



Title: Monitoring of Particulate Matter (PM) Emissions

Permit Number: EPR/FB3903MA
Operator: Unimetals Recycling UK Limited
Installation: A2
Monitoring Dates: 20 March 2025

Reference Number: EI/10658

Client Organisation: Unimetals Recycling UK Limited
Address: Land at Boulder Bridge Lane
Carlton
Barnsley
South Yorkshire
S71 3HJ

Monitoring Organisation: CES Environmental Instruments Ltd
Address: Bretby Business Park
Ashby Road
Burton on Trent
Staffordshire
DE15 0YZ

Date of Report: 4 April 2025

Report Prepared By: Richard Allen
MCERTS Registration Number: MM 19 1561 (Level 2, TE1, TE2, TE3, TE4)

Signed:

Report Approved By: Robert Allen
MCERTS Registration Number: MM 02 009 (Level 2, TE1, TE2, TE3, TE4)

Signed:

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Part 1: Executive Summary

1.1 Monitoring Objectives

Unimetals Recycling UK Limited placed a contract with CES Environmental Instruments Ltd for the compliance check monitoring of emissions to air from the A2 Stack.

A2

The principle activities at the site will be the processing of cable, non-ferrous metal and ferrous metal scrap for supply as feedstock to the steel making industry in the UK and abroad.

The site is permitted to store and treat ferrous and non-ferrous metals, End of Life Vehicles (ELVs) including hazardous components. The site is permitted to accept 90,000 tonnes of waste per annum.

The facility comprises of the following installation activities:

The Stack is a grinder that is connected to a bag filter.

The test work was undertaken on 20 March 2025 by CES Environmental Instruments Ltd Engineers and carried out as part of CES Environmental Instruments Ltd job reference EI/10658.

The substances monitored were:-

Particulate Matter

On the day of testing there were no special requirements for the monitoring.

1.2 Monitoring Results

Emission Point Reference: A2

Substance to be Monitored	Emission Limit Value	Periodic Monitoring Result	Uncertainty of Measurement (95% CI)	Blank Result	Units	Reference Conditions	Emission Rate	Date of Sampling	Start and End Times	Monitoring Method Reference	Accreditation for use of Method	Operating Status
Particulate Matter	10	0.07	0.09	0.02*	mg/m ³	273K, 101.3kPa	0.002 kg/hr	20 March 2025	09:09-12:20	BS EN 13284-1	UKAS & MCERTS	Normal Operation

* Indicates where a value less than the limit of detection of the weighing procedure (0.09mg) has been reported, the value lies between the detection limit and zero. A value of half the limit of detection (0.045mg) has been used to calculate the concentration.

1.3 Operating Information

Emission Point Reference: A2

Process Type	Batch Sample Details	Fuel	Product	Load	Abatement
Continuous	-	-	Copper & Plastic grinded down	2.5 – 3.0 tonnes/hr	Bag Filtration system

Comparison of Operator Continuous Emissions Monitoring Systems (CEMS) and Periodic Monitoring Results								
Substance to be Monitored	Emission Limit Value	Periodic Monitoring Result	Uncertainty of Measurement (95% CI)	Units	Reference Conditions	Date of Sampling	Start and End Times	CEMS Results
No CEMS Installed								

1.4 Monitoring Deviations

None.

Part 2: Supporting Information

Appendix 1 General Information

CES Environmental Instruments Ltd staff details

Name	Role	MCERT Registration Number	Level 1	Level 2	TE1	TE2	TE3	TE4	At site
Richard Allen	Team Leader	MM 19 1561		✓	✓	✓	✓	✓	T
				July 2026	Dec 2025	Mar 2027	Apr 2027	Nov 2026	
Derek Harvey	Team Leader	MM 06 686		✓	✓				✓
				June 2027	June 2027				
Cameron Helas	Technician	Trainee							✓

T = Nominated Team Leader on Site

CES Environmental Instruments Ltd method details

Pollutant	Method	CES Procedure
Particulate Matter	BS EN 13284-1	WI 4/1

Monitoring Equipment Used

Gravimat & Probe

CES Environmental Instruments Ltd Reference: C152

Appendix 2

Diagrams of Emission Point

Sampling Location

Dimensions	Cross Sectional Area	Orientation	Sample Ports Available/Used	Sampling Positions Per Plane	Standard
Dia=1000mm	0.786m ²	Horizontal	PM = 2/2	4	BS EN 15259
Comments: Sample ports: 2 off 4" BSP sockets. Sample times are calculated from the total sample time equally divided by the no. of sample positions per plane. The minimum sample time per position is 3 minutes. Sample positions calculated using the Tangential method for circular ducts Pitot Traverse Along line A and B and at positions consistent with BS EN 15259 these positions are: 6.7%, 25.1%, 75.1%, 93.3% Sample Positions Along line A and B and at as many of the positions required within the standard method as can be achieved given the clearance limitations behind each socket. BS EN 15259 requires sampling at 8 points (4 on each of two lines) these positions are: 6.7%, 25.1%, 75.1%, 93.3%.					
				Yes	No
Has homogeneity test been carried out?					✓
If Yes - Is stack gas homogenous?				-	-
Any physical or regulatory restrictions regarding usage of equipment? N/A					

Compliance with BS EN 15259 / EA TGN M1	Yes	No
Does the sample plane comply upstream?	✓	
Does the sample plane comply downstream?	✓	
Are the appropriate sample ports fitted?	✓	
Do the stack gas velocity / temperature profiles comply?	✓	
Minimum platform area >5m²	✓	



Appendix 3

Particulate Matter (Sampling Measurement & Results)

Site : Unimetals Recycling (UK) Limited - Barnsley
Date : 20 March 2025
Plant : A2
File Ref. 10658

Mean Particulate Results

Filter	Time	mg/m ³ (Actual Conditions)	m ³ /hr	mg/Nm ³ (Reference Conditions)	Nm ³ /hr	kg/hr
802097	09:09-10:11	0.09	34380	0.10	31571.0	0.003
80134	10:15-11:16	0.06	34061	0.07	31212.0	0.002
80133	11:19-12:20	0.05	33425	0.05	30168.0	0.002
Mean		0.07	33955	0.07	30983.7	0.002

Control Blank Filter

Filter	Volume (m ³)
802097	2.026
80134	1.993
80133	1.929
1.983 (Reference Conditions with no correction for Oxygen)	

Filter 522161

Tare Weight 17967.95 mg
Gross Weight 17968.00 mg *

Gain 0.04 mg

Measured Oxygen %

Concentration 0.02 mg/Nm³

Results Correct to

Temperature		Pressure		Oxygen		Gas	
°C/K	0/273	mbar/kPa	1013/101.3	%		Wet/Dry	Wet

* Indicates where a value less than the limit of detection of the weighing procedure (0.09mg) has been reported, the value lies somewhere between the detection limit and zero. A value of half the limit of detection (0.045mg) has been used to calculate the concentration.

Velocity Results

	Time	m/s
Test 1	09:09-10:11	12.10
Test 2	10:15-11:16	12.00
Test 3	11:19-12:20	11.80
Mean		11.97

protocol simultaneous isokinetic extraction measurement

collector-no. 2097

engineer RA,DH,CH

plant name A2 New Stack

place Unimetals Barnsley

remarks Normal Opertaions
Dia=1000mm
Test 1

operating parameter

normal density humid [kg / m³] : 1.27

water vapour [%Vol] : 3

ambient pressure [mbar] : 1022

duct cross-section [m²] : 0.786

extraction parameter

change of meas. point [h:m:s] : 00:07:30

points / axis : 4

nozzles diameter [mm] : 8

isokinetic factor : 1

tare weight [mg] : 18453.46

gross weight [mg] : 18453.67

evaluation

meas. time [h:m:s] : 00:59:60

dust weight [mg] : 0.21

extracted partial volume

actual conditions [m³] : 2.206

in norm wet [Nm³] : 2.026

in norm dry [Nm³] : 1.965

volume flow in duct

actual conditions [m³/h] : 34380

in norm wet [Nm³/h] : 31571

in norm dry [Nm³/h] : 30624

dust concentration

actual conditions [mg/m³] : 0.09

in norm wet [mg/Nm³] : 0.10

in norm dry [mg/Nm³] : 0.11

protocol simultaneous isokinetic extraction measurement

20/03/2025 09:09

20/03/2025 10:11

measured values table

axis	depth	T_probe [°C]	v_duct [m/s]	angle [grd]	Q_act. [m³/h]	volume [m³]	meas. time [H:M:S]	p10 [mbar]	p40 [mbar]
1	1	18	12.1	-0.1	2.24	0.280	00:07:30	-21.00	-81
1	2	20	12.1	-0.2	2.18	0.272	00:07:30	-21.00	-79
1	3	20	12.2	-0.1	2.21	0.277	00:07:30	-21.00	-80
1	4	20	12.1	0.1	2.20	0.275	00:07:30	-21.00	-80
2	1	21	12.2	0.0	2.21	0.277	00:07:30	-21.00	-81
2	2	22	12.2	0.1	2.21	0.275	00:07:30	-21.00	-80
2	3	22	12.1	0.1	2.19	0.274	00:07:30	-21.00	-80
2	4	22	12.2	0.5	2.20	0.276	00:07:30	-21.00	-80
		21	12.1	0.0	2.21	0.276		-21.00	-80

protocol simultaneous isokinetic extraction measurement

collector-no. 134

engineer RA,DH,CH

plant name A2 New Stack

place Unimetals Barnsley

remarks Normal Opertaions
Dia=1000mm
Test 2

operating parameter

normal density humid [kg / m³] : 1.27

water vapour [%Vol] : 3

ambient pressure [mbar] : 1022

duct cross-section [m²] : 0.786

extraction parameter

change of meas. point [h:m:s] : 00:07:30

points / axis : 4

nozzles diameter [mm] : 8

isokinetic factor : 1

tare weight [mg] : 18566.82

gross weight [mg] : 18566.96

evaluation

meas. time [h:m:s] : 00:59:60

dust weight [mg] : 0.14

extracted partial volume

actual conditions [m³] : 2.175

in norm wet [Nm³] : 1.993

in norm dry [Nm³] : 1.933

volume flow in duct

actual conditions [m³/h] : 34061

in norm wet [Nm³/h] : 31212

in norm dry [Nm³/h] : 30275

dust concentration

actual conditions [mg/m³] : 0.06

in norm wet [mg/Nm³] : 0.07

in norm dry [mg/Nm³] : 0.07

protocol simultaneous isokinetic extraction measurement

20/03/2025 10:15

20/03/2025 11:16

measured values table

axis	depth	T_probe [°C]	v_duct [m/s]	angle [grd]	Q_act. [m³/h]	volume [m³]	meas. time [H:M:S]	p10 [mbar]	p40 [mbar]
1	1	22	12.2	-0.3	2.20	0.275	00:07:30	-21.00	-79
1	2	21	12.2	-0.5	2.22	0.277	00:07:30	-21.00	-79
1	3	20	12.0	1.2	2.17	0.272	00:07:30	-21.00	-78
1	4	21	12.0	0.2	2.16	0.270	00:07:30	-21.00	-78
2	1	21	12.1	0.0	2.18	0.273	00:07:30	-21.00	-78
2	2	22	12.0	0.0	2.17	0.271	00:07:30	-21.00	-78
2	3	23	11.9	0.1	2.15	0.269	00:07:30	-21.00	-78
2	4	24	11.9	-0.1	2.15	0.268	00:07:30	-21.00	-77
		22	12.0	0.1	2.17	0.272		-21.00	-78

protocol simultaneous isokinetic extraction measurement

collector-no. 133

engineer RA,DH,CH

plant name A2 New Stack

place Unimetals Barnsley

remarks Normal Opertaions
Dia=1000mm
Test 3

operating parameter

normal density humid [kg / m³] : 1.27

water vapour [%Vol] : 3

ambient pressure [mbar] : 1021

duct cross-section [m²] : 0.786

extraction parameter

change of meas. point [h:m:s] : 00:07:30

points / axis : 4

nozzles diameter [mm] : 8

isokinetic factor : 1

tare weight [mg] : 18043.27

gross weight [mg] : 18043.37

evaluation

meas. time [h:m:s] : 00:59:60

dust weight [mg] : 0.10

extracted partial volume

actual conditions [m³] : 2.137

in norm wet [Nm³] : 1.929

in norm dry [Nm³] : 1.871

volume flow in duct

actual conditions [m³/h] : 33425

in norm wet [Nm³/h] : 30168

in norm dry [Nm³/h] : 29263

dust concentration

actual conditions [mg/m³] : 0.05

in norm wet [mg/Nm³] : 0.05

in norm dry [mg/Nm³] : 0.05

protocol simultaneous isokinetic extraction measurement

20/03/2025 11:19

20/03/2025 12:20

measured values table

axis	depth	T_probe [°C]	v_duct [m/s]	angle [grd]	Q_act. [m³/h]	volume [m³]	meas. time [H:M:S]	p10 [mbar]	p40 [mbar]
1	1	24	11.9	-1.7	2.15	0.270	00:07:30	-21.00	-79
1	2	24	11.9	0.5	2.14	0.268	00:07:30	-21.00	-79
1	3	24	11.9	0.0	2.15	0.268	00:07:30	-21.00	-79
1	4	25	11.9	0.4	2.16	0.270	00:07:30	-21.00	-79
2	1	25	11.6	0.4	2.09	0.262	00:07:30	-21.00	-77
2	2	26	11.6	0.0	2.10	0.263	00:07:30	-21.00	-78
2	3	26	11.8	-0.1	2.14	0.268	00:07:30	-21.00	-79
2	4	26	11.9	-0.1	2.15	0.268	00:07:30	-21.00	-79
		25	11.8	-0.1	2.14	0.267		-21.00	-79

Appendix 4

Calibration Certificates

Certificate of Calibration

Date of Issue: 18th December 2023

Certificate No. CES2403
page 1 of 2

CES Environmental Instruments Ltd
Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel: 01283 216334 Fax: 01283 550939


Certified By

Instrument Details

Instrument Type	Gravimat SHC-502
Instrument Make	Erwin Sick
Instrument Serial No.	96008705
Quality No.	C152
Calibration Date	18 12 23
Calibrated By Name	M. Rodgers

Ambient Conditions

Air Temperature (°C)	20
Barometric Pressure (mbar)	1009
Relative Humidity (%)	65

Instruments used to undertake calibration

E Type Pitot	UKAS Certificate No. K52983V	(Qu. No. C136)
Manometer Type FC012	UKAS Certificate No. 23546	(Qu. No. C082)
Manometer Type FC012	UKAS Certificate No. 23547	(Qu. No. C081)
Barometer Type 104	UKAS Certificate No. K53167P	(Qu. No. C138)
Gallus Dry Gas Meter	UKAS Certificate No. N034673	(Qu. No. C333)
RIS Supercal XT	UKAS Certificate No. 4033780001	(Qu. No. C014)

* Not UKAS traceable

** Indication only

Flow and Extraction

The reference pitot was placed in a wind tunnel located at Bretby Business Park. The Gravimat SHC-502 Sampling Probe under test was mounted within the same wind tunnel in close proximity to the reference pitot. The wind tunnel was operated to generate a differential pressure across each pitot, a direct comparison was made. The differential pressures measured were in the region of the calibration points of the reference pitot. Correction factors were applied to the reference pitot and compared to the differential pressure shown for the pitot under test. The extraction system of the unit was operated for a period of one minute.

Volume Flow

A calibrated dry gas meter was connected to the sampling nozzle of the Gravimat SCH-502. A volume of air is pulled through the sampling system. The measured value shown on the calibrated dry gas meter is then compared to the indicated value on the Gravimat SCH-502 display.

Barometric Pressure

The barometric pressure was measured using a calibrated barometer. The indicated pressure was compared to the Gravimat SCH-502 display.

Temperature

The probe thermocouple was placed in a thermocouple oven and heated. The temperature was measured using a calibrated thermocouple and temperature indicator. The resultant temperature was compared to the Gravimat SCH-502 display.

Current

A mA current source was injected into the Gravimat SCH-502 using a mA current generator. The injected current was compared to the Gravimat SCH-502 display.

Certificate of Calibration

Date of Issue: 18th December 2023

Certificate No. CES2403
page 2 of 2

CES Environmental Instruments Ltd
Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel: 01283 216334 Fax: 01283 550939


Certified By

Instrument Details

Instrument Type Gravimat SHC-502
Instrument Make Erwin Sick
Instrument Serial No 96008705
Quality No C152
Calibration Date 18 12 23

Ambient Conditions

Air Temperature (°C) 20
Barometric Pressure (mbar) 1009
Relative Humidity (%) 65
Air Density @ 0°C (kg/m³) 1.277
Corrected Air Density (kg/m³) 1.185

Calibration Details

Flow and Extraction

Applied Pressure (Pa)	Pilot Correction	Applied Pressure Corrected (Pa)	SMP502 (Calculated) (Pa)	Pressure Factor	Calculated Velocity (m/s)	SMP502 Velocity (m/s)	Velocity Factor
5.2	0.982	5.11	5.3	0.96	2.936	3.000	0.98
38.3	1.008	38.61	39.8	0.97	8.072	8.200	0.98
83.1	1.011	84.01	86.8	0.97	11.907	12.100	0.98
149.6	1.008	150.80	153.6	0.98	15.952	16.100	0.99
237.4	1.003	238.11	241.8	0.98	20.046	20.200	0.99

Volume Flow

Nominal Flow Rate	Actual Flow Rate	Actual Flow Rate	Orifice Constant
l/min	l/min	m³/hr	
10.0	9.660	0.193	13.221
15.0	14.965	0.299	13.654
20.0	20.030	0.401	13.707
25.0	24.997	1.500	13.686
30.0	30.060	0.601	13.692
Orifice Constant (@ 1.5m³/hr) =			13.686

Barometric Pressure

Pressure	
Required Value (mbar)	Indicated Value (mbar)
984	984
1009	1009
1017	1017

Temperature

Temperature Input	
Required Value (°C)	Indicated Value (°C)
25.0	24.9
50.0	49.9
100.0	100
150.0	150.0
250.0	250.1
300.0	300.2

Current

Current Value	
Required Value (mA)	Indicated Value (mA)
0	0.0
5	5.0
10	10.0
15	15.0
20	20.0

Time

Time Period mins	Required Value mins	Within Limit
3:00	2:59 → 3:01	Yes
5:00	4:59 → 5:01	Yes
10:00	9:59 → 10:01	Yes

Appendix 5

Uncertainty Calculations

Uncertainty calculation for EN 13284 Determination of low range mass concentration of dust, Manual Gravimetric Method

Limit value (ELV)	10 mg.m ⁻³	Reference oxygen	% by volume
Measured concentration	0.10 mg.m ⁻³ (at reference conditions)		

Measurement Equation

$$c = \frac{m}{V} f_c$$

Measured Quantities	Symbol	Value	Standard uncertainty	Units	Uncertainty as percentage	Uncertainty at lv	Requirement of std
Sampled Volume	V _m	2.026	uV _m	0.001 m ³	0.05		<=2%
Sampled gas Temperature	T _m	273	uT _m	2 K	0.73		<=1%
Sampled gas Pressure	p _m	101.3	up _m	0.1 kPa	0.10		<=1%
Sampled gas Humidity	H _m	0	uH _m	1 % by volume	1.00		<=1%
Oxygen content	O _{2,m}		uO _{2,m}	0.1 % by volume	#DIV/0!		<=5%
Mass particulate	m	0.21	um	0.09 mg	42.86	0.44	<5% of limit value
Note - Sampled gas humidity, temperature and pressure are values at the gas meter							
Leak	L	2		%	2.00		<=2%
Uncollected Mass (Instack filter - no rinse)	UCM	0		mg	0		<=10%

Intermediate calculations

Factor for std conds	fs	1.00				
uncertainty components	symbol	sensitivity coeff	u (in units of fs)			
	p _m	0.010	0.001			
	H _m	0.010	0.010			
	T _m	0.004	0.007			
	ufs		0.012			1.24
Corrected volume	V	2.03	uV	0.025 m ³	$V = V_m f_s$	1.24
Factor for O2 correction	fc	1.00				
uncertainty components	symbol	sensitivity coeff	u			
	O _{2,m}	0.05	0.005		$f_c = \frac{21 - O_{2,ref}}{21 - O_{2,m}}$	
Factor for O2 Correction	ufc	1.00	0.005			0.48

Parameter	Value	Units	Sensitivity coeff	Uncertainty contribution	Uncertainty as %
Corrected Volume (standard cc	V	2.03 m ³	0.05	0.00 mg.m ⁻³	1.24 %
Mass	m	0.21 mg	0.49	0.04 mg.m ⁻³	42.86 %
Factor for O2 Correction	fc	1.00	0.10	0.00 mg.m ⁻³	0.48 %
Leak	L	0.00 mg.m ⁻³	1.00	0.00 mg.m ⁻³	1.15 %
Uncollected mass	UCM	0.00 mg	0.49	0.00 mg.m ⁻³	0.00 %
Combined measurement uncertainty				0.04 mg.m ⁻³	
Expanded uncertainty as percentage of measured value		85.79	% measured of value	expressed with a level of confidence of 95% (Using a coverage factor k=2)	
Expanded uncertainty in units of measurement		0.09	mg.m ⁻³		
Expanded uncertainty as percentage of limit value		0.89	% ELV		

Verified