Noise Report for

KMK METALS RECYCLING LTD.

W0013-03

CAPPINCUR INDUSTRIAL ESTATE, DAINGEAN ROAD, TULLAMORE, CO. OFFALY

December 2011

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1.0 INTRODUCTION

ENVIROCO Management has been commissioned by Mr. Kurt Kyck of KMK Metal Recycling Ltd, Cappincur Industrial Estate, Tullamore, Co Offaly; Waste Licence Number W0113-03 to submit an environmental noise survey as required by the facilities licence conditions.

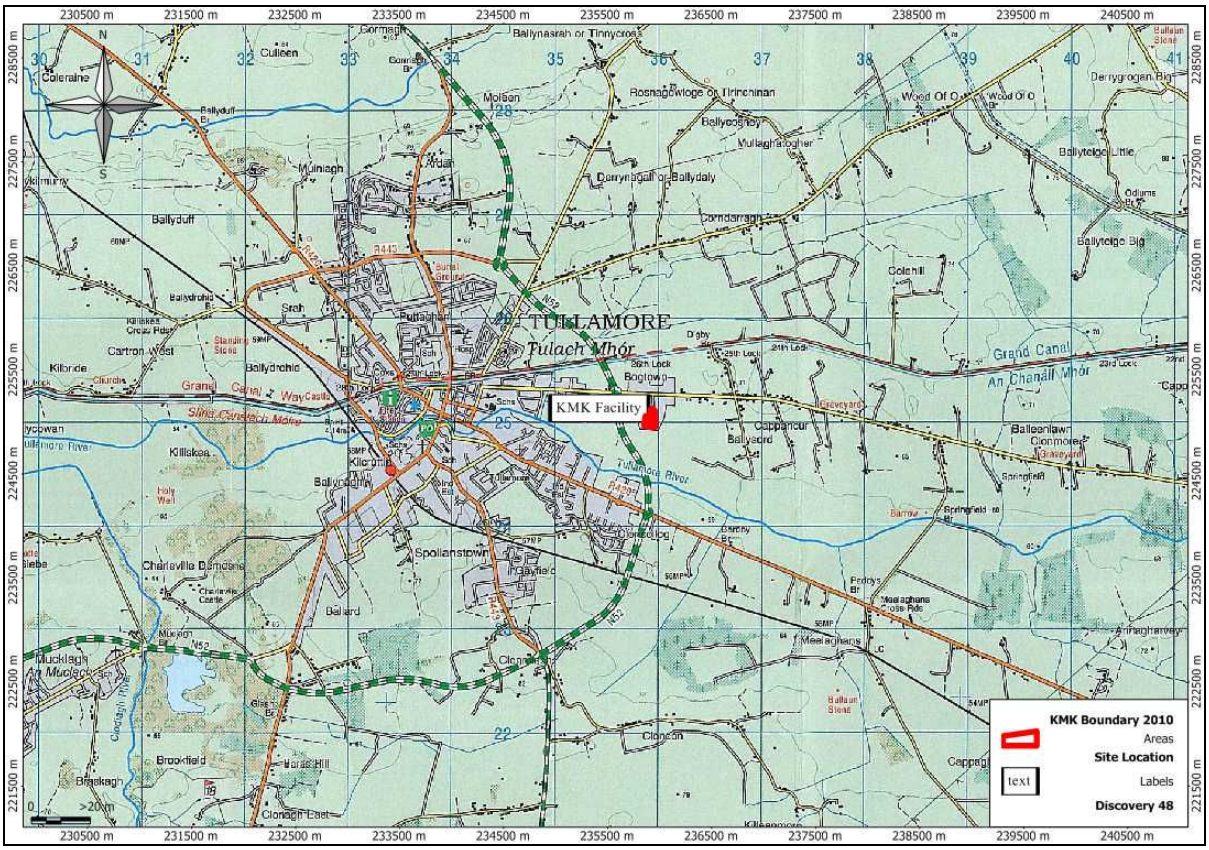


Figure 1.1.1: Site Location map of the KMK Facility, Tullamore, Co. Offaly

The KMK LTD facility is located in the Cappincur Industrial Estate towards the east of Tullamore town, off the L-02025 road to Daingean – Figure 1.0. The Cappincur Industrial Estate is dominated by enclosed industrial units, with little mobile machinery operating outside of these units.

The objectives of the environmental noise survey were to:

- Investigate the noise emissions arising from the facility during a typical working day as part of the waste licence operations.
- Assess the noise emissions in terms of nuisance or pollution potential on the immediate environment around the KMK Metals facility.

1.1 ENVIRONMENTAL MONITORING

ENVIROCO Management was commissioned by KMK Metals Recycling LTD, Cappincur Industrial Estate, Tullamore, Co Offaly to carry out environmental noise monitoring.

Monitoring occurred on Wednesday 30th November 2011. Monitoring took place during the course of a normal working day.

2.0 NOISE SURVEY

Noise has many sources, both manmade and environmental. Noise is observer defined, as levels unacceptable to one person may be perceived as necessary or enjoyable to another. As such the monitoring of noise is primarily an observational discipline requiring a full identification of the sources of possible noise and the type of sound that is been emitted (continuous, intermittent, tonal, broad-spectrum, single source, multiple source). The Environmental Protection Agency (EPA) has adopted a noise level (as a continuous equivalent noise reading – Leq) of 55 dB(A) as an indicator of annoyance due to noise arising from industrial activity. This level is given at the receptor or noise sensitive location (NSL). Monitoring of noise at the KMK plc facility in the Cappincur Industrial Estate, Tullamore, took into account both the nature of the site, the history of the site, the intensity of the operations and the proximity of local sensitive receivers. Monitoring was carried out mid-week during the hours of 6am to 1 pm. The facility does not have operations 'over night', activities do commence prior to 8am, which under their licence terms is 'night –time'. For this reason early morning measurements were conducted to assess if the night time limits were likely to be breached by these activities.

This noise monitoring programme is on the back of condition 6.11 'Noise' parts:
6.11.1 The licensee shall carry out a noise survey of the site operations annually. The survey programme shall be undertaken in accordance with the methodology specified in the 'Environmental Noise Survey Guidance Document' as published by the Agency.

6.11.2 The licensee shall implement any noise attenuation measures as required by the Agency, having regard to the principles of BAT, to ensure compliance with the noise limits specified in this licence.

Schedule B.4 Noise Emissions, states that daytime measurements must be within a $L_{Aeq\ (30\ minute)}$ emission level of 55, and night-time measurements must be within a $L_{Aeq\ (30\ minute)}$ emission level of 45, with no clearly audible tonal component or impulsive component in the noise emission from the activity at any boundary location.

Schedule C5 identifies the locations NE1 – NE5, as specified on Map I.6.1, submitted with the application as the monitoring stations to be utilised, and the following parameters to be reported on: $L_{(A)eq[30\ minute]}$, $L_{(A)10[30\ minute]}$, $L_{(A)90[30\ minute]}$ and 1/3 Octave Band analysis. To be monitored on an annual basis from the facility.

To ensure that all monitoring positions could be adequately monitored, and based upon normal best practice for night-time measurements, as issued by the EPA and others, the night time measurement period was reduced from the issued 30 minute to a 15 minute period.

2.1 METHODOLOGY

Noise monitoring was carried out to the International Standard ISO 1996/1 "Acoustics – Description & measurement of environmental noise", using a Type 1 Bruel Kjaer 2250 Sound Level Meter with outdoor equipment that was fully calibrated prior to and after the monitoring event. The meter was set to Fast Response with an effective averaging time of 0.25sec during noise monitoring. All noise monitoring was 'A' weighted which attenuates low frequencies strongly so noise measuring is more specific to human hearing and environmental noise.

Noise monitoring was carried out on Wednesday 30th November. Each monitoring location is identified on the map shown in Figure 2.1.1.

Weather conditions during the early morning were dark, cold with light air, with increasing cloud cover and more frequent gusts occurring as the morning moved into afternoon. The ground was damp from overnight rain, but no precipitation was noted during the monitoring event.

Table 2.1.1: Met Eireann Weather Report

REPORTS FROM GURTEEN WEATHER STATION						
Date	**Rainfall (mm)**	**Max Temp**	**Min Temp**	**Sunshine (hours)**	**Gusts**	**Wind speed**
30/11/2011	12	10.1	3.8	-	35	14.9

Local weather conditions were recorded on a Davis Vantage Vue weather station, located in the town of Tullamore. Data from 05:00 am to 2:00pm were collected and are displayed below:

Table 2.1.2: Vantage Vue Weather Station Data 5am to 2pm

Date	30/11/2011			
Start Time	05:00:00		**Finish Time**	14:00:00
Temperature	7.50		**High Temperature**	9.70
			Low Temperature	4.90
Humidity	88.71		**Dew Point**	5.75
Wind Speed	3.19		**High Wind Speed**	9.40
Wind Direction	SSE		**Bar**	726.06
THW Index	5.42		**Wind Chill**	5.37
Rain	0.00		**Rain Rate**	0.00

Temperature in ºC, Wind speed in m/s, rainfall in mm

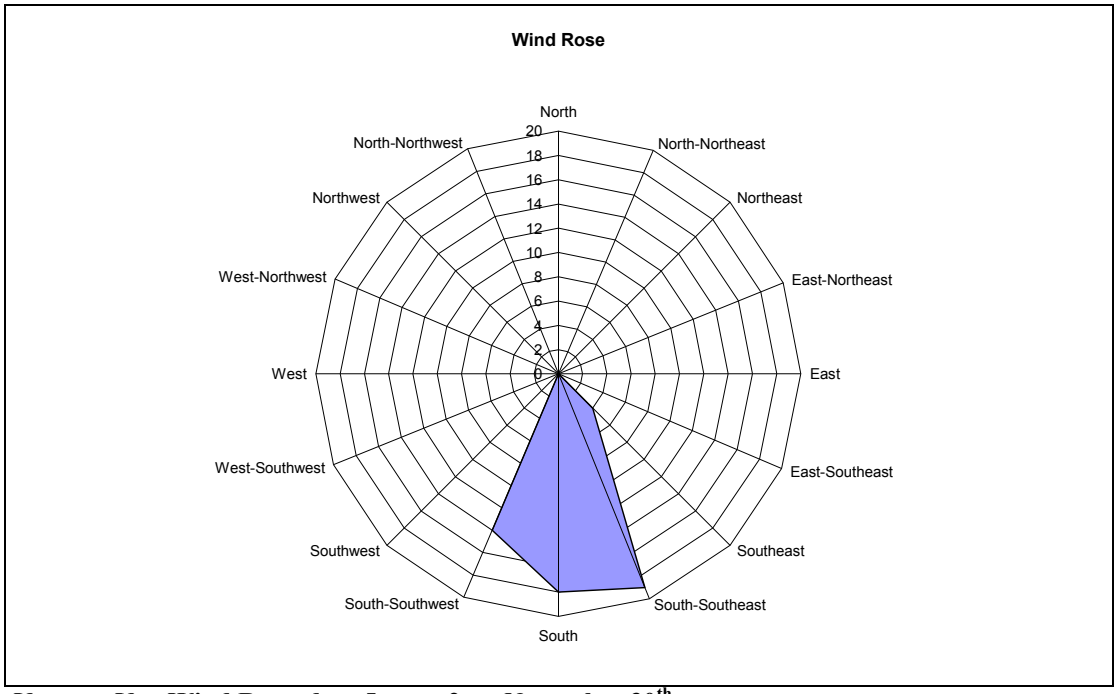


Chart 1: Vantage Vue Wind Rose, data 5am to 2pm November 30th

The monitoring equipment was manned throughout the sampling period and comments/notes taken to assist the interpretation and assessment of results.

Sampling was carried out at 6 locations along the facilities boundaries where accessible (Figure 2.1.1). ENVIROCO Management staff selected these monitoring locations in accordance with Schedule C Control and Monitoring of KMK's waste licence conditions (W0113-03).

The monitoring locations were:

N1: Car park at fence boundary
N2: Eastern boundary, beside disused portacabin
N3: Fence at southwest boundary
N4: Western boundary
N5: North-western boundary of the D4 yard area
N6: North-eastern boundary of the D4 yard area

Table 2.1.3: Grid Reference Points of Noise Monitoring Positions

Monitoring Locations	Grid Reference (ING)	
	Easting	Northing
N1	235944	225050
N2	235956	224996
N3	235859	224960
N4	235863	225011
N5	235906	225056
N6	235858	225030

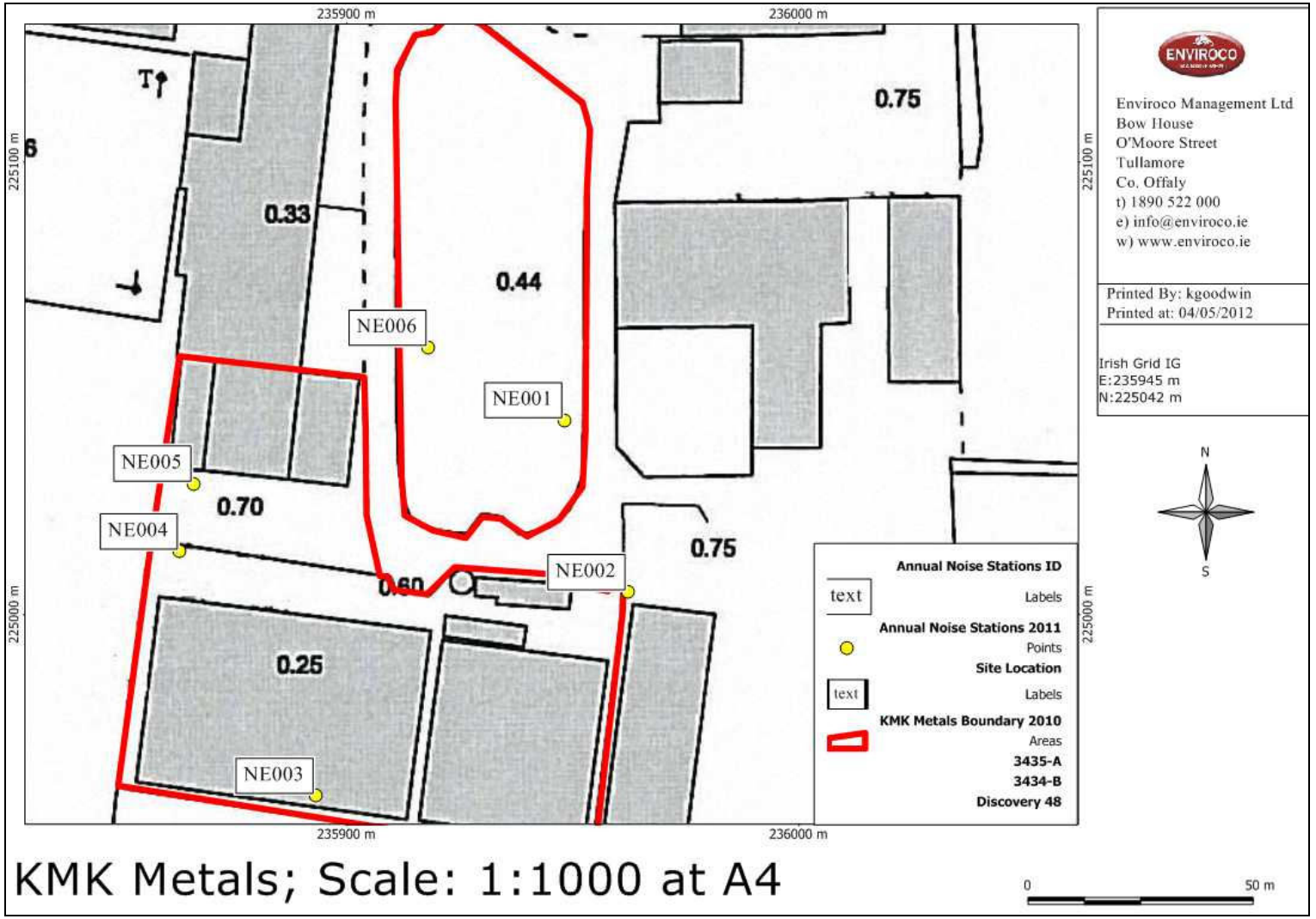


Figure 2.1.1: Noise Monitoring Locations at KMK Metal Recycling Ltd
[Note noise monitoring stations have an accuracy of $^{+}$/- 5 meters]

2.2 RESULTS

The complete set of noise measurement results is included in Appendix A. These are summarised and discussed below.

Table 2.2.1 Night Time Noise Record 15 minute measurements

Location	Start Time	L_{Aeq}	Comments
NE001	06:05	63	**Background Noise**: Traffic on the N52 (Tullamore By-Pass) **General Noise:** Workers talking, forklift operational, truck starting engine nearby
NE002	06:21	60	**General Noise:** Forklift operational in shed building, truck moving, reversing alarms audible, metal crate been placed by forklift near monitoring position, roller skip been lifted onto a truck unit
NE003	06:43	60	**Background Noise:** Traffic movements on the N52 **General Noise:** Reversing alarms, forklift movements within shed building
NE004	07:02	60	**Background Noise:** Traffic on the N52 **General Noise:** Reversing alarms, forklift movement, activities audible from the washing machine shed.
NE005	07:19	67	**Background Noise:** Metal roof slapping against the concrete supporting wall **General Noise:** Activities audible from the CRT shed building and the washing machine shed building, truck been loaded by forklift, forklift movements on site, materials been dropped into containers, reversing alarms, sweeping of the work floor by employee, radio playing in the CRT building
NE006	07:36	63	**General Noise:**Crane operational within the CRT building, forklift movements, metal been moved, reversing alarms, radio audible from the CRT building

Table 2.2.2 Day Time Noise Record 30 minute measurements

Location	Start Time	L_{Aeq}	Comments
NE001	08:54	70	**General Noise:** Construction activities – finishing works on the concrete platform and building, excavator working to level stone Forklift movements, truck movements, reversing alarms Forklift movements audible from facility to the east
NE002	09:27	63	**General Noise:** Forklift and engine noise (generator running to the north) reversing alarms, activity noise from nearby buildings, metal on metal noise audible, radio audible but faint from workshed
NE003	10:01	64	**Background Noise:** Traffic movements on the N52 **General Noise:** Reversing alarms and activities from within the shed building
NE004	10:34	66	**Background Noise:** Traffic on the N52 **General Noise:** Forklifts operating, recycling activities from the building, hum of machinery from smaller work shed, reversing alarms
NE005	11:05	65	**Background Noise:** Metal roof slapping against the concrete supporting wall, traffic on the Tullamore By-pass (N52) **General Noise:** Forklift movements, reversing alarms, hum from rear of building (unidentified source), forklift operating very close to the noise station (<4 meters) for short period of time (<45 seconds)
NE006	11:37	64	**General Noise:**Crane operating within the works shed, recycling activities audible

			from the main shed buildings, forklift movements, reversing alarms, truck moving on the access road, roller skip been loaded onto a truck within the yard area Forklift operating at a neighbouring premises (short duration <2 minutes)

Table 2.2.3: Broadband Noise Results

	Station	L_{Aeq}	L_{A10}	L_{A90}
Night Time (15 minute)	**NE001**	63	63	41
	NE002	60	62	51
	NE003	60	62	50
	NE004	60	62	57
	NE005	67	70	63
	NE006	63	67	51
Day Time (30 minute)	**NE001**	70	72	66
	NE002	63	65	57
	NE003	64	69	56
	NE004	66	68	61
	NE005	65	66	62
	NE006	64	67	60

Table 2.2.4: 1/3 Octave Data

Project Name	NE001	NE002	NE003	NE004	NE005	NE006	NE001	NE002	NE003	NE004	NE005	NE006
Start Time	06:05	06:21	06:43	07:02	07:19	07:36	08:54	09:27	10:01	10:34	11:05	11:37
Frequency (Hz)	Sound Pressure dB(Z)											
12.5	69	55	65	59	67	66	74	56	68	67	70	69
16	67	53	62	57	65	63	72	57	67	66	68	68
20	65	53	60	56	63	62	70	56	65	63	65	67
25	63	57	59	58	61	**69**	69	63	66	63	65	69
31.5	60	61	57	59	64	58	71	62	69	63	63	71
40	57	55	54	58	63	57	74	66	62	63	63	70
50	58	53	57	60	63	62	77	57	64	67	64	68
63	59	53	60	59	62	59	69	61	67	66	62	65
80	50	57	58	60	62	62	72	62	62	64	59	67
100	52	**62**	53	55	60	56	70	64	58	61	57	61
125	52	53	52	53	58	58	66	56	61	63	56	60
160	**58**	53	52	56	60	**66**	67	57	63	62	57	61
200	50	52	51	53	58	57	65	55	60	60	56	57
250	51	53	50	59	63	61	69	55	61	60	56	**62**
315	53	51	49	57	61	56	63	54	57	62	**68**	57
400	50	49	50	52	59	56	61	54	56	58	58	56
500	51	51	51	52	59	57	60	53	57	57	53	57
630	55	52	52	50	58	55	61	53	56	56	52	56
800	54	50	52	50	57	54	60	53	55	56	52	56
1k	55	50	52	50	56	51	60	53	55	56	52	54
1.25k	55	52	52	49	56	52	60	52	54	56	51	53
1.6k	53	48	50	48	55	49	58	52	52	54	51	53
2k	52	48	48	47	55	47	57	51	51	54	51	52

Project Name	NE001	NE002	NE003	NE004	NE005	NE006	NE001	NE002	NE003	NE004	NE005	NE006
2.5k	47	47	46	46	54	46	55	50	49	53	50	50
3.15k	45	50	46	45	55	45	54	51	49	51	51	49
4k	45	43	44	43	52	42	52	47	47	48	48	47
5k	38	47	41	40	51	39	50	44	45	45	45	44
6.3k	34	38	38	37	49	36	48	43	43	42	44	41
8k	29	35	35	33	46	32	45	41	40	38	41	36
10k	24	32	31	27	43	29	42	37	36	34	38	31
12.5k	20	28	25	22	39	26	38	34	33	29	34	28
16k	13	23	18	16	34	23	33	29	27	23	29	23
20k	9	16	11	10	28	11	26	21	19	16	23	17

Numbers in bold represent tonal features

2.3 DISCUSSION

There are currently no statutory limits for the control of environmental noise in Ireland. However, the EPA has issued limits on noise generated from the activities at the KMK Metals facility of $L_{Aeq(30\ minutes)}$ of 55 dB during the day-time (0800 to 2200 hours) and 45 dB during the night-time (2200 to 0800 hours). The EPA documents 'Guidance Note for Noise in Relation to Scheduled Activities 2nd Edition, 2006' and the EPA 'Environmental Noise Survey Guidance Document, 2003' have been reviewed in the preparation of monitoring on site. These documents stipulate that night-time measurements should be taken over a shorter period, of 5-15 minutes. To enable all stations to be accurately monitored, when some activity was occurring on site, the shorter monitoring periods from these guidance documents was utilised. This enabled all 6 site locations to be monitored, though for $L_{Aeq\ 15\ minute}$ periods, rather than the licensed $L_{Aeq\ 30\ minute}$ intervals.

Noise monitoring was carried out between the hours of 6am and 1 pm. Noise sources from the plant, audible at the site boundaries have been identified as:

- Vehicles entering/leaving the site
- Personnel entering/leaving buildings
- Unloading and loading of trucks with waste materials
- The movement of fork lift trucks in the process areas
- Reversing alarms from forklift trucks
- Operation of the baler unit for Large Household Appliances (LHA).
- Operations from construction of a steel structure at a neighbouring industrial unit.

The KMK Metals facility is located within the Cappincur Industrial Estate, Tullamore. This industrial estate includes warehousing, commercial/industrial and waste management operations with Tullamore Steel, Palace Kitchens, Modified Motors, Ravenhill Couriers, Robedesign and Condron Car Dismantlers and a number of other businesses, all located within a relatively close proximity to the KMK site. These other occupants all have noise associated with their activities and this results in a cumulative noise impact within the industrial estate e.g. all warehousing environments require controlled ventilation and air supply, and therefore there is noise associated with these fans, car dismantlers use angle grinders, acetylene torches,

fork lift trucks and other ancillary activities e.g. vehicle movements. Motor modification shops result in loud noise from engine tests/revving noises etc.

During the early morning measurements (prior to 8am) noise levels varied from a $L_{Aeq(15\ minute)}$ of 60-67 dB, with the highest levels occurring to the north at stations NE005 (67dB), and stations NE006 and NE 001 (63 dB each). The northern section of the site is more visually open to site activities, movement of forklifts, movement of trucks etc, with station NE005 located adjacent a work-shed area entrance. All monitoring stations are site boundary.

The day-time measurements (8am to 1pm) show a variation in $L_{Aeq(30\ minute)}$ of 63 to 70 dB, with the higher values recorded on the northern stations. NE001 (70 dB), NE004 (66 dB) and NE005 (65 dB) were all located north and west of the site working area. Station NE 001, after 8am was influenced primarily by the construction activities occurring along the newly constructed shed building to the west. These activities included the unloading of stone materials, use of an excavator to level the material, the chatting and activities of construction workers, etc. Stations NE004 and NE005 were both located in close proximity to recycling activities within the main yard area, with the movement of forklifts, radios playing and engine noise from on-site machinery all influencing the acoustic environment.

The noise generated during these operations is not likely to be a source of disturbance to neighbouring properties as it is known that noise dissipates over distance, and for point source emissions, there is a decrease in 6dB(A) for every doubling in distance away (see table 2.3.1 below).

Table 2.3.1: Attenuation of Noise over Distance for point source emissions e.g. industrial sources

Distance m	Noise level dB
10	70
20	64
40	58
80	52
160	46

Removing the result recorded at station NE001 during the day-time monitoring, due to this stations significant influences from nearby construction activities, the noise levels on site range from a $L_{Aeq\ (15\ minute)}$ of 60 dB to a $L_{Aeq(15\ minute)}$ of 67 dB. This is equivalent to the noise arising from roadside traffic at 15 meters.

Table 2.3.2: Sound Levels from Typical Sources

Sound Pressure level dB(A)	Typical source
120	Jet take off at 50m
100	Pneumatic Drill
90	Generator hall
80	Light machine shop, Heavy Truck at 15m
70 – 60	Light traffic (cars) at 15m
60	Office Noise
40	Library
20	Rural evening

3.0 OCTAVE BAND ANALYSIS AND DISCUSSION

Octave band analysis of noise is the breakdown of the sound pressure readings, as recorded on site, into specific frequency band widths. This enables a greater understanding of the type of noise evident at a site and can give indications to where tonal noise is present. There are two common forms of octave analysis. Full octave analysis groups sound pressure readings into frequency readings that cover a full octave. This type of monitoring gives a good general description of how people will perceive a sound/noise. One third octave analysis, further separates the noise reading into $^1/_3$ octave frequency groupings. Each frequency reading is given in Hz. The frequency reading is the central frequency for each band that is been monitored (i.e. Frequency band 250 Hz covers all sound pressure readings recorded between 167Hz to 333Hz). 1/3 octave analysis of noise enables the identification of tonal components present at a site. Long duration tonal noise is typically found as more aggravating to nearby sensitive receivers than broad spectrum noise sources and control measures can be used to minimise the annoyance caused by tonal sources.

3.1 OCTAVE ANALYSIS

The scope of this noise assessment is to evaluate the noise arising from the KMK Metals Recycling Ltd facility within the Cappincur Industrial Estate, Daingean Road, Tullamore, Co. Offaly. Full results of the 1/1 octave analysis are shown in Appendix A, including charted results for each location. These results and charts are discussed below. The overview chart of all monitoring stations shows a similar trend at most locations when compared between night (before 8am) and day (after 8am).

The night time measurements show a close relationship between the $L_{Aeq\ (15minute)}$ and the $L_{A10\ (15\ minute)}$ values. This is in character for stations that have a general noise environment rather than short peak or bursts of noise. During the early morning measurements, most noise arose from the arrival of workers and the starting of machinery. The low $L_{A90\ (15\ minute)}$ values, which range from 41-51 at the first 3 stations are evidence of the still relatively low background noise present in the early morning (before 7am).

After 7am the $L_{A90\ (15minute)}$ measurements elevated to 51-63 dB, showing a general increase in activity within the facility, within the industrial park and from a notable increase in background traffic noise from the N52. $L_{Aeq\ (15\ minute)}$ and $L_{A10(15\ minute)}$ measurements maintain a very close, showing a relative steady state of noise, rather than short duration noise sources.

Day-time noise measurements show a relatively high background noise level, with $L_{A90\ (30\ minute)}$ measurements ranging from 56 to 66 dB. Strong correlation between $L_{Aeq\ (30\ minute)}$ and $L_{A10\ (30\ minute)}$ continue, with a general increase in noise levels, with $L_{Aeq\ (30\ minutes)}$ ranging from 63 to 70 dB. Again these patterns are characteristic of a general noise, rather than results influenced by short high energy (sound pressure) instances.

Overall the 1-1 broadband noise levels would indicate that the noise environment along site boundaries arises from the collimation of activities on site, rather than from impacts or other short high sound pressure, events. Levels during night time were

approximately a $L_{Aeq\ (15\ minute)}$ of 63 dB at boundaries in the direction of sensitive receptors (north and northeast). The closest sensitive receptors are over xx meters from the site boundary, with other industrial units, buildings, walls and hedging present along the acoustic pathway. It is not thought that night-time levels at the closest receptors would cause annoyance.

Day-time noise measurements, at the boundaries closest to noise sensitive receptors peaked at station NE001 with a $L_{Aeq(30\ minute)}$ of 70 dB, though this arose from nearby construction works, and was not due to the normal activities on site. Station NE006 to the north, recorded a $L_{Aeq\ (30\ minute)}$ of 64 dB. The closest noise sensitive receptors are over xx meters from the facility boundary. The acoustic pathway between the site boundary and these receptors has industrial units, buildings, walls and hedging present. It is not deemed that these levels would be of sufficient level as to cause annoyance at these receptors.

3.2 $^1/_3$ OCTAVE ANALYSIS

1/3 Octave analysis is a method of analysing the recorded sound pressures to identify if tonal features are present. This analysis is done without tonal weighting (i.e. Z-weighting) to ensure that low or high frequency tones are not diminished and that mid level tones are not elevated (as would occur with A or C weighting).

The EPA guidance documents recommend the identification of a 'tone' when any individual 1/3 octave frequency is 5dB higher than its neighbouring frequency. The table below lists the tones identified from the monitoring occurring at the KMK Metals facility on 30th November 2011.

Table 3.2.1: Tonal Features Identification

Monitoring Station	Night-time Tonal Features (Frequency & Pressure)	Day-time Tonal Features (Frequency & Pressure)	Comments
NE001	58 dB at 160 Hz	No identified tones	Truck engine ticking over in the front yard area
NE002	62 dB at 100 Hz	No identified tones	Forklift operating near the office area
NE003	No identified tones	No identified tones	
NE004	No identified tones	No identified tones	
NE005	No identified tones	68 dB tone at 315 Hz	Hum noted arising from the work sheds to the north of this station – no positive id of the source
NE006	69dB tone at 25 Hz, 66dB tone at 160 Hz	62 dB tone at 250 Hz	Station located to the rear of works sheds and adjacent access road

Station's NE001, NE002 and NE006 all recorded tonal features during the night-time monitoring event. These tones arose at relatively low sound pressure values (58-69 dBZ), and were sourced to close occurring activities at each of the relevant monitoring stations – trucks starting, forklift activities, activities audible from nearby work-sheds. As such it is not likely that these tones would be audible at noise sensitive receptors, due to the distance and obstacles present between the facility boundaries and the closest receptors.

Station NE005 and NE006 both recorded tonal features in the day-time monitoring event. The former was a very distinct tone, identified as a 'hum' occurring at the rear of the adjacent work-shed during the monitoring event. Though very noticeable at this station, it was not evident at nearby station NE004, and is therefore not likely to be audible at sensitive receptors. The later, station NE006, detected a tonal feature at 250 Hz. This was sourced to the exactor style unit, used in the washing machine dismantling shed. The tone is unlikely to be audible at sensitive receptors, due to the distance and obstacles present between the facility boundary and sensitive receptors to the north.

The only tone to be audible at more than 1 location was at 160 Hz, present at station NE006 with a sound pressure of 66dBZ and at station NE001 with a sound pressure of 58 dBZ. These 2 monitoring positions are located to the north of the facility, and approximately 34 meters apart. The tone was only noticeable during the early morning recording, and is at a higher sound pressure at the stations furthest from the facility operations. Diesel truck engines were present at both locations, and this frequency is likely to arise from the running of such engines. As the frequency was not audible at other locations, it is not likely that this tone, as arising from the industrial park, is reaching dwellings located adjacent the Regional road.

4.0 CONCLUSIONS

Environmental noise monitoring was carried out by ENVIROCO Management Ltd at the KMK Metals Recycling Ltd facility situated within the Cappincur Industrial Estate, Daingean Road, Tullamore, Co. Offaly, on the 30th November 2011. Monitoring was requested by Mr. Kurt Kyck of KMK Metals Recycling Ltd as required by the conditions of their waste licence (W0113-03) for submission to the Environmental Protection Agency.

Noise monitoring was conducted utilising the Type 1 Bruel Kjaer 2250 SLM with wind muffler noise meter. This monitor operates as a Real Time Analyser (RTA) and Sound Level Meter (SLM), enabling both statistical analysis of the audible noise and breakdown of the sound pressure recorded into frequency bandwidths.

The closest noise sensitive receptors are located adjacent the Cappincur – Ballinagar local road to the north, these houses are approximately 220 to 240 meters distance from the closest noise.

Early morning (night time) measurements were taken over 15 minute intervals at all 6 EPA issued monitoring stations. The $L_{Aeq(15minute)}$ results for these stations show that noise levels after 7am and were highest on the northern boundaries. Levels are not of sufficient level to breach the EPA limits of 45 dB(A) at sensitive receptors.

The majority of stations recorded show relatively similar results, with $L_{Aeq\ (15\ minutes)}$ typically ranging from 60 to 63 dB and $L_{Aeq\ (30\ minutes)}$ typically was ranging from 63-66 dB.

Peak L_{Aeq} readings during the early morning (nigh-time) were recorded at NE005 on the northwest boundary. This was attributable to ongoing activities at all nearby work sheds and radio's playing.

Peak L_{Aeq} readings during the day were recorded at NE001, on the northern boundary. This was attributable to the ongoing construction work activities in this area.

The distance to, the obstacles present (other buildings, walls, hedging) and the proximity to other noise sources (closer industrial units, road traffic) would indicate that the noise levels recorded at the KMK Metals facility are not likely to cause annoyance at Sensitive Receptors.

1-3 Octave Band Analysis of the day and night measurements show no recurring tonal aspect (tone present at more than 2 locations, or present at both day and night recordings).

Tones were identified at 4 stations from both the day and night recordings. The variance in the tonal features, the relatively low sound pressure that the tones had, would indicate that these tonal features would not be evident at sensitive receptors.

The results of the noise survey show that noise emissions from the KMK Metals facility are not significant and will not have any negative effect of neighbouring businesses.

Appendix A

- **Noise Results & Charts**

Noise Results

Client: KMK Metals Recycling Ltd
Site: Cappincur Industrial Estate, Daingean Road, Tullamore, Co. Offaly
Monitoring Date: Wednesday 30th November 2011
Sampler: Kenneth Goodwin (ENVIROCO Management Ltd)
Weather: .Cold, damp becoming increasingly overcast and increasing frequency of gusts
Equipment: Type 1 Bruel Kjaer 2250 SLM with wind muffler

Table 1 Noise Results Night-Time

Number	Time	Duration (min)	L_{eq} dB(A)	L_{max} dB(A)	L_{min} dB(A)	$L_{(1)}$ dB(A)	$L_{(5)}$ dB(A)	$L_{(10)}$ dB(A)	$L_{(50)}$ dB(A)	$L_{(90)}$ dB(A)	$L_{(95)}$ dB(A)	$L_{(99)}$ dB(A)
NE001	06:05	00:15:00	63	79	38	73	71	63	61	41	40	39
NE002	06:21	00:15:00	60	83	48	70	65	62	57	51	51	50
NE003	06:43	00:15:00	60	81	44	71	65	62	56	50	49	47
NE004	07:02	00:15:00	60	78	52	67	64	62	59	57	56	54
NE005	07:19	00:15:00	67	86	59	73	71	70	65	63	62	61
NE006	07:36	00:15:00	63	75	48	70	67	67	59	51	50	49

Table 2 Noise Results Day-Time

Number	Time	Duration (min)	L_{eq} dB(A)	L_{max} dB(A)	L_{min} dB(A)	$L_{(1)}$ dB(A)	$L_{(5)}$ dB(A)	$L_{(10)}$ dB(A)	$L_{(50)}$ dB(A)	$L_{(90)}$ dB(A)	$L_{(95)}$ dB(A)	$L_{(99)}$ dB(A)
NE001	08:54	00:30:00	70	84	63	77	73	72	69	66	65	64
NE002	09:27	00:30:00	63	82	53	72	67	65	60	57	56	55
NE003	10:01	00:30:00	64	80	52	73	70	69	60	56	55	54
NE004	10:34	00:30:00	66	81	56	72	69	68	65	61	60	58
NE005	11:05	00:30:00	65	84	60	73	68	66	63	62	62	61
NE006	11:37	00:30:00	64	77	56	71	69	67	63	60	59	57

Notes

Table 3 Notes Regarding Monitoring Positions

Number	Grid Ref.*		Comments
	Easting	Northing	
NE001	235944	225050	Car park at fence eastern boundary
NE002	235956	224996	Eastern boundary, beside disused portacabin
NE003	235859	224960	Fence at South-western boundary
NE004	235863	225011	Western boundary adjacent to the D1-D3 building
NE005	235906	225056	North-western boundary in front of the newly roofed D4 yard area
NE006	235858	225030	North-eastern of the D4 yard area

*Grid reference are 6 figure IG reference

Table 4 Weather Data

Weather Station	Rain (mm)	Max temp (˚C)	Min temp (˚C)	Sun (hours)	Gust (knots)	Wind (knots)
Gurteen	12	10.1	3.8	-	35	14.9

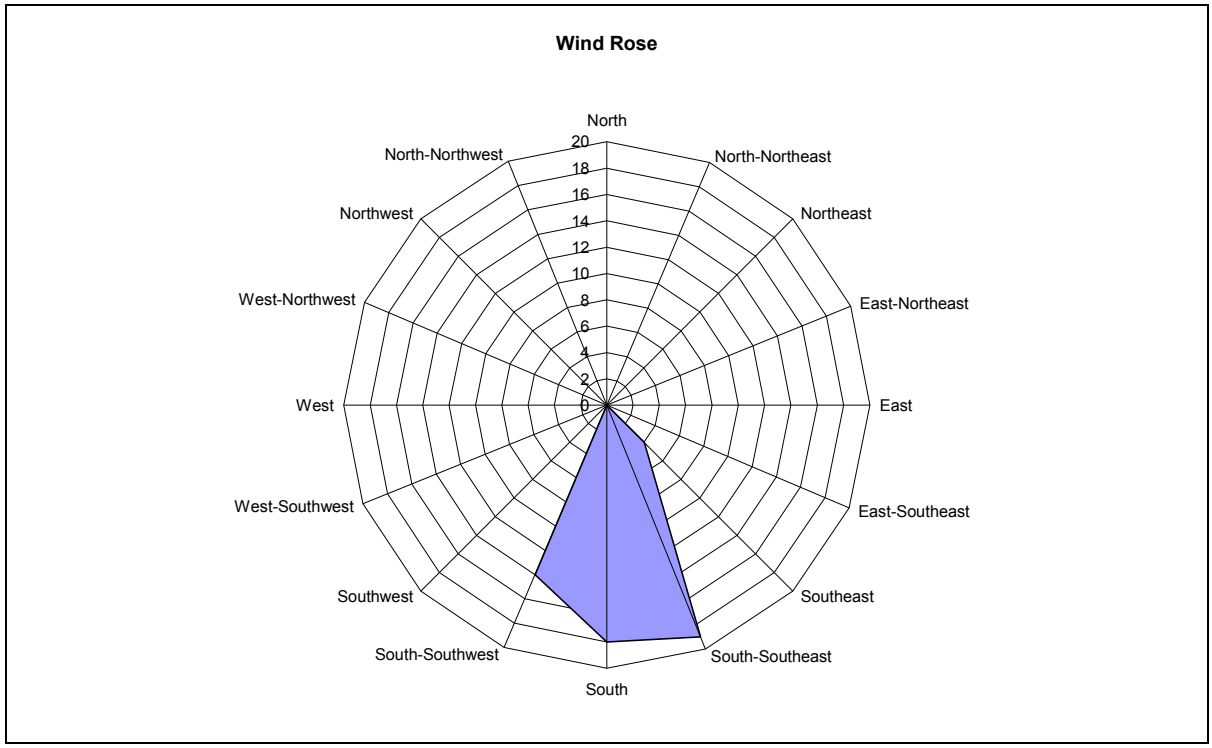
The above data refer to the period midnight to midnight They are provisional data and have not been quality controlled Rain is total precipitation plus deposition in mm. Max is the maximum temperature in Degrees Celsius Min is the minimum temperature in Degrees Celsius Sun is the total sunshine in hours Gust is the highest gust of wind in knots if 34 knots or greater Wind is the mean wind speed in knots Soil is the mean 10cm temperature in Degrees Celsius G_{min} is the minimum temperature on a grass surface in Degrees Celsius.

Table 5: Vantage Vue Weather Station Tullamore Data:

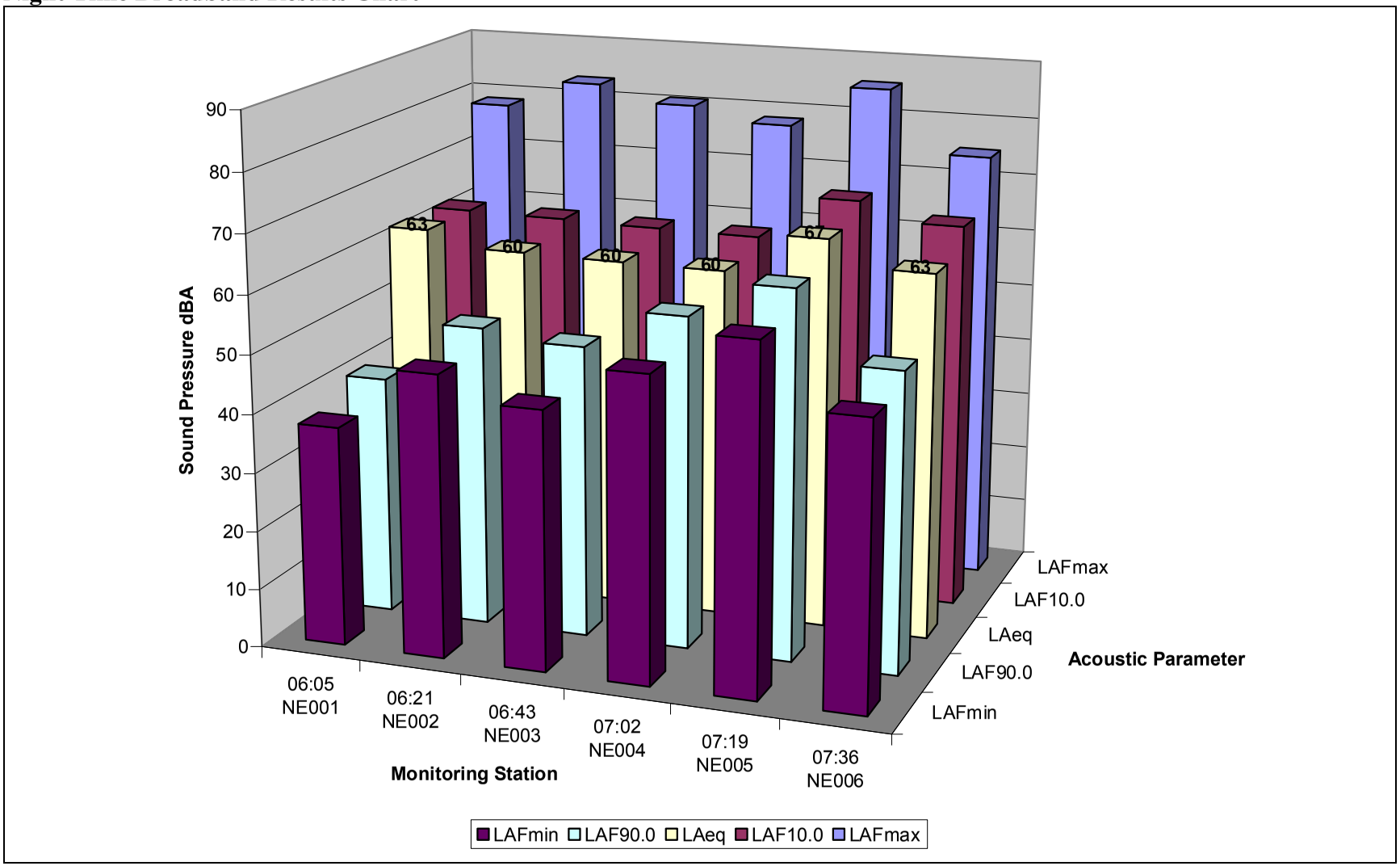
Date	30/11/2011			
Start Time	05:00:00		**Finish Time**	14:00:00
Temperature	7.50		**High Temperature**	9.70
			Low Temperature	4.90
Humidity	88.71		**Dew Point**	5.75
Wind Speed	3.19		**High Wind Speed**	9.40
Wind Direction	SSE		**Bar**	726.06
THW Index	5.42		**Wind Chill**	5.37
Rain	0.00		**Rain Rate**	0.00

Temperature in ºC, Wind speed in m/s, rainfall in mm

Wind Rose Chart – Vantage Vue Weather Station:



Night Time Broadband Results Chart



Day time Broadband Chart

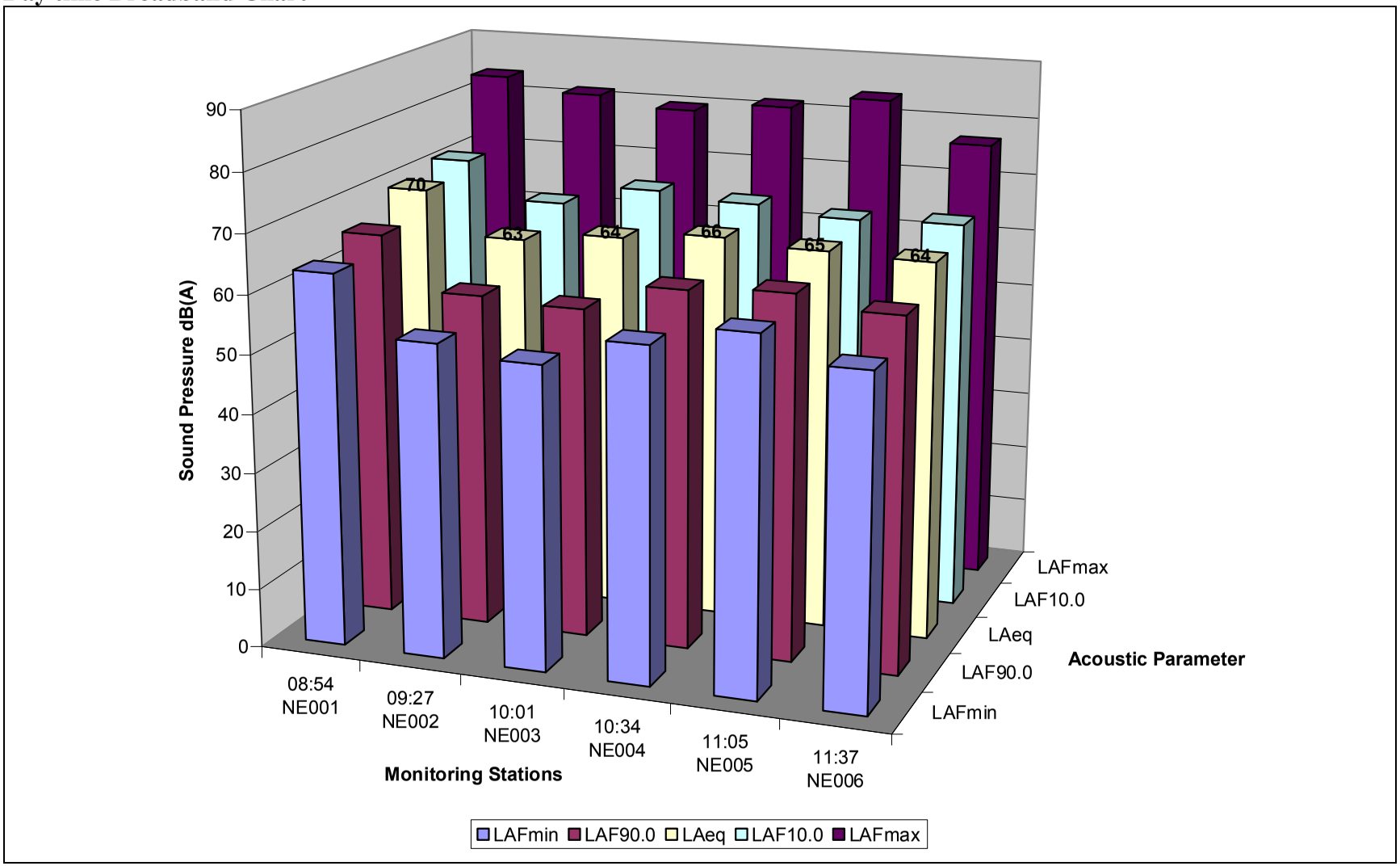


Table 6 L_{Aeq} Full Octave Analysis of Noise Measurements – Night-Time Measurements (06am to 08pm)

	L_{Aeq} Frequency (Hz)																		
Project Name	**12.5**	**16**	**20**	**25**	**31.5**	**40**	**50**	**63**	**80**	**100**	**125**	**160**	**200**	**250**	**315**	**400**	**500**	**630**	**800**
NE001	69	67	65	63	60	57	58	59	50	52	52	58	50	51	53	50	51	55	54
NE002	55	53	53	57	61	55	53	53	57	62	53	53	52	53	51	49	51	52	50
NE003	65	62	60	59	57	54	57	60	58	53	52	52	51	50	49	50	51	52	52
NE004	59	57	56	58	59	58	60	59	60	55	53	56	53	59	57	52	52	50	50
NE005	67	65	63	61	64	63	63	62	62	60	58	60	58	63	61	59	59	58	57
NE006	66	63	62	69	58	57	62	59	62	56	58	66	57	61	56	56	57	55	54

Table 6 L_{Aeq} Full Octave Analysis of Noise Measurements – Night-Time Measurements (Continued)

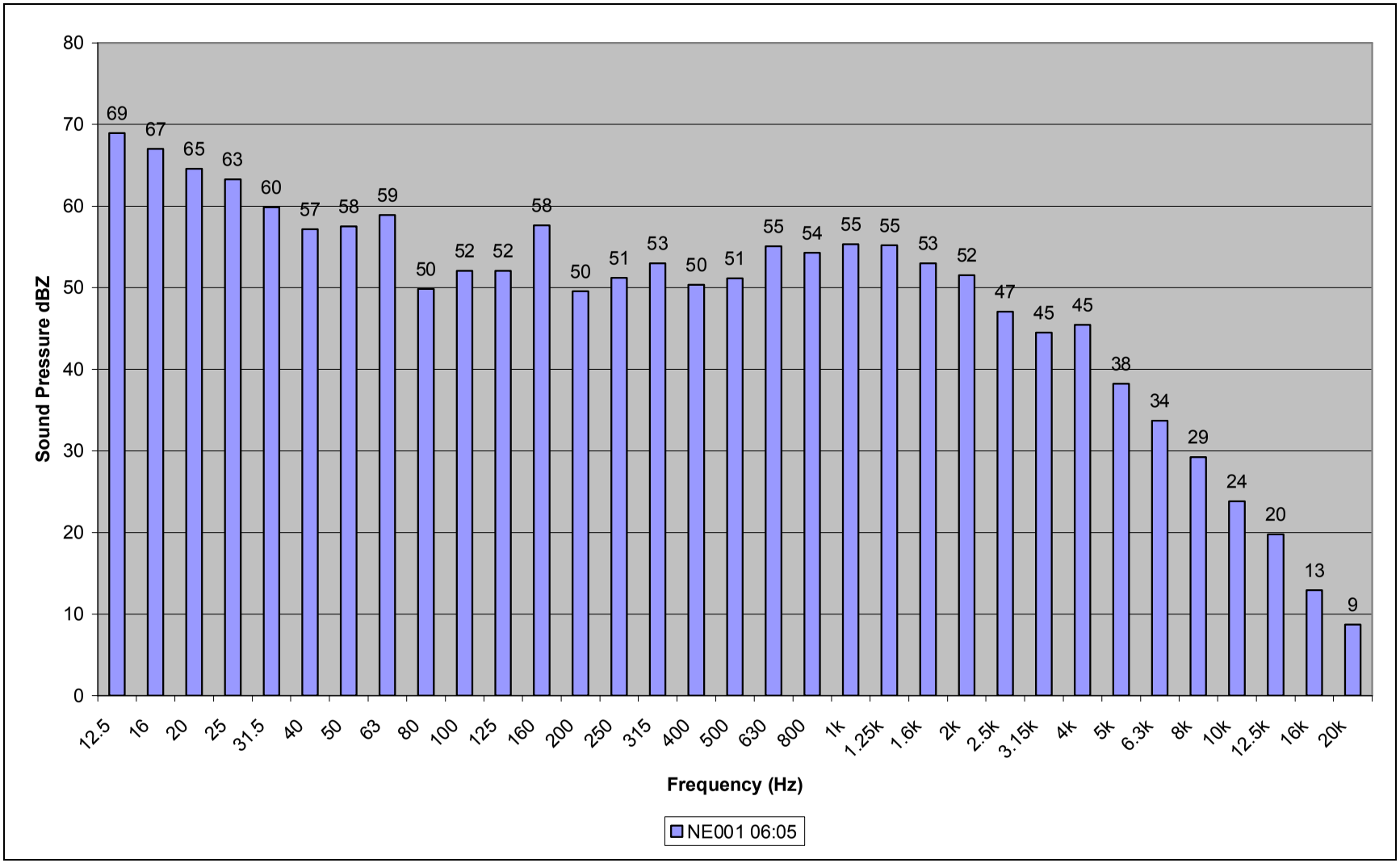
	L_{Aeq} Frequency (Hz)													
Project Name	**1k**	**1.25k**	**1.6k**	**2k**	**2.5k**	**3.15k**	**4k**	**5k**	**6.3k**	**8k**	**10k**	**12.5k**	**16k**	**20k**
NE001	55	55	53	52	47	45	45	38	34	29	24	20	13	9
NE002	50	52	48	48	47	50	43	47	38	35	32	28	23	16
NE003	52	52	50	48	46	46	44	41	38	35	31	25	18	11
NE004	50	49	48	47	46	45	43	40	37	33	27	22	16	10
NE005	56	56	55	55	54	55	52	51	49	46	43	39	34	28
NE006	51	52	49	47	46	45	42	39	36	32	29	26	23	11

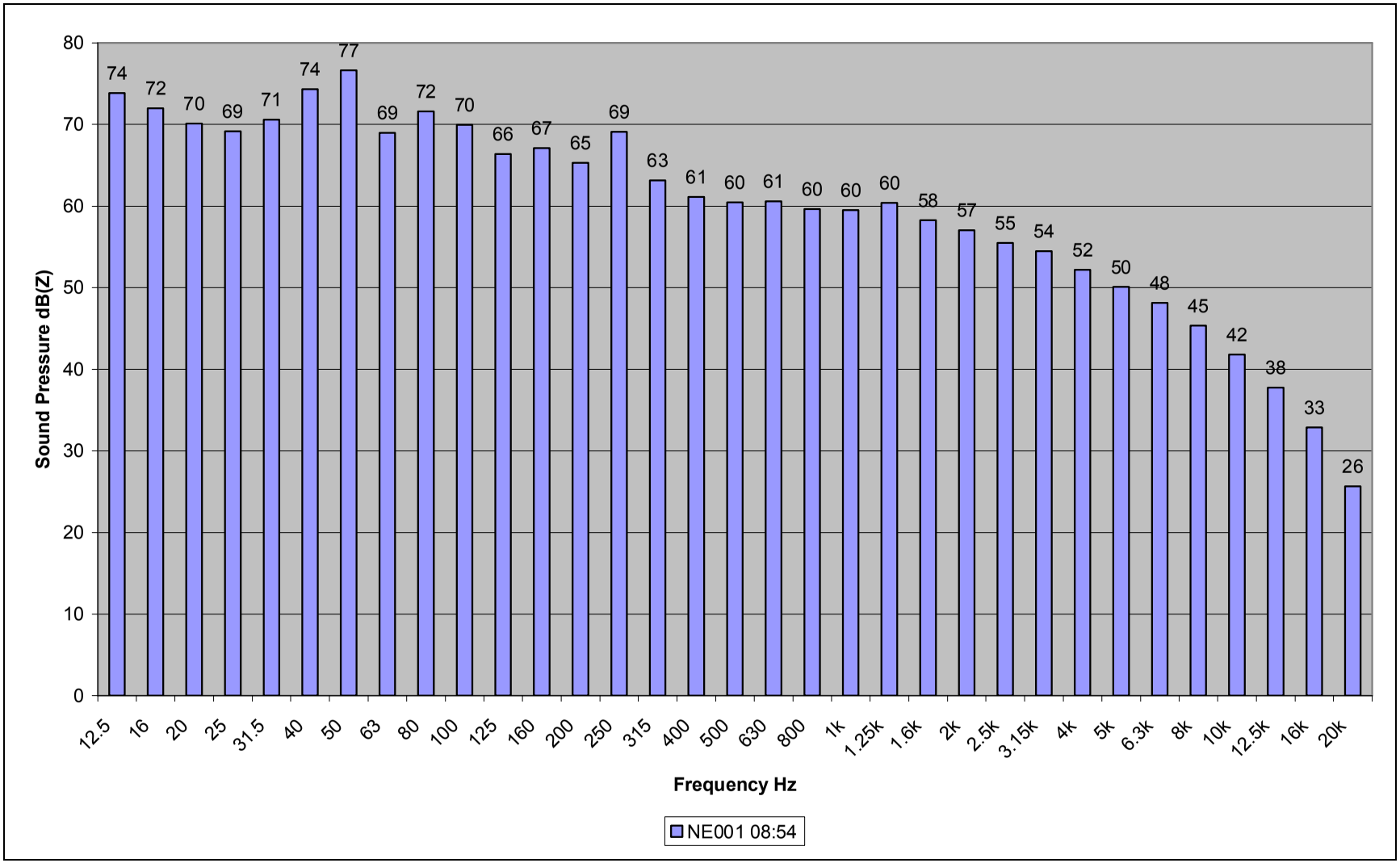
Table 6 L_{Aeq} Full Octave Analysis of Noise Measurements – Day-Time Measurements (08am to 1pm)

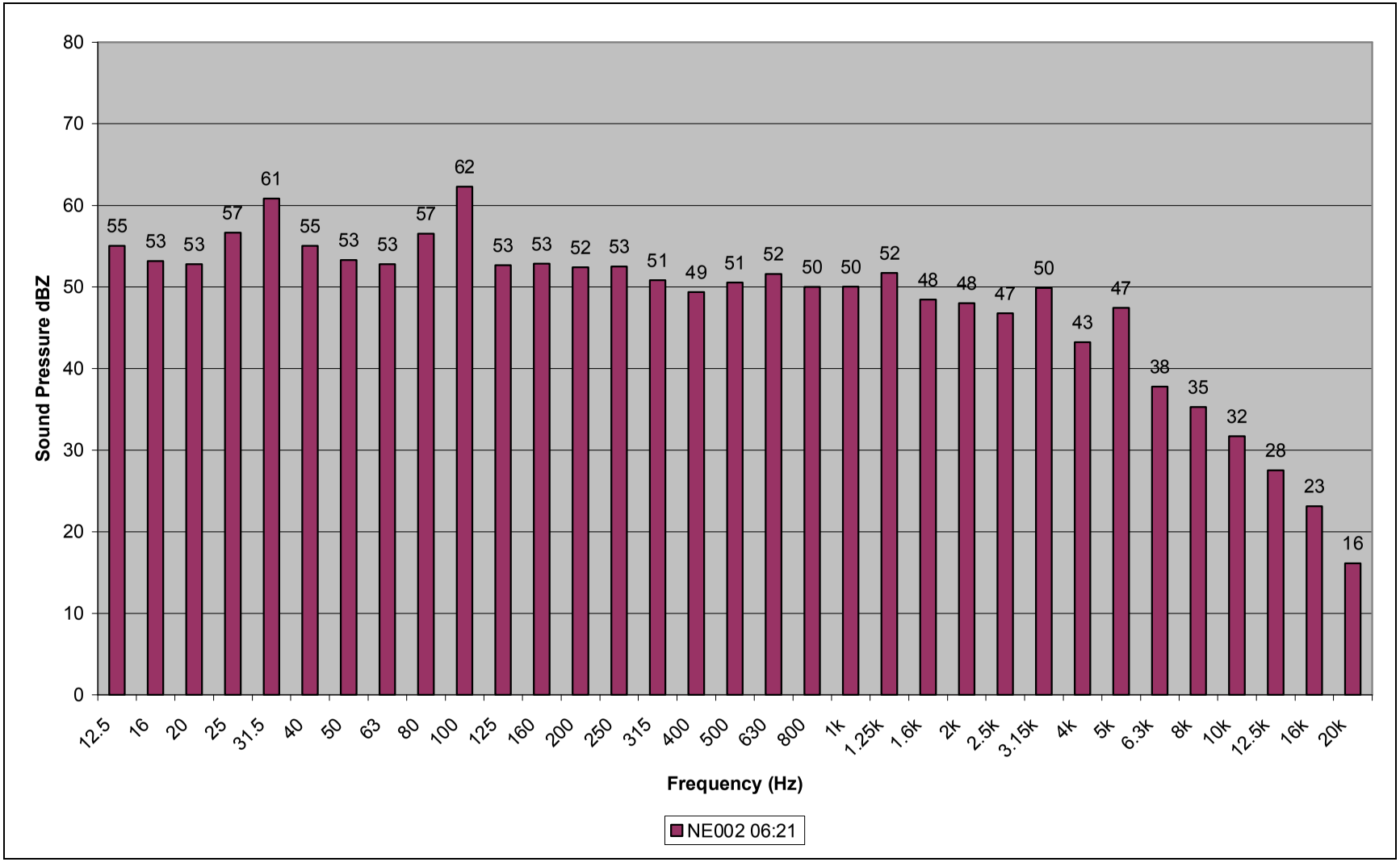
	L_{Aeq} Frequency (Hz)																		
Project Name	**12.5**	**16**	**20**	**25**	**31.5**	**40**	**50**	**63**	**80**	**100**	**125**	**160**	**200**	**250**	**315**	**400**	**500**	**630**	**800**
NE001	74	72	70	69	71	74	77	69	72	70	66	67	65	69	63	61	60	61	60
NE002	56	57	56	63	62	66	57	61	62	64	56	57	55	55	54	54	53	53	53
NE003	68	67	65	66	69	62	64	67	62	58	61	63	60	61	57	56	57	56	55
NE004	67	66	63	63	63	63	67	66	64	61	63	62	60	60	62	58	57	56	56
NE005	70	68	65	65	63	63	64	62	59	57	56	57	56	56	68	58	53	52	52
NE006	69	68	67	69	71	70	68	65	67	61	60	61	57	62	57	56	57	56	56

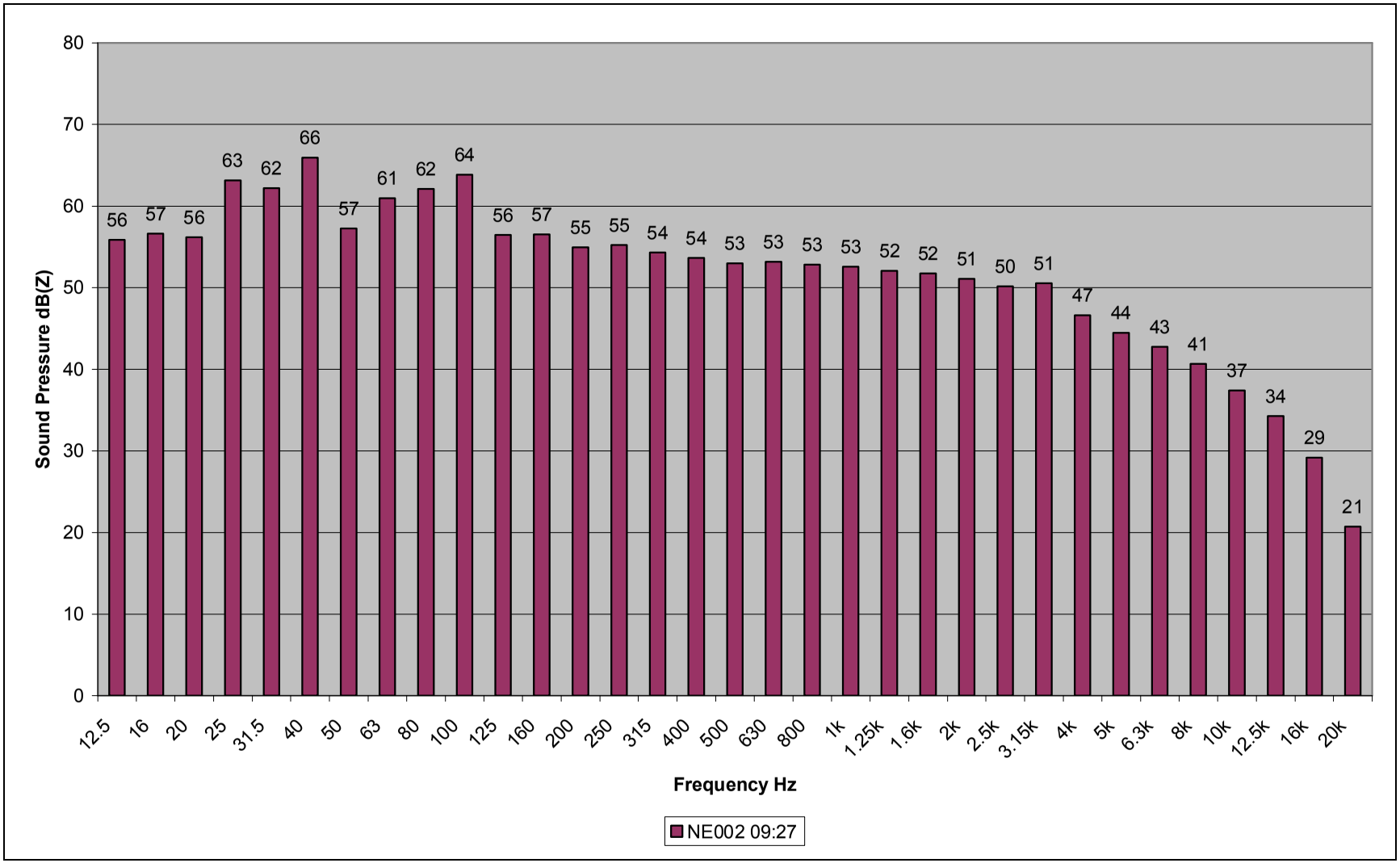
Table 6 L_{Aeq} Full Octave Analysis of Noise Measurements – Day-Time Measurements (Continued)

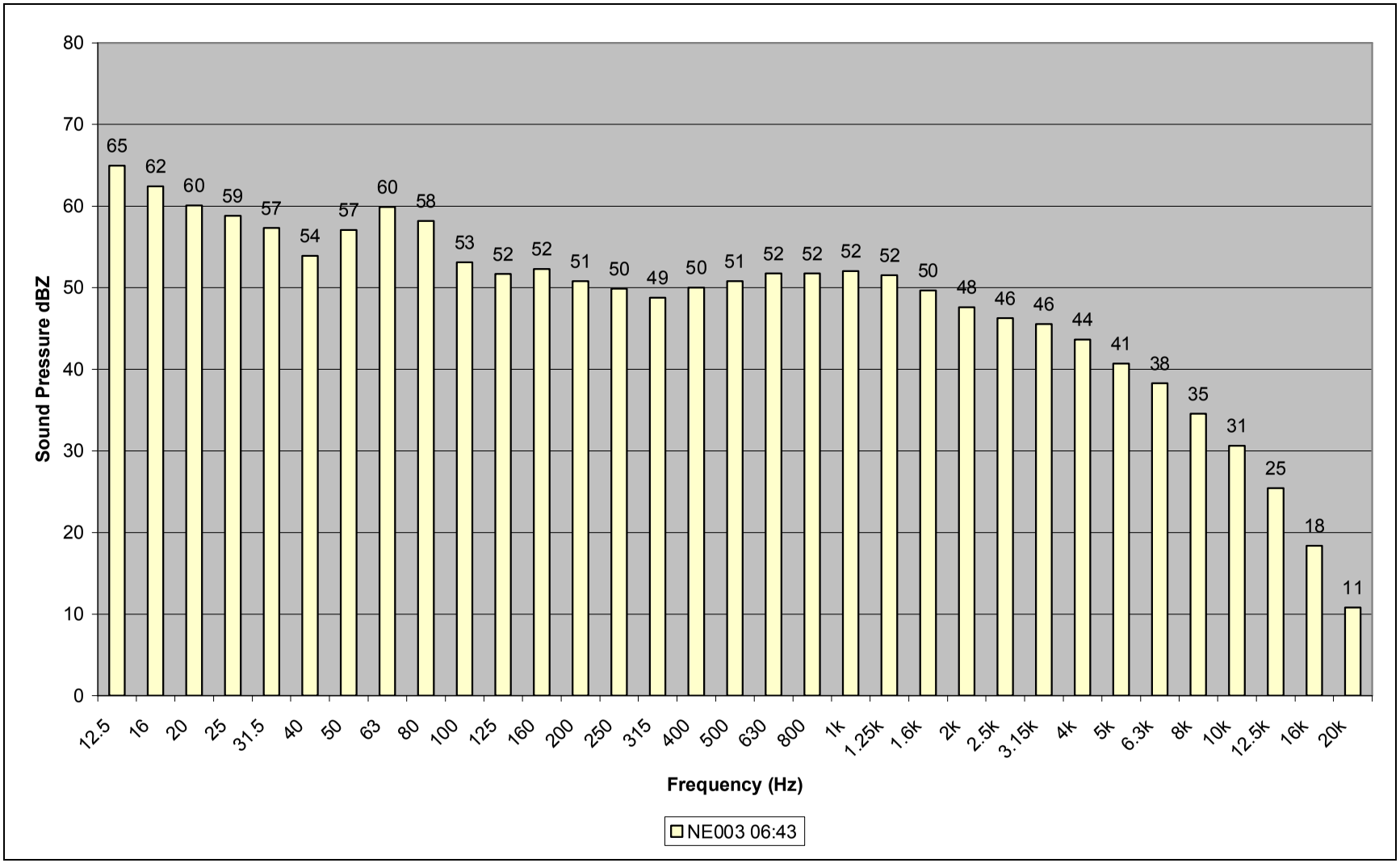
	L_{Aeq} Frequency (Hz)													
Project Name	**1k**	**1.25k**	**1.6k**	**2k**	**2.5k**	**3.15k**	**4k**	**5k**	**6.3k**	**8k**	**10k**	**12.5k**	**16k**	**20k**
NE001	60	60	58	57	55	54	52	50	48	45	42	38	33	26
NE002	53	52	52	51	50	51	47	44	43	41	37	34	29	21
NE003	55	54	52	51	49	49	47	45	43	40	36	33	27	19
NE004	56	56	54	54	53	51	48	45	42	38	34	29	23	16
NE005	52	51	51	51	50	51	48	45	44	41	38	34	29	23
NE006	54	53	53	52	50	49	47	44	41	36	31	28	23	17

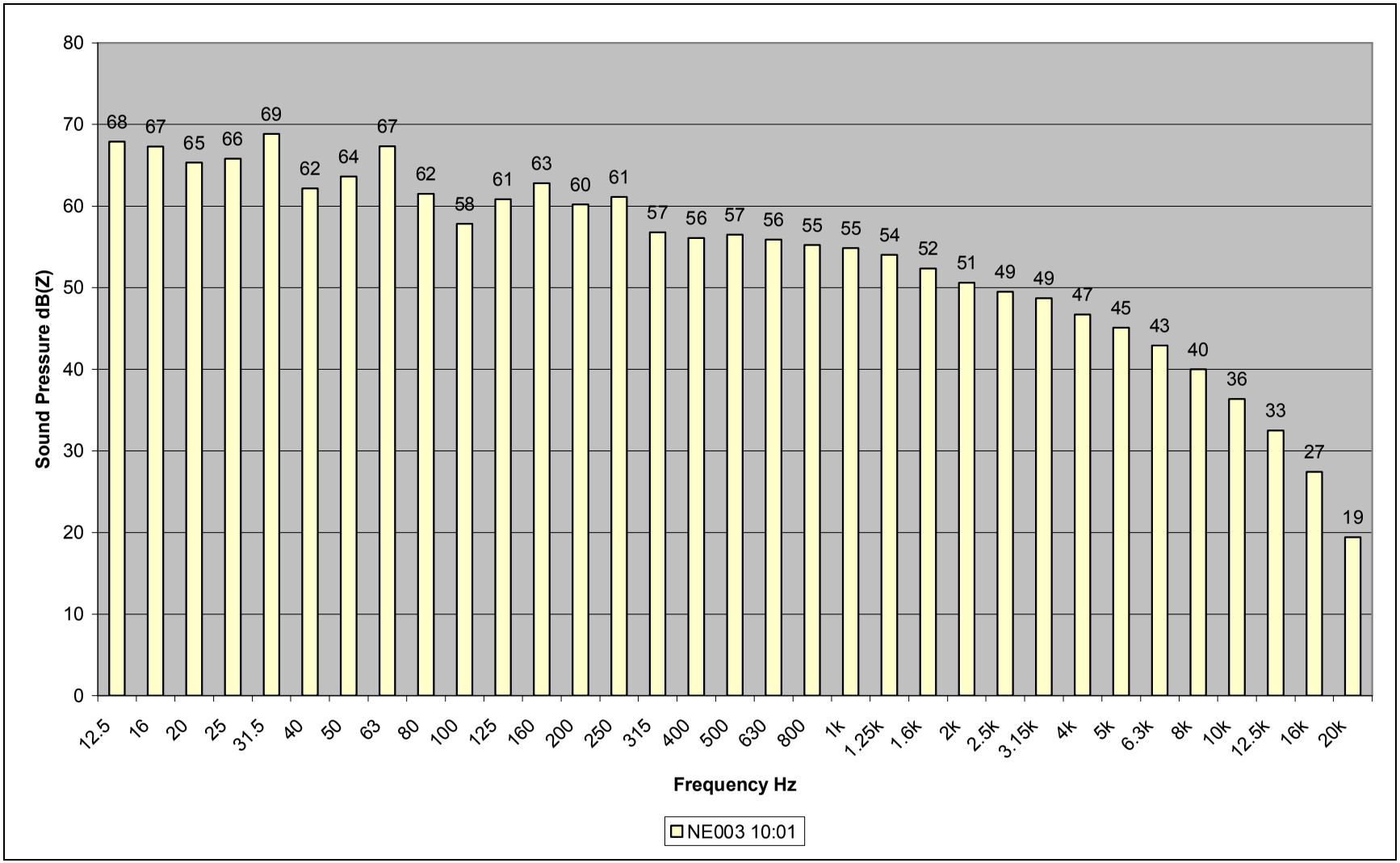

Sound Pressure dBZ
80
70
60
50
40
30
20
10
0
69
67
65
63
60
57
58
59
50
52
52
58
50
51
53
50
51
55
54
55
55
53
52
47
45
45
38
34
29
24
20
13
9
12.5
16
20
25
31.5
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1k
1.25k
1.6k
2k
2.5k
3.15k
4k
5k
6.3k
8k
10k
12.5k
16k
20k
Frequency (Hz)
NE001 06:05

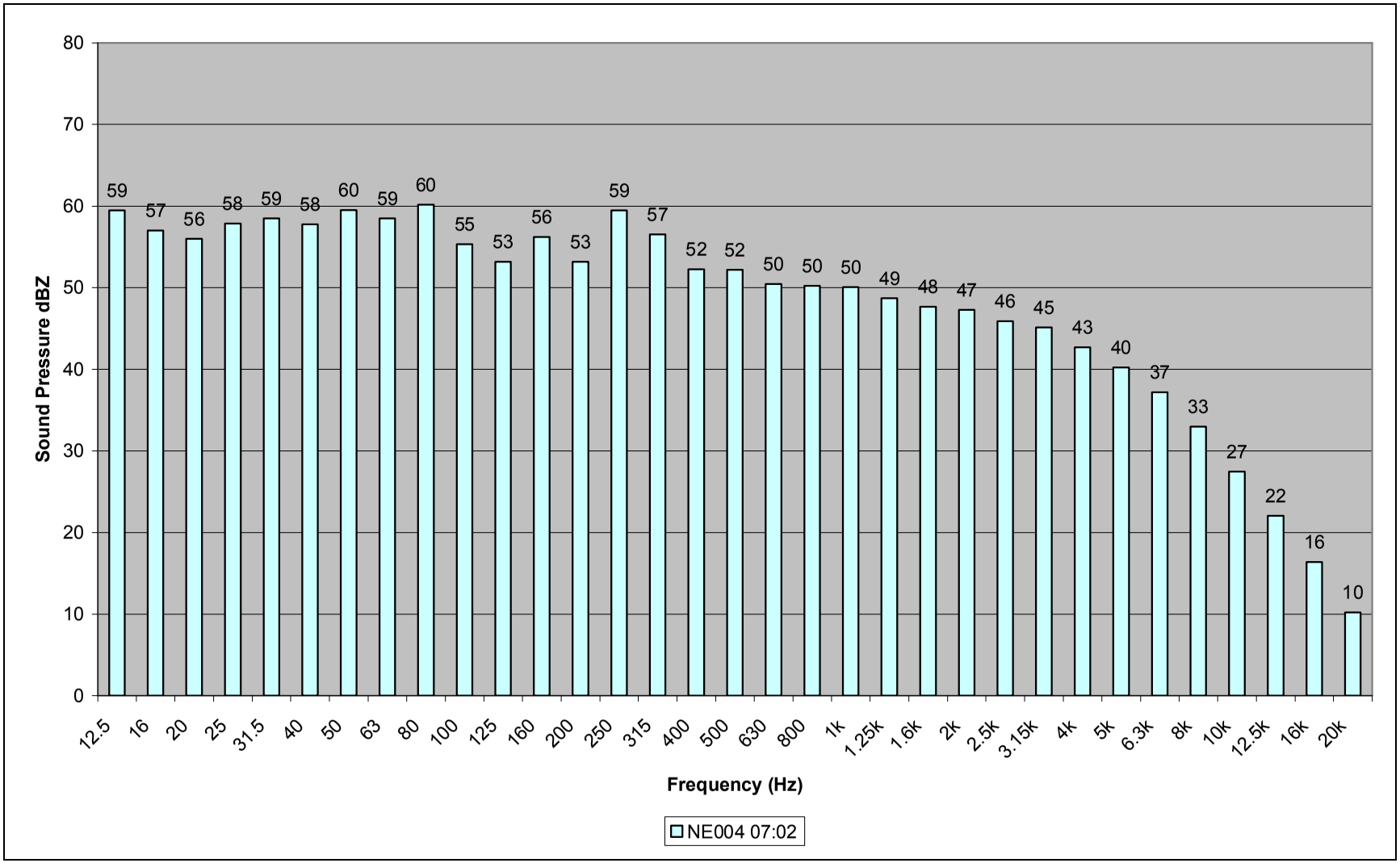

Sound Pressure dB(Z)
80
70
60
50
40
30
20
10
0
74 72 70 69 71 74 77 69 72 70 66 67 65 69 63 61 60 61 60 60 60 58 57 55 54 52 50 48 45 42 38 33 26
12.5 16 20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1k 1.25k 1.6k 2k 2.5k 3.15k 4k 5k 6.3k 8k 10k 12.5k 16k 20k
Frequency Hz
NE001 08:54

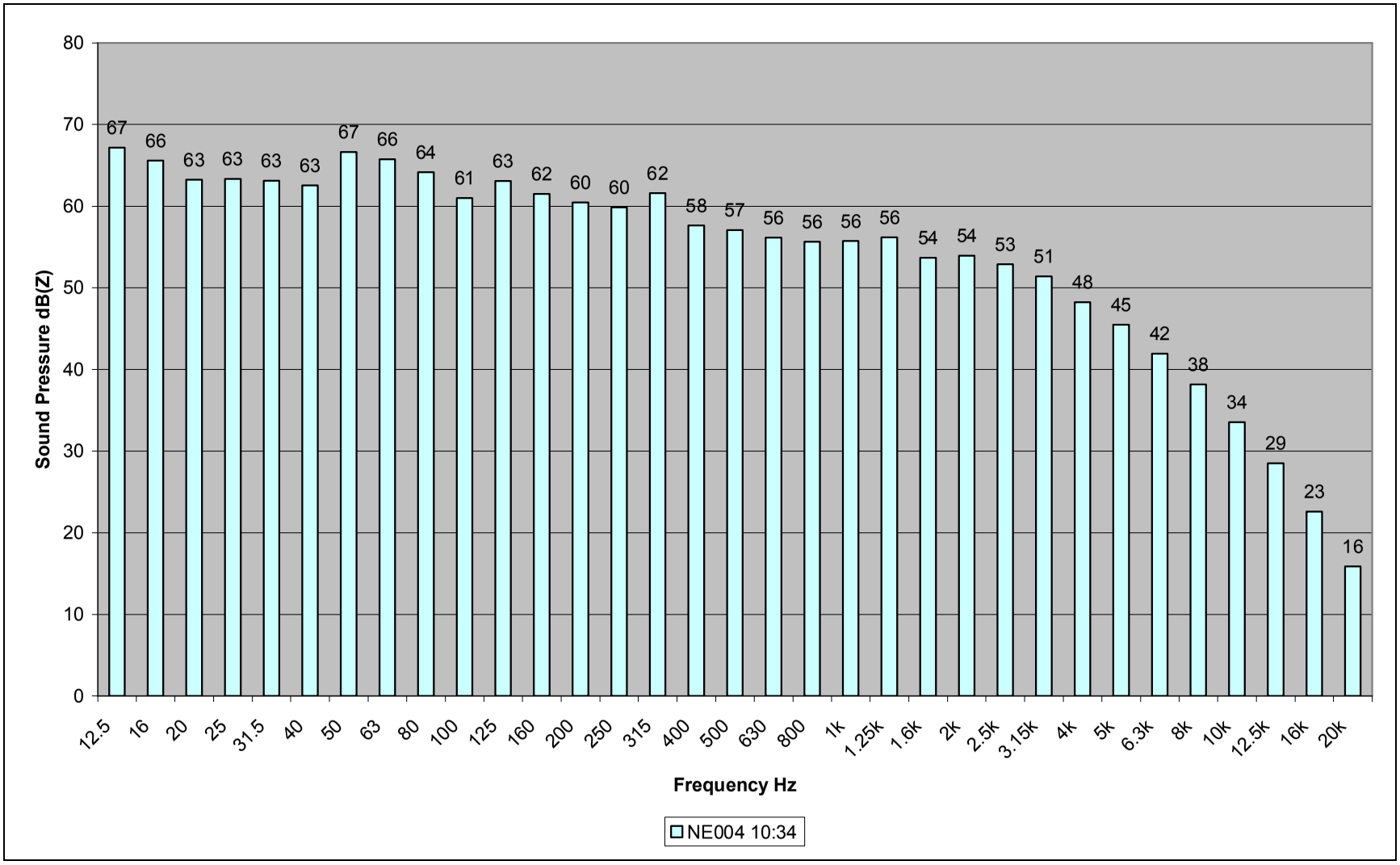

Sound Pressure dBZ
80
70
60
50
40
30
20
10
0
55 53 53 57 61 55 53 53 57 62 53 53 52 53 51 49 51 52 50 50 52 48 48 47 50 43 47 38 35 32 28 23 16
12.5 16 20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1k 1.25k 1.6k 2k 2.5k 3.15k 4k 5k 6.3k 8k 10k 12.5k 16k 20k
Frequency (Hz)
NE002 06:21

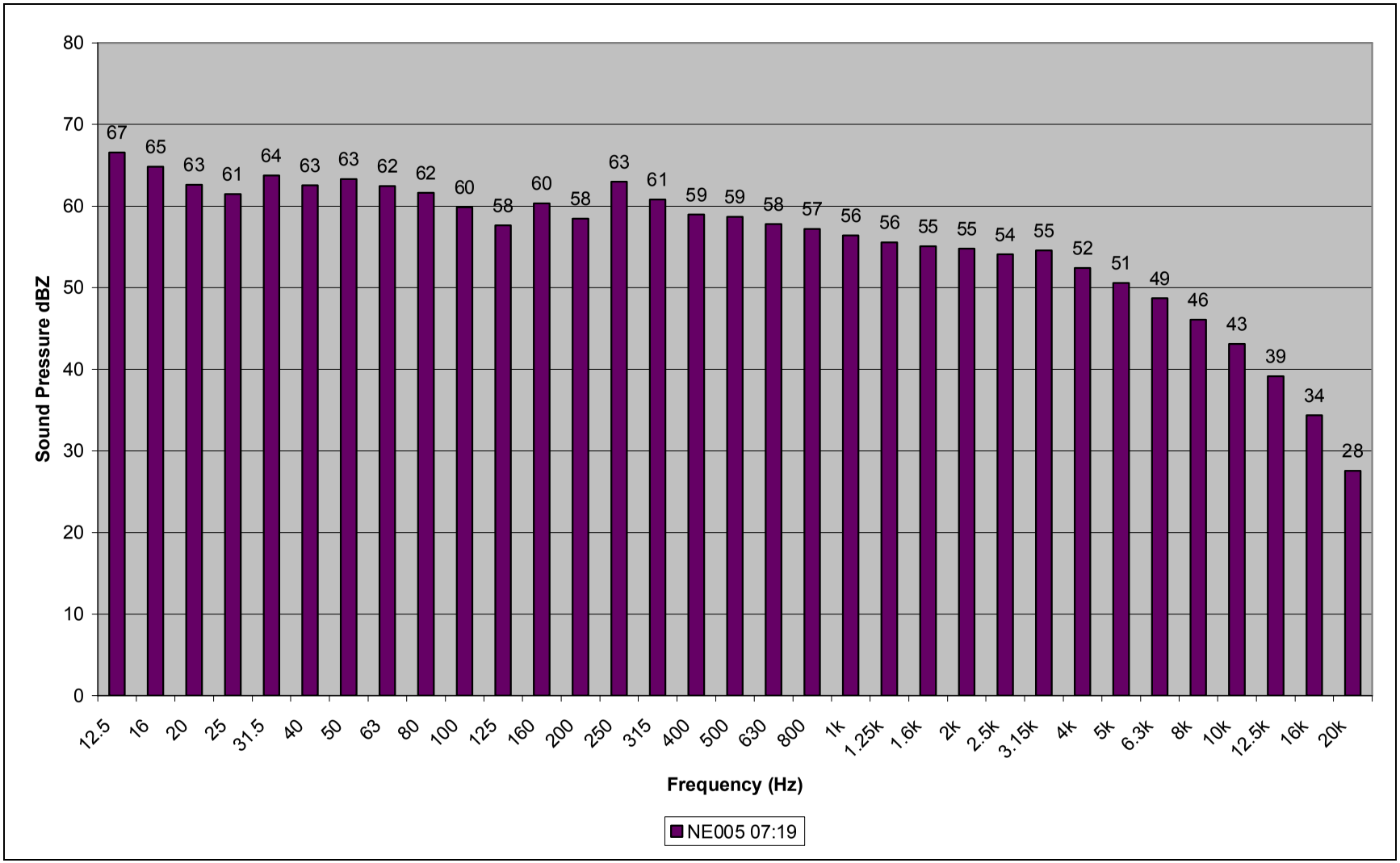

Sound Pressure dB(Z)
80
70
60
50
40
30
20
10
0
56 57 56 63 62 66 57 61 62 64 56 57 55 55 54 54 53 53 53 53 52 52 51 50 51 47 44 43 41 37 34 29 21
12.5 16 20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1k 1.25k 1.6k 2k 2.5k 3.15k 4k 5k 6.3k 8k 10k 12.5k 16k 20k
Frequency Hz
NE002 09:27

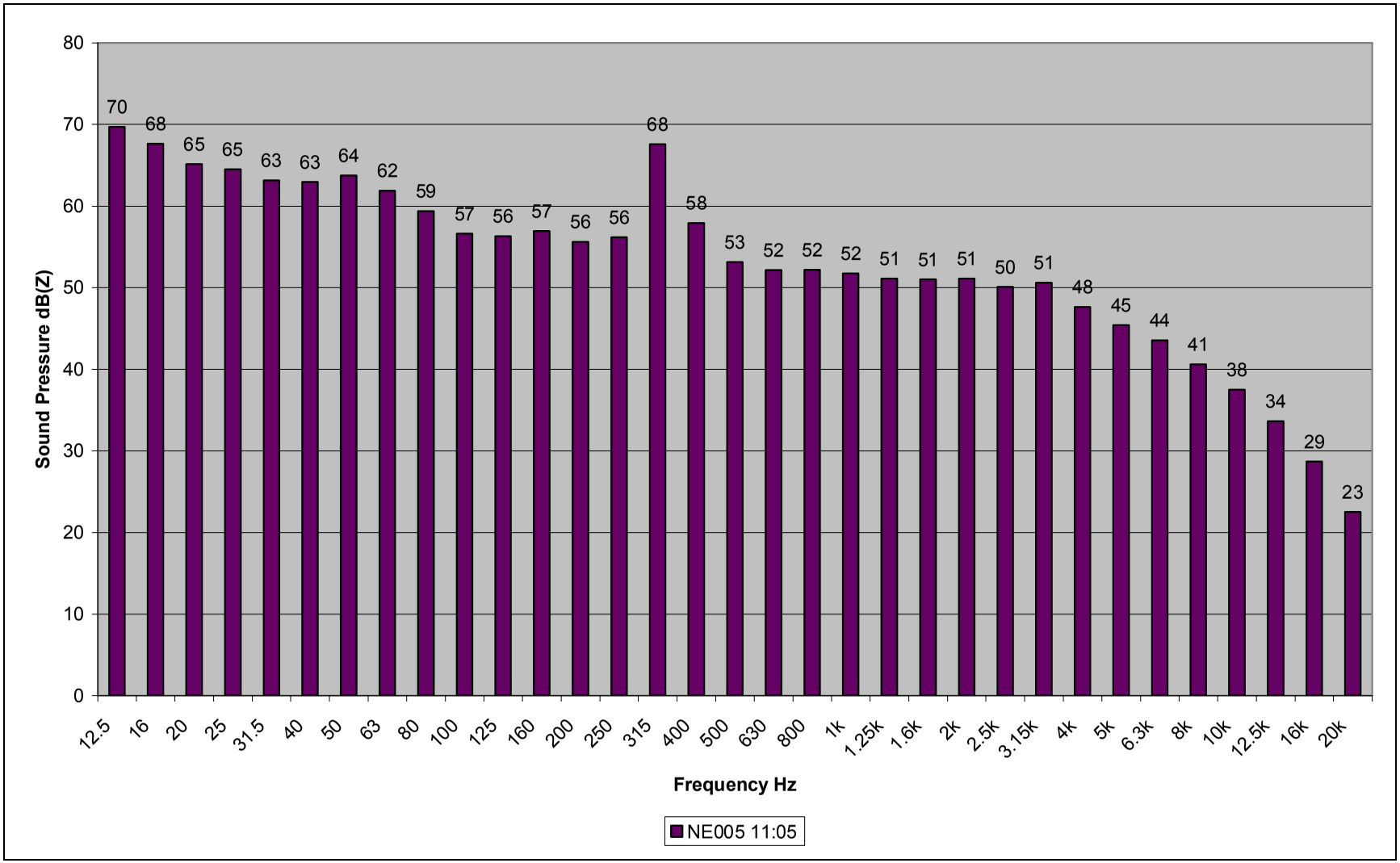

Sound Pressure dBZ
80
70
60
50
40
30
20
10
0
65
62
60
59
57
54
57
60
58
53
52
52
51
50
49
50
51
52
52
52
52
50
48
46
46
44
41
38
35
31
25
18
11
12.5
16
20
25
31.5
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1k
1.25k
1.6k
2k
2.5k
3.15k
4k
5k
6.3k
8k
10k
12.5k
16k
20k
Frequency (Hz)
NE003 06:43

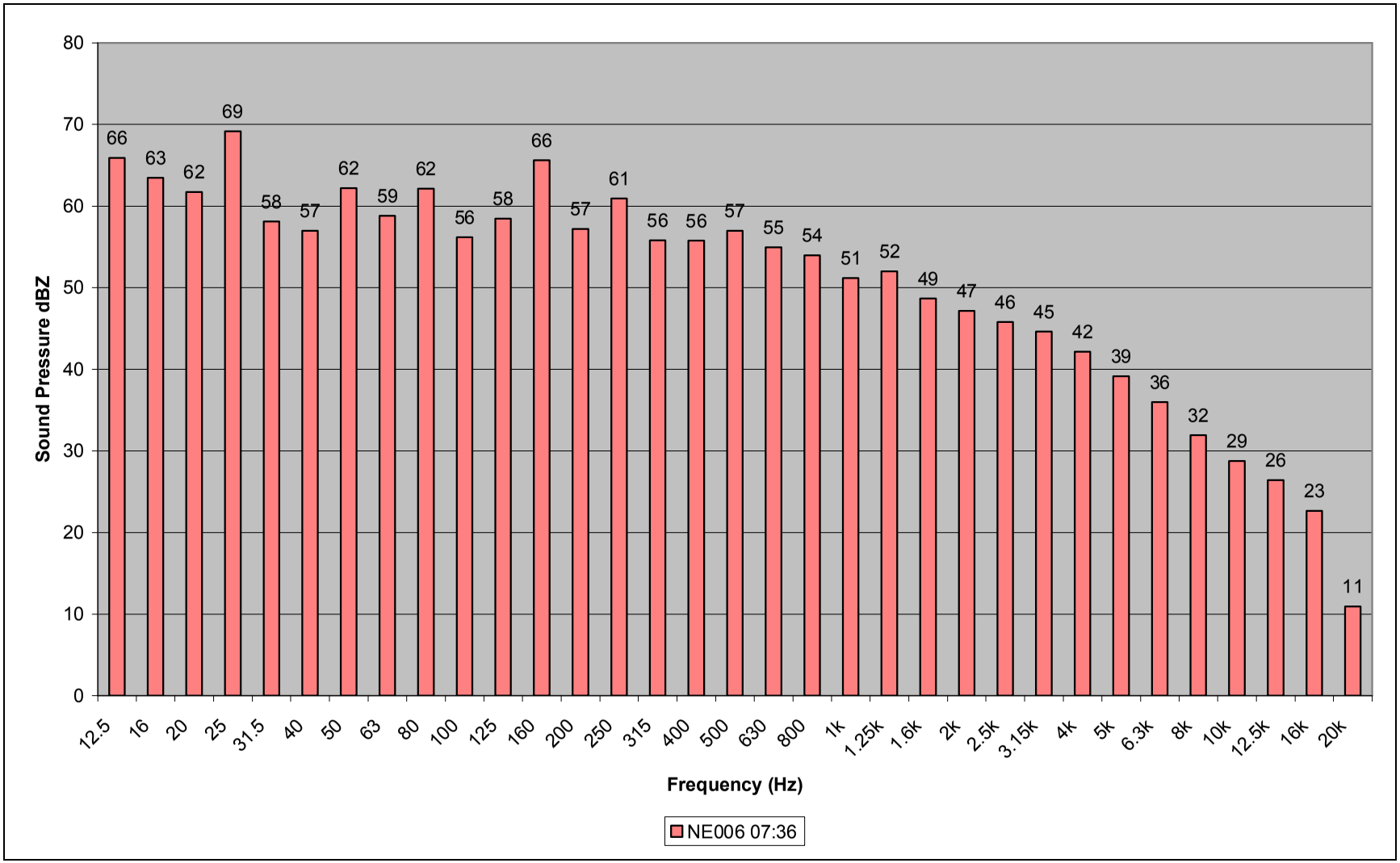

Sound Pressure dB(Z)
80
70
60
50
40
30
20
10
0
68 67 65 66 69 62 64 67 62 58 61 63 60 61 57 56 57 56 55 55 54 52 51 49 49 47 45 43 40 36 33 27 19
12.5 16 20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1k 1.25k 1.6k 2k 2.5k 3.15k 4k 5k 6.3k 8k 10k 12.5k 16k 20k
Frequency Hz
NE003 10:01

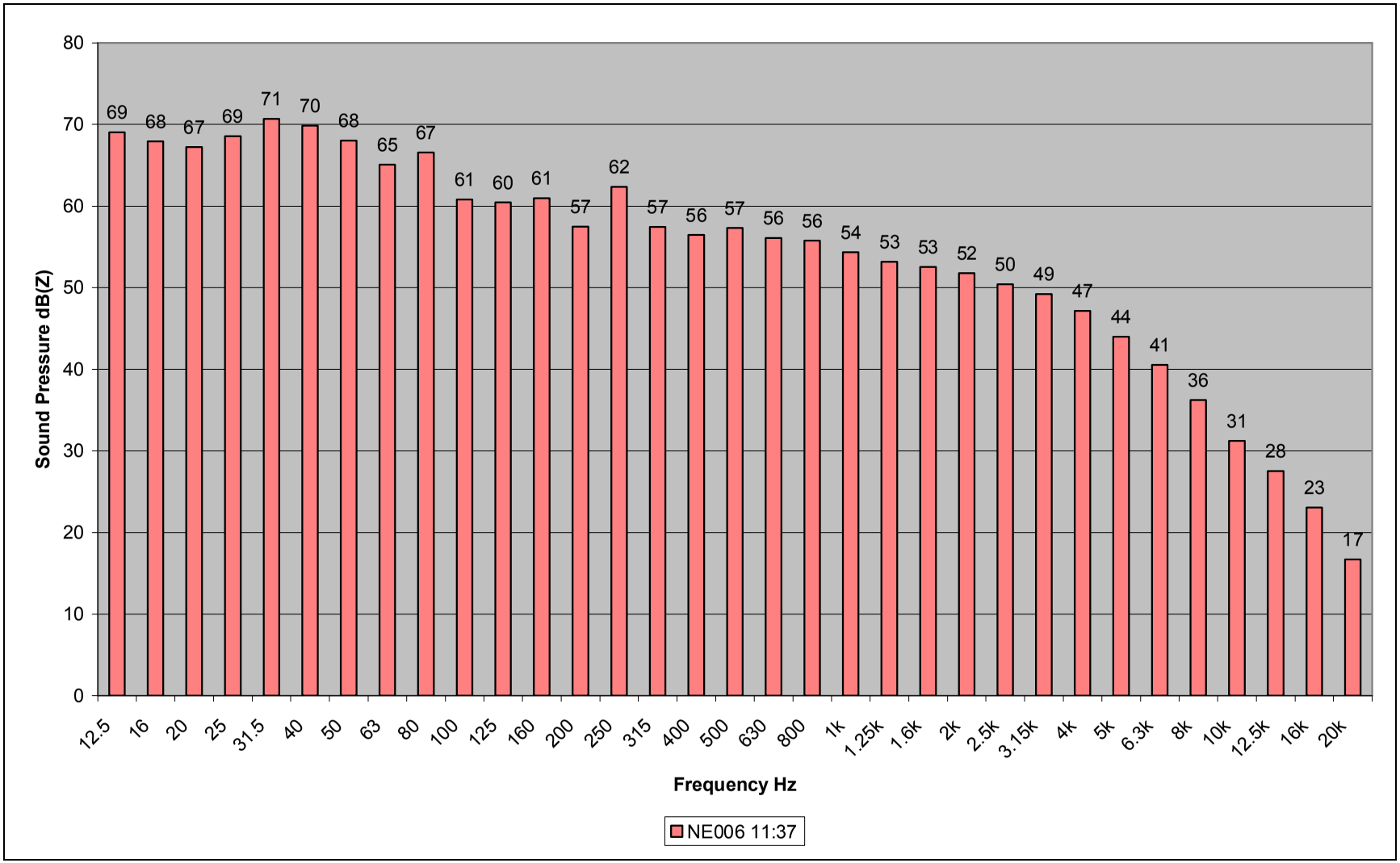

Sound Pressure dBZ
80
70
60
50
40
30
20
10
0
59
57
56
58
59
58
60
59
60
55
53
56
53
59
57
52
52
50
50
50
49
48
47
46
45
43
40
37
33
27
22
16
10
12.5
16
20
25
31.5
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1k
1.25k
1.6k
2k
2.5k
3.15k
4k
5k
6.3k
8k
10k
12.5k
16k
20k
Frequency (Hz)
NE004 07:02


Sound Pressure dB(Z)
80
70
60
50
40
30
20
10
0
67 66 63 63 63 63 67 66 64 61 63 62 60 60 62 58 57 56 56 56 56 54 54 53 51 48 45 42 38 34 29 23 16
12.5 16 20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1k 1.25k 1.6k 2k 2.5k 3.15k 4k 5k 6.3k 8k 10k 12.5k 16k 20k
Frequency Hz
NE004 10:34


Sound Pressure dBZ
80
70
60
50
40
30
20
10
0
67
65
63
61
64
63
63
62
62
60
58
60
58
63
61
59
59
58
57
56
56
55
55
54
55
52
51
49
46
43
39
34
28
12.5
16
20
25
31.5
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1k
1.25k
1.6k
2k
2.5k
3.15k
4k
5k
6.3k
8k
10k
12.5k
16k
20k
Frequency (Hz)
NE005 07:19


Sound Pressure dB(Z)
80
70
60
50
40
30
20
10
0
70 68 65 65 63 63 64 62 59 57 56 57 56 56 68 58 53 52 52 52 51 51 51 50 51 48 45 44 41 38 34 29 23
12.5 16 20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1k 1.25k 1.6k 2k 2.5k 3.15k 4k 5k 6.3k 8k 10k 12.5k 16k 20k
Frequency Hz
NE005 11:05


Sound Pressure dBZ
80
70
60
50
40
30
20
10
0
66
63
62
69
58
57
62
59
62
56
58
66
57
61
56
56
57
55
54
51
52
49
47
46
45
42
39
36
32
29
26
23
11
12.5
16
20
25
31.5
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1k
1.25k
1.6k
2k
2.5k
3.15k
4k
5k
6.3k
8k
10k
12.5k
16k
20k
Frequency (Hz)
NE006 07:36


Sound Pressure dB(Z)
80
70
60
50
40
30
20
10
0
69
68
67
69
71
70
68
65
67
61
60
61
57
62
57
56
57
56
56
54
53
53
52
50
49
47
44
41
36
31
28
23
17
12.5
16
20
25
31.5
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1k
1.25k
1.6k
2k
2.5k
3.15k
4k
5k
6.3k
8k
10k
12.5k
16k
20k
Frequency Hz
NE006 11:37