

# MILITARY VEHICLE ENGINE COOLING FANS



PRODUCTS AND SERVICES FOR  
Military/Aerospace Applications



Airtechnology  
Group

# 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. With hydraulic, belt or shaft drive options the MP4 range has the flexibility to solve virtually any specific engine-cooling problem.

## The 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 are not apparent with a true Mixed flow fan.

## Drive Options

The MP4 range offers the designer the major benefit of flexibility in choice of drive — belt, shaft or hydraulic — without sacrifice of performance.

## Fan Types and Dimensions

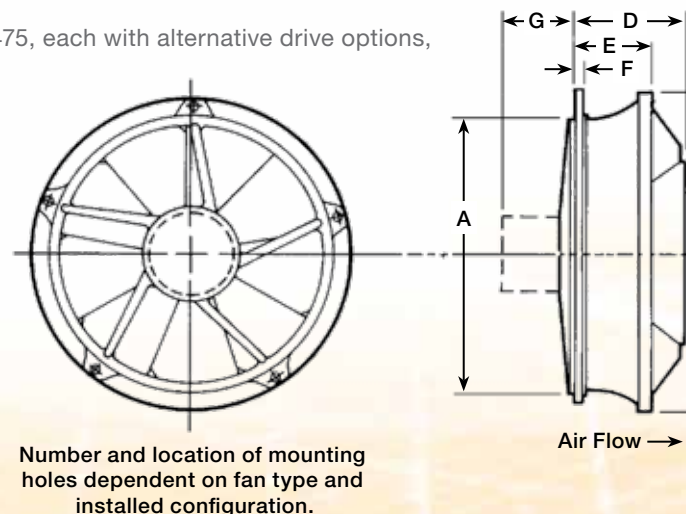
The dimension details below include data of typical hydraulic drive version (generally with integral motor). Corresponding details for direct drive and belt drive available on application.

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	Hydraulic drive versions only	
								Nom. Oil Displacement (cm <sup>3</sup> /rev)	
305 MP4	358.0	233.0	403.0	141.0	99.0	10.0	84.0	5	
								10	
380 MP4	402.0	290.0	502.0	170.0	116.0	13.0	94.0	10	
								12	
								14	
								16	
								19	
475 MP4	540.0	362.0	614.0	199.0	130.0	13.6	77.0	19	
								23	
								28	

## Technical Data

- **Performance:** See separate curves for each fan size. Performance is subject to production tolerances.
- **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 non-flammable 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



### Fan Type 305 MP4

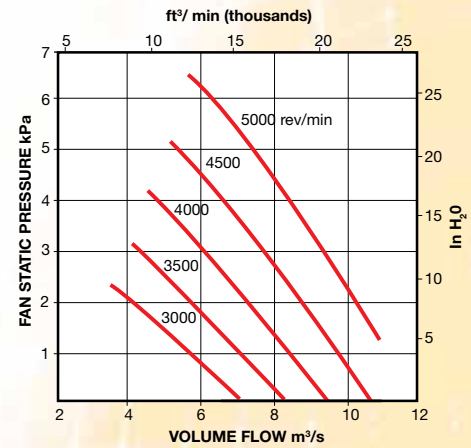
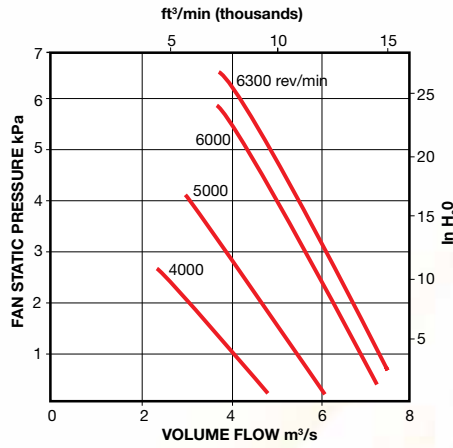
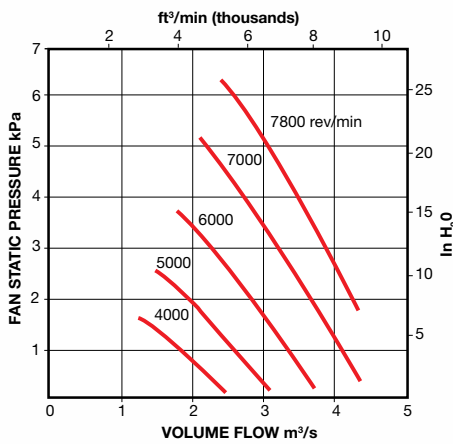
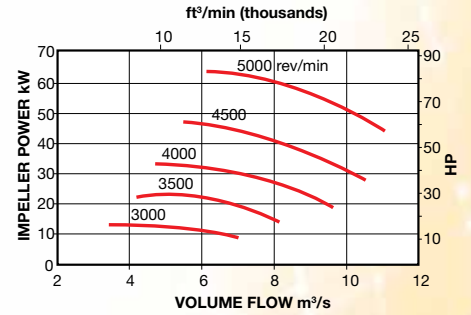
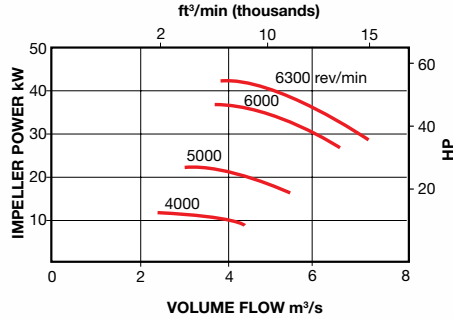
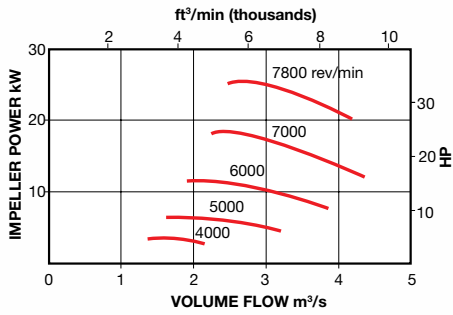
Air Density 1.2 kg/m<sup>3</sup>  
Max Speed 7,800 rev/min rev/min

### Fan Type 380 MP4

Air Density 1.2 kg/m<sup>3</sup>  
Max Speed 6,300 rev/min rev/min

### Fan Type 475 MP4

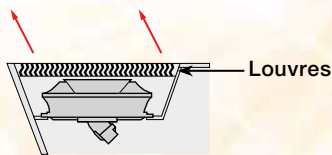
Air Density 1.2 kg/m<sup>3</sup>  
Max Speed 5,000 rev/min rev/min



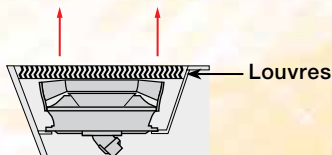
### Application Flexibility

The AMETEK Airtechnology Group 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.

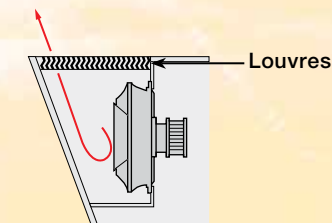
#### Mixed Flow Discharge



#### De-Swirling Axial Discharge



#### Centrifugal Discharge



### Reference List

Vehicle	Product
ZSU-23-4 'Shilka' upgrade	2x 305-MP4-331
T-72 upgrade	4x 305-MP4-331
AMV / Rosomak / Badger 8x8s	2x 380-MP4-331
BMP Upgrades (a)	2x 380-MP4-331 or -371
Undisclosed 8x8s (C13 Engines)	2x 380-MP4-352 or -363
CM-32 8x8 Variants	2x 380-MP4-364
BMP Upgrades (b)	475-MP4-3112
BvS10	457-MP4-320
PMMC G5	475-MP4-3110
C2 Oman / Titan / Trojan	3x 475-MP4-315

## Engine Cooling

AMETEK Airtechnology Group has been actively involved in defense applications for over seventy years, during which time a major area of activity has been in the supply of engine cooling for armoured fighting vehicles. A range of open discharge mixed flow fan units have been developed for the congested environment of the military vehicle engine bay. Aerodynamically designed, these powerful high speed fan units are durable and efficient in active service conditions. Available as hydraulic, belt- or shaft-driven units, designed to meet demanding engine bay environments.

Today's power pack designers face an ever-increasing demand for cooling air through a variety of high-density radiators. In addition to the engine radiators, charge coolers, transmission and hydraulic oil coolers compete with ECS condenser coils for space in the engine bay. The pressure losses associated with these components, along with the ballistic louvres typically mounted on the air outlet demand efficient, large-volume fans with high-pressure capability.

## Complete System Capability

AMETEK Airtechnology Group supplies engine cooling fans for the majority of British army armoured vehicles and a number of other vehicles worldwide. The experience gained by involvement in many and varied cooling system projects places AMETEK Airtechnology Group in a unique position to assist the design of vehicle power packs.

The engine cooling group is most effectively designed by careful management of the total air side system. Experienced consideration is given to louvre/cooler losses and distribution factors, fan inlet and discharge conditions, avoidance of hot air recirculation etc.

## AMETEK Aerospace & Defense

AMETEK Aerospace & Defense has served the global aerospace industry for more than half a century. During that time, it has earned a reputation for innovation and reliability. AMETEK serves all segments of the aerospace industry from commercial jetliners, business aircraft and helicopters to military aircraft and ground vehicles to spacecraft and rockets. Its customers include the world's leading airframe and aircraft engine manufacturers.

## AMETEK Thermal Management Systems

AMETEK Thermal Management Systems is a business unit of AMETEK Aerospace & Defense. It offers advanced blowers for electronics cooling, motion technology products, heat exchangers, environmental integrity systems and thermal management subsystems, including advanced air handling systems used on commercial and military aircraft, military vehicles and naval vessels. Recognized brands: Rotron, Hughes-Treitler, AMETEK Airtechnology Group, Aircontrol Technologies, Muirhead Aerospace and Traxsys.

## AMETEK, Inc.

AMETEK is a global leader in electronic instruments and electromechanical devices with colleagues at numerous manufacturing, sales and service locations in the United States and in many other countries around the world.



**AEROSPACE & DEFENSE  
THERMAL MANAGEMENT SYSTEMS**

**AMETEK Airtechnology Group**

111 Windmill Road • Sunbury-on-Thames, Middlesex, TW16 7EF, UK  
Tel: +44 (0)1932 765822

[www.ametektms.com](http://www.ametektms.com)

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