

Investigation in to the Emissions of Hydrogen Sulphide to Atmosphere

Part 1: **Executive Summary**
Permit Number: **PPC/093, variation 001**
Operator: **Coventry Castings Ltd**
Installation: **Barlow Road, Coventry**
Emission Point: **Furnace Extraction Stack - H**
Monitoring Date(s): **9th February 2011**



1709



1709

Contract Reference: FTBS 15409 *Revision 1*

Operator: Coventry Castings Ltd

Address: Barlow Road
Aldermans Green Industrial Estate
Aldermans Green
Coventry
CV2 2LD

Monitoring Organisation: RPS Consultants Ltd

Address: Grafton Building, Caswell Science and Technology Park, Caswell,
Towcester, Northants, NN12 8EQ

Report Date: 4th March 2011

Report Approved By: Richard Harvey

Position: Principal Consultant

MCERTS Registration No.: MM02 020

Signature:



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We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above. This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.

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Monitoring Objectives

At the request of Mr Ian Reid of Coventry Castings Ltd, RPS Consultants Ltd conducted air emission monitoring at the Coventry site in February 2011.

The monitoring programme at this installation was carried out to provide data on the emissions to atmosphere from the Furnace Extraction Stack - H

The parameters requested for monitoring and the actual monitoring conducted are detailed below.

Table 1

Parameters Requested to be Monitored	Emission Point
	Furnace Extraction Stack - H
Total Particulate Matter	✓
Hydrogen Sulphide	✓
Specific Requirements	See table 3

Notes:

- ✓ Represents the actual parameters monitored.
- ✗ Parameters requested but not monitored.

Monitoring Results

Table 2 – Monitoring Results from the Furnace Extraction Stack - H at Coventry Castings, Coventry in February 2011

Substance Monitored	Emission Limit Value Δ	Periodic Monitoring Result	Units	Uncertainty (mg/m ³) #	Reference Conditions 273K, 101.3kPa....	Sampling Date	Sampling Period	Monitoring Reference Method	Accreditation Status	Operating Status
Total Particulate Matter	20	15	mg/m ³	± 10.9 ♣	wet gas, without correction for oxygen	09-Feb-11	11:10 – 13:40	BSEN 13284-1:2001	MCerts	See table 3
Hydrogen Sulphide	5 ppm (3.8mg/m ³)	< 0.12	-	± 0.030	wet gas, without correction for oxygen	09-Feb-11	11:10 – 13:40	USEPA Method 11	-	See table 3

Notes:

The uncertainty associated with the quoted result is at the 95% confidence interval

Δ As stated in the Coventry City Council Permit PPC 093, variation notice 001

♣ Due to the fact that sampling could only be conducted along one traverse line, it is not possible to calculate and measurement of uncertainty - this figure is therefore an estimate.

Operating Information

Table 3 – Operating Information Relating to the Monitoring of the Furnace Extraction at Coventry Castings Ltd, Coventry in February 2011

Parameter	Result
Sample Date	9 th February 2011
Process Type	Batch – Flake grade cast iron 17 (260kN) - waste car brakes were melted in the electric induction furnace to >1420°C. After drossing, a portion of the melt was transferred to a 600kg ladle. This was covered with an exothermic flux. The remaining melt was transferred to large sand casts.
Process Duration	Each batch takes between 2 and 2.5 hours to complete
If 'Batch', was monitoring carried out over the whole batch?	Yes – covered melting (from cold), drossing and transfer stages
If 'No', give details	N/A
Abatement/Operational?	None
Fuel Type	N/A (electric coreless induction furnace)
Feedstock	Waste steel car brakes
Load	Approx. 1.0 tonnes
Throughput	N/A
Continuous Rating	N/A

Monitoring Deviations

Table 4 – Monitoring Deviations During Monitoring of the Furnace Extraction Stack - H at Coventry Castings Ltd, Coventry in February 2011

Substance Deviations	Monitoring Deviations	Other Relevant Issues
<p>Furnace Extraction Stack - H: None</p>	<p>Furnace Extraction Stack - H: Due to platform constraints it was not possible to conduct monitoring along one of the traverse lines. This is contrary to the requirements of BSEN 13284 which for a duct of this size requires monitoring to be conducted along two traverse lines. If required RPS can assist Coventry Castings to improve the monitoring arrangements.</p> <p>Analytical tests were carried out on the samples using a UKAS accredited method (BLM470). The results were unsuccessful so additional analyses were performed using a non-accredited method (BLM256 a former accredited method).</p>	<p>Furnace Extraction Stack - H: None</p>

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Part 2: **Supporting Information**
Permit Number: **PPC/093, variation 001**
Operator: **Coventry Castings Ltd**
Installation: **Barlow Road, Coventry**
Emission Point(s): **Furnace Extraction Stack - H**
Monitoring Date(s): **9th February 2011**



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APPENDIX 1: General Information

Monitoring Organisation Staff Details

Table 5

Site Team	Position	MCERTS Level	Technical Endorsements	TE Expiry Dates	MCERTS Registration Number
Martin Johnson	Senior Consultant	2	1	16/06/13	MM 03 168
			2	21/06/11	
			3	21/06/11	
			4	03/08/11	
Katie Brewis	Consultant	2	1	22/03/14	MM 07 876
			2	02/12/13	
			3	26/05/14	
			4	26/05/14	

Report Author	Position	MCERTS Level	Technical Endorsements	TE Expiry Dates	MCERTS Registration Number
Martin Johnson	Senior Consultant	2	1	16/06/13	MM 03 168
			2	21/06/11	
			3	21/06/11	
			4	03/08/11	

Report Reviewer	Position	MCERTS Level	Technical Endorsements	TE Expiry Dates	MCERTS Registration Number
Richard Harvey	Principal Consultant	2	1	20/11/12	MM 02 020
			2	09/03/15	
			3	20/03/11	
			4	07/12/10	

Monitoring Organisation Method Details

Table 6

Emission Parameter	Standard Method	Monitoring Procedure No.	Monitoring Accreditation Status	Analysis Technique	Analysis Procedure No.	Analytical Laboratory	Analysis Accreditation Status
Practical Considerations Prior to Monitoring	N/A	RPSCE/1/1	MCERTS	N/A	N/A	N/A	N/A
Gas Flows	BS-EN 13284-1:2001	RPSCE/1/2	MCERTS	N/A	N/A	N/A	N/A
Gas Temperatures	BS-EN 13284-1:2001	RPSCE/1/2	MCERTS	N/A	N/A	N/A	N/A
Total Particulate Matter	BS-EN 13284-1:2001	RPSCE/1/7c	MCERTS	Gravimetric	D9	RPS Laboratories, Manchester	UKAS
Hydrogen Sulphide	USEPA Method 11	RPSCE/1/17	UKAS	Colourimetry	BLM 256	Butterworth Laboratories Ltd	-

APPENDIX 2: Emission Point(s): Furnace Extraction Stack - H

Stack Gas Measurements

Table 7 - Temperature and Velocity Profile

Results of Gas Flows and Gas Temperatures Measured from the Furnace Extraction Stack - H at Coventry Castings Ltd, Coventry on the 9th February 2011

Traverse Point (m)	Sample Line A				Sample Line B			
	T (°C)	ΔP (mmH ₂ O)	Neg. Flow?	Spin <15°	T (°C)	ΔP (mmH ₂ O)	Neg. Flow?	Spin <15°
0.10	11	1.8	No	> 15	12	1.6	No	< 15
0.56	12	2.0	No	< 15	12	2.4	No	< 15

Barometric pressure (kPa)	100.4
Static Pressure (mmH₂O)	-ve 2.6
Stack Dimension Ø (m)	0.66

Table 8 - Gas Measurements (continued)

Results of Total Particulate Matter and General Emission Parameters Measured from the Furnace Extraction Stack - H at Coventry Castings Ltd, Coventry in February 2011

Emission Parameter	Units	Mean Result
Sample Date	-	09-Feb-11
Sample Period	-	11:10 – 13:40
Internal Area of Duct	m ²	0.34
Stack Moisture Content	%	0.75
Stack Temperature	°C	11.5
Gas Velocity (as measured at sampling plane)	m/sec	4.0
Volumetric Flowrate (as measured)	m ³ /sec	1.4
Volumetric Flowrate (at reference conditions)	m ³ /sec *	1.3
Total Particulate Matter Mass Emission	kg/hr	0.0702
Total Particulate Matter Concentration	mg/m ³ *	15

Notes:

* Reference conditions expressed as 273 K, 101.3 kPa, wet gas without correction for oxygen.

Photograph(s)

Photograph of Furnace Extraction Stack – H and Platform at Coventry Castings Ltd in Coventry



Reportable Blank Results

Table 9 - Results of the Reportable Blank Concentrations for Hydrogen Sulphide and Total Particulate Matter taken for the Furnace Extraction Stack - H at Coventry Castings Ltd, Coventry in February 2011

Emission Parameter	Sample Date	Units	Mean Blank Concentration
Total Particulate Matter	09-Feb-11	mg/m ³	< 0.19
Hydrogen Sulphide	09-Feb-11	mg/m ³	< 0.12

Notes:

Reference conditions expressed as 273 K, 101.3 kPa, wet gas without correction for oxygen.

Certificate(s) of Analyses



Test Certificate

Date 24/02/2011

Client	RPS Towcester Grafton Building Caswell Science & Technology Park Caswell, Towcester Northants NN12 8EQ	Order No.	FTBS15409
		Certificate No.	WK11-0906
		Issue No.	1
Contact	Katie Brewis	Date Received	16/02/2011
Description	2 filters & 2 solutions for TPM	Technique	Gravimetric

Sample No.	636967	069099	Method
Total particulate matter	<0.04 mg		D9(U)
Sample No.	636968	T118947	Method
Total particulate matter	<0.5 mg		D9(U)
Sample No.	636969	069100	Method
Total particulate matter	43.23 mg		D9(U)
Sample No.	636970	T118948	Method
Total particulate matter	2.3 mg		D9(U)



Test Certificate

Date 24/02/2011

Client RPS Towcester Certificate No. WK11-0906
Issue No. 1

Tested By Carl Hayes Date 24/02/2011

Approved By [Redacted] Date 24/02/2011

Adam Crowe
Operations Manager

For and on authority of RPS Laboratories Ltd.
RPS Laboratories terms and conditions apply - a copy is available on request.

Method Symbols (U) Analysis is UKAS Accredited
(N) Analysis is not UKAS Accredited

Concentration values (mg/m³ and ppm) are provided to assist with interpretation only, they are not covered by the scope of UKAS accreditation

Analysis carried out on samples 'as received'

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Certificate of Analysis

RPS Health, Safety and Environment

Grafton Building, Caswell Science & Technology Park
Caswell,
Towcester
Northamptonshire
UK
NN12 8EQ

Job Ref: 1102-0127
Report Ref: RN-00408-11
Date Issued: 21 February 2011
Order Ref: TOW 13262

For attention of K Brewis

Samples of: Impingers
Date Received: 16 February 2011
Analysis Started: 17 February 2011

Analysis Completed: 17 February 2011

BL Ref	Sample ID	Test	Results	Units
02-0604-11	Job Ref: FTBS Sample Ref: T120046	Hydrogen Sulphide	<0.5 <0.5	mg/L mg/L
		Initial sample volume	30	ml
		02-0605-11	Job Ref: FTBS Sample Ref: T120047	Hydrogen Sulphide
	Initial sample volume	34	ml	

Results relate to sample as received.

Samples analysed in accordance with in house methods BLM 256 (issue 5) and BLM 470 (issue 1).

Note: a negative result was obtained when analysing titrimetrically by BLM 470 so colorimetric method BLM 256 was also used.

Tim Goddard
Laboratory Manager
General & Inorganic Chemistry

David A Riches
Head of Analytical Operations
Issued for and on behalf of Butterworth Laboratories Ltd

Encl. Raw Data Pack.

[MS-MT]
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Issue 1

Butterworth Laboratories Limited
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