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Project no .: 20131107-1269_Chicken Date: 02/03/2015

Report on the Implementation of emission measurements according to DLG -

(Signum label) on an exhaust air purification system

Inno + BV

Summer measurement

Version 3

Operator: Thomas Üffing

Location: Am Wall 53
49509 Recke

Date of measurement: Summer round 1: 06/12/2014 07/22/2014
Summer run 2: July 31, 2014 September 9, 2014

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Report on the implementation of emission measurements

Name of position:	LWK Lower Saxony, LUFA North-West, IfB
	Immission and emission measuring point

File number / report number: 20131107-1269_Hähnchen Date: Jan 22, 2015

Operator:	Thomas Üffing
Location:	Am Wall 53, 49509 Recke
Type of measurement:	Suitability test of a single-stage exhaust air cleaning system with Droplet separator according to DLG test framework (Signum label):
	Emissions measurement - odor, ammonia and dust
Order number:	20131107-1269_Chicken
Order date:	07/11/2013
Measurement date:	Summer round 1: 06/12/2014 07/22/2014
	Summer run 2: July 31, 2014 September 9, 2014
Report scope:	69 pages
	2 plants
Task:	Implementation of emission measurements in accordance with the DLG test framework (Signum label) Exhaust air purification system

Summary

Investment:	Chicken fattening system with exhaust air purification, single-stage chemical washer with
	Droplet eliminator, addition of defoaming agent
Operating times:	continuously during the mast
Emission source:	Animals, feed, litter, manure

Measuring components: odor, ammonia, dust, boundary parameters, washing water parameters

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6.2.3 Odor

6.2.3.1 Summer round 1: 06/12/2014 07/22/2014

Boundary parameters

During the odor sampling, the boundary conditions were determined in the raw and clean gas recorded.

Table 11: Edge parameters of odor sampling

Sampling date	06/17/2014		06/23/2014		06/30/2014	
1. Sampling						
Sample designation	raw gas 1	clean gas 1	raw gas 1	clean gas 1		
					Raw gas 1	clean gas 1
Start time	11:10	11:10	12:45	12:45	12:00	12:00
End time	11:40	11:04	13:15	13:15	12:30	12:30
temperature	30.0	24.7	28.7	22.7	27.5	23.3
humidity	76	96	61	96	60	96
pressure	1013	1013	1020	1020	1002	1002
2. Sampling						
Name of the sample	raw gas 2	clean gas 2	raw gas 2	clean gas 2		
					Raw gas 2	clean gas 2
Start time	11:40	11:40	13:15	13:15	12:30	12:30
End time	12:10	12:10	13:45	13:45	13:00	13:00
temperature	30.2	24.6	28.7	22.6	27.5	23.4
humidity	76	96	60	96	60	97
pressure	1013	1013	1020	1020	1002	1002
3. Sampling						
Name of the sample	raw gas 3	pure gas 3	raw gas 3	pure gas 3		
					Raw gas 3	clean gas 3
Start time	12:10	12:10	13:45	13:45	13:00	13:00
End time	12:40	12:40	14:15	14:15	13:30	13:30
temperature	30.0	24.6	28.8	22.7	27.6	23.3
humidity	76	96	60	95	60	97
pressure	1013	1013	1020	1020	1002	1002
Remarks						

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Table 12: Edge parameters odor sampling

Sampling date	07/07/2014		07/14/2014		07/21/2014	
1. Sampling						
Sample designation	raw gas 1	clean gas 1	raw gas 1	clean gas 1	raw gas 1	clean gas 1
Start time	11:00	11:00	11:20	11:20	9:55	9:55
End time	11:30	11:30	11:55	11:55	10:25	10:25
temperature	25.6	20.0	24.4	20.3	24.1	21.8
humidity	66	96	82	99	88	97
pressure	1015	1015	1008	1008	1001	1001
2. Sampling						
Name of the sample	raw gas 2	clean gas 2	raw gas 2	clean gas 2	raw gas 2	clean gas 2
Start time	11:30	11:30	11:55	11:55	10:25	10:25
End time	12:00	12:00	12:25	12:25	10:55	10:55
temperature	25.4	20.1	24.6	20.3	24.2	21.8
humidity	66	97	81	99	88	97
pressure	1015	1015	1008	1008	1001	1001
3. Sampling						
Name of the sample	raw gas 3	clean gas 3	raw gas 3	clean gas 3	raw gas 3	clean gas 3
Start time	12:00	12:00	12:30	12:30	10:55	10:55
End time	12:30	12:30	13:00	13:00	11:25	11:25
temperature	25.4	20.0	24.5	20.2	24.4	21.8
humidity	66	97	82	99	87	97
pressure	1015	1015	1008	1008	1001	1001
Remarks:						

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Results olfactometry:

Table 13: Results of olfactometry

Measurement sampling date No.			PURE GAS	Raw gas smell in Clean gas	RAW GAS	geometr. medium PURELY	RAW	Remarks
	1	06/17/2014		11:10 12:40				
	1	GE / m³	152	3 x YES, 2 x NO	664	171	639	
	2	GE / m³	181	2 x YES, 3 x NO	724			
	3	GE / m³	181	2 x YES, 3 x NO	542			no typical chicken smell,
T		° C	24.6		30.1			strong after feed
LF		%	96		76			
	2	06/23/2014		12:45 pm 2:15 pm				
	1	GE / m³	235	5 x NO	470	211	456	
	2	GE / m³	242	5 x NO	395			
	3	GE / m³	166	5 x NO	512			
T		° C	22.7		28.7			
LF		%	96		60			
	3	06/30/2014		12:00 13:30				
	1	GE / m³	1534	2 x YES, 3 x NO	912	1085	912	
	2	GE / m³	1024	1 x YES, 4 x NO	861			
	3	GE / m³	813	2 x YES, 3 x NO	967			
T		° C	23.3		27.5			
LF		%	97.0		60.0			
	4th	07/07/2014		11:00 am 12:30 pm				
	1	GE / m³	542 *	5 x YES *	542	553	500	
	2	GE / m³	767 *	5 x YES *	450			
	3	GE / m³	406 *	5 x YES *	512			Of the subjects was there is still a smell of raw gas in the clean gas perceived.
T		° C	20.0		25.5			
LF		%	97		66			
	5	07/14/2014		11:20 am 13:00 pm				
	1	GE / m³	256	5 x NO	304	283	335	
	2	GE / m³	304	5 x NO	342			The smell in the clean gas was
	3	GE / m³	292	5 x NO	362			by the subjects as
T		° C	20.3		24.5			weak "chemical / organic" classified.
LF		%	99		81			
	6th	07/21/2014		9:55 11:25				
	1	GE / m³	342	5 x NO	161	237	167	
	2	GE / m³	228	1 x YES, 4 x NO	114			Of the subjects was
	3	GE / m³	171	5 x NO	256			the smell as weak
T		° C	21.8		24.2			classified organically.

LF	%	97	88

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6.2.3.2 Summer run 2: July 31, 2014 September 9, 2014

Boundary parameters

Table 14: Edge parameters of odor sampling

Sampling date	08/11/2014		08/18/2014		08/25/2014	
1. Sampling						
Sample designation	raw gas 1	clean gas 1	raw gas 1	clean gas 1	raw gas 1	clean gas 1
Start time	12:11	12:11	11:40	11:40	12:55	12:55
End time	12:21	12:21	11:50	11:50	13:05	13:05
temperature	29.6	23.0	27.1	23.7	24.1	19.4
humidity	62	94	66	95	66	94
pressure	1008	1008	1001	1001	1012	1012
2. Sampling						
Name of the sample	raw gas 2	clean gas 2	raw gas 2	clean gas 2	raw gas 2	clean gas 2
Start time	12:35	12:35	12:10	12:10	13:05	13:05
End time	12:45	12:45	12:20	12:20	13:15	13:15
temperature	29.6	23.3	27.1	23.7	24.1	19.4
humidity	62	94	66	95	66	94
pressure	1008	1008	1001	1001	1012	1012
3. Sampling						
Name of the sample	raw gas 3	clean gas 3	raw gas 3	clean gas 3	raw gas 3	clean gas 3
Start time	12:55	12:55	13:05	13:05	13:15	13:15
End time	13:05	13:05	13:15	13:15	13:25	13:25
temperature	29.6	23.5	27.1	23.7	24.1	19.4
humidity	62	94	66	95	66	94
pressure	1008	1008	1001	1001	1012	1012

Remarks:

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Table 15: Edge parameters of odor sampling

Sampling date	09/01/2014		09/08/2014	
1. Sampling				
Sample designation raw gas 1		Clean gas 1 raw gas 1		Clean gas 1
Start time	12:35	12:35	14:15	14:15
End time	12:45	12:45	14:25	14:25
temperature	23.9	20.9	23.0	18.8
humidity	71	96	72	99
pressure	1014	1014	1014	1014
2. Sampling				
Name of the sample raw gas 2		Clean gas 2 raw gas 2		Clean gas 2
Start time	12:45	12:45	14:25	14:25
End time	12:55	12:55	14:35	14:35
temperature	23.9	20.9	23.0	18.9
humidity	70	96	72	99
pressure	1014	1014	1014	1014
3. Sampling				
Name of the sample raw gas 3		Clean gas 3 raw gas 3		Clean gas 3
Start time	12:55	12:55	14:35	14:35
End time	13:05	13:05	14:45	14:45
temperature	23.9	21.0	23.1	18.9
humidity	70	96	72	99
pressure	1014	1014	1014	1014

Remarks:	Ventilation manually Mr. Üffing to 100% posed!!!

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Results olfactometry:

Table 16: Results of olfactometry

Measuring No.	Sampling date		PURE GAS	Raw gas smell in Clean gas	RAW GAS	geometr. medium PURELY	RAW	Remarks
1	08/11/2014			12:11 - 13:05				
1	GE / m³		228	5 x NO	621	211	515	
2	GE / m³		256	5 x NO	406			Was in rehearsals
3	GE / m³		161	1 x YES, 4 x NO	542			mostly none
T	° C		23.0		29.6			Smell of raw gas taken.
LF	%		94		62			
2	08/18/2014			11:40 am - 1:15 pm				
1	GE / m³		431	5 x NO	470	447	684	
2	GE / m³		512	5 x NO	790			There was no
3	GE / m³		406	5 x NO	861			Smell of raw gas perceived.
T	° C		23.7		27.1			
LF	%		95		66			
3	08/25/2014			12:55 - 13:25				
1	GE / m³		542	5 x NO	912	580	1024	
2	GE / m³		664	5 x NO	1085			There was no
3	GE / m³		542	5 x NO	1085			Smell of raw gas perceived.
T	° C		19.4		24.1			
LF	%		94		66			
4th	09/01/2014			12:35 - 13:05				
1	GE / m³		483	5 x NO	542	512	542	
2	GE / m³		512	5 x NO	512			There was no
3	GE / m³		542	5 x NO	575			Smell of raw gas perceived.
T	° C		20.9		23.9			
LF	%		96		71			
5	09/08/2014			14:15 - 14:45				
1	GE / m³		406	5 x YES	136	242	165	The ventilation was manual
2	GE / m³		192	5 x YES	192			set to 100% !!!! ***
3	GE / m³		181	5 x YES	171			
T	° C		18.9		23.0			In rehearsals was through everyone
LF	%		99		72			Test persons odor of raw gas detected.

*** the increase in ventilation was carried out at the instruction of DLG / Inno + to determine results at maximum Filter surface loading.

6.2.3.3 Discussion of the results: odor

In the course of the investigations, a filter-typical odor crystallizes out clearly different from the smell of raw gas, especially in the second summer pass.

In the olfactometric examination on September 8th, 2014, however, a clear odor of crude gas in the Perceived pure gas. It must be taken into account that the ventilation at this time was artificially increased. LUFA Nord-West had concerns about this in advance

Proceedings expressed because such an intervention a strong dilution of the raw gas and for the
then the prevailing volume flow entails atypical loads. They point to this too
Results with significantly lower raw gas concentration.