CAPABILITY STATEMENT

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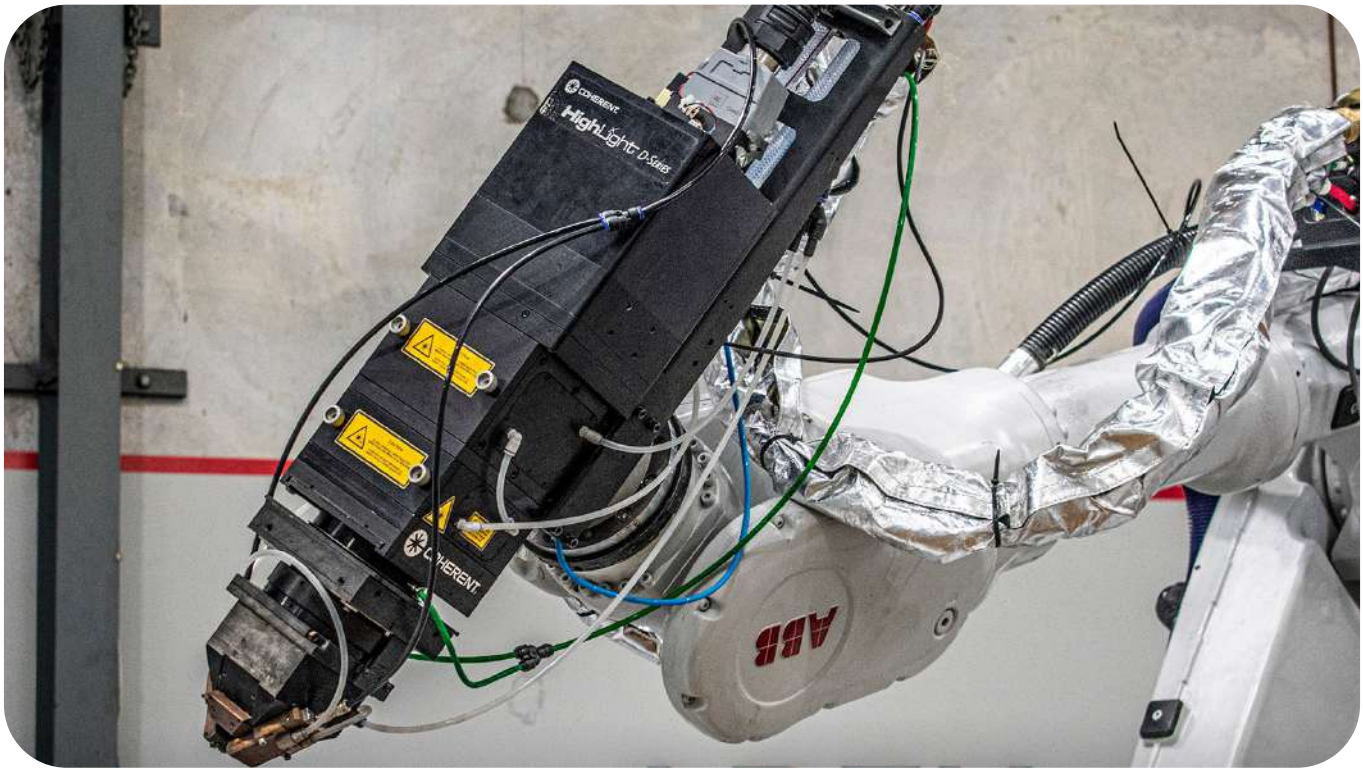
ENGINEERING TECHNOLOGY GROUP

COMPASS ASSURANCE SERVICES • ISO 9001 •

ISO 9001 QUALITY

OPTIMISED COMPONENT PERFORMANCE

ONE STOP SURFACE SOLUTIONS



What is hardfacing?

Hardfacing refers to a process of metalworking where tougher, harder, wear-resistant material is applied onto a base metal, to make it more durable or extend its lifespan. Hardfacing parts can mean saving between 25-75% of the cost of replacement parts.

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 zone (HAZ), 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.
- Cost-effectiveness
- High accuracy
- No flaking or peeling

ABOUT US

APEX Engineering Technology Group Pty. Ltd. is a one-stop surface solutions company offering a comprehensive range of advanced hardfacing products and services for multiple industries and applications.

SOLUTIONS

SERVICES

SYSTEMS

INDUSTRIES

CONSUMABLES

SUSTAINABILITY

MINING APPLICATIONS

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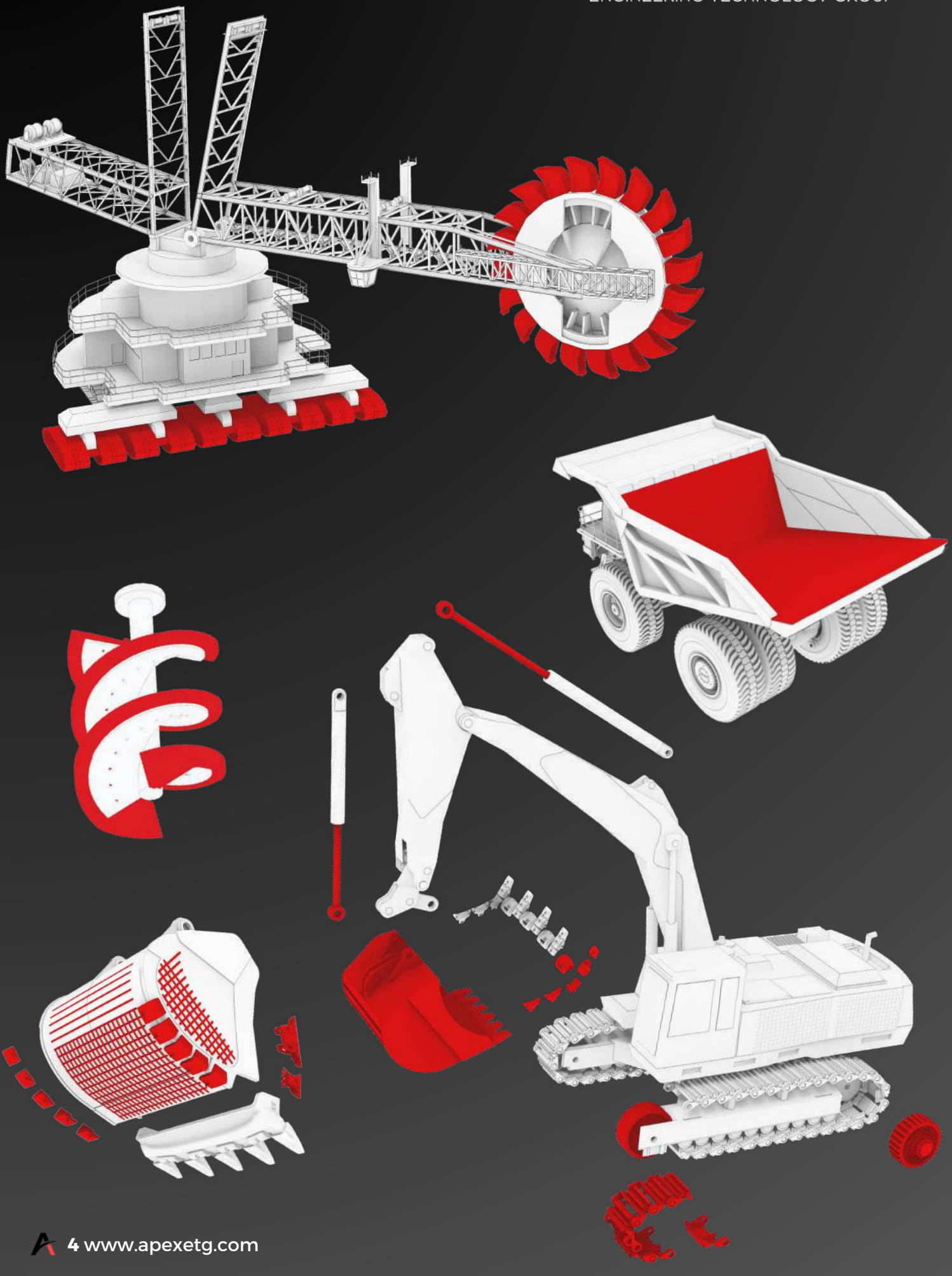
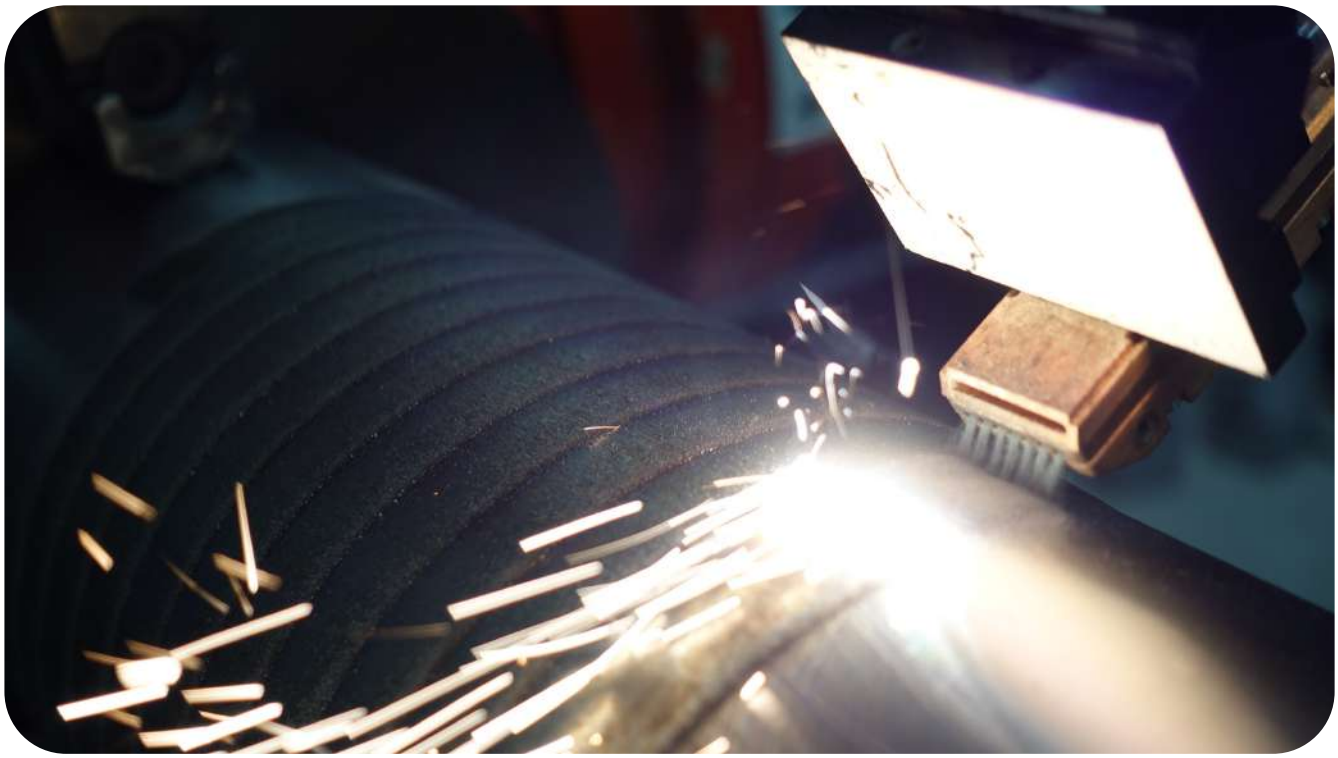


OUR SOLUTIONS



Bring us your market goals and design challenges and let's work together to find the optimal surface solutions. We have broad experience in a wide range of industries and applications, our experts are prepared to work diligently in understanding the specific requirements. Together we can create the optimal surface solutions to increase the lifecycle of your mechanical components, improve production efficiency, reliability and reduce operational costs.

Technology, flexibility and experience are the cornerstones of our business partnerships and optimal surface solutions.

FUNCTIONAL SOLUTIONS

In any given working environment, the lifetime and performance of components are influenced by the phenomena they will encounter, such as impact, corrosion, wear, fatigue, thermal effects, and dimensional control. An optimal solution requires a deep understanding of the purpose and the environment to which the component will be exposed.

OUR SERVICES

LASER CLADDING

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

Laser cladding services we offer:

- 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

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.

Application examples for welding:

- High-speed fabrication
- Hardfacing
- Wear protection
- Equipment reclamation

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.

MACHINING

At APEX ETG, 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 sizes, weights and geometries.

Pre and Post Machining Services We Offer:

- Machining lathes – 1, 3 & 5 meters between centres
- Cylindrical outer diameter grinding up to 4 meters
- Vertical boring & horizontal boring
- Internal diameter grinding
- Milling, drilling and surface grinding

OUR CAPABILITIES

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

ROBOTICS AND AUTOMATION

APEX ETG customises solutions to meet the needs of our customers. This includes project management, process automation, software, training and support from the concept stage to complete turnkey system installation. Contact us to discover more about our in-house robotics and automation services.

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 hardness testing
- Macro hardness testing
- Tensile bond strength testing

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.

OUR CAPABILITIES

OUTER DIAMETER LASER CLADDING

Outer diameter (OD) laser cladding is a method of applying a fully dense, metallurgically bonded and virtually pure coating onto the outside surface of a base part. The coating material is in powder or wire form and bonded onto the surface by a high-power laser to increase wear resistance, corrosion resistance and impact performance of the metallic component. The delivery of the powder is done either with pressurised gas or via gravity feed processes.

GRAVITY FEED

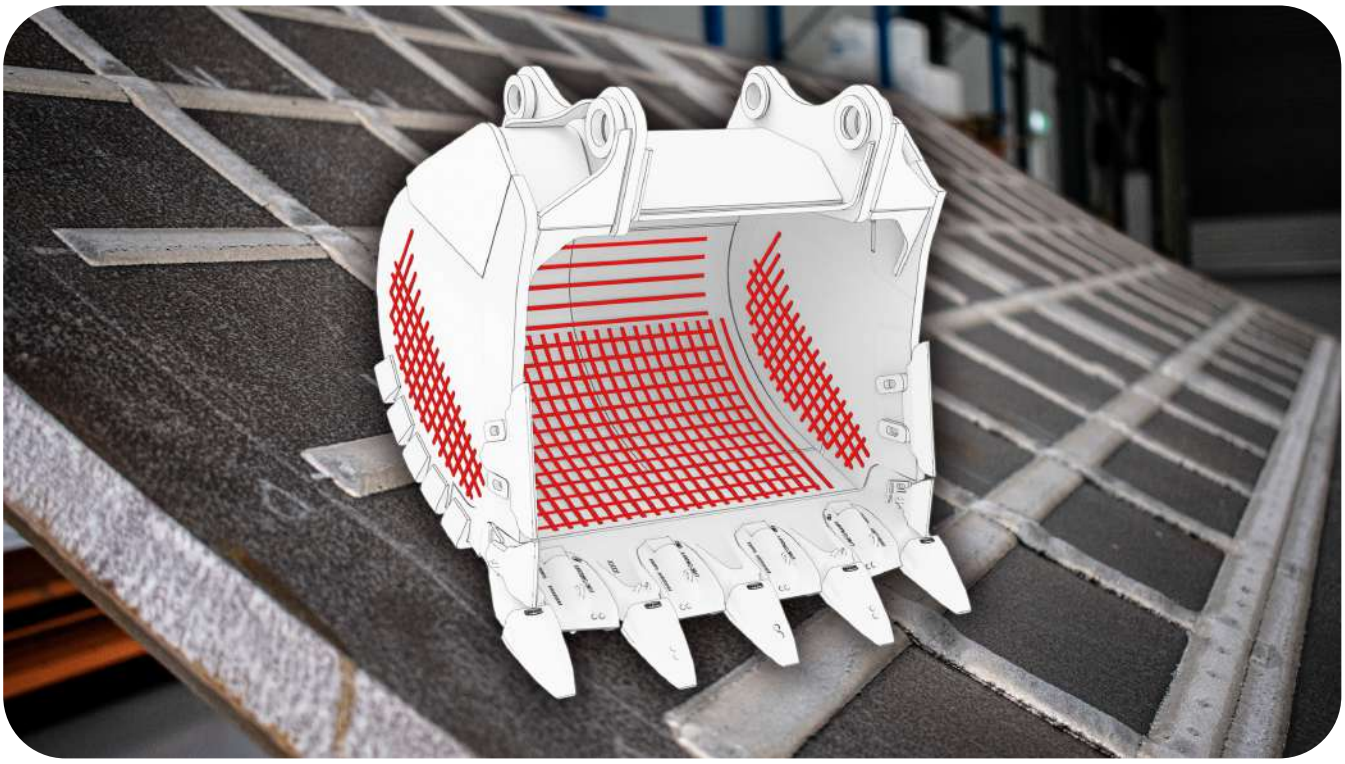
This process involves the alloy powder travelling to the surface of the application by the force of gravity. Here it meets the laser on the substrate forming a melt pool. As a result, the powder is hardfaced onto the component. The benefit of the gravity feed method is almost 100% deposit efficiency of the powder when applied horizontally. Applications include wear plates and hydraulic cylinders.

PRESSURISED FEED

This process involves having an open-loop pressurized unit that forces inert gas, such as argon to deliver the powder into the laser beam to form the melt pool. The pressurised feed process is used when cladding complex geometries and vertical applications. Applications include oil and gas stabilisers, rippers, crusher teeth and wear parts.

HOT WIRE

Hotwire laser cladding process allows for the delivery of a wide range of wire-based materials to be bonded onto the surface of the base part with 100% deposit efficiency. This means no material is wasted. Applications include boiler tubes, mining equipment and any application requiring large area cladding.



HIGH POWER LASER CLADDING

ADVANTAGES

- Large area with high deposition rate cladding up to 15kg per hour
- 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
- Wall plug efficiency >50%, equalling low operating cost
- A high-resolution process enables thin clad layers of ~0.25 mm thickness
- Lower residual stress and distortion

INDUSTRY APPLICATIONS

- Oil and gas industry components
- Water walls and water tanks
- Hardfacing of valve seats
- Bearing shafts
- Bearing seats, cylinder liners, and pins
- Hydraulic shafts
- Mining equipment
- Agricultural and forestry equipment
- Remanufacturing

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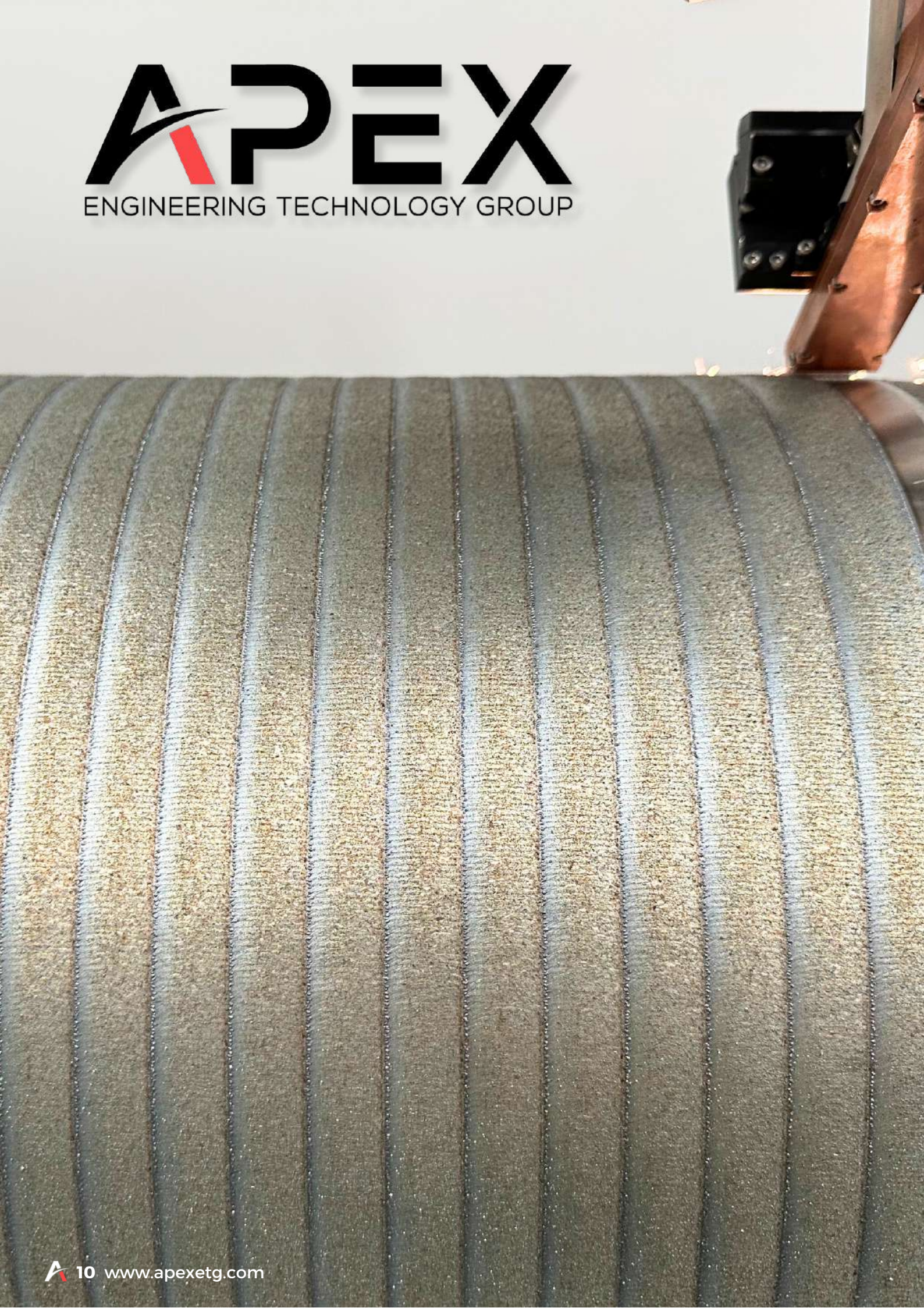

FIBER COUPLED ID LASER CLADDING

APEX ETG's in-house high-power fibre-coupled laser systems offer both coaxial and internal diameter (ID) laser cladding for applications that require precise hardfacing.

ID laser cladding is when the inside of a component such as pipe, bores or tubes are 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 tubes 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 cladding of both cylinder walls and seating surfaces.

APPLICATIONS

- Drill pipes
- Pump components
- Valve components
- Pneumatic cylinders and shafts
- Bearing sleeves and surfaces
- Drive train components
- Sealing surfaces
- Mining and drilling bits
- Gears and gear housings

INDUSTRIES

- Oil and gas recovery and refining
- Rail transportation
- Power generation
- Heavy equipment
- Mining
- Steel/aluminium manufacturing
- Marine equipment
- Defence
- Automotive


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LASER CLADDING SYSTEMS

In partnership with COHERENT, APEX ETG offers a range of laser cladding systems.

COMPACT DIODE

Compact Series diode lasers are robust, modular, compact sources with 50 to 1200W output power for materials processing of plastics and metals.

Applications:

- Brazing
- Heat treatment
- Plastics welding
- Scientific applications
- Selective soldering

FIBER COUPLED

HighLight DL Series are fiber coupled, multi-kW diode lasers for cladding, additive manufacturing, heat-treating and laser-assisted bonding.

Applications:

- Cladding
- Heat treatment
- Brazing
- Welding
- 3D additive manufacturing

DIRECT DIODE

HighLight DD direct diode lasers are ideal for high-speed, large-area materials processing with up to 10 kW output power and flexible beam shapes.

Applications:

- High deposition rate cladding
- Small-to-large area heat treating
- Hermetic welding
- Pressurize and gravity powder delivery
- Hot wire delivery

COHERENT

TURNKEY SYSTEMS

Custom built to your needs.

THERMAL SPRAY SYSTEMS

In partnership with Flame Spray Technologies (FST), APEX ETG offers a range of HVOF and plasma thermal spray systems to the market.

HIGH VELOCITY OXYGEN FUEL (HVOF)

HVOF is a low-temperature thermal spray process that utilises the combustion of gases or liquid fuels for the production of hardfacing coatings. Fuel and oxygen are atomized and mixed within the combustion area where they are ignited at controlled temperatures and pressures resulting in a flame with supersonic velocity. The high-performance material is injected into the flame producing a high bond strength coating with superior wear and corrosion resistance.

ATMOSPHERIC PLASMA SPRAY (APS)

APS is a versatile thermal spray process that allows for the use of a wide range of materials such as metals, ceramics and alloy coatings onto substrates such as metals, composite materials, glass and plastics. Among the benefits of the APS process include resistance against wear from abrasion and erosion, corrosion, clearance control, temperature management as well as electrical resistivity and conductivity.

INDUSTRIES WE SERVE

AGRICULTURE

Application examples:

- Blades: slasher, aerator
- Post hole digger
- Hydraulic shafts
- Broadacre deep ripping shanks, rollers

CONSTRUCTION

Application examples:

- Excavator buckets
- Dozer blades
- Motor grader wear parts
- Hydraulic pistons
- Loader buckets

HYDRAULICS

Application examples:

- Cylinders
- Rams
- Bores
- Various mobile and stationary applications

GAS TURBINES

Application examples:

- Combustion liners
- Transition pieces
- Blades
- Vanes

MANUFACTURING

Application examples:

- Hydraulic cylinders
- Conveyor wear parts
- Rollers
- Blades

MINERAL PROCESSING

Application examples:

- Crushers
- Grinders
- Feeders
- Chutes

INDUSTRIES WE SERVE

MINING

Application examples:

- Ground engaging tools
- Ore bins / hoppers
- Buckets
- Crusher parts
- Chute wear parts

OIL & GAS

Application examples:

- Drilling heads and pipes
- Sleeves
- Bearings
- Extruders
- Hydraulic plungers

PAPER & PRINTING

Application examples:

- Anilox rolls
- Grip rolls
- Plate cylinders
- Offset rollers
- Rods and blades

POWER GENERATION

Application examples:

- Industrial gas turbines
- Blades
- Boiler tubes
- Bearings
- Shafts

STEEL

Application examples:

- Hot mill
- Runout table rolls
- Looper rolls
- Wrapper rolls
- Stabilisation rods

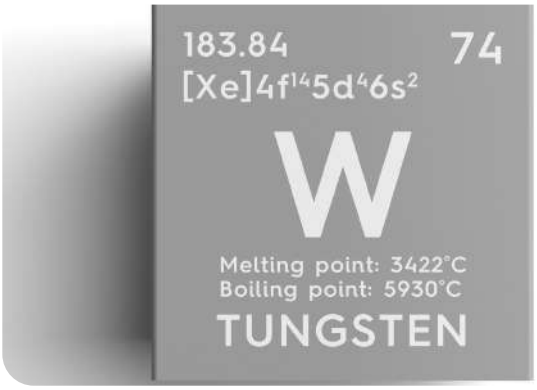
TRANSPORT & MARINE

Application examples:

- Landing gear
- Synchronising rings
- Crank shaft repairs
- Brake discs
- Piston liners

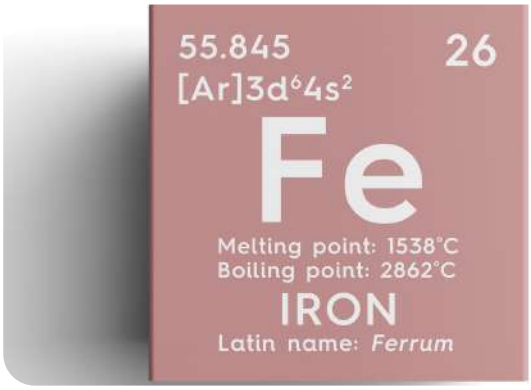
LASER CLADDING POWDERS

APEX ETG offers a wide range of laser cladding powders including tungsten carbide, nickel-based alloys, cobalt-based and iron-based alloys. Our experts ensure you receive the best performing laser cladding powder to meet the surface conditions of your application, such as wear resistance, corrosion resistance, high-temperature resistance, electrical conductivity or oxidation resistance.



Tungsten Carbide

The major use for tungsten is in cemented carbides, also called hard metals, which have a hardness approaching that of a diamond – ideal for use in cutting applications and in wear-resistant materials.

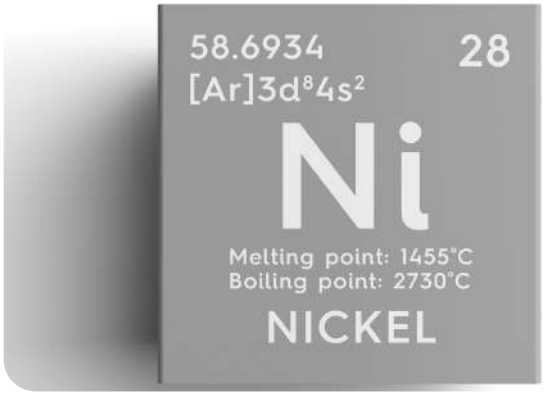


Iron Based

Iron ore is integral to the steel-making process and one of the most sought after commodities in the world. Iron is the backbone of the world we have built around us and it is the basic ingredient of steel (iron plus carbon)

Cobalt Based

Metallurgical cobalt is the second-largest cobalt consuming market and is used to produce superalloys. Superalloys consist of cobalt with other metals such as nickel and/or iron and are heat resistant, surface stable, and corrosion and oxidation resistant materials for industrial applications.



Nickel Based

Nickel (Ni) has relatively low electrical and thermal conductivities, has strength and toughness at elevated temperatures, is easily shaped into thin wires and flat sheets and is capable of being magnetised. When alloyed, nickel imparts toughness, strength, resistance to corrosion and various electrical, magnetic and heat resistant properties.

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 corrosion with refined hard-facing processes minimising waste, reducing downtime, costs and is a sustainable approach for businesses.

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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