

PROUD WINNERS OF THE QUEENS AWARD
FOR ENTERPRISE: INNOVATION 2022

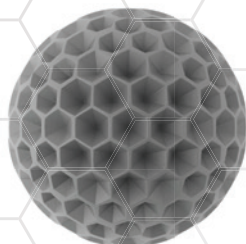


DRIVING REFORMER INNOVATION

www.unicatcatalyst.com

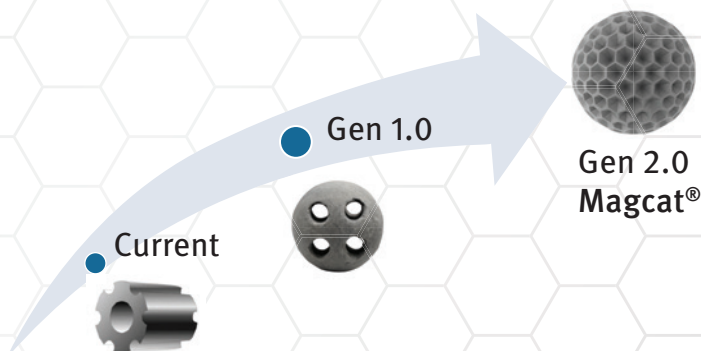


INNOVATION IN DESIGN



UNICAT Catalyst Technologies LLC are a global manufacturer and supplier of DRI Catalysts. An established supplier of DRI catalysts with over 10 years of reformer references from our 1st generation MYD spherical catalyst. Building upon 40 years of ceramic manufacturing experience our 2nd generation DRI Catalyst (**Magcat®**) was developed, which dramatically improves gas flow by +35% without the need to add any further tubes. That means ZERO CAPEX required to achieve +35% more reformed gas.

CATALYST SHAPES FOR DRI REFORMING



SHAPE TECHNOLOGY COMPARISONS

	CURRENT SUPPLIER	UNICAT MYD GEN 1.0	UNICAT MAGCAT® GEN 2.0
	Made in India	Made in China	Made in UK HRH Queens Award
OUTPUT	BASE	+32%	+35%
METHANE SLIP	BASE	BASE +1%	BASE -1%
STRENGTH	BASE	BASE x1.2	BASE x2
TWT (Tube Wall Temperature)	BASE	-8° C	-10° C
TUBE LIFETIME	BASE	+30% over BASE	+40% over BASE

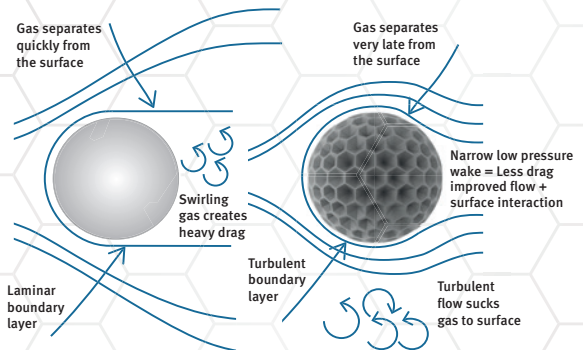
SPHERICAL TEXTURED SHAPE

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

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



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.

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



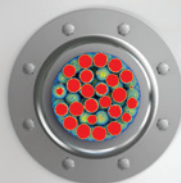
Traditional
Cylindrical Catalyst



Magcat Textured®
Spherical Catalyst

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.



Magcat®
Catalyst



Cylindrical
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.

Contact us today.

Our teams are ready to discuss.

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