News Release

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Nissin Electric Co., Ltd.
Nippon ITF Inc.

Nippon ITF Develops New DLC Coating System "MF720" and Will Commence Sale and Coating Services

— Reducing surface roughness to achieve hard and dense film —

Nippon ITF Inc., a group company of Nissin Electric Co., Ltd. engaged in coating services for automobile parts, dies/molds, tools, etc. and the manufacture and sale of coating systems, has developed a new diamond-like carbon (DLC) film coating system "MF720." It will start selling the system and offering coating services in June.

DLC films are known as films of low friction resistance and widely used in the fields of tools, dies and molds, machine parts and automobile parts. Of the DLC films, film that is formed using arc discharge and does not contain hydrogen has excellent durability and its hardness can be controlled from close to diamond to the equivalent of ceramics. However, since its surface is rough and thus parts that are mated with parts coated with this film may be worn away, final polishing was required after coating.

To reduce the roughness of film surfaces, this system has adopted a Filtered Vacuum Arc (FVA) system in which unnecessary coarse particles generated during film formation are separated from the coating elements with a magnetic filter so that only the coating elements are sent to the substrate. In the conventional FVA system, since the filter was large, it was difficult to increase productivity by installing two or more units, and high maintenance was also required. Nippon ITF conducted research focused on this issue and developed a filter that is compact yet has great efficiency in collecting coarse particles. It can be installed even on the door through which substrates are taken in and out. Furthermore, creating a structure that makes it easy to clean the inside has enhanced maintainability.

This has made it possible to form a dense film containing fewer coarse particles with less defects, and reduced average surface roughness per μm of film thickness to 0.02 μm, which is one sixth of that of conventional systems. This has a great effect on extending the service life of coated parts.

Moreover, equipped with a cathode material supply mechanism, this system is capable of coating substrates with a thick film with a maximum thickness of 20 μm. A combination with an adherent film coating process that was developed at the same time offers excellent adhesion between the film and substrate. Since the hardness of the DLC film can be controlled from 15 to 75 GPa, it can be applied for various use purposes.

The effective coating area of this system is as large as 720 mm in diameter and 750 mm in height, which is a size applicable to mass production. Although Nippon ITF offers only one type of system at the moment, it will expand this to offer a lineup of small systems.

In June, the company will start selling the system to in-house manufacturers of machine parts and automobile parts, and also offer coating services. Nippon ITF aims to achieve annual sales of 1 billion yen in fiscal 2025.

DLC coating system "MF720"