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Chemistry for tomorrow

DURAGUARD™

Sulfur and Mercury Removal Solutions for Gas Processors

William Blythe Limited offers fixed-bed absorbent products for sulfur and mercury removal in natural gas processing plants under the product family: DURAGUARD™.

DURAGUARD™ absorbents have high capacity, long-life and are a cost-effective solution for gas & liquid gas streams. All DURAGUARD™ products come with a full lifecycle support package from a team with 50+ years' experience in gas processing.

DURAGUARD™ product benefits:

- Low capital cost
- High capacities for mercury & sulphur
- Stable pressure drop through life
- Spent material can be reprocessed

S100: SULFUR REMOVAL

DURAGUARD™ S100 is a fixed bed gas absorbent optimised to remove hydrogen sulfide (H_2S) from gas and liquid hydrocarbon streams in natural gas processing plants. The DURAGUARD™ S100 product has high capacity for sulfur absorption that enables a long bed life, reducing costs for process operators by reducing changeout frequency. The product can be used in a lead-lag set up configuration to allow for continuous, uninterrupted operation and to optimise absorbent use. DURAGUARD™ S100 has a high mechanical strength which aids the loading and discharge process.

M100: MERCURY REMOVAL

DURAGUARD™ M100 is a fixed bed gas absorbent that has been engineered to offer unrivalled capacity for mercury through the optimisation of metal sulfide composition. It has also been designed to have a very sharp profile through the bed. The high capacity for mercury absorption results in a long bed life, reducing costs for process operators by reducing changeout frequency. Mercury removal beds often operate in single bed mode, the sharp profile achieved in operation enables optimum absorbent use. DURAGUARD™ M100 has a high mechanical strength which aids the loading and discharge process.

DURAGUARD™ S100: Sulfur Removal

Utilising the expertise in chemical manufacture and material processing, William Blythe Limited have engineered DURAGUARD™ S100 to have enhanced porosity and chemical activity, resulting in high capacity for H_2S removal. DURAGUARD™ S100 can operate at a wide range of temperatures, pressures and a range of H_2S concentrations with product life being dependent on the amount of H_2S passing through the bed. A key benefit of the DURAGUARD™ S100 is the cost/kg of sulfur removed over the lifetime of the bed. As shown in Figure 1, sulfur saturation is achieved throughout the bed, ensuring optimal use of all of the product.

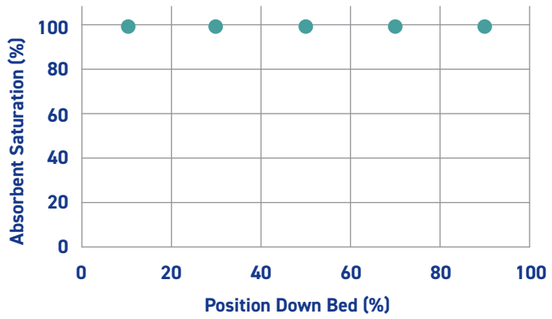

Figure 1: DURAGUARD™ S100 absorbent saturation profile in a lead-lag system.

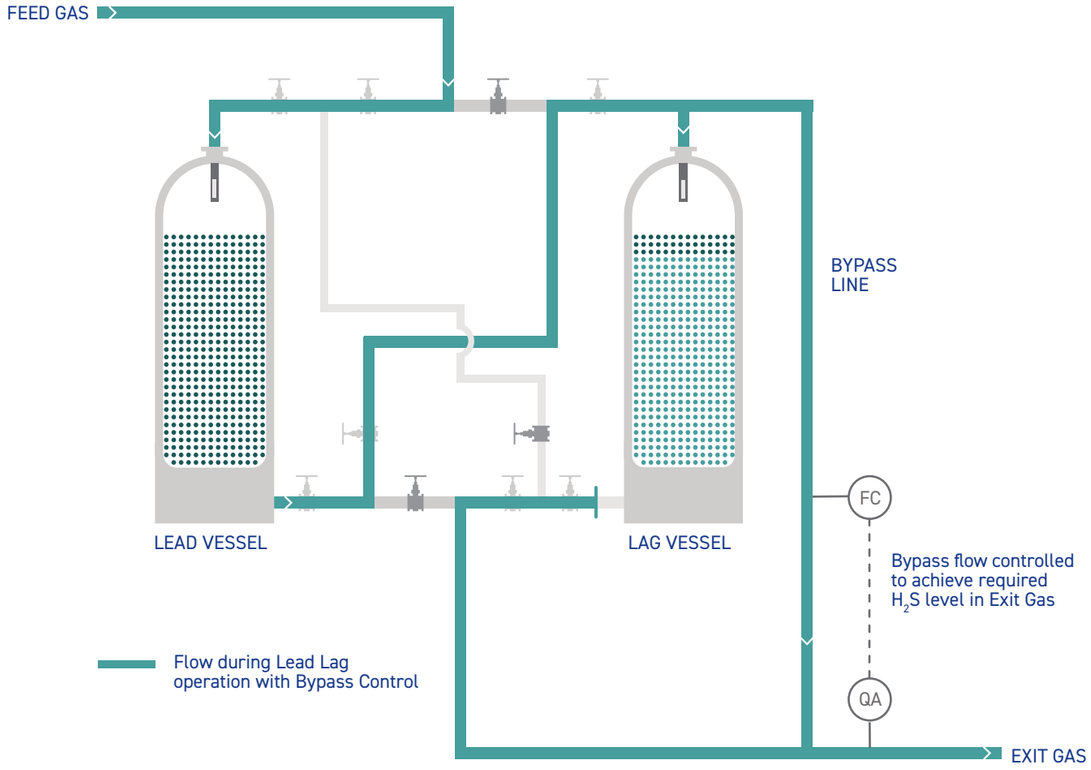

Figure 2: Operation of DURAGUARD™ S100 in a lead-lag configuration. Once the lead bed is fully saturated with sulfur, the gas stream can then be diverted to the lag vessel, ensuring continuous, uninterrupted operation of the plant. Once the DURAGUARD™ S100 absorbent has become saturated with H_2S, the sulfur remains chemically bound to the granule and will not be released into the environment.

DURAGUARD™ M100: Mercury Removal

The DURAGUARD™ M100 absorbent has been engineered to have enhanced levels of active sites, resulting in a very high capacity for mercury. Mercury is chemically bound to the granule during removal, ensuring no release to the environment during and after bed operation. Operating benefits include impurity removal to very low levels and low bed pressure drop. DURAGUARD™ M100 can operate at a wide range of temperatures, pressures and a range of mercury concentrations with product life being dependent on the amount of mercury passing through the bed. Figure 3 shows the very sharp mercury removal profile seen through DURAGUARD™ M100 bed. This profile demonstrates the fast kinetics with most of the removal occurring at the top of the bed.

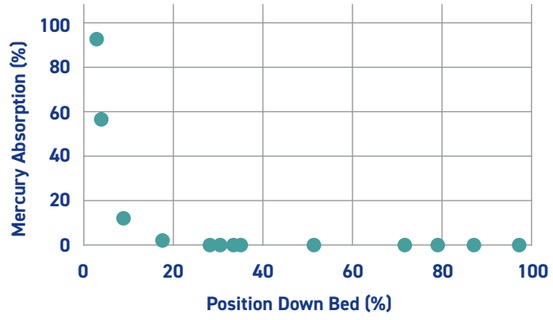

Figure 3: DURAGUARD™ M100 absorbent saturation profile.

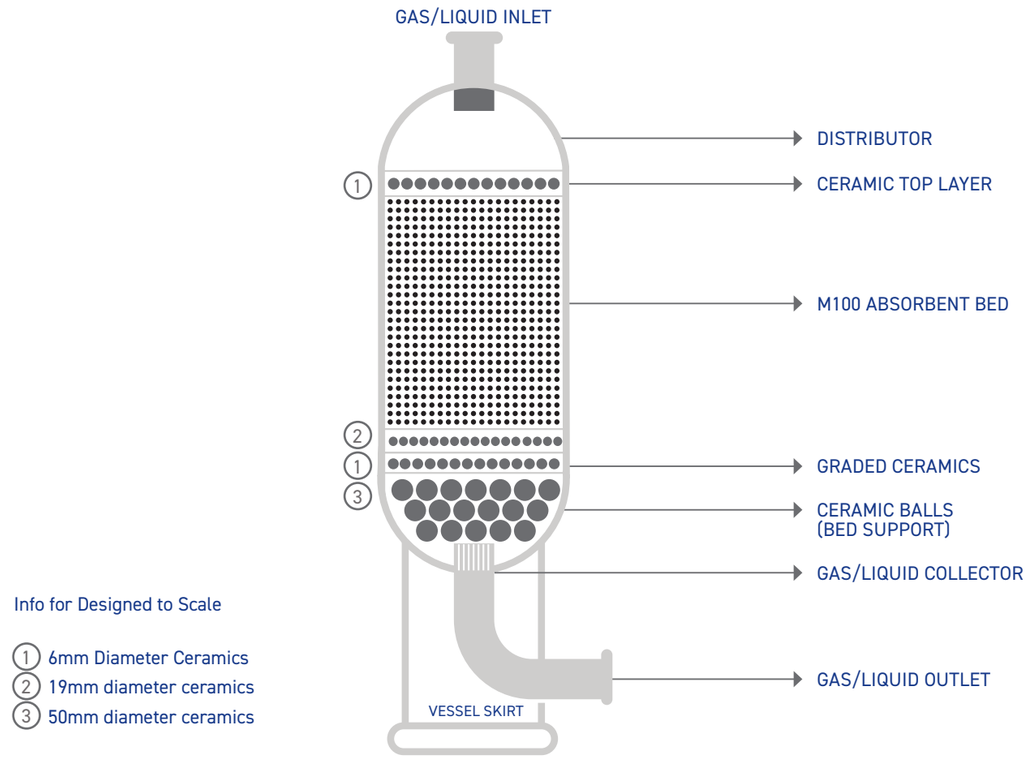

Figure 4: Operation of DURAGUARD™ M100 in a single bed configuration, made possible due to the sharp mercury absorption profile. This shows a typical arrangement for supporting DURAGUARD™ absorbent beds with graded ceramics. It is recommended that the mercury removal vessel containing DURAGUARD™ M100 is positioned in an upstream location to protect equipment from mercury contamination.

FULL LIFECYCLE SUPPORT

Reprocessing of spent DURAGUARD™ absorbent via environmentally friendly and sustainable routes can be managed by William Blythe Limited, ensuring minimum environmental impact from the process.

We offer customers a full solution approach comprising: technical support for the full life-cycle of the absorbent, providing designs for new beds, advice and supervision on loading and unloading of absorbent, process optimisation during operation and the re-processing of spent absorbent.

REPROCESSING / DISPOSAL ASSISTANCE

We support operators to reprocess or dispose of spent absorbent via an environmentally responsible route. We can manage every step of the reprocessing route from discharge, analysis, safety data sheets, permit applications and transport, through to providing a certificate of recycling.

PROCESS DESIGN

We provide process designs and a general arrangement showing supports and internals needed for new vessels. The majority of designs are for axial flow reactors but we can also design for other types such as radial flow reactors, if for instance, there is a limitation on pressure drop. For existing vessels, we provide a design review based on proven DURAGUARD™ performance. The only parameters required to design the vessel are stream composition and properties, operating conditions and any limitations on floor space/height.

DISCHARGE ADVICE AND SUPERVISION

We provide advice on vessel preparation prior to discharge and recommended discharge method for the absorbent bed. During discharge, one of our experienced team members can be on-site to provide immediate support and advice.

LOADING ADVICE AND SUPERVISION

DURAGUARD™ absorbent is supplied in packaging suitable to the requirements of the plant, for example UN approved 1,000 kg bags with lifting lugs in Octoboxes or UN approved 55 gallon drums. We provide advice on loading techniques and absorbent handling based on each specific vessel. During loading, one of our experienced team members can be on-site to provide immediate support and advice.

PROCESS OPTIMISATION

We offer support analysing samples of absorbent discharged from the absorbent bed. This can provide reassurance that the bed has performed as expected, assist in the reprocessing and disposal process and also identify if any unexpected elements are present on the samples.

PERFORMANCE MONITORING

Our engineers review operating data, including process flows and impurity (H_2S or Hg) levels in both the inlet and exit streams. We can predict bed life remaining which will ensure optimum absorbent use and enable the user to plan absorbent replacement. In the unlikely event of performance issues, we provide support to carry out root cause analysis and troubleshooting.

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William Blythe Limited is a manufacturer of speciality inorganic chemicals and advanced materials. With significant investment in product development and production infrastructure, our business is committed to working in development partnerships with our clients. Our ever expanding portfolio covers compounds of iodine, tin, copper, tungsten and graphene oxide used in catalysis, electronics, life sciences, polymer additives and renewable energy markets.

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