CARPENTER®
TECHNOLOGY

Advanced motor solutions from concept to creation

Carpenter Technology helps customers strengthen their competitive edge by rethinking the boundaries of alloy materials used in stator and rotor stacks for e-motors and electrified transportation. The performance of Carpenter Technology soft magnetic alloys and stacks opens new design options for high power and energy efficient electric motors.

Improved Torque and Power
Carpenter is enabling the electrification of vehicles by providing higher torque and power. In simulations, torque was increased up by 12%-22% while efficiency was increased 2%.

Design Freedom
A benefit of the higher torque and power enables motor designs of a lighter weight and size footprint. Other design features can be incorporated into the design to further improve the motor efficiency.

Cooler Motor
With lower losses, equivalent torque can be achieved with less current, reducing the heat generated and thermal management required. Continuous power to the motor reduces overheating and improves motor life.

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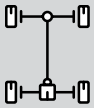
Advancing Electrification through Solutions for Power Dense Motors

Performance Benefits

Electric vehicles of the future will require higher motor performance with reduced size, weight, and current draw while delivering the same torque/speed output. Power dense motors (power-to-weight ratio) can provide optimized powertrains providing significant benefits to the next generation of electric vehicles.

Extended Range
In a 200 mile range passenger EV, modeling work showed a 20% improvement in range, motor torque and acceleration using Carpenter Solutions.

Reduced Battery Pack
The size and weight of battery packs can be reduced using Carpenter Solutions because the more efficient motors can be used to get the same range. Charging times will also be reduced with a smaller battery.



Increased Payload Capacity
The form factor and weight of power train components can be adjusted based on the improvements realized with Carpenter Solutions.

Carpenter Technology supplies soft magnetic alloys and stator/rotor stacks designed to advance the performance of e-motors and electrified transportation. Carpenter Technology's end-to-end service offerings simplify and speed the process from concept to material selection, prototype and serial production.

01 Research & Development
Carpenter Technology's world-class metallurgists and application engineers provide deep technical expertise to develop and customize soft magnetic alloys for motor applications.

02 Material Analysis
Characterization and tailoring of the grain growth, strength and magnetic properties of alloys is critical to developing processing methods that maximize stack performance.

03 Design Simulation
Carpenter Technology's application engineers work alongside customers to model new designs in simulations to determine the impact of material benefits.

04 Prototyping
Carpenter Technology's expertise and advanced capabilities ensure finished stator and rotor stacks deliver optimal performance when using alloys for power dense motors. Carpenter Technology helps optimize processing, from coating, laminating, heat treating and bonding to assembly and testing.

05 Production
Carpenter Technology's industry leading vacuum induction melting capacity, finishing, processing controls, quality system and logistics programs support serial production for applications with stringent requirements.

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Contact us to learn how our advanced soft magnetic materials and component solutions are delivering new levels of motor and vehicle performance.