

Aichi Steel Develops World's First 34,000RPM, 40% Downsized Electric Axle

Aichi Steel Corporation (President: Takahiro Fujioka) has succeeded in the world's first technology demonstration of an electric axle that is 40% smaller and lighter than existing electric axles for electric vehicles, to respond to the full-scale dissemination of electric vehicles from 2030 and the associated materials shortages. It has done so by combining Aichi Steel's original Dy-free (dysprosium-free) bonded magnet, MAGFINE^{®*1} and high-strength materials from the company's own integrated forging and steel making processes.

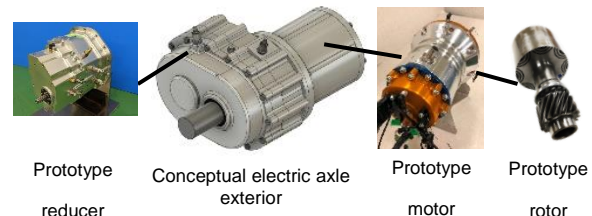
The electric axle is a drive unit that combines the reducer necessary for electric vehicles and a motor. To accelerate the progress of electrification, it is essential to produce large quantities of small lightweight resource-saving electric axles with excellent energy efficiency. This development, which provides the torque required for electric vehicles by rotating at a maximum speed of 34,000 rotations per minute and reducing the speed to a practical range, is a new challenge for an electric vehicle motor.

[Advantages of the Electric Axle]

1. Smaller and Lighter

(1) Motor

Smaller size is achieved through ultrahigh speed rotation utilizing the features of MAGFINE[®] (high magnetic force, high electrical resistivity, one-piece molding into the rotor core^{*2})



(2) Reducer

A smaller high reduction ratio reducer has been realized by using a transaxle gear (20% lighter than existing types) composed of high-strength materials from Aichi Steel's integrated forging and steel making processes.

→By combining the above elements, it is possible to make the axles approximately 40% smaller than existing electric axles.

2. Excellent Recyclability

(1) As MAGFINE[®] is a bonded magnet, the Nd (neodymium) containing magnetic powder can be recycled by simply dissolving and removing the resin after use of the magnets (magnetic powder recovery rate of 90% achieved in demonstrations).

Going forward, Aichi Steel will proceed to further develop this electric axle and promote the development of materials, components and production methods for practical application, while at the same time making the improvements to power and resource consumption essential for full-scale dissemination of electric vehicles. Also, based on the Aichi Steel Group Vision 2030, the company will contribute to the resolution of environmental issues faced by society through its production of lead frames for power cards installed in many electric vehicles and responding intently to the accelerating electrification of vehicles.

*1 MAGFINE®: Magnet molded by mixing various resins with Nd (neodymium) anisotropic magnetic powder without use of the rare earth element Dy (dysprosium). Used in electric tools and seat motors for vehicles

*2 One-piece molding: One-piece molding: Innovative production method of molding by filling a motor rotor (magnetic steel sheet) in a magnetic field with the magnetic compound (magnetic powder and resin)

Evolution of MAGFINE®

