In order to achieve the very low emission limit values required in the future using 3-way-catalysts, quick and precise Lambda control will be needed to increase cold-start efficiency and ensure low emission levels.
A new METALIT® with integrated Lambda-Sensor

Emitec has developed a new Metalit substrate that can accommodate lambda and OBD sensors. The advantages of this new type of series substrate are further enhanced by the application of turbulent metal foils with an LS and/or PE structure. The substrate also offers the option of integrating temperature or NOx sensors.

Advantages of the Lambda-Sensor-Catalyst

The classic position of the control sensor is in front of the catalyst. During the cold start phase there is often condensation in the exhaust system. Due to this fact the “sensor heating” is delayed which increases the time required for closed loop control.

Advantages of installation in the catalyst:
- No risk of sensor destruction by “water shock”
- Improved closed loop Lambda control during cold start via higher heating level and therefore emission advantages
- Fitted closer to engine = faster operational temperature achieved

Further advantages:

To fulfill OBD requirements the function of the catalyst system is usually verified by installation of the sensor between two substrates. By integrating the sensor in the catalyst the effect is:
- Single substrate system instead of two substrates
- Lower installation space requirement
- Fewer joints and lower costs
- Substrate volume to be monitored can be chosen freely

Success through Innovation

Lambda Sensor Catalyst used to achieve low emissions, particularly when cold starting – fast and efficient closed loop control.

Diagram 1: The Lambda-Sensor-Catalyst with turbulent metal foils in PE-Design™

Diagram 2: Improvement of flow distribution using turbulent metal foils example PE-Design™

Diagram 3: Optimized 3-Sensor Strategy for SULEV-Application

Diagram 4: Faster activation of Lambda-control possible

Diagram 5: Usual positions of control and OBD-sensors with two substrates; a): Arrange of the OBD-sensor in a single substrate system and integration of both sensors in the substrate.

For further information contact EMITEC.
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Advantages of installation in the catalyst:
- No risk of sensor destruction by “water shock”
- Improved closed loop Lambda control during cold start via higher heating level and therefore emission advantages
- Fitted closer to engine = faster operational temperature achieved

Advantages of the Lambda-Sensor-Catalyst:
- Standard-Design
- PE-Design™
- Cylinder 1
- Cylinder 2
- Cylinder 3
- Cylinder 4
- Cylinder 5
- Improvement
- 14 %
- 33 %
- 14 %
- 33 %
- 21 %

Diagram 3: Optimised 3-Sensor Strategy for SULEV-Application

Further advantages:
To fulfill OBD requirements the function of the catalyst system is usually verified by installation of the sensor between two substrates. By integrating the sensor in the catalyst the effect is:
- Single substrate system instead of two substrates
- Lower installation space requirement
- Fewer joints and lower costs
- Substrate volume to be monitored can be chosen freely

Diagram 5a): Usual positions of control and OBD-sensors with two substrates;
5b) and c): Arrangement of the OBD-sensor in a single substrate system and integration of both sensors in the substrate.

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