

# Catalyst Choice

Catalytic oxidizers are a reliable, cost-effective solution for VOC destruction. Catalytic oxidizers have been successfully used to treat VOC emissions in; graphic arts, flexographic and rotogravure printing, web coating, coil coating, pharmaceutical and other industries. MEGTEC has installed more than 1000 bead catalyst units, with many oxidizers operating for more than 15 years using the original catalyst.



Since catalytic oxidation is not an area of expertise for most end users of emission control equipment, this technical bulletin has been developed to assist the end-user in choosing the right catalyst for their applications.

## The following properties should be considered in choosing a catalyst:

- Activity** - Catalyst must meet stringent VOC conversion requirements at the lowest possible operating temperature
- Durability** - Catalyst must have good mechanical integrity and maintain high activity in the presence of masking agents such as phosphorus and silicon
- Cost** - Initial cost of catalyst and ease of installation should be considered

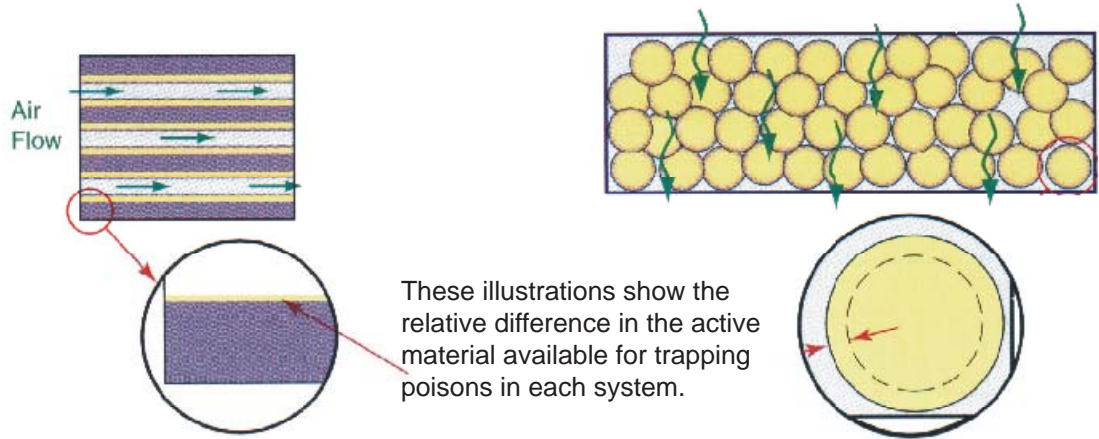
### Monolith Catalyst

Monolith catalyst consists of a honeycomb substrate of either ceramic or metal that has been washcoated with alumina (aluminum oxide). The washcoat is applied at a thickness of approximately 30 microns (0.0013 in.) and is shown below as the yellow bands. A washcoat is necessary to give the typically smooth substrate greater surface area. Precious metals are placed on the porous surface of the washcoat. The VOC-laden air flows through the length of the honeycomb structure, and the oxidation reaction takes place as the VOCs come in contact with the active metal sites.

### 936 Bead Catalyst

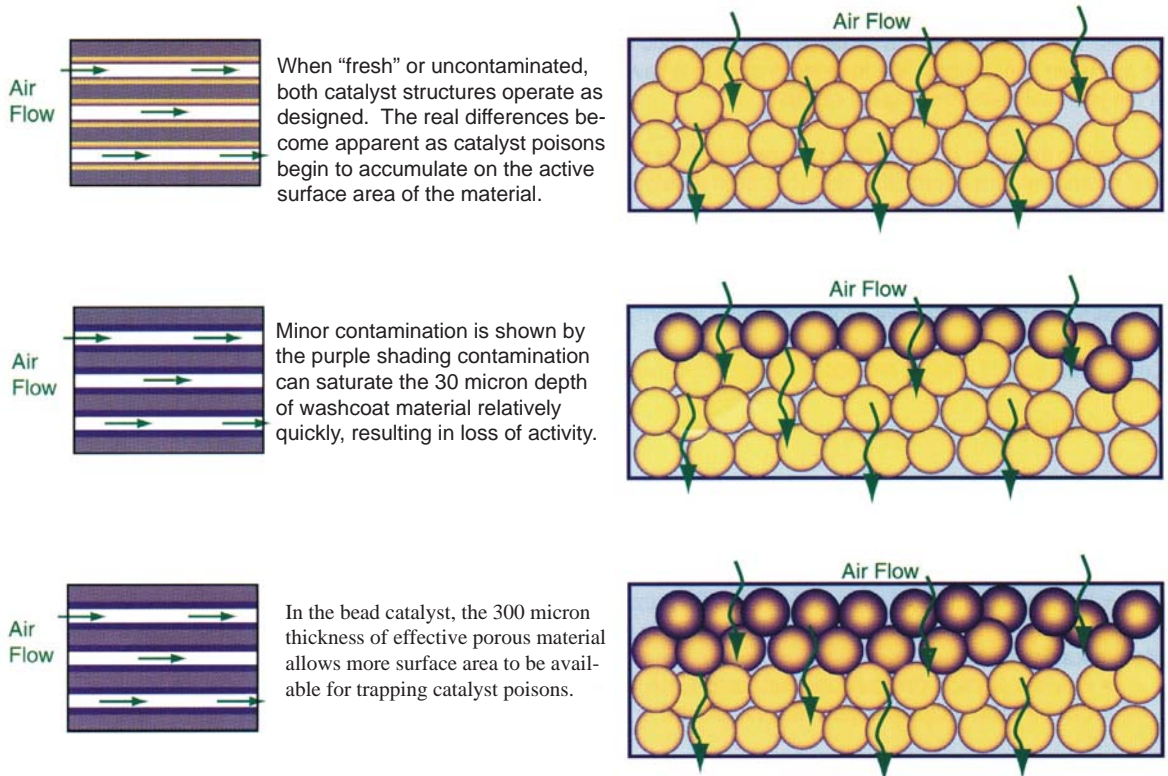
Catalyst beads are small porous alumina spheres. There is no washcoat per se, the entire bead is homogenous, and serves as both the mechanical support and the catalyst substrate. Precious metals are placed on the outer surface of the bead. Bead diameter is approximately 2540 microns (0.10 in.). Active metals are deposited within the top 300 microns of the bead surface. The VOC-laden air flows downward through the packed bed of catalyst beads, to the exit side of the bed. As the VOC-laden air passes through the bed, it is forced to twist and turn on its path through the beads. This is a very effective way of ensuring that each individual VOC comes in contact with an active metal site before it exits the catalyst bed.

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Enlarged catalyst layers on substrate

Enlarged 0.10" diameter bead



Typically, MEGTEC bead catalysts are 20 times more resistant to poisons than monolith.



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## Advantages of Bead Catalyst Systems

- ➔ High surface area
- ➔ High mass-transfer efficiency
- ➔ between reactants and catalyst

## Improved poison resistance due to high volume fraction of catalyst in reactor

- ➔ Durability under conditions of thermal cycling
- ➔ A portion of the catalyst can be easily replaced, if necessary

## Disadvantages of Bead Catalyst Systems

- ➔ Higher bed pressure drop
- ➔ Larger oxidizer sizing

## Advantages of Monolith Catalyst Systems

- ➔ Small combustion chamber size
- ➔ Easy to install/hold catalyst into the chamber.
- ➔ Low pressure drop

## Disadvantages of Monolith Catalyst Systems

- ➔ Smaller surface area easily poisoned or deactivated
- ➔ Susceptible to thermal cycle cracking
- ➔ Larger oxidizer sizing

For further information, availability, please contact your nearest MEGTEC office by visiting [www.megtec.com](http://www.megtec.com) and click on parts and upgrades or email to [info@megtec.com](mailto:info@megtec.com).