



Appendix 8.8

Façade Composite Sound Insulation Performance Calculations

APPENDIX 8.8
FAÇADE COMPOSITE SOUND INSULATION PERFORMANCE CALCULATIONS

A8.8.1 Reception Building

A8.8.1.1 External Wall Construction

350mm thick concrete push wall, built up to a height of 4.7 metres. The cladding above the concrete push wall is understood to be Euroclad “32/1000r” 0.7mm gauge (or similar) trapezoidal profile single sheet external cladding fixed vertically.

Construction / Product	Sound Reduction Indices (dB) at Octave Band Centre Frequency (Hz)								Data Source
	63	125	250	500	1 k	2 k	4 k	8 k	
Euroclad 32/1000R 0.7 mm	9	13	16	22	22	25	32	32	Euroclad test data from Corus
350mm Concrete	41	46	54	61	67	72	87	87	Calculation using Insul acoustic software.

A8.8.1.2 Roof Construction

Kingspan “1000rw” trapezoidal insulated roof panels with 60mm core thickness with Kingspan “xl forte” finish in Gull Grey (RAL 240 80 05). There is understood to be rooflights to at least 10% of the reception roof area, with Kingspan day-lite trapezoidal “KS1000 dltr 1.6” rooflights, each of nominal dimensions 1 metre x 6 metres, each with 24mm thickness as shown on roof plan drawings provided to Sol Acoustics.

Construction / Product	Sound Reduction Indices (dB) at Octave Band Centre Frequency (Hz)								Data Source
	63	125	250	500	1 k	2 k	4 k	8 k	
Kingspan 1000Rw 60mm core	13	17	32	43	48	54	60	60	Kingspan Acoustic Performance Guide
Kingspan KS1000 DLTR Rooflights	13	9	12	17	22	24	19	22	Peutz test report ref. A 2400-2E-RA 2

A8.8.1.3 External Doors

Metal external personnel doors and frames fitted with associated ironmongery with corrosion protection.

Construction / Product	Sound Reduction Indices (dB) at Octave Band Centre Frequency (Hz)								Data Source
	63	125	250	500	1 k	2 k	4 k	8 k	
Booths 29H 45mm Metal Door	18	24	25	28	30	29	34	34	Booth Industries Product Datasheet PD04

Roller shutter service doors are Ascot Doors Ltd (or similar) electric drive roller shutter doors with a plastisol finish (c.18dB R_w sound insulation performance or better).

Project Barry Biomass
Project Ref. P2013
Building Ref. Reception Building

BUILDING DIMENSIONS

Length (m) 50
Width (m) 20
Height (m) 13

Volume (m3) 12941
Surface Area (m2) 3792
Diffusivity term Cd (BS 12354) -5

**COMPOSITE SRI CALCULATIONS**

Building Façade	Total Area	Element	Area	Octave Band Frequencies								Construction
				63	125	250	500	1 k	2 k	4 k	8 k	
North west façade	260	Upper Wall	257	9	13	16	22	22	25	32	32	Euroclad 32/1000R 0.7 mm
		Lower Wall	0	41	46	54	61	67	72	87	87	350mm Concrete
		Door	3	18	24	25	28	30	29	34	34	Booths 29H 45mm Metal Door
		Louvres	0	0	0	0	0	0	0	0	0	NONE
		Roller Shutter	0	0	0	0	0	0	0	0	0	NONE
Composite SRI				9	13	16	22	22	25	32	32	
North east façade	663	Upper Wall	523	9	13	16	22	22	25	32	32	Euroclad 32/1000R 0.7 mm
		Lower Wall	77	41	46	54	61	67	72	87	87	350mm Concrete
		Door	7	18	24	25	28	30	29	34	34	Booths 29H 45mm Metal Door
		Louvres	6	2	2	2	2	2	2	2	2	Weather Louvre
		Roller Shutter	50	14	14	17	18	15	19	19	19	Ascot Doors Roller Shutter
Composite SRI				9	13	16	19	19	20	21	21	
South east façade	260	Upper Wall	172	9	13	16	22	22	25	32	32	Euroclad 32/1000R 0.7 mm
		Lower Wall	88	41	46	54	61	67	72	87	87	350mm Concrete
		Door	0	18	24	25	28	30	29	34	34	Booths 29H 45mm Metal Door
		Louvres	0	0	0	0	0	0	0	0	0	NONE
		Roller Shutter	0	14	14	17	18	15	19	19	19	Ascot Doors Roller Shutter
Composite SRI				10	15	18	24	24	27	34	34	
South west façade	663	Upper Wall	459	9	13	16	22	22	25	32	32	Euroclad 32/1000R 0.7 mm
		Lower Wall	191	41	46	54	61	67	72	87	87	350mm Concrete
		Door	0	18	24	25	28	30	29	34	34	Booths 29H 45mm Metal Door
		Louvres	13	2	2	2	2	2	2	2	2	Weather Louvre
		Roller Shutter	0	14	14	17	18	15	19	19	19	Ascot Doors Roller Shutter
Composite SRI				10	13	15	18	18	18	19	19	
Roof	973	Roof	875	13	17	32	43	48	54	60	60	Kingspan 1000Rw 60mm core
		Rooflights	98	13	9	12	17	22	24	19	22	Kingspan KS1000 DLTR
		Composite SRI				13	15	22	26	32	34	29

A8.8.2 Main Process Building & Lean To

A8.8.2.1 External Wall Construction

TATA “Trisobuild FW30V” (or similar) build up vertical cladding system of 173mm overall thickness, with 32/1000r 0.7mm trapezoidal profile, external cladding on 140mm spacer brackets, with 140mm thick glass wool insulation (nominal density of 24kg/m³), as over a 19/1000 0.4mm gauge steel liner sheet. TATA “Trisobuild” cladding panels are understood to have been laid vertically with Colorcoat “HPS200” ultra finish.

Construction / Product	Sound Reduction Indices (dB) at Octave Band Centre Frequency (Hz)								Data Source
	63	125	250	500	1 k	2 k	4 k	8 k	
Trisobuild FW30V	13	13	32	39	50	50	50	50	Predicted SRI values from TATA Steel Data Sheet (enclosed)

A8.8.2.2 Roof Construction

TATA “Trisomet 333” trapezoidal insulated roof panels (or similar), 60mm core thickness, with Colorcoat “HPS200” ultra finish.

Construction / Product	Sound Reduction Indices (dB) at Octave Band Centre Frequency (Hz)								Data Source
	63	125	250	500	1 k	2 k	4 k	8 k	
Trisomet 333	16	20	23	21	25	38	50	50	Predicted SRI values from TATA Steel Data Sheet (enclosed)

Roof covering to low level lean-to building is understood to be provided with Sika “Sarnafil” (or similar) single ply roofing membrane, mechanically fixed onto 150mm thick Rockwool “Hardrock” multi-fix DD insulation on vapour control layer, as installed above TATA Steel “Roofdek D60” fixed onto roof purlins.

Construction / Product	Sound Reduction Indices (dB) at Octave Band Centre Frequency (Hz)								Data Source
	63	125	250	500	1 k	2 k	4 k	8 k	
TATA RoofDek D60	-	19	28	26	50	64	82	19	Predicted SRI values from TATA Steel Data Sheet (enclosed)

A8.8.2.3 External Doors

Metal external personnel doors and frames fitted with associated ironmongery with corrosion protection.

Construction / Product	Sound Reduction Indices (dB) at Octave Band Centre Frequency (Hz)								Data Source
	63	125	250	500	1 k	2 k	4 k	8 k	
Booths 29H 45mm Metal Door	18	24	25	28	30	29	34	34	Booth Industries Product Datasheet PD04

Roller shutter service doors are Ascot Doors Ltd (or similar) electric drive roller shutter doors with a plastisol finish (c.18dB R_w sound insulation or better).

Project Barry Biomass
 Project Ref. P2013
 Building Ref. Main Processing Building

BUILDING DIMENSIONS

Length (m) 40
 Width (m) 19
 Height (m) 23
 Volume (m3) 17644
 Surface Area (m2) 4263
 Diffusivity term Cd (BS 12354) -5



COMPOSITE SRI CALCULATIONS

Building Façade	Total Area	Element	Area	Octave Band Frequencies								Construction
				63	125	250	500	1 k	2 k	4 k	8 k	
North west façade	439	Wall	434	13	13	32	39	50	50	50	50	TATA Trisobuild FW30V
		Roller Shutter	0	0	0	0	0	0	0	0	0	NONE
		Door	5	18	24	25	28	30	29	34	34	Booths 29H 45mm Metal Door
		Louvres	0	0	0	0	0	0	0	0	0	NONE
		Window	0	0	0	0	0	0	0	0	0	NONE
Composite SRI				13	13	32	39	47	46	48	48	
North east façade	929	Wall	886	13	13	32	39	50	50	50	50	TATA Trisobuild FW30V
		Roller Shutter	23.1	14	14	17	18	15	19	19	19	Ascot Doors Roller Shutter
		Door	0	0	0	0	0	0	0	0	0	NONE
		Louvres	20	7	8	13	19	33	39	37	30	Allaway Acoustics AL3015D
		Window	0	0	0	0	0	0	0	0	0	NONE
Composite SRI				12	13	27	31	31	35	35	35	
South east façade	439	Wall	424	13	13	32	39	50	50	50	50	TATA Trisobuild FW30V
		Roller Shutter	11	14	14	17	18	15	19	19	19	Ascot Doors Roller Shutter
		Door	4	14	14	17	18	15	19	19	19	Ascot Doors Roller Shutter
		Louvres	0	0	0	0	0	0	0	0	0	NONE
		Window	0	0	0	0	0	0	0	0	0	NONE
Composite SRI				13	13	29	32	30	34	34	34	
South west façade	929	Wall	866	13	13	32	39	50	50	50	50	TATA Trisobuild FW30V
		Roller Shutter	13	14	14	17	18	15	19	19	19	Ascot Doors Roller Shutter
		Door	5	18	24	25	28	30	29	34	34	Booths 29H 45mm Metal Door
		Louvres	44	7	8	13	19	33	39	37	30	Allaway Acoustics AL3015D
		Window	0	0	0	0	0	0	0	0	0	NONE
Composite SRI				12	13	25	30	33	37	37	37	
Roof	764	Roof	820	16	20	23	21	25	38	50	50	TATA Trisomet 333
		Rooflights	0	0	0	0	0	0	0	0	0	NONE
		Composite SRI				16	20	23	21	25	38	50



Project Barry Biomass
Project Ref. P2013
Building Ref. Lean To

**BUILDING DIMENSIONS**

Length (m)	14	Volume (m ³)	454
Width (m)	7	Surface Area (m ²)	392
Height (m)	5	Diffusivity term Cd (BS 12354)	-5

COMPOSITE SRI CALCULATIONS

Building Façade	Total Area	Element	Area	Octave Band Frequencies								Construction
				63	125	250	500	1 k	2 k	4 k	8 k	
North west façade	32	Wall	32	13	13	32	39	50	50	50	50	TATA Trisobuild FW30V
		Roller Shutter	0	0	0	0	0	0	0	0	0	
		Door	0	0	0	0	0	0	0	0	0	
		Louvres	0	0	0	0	0	0	0	0	0	
		Window	0	0	0	0	0	0	0	0	0	
Composite SRI				13	13	32	39	50	50	50	50	

North east façade	63	Wall	63	13	13	32	39	50	50	50	50	TATA Trisobuild FW30V
		Roller Shutter	0	0	0	0	0	0	0	0	0	NONE
		Door	0	0	0	0	0	0	0	0	0	NONE
		Louvres	0	0	0	0	0	0	0	0	0	NONE
		Window	0	0	0	0	0	0	0	0	0	NONE
Composite SRI				13	13	32	39	50	50	50	50	

South east façade	32	Wall	28	13	13	32	39	50	50	50	50	TATA Trisobuild FW30V
		Roller Shutter	4	14	14	17	18	15	19	19	19	Ascot Doors Roller Shutter
		Door	0	0	0	0	0	0	0	0	0	NONE
		Louvres	0	0	0	0	0	0	0	0	0	NONE
		Window	0	0	0	0	0	0	0	0	0	NONE
Composite SRI				13	14	24	27	24	28	28	28	

South west façade	n/a	Wall	0	0	0	0	0	0	0	0	0	NONE
		Roller Shutter	0	0	0	0	0	0	0	0	0	NONE
		Door	0	0	0	0	0	0	0	0	0	NONE
		Louvres	0	0	0	0	0	0	0	0	0	NONE
		Window	0	0	0	0	0	0	0	0	0	NONE
Composite SRI				n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	

Roof	100.8	Roof	60	16	19	28	26	50	50	50	50	Roofdek D60
		Rooflights	0	0	0	0	0	0	0	0	0	NONE
		Composite SRI				19	21	31	28	52	52	52

A8.8.3 Turbine Building

A8.8.3.1 External Wall Construction

Euroclad “Elite System 51” (or similar) built up vertical cladding system, 173mm overall thickness, with 32/1000r 0.7mm trapezoidal profile external cladding, on 140mm spacer bars with 140mm insulation on Proctor “Premier 500” vapour control membrane, over 19/1000 0.4mm gauge steel liner sheet. Elite System 51 cladding panels are understood to have been laid vertically with Colorcoat HPS200 finish.

Construction / Product	Sound Reduction Indices (dB) at Octave Band Centre Frequency (Hz)								Data Source
	63	125	250	500	1 k	2 k	4 k	8 k	
Euroclad Elite system 51	12	16	31	39	44	51	54	62	Euroclad test data from Sound Research Laboratories

A8.8.3.2 Roof Construction

Sika “Sarnafil” (or similar) single ply roofing membrane in Lead Grey colour, mechanically fixed onto 155mm - 255mm thick tapered Rockwool “Hardrock” multi-fix DD insulation on vapour control layer installed above TATA Steel “Roofdek D60” fixed onto steel beams.

75mm thick Rockwool “RW3” acoustic insulation with white tissue facing to at least 50% of the Turbine Hall ceiling and fixed directly to underside of Roofdek D60. The mineral wool (Rockwool) is (conservatively) assumed to be equivalent to a “Class B” performance acoustic absorber.

Construction / Product	Sound Reduction Indices (dB) at Octave Band Centre Frequency (Hz)								Data Source
	63	125	250	500	1 k	2 k	4 k	8 k	
TATA RoofDek D60	-	19	28	26	50	64	82	82	Predicted SRI values from TATA Steel Data Sheet

A8.8.3.3 External Doors

Metal external personnel doors and frames fitted with associated ironmongery with corrosion protection.

Construction / Product	Sound Reduction Indices (dB) at Octave Band Centre Frequency (Hz)								Data Source
	63	125	250	500	1 k	2 k	4 k	8 k	
Booths 29H 45mm Metal Door	18	24	25	28	30	29	34	34	Booth Industries Product Datasheet PD04

Roller shutter service doors are Ascot Doors Ltd (or similar) electric drive roller shutter doors with a plastisol finish (c.18dB R_w sound insulation performance or better).



Project Barry Biomass
Project Ref. P2013
Building Ref. Turbine Building



BUILDING DIMENSIONS

Length (m) 13 Volume (m3) 2442
 Width (m) 18 Surface Area (m2) 1114
 Height (m) 11 Diffusivity term Cd (BS 12354) -5



COMPOSITE SRI CALCULATIONS

Building Façade	Total Area	Element	Area	Octave Band Frequencies								Construction	
				63	125	250	500	1 k	2 k	4 k	8 k		
North west façade	191	Wall											
		Roller Shutter											
		Door											
		Louvres											
		Window											
Composite SRI				n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	

North east façade	136	Wall	109	12	16	31	39	44	51	54	62	Euroclad Elite system 51
		Roller Shutter	14	14	14	17	18	15	19	19	19	Ascot Doors Roller Shutter
		Door	3	18	24	25	28	30	29	34	34	Booths 29H 45mm Metal Door
		Louvres	10	5	5	8	13	22	30	28	23	Allaway 300 full chevron AL 1515D
		Window	0	0	0	0	0	0	0	0	0	NONE
Composite SRI				11	13	18	23	25	29	29	28	

South east façade	191	Wall	191	12	16	31	39	44	51	54	62	Euroclad Elite system 51	
		Roller Shutter	0										NONE
		Door	0										NONE
		Louvres	0										NONE
		Window	0										NONE
Composite SRI				12	16	31	39	44	51	54	62		

South west façade	136	Wall	133	12	16	31	39	44	51	54	62	Euroclad Elite system 51	
		Roller Shutter	0										NONE
		Door	3	18	24	25	28	30	29	34	34	Booths 29H 45mm Metal Door	
		Louvres	0	0	0	0	0	0	0	0	0	0	Weather Louvre
		Window	0										NONE
Composite SRI				12	16	29	32	33	33	33	33		

Roof	230	Roof	230.4	14	19	18	26	50	64	82	82	TATA RoofDek D60	
		Rooflights	0										NONE
		Composite SRI				14	19	18	26	50	64	82	82