IP 0001/05/C; IP 0001/06/C; IP 0003/19

NOISE MONITORING PROGRAMME FOR MAGHTAB ENVIRONMENTAL COMPLEX

REPORT OF NOISE MONITORING SURVEY

Version 1: December 2022

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Quality Assurance

Noise Monitoring Programme for Magħtab Environmental Complex
Report of Noise Monitoring Survey
December 2022

Report for: WasteServ Malta Ltd.

Revision Schedule

Rev	Date	Details	Prepared by	Reviewed by	Approved by
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REPORT OF NOISE MONITORING SURVEY

Introduction

1. This report describes a noise monitoring survey conducted as part of the Environmental Monitoring Programme (EMP) for the Magħtab Environmental Complex (MEC)[1], and in accordance with the requirements of Integrated Pollution Prevention and Control (IPPC) permits IP 0001/05/C, IP 0001/06/C, and IP 0003/19. The quoted IP permits refer to the following installations within the MEC:

    - Ta' Żwejra non-hazardous landfill (IP 0001/05/C);
    - Għallis non-hazardous landfill (IP 0001/06/C); and
    - Malta North Waste Treatment Plant (IP 0003/19).

2. **Figure 1** shows the location of the MEC and the location of the three installations, as well as the location of the former Magħtab landfill which is now closed.

3. The noise monitoring survey follows a similar survey conducted in 2018[2], to inform the preparation of the current EMP, as well as a survey conducted in 2014 which informed the previous monitoring programme for the Għallis and Ta' Żwejra landfills[3].

4. The methodology for the noise monitoring survey was agreed with WasteServ Malta Ltd and is based on that agreed by the Environment and Planning Authority (ERA) in February 2018, at the outset of the 2018 noise survey. The survey was carried out having regard to British Standard (BS) 4142[4]. In assessing the noise measured, reference was made to the requirements for noise emissions outlined in IP 0001/05/C, IP 0001/06/C, and IP 0003/19.

[1] Adi Associates Environmental Consultants Ltd, 2020. Ghallis & Zwejra Non-Hazardous Landfills, Malta North Waste Treatment Plant. Consolidated Environmental Monitoring Programme. July 2020

[2] Adi Associates Environmental Consultants Ltd, 2018. Noise Monitoring Programme for Magħtab Environmental Complex. Report of Noise Survey. May 2018 and Adi Associates Environmental Consultants Ltd, 2019. Noise Monitoring Programme for Magħtab Environmental Complex. Addendum to Report of Noise Survey. June 2019

[3] Adi Associates Environmental Consultants Ltd, 2014: *'Non-Hazardous Engineered Waste Landfills at Ghallis and Ta' Żwejra: Noise Monitoring Report – 2014'*

[4] BS 4142:2014+A1:2019*, Methods for rating and assessing industrial and commercial sound,* British Standards Institution

Figure 1: Location of the Magħtab Environmental Complex

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Description of the Magħtab Environmental Complex Operations

5. The MEC is located on the northeast coast of the island of Malta, within the Naxxar Local Council Administrative Area. The Naxxar Urban Area is located approximately 1.5 km (plan distance) to the south of the MEC; the nearest settlements are Salini, located approximately 740 m (plan distance) to the northwest, and Baħar-iċ-Ċaghaq, located approximately 890 m to the southeast.

6. As mentioned, the MEC includes Ta' Żwejra non-hazardous landfill, Għallis non-hazardous landfill and the Malta North Waste Treatment Plant, as well as the former Magħtab landfill, which is now closed and is currently being rehabilitated (see **Figure 1** above). Details of the operations of these facilities are described here to facilitate an understanding of the noise emissions arising from the operations and the rationale for the noise monitoring survey.

7. The Għallis engineered landfill has been operational since 2006 and is used for the disposal of non-hazardous wastes generated on Malta. The facility operates seven days a week, between 07:00 - 19:00 on Monday to Friday, between 07:00 – 17:00 on Saturdays, and between 07:00 – 13:00 on Sundays.

8. Ta' Żwejra engineered landfill was opened for the disposal of non-hazardous waste following the closure of the Magħtab landfill in 2004. Ta' Żwejra has since reached its capacity and waste is no longer being deposited within this landfill; the facility is currently being rehabilitated. Rehabilitation works are currently being carried out (during the times at which the Għallis landfill is operational).

9. Ancillary landfill facilities include a Combined Heat and Power (CHP) Plant, Reverse Osmosis (RO) Plant, and a Regenerative Thermal Oxidiser (RTO), which operate continuously.

10. The Malta North Waste Treatment Plant came into operation in 2016. The facility comprises a Mechanical Treatment Plant (MTP) and an Anaerobic Digestion Plant (ADP) treating organic and bulky waste and the Material Recovery Facility (MRF) line (not yet in operation). The former operates from Tuesday to Sunday, between 07:00 - 01.00; the ADP operates 24 hours, seven days a week.

Predominant Noise-generating Sources

11. The predominant noise generating sources within the MEC, and arising from the activities in connection with the MEC, can be described as:

- Noise arising from plant in connection with the MTP, ADP, CHP, RO, and RTO (continuous and intermittent noise sources audible as hums / whirring / clicking);
- Noise from heavy and other vehicles moving around the complex, in connection with the movement of wastes, excavation of the landfill cells, the tipping and compacting of waste, and the resurfacing of the landfill and stone crushing (intermittent noise sources audible as hums / bangs / clanks / screeches / beeps / horns); and

- Noise from rubbish trucks / skips moving to / from the complex (intermittent noise sources audible as hums / bangs / clanks / screeches / beeps / horns).

Description of the Area in the Vicinity of the Magħtab Environmental Complex

12. The area in which the MEC is located is essentially rural in nature (see **Figure 2**). The predominant land use is agricultural, including a number livestock farms and farmhouses.

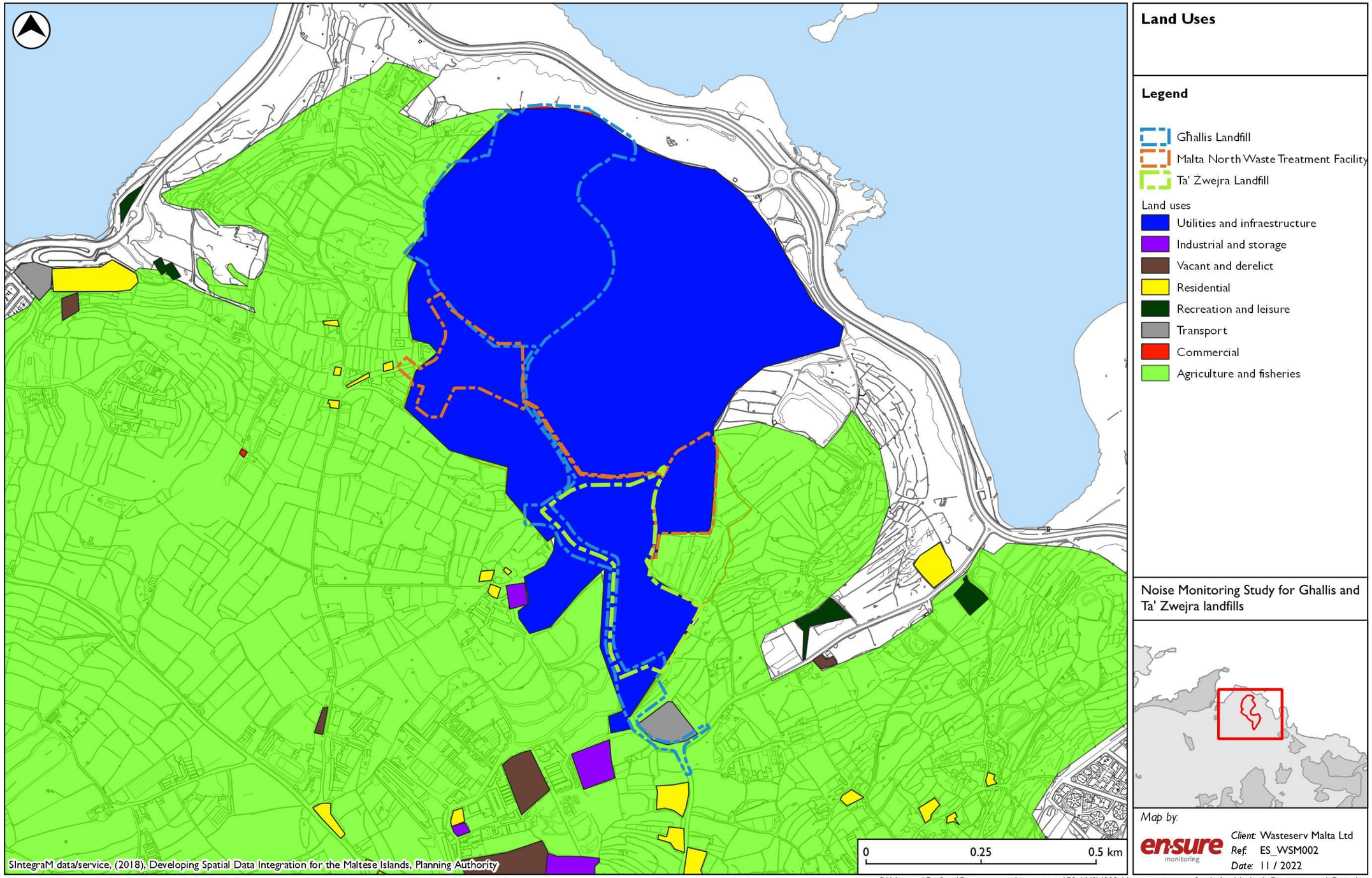
13. There are a number of industrial installations and activities in the area, particularly to the south of the MEC. These include the Enemalta Interconnector site and the Civic Amenity Site.

Predominant Noise-generating Sources

14. The predominant noise generating sources in the area surrounding the MEC, and having the potential to contribute to the noise climate at the sensitive receptors, can be described as:

- Noise from heavy and other vehicles moving on the road network (intermittent noise sources audible as hums / bangs / clanks / screeches / beeps / horns);
- Noise arising from industrial plant and machinery (continuous and intermittent noise sources audible as hums / whirring);
- Noise from farm livestock and other animals (intermittent noise sources audible as mooing / baying / barking/ chirping / crowing);
- Noise from other activity in connection with farms (intermittent noise sources audible as hums / bangs / clanks);
- Noise from construction activity (intermittent noise sources audible as hums / bangs / clanks / screeches / whirring); and
- Noise from overhead aircraft traffic (intermittent noise sources audible as hums).

Figure 2: Land Uses in the Vicinity of the Magħtab Environmental Complex



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Noise Monitoring Survey

15. Having regard to the EMP, the noise monitoring survey involved measuring the ambient noise levels when the MEC was in operation during the week and on the weekend at three monitoring locations, during the day at all three locations and also during the night at the location nearest to the MEC. The same monitoring locations were the subject of the 2014[5] and 2018[6] noise monitoring surveys.

16. As described below, the analysis of the survey results considered the difference between the measured operational noise levels at the noise sensitive receptors and the baseline noise levels at the same sensitive receptors as measured during the initial 2014 noise monitoring survey. In 2014, baseline noise measurements were undertaken at the three monitoring locations during the day, between 16:00 and 19:00 on a week-day, when noise emissions from the Għallis and Ta' Żwejra landfills were negligible, as there was minimal activity occurring; noise arising from elsewhere within the MEC was also low[7]. Using the 2014 baseline noise levels for the analysis of the 2022 day-time noise levels is considered to be appropriate because of the difficulty in shutting down operations at the MEC. The 2014 baseline noise levels are also considered still likely to be representative of current (2022) baseline noise levels during the day at the sensitive receptors.

17. There were no night-time baseline measurements taken in 2014. Accordingly, analysis of the night-time noise levels at the sensitive receptor nearest to the MEC was undertaken with regard to the respective day-time baseline measurement, as well as the measured L_{A90} values during the 2022 night-time measurements, and the observations of the noise assessors during these measurements.

Noise Sensitive Receptors and Noise Monitoring Locations

18. The noise levels were measured at three Monitoring Points (MPs), having regard to the residential sensitive receptors considered most likely to be affected by operational noise from the MEC. **Figure 3** and **Table 1** illustrate the location of the MPs. All the MPs were at ground level.

[5] Adi Associates Environmental Consultants Ltd, 2014: *'Non-Hazardous Engineered Waste Landfills at Ghallis and Ta' Żwejra: Noise Monitoring Report – 2014'*

[6] Adi Associates Environmental Consultants Ltd, 2018. Noise Monitoring Programme for Magħtab Environmental Complex. Report of Noise Survey. May 2018 and Adi Associates Environmental Consultants Ltd, 2019. Noise Monitoring Programme for Magħtab Environmental Complex. Addendum to Report of Noise Survey. June 2019

[7] The Malta North Waste Treatment Plant was not then in operation.

Table 1: Noise Monitoring Locations

MP	Location	Eastings	Northings
1	Residence on Triq ta' Saverija (190 m to the west of Għallis landfill)	59636.2	69077.5
2	Residence on Triq ir-Ramla (545 m to the east of Ta' Żwejra landfill)	59788.9	69177.9
3	Residence on Triq ir-Ramla (290 m to the south of Ta' Żwejra landfill)	59159.8	69039.7

Baseline Noise Measurements

19. The baseline noise levels, as measured in the 2014 noise monitoring survey, are reported in **Table 2**; the table also reports the climatic conditions at the time of the measurements.

Table 2: Baseline Noise Levels (2014)

MP	L_{Aeq}	L_{Amax}	L_{A90}	L_{A10}	Climatic Conditions
1	59	89	41	48	Wind direction: NW Wind speed: 12 km/hr Air temperature: 20 °C Rainfall: 0 mm Relative humidity: 47 %
2	65	86	48	67	
3	68	87	46	70	

Figure 3: Noise Monitoring Locations

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Operational Noise Measurements

20. The noise measurements were taken as shown in **Table 3**. A total of eight noise measurements were taken, to establish the ambient noise levels during the week (four measurements) and on the weekend. These included six day-time measurements - three during the week (one at each of the three MPs) and three during the weekend (again, one at each of the MPs). Two night-time measurements were taken at MP 1 – one during the week and the second on the weekend. The day-time measurements had a 1-hour measurement interval; the night-time measurements had a 5-minute measurement interval.

21. The measurements were conducted having regard to the activity schedules at the MEC, and in order to assess the 'worst case scenario' - when noise arising from the MEC is likely to be most audible at the sensitive receptors. The timing of the measurements also took account of the timing of the 2014 and 2018 operational noise measurements, so as to allow for reasonable comparison.

22. The measurements were also timed to avoid excavation works currently taking place within the MEC, including works relating to the permit under PA/03144/10 (*Proposed conversion of an un-used existing hazardous cell into non-hazardous cell, including extension of cell boundary and sanctioning of excavation*), in the immediate vicinity of MP 1. The MEC Management cooperated in ceasing all excavation works for both the week day and weekend measurements.

Table 3: Operational Noise Measurements

MP	Day-time Measurements	Night-time Measurements
1	Friday 28th October: 09:36 – 10:36	Thursday 20th October: 23:03 – 23:08
	Saturday 22nd October: 08:22 – 09:22	Saturday 22nd October: 23:00 – 23:05
2	Friday 28th October: 09:30 – 10:30	
	Saturday 22nd October: 11:05 – 12:05	
3	Friday 21st October: 08:14 – 09:14	
	Saturday 22nd October: 09:50 – 10:50	

23. All the noise measurements were undertaken in accordance with the BS 4142 measurement protocols. A Type 1 Sound Level Meter calibrated according to BS 4142 was used to take the measurements. Calibration certificates are attached as **Appendix 1**.

24. The results of the week day operational noise measurements are reported in **Table 4**; the results of the weekend operational noise measurements are reported in **Table 5**. Both tables also report the predominant noise sources audible to the assessors during the measurements, as well as the climatic conditions at the time of the measurements. The following parameters were measured and recorded for all measurements:

- $L_{Aeq(T)}$ (equivalent continuous A-weighted sound pressure level recorded over the relevant time interval of interest);

- L_{AFmax} (maximum A-weighted sound pressure level recorded over the time interval of interest, with fast time weighting);
- L_{AF10} (A-weighted sound pressure level exceeded for 10% of the time interval of interest, with fast time weighting); and
- L_{AF90} (A-weighted sound pressure level exceeded for 90% of the time interval of interest, with fast time weighting).

Table 4: Operational Noise Levels – Week Day

MP	L_{Aeq}	L_{Amax}	L_{A90}	L_{A10}	Predominant Noise Sources	Climatic Conditions
Day-time sound levels						
1	48	79	42	49	*MEC noises:* • Reversing alarms (intermittent, frequent, and significant when present) • Machinery engines (intermittent, frequent, and significant when present) • Manual bang noises (intermittent and frequent, significant when present) *Other noises*: • Birds chirping (intermittent, frequent, and significant when present) • Noise from cows in adjacent cow farm – (intermittent and infrequent, but significant when present) • Roosters crowing (intermittent and infrequent, but significant when present)	Wind direction: E Wind speed: 7 k/hr Air temperature: 23 °C Rainfall: 0 mm Relative humidity: 85 %
Night-time sound levels						
1	38	55	35	40	*MEC noises:* • No audible noises *Other noises*: • Distant traffic noises (intermittent and frequent, and significant when present) • Clanking sound in the shed of the adjacent cow farm (intermittent and frequent, and significant when present) • Music and distant chatting (intermittent and frequent, significant when present)	Wind direction: NW Wind speed: 6 km/hr Air temperature: 17 °C Rainfall: 0 mm Relative humidity: 88 %
Comments:						
• The high L_{Amax} value recorded during the day-time was a result of one loud 'bang', where the L_{A90} and L_{A10} values recorded were low. • The clanking sound from cow farm was the most significant noise recorded during the night-time.						

MP	L_{Aeq}	L_{Amax}	L_{A90}	L_{A10}	Predominant Noise Sources	Climatic Conditions
Day-time sound levels						
2	68	88	44	70	<u>*MEC noises:*</u> • Traffic moving to / from the MEC – rubbish trucks / skip trucks, etc. (intermittent but frequent, and significant when present) <u>*Other noises*</u>: • Glass breaking noises from the Civic Amenity Site (intermittently audible when there was no passing traffic, but frequent and significant when present) • Reversing alarms from machinery from the Civic Amenity Site (intermittently audible when there was no passing traffic and infrequent, but and significant when present) • 'Hum' interconnector (intermittently audible when there was no passing traffic and infrequent, but significant in the traffic lulls) • Traffic activity, including buses (intermittent, frequent and significant when present) • Activity in adjacent farm – noise from dogs barking and equipment noises (intermittent and relatively frequent, but significant when present) • Distant noises from jigger machine and excavation works from a location to the west of the monitoring location (intermittent, but frequent, and significant when present) • Rooster crowing (intermittent and infrequent, but significant when present) • Birds chirping (intermittent and frequent, but not significant) • Aircraft traffic (intermittent, infrequent, but significant when present)	Wind direction: E Wind speed: 7 k/hr Air temperature: 23 ^{o}C Rainfall: 0 mm Relative humidity: 85 %
<u>Comments:</u>						
• Passing traffic was the most significant noise recorded and accounted for the high L_{Amax} and L_{A10} values. • Traffic in connection with the MEC accounted for approximately 40% of the passing traffic. • There was only one passing aircraft.						

MP	L_{Aeq}	L_{Amax}	L_{A90}	L_{A10}	Predominant Noise Sources	Climatic Conditions
Day-time sound levels						
3	67	89	46	70	<u>*MEC noises:*</u> • Traffic moving to / from the MEC – rubbish trucks / skip trucks, etc. (intermittent but frequent, and significant when present) <u>*Other noises*</u>: • Traffic activity, including buses (intermittent, frequent and significant when present) • 'Hum' from the Enemalta Interconnector site (intermittently audible when there was no passing traffic and infrequent, but significant in the traffic lulls) • Birds chirping (intermittent and frequent, but not significant) • Noise from jigger / hammer drill being used in a location to the southwest of the monitoring location (intermittent, infrequent, but significant when present) • Gunshots (intermittent, infrequent, but significant when present) • Dog barking (intermittent, infrequent, but significant when present) • Rooster crowing (intermittent and infrequent, but significant when present) • Aircraft (intermittent, infrequent, but significant when present)	Wind direction: SE Wind speed: 8.6 k/hr Air temperature: 23 °C Rainfall: 0 mm Relative humidity: 59 %
<u>Comments:</u>						
• Passing traffic was the most significant noise recorded and accounted for the high L_{Amax} and L_{A10} values. • Traffic in connection with the MEC accounted for approximately 40% of the passing traffic. • There was only one passing aircraft.						

Table 5: Operational Noise Levels – Weekend

MP	L_{Aeq}	L_{Amax}	L_{A90}	L_{A10}	Predominant Noise Sources	Climatic Conditions
Day-time sound levels						
1	49	76	43	50	*MEC noises:* • Reversing alarms from machinery (intermittent and infrequent, but significant when present) • Heavy vehicle engines (intermittent and infrequent, but significant when present) • Air brakes from heavy vehicles (intermittent and infrequent, but significant when present) • Machinery track movement (intermittent and infrequent, but significant when present) *Other noises*: • Tractor in the distance (intermittent, frequent and not significant) • Birds chirping (intermittent, infrequent, and significant when present) • Noise from cows in adjacent cow farm (intermittent, relatively frequent, and significant when present) • Dog barking (intermittent, infrequent, but significant when present) • Rooster crowing (intermittent and infrequent, but significant when present) • Gunshots (intermittent and infrequent, but significant when present)	Wind direction: Variable Wind speed: 0 k/hr Air temperature: 21 °C Rainfall: 0 mm Relative humidity: 69 %
Night-time sound levels						
1	39	53	41	36	*MEC noises:* • No audible noise *Other noises*: • Distant traffic noises (intermittent and frequent, and significant when present) • Clanking sound in the shed of the adjacent cow farm (intermittent and frequent, and significant when present) • Cicadas chirping (intermittent and frequent, and significant when present) • Ducks quacking (intermittent and infrequent, but significant when present)	Wind direction: - Wind speed: 0 km/hr Air temperature: 22 °C Rainfall: 0 mm Relative humidity: 88 %
Comments:						
• The clanking sound from cow farm was the most significant noise recorded during the night-time,						

MP	L_{Aeq}	L_{Amax}	L_{A90}	L_{A10}	Predominant Noise Sources	Climatic Conditions
Day-time sound levels						
2	68	90	43	70	<u>*MEC noises:*</u> • Traffic moving to / from the MEC – rubbish trucks / skip trucks, etc. (intermittent but frequent, and significant when present) <u>*Other noises*</u>: • Traffic activity, including buses and HGVs (intermittent, frequent and significant when present) • Horn beeping sound from passing traffic (intermittent and infrequent, but significant when present) • Music arising from passing traffic (intermittent and infrequent, but significant when present) • 'Hum' interconnector (intermittently audible when there was no passing traffic and infrequent, but significant in the traffic lulls) • Birds chirping (intermittent and infrequent, but not significant when present) • Dog barking (intermittent and infrequent, and not significant) • Aircraft traffic (intermittent and infrequent, but significant when present)	Wind direction: SW Wind speed: 0 k/hr Air temperature: 25 ^{o}C Rainfall: 0 mm Relative humidity: 57 %
<u>Comments:</u>						
• Noise from loose chains on a skip trick hitting off the side of the skip was the loudest noise audible and accounted for the high L_{Amax} value. • Passing traffic accounted for the high L_{A10} value. • Traffic in connection with the MEC accounted for approximately 50% of the passing traffic. • There were two passing aircraft.						

MP	L_{Aeq}	L_{Amax}	L_{A90}	L_{A10}	Predominant Noise Sources	Climatic Conditions
Day-time sound levels						
3	67	86	42	70	<u>*MEC noises:*</u> • Traffic moving to / from the MEC – rubbish trucks / skip trucks, etc. (intermittent but frequent, and significant when present) • Horn beeping sound from traffic moving to / from the MEC (intermittent and infrequent – only once - but significant when present) <u>*Other noises*</u>: • Traffic activity, including buses and HGVs (intermittent, frequent, and significant when present) • Horses passing (intermittent, infrequent – happened only once - but significant when present) • Birds chirping (intermittent and frequent, but not significant) • Aircraft traffic (intermittent, infrequent, but significant when present) • Chat from passers-by (intermittent and infrequent, but significant when present)	Wind direction: Variable Wind speed: 5 km/hr Air temperature: 23 ^{o}C Rainfall: 0 mm Relative humidity: 65 %
<u>Comments:</u>						
• Passing traffic was the most significant noise recorded and accounted for the high L_{Amax} and L_{A10} values. • Traffic in connection with the MEC accounted for approximately 25% of the passing traffic. • There was only one passing aircraft.						

Noise Monitoring Analysis

25. In respect of noise emissions, IP 0001/05/C (relating to Ta' Żwejra non-hazardous landfill), IP 0001/06/C (relating to Għallis non-hazardous landfill) and IP 0001/03/19 (relating to Malta North Waste Treatment Plant) are conditional as follows: "*The level of noise emitted from the installation at all operational times shall not exceed the background noise level by 5dB"* (Section 6.37, Section 5.7.4, and Section 2.4.61, respectively). The Environmental Monitoring Programme (EMP) for the MEC further requires that, in respect of the monitoring noise emissions, "*Monitoring is to be carried out in accordance with BS 4142:2014*[8]*".*

26. BS 4142 provides a methodology for assessing sound of an industrial nature and the likely effects of this sound. The significance of the sound depends upon both the margin by which the 'specific sound level' (operational noise) exceeds the background sound level (baseline), and the context in which the sound occurs. Typically, the greater the difference, the greater the magnitude of the impact, where a difference of 3 dB is barely perceptible to the human ear, a 5 dB difference is noticeable, and a sound level 10 dB or higher is perceived as being twice as loud. **Table 6** and based on the BS 4142 guidance.

Table 6: Assessment Criteria (based on BS 4142 guidance)

Difference	Assessment
Around +10 dB or higher	Likely to be an indication of a significant adverse impact, depending on the context
Around +5 dB	Likely to be an indication of an adverse impact, depending on the context
The lower the operational sound level is relative to the baseline sound level, the less likely it is that the specific sound source will have an adverse impact or significant adverse impact.	

27. Having regard to the conditions of IP 0001/05/C, IP 0001/06/C, and IP 0003/19 and the EMP for the MEC, the results of the noise monitoring survey report:

- the level of exceedance from the background noise levels (the difference in the measured operational L_{Aeq} noise levels and the respective baseline L_{Aeq} noise levels); and
- the level of exceedance of the measured 'specific sound levels' (operational noise levels) in respect of the recommended level of marginal significance in the BS4142 assessment criteria.

28. The results also report the difference between the 2022 measured day-time and night-time operational noise levels in 2014 and in 2018, at the same monitoring locations.

[8] It is noted that the most recent version of BS4142 is *BS 4142:2014+A1:2019, Methods for rating and assessing industrial and commercial sound,* British Standards Institution

Exceedance of the Background (Baseline) Noise Level

Day-time Noise Levels

29. **Table 7** compares the measured day-time operational noise levels during the week with the 2014 baseline noise levels, and reports the level of exceedance of the background (baseline) noise levels. **Table 8** compares the measured day-time operational noise levels during the weekend with the 2014 baseline noise levels, again reporting the level of exceedance of the background (baseline) noise levels.

Table 7: Day-time Noise Levels during the Week: Level of Exceedance of the Background (Baseline) Noise Levels

MP	Background (Baseline) Noise Level				Operational Noise Level				Level of Exceedance L_{Aeq}
	L_{Aeq}	L_{Amax}	L_{A90}	L_{A10}	L_{Aeq}	L_{Amax}	L_{A90}	L_{A10}	
1	**59**	89	41	48	**48**	79	42	49	- 11 dB
2	**65**	86	67	48	**68**	88	44	70	+ 3 dB
3	**68**	87	46	70	**67**	89	46	70	- 1 dB

Table 8: Day-time Noise Levels during the Weekend: Level of Exceedance of the Background (Baseline) Noise Levels

MP	Background (Baseline) Noise Level				Operational Noise Level				Level of Exceedance L_{Aeq}
	L_{Aeq}	L_{Amax}	L_{A90}	L_{A10}	L_{Aeq}	L_{Amax}	L_{A90}	L_{A10}	
1	**59**	89	41	48	**49**	76	43	50	- 10 dB
2	**65**	86	67	48	**68**	90	43	70	+ 3 dB
3	**68**	87	46	70	**67**	86	42	70	-1 dB

30. In the case of MP 1 (the sensitive receptor closest to the MEC), the day-time operational noise levels measured both during the week and on the weekend were lower than the background (baseline) noise level. Hence, in the case of the sensitive receptor at MP 1, this suggests that day-time operations at the MEC during the week and on the weekend are compliant with the conditions of IP 0001/05/C, IP 0001/06/C, and IP 0003/19.

31. In the case of MP 2, day-time operational noise levels during the weekend and on the weekend were marginally higher than the baseline noise level, by +3 dB on both occasions. In both cases, the noise level did not exceed the background (baseline) noise level by +5 dB. This suggests that, in the case of the sensitive receptor at MP 2, day-time operations at the MEC during the week and on the weekend are compliant with the conditions of IP 0001/05/C, IP 0001/06/C, and IP 0003/19.

Night-time Noise Levels at MP 1

32. As mentioned, there were no night-time baseline measurements taken in 2014. Hence, the analysis of the change in the night-time noise levels at MP 1 (the sensitive receptor nearest to the MEC) was undertaken having regard to the respective day-time baseline measurement, the L_{A90} values measured during both the 2022 night-time surveys at MP 1 (week-day and weekend), and the observations of the noise assessors during both these measurements. In the absence of a night-time baseline noise value, such analysis is considered to be reasonable in gauging the impact of the MEC operations at night on the sensitive receptor at MP 1.

33. The day-time baseline L_{Aeq} value measured at MP 1 in 2014 (59 dB) considerably exceeds the operational L_{Aeq} values measured at night during the week and on the weekend in 2022 (38 dB and 39 dB, respectively). The L_{A90} values measured at night during the week and on the weekend at MP 1 (35 dB and 36 dB, respectively) are relatively lower than the respective measured L_{Aeq} values, by 3 dB during the week and the weekend (at 38 dB and 39 dB, respectively). During the week-day night-time measurement, there was no noise arising from the MEC audible to the noise assessors at the measurement location; similarly, there was no noise arising from the MEC audible to the noise assessors during the weekend night-time measurement.

34. The reasonable assumptions of these circumstances are that the current background (baseline) noise level at MP 1 at night during the week is considerably lower it is during the day, and that it is more likely to be in the range of 35 dBA – 36 dBA, in recognition of the measured L_{A90} values in 2022. This is also in recognition of the fact that noise from MEC operations not being audible to the noise assessors does not mean that MEC is not influencing the ambient noise levels at night at MP 1. On a reconnaissance of the area around MP 1, the noise assessors did observe there to be a faint hum / whirring emanating from the MEC as they approached the entrance to the complex, to the east of MP 1. Noise arising from MEC operations is, therefore, likely to be having some influence on the ambient noise levels at the nearest sensitive receptor on Triq ta' Saverija. However, it is unlikely that the MEC noise is resulting in a +5 dB increase in the background (baseline) level, and in recognition of the general rule that a +5 dB increase would be noticeable to the human ear.

BS 4142:14 Assessment

35. In the case of all three MPs, the difference between the day-time ambient sound levels (the measured L_{Aeq} noise level with MEC in operation) and the residual sound levels (the measured L_{Aeq} background (baseline) noise level) was less than 3 dB. Paragraphs 7.3.3 and 7.3.5 of BS 4142 advocate determining the specific sound level by a combination of measurement and calculation where the difference between the ambient sound level and the residual sound level is ≤3 dB. However, it is not considered to necessary to undertake further analysis through calculation to determine the specific noise level at MPs 1, 2 and 3. The reasons for this have regard to the conditions of IP 0001/05/C, IP 0001/06/C, and IP

0003/19, the BS 4142 assessment criteria, and the results of the noise monitoring.

36. As mentioned, IP 0001/05/C, IP 0001/06/C, and IP 0003/19, are conditional to the level of noise emitted from MEC not exceeding the background noise level by 5dB, and the results of the noise monitoring reveal the measured change in the background (baseline) noise levels during the day-time during the week and on the weekend at MPs 1, 2 and 3 to not exceed 5dB.

37. Moreover, the BS 4142 assessment criteria guides that, the lower the operational sound level is relative to the baseline sound level, the less likely it is that the specific sound source will have an adverse impact or significant adverse impact. In the case of MP 1, the day-time operational sound levels during the week and on the weekend were lower than the background (baseline) noise levels. In the case of MP 2 and MP 3, the day-time operational sound levels on the weekend were lower than and equal to the background (baseline) noise levels, being - 1dB and 0 dB, respectively. The day-time operational sound levels during the week did exceed the background (baseline) noise levels, but with the measured change being negligible (by +3 dB and +2 dB, respectively). As mentioned, a difference of 3 dB is barely perceptible to the human ear.

Comparison of the Change in Operational Noise Levels from 2014

38. **Tables 9** and **10** report the ambient day-time and night-time noise levels at the monitoring locations with the MEC in operation in 2014, in 2018, and as recently measured (in 2022). Weekend measurements were not taken in 2014 and 2018; accordingly, **Tables 9** and **10** report the changes in the week-day noise levels only.

39. In the case of MP 1, the results suggest that there has been relatively little change in the day-time operational noise levels during the week at the closest sensitive receptor to the MEC since 2014. The 2022 day-time noise levels during the week were a negligible 1 dB and 3 dB lower than the 2014 and 2018 noise levels, respectively.

40. Regarding the night-time noise levels at MP 1, the 2022 noise level was a negligible +2 dB higher than the noise level measured at night in 2014, but in the range of -4 dB to – 16 dB lower than that measured in 2018.

41. In the case of MP 2, again, the results suggest that there has been relatively little change in the day-time operational noise levels during the week since 2014. The 2022 day-time noise level at MP 2 during the week was similar to that measured in 2014 and a negligible 1 dB lower than that measured in 2018.

42. In the case of MP 3, similarly, the results suggest that there has been relatively little change in the day-time operational noise levels during the week since 2014. The 2022 day-time noise level at MP 2 during the week was a negligible 2 dB lower to that measured in 2014 and was the same as that measured in 2018.

Conclusion

43. IP 0001/05/C (relating to Ta' Żwejra non-hazardous landfill), IP 0001/06/C (relating to Għallis non-hazardous landfill) and IP 0001/03/19 (relating to Malta North Waste Treatment Plant) are conditional to the level of noise emitted from MEC operations not exceeding the background noise level by 5 dB. The EMP for the MEC requires that the monitoring noise emissions be carried out in accordance with BS4142; hence the IPs are also conditional to the level of noise emitted from MEC operations not exceeding the recommended level of marginal significance in BS4142.

44. The results of the noise monitoring survey suggest that the level of noise emitted from MEC operations during the day and at night, both during the week and on the weekend, is not exceeding the background noise level at the monitoring locations by 5 dB, with the maximum exceedance (where there was an exceedance) being 3 dB. Accordingly, the results of the survey suggest that the MEC is compliant with the conditions of IP 0001/05/C, IP 0001/06/C and IP 0001/03/19 in this regard.

45. The results of the noise monitoring survey suggest that the level of noise emitted from MEC operations during the day and at night, both during the week and on the weekend, is not exceeding the recommended level of marginal significance in BS4142. Accordingly, the results of the survey suggest that the MEC is compliant with the conditions of IP 0001/05/C, IP 0001/06/C and IP 0001/03/19 in this regard.

Table 9: Change in the Day-time Operational Noise Levels from 2014

MP	2014				2018				2022				Change from 2014 L_{Aeq}	Change from 2018 L_{Aeq}
	L_{Aeq}	L_{Amax}	L_{A90}	L_{A10}	L_{Aeq}	L_{Amax}	L_{A90}	L_{A10}	L_{Aeq}	L_{Amax}	L_{A90}	L_{A10}		
1	**49**	68	45	52	**51**	67	46	54	**48**	79	47	49	-1 dB	- 3 dB
2	**68**	92	44	68	**69**	96	43	70	**68**	88	44	70	0 dB	- 1 dB
3	**69**	91	50	69	**67**	89	46	69	**67**	89	46	70	- 2 dB	0 dB

Table 10: Change in the Night-time Operational Noise Levels from 2014

MP	2014				2018[9]				2022				Change from 2014 L_{Aeq}	Change from 2018 L_{Aeq}
	L_{Aeq}	L_{Amax}	L_{A90}	L_{A10}	L_{Aeq}	L_{Amax}	L_{A90}	L_{A10}	L_{Aeq}	L_{Amax}	L_{A90}	L_{A10}		
1	**36**	44	33	38	**54**	73	36	58	**38**	55	35	40	+ 2 dB	- 4 dB to – 16 dB
					42	64	33	43						

[9] There were two night-time measurements taken at MP 1 in 2018.

en-sure monitoring

Calibration certificates

Laaber GmbH

Kalibrierstelle für die Messgröße Beschleunigung und Akustische Messgrößen.
Calibration Body for the measurement parameter Acceleration and acoustical measurement parameters.

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AKKREDITIERTUNG AUSTRIA

K 21-094
0624
09.04.2021

Kalibrierschein nach ISO/IEC 17025
Calibration Certificate

Kalibrierzeichen
Calibration mark

Gegenstand *Object*	Soundlevelmeter
Hersteller *Manufacturer*	Norsonic
Typ *Type*	140
Herstellernummer *Serial number*	1405007
Auftraggeber *Customer*	En-sure Ltd *Malta, SGN4197 San Gwann*
Kalibriernummer *Order No.*	K 21-094
Anzahl der Seiten des Kalibrierscheines *Number of pages of the certificate*	3+6
Datum der Kalibrierung *Date of calibration*	09.04.2021

Dieser Kalibrierschein dokumentiert die Rückführbarkeit auf nationale Normale zur Darstellung der physikalischen Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI).

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office@schallmessung.com

Stempel *Seal*	Datum *Date*	Leiter der Kalibrierstelle *Authorised person*	Bearbeiter *Person responsible*

Beschreibung des Kalibriergegenstandes:
Describtion of the test object:

Das Testobjekt ist ein Schallanalysator mit ½" Vorverstärker und Mikrofon.
The test object is a sound level meter with ½" preamplifier and microphone.

Schallpegelmesser *Sound level meter*	140	Ser. Nr. 1405007
Vorverstärker *Preamplifier*	1209	Ser. Nr. 14564
Mikrofon *Microphone*	1225	Ser. Nr. 149544

Software Version 2.1.670

Angewandtes Kalibrierverfahren:
Calibration procedure:

Die Kalibrierung wurde nach den internationalen Normen für Schallpegelmesser EN IEC 61672-3 und Bandfilter für Oktaven und Bruchteile von Oktaven EN IEC 61260 durchgeführt. Die Kalibrierung des akustischen Frequenzganges erfolgte durch Messung mit einem Multifunktionskalibrator.
The calibration is performed according to the corresponding national and international standards for sound level meters EN IEC 61672-3 and Octave-band and fractional-octave-band filters EN IEC 61260. The measurement of the acoustical frequency response is done with a multifunction acoustic calibrator.

Referenznormale:
Reference etalons:

Folgende Normale wurden verwendet:
Following etalons have been used:

• Funktionsgenerator Standford DS 360 *Function generator*	Ser. Nr. 33672	BEV T20-1115/1
• Digital Multimeter HP 34401A	Ser. Nr. US 36131421	BEV T19-1204
• Schallkalibrator Nor 1251 *Reference sound calibrator*	Ser. Nr. 32301	BEV T20-1991/1
• Schallkalibrator Nor 1253 *Reference sound calibrator*	Ser. Nr. 25723	BEV T20-1991/2
• Multifunktionskalibrator B&K 4226 *Multifunction calibrator*	Ser. Nr. 1445412	BEV T20-0302/1/1
• ½" Mikrofon B&K 4180 *½" Microphone*	Ser. Nr. 2341451	BEV T20-1644/1
• Test Unit Nor 483B	Ser. Nr. 31074	
• Multifunktions-Messgerät Testo 445 *Multifunction instrument*	Ser. Nr. 0081 3700/303	199180, 199181

Messort:
Measurement place:

Laaber GmbH
Brown-Boveri-Straße 8 B17/2
2351 Wr. Neudorf, Austria
Eichraum

Umgebungsbedingungen:
Reference condition:

Luftdruck:	999 hPa ±5 hPa	Relative Feuchte:	36,2 % ± 3%	Temperatur:	23,6 °C ± 1°C
Air pressure		*Relative humidity*		*Temperature*	

Ergebnisse der Kalibrierung:
Results:

Siehe folgende 6 Seiten.
See the following 6 pages.

Angegeben ist die erweiterte Messunsicherheit, die sich aus der Standardmessunsicherheit durch Multiplikation mit dem Erweiterungsfaktor k = 2 ergibt. Sie wurde gemäß EA-4/02 ermittelt. Der Wert der Messgröße liegt mit einer Wahrscheinlichkeit von 95% im zugeordneten Werteintervall.
Stated is the expanded measurement uncertainty arising from the standard uncertainty of measurement multiplied by the coverage factor k = 2. It was established according to EA-4/02. The value of the measurand lies with a probability of 95% in the corresponding interval.

Konformitätsbewertung:
Conformity assessment:

Self-generated noise with microphone, IEC 61672-3, Part 11.1	passed
Self-generated noise by electrical input signal device, IEC 61672-3, Part 11.2	passed
Acoustical signal test, IEC 61672-3, Part 12	passed
Electrical signal test of frequency weightings, IEC 61672-3, Part 13	passed
Frequency and time weightings at 1 kHz, IEC 61672-3, Part 14	passed
Long-term stability, IEC 61672-3, Part 15	passed
Level linearity, IEC 61672-3, Part 16	passed
Tone burst response, IEC 61672-3, Part 18	passed
Peak C sound level, IEC 61672-3, Part 19	passed
Overload indication, IEC 61672-3, Part 20	passed
High-level stability, IEC 61672-3, Part 21	passed

Anmerkung:
Remark:

Dieser Kalibrierschein darf nur unverändert weitergegeben werden. Auszüge oder Änderungen sind unzulässig. Kalibrierscheine ohne Unterschrift und Stempel haben keine Gültigkeit.
This certificate may only be passed unchanged. Extracts or changes are not permitted. Calibration certificates without signature and stamp are not valid.

Die Ergebnisse der Kalibrierung beziehen sich ausschließlich auf das eingereichte Messgerät zum Zeitpunkt der Kalibrierung.
The results of the calibration are exclusively submitted to the handed in instrument at the time of calibration.

Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.
The user is obliged to have the object recalibrated at appropriate intervals.

Das Gerät wurde mit einer Klebeetikette gekennzeichnet.
The instrument was marked with a label.

Self generated noise with microphon, IEC 61672-3, Part 11.1:

Frequency weighting	Measurand dB	extended Uncertainty dB
A	15,99	0,17

Microphon replaced by the electrical input signal divice, IEC 61672-3, Part 11.2:

Frequency weighting	Measurand dB	extended Uncertainty dB
A	11,05	0,25
C	13,63	0,17
Z	23,60	0,74

Acoustical signal tests of a frequency weighting, IEC 61672-3, Part 12

Frequency weighting C, Cal level 94 dB, Cal frequency 250 Hz, Multfunction acoustic calibrator B&K 4226

	Frequency Hz	C-weighting dB	Measurand dB	Measurand rel. Cal dB	extended Uncertainty dB
Cal	250	0,00	93,7	93,67	0,40
	125	-0,20	93,5	0,02	0,20
	1000	0,00	93,6	-0,09	0,40
	8000	-3,00	88,0	0,25	0,70

Frequency weighting A, Cal level 85.3 dB, Cal frequency 250 Hz, Multfunction acoustic calibrator B&K 4226

Frequency Hz	A-weighting dB	Measurand dB	Measurand rel. Cal dB	extended Uncertainty dB
250	8,70	85,02	93,72	0,40
125	-16,10	77,53	-0,09	0,20
1000	0,00	93,56	-0,13	0,40
8000	1,10	89,86	-2,00	0,70

Electrical signal tests of frequency weightings, IEC 61672-3, Part 13

Frequency weighting A, Cal level 94 dB, Cal frequency 1000 Hz

	Frequency Hz	Measurand dB	Measurand rel. Cal dB	extended Uncertainty dB
Cal	1000	94,01	60,01	
	63	60,09	0,09	0,17
	125	59,96	-0,04	0,17
	250	59,90	-0,11	0,17
	500	59,92	-0,08	0,17
	1000	59,99	-0,02	0,17
	2000	59,94	-0,07	0,17
	4000	59,88	-0,13	0,17
	8000	59,91	-0,10	0,17
	16000	59,93	-0,08	0,17

Frequency weighting C, Cal level 94 dB, Cal frequency 1000 Hz

	Frequency Hz	Measurand dB	Measurand rel. Cal dB	extended Uncertainty dB
Cal	1000	94,02	60,02	
	63	60,06	0,05	0,17
	125	59,97	-0,03	0,17
	250	59,95	-0,06	0,17
	500	60,02	0,01	0,17
	1000	60,00	-0,01	0,17
	2000	59,95	-0,06	0,17
	4000	59,88	-0,13	0,17
	8000	59,91	-0,10	0,17
	16000	59,89	-0,11	0,17

Frequency weighting Z, Cal level 94 dB, Cal frequency 1000 Hz

	Frequency Hz	Measurand dB	Measurand rel. Cal dB	extended Uncertainty dB
Cal	1000	94,02	60,02	
	63	60,09	0,09	0,17
	125	59,97	-0,04	0,17
	250	59,95	-0,06	0,17
	500	59,98	-0,03	0,17
	1000	60,00	-0,01	0,17
	2000	59,94	-0,07	0,17
	4000	59,94	-0,07	0,17
	8000	59,93	-0,08	0,17
	16000	59,95	-0,06	0,17

Frequency and time weightings at 1 kHz, IEC 61672-3, Part 14

Frequency weighting A, Cal level 94 dB, Cal frequency 1000 Hz

	Frequency Hz	Measurand dB	Deviation dB	extended Uncertainty dB
Cal	1000	94,04		
A Leq	1000	94,04	0,00	0,17
A Slow	1000	94,00	-0,04	0,17
C Fast	1000	94,04	0,00	0,17
Z Fast	1000	94,04	0,00	0,17

Level linearity on the referenc level range, IEC 61672-3, Part 16

Frequency weighting A, Cal level 92.9 dB, Cal frequency 8000 Hz

	Level dB	Measurand dB	Overload 0/1	Deviation dB	extended Uncertainty dB
Cal	92,9	92,85			
	140,8	137,77	1	-3,07	0,17
	139,8	137,73	1	-2,11	0,17
	138,8	137,60	1	-1,24	0,17
	137,8	137,34	1	-0,50	0,17
	132,8	132,85	0	0,01	0,17
	127,8	127,85	0	0,01	0,17
	122,8	122,85	0	0,01	0,17
	117,8	117,86	0	0,02	0,17
	112,8	112,85	0	0,01	0,17
	107,8	107,84	0	0,00	0,17
	102,8	102,84	0	0,00	0,17
	97,8	97,84	0	0,00	0,17
	92,8	92,86	0	0,02	0,17
	87,8	87,83	0	-0,01	0,17
	82,8	82,83	0	-0,01	0,17
	77,8	77,83	0	-0,01	0,17
	72,8	72,85	0	0,01	0,17
	67,8	67,82	0	-0,02	0,17
	62,8	62,82	0	-0,02	0,17
	57,8	57,83	0	-0,01	0,17
	52,8	52,92	0	0,08	0,17
	47,8	47,96	0	0,12	0,17
	42,8	42,95	0	0,11	0,17
	37,8	37,91	0	0,07	0,17
	32,8	32,91	0	0,07	0,17
	27,8	27,93	0	0,09	0,17
	26,8	26,96	0	0,12	0,17
	25,8	26,00	0	0,16	0,17
	24,8	24,92	0	0,08	0,17
	23,8	24,01	0	0,17	0,17
	22,8	23,02	0	0,18	0,17
	21,8	22,09	0	0,25	0,17
	20,8	21,06	0	0,22	0,17
	19,8	20,15	0	0,31	0,17
	20,8	21,03	0	0,19	0,17
	21,8	22,10	0	0,26	0,17
	22,8	23,02	0	0,18	0,17
	23,8	24,02	0	0,18	0,17
	24,8	24,91	0	0,07	0,17
	25,8	26,00	0	0,16	0,17
	26,8	26,95	0	0,11	0,17
	27,8	27,91	0	0,07	0,17
	32,8	32,91	0	0,07	0,17
	37,8	37,91	0	0,07	0,17
	42,8	42,94	0	0,10	0,17
	47,8	47,95	0	0,11	0,17
	52,8	52,92	0	0,08	0,17
	57,8	57,83	0	-0,01	0,17
	62,8	62,82	0	-0,02	0,17
	67,8	67,81	0	-0,03	0,17
	72,8	72,84	0	0,00	0,17
	77,8	77,83	0	-0,01	0,17
	82,8	82,83	0	-0,01	0,17
	87,8	87,83	0	-0,01	0,17
	92,8	92,85	0	0,01	0,17
	97,8	97,84	0	0,00	0,17
	102,8	102,84	0	0,00	0,17
	107,8	107,84	0	0,00	0,17
	112,8	112,85	0	0,01	0,17
	117,8	117,86	0	0,02	0,17

122,8	122,85	0	0,01	0,17
127,8	127,85	0	0,01	0,17
132,8	132,85	0	0,01	0,17
137,8	137,34	1	-0,50	0,17
138,8	137,60	1	-1,24	0,17
139,8	137,73	1	-2,11	0,17
140,8	137,77	1	-3,07	0,17

Long-term stability, IEC 61672-3, Part 15:

Frequency weighting A, Level range 0 dB Gain, Cal level 94 dB, Cal frequency 1000 Hz

	Level dB	Measurand dB	Deviation dB	extended Uncertainty dB
Cal	94	94,00		
1st Measureme	94,0	94,01	0,02	0,17
2nd Measurem	94,0	94,03		0,17

High-level stability, IEC 61672-3, Part 21:

Frequency weighting A, Level range 0 dB Gain, Cal level 94 dB, Cal frequency 1000 Hz

	Level dB	Measurand dB	Deviation dB	extended Uncertainty dB
Cal	94	94,04		
1st Measureme	137,0	137,04	0,00	0,17
2nd Measurem	137,0	137,04		0,17

Toneburst response, IEC 61672-3, Part 18

Frequency weighting A, Cal level 95 dB, Cal frequency 4000 Hz, Fast

	Frequency Hz	Measurand dB
Cal	4000	94,91

Burst cycle	Signal level Lpmax dB	Measurand Lpmax dB	Deviation dB	extended Uncertainty dB	Signal level LE dB	Measurand LE dB	Deviation dB	extended Uncertainty dB
800	133,91	133,89	-0,02	0,17	127,92	127,89	-0,03	0,17
80	126,61	126,34	-0,27	0,17	117,92	117,87	-0,05	0,17
1	107,91	107,39	-0,52	0,26	98,89	98,53	-0,36	0,26

Frequency weighting A, Cal level 95 dB, Cal frequency 4000 Hz, Slow

	Frequency Hz	Measurand dB
Cal	4000	94,86

Burst cycle	Signal level Lpmax dB	Measurand Lpmax dB	Deviation dB	extended Uncertainty dB
800	127,36	127,45	0,09	0,17
80	117,86	117,79	-0,07	0,17

Peak C sound level, IEC 61672-3, Part 19

Frequency weighting C, Cal level 94 dB, Cal frequency 500 Hz, Fast

	Frequency Hz	Measurand dB
Cal	500	93,96

Peak, + Half cycles

Signal level Lpeak dB	Measurand Lpeak dB	Deviation dB	extended Uncertainty dB
132,36	132,13	-0,23	0,17

Frequency weighting C, Cal level 94 dB, Cal frequency 500 Hz, Fast

	Frequency Hz	Measurand dB
Cal	500	93,98

Peak, - Half cycles

Signal level Lpeak dB	Measurand Lpeak dB	Deviation dB	extended Uncertainty dB
132,38	132,11	-0,27	0,17

Frequency weighting C, Cal level 91 dB, Cal frequency 8000 Hz, Fast

	Frequency Hz	Measurand dB
Cal	8000	90,91

Peak, Single burst

Signal level Lpeak dB	Measurand Lpeak dB	Deviation dB	extended Uncertainty dB
129,31	128,94	-0,37	0,40

Overload indication, IEC 61672-3, Part 20

Frequency weighting A, Cal level 95 dB, Cal frequency 4000 Hz, Fast

	Frequency Hz	Measurand dB
Cal	4000	94,89

Leq, + Half cycles

Signal level Leq [dB]	Measurand Leq [dB]	Deviation dB	Overload 0/1	extended Uncertainty dB
88,86	87,57	-1,29	0	0,38
89,36	88,20	-1,16	0	0,28
89,86	88,52	-1,34	1	0,76
89,96	88,84	-1,12	1	0,17
90,06	88,75	-1,31	1	0,55
90,16	88,84	-1,32	1	0,49
90,26	89,03	-1,23	1	0,17

	Frequency Hz	Measurand dB
Cal	4000	94,88

Leq, - Half cycles

Signal level Leq [dB]	Measurand Leq [dB]	Deviation dB	Overload 0/1	extended Uncertainty dB
88,85	87,62	-1,23	0	1,02
89,35	88,34	-1,01	0	0,17
89,85	88,60	-1,25	0	0,90
89,95	88,53	-1,42	1	0,96
90,05	88,84	-1,21	1	0,53
90,15	88,70	-1,45	1	0,72
90,25	88,93	-1,32	1	0,49

Microphone sensitivity

	Measurand	extendet Uncertainty dB
dB re 1V/Pa	-26,36	0,1
mv/Pa	48,07	

Laaber GmbH

Kalibrierstelle für die Messgröße Beschleunigung und Akustische Messgrößen.
Calibration Body for the measurement parameter Acceleration and acoustical measurement parameters.

akkreditiert durch die / *accredited by*
AKKREDITIERTUNG AUSTRIA

K 22-202
0624
20.07.2022

Kalibrierschein nach ISO/IEC 17025
Calibration Certificate

Kalibrierzeichen
Calibration mark

Gegenstand *Object*	Soundlevelmeter
Hersteller *Manufacturer*	Norsonic
Typ *Type*	140
Herstellernummer *Serial number*	1406005
Auftraggeber *Customer*	En-sure Ltd. *SGN 4197 San Gwann*
Kalibriernummer *Order No.*	K 22-202
Anzahl der Seiten des Kalibrierscheines *Number of pages of the certificate*	3+6
Datum der Kalibrierung *Date of calibration*	20.07.2022

Dieser Kalibrierschein dokumentiert die Rückführbarkeit auf nationale Normale zur Darstellung der physikalischen Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI).

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This calibration certificate may not be reproduced other than in full. Calibration certificates without signature and seal are not valid.

Laaber GmbH
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office@schallmessung.com

Stempel *Seal*	Datum *Date*	Leiter der Kalibrierstelle *Authorised person*	Bearbeiter *Person responsible*

Beschreibung des Kalibriergegenstandes:
Describtion of the test object:

Das Testobjekt ist ein Schallanalysator mit ½" Vorverstärker und Mikrofon.
The test object is a sound level meter with ½" preamplifier and microphone.

Schallpegelmesser *Sound level meter*	140	Ser. Nr. 1406005
Vorverstärker *Preamplifier*	1209	Ser. Nr. 20041
Mikrofon *Microphone*	1225	Ser. Nr. 208101

Software Version 3.0.1842.

Angewandtes Kalibrierverfahren:
Calibration procedure:

Die Kalibrierung wurde nach den internationalen Normen für Schallpegelmesser EN IEC 61672-3 und Bandfilter für Oktaven und Bruchteile von Oktaven EN IEC 61260 durchgeführt. Die Kalibrierung des akustischen Frequenzganges erfolgte durch Messung mit einem Multifunktionskalibrator.
The calibration is performed according to the corresponding national and international standards for sound level meters EN IEC 61672-3 and Octave-band and fractional-octave-band filters EN IEC 61260. The measurement of the acoustical frequency response is done with a multifunction acoustic calibrator.

Referenznormale:
Reference etalons:

Folgende Normale wurden verwendet:
Following etalons have been used:

• Funktionsgenerator Standford DS 360 *Function generator*	Ser. Nr. 61983	BEV T21-0391
• Digital Multimeter HP 34401A	Ser. Nr. US 36131421	BEV T21-1165
• Schallkalibrator Nor 1251 *Reference sound calibrator*	Ser. Nr. 32301	BEV T21-1985/1
• Schallkalibrator Nor 1253 *Reference sound calibrator*	Ser. Nr. 25723	BEV T21-1985/2
• Multifunktionskalibrator B&K 4226 *Multifunction calibrator*	Ser. Nr. 1445412	BEV T22-0456
• ½" Mikrofon B&K 4180 *½" Microphone*	Ser. Nr. 2341451	BEV T21-1760/1
• Test Unit Nor 483B	Ser. Nr. 31074	
• Multifunktions-Messgerät Testo 445 *Multifunction instrument*	Ser. Nr. 0081 3700/303	AF0265, AD0263, AT0675

Messort:
Measurement place:

Laaber GmbH
Brown-Boveri-Straße 8 B17/2
2351 Wr. Neudorf, Austria
Eichraum

Umgebungsbedingungen:
Reference condition:

Luftdruck:	995 hPa ±5 hPa	Relative Feuchte:	37,1 % ± 3%	Temperatur:	25,6 °C ± 1°C
Air pressure		*Relative humidity*		*Temperature*	

Ergebnisse der Kalibrierung:
Results:

Siehe folgende 6 Seiten.
See the following 6 pages.

Angegeben ist die erweiterte Messunsicherheit, die sich aus der Standardmessunsicherheit durch Multiplikation mit dem Erweiterungsfaktor k = 2 ergibt. Sie wurde gemäß EA-4/02 ermittelt. Der Wert der Messgröße liegt mit einer Wahrscheinlichkeit von 95% im zugeordneten Werteintervall.
Stated is the expanded measurement uncertainty arising from the standard uncertainty of measurement multiplied by the coverage factor k = 2. It was established according to EA-4/02. The value of the measurand lies with a probability of 95% in the corresponding interval.

Konformitätsbewertung:
Conformity assessment:

Self-generated noise with microphone, IEC 61672-3, Part 11.1	passed
Self-generated noise by electrical input signal device, IEC 61672-3, Part 11.2	passed
Acoustical signal test, IEC 61672-3, Part 12	passed
Electrical signal test of frequency weightings, IEC 61672-3, Part 13	passed
Frequency and time weightings at 1 kHz, IEC 61672-3, Part 14	passed
Long-term stability, IEC 61672-3, Part 15	passed
Level linearity, IEC 61672-3, Part 16	passed
Tone burst response, IEC 61672-3, Part 18	passed
Peak C sound level, IEC 61672-3, Part 19	passed
Overload indication, IEC 61672-3, Part 20	passed
High-level stability, IEC 61672-3, Part 21	passed

Anmerkung:
Remark:

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Die Ergebnisse der Kalibrierung beziehen sich ausschließlich auf das eingereichte Messgerät zum Zeitpunkt der Kalibrierung.
The results of the calibration are exclusively submitted to the handed in instrument at the time of calibration.

Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.
The user is obliged to have the object recalibrated at appropriate intervals.

Das Gerät wurde mit einer Klebeetikette gekennzeichnet.
The instrument was marked with a label.

Self generated noise with microphon, IEC 61672-3, Part 11.1:

Frequency weighting	Measurand dB	extended Uncertainty dB
A	16,96	0,17

Microphon replaced by the electrical input signal divice, IEC 61672-3, Part 11.2:

Frequency weighting	Measurand dB	extended Uncertainty dB
A	9,52	0,17
C	12,66	0,70
Z	20,29	0,56

Acoustical signal tests of a frequency weighting, IEC 61672-3, Part 12

Frequency weighting C, Cal level 94 dB, Cal frequency 250 Hz, Multfunction acoustic calibrator B&K 4226

	Frequency Hz	C-weighting dB	Measurand dB	Measurand rel. Cal dB	extended Uncertainty dB
Cal	250	0,00	94,21	94,21	0,40
	125	-0,20	94,05	0,04	0,20
	1000	0,00	94,05	-0,13	0,40
	8000	-3,00	89,41	1,16	0,70

Frequency weighting A, Cal level 85.3 dB, Cal frequency 250 Hz, Multfunction acoustic calibrator B&K 4226

Frequency Hz	A-weighting dB	Measurand dB	Measurand rel. Cal dB	extended Uncertainty dB
250	8,70	85,47	94,17	0,40
125	-16,10	78,01	-0,05	0,20
1000	0,00	93,98	-0,15	0,40
8000	-1,10	91,30	1,19	0,70

Electrical signal tests of frequency weightings, IEC 61672-3, Part 13

Frequency weighting A, Cal level 94 dB, Cal frequency 1000 Hz

	Frequency Hz	Measurand dB	Measurand rel. Cal dB	extended Uncertainty dB
Cal	1000	93,96	91,96	
	63	91,98	0,02	0,17
	125	91,95	-0,01	0,17
	250	91,89	-0,06	0,17
	500	91,91	-0,05	0,17
	1000	91,95	-0,01	0,17
	2000	91,94	-0,02	0,17
	4000	91,88	-0,08	0,17
	8000	91,95	0,00	0,17
	16000	91,95	-0,01	0,17

Frequency weighting C, Cal level 94 dB, Cal frequency 1000 Hz

	Frequency Hz	Measurand dB	Measurand rel. Cal dB	extended Uncertainty dB
Cal	1000	93,94	91,94	
	63	91,93	-0,02	0,17
	125	91,97	0,01	0,17
	250	91,92	-0,04	0,17
	500	91,98	0,03	0,17
	1000	91,95	-0,01	0,17
	2000	91,96	0,00	0,17
	4000	91,89	-0,07	0,17
	8000	91,95	-0,01	0,17
	16000	91,92	-0,03	0,17

Frequency weighting Z, Cal level 94 dB, Cal frequency 1000 Hz

	Frequency Hz	Measurand dB	Measurand rel. Cal dB	extended Uncertainty dB
Cal	1000	93,95	91,95	
	63	91,95	0,00	0,17
	125	91,96	0,00	0,17
	250	91,92	-0,03	0,17
	500	91,96	0,00	0,17
	1000	91,96	0,00	0,17
	2000	91,95	-0,01	0,17
	4000	91,94	-0,02	0,17
	8000	91,97	0,01	0,17
	16000	91,96	0,00	0,17

Frequency and time weightings at 1 kHz, IEC 61672-3, Part 14

Frequency weighting A, Cal level 94 dB, Cal frequency 1000 Hz

	Frequency Hz	Measurand dB	Deviation dB	extended Uncertainty dB
Cal	1000	93,98		
A Leq	1000	113,99	0,01	0,17
A Slow	1000	113,99	0,01	0,17
C Fast	1000	113,99	0,01	0,17
Z Fast	1000	113,99	0,01	0,17

Level linearity on the referenc level range, IEC 61672-3, Part 16

Frequency weighting A, Cal level 92.9 dB, Cal frequency 8000 Hz

	Level dB	Measurand dB	Overload 0/1	Deviation dB	extendec Uncertainty dB
Cal	92,9	92,86			
	113,86	113,88	0	0,02	0,17
	118,86	118,88	0	0,02	0,17
	123,86	123,88	0	0,02	0,17
	128,86	128,88	0	0,02	0,17
	129,86	129,88	0	0,02	0,17
	130,86	130,88	0	0,02	0,17
	131,86	131,88	0	0,02	0,17
	132,86	132,88	0	0,02	0,17
	133,86	133,88	0	0,02	0,17
	134,86	134,88	0	0,02	0,17
	135,86	135,89	0	0,03	0,17
	136,86	136,89	0	0,03	0,17
	137,86	137,89	1	0,03	0,17
	113,86	113,88	0	0,02	0,17
	108,86	108,86	0	0,00	0,17
	103,86	103,86	0	0,00	0,17
	98,86	98,85	0	-0,01	0,17
	93,86	93,84	0	-0,02	0,17
	88,86	88,86	0	0,00	0,17
	83,86	83,86	0	0,00	0,17
	78,86	78,86	0	0,00	0,17
	73,86	73,84	0	-0,02	0,17
	68,86	68,86	0	0,00	0,17
	63,86	63,86	0	0,00	0,17
	58,86	58,84	0	-0,02	0,17
	53,86	53,86	0	0,00	0,17
	48,86	48,88	0	0,02	0,17
	43,86	43,91	0	0,05	0,17
	38,86	38,91	0	0,05	0,17
	33,86	33,88	0	0,02	0,17
	28,86	28,88	0	0,02	0,17
	27,86	27,98	0	0,12	0,17
	26,86	26,99	0	0,13	0,17
	25,86	25,90	0	0,04	0,17
	24,86	24,98	0	0,12	0,17
	23,86	24,03	0	0,17	0,17
	22,86	23,13	0	0,27	0,17
	21,86	22,18	0	0,32	0,17

Long-term stability, IEC 61672-3, Part 15:

Frequency weighting A, Level range 0 dB Gain, Cal level 94 dB, Cal frequency 1000 Hz

	Level dB	Measurand dB	Deviation dB	extended Uncertainty dB
Cal	94	93,98		
1st Measureme	94,0	93,98	0,00	0,17
2nd Measurem	94,0	93,98		0,17

High-level stability, IEC 61672-3, Part 21:

Frequency weighting A, Level range 0 dB Gain, Cal level 94 dB, Cal frequency 1000 Hz

	Level dB	Measurand dB	Deviation dB	extended Uncertainty dB
Cal	94	93,98		
1st Measureme	136,0	136	0,01	0,17
2nd Measurem	136,0	136,01		0,17

Toneburst response, IEC 61672-3, Part 18

Frequency weighting A, Cal level 95 dB, Cal frequency 4000 Hz, Fast

	Frequency Hz	Measurand dB
Cal	4000	94,88

Burst cycle	Signal level Lpmax dB	Measurand Lpmax dB	Deviation dB	extended Uncertainty dB	Signal level LE dB	Measurand LE dB	Deviation dB	extended Uncertainty dB
800	133,88	133,90	0,02	0,17	127,89	127,90	0,01	0,17
80	126,58	126,51	-0,07	0,17	117,89	117,88	-0,01	0,17
1	107,88	107,38	-0,50	0,40	98,86	98,52	-0,34	0,38

Frequency weighting A, Cal level 95 dB, Cal frequency 4000 Hz, Slow

	Frequency Hz	Measurand dB
Cal	4000	94,84

Burst cycle	Signal level Lpmax dB	Measurand Lpmax dB	Deviation dB	extended Uncertainty dB
800	127,44	127,44	0,00	0,17
8	107,84	107,81	-0,03	0,17

Peak C sound level, IEC 61672-3, Part 19

Frequency weighting C, Cal level 94 dB, Cal frequency 500 Hz, Fast

	Frequency Hz	Measurand dB
Cal	500	93,98

Peak, + Half cycles

Signal level Lpeak dB	Measurand Lpeak dB	Deviation dB	extended Uncertainty dB
134,38	134,20	-0,18	0,17

Frequency weighting C, Cal level 94 dB, Cal frequency 500 Hz, Fast

	Frequency Hz	Measurand dB
Cal	500	93,97

Peak, - Half cycles

Signal level Lpeak dB	Measurand Lpeak dB	Deviation dB	extended Uncertainty dB
134,37	134,20	-0,17	0,17

Frequency weighting C, Cal level 91 dB, Cal frequency 8000 Hz, Fast

	Frequency Hz	Measurand dB
Cal	8000	90,91

Peak, Single burst

Signal level Lpeak dB	Measurand Lpeak dB	Deviation dB	extended Uncertainty dB
132,31	131,65	-0,66	1,02

Overload indication, IEC 61672-3, Part 20

Frequency weighting A, Cal level 95 dB, Cal frequency 4000 Hz, Fast

	Frequency Hz	Measurand dB
Cal	4000	94,88

Leq, + Half cycles

Signal level Leq [dB]	Measurand Leq [dB]	Deviation dB	Overload 0/1	extended Uncertainty dB
90,85	89,93	-0,92	0	0,17
90,95	89,73	-1,22	0	0,17
91,05	89,59	-1,46	0	0,64
91,15	89,73	-1,42	0	0,46
91,25	89,81	-1,44	0	0,17
91,35	89,92	-1,43	0	0,22
91,45	90,29	-1,16	0	0,57
91,55	90,44	-1,11	0	0,38
91,65	90,60	-1,05	0	0,18
91,75	90,74	-1,01	0	0,17
91,85	90,41	-1,44	0	0,97
91,95	90,80	-1,15	0	0,19
92,05	91,04	-1,01	1	0,17
92,15	90,85	-1,30	1	0,31
92,25	91,14	-1,11	1	0,22
92,35	91,04	-1,31	1	0,46
92,45	91,16	-1,29	1	0,26
92,55	91,01	-1,54	1	0,21
92,65	91,33	-1,32	1	0,45
92,75	91,27	-1,48	1	0,48

	Frequency Hz	Measurand dB
Cal	4000	94,88

Leq, - Half cycles

Signal level Leq [dB]	Measurand Leq [dB]	Deviation dB	Overload 0/1	extended Uncertainty dB
90,85	89,72	-1,13	0	0,54
90,95	89,70	-1,25	0	0,66
91,05	89,64	-1,41	0	0,52
91,15	90,13	-1,02	0	0,26
91,25	89,93	-1,32	0	0,76
91,35	90,27	-1,08	0	0,34
91,45	90,33	-1,12	0	0,48
91,55	90,09	-1,46	0	0,39
91,65	90,65	-1,00	0	0,24
91,75	90,73	-1,02	0	0,17
91,85	90,57	-1,28	0	0,17
91,95	90,56	-1,39	1	0,82
92,05	90,87	-1,18	1	0,87
92,15	91,00	-1,15	1	0,18
92,25	90,96	-1,29	1	0,65
92,35	90,98	-1,37	1	0,70
92,45	91,27	-1,18	1	0,17
92,55	91,05	-1,50	1	0,73
92,65	91,09	-1,56	1	0,46
92,75	91,36	-1,39	1	0,47

Microphone sensitivity

	Measurand	extendet Uncertainty dB
dB re 1V/Pa	-28,32	0,1
mv/Pa	38,36	

Laaber GmbH

Kalibrierstelle für die Messgröße Beschleunigung und Akustische Messgrößen.
Calibration Body for the measurement parameter Acceleration and acoustical measurement parameters.

akkreditiert durch die / *accredited by*
AKKREDITIERTUNG AUSTRIA

K 22-201
0624
20.07.2022

Kalibrierschein nach ISO/IEC 17025
Calibration Certificate

Kalibrierzeichen
Calibration mark

Gegenstand *Object*	Soundcalibrator
Hersteller *Manufacturer*	Norsonic
Typ *Type*	1251
Herstellernummer *Serial number*	34129
Auftraggeber *Customer*	En-Sure Ltd *SGN 4197 San Gwann*
Kalibriernummer *Order No.*	K 22-201
Anzahl der Seiten des Kalibrierscheines *Number of pages of the certificate*	3
Datum der Kalibrierung *Date of calibration*	20.07.2022

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Brown-Boveri-Straße 8
B 17/2
A - 2351 Wiener Neudorf
Tel.: +43 2236 677 971
office@schallmessung.com

Stempel *Seal*	Datum *Date*	Leiter der Kalibrierstelle *Authorised person*	Bearbeiterin *Person responsible*

Beschreibung des Kalibriergegenstandes:
Describtion of the test object:

Das Testobjekt ist ein Schallkalibrator mit zwei Pegel und einer Frequenz für ½" Mikrofone.
The test object is a sound calibrator with two levels and one frequency for ½" microphones.

Schallkalibrator *Sound calibrator*	1251	Ser. Nr. 34129

Angewandtes Kalibrierverfahren:
Calibration procedure:

Die Kalibrierung wurde nach der internationalen Norm für Schallkalibratoren EN IEC 60942 durchgeführt. Die Messung des Pegels erfolgte durch Vergleichsmessung mit einem Referenzkalibrator.
Die Frequenzmessung erfolgte mit einem Digitalmultimeter. Der Klirrfaktor wurde aus einer 1/3 Oktavbandanalyse ermittelt.
The calibration is performed according to the standards for sound calibrators EN IEC 60942.
The level measurement is performed as a comparison with a reference calibrator. The frequency is measured with a digital multimeter. The distortion is calculated from 1/3 octave band values.

Referenznormale:
Reference etalons:

Folgende Normale wurden verwendet:
Following etalons have been used:

• Schallpegelmesser Nor 140 *Sound level meter*	Ser. Nr. 1402840	Laaber K 22-181
• Vorverstärker Nor 1209 *Preamplifier*	Ser. Nr. 13251	Laaber K 22-181
• Schallkalibrator Nor 1251 *Reference sound calibrator*	Ser. Nr. 32301	BEV T21-1985/1
• Digital Multimeter HP 34401A	Ser. Nr. US36131421	BEV T21-1166
• ½" Mikrofon B&K 4180 *½" Microphone*	Ser. Nr. 2341451	BEV T21-1760/1
• 1" Mikrofon Gras 40EU • *1" Microphone*	Ser. Nr. 41810	BEV T21-1760/2
• Multifunktions-Messgerät Testo 445 *Multifunction instrument*	Ser. Nr. 0081 3700/303	AF0265, AD0263,AT0675

Messort:
Measurement place:

Laaber GmbH
Brown-Boveri-Straße 8 B17/2
2351 Wr. Neudorf, Austria
Eichraum

Umgebungsbedingungen:
Reference condition:

Luftdruck: *Air pressure*	995 hPa ±5 hPa	Relative Feuchte: *Relative humidity*	37,1 % ± 3%	Temperatur: *Temperature*	25,7 °C ± 1°C

Ergebnisse der Kalibrierung:
Results:

	Sound pressure level dB	Extended Uncertainty dB	Frequency Hz	Extended Uncertainty %	Distortion %	Extended Uncertainty %
with 1443	114,03	0,13	999,40	0,2	0,28	0,2
without 1443	113,94	0,13	999,24	0,2	0,28	0,2

Angegeben ist die erweiterte Messunsicherheit, die sich aus der Standardmessunsicherheit durch Multiplikation mit dem Erweiterungsfaktor k = 2 ergibt. Sie wurde gemäß EA-4/02 ermittelt. Der Wert der Messgröße liegt mit einer Wahrscheinlichkeit von 95% im zugeordneten Werteintervall.
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Konformitätsbewertung:
Conformity assessment:

Die Messwerte des Schallkalibrators liegen innerhalb der Klasse 1 Toleranzen der zu Grunde liegenden Norm.
The measured values are within class 1 tolerances of the relevant standard.

Anmerkung:
Remark:

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Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.
The user is obliged to have the object recalibrated at appropriate intervals.

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The instrument was marked with a label.

Laaber GmbH

Kalibrierstelle für die Messgröße Beschleunigung und Akustische Messgrößen.
Calibration Body for the measurement parameter Acceleration and acoustical measurement parameters.

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Kalibrierschein nach ISO/IEC 17025
Calibration Certificate

Kalibrierzeichen
Calibration mark

Gegenstand *Object*	Soundcalibrator
Hersteller *Manufacturer*	Norsonic
Typ *Type*	1251
Herstellernummer *Serial number*	34129
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Kalibriernummer *Order No.*	K 22-201
Anzahl der Seiten des Kalibrierscheines *Number of pages of the certificate*	3
Datum der Kalibrierung *Date of calibration*	20.07.2022

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Stempel *Seal*	Datum *Date*	Leiter der Kalibrierstelle *Authorised person*	Bearbeiterin *Person responsible*

Beschreibung des Kalibriergegenstandes:
Describtion of the test object:

Das Testobjekt ist ein Schallkalibrator mit zwei Pegel und einer Frequenz für ½" Mikrofone.
The test object is a sound calibrator with two levels and one frequency for ½" microphones.

Schallkalibrator *Sound calibrator*	1251	Ser. Nr. 34129

Angewandtes Kalibrierverfahren:
Calibration procedure:

Die Kalibrierung wurde nach der internationalen Norm für Schallkalibratoren EN IEC 60942 durchgeführt. Die Messung des Pegels erfolgte durch Vergleichsmessung mit einem Referenzkalibrator.
Die Frequenzmessung erfolgte mit einem Digitalmultimeter. Der Klirrfaktor wurde aus einer 1/3 Oktavbandanalyse ermittelt.
The calibration is performed according to the standards for sound calibrators EN IEC 60942.
The level measurement is performed as a comparison with a reference calibrator. The frequency is measured with a digital multimeter. The distortion is calculated from 1/3 octave band values.

Referenznormale:
Reference etalons:

Folgende Normale wurden verwendet:
Following etalons have been used:

• Schallpegelmesser Nor 140 *Sound level meter*	Ser. Nr. 1402840	Laaber K 22-181
• Vorverstärker Nor 1209 *Preamplifier*	Ser. Nr. 13251	Laaber K 22-181
• Schallkalibrator Nor 1251 *Reference sound calibrator*	Ser. Nr. 32301	BEV T21-1985/1
• Digital Multimeter HP 34401A	Ser. Nr. US36131421	BEV T21-1166
• ½" Mikrofon B&K 4180 *½" Microphone*	Ser. Nr. 2341451	BEV T21-1760/1
• 1" Mikrofon Gras 40EU • *1" Microphone*	Ser. Nr. 41810	BEV T21-1760/2
• Multifunktions-Messgerät Testo 445 *Multifunction instrument*	Ser. Nr. 0081 3700/303	AF0265, AD0263,AT0675

Messort:
Measurement place:

Laaber GmbH
Brown-Boveri-Straße 8 B17/2
2351 Wr. Neudorf, Austria
Eichraum

Umgebungsbedingungen:
Reference condition:

Luftdruck: *Air pressure*	995 hPa ±5 hPa	Relative Feuchte: *Relative humidity*	37,1 % ± 3%	Temperatur: *Temperature*	25,7 °C ± 1°C

Ergebnisse der Kalibrierung:
Results:

	Sound pressure level dB	Extended Uncertainty dB	Frequency Hz	Extended Uncertainty %	Distortion %	Extended Uncertainty %
with 1443	114,03	0,13	999,40	0,2	0,28	0,2
without 1443	113,94	0,13	999,24	0,2	0,28	0,2

Angegeben ist die erweiterte Messunsicherheit, die sich aus der Standardmessunsicherheit durch Multiplikation mit dem Erweiterungsfaktor k = 2 ergibt. Sie wurde gemäß EA-4/02 ermittelt. Der Wert der Messgröße liegt mit einer Wahrscheinlichkeit von 95% im zugeordneten Werteintervall.
Stated is the expanded measurement uncertainty arising from the standard uncertainty of measurement multiplied by the coverage factor k = 2. It was established according to EA-4/02. The value of the measurand lies with a probability of 95% in the corresponding interval.

Konformitätsbewertung:
Conformity assessment:

Die Messwerte des Schallkalibrators liegen innerhalb der Klasse 1 Toleranzen der zu Grunde liegenden Norm.
The measured values are within class 1 tolerances of the relevant standard.

Anmerkung:
Remark:

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Die Ergebnisse der Kalibrierung beziehen sich ausschließlich auf das eingereichte Messgerät zum Zeitpunkt der Kalibrierung.
The results of the calibration are exclusively submitted to the handed in instrument at the time of calibration.

Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.
The user is obliged to have the object recalibrated at appropriate intervals.

Das Gerät wurde mit einer Klebeetikette gekennzeichnet.
The instrument was marked with a label.