



**Dioxin Research Laboratory  
CSIR-NIIST**

**Test Result of the Burnhut Experiment using unused sanitary pads as test material on 28/06/2019**

Customer Name: CSIR- NEERI  
Date of Sampling : 28/06/2019  
Date of Issue: 26/07/2019

Sample Id : NIIST/DLab/ES/01  
Date of Analysis : 01/07/2019 - 11/07/2019

Parameters	Observations
Type of study conducted	Replicated combustion studies in a simulated burning chamber - Burnhut
Initial weight of the material taken	6.6 Kg
Final weight on the completion of the experiment	0.3 Kg
Total run time	39.4 minutes
Volume of air sampled	0.4582 Nm <sup>3</sup>
Total volume of air blown during the experiment	874.5
Weight of the residual ash	0.3 Kg
<b>Air Analysis Results</b>	
Concentration of dioxins and furan (17 congeners) in air	7.77 pg TEQ <sub>PCDD/F</sub> /Nm <sup>3</sup>
Total generated dioxins in air = Concentration of dioxins * total volume of air blown during the experiment	6.79 ng TEQ <sub>PCDD/F</sub>
<b>Air Emission Factor (EFair)</b>	<b>1.03 µg TEQ<sub>PCDD/F</sub>/ton of sanitary pad burned</b>
<b>The <sup>13</sup>C labelled internal standard recoveries for all the 17 congeners were within the acceptable limit of 60 – 120%.</b>	
<b>Ash Analysis Results</b>	
Concentration of dioxins and furan (17 congeners) in ash	0.714 pg TEQ <sub>PCDD/F</sub> /gm of ash
Total generated dioxins in ash = Concentration of dioxins * total quantity of ash produced during the experiment	0.214 ng TEQ <sub>PCDD/F</sub>
<b>Residual Emission Factor (EFres)</b>	<b>0.03 µg TEQ<sub>PCDD/F</sub>/ton of sanitary pad burned</b>
<b>Total Emission Factor (EFtotal)</b>	<b>1.06 µg TEQ<sub>PCDD/F</sub>/ton of sanitary pad burned</b>
<b>The <sup>13</sup>C labelled internal standard recoveries for all the 17 congeners were within the acceptable limit of 60 – 120%.</b>	

\*TEQ = Toxicity Equivalence



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**Finding of the preliminary studies:**

1. Formation of dioxins and furans during simulated open burning of unused sanitary pads were observed
2. Dioxins and Furans were quantified in stack air and in residual ash samples

<b>Recovery rate and TEQ calculation of Burnhut air sample</b>				
Air volume sampled – 0.4582 Nm <sup>3</sup>				
Compounds	% Recovery of <sup>13</sup> C standard	Concentration of native compounds/Nm <sup>3</sup>	TEF	TEQ
<b>2378-TCDF</b>	119.9	14.57	0.1	1.46
<b>2378-TCDD</b>	113.9	1.51	1	1.51
<b>12378-PeCDF</b>	93.0	0.26	0.03	0.01
<b>23478-PeCDF</b>	81.4	3.91	0.3	1.17
<b>12378-PeCDD</b>	73.6	1.38	1	1.38
<b>123478-HxCDF</b>	105.6	9.53	0.1	0.95
<b>123678-HxCDF</b>	106.9	2.49	0.1	0.25
<b>234678-HxCDF</b>	102.7	1.83	0.1	0.18
<b>123478-HxCDD</b>	103.2	2.96	0.1	0.30
<b>123678-HxCDD</b>	89.2	0.11	0.1	0.01
<b>123789-HxCDD</b>	87.8	0.00	0.1	0.00
<b>123789-HxCDF</b>	95.2	3.78	0.1	0.38
<b>1234678-HpCDF</b>	112.6	2.72	0.01	0.03
<b>1234678-HpCDD</b>	112.1	8.16	0.01	0.08
<b>1234789-HpCDF</b>	109.6	3.24	0.01	0.03
<b>OCDD</b>	98.7	83.39	0.0003	0.03
<b>OCDF</b>	97.4	2.68	0.0001	0.00
<b>Obtained PCDD/F concentration</b>		<b>–</b>	<b>7.77 pg TEQ<sub>PCDD/F</sub>/Nm<sup>3</sup></b>	



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<b>Recovery rate and TEQ calculation of residue ash sample</b>				
Sample intake – 5.3 gm				
Compounds	% Recovery of <sup>13</sup> C standard	Concentration of native compounds/gm	TEF	TEQ
<b>2378-TCDF</b>	74.8	1.40	0.1	0.14
<b>2378-TCDD</b>	74.7	0.16	1	0.16
<b>12378-PeCDF</b>	85.1	0.05	0.03	0.00
<b>23478-PeCDF</b>	91.4	0.06	0.3	0.02
<b>12378-PeCDD</b>	93.1	0.17	1	0.17
<b>123478-HxCDF</b>	85.2	0.88	0.1	0.088
<b>123678-HxCDF</b>	85.9	0.24	0.1	0.024
<b>234678-HxCDF</b>	97.0	0.15	0.1	0.015
<b>123478-HxCDD</b>	91.6	0.31	0.1	0.031
<b>123678-HxCDD</b>	87.4	0.07	0.1	0.007
<b>123789-HxCDD</b>	93.2	0.04	0.1	0.004
<b>123789-HxCDF</b>	89.2	0.37	0.1	0.037
<b>1234678-HpCDF</b>	83.9	0.27	0.01	0.003
<b>1234678-HpCDD</b>	93.1	1.09	0.01	0.011
<b>1234789-HpCDF</b>	86.7	0.31	0.01	0.003
<b>OCDD</b>	82.9	8.31	0.0003	0.002
<b>OCDF</b>	82.0	0.25	0.0001	0.000
<b>Obtained PCDD/F concentration</b>		–	<b>0.714 pg TEQ<sub>PCDD/F</sub>/gm ash</b>	



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Air Emission Data									
Experimental condition	Weight of sanitary pads (Kg)	Obtained TEQ (pg TEQ <sub>PCDD/F</sub> )	Vstd (Nm <sup>3</sup> )	Stack Concentration (pg TEQ/Nm <sup>3</sup> )	Run time (min)	Vtotal (Nm <sup>3</sup> )	Total TEQ emitted (ng TEQ <sub>PCDD/F</sub> )	TEQ per kg of (ng TEQ <sub>PCDD/F</sub> /kg)	Air Emission factor (EFair) (ug TEQ <sub>PCDD/F</sub> /ton of sanitary pad burned)
Unused pads (dry)	6.6	3.56	0.4582	7.77	39.4	874.5	6.79	1.03	1.03

Experimental condition	Weight of sanitary pads (Kg)	% Moisture of waste	Obtained TEQ (pg TEQ <sub>PCDD/F</sub> )	Sample weight (gm)	Ash Concentration (pg TEQ/Nm <sup>3</sup> )	Total ash produced (gm)	Total TEQ emitted (ng TEQ <sub>PCDD/F</sub> )	TEQ per kg (ng TEQ <sub>PCDD/F</sub> /kg)	Residual Emission Factor (EFres) (ug TEQ <sub>PCDD/F</sub> /ton of pads burned)
Unused pads (dry)	6.6	-	3.79	5.3	0.714	300	0.214	0.03	0.03



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