



Title: Monitoring of Particulate Matter (PM) Emissions

Permit Number: EPR/FB3903MA
Operator: Unimetals Recycling UK Limited
Installation: A1 Emissions Control System Exhaust
(Granulator)
Monitoring Dates: 13 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: 1 April 2025

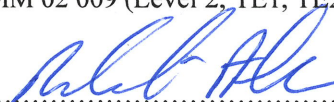
Report Prepared By: Paul Broxham
MCERTS Registration Number: MM 13 1254 (Level 2, TE1, TE2, TE3, TE4)

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 A1 Emissions Control System Exhaust (Granulator).

A1 Emissions Control System Exhaust (Granulator)

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:

- Recovery of non-hazardous waste with a capacity of more than 75 tonnes per day involving treatment in shredders of metal waste.
- Disposal or recovery of hazardous waste with a capacity exceeding 10 tonnes per day involving physio-chemical treatment
- Temporary storage of hazardous waste with a total capacity exceeding 50 tonnes.

And comprises the following directly associated activities:

- Storage of non-hazardous waste pending treatment.
- Storage of non- hazardous waste post treatment.
- Storage of Raw Materials.
- Surface Water Management

The facility also includes a waste operation not technically connected to the shredder / granulator which has been included in the permit as waste operation. Waste operation includes depolluted dismantling of end-of-life vehicles (ELVs), other WEEE recycling operations, metal recycling operations, and non-hazardous waste treatment and storage.

The installation activity will give rise to particulates from granulation. This emission is limited to 10 mg/m³ of total particulates that is including PM₁₀ and PM_{2.5}. The emissions to air (A1) will be abated via a cyclone and bag filtration system to capture particulates.

The test work was undertaken on 13 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: A1 Emissions Control System Exhaust (Granulator)

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	2.03	0.28	0.02*	mg/m ³	273K, 101.3kPa	0.073 kg/hr	13 March 2025	09:18-12:47	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: A1 Emissions Control System Exhaust (Granulator)

Process Type	Batch Sample Details	Fuel	Product	Load	Abatement
Continuous	-	-	High Grade Cables	6.0 tonnes/hr	Cyclone & 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
Paul Broxham	Team Leader	MM 13 1254		✓	✓	✓	✓	✓	T
				Nov 2029	Feb 2030	Feb 2030	Nov 2029	Nov 2029	
Adam Orme	Technician	MM 04 530	✓						✓
			Mar 2026						
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	Vertical	PM = 2/2	8	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 : 13 March 2025
Plant : A1 Emissions Control System Exhaust
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
802136	09:18-10:21	1.26	39579	1.35	36774.0	0.050
802080	10:23-11:36	1.88	38730	2.04	35833.0	0.073
80133	11:38-12:47	2.47	39508	2.69	36320.0	0.098
Mean		1.87	39272	2.03	36309.0	0.073

Control Blank Filter

Filter	Volume (m ³)
802136	2.379
802080	2.344
80133	2.318
	2.347 (Reference Conditions with no correction for Oxygen)

Filter 522061

Tare Weight 17216.93 mg
Gross Weight 17216.98 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	09:18-10:21	14.00
Test 2	10:23-11:36	13.70
Test 3	11:38-12:47	14.00
Mean		13.90

protocol simultaneous isokinetic extraction measurement

collector-no.	2136
engineer	AO CH PB
plant name	A1 Emissions Control Granulator
place	Unimetals Barnsley
remarks	Normal Operations Diameter=1000mm t1

operating parameter

normal density humid	[kg / m ³]	: 1.27
water vapour	[%Vol]	: 3
ambient pressure	[mbar]	: 1006
duct cross-section	[m ²]	: 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]	: 18638.26
gross weight	[mg]	: 18641.48

evaluation

meas. time	[h:m:s]	: 00:59:60
dust weight	[mg]	: 3.22

extracted partial volume		
actual conditions	[m ³]	: 2.560
in norm wet	[Nm ³]	: 2.379
in norm dry	[Nm ³]	: 2.307

volume flow in duct		
actual conditions	[m ³ /h]	: 39579
in norm wet	[Nm ³ /h]	: 36774
in norm dry	[Nm ³ /h]	: 35671

dust concentration		
actual conditions	[mg/m ³]	: 1.26
in norm wet	[mg/Nm ³]	: 1.35
in norm dry	[mg/Nm ³]	: 1.40

protocol simultaneous isokinetic extraction measurement

13/03/2025 09:18

13/03/2025 10:21

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	20	13.9	0.7	2.53	0.323	00:07:30	5.00	-46
1	2	20	13.9	0.9	2.48	0.313	00:07:30	5.00	-44
1	3	20	14.0	-1.1	2.57	0.322	00:07:30	5.00	-44
1	4	21	14.0	0.1	2.56	0.321	00:07:30	5.00	-43
2	1	20	14.1	0.0	2.58	0.323	00:07:30	5.00	-42
2	2	20	14.0	-0.4	2.56	0.319	00:07:30	5.00	-43
2	3	20	14.1	0.7	2.62	0.328	00:07:30	5.00	-43
2	4	20	13.9	1.3	2.48	0.311	00:07:30	5.00	-42
		20	14.0	0.3	2.55	0.320		5.00	-43

protocol simultaneous isokinetic extraction measurement

collector-no.	2080
engineer	AO CH PB
plant name	A1 Emissions Control Granulator
place	Unimetals Barnsley
remarks	Normal Operations Diameter=1000mm t2

operating parameter

normal density humid	[kg / m ³]	: 1.27
water vapour	[%Vol]	: 3
ambient pressure	[mbar]	: 1006
duct cross-section	[m ²]	: 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]	: 18446.46
gross weight	[mg]	: 18451.23

evaluation

meas. time	[h:m:s]	: 00:59:60
dust weight	[mg]	: 4.77

extracted partial volume		
actual conditions	[m ³]	: 2.533
in norm wet	[Nm ³]	: 2.344
in norm dry	[Nm ³]	: 2.273

volume flow in duct		
actual conditions	[m ³ /h]	: 38730
in norm wet	[Nm ³ /h]	: 35833
in norm dry	[Nm ³ /h]	: 34758

dust concentration		
actual conditions	[mg/m ³]	: 1.88
in norm wet	[mg/Nm ³]	: 2.04
in norm dry	[mg/Nm ³]	: 2.10

protocol simultaneous isokinetic extraction measurement

13/03/2025 10:23

13/03/2025 11:36

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	20	14.0	0.8	2.57	0.321	00:07:30	5.00	-41
1	2	20	13.9	1.1	2.56	0.320	00:07:30	5.00	-41
1	3	21	13.6	0.2	2.51	0.313	00:07:30	5.00	-40
1	4	21	13.5	-0.3	2.52	0.314	00:07:30	5.00	-40
2	1	22	13.7	1.4	2.54	0.318	00:07:30	5.00	-40
2	2	22	13.7	1.5	2.54	0.317	00:07:30	5.00	-41
2	3	22	13.8	0.1	2.56	0.320	00:07:30	5.00	-42
2	4	23	13.3	0.2	2.48	0.310	00:07:30	6.00	-39
		21	13.7	0.6	2.53	0.317		5.13	-41

protocol simultaneous isokinetic extraction measurement

collector-no.	133
engineer	AO CH PB
plant name	A1 Emissions Control Granulator
place	Unimetals Barnsley
remarks	Normal Operations Diameter=1000mm t3

operating parameter

normal density humid	[kg / m ³]	: 1.27
water vapour	[%Vol]	: 3
ambient pressure	[mbar]	: 1006
duct cross-section	[m ²]	: 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]	: 18502.02
gross weight	[mg]	: 18508.26

evaluation

meas. time	[h:m:s]	: 00:59:60
dust weight	[mg]	: 6.24

extracted partial volume		
actual conditions	[m ³]	: 2.522
in norm wet	[Nm ³]	: 2.318
in norm dry	[Nm ³]	: 2.249

volume flow in duct		
actual conditions	[m ³ /h]	: 39508
in norm wet	[Nm ³ /h]	: 36320
in norm dry	[Nm ³ /h]	: 35230

dust concentration		
actual conditions	[mg/m ³]	: 2.47
in norm wet	[mg/Nm ³]	: 2.69
in norm dry	[mg/Nm ³]	: 2.77

protocol simultaneous isokinetic extraction measurement

13/03/2025 11:38

13/03/2025 12:47

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	23	13.9	1.2	2.47	0.311	00:07:30	6.00	-40
1	2	24	14.0	1.9	2.53	0.316	00:07:30	6.00	-42
1	3	24	14.0	2.1	2.52	0.316	00:07:30	5.00	-42
1	4	24	14.0	0.4	2.53	0.317	00:07:30	6.00	-42
2	1	24	14.0	0.3	2.53	0.317	00:07:30	6.00	-41
2	2	25	14.0	-2.1	2.54	0.318	00:07:30	6.00	-42
2	3	24	13.9	-1.8	2.48	0.313	00:07:30	6.00	-41
2	4	24	13.9	-0.3	2.48	0.314	00:07:30	6.00	-41
		24	14.0	0.2	2.51	0.315		5.88	-41

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
Nominal 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	2.69 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	2.318	uV _m	0.001 m ³	0.04		<=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	6.24	um	0.09 mg	1.44	0.39	<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	0.5		mg	8.012820513		<=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	2.32	uV	0.029 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 α	V		2.32 m ³	1.16	0.03 mg.m ⁻³	1.24 %
Mass	m		6.24 mg	0.43	0.04 mg.m ⁻³	1.44 %
Factor for O2 Correction	fc		1.00	2.69	0.01 mg.m ⁻³	0.48 %
Leak	L		0.03 mg.m ⁻³	1.00	0.03 mg.m ⁻³	1.15 %
Uncollected mass	UCM		0.29 mg	0.43	0.12 mg.m ⁻³	4.63 %
Combined measurement uncertainty					0.14 mg.m ⁻³	
Expanded uncertainty as percentage of measured value			10.31	% measured of value	expressed with a level of confidence of 95% (Using a coverage factor k=2)	
Expanded uncertainty in units of measurement			0.28	mg.m ⁻³		
Expanded uncertainty as percentage of limit value			2.78	% ELV		

Verified