Aerotest Limited
Consultants & Specialists in Aero Engine Test Facilities & Ground Support Equipment

Engine Water Vapour Resistant (WVR) "Aero-Bag"

For the Airbus SA330 Puma, AS332 and AS562 Super Puma - Makila 1A1 / 1A2
Airbus EC225/ H225 Super Puma - Makila 2A / 2B
Denel Aviation Rooivalk attack helicopter - Makila 1K2

ATL 1365-001
MAKILA Engine WVR Aero-bag

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The Water Vapour Resistant WVR Aero-bag has been designed and developed to enable the Engines installed on the Airbus SA330 Puma, AS332/ AS562 Super Puma, EC225/ H225 Super Puma and Denel Aviation Rooivalk attack helicopter aircraft to be stored and preserved against the environment for indefinite periods of time whilst mounted onto a storage/ transport support stand.

The durable WVR Aero-bag is manufactured as one assembly, such that they completely enclose and protect their contents from potential corrosive elements in the external ambient environment.

The Makila WVR Aero-bag (1365-001) is unique in size and shape to the Makila Engine. The WVR Aero-bags are produced in two standard colours RAL- 5029 Light Blue and RAL-6001 Green, although additional colours are available upon request.

The WVR Aero-bag is designed to protect the Engine during storage and transportation.

The WVR Aero-bag has been designed and developed based upon the same technology used for the ATL1175-001 C-130J WVR Aero-bag which was tested and approved by Lockheed Martin Aeronautics Inc, Marietta, Georgia. This product has consequently been identified as the preferred design for all future WVR preservation, storage and transportation standards.

Part Marking

Each WVR Aero-bag is individually identified with the following information:

- WVR Aero-bag Part Number.
- Description.
- Individual Serial number.

Each WVR Aero-bag is supplied in a lightweight fabric transport bag. This simplifies transportation and ensures that all elements of the Aero-bag system remain together as a complete working unit.

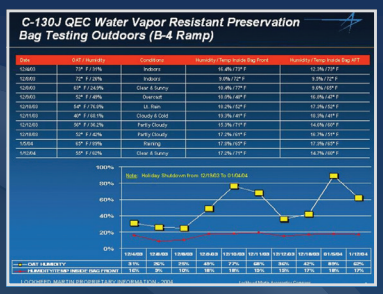
The WVR Aero-bag is designed to fit the Makila engines in the Port configuration as follows:

- Makila 1 Engine whilst interfacing and sealing between the Turbomeca Engine Support Stand PN: 8814083000 and the Engine Support Stand Anti-vibration mounts - Part No. 8816233000H.
- Makila 2 Engine whilst interfacing and sealing between the Turbomeca Engine Support Stand PN: TM1118G004 and the Engine Support Stand Anti-vibration mounts - Part No. 8816233000H.

The Engine Support Stand Anti-vibration mounts can be attached to an engine storage trolley, installed into a transport/ storage crate or Shuttle crate, Turbomeca part number 8242000020 with the WVR Aero-bag installed.

Relative Humidity

- The graph below shows a C-130J QEC WVR Aero-bag under test. The tests compare the environmental conditions using the outside humidity levels and the humidity levels within the Aerotest Aero-bag. The humidity level within the WVR Aero-bag must be sustained at a level below 40% which is illustrated in the graph below by the red line. The external humidity level is represented by the yellow line. This technology is the basis for all Aerotest's WVR Aero-bag designs.
- If the storage and preservation system is properly managed, the engines can be safely stored indefinitely. The Silica Gel is the only thing that needs to be monitored, generally requiring replacement or rejuvenation approximately every six months.

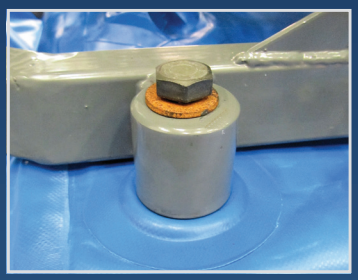


- The preservation system is monitored by observing an Environmental digital indicator which is located on the front on the WVR Aero-bag and is capable of reading relative humidity, temperature and due point inside the Aero-bag.

Special Features and Specification

- Integrally welded continuous 'TZIP easy' zip seal is welded in a horizontal direction around the Aero-bag. This enables the engine to be accessed without having to remove it from its transport stand.
- Two sealed porthole covers are located at the front and on the underside sections of the WVR Aero-bag. Their primary function is to provide an access point to remove and/ or replace the silica gel without breaking into the primary 'TZIP easy' zip seal.
- A one-way purge valve is installed into the front porthole cover, this arrangement is for connecting a purge valve adapter which screws onto and opens the purge valve allowing nitrogen purging of the WVR Aero-bag.

- An anti-tamper lug is provided at each porthole and also at the zip termination. Anti-tamper tags can be used to indicate whether the bag has remained sealed.
- The WVR Aero-bag material has a rated temperature envelope of -30 to +70ºC (-22 to 158ºF.)
- The WVR Aero-bag is manufactured from a supported PVC textile which is strong and durable and may be creased or folded.
- The Aero-bag outer surfaces are coated with a protective flexible coating of acrylic lacquer for protection against ester-based fluids.
- Attachment straps ensure that the horizontal zip is easy to open and close.
- Aero-bag internal desiccant sachet-retaining bags are located in the front section and the underside of the exhaust. These bags are permanently installed and have been designed to allow the desiccant sachets to be easily accessible and held in position once installed.
- The WVR Aero-bag is sealed by four gasket seals which are compressed between the Turbomeca Engine Support Stand and the Engine Support Stand Anti-vibration mounts, the gaskets have been inserted into a welded PVC patch pocket for permanent fixture to the inside of the WVR Aero-bag.



- The WVR Aero-bag has an Integral pressure relief valve fitted, set at 0.5 psi (3.5 kPa). This ensures the Aero-bag is not over pressurised when subjected to variation in atmospheric pressure or temperature, enabling safe transport at altitude and transfers between cold to hot climates.
- The Aero-bag has an external sealable panel to store engine logbook records and standard WVR Aero-bag repair kit.
- Laminated installation/operating instructions are supplied with each WVR Aero-bag.

Ordering Information:

MAKILA ATL 1365-001-B (BLUE)
MAKILA ATL 1365-001-G (GREEN)

NCAGE Number: KE 160

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