



**BOOYCO  
ENGINEERING**

# **MILITARY SOLUTIONS**



**QUALITY ENGINEERED PRODUCTS**

## CONTENTS

Company Overview	1
Sectors	2
Military Solutions	3
Applications	4
Standard Products	5
Packaged AC Units	6
Split AC Units	7
DC Electric Units	9
Anti-Idle APU	9
Cabin & Engine Air Filtration Units	10
Custom Solutions	11
Main Battle Tanks	12
Armoured Personnel Carriers	13
Military Shelters	14
Infantry Fighting Vehicles	15
Military Aviation	16
Military Marine	17

## OVER 40 YEARS OF ENGINEERING EXCELLENCE

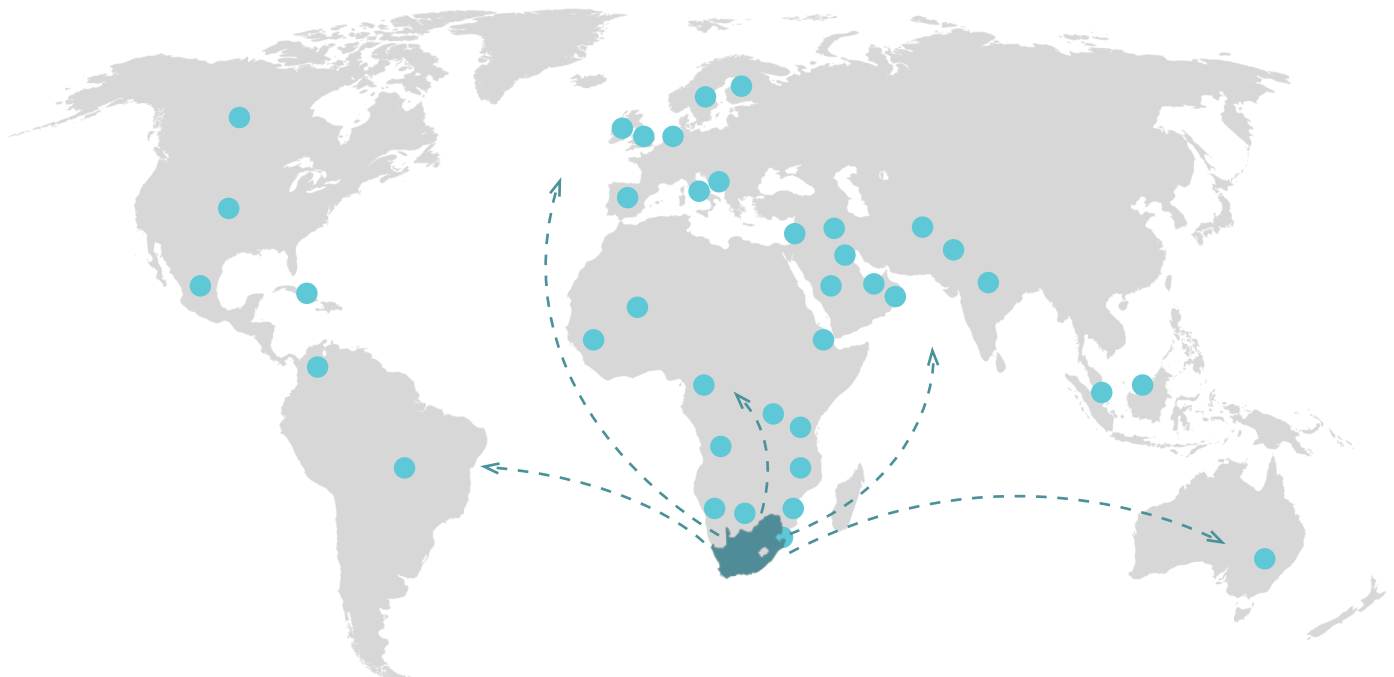
Booyco Engineering (Pty) Ltd is a South African company specialising in the design, development and manufacturing of custom-made air handling systems for mobile applications.

The company was originally established in 1985 to provide heating, ventilation and air conditioning (HVAC) systems to the local military vehicle industry, and have subsequently diversified into the mining, railway, construction and industrial sectors.

With over four decades of expertise, we have built a strong reputation for innovation, quality and reliability, making us a trusted partner for industries across the globe and earning the confidence of leading OEMs and operators alike.

## LOCAL EXPERTISE, GLOBAL REACH

Our world-class engineers design our solutions to stringent international standards, ensuring superior performance in demanding environments. Manufactured in-house at our local facility, our systems are trusted by customers across the world, delivering performance, innovation and quality to over 40 countries across 6 continents.



## MILITARY SOLUTIONS

Booyco Engineering has designed, developed and manufactured HVAC systems, filtration systems and auxiliary power units (APUs) for military vehicles such as the G6 self-propelled howitzer, RG12 riot control vehicle, RG31 mine-resistant ambush protected (MRAP) vehicle, Terrex 8x8 armoured fighting vehicle (AFV) and the Belrex family of MRAP vehicles.

Booyco Engineering has also designed, developed and manufactured crew HVAC and electronics cooling systems for military shelters.

# MILITARY

## MINING SOLUTIONS

Booyco Engineering has a range of standard HVAC units suitable for different types and variants of mining vehicles. These units are specifically designed to perform in the extreme conditions experienced in both surface and underground mining.

Booyco Engineering has also developed an anti-idle auxiliary power unit (APU), which can be paired with our electric air conditioning units to dramatically reduce fuel and maintenance costs on large mining vehicles.

Booyco Engineering is an official distributor for Sy-Klone International and offers their range of cab and engine combustion air filtration systems, including an ISO 23875 Cab Air Quality Standard compliant filtration system.

# MINING

## RAIL SOLUTIONS

Booyco Engineering has developed a number of custom locomotive cab and passenger car HVAC systems for both local and international customers. These systems were designed, qualified and manufactured according to applicable railway standards and cover a wide range of input power supplies, such as 72 VDC, 110 VDC, 230 VAC, single-phase and 380 VAC, three-phase.

Booyco Engineering has also developed locomotive cooling towers for the cooling of the traction motor transformer and power converters as well as blower units to cool the traction motors of motor coaches.

# RAIL

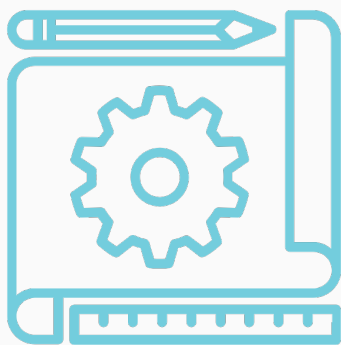
# MILITARY SOLUTIONS



Booyco Engineering has been delivering customised HVAC solutions to the defence industry since 1985. Over the years, we've designed, developed, and manufactured HVAC units, air filtration systems, and auxiliary power units (APUs) for a range of military vehicles.

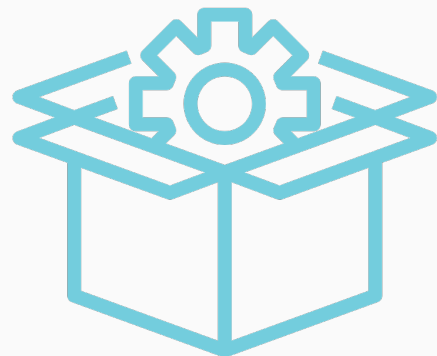
Our portfolio includes the G6 self-propelled howitzer, RG12 riot control vehicle, RG31 MRAP, Terrex 8x8, and Belrex 4x4 IFVs. Our expertise also extends to crew HVAC and electronics cooling systems for military shelters, aircraft, and naval vessels.

## OUR KEY SOLUTIONS



### BESPOKE SYSTEMS

Booyco Engineering has been designing and manufacturing bespoke military HVAC and APU solutions for over 40 years and is able to leverage this experience to tailor solutions according to our customer's requirements.








### STANDARD PRODUCTS

We carry a range of standard products that are suitable for a wide array of military applications. This range of mobile HVAC units offers the same high-quality performance you have come to expect from Booyco custom HVAC systems, at competitive lead-times and costs.

## ADDITIONAL SOLUTIONS

Booyco Engineering also offers a number of other solutions to the military industry, such as:

- Crew air filtration solutions, including CBRN filter systems
- Engine air filtration solutions
- Electronics and equipment cooling
- Ground support units for aircraft
- Battery heating and cooling on electric/hybrid vehicles

APPLICATIONS		Crew HVAC	Electronics/ Equipment Cooling	Cabin Air Filtration	CBRN Air Filtration	Engine Air Filtration	Anti-Idle APU
	Wheeled Vehicles	●	●	●	●	●	●
	Tracked Vehicles	●	●	●	●	●	●
	Military Shelters	●	●	●	●		●
	Military Aviation	●	●				
	Military Marine	●	●	●	●		



# STANDARD PRODUCTS



At Booyco Engineering, we offer a range of affordable, ready-to-deploy products that can be retrofitted into most closed cab vehicles. From rugged HVAC systems to auxiliary power units and advanced cabin and engine air filtration, our solutions built tough to deliver reliable performance and address common field challenges in the world's harshest operating environments.

## OUR STANDARD OFFERINGS



STANDARD HVAC UNITS



POWER SOLUTIONS



AIR FILTRATION SOLUTIONS

### TYPICAL APPLICATIONS FOR MILITARY VEHICLES

Our range of Standard HVAC Units

No. of Crew	Split System	Integrated System	24 VDC Electric Unit
1-2	A009/A018/A020 + B009	D006/D007	D006E
3-6	A004/A015/A018 + B011	2 x D006/D007	A009 + B012
7-12	A021 + Custom Condenser 2 x A004/A015/A018+ 2 x B011	-	2 x D006E

## STANDARD HVAC UNITS

Booyco's new range of standard products distills over 40 years of expertise into readily available, easily adaptable systems. With this series of vehicular HVAC units, you receive the quality you have come to expect from a Booyco custom HVAC system, at competitive lead times and costs.

- Designed to withstand harsh conditions
- Rated T3 in accordance ISO 5151
- Able to operate in ambient temperatures up to 55°C
- Customisable to suit a variety of military applications
- Easy installation, replacement parts readily available
- Ideal solutions for most military vehicles

### NOTE ON

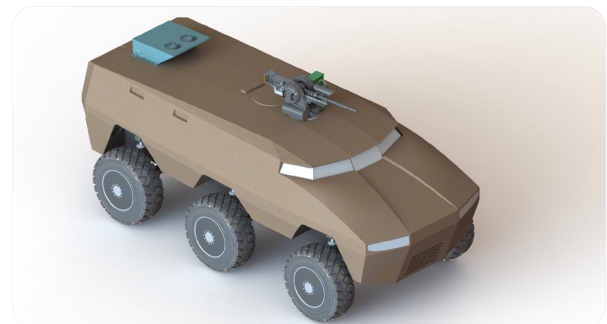
### PERFORMANCE RATINGS

Booyco Engineering rates the performance of our standard products at ISO 5151 T3 conditions.

ISO 5151 Rating	Cabin Air Conditions	Ambient Air Conditions
T3	29°C & 38.5% RH	46°C & 15.3% RH

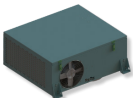
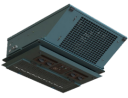
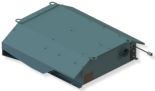
## PACKAGED AC UNITS

Packaged AC units have both the evaporator and condenser combined into a single unit. Booyco Engineering's packaged AC units are externally roof-mounted with an integrated electrically driven compressor or a remote engine-driven compressor.



ROOF-MOUNTED PACKAGED UNIT

### D SERIES - PACKAGED AC UNITS

	Unit	Type	Power Supply	Capacity Cooling (Heating*)	Overall Size (mm)
	D003	Integrated electric compressor	380 VAC, 3-Ph, 50 Hz	6.5 (4.5) kW	1106 x 1133 x 468
	D006	Remote engine driven compressor	12/24 VDC	5 (4) kW	802 x 846 x 242
	D007	Remote engine driven compressor	12/24 VDC	4.5 (3.5) kW	754 x 846 x 230

\* Heating function is optional





## SPLIT AC UNITS

Booyco Engineering’s split AC systems consist of a separate A Series evaporator (indoor) unit paired with either a B Series condensing (outdoor) unit or a radiator-mounted condenser coil. These split AC systems feature an electrically or hydraulically driven compressor integrated into the condensing unit or a remote engine-driven compressor.

### A SERIES - EVAPORATOR UNITS

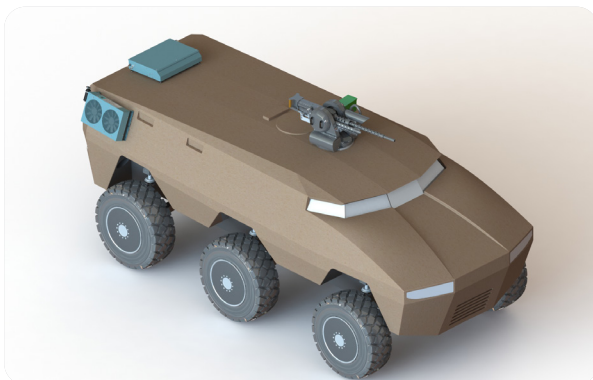
	Unit	Type	Power Supply	Capacity Cooling (Heating*)	Overall Size (mm)	Condensing Units
	A002	External roof mount	12/24 VDC	5.5 (5) kW	835 x 610 x 155	B009, B011, B012, B013
	A004	Internal horizontal/vertical mount	12/24 VDC	6 (3) kW	657 x 574 x 210	B011, B015
	A006	Internal vertical mount	230 VAC, 1-Ph/380 VAC, 3-Ph, 50 Hz	6 (5) kW	670 x 576 x 210	B006
	A009	Internal vertical mount	12/24 VDC	4 kW	523 x 425 x 155	B009, B012, B013
	A015	Internal under roof mount	12/24 VDC	8 (5) kW	935 x 765 x 250	B011, B015
	A018	Internal horizontal/vertical mount, ducted system	12/24 VDC	5.5 kW	566 x 375 x 172	B009, B011, B012, B013
	A019	External roof mount	230 VAC, 1-Ph/380 VAC, 3-Ph, 50 Hz	4 (2.25) kW	840 x 718 x 225	B016B
	A020	Internal under-roof mount	12/24 VDC	3 kW	726 x 380 x 206	B009, B012
	A021	Internal vertical mount, ducted system	12/24 VDC	5 (10) kW	750 x 475 x 800	Custom

\* Heating function is optional

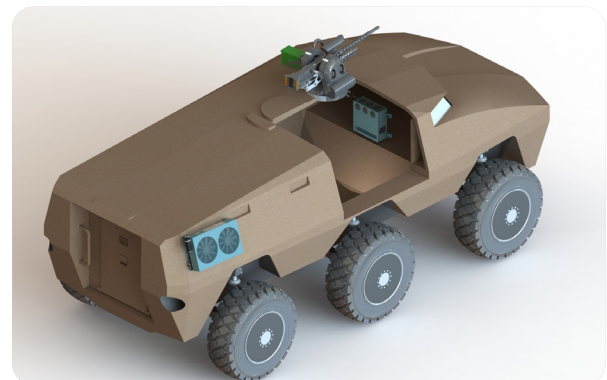
# STANDARD PRODUCTS

## B SERIES - CONDENSING UNITS

	Unit	Compressor	Power Supply	Heat Rejection Capacity	Overall Size (mm)
	B006	Integrated AC compressor	230 VAC, 1-Ph/380 VAC, 3-Ph, 50 Hz	9 kW	750 x 680 x 593
	B009	Remote engine driven compressor	12/24 VDC	9.5 kW	600 x 360 x 160
	B011	Remote engine driven compressor	12/24 VDC	14 kW	670 x 406 x 185
	B013	Integrated hydraulic compressor	12/24 VDC Hydraulics	8 kW	785 x 393 x 458
	B015	Integrated hydraulic compressor	12/24 VDC Hydraulics	14 kW	785 x 403 x 471
	B016	Integrated AC compressor	230 VAC, 1-Ph/380 VAC, 3-Ph, 50 Hz	7 kW	685 x 386 x 616



SPLIT SYSTEM WITH ROOF-MOUNTED EVAPORATOR UNIT AND SIDE-MOUNTED CONDENSING UNIT

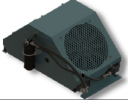

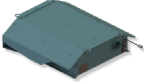


SPLIT SYSTEM WITH INTERNAL EVAPORATOR UNIT AND SIDE-MOUNTED CONDENSING UNIT



## DC ELECTRIC AC UNITS

Booyco Engineering’s DC electric air conditioning units feature DC electric compressors, making them ideal for vehicles where mounting a compressor to the engine is impractical or where air conditioning operation is required with the engine off.

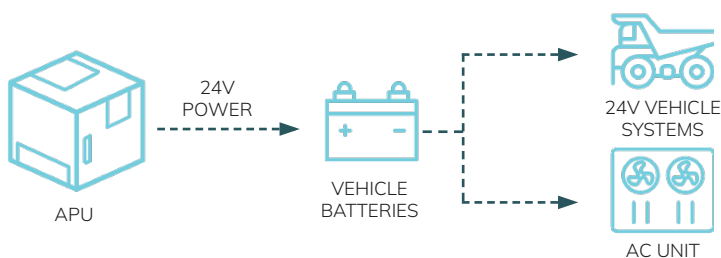
	Unit	Type	Power Supply	Capacity Cooling (Heating*)	Overall Size (mm)
	B012	Split condensing unit with integrated DC electric compressor	24/48/72 VDC	4.8 kW	663 x 358 x 320
	D006E	Roof-mounted packaged unit with integrated DC electric compressor	24 VDC	4.8 (4) kW	802 x 846 x 242
	D007E	Roof-mounted packaged unit with integrated DC electric compressor	24 VDC	4 (3.5) kW	754 x 846 x 230

\* Heating function is optional

## ANTI-IDLE SYSTEM

Booyco Engineering’s anti-idle system reduces fuel and maintenance costs while lowering CO<sub>2</sub> emissions of military vehicles by allowing the main engine to be switched off during idle periods. A diesel fuelled APU supplies 24 VDC power to the vehicle batteries, which support a 24 VDC air-conditioning system and critical vehicle systems when the main engine is off. The APU can also function as a standalone unit, providing 24 VDC power and compressed air.

- Operates in ambient temperatures up to 50°C
- Nominal fuel consumption of ± 1.3 l/h
- Outputs 110 A @ 28 VDC
- Acoustic noise suppression built into enclosure
- Integrated or remote fuel tank
- Optional integrated air or AC compressor
- Also available in small footprint version

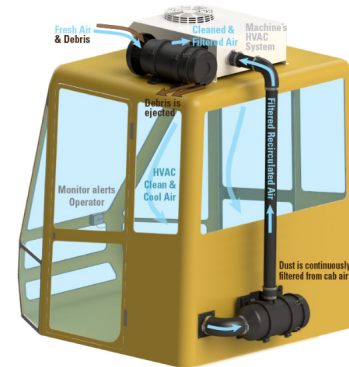


## STANDARD PRODUCTS

### CABIN & ENGINE AIR FILTRATION UNITS

Booyco Engineering is an official distributor of Sy-Klone International products, offering a full range of cab and engine combustion air filtration systems, including an ISO 23875 Cab Air Quality Standard compliant filtration system.

All Sy-Klone International powered systems are available in 12 VDC or 24 VDC, with filter cartridges offered in MERV 16, EPA, HEPA, Engine, Odor/HEPA, ABEK Gas/HEPA and Ammonia/HEPA options.



Type	Unit	Description	Air Flow Rate	
		Series 9000	Non-powered cyclonic filter, various sizes available	16.8 – 2378 m <sup>3</sup> /h
Engine Pre-Cleaner		XLR	Powered 2-stage engine pre-filter unit, cyclonic separator first stage and pleated filter cartridge second stage	0 – 594.6 m <sup>3</sup> /h
		Vortex Max		510 – 1020 m <sup>3</sup> /h
Cab Air Filter		CF2	Powered 2-stage cab fresh air filter unit, cyclonic separator first stage and pleated filter cartridge second stage	0 – 424.8 m <sup>3</sup> /h
		CFX2	Powered 2-stage cab recirculation air filter unit, cyclonic separator first stage and pleated filter cartridge second stage, ducted inlet and outlet	0 – 424.8 m <sup>3</sup> /h
		PFX	Powered cab recirculation air filter unit with pleated filter cartridge, ducted outlet	3000 – 4380 m <sup>3</sup> /h
		FFX2	Non-powered cab recirculation air filter unit with pleated filter cartridge, ducted outlet	0 – 4380 m <sup>3</sup> /h
		Pure	Powered cab recirculation air filter unit with pleated filter cartridge, no ducting	51 – 153 m <sup>3</sup> /h (12 VDC) 51 – 237.6 m <sup>3</sup> /h (24 VDC)
Cab Air Quality Monitor		RESPA Advisor	ISO 23875 compliant cab air quality monitoring unit	n/a

# CUSTOM SOLUTIONS



At Booyco Engineering, we take pride in our ability to design, develop, manufacture and qualify a wide range of tailored solutions for the military industry. Our capabilities include new ground-up developments, customization of existing designs, and the local manufacture of products under license.

## DESIGNING AND MANUFACTURING TO GLOBAL STANDARDS

We collaborate with both local and international test facilities to ensure our products are qualified to meet customer specifications and comply with international standards, including:

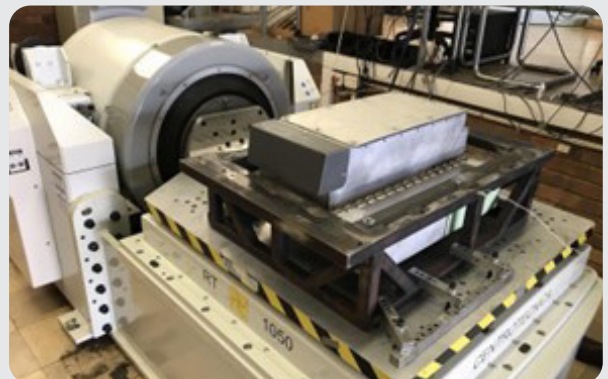
MIL-STD-461	Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment.
MIL-STD-464	Electromagnetic Environmental Effects Requirements for Systems.
MIL-STD-810	Environmental Engineering Considerations and Laboratory Tests.
MIL-STD-1472	Human Engineering

## RIGOROUS PROTOTYPING AND TESTING

We have the capability to verify and validate each HVAC design to specific client requirements through various forms of system tests.



Prototype AC Unit Undergoing EMI/EMC Testing



Prototype AC Unit Undergoing Vibration Testing

## CUSTOM SOLUTIONS

### MAIN BATTLE TANKS

Booyco Engineering has produced several products for main battle tanks (MBT). These include an AC system for a Tank Technology Demonstrator (TTD) for ARMSCOR, an AC system and APU for the SANDF Olifant MBT and an APU powered HVAC system for a Leopard AS1 MBT for the Australian Army.



#### OLIFANT MBT

The Olifant serves as the main battle tank of the South African National Defence Force. The Olifant 1B's turret was upgraded, and Booyco developed a turret-mounted air conditioning system with a remote APU to support this enhancement.



#### LEOPARD AS1 MBT

Booyco locally designed, developed and qualified a turret-mounted, integrated air conditioning system and auxiliary power unit (APU) for the Leopard AS1 main battle tank (MBT). Technology transfer was carried out to enable local manufacturing of the systems in Australia.



Main Battle  
Tanks

Armoured Personnel  
Carriers

Military  
Shelters

Infantry Fighting  
Vehicles

Military  
Aviation

Military  
Marine



## ARMoured PERSONEL CARRIERS



### RG12 APC

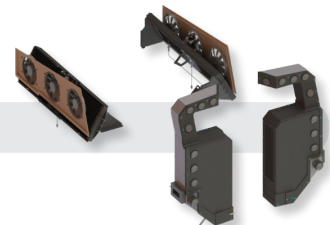
The RG12 multi-purpose APC was initially developed as a riot control vehicle for the SA Police Service and has subsequently been supplied into several international markets. The various versions of the RG12 APC are fitted with custom Booyco Engineering HVAC systems, some of which feature an APU to drive the AC system.

Roof-Mounted HVAC Unit and APU



### RG31 APC

Booyco Engineering developed an air-conditioning system for the RG31 APC and has supplied large quantities of these systems for the US Armed Forces MRAP programme.



## CUSTOM SOLUTIONS

### MILITARY SHELTERS

Booyco Engineering's military shelter HVAC systems are purpose-built for extreme environments and are CBRN (Chemical, Biological, Radiological, and Nuclear) ready, ensuring operational reliability under demanding conditions. Designed for flexibility, the systems can be configured as single or dual units to meet varying cooling and heating demands. Notably, they operate with exceptionally low acoustic noise and comply with rigorous military EMI/EMC standards, reflecting a strong commitment to both performance and stealth in the field.

#### MILITARY SHELTER HVAC SYSTEM

Booyco's military shelter HVAC units are available in various capacities and in both vertical and horizontal configurations to suit a wide range of applications. These integrated units are modular and can be easily customized to meet specific customer or shelter requirements.



Main Battle  
Tanks

Armoured Personnel  
Carriers

Military  
Shelters

Infantry Fighting  
Vehicles

Military  
Aviation

Military  
Marine



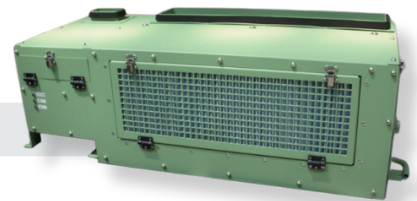
## INFANTRY FIGHTING VEHICLES



### TERREX AMPHIBIOUS 8x8 IFV

Booyco Engineering is the preferred HVAC supplier for ST Engineering Land Systems' range of Terrex amphibious 8x8 Infantry Fighting Vehicles (IFVs). We have developed several custom solutions for these vehicles, including air-conditioning systems for the Terrex Mustry 2 and Mustry 3 variants, as well as an HVAC system for the latest model in the Terrex family, the Gen 5.

In addition, we have developed an integrated HVAC and battery cooling system for a hybrid-drive version of the Terrex vehicle, which utilizes high-voltage DC compressors.



### PROTECTED COMBAT SUPPORT VEHICLE

Booyco Engineering developed and supplied a modular HVAC system for the various versions of Singapore Armed Forces' Protected Combat Support Vehicle (PCSV). This externally mounted system featured NIJ level III ballistic protection and an integrated diesel fuelled heater.



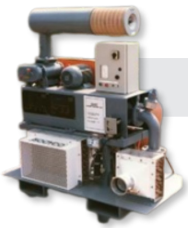
Side-Mounted HVAC Unit

## CUSTOM SOLUTIONS

### MILITARY AVIATION

#### ATLAS CHEETAH

Booyco's entry into the aviation sector began with the supply of avionics cooling systems for ground support units (GSUs) used with the Atlas Aircraft Corporation's (now Denel Aeronautics) Cheetah turbojet fighter aircraft



Avionics Cooling System for GSU



#### ATLAS ACE

Booyco Engineering subsequently developed a prototype Environmental Control System (ECS) for the Atlas ACE, a South African composite turboprop trainer aircraft.



#### ROOIVALK ATTACK HELICOPTER ECS

The Atlas Ace paved the way for the development of the environmental cooling system (ECS) for the Rooivalk attack helicopter, which later entered production for the South African Air Force.

The Rooivalk is a South African-designed and manufactured attack helicopter developed for the SAAF. Booyco designed, developed and qualified an ECS for crew cooling.

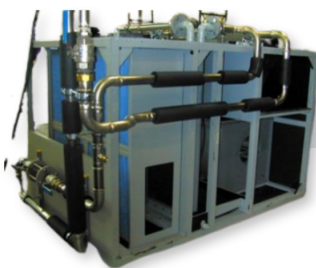




## MILITARY MARINE

### SAN CORVETTE - AC UNIT

Booyco Engineering was subcontracted by a German company to manufacture air-conditioning units and components for the South African Navy's Corvette frigates. While the overall design was provided by the German company, the unit heat exchangers were locally designed by Booyco Engineering to meet the specified requirements.



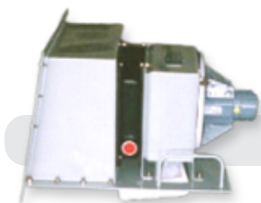
Corvette Air Conditioning Unit

### SAN CORVETTE - 35-DPG COOLING UNITS

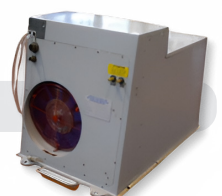
Booyco Engineering supplied equipment cooling systems as well as hydraulic oil coolers for the 35 mm calibre Dual Purpose Gun (DPG), used on the South African Navy's (SAN) Corvette frigates.



The equipment cooling systems provide cooling for the gun electronics, while the oil coolers cool the oil for the hydraulic gun actuators.



Gun Hydraulic Oil Cooling Unit



Gun Control System Cooling Unit



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## CONTACT US



+27 (0) 11 974 8640



info@booyco.co.za



booyco.co.za



101 Newton Road, Meadowdale,  
Gauteng, South Africa, 1614



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