CataFlex™ DiOxi

Medical waste incinerator
Thailand
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Dioxin destruction by CataFlex™ DiOxi catalytic filter bags

At a new medical waste incinerator in Thailand, a desire to safely and securely handle dioxin emissions has led to the installation of CataFlex™ DiOxi catalytic filter bags in the beginning of 2018.

Dutch Incinerators, who provides turn-key solutions in thermal waste processing and waste-to-energy, was constructing a medical waste incinerator in Thailand. Based on their extensive experience in the medical and hazardous waste market, they knew that dioxin formation during the combustion process is a challenge. Even when following best practice and using state-of-the-art technology, very little has to deviate for the dioxin formation to end above the very strict regulated limit. Adsorption by activated carbon is the most widely used technology for the capture of dioxins at waste incinerators. However, this technology also has limits, which mean that plant operators and management always doubt whether they are in compliance or not. Online measurements of dioxins are currently not possible, and this means that activated carbon is in practice added in fixed quantities during the operation of the plant. Experience however tells that inlet quantities of dioxins vary significantly, both as a function of the type of waste and the operating conditions of the combustion process. Furthermore, it is also known that increasing the capture of dioxins by increasing the activated carbon injection is not always possible. Dutch Incinerators has previously experienced in an existing plant with similar setup that dioxin emissions could not be pushed below the local regulation of 0.5 ng-TEQ/Nm³ even by dosing 10 times more activated carbon. In fact, the increased activated carbon injection hardly had any effect. On top of this, activated carbon only captures the dioxins and poses a new risk when handling the spent activated carbon – now containing dioxins.

Dutch Incinerators wanted instead to catalytically destruct the dioxins converting them into primarily CO₂ and H₂O. This solution became possible by installing CataFlex™ DiOxi catalytic filter bags in their conventional filter house hosting 312 filter bags. The CataFlex™ DiOxi catalytic filter bags work as conventional dust filter bags when it comes to particulate removal, but their fabric is loaded with a proprietary catalyst, which destructs both dioxins and furans. Tests after the installation of CataFlex™ DiOxi filter bags at Dutch Incinerators’ medical waste incinerator showed a destruction of >99% of dioxins and furans without any injection of activated carbon. Inlet and outlet measurements were performed by SGS Thailand Ltd., which confirmed the performance and measured less than 0.02 ng-TEQ/Nm³ of dioxins and furans in the released flue gas – far below the strictest regulations. With the new catalytic filter bags, Dutch Incinerators now has a passive dioxin destruction solution ensuring...
the plant is always in compliance. This puts the mind at ease and allows for full focus on optimizing plant operation.

If desired, CataFlex™ DiOxi filter bags can also be used in combination with activated carbon injection to ensure the destruction of any potential dioxin or furan that may escape the activated carbon due to offsets in either activated carbon injection or higher dioxin formation in the combustion process caused by some of the upstream equipment. This allow plant operators to optimize the activated carbon injection and still constantly ensure compliance with the strictest regulations.

<table>
<thead>
<tr>
<th>CataFlex™ DiOxi performance</th>
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<tbody>
<tr>
<td>Dioxins/furans destruction (TEQ)</td>
<td>&gt;99%</td>
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<tr>
<td>Dioxins/furans emission, ng-TEQ/Nm³</td>
<td>&lt;0.02</td>
</tr>
<tr>
<td>Dust emission, mg/Nm³ (wet)</td>
<td>&lt;10</td>
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Installation of CataFlex™ DiOxi catalytic filter bags in the conventional filter house and tube sheet.

The design of the catalytic filter bags can be customized – in this case, snap rings were used to mount the filter bags to the tube sheet.