

**Noise Test Report: R240966R6****Date: 13 October 2025**

Client Name	Company	email
Michael Jennings	Zenith Engineering	michael@zenith.net.au

INTRODUCTION

RSA completed outdoor machinery noise testing of 1 marine generator model Vortum 13.5 on Friday 3rd October 2025. The tests were carried out in the outdoor area of Zenith Engineering site at 50 Barku Court, Hemmant, Queensland.

The noise measurements were conducted at various distances and elevations with respect the generator.

SAMPLE DETAILS

1 Zenith marine generator serial number 3453.

SAMPLE SPECIFICATIONS

Sample Description	
Manufacturer	Zenith Engineering
Type	Marine Generator
Model	Vortum 13
Year of Manufacture	2025
Engine Speed (rpm)	1500

ENVIRONMENTAL CONDITIONS

At the time of testing the sky was partly cloudy with no rain and wind speeds in the range of 1.7 m/s.

Environmental Conditions			
Wind Speed (m/s)	1.7	Temperature, C	25
Cloud Amount (oktas)	3	Relative Humidity (%)	50
Precipitation (mm)	0	Surface	Concrete (non-porous)
Test environment	Free field	-	-

TEST INSTRUMENTATION

Tests were performed with the following equipment:

Equipment	Manufacturer / Model	Serial No.	Calibration Date	Certificate No.
Sound Level Meter	Sinus / Soundbook-Mk2	07077	31/01/2025	-
Microphone	GRAS / GRAS40AF	62562	16/08/2024	8460
Microphone	GRAS / GRAS40AF	102698	16/08/2024	8459
Microphone	GRAS / GRAS40AF	102699	16/08/2024	8458
Microphone	GRAS / GRAS40AF	150678	16/08/2024	8457
Microphone	GRAS / GRAS40AZ	133918	13/08/2025	10242
Microphone	GRAS / GRAS40AZ	133920	13/08/2025	10241
Calibrator	Svantek SV 36	116299	07/07/2025	C54551

RESULTS

A summary of the measured Sound Pressure Levels (L_p) and calculations are presented below.

The determined Mean Sound Pressure Level is: **64 dB L_{pA}** .

The calculated Sound Pressure Level for No Load operating mode at 1 m is: **69 dB L_{pA}** .

The calculated Sound Pressure Level for No Load operating mode at 7 m is: **61 dB L_{pA}** .

The calculated Sound Pressure Level for Full Load operating mode at 1 m is: **68 dB L_{pA}** .

The calculated Sound Pressure Level for Full Load operating mode at 7 m is: **59 dB L_{pA}** .

Prepared by:



Alvaro Liberona
Senior Acoustic Engineer (MAAS)

Approved by:



Desmond Raymond
Director

Test Date 3/10/2025
 Tests Location Zenith Engineering - Shed 42 The Yard, 50 Barku Court, Hemmant, QLD 4207
 Tested by Alvaro Liberona
 Witnesses Michael Jennings

Background Noise Correction (K_{1A}) Test A 0.12
 Background Noise Correction (K_{1A}) Test B 0.13
 Environmental correction (K_{2A}) 0.80

Machine Marine Generator - Vortum 13.5kW
Machine Serial No. 3453

TEST A - No load

	1	2	3	4	5	6	7	8	9	10	11	12	Mean time-average Lp (dB, LAeq)
Reading 1A	66.80	65.10	65.30	63.40	64.80	64.30	64.80	63.10	67.50	65.30	66.70	65.50	65.40
Reading 2A	66.10	64.80	64.90	63.40	64.40	63.70	64.30	63.00	67.50	65.30	66.70	65.40	65.15
Reading 3A	66.20	64.80	65.00	63.30	64.40	63.70	64.40	62.90	67.40	65.20	66.50	65.30	65.11
Background Noise Level	45.60	46.50	45.40	51.70	46.20	45.70	45.80	51.70	52.90	50.70	51.40	50.90	49.63
A-weighted surface Lp from the 2 highest values													65.28
Corrected Level for Background noise													64.36

TEST B - Full load

	1	2	3	4	5	6	7	8	9	10	11	12	Mean time-average Lp (dB, LAeq)
Reading 1B	63.7	64.6	63.1	64.7	66.9	63.9	64.3	62.4	66.7	65.6	66.2	64.6	64.93
Reading 2B	63.5	64.3	62.7	64.6	67	64	64.1	62.3	66.6	65.7	66.2	64.7	64.88
Reading 3B	63.1	63.9	62.6	64.3	66.9	64	64	61.9	66.3	65.6	65.9	64.4	64.65
Background Noise Level	45.6	46.5	45.4	51.7	46.2	45.7	45.8	51.7	52.9	50.7	51.4	50.9	49.63
A-weighted surface Lp from the 2 highest values													64.90
Corrected Level for Background noise													63.97

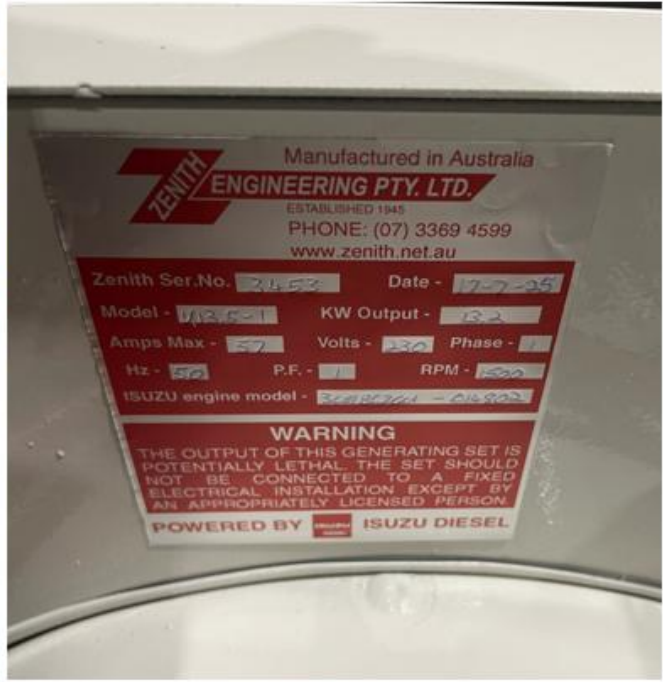
Mean Level (LPAeq,T) 64.17 dB Combined operation modes

No load operation mode

Calculated L_{PA} at 1m	69	dB
Calculated L_{PA} at 7m	61	dB

Full load operation mode

Calculated L_{PA} at 1m	68	dB
Calculated L_{PA} at 7m	59	dB





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Föppelstrasse 13
D-04347 Leipzig, Germany
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Production Test for Device


Soundbook Soundbook_61

Serial Number: #07077

This device was tested according ISO 61672, ISO 60651 and the internal test specifications of the SINUS Messtechnik GmbH.

Date: 31-Jan-2025
Recommended Interval: 24 months
Next Production Test: Jan-2027
Operator: Ch

Signature:


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Summary

The results of the testing procedure can be found in the table below. Testing equipment:

Generator: DS360, Stanford Research Systems (serialnumber: 61181)
calibration certificate (4302293) valid until: 14 Mar 2025

Software: testing program version is 1.21.39
driver version is 6.2.9-3d83496b

All measured data can be ordered in MATLAB file format for an additional price.

The following Tests are done:

Channel	Apollo Firmware	Coupling	Frequency Response	Gain	Level Linearity	Inherent Noise	Phase Difference	THD	Third Octaves
LEMO7_1	passed	passed	passed	passed	passed	passed	passed	passed	passed
LEMO7_2	passed	passed	passed	passed	passed	passed	passed	passed	passed
LEMO7_3	passed	passed	passed	passed	passed	passed	passed	passed	passed
LEMO7_4	passed	passed	passed	passed	passed	passed	passed	passed	passed
LEMO7_5	passed	passed	passed	passed	passed	passed	passed	passed	passed
LEMO7_6	passed	passed	passed	passed	passed	passed	passed	passed	passed
LEMO7_7	passed	passed	passed	passed	passed	passed	passed	passed	passed
LEMO7_8	passed	passed	passed	passed	passed	passed	passed	passed	passed

The following pages only show the test results for channel 1. The results for the other channels are available from SINUS Messtechnik GmbH upon request.



CERTIFICATE OF CALIBRATION

Certificate Number: 8460 **NATA Accreditation No:** 20688

Customer: SAVTek Pty Ltd
Shop 5, 2 Lahore Street
The Gap, QLD, Australia 4061

Test Object: Microphone
Manufacturer: GRAS
Model: GRAS40AF
Serial No: 62562

Environmental Conditions:	Pressure	Temperature	Relative Humidity
Reference Conditions:	101.325 kPa	23.0 °C	50.0 % RH
Measurement Conditions:	100.700 kPa	24.0 °C	60.1 % RH

Measurement Results:	Sensitivity (dB re 1V/Pa)	Sensitivity (mV/Pa)
1:	-26.33	48.25
2:	-26.35	48.15
3:	-26.34	48.18
Result (Average):	-26.34	48.19
Expanded Uncertainty:	0.12	
Degree of Freedom:	>100	
Coverage Factor:	2.0	

The measurements are performed according to IEC 61094-5 Ed. 1.0 Measurement microphones - Part 5: Methods for pressure calibration of working standard microphones by comparison and IEC 61094-6 Ed. 1.0 Measurement microphones - Part 6: Electrostatic actuators for determination of frequency response.

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Date of Calibration: 16/08/2024
Date of Issue: 20/08/2024
Authorised Signatory:



CERTIFICATE OF CALIBRATION

Certificate Number: 8459 **NATA Accreditation No:** 20688

Customer: SAVTek Pty Ltd
Shop 5, 2 Lahore Street
The Gap, QLD, Australia 4061

Test Object: Microphone
Manufacturer: GRAS
Model: GRAS40AF
Serial No: 102698

Environmental Conditions:	Pressure	Temperature	Relative Humidity
Reference Conditions:	101.325 kPa	23.0 °C	50.0 % RH
Measurement Conditions:	100.767 kPa	23.9 °C	64.0 % RH

Measurement Results:	Sensitivity (dB re 1V/Pa)	Sensitivity (mV/Pa)
1:	-25.50	53.09
2:	-25.52	52.98
3:	-25.50	53.06
Result (Average):	-25.51	53.05
Expanded Uncertainty:	0.12	
Degree of Freedom:	>100	
Coverage Factor:	2.0	

The measurements are performed according to IEC 61094-5 Ed. 1.0 Measurement microphones - Part 5: Methods for pressure calibration of working standard microphones by comparison and IEC 61094-6 Ed. 1.0 Measurement microphones - Part 6: Electrostatic actuators for determination of frequency response.

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Date of Calibration: 16/08/2024
Date of Issue: 20/08/2024
Authorised Signatory:



CERTIFICATE OF CALIBRATION

Certificate Number: 8458 **NATA Accreditation No:** 20688

Customer: SAVTek Pty Ltd
Shop 5, 2 Lahore Street
The Gap, QLD, Australia 4061

Test Object: Microphone
Manufacturer: GRAS
Model: GRAS40AF
Serial No: 102699

Environmental Conditions:	Pressure	Temperature	Relative Humidity
Reference Conditions:	101.325 kPa	23.0 °C	50.0 % RH
Measurement Conditions:	100.720 kPa	24.2 °C	60.7 % RH

Measurement Results:	Sensitivity (dB re 1V/Pa)	Sensitivity (mV/Pa)
1:	-25.42	53.56
2:	-25.41	53.63
3:	-25.42	53.61
Result (Average):	-25.42	53.60
Expanded Uncertainty:	0.12	
Degree of Freedom:	>100	
Coverage Factor:	2.0	

The measurements are performed according to IEC 61094-5 Ed. 1.0 Measurement microphones - Part 5: Methods for pressure calibration of working standard microphones by comparison and IEC 61094-6 Ed. 1.0 Measurement microphones - Part 6: Electrostatic actuators for determination of frequency response.

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Date of Calibration: 16/08/2024
Date of Issue: 20/08/2024
Authorised Signatory:



THE CALIBRE TECHNOLOGY
ACOUSTIC & VIBRATION CALIBRATION CENTRE

CERTIFICATE OF CALIBRATION

Certificate Number: 8457 **NATA Accreditation No:** 20688

Customer: SAVTek Pty Ltd
Shop 5, 2 Lahore Street
The Gap, QLD, Australia 4061

Test Object: Microphone
Manufacturer: GRAS
Model: GRAS40AF
Serial No: 150678

Environmental Conditions:	Pressure	Temperature	Relative Humidity
Reference Conditions:	101.325 kPa	23.0 °C	50.0 % RH
Measurement Conditions:	100.800 kPa	24.7 °C	61.8 % RH

Measurement Results:	Sensitivity (dB re 1V/Pa)	Sensitivity (mV/Pa)
1:	-26.89	45.23
2:	-26.87	45.36
3:	-26.91	45.14
Result (Average):	-26.89	45.24
Expanded Uncertainty:	0.12	
Degree of Freedom:	>100	
Coverage Factor:	2.0	

The measurements are performed according to IEC 61094-5 Ed. 1.0 Measurement microphones - Part 5: Methods for pressure calibration of working standard microphones by comparison and IEC 61094-6 Ed. 1.0 Measurement microphones - Part 6: Electrostatic actuators for determination of frequency response.

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Date of Calibration: 16/08/2024
Date of Issue: 20/08/2024
Authorised Signatory:





THE CALIBRE TECHNOLOGY
ACOUSTIC & VIBRATION CALIBRATION CENTRE

CERTIFICATE OF CALIBRATION

Certificate Number:	10242	NATA Accreditation No: 20688	
Customer:	Savtek Pty Ltd Shop 5, 2 Lahore Street The Gap, QLD, Australia 4061		
Test Object:	Microphone		
Manufacturer:	GRAS		
Model:	GRAS40AZ		
Serial No:	133918		
Environmental Conditions:	Pressure	Temperature	Relative Humidity
Reference Conditions:	101.325 kPa	23.0 °C	50.0 % RH
Measurement Conditions:	101.900 kPa	24.2 °C	46.6 % RH
Measurement Results:	Sensitivity (dB re 1V/Pa)	Sensitivity (mV/Pa)	
1:	-25.43	53.50	
2:	-25.43	53.51	
3:	-25.43	53.49	
Result (Average):	-25.43	53.50	
Expanded Uncertainty:	0.12		
Degree of Freedom:	>100		
Coverage Factor:	2.0		

The measurements are performed according to IEC 61094-5 Ed. 1.0 Measurement microphones - Part 5: Methods for pressure calibration of working standard microphones by comparison and IEC 61094-6 Ed. 1.0 Measurement microphones - Part 6: Electrostatic actuators for determination of frequency response. Calibration completed at 250 Hz.

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Date of Calibration: 13/08/2025
Date of Issue: 14/08/2025
Authorised Signatory:

Claire Richardson





CERTIFICATE OF CALIBRATION

Certificate Number: 10241 **NATA Accreditation No:** 20688

Customer: Savtek Pty Ltd
Shop 5, 2 Lahore Street
The Gap, QLD, Australia 4061

Test Object: Microphone
Manufacturer: GRAS
Model: GRAS40AZ
Serial No: 133920

Environmental Conditions:	Pressure	Temperature	Relative Humidity
Reference Conditions:	101.325 kPa	23.0 °C	50.0 % RH
Measurement Conditions:	101.900 kPa	24.6 °C	46.0 % RH

Measurement Results:	Sensitivity (dB re 1V/Pa)	Sensitivity (mV/Pa)
1:	-26.78	45.84
2:	-26.80	45.69
3:	-26.78	45.80
Result (Average):	-26.79	45.78
Expanded Uncertainty:	0.12	
Degree of Freedom:	>100	
Coverage Factor:	2.0	

The measurements are performed according to IEC 61094-5 Ed. 1.0 Measurement microphones - Part 5: Methods for pressure calibration of working standard microphones by comparison and IEC 61094-6 Ed. 1.0 Measurement microphones - Part 6: Electrostatic actuators for determination of frequency response. Calibration completed at 250 Hz.

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Date of Calibration: 13/08/2025
Date of Issue: 14/08/2025
Authorised Signatory:

Claire Richardson



CERTIFICATE OF CALIBRATION

CERTIFICATE NO: **C54551**

EQUIPMENT TESTED : Acoustic Calibrator

Make & Model: Svantek SV 36 **Serial No:** 116299
Class: 1

Owner: Rodney Stevens Acoustics
48 Bannockburn Road,
Pymble NSW 2075


Tests Performed: Measured Output Pressure level, Frequency & Distortion
Comments: See Details and Class Tolerance overleaf.

CONDITION OF TEST:

Ambient Pressure	1002 hPa ± 1 hPa	Date of Receipt :	03/07/2025
Temperature	22 °C ± 1 ° C	Date of Calibration :	07/07/2025
Relative Humidity	48 % ± 5 %	Date of Issue :	07/07/2025

Acu-Vib Test AVP02 (Calibrators)
Procedure: Test Method: AS IEC 60942 - 2017

CHECKED BY: *A. Nowosadzki* **AUTHORISED SIGNATURE:**


H. Soe
Lab Manager

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The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.


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