

Heineken Manchester, Denmark Road Manchester

Planning Compliance Report
Report 23102.PCR.04

Norder Design Associates Ltd
Beech Lawn
Green lane
Belper
Derbyshire
DE56 1BY

Report 23102.PCR.04 Revision History			
First Issue Date: 02/12/2024			
A		D	
B		E	
C		F	
Written by:		Checked by:	
John Cane MIOA Senior Acoustic Consultant		Daniel Stuart MIOA Senior Acoustic Consultant	
Disclaimer KP Acoustics Ltd. has used reasonable skill and care to complete this technical document, within the terms of its brief and contract with the resources devoted to it by agreement with the client. We disclaim any responsibility to the client and others in respect of any matters outside the stated scope. This report is confidential to the client and we accept no responsibility to third parties to whom this report, or any part thereof, is made known. KP Acoustics Ltd. accepts no responsibility for data provided by other bodies and no legal liability arising from the use by other persons of data or opinions contained in this report. KP Acoustics Ltd. 2024			

Contents

1.0	INTRODUCTION	1
2.0	SITE SURVEYS	1
2.1	Site Description	1
2.2	Previous Assessment.....	2
3.0	NOISE ASSESSMENT GUIDANCE AND TARGETS.....	2
3.1	Local Authority Guidance.....	2
3.2	Targets	2
4.0	NOISE IMPACT ASSESSMENT	3
4.1	Proposed Plant Installations	3
4.2	Closest Noise Sensitive Receiver.....	6
4.3	Calculations	6
5.0	NOISE CONTROL MEASURES	6
5.1	Anti-Vibration Mounting Strategy	6
6.0	CONCLUSION.....	7

List of Attachments

Appendix A	Glossary of Acoustics Terminology
Appendix B	Acoustic Calculations
Appendix C	Anti-Vibration Mounting Specification Reference Document

1.0 INTRODUCTION

KP Acoustics Ltd has been commissioned by Norder Design Associates Ltd, Beech Lawn, Green Lane, Belper, Derbyshire, DE56 1BY to undertake a noise impact assessment of a proposed plant equipment installation and change to a façade in the HV/LV Area at Heineken, Denmark Road, Manchester. Norder project reference 8767.

This report presents calculations to demonstrate the feasibility of the plant unit installation and façade element changes to satisfy the emissions criterion at the closest noise-sensitive receivers. Mitigation measures will be outlined as appropriate. This report follows an earlier report, reference '23102.PCR.01', which assessed the impact of plant more widely across the site.

2.0 SITE SURVEYS

2.1 Site Description

As shown in Figure 2.1, the site is bounded by Greenheys Lane to the North, Princess Road to the West, Moss Lane to the South and local roads to the East. There are commercial buildings to the west of the site over the road and a mix of commercial, residential and civil buildings in other directions.

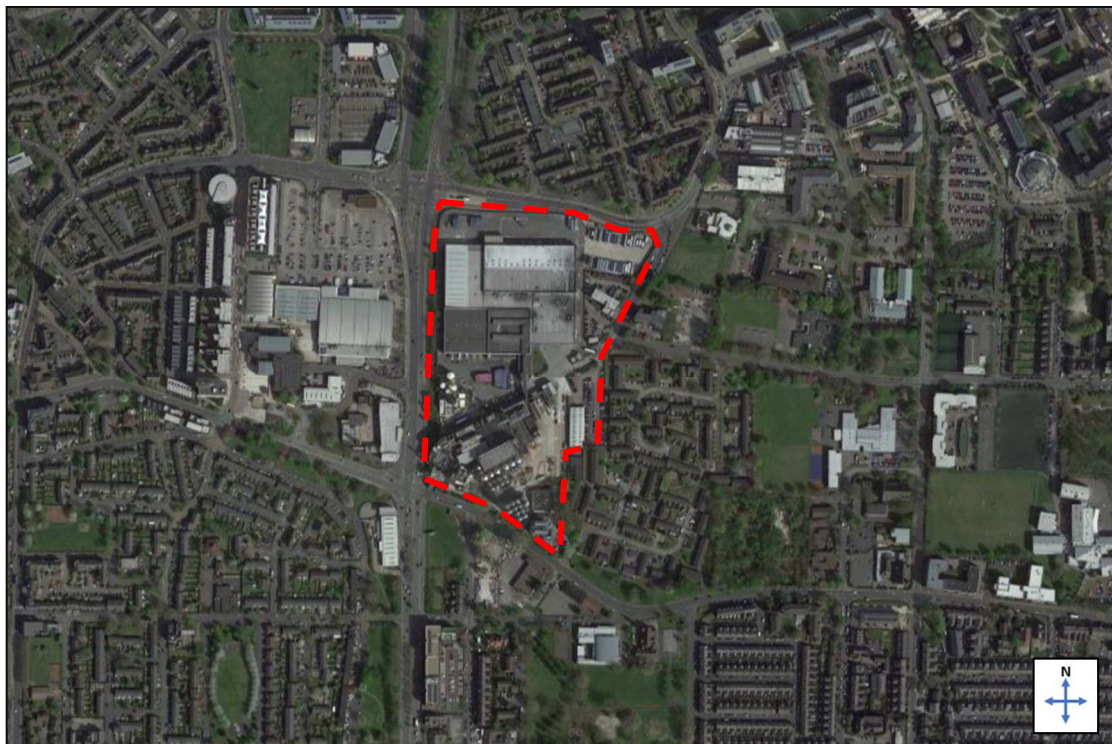


Figure 2.1 Site Location Map (Image Source: Google Maps)

2.2 Previous Assessment

A full study of the noise environment was carried out and detailed in KP Acoustics report with reference 23102.PCR.01, dated 23/12/2021.

In the above study, the noise impact of the site was found to be acceptable after the use of noise mitigation measures recommended to bring down the noise levels of some elements, which had been complained about or were otherwise found to require mitigation.

3.0 NOISE ASSESSMENT GUIDANCE AND TARGETS

3.1 Local Authority Guidance

The guidance provided in the Manchester City Council Planning & Noise Technical Guidance 2015 for noise emissions of new plant in this instance is as follows:

“The noise assessment should be based on BS 4142: 2014 and any application for fixed plant, equipment or machinery must demonstrate that: ‘Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location’.”

3.2 Targets

The targets for noise level external to receivers 1-5 were set in report reference ‘23102.PCR.01’, and are listed below in Table 3.1.

Receiver	Criterion, dB(A), Day 07:00-23:00	Criterion, dB(A), Night 23:00-07:00
1	57	50
2	57	50
3	57	41
4	55	44
5	58	46

Table 3.1 Criteria at nearest noise sensitive locations

The location of receivers are explained in detail in report reference ‘23102.PCR.01’, but they are:

- R1 - Quinney Crescent to the southwest of the site
- R2 - Barnhill Street to the south of the site
- R3 - Charles Halle Road to the east of the site

- R4 - Greenheys Lane to the north of the site
- R5 - Westwood Street to the southeast of the site

4.0 NOISE IMPACT ASSESSMENT

4.1 Proposed Plant Installations

It is understood that the proposed plant installation is comprised of the following units:

- 2 No. Wilson T2 Ecotrans Transformers - 2000KVA- Tier 2
- HV Switchgear – understood not to produce significant noise

The proposed installation location for the proposed plant will be in the Engineering Workshop building, in a room on the northwest façade, as shown marked in red in Figure 4.1 below, and in Figure 4.2. The noise emission levels as provided by the manufacturer for the units are shown in Table 4.1.

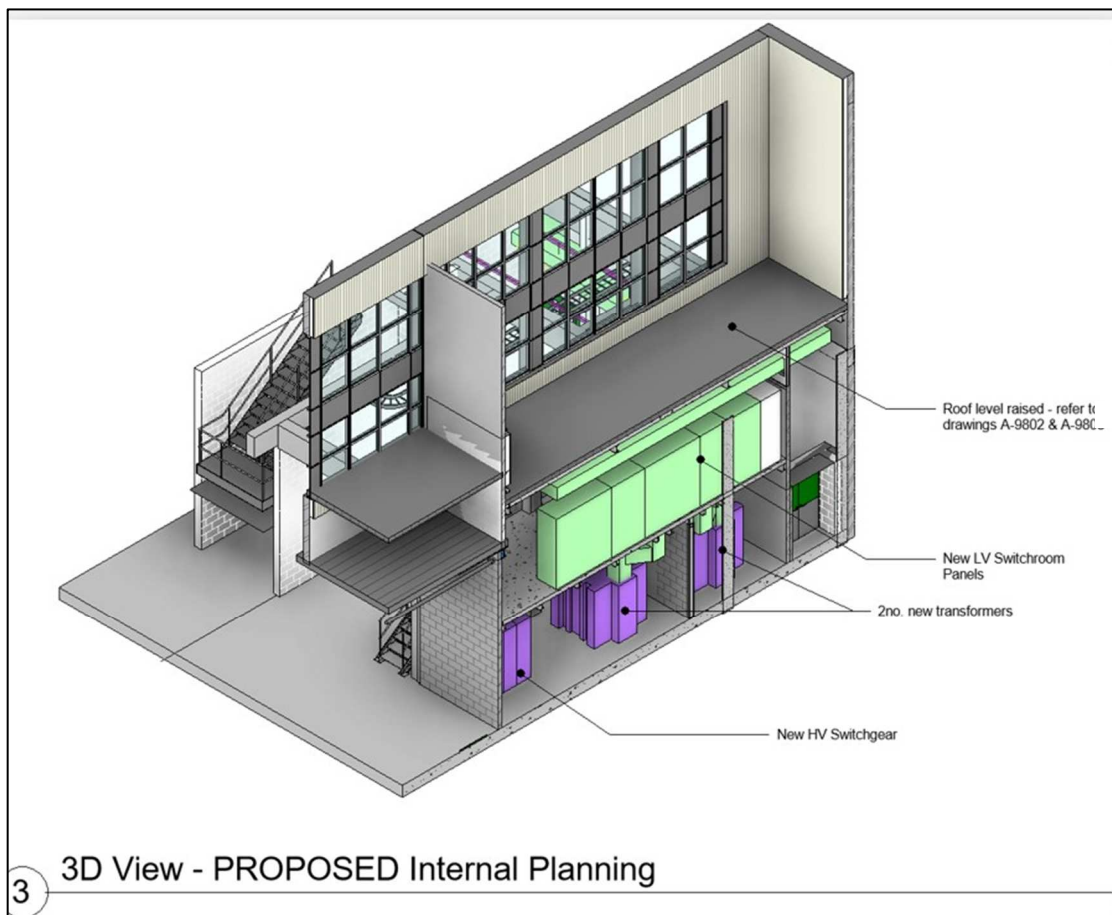
Unit	Descriptor	Octave Frequency Band (Hz)								Overall (dBA)
		63	125	250	500	1k	2k	4k	8k	
Wilson T2 Ecotrans Transformers - 2000KVA- Tier 2	SWL (dBA)	Spectral data not provided by manufacturer								100

Table 4.1 Plant Units Noise Emission Levels as provided by the manufacturer

The proposals for the façade changes are shown in Figure 4.3.



Figure 4.1 Proposed plant location (red) (Source: Google Maps)



3 3D View - PROPOSED Internal Planning

Figure 4.2 Proposed plant locations (Source: Norder)

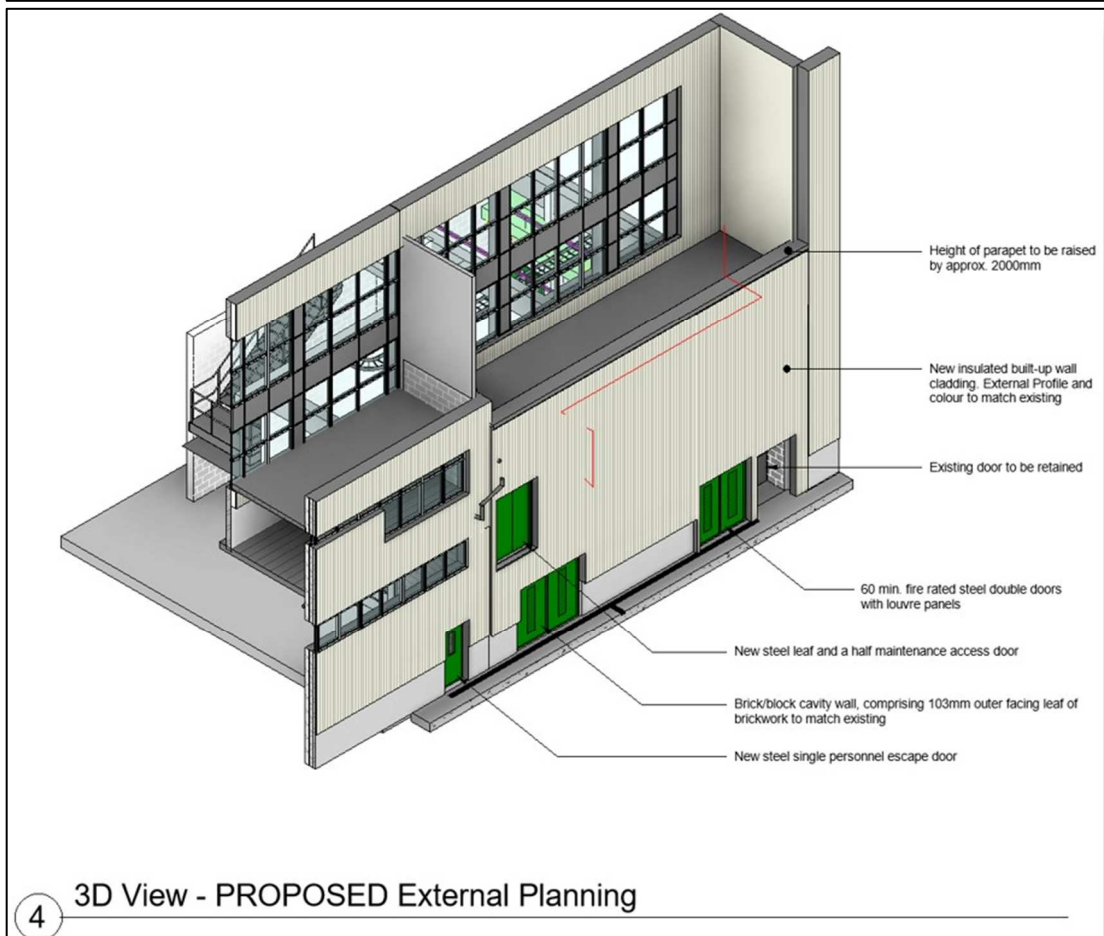
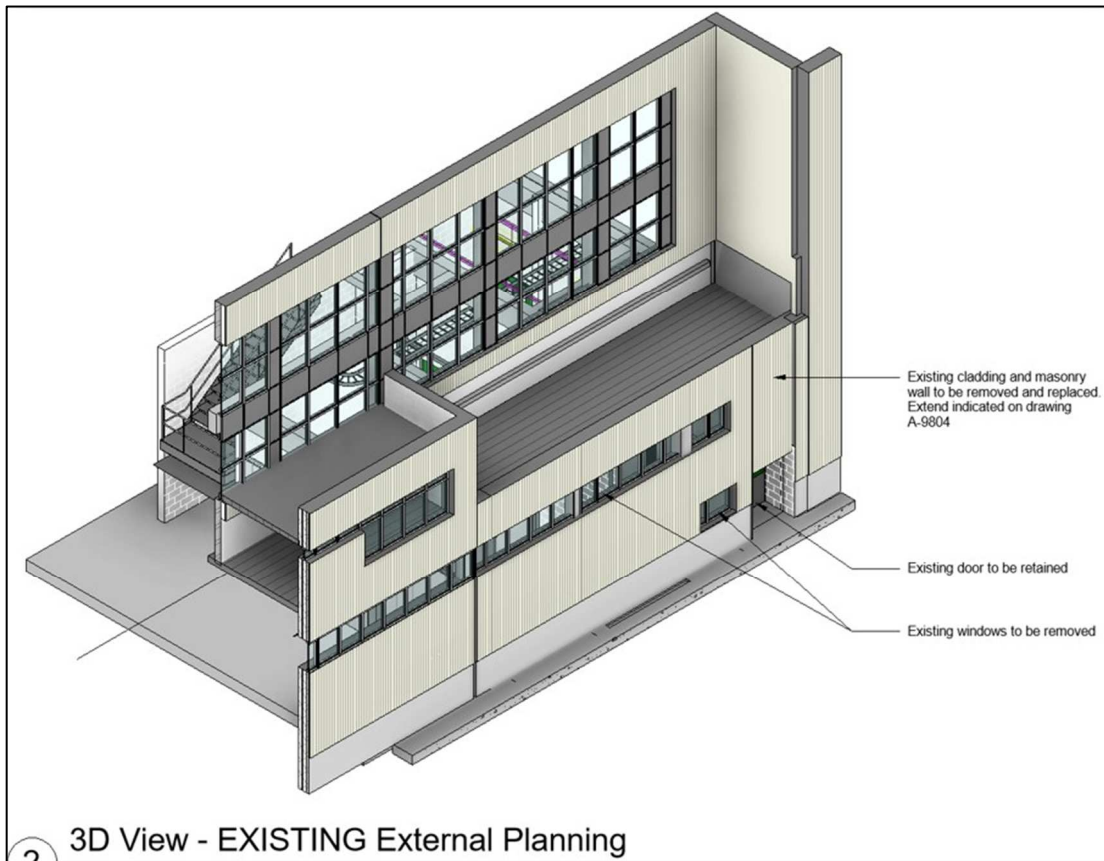


Figure 4.3 Existing view and proposed façade changes (Source: Norder)

4.2 Closest Noise Sensitive Receiver

The closest noise sensitive receiver to the proposed installation location is receiver 3, located approximately 180 metres from the proposed plant installation location.

4.3 Calculations

Taking all acoustic corrections into consideration, and using a worst-case situation of non-acoustic weather louvres to the plant rooms, the noise level contribution expected at the closest receiver from the proposed plant would be as shown in Table 4.2. The criterion quoted is for night-time; further details in report 23102.PCR.01.

Receiver	Criterion, dB(A) 23:00-07:00	Noise Level at 1m From the Closest Noise Sensitive Window, dB(A)
3	41	-1

Table 4.2 Predicted noise level and criterion at nearest noise sensitive location (night-time)

As shown in Appendix B and Table 4.2, transmission of noise to the nearest sensitive windows due to the effects of the proposed plant unit installation and façade change is up to 42dB below the emissions criterion of the Local Authority, providing that the mitigation measures outlined in Section 6 are implemented. This indicates that it would be more than 10dB lower compared with other noise at the nearest and most sensitive receiver, and would, therefore, not cause 'noise creep'.

5.0 NOISE CONTROL MEASURES

In order to achieve the noise level shown in the assessment above, no noise control strategy is necessary. It is recommended that doors to the new equipment are kept closed to prevent excessive noise breakout.

5.1 Anti-Vibration Mounting Strategy

In the case of all plant units, appropriate anti-vibration mounts should be installed in order to ensure that vibrations do not give rise to structure-borne noise. Appendix C outlines detailed advice in order to ensure that the system installer selects the appropriate anti-vibration mount for the installation.

It is the supplier's responsibility to ensure that all mountings offered are suitable for the loads, operating and environmental conditions which will prevail.

This is a general recommendation to improve conditions on site, and is not required to prevent vibration travel to the nearest sensitive receiver identified above. The distance is too great for significant vibration to be transmitted.

6.0 CONCLUSION

Using manufacturer noise data, noise levels are predicted at the nearby noise sensitive receivers for compliance with current requirements.

Calculations show that noise emissions from the proposed plant unit installation and façade change would meet the requirements of Manchester Council.

GENERAL ACOUSTIC TERMINOLOGY

Decibel scale - dB

In practice, when sound intensity or sound pressure is measured, a logarithmic scale is used in which the unit is the 'decibel', dB. This is derived from the human auditory system, where the dynamic range of human hearing is so large, in the order of 10^{13} units, that only a logarithmic scale is the sensible solution for displaying such a range.

Decibel scale, 'A' weighted - dB(A)

The human ear is less sensitive at frequency extremes, below 125Hz and above 16Khz. A sound level meter models the ears variable sensitivity to sound at different frequencies. This is achieved by building a filter into the Sound Level Meter with a similar frequency response to that of the ear, an A-weighted filter where the unit is dB(A).

L_{eq}

The sound from noise sources often fluctuates widely during a given period of time. An average value can be measured, the equivalent sound pressure level L_{eq} . The L_{eq} is the equivalent sound level which would deliver the same sound energy as the actual fluctuating sound measured in the same time period.

L_{10}

This is the level exceeded for no more than 10% of the time. This parameter is often used as a "not to exceed" criterion for noise.

L_{90}

This is the level exceeded for no more than 90% of the time. This parameter is often used as a descriptor of "background noise" for environmental impact studies.

L_{max}

This is the maximum sound pressure level that has been measured over a period.

Octave Bands

In order to completely determine the composition of a sound it is necessary to determine the sound level at each frequency individually. Usually, values are stated in octave bands. The audible frequency region is divided into 11 such octave bands whose centre frequencies are defined in accordance with international standards. These centre frequencies are: 16, 31.5, 63, 125, 250, 500, 1000, 2000, 4000, 8000 and 16000 Hertz.

Environmental noise terms are defined in BS7445, *Description and Measurement of Environmental Noise*.

APPLIED ACOUSTIC TERMINOLOGY

Addition of noise from several sources

Noise from different sound sources combines to produce a sound level higher than that from any individual source. Two equally intense sound sources operating together produce a sound level which is 3dB higher than a single source and 4 sources produce a 6dB higher sound level.

Attenuation by distance

Sound which propagates from a point source in free air attenuates by 6dB for each doubling of distance from the noise source. Sound energy from line sources (e.g. stream of cars) drops off by 3dB for each doubling of distance.

Subjective impression of noise

Hearing perception is highly individualised. Sensitivity to noise also depends on frequency content, time of occurrence, duration of sound and psychological factors such as emotion and expectations. The following table is a guide to explain increases or decreases in sound levels for many scenarios.

Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud

Transmission path(s)

The transmission path is the path the sound takes from the source to the receiver. Where multiple paths exist in parallel, the reduction in each path should be calculated and summed at the receiving point. Outdoor barriers can block transmission paths, for example traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and construction.

Ground-borne vibration

In addition to airborne noise levels caused by transportation, construction, and industrial sources there is also the generation of ground-borne vibration to consider. This can lead to structure-borne noise, perceptible vibration, or in rare cases, building damage.

Sound insulation - Absorption within porous materials

Upon encountering a porous material, sound energy is absorbed. Porous materials which are intended to absorb sound are known as absorbents, and usually absorb 50 to 90% of the energy and are frequency dependent. Some are designed to absorb low frequencies, some for high frequencies and more exotic designs being able to absorb very wide ranges of frequencies. The energy is converted into both mechanical movement and heat within the material; both the stiffness and mass of panels affect the sound insulation performance.

APPENDIX B

Heineken Manchester, Denmark Road

PLANT NOISE EMISSIONS CALCULATIONS

	Frequency, Hz								dB(A)
	63	125	250	500	1k	2k	4k	8k	
Wilson T2 Ecotrans Transformer - 2000KVA- Tier 2 (Sound Power Level)									62
Correction for number of units (2),dB									3
Reverberation time (1s), dB									0
Room volume (42m³), dB									-2
Reverberant Sound Pressure Level in Plant Room									63
Area of louvre (2m²), dB									-3
Minimum attenuation provided by acoustic louvre, dB									-10
Sound Power Level at Louvre									50
Directivity correction, dB									2
Minimum attenuation provided by distance (180m), dB*									-53
Sound Pressure Level at Receiver due to All Units, dB	0	0	0	0	0	0	0	0	-1

Design Criterion	31
------------------	----

ANTI-VIBRATION MOUNTING SPECIFICATION REFERENCE DOCUMENT

1.0 General

- 1.1 All mountings shall provide the static deflection, under the equipment weight, shown in the schedules. Mounting selection should allow for any eccentric load distribution or torque reaction, so that the design deflection is achieved on all mountings under the equipment, under operating conditions.
- 1.2 It is the supplier's responsibility to ensure that all mountings offered are suitable for the loads, operating and environmental conditions which will prevail. Particular attention should be paid to mountings which will be exposed to atmospheric conditions to prevent corrosion.
- 1.3 All mountings shall be colour coded, or otherwise marked, to indicate their load capacity, to facilitate identification during installation.

Where use of resilient supports allows omission of pipe flexible connections for vibration/noise isolation, it shall be the Mechanical Service Consultant's or Contractor's responsibility to decide whether such devices are required to compensate for misalignment or thermal strain.

2.1 Type A Mounting (Caged Spring Type)

- 2.1.1 Each mounting shall consist of cast or fabricated telescopic top and bottom housings enclosing one or more helical steel springs as the principle isolation elements, and shall incorporate a built-in levelling device. The housing should be designed to permit visual inspection of the springs after installation, i.e. the spring must not be totally enclosed.
- 2.1.2 The springs shall have an outside diameter of not less than 75% of the operating height, and be selected to have at least 50% overload capacity before becoming coil-bound.
- 2.1.3 The bottom plate of each mounting shall have bonded to it a rubber/neoprene pad designed to attenuate any high frequency energy transmitted by the springs.
- 2.1.4 Mountings incorporating snubbers or restraining devices shall be designed so that the snubbing, damping or restraining mechanism is capable of being adjusted to have no significant effect during the normal running of the isolated machine.
- 2.1.5 All nuts, bolts or other elements used for adjustment of a mounting shall incorporate locking mechanisms to prevent the isolator going out of adjustment as a result of vibration or accidental or unauthorised tampering.

2.2 Type B Mounting (Open Spring Type)

- 2.2.1 Each mounting shall consist of one or more helical steel springs as the principal isolation elements, and shall incorporate a built-in levelling device.
- 2.2.2 The springs shall be fixed or otherwise securely located to cast or fabricated top and bottom plates, shall have an outside diameter of not less than 75% of the operating height, and shall be selected to have at least 50% overload capacity before becoming coil-bound.
- 2.2.3 The bottom plate shall have bonded to it a rubber/ neoprene pad designed to attenuate any high frequency energy transmitted by the springs.

2.3 Type C Mounting (Rubber/Neoprene Type)

Each mounting shall consist of a steel top plate and base plate completely embedded in oil resistant rubber/neoprene. Each mounting shall be capable of being fitted with a levelling device, and should have bolt holes in the base plate and a threaded metal insert in the top plate so that they can be bolted to the floor and equipment where required.

3.0 Plant Bases

3.1 Type A Bases (A.V. Rails)

An A.V. Rail shall comprise a steel beam with two or more height-saving brackets. The steel sections must be sufficiently rigid to prevent undue strain in the equipment and if necessary should be checked by the Structural Engineer.

3.2 Type B Bases (Steel Plant Bases)

Steel plant bases shall comprise an all-welded steel framework of sufficient rigidity to provide adequate support for the equipment, and fitted with isolator height saving brackets. The frame depth shall be approximately 1/10 of the longest dimension of the equipment with a minimum of 150 mm. This form of base may be used as a composite A.V. rail system.

3.3 Type C Bases (Concrete Inertia Base: for use with steel springs)

These shall consist of an all-welded steel pouring frame-work with height saving brackets, and a frame depth of approximately 1/12 of the longest dimension of the equipment, with a minimum of 100 mm. The bottom of the pouring frame should be blanked off, and concrete (2300 kg/m³) poured in over steel reinforcing rods positioned 35 mm above the bottom. The inertia base should be sufficiently large to provide support for all parts of the equipment, including any components which over-hang the equipment base, such as suction and discharge elbows on centrifugal pumps.