

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 2017 to 31st December 2017

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]	10.5	TGN M22	29/11/2017, 10:00-11:00hrs	MCERTS / UKAS	±7.5 mg/m ³
A2	Oxides of nitrogen as NO ₂	200mg/m ³ ^[7]	91.2	BS EN 14792	28/11/2017 09:58-10:58hrs	MCERTS / UKAS	± 24 mg/m ³
A2	Carbon monoxide	200mg/m ³ ^[7]	<1.8	BS EN 15058	28/11/2017 09:58-10:58hrs	MCERTS / UKAS	± 29 mg/m ³
A3	Oxides of nitrogen as NO ₂	None	145 (b)	BS EN 14792	27/11/2017 14:39-14:41 & 14:56-14:58hrs	MCERTS / UKAS	± 26 mg/m ³
A3	Carbon monoxide	None	105 (b)	BS EN 15058	27/11/2017 14:39-14:41 & 14:56-14:58hrs	MCERTS / UKAS	± 14 mg/m ³
A13 & A24	Formaldehyde	100g/hr ^[6] ^[8]	4.92	BS EN 13649	01/06/2017 09:30-10:30, 10:35-11:35, 11:40-12:40hrs, 30/11/2017 11:15-12:15, 12:20-13:20, 13:25-14:25 hrs (A13 & A24)	MCERTS / UKAS	± 36% 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. 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 (during the sampling period the boiler was only operating for 6 min as it is now typically only on standby 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: 30th January 2018

Permit Reference Number: BU21101S

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 2017 (01/01/17 – 31/12/17)

Waste Description	Disposal Route	Recovery	
		Tonnes	Tonnes
1) Hazardous Wastes			
Hazardous waste from production and maintenance activities	D09, D15, R09, R13	28.4	3.1
Other hazardous wastes	N/A	N/A	
Total hazardous waste		28.4	
2) Non-Hazardous Wastes			
Non-Hazardous silica waste to landfill from production activities (including packaging)			
Non-Hazardous waste from production and maintenance activities	D01	115.4	
Non-Hazardous waste from construction activities (subsoil and hardcore)	D01, D15, R01, R03, R04, R13	2.7	135.7
Total Non-Hazardous waste		118.1	168.2
TOTAL WASTE		146.5	171.3

Trends in Waste Disposal and Recovery			
Year	Parameter	Total Waste	Waste per unit output
2008	Named Waste	456.2	Report on P11
2009		154.8	Report on P11
2010		199.5	Report on P11
2011		245.4	Report on P11
2012		165.65	Report on P11
2013		214.31	Report on P11
2014		242.50	Report on P11
2015		258.72	Report on P11
2016		430.6	Report on P11
2017		146.5	Report on P11

Operator comments: A decrease on CY16 totals in landfill silica. (campaign to significantly reduce end of shelf life silica). Over half of the waste generated on site is recycled or incinerated (RDF).

Signed

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Date 30th January 2018

Permit Reference Number: BU21101S

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 2017 (01/01/17 – 31/12/17)

Water Source	Usage (m ³)	Specific Usage (m ³ /t)
Mains water	76,512	6.35
Dow Corning	38,898	3.23
TOTAL WATER USAGE	115,410	9.58

Year	Trends in Water Usage		
	Mains water	Dow Corning	Total water usage
2006	103,892	94,047	197,939
2007	92,671	87,424	180,096
2008	49,805	73,734	123,539
2009	52,229	47,656	99,885
2010	58,643	43,664	102,307
2011	73,172	44,154	117,326
2012	76,828	42,204	119,032
2013	76,004	49,040	125,044
2014	68,392	41,828	110,220
2015	74,320	38,023	112,343
2016	78,272	32,911	111,182
2017	76,512	38,898	115,410

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Date 30th January 2018

Permit Reference Number: BU21101S

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 2017 (01/01/17 – 31/12/17)

Energy Source	Energy Usage		CO ₂ Produced (Tonnes)
	Quantity	Primary Energy (MWh)	
Electricity	MWh	39,538	6563
Natural Gas	MWh	36,673	6968
TOTAL		76,211	13,531

* 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

Year	Trends in Energy Usage		
	Primary Energy usage	CO ₂ produced	CO ₂ per unit output
2006	108,936	19,884	Report on P11
2007	107,011	19,531	Report on P11
2008	99,904	18,219	Report on P11
2009	95,570	17,445	Report on P11
2010	99,165	18,055	Report on P11
2011	97,179	17,681	Report on P11
2012	93,540	17,004	Report on P11
2013	84,074	15,040	Report on P11
2014	85,449	15,306	Report on P11
2015	86,454	15,480	Report on P11
2016	85,907	15,351	Report on P11
2017	76,211	13,531	Report on P11

Operator comments: Opportunity identified to reduce Natural Gas consumption used to keep the standby Package Boiler at working temperature & pressure by installing Boiler Banking (*direct steam injection from Main Steam header*).

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Date 30th January 2018

Permit Reference Number: BU2110IS

Operator: Cabot Carbon Limited

Installation: Barry Silicon-Based Manufacturing Installation

Form Number: P11 / Form Dated 1st February 2006

Reporting of Performance Indicators for the year 2017 (01/01/17 – 31/12/17)

Annual Production/Treatment	
Production of fumed silica	12052 tonnes

Environmental Performance Indicators

Parameter	Annual Average	Units
Carbon monoxide	21.3	kg/tonne
Water use	9.58	m ³ /tonne
Energy use	6,324	kWh/tonne
Carbon dioxide	0.58	tonne/tonne
Waste silica to landfill	9.6	kg/tonne
Chlorosilane	2.50	tonne/tonne
Hydrogen	557.63	Nm ³ /tonne

Year	Trends in Environmental Performance						
	Parameter						
	CO	Water	Energy	CO ₂	Waste silica	Chlorosilane	H ₂
	kg/t	m ³ /t	kWh/t	t/t	kg/t	t/t	Nm ³ /t
2006	22.75	17.3	9,500	1.5523	4.16	2.65	580.14
2007	25.26	15.8	9,390	1.2285	8.31	2.57	571.87
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

Operator's comments: CO2 based on natural gas consumption only. Reduction in energy use due to Boiler Banking Project

Signed

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30th January 2018

