

VK-W series Wet gas sulphuric acid catalysts

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Tailored catalyst solutions for Topsøe's WSA processes

The catalytic SO₂ converter is key equipment in Topsøe's WSA (Wet gas Sulphuric Acid) processes. The quality and characteristics of the catalysts installed are crucial to a reliable and energy-efficient operation of the WSA processes.

For WSA and WSA-DC plants, Topsøe offers four different catalyst formulations in the VK-W series. These effectively cover all operating conditions encountered in the broad variety of WSA applications.

The VK-W catalysts have exceptionally high strength, achieved through the use of specially selected raw materials and rigorous manufacturing quality control. This strength advantage contributes to a long service life in the water-vapour containing gas streams which characterises the WSA processes.

By combining outstanding activity with low pressure drop, high strength and a long service life, the VK-W catalysts will ensure a cost-efficient and flexible operation of the WSA and WSA-DC plants for many years.

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VK-WSA

The VK-WSA formulation offers excellent activity over a wide range of operating conditions and can be used in any bed of a WSA or WSA-DC converter. VK-WSA is available in the 12 mm Daisy shape and as a dust-protection catalyst in the large 25 mm Daisy shape.

25 mm Daisy – dust protection catalyst

A 150 mm top-layer of VK-WSA 25 mm Daisy helps to ensure high availability of the WSA unit by significantly reducing the rate of pressure drop build-up.

The extra void fraction and a lower specific surface area provide the 25 mm Daisy with an excellent capacity for dust and an improved dust distribution throughout a larger depth in the bed.

A top-layer of 25 mm Daisy can effectively double the on-stream time before increasing pressure drop degrades plant performance.

VK-WSX

The VK-WSX formulation was developed to offer higher activity in SO₂ gasses that are more than 90% converted. Typically VK-WSX is used in the last bed of a WSA converter. For this service, VK-WSX is more active than VK-WSA and even more active than caesium-promoted VK-WH catalyst. The high activity is the result of carefully optimising the alkali-metal promoter content to

the specific conditions in WSA converters in combination with a unique support material. VK-WSX is a non-caesium catalyst; yet it can operate effectively at temperatures as low as 370°C/700°F, enabling very high conversion rates to be reached.

VK-WH

VK-WH is a caesium-promoted catalyst designed for continuous operation down to 370°C/700°F in medium- to high-strength SO₂+SO₃ gasses. A top-layer of VK-WH can significantly improve operating flexibility by widening the bed temperature control window, especially in plants struggling with fluctuating gas conditions. For WSA-DC plants operating with high-strength feed gas, VK-WH offers the ability to operate the first bed with more control and without excessive outlet temperatures while maintaining excellent bed conversion.

VK-WL

VK-WL is a caesium-promoted catalyst designed for continuous operation down to 370°C/700°F in lean SO₂+SO₃ gasses (less than approximately 2 mole%). At these conditions, VK-WL offers unmatched high activity throughout the entire operating temperature range. The very high activity provides the opportunity to operate the WSA-DC plant at state-of-the-art conversion efficiencies of more than 99.95% with only four catalyst passes.

	VK-WSA	VK-WSX	VK-WH	VK-WL
Type	Potassium-promoted	Potassium-promoted	Caesium-promoted	Caesium-promoted
Ignition temperature	360°C/680°F	340°C/645°F	320°C/610°F	320°C/610°F
Continuous operating temperature range	400-630°C 750-1165°F	370-450°C 700-840°F	370-500°C 700-930°F	370-450°C 700-840°F
Thermostability	650°C/1200°F	650°C/1200°F	650°C/1200°F	650°C/1200°F
Size and shape	12 mm Daisy 25 mm Daisy	9 mm Daisy	12 mm Daisy	9 mm Daisy
Application area	All beds. Dust protection in first bed only	Last bed in WSA plants for high conversion efficiency	Top layer in first bed for increased operating flexibility	Last bed in WSA-DC plants for high conversion efficiency