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Company Name: NHK SPRING CO., LTD.

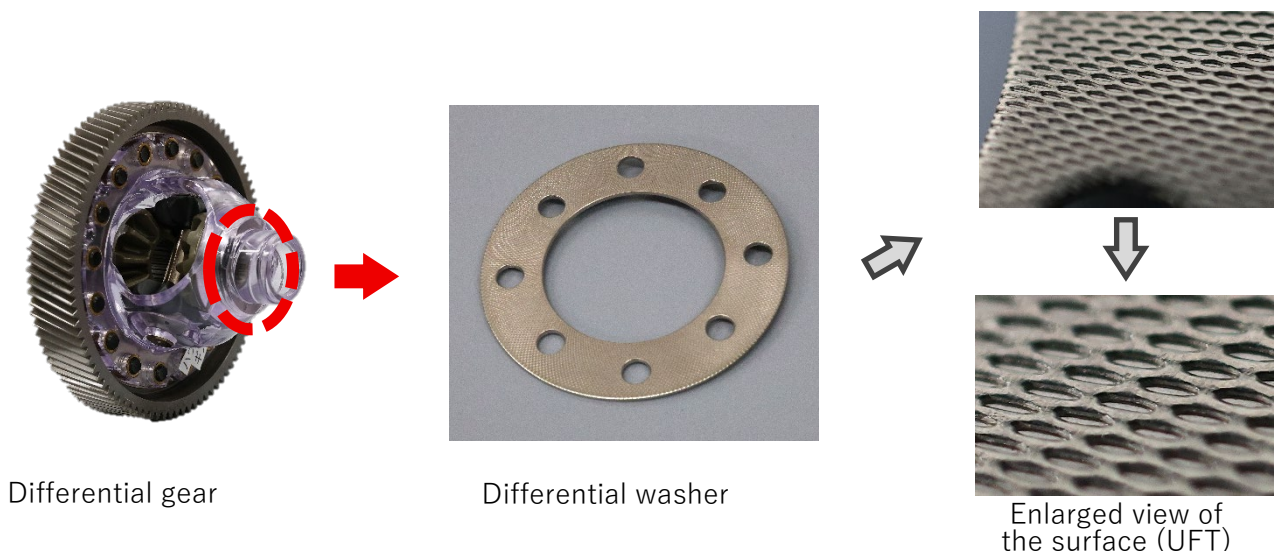
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TOKUHATSU Develops New Differential Washer to Improve Vehicle Energy Efficiency

Micron-scale Microgrooves Created Using "ULTRA FINE TEXTURE" Reduce Costs and Meet Demand for Smaller Differentials

TOKUHATSU CO.,LTD. (Head office: Itami, Hyogo, Japan; President: Yasuhiro Shinkai), a group company of NHK SPRING CO., LTD. (Head office: Yokohama, Japan; President & COO: Kazuhisa Uemura), has jointly developed with a Japanese automobile manufacturer a new model of the “differential washer,” which is a sliding component used inside a differential. TOKUHATSU has established a mass-production system for this product at its Sanda Plant and has already begun supplying it to the market.

Differential washers are components that slide between the differential case and side gears, and are subjected to high levels of friction and wear. Recent years have seen rising demand for higher efficiency and smaller size in differentials. TOKUHATSU has responded by applying its proprietary ultrafine groove processing technology, “ULTRA FINE TEXTURE” (hereinafter referred to as “UFT”)*¹, to this the new product. The result is formation of a stable oil film even when using low-viscosity lubricating oil. Compared with conventional products employing surface treatment (PTFE composite electroless nickel plating*²), the new product achieves equivalent seizure resistance at a lower cost.



Guided by its corporate philosophy of “Key Parts, Driving the World Forward,” the NHK SPRING Group will continue to develop and introduce new technologies and engage in manufacturing that drives society forward.

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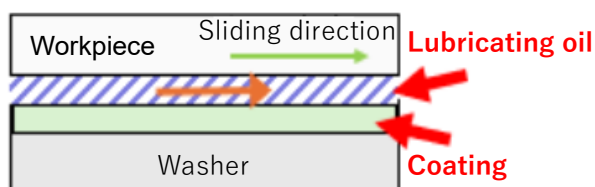
■ Development Background

Recent years have seen intensifying demand for the automotive, industrial machinery, and precision equipment industries to deliver greater space savings and weight reduction through the miniaturization of sliding components, as well as higher efficiency through the use of lower-viscosity lubricating oils. To meet these challenges, TOKUHATSU has developed a mechanism that retains oil in grooves by forming UFT on the sliding surfaces of its products through press processing. This technology provides exceptional seizure-prevention performance even under high-load conditions that arise from the miniaturization of differentials. The new product has been developed for use in electric vehicles.

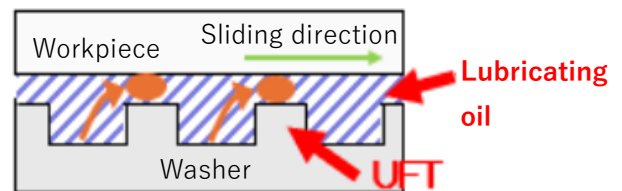
■ Product Features

1. High durability

Oil reservoirs (recesses) are formed on the surfaces of sliding components. By retaining lubricating oil in these grooves, a stable oil film can be formed even under severe lubrication conditions, thereby improving seizure resistance.



Conventional product (surface treatment)



Newly developed product (UFT)

2. High productivity

Because UFT is formed through press processing, high productivity can be achieved. In addition, eliminating the surface treatment process previously required also helps to reduce production costs.

3. Compatibility with miniaturization

The smaller the washer, the greater the contact pressure on its sliding surfaces, making seizure more likely to occur. By forming a stable oil film using ultrafine grooves, this product demonstrates outstanding seizure resistance even under high contact pressure conditions. This helps designers to make differentials ever smaller and lighter.

■ TOKUHATSU 's proprietary technology

One challenge in forming UFT through press processing has been ensuring the reproducibility of fine groove geometries during mass production. Applying both its proprietary die manufacturing technology and high-precision press processing technology enables TOKUHATSU to consistently form ultrafine groove geometries even during mass production. This minimizes variation between production lots.

*1 ULTRA FINE TEXTURE is a technology developed by TOKUHATSU for forming fine grooves on sliding surfaces.

*2 A surface treatment in which PTFE (fluororesin) is incorporated into electroless nickel plating. It is used to reduce friction and improve seizure resistance in sliding components.