



Stephenson

Environmental Management Australia

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EMISSION TEST REPORT (ETR) No. 7089

COMPLIANCE EMISSION SURVEY - EPL 5803

BATTERY ENERGY POWER SOLUTIONS PTY LTD

96 FAIRFIELD STREET, FAIRFIELD, NSW

PROJECT No.: 7089/S25660/20

DATE OF SURVEY: 17 JULY 2020

DATE OF ISSUE: 4 AUGUST 2020



NATA accredited laboratory number 15043.

Accredited for Compliance with ISO/IEC 17025 - Testing

EMISSION TEST REPORT No.7089

The sampling and analysis was commissioned by:

Organisation:	Battery Energy Power Solutions Pty Ltd
Contact:	David Clark
Site Address:	96 Fairfield Street, Fairfield NSW
Telephone:	02 9681 3633
Email:	david.clark@batteryenergy.com.au
Project Number:	7089/S25660/20
Test Date:	17 July 2020
Production Conditions:	Battery fabrication was conducted as per normal operations.
Analysis Requested:	Flow, temperature, velocity, moisture, dry gas density, oxygen, heavy metals (Type I & II substances) and total solid particulates
Sample Location:	Battery Fabrication Baghouse (EPL Point 1)
Sample ID Nos.:	Refer to Attachment A
Identification	The samples are labelled individually. Each label recorded the testing laboratory, sample number, sampling location (or Identification) sampling date and time and whether further analysis is required.

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<i>Test</i>	<i>Test Method Number for Sampling and Analysis</i>	<i>NATA Laboratory Analysis By: NATA Accreditation No. & Report No.</i>
Dry Gas Density	NSW TM-23, USEPA M3	SEMA, Accreditation No. 15043, ETR No. 7089
Flow	NSW TM-2, USEPA M2	SEMA, Accreditation No. 15043, ETR No. 7089
Metals	NSW TM12, 13 & 14, USEPA M29	Envirolab Group, Accreditation No. 2901, Report No. 247489
Moisture	NSW TM-22, USEPA M4	SEMA, Accreditation No. 15043, ETR No. 7089
Molecular Weight of Stack Gases	NSW TM-23, USEPA M3	SEMA, Accreditation No. 15043, ETR No. 7089
Oxygen	NSW TM-25, USEPA M3A,	SEMA, Accreditation No. 15043, ETR No. 7089
Stack Pressure	NSW TM-2, USEPA M2	SEMA, Accreditation No. 15043, ETR No. 7089
Stack Temperature	NSW TM-2, USEPA M2	SEMA, Accreditation No. 15043, ETR No. 7089
Total Solid Particulates	NSW TM-15, AS4323.2	SEMA, Accreditation No. 15043, Particle Test Report No. 2171
Velocity	NSW TM-2, USEPA M2	SEMA, Accreditation No. 15043, ETR No. 7089

Deviations from Test Methods

A field blank for metals analysis, which is required under USEPA M29, was not analysed. This was requested by the client for their commercial reasons.

Sampling Times

NSW - As per Test Method requirements or if not specified in the Test Method then as per Protection of the Environment Operations (Clean Air) Regulations Part 2, except for OM-6.

Reference Conditions

NSW - As per

- (1) Environment Protection Licence conditions, or
- (2) Part 3 of the Protection of the Environment Operations (Clean Air) Regulations

All associated NATA endorsed Test Reports/Certificates of Analysis are provided separately in Attachment A.

Issue Date - 4 August 2020



P W Stephenson
Managing Director

SUMMARY OF EMISSION TEST RESULTS – 17 JULY 2020

Parameter	Unit	Location	EPL 5803 Point 1 100 Percentile Concentration Limit
		Battery Fabrication Baghouse (EPL Pt.1)	
Stack Temperature	°C	16	--
Velocity	m/s	4.8	--
Volumetric Flow	m ³ /s	0.62	--
Moisture	%	0.6	--
Molecular Weight Dry Stack Gas	g/g mole	28.8	--
Gas Density	kg/m ³	1.29	--
Stack pressure	kPa	102.0	--
Oxygen	%	20.9	--
Cadmium (Cd)	mg/m ³	<0.00010	--
Lead (Pb)	mg/m ³	0.00096	--
Type I & II Substances in Aggregate	mg/m ³	0.012	10
Total Solid Particulates	mg/m ³	0.4	250

Key:

°C	=	degrees Celsius
m/s	=	metres per second
m ³ /s	=	dry cubic metre per second 0°C and 101.3 kilopascals (kPa)
g/g mole	=	grams per gram mole
kg/m ³	=	Kilograms per cubic metre
kPa	=	Kilo Pascals
%	=	percentage
mg/m ³	=	milligrams per cubic metre at 0°C and 101.3 kilopascals (kPa)
--	=	not specified
<	=	less than

DETAILED EMISSION TEST RESULTS – TSP AND METALS

Emission Test Results	TSP	Metals - Type I & II
Project Number	7089	7089
Project Name	Battery Energy	Battery Energy
Test Location	Battery Fabrication baghouse stack	Battery Fabrication baghouse stack
Date	17-Jul-20	17-Jul-20
RUN	1	1
Sample Start Time (hrs)	9:26	9:26
Sample Finish Time (hrs)	10:46	10:46
Sample Location (Inlet/Exhaust)	Exhaust	Exhaust
Stack Temperature (°C)	9:26	9:26
Stack Cross-Sectional area (m ²)	0.135	0.135
Average Stack Gas Velocity (m/s)	4.8	4.9
Actual Gas Flow Volume (am ³ /min)	39	40
Total Normal Gas Flow Volume (m ³ /min)	37	38
Total Normal Gas Flow Volume (m ³ /sec)	0.62	0.63
Total Stack Pressure (kPa)	102.0	102.0
Analysis	TSP	Metals
Method	TM-15	TM-12,13,14 (USEPA M29)
SEMA Lab Number	728017	728018
Mass In Sample (mg)	0.42	0.012
Air Volume Sampled (am ³)	1.102	1.087
Normal Sample Volume (m ³)	1.06	1.04
Concentration at Stack O₂ (mg/m³)	0.397	0.012
Mass Emission Rate (g/s)	0.000245	0.000007
Moisture Content (% by volume)	0.58	0.71
Molecular Weight Dry Stack Gas (g/g-mole)	28.8	28.8
Dry Gas Density (kg/m ³)	1.29	1.29
EPL Limit (mg/m³)	250	10
Isokinetic Sampling Rate (%)	99	94
Sample Storage Period	3 months	Consumed in Analysis
Sampling Performed by	JW, PWS	JW, PWS
Sample Analysed by (Laboratory)	SEMA	Envirolab
Calculations Entered by	JW	JW
Calculations Checked by	PWS	PWS

Abbreviations of Personnel

PWS = Peter W Stephenson

JW = Jay Weber

ESTIMATED UNCERTAINTY OF MEASUREMENT

Pollutant	Methods	Uncertainty
Metals	NSW TM-12,13 & 14, USEPA 29	100% (50-200%)
Moisture	AS4323.2, NSW TM-22, USEPA 4	25%
Oxygen	NSW TM-24, USEPA 3A	1% actual
Particulate > 20 mg/m ³	NSW TM-15, AS4323.2	15%
Particulate < 20 mg/m ³	NSW TM-15, AS4323.2	50%
Velocity	AS4323.1, NSW TM-2, USEPA 2	5%

Key:

Unless otherwise indicated the uncertainties quoted have been determined @ 95% level of Confidence level (i.e. by multiplying the repeatability standard deviation by a co-efficient equal to 1.96) (Source - Measurement Uncertainty)

Sources: *Measurement Uncertainty – implications for the enforcement of emission limits* by Maciek Lewandowski (Environment Agency) & Michael Woodfield (AEAT) UK

Technical Guidance Note (Monitoring) M2 Monitoring of stack emissions to air Environment Agency Version 3.1 June 2005.

Note: ISO 9096 is for 20-1000 mg/m³ which AS4323.2 is based on.

Note DSEN 13284-1 testing for < 5 mg/m³ correlates to 5 mg/m³ with most quoted uncertainties of ± 5.3 mg/m³ @ 6.4 mg/m³. From Clean Air Engineering in the United States the lowest practical limit of USEPA M5 is 5 mg/m³ under lab conditions.