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ACOUSTICS PLUS

Proposed Sound Insulation Measures

55 Loudoun Road London, NW8.

Insulation Recommendations

December 2010

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APL Doc Ref: 101836a.ad.12.10.Issue1
ANC Registration No: 161

Site Address; 55 Loudoun Road, London, NW8.
Proposed Sound Insulation Measures
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1. INTRODUCTION

1.1 Acoustics Plus Ltd (APL) is an independent firm of multi-disciplinary acoustic engineers APL is a registered member of The Association of Noise Consultants (ANC) and the author is an associate member of The Institute of Acoustics (IOA).

1.2 APL has been instructed by Backyard Design Studios Ltd, to consider and advise upon wall and door sound insulation measures regarding the proposal to remodel an existing plant room.

1.3 The proposal relates to the plant room ventilation supply and exhaust fans being replaced, two existing outdoor condensers being repositioned and a new condenser unit to be installed within the remodelled internal plant room. It is also understood that a number of new non load bearing walls will be erected that will separate office spaces and the new plant room.

1.4 This report provides the response to Backyard Design Studios Ltd.

2. BASELINE SITUATION

2.1 The brief outline proposal detailed in paragraph 1.3 above relates to the proposal to remodel an existing plant room layout. The proposed new plant room layout is detailed below in Diagram 1.

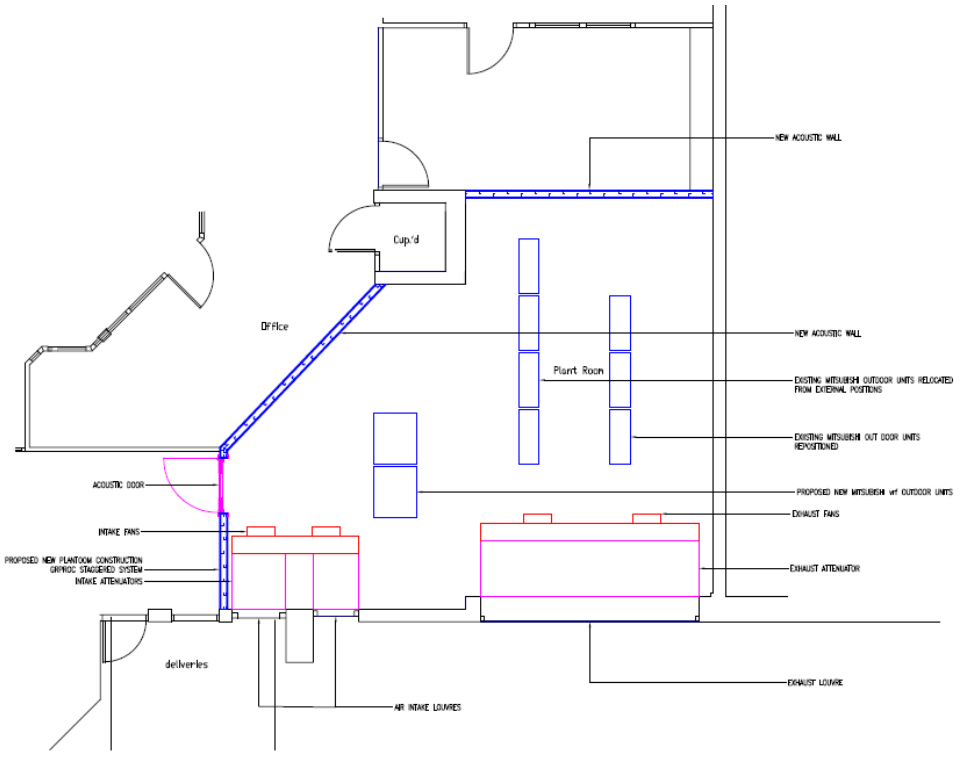


Diagram 1

2.2 It is understood the existing separating wall constructions between the office spaces and plant room are to be removed and new non load bearing partitions are proposed to be erected.

2.3 It is understood the new separating wall will consist of the following:

- *Staggered metal frame studwork mounted with plasterboard.*

2.4 It is understood that there are a number of areas that will require sound insulation consideration:

(a) Installing a new separating partition between office spaces and the new plant room;

(b) Installation of new acoustic door between an office space and the new plant room;

3. RECOMMENDATIONS

(a) Installing a new separating partition between office spaces and the new plant room.

3.1 Based on information received from Backyard Design Studios, all existing separating wall constructions between the current plant room and office spaces are to be removed and replaced with new non load bearing partitions.

3.2 The typical new separating wall construction between proposed office spaces and the new plant room is indicated in diagram 1 below;

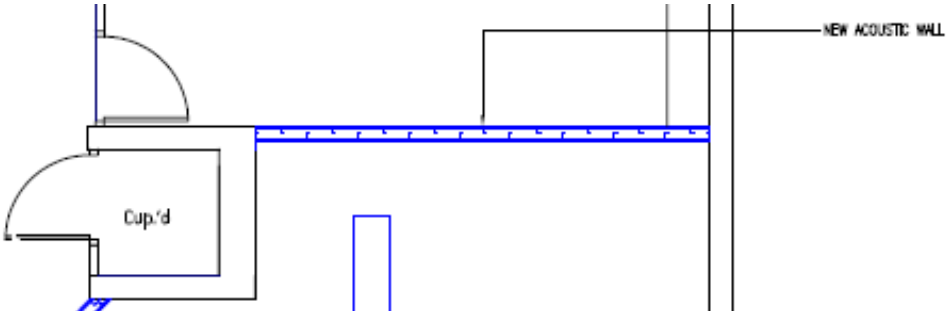


Diagram 1

3.3 It is understood that the following work will be undertaken:

Gypframe Floor & Ceiling Channels to be fixed to the floor and soffit.

Gypframe 'I' Studs are then fitted vertically into the channel sections and held in place by spacer clips.

Alternate studs are then staggered (offset).

As the spacer clips are friction fitted this allows for stud adjustment during boarding.

Gypframe 'C' Studs are fixed at abutments. 50mm Isowool insulation is fitted between studs and the perimeter sealed using Gyproc Sealant.

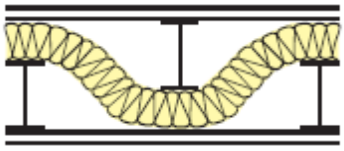
Boards are screw-fixed to alternate offset studs to form the lining.

Horizontal board end joints of face layer boards should be backed with Gypframe GFS1 Fixing Straps.

Two layers of 12.5mm Soundbloc plasterboard to be mounted to each outer face of the studwork.

3.4 The proposed construction is detailed below;

2



92 / 148 combination

Two rows of Gypframe 92 I 90 'I' Studs in Gypframe 148 DC 60 Deep Flange Floor & Ceiling Channel. Gypframe SC2 Spacer Clips and alternate studs staggered in the channel at 300mm centres. Isowool APR 1200 insulation and linings as in table.

Detail	Board type[3]	Lining thickness mm	Partition thickness mm	Approx. weight kg/m²	Max. partition height[1] mm	Sound insulation R_w (R_w + Ctr) dB 25mm[2]	50mm[2]	Partition duty	System reference
30 minutes fire resistance EN									
1	SoundBloc	1 x 15	102	28	3300	49	52	Medium	A233001/021
2	SoundBloc	1 x 15	178	28	5400	53	55	Medium	A233006/026
60 minutes fire resistance EN									
1	SoundBloc	2 x 12.5	122	44	3600	57	59 (48)	Severe	A233002/022
2	SoundBloc	2 x 12.5	198	44	5700	61 (51)	62 (53)	Severe	A233007/027

3.5 The perimeter of the walls should be well sealed with tape or mastic.

3.6 There is a strong risk of flanking transmission in situations where existing beams pass through new separating partitions, large concrete beams do not present a significant risk as long as the new partition is well sealed against the beam but steel beams must be boxed in using two sheets of dense gypsum based board (minimum 10kg/m^2) with the cavity created around the steel filled with a minimum 25mm layer of mineral fibre quilt.

3.7 Where a new separating wall is constructed off an existing timber floor, the floorboards must never run continuously under the partition as this will create a strong flanking path and they should be cut along the line of the new partition cavity. There is also a high risk of flanking transmission within the ceiling and floor joist voids, especially if the joists run at right angles to the partition, it is recommended that where possible that each partition leaf is built along the line of a joist but if this is not possible a full depth timber noggin is to inserted between every joist along the full length of each partition. A dense mineral fibre batt (140-200 kg/m^3) should also be inserted in any cavity created between the newly inserted noggins.

3.8 Technical data sheets of products highlighted in the above paragraphs and diagrams are included in Appendix A.

(b) Installation of new acoustic door between an office space and the new plant room

3.9 Based on information received from Backyard Design Studios, a new acoustic door is to be sited in the proposed new wall partition system separating an office space and the new plant room.

3.10 Any openings in the new wall partition must be constructed with care so as to maintain the walls acoustic performance. A specialist heavy acoustic door set will be required to maintain the integrity of the wall.

3.11 It is recommended that the following work is considered:

Install a bespoke steel acoustically rated door with a minimum R'w or Rw rating of 45dB. Suppliers of such doors are Industrial Acoustic Company Ltd, L20-480 STC-51 steel acoustic door (R'w 45dB)

3.12 Based on information provided above and assuming the installation is made in accordance with the manufacturer's installation guidelines, it is our opinion that this door will maintain the acoustic performance of the new partition system.

3.13 Technical data sheets of products highlighted in the above paragraphs are included in Appendix A.

4. EQUIPMENT

4.1 All measurements were obtained using the following equipment:

- Rion NA-28
  Serial No. 00370311
- Rion Calibrator Type NC-74 Class 1
  Serial No. 00410215

4.2 The relevant equipment carries full and current traceable calibration.

4.3 The equipment, where necessary, was calibrated prior to and after the measurements were carried out.

4.4 Measurement data used during the exercise is presented in Appendix B.

5. NOISE ASSESSMENT

Plant room noise egress through proposed new wall into adjacent office spaces

5.1 In order to calculate the expected noise level in the adjacent office space from the plant room, consideration was given to Equation 1:

$$L_{p1} - L_{p2} = R - 10\text{Log}S + 10\text{Log}\,A$$

where :

L_{p1} is the average level in the source room

L_{p2} is the average level in the receive room

S is area of partition (m^2)

R is sound reduction index of partition

A is the absorption in receiving room (m^2)

Equation 1

5.2 APL were informed that the new separating wall construction will consist of the following:

- *Gyproc's Gypwall Staggered System*

5.3 The sound insulating performance (R_w) of a similar separating partition to that proposed was measured; performance values quoted were based on measurements obtained during that measurement exercise. The measurement data used during the exercise is contained in documents located within Appendix B. The R_w utilised is shown in Table 1:

Sound reduction index	Octave Band Centre Frequency (Hz)							
R_w	63	125	250	500	1k	2k	4k	8k
wall as per para 3.3	25	33	45	55	60	63	74	78

Table 1

5.4 The surface area of the separating partition considered was determined from measurements made from a scaled drawing. The approximate surface area is reported below:

(a) Office space adjacent to proposed new plant room – 4.5m x 2.5m

5.5 The proposed acceptable noise level within the office space is detailed in Table 2 below and is based on a requirement not to exceed any single octave band level comprised within the NR30 curve in the office space;

Location	Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
NR30	59	48	40	34	30	27	25	23	39

Table 2

5.6 From the information provided above, the anticipated levels within an adjacent office space was calculated using equation 1, this is based on a calculated level of 73dB(A) within the plant room as detailed in Table 3 below;

Make & Model	Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Mitsubishi FDCA 140EXA4	58	56	49	53	45	40	43	32	53
Mitsubishi FDCA 140EXA4	58	56	49	53	45	40	43	32	53
Mitsubishi FDCA 140EXA4	58	56	49	53	45	40	43	32	53
Mitsubishi FDCA 140 HKEN4	58	56	49	53	45	40	43	32	53
Mitsubishi FDCA 140 HKEN4	58	56	49	53	45	40	43	32	53
Mitsubishi FDCA 151 HEN	53	55	47	46	44	38	31	25	48
Mitsubishi FDCA 251 HEN	53	55	47	46	44	38	31	25	48
Mitsubishi PUHY EP400SHM	67	66	63	57	54	49	43	40	60
6No. 50JM Aerofoil fans (inlet side)	79	83	80	80	78	74	71	65	
6No. 50JM Aerofoil fans (outlet side)	81	85	81	80	78	74	72	66	
COMBINEDTOTAL	65	69	66	65	63	59	57	51	**73**

Table 3

5.7 The anticipated level of noise egress from the remodelled plant room to within the office space is detailed in Table 4 below;

Noise egress through wall	Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Office space	47	42	27	16	10	2	0	0	28

Table 4

Plant room noise egress through proposed new plant room door into an adjacent office space

5.8 In order to calculate the expected noise level in the adjacent office space from the plant room, consideration was given to Equation 1 detailed previously:

5.9 APL recommends that the new acoustic door consists of the following:

- *Industrial Acoustic Company Ltd, L20/480 STC-51 steel acoustic door*

5.10 The sound insulating performance (R_w) of the recommended door is shown in Table 5:

Sound reduction index R_w	Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
L20/480 STC-51 steel acoustic door	20	27	46	50	52	52	58	63

Table 5

5.11 The surface area of the door was assumed to be as follows;

(a) Proposed new acoustic door to plant room – 2.0m x 0.9m

5.12 The proposed acceptable noise level within the office space is detailed in Table 6 below and is based on a requirement not to exceed any single octave band level comprised within the NR30 curve in the office space;

Location	Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
NR30	59	48	40	34	30	27	25	23	39

Table 6

5.13 From the information provided above, the anticipated levels within an adjacent office space was calculated using equation 1, this is based on the calculated level of 73dB(A) within the plant room as detailed in Table 7 below;

Make & Model	Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Mitsubishi FDCA 140EXA4	58	56	49	53	45	40	43	32	53
Mitsubishi FDCA 140EXA4	58	56	49	53	45	40	43	32	53
Mitsubishi FDCA 140EXA4	58	56	49	53	45	40	43	32	53
Mitsubishi FDCA 140 HKEN4	58	56	49	53	45	40	43	32	53
Mitsubishi FDCA 140 HKEN4	58	56	49	53	45	40	43	32	53
Mitsubishi FDCA 151 HEN	53	55	47	46	44	38	31	25	48
Mitsubishi FDCA 251 HEN	53	55	47	46	44	38	31	25	48
Mitsubishi PUHY EP400SHM	67	66	63	57	54	49	43	40	60
6No. 50JM Aerofoil fans (inlet side)	79	83	80	80	78	74	71	65	
6No. 50JM Aerofoil fans (outlet side)	81	85	81	80	78	74	72	66	
COMBINEDTOTAL	65	69	66	65	63	59	57	51	**73**

Table 7

5.14 The anticipated level of noise egress from the remodelled plant room to within an adjacent office space through the acoustic door is detailed in Table 8 below;

Noise egress through door	Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Office space	45	42	20	15	11	7	0	0	27

Table 8

6. CONCLUSION

6.1 The foregoing assessment indicates that any noise egress from the remodelled plant room should not present any undue noise concerns to occupiers of the adjacent office spaces provided the plant room noise levels highlighted are not exceeded and that the new partitions and acoustic door / sets are installed in accordance with the manufacturer's installation guidelines.

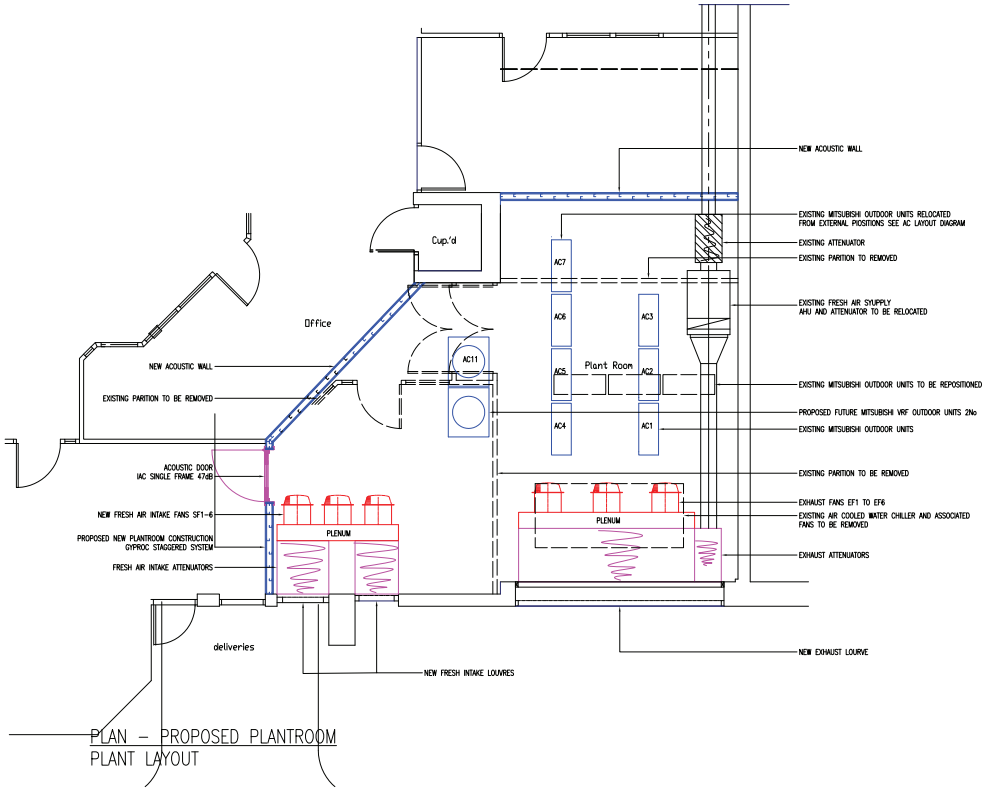
6.2 Noise egress from the plant room is a function of:

(a) Plant room noise level;

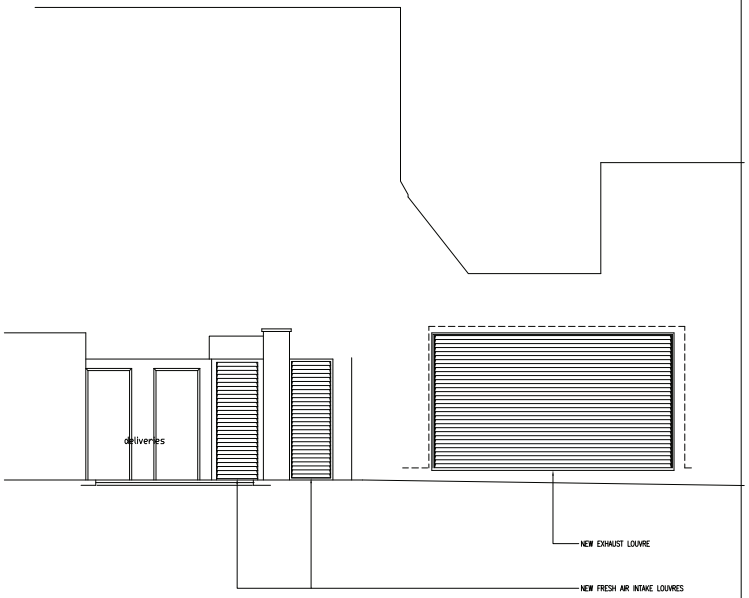
(b) The resistance of the plant room envelope to the passage of sound.

6.3 It is patent that increasing plant room noise levels or changing the sound insulation envelope of the plant room could adversely affect the noise level within the office spaces and increase the likelihood of complaint.

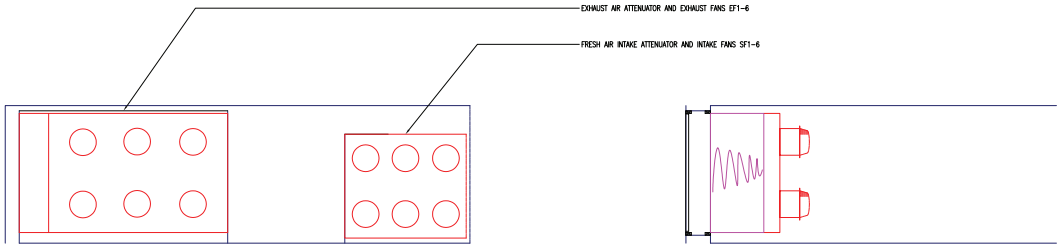
Drawings



PLAN – PROPOSED PLANTROOM
PLANT LAYOUT



NORTH ELEVATION
PROPOSED LOUVRES



SECTION THROUGH PLANTROOM
PROPOSED FANS AND ATTENUATORS

SECTION THROUGH PLANTROOM
PROPOSED FANS AND ATTENUATORS

PLANTROOM EQUIPMENT SCHEDULE

REF	EQUIPMENT	SOUND DATA								SPL
AC1	MITSUBISHI FDCA140EXA4	SEE ATTACHED MITSUBISHI SOUND PRESSURE DATA								53dB @1M
AC2	MITSUBISHI FDCA140EXA4	SEE ATTACHED MITSUBISHI SOUND PRESSURE DATA								53dB @1M
AC3	MITSUBISHI FDCA140EXA4	SEE ATTACHED MITSUBISHI SOUND PRESSURE DATA								53dB @1M
AC4	MITSUBISHI FDCA140HKEN4	SEE ATTACHED MITSUBISHI SOUND PRESSURE DATA								
AC5	MITSUBISHI FDCA140HKEN4	SEE ATTACHED MITSUBISHI SOUND PRESSURE DATA								
AC6	MITSUBISHI FDAC151HEN	SEE ATTACHED MITSUBISHI SOUND PRESSURE DATA								48dB @ 1m
AC7	MITSUBISHI FDCA251HEN	SEE ATTACHED MITSUBISHI SOUND PRESSURE DATA								48dB @ 1M
AC11	MITSUBISHI PUHY-EP400SHM (HIGH COP)	SEE ATTACHED MITSUBISHI SOUND PRESSURE DATA								60dB @ 1M
EF1-6	6NR WOODS FLAKT AXIAL FLOW AEROFOIL FANS 50JM/20/4/6/22	63	125	250	500	1K	2K	4K	8K	MID BAND FREQUENCY (Hz)
		73	77	73	72	70	66	64	58	SWL (dB)
SF1-6	6Nr WOODS FLAKT AXIAL FLOW AEROFOIL FANS 50JM/20/4/6/22	63	125	250	500	1K	2K	4K	8K	MID BAND FREQUENCY (Hz)
		73	77	73	72	70	66	64	58	SWL (dB)

Ref	Date	Description	Checked
A	01/11/2010	PRELIMINARY ISSUE	

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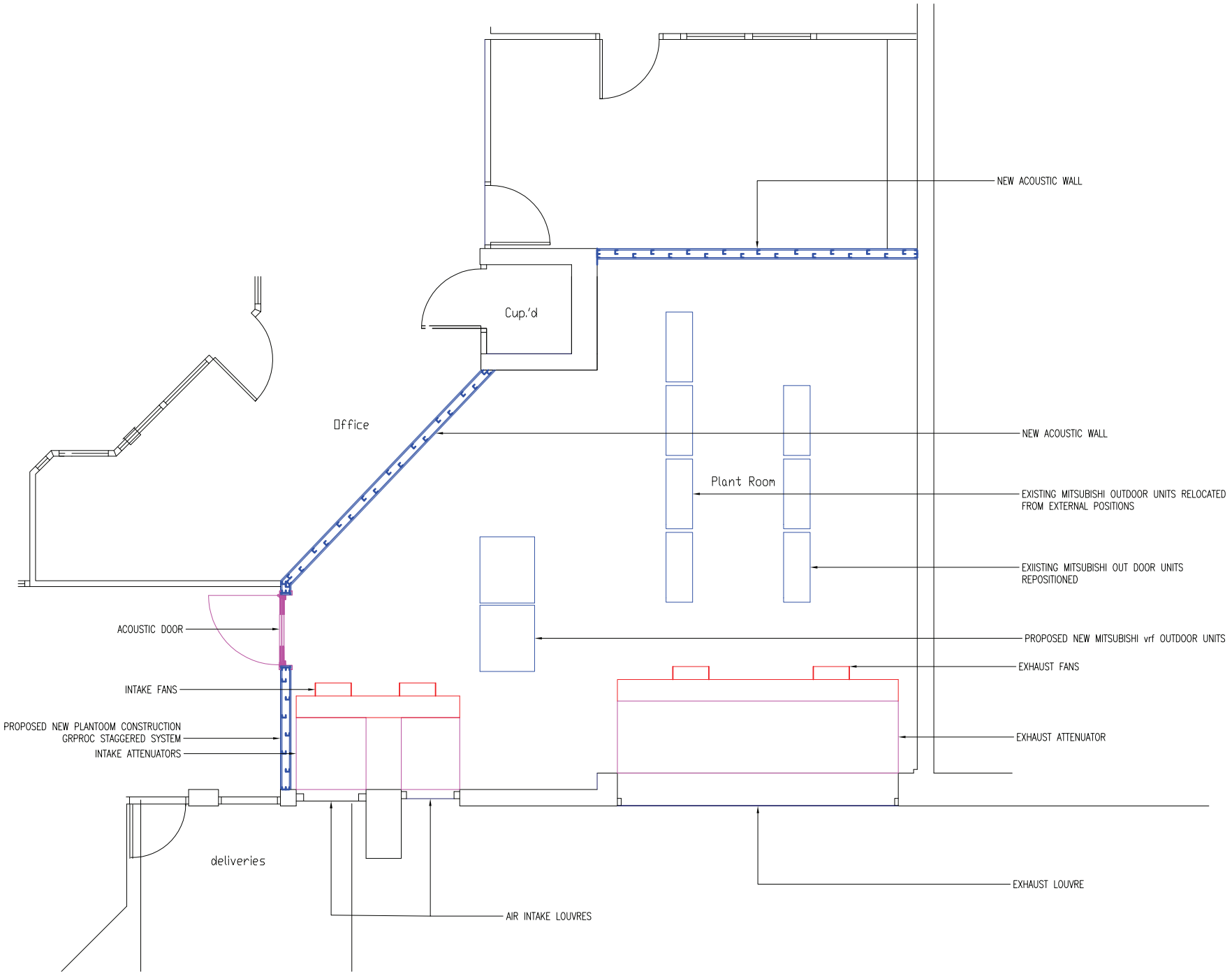
Project
COMFORT COOLING/HEATING SYSTEMS

Title
PLANTROOM PROPOSALS

Date	Drawn By
NOVEMBER 2010	--/--
Scale: 1:50 @ A1	Cad Ref: --
	Checked: DRB

PRELIMINARY

Drawing No.: DB/09.01/M/4
Rev: A



Ref	Date	Description
A	01/05/2010	FEASIBILITY

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Project
Comfort Cooling/Heating Systems

Title
Plantroom Proposals

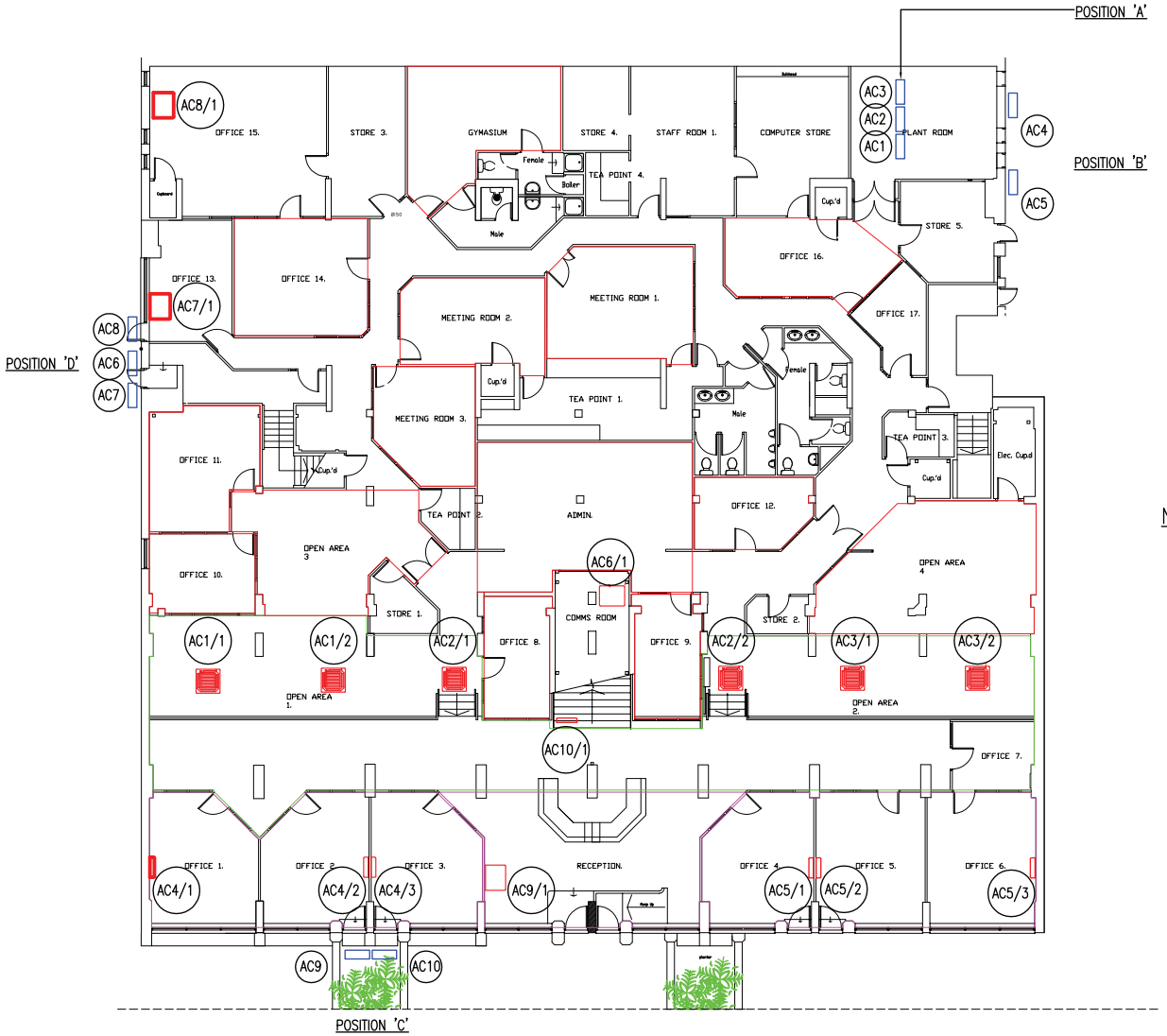
	Cad Ref –
Date May 2010	Drawn By ---/--
Scale 1:50 @ A3	Checked DRB

PRELIMINARY

Drawing No. DB/09.07/M/03

Rev A

AC LAYOUT DIAGRAM



Appendix A

GypWall™ STAGGERED

Staggered stud acoustic partition system

49 – 63 dB

30 – 90 mins

GypWall™ STAGGERED is a non-loadbearing stud partition which provides very high levels of sound insulation. In public and commercial developments it can be used for space division within critical areas of offices, hotels, schools, hospitals, recreational complexes, shops, and conference centres. In industrial units it can be used to isolate machinery noise. In refurbishment work on residential units it can be used as a sound resisting, space saving partition between dwellings.

Sector

- ✓ Office / commercial
- ✓ Educational
- ✓ Residential
- ✓ Healthcare
- ✓ Leisure
- ✓ Industrial

A  Gypframe 'I' Stud

A  Gypframe Spacer Clip

B  Gypframe Floor & Ceiling Channel

Key facts

- Choice of framing sizes to suit range of performance requirements
- Achieves very high levels of sound insulation
- Satisfies *BS 5234* strength and robustness requirements up to Severe Duty
- Up to 90 minutes fire resistance
- Single layer or double layer board linings

System components

Gypframe metal products

60 I 70 'I' Stud — **Length** 3600, 4200mm
Used with 72mm Gypframe Standard Floor & Ceiling Channel to form 60/72 combination.

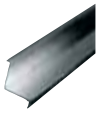
92 I 90 'I' Stud — **Length** 3600, 5000mm 6000mm
Used with 148mm Gypframe Standard Floor & Ceiling Channel to form 92/148 combination.

70 S 50 'C' Stud — **Length** 2400, 2700, 3000, 3330, 3600, 4200mm

146 S 50 'C' Stud — **Length** 2400, 2700, 3000, 3330, 4200mm

Floor & Ceiling Channels
Standard, Deep Flange (DC) and Extra Deep Flange (EDC) Floor & Ceiling Channels.
All channels are available in 3600mm only.

SC1 Spacer Clip (used in 60/72 combination)
SC2 Spacer Clip (used in 92/148 combination)

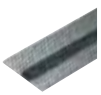


GA5 Internal Fixing Angle
Prime dimensions 60mm x 60mm

GFS1 Fixing Strap — **Length** 2400mm

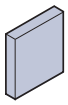
or

99 FC 50 Fixing Channel — **Length** 2400mm

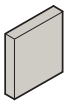


GFT1 Fixing 'T' — **Length** 2400mm

Gyproc board products



SoundBloc[1]
Thickness 12.5, 15mm
Width 1200mm



DuraLine[1]
Thickness 15mm
Width 1200mm

[1] Moisture resistant boards are specified in intermittent wet use areas e.g. shower cubicles.

Fixing and finishing products

Gyproc Drywall Screws
For fixing boards to stud framing up to 0.79mm thick.

or

Gyproc Jack-Point Screws
For fixing boards to stud framing 0.80mm thick or greater and 'I' studs greater than 0.55mm thick.

Gyproc jointing materials
For seamless jointing.

Gyproc Sealant
Sealing airpaths for optimum sound insulation.

Gyproc edge beads
Protecting and enhancing board edges and corners.

Gyproc Control Joint
To accommodate structural movement.

Gyproc FireStrip
For fire-stopping deflection heads.

Thistle Board Finish or Thistle Multi-Finish
To provide a plaster skim finish.

Isowool APR 1200
25mm or 50mm, for improved acoustic performance.

Installation overview

Gypframe Floor & Ceiling Channel is fixed to the floor and soffit. Gypframe 'I' Studs are fitted vertically into the channel sections and held in place by spacer clips. Alternate studs are staggered (offset). As the spacer clips are friction fitted this allows for stud adjustment during boarding. Gypframe 'C' Studs are fixed at abutments. Isowool insulation is fitted between studs and the perimeter sealed using Gyproc Sealant.

Boards are screw-fixed to alternate offset studs to form the lining. Horizontal board end joints of face layer boards should be backed with Gypframe GFS1 Fixing Strap (double layer) or Gypframe GFT1 Fixing 'T' (single layer).

Openings

Any openings must be constructed with care so as to maintain the acoustic performance. Specialist heavy acoustic door sets may be required.

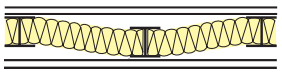
Services

Electrical and other services are normally installed after one side is boarded. Horizontal runs are routed through cut-outs in the studs. Gypframe 99 FC 50 Fixing Channel is installed between studs to support recessed switch boxes / socket outlets, or a high performance socket box detail used where higher acoustic performance is required.

Performance (▶Refer to **2 - Basic principles of system design**)

EN Table 1a – GypWall STAGGERED - 60 / 72 and 92 / 148 combinations

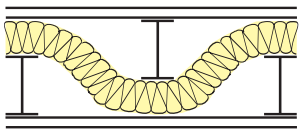
1



60 / 72 combination

Two rows of Gypframe 60 I 70 'I' Studs in Gypframe 72 C 50 Standard Floor & Ceiling Channel. Gypframe SC1 Spacer Clips and alternate studs staggered in the channel at 300mm centres. Isowool APR 1200 insulation and linings as in table.

2



92 / 148 combination

Two rows of Gypframe 92 I 90 'I' Studs in Gypframe 148 DC 60 Deep Flange Floor & Ceiling Channel. Gypframe SC2 Spacer Clips and alternate studs staggered in the channel at 300mm centres. Isowool APR 1200 insulation and linings as in table.

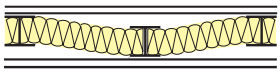
Detail	Board type[3]	Lining thickness	Partition thickness	Approx. weight	Max. partition height[1]	Sound insulation R_w (R_w + Ctr) dB		Partition duty	System reference
		mm	mm	kg/m²	mm	25mm[2]	50mm[2]		
30 minutes fire resistance EN									
1	SoundBloc	1 x 15	102	28	3300	49	52	Medium	A233001/021
2	SoundBloc	1 x 15	178	28	5400	53	55	Medium	A233006/026
60 minutes fire resistance EN									
1	SoundBloc	2 x 12.5	122	44	3600	57	59 (48)	Severe	A233002/022
2	SoundBloc	2 x 12.5	198	44	5700	61 (51)	62 (53)	Severe	A233007/027
90 minutes fire resistance EN									
1	SoundBloc	2 x 15	132	53	3900	59 (49)	61 (53)	Severe	A233003/023
2	SoundBloc	2 x 15	208	53	5000	62 (54)	63 (55)	Severe	A233008/028

[1] The maximum heights quoted are limited by the fire state field of application or by limiting deflection of L/240 at 200Pa, whichever is the more onerous.
[2] Isowool APR 1200 insulation.
[3] For improved durability and impact resistance, the outer layer of Gyproc SoundBloc can be replaced with a layer of 15mm Gyproc DuraLine. On single layer linings this will improve duty rating to Severe Duty.

NB The fire resistance and sound insulation performances are for imperforate partitions, walls and ceilings incorporating boards with joints taped and filled, or skimmed according to British Gypsum's recommendations. The quoted performance are achieved only if British Gypsum components are used throughout, and the Company's fixing recommendations are strictly observed. Any variation in the specifications should be checked with British Gypsum.

BS Table 1b – GypWall STAGGERED - 60 / 72 and 92 / 148 combinations

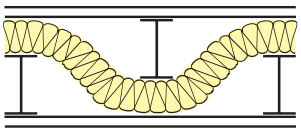
1



60 / 72 combination

Two rows of Gypframe 60 I 70 'I' Studs in Gypframe 72 C 50 Standard Floor & Ceiling Channel. Gypframe SC1 Spacer Clips and alternate studs staggered in the channel at 300mm centres. Isowool APR 1200 insulation and linings as in table.

2



92 / 148 combination

Two rows of Gypframe 92 I 90 'I' Studs in Gypframe 148 DC 60 Deep Flange Floor & Ceiling Channel. Gypframe SC2 Spacer Clips and alternate studs staggered in the channel at 300mm centres. Isowool APR 1200 insulation and linings as in table.

Detail	Board type[3]	Lining thickness mm	Partition thickness mm	Approx. weight kg/m²	Max. partition height[1] mm	Sound insulation R_w (R_w + Ctr) dB 25mm[2]	50mm[2]	Partition duty	System reference
30 minutes fire resistance BS									
1	SoundBloc	1 x 15	102	28	3300	49	52	Medium	A233001/021
2	SoundBloc	1 x 15	178	28	5400	53	55	Medium	A233006/026
60 minutes fire resistance BS									
1	SoundBloc	2 x 12.5	122	44	3600	57	59	Severe	A233002/022
2	SoundBloc	2 x 12.5	198	44	5700	61 (51)	62 (53)	Severe	A233007/027
90 minutes fire resistance BS									
1	SoundBloc	2 x 15	132	53	3900	59 (49)	61 (53)	Severe	A233003/023
2	SoundBloc	2 x 15	208	53	6000	62 (54)	63 (55)	Severe	A233008/028

[1] Based on a limiting deflection of L/240 at 200Pa.
[2] Isowool APR 1200 insulation
[3] For improved durability and impact resistance, the outer layer of Gyproc SoundBloc can be replaced with a layer of 15mm Gyproc DuraLine. On single layer linings this will improve duty rating to Severe Duty.

NB The fire resistance and sound insulation performances are for imperforate partitions, walls and ceilings incorporating boards with joints taped and filled, or skimmed according to British Gypsum's recommendations. The quoted performance are achieved only if British Gypsum components are used throughout, and the Company's fixing recommendations are strictly observed. Any variation in the specifications should be checked with British Gypsum.

Design

Planning - key factors

The position of services and heavy fixings should be pre-determined and their installation planned into the frame erection stage. If a plastered finish is specified, the thickness of the door or glazing frame must allow for the thickness of the plaster finish. Timber sole plates should be considered where the floor is uneven.

▶ Refer to 2.5 – Service installations.

Cavity fire barriers

Stone mineral wool cut neatly to fit across the cavity forms a suitable closure.

Acoustic performance

The partition achieves high levels of sound insulation by virtue of the separation between the two rows of studs. It is important that this isolation is maintained, and that services, fixtures, etc, do not form a bridge between the two linings.

Fixing floor and ceiling channels

The channels must be securely fixed to the floor and structural soffit at 600mm maximum centres. Gypframe 148 DC 60 Deep Flange Floor & Ceiling Channels must be fixed with two lines of staggered fixings, each line at 600mm centres, and each fixing 25mm in from the flange.

If the floor is uneven a 38mm thick timber sole plate equal to the width of the channel should be used. If the concrete or screeded floor is new, consideration should be given to the installation of a damp proof membrane between the floor surface and the channel or sole plate.

Deflection heads

Partition head deflection designs may be necessary to accommodate deflections in the supporting floor. Deflection heads may also be required to the underside of roof structures subjected to positive and negative pressures.

The partitions can incorporate head deflection designs with only a slight reduction in sound insulation performance. See Construction details – 1 and 2.

▶ Refer to 2 – Basic principles of system design.

Services

Penetrations

Penetrations of fire resistant constructions for services need careful consideration to ensure that the integrity of the element is not impaired and also that the services themselves do not act as the mechanism of fire spread.

▶ Refer to 2.5 – Service installations.

Independent support

When designing for the installation of services such as fire dampers and associated ductwork through a GypWall partition, consideration should be given to the size and weight of the damper - this will determine whether it can be supported directly from the partition or needs to be independently supported from the structure.

▶ Refer to 2.5 – Service installations.

Electrical

The installation of electrical services should be carried out in accordance with the recommendations of the Institution of Electrical Engineers. The cut-outs in the studs can be used for routing electrical and other small services.

Door openings

Any openings will require very careful detailing if the acoustic performance of the partition is to be maintained. Specialist heavy acoustic doorsets may require additional support. Contact the British Gypsum Drywall Academy Advice Centre for guidance.

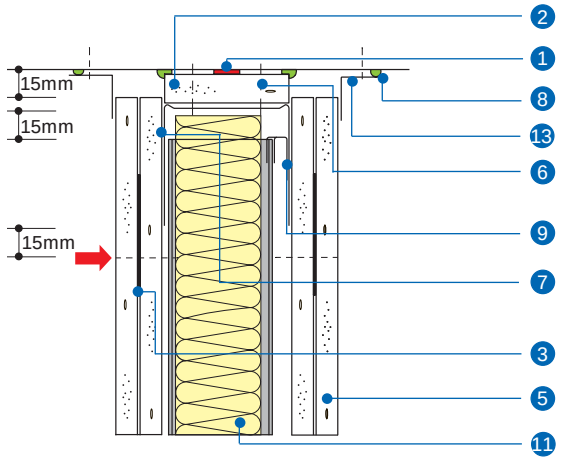
Board finishing

▶ Refer to 10 – Finishing systems and decorative effects.

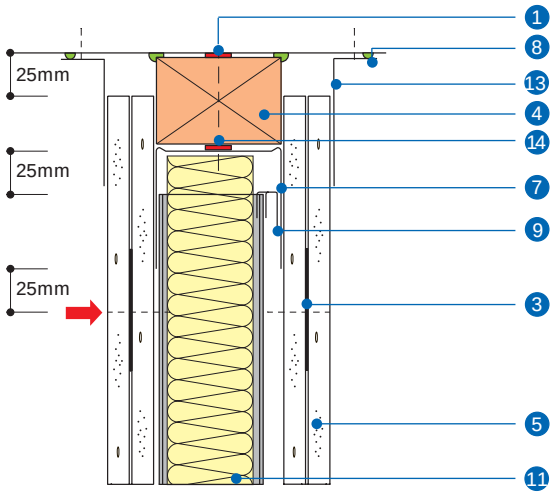
▶ Please refer to **2 - Basic principles of system design** for general guidance.

Construction details (60/72 combination illustrated)

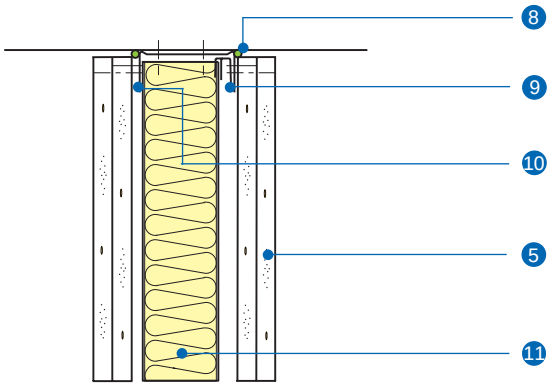
1 Deflection head - 60 minutes fire resistance, 15mm downward deflection.



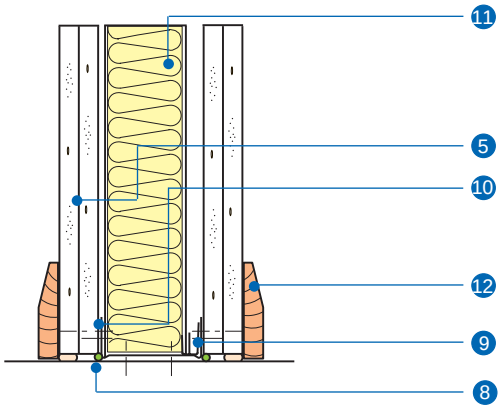
2 60 minutes fire resistance, ± 25mm deflection.



3 Head detail



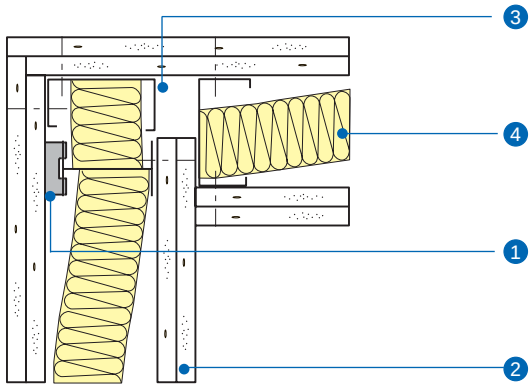
4 Base detail



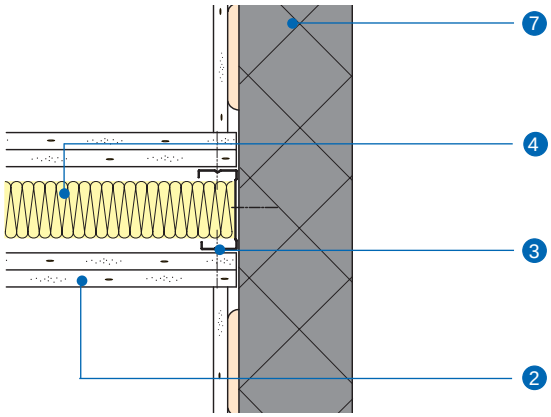
1. Gyproc FireStrip (continuous line)
2. Gyproc Plank
3. Gypframe GFS1 Fixing Strap
4. Timber head plate suitably fixed to structure
5. Gyproc SoundBloc or Gyproc DuraLine
6. Fixing through firestop into structure at 600mm maximum centres
7. Gypframe 72 EDC 60 Extra Deep Flange Floor & Ceiling Channel
8. Gyproc Sealant
9. Gypframe Spacer Clip
10. Gypframe 72 C 50 Standard Floor & Ceiling Channel
11. Isowool insulation
12. Skirting
13. Steel Angle trim, 75 x 25mm (by others)
14. Fixing of head channel into timber head plate at 600mm maximum centres.

NB No fixings should be made through the boards into the flanges of the head channel. The arrow (➡) denotes the position of the uppermost board fixings which should be made into Gypframe GFS1 Fixing Strap. Continuous Gyproc FireStrip must be installed as shown in order to maintain fire performance. Gypframe Steel Angle or approved decorative trim (by others) should be fixed to the soffit either side of the partition as shown in order to maintain the acoustic performance. Where ± deflection is a requirement, Gypframe SC1 or SC2 Spacer Clips must be pre-fixed to the 'I' studs to avoid the risk of disengagement once deflection is taken up.

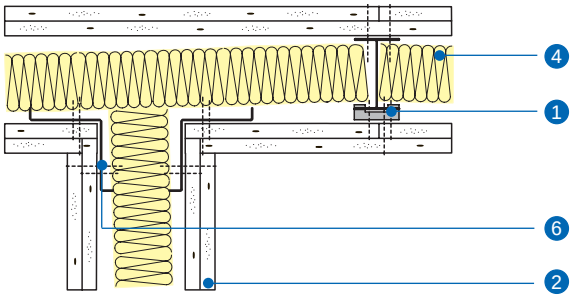
5 Corner junction



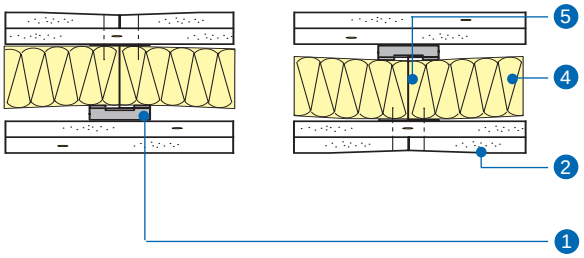
6 Wall junction



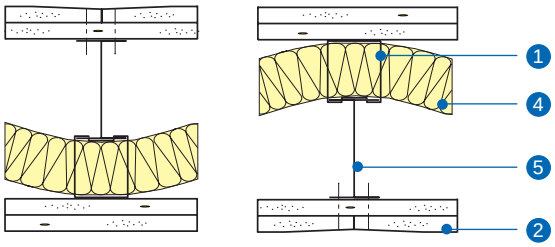
7 'T' junction



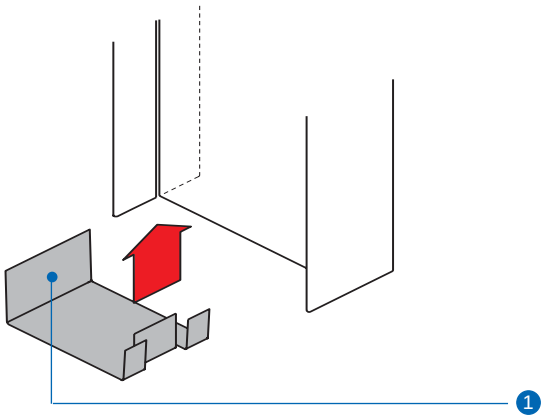
8 Plan detail (60 / 72 combination)



9 Plan detail (92 / 148 combination)



10 Clip attachment



1. Gypframe Spacer Clip
2. Gyproc SoundBloc or Gyproc DuraLine
3. Gypframe 'C' Stud
4. Isowool insulation
5. Gypframe 'I' Stud
6. Gypframe GA5 Internal Fixing Angle
7. Dense internal blockwork

L20/480 - STC-51 STEEL ACOUSTIC DOOR

Refer to drawings : .....

Manufacturer and reference:

IAC Ltd
IAC House
Moorside Road
Winchester
Hampshire SO23 7US
Tel : 01962 873000 Fax: 01962 873123
Contact:- Scott Simmons Email: scotts@iacl.co.uk

Construction: Leaf – Each leaf shall be 64mm thick, fabricated from 2.0mm thick steel sheet filled with sound absorbing and damping elements. Leaf shall be internally reinforced to accept hardware.

Frame - Architectural split frame shall be fabricated from 2.0mm thick steel sheets, channels and plates also to be filled with sound absorbing and damping elements. Structural support incorporated into the builders wall will be needed to support the door assembly, please refer to IAC for more information.

Acoustic Seals - Side and head of door and frame shall each receive two sets of acoustic seals. An acoustic labyrinth shall be created when door is in closed position. Bottom of door leaf shall contain continuous gravity-activated seal which shall compress against steel threshold as door is closed.

Pre-hung - Assembly and adjustments of door leaf, frame, acoustic seals and hinges shall take place at factory to insure ease of installation, reliable operation and acoustic performance. The entire unit shall be shipped to job site ready to install and operate.

Hinges - Shall be by IAC, painted to match the door.

Preparation - Door leaf and frame shall be predrilled and tapped in accordance with manufacturer's templates to accept specified hardware.

Vision Panel: (if applicable) Double glazed window unit comprising of 14.8mm & 12.8mm thick Laminated Safety Glass sealed within aluminium frames to suit leaf thickness of 64mm. Acoustic perforated steel reveals complete with absorptive material fitted between glass. Aluminium window frames to be self finished aluminium, perforated steel reveals to be finished in polyester powder paint subject to standard BS/RAL colour. Overall size of vision panel to be confirmed by CA.

Colour/Finishes: Leaf and frame to be polyester powder painted.

Furniture: To be confirmed by CA

Acoustic Rating: STC-51(dB) to achieve minimum R'w45dB once installed (subject to flanking). Certified Laboratory performance in single leaf arrangement as follows:-

Frequency (Hz)	63	125	250	500	1K	2K	4K	8K
STC-51	20	27	46	50	52	52	58	63

Appendix B

Project:

Measurement: Airborne sound insulation between rooms

Source room:

Receiving room:

Band (Hz)	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k	5k	
																						Source positions
DnT (dB)	27.0	27.9	37.3	44.6	50.5	49.5	45.1	48.4	50.4	53.1	55.0	60.3	61.0	63.3	65.9	65.7	61.7	63.0	68.6	71.2	74.0	2
Error code	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	

DnT,w (C; Ctr) = 60 (-2; -5) dB No error

To (s)	0.5																					
T- mode	T20 & T30																					
																						Registrations
T20 (s)	0.48	0.58	0.57	0.92	1.14	1.27	0.94	1.56	1.13	1.19	1.06	0.98	0.93	0.71	0.71	0.63	0.64	0.60	0.63	0.59	0.51	6
T30 (s)	0.58	0.72	0.59	0.90	1.22	1.26	1.22	1.28	1.29	1.35	1.07	1.09	0.80	0.78	0.80	0.67	0.61	0.61	0.67	0.62	0.54	6
																						Microphone positions
L1;1 (dB)	83.9	94.9	97.1	94.7	102.4	102.0	101.8	100.8	100.6	99.5	99.3	98.5	97.3	95.9	97.3	98.2	98.2	97.2	96.0	95.4	97.1	5
L2;1 (dB)	57.4	69.4	63.8	55.5	54.2	56.4	59.4	56.8	55.3	50.5	48.2	41.9	38.2	34.4	33.7	33.8	38.0	35.6	29.1	25.4	24.1	5
Error code	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
L1;2 (dB)	84.6	94.1	102.2	105.2	101.8	99.3	99.3	100.4	101.6	98.2	99.5	98.9	97.3	95.5	97.0	98.1	98.9	97.3	96.6	95.8	97.9	5
L2;2 (dB)	56.7	65.1	62.0	60.4	56.8	54.0	59.3	55.8	54.4	49.6	47.3	41.7	38.5	34.2	32.9	33.6	37.4	34.6	28.9	24.9	23.0	5
Error code	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	

<u>Walls</u>

- *2 layers of 12.5mm sound bloc plasterboard;*
- *Twin stud construction with insulation in each stud void;*
- *2 layers of 12.5mm sound bloc plasterboard;*

Measurement data and calculations for proposed new plant room 55 Loudoun Road, London, NW8

Wall 1 - Gyproc Gypwall staggered

	63	125	250	500	1k	2k	4k	8k
Average source	84	102	98	95	94	97	95	98
Average receive	59	68	53	39	34	34	21	21
difference	**25**	**33**	**45**	**55**	**60**	**63**	**74**	**78**

	63	125	250	500	1k	2k	4k	8k
source 1	81	102	98	95	94	97	95	98
source 2	86	101	97	94	94	97	96	98
average	**84**	**102**	**98**	**95**	**94**	**97**	**95**	**98**

	63	125	250	500	1k	2k	4k	8k
Receive 1	56	69	52	39	34	34	22	22
Receive 2	63	67	53	40	34	33	20	19
average	**59**	**68**	**53**	**39**	**34**	**34**	**21**	**21**

$L_{p1} - L_{p2} = R - 10\text{Log}S + 10\text{Log}A$

where :

L_{p1} is the average level in the source room

L_{p2} is the average level in the receive room

S is area of partition (m^2)

R is sound reduction index of partition

A is the absorption in receiving room (m^2)

Surface area	11.25
RT	0.85
A	8.62
V	45.00
10logS	10.51
10logA	9.35

Internal noise egress

	63	125	250	500	1k	2k	4k	8k	dBA
R	25	33	45	55	60	63	74	78	

calculated level	63	125	250	500	1k	2k	4k	8k	dBA
Plant room noise	70	74	71	70	68	64	62	56	73

required levels	63	125	250	500	1 k	2 k	4 k	8 k	dB(A)
office space NR30	59	48	40	34	30	27	25	23	39

Calculated level	63	125	250	500	1k	2k	4k	8k	dBA
office space	47	42	27	16	10	2	0	0	28

Acoustic Door - L20/480 - STC-51

Acoustic Rating: STC-51(dB) to achieve minimum R'w45dB once installed (subject to flanking). Certified Laboratory performance in single leaf arrangement as follows:-

Frequency (Hz)	63	125	250	500	1K	2K	4K	8K
STC-51	20	27	46	50	52	52	58	63

$L_{p1} - L_{p2} = R - 10\text{Log}S + 10\text{Log}\ A$

where :

L_{p1} is the average level in the source room

L_{p2} is the average level in the receive room

S is area of partition (m^2)

R is sound reduction index of partition

A is the absorption in receiving room (m^2)

Surface area	1.80
RT	0.65
A	6.27
V	25.00
10logS	2.55
10logA	7.97

Internal noise egress

	63	125	250	500	1k	2k	4k	8k	dBA
R	20	27	46	50	52	52	58	63	

calculated level	63	125	250	500	1k	2k	4k	8k	dBA
Plant room noise	70	74	71	70	68	64	62	56	73

required levels	63	125	250	500	1 k	2 k	4 k	8 k	dB(A)
office space NR30	59	48	40	34	30	27	25	23	39

Calculated level	63	125	250	500	1k	2k	4k	8k	dBA
office space	45	42	20	15	11	7	0	0	27