

# HIPERCO® PRIME AND HIPERCO® PRIME PLUS

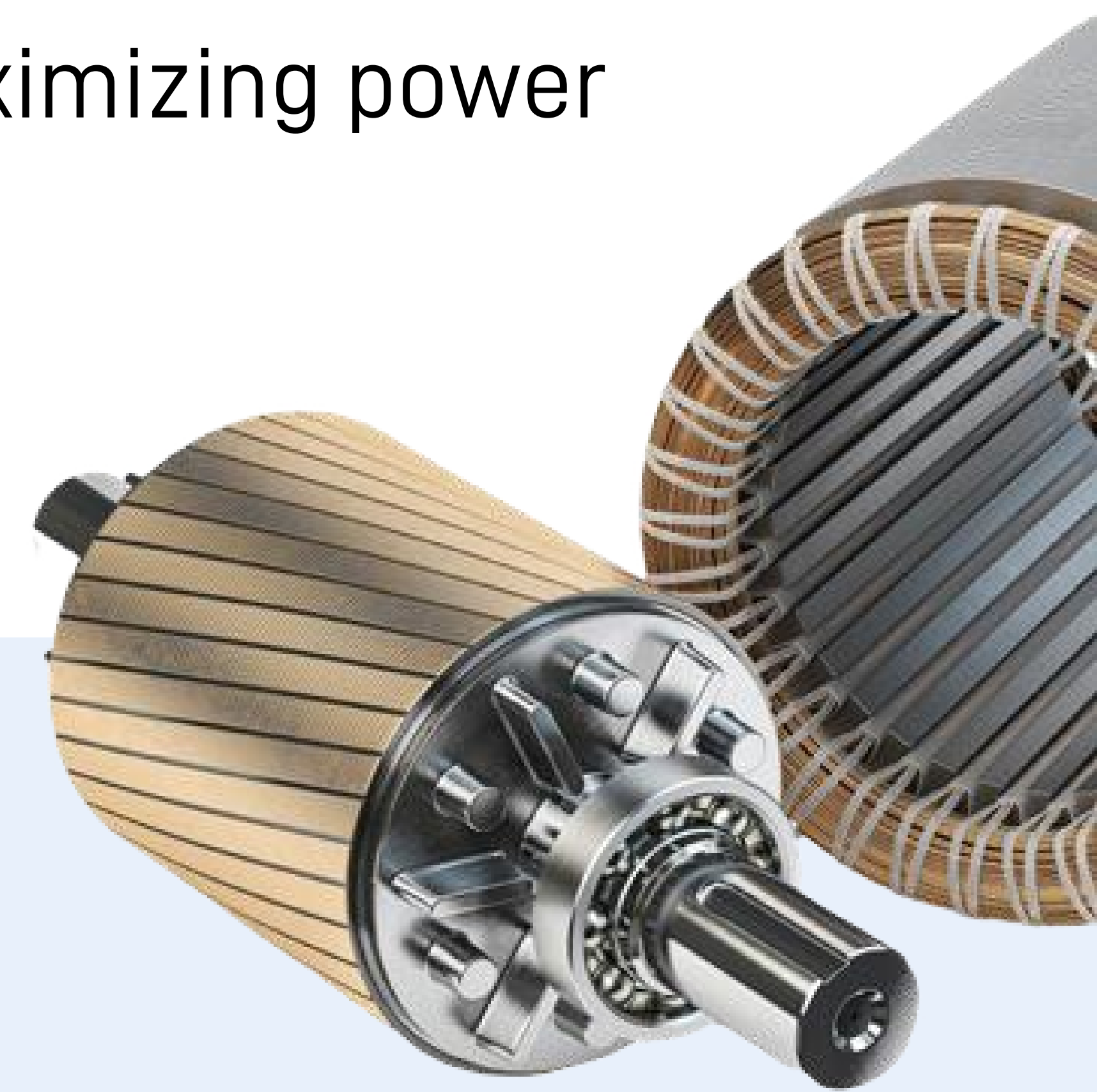
Hiperco® Prime and Hiperco® Prime Plus are designed to advance high-power motor performance, offering enhanced mechanical properties and reduced core losses for next-generation electrification applications. Hiperco® Prime and Hiperco® Prime Plus are available from Carpenter Electrification solely as stator and rotor stacks, or similar cores.

Also known for its high induction properties, our new Hiperco® Prime and Hiperco® Prime Plus are engineered through a proprietary process that creates specialized stator and rotor grades with unique combinations of strength and core loss from the same strip material. This breakthrough enables high yield strength (as high as 550 MPa) for rotor components and 30% lower losses for stator components. Hiperco® Prime and Hiperco® Prime Plus are the material of choice for high-performance electric motors and generators for aerospace, defense, and advanced automotive applications where maximizing power density and efficiency is critical.

**Similar alloys:** Hiperco® 50, Hiperco® 50A, Hiperco® 50HS

## KEY FEATURES OF HIPERCO® PRIME & HIPERCO® PRIME PLUS

- **High mechanical strength:** Yield strength as high as 550 MPa (80 ksi) supports higher motor speed and boosts durability in demanding motor applications.
- **Reduced core losses:** Innovative process cuts core loss by ~30% vs. standard Hiperco®, reducing heat and supporting high speed and high frequency applications.
- **Cooler operation:** Lower losses and optimized magnetics reduce temps by up to 100°F, extending life and enabling compact designs.
- **Enhanced power density:** Delivers 2–5% more motor power and ~25% more torque density from the same form factor.



## TECHNICAL CASE STUDIES

Property	Case 1: Low loss stator stack		Case 1: Low loss rotor stack		Case 2: High strength rotor stack	
	Hiperco	Hiperco Prime Plus	Hiperco Prime	Hiperco Prime Plus	Hiperco	Hiperco Prime
Inductance at 8000 A/m (T)	2.3	2.3	2.3	2.3	2.3	2.3
Yield Strength (ksi)	28	27	53	56	81	80
(Mpa)	193	186	365	386	558	550
Core Loss for 0.006" at 1.5T/400Hz (W/kg)	21	15 (30% reduction)	38	26 (32% reduction)	94	60 (36% reduction)

The magnetic and mechanical properties of Hiperco Prime Plus and Hiperco Prime can be tailored to meet specific customer requirements.

## APPLICATION ADVANTAGES

Hiperco® 50 and Hiperco® 50A deliver 10-20% higher power as compared to traditional silicon steel. Our Hiperco® Prime and Hiperco® Prime Plus offer an additional 2-5% of power density in stator and rotor stacks. This directly translates to a number of critical benefits for high performance motors.

The world is moving toward high-speed motors for increased power density, creating a critical need for materials that combine high strength with minimal losses. Our proprietary processing allows us to overcome traditional limitations where very low core loss grades had insufficient yield strength for high-speed rotors.

In aerospace applications, particularly eVTOL aircraft, our Hiperco® Prime and Hiperco® Prime Plus grades deliver higher power density that directly translates to increased passenger and payload capacity. For defense systems, the significant reduction in operating temperatures enhances reliability in mission-critical applications. Automotive electrification benefits from the ability to operate motors at higher speeds, improving overall efficiency and extending vehicle range.

## TRANSFORM YOUR MOTOR DESIGN

Contact our materials experts to explore how our new Hiperco® grades can enhance your application. Our engineering team can provide material samples for testing, detailed technical specifications, and consultation on optimizing your designs.

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