Cole Jarman

Domino's, Clitheroe

Plant Noise Assessment

Report 17/0329/R1

Domino's, Clitheroe

Plant Noise Assessment

Report 17/0329/R1

Domino's Pizza UK & Ireland

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Revision	Description	Date	Prepared	Approved
0	1st Issue	4th July 2017	Matthew Heyes	Ben Harper

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1 Introduction

1.1 Planning permission is being sought for the conversion of the ground floor of the former White Horse Public House, York Street, Clitheroe for use as A5 category (takeaway) premises. As part of the works mechanical services plant will be installed on the site.

1.2 Cole Jarman have conducted a noise survey at the site to quantify background noise levels at the nearest residences. The results of the survey have been used to set noise limits for the proposed mechanical services items. A plant noise assessment has been carried out to assess the impact of the mechanical services plant and mitigation has been proposed, where necessary, in order to meet the noise limits.

1.3 This report documents the methodology used to conduct the noise survey and the calculation of noise emissions from the proposed plant to noise sensitive locations.

2 Site Description

2.1 The former White Horse is an existing three storey semi-detached building which fronts on to York Road. The ground floor has planning permission for use as two retail units and the floors above are to be converted to residential use. The unit and surrounding area is shown on attached site plan 17/0329/SP1.

2.2 York Road runs along the south eastern boundary of the site and beyond this are retail units. Attached to the south of the building is a four storey building with a retail unit on the ground floor and dwellings above.

2.3 To the north of the site are gardens belonging to houses on Church Street. To the west are the rear facades of houses on Church Street.

2.4 The proposed development will include the installation of a supply fan, oven extract fan, an air conditioning condenser and a cold room condenser.

3 Background Noise Survey

3.1 **Methodology**

3.1.1 An unattended noise survey was undertaken at the site commencing at 11:00 hours on the 13th of June 2017 terminating at 10:00 hours on the 14th June 2017.

3.1.2 Measurements of the background noise levels were taken in a free field position 1.5m above ground level within the courtyard towards the rear of the property. Illustrated in site plan 17/0329/SP1.

3.1.3 The location of the measurement position was chosen to be best representative of the background noise levels at the closest noise sensitive dwelling to the rear of, and above, the site.

3.1.4 Measurements of the L_{Aeq}, L_{Amax} and L_{A90} indices were measured over consecutive 15 minute periods for the duration of the survey using the equipment listed within table T1 (see attached Glossary of Acoustic Terms for an explanation of the noise units used).

Item	Manufacturer	Type
Sound Level Analyser	Rion	NL-52
Acoustic Calibrator	Rion	NC-74
Weatherproof windshield	Rion	WS-15

T1 Equipment used during unattended noise survey.

3.1.5 The microphone of the sound level meter was extended by cable and placed inside a weatherproof windshield with the sound level meter calibrated before and after the survey in order to confirm an acceptable level of accuracy. No significant drift was observed.

3.1.6 The weather when setting up and collecting the noise monitors was dry, warm and overcast.

3.2 Results

3.2.1 A time history of the noise measured during the survey is shown in 17/0329/TH1.

3.2.2 The representative background noise L_{A90} for both the Day and Night times for the property is detailed in table T2 below:

Location	Representative Background Noise Level, dB(A)	
	Daytime (1100-2300)	Night time (24 Hours)
MP1	31	30

T2 Representative measured background noise L_{A90}.

4 Plant Noise Limits

4.1 Guidance

4.1.1 When setting noise limits for fixed plant items it is appropriate to consider guidance provided within BS 4142:2014 - "Methods for rating and assessing industrial and commercial sound". This standard compares the rating level of the noise source against the existing background noise level in order to assess the impact. Details of the expected impact for different variations is repeated below:

" a) Typically, the greater this difference [between industrial site noise rating level and baseline background level], the greater the magnitude of the impact.

b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

d) 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."

4.1.2 In addition to the above, BS 4142 also states:

"For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.

Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night."

As stated above, where background sound levels and rating levels are low, absolute levels can be more relevant than a margin compared to the existing level. For this reason it is proposed that a rating level of 30 dB be taken as a lower limit for design criterion (background levels below 30 dB and rating levels below 35 dB are considered 'very low' in BS4142:1997). Where the existing background level is 35 dB or lower, the design will be to reduce the rating level as much as practicable down to or below a rating level of 30 dB

Based on the guidance above plant noise limits have been set at the nearest existing dwellings as equal to the existing background noise levels or 30 dB(A), whichever is higher. These limits must be agreed with the local planning authority prior to installing any mechanical services plant."

4.2 Noise Limits

4.2.1 Noise limits have been set for the new mechanical services items based on the guidance above. These are shown within the table below:

Location	Mechanical Services Noise Limits, $L_{A,r}$ dB(A)	
	Daytime (1100-2300)	Night time (24 Hours)
1m from the nearest residential windows	31	30

T3 Mechanical services noise limits.

4.2.2 The limits above apply to the combined noise rating level from all of the mechanical services items to be installed as part of the application.

5 Plant Noise Assessment

5.1 Proposed Installation

5.1.1 The proposed units to be installed are as follows:

- Air conditioning unit: Mitsubishi Heavy Industries FDC 100VNX
- Cold Room Condenser: Karbox 2464
- Extract Fan: Vent Axia Black Sabre BSC500/4
- Intake Fan: Air Vent Tech Model 5

5.1.2 If the units above are changed during the design process then it will be necessary to update the noise assessment.

5.1.3 The extract and intake fans are both located within the proposed Dominos demise. The duct runs from these fans terminate at the rear wall of the property overlooking the courtyard. The condensing units are located at high level within the property and a supply vent is located within the rear wall overlooking the courtyard.

5.1.4 All of the proposed plant will run during the opening hours of the proposed hot food takeaway, 1100-2300 daily with only the cold store condenser running 24/7.

5.2 Methodology

5.2.1 Our assessment is based on manufacturer's noise data for each plant item shown in attached plant noise schedule 17/0329/PNS1. The noise data indicates that no tonality correction need be applied.

5.2.2 The assessment has considered the nearest and most exposed receptors to the proposed plant, labelled on attached site plan 17/0329/SP1 and described as follows:

- AP1 – Rear windows of dwellings located on Church Street to the rear of the site
- AP2 – Nearest windows of the proposed dwellings to be located above the store, overlooking the courtyard.

5.2.3 The noise levels generated by the equipment at the assessment positions have been calculated by correcting the plant noise levels for distance and radiation losses, façade reflections and screening where appropriate. In addition to this the reverberation time within the plant room and reverberant to free field corrections have been taken into account for the condensing units.

5.3 Required Mitigation Measures

5.3.1 In order to meet the noise limits it will be necessary to install atmospheric side silencers to the supply and extract fans as well as to the vent providing air to the condenser units. These silencers must meet the insertion losses in each octave band shown in T4.

Unit	Insertion Loss (dB) Octave Band Centred Frequency (Hz)							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Oven Extract Fan	11	23	45	50	50	48	34	24
Store Supply Fan	10	20	35	48	50	50	50	37
Plant Room	5	11	19	29	36	37	29	18

T4 Insertion Loss needed

5.3.2 The attenuation needed for the Extract Fan should be achievable with the use of a 2400mm long 33% free area Melinex faced Silencer. The Supply fan attenuation should be met with a 2100mm long 30% free area rectangular silencer. The plant room attenuation should be achievable with a 1200mm long 35% silencer.

5.3.3 It will also be necessary to install 20m^2 of absorptive lining within the plant room housing the condensers. This lining should meet the performance requirements provided within attached

specification 17/0329/SPC1. The lining could be installed on the plant room ceiling or walls as necessary.

5.3.4 It may be necessary to install a supply/extract fan for the condenser plant room in order to get the required airflow to the units. If this is the case then the assessment must be updated to take any noise generated by the fan(s) into account.

5.3.5 All fans and condensing units should be installed on anti-vibration mounts with suitable ductwork connections controlling structural sound transmission.

5.4 Results

5.4.1 With the attenuation measures indicated above modelled the noise levels have been calculated shown in T5 below:

Receiver	Calculated Noise Levels, dB(A)	
	Daytime (1100-2300)	Night time (24-hour)
AP1	12	7
AP2	29	23

T5 Noise assessment near noise sensitive receivers.

5.4.2 The results indicate that the Day and Night limits on noise can be achieved with installation of the proposed mitigation measures. Calculations summary sheets are shown in 17/0329/CS1-4. Full calculations are available on request.

6 Conclusion

6.1 Planning permission is being sought for the conversion of the ground floor of the former White Horse Public House, York Street, Clitheroe for use as an A5 category (takeaway) premises. As part of the conversion/construction mechanical services plant will be installed on the site.

6.2 Cole Jarman have conducted a noise survey at the site and set noise limits at the nearest dwellings. An assessment of mechanical services noise has also been conducted and mitigation measures have been proposed in order to meet the noise limits.

6.3 Full details of the survey and assessment methodology have been provided within this report, along with details of any mitigation measures required to meet the noise limits set by the council.

End of Section

Glossary of Acoustic Terms

L_{Aeq}:

The notional steady sound level (in dB) which over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measurement over that period. Values are sometimes written using the alternative expression dB(A) L_{eq}.

L_{Amax}:

The maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise when occasional loud noises occur, which may have little effect on the L_{Aeq} noise level. Unless described otherwise, L_{Amax} is measured using the "fast" sound level meter response.

L_{A10} & L_{A90}:

If non-steady noise is to be described, it is necessary to know both its level and degree of fluctuation. The L_{An} indices are used for this purpose. The term refers to the A-weighted level (in dB) exceeded for n% of the time specified. L_{A10} is the level exceeded for 10% of the time and as such gives an indication of the upper limit of fluctuating noise. Similarly L_{A90} gives an indication of the lower levels of fluctuating noise. It is often used to define the background noise.

L_{A10} is commonly used to describe traffic noise. Values of dB L_{An} are sometimes written using the alternative expression dB(A) L_n.

L_{AX}, L_{AE} or SEL

The single event noise exposure level which, when maintained for 1 second, contains the same quantity of sound energy as the actual time varying level of one noise event. L_{AX} values for contributing noise sources can be considered as individual building blocks in the construction of a calculated value of L_{Aeq} for the total noise. The L_{AX} term can sometimes be referred to as Exposure Level (L_{AE}) or Single Event Level (SEL).

End of Section

Cole Jarman

Figure 17/0329/SP1

Title:

Site Plan indicating measurement and assessment positions.

Project:

Dominos, Clitheroe

Date:

July 2017

Revision:

-

Scale:

Not to scale

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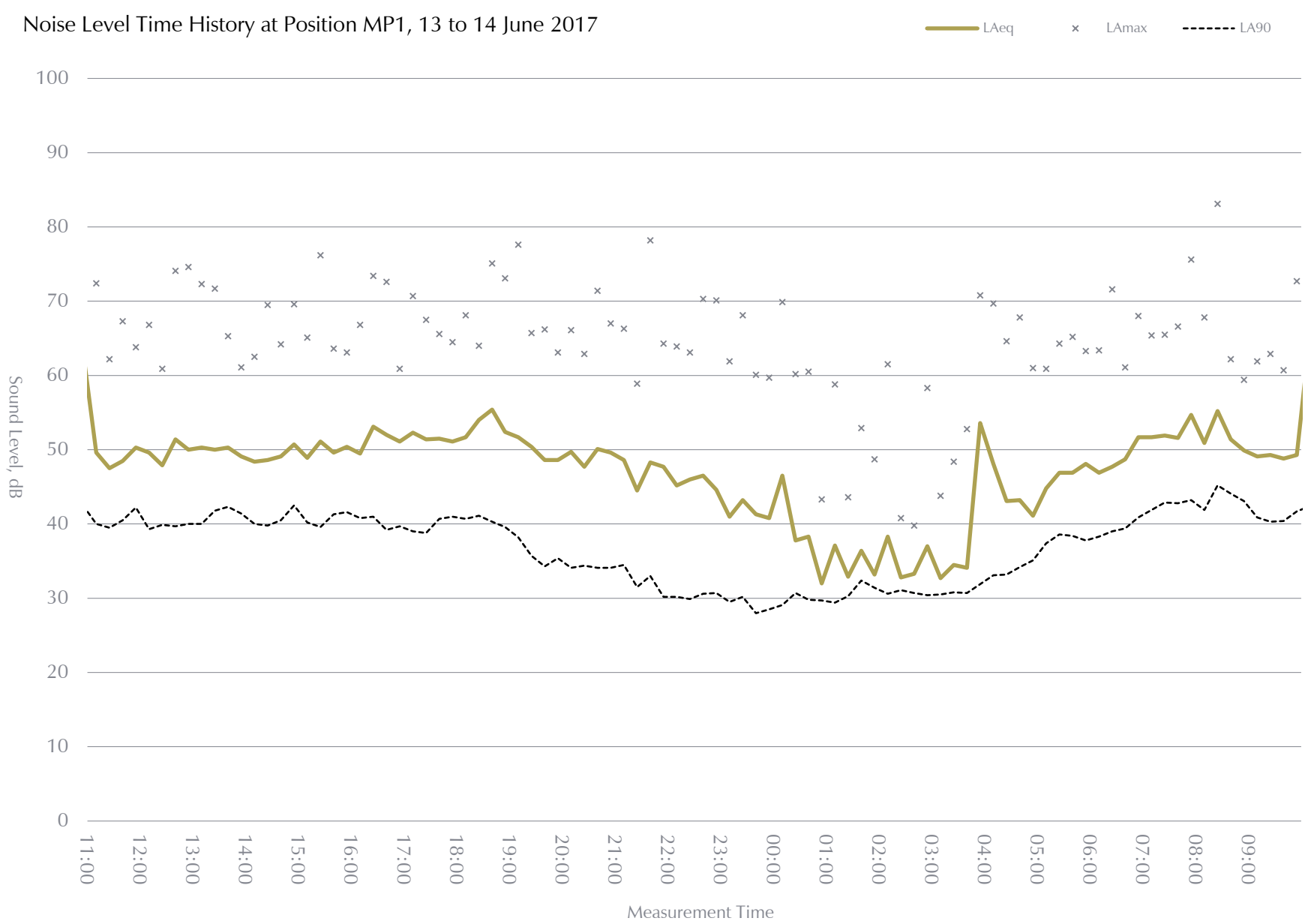


Figure 17/0329/TH01

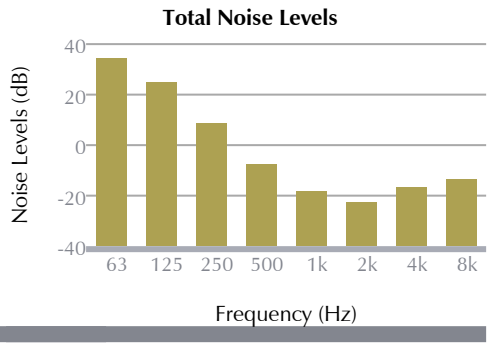
Schedule of Plant and Air Handling Equipment Sound Levels, dB

Reference	Unit Details	Data Source[1]	Noise Level Type	Noise Levels (dB)							
				63	125	250	500	1k	2k	4k	8k
Cold Room Condenser	Karbox 2464	Man	Sound Power, Lw	64	61.5	61.5	63	59.4	57.3	54.1	46.9
Supply	Air Vent Tech Model 5	Man	Sound Power, Lw	77	79	73	74	77	77	74	69
Extract	Vent Axia Black Sabre BSC500/4	Man	Sound Power, Lw	80	79	76	72	75	75	68	61
AC Condenser	Mitsubishi Heavy Industries FDC100VNX	Man	Sound Power, Lw	49	56	60	62	59	56	52	44

Notes

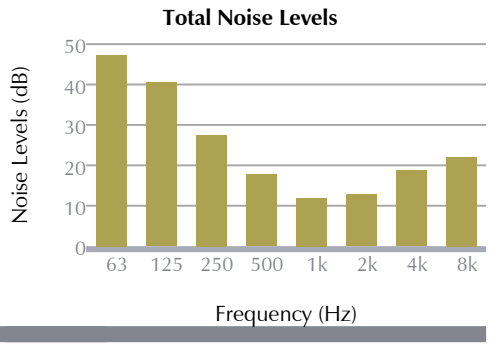
1 - Man refers to data supplied by the equipment manufacturer or supplier, Emp refers to data calculated using empirical formulae, and Meas refers to data measured by Cole Jarman

Project Name	Domino's, Clitheroe
Project Reference	17/0329
Receiver Reference	AP1 - Day
Description	Dwellings to rear
Noise Limit	-
dBA	11.7



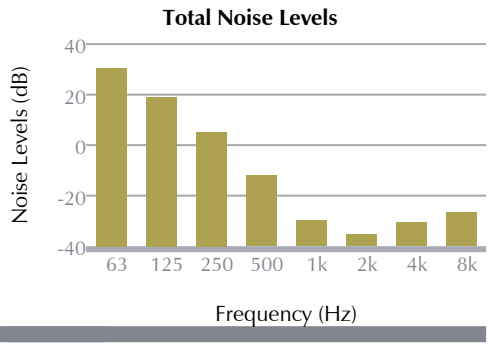
Reference	Noise Levels (dB)							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Plant Room - Day	30.6	20.1	7.5	-9.4	-27	-32.9	-28.4	-24.9
Supply	24.3	19.1	0.3	-15	-23	-30.1	-33.1	-25.1
Extract	30.8	20.6	-3.2	-16	-21	-24.1	-17.1	-14.1

Project Name	Domino's, Clitheroe
Project Reference	17/0329
Receiver Reference	AP2 - Day
Description	Dwellings above store
Noise Limit	-
dBA	28.9



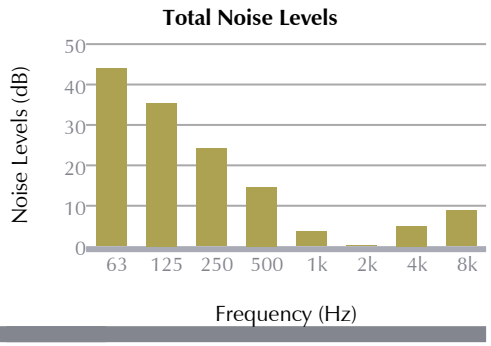
Reference	Noise Levels (dB)							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Plant Room - Day	44.1	36.5	26.5	17.2	6.4	2.6	7.1	10.6
Supply	37.1	34.5	19.1	6.6	6.4	5.4	2.4	10.4
Extract	43.5	36	15.5	5.6	8.4	11.4	18.4	21.4

Project Name	Domino's, Clitheroe
Project Reference	17/0329
Receiver Reference	AP1 - Night
Description	Dwellings to rear
Noise Limit	-
dBA	7.1



Reference	Noise Levels (dB)							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Plant Room - Night	30.5	19.1	5.2	-12	-29.8	-35.3	-30.5	-26.7

Project Name	Domino's, Clitheroe
Project Reference	17/0329
Receiver Reference	AP2 - Night
Description	Dwellings above store
Noise Limit	-
dBA	23.2



Reference	Noise Levels (dB)							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Plant Room - Night	44	35.5	24.2	14.6	3.6	0.2	5	8.8

Specification 17/0329/SPC1

Project: **Domino's Clitheroe**
Subject: **Acoustic Lining**
Date: **4 July 2017**

1 General

This specification defines the applicable requirements for black faced, mineral fibre lining to the condenser plant room. The suppliers of the materials shall provide the necessary information and data to verify the required performance.

The supplier shall be responsible for ensuring that all the performance criteria set out herein are met by the product being offered.

2 Products

The acoustic lining is to be supplied in the minimum thickness stated and shall be inorganic glass fibre material with a minimum density of 48 kg/m^3. The material shall be provided with an erosion resistive acoustically transparent coating suitable for airflow velocities up to 15 m/s.

The sound absorption provided by the material (with and/or without the erosion resistive facing) shall meet or exceed the values tabulated below:

Minimum Thickness (mm)	**Octave Band Centred Frequency (Hz)**					
	125	**250**	**500**	**1k**	**2k**	**4k**
50	0.20	0.45	0.70	0.90	0.95	0.95

T1 Absorption Coefficients of Acoustically Absorbent Plant Area Lining

3 Execution

3.1 Attach 20m^2 to the walls or ceiling within the plant room as detailed in report 17/0329/R1.

3.2 All available portions of the area designed to receive the acoustic liner shall be completely covered. All joints shall be neatly butted and there shall be no interruptions or gaps.

3.3 The erosion resistive face shall be orientated toward the plant room (not the wall).

3.4 The acoustic liner shall be secured with mechanical fasteners which shall compress the liner sufficiently to hold it firmly in place.

3.5 Liner shall be compressed to assure overlapped and compressed longitudinal corner joints.

End of Section

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