



UCM

EV/CAB

JetCaster

Vortex

4D Quench

Super IQ

Vector

Pit-LPC

ZeroFlow

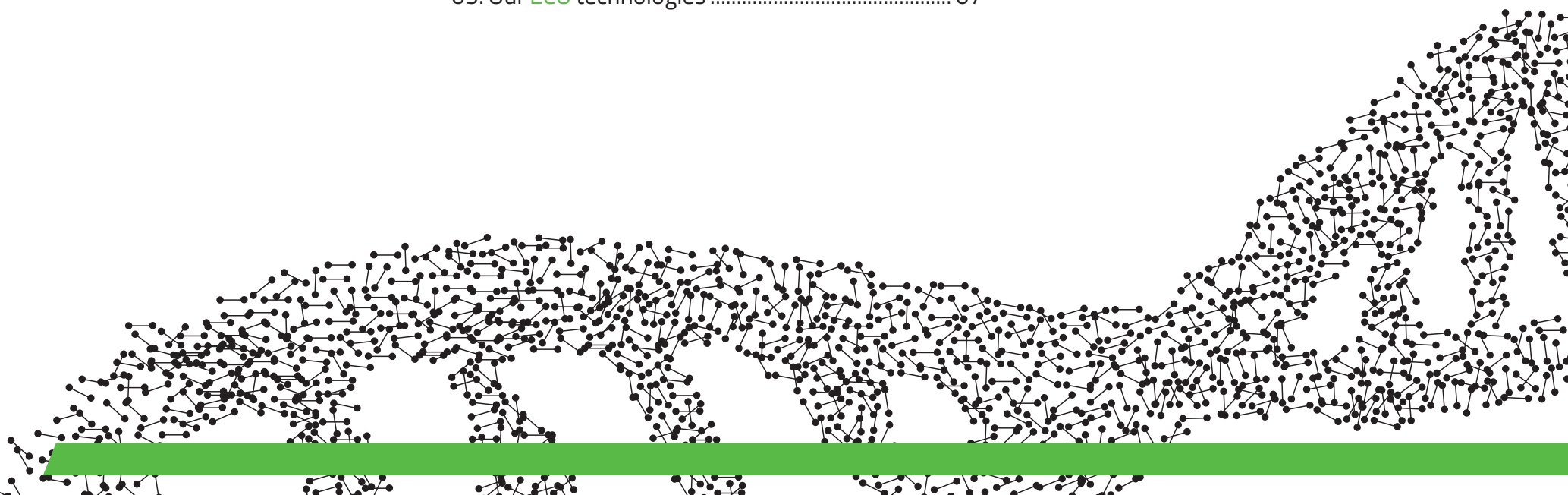
CMe

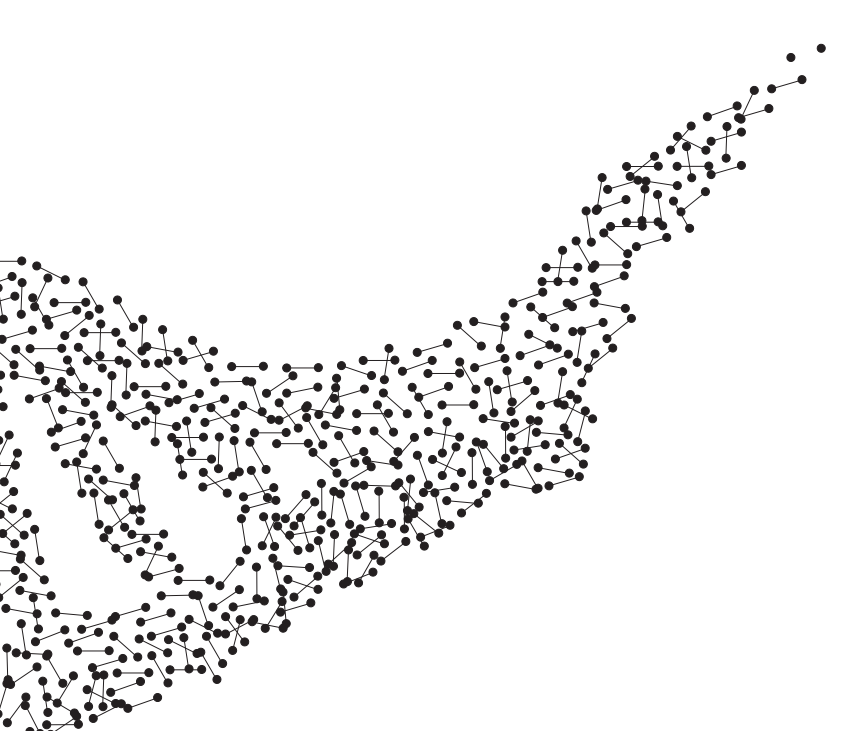
SECO/WARWICK

ECOLOGY IS INSCRIBED IN OUR NATURE

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SECOLOGY

The ECO prefix is inscribed in our name and the Group's DNA. We do not talk and do not think differently about ecology other than **Secology**, because we look at environmental protection so broadly.

Secology is therefore a set of projects and ecological social initiatives, ecological investments within the company and the green technologies that we use or create. **Secology**, thus, is not a new science or strategy, it is the SECO/WARWICK Group's attitude visible in various aspects of its operation.

We have an ecological approach inscribed in our mission, in which we declare that “we create innovative products providing our customers with reliable, safe and environmentally friendly solutions for heat treatment and metallurgy”.

We've changed the metallurgy and heat treatment color to green



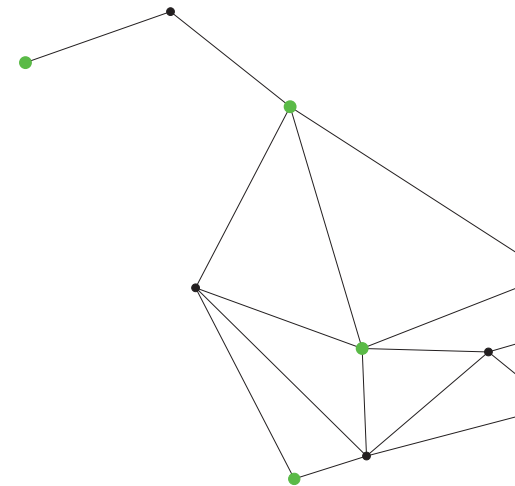
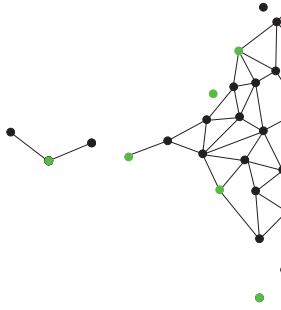
SECO/PEOPLE



SECO/COMPANY



SECO/TECHNOLOGIES





SECO/PEOPLE

"Ecology is inscribed in our DNA" refers to our involvement in green social initiatives. This is why we plant and clean forests, we give books, banners & computers a second life, we build and provide our own containers for plastic caps, we ride bicycles and drink filtered water instead of bottled water, and we donate our frequent flyer points to airlines for the purchase of sustainable fuel.

These are our S(ECO) attitudes.

SECO/COMPANY

SECO is ECO, which is why our production, buildings and activities turn green. And so we water our lawns with rainwater, we introduced energy-saving lighting (often sensor-based), monitor and reduce the paper and printer toner consumption by taking advantage of printing automation and electronic document circulation. We've also introduced paper and cardboard shredders, thanks to which we have ecological packing material for our shipments. Our fleet has also become green, and the roof of the largest shop is decorated with photovoltaic panels.

This is ECO in SECO style.



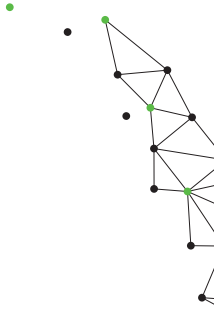
SECO/TECHNOLOGIES

We continue to change the heat treatment and metallurgy color to green by offering customers our solutions. That is why we primarily implement innovative, ecological technologies allowing users to make many pro-environmental changes in the energy, aviation, automotive and recycling industries. SECO/WARWICK has changed our technologies to green by providing solutions that reduce production energy consumption, increase production efficiency, shorten the process and treatment time, and reducing the energy and process gases consumption.

These are the technologies with the S(ECO) mark.

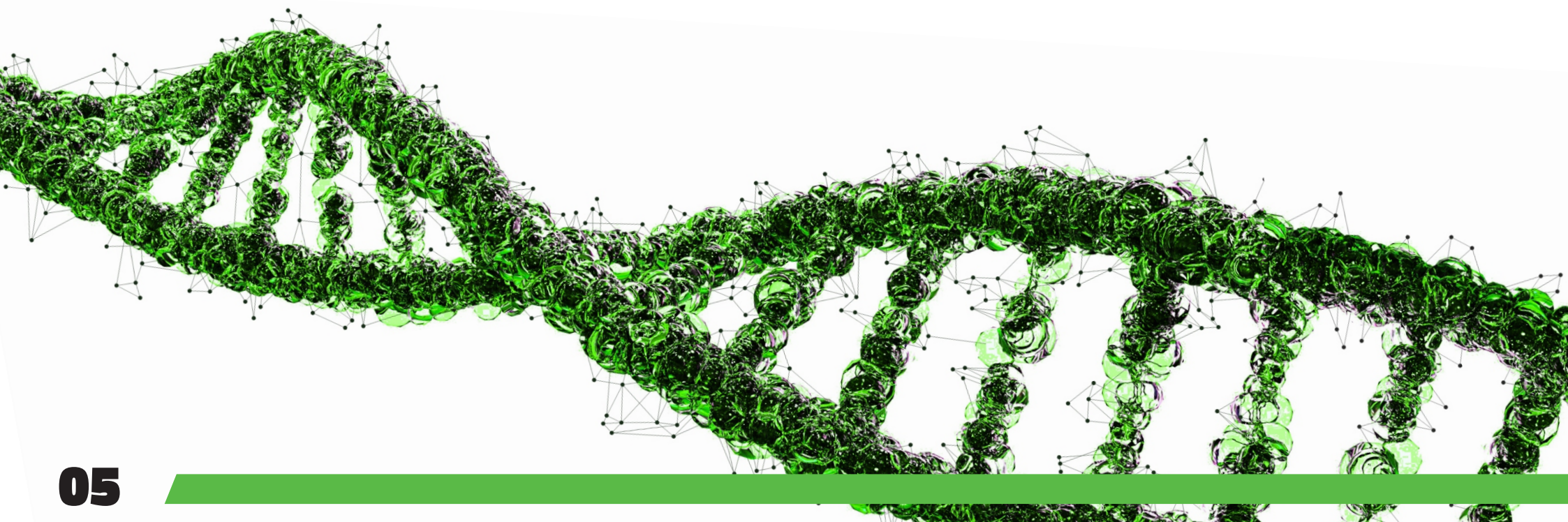


SECO IS **ECO**



Caring for the environment is an important value for the SECO/WARWICK Group. It is understood not only as **sustainable production of ecological and innovative solutions, but also as care for energy conservation, involvement in ecological social campaigns and supporting Partners who contribute to the improvement of the the natural environment.** This is a part of our long-term strategy. That is why we create solutions which save energy and reduce CO₂ emissions in many industries.

Heavy industry can be ecological, and we consistently prove this thesis with our solutions.
Discover these selected **ECO technologies made by SECO/WARWICK.**



VACUUM AS AN **ECO** FURNACE ATMOSPHERE

Vacuum furnaces use vacuum (vacuum created by air evacuation) as the protective atmosphere for the heat treated part surfaces. The vacuum furnace's main advantage is their versatility and the ability to carry out processes traditionally carried out in atmospheric furnaces. Differences in the vacuum furnace construction as well as the method of conducting the processes minimizes both media consumption and emissions to the environment, making the vacuum furnace itself a SECO/ECO solution when compared to traditional atmosphere furnaces.

Vacuum heat treatment's eco-friendly features include:

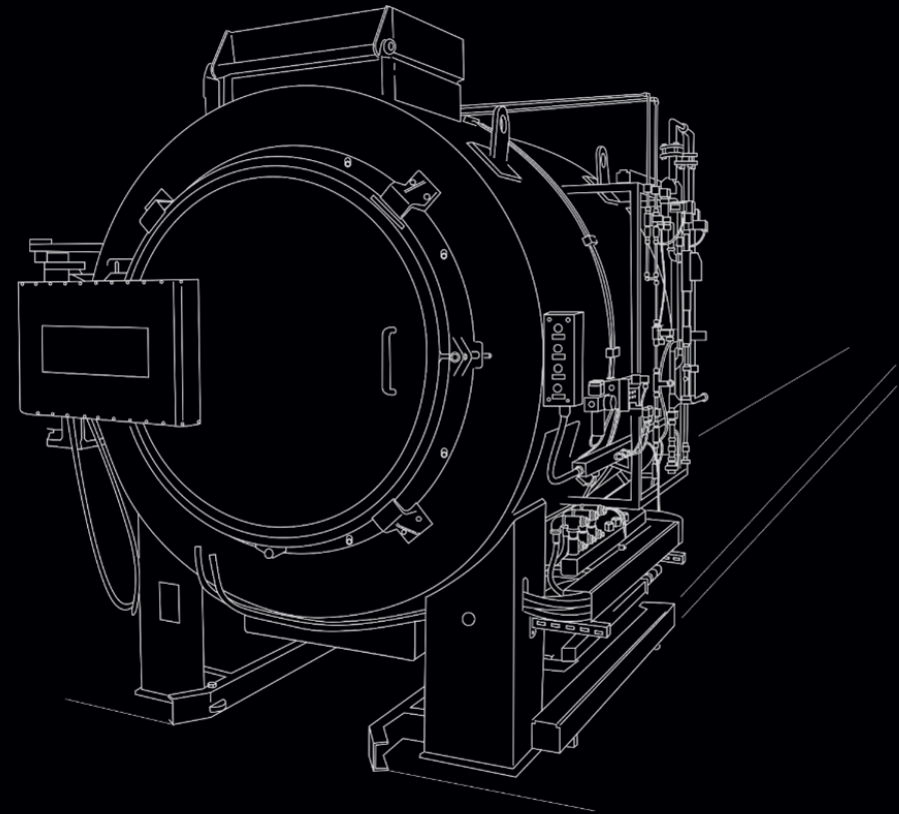
- / perfect part surface quality (without additional operations)
- / no intercrystalline oxidation (no additional mechanical treatment)
- / no need to use protective gases (lower costs and emissions)
- / minimal consumption of process gases (cost savings)
- / minimum time for atmosphere preparation and conditioning (saving time and costs)
- / zero startup and shutdown time, work on demand (saving time, costs)
- / no open flame, no risk of fire or explosion (safety)
- / clean process, no part washing required (reduced environmental pollution)
- / low heat and by-product emissions (limited global warming effect)
- / environmentally friendly (zero pollution)
- / zero CO2 emissions (carbon footprint reduction)



GREEN NITRIDING USING THE ZEROFLOW METHOD

ENERGY-SAVING AND ECOLOGICAL GAS NITRIDING SOLUTION

- / process control by a nitrogen stream to the part with minimal ammonia consumption
- / ammonia demand is significantly reduced, up to 10 times less than traditional technology
- / minimal emission of post-process gases meeting environmental protection requirements
- / vacuum purging instead of gas purging reduces inert gas utilization
- / precise building of any nitrided layer configuration, efficient process
- / carbonitriding carried out effectively and efficiently using methanol

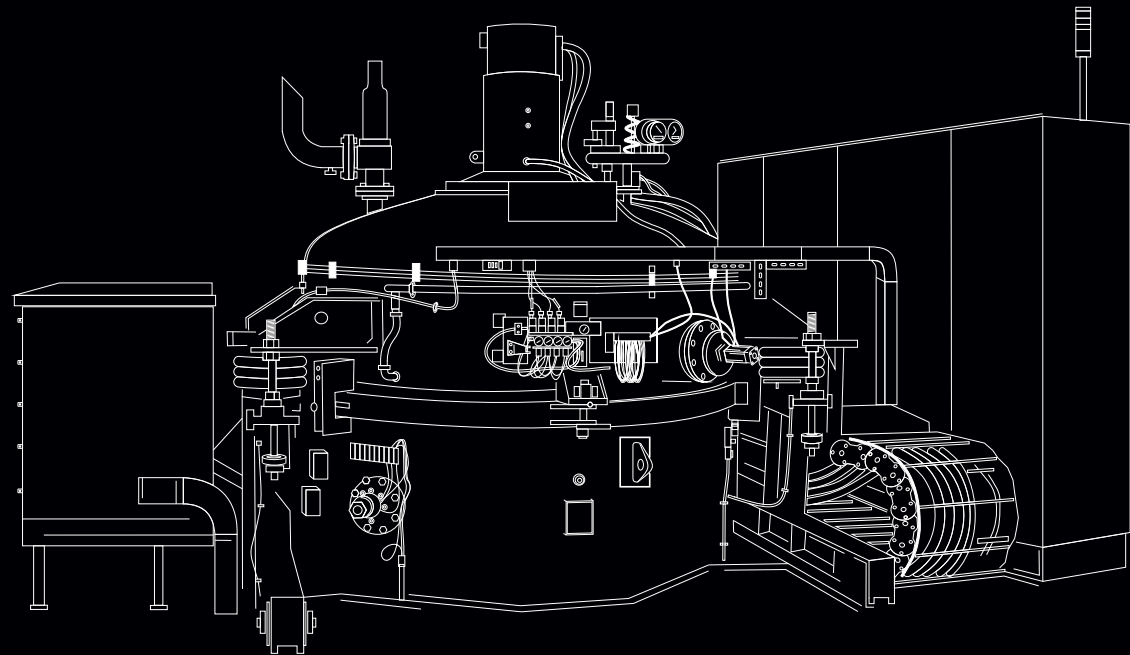


LOW PRESSURE CARBURIZING

THE GREEN ALTERNATIVE TO ATMOSPHERIC CARBURIZING

LPC is used in the following furnaces: CMe (oil, HPGQ), Pit-LPC, Vector

- / produces a significant reduction in carburizing time (up to 5 times) resulting in lower costs and energy consumption
- / zero CO₂ emissions
- / no intergranular oxidation (IGO)
- / saves electricity via low heat losses
- / safe operation, no flammable or explosive atmospheres
- / operational flexibility, work on demand, no idling
- / minimum carburizing gas consumption
- / low emission of heat and by-products

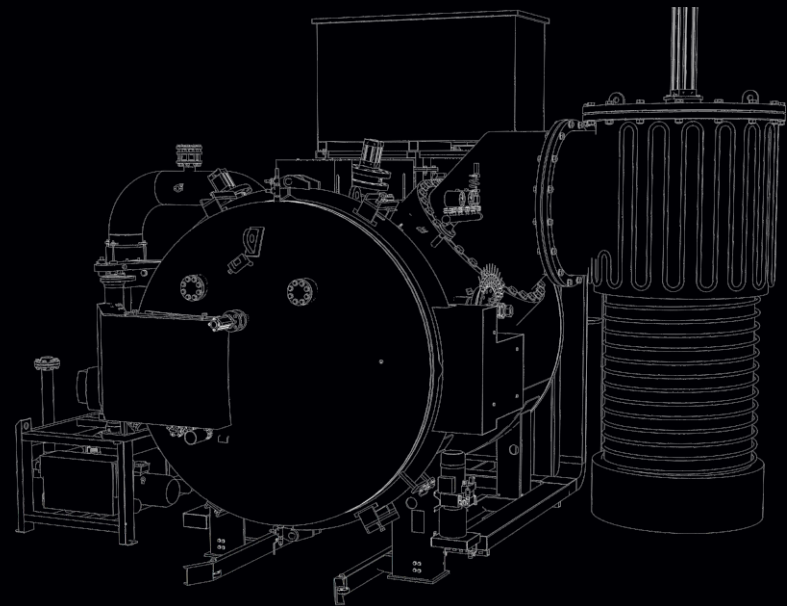


GREEN STANDARD FOR SINGLE-CHAMBER VACUUM FURNACE - VECTOR LINE

ANNEALING, BRAZING, GAS HARDENING

Vacuum as a protective and technological atmosphere eliminates the need to use harmful process gases and their emission to the environment

- / no CO₂ emissions, no use of fossil fuels
- / gas utilization for cooling (nitrogen, argon), captured and returned to the air, neutral for the environment
- / reinforced thermal insulation saves electricity (approx. 20%)
- / high energy efficiency of used electrical components (IE3 class motors, inverter control, etc.)
- / application of systems and algorithms limiting energy and technological factor consumption (pumping, heating and cooling systems)
- / no harmful substance emissions
- / reduction of hardening deformations and downstream machining costs
- / elimination of part washing after heat treatment

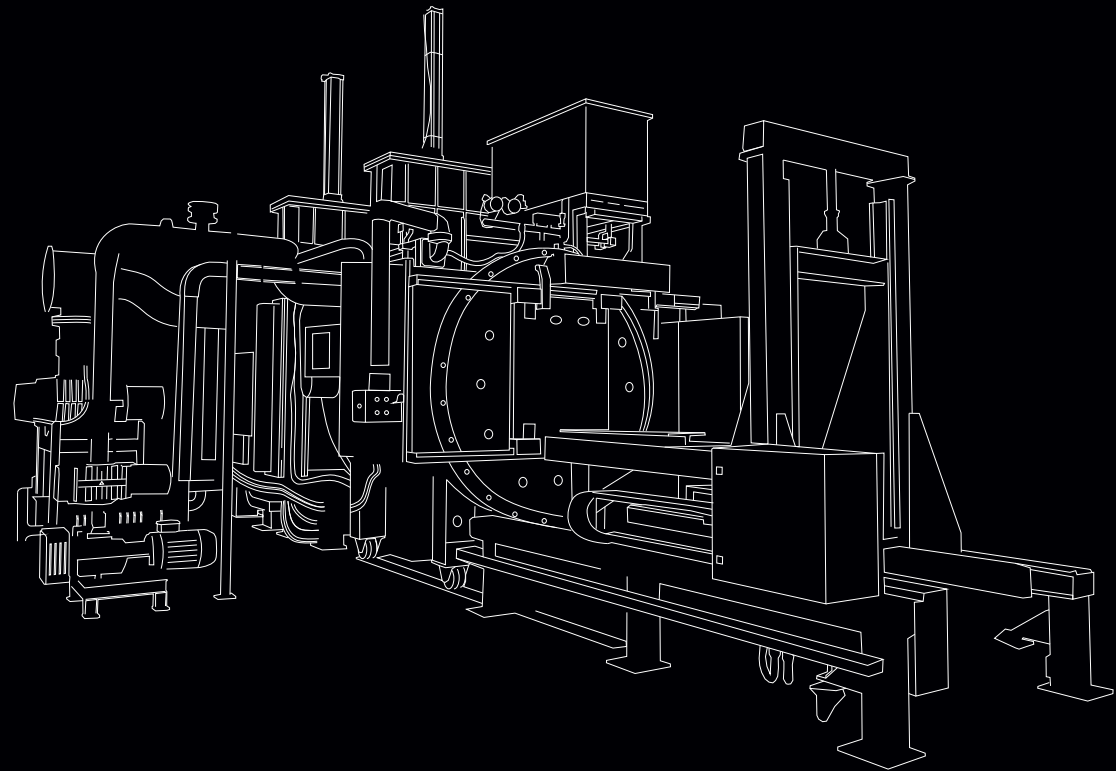


THE CASEMASTER EVOLUTION

TWO- AND THREE-CHAMBER VACUUM FURNACES DESIGNED FOR **ECO-FRIENDLY** HIGH VOLUME PRODUCTION

LPC + HPGQ or oil quench:

- / elimination of quenching oil and contamination, washers and cleaning chemicals
- / environmentally friendly process
- / no emission of climate-warming gas CO₂
- / fast and uniform LPC of densely pack loads
- / nitrogen quench (neither oil nor helium is needed)
- / high lifespan of hot zone components - graphite
- / no emission of harmful gases (CO, NOx)
- / safe, no flammable and poisonous atmosphere
- / no decarburization or oxidation, elimination of IGO
- / flexible, on-demand operation
- / no open fire

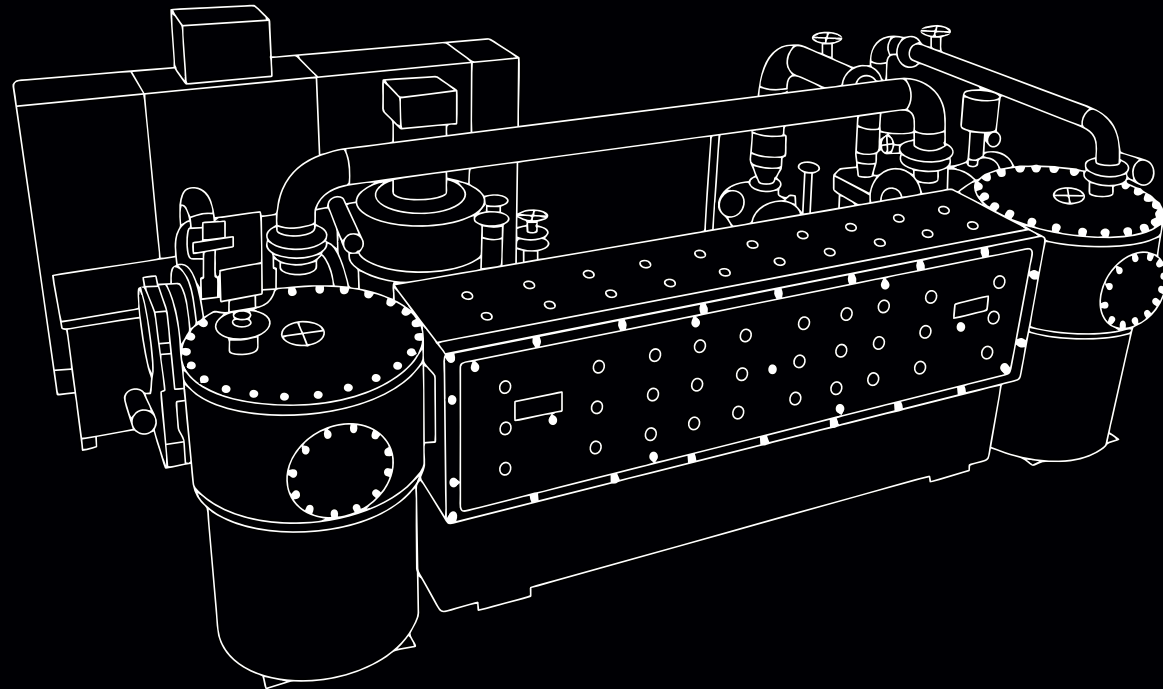


UNICASE MASTER

GREEN SINGLE-PIECE FLOW VACUUM HEAT TREATMENT

High Pressure Gas Quench (4D Quenching®):

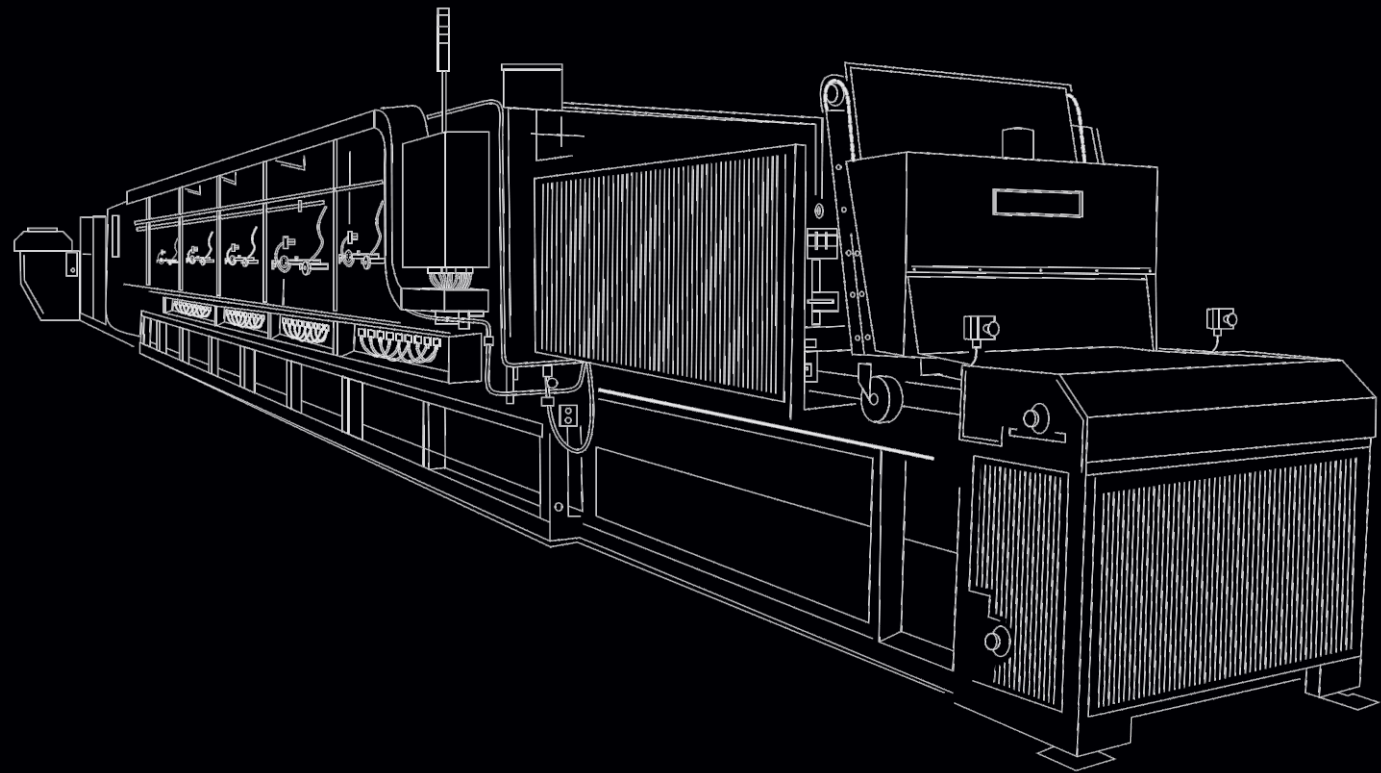
- / many times less hard machining time
- / elimination of many post-machining operations
- / low pressure carburizing / high pressure gas quench
- / fast and efficient carburizing
- / elimination of fire and explosion hazard
- / ideal surface quality
- / elimination of IGO
- / clean and environmentally friendly production



GREEN AUTOMOTIVE THANKS TO EV/CAB

CAB TECHNOLOGY ANSWER FOR ELECTROMOBILITY

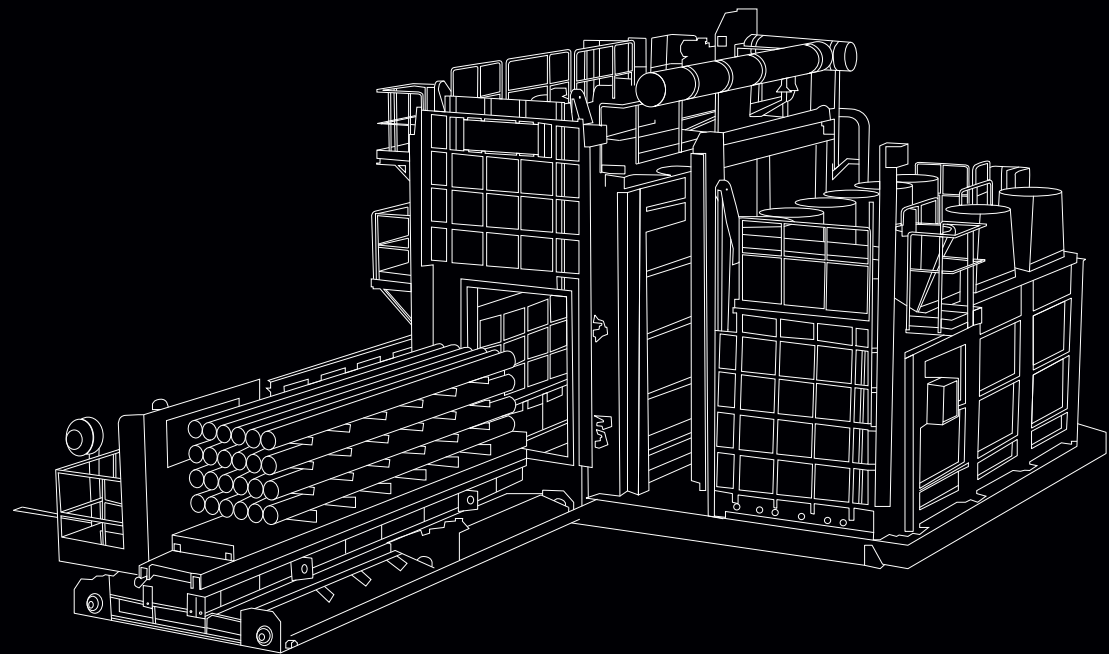
- / supports the electromobility development
- / fits in with the trend and the obligation to care for reducing exhaust emissions and for the natural environment
- / thanks to independently controlled heating and cooling zones, corrugated muffle design, unique curtain chambers and many other design features, excellent and stable brazing conditions are guaranteed for this specific product



VORTEX

ECO-FRIENDLY TECHNOLOGY FOR ALUMINIUM COIL AND FOIL ANNEALING

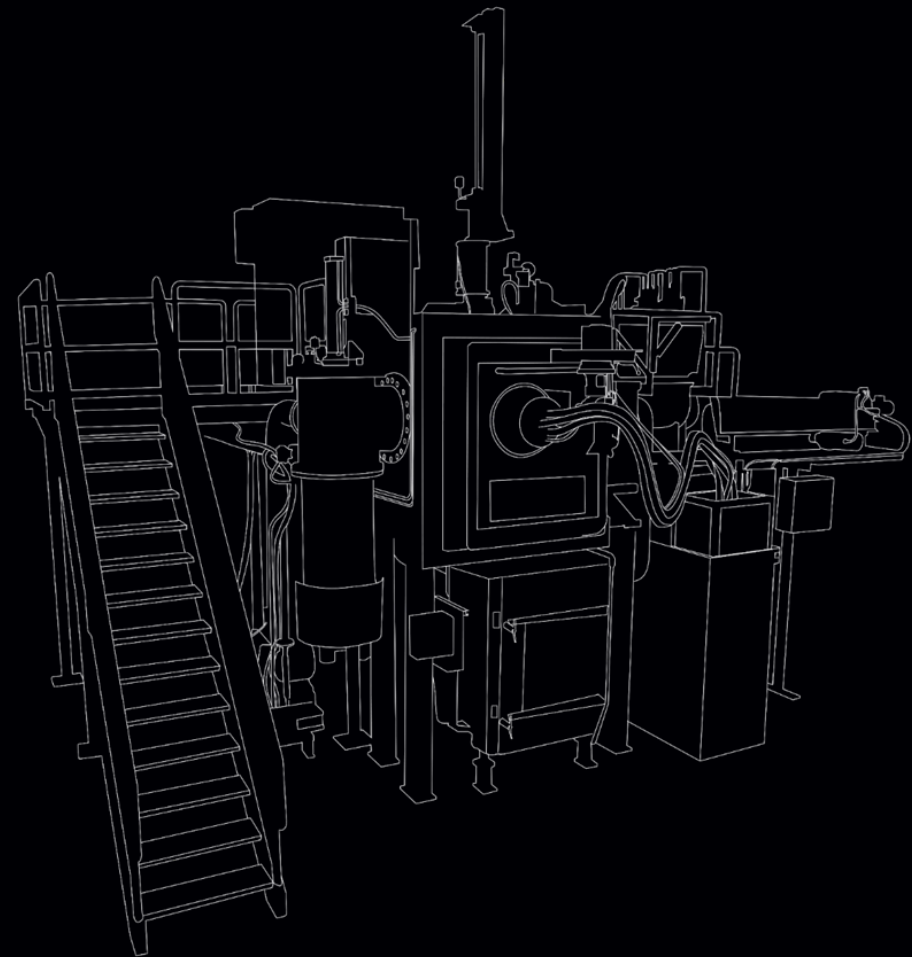
- / increases productivity and thus allows to reduce energy consumption and costs
- / utilized burners with an auto-recuperator having high efficiency up to approx. 86%, as well as ecological insulation with a properly selected thickness to optimize heat loss through the walls
- / the use of the innovative SeCoil® tool allows to design, optimize, control and shorten the aluminum sheet coils' heating process in real time, which saves energy and media consumption
- / use of heat recovery from the exhaust to heat the nitrogen
- / use of high efficiency auto-recuperator burners (up to approx. 86% output)
- / ecological, biosoluble insulation with a properly selected thickness to reduce heat losses through the walls



JET CASTER

GREEN VACUUM CASTING SYSTEM WITH GAS CRYSTALLIZATION METHOD

- / production of twice as many castings with a comparable level of energy demand
- / casting crystallization time reduction by 50%
- / increase in production efficiency by 82%
- / production energy consumption reduction by 40%
- / cooling water consumption reduction by 50%



SECO/WARWICK

INVENTION MEETS RELIABILITY

