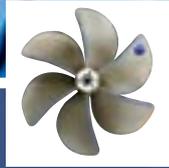


HIGH PERFORMANCE PROPELLERS

VEEM

VEEM LIMITED



PROPELLERS AND PROPULSION SYSTEMS

ABN 51 008 944 009



Quality
Endorsed
Company
AS/NZS ISO 9001:2000
LIC. No. QEC 9075



Under carriage door components for AIRBUS A340 are manufactured by VEEM



VEEM manufactures Worcester valves for the Royal Australian Navy's Collins class submarines



A typical 5 tonne pour

THE COMPANY

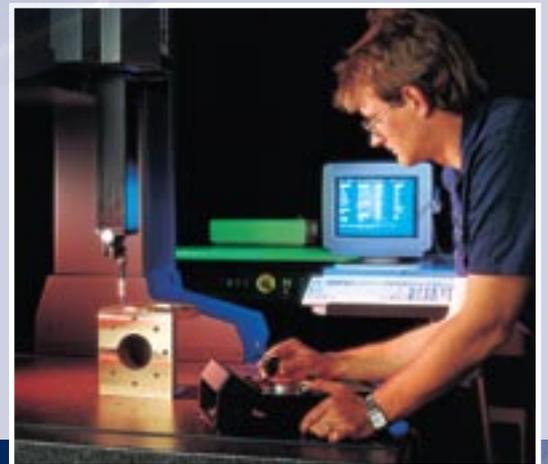
VEEM Limited is a quality endorsed company comprising of a number of specialized and efficient divisions with a broad skills base that covers the marine, mining, defence and aerospace industries. VEEM offers a unique combination of talents which include:

- propeller manufacture and repair
- shaftline, rudder, and ride control equipment manufacture
- valve manufacture
- dynamic balancing
- precision engineering and CNC machining
- mechanical equipment repair and maintenance
- gas turbine refurbishment
- quality and project management

Based in Perth, Western Australia, VEEM supplies products both domestically and internationally to clients who value quality and need confidence in what they receive.



14 tonne melting capacity of bronzes



Dimensional inspections of all types of components can be carried out using a computerised coordinate measuring machine



Photo courtesy of Oceanline Yachts

127' Super Yacht fitted with VEEM Propellers



Pusher Boat



22m (70') Tuna boat running a 1250mm (49")
4 blade VEEMStar® propeller

PROPELLER AND FOUNDRY DIVISION

With 50 years of propeller manufacturing behind it, the Propeller and Foundry Division offers a complete range of services associated with the industry. These include:

- professional engineering consultancy
- computer design and analysis
- pattern making
- moulding and casting
- machining - manual and CNC
- dynamic balancing
- certified repair work

EXPERIENCE

The Propeller and Foundry Division began manufacturing propellers in 1956 and has since delivered tens of thousands of propellers to a multitude of users, from the leisure market to high speed naval vessels. VEEM can rely on a database of thousands of vessels which it uses to constantly verify and fine tune its designs. This also enables VEEM's naval architects to optimise a vessel's performance.

In addition to new construction, the Propeller and Foundry Division is renowned for its prompt, high quality repair and refurbishment of propellers.



Photo courtesy of Austal Ships

VEEM manufactures ride control systems for Austal Ships
"Highspeed 4", a 92m (300') Auto Express vehicle- passenger catamaran built for Minoan Flying Dolphins, Greece





Yemen patrol boats



Fremantle Class Patrol Vessel running VEEM propellers



The Australian Submarine squadron of Oberon and Collins Class submarines are ably supported by VEEM



Royal Australian Navy Destroyer Escort propellers repaired at VEEM

PROPELLER MANUFACTURING

VEEM offers flexibility in propeller designs that no other manufacturer can match. Our technologically advanced manufacturing process allows a custom propeller design to be supplied for each vessel application, with no impact to price or lead time. Why settle for a standard propeller when VEEM can offer a custom design solution for your boat, ensuring you obtain maximum performance with the smoothest possible operation? All VEEM propellers are fully CNC machined using the latest equipment available, ensuring the highest accuracy and quality possible. VEEM has a strong list of base propeller designs, and can provide you with the optimum propeller to suit each application. VEEM is strictly controlled under the company's ISO 9000:2000 certified quality management system to ensure that our products are of the highest quality. VEEM are pre-approved for internal processes by many Classification societies which reduces the manufacturing time and costs for propellers manufactured under classification. VEEM Engineering Group are endorsed to this standard by both Standards Australia and by the Australian Department of Defence.

All VEEM custom propeller designs are developed using the latest CFD (Computational Fluid Dynamics) and FEA (Finite Element Analysis) technologies, and are validated using cavitation tunnel testing and full scale vessel testing. VEEM's primary test vessel is a 64ft Sport fisher powered by two off 2400HP engines which is used to validate 30 to 50+ knot propeller design, however VEEM is highly experienced within all market segments, and our dedication to continuous product research and development ensures that VEEM is at the cutting edge of propeller design and manufacture. Why compromise performance and smoothness when you have ultimate flexibility in propeller design with VEEM?



VEEM has precision CNC Machines that can mill up to 3750mm x 1500mm x 1500mm and CNC turn up to 2100mm diameter



Hollow section ride control "T" foil as fitted to Austal Ships vessel



Typical installation of VEEMStar® series propellers



Royal Australian Navy Destroyer Escort with VEEM refurbished propellers

DESIGN ENGINEERING

VEEM offers professional services in the field of naval architecture to ensure compatibility of hull and propulsion. Specializing in the detail design and selection of propulsion components, our technical staff seek early involvement with the hull designers with the view of always meeting performance requirements. Our services are usually called upon as part of a design and manufacturing scope and we can provide recommendations in all stages of the design process including:

- initial design
- review of all hull design specifications
- optimization of propulsion systems

VEEM is able to supply fully documented technical packages for the approval of both client and classification authorities where applicable.

PROPULSION PACKAGES

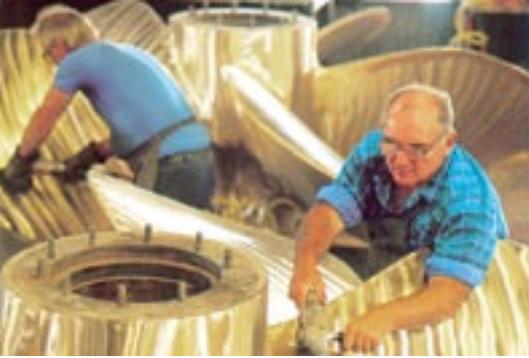
A propulsion package procured from VEEM will usually include all the components in the shaft-line from the gearbox coupling aft, including the propeller, shafts, shaft brackets, bearings, seals and rudders. Generally, most shaft-line components are individually designed to meet the client's requirements. VEEM also manufactures ride control components including;

- roll fins
- interceptors
- trim tabs
- T-foils
- rudders

The advantage of a VEEM supplied propulsion package as opposed to individual component buying includes:

- technically advanced design
- no unpleasant surprises or assembly problems
- all components are assembled and checked prior to despatch
- single source rather than multiple suppliers
- less paperwork saving time and money
- guaranteed system quality
- reduced lead time





The sea of gold – propeller finishing. Destroyer escort propellers manufactured from nickel aluminium bronze. The end result is spectacular!



Fremantle Port Authority Safety Vessel fitted with VEEM propulsion



Controllable pitch propeller

MATERIALS

Propellers are offered with a variety of material specifications, including aluminium, manganese bronzes, nickel aluminium bronzes (NiBrAl) and stainless steel.

While aluminium and manganese bronzes offer less expensive options for general use, nickel aluminium bronze offers increased strength and reduced drag due to thinner blades. Nickel aluminium bronze provides excellent resistance to corrosion, erosion and fatigue, while being easily repairable. Our Foundry Division is able to alloy all of its own metals using our NATA (National Association of Testing Authorities) certified laboratory to provide chemical analysis to assist in meeting any material specification required.

PROPELLER REPAIR SERVICES

In addition to its manufacturing capabilities, VEEM offers repair and refurbishment services for fixed pitch and controllable pitch propellers. During periodic servicing, propellers are sent to VEEM for de-fouling, cleaning and inspection and the propeller is returned to an as new condition. Depending on client requirements, the propeller may be completely checked for profile and dynamically balanced prior to being fitted to the ship.

DYNAMIC BALANCING FACILITIES

Dynamic balancing is integral to VEEM's propeller manufacturing. Propellers are balanced to a very high standard using either ISO 1940/1 G2.5 or G6.3, and all propellers that leave VEEM have a balance certificate on record. Dynamic balancing is particularly important for high speed vessels to ensure that our high performance designs are accompanied by excellent smoothness.

PROPELLER BALANCING NOTES

Caution must be taken when balancing marine propellers due to the critical nature of blade cross sections, and the effect that this has on thrust (dynamic load) during operation. When balancing propellers, the allowable residual unbalance as defined by ISO 1940/1 should be calculated by taking into account shaft bearing spacings and propeller added mass (due to entrained fluid).

As propellers are generally balanced between machine pedestals, but operate as an overhung rotor, the allowable unbalance is commonly miscalculated.

Of major concern is that by far exceeding the required balance standard, vibration can be introduced due to the effect of dynamic forces generated by distorted blade profiles. This introduced vibration greatly exceeds any benefit gained by reducing the unbalance in air. This provides a sound reason as to why balance standards for marine propellers should not be exceeded.



Precision dynamic balancing of rotor components



VEEM has NATA certification for dynamic balancing up to 28 tonne – refurbished GE gas turbine rotor



A VEEMStar[®] propeller being balanced in one of VEEM's 7 balancing machines

DYNAMIC BALANCING CAPABILITIES

The capabilities of the balancing division which is equipped with 4 Schenck and 3 CEMB balancing machines includes:

Dynamic Balancing - 100grams to 28,000 kg. 3.5 metres in diameter and 12 metres long.

Static balancing - 100grams to 28,000 kg. 7 metres in diameter and 12 metres long.

General Balancing of - Propellers, fan and pump impellers, centrifuges, turbines, wheel hubs, machine spindles, brake drums, electric armatures and rotors, gyroscopes, rollers, beaters etc.

Engine Balancing - dynamic balancing of all engine components for all currently available engines from single cylinders to V16 Alco diesels.

Driveshaft Balancing - of all marine, industrial, automotive, agricultural, transport and earthmoving power takeoff shafts.

ISO 1940/1 DYNAMIC BALANCE QUALITY GRADES

- G16 Drive shafts, engine components, engine crankshafts
- G6.3 Marine main turbine gears, pump impellers, electric armatures
- G2.5 Gas and steam turbines, turbo compressors, computer memory drums
- G1 Grinding machine drives, small electric armatures, phonograph drives
- G0.4 Gyroscopes, Spindles, precision grinders

NATA CERTIFICATION

VEEM is certified for dynamic and static balancing by the National Association of Testing Authorities and is controlled under an ISO 9000:2000 quality system.

BALANCING EXPERIENCE

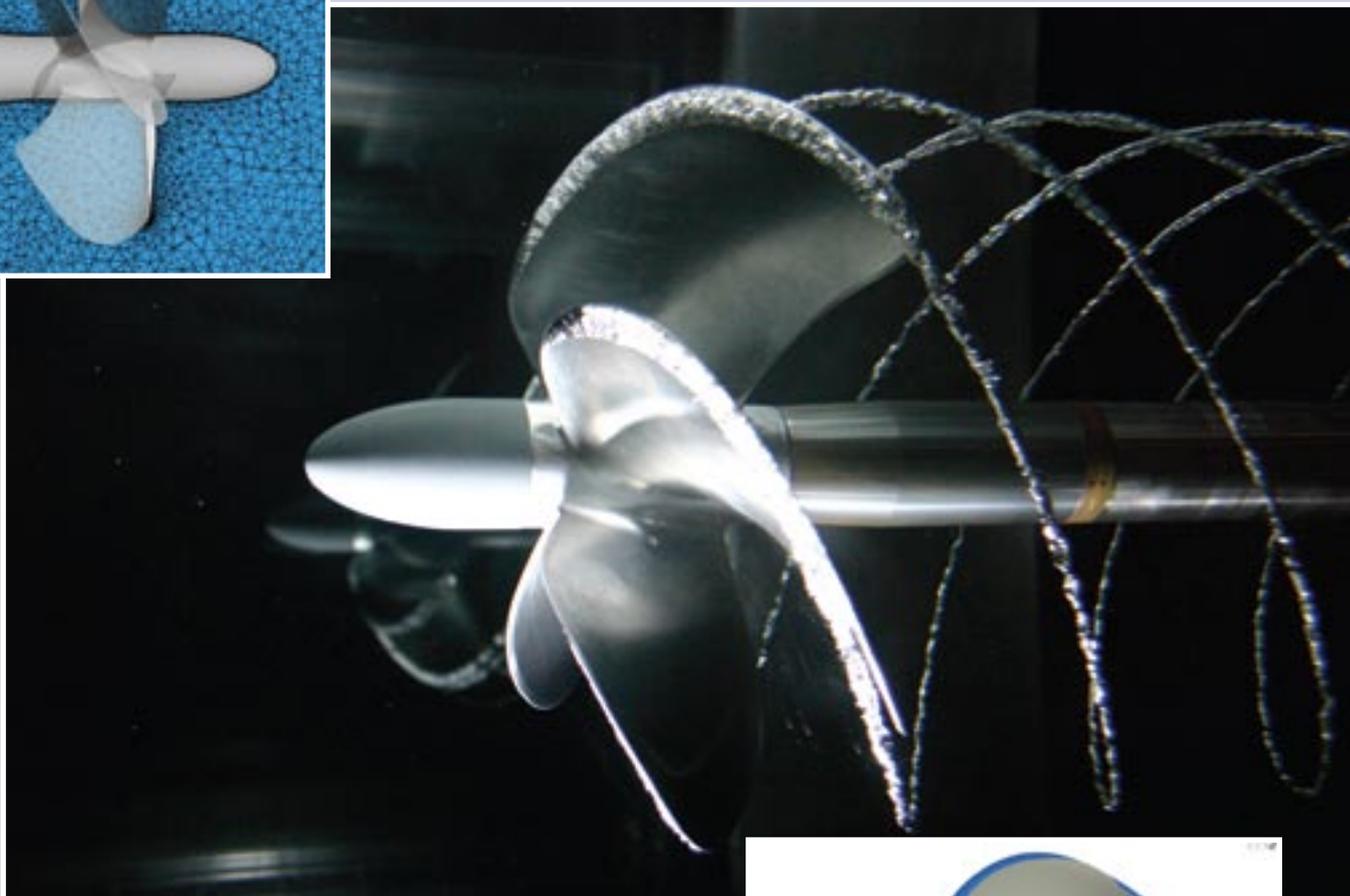
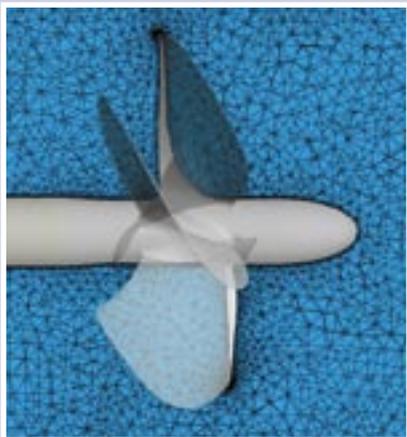
Since its inception in 1968, the division has been a leader in the field of dynamic balancing and is equipped with modern, accurate equipment to meet the demands of its wide variety of clients. We are proficient in balancing to ISO 1940/1 and AS 3709 standards down to a quality grade of G1, where required.



RESEARCH AND DEVELOPMENT

RESEARCH AND DEVELOPMENT

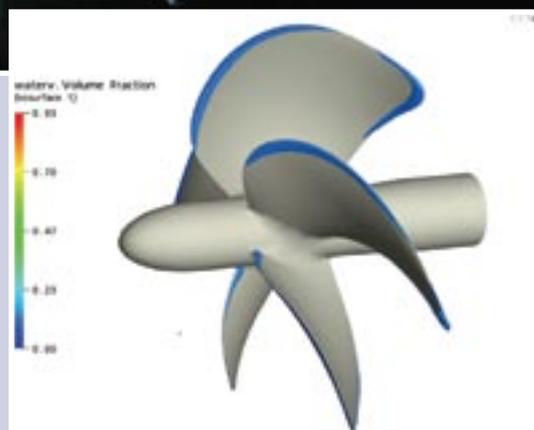
VEEM has a continuous research and development program for the evolution of propeller designs, shaft-line equipment and new propulsion related products. VEEM also has a parallel research and development program for manufacturing processes, which ensures the highest quality and accuracy during manufacture is achieved. Consequently, VEEM boast a series of market leading propeller designs, manufactured using the very latest robotic and CNC machinery, supported by a high level of factory automation.



Design analysis using CFD prediction and cavitation tunnel verification

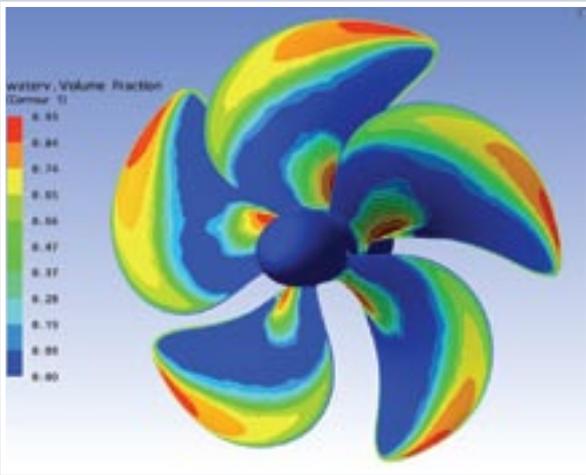
ONE STEP AHEAD

VEEM's development program is driven by planned milestones, which ensures that propeller and propulsion system design improvement is progressive. Our dedication to advancing designs and creating innovative propulsion systems ensures that VEEM is always one step ahead of the competition.



LATEST TECHNOLOGY

New design revisions are developed using the latest Computational Fluid Dynamics software (CFD) and tested for strength using Finite Element Analysis (FEA). CFD is now capable of accurately predicting incremental design improvements, and offers a significant time saving to evolving propulsion designs using multiple models and full scale trials. Validation of propeller designs is of particular importance to finalise the design process. All proposed new designs are tested in a cavitation tunnel using a scale model, and then trialed on a full scale vessel to check other performance attributes such as manoeuvrability and acceleration. Finally, the predicted improvement in efficiency and/or smoothness is verified with back to back trials on the full scale vessel using the current and proposed propeller designs.



Vapour fraction contour

THE CUTTING EDGE

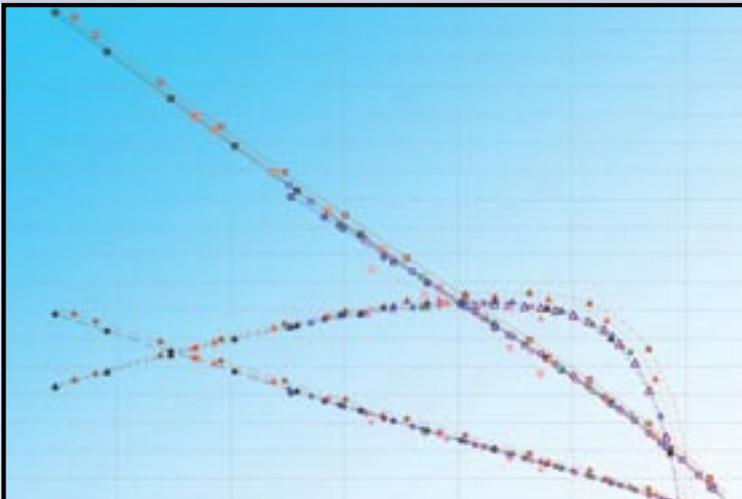
VEEM's primary test vessel is a 64ft sport fisher powered by two off 2400HP+ engines. This vessel is specifically used for validating new propeller designs operating in the 30 to 50+ knot bracket. VEEM's commitment to research and development ensures you are purchasing a cutting edge product.



High speed propeller testing (VEEM 64 footer)

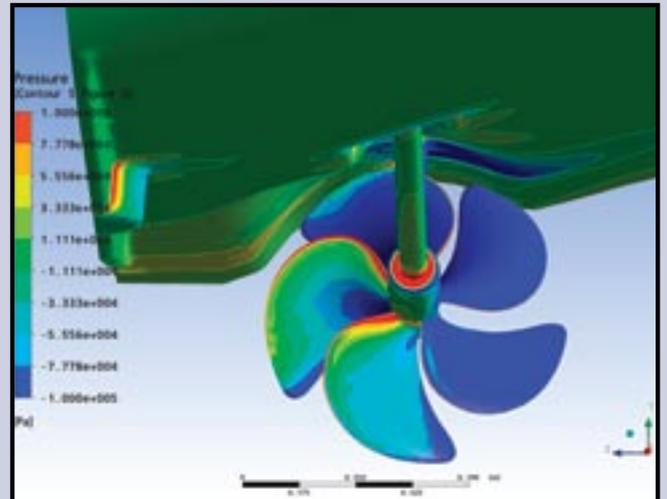
Cavitating & Non-cavitating Open Water Propeller Characteristics

Thrust Coeff., Torque Coeff., Efficiency ($K_T, 10K_Q, \eta$)



Advance Ratio (J)

Hull & Propeller Interaction





INTERCEPTOR PROPELLER™

INTERCEPTOR PROPELLER™

THE PRODUCT

The product is a highly differentiated patented propeller that has an adjustable nickel Teflon finish to inhibit marine growth and improve the self-cleaning ability. It is more accurate and more repeatable than any propellers on the market.

"SPLASH AND FORGET™"

TECHNICAL AND COMMERCIAL REASONS FOR THE PRODUCT

Pitch is one of the major factors influencing the efficiency and performance of boat propellers. To protect engine warranty and ensure optimum engine performance, the propellers need to have the correct pitch. It is however difficult to design a propeller with the ideal pitch for a particular boat prior to it being launched because of variables unknown at the time of manufacture. These include:

- one off designs and construction variations (common in high end boats);
- manufacturing variations in boat hull design;
- manufacturing variations in engine power output;
- the addition or removal of heavy structures on the boat such as towers, fuel or water tanks;
- addition or removal of ride control effecting power at the propeller
- operating conditions where water and air temperature differ both seasonally and geographically;
- salt water content.



Interceptor 0mm



Interceptor 2.5mm



PELLER™

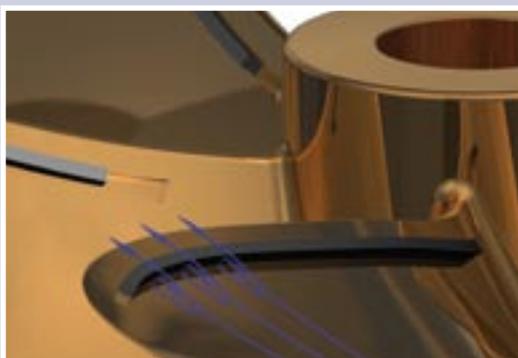
pitch feature of up to 3 inches. In the future the propellers will have a
of the blades when in operation. Interceptor propellers are geometrically



HOW IT WORKS

The Interceptor™ design is an adjustable protrusion on the trailing edge of the pressure face of the blade to produce a surface discontinuity. The protrusion is arranged with an included angle equal to or less than 90 degrees which causes a “wedge” of circulating fluid to be captured. This “wedge” of fluid induces a local increase in lift in this region of the foil section, without the associated frictional drag associated with alternative foil sections. Furthermore the effective pitch of the blade foil section is dependant on the relative height of the interceptor strip.

The ability to adjust the relative height of the protrusion via interchangeable strips allows the “effective pitch” of the propeller to be adjusted to suit the specific application the propeller operates in.



Interceptor 3mm

PERFORMANCE WITH ECONOMY

The Interceptor solves the pitch problem by machining a recess into the trailing edge of each propeller blade. Strips of a specialised polymer are manufactured to fit and lock into the recesses. The top of each insert sits proud of the trailing edge of the propeller blade and creates the interceptor, effectively altering the pitch of the propeller. The ideal pitch can then be calculated using VEEM's interactive website and the pitch adjusted using a set of inserts of equal height. The insert heights range from 0 to 3 mm.

When a change in pitch is required a set of inserts of a different height can be used, eliminating the need to either change to a new propeller or mechanically alter the existing one.



PLEASURE CRAFT AND SPORT FISHERS

PLEASURE CRAFT AND SPORT FISHERS

Many leading boat builders around the world utilise VEEM propellers to get the best from their vessels. VEEM have developed the VEEMStar, VEEMStar-C and VEEMSportfish designs specifically for use in the pleasure craft and sport fisher market. VEEM pride themselves in developing market leading products specific to each builders' requirements. This is achieved by working closely with each builder on new vessel models and designing our propellers to suit.

RELIABILTY - PERFORMANCE

VEEM has a full time research and development division which continues to push the boundaries of performance for high speed designs. Particular emphasis is placed on validating new designs before release to customers. This ensures that common propeller related problems do not occur, and is the key to VEEM's success within the pleasure craft and sport fisher market. Many boat builders recognise the need for a product which is not only fast and smooth, but is reliable in operation throughout its life. VEEM's "no compromise" attitude ensures that each propeller adds value to the vessel, delivering smooth, fast and trouble free operation first time, every time.



Riviera 51' with VEEMStar-C Propellers



Advanced blade profiles to suit very high speed applications



A fleet of Viking Yachts fitted with VEEM Propellers.



Riviera 60' - 1500HP Enclosed Flybridge



Viking 64' with Interceptor™ propellers

TECHNOLOGY

VEEM's pleasure craft and sport fisher designs are created using the latest C.F.D.(Computational Fluid Dynamics) technology and cavitation tunnel testing. These designs are then validated on full scale trial vessels. VEEM's primary test vessel is a 64ft Sport fisher with two off 2400HP engines which is required to validate 30 to 50+ knot propeller designs. VEEM is highly experienced within the medium to high speed vessel market, and our dedication to product research and development is proof that VEEM is one step ahead of the rest.

SPEED WITH ECONOMY

Medium to high speed pleasure craft and sport fishers are similar in that they require custom designs specific to each vessel in order to obtain optimum speed, smoothness and fuel economy. VEEM takes pride in the design and manufacturing quality of its products which means that your new VEEM propeller performs smoothly and efficiently, first time.



PASSENGER AND VEHICLE FERRIES

PASSENGER AND VEHICLE FERRIES

VEEM supplies many of the worlds' leading Ferry builders, providing both product and engineering design solutions. Propellers, shaft lines and ride control are all available as part of a package. A package solution from VEEM ensures component compatibility, accurate assembly and operational simplicity. VEEM can supply shaft line components to suit any vessel size, giving ferry builders a one stop shop for propulsion systems.

Complete, simple, and cost effective solutions are the primary requirement of ferry builders, VEEM products excel in these three areas. VEEM propulsion expertise ensures that the propulsion system adds value to the vessel through reliable performance and smooth operation. VEEM products are made at one site under a stringent quality control system.

Propellers for this market require customised designs to ensure maximum performance. Base propeller designs suitable to conventional ferry applications include the VEEMStar and VEEMStar-C. These designs operate successfully on ferries constructed by prominent builders around the world. VEEM also offer complete propulsion systems for surface drive and water jet applications. They have extensive experience in the design and manufacture of innovative and unconventional propulsion solutions.

VEEM uses cutting edge technology in the design and selection of propellers. This includes noise and vibration prediction, propulsive efficiency optimisation using Computational Fluid Dynamics (C.F.D.) software and cavitation tunnel testing, followed by blade strength calculation using Finite Element Analysis (F.E.A.) software. A cost effective package is developed using these technologies, applying their experience, and streamlining the design process.

Kangaroo Island ferry using VEEM components



Photo courtesy of Austal Ships

VEEM Manufactures ride control systems for AUSTAL Ships

SUPER YACHTS

SUPER YACHTS

VEEM has extensive experience in the super yacht market. This experience shines through in the success of the designs for this sector. VEEM's ability to provide products specifically for the application means that the performance is optimized, and tailored to clients needs.

Photo supplied courtesy of Trinity Yachts



Super yacht manufacturers seek propulsion systems that provide maximum propulsive efficiency combined with the smoothest possible operation. Application specific versions of the VEEMStar or VEEMStar-LC are recommended for super yachts. The VEEMStar-LC is suited to applications with high horsepower and limited diameter.

VEEM's custom engineering of each propeller design is tailored to meet the specific requirements of each vessel. Problems associated with cavitation, noise and vibration are solved through optimisation of blade profiles, skew and sizing expertise. VEEM employs professional engineers and Naval Architects to ensure that the right propeller is fitted first time, eliminating the need for costly post trial modifications.

VEEM uses cutting edge technology in design and selection of propellers. This includes noise and vibration prediction, propulsive efficiency optimisation using Computational Fluid Dynamics(C.F.D.) software and cavitation tunnel testing, and blade strength calculation using Finite Element Analysis (F.E.A.). Optimal inflow to the propellers can be provided with a complete VEEM shaft line package, designed and manufactured by VEEM, tailored to suit each vessel.



Evolution 110' Super Yacht with VEEM Propellers fitted



COMMERCIAL FISHING & WORK BOATS

COMMERCIAL FISHING & WORK BOATS

VEEM's experience within the fisheries market extends for more than 45 years. Our practical knowledge combined with the latest technology in software, manufacturing and design, position VEEM as the market leader. A wide range of trawlers, fishing boats, tugs and other work vessels benefit from VEEM propellers.

Trawlers and work boats require a propeller that offers maximum thrust, smoothness and manoeuvrability, whilst offering maximum fuel economy. VEEM's primary focus is to design propellers with high efficiency. High propeller efficiency translates to improved fuel economy and increased vessel speed. For many vessels, the saving in fuel consumption over one to two years will pay for the cost of a new propeller.

Trawler with VEEM Skewplan propeller



VEEM offer many designs suitable to the fishing and work boat industry which ensures that the optimal solution for each vessel is available. For trawlers, pusher boats and tugs with nozzles, VEEM offer traditional designs such as the Kaplan, however our new Skewplan and Maxifoil Skewplan designs offer the ultimate in thrust, smoothness and efficiency. Low speed work boats without nozzles fitted benefit from either the Loadstar or VEEMStar designs, both providing excellent thrust and manoeuvrability.

Cray boats, pilot boats, offshore supply vessels and other medium to high speed commercial vessels with open propellers benefit from either the VEEMStar or VEEMStar C designs, both offering smooth, fast and efficient operation.

While ensuring maximum thrust and smoothness, VEEM's fishing and work boat propeller designs also prevent common problems such as cavitation burn and poor manoeuvrability. VEEM's design and selection skills ensure that your vessel enjoys hassle free operation from day one. VEEM propellers are built using the highest grade Nickel Aluminium Bronze, and are robust to ensure you get the maximum life out of your investment. Trawler owners praise VEEM propellers for their strength and durability; they often remain undamaged after impacts with debris and sharks.



Photo courtesy of Austal Ships

Austal Ships - Electra5 luxury research vessel

MILITARY VESSELS

MILITARY VESSELS

VEEM Limited deliver high quality marine products and services to the military sector. Areas of expertise include propulsion, full shaft-lines, submarine valves, Naval refits and repairs. VEEM's expertise in propeller design and selection has ensured that VEEM propellers are in service on a large number of high performance Military Vessels. With VEEM's quality management system, extensive experience in the application of Naval Engineering Standards and N.A.T.A.(National Association of Testing Authority) accreditation, you can rely on VEEM products even in the most demanding service environments.

Yemen Patrol Boats



Military applications require classification approved products of high quality. VEEM's internal processes are pre-approved by many classification societies without third party inspection. Military systems require reliability whilst providing efficiency and performance. VEEM's technology driven manufacturing processes, and ability to provide complete shaft line packages ensures that a cost effective solution is met.

VEEM offers a broad range of propeller designs that are applicable to military vessels, however the strength of VEEM product lies in custom designs. Where others offer an existing series or design, VEEM recognises the need for a one off design for many applications. With VEEM's technology and expertise the cost of a custom design is no longer an issue. With VEEM you get a 'no compromise' solution.

Noise is of primary concern for many military applications. VEEM offers a comprehensive analysis of noise and vibration in conjunction with vessel speed optimisation. With the professional staff employed by VEEM, using the latest technology in design and selection, you can have confidence in the predicted results. This means you get the right solution for every application.



Photo courtesy of Austal Ships

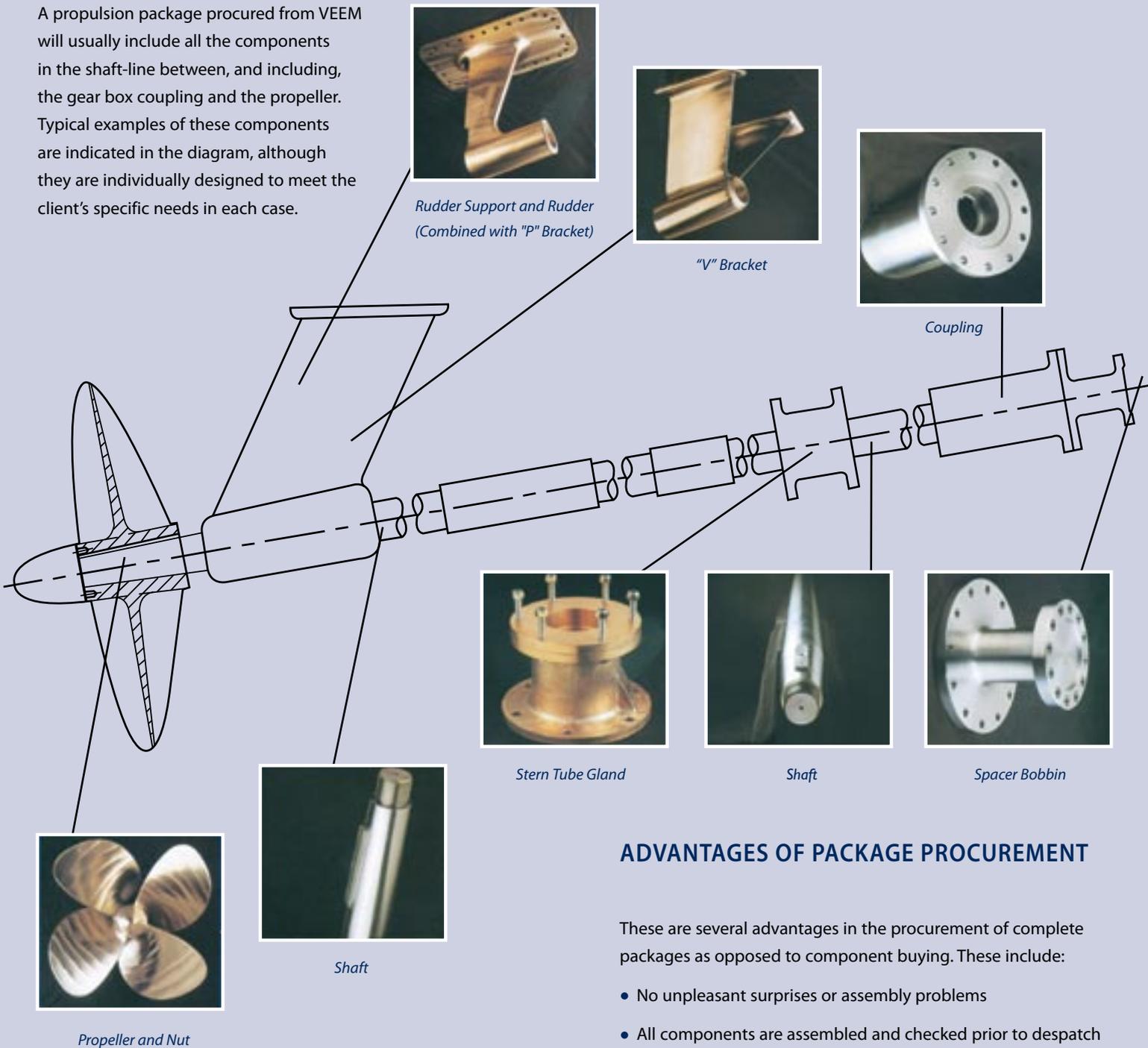
Armidale Patrol Boats for Australian Defence Force

SHAFTING SYSTEMS

SHAFTING SYSTEMS - COMPLETE PACKAGE SOLUTIONS

WHAT IS A PACKAGE?

A propulsion package procured from VEEM will usually include all the components in the shaft-line between, and including, the gear box coupling and the propeller. Typical examples of these components are indicated in the diagram, although they are individually designed to meet the client's specific needs in each case.



ADVANTAGES OF PACKAGE PROCUREMENT

These are several advantages in the procurement of complete packages as opposed to component buying. These include:

- No unpleasant surprises or assembly problems
- All components are assembled and checked prior to despatch
- Single source rather than multiple suppliers
- Less paperwork saving time and money
- Guaranteed system quality

NEW PRODUCT

VEEMSportfish™ PROPELLER SERIES

The new VEEMSportfish series of propellers have been designed specifically to meet the requirements of the modern sport fishing vessel. The VEEMSportfish series has been optimised using the latest in computational fluid dynamics software, and tested over thousands of hours during the world's most demanding fishing tournaments. The result is a propeller series that provides unrivalled manoeuvrability, as well as maximum top speed, fuel efficiency and smoothness.

Modern sport fishing vessels require propellers with the highest level of manufacturing quality available. VEEM's highly advanced manufacturing method allows each propeller to be tailored to suit the specific needs of each vessel. The ability to custom design each feature of the propeller design provides the vessel with a major advantage over competitors. All VEEM propellers are 5 axis CNC machined on 100% of the propeller, including the bore, key way, boss, blades, puller holes and edges. All VEEM propellers are then finished by a fully automated high lustre polishing process, ensuring the smoothest and shiniest finish possible.

Every VEEMSportfish propeller is offered with the ability to customise ANY aspect of the propeller geometry, including the addition of the popular Interceptor™ technology. Diameter, pitch, rake, skew, section type, blade area and boss detail are all available for optimisation with each new order. As a result, the VEEMSportfish propeller series is the propeller of choice for professional captains.

Vessel wake at trolling speed has also been a focus of the VEEMSportfish propeller series. Unloaded blade tips and optimised tip geometry minimise the blade tip vortex. As a result, the VEEMSportfish has a clean and smooth wake at trolling speed, free from visible vortex signatures. The VEEMSportfish design provides modern sport fishers with the ability to maximise vessel performance, smoothness and manoeuvrability, while offering the cleanest wake possible for maximising fish strikes.



5 Blade VEEMSportfish™ Propeller

VEEMSPORTFISH SPECIFICATIONS

Diameter:	500mm - 2000 mm (20" -78")
Pitch Distribution:	Variable Pitch
Blade Section Type:	Double Ogival/Cambered
Skew:	Custom
Blade Rake:	Custom
Material:	NiBrAl (Nickel Aluminium Bronze)
Manufacturing Standard:	ISO 484/2 Class S
Balance Standard:	ISO 1940/1 G2.5



VEEMStar® PROPELLERS

VEEMStar® PROPELLERS

The VEEMStar propeller design has been developed using the latest technology available, and is designed for use on medium speed applications. The VEEMStar's reputable performance is assisted by unique and advanced features including: efficient double ogival blade sections, variable pitch distribution, noise reducing blade tips, and cavitation resistant blade profiles. The VEEMStar offers outstanding blade cavitation control which results in increased performance, and improved smoothness. VEEM propellers are made from high strength nickel aluminium bronze as standard, providing excellent resistance to corrosion, erosion and fatigue. VEEM offer several other alloys where required. In essence, the VEEMStar is a proven performer for a wide range of medium speed applications.



5 Blade VEEMStar® Propeller

VEEMSTAR NOMINAL SPECIFICATIONS

Diameter:	500mm - 2000mm (20" - 78")
Pitch Distribution:	Variable Pitch
Blade Section Type:	Double Ogival
Skew:	25 Degrees
Blade Rake:	0 Degrees
Material:	NiBrAl (Nickel Aluminium Bronze)
Manufacturing Standard:	ISO 484/2 Class S
Balance Standard:	ISO 1940/1 G6.3 or G2.5

VEEMStar-LC® PROPELLERS

VEEMStar-LC® PROPELLERS

The VEEMStar-LC is designed exclusively for super-yachts and other medium speed vessels that simply require the ultimate in smoothness and efficiency. The VEEMStar-LC has been designed in conjunction with several of the worlds' largest super-yacht manufacturers, where the design criteria was to obtain maximum efficiency and smoothness.

In order to satisfy the highest customer expectations, the VEEMStar-LC incorporates high skew, variable cambered blade sections, variable pitch, optimized thickness distributions, cavitation burn resistant profiles and anti-singing edges. Manufactured using the latest robotic and CNC processes, the VEEMStar-LC is of the highest quality and accuracy attainable, and is further improved with dynamic balancing at VEEM's NATA approved balancing facility. The VEEMStar-LC is the choice for those who require the smoothest and most efficient operation possible, while retaining excellent manoeuvrability.

VEEMSTAR-LC HIGH PERFORMANCE NOMINAL SPECIFICATIONS

Diameter:	500mm - 2000mm (20" - 78")
Pitch Distribution:	Variable Pitch
Blade Section Type:	Double Ogival/Cambered
Skew:	35 Degrees
Blade Rake:	0 Degrees
Material:	NiBrAl (Nickel Aluminium Bronze)
Manufacturing Standard:	ISO 484/2 Class S
Balance Standard:	ISO 1940/1 G2.5



6 Blade VEEMStar-LC® Propeller

VEEMStar-C® PROPELLERS VEEMSurf® PROPELLERS

VEEMStar-C® High Performance PROPELLERS

The VEEMStar-C is the latest in high speed propeller design for high speed vessels which has evolved from the highly successful VEEMStar design. The VEEMStar-C has been designed in conjunction with several of the worlds' largest pleasure boat manufacturers, where the design criteria was to obtain maximum performance, while retaining an exceptionally quiet and smooth ride. Our largest users are high speed sport fishers and luxury vessels, along with numerous other applications up to and beyond 50 knots. The VEEMStar-C incorporates many market leading technologies including high skew, variable cambered blade sections, variable pitch, optimized thickness distributions, cavitation burn resistant profiles and anti-singing edges. The VEEMStar-C is the choice for those who want the highest performance available while retaining excellent smoothness and maneuverability.



5 Blade VEEMStar-C® Propeller with Interceptor

VEEMSTAR-C HIGH PERFORMANCE NOMINAL SPECIFICATIONS

Diameter:	500mm - 2000mm (20" - 78")
Pitch Distribution:	Variable Pitch
Blade Section Type:	Double Ogival/Cambered
Skew:	35 Degrees
Blade Rake:	0 Degrees
Material:	NiBrAl (Nickel Aluminium Bronze)
Manufacturing Standard:	ISO 484/2 Class S
Balance Standard:	ISO 1940/1 G2.5

VEEMSurf® PROPELLERS

The VEEMSurf propeller is the latest in surface piercing propeller design. It has been developed to meet the requirements of high speed planing vessels and features a cleaver-type blade profile, with hollow faced, wedge shaped sections, designed to optimise shock free entry, and hence provide smooth operating characteristics. The VEEMSurf is manufactured to suit all types of commercial surface drives including Arneson and Levi units. Each VEEMSurf is custom designed and fully CNC machined to suit each application, offering optimum propulsive efficiency while retaining excellent smoothness on high speed applications. The VEEMSurf is manufactured from high strength nickel aluminium bronze or stainless steel.

VEEMSURF NOMINAL SPECIFICATIONS

Diameter:	500mm - 2000mm (20" - 78")
Pitch Distribution:	Variable Pitch
Blade Section Type:	Cambered, cupped
Blade profile Type:	Cleaver
Skew:	35 Degrees
Blade Rake:	0 Degrees
Material:	NiBrAl (Nickel Aluminium Bronze) or Stainless Steel (SS 316L)
Manufacturing Standard:	ISO 484/2 Class S
Balance Standard:	ISO 1940/1 G2.5



5 Blade VEEMSurf® Propeller with Interceptor

VEEMKaplan® PROPELLERS

VEEMKaplan® PROPELLERS

The VEEMKaplan propeller series is suited to nozzle applications and is extremely popular for trawlers, tugs and other vessels requiring high towing or bollard pull thrust. The Kaplan propeller is designed to operate in a nozzle and has excellent thrust characteristics in low speed applications. The Kaplan propeller has a combination of aerofoil sections and double ogival sections towards the tip. The blade contour has a wide tip that is designed to run with a close fit to the inside of the nozzle. Each Kaplan propeller is customized for rake, blade area and boss detail to suit the specific requirements of each vessel. Why compromise when VEEM can supply you with a propeller that provides optimum performance? The VEEMKaplan is manufactured from high strength nickel aluminium bronze material, providing high quality castings with excellent resistance to corrosion, erosion and fatigue. In addition, nickel aluminium bronze is readily repairable.



VEEMKaplan® Propeller

VEEMKAPLAN NOMINAL SPECIFICATIONS

Diameter:	500mm - 4000mm (20" - 173")
Pitch Distribution:	Constant Pitch
Blade Section Type:	Cambered/Double Ogival
Skew:	0 Degrees
Blade Rake:	0 Degrees
Material:	NiBrAl (Nickel Aluminium Bronze)
Manufacturing Standard:	ISO 484/2 Class 1
Balance Standard:	ISO 1940/1 G6.3

VEEMSkewplan®

VEEMSkewplan®

The VEEMSkewplan propeller is a further evolution to the highly successful VEEMKaplan propeller. The Skewplan is designed for use in applications similar to the Kaplan such as on trawlers, tugs and long liners, whilst providing superior smoothness. Reducing noise and vibration is of particular concern for vessels which operate for extended periods of time, where crew fatigue is not only dangerous, but reduces productivity. Not simply a skewed Kaplan, the Skewplan incorporates many additional features not found on competitors' propellers. Blade foil sections have been further optimised to suit modern trawling and bollard pull applications, which means that the Skewplan is well suited to new nozzle designs. Water inflow angle is optimised to each area of the propeller using a variable pitch distribution, as compared to the constant pitch of the Kaplan design, which has the additional effect of controlling cavitation near the blade tips. Overall the Skewplan offers excellent bollard pull, high efficiency, and smooth operation, making it the ideal choice for any vessel equipped with a nozzle.

VEEMSKEWPLAN NOMINAL SPECIFICATIONS

Diameter:	500mm - 4000mm (20" - 173")
Pitch Distribution:	Variable Pitch
Blade Section Type:	Cambered/Double Ogival
Skew:	35 Degrees
Blade Rake:	0 Degrees
Material:	NiBrAl (Nickel Aluminium Bronze)
Manufacturing Standard:	ISO 484/2 Class 1
Balance Standard:	ISO 1940/1 G6.3

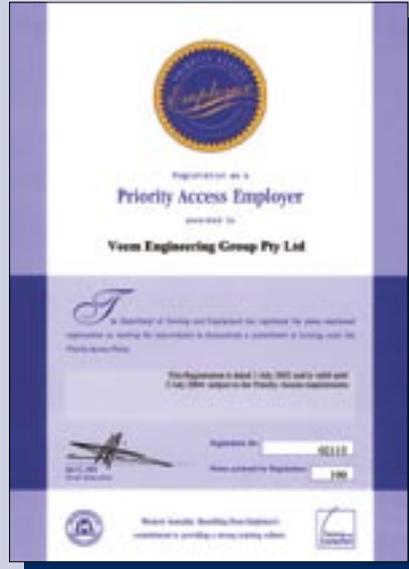


VEEMSkewplan® Propeller

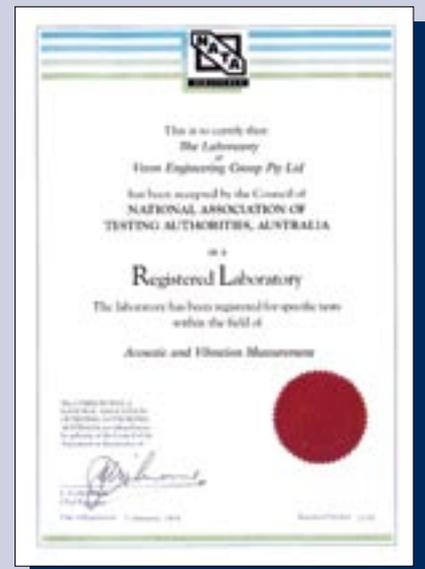
QUALIFICATION AND CERTIFICATION



ISO 9001 Quality Endorsed Company



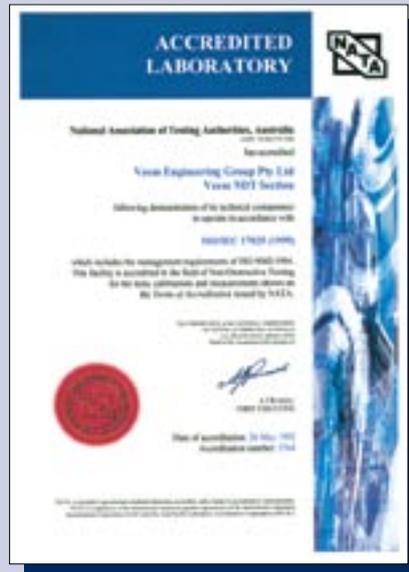
Government of Western Australia
 Priority Access Employer



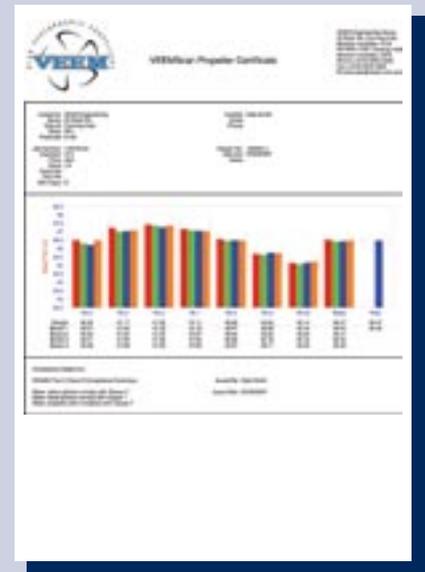
NATA registered for Acoustic and Vibration
 Measurement in the field of Dynamic Balancing



VEEM Propeller Dynamic Balancing Report



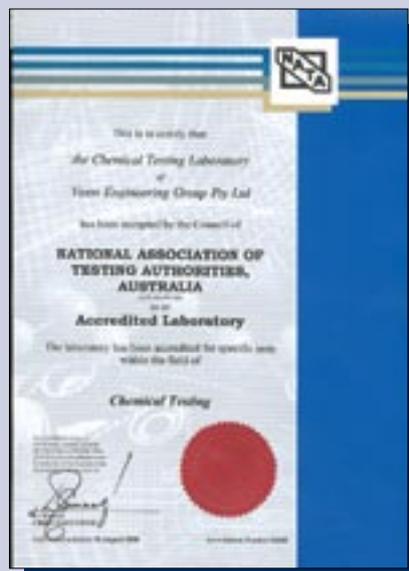
NATA registered for Non-Destructive Testing



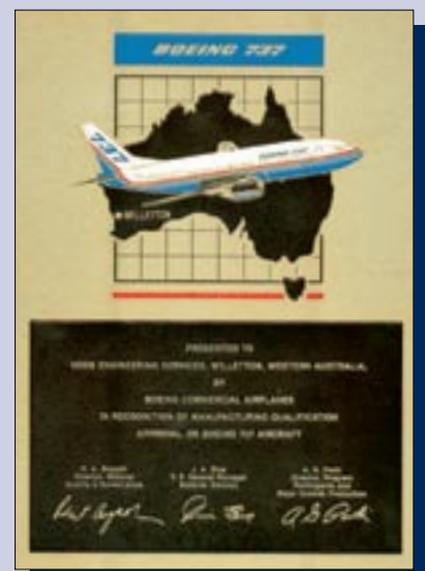
VEEMScan Propellor



AMEX Certificate



NATA registered for Chemical Testing



Boeing approval for Aircraft Component
 Manufacturing



VEEM LIMITED

P.O. Box 1542 Canning Vale – Western Australia 6970

22 Baile Road Canning Vale – Western Australia 6155

Telephone (+618) 9455 9355 Facsimile (+618) 9455 9333

Email: props@veem.com.au Website: www.veem.com.au

Dealer



ABN 51 008 944 009