INNOVATIVE TECHNOLOGY
FOR IMPROVING PERFORMANCE AND REDUCING EMISSIONS
Helical Technology has been established for over 50 years and has a global presence with production facilities in the UK, India and China.

With a background in the design and manufacture of springs, valve rotators and actuators, Helical is now a world leader in the design and manufacture of acoustic and EGR exhaust valves and it has its own in-house Technical Centre.

Our company has evolved over the years to meet the growing demands of an increasingly global market. Today the family-owned business supplies clients across Europe, America and Asia from its headquarters and Technical Centre in Lancashire and from manufacturing subsidiaries in China and India.

Our collaborative approach, with clients and production partners alike, enables us to deliver tried and tested solutions that perform without compromise in the most challenging conditions. Dedicated design teams for each product line are focused on a continuous process of development and improvement, while extensive on-site testing facilities ensure each component and system conforms to our Customers’ exacting standards.

We are proud to have achieved the very highest international quality and environmental accreditations, and we think you’ll find evidence of our commitment to excellence in every aspect of our business.
**Global Locations**

**Helical Technology Headquarters (UK)**
- Independent family-owned company
- Established 1962
- Lytham, UK
- Valve Rotators
- Exhaust Valves
- Springs

**Helical Technology Technical Centre (UK)**
- Independent family-owned company
- Established 2012
- Warton, UK
- Engine and Exhaust Testing
- Actuators
- Exhaust Systems

**Helical Funwick Engineering (China)**
- Joint venture UK/China
- Established 2002
- Kunshan, China
- Actuators

**Helical Engineering Kunshan (China)**
- Subsidiary
- Established 2008
- Kunshan, China
- Valve Rotators

**Helical Auto Technology (India)**
- Subsidiary
- Established 2007
- Pune, India
- Actuators
- Valve Rotators

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**Our History**

Matthew Mills founded the Moss Iron Works and Mills engineering company in Heywood Lancashire.

James Mills died October 26th age 52. Matthew William Mills takes over from his father’s legacy.


Helical's own built Speed 12 supercar successfully trials at the Nürburgring.

Helical wins Queen’s award for achievement in exports.

Helical celebrates 50th Anniversary.

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Helical Engineering Kunshan established in China.

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**Timelines**

- 1825
- 1828
- 1880
- 1920
- 1962
- 1987
- 1992
- 1996
- 2002
- 2007
- 2008
- 2009
- 2012
- 2015

Matthew William Mills became a leading authority in the realms of sewerage machinery reviving the fortunes of the Mills engineering company.

First manufacture of valve rotators for supply to large diesel engine OEMs.

Helical Technology Ltd founded Helical Corporation now heavily involved in automotive industry led by Alistair, Charles and Andrew Morris, sons of James Mills Morris.

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OVERVIEW OF HELICAL’S PRODUCTS AND SERVICES

EXHAUST VALVES
Helical develops and manufactures exhaust valves for many of the world’s leading performance and luxury car brands.

ACTUATORS
Our actuators for turbochargers enable fast and precise control, reducing vehicle emissions.

VALVE ROTATORS
Helical valve rotators for large diesel and gas engines help to keep valves cleaner, reducing carbon build-up and so lowering engine emissions - as well as extending the life of key engine and valve gear components.
PROTOTYPE EXHAUSTS
Design and fabrication of development samples and prototypes of bespoke exotic exhaust systems for luxury and performance cars, from lightweight & durable materials.

TECHNICAL CENTRE
The Warton Technical Centre offers a range of test facilities for vehicles, engines and components, including low and ultra-low emission vehicle technologies such as hybrid and electric.

R&D
Helical develops innovative concept designs of products and prototypes for premium automotive and other clients.
EXHAUST VALVES

Helical Technology is the world leader in design and supply of top quality Exhaust Valves for both Acoustic & EGR applications, supplied to many of the world’s most prominent vehicle manufacturers.

We design, develop, validate, and manufacture a complete range of exhaust and emissions systems – from manifold to tailpipe, for some of the most technically advanced and difficult applications.

Helical offers a total service of R&D, design, testing and manufacturing, under one roof. A purpose-built Helical Technical Centre houses physical and simulation testing facilities for vehicles, engines, systems, sub-systems and components, to reduce development lead times and ensure a swift, professional response. The Technical Centre has been developed with the sole aim to provide advanced exhaust engineering to the automotive sector. Helical Technical Centre is a one-stop-shop, delivering high quality test and development support with rigid quality at competitive prices.

ACOUSTIC EXHAUST VALVES

Exhaust valves are fitted as an integral part of a vehicle’s exhaust system, opening and closing to control the gas flow and optimising engine back-pressure for improved performance and acoustic control.

- 100% control of valve position
- Tunable NVH characteristics
- Controllable back-pressure

EGR EMISSION CONTROL EXHAUST VALVES

NOx emission reduction using Exhaust Gas Recirculation (EGR).

Benefits of Low Pressure (LP) EGR over conventional High Pressure (HP) EGR

- No scavenging means increased turbo effectiveness and increased efficiency
- Easier recirculation at high loads with variable-geometry turbocharger
- Larger particulate matter

Long Loop EGR using Helical’s Low Pressure (LP) EGR Valve

- High turbo effectiveness & high MPG
- EGR already been filtered via DPF
- Can be used in conjunction with High Pressure Loop (HP) EGR

Helical’s Low Pressure (LP) EGR Valve

- Fast response <170 milliseconds both directions
- Can be made to various diameters
- Robust design and quiet operation
ACTUATORS

The gradual worldwide introduction of new automotive emissions standards has created the need to equip new vehicles, both petrol and diesel, with ever more precise control systems.

Pneumatic actuators

Our pneumatic pressure and vacuum actuators for turbochargers enable fast and precise control, reducing harmful emissions while withstanding extremes of temperature, vibration and environment.

All our actuators go through the procedures of leak testing, hysteresis, extremes of temperature and vibration testing.

We also design and produce pressure and vacuum actuators with and without position sensors. Position sensors give feedback to the engine's ECU in order to precisely control emission levels.

We are the only actuator manufacturer to design and produce springs in-house, reducing costs and time to market.

Our actuators are low cost relative to their performance, reliability and longevity. Each actuator is tailor-made for a specific application.

Actuators for turbocharger applications

- Over 44 million actuators sold to date
- Adding value and varied commodities
- Over 25 years experience
- Largest actuator manufacturer in India and China
- Supplied to leading turbo manufacturers all over the world
- Supplied to well known top OEM brands
- Global sourcing strategy enabling competitive advantage
Valve rotator applications
Rotators are used in large diesel and gas engines in the following sectors:
• Marine
• Locomotives
• Power generation
• Trucks
• Large off-road vehicles
• Various specialised vehicles and engines

Benefits of valve rotators
• Each time a valve opens, the valve rotator turns the valve slightly
• This prevents the valves sticking due to carbon build up
• It allows the inlet and exhaust valves to be heated and cooled symmetrically
• Fitted to the top or bottom of the valve spring, the valve rotator helps to keep valves cleaner, reducing carbon build-up and so lowering engine emissions
• Valve rotators extend the life of key engine and valve gear components
• They help to reduce the amount of carbon deposits on the valve and prevent carbon build-up on the valve seat
• Cleaner valves reduce engine emissions and prevent burning and guttering of the valve face and seat
• Valve rotators reduce thermal gradient and stress, reducing the need for high-cost nimonic steel valves

Helical valve rotators
Helical valve rotators operate by means of the increase in valve spring loads from valve closed to valve open. Our rotators can be manufactured in sizes ranging from 25mm to 150mm diameter. Each one is tailor-made for a specific engine application. We have the design expertise and flexibility to complete the development cycle rapidly from design to prototype stage, and then to on-time delivery of serial production.

All our valve rotators are tested to meet customers’ overspeed, overload and temperature specifications. We have test rigs for engines up to 460mm cylinder diameter.

Our rotators must have a long life span, extending to tens of thousands of hours. The quality and design of our rotators allow us to meet the demands of the toughest applications.
Helical has the capability to design and develop bespoke exhaust systems for luxury and performance cars from lightweight and durable materials.

We are developing a specialism in manufacturing prototype exhaust systems from lightweight and durable materials such as titanium and inconel for premium, luxury and performance cars.

Helical can fabricate bespoke development samples and prototype exhaust systems and components in low volumes.

We have employees with many years’ experience of working in the area of exhaust systems design.

Helical is a world leader in the design and manufacture of exhaust system components such as exhaust valves.
The Warton Technical Centre offers a range of facilities including 15 test and NVH cells and a calibrated test track, for vehicles and components, including low and ultra-low emission vehicle technologies such as hybrid and electric.

We offer:
- Durability testing
- Validation programmes
- Evaluation work
- Emissions testing (Horiba MEXA)
- R&D programs
- NVH data acquisition and development
- Consultancy
- Prototype development

For:
- Powertrains with a range of fuels eg. gasoline, diesel, gas and dual-fuel (Compressed Natural Gas (CNG) and Liquid Natural Gas (LNG))
- Exhaust systems
- Hybrid and electric components
- Gearboxes

Services
- Acoustic acquisition & analysis (LMS TestLab hardware & software)
- Engine calibration (INCA, ATI & CANalyser hardware & software)
- Structural diagnostics & evaluation
- Heavy duty & passenger vehicle emissions measurements
- Mechanical & thermal fatigue analysis & durability testing
- Climatic & environmental testing
- Materials analysis

Facilities
- Engine test cells x 12
- Semi-anechoic chambers x 3
- Vibration shakers x 5
- Hydraulic actuators
- Climatic chambers x 1
- Vibration climatic chamber x 1
  -70°C to +190°C rapid cooling
- Natural gas burners x 5
- Environmental chambers x 11
- Drive-by noise test track
- Cold flow rig tester
- Manufacture and modification
- Vehicle workshops
- Pre & post inspection
- Serviced offices and warehouse
**INNOVATIVE PRODUCT DEVELOPMENT**

This Special Projects team undertakes our most ambitious assignments. Our skilled team is focused on designing and developing innovative mechatronic engineering solutions – often in collaboration with our development partners.

**ELECTRIC ACTUATORS**

An example of a product in research and development is an electrical actuator. Rotary or linear designs can be made as required, with or without built-in intelligence. We have the design expertise and flexibility to complete the development cycle rapidly from design to prototype stage, and then to on-time delivery of serial production.

**PROTOTYPE CAPABILITIES**

- Full CNC tool room for rapid tooling
- 75 tonne press work including pierce and lip tooling
- 2D Mazak laser cutting CNC
- Manifold fabrication
- 3 axis CNC electric mandrel tube bending (31.2-76mm ID)
- Pittsburgh lock seam with interleaf
- 10 tonne press case
- Spun end caps/moon end seamer
- Box pan folder & press brake
- 2 x Eagle sizing machines
- Titanium component and system fabrication
- 3D Printing extruded ABS [FDM process] & laser cured resin [stereolithography process]
- Various fabrication machinery and equipment

**HELICAL SUPERCAR PROJECT**

Helical has built two bespoke supercars inspired by the TVR Cerbera Speed 12. The Mk1 GT Racecar is naturally-aspirated, the Mk2 GT Roadcar is turbocharged. The Mk2 features a twin-turbo 6.0-litre dry sump V12 engine developing 1012bhp, resulting in a 0-60mph time of 2.9 seconds and a top speed of 218mph.

Helical’s venture into supercar manufacture has provided the opportunity to develop and test new technologies such as carbon fibre composites, acoustic electronic exhaust valves, titanium exhaust system, sound enhancement technologies and other blue sky R&D projects.

The supercars also act as dynamic test rigs to test the product design iterations in real-life scenarios, where the driving dynamics factor is a valued addition over standard test equipment in the laboratories.

Modern turbocharged engines have lost the desired sound characteristics that customers yearn for and Helical is striving to develop a natural pleasing normally aspirated V-engine sound from today’s modern turbocharged engines.
QUALITY

Helical operates a Quality Management System compliant with the international standards ISO 9001 and TS 16949.

ENVIRONMENT

Helical operates an Environmental Management System compliant with the international standard ISO 14001.