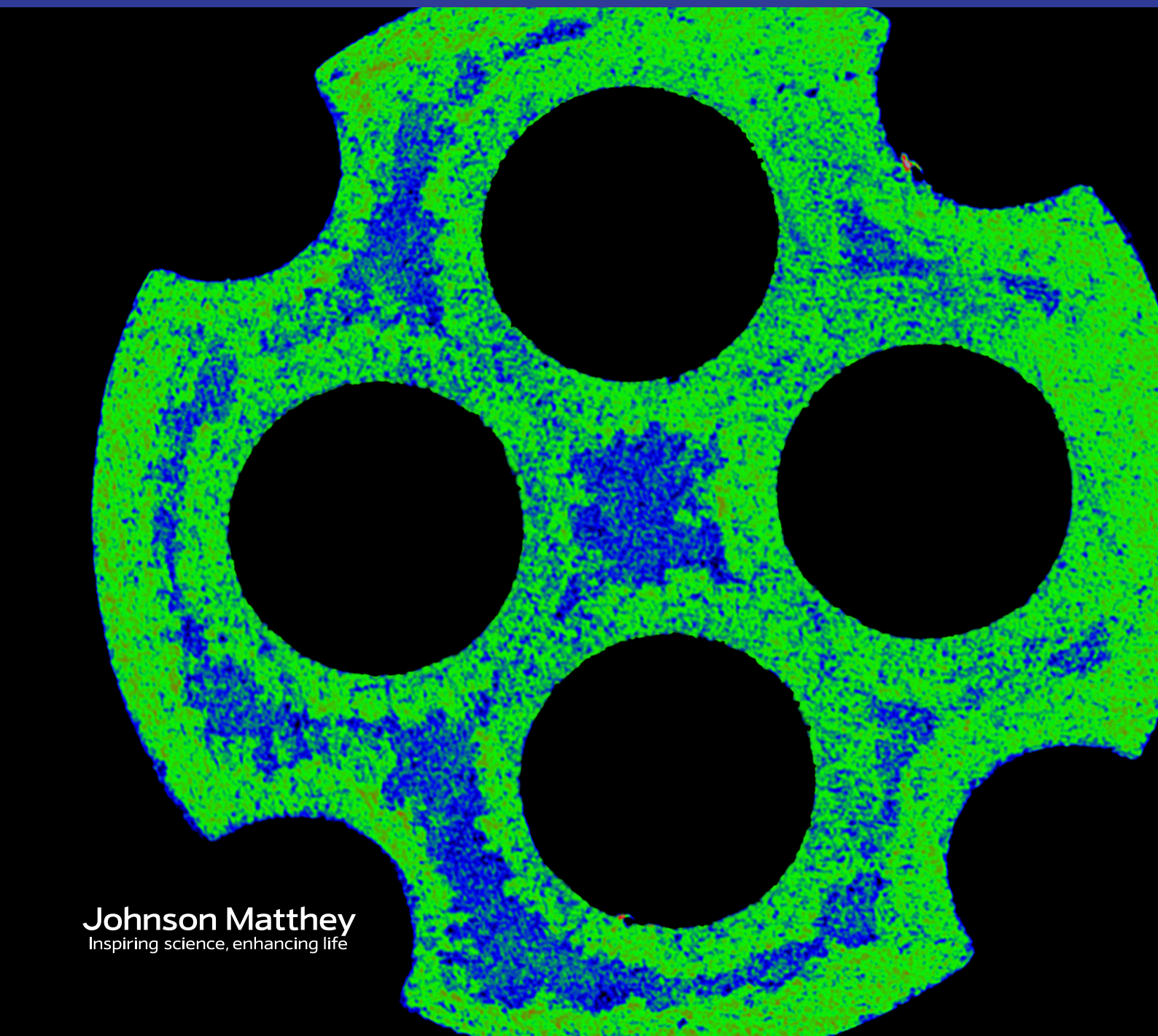
JM

PURASPEC 2272: Protection for Longer LTS Life



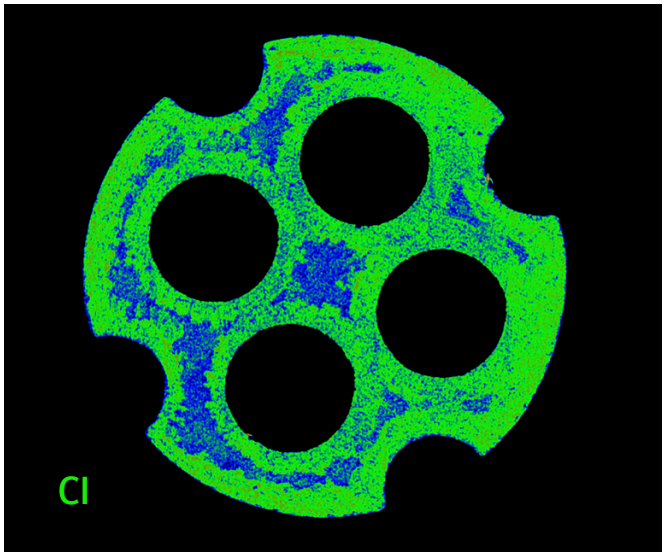
Johnson Matthey
Inspiring science, enhancing life

Protection for Longer LTS Life

Background

Johnson Matthey (JM) **PURASPEC**™ 2272 is a patented solution which draws on expertise in pressure drop reduction and specialty purification solutions through our **PURASPEC** business activities. JM offers this to be installed under a charge of our HTS catalyst when **KATALCO**™ LTS solutions are used in the LTS reactor.

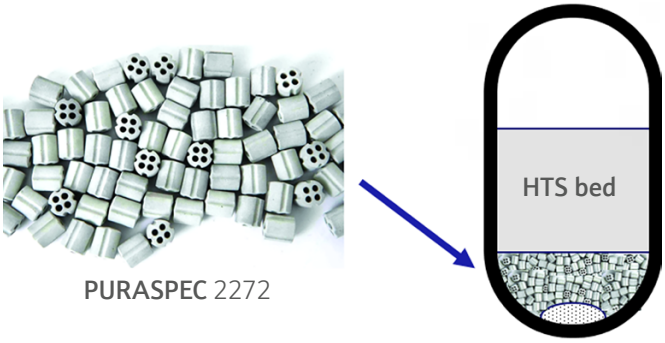
The **QUADRALOBE**™ shape provides a low pressure drop Cl-absorbing support media when loaded in a HTS reactor.



No ancillary equipment, utilities or services are necessary in operation. Once installed in HTS vessels, the **PURASPEC** 2272 absorbent removes chlorides from the process gas, reducing chloride migration to downstream LTS units which are more susceptible to chloride poisoning. It is a simple, effective and practical solution that offers peace of mind to the operator.

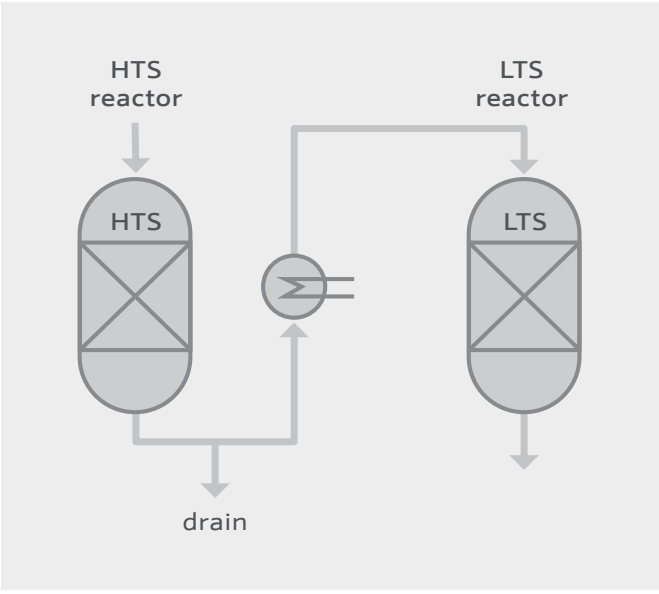
Superior guard performance

PURASPEC 2272, JM's chloride guard material, is installed as a low pressure drop support loading option below the HTS unit, utilizing space which is typically only filled with inert spherical support media. It acts as an additional provision upstream from the LTS to extend the performance further and add a little more security if the LTS bed has a wetting event, which can spread soluble chlorides deeper into the bed.



PURASPEC 2272

PURASPEC 2272 takes advantage of previously inactive vessel space to protect and extend the lifetime of our **KATALCO** 83-3X series LTS catalysts. As illustrated below the location of the HTS exit for a Cl guard is preferred due to the lower risk of wetting due to high dewpoint margin.



HTS exit PURASPEC 2272	
Process	840°F / 450°C
Dewpoint	356°F / 180°C
Dewpoint merge	484°F / 270°C

LTS inlet - Traditional	
Process	380°F / 195°C
Dewpoint	355°F / 180°C
Dewpoint merge	27°F / 15°C

Chlorides are exceptionally soluble and thus very mobile when wetted, meaning that condensation events can have a severe impact on LTS performance. Given the problems with migration of Cl in LTS, especially if the bed is wetted JM developed this novel solution.

With **PURASPEC** 2272 installed, a condensation event is less damaging to the LTS as there will be less Cl present at the top of the LTS, so it can't be washed down the bed. Installation at the base of the HTS is advantageous as there is an order of magnitude increase in safety margin to the dewpoint of ~485 °F (270°C) versus only a narrow ~25°F (~15°C) margin at the LTS inlet. Additionally, it keeps chlorides out of the LTS; therefore, if condensation occurs during start-up, any Cl that is washed out leaves from the drain.

Real world examples

PURASPEC 2272 has been installed in several facilities, with the performance closely monitored to enable JM to accurately check the benefits of improved performance. Figure 1 shows the range slower LTS profile movement rates seen with **PURASPEC** 2272 versus expected deactivation rate for JM's conventional basis of LTS design.

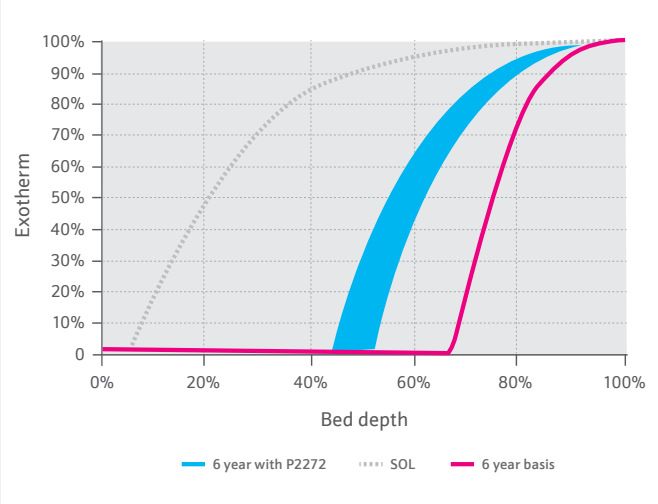


Figure 1: lower LTS deactivation rate with **PURASPEC** 2272 verses JM LTS design basis

Due to the better protection against Cl poisoning the slower LTS deactivation rate with **PURASPEC** 2272 installed upstream of the JM LTS means it performs with a low CO slip for longer, contributing to an increased LTS catalyst life and optimized performance. Figure 2 shows the predicted improvements range.

Superior protection

PURASPEC 2272 has already been installed in multiple references with outstanding performance that meets or exceeds expectations. It creates value for plant operators when compared to conventional LTS package products by providing:

- Lower pressure drop than traditional spherical balls
- Active material below the HTS, using volume that was previously inert
- A high purity strong ceramic support promoted with alkali, a strong affinity for trapping chlorides
- Longer downstream catalyst lives due to preventative protection against wetting and Cl migration

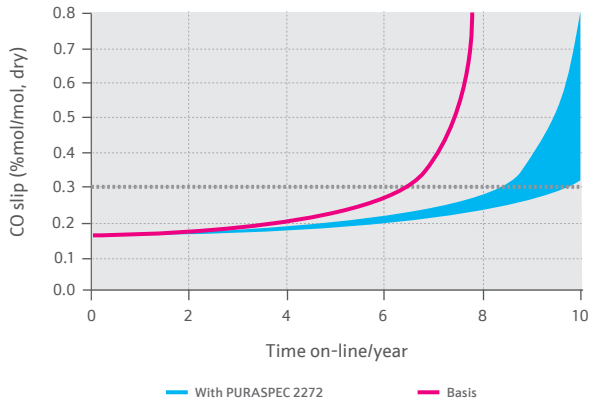


Figure 2: Improved CO slip prediction with **PURASPEC** 2272 verses JM LTS design basis

Johnson Matthey will continue to monitor the performance and contribution of the **PURASPEC** 2272 over time and communicate the effectiveness of this product which appropriately used can increase LTS life in range between 20-50% depending on plant conditions.

Contact your local Johnson Matthey office for more information on how we can benefit your site.

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