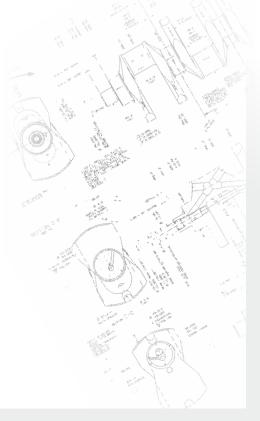
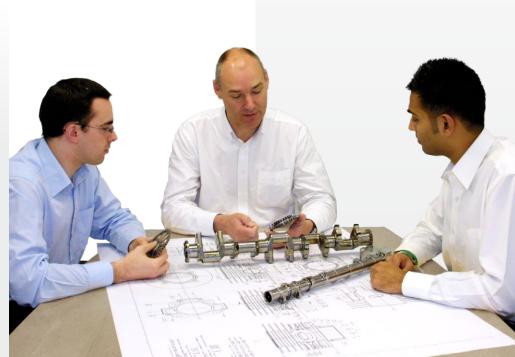
COSWORTH

Cosworth leverages over fifty years of successful motorsport pedigree. We use our performance technology expertise and globally recognised brand to provide high quality engineered solutions across a diverse range of industries. The company's head office in Northampton is home to cutting edge engineering, world-class manufacturing and comprehensive test facilities. Our business is geared to deliver smart solutions and exceptional service to customers around the world.

Cosworth delivers world-class engineering capability, offering the ability to scheme, analyse, design, develop and manufacture batches of engines using its highly experienced, specialist staff on a single site. This unique structure enables Cosworth to set industry benchmark leadtimes, whilst providing unparalleled technology transfer opportunities. This document outlines our processes, allowing clients to maximise the benefits received from exploiting Cosworth's unique capabilities.

"one stop solution for design and manufacturing"





time

Fully project managed solutions from design concept to manufactured product

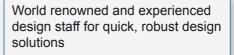


World-class engineering staff with hands-on experience, able to create or formalise concepts for the following:

- Any engine configuration from 1 to 12 cylinders
- Normally aspirated, turbo charged or supercharged
- Petrol, diesel, alcohol and bio-



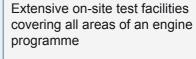




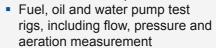
- Unigraphics NX with comprehensive file translation capability
- Material selection and specification
- Casting, moulding, extrusion and fabrication knowledge
- Engine and chassis control, data logging and electrical harness capability, including Pi Research and Pectel products













Materials laboratory for tensile, fatigue and wear/friction testing





Design

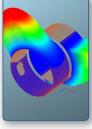
Prototype Manufacture

Test & **Development**

Manufacture

Typically 10-12 months from blank screen to running engine

Concept

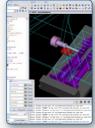


Comprehensive, dedicated and experienced in-house analysis

- FEA using Patran, Abaqus, Nastran packages
- CFD via Star-CD
- Dynamic analysis with multi-body dynamics software, proprietary crank and valvetrain applications



Simulation





On site, state-of-the-art manufacturing facilities ensure flexible, high quality, short lead time response to prototype manufacture

- Fully integrated CAD/CAM system using Vericut machine simulation
- 3,4 and 5 axis machining centres for CNC milling, turning, grinding and honing
- Materials processing capability for aluminium, titanium, magnesium and steel (including







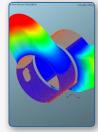
Niche volume production run manufacture (typically up to 100 engine sets) using the onsite 3600m² AS9100 accredited machine shop

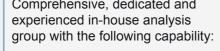
Manufacturing processes focused

- Reducing setup time
- Reducing manufacturing cycle
- Minimising handling lights out manufacture
- Complete value chain management
- 'Right first time' manufacture





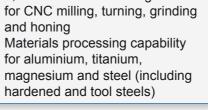




- 1D engine simulation using GT









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