BS4142 Noise Assessment for 10 Bloomsbury Way, London, WC1A 2SL

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1.0 INTRODUCTION

MONO Acoustics has been appointed by Narts Licensing to take an environmental noise impact assessment of proposed mechanical plant.

Proposal is to install a new plant inside to premises. It is understood the business will be running between 12:00 and 22:30 Monday to Saturday and between 12:00 to 22:00 on Sundays.

1.1 Noise Break-Out Assessment

The purpose of the assessment is to determine the impact of noise from the operation of the proposed plant at the nearest noise sensitive receptors. The assessment looks specifically at the worst affected dwellings close to the proposed development.

MONO Acoustics have visited the site for investigation purposes in order to carry out an environmental noise survey and establish existing background noise levels at a location representative of the nearest noise sensitive receptors on the 20th November 2020. However, government guidelines due to Coronavirus (COVID-19), measurement position at nearest resident's window was not accessible. Therefore, the measured background noise levels have been obtained from previous noise report, **Application No: 2018/2155/P**, at the intended location, then compared against the predicted noise (Rating Level) of the proposed plant over a 24-hour period. This assessment has been undertaken in accordance with the methodology outlined within with BS 4142: 2014 "*Methods for rating and assessing industrial and commercial sound"* as typically required for planning purposes.

1.2 Planning Condition

It is understood that following planning conditions apply to the proposed fixed plant in Camden Local Plan 2017, Appendix 3:

The significance of noise impact varies dependent on the different noise sources, receptors and times of operation presented for consideration within a planning application. Therefore, Camden's thresholds for noise and vibration evaluate noise impact in terms of various 'effect levels' described in the National Planning Policy

Framework and Planning Practice Guidance:

- *NOEL – No Observed Effect Level*
- *LOAEL – Lowest Observed Adverse Effect Level*
- *SOAEL – Significant Observed Adverse Effect Level*

Three basic design criteria have been set for proposed developments; these being aimed at guiding applicants as to the degree of detailed consideration needed to be given to noise in any planning application. The design criteria outlined below are defined in the corresponding noise tables. The values will vary depending on the context, type of noise and sensitivity of the receptor:

- *Green – where noise is considered to be at an acceptable level.*
- *Amber – where noise is observed to have an adverse effect level, but which may be considered acceptable when assessed in the context of other merits of the development.*
- *Red – where noise is observed to have a significant adverse effect.*

2.0 SITE DESCRIPTION

The premise is located at 10 Bloomsbury Way, on the ground floor of a commercial building and surrounded by commercial and residential buildings. The nearest noise sensitive receptor is directly across the noise breakout point at 1st floor level above 35 Bloomsbury Way. The premises in relation to its surroundings is shown in the google map and street view photos presented, including noise breakout point and nearest noise sensitive receptor presented in Figure 1.

Figure 1 – Site Location

3.0 BS4142:2014 ASSESSMENT

BS 4142:2014 "Methods for rating and assessing industrial and commercial sound" presents a method for assessing the significance and possible adverse impact due to an industrial noise source, based on a comparison of the source noise levels and the background noise levels, both of which are measured or predicted at a noise sensitive receiver e.g. a residential property.

The specific noise level due to the source is determined, with a series of corrections for tonality, impulsivity, intermittency or other unusual characteristic. This can result in a maximum total correction of +18dB being added if the new noise source demonstrates all

of the above characteristics. The rating level is then compared to the background noise level and the significance of the new noise source likelihood of any adverse impact is determined in accordance with the following advice:

"The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context. A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context. The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."

3.1 Existing Background Noise Levels

Three consecutive days of obtained typical background sound levels are seen to be as per Table 1 below. Detailed background measurements can be seen in Appendix C.

Period	$L_{A90,\ 1hour}$ dB
13:30 – 00:45	61
08:00 – 00:45	59
08:00 – 21:45	59

Table 1 – Summary of background lowest background levels

3.2 Proposed Plant

The proposed equipment is to be installed:

- Helios GBD EC 560 mm ø Giga Box centrifugal fan
- Helios KSD 1200/500
- Purified Air ESP 3000E Particulate Control Unit

Table 2 below shows A-weighted sound pressure levels of the plant provided by manufacturer. The manufactures data sheet for the proposed units are provided within Appendix A of this report.

Frequency (Hz)	125	250	500	1000	2000	4000	8000	Overall
dB (A)	65	74	79	80	75	70	62	**84**

Table 2 – Specification details for Helios GBD EC 560 ø Giga Box Fan

3.3 Attenuator

Specification details for the proposed attenuator (silencer) to the kitchen extract fan are provided in Table 3 below.

Frequency (Hz)	125	250	500	1000	2000	4000	8000	Overall
dB (A)	5	7	16	21	21	17	12	**11**

Table 3 – Specification details for Helios attenuator type KSD 1000/500

An attenuator proposed to be fitted to within the kitchen extract fan system atmosphere side ductwork to reduce fan noise through the ductwork.

The proposed attenuator is Helios type KSD 1000/5000 (ref 8733) and is matched specifically to suit Helios 560mm diameter extract fans including the Helios Giga Box fan model GBD EC 560.

A copy of the manufacturer's data sheet (including noise attenuation data) for the proposed attenuator is provided in Appendix A. Summary specification for the attenuator is provided in Table 4 on the following page. The overall noise reduction of the attenuator as applied to the extract outlet of the Helios Giga Box fan model GBD EC 560 is **-11 dBA**.

4.0 ASSSESSMENT

The nearest Noise Sensitive Receptor (NSR) identified is the residential property approximately 19m away directly across the main road at the 1st floor level and facing to the noise breakout point.

Table 4 provides the predicted Rating Level at the nearest NSR.

Representative Background Noise Level, $L_{A90,T}$	**59**	
Acoustic Feature Correction	**+3**	
Rating Level	**39.4 dB + 2 = 41.4**	
Excess of rating over background sound level	**42.4 – 59 = -16.6 dB**	

Table 4 – Specification details for Helios attenuator type KSD 1000/500

Detailed calculations for plant unit installation and all attenuation mechanisms are shown in Appendix B.

5.0 CONCLUSION

A BS4142 noise assessment has been carried out at the site of a proposed kitchen extract installation at the 10 Bloomsbury Way, London, WC1A 2SL to assess the impact of the operation of the extract on the nearest sensitive receiver. A background noise level was obtained from latest noise assessment report at a location representative of the nearest sensitive receivers.

An assessment has been made in accordance with BS4142:*2014* which has shown that the proposed extract operation is around **16.6 dB** below the measured background. According to *BS4142 2014*: "The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or significant adverse impact. *Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."*

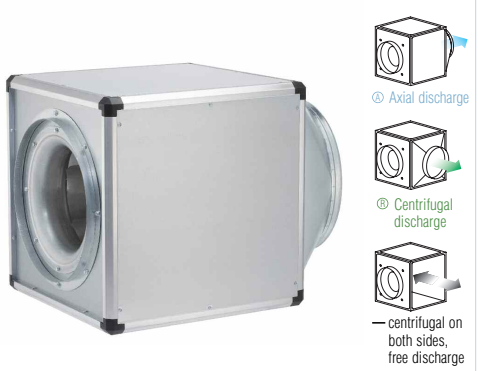
APENDIX A

Manufacturers Data

GigaBox centrifugal fan 560 mm ø

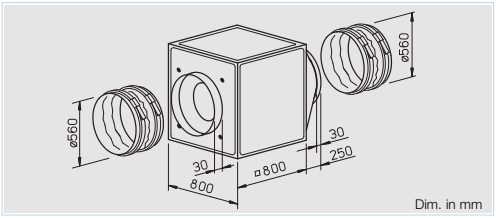
Models GB..

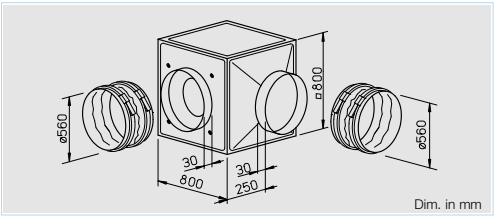
Arbitrary installation position and flexible assembly by five possible discharge directions.



Models GB.. T120 NEW!

Designed for moving dirty, humid and hot air up to max. 120° C.





■ **Special features of type GB.. T120**
- Designed for moving dirty, humid and hot air volumes up to max. 120° C.
- Motor located outside of air flow.
- Temperature insulated partition panel between motor and impeller, lined with 20 mm thick, flame-retardant mineral wool.
- Easily accessible motor and impeller unit, removable without disassembling the system components.
- Inspection cover with handle, simply remove for cleaning and maintenance.
- Condensate collector with condensate spigot included in delivery. Drill hole for rain drainage (accessories) for outdoor installation is prepared.

☐ **Assembly of types GB.. T120**
Installation must be carried out with condensation discharge showing downward. Flexible assembly by three possible centrifugal discharge directions via the discharge adapter. Outdoor installation is possible using outdoor cover hood and external weather louvers (accessories).

■ **Feature**

☐ **Assembly of types GB..**
Arbitrary installation position and flexible assembly by five possible discharge directions via the discharge adapter. For wall mounting the wall bracket (accessories) has to be used. Outdoor installation is possible using outdoor cover hood and external weather louvers (accessories).

■ **Specification of both types**

☐ **Casing**
Self-supporting frame construction from aluminium hollow profiles. Double-walled side panels from galvanised sheet steel, lined with 20 mm thick temperature insulting and flame-retardant mineral wool. Intake cone for ideal inflow as well as spigot and flexible sleeve (for the respective max. permissible air flow temperature) for duct connection. With discharge adapter (from square to circular) on the pressure side for low-loss discharge and flexible sleeve to reduce vibration transmission. Simple positioning by standard crane hooks.

☐ **Impeller**
Smooth running backward curved aluminium centrifugal impeller highly efficient and direct driven. Energy efficient with a low noise development. Dynamically balanced together with the motor to DIN ISO 1940 Pt.1 – class 6.3.

☐ **Motor**
Maintenance-free external rotor motor or IEC-standard motor protected to IP 44 or 54. With ball bearings and radio suppressed as standard.

☐ **Electrical connection**
Standard terminal box (IP 54) fitted on the motor; with GB.. T120 fitted on the motor support plate.

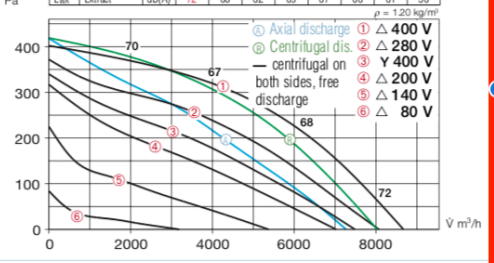
Type	Ref. No.	Air flow volume (FID)	R.P.M.	Sound press. level case breakout	Motor power (nominal)	Current full load	Current speed controlled	Wiring diagram	Maximum air flow temperature full load	Maximum air flow temperature controlled	Nominal weight (net)	5 step transformer controller with motor protect. unit Type	Ref. No.	without motor protect. unit Type	Ref. No.	Full motor protection unit using the thermal contacts Type	Ref. No.
		V̇ m³/h	min⁻¹	dB(A) at 4 m	kW	A	A	Nr.	+°C	+°C	kg						
2 speed motor, 3 Phase motor, 400 V / 3 ph. / 50 Hz, Y/△-wiring, protection to IP 54																	
GBD 560/6/6	5522	7800/8640	690/870	35	0.51/0.80	0.90/1.90	1.90	867	60	60	80	**RDS 4**	1316	**TSD 3.0**	1502	**M4**[1)]	1571
GBD 560/4/4	5521	11500/12590	1110/1350	44	1.70/2.50	2.80/4.80	4.90	867	55	45	90	**RDS 7**	1578	**TSD 7.0**	1504	**M4**[1)]	1571
2 speed motor, 3 Phase motor, 400 V / 3 ph. / 50 Hz, Y/△-wiring, protection to IP 54																	
GBD 560/4/4 T120	5778	11520/12300	1250/1400	48	1.85/2.50	3.20/6.80	6.80	520	120	120	105	**RDS 7**	1578	**TSD 7.0**	1504	**M4**[1)]	1571

[1)] incl. operation and 2 speed switch

GigaBox centrifugal fan 560 mm ø

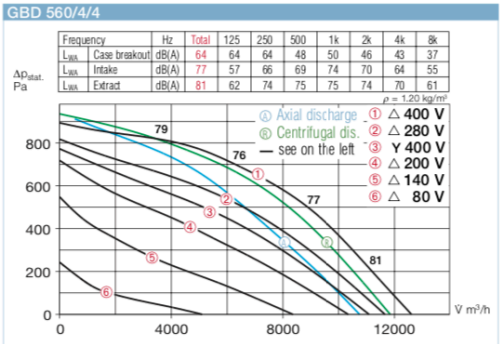
GBD 560/6/6

Frequency		Hz	Total	125	250	500	1k	2k	4k	8k
L_{WA}	Case breakout	dB(A)	55	52	51	42	40	37	32	25
L_{WA}	Intake	dB(A)	68	51	53	63	64	61	53	43
L_{WA}	Extract	dB(A)	72	60	62	69	67	66	61	50



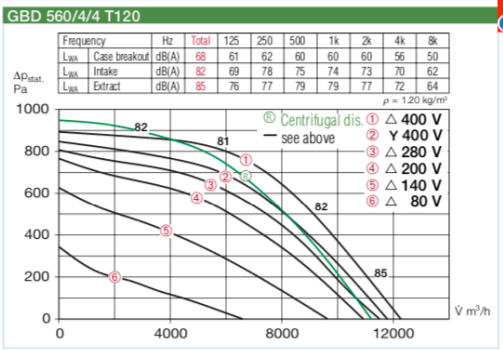
GBD 560/4/4

Frequency		Hz	Total	125	250	500	1k	2k	4k	8k
L_{WA}	Case breakout	dB(A)	64	64	64	48	50	46	43	37
L_{WA}	Intake	dB(A)	77	57	66	69	74	70	64	55
L_{WA}	Extract	dB(A)	81	62	74	75	75	74	70	61



GBD 560/4/4 T120

Frequency		Hz	Total	125	250	500	1k	2k	4k	8k
L_{WA}	Case breakout	dB(A)	68	61	62	60	60	60	56	50
L_{WA}	Intake	dB(A)	82	69	78	75	74	73	70	62
L_{WA}	Extract	dB(A)	85	76	77	79	79	77	72	64



☐ **Motor protection**
Motors have thermal contacts wired to the terminal block and must be connected to a motor protection unit.

☐ **Speed control**
All types are speed controllable by voltage reduction using a transformer controller.
The 3-phase models can also be 2 speed controlled by star/delta switch (accessories DS 2 or full motor protection unit M 4). The duties at different speeds are given in the performance curve.

■ **Sound levels**
Total sound power levels and the spectrum figures in dB(A) are given for:
- sound level case breakout
- sound level intake
- sound level extract

in the tables above the performance curve. Beside, the sound power level (on intake) is stated over the rated characteristic curve. In the table below you can also find the
- case breakout level at 4 m (freefield conditions).

■ **Accessories of both types**

Anti vibration mounts for installation indoors. Set of 4.
SDD-U Ref. No. 5627

Wall bracket for wall mounting.
GB-WK 560 Ref. No. 5626

External weather louvers to cover exhaust opening.
GB-WSG 560 Ref. No. 5640

Outdoor cover hood for outdoor installation.
GB-WSD 560 Ref. No. 5749

On/Off and 2-speed switch for 3-phase star/delta motors.
DS 2 [2] Ref. No. 1351

[2] full motor protection unit recommended: MD Ref. No. 5849

Information	Pages
Design of systems, acoustic	12 on
General techn. information, speed control	17 on

Accessory-Details	Pages
Speed controller and full motor protection unit	397 on

■ **Specific accessories**

☐ **for types GB..**
Condensate collector with condensate spigot for pipe connection.
GB-KW 560 Ref. No. 5645
(Condensate collector with condensate spigot included in delivery with GB.. T120).

☐ **for types GB.. T120**
Rain drainage for outdoor installation (drill holes for rain drainage is already prepared).
GB-RA Ref. No. 9418

Selection of attenuators
Rectangular attenuator KSD

General
If the noise level of a fan exeeds the required level, additional measures can be taken to reduce it. The use of attenuators, working on the principle of absorbtion, is a very effective method. This type of attenuator offers high damping figures creating only low additional resistances.
HELIOS offer attenuators that are optimal to the HELIOS fan range. Circular and rectangular attenuators are available in virtually any size. All attenuators can of course be used together with fans by others.
HELIOS attenuators are made from galvanised steel, fitted with high quality mineral wool, covered against air flow with scrim to prevent erosion.

Technical information
Attenuation
The amount of attenuation is determined using the principle of comparison. It compares the noise reduction within a pipe or ducting with and without the attenuator.
When measuring without an attenuator, it is replaced by a straight piece of rigid, noise hard ducting. The attenuation is calculated to:

$D_e = L_o - L_m$ dB
L_o: Sound level without attenuator
L_m: Sound level with attenuator

The efficiency of an attenuator is largely dependent on the frequency of the sound source, therefore the attenuation is stated over the octave spectrum. Low frequency noise is more difficult to attenuate than high frequency. Therefore a larger or more resistive attenuator is required.

It is necessary to know the noise spectrum of a fan (octave or tierce spectrum) to choose an attenuator. When selecting an attenuator for a system the attenuating effect of other components like bends, transformation pieces etc. must be considered in addition to the noise level of the fan.
To avoid regeneration of noise through the air speed over the duct surface the air velocity should be minimised.

Fast selection of an attenuator
For easy estimating of a retangular or circular attenuator the average attenuation figure is given in the red underlined column (right hand column) of the attenuator's table. This figure is to be deducted from the sound power level (L_{WA} total) of the fan.

The result is the sound power level (L_{WA} reduced) of the fan, reduced by attenuation. The difference with this selection method (if compared to the frequency band calculation) it is an approximation. More exactly values can be reached using the calculation to the octave band.

Example:
Given:
Fan model VARD 225/2
Chosen: Circular attenuator RSD 225/600 (length = 600 mm)

Sound power level of fan
L_{WA} total = 81 dB(A)
Average attenuation figure for attenuator
reduction = 15 dB(A)
= reduced soud power level
L_{WA} reduced = 66 dB(A)

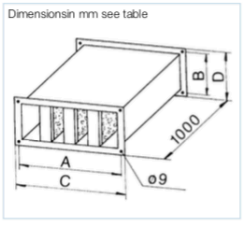
Key
L_{WA} total = Sound power level of the fan in dB(A) (from table above fan's performance curve).

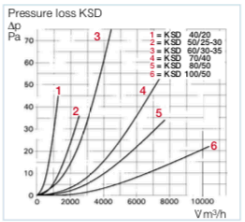
Average attenuation = calculated attenuation figure of the attenuator in dB(A) (red column in the attenuator's table).

L_{WA} reduced = reduced sound level in dB(A) using an attenuator.

Sound level calculation
To calculate the relevant sound level the attenuator sound reduction must be substracted from the fan sound level. This should be done in frequency bands. For better attenuation several attenuators of the same diameter can be installed one after another.

Rectangular attenuator KSD
☐ **Specification – Installation**
Casing made from galvanised steel with flanges to fit the fan's dimensions. To be installed in-line with ducting on inlet or exhaust. To reduce vibration transmission from the fan, a flexible connector (accessories VS or VS…Ex) should be installed between fan/attenuator and ducting.
☐ **Pressure drop**
The attenuator will add an additional resistance to the duct system (see chart), which must be considered when selecting a fan. The figures shown refer to an equal inlet into the attenuator. Turbulences from the fan's exhaust can be reduced if 1 metre of straight ducting is fitted between fan and attenuator. Otherwise allow for a higher resistance.





Type	Ref. No.	Duct size in mm	Dimensions in mm A	B	C	D	Nominal weight kg	Attenuation D_e dB 125	250	500	1000	2000	4000	8000	Average attenuation
KSD 400/200	8728	400/200	420	220	443	240	13	8	11	23	31	31	26	18	17
KSD 500/250..	8729	500/250-300	520	270/320	540	340	16.5	6	9	19	25	25	20	15	14
KSD 600/300..	8730	600/300-350	620	320/370	640	390	20	7	10	21	28	28	23	16	12
KSD 700/400	8731	700/400	720	420	740	440	25	6	8	18	24	24	20	14	12
KSD 800/500	8732	800/500	820	520	840	540	31	7	9	19	26	26	21	15	14
KSD 1000/500	8733	1000/500	1020	520	1040	540	35	5	7	16	21	21	17	12	11

APPENDIX B

Calculations

		125	250	500	1000	2000	4000	8000	Overall
Source	**Helios GBD 560**	65	74	79	80	75	70	62	84
Distance (m)	**19**	31.4	40.4	45.4	46.4	41.4	36.4	28.4	50.4
Silencer	**Helios KSD 1200/500**	5	7	16	21	21	17	12	11
Acoustic Correction	**Intermittency**								3
Total Attenuation (dBA)									**42.4**

Table 5 – Source and overall attenuation calculations

APPENDIX C

Measurement Data

20th April 2018

Time	L_{Aeq}	L_{Amax}	L_{A90}	$L_{A90,1hour}$
13:30:00	70.1	82.8	63.9	
13:45:00	68.6	80.5	63.2	**64**
14:00:00	70.1	83.6	64.3	
14:15:00	76.8	101.3	65.3	
14:30:00	71.3	84.6	65.2	
14:45:00	75.0	98.5	64.8	**65**
15:00:00	70.8	83.8	64.8	
15:15:00	76.0	97.1	65.9	
15:30:00	71.3	83.1	65.2	
15:45:00	70.9	86.6	64.4	**65**
16:00:00	72.7	95.0	64.6	
16:15:00	70.8	88.0	64.8	
16:30:00	69.5	82.1	64.1	
16:45:00	70.6	85.3	64.9	**64**
17:00:00	69.4	80.2	63.0	
17:15:00	70.1	88.0	63.8	
17:30:00	70.2	84.0	64.2	
17:45:00	69.9	87.0	62.2	**64**
18:00:00	70.7	85.6	64.0	
18:15:00	69.5	83.5	64.0	
18:30:00	69.8	97.9	63.2	
18:45:00	77.3	100.3	63.2	
19:00:00	76.7	104.5	63.7	**63**
19:15:00	70.4	88.0	63.7	
19:30:00	70.2	79.0	62.7	
19:45:00	75.0	101.7	62.9	**63**
20:00:00	70.3	85.3	62.2	
20:15:00	71.9	93.6	62.6	
20:30:00	75.3	102.0	60.8	
20:45:00	69.2	81.0	62.7	**62**
21:00:00	69.9	89.4	62.9	
21:15:00	68.9	81.6	61.5	
21:30:00	74.6	102.3	61.9	
21:45:00	68.7	81.5	63.1	**62**
22:00:00	69.8	83.7	62.0	
22:15:00	69.2	79.6	62.4	
22:30:00	69.4	79.1	63.4	

22:45:00	69.0	81.6	62.4	**62**
23:00:00	75.2	100.1	60.5	
23:15:00	69.4	80.2	61.5	
23:30:00	70.0	87.3	62.6	**61**
23:45:00	68.6	79.4	61.1	
00:00:00	70.6	91.7	60.3	
00:15:00	69.3	82.4	59.6	
00:30:00	69.1	81.3	60.1	
00:45:00	69.7	90.7	60.8	

21st April 2018

Time	L_{AFeq}	L_{AFmax}	L_{A90}	$L_{A90,1hour}$
08:00:00	69.0	83.6	57.2	**59**
08:15:00	68.8	80.7	59.9	
08:30:00	71.3	88.1	60.5	
08:45:00	69.9	84.1	59.2	
09:00:00	69.5	81.0	58.4	**61**
09:15:00	69.1	81.8	59.9	
09:30:00	70.1	83.4	60.8	
09:45:00	72.5	95.7	62.1	
10:00:00	72.2	96.2	62.0	**62**
10:15:00	70.7	84.5	63.0	
10:30:00	70.3	83.9	61.9	
10:45:00	69.7	79.9	60.7	
11:00:00	71.0	94.0	62.4	**62**
11:15:00	70.5	81.2	62.5	
11:30:00	69.9	80.1	62.0	
11:45:00	69.4	80.3	61.4	
12:00:00	69.5	79.7	62.8	**62**
12:15:00	72.4	96.9	62.1	
12:30:00	69.1	81.5	62.4	
12:45:00	69.0	83.5	62.2	
13:00:00	69.9	80.5	62.9	**63**
13:15:00	76.5	103.2	62.0	
13:30:00	69.3	85.7	63.2	
13:45:00	69.4	88.3	62.3	
14:00:00	69.7	92.7	61.6	**62**
14:15:00	70.8	93.3	63.1	
14:30:00	68.9	81.6	61.7	
14:45:00	68.6	84.8	61.8	

15:00:00	69.4	84.3	62.3	**62**
15:15:00	72.2	87.4	61.8	
15:30:00	68.8	81.0	61.8	
15:45:00	67.9	85.7	61.8	
16:00:00	73.9	98.9	61.0	**62**
16:15:00	69.2	82.6	62.3	
16:30:00	68.4	88.4	62.2	
16:45:00	68.3	79.9	61.9	
17:00:00	67.5	90.3	62.1	**63**
17:15:00	68.9	81.0	63.0	
17:30:00	69.0	86.3	62.7	
17:45:00	69.3	83.5	64.0	
18:00:00	69.1	89.8	63.3	**62**
18:15:00	68.6	81.6	63.1	
18:30:00	68.3	88.5	60.5	
18:45:00	68.4	81.1	61.8	
19:00:00	75.4	101.0	61.9	**62**
19:15:00	76.1	100.8	62.5	
19:30:00	69.2	93.8	62.1	
19:45:00	68.7	84.0	61.4	
20:00:00	68.3	85.0	61.7	**62**
20:15:00	68.2	83.5	61.4	
20:30:00	69.0	90.8	62.3	
20:45:00	72.5	94.2	61.2	
21:00:00	68.4	82.5	61.1	**61**
21:15:00	70.8	94.3	60.8	
21:30:00	67.5	80.9	60.7	
21:45:00	77.0	106.0	60.8	
22:00:00	71.5	96.1	60.4	**61**
22:15:00	70.3	91.5	61.2	
22:30:00	75.7	102.5	62.1	
22:45:00	72.7	100.3	61.5	
23:00:00	67.6	80.2	61.1	**61**
23:15:00	71.6	95.2	60.8	
23:30:00	67.9	89.4	60.9	
23:45:00	67.3	79.9	59.2	
00:00:00	72.7	96.1	60.9	**60**
00:15:00	68.0	79.3	60.7	
00:30:00	67.6	82.2	60.7	
00:45:00	66.1	80.7	59.5	

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Time	L_{AFeq}	L_{AFmax}	L_{A90}	$L_{A90,1hour}$
08:00:00	66.4	81.1	54.7	**55**
08:15:00	66.2	79.1	53.8	
08:30:00	66.7	79.3	56.2	
08:45:00	66.7	78.6	55.5	
09:00:00	66.3	77.5	56.4	**57**
09:15:00	66.5	81.1	56.5	
09:30:00	67.4	85.4	57.0	
09:45:00	73.1	100.4	58.4	
10:00:00	67.8	81.6	59.3	**59**
10:15:00	67.2	80.1	58.3	
10:30:00	67.8	80.3	58.8	
10:45:00	72.7	98.0	58.5	
11:00:00	68.3	81.2	60.5	**60**
11:15:00	66.8	82.1	58.9	
11:30:00	68.8	84.7	59.9	
11:45:00	68.7	85.0	60.8	
12:00:00	69.1	83.0	61.2	**62**
12:15:00	68.8	83.9	62.0	
12:30:00	68.4	82.4	60.9	
12:45:00	68.2	86.3	62.0	
13:00:00	69.0	88.0	62.2	**62**
13:15:00	68.9	82.1	62.1	
13:30:00	68.9	87.0	62.1	
13:45:00	68.8	92.3	61.7	
14:00:00	73.3	99.4	61.2	**62**
14:15:00	68.8	85.5	61.8	
14:30:00	68.8	80.8	63.1	
14:45:00	67.8	83.5	61.2	
15:00:00	68.6	86.4	61.6	**62**
15:15:00	71.0	85.4	62.6	
15:30:00	68.4	79.3	61.9	
15:45:00	68.1	81.9	61.2	
16:00:00	81.3	108.3	60.7	**61**
16:15:00	67.8	80.7	60.5	
16:30:00	69.0	92.8	61.4	
16:45:00	68.0	83.1	59.8	
17:00:00	68.5	79.5	61.3	**62**
17:15:00	67.4	82.7	62.0	
17:30:00	69.3	90.6	61.6	
17:45:00	68.8	80.4	61.4	
18:00:00	69.0	82.4	61.6	**62**
18:15:00	68.5	88.6	62.0	
18:30:00	68.0	80.5	60.9	
18:45:00	70.5	90.6	62.7	

19:00:00	77.9	105.3	62.6	**61**
19:15:00	68.4	83.6	60.0	
19:30:00	69.3	90.0	60.5	
19:45:00	68.9	83.8	61.6	
20:00:00	68.3	86.4	60.5	**60**
20:15:00	73.4	101.8	60.6	
20:30:00	68.5	88.8	59.7	
20:45:00	68.0	83.0	60.0	
21:00:00	68.5	80.7	59.6	**60**
21:15:00	70.8	93.9	60.2	
21:30:00	68.0	82.7	59.0	
21:45:00	68.4	86.8	59.6	