



HA₂
HOTCHKISS
AIR ACOUSTICS



R A F R e c t a n g u l a r A t t e n u a t o r s
5 S e r i e s

Description

Hotchkiss Air Acoustics offer a new range of rectangular duct attenuators for HVCA applications. These attenuators incorporate an innovative new acoustic splitter construction, which offers significantly improved mechanical integrity of the acoustic media containment envelope.

Construction

RAF rectangular duct attenuator castings are manufactured generally in accordance with DW144 using high quality galvanised sheet steel material with a variety of options for fixing frames, flanges or spigot connections, with stiffening frames for high pressure applications.

Acoustic Splitters

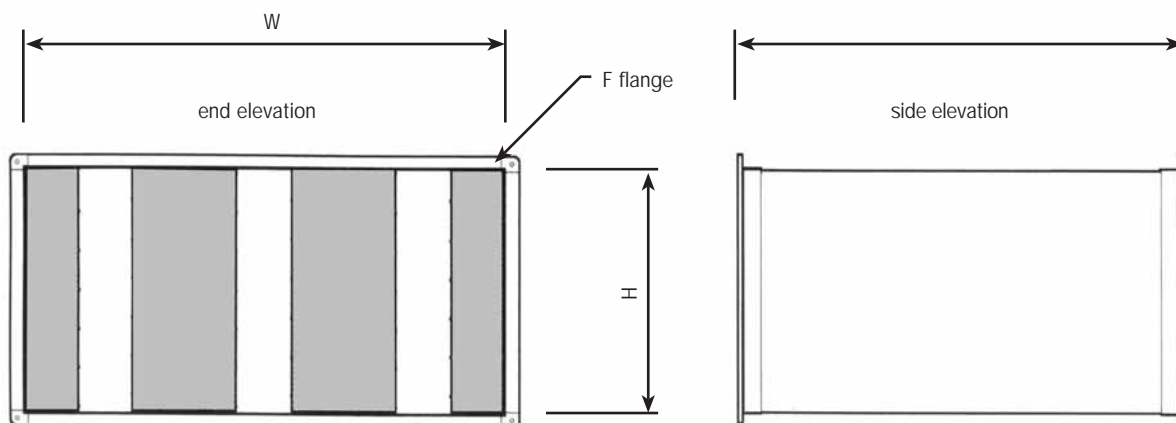
Hotchkiss RAF attenuators are manufactured using the innovative new design acoustic splitter construction. The mechanical strength which results from the perforated metal design, is significantly superior to accepted "traditional" acoustic splitter construction. The aerodynamic profile of the splitter design ensures that pressure losses for air passing through the attenuator, are minimised.

The acoustic splitter infill comprises crown slab acoustic media, with a surface particulate membrane. This material has a Class 1 rating for surface spread of flame when measured to BS 476 (part 7 1971) and is suitable for surface velocities up to 30 m/s.

Sidewall acoustic splitters of similar design, materials and construction are included to minimise the potential for "noise breakout" along the unit casing.

Casing Flanges/Fixings

The RAF range of attenuators are offered with a variety of proprietary or rolled steel angle flange/fixings options. Straight and stepped spigot duct connections are also available as options for smaller duct sizes.



Special Finishes

Where required RAF range attenuators can be supplied in the following finish options:-

- Stainless steel to required grade
- Heavy-duty case construction
- External polyester powder coat paint finish, to BS/RAL standard colour range



Attenuator Performance

The RAF range attenuator performance tables shown overleaf are static insertion loss values, when tested in accordance with the parameters as defined within BS 4718.

Hotchkiss Air Acoustics acknowledge that the dynamic insertion loss value for any attenuator will vary with airflow, i.e. the higher the flow rate for air passing through the attenuator airways, the lower the dynamic insertion loss for that attenuator. However, for the airflow rate values indicated by this data sheet, dynamic and static insertion loss values achieved for a given attenuator, indicated a variation not exceeding 2dB over the intended application range, hence, the tabulated data for this publication only relates to static insertion loss values.

Tests have shown that dynamic insertion losses only vary dramatically at velocities of 20m/s (per second) and above.

RAF 520 Rectangular Attenuators

The RAF 520 range of attenuators offer high attenuation characteristics, but have lower free area than the RAF 530 & RAF 540 ranges

Table A - RAF520

Attenuator Performance (Static Insertion Loss)

Attenuator	Octave band mid frequencies							
	63	125	250	500	1k	2k	4k	8k
Code-L								
RA 520-06	6	9	13	20	31	29	22	15
RA 520-09	8	10	19	30	37	36	28	19
RA 520-12	9	13	25	38	42	41	35	23
RA 520-15	10	16	30	45	48	47	42	27
RA 520-18	12	18	35	50	50	50	46	30
RA 520-21	13	21	40	50	50	50	50	34
RA 520-24	14	23	43	50	50	50	50	37



Table B - RAF 520

Attenuator Pressure Loss

The airflow/pressure loss data shown below is based upon BS4718:1971 and assumes uniform airflow across the attenuator face entering and leaving the attenuator. Attenuators installed with poor aerodynamic entry and exit conditions (close to fan outlets, system bends or transformations) may impose pressure loss values considerably higher than those indicated below.

Attenuator case dimensions		Air Volume I/S against imposed resistance pa					
w	h	10pa	20pa	30pa	40pa	50pa	60pa
300	300	139	196	240	277	310	340
300	450	208	294	360	416	465	510
300	600	277	392	480	555	620	679
300	750	347	490	600	693	775	849
300	900	416	588	721	832	930	1019
550	450	277	392	480	555	620	679
550	600	416	588	721	832	930	1019
550	750	555	784	961	1109	1240	1359
550	900	693	981	1201	1387	1550	1698
550	1050	832	1177	1441	1664	1861	2038
550	1200	971	1373	1681	1941	2171	2378
850	600	832	1177	1441	1664	1861	2038
850	750	1040	1471	1801	2080	2326	2548
850	900	1248	1765	2162	2496	2791	3057
850	1050	1456	2059	2522	2912	3256	3567
850	1200	1664	2353	2882	3328	3721	4076
850	1350	1872	2648	3243	3744	4186	4586
850	1500	2080	2942	3603	4160	4651	5095
1100	600	1387	1961	2402	2774	3101	3397
1100	750	1664	2353	2882	3328	3721	4076
1100	900	1941	2746	3363	3883	4341	4756
1100	1050	2219	3138	3843	4438	4961	5435
1100	1200	2496	3530	4323	4992	5582	6114
1100	1350	2774	3922	4804	5547	6202	6794
1100	1500	3051	4315	5284	6102	6822	7473
1100	1650	3328	4707	5765	6656	7442	8152
1100	1800	1387	1961	2402	2774	3101	3397
1400	900	2080	2942	3603	4160	4651	5095
1400	1050	2427	3432	4203	4854	5427	5944
1400	1200	2774	3922	4804	5547	6202	6794
1400	1350	3120	4413	5404	6240	6977	7643
1400	1500	3467	4903	6005	6934	7752	8492
1400	1650	3814	5393	6605	7627	8527	9341
1400	1800	4160	5883	7206	8321	9303	10190
1700	900	2496	3530	4323	4992	5582	6114
1700	1050	2912	4118	5044	5824	6512	7133
1700	1200	3328	4707	5765	6656	7442	8152
1700	1350	3744	5295	6485	7488	8372	9171
1700	1500	4160	5883	7206	8321	9303	10190
1700	1650	4576	6472	7926	9153	10233	11210
1700	1800	4992	7060	8647	9985	11163	12229

Table C - RAF 520

Attenuator Weight Table

Attenuator case dimensions			RA520 Attenuator weights kg Attenuator Length Codes & Length Lmm							
w	h	f	-06 600	-09 900	-12 1200	-15 1500	-18 1825	-21 2100	-24 2400	
300	300	20	8	10	13	16	18	21	24	
300	450	20	11	15	19	23	27	31	35	
300	600	20	14	19	25	30	35	41	46	
300	750	20	17	24	31	37	44	51	57	
300	900	30	21	29	37	45	52	60	68	
550	450	20	19	26	34	41	49	56	64	
550	600	20	24	34	44	54	64	74	84	
550	750	20	30	42	55	67	80	92	105	
550	900	30	36	51	65	80	95	110	125	
550	1050	30	41	59	76	93	111	128	146	
550	1200	30	47	67	87	106	126	146	166	
850	600	30	36	50	65	80	95	110	125	
850	750	30	44	62	81	99	118	137	155	
850	900	30	52	74	96	119	141	163	186	
850	1050	30	60	86	112	138	164	190	216	
850	1200	30	68	97	127	157	187	216	246	
850	1350	40	76	109	143	176	210	243	277	
850	1500	40	89	128	168	207	247	287	326	
1100	600	40	48	69	90	111	131	152	173	
1100	750	40	59	85	111	137	163	189	215	
1100	900	40	70	101	133	164	195	226	257	
1100	1050	40	81	118	154	190	227	263	299	
1100	1200	40	92	134	175	217	258	300	342	
1100	1350	40	103	150	197	243	290	337	384	
1100	1500	40	114	166	218	270	322	374	426	
1100	1650	40	125	182	239	297	354	411	468	
1100	1800	40	136	199	261	323	386	448	510	
1400	900	40	87	126	165	205	244	283	322	
1400	1050	40	101	147	192	238	283	329	374	
1400	1200	40	115	167	219	271	323	375	427	
1400	1350	40	128	187	245	304	363	421	480	
1400	1500	40	142	207	272	337	402	467	533	
1400	1650	40	155	227	299	370	442	514	585	
1400	1800	40	169	247	325	403	482	560	638	
1700	900	40	104	151	198	245	292	339	386	
1700	1050	40	121	175	230	285	340	395	449	
1700	1200	40	137	200	262	325	387	450	513	
1700	1350	40	153	224	294	365	435	505	576	
1700	1500	40	169	248	326	404	483	561	639	
1700	1650	40	186	272	358	444	530	616	702	
1700	1800	40	202	296	390	484	578	672	766	

Selection

From table A, select a suitable RAF 520 code attenuator that best satisfies the acoustic performance requirement, this will determine attenuator length.

From table B select the width w and height h dimensions that provide the required resistance for the attenuator against the design airflow (interpolation may be required for intermediate values).

The attenuator weight is shown in table C.

Should any dimensional restrictions not suit a RAF 520 range attenuator, examine alternative options from the RAF 530 or RAF 540 ranges.



RAF 530 Rectangular Attenuators

The RAF 530 range of attenuators offer high attenuation characteristics, with slightly lower acoustic performance but greater free area than the RAF 520 range and greater acoustic performance but lower free area than the RAF 540 range.

Table A - RAF 530

Attenuator Performance (Static Insertion Loss)

Attenuator	Octave band mid frequencies							
Code-L	63	125	250	500	1k	2k	4k	8k
RA 530-06	5	7	11	16	25	20	13	11
RA 530-09	7	9	16	25	32	25	17	13
RA 530-12	8	11	20	32	35	31	22	16
RA 530-15	9	13	24	40	43	38	27	19
RA 530-18	9	15	28	45	46	42	31	21
RA 530-21	10	17	32	50	50	47	37	23
RA 530-24	11	19	36	50	50	50	41	25



Table B - RAF 530

Attenuator Pressure Loss

The airflow/pressure loss data shown below is based upon BS4718:1971 and assumes uniform airflow across the attenuator face entering and leaving the attenuator. Attenuators installed with poor aerodynamic entry and exit conditions (close to fan outlets, system bends or transformations) may impose pressure loss values considerably higher than those indicated below.

Attenuator case dimensions		Air Volume l/s against imposed resistance pa					
w	h	10pa	20pa	30pa	40pa	50pa	60pa
350	300	233	330	404	467	522	572
350	450	350	495	606	700	783	857
350	600	467	660	808	933	1043	1143
350	750	583	825	1010	1167	1304	1429
250	900	700	990	1212	1400	1565	1715
650	450	467	660	808	933	1043	1143
650	600	700	990	1212	1400	1565	1715
650	750	933	1320	1616	1867	2087	2286
650	900	1167	1650	2021	2333	2609	2858
650	1050	1400	1980	2425	2800	3130	3429
650	1200	1633	2310	2829	3266	3652	4001
1000	600	1400	1980	2425	2800	3130	3429
1000	750	1750	2475	3031	3500	3913	4286
1000	900	2100	2970	3637	4200	4695	5144
1000	1050	2450	3465	4243	4900	5478	6001
1000	1200	2800	3959	4849	5600	6260	6858
1000	1350	3150	4454	5456	6299	7043	7715
1000	1500	3500	4949	6062	6999	7826	8573
1350	600	2333	3300	4041	4666	5217	5715
1350	750	2800	3959	4849	5600	6260	6858
1350	900	3266	4619	5658	6533	7304	8001
1350	1050	3733	5279	6466	7466	8347	9144
1350	1200	4200	5939	7274	8399	9391	10287
1350	1350	4666	6599	8082	9333	10434	11430
1350	1500	5133	7259	8890	10266	11478	12573
1350	1650	5600	7919	9699	11199	12521	13716
1350	1800	2333	3300	4041	4666	5217	5715
1700	900	3500	4949	6062	6999	7826	8573
1700	1050	4083	5774	7072	8166	9130	10001
1700	1200	4666	6599	8082	9333	10434	11430
1700	1350	5250	7424	9093	10499	11738	12859
1700	1500	5833	8249	10103	11666	13043	14288
1700	1650	6416	9074	11113	12832	14347	15716
1700	1800	6999	9899	12123	13999	15651	17145
2050	900	4200	5939	7274	8399	9391	10287
2050	1050	4900	6929	8486	9799	10956	12002
2050	1200	5600	7919	9699	11199	12521	13716
2050	1350	6299	8909	10911	12599	14086	15431
2050	1500	6999	9899	12123	13999	15651	17145
2050	1650	7699	10889	13336	15399	17216	18860
2050	1800	8399	11878	14548	16799	18781	20574

Table C - RAF 530

Attenuator Weight Table

Attenuator case dimensions			RA730 Attenuator weights kg Attenuator Length Codes & Length Lmm						
w	h	f	-06 600	-09 900	-12 1200	-15 1500	-18 1825	-21 2100	-24 2400
350	300	20	8	11	14	17	19	22	25
350	450	20	12	16	20	24	28	32	37
350	600	20	15	21	26	32	37	43	48
350	750	20	18	25	32	39	46	53	60
250	900	30	22	30	38	47	55	64	72
650	450	20	20	28	36	44	52	60	67
650	600	20	26	37	47	58	68	79	89
650	750	20	32	45	58	71	84	98	111
650	900	30	38	53	69	85	101	117	132
650	1050	30	44	62	80	99	117	136	154
650	1200	30	49	70	91	112	134	155	176
1000	600	30	38	54	69	85	101	116	132
1000	750	30	46	66	86	105	125	145	164
1000	900	30	55	78	102	126	149	173	196
1000	1050	30	78	112	146	179	213	247	281
1000	1200	30	72	103	135	166	197	229	260
1000	1350	40	80	116	151	186	222	257	292
1000	1500	40	94	136	179	221	263	305	347
1350	600	40	51	73	95	116	138	160	182
1350	750	40	62	90	117	144	171	199	226
1350	900	40	74	107	139	172	205	237	270
1350	1050	40	85	124	162	200	238	276	314
1350	1200	40	97	141	184	228	271	315	358
1350	1350	40	108	157	207	256	305	354	403
1350	1500	40	120	174	229	283	338	392	447
1350	1650	40	131	191	251	311	371	431	491
1350	1800	40	143	208	274	339	404	470	535
1700	900	40	92	133	174	216	257	298	339
1700	1050	40	107	154	202	250	298	346	394
1700	1200	40	121	176	230	285	340	395	450
1700	1350	40	135	197	258	320	382	443	505
1700	1500	40	149	218	286	355	423	492	560
1700	1650	40	164	239	314	390	465	540	616
1700	1800	40	178	260	342	425	507	589	671
2050	900	40	110	160	209	259	309	358	408
2050	1050	40	128	185	243	301	359	416	474
2050	1200	40	145	211	277	343	409	475	541
2050	1350	40	162	236	310	385	459	533	607
2050	1500	40	179	261	344	426	509	592	674
2050	1650	40	196	287	378	468	559	650	741
2050	1800	40	213	312	411	510	609	708	807

Selection

From table A, select a suitable RAF 530 code attenuator that best satisfies the acoustic performance requirement, this will determine attenuator length.

From table B select the width w and height h dimensions that provide the required resistance for the attenuator against the design airflow (interpolation may be required for intermediate values).

The attenuator weight is shown in table C.

Should any dimensional restrictions not suit a RAF 530 range attenuator, examine alternative options from the RAF 520 or RAF 540 ranges.



RAF 540 Rectangular Attenuators

The RAF 540 range of attenuators offer high attenuation characteristics, with slightly lower acoustic performance but greater free area than the RAF 520 and RAF 530 ranges.

Table A - RAF 540

Attenuator Performance (Static Insertion Loss)

Attenuator	Octave band mid frequencies							
Code-L	63	125	250	500	1k	2k	4k	8k
RA 540-06	4	6	10	14	18	14	10	6
RA 540-09	5	7	13	20	23	17	12	8
RA 540-12	6	8	16	25	30	23	14	11
RA 540-15	7	10	20	31	37	27	16	13
RA 540-18	7	12	23	35	41	30	18	14
RA 540-21	8	14	27	41	46	34	20	15
RA 540-24	8	16	30	46	50	38	22	16



Table B - RAF 540

Attenuator Pressure Loss

The airflow/pressure loss data shown below is based upon BS4718:1971 and assumes uniform airflow across the attenuator face entering and leaving the attenuator. Attenuators installed with poor aerodynamic entry and exit conditions (close to fan outlets, system bends or transformations) may impose pressure loss values considerably higher than those indicated below.

Attenuator case dimensions		Air Volume l/s against imposed resistance pa					
w	h	10pa	20pa	30pa	40pa	50pa	60pa
400	300	354	500	612	707	791	866
400	450	530	750	919	1061	1186	1299
400	600	707	1000	1225	1414	1581	1732
400	750	884	1250	1531	1768	1976	2165
400	900	1061	1500	1837	2121	2372	2598
750	450	707	1000	1225	1414	1581	1732
750	600	1061	1500	1837	2121	2372	2598
750	750	1414	2000	2449	2828	3162	3464
750	900	1768	2500	3062	3536	3953	4330
750	1050	2121	3000	3674	4243	4743	5196
750	1200	2475	3500	4287	4950	5534	6062
1150	600	2828	4000	4899	5657	6325	6928
1150	750	2121	3000	3674	4243	4743	5196
1150	900	2652	3750	4593	5303	5929	6495
1150	1050	3182	4500	5511	6364	7115	7794
1150	1200	3712	5250	6430	7425	8301	9093
1150	1350	4243	6000	7348	8485	9487	10392
1150	1500	4773	6750	8267	9546	10673	11691
1550	600	5303	7500	9186	10607	11859	12990
1550	750	3536	5000	6124	7071	7906	8660
1550	900	4243	6000	7348	8485	9487	10392
1550	1050	4950	7000	8573	9899	11068	12124
1550	1200	5657	8000	9798	11314	12649	13856
1550	1350	6364	9000	11023	12728	14230	15588
1550	1500	7071	10000	12247	14142	15811	17321
1550	1650	7778	11000	13472	15556	17393	19053
1550	1800	8485	12000	14697	16971	18974	20785
1950	900	5303	7500	9186	10607	11859	12990
1950	1050	6187	8750	10717	12374	13835	15155
1950	1200	7071	10000	12247	14142	15811	17321
1950	1350	7955	11250	13778	15910	17788	19486
1950	1500	8839	12500	15309	17678	19764	21651
1950	1650	9723	13750	16840	19445	21741	23816
1950	1800	10607	15000	18371	21213	23717	25981
2350	900	6364	9000	11023	12728	14230	15588
2350	1050	7425	10500	12860	14849	16602	18187
2350	1200	8485	12000	14697	16971	18974	20785
2350	1350	9546	13500	16534	19092	21345	23383
2350	1500	10607	15000	18371	21213	23717	25981
2350	1650	11667	16500	20208	23335	26089	28579
2350	1800	12728	18000	22045	25456	28460	31177

Table C - RAF 540

Attenuator Weight Table

Attenuator case dimensions			RA540 Attenuator weights kg Attenuator Length Codes & Length Lmm						
w	h	f	-06 600	-09 900	-12 1200	-15 1500	-18 1825	-21 2100	-24 2400
400	300	20	9	12	15	17	20	23	26
400	450	20	12	17	21	25	30	34	39
400	600	20	16	22	27	33	39	45	51
400	750	20	19	27	34	41	49	56	63
400	900	30	23	32	40	49	58	67	75
750	450	20	21	30	38	46	55	63	71
750	600	20	28	39	50	61	72	83	94
750	750	20	34	48	61	75	89	103	117
750	900	30	40	56	73	90	106	123	139
750	1050	30	46	65	85	104	123	143	162
750	1200	30	52	74	96	119	141	163	185
1150	600	30	40	57	73	90	106	123	140
1150	750	30	49	70	90	111	132	153	173
1150	900	30	58	83	108	132	157	182	207
1150	1050	30	97	138	180	221	263	304	345
1150	1200	30	76	109	142	175	208	241	275
1150	1350	40	85	122	159	196	234	271	308
1150	1500	40	100	145	189	234	279	323	368
1550	600	40	54	76	99	122	145	168	190
1550	750	40	66	94	123	151	180	208	237
1550	900	40	78	112	146	180	214	249	283
1550	1050	40	90	130	169	209	249	289	329
1150	1200	40	102	147	193	238	284	330	375
1550	1350	40	114	165	216	268	319	370	421
1550	1500	40	126	183	240	297	354	411	468
1550	1650	40	138	200	263	326	388	451	514
1550	1800	40	150	218	286	355	423	492	560
1950	900	40	97	140	183	226	270	313	356
1950	1050	40	112	162	213	263	313	364	414
1950	1200	40	127	185	242	300	357	415	472
1950	1350	40	142	207	271	336	401	465	530
1950	1500	40	157	229	301	373	445	516	588
1950	1650	40	172	251	330	409	488	567	646
1950	1800	40	187	273	359	446	532	618	705
2350	900	40	117	169	221	273	325	377	429
2350	1050	40	134	195	256	317	377	438	499
2350	1200	40	152	222	291	361	430	499	569
2350	1350	40	170	248	327	405	483	561	639
2350	1500	40	188	275	362	449	535	622	709
2350	1650	40	206	302	397	493	588	683	779
2350	1800	40	224	328	432	537	641	745	849

Selection

From table A, select a suitable RAF 540 code attenuator that best satisfies the acoustic performance requirement, this will determine attenuator length.

From table B select the width w and height h dimensions that provide the required resistance for the attenuator against the design airflow (interpolation may be required for intermediate values).

The attenuator weight is shown in table C.

Should any dimensional restrictions not suit a RAF 540 range attenuator, examine alternative options from the RAF 520 or RAF 530 ranges.

Acoustic Product Range

RAF Rectangular Attenuators & Splitters

Primary Plant Attenuators



CR3 & CR4 Circular Attenuators

Circular Attenuators for Axial Fan Applications



RAS Rectangular Attenuators

Cross Talk & Terminal Attenuators



Ovaline Attenuators

Flat Oval Attenuators for flat oval ducted systems



CR2 Circular Attenuators

Circular Attenuators for "small" Cross Talk & Terminal Applications



LA Acoustic Louvres

External Acoustic Weather Louvres



Soundpac

Innovative Acoustic Foam "Insert" for circular & rectangular "small" duct applications



Head Office:

Heath Mill Road, Wombourne,
Wolverhampton,
West Midlands, WV5 8AP
Tel: (01902) 895161
Fax: (01902) 892045

www.hotchkissairsupply.co.uk
www.ha2.co.uk

email: sales@hotchkissairsupply.co.uk
email: sales@ha2.co.uk