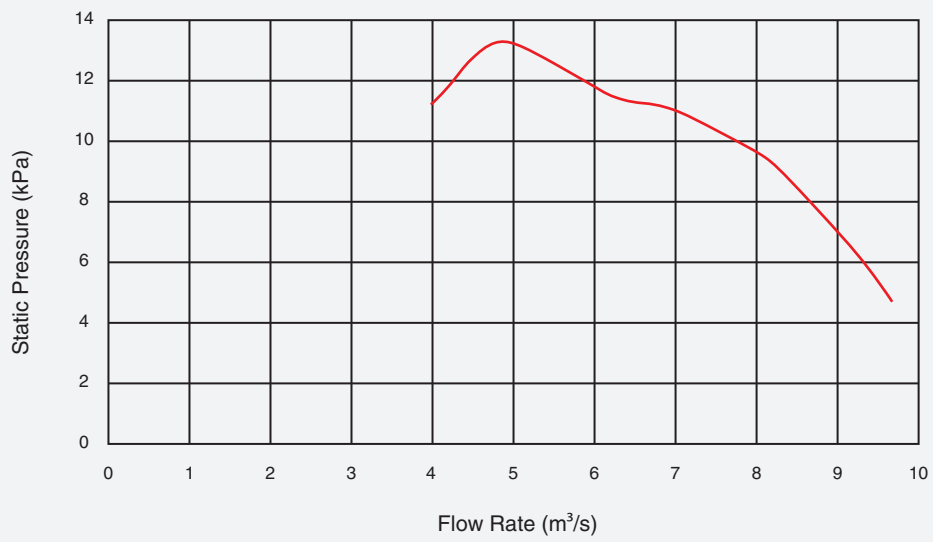



| | |
|---|---|
| Ø A | 577.0 |
| Ø B | 440.0 |
| Ø C | 308.0 |
| D | 325.0 |
| E | 184.5 |
| F | 42.0 |
| G | 117.0 |

| | |
|---|---|
| Rated Peak Motor drive Output | <850V |
| Rated Motor Shaft Output Power | 98 kW +/- 5% |
| Rated Motor Speed | 7700rpm |
| Rated Motor Efficiency | >93% |
| Current Limit | 200A |
| Commutation | Sinusoidal Resolver Feedback |
| Drive Type | Sinusoidal PWM Inverter Drive, 3 phase |
| Ambient Condition | -40°C to +100°C |
| Cooling | Liquid Cooled |



Performance Graph
at Standard Air Pressure (1.2 kg/m³; 0.075/lbft³) - **7700 rpm**



# Contact Us


Aerospace & Defence Applications

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