Pulse Tube Database

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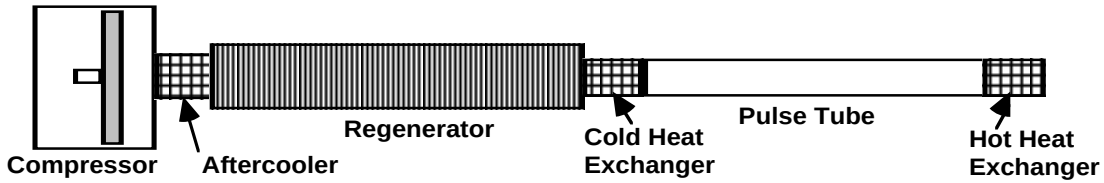
Basic Pulse Tubes
Performance Comparison



	Com-pressor	Regenerator			Pulse Tube			Operation						
Ref. No. (Yr/Mo.iii)	Displacement (cm^3)	Inner Dia. (cm)	Length (cm)	Packing	Inner Dia. (cm)	Length (cm)	Wall Thick. (cm)	Gas Used	Oper. Press. (bar)	Press. Ratio P_{hi}/P_{lo}	Oper. Freq. (Hz)	Hot Ht. Ex. Temp. (K)	Cold Ht. Ex. Temp. (K)	Cold Load (W)
92/11.LKTR														
92/10.HT		1.82		0.1 cm iron beads; 25 grams	1.82	30	.04	Dry air	11	11.0	0.75		257.4	1.83
92/10.HT		1.82		0.1 cm iron beads; 100 grams	1.82	30	.04	Dry air	11	11.0	0.75		243.9	2.85
92/10.HT		1.82		0.1 cm iron beads; 150 grams	1.82	30	.04	Dry air	11	11.0	0.75		235.1	3.77
92/10.HT		1.82		0.1 cm iron beads; 150 grams	1.82	30	.04	Dry air	11	11.0	0.75		233.8	4.22
92/10.HT		1.82		0.1 cm iron beads; 300 grams	1.82	30	.04	Dry air	11	11.0	0.75		235.1	5.24
92/10.HT		1.82		0.147 cm copper beads; 100 grams	1.82	30	.04	Dry air	11	11.0	0.75		245.9	2.78
92/10.HT		1.82		0.147 cm copper beads; 150 grams	1.82	30	.04	Dry air	11	11.0	0.75		243.2	3.32
92/10.HT		1.82		0.147 cm copper beads; 225 grams	1.82	30	.04	Dry air	11	11.0	0.75		238.6	4.21
92/10.HT		1.82		0.147 cm copper beads; 300 grams	1.82	30	.04	Dry air	11	11.0	0.75		229.8	5.3
92/10.HT		1.82		0.147 cm copper beads; 350 grams	1.82	30	.04	Dry air	11	11.0	0.75		233.7	5.36
92/10.HT		1.82		0.147 cm copper beads; 450 grams	1.82	30	.04	Dry air	11	11.0	0.75		236.6	6.45
89/07.DM		1.36	17	630 discs 80 mesh Cu screen	1.9	20			11	3.4	3.2	293	169	0
89/07.DM		1.36	17	630 discs 80 mesh Cu screen	1.2	20			11	3.4	3.2	293	177	0
89/07.DM		1.36	17	630 discs 80 mesh Cu screen	1.0	20			11	3.4	3.2	293	181	0

Basic Pulse Tubes Performance Comparison (cont.)

	Com-pressor	Regenerator			Pulse Tube			Operation						
Ref. No. (Yr/Mo.iii)	Displacement (cm^3)	Inner Dia. (cm)	Length (cm)	Packing	Inner Dia. (cm)	Length (cm)	Wall Thick. (cm)	Gas Used	Oper. Press. (bar)	Press. Ratio P_{hi}/P_{lo}	Oper. Freq. (Hz)	Hot Ht. Ex. Temp. (K)	Cold Ht. Ex. Temp. (K)	Cold Load (W)
89/07.DM		1.36	17	630 discs 80 mesh Cu screen	0.6	20			11	3.4	3.2	293	230	0
88/08.MM		3.6	12.5	200 mesh Cu screen	1.1	22.8	0.05	He			3.5		163	0
88/08.MM		3.6	12.5	200 mesh Cu screen	1.1	22.8	0.05	He			3.5		215	5
88/01.R		0.25 gap	15	2 mm dia. Pb spheres in annulus	1	15		He	4	6	5	290	150	0
72/08.LA		1.2	20.3	150 mesh phosphor bronze screens	2.5-1.2	20.3		He					185	0
72/08.LA		1.2	25.4	150 mesh phosphor bronze screens	2.5-1.2	25.4		He					160	0
72/08.LA		1.2	10	250 mesh phosphor bronze screens	1.9-1.2	12		He	10.7	4.2	4.4		135	0
72/08.LA		1.2	10	250 mesh phosphor bronze screens	1.9-1.2	12		He	10.7	4.2	4.4		150	1
72/06.NM		1.75	10	200 mesh Phosphor Bronze	1.75	58		air						
72/06.NM		1.75	10	200 mesh Phosphor Bronze	1.75	40		air						
72/06.NM		1.75	10	200 mesh Phosphor Bronze	1.75	20		air	5.8	10.3	0.67	303	214.5	0
72/06.NM		1.25	10	200 mesh Phosphor Bronze	1.25	20		air						
72/06.NM		1.25	10	200 mesh Phosphor Bronze	1.25	58		air						
72/06.NM		1.25	10	200 mesh Phosphor Bronze	1.25	40		air						
72/06.NM		1.25	10	200 mesh Phosphor Bronze	1.25	20		air						
71/05.L					2.5	20.3		He					185	0
71/05.L					2.5	25.4		He	7.7	5.8	1.4		160	0
67/08.CFRS		2.44	30.5	0.127 cm dia. Pb shot	1.5	30.5	0.041	He	3.4	3	2.6	279	220	16
67/08.CFRS		2.44	30.5	0.127 cm dia. Pb shot	1.5	30.5	0.041	He	3.4	3	2.6	279	200	1
67/01.L					1.9	31.75		He	17.2		0.67	294	167	0
66/06.GK		1.9	6.35	>400 200 mesh bronze screens	4x0.64	10.2		He	7.9	4.2	6.1	289	230	1.2

Basic Pulse Tubes Performance Comparison (cont.)

	Com-pressor	Regenerator			Pulse Tube			Operation						
Ref. No. (Yr/Mo.iii)	Displacement (cm^3)	Inner Dia. (cm)	Length (cm)	Packing	Inner Dia. (cm)	Length (cm)	Wall Thick. (cm)	Gas Used	Oper. Press. (bar)	Press. Ratio P_{hi}/P_{lo}	Oper. Freq. (Hz)	Hot Ht. Ex. Temp. (K)	Cold Ht. Ex. Temp. (K)	Cold Load (W)
66/06.GK		1.9	6.35	>400 200 mesh bronze screens	4x0.64	10.2		He	13.4	4.2	6.1	289	230	2.7
66/06.GK		1.9	6.35	>400 200 mesh bronze screens	4x0.64	10.2		He	13.4	4.2	6.1	289	165	0
65/01.GL		1.6	6.35	200-mesh bronze screens	1.8	17.8	.05	He	10.6	10.2	0.7	283	169	0
65/01.GL		1.6	6.35	200-mesh bronze screens	1.8	17.8	.05	He	13.7	7.4	1.27	282	167	0

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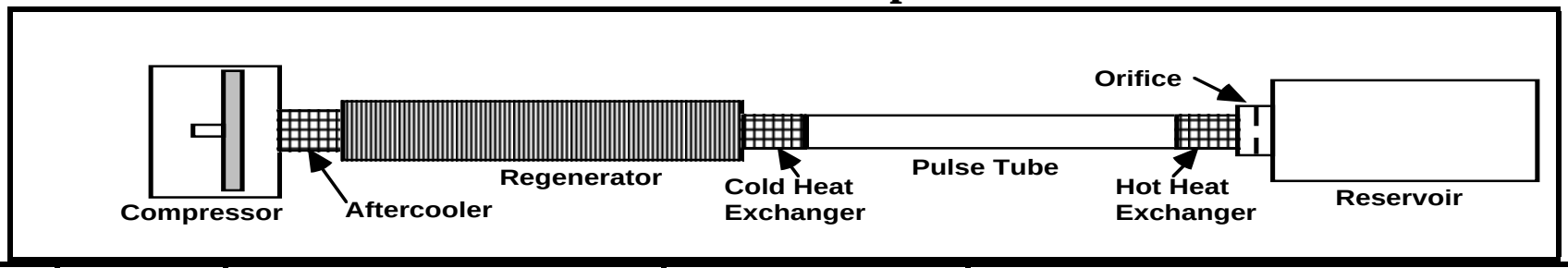
Single-Stage Orifice Pulse Tubes
Performance Comparison



	Com-pressor	Regenerator			Pulse Tube			Operation						
Ref. No. (Yr/Mo.iii)	Displacement (cm^3)	Inner Dia. (cm)	Length (cm)	Packing	Inner Dia. (cm)	Length (cm)	Wall Thick. (cm)	Gas Used	Oper. Press. (bar)	Press. Ratio P_{hi}/P_{lo}	Oper. Freq. (Hz)	Hot Ht. Ex. Temp. (K)	Cold Ht. Ex. Temp. (K)	Cold Load (W)
93/03.WWC	15	1.4	6.5	650 disks of 400 mesh stainless steel	0.75	8		He					105	
93/03.GM		2.0, 1.7, 1.7	8.5, 8.0, 7.5	1st stage-300 mesh bronze screen; 2nd stage-Pb shot; 3rd stage-Er3Ni shot	0.9	10.0	.05					66	10	
92/06.WWC	13.6	1.4	6.5	400 mesh stainless steel screen	0.75	6.5		He	7		18		114	0
91/06.DME														
90/10.RTR	25	1.53	10	stacked discs of 304 stainless steel wire cloth woven from 0.053 mm diameter wire forming 7.9 openings per milimeter, porosity = 0.63.				He	22		7	290	77	
90/05.BHCG					1.8	40		He	3	2.5	3	310	294	
90/04.WZZZ	55	2		2000 layers Cu & stainless steel screens				He	19	1.26	14	350	68	0
90/04.WZZZ	68	2		2000 layers Cu & stainless steel screens				He	13	1.26	13	350	62	0
90/04.WZZZ	68	2		2000 layers Cu & stainless steel screens				He	13	1.26	13	350	77	2.5
90/04.ZWCZZ	240	3.6/2.8	20/3	150 Cu mesh	1.9	42		He	11		7		55	0
89/07.DM		1.36	17	630 discs 80 mesh Cu screen	1.9	20			11	3.4	3.2	293	85	0

Single-Stage Orifice Pulse Tubes Performance Comparison (cont.)

	Com-pressor	Regenerator			Pulse Tube			Operation						
Ref. No. (Yr/Mo.iii)	Displacement (cm^3)	Inner Dia. (cm)	Length (cm)	Packing	Inner Dia. (cm)	Length (cm)	Wall Thick. (cm)	Gas Used	Oper. Press. (bar)	Press. Ratio P_{hi}/P_{lo}	Oper. Freq. (Hz)	Hot Ht. Ex. Temp. (K)	Cold Ht. Ex. Temp. (K)	Cold Load (W)
89/07.DM		1.36	17	630 discs 80 mesh Cu screen	1.2	20			11	3.4	3.2	293	116	0
89/07.DM		1.36	17	630 discs 80 mesh Cu screen	1.0	20			11	3.4	3.2	293	120	0
89/07.DM		1.36	17	630 discs 80 mesh Cu screen	1.9	20			11	3.4	3.2	293	100	4
89/07.TCB				stainless steel screens				He				300	53	0
89/06.LZZ	240	3.6/2.8	20/3	150 mesh Cu screens	1.9	42	0.05	He	10.6		8.3		49	0
89/06.LZZ	240	3.6/2.8	20/3	150 mesh Cu screens	1.9	42	0.05	He	10.6		8.3		65	6.6
89/06.LZZ	240	3.6/2.8	20/3	150 mesh Cu screens	1.9	42	0.05	He	10.6	1.44	8.3		77	12
88/08.KM		1.3	5	200 mesh phosphor-bronze	0.7	14	0.05	He	2.9	1.4	1.9	300	245	1
88/08.KM		1.3	5	200 mesh phosphor-bronze	0.7	14	0.05	He	2.9	1.4	1.9	300	205	0
88/08.MM		3.6	12.5	200 mesh Cu screen	1.1	22.8	0.05	He	18	1.49	6.5		78	0
88/08.MM		3.6	12.5	200 mesh Cu screen	1.1	22.8	0.05	He	18	1.49	6.5		125	7.5
88/08.RCZ	25	1.22	12.7	150 mesh stainless steel	0.9	11	0.025	He	15	1.3	15	315	82	0
88/08.RCZ	25	1.22	7.6	150 mesh stainless steel	0.9	11	0.025	He	15		10	315	94.6	0
88/08.RCZ	25	1.53	10	200 mesh stainless steel	0.9	12.34	0.025	He	15	1.27	15	315	71	0
88/08.RCZ	25	1.53	12.7	200 mesh stainless steel	0.9	12.34	0.025	He	15		15	315	81.3	0
88/08.RCZ	25	1.53	12.7	200 mesh stainless steel	0.9	19.1	0.025	He	15	1.16	20	315	105	0
88/08.RCZ	25	1.53	17.8	200 mesh stainless steel	0.9	21	0.025	He	15	1.19	10	315	81	0
88/08.RCZ	25	1.35	2.8	210 mesh nylon screen	0.9	11	0.025	He	15	1.47	10	315	104	0
88/08.RCZ	25	1.66	8.9	200 mesh stainless steel screen & 210 mesh nylon screen	0.9	12.34	0.025	He	15	1.26	15	315	71	0

Single-Stage Orifice Pulse Tubes Performance Comparison (cont.)

	Com-pressor	Regenerator			Pulse Tube			Operation						
Ref. No. (Yr/Mo.iii)	Displacement (cm^3)	Inner Dia. (cm)	Length (cm)	Packing	Inner Dia. (cm)	Length (cm)	Wall Thick. (cm)	Gas Used	Oper. Press. (bar)	Press. Ratio P_{hi}/P_{lo}	Oper. Freq. (Hz)	Hot Ht. Ex. Temp. (K)	Cold Ht. Ex. Temp. (K)	Cold Load (W)
88/08.RCZ	25	1.91	6.9	150 mesh stainless steel & 140 mesh nylon (top 1.7 cm), 200 mesh stainless steel & 210 mesh nylon (mid 3.4 cm), 250 mesh stainless steel & 210 mesh nylon (bottom 1.8 cm),	0.9	12.34	0.025	He	15	1.29	15	315	77	0
88/08.RCZ	25	1.66	6.8	250 mesh stainless steel	0.9	12.34	0.025	He	20		9	315	67	0
88/08.RCZ	25	1.66	6.8	250 mesh stainless steel	0.9	12.34	0.025	He	20		15	315	80	2
87/06.SR					1.9	13		He	10	2.3	6	300	200	34
86/09.RH		1.9	12.7	1050 discs 150 mesh phosphor-bronze screen	1.17	24	0.051	He	10	2.6	6	300	90	15
86/09.RH		1.9	12.7	1050 discs 150 mesh phosphor-bronze screen	1.17	24	0.051	He	10	2.6	6	300	270	45
86/09.RH		1.9	12.7	1050 discs 150 mesh phosphor-bronze screen	0.58	24	0.03	He	10	2.6		300		
86/09.RH		1.9	12.7	1050 discs 150 mesh phosphor-bronze screen	1.17	12	0.051	He	10	2.6		300		
86/09.RH		1.9	12.7	1050 discs 150 mesh phosphor-bronze screen	1.77	12	0.071	He	10	2.6		300		
85/08.RZSL		1.9	12.7	1050 disks, 150 mesh phosphor-bronze screen	1.27	23.7		He	9.75	1.75	9		60	0
83/08.MTS				bronze net	1	45		air	4		15	300	105	0
83/08.MTS				bronze net	1	45		air	4		15	300	180	50

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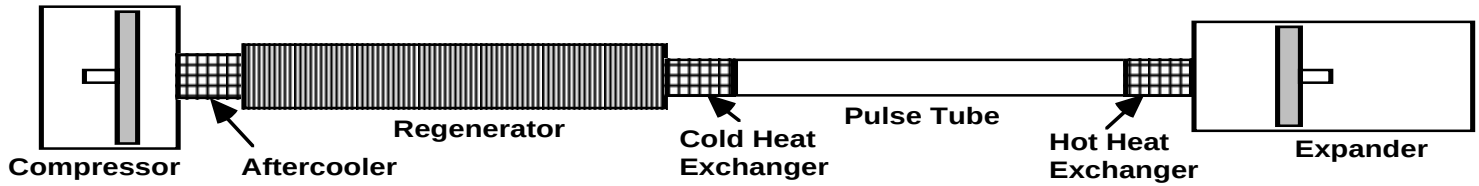
Expander Pulse Tubes
Performance Comparison



	Com-pressor	Regenerator			Pulse Tube			Operation						
Ref. No. (Yr/Mo.iii)	Displacement (cm^3)	Inner Dia. (cm)	Length (cm)	Packing	Inner Dia. (cm)	Length (cm)	Wall Thick. (cm)	Gas Used	Oper. Press. (bar)	Press. Ratio P_{hi}/P_{lo}	Oper. Freq. (Hz)	Hot Ht. Ex. Temp. (K)	Cold Ht. Ex. Temp. (K)	Cold Load (W)
92/11.II		3.6		150 mesh bronze + 200 mesh stainless steel + 0.3 mm Pb	1.5	25		He	25				80	45
92/11.MGTHK		3.6	12.3	300 mesh copper screen disks; 3.6 cm in diameter	1.9	23.7		He	15		2		80	17.5
92/08.YK		3.495	31.0	Stainless steel screen; 700 of 80 mesh (hot end); 1800 of 250 mesh (cold end)	2.5	32.7	.05	He	13.95	1.56	1.3		47	0
92/08.YK		3.495	16.0	Stainless steel screen; 395 of 80 mesh (hot end); 1025 of 250 mesh (cold end)	2.5	32.7	.05	He	13.95	1.66	1.3		51	0
92/08.YK		3.495	31.0	Stainless steel screen; 700 of 80 mesh (hot end); 1800 of 250 mesh (cold end)	2.5	17.7	.05	He	13.75	1.96	1.3		137	0
92/08.YK		3.495	16.0	Stainless steel screen; 395 of 80 mesh (hot end); 1025 of 250 mesh (cold end)	2.5	17.7	.05	He	13.90	2.05	1.3		144	0
92/06.WWC	13.6	1.4	6.5	400 mesh stainless steel screen	0.75	6.5		He	7		18		78	0

Expander Pulse Tubes Performance Comparison (cont.)

	Com-pressor	Regenerator			Pulse Tube			Operation						
Ref. No. (Yr/Mo.iii)	Displacement (cm^3)	Inner Dia. (cm)	Length (cm)	Packing	Inner Dia. (cm)	Length (cm)	Wall Thick. (cm)	Gas Used	Oper. Press. (bar)	Press. Ratio P_{hi}/P_{lo}	Oper. Freq. (Hz)	Hot Ht. Ex. Temp. (K)	Cold Ht. Ex. Temp. (K)	Cold Load (W)
91/08.KYGG		3.495	30	Stainless steel screen; 700 of 80 mesh (hot end); 1800 of 250 mesh (cold end)	2.5	32.7	.05	He					47	
91/04.KNGYG		3.495	30	Hot end: 700 stainless steel screens of 80 mesh; cold end: 1800 stainless steel screens of 250 mesh	2.5	28	0.05		5-6		1.4-1.6	Room temp.	146	0
90/04.DM									10.3	4.42	3.3		57	0
90/04.DM									10.3	4.42	3.3		72	12
88/08.MM		3.6	12.5	200 mesh Cu screen	1.1	22.8	0.05	He	17	1.27	10		73	0
88/08.MM		3.6	12.5	200 mesh Cu screen	1.1	22.8	0.05	He	17	1.27	10		110	7.5

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