

## ***Technical Information***

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### ***The KATEC-Allmetal-Catalyst***

#### **Structure – Standard Elements – Special Shapes**

The Metal Supported Catalyst was developed in 1950 by H. J. Suter and R. J. Ruff especially for the oxydation of hydrocarbon vapours from industrial pollution sources. This catalyst is being applied wherever high combustion efficiency is desired.

The KATEC-Allmetal-Catalyst is consisting of a metally basic material coated with an activation precious metal. The special metallic basic has the function of spreading the activating component over the largest possible surface (contact) area .

In consequence of that an optimum of investion versus output can be achieved, considering the above mentioned point by also achieving an optimum of total active surface and dwell time.

#### **Support Material – Element Construction**

Perforated ribbon is packed between container screens to form a mat type structure similar to conventional air filter mats. These mats are 32 mm thick and can be packed two, three or four together to form elements. Two mats together form the element type –2 with a depth of 65 mm, three mats together form type –3 with a depth of 96 mm etc.

Ribbon and Screen are made from alloys containing Nickel, Chromium, Iron and Aluminium. The melting point is above 1100 °C and the mechanical strength allows continuous service at 750 °C for permanent operation.

Uniform distribution of the ribbon within the container screens is a prerequisite for good uniform contact of the vapours with the catalyst. A constant pressure drop over the entire catalyst face area is obtained through proper production control methods.

#### **Improvement of mechanical structure**

The basic ribbon in form of flat wire is crimped and especially treated with our own process to provide good distribution and a large surface area. These processes assure highest contact time with optimal catalyst volume and lowest pressure drop.

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### ***Active Catalyst Surface***

The metallic basic material is coated with metals of the Platinum Group and special promoters. Production will be completed by activation of each catalyst element so that reproducible standard for hydrocarbon burning will be obtained prior to shipment.

### **Catalyst Elements**

The catalyst mats described above are packed into stainless steel frames to form standard catalyst elements. The size of the entry face and the depth of the catalyst element are selected on the basis of the exhaust gas volume to be treated.

The series of standard size elements listed on page 5 has proven sufficient to treat common gas volume encountered in most industrial applications. The elements are assembled in parallel for the treatment of various volumes.

Whenever special applications require a special element design, these can be built in our works. The polygon or hollow cylindrical design is selected for example, whenever large gas volumes must be treated.

### **The advantages of the KATEC-metal-supported-catalyst**

The advantages of the allmetal catalyst are listed below:

- Compact structure in ready to mount stainless steel frames makes the catalyst easy to handle and install.
- The building block approach can be applied because the standard elements have specific volume capacities and can be mounted on suitable frames in parallel.
- Because of their metallic structure the elements are rugged and unbreakable.
- The fixed bed catalyst stays in position and unlike the ceramic supported catalyst by-pass channelling is no problem.
- Abrasion of the catalyst surface cannot occur because of the fixed position structure of the allmetal catalyst.

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- Even distribution of the metallic basic assures good distribution of the gas stream across the catalyst entry face.
- The metal structure assures a low pressure drop and allows the application of conventional heat fans in catalytic incinerators.
- The metal supported catalyst has good activity with the lowest possible precious metal content, since the precious metal catalyst is distributed on the basic material surface.
- The metal catalyst can be washed with water and acid, a process which removes dust and dirt and prolongs full combustion efficiency.
- Metal catalysts can be reactivated by removing the active catalyst surface and replacing it with a new one. KATEC-Allmetal-Catalysts can thus be kept in service for ten years and more.

### **Standard Catalyst Elements**

The list on page 5 contains a series of rectangular and flat catalyst elements.

The elements differ in their entry surface and depth. The entry surface areas are selected in order to achieve a suitable volume capacity.

The variation in depth allows an additional variation of volume capacity with the same element entry face area. The type –2 element is the normal depth used. Depth of less than 64 mm (type 2) are not recommended, since the low pressure drop would hinder even distribution of the exhaust gas over the entire face area. With an increase in depth to 96 mm (type –3) the volume capacity will be 1 ½ times the capacity of type –2.

Increasing the depth further to 128 mm (type –4) will raise the volume capacity to 2 times that of type –2 while keeping the same face area. These considerations are important when space limitations in incinerators dictate the face dimensions which a catalyst can have. The disadvantage is the higher pressure drop, which requires special gas for elements type –4.

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### **Expanded Elements**

At times catalysts must be fitted into existing incinerators with allowable pressure drop already dictated by the hot gas fan installed in the unit. Mostly these systems are equipped with fans which are already running at maximum permissible speed.

The expanded allmetal catalyst is applied in these cases. The types of elements are designated with the affixation of the letter "E" behind the type, i. e. Type 1–2 E. All elements can be manufactured in expanded form.

The expanded form E has twice the depth of the normal form while the amount of catalyst remains the same as is installed in the normal elements. The expanded catalyst has the catalyst media spread over twice the depth. E elements have half of the density of normal elements.

As explained in "Technical Information" No. 3 expanded elements have less pressure drop than normal elements which can become a consideration when catalysts are fitted into existing installations. It is important to remember, however, that the application of expanded elements necessitates proper mixing of hydrocarbons in the exhaust gas stream and proper distribution across the catalytic chamber prior to entry into the catalyst bed.

Many existing installations such as ovens require fixed dimensions on the catalysts and installation in vertical, horizontal or inclined positions. The allmetal catalyst can be installed in all positions and manufactured in all sizes and shapes. While slightly more costly, special elements are part of our product program.

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### *Standard Catalyst Elements*

– rectangular and flat forms –

Type	measurement outside mm	weight kg	off gas volume loading, max. Nm <sup>3</sup> /h
1-2	610 x 457 x 67	11	800
1-3	610 x 457 x 99	17	1200
1-4	610 x 457 x 131	23	1600
2-2	610 x 305 x 67	8	500
2-3	610 x 305 x 99	12	800
2-4	610 x 305 x 131	16	1000
3-2	457 x 305 x 67	6	370
3-3	457 x 305 x 99	9	550
3-4	457 x 305 x 131	12	730
4-2	280 x 186 x 67	3	150
4-3	280 x 186 x 99	4	220
4-4	280 x 186 x 131	5	300

Above listed volume capacities are suitable for catalytic oxidation for those hydrocarbons like Toluene, Xylene etc. which are easy to burn. The volume capacities correspond 100 % off gas loading for allmetal catalysts.

For several fields of catalytic oxydation of hydrocarbon emissions above listed catalysts volume capacities must be reduced.