



# Background Noise Survey

BS4142:1997 and PPG Assessment  
Refrigeration and Air Conditioning Equipment

## Site

Rickmansworth,  
Happy Man PH, Berry Lane, Rickmansworth, WD3 7HR

## Customer

Tesco Stores Ltd,  
Tesco House, Delamere Road, Cheshunt, Hertfordshire, EN8 9SL

Testing Laboratory: KR Associates (UK) Ltd  
Laboratory Address: 56 Bassett Green Road, Southampton, SO16 3DX.

Date of Report: 31st January 2008  
Report Reference: KR01175  
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Version: v1.0

Technician: John Earwood  
Consultant: Rhys Scrivener

Approval: Rhys Scrivener  
Position: Director

Signed:   
Date: 31st January 2008

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## 1 EXECUTIVE SUMMARY

### 1.1 Instruction.

KR Associates (UK) Ltd have been instructed by Tesco Stores Ltd of Tesco House, Delamere Road, Cheshunt, Hertfordshire to undertake an assessment on the proposed site at Rickmansworth, Happy Man PH, Berry Lane, Rickmansworth to determine if the refrigeration and air conditioning units will adversely effect the nearest residential properties in terms of noise.

### 1.2 Scope of Report.

The report is written as a short executive summary in section 1 with additional supporting details in sections 2 to 9.

### 1.3 Site Description

The existing building was a public house that has suffered a fire. It is proposed to demolish the pub and build a single storey flat roofed modular building in the Tesco Express format. The plant area is likely to be at the rear of the store. The area is predominantly a residential area. The site is located on a cross roads. There is a small parade of shops generally to the rear of the store.

### 1.4 Details of Units

It is proposed to install the following equipment

Equipment	Manufacturer	Model Number	Location
Refrigeration Condenser	Searle	MGB124	at the rear of the site within a dedicated plant area.
Sales Floor AC Units	Mitsubishi Heavy	2 x FDCA 501 HESR	
Cash Office AC Units	Mitsubishi Heavy	1 x SRC 28 CD-5	

### 1.5 Local Authority Discussions

Three Rivers District Council - 01923 776611 (Call centre).

All fixed plant must be assessed to BS4142:1997.. The plant should not increase the background noise levels..

### 1.6 Test Procedure

Background noise levels were recorded between 00:00 and 04:00 and used to establish a typical 24 hour background noise profile. The prevailing weather conditions were recorded. All measurements were taken with consideration to BS4142:1997.

### 1.7 Calculations

The specific noise levels at the assessment position are calculated from the manufacturers data with corrections detailed within section 7.

Calculation Element	Description						
(7.1) Addition of Sources	See Section 7						
(7.2) Source Directivity	+3 dB (1 Surfaces)						
(7.3) Distance Correction	-20 dB (10m from Source to Assessment Position)						
(7.4) Barrier Correction	63Hz	125Hz	250Hz	500Hz	1000Hz	2000 Hz	4000Hz
	-0 dB	-0 dB	-0 dB	-0 dB	-0 dB	-0 dB	-0 dB
(7.5) Façade Correction	+3 dB (1 Surfaces)						

## 1.8 Assessments

### 1.8.1 BS4142:1997

An assessment is undertaken to determine the likelihood of complaints.

### 1.8.2 Planning and Policy Guidance

An assessment is undertaken to determine if planning permission should be granted.

## 1.9 Results

### 1.9.1 Rating Noise Levels

Time Period	Resultant Noise Levels from Operation of Refrigeration and AC Units
Day Time (07:00 to 23:00)	41 dB
Night Time (23:00 – 07:00)	27 dB
Sound Pressure Levels – $L_{Aeq,5 \text{ min}}$ dB reference level ( $2 \times 10^{-5} \text{ Nm}^{-2}$ ).	

### 1.9.2 Background Noise Levels

Time Period	Background Noise Levels (Minimum 5 minutes Periods)
Morning (07:00 to 09:00)	46 dB (Estimated)
Day Time (09:00 – 19:00)	49 dB (Estimated)
Evening (19:00 – 23:00)	44 dB (Estimated)
Night Time (23:00 – 07:00)	34 dB (Measured)
Sound Pressure Levels – $L_{A90,5 \text{ min}}$ dB reference level ( $2 \times 10^{-5} \text{ Nm}^{-2}$ ).	

The background noise levels were measured at the side of the site. (location sketch in section 4).

### 1.9.3 BS4142:1997 Assessment

Time Period	Conclusion – BS4142:1997
Morning (07:00 to 09:00)	-5 dB – (Complaints Marginal)
Day Time (09:00 – 19:00)	-8 dB – (Complaints Marginal)
Evening (19:00 – 23:00)	-3 dB – (Complaints Marginal)
Night Time (23:00 – 07:00)	-7 dB – (Complaints Marginal)

### 1.9.4 PPG 24 Assessment

Though not specifically suited for assessing refrigeration and air conditioning equipment its an assessment under PPG indicates that planning permission should be granted.

## 1.10 Conclusion

The noise emissions from the refrigeration and air conditioning equipment will not have an adverse effect on the nearby residential properties and will meet the requirements of the Local Authority,

### 1.11 Recommended Conditions

None at this stage.

## 2 REQUIRED INFORMATION SUMMARY

Section 10 BS 4142	Item	Description
a)	Source Under Investigation	
1)	Source – Refrigeration	Searle - MGB124
	Source – Sales Floor Air Conditioning	Mitsubishi Heavy - 2 x FDCA 501 HESR
	Source – Cash Office Air Conditioning	Mitsubishi Heavy - 1 x SRC 28 CD-5
2)	Hours of Operation – Refrigeration	24 hours per day
	Hours of Operation – Sales Floor AC	07:00 to 23:00 hours
	Hours of Operation – Cash Office AC	07:00 to 23:00 hours
3)	Mode of Operation – Refrigeration	Operates continuously
	Mode of Operation – Sales Floor AC	Operates continuously
4)	Mode of Operation – Cash Office AC	Operates continuously
	Location - Refrigeration	at the rear of the site within a dedicated plant area.
	Location – Sales Floor AC	
	Location – Cash Office AC	
b)	Dominance / Audibility – Refrigeration	The refrigeration unit will be inaudible
	Dominance / Audibility – Sales Floor AC	The sales floor AC unit will be inaudible
	Dominance / Audibility – Cash Office	The Cash office AC unit will be inaudible
c)	Assessment Position	1m from the residential properties generally to the side of the proposed store
	Background Noise Levels	The background noise levels were recorded at the side of the site.
	Location Plant	(Location Plan – Section 4)
d)	Equipment	KRE/001
1)	Type	2250
2)	Manufacturer	Bruel & Kjaer
3)	Serial Number	250650
4)	Calibration Details	The meter was calibrated before and after the tests.
e)	Operational Tests	
1)	Calibrator	The associated calibrator was used.
2)	Before Tests / After Tests	94.3dB / 94.3dB
f)	Weather Conditions	
1)	Wind Speed and Direction	4.2, wind from the West
2)	Temperature Inversion Conditions	4 (No)
3)	Precipitation	No rain
4)	Fog	Low cloud
g)	Date and Time of Measurement	00:00 to 04:00 on 28th January 2008
i)	Measurement Time Intervals	Continuous Measurement Recorded as 5 minutes readings.
j)	Reference Time Interval	5 minutes
k)	Resultants Level (All Sources)	See Calculation
l)	Background Noise Levels	See Section 4
m)	Excess of Background	See Calculations
For assessment relating to the morning and evening period see section 7.1 and 7.3		

**3 LOCATION PLAN / SITE LAYOUT**



<Details of Plant>

*R	Location of Refrigeration Units
*AC	Location of Air Conditioning Units
*A	Assessment Position
*B	Background Noise Measurements



**4 BACKGROUND NOISE LEVELS**

**4.1.1 Recorded Noise Levels (00:00 to 04:00)**

00:00 to 01:00		01:00 to 02:00		02:00 to 03:00		03:00 to 04:00	
00:00 to 00:05	43 dB	01:00 to 01:05	38 dB	02:00 to 02:05	37 dB	03:00 to 03:05	36 dB
00:05 to 00:10	41 dB	01:05 to 01:10	36 dB	02:05 to 02:10	37 dB	03:05 to 03:10	37 dB
00:10 to 00:15	42 dB	01:10 to 01:15	35 dB	02:10 to 02:15	35 dB	03:10 to 03:15	35 dB
00:15 to 00:20	41 dB	01:15 to 01:20	37 dB	02:15 to 02:20	35 dB	03:15 to 03:20	36 dB
00:20 to 00:25	40 dB	01:20 to 01:25	37 dB	02:20 to 02:25	35 dB	03:20 to 03:25	35 dB
00:25 to 00:30	41 dB	01:25 to 01:30	37 dB	02:25 to 02:30	34 dB	03:25 to 03:30	35 dB
00:30 to 00:35	40 dB	01:30 to 01:35	35 dB	02:30 to 02:35	36 dB	03:30 to 03:35	35 dB
00:35 to 00:40	40 dB	01:35 to 01:40	36 dB	02:35 to 02:40	36 dB	03:35 to 03:40	36 dB
00:40 to 00:45	40 dB	01:40 to 01:45	35 dB	02:40 to 02:45	35 dB	03:40 to 03:45	35 dB
00:45 to 00:50	39 dB	01:45 to 01:50	35 dB	02:45 to 02:50	37 dB	03:45 to 03:50	36 dB
00:50 to 00:55	38 dB	01:50 to 01:55	35 dB	02:50 to 02:55	35 dB	03:50 to 03:55	34 dB
00:55 to 01:00	37 dB	01:55 to 02:00	35 dB	02:55 to 03:00	37 dB	03:55 to 04:00	37 dB
Sound Pressure Levels – dB, $L_{A90,5 \text{ minutes}}$ with a reference level of $2 \times 10^{-5} \text{ Nm}^{-2}$							

**4.1.2 24 Hour Background Noise Levels**

Morning (07:00 to 09:00)		Day Time (09:00 to 19:00)		Evening (19:00 to 23:00)		Night Time (23:00 to 07:00)	
07:00 to 08:00	46 dB	09:00 to 10:00	50 dB	19:00 to 20:00	48 dB	23:00 to 00:00	47 dB
08:00 to 09:00	47 dB	10:00 to 11:00	50 dB	20:00 to 21:00	47 dB	00:00 to 01:00	39 dB
		11:00 to 12:00	53 dB	21:00 to 22:00	46 dB	01:00 to 02:00	34 dB
		12:00 to 13:00	53 dB	22:00 to 23:00	44 dB	02:00 to 03:00	34 dB
		13:00 to 14:00	52 dB		03:00 to 04:00	34 dB	
		14:00 to 15:00	51 dB		04:00 to 05:00	43 dB	
		15:00 to 16:00	49 dB		05:00 to 06:00	40 dB	
		16:00 to 17:00	50 dB		06:00 to 07:00	46 dB	
		17:00 to 18:00	51 dB				
		18:00 to 19:00	51 dB				
Sound Pressure Levels – dB, $L_{A90,5 \text{ minutes}}$ with a reference level of $2 \times 10^{-5} \text{ Nm}^{-2}$ (Minimum 5 minute background levels within the respective hourly period.							

**4.1.3 Measured Background Levels**

The background levels between 00:00 and 04:00 were measured at the background measurement position shown on the location plan in section 3.4.

**4.1.4 Estimated Background Levels**

The background levels between 04:00 and 00:00 were estimated from the observations made on site and experience of other similar sites.

**4.1.5 Reason for Estimating Background Levels**

The measured background levels were designed to measure the most sensitive periods. From the observations of the site location the daytime levels have therefore been estimated.

## 5 SOURCE LEVELS

### 5.1 Refrigeration Units - ISO 3746 Test Certificate

BS EN 13487 – Heat Exchangers Forced convection air cooled refrigerant condenser – Sound Measurement								
Manufacturer	Searle		Model Number	MGB124				
Location of Tests	Sheffield							
Date of Tests	14/09/2007							
Details of Test Envelope		Dimension A	Dimension B	Surface Area	r			
Surface Area 1 (Front of unit)		6.8 m	3.4 m	23.1 m <sup>2</sup>	1.8 m			
Surface 2 (Left hand side of unit)		5.4 m	3.4 m	18.4 m <sup>2</sup>	1.8 m			
Surface 3 (Rear of unit)		6.8 m	3.4 m	23.1 m <sup>2</sup>	1.8 m			
Surface 4 (Right hand side of unit)		5.4 m	3.4 m	18.4 m <sup>2</sup>	1.8 m			
Surface 5 (Top of unit)		6.8 m	5.4 m	36.7 m <sup>2</sup>	1.8 m			
The above test envelope fully complies with the requirements of Annex C of ISO 3746:1996								
Frequency (Hz)	SWL (dB)	Photograph of unit under test						
50	71 dB							
63	66 dB							
80	61 dB							
100	59 dB							
125	56 dB							
160	49 dB							
200	51 dB							
250	46 dB							
315	44 dB							
400	42 dB							
500	39 dB							
630	40 dB							
800	45 dB							
1000	43 dB							
1250	42 dB							
1600	39 dB							
2000	43 dB							
2500	40 dB							
3150	36 dB							
4000	35 dB							
5000	35 dB							
Octave Band Centre Frequency (Hz)		63	125	250	500	1000	2000	4000
Average Sound Power Levels		71 dB	60 dB	52 dB	44 dB	47 dB	42 dB	38 dB
<b>Sound Power Level</b>	<b>55 dB</b>	Approved		Rhys Scrivener				
		Position		Director				
		Signed						
Report Reference	KR00797		Approval By:		P Salmon			
Test Laboratory	KR Associates (UK) Ltd							

**5.2 Sales Floor AC Units - ISO 3746 Test Certificate**

BS EN 13487 – Heat Exchangers Forced convection air cooled refrigerant condenser – Sound Measurement								
Manufacturer	Mitsubishi Heavy	Model Number	2 x FDCA 501 HESR					
Location of Tests	Sheffield							
Date of Tests	14/09/2007							
Details of Test Envelope		Dimension A	Dimension B	Surface Area	r			
Surface Area 1 (Front of unit)		4.6 m	2.5 m	11.3 m <sup>2</sup>	1.2 m			
Surface 2 (Left hand side of unit)		2.9 m	2.5 m	7 m <sup>2</sup>	1.2 m			
Surface 3 (Rear of unit)		4.6 m	11.3 m	11.3 m <sup>2</sup>	1.2 m			
Surface 4 (Right hand side of unit)		2.9 m	2.5 m	7 m <sup>2</sup>	1.2 m			
Surface 5 (Top of unit)		4.6 m	2.9 m	13.1 m <sup>2</sup>	1.2 m			
The above test envelope fully complies with the requirements of Annex C of ISO 3746:1996								
Frequency (Hz)	SWL (dB)	Photograph of unit under test						
50	78 dB							
63	76 dB							
80	73 dB							
100	75 dB							
125	67 dB							
160	62 dB							
200	63 dB							
250	56 dB							
315	57 dB							
400	55 dB							
500	52 dB							
630	52 dB							
800	57 dB							
1000	56 dB							
1250	54 dB							
1600	53 dB							
2000	57 dB							
2500	55 dB							
3150	50 dB							
4000	50 dB							
5000	49 dB							
Octave Band Centre Frequency (Hz)		63	125	250	500	1000	2000	4000
Average Sound Power Levels		79 dB	75 dB	64 dB	57 dB	59 dB	57 dB	52 dB
<b>Sound Power Level</b>	<b>67 dB</b>	Approved		Rhys Scrivener				
		Position		Director				
		Signed						
Report Reference	KR00797		Approved By:		P Salmon			
Test Laboratory	KR Associates (UK) Ltd							

**5.3 Cash Office AC Unit - ISO 3746 Test Certificate**

BS EN 13487 – Heat Exchangers Forced convection air cooled refrigerant condenser – Sound Measurement								
Manufacturer	Mitsubishi Heavy	Model Number	1 x SRC 28 CD-5					
Location of Tests	Shefford							
Date of Tests	14/09/2007							
Details of Test Envelope		Dimension A	Dimension B	Surface Area	r			
Surface Area 1 (Front of unit)		3.4 m	2.1 m	7 m <sup>2</sup>	1.2 m			
Surface 2 (Left hand side of unit)		2.8 m	2.1 m	5.7 m <sup>2</sup>	1.2 m			
Surface 3 (Rear of unit)		3.4 m	2.1 m	7 m <sup>2</sup>	1.2 m			
Surface 4 (Right hand side of unit)		2.8 m	2.1 m	5.7 m <sup>2</sup>	1.2 m			
Surface 5 (Top of unit)		3.4 m	2.8 m	9.2 m <sup>2</sup>	1.2 m			
The above test envelope fully complies with the requirements of Annex C of ISO 3746:1996								
Frequency (Hz)	SWL (dB)	Photograph of unit under test						
50	74 dB							
63	76 dB							
80	70 dB							
100	69 dB							
125	68 dB							
160	65 dB							
200	59 dB							
250	54 dB							
315	53 dB							
400	51 dB							
500	47 dB							
630	47 dB							
800	50 dB							
1000	51 dB							
1250	48 dB							
1600	47 dB							
2000	48 dB							
2500	46 dB							
3150	45 dB							
4000	44 dB							
5000	42 dB							
Octave Band Centre Frequency (Hz)		63	125	250	500	1000	2000	4000
Average Sound Power Levels		74 dB	70 dB	59 dB	52 dB	52 dB	50 dB	47 dB
<b>Sound Power Level</b>	<b>59 dB</b>	Approved		Rhys Scrivener				
		Position		Director				
		Signed						
Report Reference	KR00797		Approved By:		P Salmon			
Test Laboratory	KR Associates (UK) Ltd							



## 6 CALCULATIONS

### 6.1 Multiple Sources

The noise levels from the refrigeration and air conditioning units are established using the following formula.

Formula	Symbols
$L_{WTOTAL} = 10 \cdot \text{Log}_{10} [(10^{LW1/10}) + (10^{LW2/10})]$	$L_{WTOTAL}$ = Total Sound Power Levels (dB) $L_{W1}$ = Sound Power Level of First Unit (dB) $L_{W2}$ = Sound Power Level of Second Unit (dB)

### 6.2 Source Directivity

A correction for the number of surfaces around the source.

Number of Surfaces	Correction in dB
1 Reflective Surface	+3 dB
2 Reflective Surfaces	+6 dB
3 Reflective Surfaces	+9 dB

### 6.3 Distance

A correction for the distance between the source and assessment position using the following formula

Formula	Symbols
$D = -20 \cdot \text{Log}_{10} (r)$	$D$ = Reduction (dB) $R$ = Distance from source to assessment position (m)

### 6.4 Barrier Effect

A correction is made for any barrier in the direct line of site between the source and the assessment position.

Formula	Symbols
$EBA = 10 \cdot \text{Log}_{10} [3 + (40 \cdot \delta / \lambda)]$  where $\delta = a + b - r$ and $\lambda = c / f$	$EBA$ = Effective barrier attenuation (dB) $\delta$ = Path difference (m) $a$ = Distance from source to barrier head (m) $b$ = Distance from barrier head to assessment position (m) $r$ = Distance from source to assessment position (m) $\lambda$ = Wavelength of sound (m) $c$ = Speed of sound – Assumed to be 342 ms <sup>-1</sup> $f$ = Octave band centre frequency (Hz)

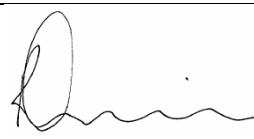
### 6.5 Façade Correction

A correction is made for the number of surfaces around the assessment position

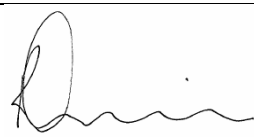
Number of Surfaces	Correction in dB
1 Reflective Surface	+3 dB
2 Reflective Surfaces	+6 dB
3 Reflective Surfaces	+9 dB

## 7 BS 4142 ASSESSMENTS


### 7.1 07:00 to 09:00 - Morning

BS4142:1997 Assessment							
Client	Tesco Stores Ltd	Site	Rickmansworth				
Refrigeration	Searle - MGB124						
Sales Floor AC	Mitsubishi Heavy - 2 x FDCA 501 HESR						
Cash Office AC	Mitsubishi Heavy - 1 x SRC 28 CD-5						
Assessment Position	1m from the residential properties generally to the side of the proposed store						
Background Position	10 m from the source centre Background noise levels were recorded at the side of the site.						
Octave Band Centre Frequency (Hz)	63	125	250	500	1000	2000	4000
Refrigeration Unit – Sound Power Levels	71 dB	60 dB	52 dB	44 dB	47 dB	42 dB	38 dB
Sales Floor AC – Sound Power Levels	79 dB	75 dB	64 dB	57 dB	59 dB	57 dB	52 dB
Cash Office – Sound Power Levels	75 dB	70 dB	60 dB	52 dB	52 dB	50 dB	47 dB
Combined Sound Power Levels (7.1)	81 dB	76 dB	66 dB	58 dB	60 dB	58 dB	53 dB
Source Directivity (7.2)	3 dB	3 dB	3 dB	3 dB	3 dB	3 dB	3 dB
Distance Correction (7.3)	-20 dB	-20 dB	-20 dB	-20 dB	-20 dB	-20 dB	-20 dB
Barrier Correction (7.4)	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB
Façade Correction (7.5)	3 dB	3 dB	3 dB	3 dB	3 dB	3 dB	3 dB
Resultant Specific Noise Level	56 dB	51 dB	41 dB	33 dB	35 dB	33 dB	28 dB
A – Weighting	-26 dB	-16 dB	-9 dB	-3 dB	0 dB	+1 dB	+1 dB
A-Weighted Specific Noise Levels	30 dB	35 dB	32 dB	30 dB	35 dB	34 dB	29 dB
41 dB							
Sound Power Levels – dB, 5 minute $L_{eq}$ 's with a reference level of $1 \times 10^{-12}$ watts Sound Pressure Levels – dB, 5 minute $L_{eq}$ 's with a reference level of $2 \times 10^{-5}$ $Nm^{-2}$							
Item	Calculation	Clause	Commentary				
Specific Noise Level	41 dB	6.3	Specific noise level was calculated from the manufacturers data. See section 6 for calculations				
Acoustic feature correction	+0 dB	8.2.	Neither the refrigeration nor air conditioning equipment had a distinct tone or character.				
Rating Level	41 dB	8.3.	The acoustic feature correction is added to the specific noise level.				
Background Noise Level	46 dB	7.1.	The background noise level was measured at an appropriate position to obtain the level at the assessment position.				
Excess of Rating over Background Level	- 5 dB	9	The background levels is subtracted from the rating level. (Numerical values)				
Assessment indicated complaint are Complaints Marginal		9	The excess of rating over the background is compared against BS4142:1997.				
<b>Conclusion</b>	<b>-5 dB</b>	Approved	Rhys Scrivener				
		Position	Director				
Local Authority Requirements	0 dB	Signed					
Meets Local Authority Requirements	Meets the Local Authority Requirements						

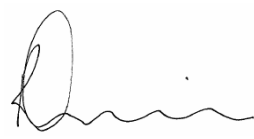
## 7.2 09:00 to 19:00 – Day Time

BS4142:1997 Assessment							
Client	Tesco Stores Ltd		Site	Rickmansworth			
Refrigeration	Searle - MGB124						
Sales Floor AC	Mitsubishi Heavy - 2 x FDCA 501 HESR						
Cash Office AC	Mitsubishi Heavy - 1 x SRC 28 CD-5						
Assessment Position	1m from the residential properties generally to the side of the proposed store						
Background Position	10 m from the source centre Background noise levels were recorded at the side of the site.						
Octave Band Centre Frequency (Hz)	63	125	250	500	1000	2000	4000
Refrigeration Unit – Sound Power Levels	71 dB	60 dB	52 dB	44 dB	47 dB	42 dB	38 dB
Sales Floor AC – Sound Power Levels	79 dB	75 dB	64 dB	57 dB	59 dB	57 dB	52 dB
Cash Office – Sound Power Levels	75 dB	70 dB	60 dB	52 dB	52 dB	50 dB	47 dB
Combined Sound Power Levels (7.1)	81 dB	76 dB	66 dB	58 dB	60 dB	58 dB	53 dB
Source Directivity (7.2)	3 dB	3 dB	3 dB	3 dB	3 dB	3 dB	3 dB
Distance Correction (7.3)	-20 dB	-20 dB	-20 dB	-20 dB	-20 dB	-20 dB	-20 dB
Barrier Correction (7.4)	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB
Facade Correction (7.5)	3 dB	3 dB	3 dB	3 dB	3 dB	3 dB	3 dB
Resultant Specific Noise Level	56 dB	51 dB	41 dB	33 dB	35 dB	33 dB	28 dB
A – Weighting	-26 dB	-16 dB	-9 dB	-3 dB	0 dB	+1 dB	+1 dB
A-Weighted Specific Noise Levels	30 dB	35 dB	32 dB	30 dB	35 dB	34 dB	29 dB
41 dB							
Sound Power Levels – dB, 5 minute $L_{eq}$ 's with a reference level of $1 \times 10^{-12}$ watts Sound Pressure Levels – dB, 5 minute $L_{eq}$ 's with a reference level of $2 \times 10^{-5}$ Nm <sup>-2</sup>							
Item	Calculation	Clause	Commentary				
Specific Noise Level	41 dB	6.3	Specific noise level was calculated from the manufacturers data. See section 6 for calculations				
Acoustic feature correction	+0 dB	8.2.	Neither the refrigeration nor air conditioning equipment had a distinct tone or character.				
Rating Level	41 dB	8.3.	The acoustic feature correction is added to the specific noise level.				
Background Noise Level	49 dB	7.1.	The background noise level was measured at an appropriate position to obtain the level at the assessment position.				
Excess of Rating over Background Level	- 8 dB	9	The background levels is subtracted from the rating level. (Numerical values)				
Assessment indicated complaint are Complaints Marginal		9	The excess of rating over the background is compared against BS4142:1997.				
<b>Conclusion</b>	<b>-8 dB</b>	Approved	Rhys Scrivener				
		Position	Director				
Local Authority Requirements	0 dB	Signed					
Meets Local Authority Requirements	Meets the Local Authority Requirements						

### 7.3 19:00 to 23:00 – Evening

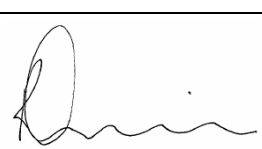
BS4142:1997 Assessment							
Client	Tesco Stores Ltd		Site	Rickmansworth			
Refrigeration	Searle - MGB124						
Sales Floor AC	Mitsubishi Heavy - 2 x FDCA 501 HESR						
Cash Office AC	Mitsubishi Heavy - 1 x SRC 28 CD-5						
Assessment Position	1m from the residential properties generally to the side of the proposed store						
Background Position	10 m from the source centre Background noise levels were recorded at the side of the site.						
Octave Band Centre Frequency (Hz)	63	125	250	500	1000	2000	4000
Refrigeration Unit – Sound Power Levels	71 dB	60 dB	52 dB	44 dB	47 dB	42 dB	38 dB
Sales Floor AC – Sound Power Levels	79 dB	75 dB	64 dB	57 dB	59 dB	57 dB	52 dB
Cash Office – Sound Power Levels	75 dB	70 dB	60 dB	52 dB	52 dB	50 dB	47 dB
Combined Sound Power Levels (7.1)	81 dB	76 dB	66 dB	58 dB	60 dB	58 dB	53 dB
Source Directivity (7.2)	3 dB	3 dB	3 dB	3 dB	3 dB	3 dB	3 dB
Distance Correction (7.3)	-20 dB	-20 dB	-20 dB	-20 dB	-20 dB	-20 dB	-20 dB
Barrier Correction (7.4)	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB
Facade Correction (7.5)	3 dB	3 dB	3 dB	3 dB	3 dB	3 dB	3 dB
Resultant Specific Noise Level	56 dB	51 dB	41 dB	33 dB	35 dB	33 dB	28 dB
A – Weighting	-26 dB	-16 dB	-9 dB	-3 dB	0 dB	+1 dB	+1 dB
A-Weighted Specific Noise Levels	30 dB	35 dB	32 dB	30 dB	35 dB	34 dB	29 dB
41 dB							
Sound Power Levels – dB, 5 minute $L_{eq}$ 's with a reference level of $1 \times 10^{-12}$ watts Sound Pressure Levels – dB, 5 minute $L_{eq}$ 's with a reference level of $2 \times 10^{-5}$ Nm <sup>-2</sup>							
Item	Calculation	Clause	Commentary				
Specific Noise Level	41 dB	6.3	Specific noise level was calculated from the manufacturers data. See section 6 for calculations				
Acoustic feature correction	+0 dB	8.2.	Neither the refrigeration nor air conditioning equipment had a distinct tone or character.				
Rating Level	41 dB	8.3.	The acoustic feature correction is added to the specific noise level.				
Background Noise Level	44 dB	7.1.	The background noise level was measured at an appropriate position to obtain the level at the assessment position.				
Excess of Rating over Background Level	- -3 dB	9	The background levels is subtracted from the rating level. (Numerical values)				
Assessment indicated complaint are Complaints Marginal		9	The excess of rating over the background is compared against BS4142:1997.				
<b>Conclusion</b>	<b>-3 dB</b>	Approved	Rhys Scrivener				
		Position	Director				
Local Authority Requirements	0 dB	Signed					
Meets Local Authority Requirements	Meets the Local Authority Requirements						

#### 7.4 23:00 to 07:00 – Night Time

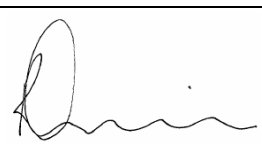
BS4142:1997 Assessment							
Client	Tesco Stores Ltd		Site		Rickmansworth		
Refrigeration	Searle - MGB124						
Sales Floor AC	Mitsubishi Heavy - 2 x FDCA 501 HESR						
Cash Office AC	Mitsubishi Heavy - 1 x SRC 28 CD-5						
Assessment Position	1m from the residential properties generally to the side of the proposed store						
Background Position	10 m from the source centre Background noise levels were recorded at the side of the site.						
Octave Band Centre Frequency (Hz)	63	125	250	500	1000	2000	4000
Refrigeration Unit – Sound Power Levels	71 dB	60 dB	52 dB	44 dB	47 dB	42 dB	38 dB
Sales Floor AC – Sound Power Levels	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB
Cash Office – Sound Power Levels	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB
Combined Sound Power Levels (7.1)	71 dB	60 dB	52 dB	44 dB	47 dB	42 dB	38 dB
Source Directivity (7.2)	3 dB	3 dB	3 dB	3 dB	3 dB	3 dB	3 dB
Distance Correction (7.3)	-20 dB	-20 dB	-20 dB	-20 dB	-20 dB	-20 dB	-20 dB
Barrier Correction (7.4)	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB
Facade Correction (7.5)	3 dB	3 dB	3 dB	3 dB	3 dB	3 dB	3 dB
Resultant Specific Noise Level	46 dB	35 dB	27 dB	19 dB	22 dB	17 dB	13 dB
A – Weighting	-26 dB	-16 dB	-9 dB	-3 dB	0 dB	+1 dB	+1 dB
A-Weighted Specific Noise Levels	20 dB	19 dB	18 dB	16 dB	22 dB	18 dB	14 dB
27 dB							
Sound Power Levels – dB, 5 minute $L_{eq}$ 's with a reference level of $1 \times 10^{-12}$ watts							
Sound Pressure Levels – dB, 5 minute $L_{eq}$ 's with a reference level of $2 \times 10^{-5}$ $Nm^{-2}$							
Item	Calculation	Clause	Commentary				
Specific Noise Level	27 dB	6.3	Specific noise level was calculated from the manufacturers data. See section 6 for calculations				
Acoustic feature correction	+0 dB	8.2.	Neither the refrigeration nor air conditioning equipment had a distinct tone or character.				
Rating Level	27 dB	8.3.	The acoustic feature correction is added to the specific noise level.				
Background Noise Level	34 dB	7.1.	The background noise level was measured at an appropriate position to obtain the level at the assessment position.				
Excess of Rating over Background Level	- 7 dB	9	The background levels is subtracted from the rating level. (Numerical values)				
Assessment indicated complaint are Complaints Marginal		9	The excess of rating over the background is compared against BS4142:1997.				
<b>Conclusion</b>	<b>-7 dB</b>		Approved	Rhys Scrivener			
			Position	Director			
Local Authority Requirements	0 dB		Signed				
Meets Local Authority Requirements	Meets the Local Authority Requirements						

## 8 PPG 24 ASSESSMENTS

### 8.1 07:00 to 23:00 - Daytime

Planning and Policy Guidance 24 Assessment – Mixed Sources								
Client	Tesco Stores Ltd		Site		Rickmansworth			
Refrigeration Sales Floor AC Cash Office AC Assessment Position	Searle - MGB124 Mitsubishi Heavy - 2 x FDCA 501 HESR Mitsubishi Heavy - 1 x SRC 28 CD-5 1m from the residential properties generally to the side of the proposed store 10 m from the source centre							
Octave Band Centre Frequency (Hz)	63	125	250	500	1000	2000	4000	
Refrigeration Unit – Sound Power Levels	71 dB	60 dB	52 dB	44 dB	47 dB	42 dB	38 dB	
Sales Floor AC – Sound Power Levels	79 dB	75 dB	64 dB	57 dB	59 dB	57 dB	52 dB	
Cash Office – Sound Power Levels	75 dB	70 dB	60 dB	52 dB	52 dB	50 dB	47 dB	
Combined Sound Power Levels (7.1)	81 dB	76 dB	66 dB	58 dB	60 dB	58 dB	53 dB	
Source Directivity (7.2)	3 dB	3 dB	3 dB	3 dB	3 dB	3 dB	3 dB	
Distance Correction (7.3)	-20 dB	-20 dB	-20 dB	-20 dB	-20 dB	-20 dB	-20 dB	
Barrier Correction (7.4)	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	
Façade Correction (7.5)	3 dB	3 dB	3 dB	3 dB	3 dB	3 dB	3 dB	
Resultant Specific Noise Level	56 dB	51 dB	41 dB	33 dB	35 dB	33 dB	28 dB	
A – Weighting	-26 dB	-16 dB	-9 dB	-3 dB	0 dB	+1 dB	+1 dB	
A-Weighted Specific Noise Levels	30 dB	35 dB	32 dB	30 dB	35 dB	34 dB	29 dB	
41 dB								
Sound Power Levels – dB, 5 minute $L_{eq}$ 's with a reference level of $1 \times 10^{-12}$ watts Sound Pressure Levels – dB, 5 minute $L_{eq}$ 's with a reference level of $2 \times 10^{-5} \text{ Nm}^{-2}$								
NEC Category	Levels	Commentary						
A	<55 dB	Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as a desirable level.						
B	55 – 63 dB	Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise.						
C	63 – 72 dB	Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.						
D	>72 dB	Planning permission should normally be refused.						
<b>Noise Exposure Category</b>	<b>NEC A</b> <b>(<math>L_{Aeq,16 \text{ hours}}</math> 41 dB)</b>	Approved	Rhys Scrivener					
		Position	Director					
Local Authority Requirements	Category NEC A	Signed						
Meets Local Authority Requirements	Meets the Local Authority Requirements							

## 8.2 23:00 to 07:00 – Night Time

Planning and Policy Guidance 24 Assessment – Mixed Sources								
Client	Tesco Stores Ltd			Site	Rickmansworth			
Refrigeration Sales Floor AC Cash Office AC Assessment Position	Searle - MGB124 Mitsubishi Heavy - 2 x FDCA 501 HESR Mitsubishi Heavy - 1 x SRC 28 CD-5 1m from the residential properties generally to the side of the proposed store 10 m from the source centre							
Octave Band Centre Frequency (Hz)	63	125	250	500	1000	2000	4000	
Refrigeration Unit – Sound Power Levels	71 dB	60 dB	52 dB	44 dB	47 dB	42 dB	38 dB	
Sales Floor AC – Sound Power Levels	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	
Cash Office – Sound Power Levels	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	
Combined Sound Power Levels (7.1)	71 dB	60 dB	52 dB	44 dB	47 dB	42 dB	38 dB	
Source Directivity (7.2)	3 dB	3 dB	3 dB	3 dB	3 dB	3 dB	3 dB	
Distance Correction (7.3)	-20 dB	-20 dB	-20 dB	-20 dB	-20 dB	-20 dB	-20 dB	
Barrier Correction (7.4)	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	
Façade Correction (7.5)	3 dB	3 dB	3 dB	3 dB	3 dB	3 dB	3 dB	
Resultant Specific Noise Level	46 dB	35 dB	27 dB	19 dB	22 dB	17 dB	13 dB	
A – Weighting	-26 dB	-16 dB	-9 dB	-3 dB	0 dB	+1 dB	+1 dB	
A-Weighted Specific Noise Levels	20 dB	19 dB	18 dB	16 dB	22 dB	18 dB	14 dB	
27 dB								
Sound Power Levels – dB, 5 minute $L_{eq}$ 's with a reference level of $1 \times 10^{-12}$ watts								
Sound Pressure Levels – dB, 5 minute $L_{eq}$ 's with a reference level of $2 \times 10^{-5} \text{ Nm}^{-2}$								
NEC Category	Levels	Commentary						
A	<45 dB	Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as a desirable level.						
B	45 – 57 dB	Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise.						
C	57 – 66 dB	Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.						
D	>66 dB	Planning permission should normally be refused.						
Noise Exposure Category	NEC A ( $L_{Aeq,8 \text{ hours}}$ 27 dB)	Approved	Rhys Scrivener					
		Position	Director					
Local Authority Requirements	Category NEC A	Signed						
Meets Local Authority Requirements	Meets the Local Authority Requirements							



## **9 REFERENCES**

### **9.1 BS 4142:1997**

Method for Rating industrial noise affecting mixed residential and industrial areas.

### **9.2 PPG 24**

Planning and Policy Guidance 24 – Planning and Noise.