

GRACE

NADIUS™ 4G

NADIUS™ 4G is the latest generation of Grace's market-leading NADIUS™ catalyst family for hydrotreated and straight-run VGO feed applications.

NADIUS™ 4G, an extension of the NADIUS™ catalyst family, is a component of the EnhanceR™ technology platform, which is the market leader in the EMEA region (Fig. 1).

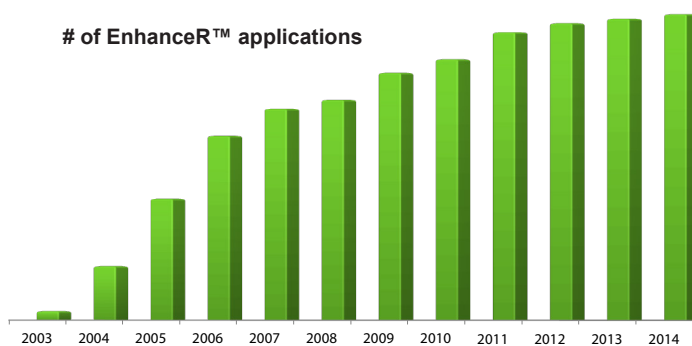


Fig. 1. NADIUS™ 4G belongs to Grace's EnhanceR™ technology platform, the EMEA market leader.

NADIUS™ 4G incorporates new technologies that were developed during the extensive Grace R&D program that was initiated as a result of the tight oil boom in North America and the new challenges faced by European refineries.

This R&D program resulted in advances to the following five functionalities:

- Higher Diffusivity Matrices
- Flexible Hydrogen Transfer
- Higher Activity
- Advanced Metals Tolerance
- Dual Zeolite Functionality.

NADIUS™ 4G brings new functionalities for low-metals feed applications

As shown in Fig. 2, NADIUS™ 4G features higher activity and flexible hydrogen transfer.

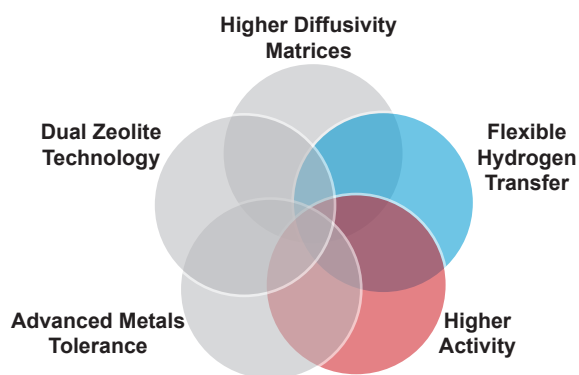


Fig. 2. New functionalities utilized in NADIUS™ 4G.

NADIUS™ 4G catalysts bring the following performance benefits to unit operations:

- higher intrinsic activity
- flexible unit size to tailor product olefinicity
- high conversion in low metal applications
- low gas yields
- excellent attrition resistance.

NADIUS™ 4G catalysts are fully compatible with all Grace additives.

Technical Service

An equally critical component associated with processing challenging feeds is solid technical service support. Grace has been providing industry-leading technical service to the refining industry since 1947.

Grace's experienced engineers support FCC customers with:

- Application and operations expertise
- Start-up and optimization assistance
- Industry benchmarking
- Feed characterization and pilot plant studies

Innovation

NADIUS™ 4G is the latest in a long line of Grace's innovation in catalyst technology, and is the product of Grace's global team of research scientists.

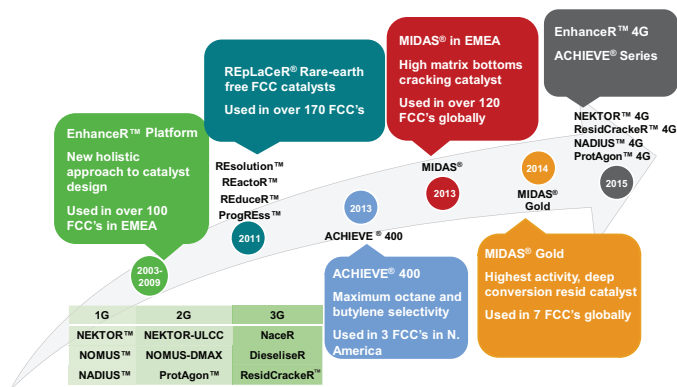


Fig. 3. NADIUS™ 4G catalysts result from Grace's innovation in FCC catalyst technology.

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