

### Clean air is only a block away.

Flanders Precisionaire, through its innovation, has resolved the problems associated with loose filled activated carbon filters and introduces HMZD bonded carbon panels.

HMZD stands for High Mass and Zero Dust. High mass refers to the greater density of activated carbon installed and zero dust means that the filters will not release carbon dust into the air stream. The panels are fabricated from 100% virgin coconut shell activated carbon with a minimum 60% CTC activity. The premium grade carbon is bonded together during a sintering process to form a rigid block and framed to provide clean air.

HMZD panels are replaced right at the air handling unit with the same quality 100% virgin carbon as the initial installation. Loose filled tray systems are typically replaced with regenerated carbon minimizing adsorption performance.

### Superior performance:

The HMZD panels provide superior adsorption performance because there is no settling within the carbon bed. The carbon granules are bonded together to provide a uniform density of sorbent media across the panel eliminating air bypass and stratification zones for high efficiency and extended service life. The panel design creates uniform air flow distribution and uniform residence time ensuring maximum removal efficiencies.

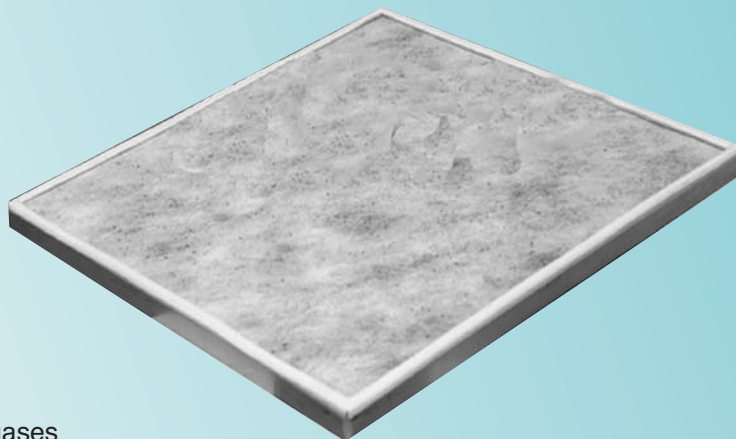
### Cleaning the air

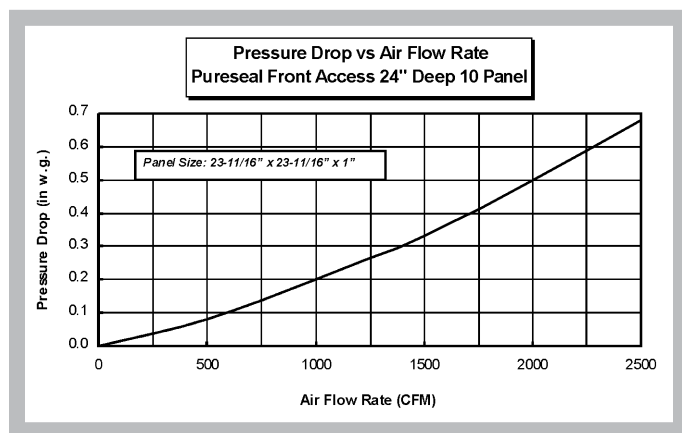
The uniform air velocity through the bed eliminates high velocity zones and bed fluidization. Bed fluidization is a major cause of continuous dusting in loose granular system designs. HMZD panels deliver clean air. No after filters are required.

### Carbon Usages

Activated carbon is highly effective on many gas phase contaminants:

- Adhesives
- Alcohols
- Animal odors
- Asphalt fumes
- Auto exhaust
- Body odors
- Charred Materials
- Sour milks
- Turpentine
- Waste products
- Cleaning odors
- Cosmetics
- Jet engine exhaust
- Fertilizers
- Fish odors
- Kitchen odors
- Stale odors
- Vinegar
- Liquor odors
- Mold
- Moth balls
- Onion odors
- Ozone
- Paint fumes
- Sewer odors
- Tobacco smoke
- Vinyl chloride
- Many process gases

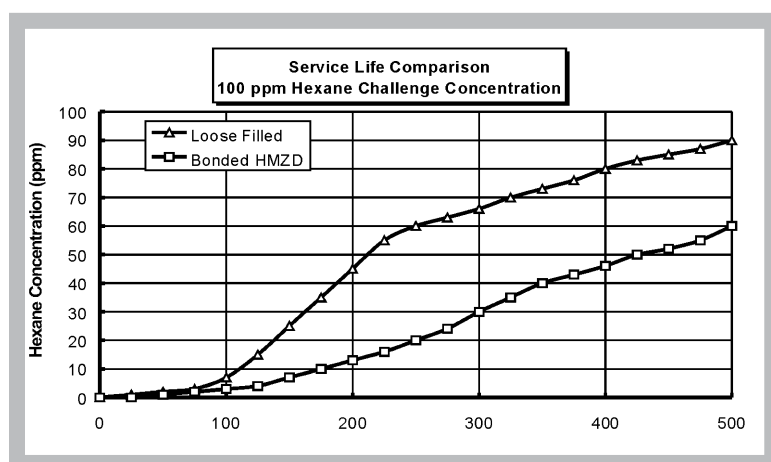




## Pressure Drop

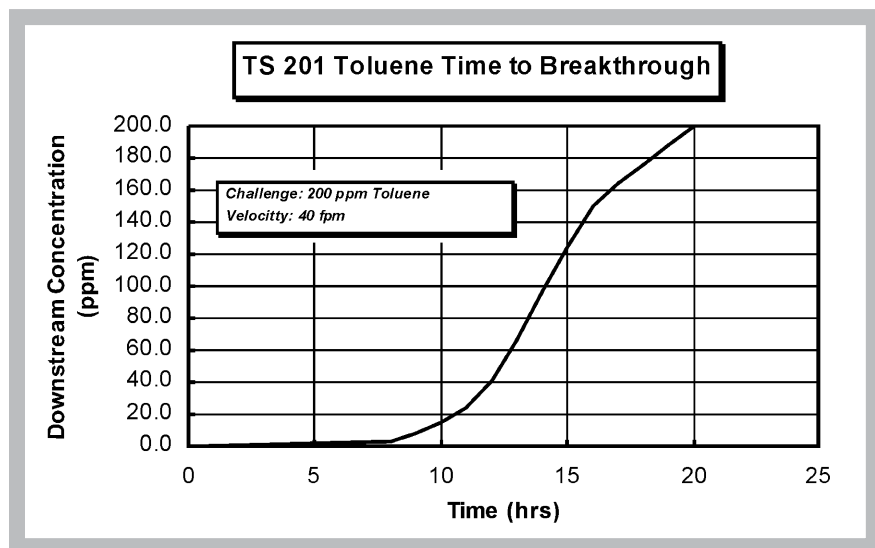
HMZD Panels can be incorporated into V shaped configurations with minimal pressure drop and impact on the system.

Please note that the breakthrough test was based on continuous 100 ppm Hexane challenge concentration. Testing conducted at an independent lab on virgin coconut shell carbon.



## Efficiency

HMZD panels perform better than loose filled systems due to increased density of carbon and elimination of air bypass



## Carbon Selection

In general, contaminants with a boiling point greater than 100 C can be effectively removed with carbon type 201.

Contaminants with a boiling point below 100 C require other available types of impregnated carbon such as type 202, 204, 205, 209.

## Retrofitting existing loose trays:

HMZD panels are available from 3/8" to 3" thick and are easily installed into any existing side or front access carbon housing without any mess from carbon dusting. The labor required to transport to a remote area and refill trays is eliminated with bonded panels and high initial efficiency is maintained with replacement panels composed of 100% virgin carbon as opposed to utilizing regenerated carbon.

## Providing clean air:

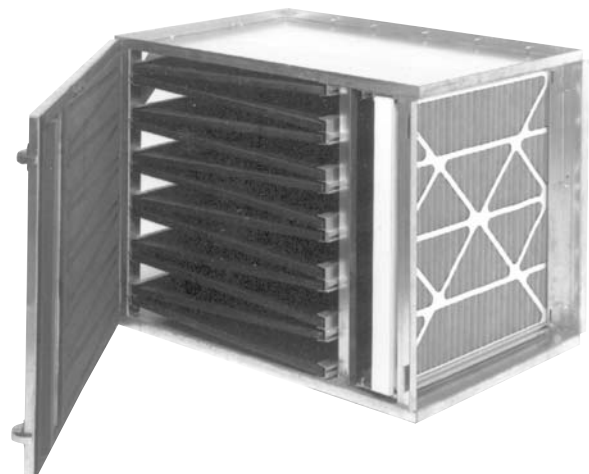
HMZD carbon panels are suitable for solving complex Indoor Air Quality problems within museums, schools, airports, semiconductor manufacturing plants, waste water treatment facilities and hospitals. A carbon solution is available for removing the application specific contaminants.

## Carbon selection:

HMZD carbon panels can be manufactured from virgin carbon, where contaminant removal is accomplished by physical adsorption or from impregnated virgin carbon where contaminant removal by chemical adsorption mechanisms are required.

## HMZD Carbon Types and Applications:

- 201- Impregnate is virgin coconut shell carbon for general removal of VOC s
- 202- Caustic impregnated for removal of acid gases
- 204- Acid impregnated for removal of alkaline gases
- 205- Chromate impregnated for removal of amines
- 209- Universal impregnate for removal of acid and alkaline gases.
- 225- Proprietary blend for airports & helipads



## Guide Specifications

### 1.0 General

- .1 Molecular contamination control filters shall be Flanders High Mass and Zero Dust (HMZD) bonded carbon panels. Panels shall be self-supported bonded granular carbon and be sized to fit into the selected Flanders Pureseal front or side access housing as well as competitive carbon systems. Model numbers shall be as per schedule for application specific requirements.

### 2.0 References

- 2.1 ASTM test method D 3467-88, Standard Method for Carbon Tetrachloride Activated, American Society for Testing and Materials, Philadelphia, 1988.

### 3.0 Construction

- 3.1 The granular carbon shall be bonded together in a briquette form so that the panel contains no loose carbon; loose filled tray type systems are not permitted.
- 3.2 Panels shall be covered on both sides with a spun bonded polyester scrim and framed in a galvanized (or stainless steel) channel. A black polybutyl (or silicone) gasket shall be affixed to one side of the panel frame for front access designs.
- 3.3 The bonded carbon configuration shall not settle, shall not particulate and shall not allow channeling through the bed.
- 3.4 The bonded panels shall be self-supporting and when installed in the housing shall provide a continuous seal around its periphery.

### 4.0 Packaging

- 4.1 The panels shall be individually sealed into a polyethylene bag prior to being boxed. Filters shall be stacked on pallets and stretch wrapped.

### 5.0 Carbon Material

- 5.1 The panels shall be composed of virgin coconut shell granular activated carbon with a minimum carbon tetrachloride (CTC) activity of 60% per ASTM D-3437. The granular carbon shall be 4x8 US mesh size with an apparent density of 0.49 g/ml minimum. The minimum hardness shall be 97 per ASTM D 3802. The minimum surface area shall be 1100 m<sup>2</sup>/g (N<sub>2</sub>BET Method) and the moisture content shall not exceed 5%.
- 5.2 The carbon shall be Flanders Tech Sorb TS (carbon type model number) as designed for the removal of (contaminant). The contaminant removal capacity shall be (x%) by weight as (challenge).

<b>Tech Sorb #</b>	<b>Capacity</b>	<b>Challenge</b>
201	24%	butane
202	20%	hydrogen sulfide
204	10%	ammonia
205	5%	formaldehyde
209	12%	hydrogen sulfide

The mass of carbon in the filter shall be (x)grams/ft<sup>2</sup>

<b>Tech Sorb #</b>	<b>1"</b>	<b>3/4"</b>	<b>5/8"</b>	<b>7/16"</b>
201	2.6	1.9	1.6	1.1
202	2.9	2.2	1.8	1.3
204	3.7	2.8	2.3	1.6
205	3.0	2.2	1.9	1.3
209	2.8	2.1	1.8	1.2

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