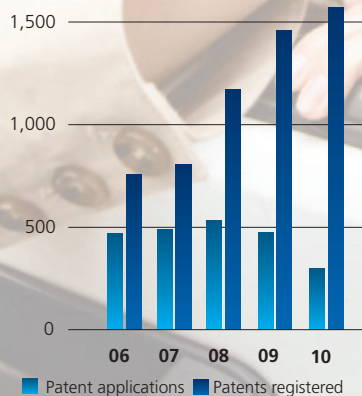
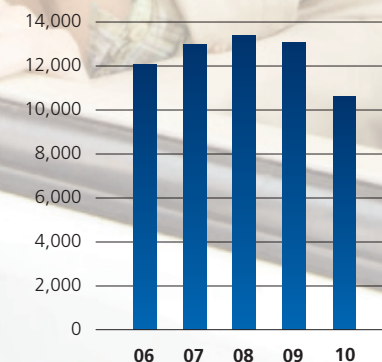


Research and Development

Patent Applications and Patents Registered



R&D Investment
(¥ million)



Investment in research and development for the fiscal year ended March 31, 2010 amounted to ¥10,626 million. Hitachi Metals held 1,574 patents as of the fiscal year-end.

Materials development is the starting point of change and evolution in industry and is the source of the Hitachi Metals Group's ability to carry out reliable business operations and contribute to society. In order to cement its leading position as a materials manufacturer, Hitachi Metals is aiming for a new product sales ratio of 30% as it continually replaces that portion of its product lineup.

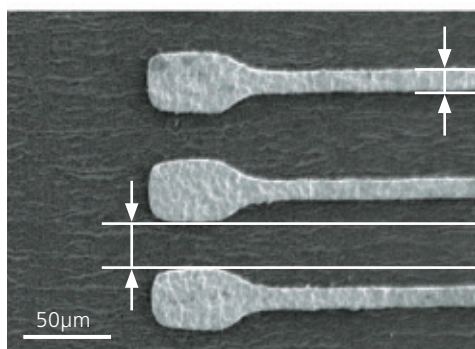
Development Topics for the Fiscal Year Ended March 31, 2010

Development of New Coating Technology and New Substrate Steel for Automotive Components

Hitachi Tool Engineering, Ltd. and Hitachi Metals, in collaboration with Hitachi, Ltd., have developed technology that enhances the adhesiveness of diamond-like carbon (DLC) coating for automotive components. Furthermore, they have developed a new type of substrate steel, also for automotive components, that offers even greater film characteristics.

Better fuel efficiency, cleaner exhaust emissions and other aspects of automotive environmental performance are increasingly in demand. To this end, an important topic now gaining attention is how to reduce the friction generated within engines by actuators and the fuel injection sliding components. In light of this, DLC coating technology, which reduces friction even more than before is attracting attention and is becoming more widely adopted.

With DLC coatings, Hitachi Tool Engineering and Hitachi Metals have improved film adhesiveness and strengthened measures to eliminate impurities between the coating itself and the surface of steel materials that diminish the adhesiveness of film. The result was to successfully boost adhesiveness by approximately 50% from the Company's conventional products and raise the level of reliability. The new type of DLC coating is called L-Frex[®]. In tandem with this, the companies developed ASL[®]555, a steel substrate material with enhanced film characteristics for automobile components. This development contributes to the spread of DLC coating applications and greater environmental performance of automobiles.



Printed circuit board surface (L/S=10/25µm)

Development of Nickel Plating Technology for Printed Circuit Board Copper Wiring

The Hitachi Metals Group's NEOMAX KAGOSHIMA Co., Ltd. has developed a highly precise nickel plating technology for the fine copper wiring (fine pitch Cu pattern) used on printed circuit boards. This technology contributes to the prevention of short circuits that result from faulty insulation between wiring, while also increasing circuit board wiring density.

The development of the electronic circuits mounted on printed circuit boards must constantly keep pace with demand for greater sophistication and density. This demand is what is driving the trend toward increasingly fine gauge copper wiring (Cu pattern) for printed circuit boards.

Conventionally, in order to prevent the corrosion of the copper surface and improve copper wiring solderability, it is necessary to apply nonelectrolytic nickel plating or nonelectrolytic gold plating combined with grounded nonelectrolytic nickel plating. However, it is difficult to completely prevent abnormal nickel deposits from forming between wires. Because of this, problems arise in the form of diminished voltage resistance and poorer insulating effect.

To counter these issues, NEOMAX KAGOSHIMA undertook a comprehensive review of the traditional plating method that utilizes palladium as a catalyst, and developed a technology that enables nickel plating to be applied to bare copper wiring. This technology made possible the prevention of short circuits due to poor insulation between copper wiring and nickel plating, and brought to reality the manufacture of reliable and highly dense printed circuit boards.