2792

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24 HOUR NOISE LEVEL SURVEY CARRIED OUT ON THE ROOF OF THE PREMISES AT NO. 20-24 KIRBY STREET, LONDON EC1 AND A REPORT ON THE NOISE CONTROL MEASURES REQUIRED TO MINIMISE THE NOISE IMPACT OF THE PROPOSED NEW AIR CONDITIONING UNITS

Test Engineer : M G Roberts

Report Author : .....
M G Roberts

Authorised for
Release by : .....

I J Marchant

Client : Peter Deer & Associates
Project : 20-24 Kirby Street, London EC1
Emtec Ref. : QF5240/PF3058
Date : 18th December 2006

QF5240/PF3058

EMTEC PRODUCTS LTD.

24 HOUR NOISE LEVEL SURVEY CARRIED OUT ON THE ROOF OF THE PREMISES AT NO. 20-24 KIRBY STREET, LONDON EC1 AND A REPORT ON THE NOISE CONTROL MEASURES REQUIRED TO MINIMISE THE NOISE IMPACT OF THE PROPOSED NEW AIR CONDITIONING UNITS

1.0. INTRODUCTION

This report details the results of a 24 hour noise survey carried out the 4th floor roof at the back of the building at No. 20-24 Kirby Street, London EC1.

The objectives of this survey were as follows:

- To establish the existing background noise level at the edge of the 4th floor roof.
- To assess the proposed new Air Conditioning Plant that is to be mounted on the 4th floor roof of the building and to recommend areas that may require particular treatment to ensure that the operation of the new plant does not disturb the occupants of the neighbouring residential properties.

This report has been divided into the following sections for ease of analysis:

2.0. TEST INSTRUMENTATION

All measurement equipment used during the survey complied with the requirements of BS4142:1990 "Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas". Details of the equipment are as follows:

Integrating Sound Level Meters	: Bruel & Kjaer type 2231 fitted with a Bruel & Kjaer type 4155 ½ inch condenser microphone.
Statistical Analysis Modules	: Bruel & Kjaer type BZ 7115 capable of computing the percentile levels L1, L10, L50, L90 and L99 and also the Leq level.
Acoustic Calibrator	: Bruel & Kjaer type 4231 electronic calibrator.

Calibration was performed before and after the surveys and found to be, in all cases, +/- 0.1 dB from the reference source.

3.0. TEST PROCEDURE

The survey was conducted during a continuous 24 hour period from 16.42pm on Monday the 11th of December 2006 to 16.02 on Tuesday the 12th of December 2006.

Data was continuously acquired throughout the measurement period with the individual averaging time for statistical noise data set to 20 minutes. The following statistical measurements were recorded concurrently:

LA1 - The Sound Pressure Level exceeded for 1% of the measurement period.

LA10 - The Sound Pressure Level exceeded for 10% of the measurement period.

LA50 - The Sound Pressure Level exceeded for 50% of the measurement period.

LA90 - The Sound Pressure Level exceeded for 90% of the measurement period. LA90 is considered to represent the "background noise level" during the measurement period and is used for the assessment of noise to determine the likelihood of complaints (See BS 4142).

LA99 - The Sound Pressure Level exceeded for 99% of the measurement period.

LAeq - The continuous steady state Sound Pressure Level that has the same acoustic energy as the real fluctuating level.

All noise levels recorded were filtered using a standard 'A' Weighting filter.

3.1. Measurement Position

The noise levels were measured at a position at the rear edge of the 4th floor roof, immediately opposite the residential property which faces the back of the building.

The microphone was positioned so that it was pointing away from the building and towards the adjacent residential property.

The microphone was approximately 1 metre above the roof level. The rest of the measurement equipment was located in a weatherproof enclosure.

The location of the microphone is shown on our attached sketch No. QF/5240/GA1.

3.2. Weather Conditions

The weather conditions prevailing during the measurement period were in line with those recommended in BS 4142:1990 with no precipitation and light wind. The weather was dull and overcast throughout the daytime and nightime period.

The microphone was protected throughout the tests by an acoustically transparent wind balloon.

4.0. RESULTS

The raw test data, gathered during the 24 hour noise survey, is given in Appendix 'A 'of this report.

The 'A' Weighted Leq levels measured over each 20 minute interval throughout the 24 hour periods (denoted by LAeq, (20 mins)) are displayed as bar graphs on the attached Sketch No. QF/5240/T1 at the back of this report.

The 'A' Weighted percentile levels measured over each 20 minute interval denoted by LA10 (20 mins), LA50 (20 mins) and LA90 (20 mins) are displayed as line graphs on the attached Sketch No. QF/5240/T2 at the back of this report.

4.1. Summary of Results

The table QF/5240/D1 below summarises the noise levels taken over the 24 hour period in terms of the maximum and minimum Sound Pressure Levels recorded.

Table QF/5240/D1 – Summary of Maximum and Minimum Noise Levels

	LA1	LA10	LA50	LA90	LA99	Laeq
Min.	56.5 dBA	54.5 dBA	52.5 dBA	51.5 dBA	51 dBA	53.4 dBA
Max.	82.5 dBA	68.5 dBA	62 dBA	60 dBA	59 dBA	69.6 dBA

5.0. DISCUSSION OF RESULTS

The lowest recorded LA_{90} background noise level was 51.5 dBA which occurred in one measurement period ending at 1.22am.

If any of the roof mounted air cooled condensers are to be operated on a 24 hour basis then the noise from these units should be designed to be no greater than 10 dB below the lowest LA_{90} level. This would necessitate the units achieving a noise level of 41.5 dBA at 1 metre from the adjacent residential property's windows.

We believe that the roof mounted condensers are associated with air conditioning systems within the office development and will therefore only operate during extended office hours (ie: 8.00am to 10.00pm). If this is the case then the lowest LA_{90} level measured during this period was 53 dBA which was measured during two consecutive time periods ending at 20.02pm and 22.22pm.

In order for the plant to be inaudible at the adjacent residential property the new plant will need to achieve a noise level 10 dB below this lowest LA_{90} level. The plant should therefore be designed to achieve 43 dBA at 1 metre from the façade of the adjacent residential property.

We believe that the following air cooled condensers are to be mounted onto the fourth floor roof immediately opposite the residential property:-

Location	Sound Pressure Level (dB ref 2 x 10^{-5} N/m^2)							
	63	125	250	500	1k	2k	4k	8k
Hitachi RAS 4.0 HRNE	56	48	44	42	40	34	25	28
Hitachi RAS 6.0 HRNE	55*	50*	48*	46*	43*	37*	27*	30*
Hitachi RAS 8.0 HRNE	63	61	57	53	49	41	33	30

Note: The above noise levels were taken from Hitachi's standard data sheets but unit noise levels for the RAS 6.0 HRNE (*) are estimations based upon the published global levels and RAS 5.0 octave band levels.

Based upon achieving an overall noise level of 43 dBA at 1 metre from the adjacent residential façade, which is approximately 10 metres from the proposed location of the condensers it should not be necessary to fit any acoustic treatment to the Hitachi RAS 4.0 HRNE or RAS 6.0 HRNE units. However, treatment should be fitted to the Hitachi RAS 8.0 HRNE unit.

The acoustic treatment necessary would be a discharge plenum silencer and a simple screen across the front of the unit. With this level of treatment the noise level of 43 dBA at 1 metre from the residential flat opposite will be achieved.

EMTEC PRODUCTS LTD
18th December 2006

APPENDIX A

Raw Data – Noise Survey

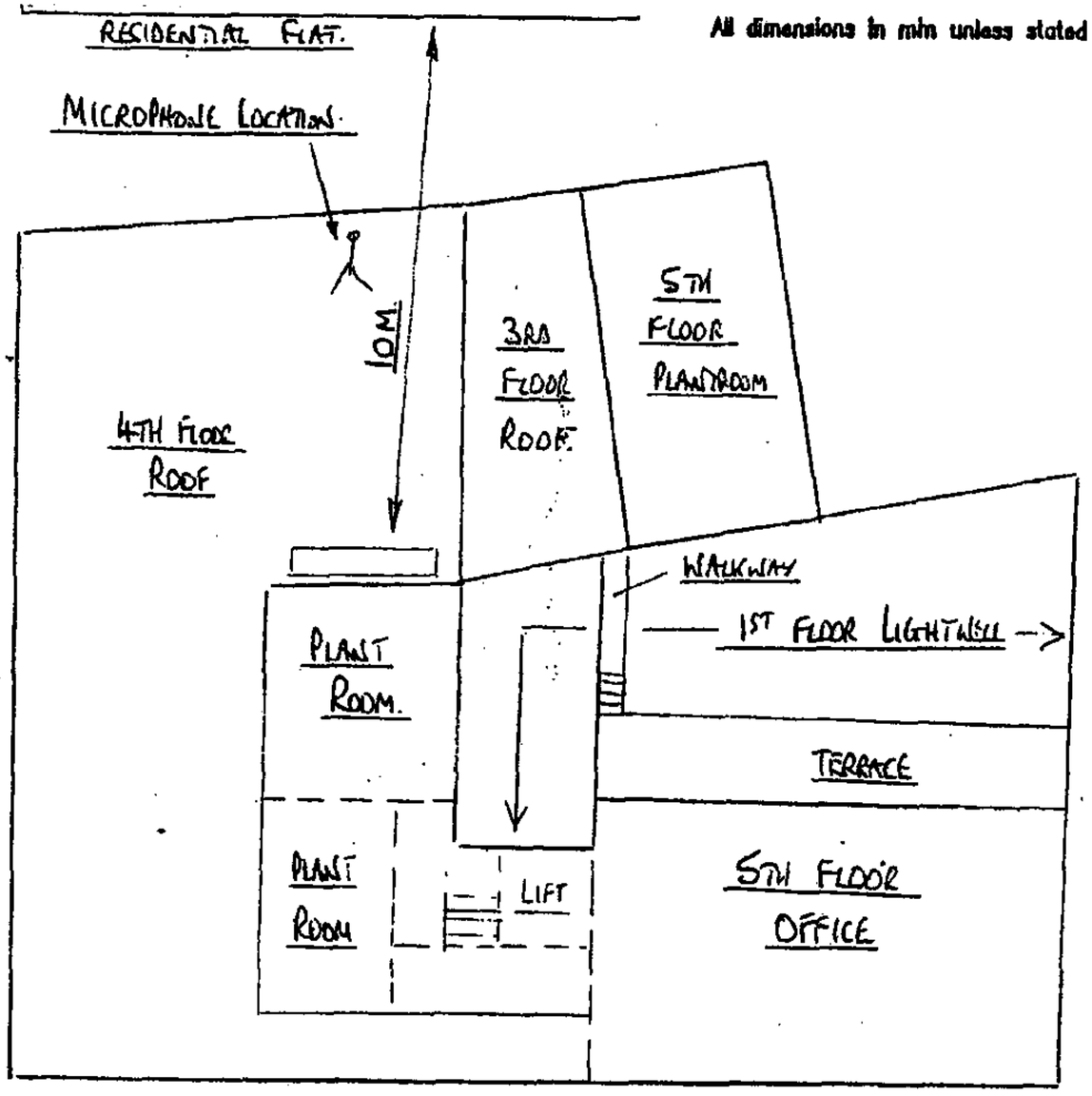
11th to 12th of December 2006

NOISE SURVEY DATA FROM BACKGROUND NOISE LEVEL SURVEY ON THE ROOF TO THE REAR OF NO.24 KIRBY STREET, LONDON EC1.

Project : 24 Kirby Street, London EC1.
Client : Peter Dear & Associates
Ref : QF5240
Date : 19th December 2006

Measure No.	Start Time	MaxP (dBA)	L1 (dBA)	L10 (dBA)	L50 (dBA)	L90 (dBA)	L99 (dBA)	Leq (dBA)
1	16:42	102.8	68	62.5	58.5	56.5	56	60.4
2	17:02	107.3	82.5	66.5	59	57	56	69.6
3	17:22	82.7	63.5	59	57	56	55.5	57.7
4	17:42	82.4	61	58	56.5	55.5	55.5	56.9
5	18:02	82.1	61	58	56.5	55.5	55.5	57
6	18:22	92.2	60.5	58	55.5	54	53	55.9
7	18:42	91.2	62	57.5	55	54	53.5	56
8	19:02	83.2	65	57.5	55	54	53.5	56.4
9	19:22	91.1	58.5	58	54.5	53.5	53	54.8
10	19:42	83.6	63	58	55	53.5	53	56.2
11	20:02	82.9	57	55.5	54	53	52	54
12	20:22	93.6	59	56	54	53	52.5	54.6
13	20:42	82.1	59.5	56.5	55	54.5	54.5	55.6
14	21:02	81.8	58	56.5	55.5	54.5	54.5	55.6
15	21:22	93.5	59.5	56.5	55.5	54.5	54	55.8
16	21:42	81.7	59.5	57	55.5	55	54.5	55.9
17	22:02	82.1	59.5	57	55.5	53.5	52.5	55.5
18	22:22	87.4	64	60.5	56.5	53	52	58.3
19	22:42	89.9	66	61	56	52.5	51.5	58.4
20	23:02	92.4	58.5	56.5	54	52.5	52	54.5
21	23:22	92.7	59	56.5	55	54.5	53	55.4
22	23:42	92.9	64	57	53.5	52.5	51.5	55.2
23	00:02	82.8	56.5	55	53	52	51.5	53.4
24	00:22	82.5	57	54.5	53	52	52	53.4
25	00:42	83.1	57	55	53.5	52	51.5	53.6
26	01:02	82.4	58	55	53	52	51.5	53.5
27	01:22	92.8	59	54.5	52.5	51.5	51	53.4
28	01:42	82.4	60	58	53	52	51.5	54
29	02:02	82.4	59.5	55.5	53.5	52	51.5	53.9
30	02:22	82.1	61	56	54	52.5	51.5	54.5
31	02:42	91.5	58	56	54.5	53	52	54.6
32	03:02	81.2	58	56.5	54.5	54	52.5	55
33	03:22	82.3	58	55.5	53.5	52.5	52	54
34	03:42	82.8	57	54.5	53	52	51.5	53.4
35	04:02	82.8	58	55	53	52	51.5	53.5
36	04:22	82.7	59	55.5	53.5	52.5	52	54.2
37	04:42	91.6	59	56.5	53.5	52	51.5	54.3
38	05:02	82.1	58	55	53	52	51.5	53.6
39	05:22	92.3	69	57.5	54	52.5	51.5	57
40	05:42	82.2	58	56	54	53	52	54.3
41	06:02	82.7	60	56.5	54.5	53.5	52.5	55.2
42	06:22	83.1	64.5	57.5	56	54.5	53.5	56.7
43	06:42	82.6	59	57	55.5	54.5	54	55.7
44	07:02	84	60	58	56	55	54	56.6
45	07:22	82.5	61	58	56	55	54.5	56.7
46	07:42	92.7	65.5	62	57.5	55.5	55	58.9
47	08:02	91.5	62.5	60	57.5	56	55	57.9
48	08:22	83	61	59	57	56	55.5	57.4
49	08:42	92.4	69.5	61.5	58	56.5	56	60.3
50	09:02	89.3	69	60	58	56.5	56	59.7
51	09:22	95.3	69	60	57.5	56.5	56	59.3
52	09:42	106.5	75.5	61	58	57	56	62.4
53	10:02	107	76.5	62.5	59	57	56	63.7
54	10:22	106.8	65	60	57.5	56.5	55.5	59.6
55	10:42	103.2	63	60	58	57	56.5	58.9
56	11:02	106.8	76.5	63	58.5	57	56.5	63.6
57	11:22	106.6	74.5	63.5	59.5	58	57	63
58	11:42	105.6	70	63	59.5	57.5	57	62
59	12:02	106.7	74.5	63	58	56.5	56	62.7
60	12:22	105.6	76	61	58	57	56	62.9
61	12:42	106.7	64	60.5	58	57	56	60
62	13:02	105.2	67.5	62	60	59	58	61.2
63	13:22	103.3	70.5	64	62	59.5	58.5	63.1
64	13:42	95.1	66	62.5	60.5	59	58	61.2
65	14:02	107.2	70.5	62.5	60.5	59.5	58.5	63
66	14:22	101.8	66.5	63.5	60.5	59.5	58	61.9
67	14:42	102.8	70.5	62	60	58.5	57.5	61.9
68	15:02	94.7	64	61.5	59.5	58	57	60
69	15:22	89.2	66	62	60	58.5	57.5	60.5
70	15:42	105.9	68.5	62.5	60.5	60	59	62
71	16:02	99.8	70.5	65	61.5	60	59	62.9

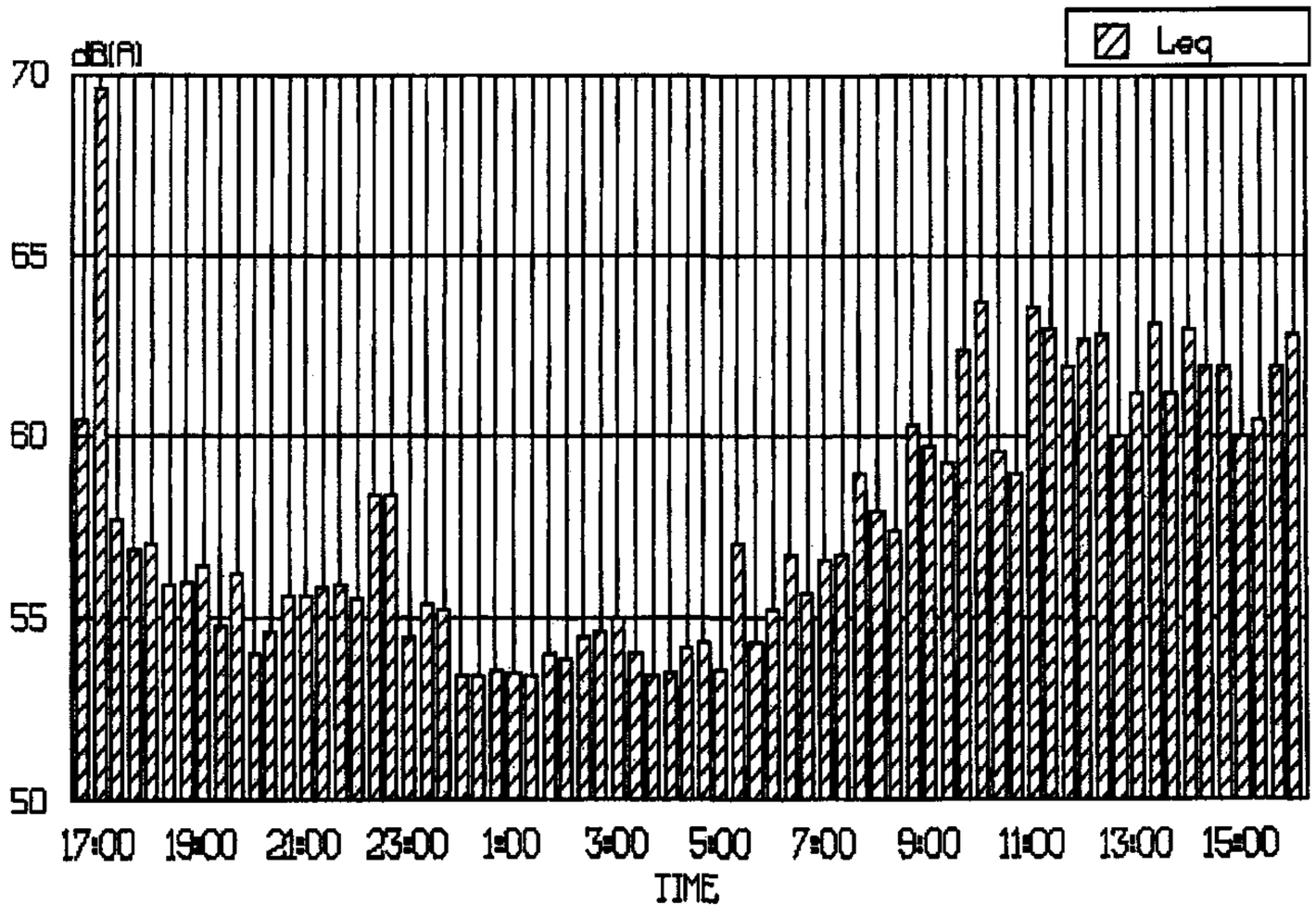
All dimensions in mm unless stated



LOCATION OF MICROPHONE.

TITLE: LOCATION OF MICROPHONE	ISSUE DATE: 18/12/06	DRAWN BY: MGR	A B C D E F G H	ENTEC	
CLIENT: PETER DEER & ASSOCIATES	PF No. PF3058.	APPROVED BY:	REVISION:	Entec Products Ltd., Enterprise House, Blyth Road, Hayes, Middx, UB3 1CD. Tel: 0181-848 3031 Fax: 0181-573 3605	
PROJECT: 20-24, KIRBY STREET.	STATUS: Q A M I	DESIGN AUTH: MGR	SK No. QF/5240/GA1		

24 KIRBY STREET, LONDON EC1.
11th to 12th December 2006



TITLE LAeq Levels	ISSUE DATE: 18/12/06	DRAWN BY: MGR	A B C D E F G H
CLIENT Peter Deer & Associates	PF No. 3058	APPROVED BY: MGR	REVISION
PROJECT 24 Kirby Street, London EC1	STATUS Q A M I	DESIGN AUTH: MGR	SK No. QF/5240/T1

[redacted]
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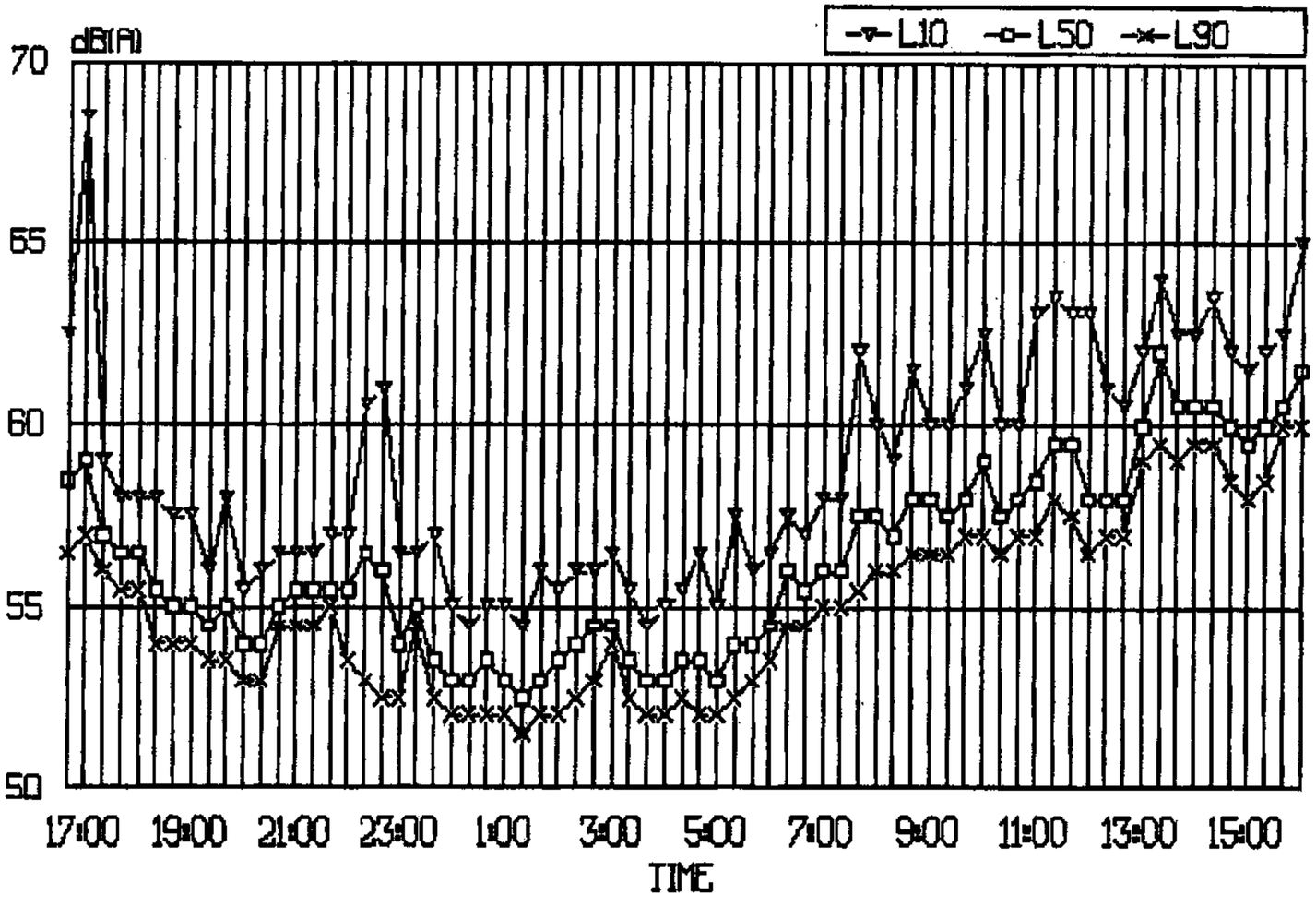
Web: www.emtecproducts.co.uk

24 KIRBY STREET, LONDON EC1.
11th to 12th December 2006



TITLE LA10, LA50 and LA90 Levels	ISSUE DATE: 18/12/06	DRAWN BY: MGR	A B C D E F G H	[redacted]
CLIENT Peter Deer & Associates	PF No. 3058	APPROVED BY: MGR	REVISION	Enterprise House, Blyth Road Hayes, Middlesex UB3 1DD Tel: 020 8848 3031 Fax: 020 8573 3605 Web: www.emtecproducts.co.uk
PROJECT 24 Kirby Street, London EC1	STATUS Q A M I	DESIGN AUTH: MGR	SK No. QF/5240/T2	

Enterprise House, Blyth Road, Hayes, Middx. UB3 1DD

Telephone: 020 8848 3031 Fax: 020 8573 3605

QF5240/A1/MGR/CG

18th December 2006

Peter Deer & Associates,
South Point House
321 Chase Road
Southgate
London
N14 6JT

For the attention of Mr Mirek Sawicki

Dear Sir,

Re: 20-24 Kirby Street, London EC1

Following the recent 24 hour noise survey carried out at the above premises we have pleasure in quoting on the attached schedule for the necessary screen and outlet plenum silencer to the Hitachi RAS 8.0 HRNE air cooled condenser required to achieve 43 dBA at 1 metre from the adjacent residential properties façade.

In selecting the equipment required we have used the sound pressure levels stated below as the basis of our calculations:-

Location	Sound Pressure Level (dB ref 2 x 10^{-5} N/m^2)							
	63	125	250	500	1k	2k	4k	8k
Hitachi RAS 4.0 HRNE	56	48	44	42	40	34	25	28
Hitachi RAS 6.0 HRNE	55*	50*	48*	46*	43*	37*	27*	30*
Hitachi RAS 8.0 HRNE	63	61	57	53	49	41	33	30

We attach herewith our sketch No. QF/5240/GA2 which gives details of the proposed screen. We have taken the screen across all the condensing units as this makes the installation more pleasing aesthetically.

We trust that you will find our proposal acceptable and we attach herewith our bulletins on the products offered.

We trust that the above is in line with your requirements, but should you have any queries with regard to our proposals, please do not hesitate to contact the undersigned.

Yours faithfully,

M.G.Roberts
Managing Director

QF5240/a1/mgr/cg

Date: 18th December 2006

LOUVRE SCHEDULE

Client: Peter Deer & Associates

Project: 20-24 Kirby Street, London

Ref.	Location	Type	Dimensions (mm) W x H x L			Vol (m^3/s)	P.D (Pa)	Dynamic Insertion Loss (dB) 63	125	250	500	1k	2k	4k	8k	No.Off	Price Each (£)	Total (£)
L1	Weather louvred screen	WLAC 50 (AL)	4200	1800	78	6.27	5				-					1		£1,210.00
L2	Weather louvred screen	WLAC 50 (AL)	1800	1800	78	6.27	5				-					1		£518.00
P1	Acoustic Panel	PAC 40	2900	1800	-	-	-	21	22	31	37	44	46	51	49	1		£835.00
SS1	Support steelwork, purlins, strut off building sufficient to support the above screens and acoustic panels. All items from galvanised material.																	£1,280.00
P2	Outlet plenum silencer	PAC 30	950	750	1000	2.30	Neg	18	20	28	32	40	41	44	38	2	£580.00	£1,160.00
I1	Installation of the above equipmet assuming free access to site, free use of an electrical supply within 15 metres and free use of a hoist to lift equipment to roof level. The screen would be located onto wooden blocks and anchored back to the wall of the plantroom.																	£1,444.00
																	Total price (supply, deliver and install)	**£6,447.00**

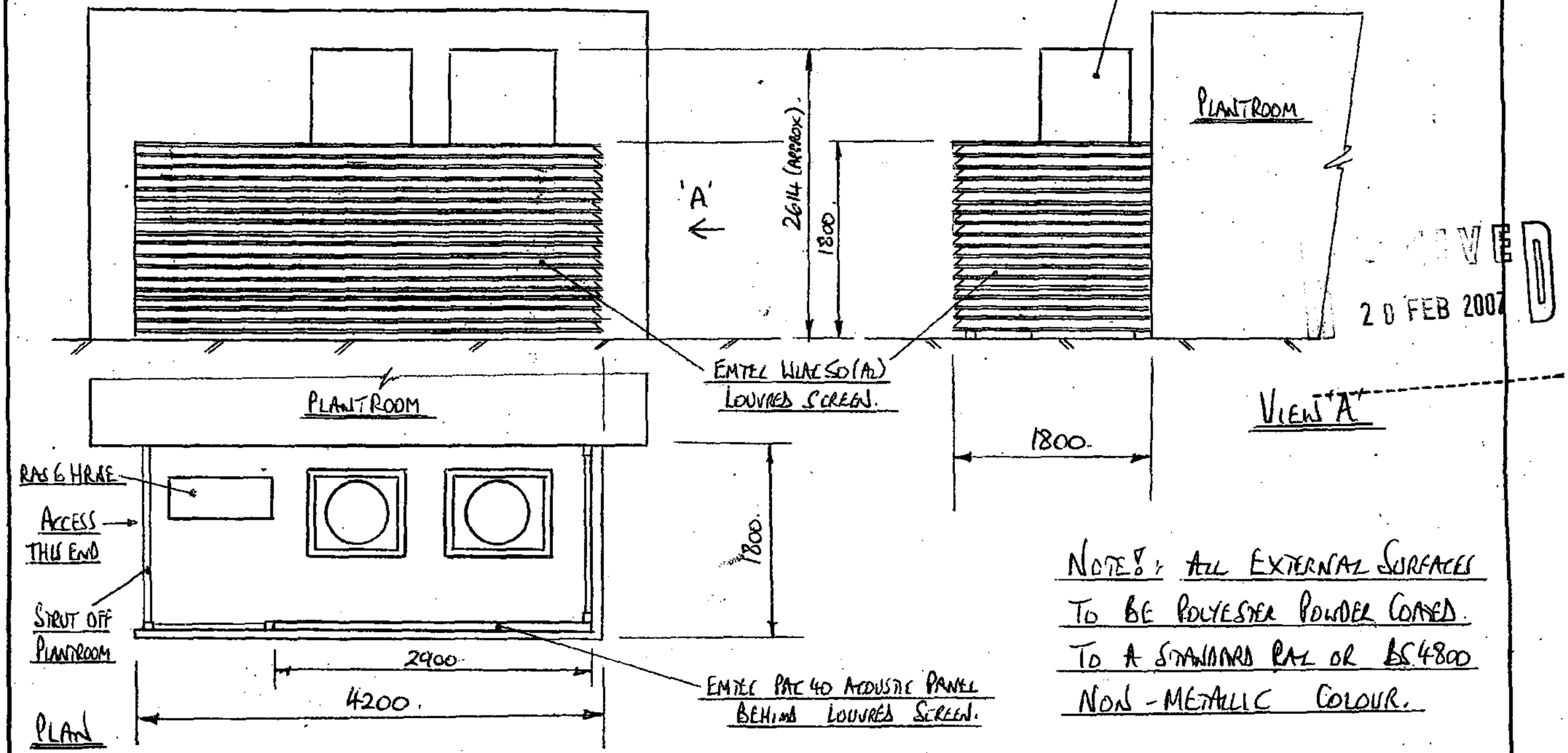
Notes: - The above screen to be generally as detailed on our attached sketch No. QF/5240/GA2.
- All external surfaces of screen and outlet plenum silencers to be polyester powder coated to a standard, non-metallic, BS4800 or RAL colour.
- All steelwork supporting the screen from galvanised sheet steel.

Terms and Conditions of Quotation

Validity : Prices are fixed for acceptance for 60 days.
Drawings : 1-2 weeks from receipt of order.
Delivery : 2-4 weeks from approval of drawings.
Carriage : Included.
Installation : Assumes free and unrestricted access to site, uninterrupted working between 0800 and 1730 Monday to Friday excluding Bank Holidays, free use of 110V/240V electricity supply within 15m of all points of installation and that all site preparation and disconnection of services will be carried out prior to the arrival of Emtec Products Ltd. on site.
Exclusions : Offloading, storage and position.
All craneage, lifting and scaffolding.
All builderswork, including making good.
All disconnection and reconnection of services.
All removal of debris and carting away.
V.A.T. : Chargeable extra at the appropriate rate.
Payment : Nett 30 days from date of invoice subject to credit clearance.

All dimensions in mm unless stated

FRONT VIEW



NOTE: ALL EXTERNAL SURFACES TO BE POLYESTER POWDER COATED TO A STANDARD RAL OR BS 4800 NON-METALLIC COLOUR.

20 FEB 2007

TITLE: LAYOUT OF ACOUSTIC SCREEN.	ISSUE DATE: 18/12/06	DRAWN BY: MGR	A B C D E F G H	EMTEC	
CLIENT: PETER DEER ASSOCIATES	PF No.	APPROVED BY:	REVISION:	Emtec Products Ltd., Enterprise House, Blyth Road, Hayes, Middx. UB3 1CD. Tel: 0181-848 3031 Fax: 0181-573 3695	
PROJECT: 20-24 KIRBY STREET.	STATUS: Q A M I	DESIGN AUTH: MGR	SK No. QF/5240/GA2		