



GB ACOUSTIC JACKETS

As a company HELIOS is working towards a better environment for all and therefore as acoustic issues become more prominent with the requirement of breakout noise reaching levels externally that were only previously used internally we have produced a range of items to help in the fans performance.

Acoustic Jacket.

This is a cladding that simply bolts to the existing casing giving a lower breakout noise for the fan casing. It uses existing fixing holes and comes as 4 x 50mm panels that fit together around the GB Fan box.

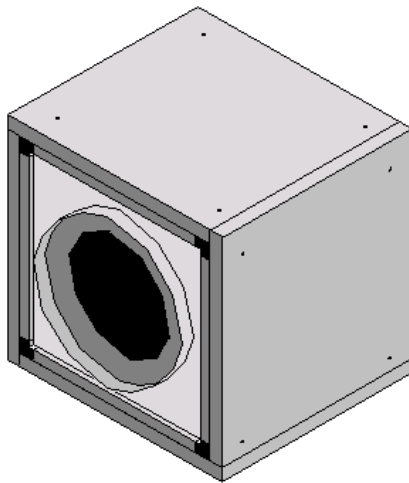


Illustration of GB630 with Cladding fitted

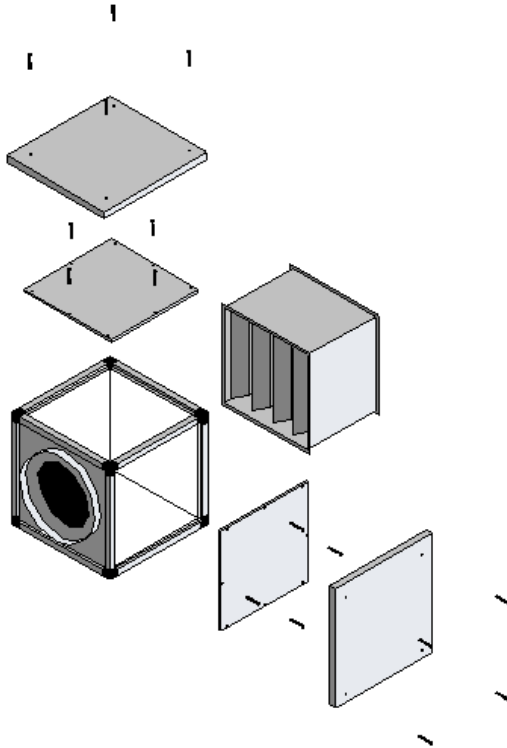
The Acoustic panel construction

The panel is made of a sandwich of internal perforated galvanised sheet steel 0.9mm thk with 50mm rockwool material of 60kg/m³ density with an outer skin of 1.0mm sheet steel.

Reduction for panel

Mid band freq Hz	63	125	250	500	1K	2K	4K	8K
Sound reduction dB	12	18	24	32	34	39	42	44

The Jacket Assembly along with the discharge silencer is shown below



In conjunction with the breakout noise reduction, the kit comes with a discharge silencer to bring the airbourne discharge noise level down as well so the following table illustrates each fan type with its standard discharge noise and breakout noise and then with the jacket and silencer fitted.

Please note that any level reduced below 16dB is listed as 16dB as this will make little difference to the overall sound level but some residual noise will operate at this frequency.

GBW250/4

All figures not A weighted, Silencer 600mm long

Mid band freq Hz	63	125	250	500	1K	2K	4K	8K	Total
Sound intake dB	59	57	58	55	54	54	48	40	64
Sound extract dB	63	61	62	59	57	53	52	45	
Case Breakout dB	56	53	54	43	33	31	23	19	
Case breakout clad dB	44	35	30	16	16	16	16	16	
Silencer Reduction dB	5	9	16	30	39	39	31	26	

GBW315/4

All figures not A weighted, Silencer 600mm long

Mid band freq Hz	63	125	250	500	1K	2K	4K	8K	Total
Sound intake dB	59	57	58	55	54	54	48	40	
Sound extract dB	63	61	62	59	57	53	52	45	
Case Breakout dB	56	53	54	43	33	31	23	19	
Case breakout clad dB	44	35	30	16	16	16	16	16	
Silencer Reduction dB	5	9	16	30	39	39	31	26	

GBW355/4

All figures not A weighted, Silencer 800mm long

mid band freq Hz	63	125	250	500	1K	2K	4K	8K	overall
Sound intake dB	78	70	64	64	61	57	53	42	79
Sound discharge dB	80	72	69	68	63	59	55	46	81
Case Breakout dB	70	62	59	52	44	38	27	26	71
case breakout clad dB	58	44	35	20	16	16	16	16	58
Silencer Reduction dB	6	11	19	34	45	45	39	28	

GBW400/4

All figures not A weighted Silencer 800mm long

mid band freq Hz	63	125	250	500	1K	2K	4K	8K	overall
Sound intake dB	82	74	70	66	66	60	55	48	83
Sound discharge dB	85	77	76	72	65	62	59	54	86
Case Breakout dB	75	67	66	56	46	41	31	34	76
case breakout clad dB	63	49	42	24	16	16	16	16	63
Silencer Reduction dB	6	11	19	34	45	45	39	28	

GBW450/4

All figures not A weighted Silencer 800mm long

mid band freq Hz	63	125	250	500	1K	2K	4K	8K	overall
Sound intake dB	84	76	72	68	67	62	57	50	85
Sound discharge dB	86	78	78	74	68	64	61	56	87
Case Breakout dB	76	68	68	58	49	43	33	36	77
case breakout clad dB	64	50	44	26	16	16	16	16	64
Silencer Reduction dB	6	11	19	34	45	45	39	28	

GBW500/4

All figures not A weighted Silencer 800mm long

mid band freq Hz	63	125	250	500	1K	2K	4K	8K	overall
Sound intake dB	81	73	75	72	74	69	63	56	84
Sound discharge dB	85	77	82	77	74	72	68	61	88
Case Breakout dB	75	67	72	61	55	51	40	41	77
case breakout clad dB	63	49	48	29	21	16	16	16	63
Silencer Reduction dB	6	11	19	34	45	45	39	28	

GBD560/4

All figures not A weighted Silencer 1200mm long

mid band freq Hz	63	125	250	500	1K	2K	4K	8K	overall
Sound intake dB	81	73	75	72	74	69	63	56	84
Sound discharge dB	86	78	83	78	75	73	69	62	89
Case Breakout dB	76	68	73	62	56	52	41	42	78
case breakout clad dB	64	50	49	30	22	16	16	16	64
Silencer Reduction dB	7	14	26	46	55	55	52	38	

GBD630/4

All figures not A weighted Silencer 1200mm long

mid band freq Hz	63	125	250	500	1K	2K	4K	8K	overall
Sound intake dB	84	77	79	81	78	73	67	60	88
Sound discharge dB	90	82	86	82	79	77	73	66	93
Case Breakout dB	80	72	76	66	60	56	45	46	82
case breakout clad dB	68	54	52	34	26	17	16	16	68
Silencer Reduction dB	7	14	26	46	55	55	52	38	

Silencer Details

The silencers have been coded to fit internally to the end of the GB fan and the length and airway decides the acoustic performance of the Silencer. The fan boxes are grouped as

A 250 size 400 x 400 box

B 315,355 size 500 x 500 box

C 400,450,500 size 670 x 670 Box

D 560,630 size 800 x 800 Box

Fan Size	Silencer length	63	125	250	500	1K	2K	4K	8K	Pa loss	Volume m ³ /Hr
A	600	5	9	16	30	39	39	31	26	15	800
A	800	6	11	19	34	45	45	39	28	18	800
B	600	5	9	16	30	39	39	31	26	17	1500
B	800	6	11	19	34	45	45	39	28	21	1500
B	1200	7	14	26	46	55	55	55	42	28	1500
C	800	5	9	16	30	39	39	31	26	16	4200
C	1200	6	12	23	40	51	51	41	29	22	4200
C	1600	8	16	26	43	53	53	45	32	30	4200
D	1200	5	9	19	33	42	42	30	18	29	9000
D	1600	7	12	22	38	47	47	34	20	32	9000
D	2000	9	17	30	50	55	51	46	28	38	9000

Using all the above information to select the required items is quite simple from the following tables.

Step 1 what is the noise level to be achieved. Usually this is best given as a NC or NR rating these are noise curves weighted as the ear would hear them below is a table with all the noise rating curves and relevant noise data at the specific frequency.

Note that background external levels are usually 40 – 45 at night time

Rating Curves

Maximum Sound Pressure Level (dB)									
Noise Rating - NR - Curve	Octave band mid-frequency (Hz)								
	31.5	62.5	125	250	500	1000	2000	4000	8000
NR 0	55	36	22	12	5	0	-4	-6	-8
NR5	58	39	26	16	10	5	1	-1	
NR 10	62	43	31	21	15	10	7	4	2
NR15	65	47	35	26	20	15	12	9	8
NR 20	69	51	39	31	24	20	17	14	13
NR25	73	55	43	35	29	25	22	20	18
NR 30	76	59	48	40	34	30	27	25	23
NR35	79	63	53	44	39	35	32	30	28
NR 40	83	67	57	49	44	40	37	35	33
NR45	86	71	62	54	49	45	42	40	38
NR 50	89	75	66	59	54	50	47	45	44

Working out your Sound criteria

The following is a example the criteria is NR35 and the fan duty is 6000m³/hr @ 550Pa so fan selection is GBD560/4 fan is 4m from window in question and then has 4m ductwork from discharge back to fan. The fan sits on a flat roof so the fan is 12m from window.

mid band freq Hz	63	125	250	500	1K	2K	4K	8K
Required Sound Criteria dB	79	63	53	44	39	35	32	30
Reduction for distance dB	12	12	12	12	12	12	12	12
Reduction for Ductwork dB	5	5	5	5	5	5	5	5
Final reduction dB	96	80	70	61	56	52	49	47

The above information for reductions can be taken from the information below.

As sound propergates from an object it reduces therefore at a distance from an object a set reduction can be used. This effects all frequencies.

Distance from noise	2	3	4	6	8	10	12	14	16	18
Sound reduction dB	6	9	12	15	16	20	21	23	24	25

The following is a reduction for noise in a duct system that is straight note that it is not as much of a reduction for distance as free field because the noise reflects of the inner duct walls and does not decay as fast as in open air.

Distance from noise	2	3	4	6	8	10	12	14	16	18
Sound reduction dB	2	4	5	7	9	10	11	12	13	14

Now we can access the criteria against the fan data

GBD560/4

All figures not A weighted Silencer 1200mm long

mid band freq Hz	63	125	250	500	1K	2K	4K	8K	overall
Sound discharge dB	86	78	83	78	75	73	69	62	89
Reduction calculated dB	96	80	70	61	56	52	49	47	
Discharge sound calc dB	-10	-2	13	17	19	21	20	15	
Silencer Reduction dB	7	14	26	46	55	55	52	38	

So having taken the reduction calculated away from the fan generated noise we get the calculated figure we can then compare this to the silencer reduction and see that the silencer is adequate to take out all necessary noise. If it was not then we would look at a longer silencer.

GBD560/4

mid band freq Hz	63	125	250	500	1K	2K	4K	8K	overall
Case Breakout dB	76	68	73	62	56	52	41	42	78
Reduction calculated dB	95	79	69	60	55	51	48	46	
Final calculated rating dB	-19	-11	4	2	1	1	-7	-4	
case breakout clad dB	64	50	49	30	22	16	16	16	64

[illegible][illegible][illegible][illegible]