

TAFNEX™ CF/PP and 3D-Printed Components Developed by the Mitsui Chemicals Group Find Application in Toyota Fortuner-Based Pace Car

TOYOTA Hyper-F CONCEPT set to make an outing at the Idemitsu Super Endurance 25 Hours on December 21 and 22

Mitsui Chemicals, Inc. (Tokyo: 4183; President & CEO: HASHIMOTO Osamu) and subsidiary ARRK Corporation (Osaka; President & CEO: MOROZUMI Naoki) today announced that materials developed by Mitsui Chemicals have been employed in a pace car based on the Toyota Fortuner. Direct pellet-fed 3D-printed components^{*1} jointly developed by Mitsui Chemicals and ARRK, and TAFNEX™ CF/PP^{*2} – a unidirectional carbon fiber-reinforced polypropylene resin sheet developed by Mitsui Chemicals – have found application in the TOYOTA Hyper-F CONCEPT, which has been designed by TCD ASIA CO., LTD.^{*3} (Bangkok, Thailand; President: KAWAZOE Takayuki).



TOYOTA Hyper-F CONCEPT



Pre-race testing at Bira Circuit

The TOYOTA Hyper-F CONCEPT is a high-performance concept model with a styling design that incorporates the road handling and aerodynamic performance cultivated in the racing field by TCD ASIA's motorsport business. The new materials have enabled the company to further reduce the concept car's weight. In addition, the fitting of four sport seats provides a new mode of enjoyment that users cannot experience in a two-seater vehicle.

Since its unveiling^{*4} at Bangkok Auto Salon 2024, held in the Thai capital in June, the car has gone through proof of concept. It is now set to run as a fully operational safety car in the Idemitsu Super Endurance 25 Hours race, which will take place at Chang International Circuit in Thailand's Buriram Province on December 21 and 22.

In the drivable model, TAFNEX™ CF/PP has been used for the hood air vents, decorative components on part of the front bumper, and underbody panel. Additionally, direct pellet-fed 3D-printed components are fitted to the hood air duct bezels and rear overfender.



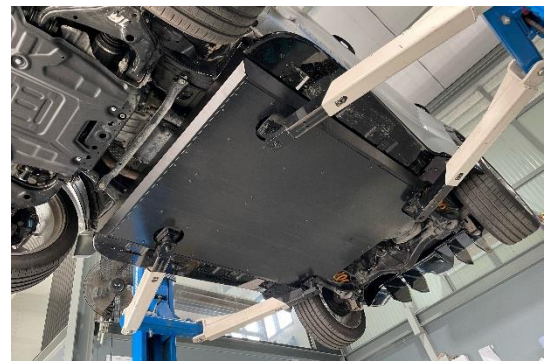
Hood air duct bezels
(direct pellet-fed 3D-printed components)



Rear overfender (direct pellet-fed 3D-printed components, before painting)



Decorative components on part of the front bumper (TAFNEX™ CF/PP)



Large panel used in the underbody panel (TAFNEX™ CF/PP)

***1 Direct pellet-fed 3D-printed components**

In 2020, Mitsui Chemicals launched an investment and business alliance with Dreams Design Corporation (Nagoya, Aichi; Representative Director: OKUMURA Yasuyuki), an engineering service provider focused on automobile development. Then, in 2023, Mitsui Chemicals embarked on a similar investment and business alliance with ExtraBold Inc. (Toshima-ku, Tokyo; CEO: HARA Yuji), a manufacturer of direct pellet-fed 3D printers.

The 3D-printed components fitted to the concept car bring together the auto part design technology of Dreams Design; ExtraBold's EXF-12 3D printer, which delivers high-speed printing of large parts; the 3D printing and post-processing technologies of ARRK, one of Japan's largest product development support companies in this industry, offering everything from prototyping to mass production; and the polyolefin-based composite technology being developed by Mitsui Chemicals for use in 3D printing.

Applying mechanisms used in injection molding, direct pellet-fed 3D printers form structures directly from plastic pellets. The advantage of this approach over conventional 3D printers is a stable increase in the quantity of plastic discharged, thereby enabling large structures to be formed quickly. When used in the high-mix, low-volume mass production of 3D-printed items, the moldless technique helps to reduce both development lead times and the initial investment required, including mold costs. In addition, the technology is expected to contribute to the circular economy, as the 3D-printed items can be crushed into pellets and recycled as raw materials for further 3D printing.

***2 TAFNEX™ CF/PP**

TAFNEX™ CF/PP is a unidirectional tape (UD tape) made from a carbon fiber (CF) and polypropylene (PP) composite using Mitsui Chemicals' proprietary technologies. As well as being lightweight and highly rigid with

good moldability, it boasts features that can be altered to suit a diverse range of designs, such as marble-like patterns. TAFNEX™ is designed to be adapted for use in automobiles and drones, along with a range of other applications in the industrial and consumer sectors. Such applications include local reinforcement of injected or pressed molded parts, and the material can also be processed into parts in the form of tubes or laminated sheets.

Special site: [Mitsui Chemicals TAFNEX™ \(mitsuichemicals.com\)](https://mitsuichemicals.com)

***3 TCD ASIA CO., LTD. is a Thai subsidiary of TOYOTA CUSTOMIZING & DEVELOPMENT Co., Ltd.**

***4 Mitsui Chemicals news release (June 26, 2024)**

https://jp.mitsuichemicals.com/en/release/2024/2024_0626/index.htm

■ References

- ARRK Corporation: <https://jp.ark.com/en/>
- Dreams Design Corporation: <https://www.dreams-design.co.jp/>
- ExtraBold Inc.: <https://www.extbody.com/en>

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[TAFNEX™ inquiry form](#)