

By James R. Graham, Ph.D.

Odor-Less

Odoriferous compounds, a typical byproduct of chemical processes, are detectable at very low concentrations in sewage treatment plants, refineries and pulp and paper mills. The more common inorganic offender is hydrogen sulfide (H₂S) while the most frequent organic components are methyl mercaptan (CH₃SH), dimethyl sulfides and other organic sulfides.

To control these odorous compounds, plant operators choose from several odor control carbons; including virgin, untreated and chemically treated coal- and coconut shell-based granular or pelletized activated carbons as well as custom-manufactured granular activated carbons that require periodic water washing in order to remain active.

A new custom manufactured odor control media (OCM) combines selected active ingredients and premium quality bituminous coal to yield an OCM with an extraordinarily high H₂S breakthrough capacity. It effectively reduces H₂S concentrations to below odor threshold levels by catalytically oxidizing the H₂S almost exclusively to elemental sulfur.

The physical size of a sulfur molecule is approximately 3-1/2 times smaller than that of a molecule of sulfuric acid. The new design has a high surface area, micro- and macro-porous pore structure and large total pore volume. It can store about 3-1/2 times more H₂S than a similar carbon that produces mainly H₂SO₄ as the oxidation product before needing to be replaced.

This media handles a wide spectrum of odorous and corrosive gases and can be used in any application where impregnated and/or water wash carbons are being used. The presence of high concentrations of CO₂ does not affect its high H₂S and acidic gas loading capacity. In addition, the OCM's 4-mm diameter pellet offers a low-pressure drop to gas

Comparing the Midas™ OCM to other odor control carbons

OC Carbons	Density (g/cc)	Weight (lbs/ft ³)	H ₂ S Removed (g/cc)	H ₂ S Removed (% of wt)
Coconut shell and coal carbons	0.50	31	0.05	10.0%
Chemically treated carbons	0.55	34	0.14	25.4%
Water wash carbon	0.56	35	0.09	16.1%
Midas™ OCM	0.48	30	0.30	62.5%

flows, and its superior hardness resists dust and fine particles formation.

Since it is not impregnated, it does not suffer the serious drawbacks associated with alkali-impregnated carbons. The ignition temperature is similar to virgin coal-based carbons (>450 °C), so it does not pose a significant fire hazard during installation, system startup and use. By not being impregnated with a strong alkali, the OCM is much safer to load, start up and remove from an adsorber system. Additionally, it does not create sulfuric acid as a prime byproduct. It is therefore not strongly acidic when spent and can be handled as a non-hazardous material.

Other product benefits include:

- ▶ Thrives on high humidity;
- ▶ Never needs washing;
- ▶ Reduced labor and lower



Other OCM: $\text{H}_2\text{S} + 2\text{O}_2 = \text{H}_2\text{SO}_4$
New design OCM: $2\text{H}_2\text{S} + \text{O}_2 = 2\text{S} + 2\text{H}_2\text{O}$

operating costs;

- ▶ Longer bed life (fewer service interruptions, lower O&M costs); and
- ▶ Backing of technical support and strong QA/QC program.

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About the Author

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