

# Development of the NOXNON 700-HT SCR Catalyst for Simple Cycle Gas Turbine

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## Summary

Recently, the simple cycle gas turbine has been a fast growing technology to meet peak load requirements in the U.S. In this system, the temperature of the exhaust gas ranges from about 840-1100°F at the inlet of SCR reactor because there is no Heat Recovery Steam Generator (HRSG) as in Combined Cycle applications. In the higher temperature range, the conventional DeNOx catalyst accelerates the combustion of the reducing agent, NH<sub>3</sub>, resulting in lower DeNOx efficiencies. Therefore the applicable reaction temperature of the conventional catalyst (TiO<sub>2</sub>-V-W) was limited to below 420°C.

Hitachi Zosen Corporation (Hitz) has developed the NOXNON700-HT, a catalyst that works within these high temperature conditions. In the application to high temperature SCR, the catalyst is required to have the suppression for NH<sub>3</sub> combustion and the strong affinity for NH<sub>3</sub> adsorption. According to the increase of the temperature, the amount of the adsorbed NH<sub>3</sub> on catalyst becomes smaller because of NH<sub>3</sub> desorption, and DeNOx performance goes down.

The improved performance of the our new catalyst is made possible by suppressing the combustion of NH<sub>3</sub> in the higher temperature range and substantially increasing the amount of NH<sub>3</sub> on the surface of the catalyst, compared with conventional catalysts.

We have initiated testing the new catalyst in a 75000kW simple cycle gas turbine (GE 6FA) in Ibaraki, Japan. The goal of this test is to demonstrate the durability of the new catalyst.

The test indicates that the new catalyst meets durability requirements for commercial high temperature applications.

The new catalyst is also being prototyped in two 6000kw gas engines (exhaust gas temperatures: 450°C to 470°C) at the Kanagawa Plant, Kawasaki City, Japan. In this testing, NOx reduction efficiencies >90% with NH3 slip < 10ppm have been achieved.

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