PROUD WINNERS OF THE QUEENS AWARD
FOR ENTERPRISE: INNOVATION 2022

THE QUEEN'S AWARDS
FOR ENTERPRISE:
INNOVATION
2022

UNICAT

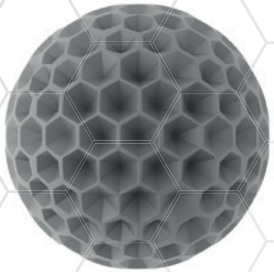
CATALYST TECHNOLOGIES, LLC

DRIVING CATALYST PERFORMANCE

www.unicatcatalyst.com

Magcat Textured®

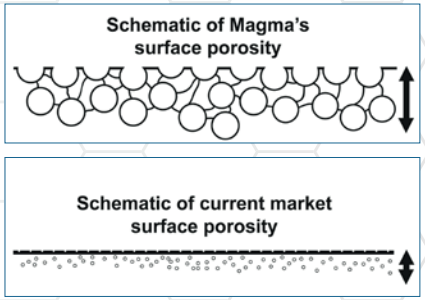
INNOVATION IN DESIGN



We design our own catalyst carrier utilising our strength of 40 years' experience in the Ceramics industry. Catalysts are formed using polymer ceramic technology rather than the traditional pressure method, which provides higher intrinsic strength, greater geometric surface area and surface texture.

TEXTURED SURFACE TECHNOLOGY

Texture on the **Magcat**® spherical shape creates a 3x improvement in active surface area, increasing the effective reaction zone with nickel. That combined with enlarged near surface porosity and ENHANCER™ Nickel crystal promoter, delivers three times more available nickel for reaction.

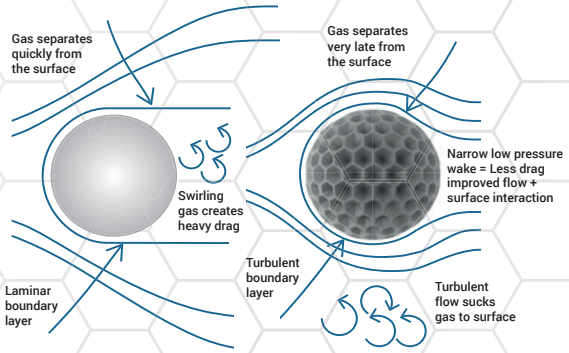


SPHERICAL TEXTURED SHAPE

The "Golf ball" texturing generates turbulent flow around the catalyst, reducing drag coefficient and pulling reactant gases around the pellet, seeing all sides evenly and also allowing gas to flow smoothly into the spaces behind each pellet.

The flat surfaces and lack of texture on the smooth surfaced catalyst creates laminar flow and heavy drag. The flow passes over the presenting side of the catalyst, but will not effectively contact the rear side, causing dead zones and voidage.

The "Golf ball" texturing generates turbulent flow around the catalyst, reducing drag coefficient



The increased Reynolds number leads to reduced pD and the turbulent flow improves heat transfer

TUBE PACKING

Magcat® textured spherical catalysts pack uniformly within reformer tubes settling evenly and predictably despite the orientation of any individual pellets. The higher and consistent "coordination number" (how many other pellets are touching each pellet) means there is more even packing at the tube wall.

This decreased voidage and increased wall contact will disrupt the flow at the wall, causing turbulence and bring heat from the outside into the centre of the tube where it is needed. Creating optimal gas flow throughout the packed bed, and leading to improved catalyst – gas contact.

TUBE WALL CONTACT & VOIDAGE

Traditional cylindrical shaped catalysts pack in a random chaotic manner, creating large void space and uneven gas flow. Gas will travel along the outside of the tube as "the path of least resistance" and not bring heat from the wall into the centre of the tube. Previously the only answer had been to reduce the size of pellets, which had a secondary negative effect in that it increased pressure drop. By selecting smaller **Magcat**® textured spheres low pressure drop is achieved, with improved radial heat transfer and activity.

"If gas is not flowing over an area of nickel then it is not reacting"

Traditional Cylindrical Catalyst

Magcat Textured® Spherical Catalyst

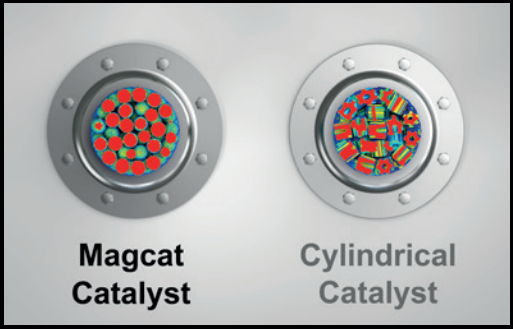
HEATING & COOLING OF TUBES

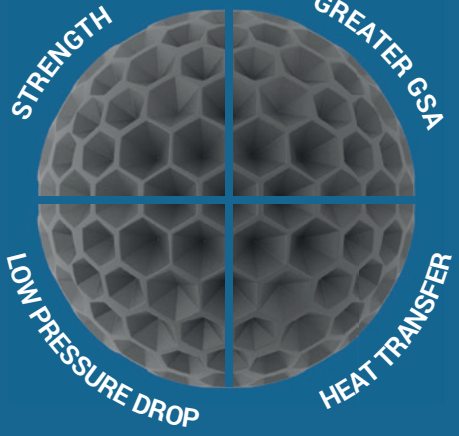
Traditionally when hot tubes expand and cool (contract) catalysts reorder, and the catalyst levels drop causing increases in pressure drop. **Magcat**® spheres respond differently, as those in the central core barely move from the original position.

A stable catalyst core and uniform packing means large voids will NOT be present to cause a cascade of pellets down the bed or significant rearrangements from initial loading.

HEAT TRANSFER

Magcat's Ideal gas flow patterns increase heat transfer rates from the tube wall, which in turn increases reforming capability, and reduces tube wall temperatures. The average reduction in tube wall temperature is 10°C, which in turn can deliver a 40% increase in tube life.





ADVANTAGES OF MAGCAT®

- ✔ STRENGTH
- ✔ GREATER GSA
- ✔ HEAT TRANSFER
- ✔ LOW PRESSURE DROP

Contact us today. Our teams are ready to discuss.

E: info@unicatcatalyst.com www.unicatcatalyst.com

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