



No 1181

Report for the Periodic Monitoring of Emissions to Air

IPPC Permit Number: EP3935UC
Aleris Recycling Ltd
Swansea Plant
10-13 March 2014

Contract Reference:	Aleris-02302
Client:	Aleris Recycling Ltd
Address:	Waunarlwydd Works Waunarlwydd, Swansea, SA5 4YG
Site Contact:	Clive Edwards
Monitoring Organisation:	NWSS 40 Court Road Industrial Estate Cwmbran, Torfean. NP44 3AS Tel: 01633 862950 www.nw-ss.co.uk

This report relates to tested items only

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

Report written by
Designation

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Date 7-Apr-14

Report Approved by
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Date 7-Apr-14

TE's Held

1, 2, 3 & 4

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1.1 Monitoring Objectives

The scope of work of the monitoring as shown in the following table was required to demonstrate emission concentrations.

Emission Point Number	Determinands to be Measured	Sampling Time	Number of Samples
A4	Volatile Organic Compounds (VOCs)	4 hours	Continuous Monitoring
	Sulphur Dioxide	4 hours	Continuous Monitoring
	Oxides of Nitrogen	4 hours	Continuous Monitoring
	Oxygen	4 hours	Continuous Monitoring
	Hydrogen Chloride	4 hours	1 & Field Blank
	Hydrogen Fluoride	4 hours	1 & Field Blank

1.2 Monitoring Results

Job Type	Monitoring Emissions to Atmosphere
Company	Aleris Recycling Ltd
Site	Swansea
Location	A4
Process Status During Monitoring	Operating as Normal
Reference Conditions	273k, 101.3kPa, without correction for moisture and oxygen

Determinand	Run	Units	Emission Limit Value	Date of Sampling	Start and End Times	Periodic Monitoring Result	Uncertainty (mg/Nm ³)	Vol. Flow (Nm ³ /min)	Mass Emission Rate (kg/hr)	Moisture (%H ₂ O)	Monitoring Method Reference	Accreditation for use of Method
VOC's as Carbon	1	mg/Nm ³	50	13-Mar-14	12:45-16:45	17.2	7.5	-	2.8	-	BS EN 12619	MCERTS
Sulphur Dioxide	1	mg/Nm ³	50	10-Mar-14	14:00-18:00	22.9	26.6	-	3.7	-	EA TGN M21	
Oxides of Nitrogen	1	mg/Nm ³ as NO ₂	60	10-Mar-14	14:00-18:00	23.9	9.6	-	3.9	-	BS EN 14792	MCERTS
Oxygen	1	%	NA	10-Mar-14	14:00-18:00	20.1	-	-	-	-	BS EN 14789	MCERTS
Hydrogen Chloride	1	mg/Nm ³	10	11-Mar-14	12:13-16:13	0.7	0.1	2752	0.12	1.8	BS EN 1911	MCERTS
	Blank				11:45-11:50	0.6	0.1	-	-	-		
Hydrogen Fluoride	1	mg/Nm ³	2	12-Mar-14	11:05-15:05	0.7	0.1	2670	0.11	2.2	BS EN 1911	MCERTS
	Blank				10:08-10:13	<0.01	0.003	-	-	-		

Note 1 Uncertainties expressed at 95% confidence level

Note 2 Where the value is "<", the uncertainty of measurement has been calculated at the limit of detection.

1.3 Operating Information

Emission Point Reference	Date	Continuous or Batch Process	Fuel	Feedstock	Abatement	Load	Comparison of Operator CEMS and Periodic Monitoring Results			
							Substance	CEMS Results	Periodic Monitoring Results	Units
A4	10-13 March 2014	Cyclic Batch (Furnaces are not synchronised)	Natural Gas / Oxygen	Oily and Coated Aluminium Scrap. Dross	Gases pass through a lime/charcoal mixture and then through bag house filters.	Two furnaces were in operation during the monitoring period	No Relevant CEMS Installed			

1.4 Monitoring Deviations

Emission Point Number	Substance Deviations	Monitoring Deviations	Other Relevant Issues
A4	None	None	None

APPENDIX 1: General Information

Monitoring organisation staff details

Monitoring organisation method details

Monitoring organisation equipment check list references

Manual monitoring method results calculations

2.1.1 Monitoring organisation staff details

Name	Position	MCERTS Level	TE1	TE2	TE3	TE4	MCERTS registration No.
Sampling Team							
Dale Padfield	Air Quality Air Technician	I					MM13 1224
Craig Harley	Air Quality Test Engineer	II	✓	✓	✓	✓	MM03 176
Report Writing							
Craig Harley	Air Quality Test Engineer	II	✓	✓	✓	✓	MM05 670
Report Authorisation							
Darren Price	Air Quality Senior Project Manager	II	✓	✓	✓	✓	MM03 176

2.1.2 Monitoring organisation method details

Determinand	In House Method ID	Reference Standard	Analytical Laboratory
VOCs	A57	BS EN 12619	N/A
SO ₂	A44	EA TGN M21	N/A
NO _x	A44	BS EN 14792	N/A
Oxygen	A44	BS EN 14789	N/A
HCl	A48	BS EN 1911	NWSS
HF	A64	ISO 15713	NWSS

2.1.3 Monitoring organisation equipment check list references

Equipment Checklist Ref: Aleris-02302 Q1 March 2014

2.1.4 Calculation of Stack Gas Velocities, Volumetric Flow, Emission Concentrations and Mass Emission Rates

Total pressure (mm Hg) =	Atmospheric pressure(mm Hg) + static pressure (mm Hg)
Dry Gas volume sampled @ ntp (Nm3) =	$\frac{\text{Dry gas volume sampled(l)} \times 273 \times \text{Atmospheric pressure(mm Hg)}}{1000 \times \text{average ambient temp(K)} \times 760}$
Bws =	$\frac{\text{mass H2O collected (g)} \times 0.00124}{\text{Dry gas volume sampled@ntp(Nm/s)} + (\text{mass H2O collected(g)} \times 0.00124)}$
% Moisture =	100* Bws
Wet Gas volume sampled @ ntp (Nm3) - dry gas meter measurements =	Dry gas volume sampled@ntp(Nm/s)*(100/100-% moisture)
Wet Gas volume sampled @ ntp (Nm3) - sorbent tubes =	$\frac{\text{Average rotameter reading (l/min)} \times \text{sampling time (mins)} \times 273 \times \text{Atmospheric pressure (mm Hg)}}{1000 \times \text{ambient temperature (K)} \times 760}$
Mol. Wt. of 22-24 July & 28 August 2013	Mol. Wt. dry gas * (1-Bws) + 18*Bws Default value for wt. of dry gas = 28.84 (Non-comb. Process)
Actual mean gas velocity (m/s) =	$\frac{34.97 \times \text{Pitot Coefficient} \times \text{root delta P (mm H2O)} \times (\text{Stack temp.(K)}^{0.5})}{(\text{Mol wt of wet gas} \times \text{total pressure(mm Hg)})^{0.5}}$
Actual mean gas velocity @ ntp (m/s) =	$\frac{\text{Actual gas velocity(m/s)} \times \text{total pressure(mm Hg)} \times 273}{\text{stack temperature(K)} \times 760}$
Stack cross section area (m2) =	3.14 * (stack diameter(m)/2)^2
Actual volume flow (m³/min) =	60* c.s.a.(m2)* actual gas velocity (sampling) (m/s)
Corrected Volume flow @ ntp (Nm³/min) =	60*stack c.s.a(m2)*mean actual gas velocity (m/s)*ref temp (K)/Duct temp (K)*total pressure (mmHg)/ref. Pressure
Pollutant Concentration @ ntp (mg/Nm3) - wet basis =	$\frac{\text{Mass of Pollutant collected (mg)}}{\text{Wet Gas volume sampled @ ntp(Nm3)}}$
Pollutant Concentration @ ntp (mg/Nm3) - dry basis =	$\frac{\text{Mass of Pollutant collected (mg)}}{\text{Mass of Pollutant collected (mg)}} \times \frac{\text{Dry Gas volume sampled @ ntp(Nm3)}}{\text{Dry Gas volume sampled @ ntp(Nm3)}}$
Pollutant Mass emission rate (kg/hr) =	$\text{Pollutant conc (@ ntp wet basis)} \times \text{Vol. flow (@ ntp wet basis)} \times 60/1000000$ or $\text{Pollutant conc (@ ntp dry basis)} \times \text{Vol. flow (@ ntp dry basis)} \times 60/1000000$

Conversion of ppm to mg/Nm³ (Direct reading instrument)

Conc of pollutant as mg/Nm ³ =	Conc of pollutant in ppm * (Molecular wt of pollutant / Molar volume)
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Correction of pollutant concentration to oxygen reference

Conc of pollutant at ref oxygen level =	Conc of pollutant (@ ntp) * ((21- O _{2 ref})/(21-O _{2 measured}))
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APPENDIX 2: Stack - A4

Diagrams

Flow criteria measurements

Extractive results sheets

Instrumental gas analyser calibration tables

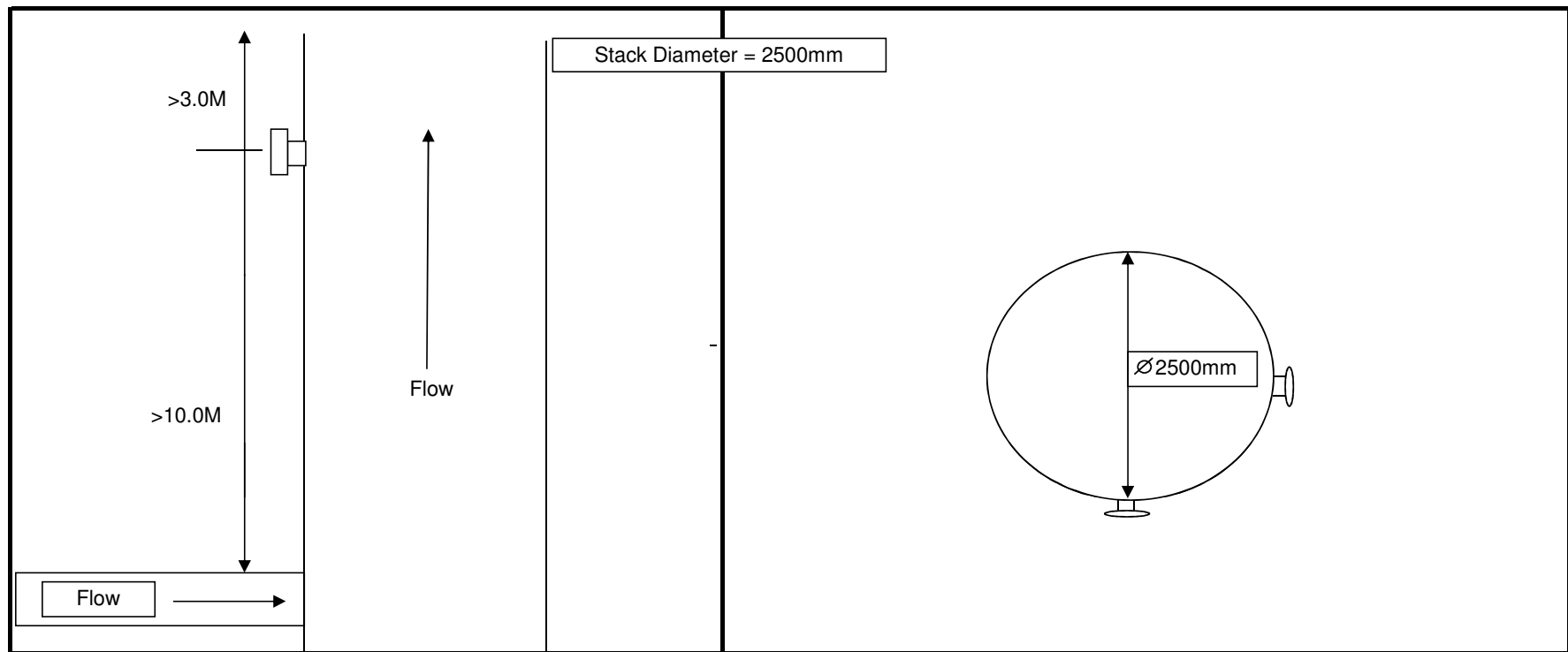
Instrumental gas analyser results tables

Uncertainty of measurement

Analytical results

Permit Number	Operator Name	Installation Name	Installation Address
EP3935UC	Aleris Recycling Ltd	Aleris - Swansea	Waunarlwydd Works, Waunarlwydd, Swansea, SA5 4YG

Stack A4



NWSS

Velocity and Temperature Data

DATE: 11/03/2014

JOB REF.: Aleris-02302

Client:	Aleris Recycling Ltd	Operators:	CH/DPd
Location:	Swansea	Test For:	Various
Stack:	A4	In-house method:	Various
Pitot Type:	S	Pitot Cp:	0.82
Bar. Pressure:	103.5	Static:	4.7
Ambient Temp.:	11	Probe ID:	546
Stack O2 (%):	NA	Duct Shape : Circle (C) or Square (S)	Meter ID: 2533
Stack CO2 (%):	NA	Stack Diameter (mm):	2500
Stack Moisture (%):	NA	Port Length (mm):	210
		Area (m2):	4.91

Traverse Point Number	Distance (mm)	Sample Port 1			Sample Port 2		
		Temp. °C	ΔP cm H2O	Sq.root ΔP	Temp. °C	ΔP cm H2O	Sq.root ΔP
1	65	111	1.00	1.00	110	1.10	1.05
2	205	111	1.10	1.05	1.9	1.00	1.00
3	365	111	1.10	1.05	109	1.00	1.00
4	565	110	1.00	1.00	109	1.00	1.00
5	855	110	1.00	1.00	110	1.00	1.00
6	1645	109	1.10	1.05	1.7	1.00	1.00
7	1935	108	1.10	1.05	106	1.20	1.10
8	2135	107	1.15	1.07	101	1.15	1.07
9	2295	107	1.10	1.05	97	0.90	0.95
10	2435	107	1.10	1.05	101	1.00	1.00
Total	TA=2500	1091	10.8	10.4	846.6	10.4	10.2
Average		109	1.08	1.0	84.7	1.04	1.0

Flow-stability criteria for periodic sampling of particulates

Criteria	Requirement	Actual
Angle of gas flow	<±15° from stack longitudinal axis	<±15°
Flow direction	No local negative flow	Positive flow
Minimum velocity	5 Pa for pitot tubes	88.2 Pa
Gas velocity variations	Ratio of highest to lowest less than 3:1 (9:1 Pitot)	1.3 :1
Temperature variation	≤ ±5% of mean temperature in Kelvin	25.7 %

CLIENT: Aleris Recycling

SAMPLE DATE: 12-Mar-14

LOCATION: Swansea

BLANK DATE: 12-Mar-14

STACK: A4 - Main Stack

TIME OF SAMPLING: 11:05-15:05

TIME OF BLANK: 10:08-10:13

SAMPLING DATA		HF 1
Run Time (min)	240	
Total mass H ₂ O collected (g)	13.2	
Pitot tube constant,Cp	0.80	
Dry gas meter (DGM) volume (litres)	777.97	
Temperature DGM (°C)	24	
Temperature stack (°C)	96	
Mean pitot tube pressure drop (traverse), delta P(cm H ₂ O)	1.1	
Mean pitot tube pressure drop at sample point (traverse), delta P(cm H ₂ O)	1.1	
Mean pitot tube pressure drop(sample run) , delta P(cm H ₂ O)	1.1	
Barometric Pressure (kPa)	103.4	
X-sectional area of stack (m ²)	4.9	
Efficiency of the 1st Impinger (%)	100	
Field Blank as a percentage of ELV (%)	< 0.4	
Reference Conditions		
Temperature (K)	273	
Pressure (kPa)	101.3	
As a wet gas		
Emission Limit Value (mg/Nm ³)	2	
Flow Data		
Velocity, actual (m/s)	12	
Velocity, ntp (m/s)	9	
Vol.Flow, actual (m ³ /min)	3519	
Vol.Flow, ntp wet gas	2670	
Volume sampled, ntp, dry gas (Nm ³)	0.7	
Volume sampled, ntp, wet gas (Nm ³)	0.7	
Analytical Data (max µg collected)	Sample Run	Blank
Fluoride	495	< 6
Concentration Data (mg/Nm3 unless otherwise stated)	wet gas	
H ₂ O (% vol)	2.2	
Hydrogen Fluoride Blank	< 0.009	
Hydrogen Fluoride	0.70	± 0.08
Mass Emissions Data (Kg/Hr unless otherwise stated)		
Hydrogen Fluoride	0.11	

CLIENT: Aleris Recycling

LOCATION: Swansea

STACK: A4 - Main Stack

Hydrogen Fluoride Uncertainty Calculations		HF 1	Blank	
Sampling Uncertainty (@ 95% confidence level)	%	10	10	
Sample Volume @ Reference Conditions	m3	0.746	0.746	
Volume Impinger 1	ml	120	106	
Volume Impinger 2	ml	98	98	
Concentration @ Reference Conditions	mg/Nm3	0.70	<	0.01
NWSS have calculated total sampling uncertainty at a 95 % confidence level for different sampling conditions.				
The results were between 6 and 9 %.				
NWSS have decided to quote a 'worst case' sampling uncertainty of 10% to cover all sampling procedures.				
	Unit	Source	Value	Value
Analytical Uncertainty	%	From AQC data	6.5	6.5
Impinger 1 1/2 LOD	mg/l	From AQC data	0.015	0.015
Impinger 2 1/2 LOD	mg/l	From AQC data	0.015	0.015
mass Fluoride collected in Impinger 1	mg	Lab result	0.5	0.0
mass Fluoride collected in Impinger 2	mg	Lab result	0.0	0.0
Maximum Fluoride Collected	mg	Calculation	0.49	0.01
Impinger 1 Analytical Uncertainty as Fluoride	mg	Calculation	0.03	0.00
Impinger 2 Analytical Uncertainty as Fluoride	mg	Calculation	0.001	0.001
Total Analytical Uncertainty as Fluoride	mg	Calculation	0.03	0.00
Sampling Uncertainty as Fluoride	mg	Calculation	0.05	0.001
Total Uncertainty as Hydrogen Fluoride	mg	Calculation	0.062	0.002
Total Uncertainty as Hydrogen Fluoride	mg/Nm3	Calculation	0.08	0.003
Total Uncertainty as Hydrogen Fluoride	%	Calculation	12	37

CLIENT:	Aleris Recycling	SAMPLE DATE:	11-Mar-14
		PRE BLANK DATE:	11-Mar-14
LOCATION:	Swansea		
		TIME OF SAMPLING:	12:13-16:13
STACK:	A4 - Main Stack	TIME OF PRE BLANK:	11:45-11:50

SAMPLING DATA		Cen HCl 1
Run Time (min)		240
Total mass H ₂ O collected (g)		8.3
Pitot tube constant, Cp		0.81
Dry gas meter (DGM) volume (litres)		584.68
Temperature DGM (°C)		22
Temperature stack (°C)		91
Mean pitot tube pressure drop (traverse), delta P(cm H ₂ O)		1.1
Mean pitot tube pressure drop at sample point (traverse), delta P(cm H ₂ O)		1.1
Mean pitot tube pressure drop(sample run) , delta P(cm H ₂ O)		1.1
Barometric Pressure (kPa)		103.5
X-sectional area of stack (m ²)		4.9
Efficiency of the 1st Impinger (%)		100
Field Blank as a percentage of ELV (%)		5.73
Reference Conditions		
Temperature (K)		273
Pressure (kPa)		101.3
As a wet gas		
Emission Limit Value (mg/Nm ³)		10
Flow Data		
Velocity, actual (m/s)		12
Velocity, ntp (m/s)		9
Vol.Flow, actual (m ³ /min)		3574
Vol.Flow, ntp wet gas		2752
Volume sampled, ntp, dry gas (Nm ³)		0.55
Volume sampled, ntp, wet gas (Nm ³)		0.56
Analytical Data (max µg collected)		Sample Run Pre Blank
Chloride	391	314
Concentration Data (mg/Nm ³ unless otherwise stated)		wet gas
H ₂ O (% vol)		1.8
Hydrogen Chloride Pre Blank		0.6
Hydrogen Chloride		0.7
Mass Emissions Data (Kg/Hr unless otherwise stated)		
Hydrogen Chloride		0.12

CLIENT: Aleris Recycling

LOCATION: Swansea

STACK: A4 - Main Stack

Hydrogen Chloride Uncertainty Calculations		Cen HCl 1	Pre Blank	
Sampling Uncertainty (@ 95% confidence level)	%	10	10	
Sample Volume @ Reference Conditions	m3	0.563	0.563	
Volume Impinger 1	ml	152	98	
Volume Impinger 2	ml	114	98	
Concentration @ Reference Conditions	mg/Nm3	0.7	0.6	
NWSS have calculated total sampling uncertainty at a 95 % confidence level for different sampling conditions.				
The results were between 6 and 9 %.				
NWSS have decided to quote a 'worst case' sampling uncertainty of 10% to cover all sampling procedures.				
	Unit	Source	Value	Value
Analytical Uncertainty	%	From AQC data	9	9
Impinger 1 1/2 LOD	mg/l	From AQC data	0.25	0.25
Impinger 2 1/2 LOD	mg/l	From AQC data	0.25	0.25
mass Chloride collected in Impinger 1	mg	Lab result	0.3	0.2
mass Chloride collected in Impinger 2	mg	Lab result	0.0	0.1
Maximum Chloride Collected	mg	Calculation	0.39	0.31
Impinger 1 Analytical Uncertainty as Chloride	mg	Calculation	0.04	0.02
Impinger 2 Analytical Uncertainty as Chloride	mg	Calculation	0.03	0.02
Total Analytical Uncertainty as Chloride	mg	Calculation	0.05	0.03
Sampling Uncertainty as Chloride	mg	Calculation	0.04	0.03
Total Uncertainty as Hydrogen Chloride	mg	Calculation	0.063	0.048
Total Uncertainty as Hydrogen Chloride	mg/Nm3	Calculation	0.11	0.09
Total Uncertainty as Hydrogen Chloride	%	Calculation	16	15

Combustion Gas Emission Data from A4 - Main Stack			
Time	Drift Corrected @ Reference Conditions		
	Oxygen	Sulphur Dioxide	Oxides of Nitrogen as NO2
10-Mar-14	(%)	(mg/Nm ³)	(mg/Nm ³)
14:00	20.0	5.4	26.8
14:01	20.1	12.5	25.8
14:02	20.4	7.4	16.5
14:03	20.2	6.0	20.9
14:04	20.0	6.3	45.9
14:05	20.3	7.1	34.8
14:06	20.4	6.9	23.4
14:07	19.8	9.4	34.0
14:08	19.4	26.6	41.5
14:09	19.6	18.2	34.2
14:10	19.7	16.5	37.5
14:11	20.2	18.7	34.4
14:12	20.3	12.5	33.2
14:13	20.2	8.6	30.8
14:14	20.1	5.7	32.6
14:15	20.4	6.0	26.2
14:16	20.5	4.3	19.3
14:17	20.8	6.0	19.9
14:18	20.9	5.4	13.3
14:19	20.7	5.7	13.1
14:20	20.8	6.3	16.5
14:21	20.9	13.4	7.4
14:22	20.4	27.8	12.5
14:23	20.1	23.6	17.7
14:24	20.2	18.7	17.9
14:25	20.2	19.3	16.3
14:26	20.3	15.1	15.7
14:27	20.1	12.8	18.9
14:28	19.8	9.7	24.6
14:29	20.0	8.3	23.4
14:30	20.4	8.0	20.1
14:31	20.5	7.7	19.1
14:32	20.5	7.2	16.5
14:33	20.5	7.2	16.5
14:34	20.0	54.4	16.3
14:35	19.9	19.9	16.7
14:36	20.0	22.4	18.1
14:37	19.8	16.5	20.3
14:38	20.0	19.0	20.1
14:39	19.7	11.1	22.6
14:40	19.6	9.4	23.4
14:41	19.8	9.1	23.6
14:42	19.6	7.7	23.6
14:43	19.6	7.7	25.6
14:44	19.8	6.9	27.0
14:45	19.3	168.4	15.5
14:46	18.7	233.8	24.4
14:47	18.5	112.1	40.1

Combustion Gas Emission Data from A4 - Main Stack			
Time	Drift Corrected @ Reference Conditions		
	Oxygen	Sulphur Dioxide	Oxides of Nitrogen as NO2
10-Mar-14	(%)	(mg/Nm ³)	(mg/Nm ³)
14:48	18.5	96.6	30.8
14:49	18.4	71.4	32.3
14:50	18.8	83.8	28.2
14:51	19.8	37.4	19.5
14:52	19.8	33.8	20.3
14:53	19.7	21.9	26.6
14:54	19.7	19.3	28.8
14:55	19.7	18.2	31.0
14:56	19.7	17.1	32.1
14:57	19.6	15.4	32.5
14:58	19.6	15.4	32.5
14:59	19.6	17.7	34.5
15:00	19.6	20.5	31.0
15:01	19.5	23.3	31.7
15:02	19.6	25.0	29.2
15:03	19.8	26.4	31.7
15:04	19.5	91.5	26.4
15:05	18.8	102.5	32.5
15:06	19.5	41.7	30.4
15:07	19.7	21.6	32.1
15:08	19.7	32.9	29.8
15:09	19.5	44.5	27.2
15:10	19.5	53.0	27.2
15:11	19.7	28.1	26.6
15:12	19.8	22.8	28.0
15:13	19.9	21.9	26.6
15:14	19.7	19.4	27.0
15:15	19.6	11.4	28.4
15:16	19.6	10.6	30.7
15:17	19.7	10.3	35.9
15:18	19.8	11.7	37.5
15:19	19.8	13.4	36.7
15:20	19.7	14.3	34.1
15:21	19.7	15.1	38.9
15:22	19.7	15.1	37.9
15:23	20.1	16.3	32.5
15:24	20.3	13.7	25.6
15:25	20.3	12.3	23.2
15:26	20.4	10.9	21.2
15:27	20.4	10.3	21.2
15:28	20.4	10.0	19.8
15:29	20.6	10.0	22.8
15:30	20.6	9.8	30.5
15:31	20.6	9.2	31.1
15:32	20.6	8.6	32.9
15:33	20.6	9.2	31.7
15:34	20.6	8.9	32.9
15:35	20.8	7.5	31.3

Combustion Gas Emission Data from A4 - Main Stack			
Time	Drift Corrected @ Reference Conditions		
	Oxygen	Sulphur Dioxide	Oxides of Nitrogen as NO2
10-Mar-14	(%)	(mg/Nm ³)	(mg/Nm ³)
15:36	20.8	7.8	31.7
15:37	20.8	7.5	29.9
15:38	20.7	8.9	31.7
15:39	20.9	11.5	15.1
15:40	20.9	9.5	11.7
15:41	20.9	12.6	11.7
15:42	21.0	10.3	11.3
15:43	20.9	11.7	11.3
15:44	21.0	9.8	11.1
15:45	20.9	11.7	10.9
15:46	21.0	10.3	10.7
15:47	20.9	11.5	10.7
15:48	21.0	10.1	10.3
15:49	20.9	13.5	10.7
15:50	21.0	15.2	9.9
15:51	20.9	9.8	12.1
15:52	20.6	8.6	17.3
15:53	20.9	9.5	11.9
15:54	20.6	8.6	13.5
15:55	20.5	8.9	11.7
15:56	20.5	8.6	11.5
15:57	20.5	8.6	11.5
15:58	20.5	7.8	11.3
15:59	19.9	21.7	19.6
16:00	19.8	29.9	18.3
16:01	19.7	36.7	20.4
16:02	19.5	42.9	23.0
16:03	19.3	57.1	25.4
16:04	19.3	30.7	28.1
16:05	19.6	44.0	21.2
16:06	19.8	14.3	21.4
16:07	20.1	8.4	19.6
16:08	20.1	9.2	17.5
16:09	20.1	12.1	18.4
16:10	20.1	13.5	16.5
16:11	20.2	8.4	16.7
16:12	20.3	7.2	15.5
16:13	19.8	7.2	22.6
16:14	19.8	6.4	25.6
16:15	19.8	6.1	29.5
16:16	19.8	6.1	32.1
16:17	20.0	5.8	30.5
16:18	20.3	10.1	24.6
16:19	20.3	8.9	25.8
16:20	20.3	9.5	20.6
16:21	20.5	11.2	19.0
16:22	20.7	36.1	11.5
16:23	20.8	28.2	10.5

Combustion Gas Emission Data from A4 - Main Stack			
Time	Drift Corrected @ Reference Conditions		
	Oxygen (%)	Sulphur Dioxide (mg/Nm ³)	Oxides of Nitrogen as NO2 (mg/Nm ³)
10-Mar-14			
16:24	20.8	30.2	10.7
16:25	20.9	15.2	10.1
16:26	20.7	11.2	9.2
16:27	20.7	11.5	7.8
16:28	20.7	11.8	8.4
16:29	20.6	9.8	7.0
16:30	20.6	9.0	6.6
16:31	20.4	9.5	8.6
16:32	20.3	9.0	8.4
16:33	20.1	7.0	16.9
16:34	20.0	7.3	22.2
16:35	20.2	7.3	23.0
16:36	20.5	7.0	8.8
16:37	20.6	7.3	8.2
16:38	20.6	6.1	8.2
16:39	20.6	6.4	8.2
16:40	20.6	5.9	8.6
16:41	20.6	5.6	8.6
16:42	20.6	5.9	8.2
16:43	20.6	6.1	8.6
16:44	20.6	6.4	9.0
16:45	20.6	7.0	9.5
16:46	20.6	6.4	9.9
16:47	20.6	7.0	10.1
16:48	20.6	5.9	10.1
16:49	20.6	6.1	10.3
16:50	20.6	6.1	10.1
16:51	20.6	6.4	10.3
16:52	20.6	6.1	10.7
16:53	20.6	8.4	11.5
16:54	20.2	21.4	12.7
16:55	20.1	10.1	12.1
16:56	20.1	6.4	13.9
16:57	20.1	6.1	14.7
16:58	20.1	6.4	15.1
16:59	20.1	5.6	15.9
17:00	20.1	5.9	17.6
17:01	20.1	6.7	20.2
17:02	20.1	7.3	22.8
17:03	20.1	12.7	24.2
17:04	20.1	20.3	24.9
17:05	20.1	28.3	26.5
17:06	20.0	36.2	27.1

Combustion Gas Emission Data from A4 - Main Stack			
Time	Drift Corrected @ Reference Conditions		
	Oxygen (%)	Sulphur Dioxide (mg/Nm ³)	Oxides of Nitrogen as NO2 (mg/Nm ³)
10-Mar-14			
17:07	20.0	47.0	28.3
17:08	20.0	54.6	32.8
17:09	20.2	58.6	30.9
17:10	20.2	70.2	25.1
17:11	19.9	68.2	26.7
17:12	19.7	86.1	30.5
17:13	19.7	90.0	30.7
17:14	19.6	96.0	31.3
17:15	19.9	109.9	30.1
17:16	20.2	101.1	15.5
17:17	20.0	74.5	19.4
17:18	19.9	69.1	21.4
17:19	19.6	75.9	34.8
17:20	19.4	81.8	35.8
17:21	19.1	105.9	33.2
17:22	19.1	108.8	29.1
17:23	19.7	68.2	22.6
17:24	19.8	48.1	25.7
17:25	20.2	30.0	22.6
17:26	20.3	24.0	23.4
17:27	20.2	20.6	24.3
17:28	19.9	20.1	30.3
17:29	20.2	17.5	31.8
17:30	19.8	24.9	23.4
17:31	20.4	17.5	36.0
17:32	19.7	22.3	60.6
17:33	19.3	26.9	84.9
17:34	19.4	17.5	73.4
17:35	19.4	15.8	66.1
17:36	19.4	15.8	51.7
17:37	19.4	15.0	43.1
17:38	19.5	13.6	38.7
17:39	19.5	13.6	36.2
17:40	19.7	14.1	30.4
17:41	19.8	15.8	25.9
17:42	19.8	14.4	27.3
17:43	19.9	13.6	25.7
17:44	19.9	13.6	25.9
17:45	19.9	13.3	27.3
17:46	19.8	14.1	27.3
17:47	19.7	14.1	26.7
17:48	19.6	15.5	23.5
17:49	19.5	15.0	23.7

Combustion Gas Emission Data from A4 - Main Stack			
Time	Drift Corrected @ Reference Conditions		
	Oxygen (%)	Sulphur Dioxide (mg/Nm ³)	Oxides of Nitrogen as NO2 (mg/Nm ³)
10-Mar-14			
17:50	19.4	14.7	27.1
17:51	19.5	15.3	27.5
17:52	19.4	17.5	25.9
17:53	19.3	17.8	28.5
17:54	19.3	17.0	35.6
17:55	19.1	18.4	34.2
17:56	19.2	18.7	32.8
17:57	19.4	17.5	43.0
17:58	19.1	19.0	42.7
17:59	18.9	19.5	45.0
18:00	19.4	18.1	37.9
Average	20.1	22.9	23.9

SO2 Uncertainty Calculations
A4 - Main Stack

Range U - ? ppm	SO2
200	571 mg/m³

studied concentration SO2 (VLE)	22.9 mg/m ³
measuring time	1456 minutes

Conditions of operation	
Measurement are performed in an environment where	
fluctuations of ambient temperature (in °C)	298 to 318 K
fluctuations of sample pressure are within (in kPa)	100 +/- 5
fluctuations of voltage (in V)	200-220
atmospheric pressure variations (in kPa)	99-100
frequency of adjustment (in hours)	10
O2 concentration measured	NA
NH3 range : unknown	Default values : 0-20 mg/m3
CO2 range	8-15 %
H2O range	10-20%
O2 reference concentration	NA

Performance characteristics	Value	*	specification
Response time	L 60	seconds	1 minute
Repeatability at zero	L 1	% of the full scale	0,2% of the full scale
Repeatability at span level	L 1	% of the full scale	2% of the full scale
Deviation from linearity	L 0.5	% of value	+/-5% of elv
Zero drift ***	L 0.00	% of fs/24h	+/-5% of fs/24h
Span drift ***	L 0.00	% of fs/24h	+/-5% of fs/24h
volume or pressure flow dependence	L 0.02	% of fs/kPa	1% of fs/30kPa
atmospheric pressure dependence	L 0.8	% of value/kPa	3% of value/4kPa
ambient temperature dependence	L 3	%fs/10K	3%fs/10K
dependence on voltage	L 1	%fs/10V	2%fs/10V
losses in the line (leak)	F 2	% of value	2% of value
Uncertainty of calibration gas	F 2	% of value	

L=laboratory F=Field

Measurement performance related to dynamic conditions	
Requirement for response time	120 sec
Measured response time	2 minutes
Conclusion	requirement met

Measurement performance related to stationary conditions			
Performance characteristic	Uncertainty	Value of uncertainty quantity	
Standard deviation of repeatability at zero	U_{r0}	0.0015*410	5.71
Standard deviation of repeatability at span level	U_{rs}	0.008*410	5.71
Lack of fit	U_{fit}	0.007*410/3 ^{1/2}	1.65
Zero drift	U_{odr}	0.0001*410/3 ^{1/2}	0.00
Span drift	U_{sdr}	0.01*410/3 ^{1/2}	0.00
volume or pressure flow dependence	U_{spres}	(0.0002*410)*5/3 ^{1/2}	0.33
atmospheric pressure dependence	U_{apres}	(0.008*200/1)*0,5/3 ^{1/2}	0.05
ambient temperature dependence	U_{temp}	(0.003*410/10)*10/3 ^{1/2}	9.90
dependence on voltage	U_{volt}	0.0012/10*410*10/3 ^{1/2}	3.30
losses in the line (leak)	U_{leak}	0.02*200/3 ^{1/2}	0.26
Uncertainty of calibration gas	U_{calib}	0.02*200/3	0.26

Measurement uncertainty at		23	mg/m ³
U_{tot}		13.3	mg/m ³
U_{tot}/C_{lim}		58	%
$U_{tot,rel}$		116	%

NOx Uncertainty Calculations
A4 - Main Stack

Range 0 - ? ppm	NOx
100	205 mg/m ³

studied concentration NOx (VLE)	24 mg/m ³
measuring time	1456 minutes

Conditions of operation	
Measurement are performed in an environment where	
fluctuations of ambient temperature (in °C)	298 to 318 K
fluctuations of sample pressure are within (in kPa)	100 +/- 5
fluctuations of voltage (in V)	200-220
atmospheric pressure variations (in kPa)	99-100
frequency of adjustment (in hours)	10
O2 concentration measured	NA
NH3 range : unknown	Default values : 0-20 mg/m3
CO2 range	8-15 %
H2O range	10-20%
O2 reference concentration	NA

Performance characteristics	Value	*	specification
Response time	L	30 seconds	1 minute
Repeatability at zero	L	1 % of the full scale	0,2% of the full scale
Repeatability at span level	L	1 % of the full scale	2% of the full scale
Deviation from linearity	L	0.5 % of value	+/-5% of elv
Zero drift ***	L	0.00 % of fs/24h	+/-5% of fs/24h
Span drift ***	L	0.00 % of fs/24h	+/-5% of fs/24h
volume or pressure flow dependence	L	0.02 % of fs/kPa	1% of fs/30kPa
atmospheric pressure dependence	L	0.8 % of value/kPa	3% of value/4kPa
ambient temperature dependence	L	3 %fs/10K	3%fs/10K
dependence on voltage	L	1 %fs/10V	2%fs/10V
losses in the line (leak)	F	2 % of value	2% of value
Uncertainty of calibration gas	F	2 % of value	

L=laboratory F=Field

Measurement performance related to dynamic conditions	
Requirement for response time	120 sec
Measured response time	2 minutes
Conclusion	requirement met

Measurement performance related to stationary conditions			
Performance characteristic	Uncertainty	Value of uncertainty quantity	
Standard deviation of repeatability at zero	U_{r0}	$0.0015 \cdot 410$	2.05
Standard deviation of repeatability at span level	U_{rs}	$0.008 \cdot 410$	2.05
Lack of fit	U_{fit}	$0.007 \cdot 410 \cdot 3^{-0.5}$	0.59
Zero drift	U_{0dr}	$0.0001 \cdot 410 \cdot 3^{-0.5}$	0.00
Span drift	U_{sdr}	$0.01 \cdot 410 \cdot 3^{-0.5}$	0.00
volume or pressure flow dependence	U_{spres}	$(0.0002 \cdot 410) \cdot 5 \cdot 3^{-0.5}$	0.12
atmospheric pressure dependence	U_{apres}	$(0.008 \cdot 200/1) \cdot 0,5 \cdot 3^{-0.5}$	0.06
ambient temperature dependence	U_{temp}	$(0.003 \cdot 410/10) \cdot 10 \cdot 3^{-0.5}$	3.56
dependence on voltage	U_{volt}	$0.0012/10 \cdot 410 \cdot 10 \cdot 3^{-0.5}$	1.19
losses in the line (leak)	U_{leak}	$0.02 \cdot 200 \cdot 3^{-0.5}$	0.28
Uncertainty of calibration gas	U_{calib}	$0.02 \cdot 200 \cdot 3^{-0.5}$	0.28

Measurement uncertainty at	24	mg/m ³
U_{tot}	5	mg/m ³
U_{tot}/C_{lim}	20	%
$U_{tot,rel}$	40	%

Page No.:	OF	Project No.:		Date:	10-Mar-14	to	11-Mar-14
Client:	Aleris	Plant:	Swansea	Location:	A4		
Operators:	CH DPd	Test For:	Nox/SO2	In-house Method No.:	A44		
Laptop ID:	1298	Start:	9	Pressure (kPa)	100.4	Flow Rate (l/min)	0.4
Data Logger ID:	1024	End:	9		100.4		0.4
Action	O2	CO	SO2	NO	NOx	CO2	VOC
Analysers & Cylinder Info.	Analysers ID	5121					
	Gas Divider ID	1001					
	Span Gas Lot Number	VCD115589		VCD115589	VC5702013	VC5702013	
	Span Gas Uncertainty (±%)	1.2		1	1.9	1.9	1
ELVs & Ranges	Half hourly or Daily ELV (mg/m³)	N/A	N/A		N/A	N/A	
	Half hourly or Daily ELV (ppm)	N/A	N/A		N/A	N/A	N/A
	Ideal Range [150%] to [300%] (ppm)	N/A	N/A	N/A	N/A	N/A	N/A
	Range Used	25		200	100	100	20
Span & Divider Information	Span Range [50%] to [90%] (ppm)	N/A		100	180	50	90
	Span Certified Value of Cylinder (ppm)	15.00		176.00	71.00	71.00	
	Proposed Span Value (ppm)	15.00		158.30	71.00	71.00	
	Actual Gas Divider %	100.00		89.92	100.00	100.00	
	Actual Span value to be used (ppm) (A)	15.0		158.3	71.0	71.0	
	T ₉₀ Value (ppm) of (A)	13.5		142.4	63.9	63.9	
Analysers Calibration	T ₉₀ Time Analyser (seconds)	20		30	20	20	
	3 x T ₉₀ Time Between Readings	60		90	60	60	
	Zero Response	-0.02		0.10	-0.10	-0.10	
	Span Response (B)	15.04		157.90	71.00	71.00	
	Re-Zero Response	-0.02		0.10	-0.10	-0.10	
	Analysers Repeatability	0.08		0.28	0.06	N/A	
	<2 x Repeatability	PASS		PASS	PASS	N/A	
Initial Line Checks	T ₉₀ Time System (seconds)	30		45	30	30	
	3 x T ₉₀ Time Between Readings	90		135	90	90	
	System Check: Zero (C)	0.06		0.10	-0.10	-0.100	
	C/B*100 =	0.40		0.06	-0.1408	-0.14085	
	C/B*100 = <2%	PASS		PASS	PASS	PASS	
	System Check: Span (D)	15.04		157.00	71.00	71.00	
	(D-B)/B*100 =	0.00		-0.57	0.00	0.00	
	(D-B)/B*100 = <2% (= <5% SO ₂)	PASS		PASS	PASS	PASS	
Final Line Checks	System Check: Zero (E)	0.01		-0.30	0.10	0.10	
	(E-C)/D*100 =	-0.33		-0.2548	0.2817	0.2817	
	Drift: (E-C)/D*100 = <5%	PASS		PASS	PASS	PASS	
	System Check: Span (F)	15.03		150.40	67.70	67.70	
	(F-D)/B*100 =	-0.07		-4.18	-4.65	-4.65	
	Drift: (F-D)/B*100 = <5%	PASS		PASS	PASS	PASS	
A	NA						

Combustion Gas Emission Data from A4 - Main Stack	
Time	VOC as Carbon
13-Mar-14	(mg/Nm ³)
12:45	8.2
12:46	8.9
12:47	8.1
12:48	8.2
12:49	8.1
12:50	7.9
12:51	9.6
12:52	10.4
12:53	10.7
12:54	11.1
12:55	10.4
12:56	9.7
12:57	9.4
12:58	9.1
12:59	9.4
13:00	9.1
13:01	8.6
13:02	8.4
13:03	8.3
13:04	9.6
13:05	19.2
13:06	26.5
13:07	18.2
13:08	22.2
13:09	13.1
13:10	13.6
13:11	10.6
13:12	21.5
13:13	78.4
13:14	79.4
13:15	159.2
13:16	159.4
13:17	86.1
13:18	21.8
13:19	12.7
13:20	10.6
13:21	8.9
13:22	7.9
13:23	8.3
13:24	10.8
13:25	9.6
13:26	7.3
13:27	6.8
13:28	6.3
13:29	6.3
13:30	6.3
13:31	6.3
13:32	6.1

Combustion Gas Emission Data from A4 - Main Stack	
Time	VOC as Carbon
13-Mar-14	(mg/Nm ³)
13:33	5.8
13:34	5.5
13:35	5.3
13:36	5.5
13:37	5.8
13:38	11.4
13:39	7.3
13:40	5.1
13:41	5.3
13:42	5.8
13:43	6.5
13:44	8.0
13:45	9.0
13:46	12.1
13:47	11.6
13:48	12.4
13:49	12.8
13:50	10.8
13:51	8.6
13:52	7.8
13:53	8.6
13:54	8.1
13:55	6.3
13:56	7.0
13:57	7.5
13:58	16.9
13:59	47.4
14:00	21.4
14:01	10.5
14:02	18.6
14:03	62.5
14:04	112.5
14:05	47.1
14:06	33.8
14:07	25.9
14:08	14.1
14:09	11.0
14:10	9.1
14:11	8.1
14:12	7.2
14:13	6.5
14:14	5.8
14:15	5.3
14:16	4.7
14:17	5.0
14:18	5.7
14:19	7.7
14:20	7.7

Combustion Gas Emission Data from A4 - Main Stack	
Time	VOC as Carbon
13-Mar-14	(mg/Nm ³)
14:21	7.2
14:22	5.2
14:23	4.8
14:24	5.2
14:25	5.2
14:26	10.0
14:27	10.5
14:28	11.1
14:29	11.6
14:30	11.6
14:31	11.5
14:32	11.0
14:33	10.0
14:34	9.8
14:35	10.0
14:36	38.7
14:37	65.2
14:38	42.0
14:39	63.2
14:40	9.3
14:41	5.4
14:42	5.0
14:43	4.9
14:44	4.7
14:45	4.4
14:46	4.2
14:47	4.2
14:48	4.2
14:49	4.0
14:50	3.9
14:51	3.7
14:52	3.7
14:53	3.5
14:54	35.5
14:55	32.1
14:56	30.7
14:57	30.6
14:58	100.7
14:59	60.7
15:00	51.6
15:01	13.5
15:02	14.8
15:03	30.6
15:04	13.2
15:05	8.2
15:06	6.2
15:07	6.4
15:08	6.4

Combustion Gas Emission Data from A4 - Main Stack	
Time	VOC as Carbon
13-Mar-14	(mg/Nm ³)
15:09	5.7
15:10	5.9
15:11	6.0
15:12	5.2
15:13	4.7
15:14	5.4
15:15	5.4
15:16	5.1
15:17	7.7
15:18	6.7
15:19	4.9
15:20	5.4
15:21	15.7
15:22	28.4
15:23	68.7
15:24	12.7
15:25	7.9
15:26	6.6
15:27	5.7
15:28	5.1
15:29	5.6
15:30	4.9
15:31	4.6
15:32	4.1
15:33	3.7
15:34	3.7
15:35	3.6
15:36	3.9
15:37	3.4
15:38	3.6
15:39	4.2
15:40	4.1
15:41	4.2
15:42	19.5
15:43	47.9
15:44	78.9
15:45	82.7
15:46	77.9
15:47	69.6
15:48	85.2
15:49	37.9
15:50	11.7
15:51	10.4

Combustion Gas Emission Data from A4 - Main Stack	
Time	VOC as Carbon
13-Mar-14	(mg/Nm ³)
15:52	14.0
15:53	22.0
15:54	16.4
15:55	23.8
15:56	18.0
15:57	17.7
15:58	28.0
15:59	101.0
16:00	84.2
16:01	36.9
16:02	27.2
16:03	11.7
16:04	9.9
16:05	7.2
16:06	6.3
16:07	5.6
16:08	5.6
16:09	4.6
16:10	4.4
16:11	3.6
16:12	3.3
16:13	3.1
16:14	3.1
16:15	2.9
16:16	3.1
16:17	3.1
16:18	2.6
16:19	2.4
16:20	2.4
16:21	2.3
16:22	4.4
16:23	5.1
16:24	3.8
16:25	4.4
16:26	43.9
16:27	64.5
16:28	23.7
16:29	6.9
16:30	4.9
16:31	6.3
16:32	9.6
16:33	6.3
16:34	5.1

Combustion Gas Emission Data from A4 - Main Stack	
Time	VOC as Carbon (mg/Nm ³)
13-Mar-14	
16:35	7.6
16:36	5.9
16:37	31.5
16:38	24.5
16:39	9.3
16:40	5.5
16:41	5.6
16:42	6.0
16:43	5.5
16:44	4.0
16:45	4.1
Average	17.2

VOC Uncertainty Calculations

A4 - Main Stack

Range 0 - ? ppm	VOC
100	161 mg/m ³

studied concentration VOC (VLE)	17 mg/m ³
measuring time	1321 minutes

Conditions of operation	
Measurement are performed in an environment where	
fluctuations of ambient temperature (in °C)	298 to 318 K
fluctuations of sample pressure are within (in kPa)	100 +/- 5
fluctuations of voltage (in V)	200-220
atmospheric pressure variations (in kPa)	99-100
frequency of adjustment (in hours)	10
O2 concentration measured	NA
NH3 range : unknown	Default values : 0-20 mg/m3
CO2 range	8-15 %
H2O range	10-20%
O2 reference concentration	NA

Performance characteristics	Value	*	specification
Response time	L 5	seconds	1 minute
Repeatability at zero	L 1	% of the full scale	0,2% of the full scale
Repeatability at span level	L 1	% of the full scale	2% of the full scale
Deviation from linearity	L 0.5	% of value	+/-5% of elv
Zero drift ***	L 0.00	% of fs/24h	+/-5% of fs/24h
Span drift ***	L 0.00	% of fs/24h	+/-5% of fs/24h
volume or pressure flow dependence	L 0.02	% of fs/kPa	1% of fs/30kPa
atmospheric pressure dependence	L 0.8	% of value/kPa	3% of value/4kPa
ambient temperature dependence	L 3	%fs/10K	3%fs/10K
dependence on voltage	L 1	%fs/10V	2%fs/10V
losses in the line (leak)	F 2	% of value	2% of value
Uncertainty of calibration gas	F 2	% of value	

L=laboratory F=Field

Measurement performance related to dynamic conditions	
Requirement for response time	120 sec
Measured response time	2 minutes
Conclusion	requirement met

Measurement performance related to stationary conditions					
Performance characteristic		Uncertainty		Value of uncertainty quantity	
Standard deviation of repeatability at zero		u _{r0}		0.0015*410	1.61
Standard deviation of repeatability at span level		u _{rs}		0.008*410	1.61
Lack of fit		u _{fit}		0.007*410/3 ^{1/2}	0.46
Zero drift		u _{odr}		0.0001*410/3 ^{1/2}	0.00
Span drift		u _{sdr}		0.01*410/3 ^{1/2}	0.00
volume or pressure flow dependence		u _{apres}		(0.0002*410)*5/3 ^{1/2}	0.09
atmospheric pressure dependence		u _{apres}		(0.008*200/1)*0,5/3 ^{1/2}	0.04
ambient temperature dependence		u _{temp}		(0.003*410/10)*10/3 ^{1/2}	2.78
dependence on voltage		u _{volt}		0.0012/10*410*10/3 ^{1/2}	0.93
losses in the line (leak)		u _{leak}		0.02*200/3 ^{1/2}	0.20
Uncertainty of calibration gas		u _{calib}		0.02*200/3	0.20

Measurement uncertainty at		17.18	mg/m ³
u _{tot}		3.75	mg/m ³
u _{tot} /C _{lim}		22	%
u _{tot,rel}		44	%

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Client:	Aleris	Plant:	Swansea	Location:	A4
Operators:	CH DPd	Test For:	VOCs	In-house Method No.:	A57
Laptop ID:	1298	Start:	Temp (°C) 9	Pressure (kPa)	103.2
Data Logger ID:	1024	End:	9	103.2	Flow Rate (l/min)
					-

Action		O2	CO	SO2	NO	NOx	CO2	VOC
Analyser & Cylinder Info.	Analyser ID							1230
	Gas Divider ID	1137						
	Span Gas Lot Number							
	Span Gas Uncertainty (±%)						1	1
ELVs & Ranges	Half hourly or Daily ELV (mg/m³)							10
	Half hourly or Daily ELV (ppm)							6
	Ideal Range [150%] to [300%] (ppm)							9 19
	Range Used							100
Span & Divider Information	Span Range [50%] to [90%] (ppm)	N/A						10
	Span Certified Value of Cylinder (ppm)							106.86
	Proposed Span Value (ppm)							64.10
	Actual Gas Divider %							59.96
	Actual Span value to be used (ppm) (A)							64.1
	T ₉₀ Value (ppm) of (A)							57.7
Analyser Calibration	T ₉₀ Time Analyser (seconds)							5
	3 x T ₉₀ Time Between Readings							15
	Zero Response							-0.10
	Span Response (B)							64.10
	Re-Zero Response							-0.10
	Analyser Repeatability					N/A		0.12
	<2 x Repeatability					N/A		PASS
Initial Line Checks	T ₉₀ Time System (seconds)							15
	3 x T ₉₀ Time Between Readings							45
	System Check: Zero (C)							0.60
	C/B*100 =							0.9360
	C/B*100 = <2%							PASS
	System Check: Span (D)							63.00
	(D-B)/B*100 =							-1.72
Final Line Checks	(D-B)/B*100 = <2% (= <5% SO ₂)							PASS
	System Check: Zero (E)							0.00
	(E-C)/D*100 =							-0.9524
	Drift: (E-C)/D*100 = <5%							PASS
	System Check: Span (F)							61.80
	(F-D)/B*100 =							-1.87
Drift: (F-D)/B*100 = <5%							PASS	

A		NA	
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Client: ALERIS RECYCLING (UK) LTD

Clive Edwards
Waunarlwydd Works

Northumbrian Water Scientific Services
Northumberland Dock Road
Wallsend

Contract: ALERIS-02302

Waunarlwydd
Swansea

Tyne & Wear
NE28 0QD

Air Monitoring

Tel. 0191 2968366 Fax. 0191 2968535

						Method	H163	H164
Sample			Date	Time	Date	Date	volume of sample	fluoride in NaOH
ID Number	Description		Taken	Taken	Received	Started	ml	mg/l
739558	A4 MAIN STACK - RUN 1 IMPINGER 1	0.1N NAOH	12/03/14	11:05	14/03/14	18/03/14	120.00	4.1
739559	A4 MAIN STACK - RUN 1 IMPINGER 2	0.1N NAOH	12/03/14	11:05	14/03/14	18/03/14	98.000	<0.030
739563	A4 MAIN STACK - BLANK IMPINGER 1	0.1N NAOH	12/03/14	10:08	14/03/14	18/03/14	106.00	<0.030
739564	A4 MAIN STACK - BLANK IMPINGER 2	0.1N NAOH	12/03/14	10:08	14/03/14	18/03/14	98.000	<0.030

Authorised by:



Ian Barnabas - Scientific Support Laboratory Manager

Tests marked "***" in this report are NOT included in the UKAS accreditation schedule for this laboratory.

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Printed 02/04/2014

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In the event of a query please contact them on the above number

Opinions and interpretations expressed herein are out side the scope of UKAS accreditation

Results relate only to the items tested

Aleris-02302

March 2014

Issue 1

Aleris Recycling Ltd
Swansea Plant
IPPC Permit Number: EP3935UC

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14/03/2014 23:59:59

Client: ALERIS RECYCLING (UK) LTD

Clive Edwards
Waunarlwydd Works

Northumbrian Water Scientific Services
Northumberland Dock Road
Wallsend

Contract: ALERIS-02302

Waunarlwydd
Swansea

Tyne & Wear
NE28 0QD

Air Monitoring

Tel. 0191 2968366 Fax. 0191 2968535

						Method	H090	H163
Sample			Date	Time	Date	Date	chloride	volume of sample
ID Number	Description		Taken	Taken	Received	Started	mg/l	ml
739548	A4 MAIN STACK - RUN 1 MPINGER 1	DI H2O	11/03/14	12:13	14/03/14	18/03/14	2.2	152.00
739551	A4 MAIN STACK - RUN 1 MPINGER 2	DI H2O	11/03/14	12:13	14/03/14	18/03/14	<0.50	114.00
739554	A4 MAIN STACK - PRE BLANK IMPINGER 1	DI H2O	11/03/14	11:45	14/03/14	18/03/14	2.1	98.000
739555	A4 MAIN STACK - PRE BLANK IMPINGER 2	DI H2O	11/03/14	11:45	14/03/14	18/03/14	1.1	98.000

Authorised by:



Ian Barnabas - Scientific Support Laboratory Manager

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