

Permit Reference Number: BU2110IS

Operator: Cabot Carbon Limited

Installation: Barry Silicon-Based Manufacturing Installation

Form Number: A2 / Form Dated 1st February 2006

Reporting of Emissions to Air for the period from 1st January 2021 to 31st December 2021

Emission Point	Substance / Parameter	Emission Limit Value	Result ^[1]	Test Method ^[2]	Sample Date and Times ^[3]	Accreditation/ Certification ^[4]	Uncertainty ^[5]
A1	Oxides of nitrogen as NO ₂	50mg/m ³ ^[6]	7.5	TGN M22	21.12.21 14:48-15:48, 15:49-16:49, 16:50-17:50	MCERTS / UKAS	±4.2 mg/m ³
A2	Oxides of nitrogen as NO ₂	200mg/m ³ ^[7]	79.5	BS EN 14792	04.11.21 10:00-11:00	MCERTS / UKAS	±4.0 mg/m ³
A2	Carbon monoxide	200mg/m ³ ^[7]	1.6	BS EN 15058	04.11.21 10:00-11:00	MCERTS / UKAS	±0.6 mg/m ³
A3	Oxides of nitrogen as NO ₂	None	141.1	BS EN 14792	03.11.21 14:30-15:30	MCERTS / UKAS	±6.8 mg/m ³
A3	Carbon monoxide	None	1.4	BS EN 15058	03.11.21 14:30-15:30	MCERTS / UKAS	±0.6 mg/m ³
A13 & A24	Formaldehyde	100g/hr ^[6] ^[8]	4.79	BS EN 13649	14.05.21 09:40-10:40, 10:45-11:45, 11:50-12:50 02.11.21 11:05-12:05, 12:12-13:12, 13:20-14:20	MCERTS / UKAS	±0.29 g/hr

[1] The result given is the maximum value (or the minimum value in the case of a limit that is expressed as a minimum) obtained during the reporting period, expressed in the same terms as the emission limit value. Note: Result [1] are average values of sample results (where indicated), being more representative, as agreed with NRW

[1b] Results of site's only operational boiler B. (Sampling period was extended to capture more operational time, but testing was referenced to 3% Oxygen as stated in the Permit).

[2] Where an internationally recognised standard test method is used the reference number is given. Where another method that has been formally agreed with the Agency is used, then the appropriate identifier is given.

[3] For non-continuous measurements the date and time of the sample that produced the result is given.

[4] The accreditation status of the equipment and/or the monitoring organisation, as appropriate, for the methods used for both sampling and analysis.

[5] The uncertainty associated with the quoted result at the 95% confidence interval, unless otherwise stated. The basis of any other uncertainty figure needs to be stated. Where no figure is available NRW will need to agree an appropriate uncertainty value.

[6] Corrected to 273K, 101.3KPa.

[7] Corrected to 273K, 101.3KPa, 3% oxygen, dry.

[8] Combined mass emission from A13 and A24 emission point corrected 273K, 101.3KPa.

Signed



(authorised to sign as representative of Operator)

Date: 28.01.2022

Reference Number: BU2110IS

Operator: Cabot Carbon Limited

Installation: Barry Silicon-Based Manufacturing Installation

Form Number: A3 / Form Dated 1st February 2006

Reporting of Emissions to Air for the period 1st October 2021 to 31st December 2021

Emission Point	Substance / Parameter	Emission Limit Value ^[6]	Result ^[1] [Note A]	Test Method ^[2]	Sample Date and Times ^[3]	Accreditation/ Certification ^[4]	Uncertainty +/- ^[5]
A1	Chlorine	10 mg/m ³	1.3 mg/m ³	US EPA Method 26A	21.12.21 14:40-15:10, 15:15-15:45, 15:50-16:20, 16:25-16:55, 17:00-17:30	MCERTS / UKAS	±0.27mg/m ³
A1	Chlorine	10mg/m ³	4.2 mg/m ³	US EPA Method 26A	^[7] Annual average of CY21Q1(6.9) CY21Q2(5.4) CY21Q3(3.3) CY21Q4(1.3)	MCERTS / UKAS	±0.48 mg/m ³
A1	Chloromethanes (as methyl chloride)	50mg/m ³	3.22 mg/m ³	BS EN 13649	21.12.21 14:48-15:48, 15:49-16:49, 16:50-17:50	MCERTS / UKAS	±0.65 mg/m ³
A1	Hydrogen chloride	10mg/m ³	0.6 mg/m ³	TGN M22 ^[2]	21.12.21 14:48-15:48, 15:49-16:49, 16:50-17:50	MCERTS / UKAS	±1.7 mg/m ³

[1] The result given is the maximum value (or the minimum value in the case of a limit that is expressed as a minimum) obtained during the reporting period, expressed in the same terms as the emission limit value.

[2] Where an internationally recognised standard test method is used the reference number is given. Where another method that has been formally agreed with the Agency is used, then the appropriate identifier is given.

[3] For non-continuous measurements the date and time of the sample that produced the result is given.

[4] The accreditation status of the equipment and/or the monitoring organisation, as appropriate, for the methods used for both sampling and analysis.

[5] The uncertainty associated with the quoted result at the 95% confidence interval, unless otherwise stated. The basis of any other uncertainty figure needs to be stated. Where no figure is available the Agency will need to agree an appropriate uncertainty value.

[6] Corrected to 273K, 101.3Kpa.

[7] Annual Average reported CY21 Q1-Q4 inclusive

[Note A]: Results are given as averages being more representative, as agreed with NRW.

Signed



(authorised to sign as representative of Operator)

Date: 28.01.2022

Permit Reference Number: BU2110IS

Operator: Cabot Carbon Limited

Installation: Barry Silicon-Based Manufacturing Installation

Form Number: W1 / Form Dated 1st February 2006

Reporting of Emissions to Water (other than to Sewer) for the period from 1 October 2021 to 31 December 2021

Emission Point	Substance / Parameter	Emission Limit Value	Result ^[1]	Test Method ^[2]	Sample Date and Times ^[3]	Accreditation/ Certification ^[4]	Uncertainty ^[5]
W1	Oil and grease	5mg/l ^[6]	<0.6 mg/l	IR Spectrometry - W-TEC-IR	07.12.21 12:10	UKAS	+/- 20.0%
	BOD ₅	20mg/l ^[6]	<1 mg/l	ISBN 011 7522120	07.12.21 12:10	UKAS	+/- 23.6%
	pH	>5, <9 ^[7]	7.6	ISBN: 011 7514284	07.12.21 12:10	UKAS	+/- 20.3%
W2	Oil and grease	5mg/l ^[6]	<0.6 mg/l	IR Spectrometry - W-TEC-IR	07.12.21 12:15	UKAS	+/- 20.0%
	BOD ₅	20mg/l ^[6]	<1 mg/l	ISBN 011 7522120	07.12.21 12:15	UKAS	+/- 23.6%
	pH	>5, <9 ^[7]	8.0	ISBN: 011 7514284	07.12.21 12:15	UKAS	+/- 20.3%
W3	Oil and grease	5mg/l ^[6]	0.61 mg/l	IR Spectrometry - W-TEC-IR	12.12.21 10:05	UKAS	+/- 20.0%
	BOD ₅	20mg/l ^[6]	<1 mg/l	ISBN 011 7522120	12.12.21 10:05	UKAS	+/- 23.6%
	pH	>5, <9 ^[7]	7.9	ISBN: 011 7514284	12.12.21 10:05	UKAS	+/- 20.3%

[1] The result given is the maximum value (or the minimum value in the case of a limit that is expressed as a minimum) obtained during the reporting period, expressed in the same terms as the emission limit value. Where the emission limit value is expressed as a range, the result is given as the 'minimum – maximum' measured values.

[2] Where an internationally recognised standard test method is used the reference number is given. Where another method that has been formally agreed with the Agency is used, then the appropriate identifier is given.

[3] For non-continuous measurements the date and time of the sample that produced the result is given.

[4] The accreditation status of the equipment and/or the monitoring organisation, as appropriate, for the methods used for both sampling and analysis.

[5] The uncertainty associated with the quoted result at the 95% confidence interval, unless otherwise stated. The basis of any other uncertainty figure needs to be stated. Where no figure is available the Agency will need to agree an appropriate uncertainty value.

[6] The emission limit value for Oil and grease, and BOD₅, is expressed as a maximum individual value.

[7] The emission limit values for pH are expressed as minimum and maximum individual values.

[8] ALS Environmental has obtained UKAS accreditation for all test method.

Signed

(authorised to sign as representative of Operator)

Date: 28.01.2022

Permit Reference Number: BU2110IS

Operator: Cabot Carbon Limited

Installation: Barry Silicon-Based Manufacturing Installation

Form Number: R1 / Form Dated 1st February 2006

Reporting of Waste Disposal and Recovery for the year 2021 (01/01/2021-31/12/2021)

Waste Description	Disposal		Recovery Tonnes
	Route	Tonnes	
1) Hazardous Wastes			
Hazardous waste from production and maintenance activities	D09, D15, R09, R13	206.5	8.37
Other hazardous wastes	N/A		
Total hazardous waste		214.9	
2) Non-Hazardous Wastes			
Non-Hazardous silica waste to landfill from production activities (including packaging)	D01	68.28	
Non-Hazardous waste from production and maintenance activities	D01, D15, R01, R03, R04, R13	107.32	120.9
Non-Hazardous waste from construction activities (subsoil and hardcore)		107.32	
Total Non-Hazardous waste		175.6	120.9
TOTAL WASTE		382.1	129.3

Trends in Waste Disposal and Recovery			
Year	Parameter	Total Waste	Waste per unit output
	Named Waste		
2010	199.5	199.5	Report on PI1
2011	245.4	245.4	Report on PI1
2012	165.65	165.65	Report on PI1
2013	214.31	214.31	Report on PI1
2014	242.50	242.50	Report on PI1
2015	258.72	258.72	Report on PI1
2016	430.6	430.6	Report on PI1
2017	146.5	146.5	Report on PI1
2018	174.9	174.9	Report on PI1
2019	155.1	155.1	Report on PI1
2020	480.4	480.4	Report on PI1
2021	382.1	382.1	Report on PI1

Operator comments:

Signed

(authorised to sign as representative of the Operator)

Date: 28.01.2022

Permit Reference Number: BU2110IS

Operator: Cabot Carbon Limited

Installation: Barry Silicon-Based Manufacturing Installation

Form Number: WU1 / Form Dated 1st February 2006

Reporting of Water Usage for the year 2021 (01/01/2021 – 31/12/2021)

Water Source	Usage (m ³)	Specific Usage (m ³ /t)
Mains water	61,830	6.25
Dow Corning	47,335	4.79
TOTAL WATER USAGE	109,165	11.04

Trends in Water Usage				
Year	Parameter			
	Mains water	Dow	Total water usage	Water per unit output
2006	103,892	94,047	197,939	Report on PI1
2007	92,671	87,424	180,096	Report on PI1
2008	49,805	73,734	123,539	Report on PI1
2009	52,229	47,656	99,885	Report on PI1
2010	58,643	43,664	102,307	Report on PI1
2011	73,172	44,154	117,326	Report on PI1
2012	76,828	42,204	119,032	Report on PI1
2013	76,004	49,040	125,044	Report on PI1
2014	68,392	41,828	110,220	Report on PI1
2015	74,320	38,023	112,343	Report on PI1
2016	78,272	32,911	111,182	Report on PI1
2017	76,512	38,898	115,410	Report on PI1
2018	69,695	50,490	120,185	Report on PI1
2019	69,980	53,899	123,879	Report on PI1
2020	66,007	49,363	115,370	Report on PI1
2021	61,830	47,335	109,365	Report on PI1

operator comments:

Signed



(authorised to sign as representative of the Operator)

Date: 28.01.2022

Permit Reference Number: BU2110IS

Operator: Cabot Carbon Limited

Installation: Barry Silicon-Based Manufacturing Installation

Form Number: E1 / Form Dated 1st February 2006

Reporting of Energy Usage for the year 2021 (01/01/2021-31/12/2021)

Energy source	Energy Usage		
	Quantity	Primary Energy (MWh)	CO ₂ Produced (Tonnes)
Electricity	MWh	35,866	5,954
Natural Gas	MWh	38,650	7,340
TOTAL		74,516	13,293

* Conversion factor for delivered electricity to primary energy = 2.4

** Conversion factor for Electricity CO₂ equivalent metric tonnes = MWh x 0.166

*** Conversion factor for Gas CO₂ equivalent metric tonnes = MWh x 0.190

Trends in Energy Usage			
Year	Parameter		
	Primary Energy usage	CO ₂ produced	CO ₂ per unit output
2011	97,179	17,681	Report on PI1
2012	93,540	17,004	Report on PI1
2013	84,074	15,040	Report on PI1
2014	85,449	15,306	Report on PI1
2015	86,454	15,480	Report on PI1
2016	85,907	15,351	Report on PI1
2017	76,211	13,531	Report on PI1
2018	83,219	14,865	Report on PI1
2019	76,066	13,567	Report on PI1
2020	75,863	13,546	Report on PI1
2021	74,516	13,293	Report on PI1

operator comments:

Signed



(authorised to sign as representative of the Operator)

Date: 28.01.22

Permit Reference Number: BU2110IS

Operator: Cabot Carbon Limited

Installation: Barry Silicon-Based Manufacturing Installation

Form Number: PI1 / Form Dated 1st February 2006

Reporting of Performance Indicators for the year 2021 (01/01/2021– 31/12/2021)

Annual Production/Treatment	
Production of fumed silica	9887.6 tonnes

Environmental Performance Indicators

Parameter	Annual Average	Units
Carbon monoxide	24.95	kg/tonne
Water use	11.04	m ³ /tonne
Energy use	7,536	kWh/tonne
Carbon dioxide	0.74	tonne/tonne
Waste silica to landfill	6.9	kg/tonne
Chlorosilane	2.5	tonne/tonne
Hydrogen	550.08	Nm ³ /tonne

Trends in Environmental Performance							
Year	Parameter						
	CO	Water	Energy	CO ₂	Waste silica	Chloro-silane	H ₂
	kg/t	m ³ /t	kWh/t	t/t	kg/t	t/t	Nm ³ /t
2008	29.05	13.2	10,670	1.3855	8.30	2.73	694.81
2009	30.61	11.3	10,817	1.3790	4.87	2.60	766.64
2010	40.41	10.2	9,900	1.2640	7.56	2.59	604.20
2012	37.28	13.2	10,356	1.2990	8.63	2.83	628.90
2013	21.31	10.80	7,262	0.7401	11.89	2.41	575.30
2014	21.69	9.04	7,011	0.7282	17.06	2.51	503.51
2015	20.63	8.98	6,910	0.7143	14.13	2.53	579.39
2016	22.90	9.41	7,273	0.7309	27.5	2.50	583.30
2017	21.30	9.58	6,324	0.5782	9.6	2.50	557.63
2018	27.29	9.62	6,663	0.6926	11.3	2.50	585.94
2019	24.48	11.40	7,002	0.69	10.2	2.82	583.14
2020	27.02	12.72	8,363	0.83	9.8	2.5	604.93
2021	24.95	11.04	7,536	0.74	6.9	2.5	550.08

Operator's comments. 2021 represents a low year for production volumes with nearly 2000MT shortfall over previous years. The requirement to keep the operations running on heatload when not producing means our PI/MT are higher than previously reported.

Signed

(authorised to sign as representative of the Operator)

Date: 28.01.2022