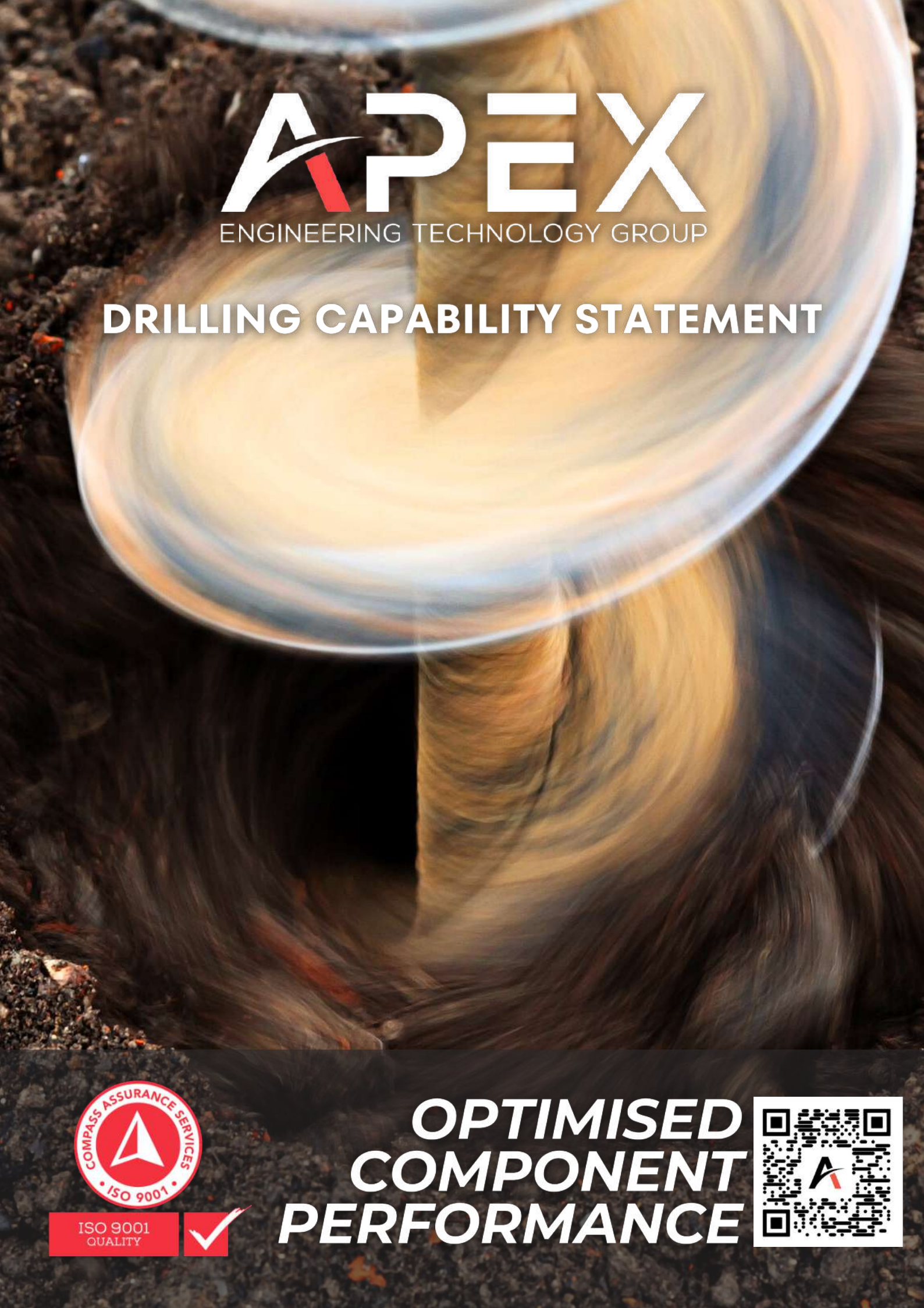


APEX

ENGINEERING TECHNOLOGY GROUP

DRILLING CAPABILITY STATEMENT

COMPASS ASSURANCE SERVICES • ISO 9001 •

ISO 9001 QUALITY

OPTIMISED COMPONENT PERFORMANCE

CAUSES OF WEAR

Abrasive Wear

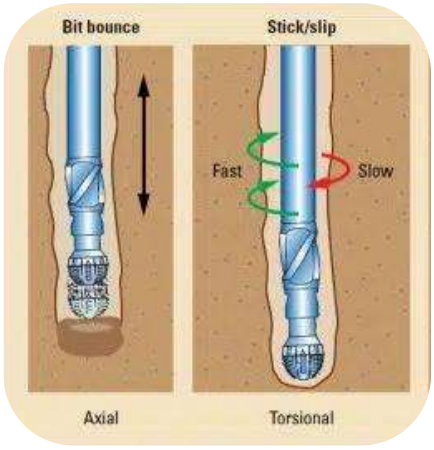
Some drilling applications involve working with abrasive materials, which can accelerate wear and tear on drilling parts, leading to the need for repair.

Erosion

In some drilling applications, the drilling fluid or slurry used to lubricate the drilling process can cause erosion of the surfaces of drilling parts.

Corrosion

Exposure to harsh chemicals, moisture, or other corrosive substances can cause corrosion of drilling parts, leading to weakened performance and eventual failure.



Wear and Tear

The repetitive nature of drilling operations exposes drilling parts to continuous wear and tear, which can lead to failure or reduced efficiency.

Fatigue and Deformation

Repeated use and cyclic loading can induce fatigue in drilling parts, causing them to weaken and deform over time.

Impact and Shock

Drilling operations can encounter unexpected obstructions, rocks, or other hard objects that can cause impact and shock to the equipment. This sudden stress can result in damage to the drilling parts.

BENEFITS OF LASER CLADDING

Enhanced Wear & Corrosion Resistance

APEX ETG's laser cladding significantly improves the wear resistance of drilling components, ensuring extended lifespan and reduced replacement costs. Our laser cladding process creates a robust protective barrier, safeguarding drilling components from corrosive environments and maintaining their performance over time.

Customised Material Properties

With APEX ETG, you gain the flexibility to tailor material properties to match your drilling requirements. We can provide materials with enhanced hardness, strength, and thermal conductivity for optimised performance.

Efficient Repair Solutions

Our laser cladding services offer reliable and efficient repair solutions for worn or damaged drilling components, minimising downtime and lowering maintenance costs.

Design Flexibility

APEX ETG's precise laser cladding process allows for the creation of complex shapes and optimised designs, providing drilling companies with design flexibility to meet specific operational needs.

Cost Savings and Sustainability

By minimising material waste through precise deposition, APEX ETG's laser cladding services help drilling companies reduce costs and adopt sustainable manufacturing practices.

DRILLING APPLICATIONS

Mineral Exploration

Application examples:

- Diamond Drilling: Drill bits and core barrels.
- Reverse Circulation (RC) Drilling: RC drill bits and wear plates used in the drill string.

Oil and Gas

Application examples:

- Offshore Drilling: Wear parts such as drill bits, stabilisers, drilling jars, downhole tools, wear plates, and mud motor components such as rotors and stators.

Water Well

Application examples:

- Rotary Drilling: Wear parts like drill bits, drill rods, drill collars, casing shoes, swivels and rotary tables and mud pump components.

Geotechnical

Application examples:

- Rotary Drilling: Wear parts such as drill bits, drill rods, stabilisers, augers, core barrels and casing shoes.

Environmental

Application examples:

- Direct Push Drilling: Wear parts such as samplers, probe rods, casing shoes and casing advancement systems.

Coal Seam Gas

Application examples:

- Directional Drilling: Drill bits, stabilisers, downhole motors, casing shoes, frac plugs and centralisers.

ONE STOP SURFACE SOLUTIONS

What is laser cladding?

Laser cladding is the most advanced hardfacing process on the market today. Unlike traditional hardfacing, laser cladding uses a laser beam as the source of energy instead of an arc to fuse or alloy coating material and the base material together.

What are the benefits of laser cladding?

- Laser cladding has a significantly reduced heat-affected sone (HAs), which means short cooling times. This creates many advantages:
  - Base material dilution is minimal
  - Almost no distortion of the base material
  - The coating material retains many of its original properties. Resulting in coatings with high hardness and excellent wear resistance, corrosion resistance and dimensional control.
- Large area with high deposition rate
- Cost-effectiveness
- High accuracy
- No flaking or peeling
- 4mm to 30mm deposit width
- Excellent cladding metallurgy
- High-efficiency process — lower thermal input and lower powder consumption
- Minimal pre and post-processing required
- Precision control
- A high-resolution process enables thin-clad layers of ~0.25 mm thickness
- Lower residual stress and distortion

OUR SERVICES

OD LASER CLADDING

APEX ETG offers high-quality laser cladding services for a variety of industrial applications.

Laser cladding services

- 10 kW high power large area cladding
- Internal diameter (ID) laser cladding
- Coaxial multidirectional precision laser cladding
- Hotwire and powder feed delivery options
- EHLA = high-speed laser cladding
- Pre and post-machining services

ID LASER CLADDING

ID laser cladding is when the inside of a component, such as a pipe, bores or tubes, is clad for the benefits of dimensional control, repair and reinforcement, as well as protection against impact, wear, and corrosion. Our versatile ID laser cladding capabilities are ideal for bores or tube 75mm in diameter or greater, with a reach of 2.5 meters. A wide range of alloy materials can be used in either powder or wire form. The 45° laser beam exit angle allows the cladding of both cylinder walls and seating surfaces.

LASER HEAT TREATMENT

The advantages of APEX ETG's cost-effective surface hardening diode laser heat-treating service are high processing speed and precise case depths resulting in negligible distortion and enhanced resistance to wear, fatigue and corrosion resistance. Application examples include: carbon alloy steels and cast irons, bearing surfaces, cutting surfaces, pumps, valve seats, drive train components, gears, pulleys, hand tools, needles and pins, forming tools, stamping dies and turbine blades.

WELDING

At APEX ETG, we use both conventional and laser welding technologies in conjunction with automated robotics allowing us to offer fabrication and hardfacing services, ensuring quality, repeatability and productivity.

Welding and fabrication services

- High-speed fabrication
- 3Phase 400amp MIG welder
- Cutting and forming custom jigs for applications
- Equipment reclamation and repairs

OUR CAPABILITIES

MACHINING

We offer a comprehensive range of services and equipment to manufacture new components, from unique 'one-offs' to large batch runs in a broad range of sises, weights and geometries.

Pre and post-machining services:

- Milling machine with 1.5m bed
- Lathes; 1-4m between centres, up to 2200mm swing
- Cylindrical grinder 3.5m between centres, 650mm swing
- Linisher 5.5m between centres, 1600mm swing diamond belts
- VTL 1200mm swing with a height of 1200mm

TURNKEY SYSTEMS

Our turnkey systems are custom-built to meet your needs. Through our business partnerships with equipment manufacturers and our expertise, we are able to design, manufacture, build and integrate systems for laser cladding and thermal spray applications. Once the system is fully commissioned, we provide calibration, training and aftermarket maintenance support to your organisation

COHERENT FST

LABORATORY SERVICES

APEX ETG's in-house laboratory covers a range of services to engineer, test and analyse hardfacing and laser cladding applications ensuring the optimal surface solution. **These capabilities include:**

- Sample preparation and testing
- Material analysis equipment and software
- Twin rotatory sample grinding & polishing
- Micro and macro hardness testing
- Positive Material Identification (PMI)
- Ultrasonic Testing (UI)
- Dye penetrant inspection

RESEARCH AND DEVELOPMENT

APEX ETG is actively searching for the next innovative component, product, system, technology or process that can increase the opportunities for surface coating solutions. APEX ETG is at the forefront of cutting-edge hardfacing technologies and provides ongoing R&D collaboration opportunities for businesses looking to improve their efficiencies, long-term profitability and environmental goals.

SUSTAINABILITY

Material Conservation

Laser cladding involves applying a thin layer of material onto a base component, which helps restore or enhance its functionality. This targeted approach minimises the use of raw materials compared to full component replacement, reducing waste and conserving resources.

Extended Lifespan

By repairing components using laser cladding, their operational lifespan can be significantly extended. This reduces the need for frequent replacements, which not only saves resources but also reduces the environmental impact associated with the production and disposal of new components.

Energy Efficiency

Laser cladding is a highly efficient process that uses focused laser energy to melt and fuse the cladding material onto the base component. Laser cladding typically requires less energy input than traditional repair methods, such as welding or thermal spraying, resulting in lower energy consumption and reduced carbon emissions.

Reduced Waste Generation

Repairing components through laser cladding generates less waste compared to replacement options. Instead of discarding entire components, laser cladding selectively repairs and reinforces damaged areas, minimising the amount of material that would otherwise be sent to landfills or recycling facilities.

Improved Performance and Functionality

Laser cladding can enhance the performance and functionality of components by using specialised cladding materials, such as corrosion-resistant alloys or wear-resistant coatings. This improves the durability of repaired components, reducing the likelihood of future failures and the associated environmental impact.

Cost-effectiveness

Laser cladding can often be a cost-effective repair option compared to component replacement, particularly for high-value or complex parts. By avoiding the need for complete replacements, businesses can save on procurement costs, transportation, and disposal expenses while reducing the overall environmental footprint.

APEX ETG's Sustainability Strategy

Sustainability is at the heart of our business and our purpose in creating lasting value for our clients and society. To this end, it is about integrating environmental, social and governance (ESG) considerations into our decision-making every day. As a solutions and services provider, our focus is on contributing to better outcomes for our clients, people, partners, suppliers, and the environment. APEX ETG is uniquely placed as a trusted partner to help facilitate sustainable, responsible and efficient operating procedures. By working together, we collectively contribute to a low-carbon future.

In the battle against global warming, APEX ETG supports companies in heavy industries to reach their carbon neutrality targets by offering sustainable alternatives to wear part replacement and R&D collaboration opportunities to pursue green energy innovations. Refurbishing, reinforcing and repairing wear parts damaged by friction, impact, and erosion with refined hard-facing processes minimise waste, reduces downtime and costs, and is a sustainable business approach.

APEX ETG's collaborative R&D efforts with OEMs and service providers are aiding the mining, mineral processing and a range of industries move towards sustainable practices with laser-clad hardfacing on excavators, screens, crushing, wear parts and many more applications. We're excited to be working on new lines of business services that we hope will further support our clients, contribute to the community, and enable a just and fair transition to a cleaner global economy.

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ONE STOP SURFACE SOLUTIONS COMPANY

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