

### ▼ Model ABW

The **Carnes Model ABW**, By-Pass Control Hot Water Reheat Unit, provides variable air volume with reheat capability to individual zones while by-passing the unneeded air to the ceiling plenum for recirculation.

Although zone air volumes in small buildings may vary greatly, the cost of fan controls many times cannot be justified. Zone air volumes are realized

with the by-pass reheat unit while the supply fan delivers a constant CFM.

The ABW can be ordered for reverse acting or direct acting pneumatic thermostats or electric thermostats. Zone thermostats directly control the by-pass damper assuring that only the air that is needed is delivered to the zone.

#### *Features Include:*

- Air flow capacities from full shut-off to 3,650 CFM.
- Pneumatic or electric controls.
- Thermally and acoustically insulated casing (hot water coil casing is uninsulated).
- Reheat coils available in one to four rows.
- Open-end discharge provided with slip and drive connection for easy installation.
- Balancing damper in by-pass is standard.
- Tri-Averaging air flow sensor at inlet of unit.
- Optional hanger brackets.
- Optional control enclosure.
- Optional foil coated insulation.

#### *Available Modules:*

- Basic Control Unit — **Model ABW**
- Sound Attenuator — **Model AXA**



IAQ Insulation  
Available



A Participating Member  
in the AHRI 880  
Certification Program

Discharge and Radiated (NC) Noise Criteria

Inlet Unit Size (Inches)	CFM	Minimum Pressure Drop				Min. Δ Ps				1.0" Δ Ps				1.5" Δ Ps				3.0" Δ Ps			
		Min. Δ Ps		Min. Δ Pt		Dis. NC		Rad. NC		Dis. NC		Rad. NC		Dis. NC		Rad. NC		Dis. NC		Rad. NC	
		With 1 Row	With 2 Row	With 1 Row	With 2 Row	1 Row	2 Row	1 Row	2 Row	1 Row	2 Row	1 Row	2 Row	1 Row	2 Row	1 Row	2 Row	1 Row	2 Row	1 Row	2 Row
6	75	.037	.073	.076	.082	—	—	—	—	—	—	11	10	11	11	13	13	17	17	20	19
	100	.121	.121	.131	.137	—	—	—	—	—	—	14	13	11	11	18	16	17	17	22	20
	150	.262	.262	.281	.298	—	—	—	—	11	11	16	18	13	13	20	20	20	20	25	22
	200	.455	.455	.487	.519	—	—	11	10	15	15	20	19	18	18	22	22	22	22	27	25
	250	.707	.707	.764	.807	17	17	16	18	15	15	21	19	22	22	24	24	25	25	30	27
7	75	.030	.037	.035	.042	—	—	—	—	—	—	14	12	14	13	18	15	24	21	25	21
	100	.055	.061	.064	.070	—	—	—	—	10	—	14	13	15	14	18	16	24	22	26	22
	200	.200	.225	.234	.259	—	—	—	—	16	14	19	19	20	18	22	22	26	24	27	25
	300	.440	.512	.517	.588	10	10	14	13	18	18	21	20	23	24	25	25	30	28	31	31
	350	.594	.684	.698	.788	13	13	19	17	18	18	22	21	25	24	27	26	30	29	34	33
8	100	.036	.047	.041	.051	—	—	—	—	10	—	19	19	13	14	22	22	20	21	26	26
	200	.123	.151	.142	.170	—	—	—	—	14	12	22	21	17	16	25	24	22	23	30	28
	300	.262	.316	.303	.357	—	—	—	—	17	15	25	21	21	18	28	25	26	25	32	31
	400	.444	.521	.517	.594	—	—	14	12	18	14	26	20	23	19	32	26	30	28	36	33
	500	.711	.816	.824	.930	14	16	21	18	18	15	26	19	24	19	32	25	31	30	39	35
10	150	.033	.041	.037	.045	—	—	—	—	14	12	16	19	19	18	18	23	18	18	25	27
	250	.085	.098	.096	.109	—	—	—	—	16	15	15	18	19	18	20	22	19	24	25	27
	400	.192	.224	.221	.252	—	—	—	—	18	17	21	20	23	22	24	24	28	28	28	28
	600	.392	.437	.456	.501	—	—	14	12	19	17	21	20	24	22	27	26	30	30	34	34
	750	.609	.677	.710	.777	14	13	20	18	18	17	23	20	25	21	27	26	31	30	36	36
12	215	.037	.046	.042	.050	—	—	—	—	15	12	19	20	19	18	21	22	28	27	27	28
	400	.108	.135	.125	.152	—	—	—	—	19	17	23	22	24	22	25	25	30	29	31	30
	600	.227	.268	.265	.306	—	—	—	—	19	17	26	23	25	23	31	28	32	31	36	34
	900	.478	.496	.563	.581	12	12	16	14	20	17	26	23	27	23	32	28	33	31	42	39
	1150	.718	.867	.857	1.006	19	19	23	21	21	19	29	23	26	23	33	28	35	31	42	39
14	300	.035	.043	.040	.047	—	—	—	—	12	14	18	15	16	17	21	19	25	24	27	26
	500	.093	.108	.104	.120	—	—	—	—	16	14	21	20	19	18	23	22	25	25	28	27
	800	.224	.262	.253	.292	—	—	—	—	18	17	23	20	23	22	26	25	30	28	32	32
	1200	.452	.545	.518	.611	13	—	14	12	20	16	23	20	25	22	28	25	32	31	36	36
	1550	.735	.919	.846	1.029	21	18	21	19	22	18	24	20	26	22	30	25	33	34	37	37
16	390	.035	.042	.039	.046	—	—	—	—	16	11	15	14	22	14	18	16	30	23	22	22
	800	.136	.154	.153	.171	—	—	—	—	21	18	20	20	25	21	23	23	31	26	28	28
	1200	.032	.330	.339	.367	—	—	—	—	22	18	21	20	27	24	25	25	33	30	33	33
	1800	.691	.692	.774	.775	22	17	18	19	25	18	20	19	29	24	25	24	35	34	36	36
	2100	.908	.932	1.022	1.045	26	21	24	19	27	20	22	19	30	24	25	24	35	33	37	36
18	550	.034	.041	.037	.044	—	—	—	—	17	17	22	21	21	19	26	25	27	27	33	32
	1100	.130	.154	.145	.168	—	—	—	—	22	21	25	25	25	24	28	30	32	32	35	35
	1650	.298	.334	.330	.377	10	—	—	—	23	20	26	25	28	26	31	31	34	33	37	37
	2200	.567	.627	.625	.685	19	18	15	15	23	21	25	25	28	27	31	31	36	35	40	39
	2750	.956	.962	1.046	1.052	24	22	22	22	25	23	26	25	28	27	31	31	37	37	40	40
24	750	.040	.058	.043	.061	16	—	—	—	—	16	23	22	19	19	25	25	27	25	33	33
	1500	.147	.200	.105	.503	24	—	—	—	—	21	25	25	28	26	30	30	31	30	37	36
	2200	.318	.427	.342	1.002	24	—	12	12	14	21	25	26	29	27	32	31	37	36	39	39
	2950	.546	.715	.589	1.503	26	18	20	20	21	21	26	25	30	27	32	32	37	36	40	40
	3650	.810	1.037	.875	3.003	27	24	26	27	26	26	27	26	30	27	32	31	38	36	40	40

- NOTES:**
1. Δ Ps static pressure difference from inlet to discharge.
  2. Δ Ps is the minimum pressure required to deliver CFM shown with the primary damper in wide open position.
  3. Δ Pt is the total pressure difference from inlet to discharge.
  4. Dash (—) indicates NC level less than 10.

NC levels are derived from tests conducted in accordance with AHRI Standard 880-2008 and are calculated in accordance with AHRI Standard 885-2008 as application data based on the following:

**Discharge NC levels are based on —**

- a) 5 foot rectangular duct lined with 1" fiberglass insulation.
- b) 5 foot lined flex duct (8" diameter).
- c) Flow division.
- d) Space effect factor (2400 ft<sup>3</sup>) at 5 feet from outlet.
- e) End reflection.
- f) Environmental adjustment factor.

**Radiated NC levels are based on—**

- a) Plenum / ceiling effect - 5/8" mineral fiber tile, 35 lb / ft<sup>3</sup> - 3 foot plenum.
- b) Environmental adjustment factor.

**Discharge Sound Power  
1 Row Coil**

Inlet Size (Inches)	CFM	Minimum $\Delta P_s$							1.0" $\Delta P_s$							1.5" $\Delta P_s$							3.0" $\Delta P_s$							
		$\Delta P_s$	Sound Power (db) by Octave Band							Sound Power (db) by Octave Band							Sound Power (db) by Octave Band							Sound Power (db) by Octave Band						
			(2)	(3)	(4)	(5)	(6)	(7)	(7)	(2)	(3)	(4)	(5)	(6)	(7)	(7)	(2)	(3)	(4)	(5)	(6)	(7)	(7)	(2)	(3)	(4)	(5)	(6)	(7)	(7)
6	75	.037	34	31	27	19	16	18	46	45	45	46	47	42	44	45	46	50	51	48	46	47	50	53	55	54				
	100	.121	40	32	33	28	24	18	47	47	46	47	47	43	48	47	47	49	52	48	47	47	51	55	55	54				
	150	.262	50	41	40	37	37	31	52	52	51	51	52	48	52	53	52	53	53	50	52	54	53	56	59	57				
	200	.455	56	50	47	44	46	41	59	57	54	53	54	50	57	57	56	56	57	55	57	58	58	60	61	59				
	250	.707	62	55	52	49	50	48	61	57	54	54	54	51	62	63	59	59	59	56	60	62	61	63	64	62				
7	75	.030	35	24	18	16	16	18	49	50	49	50	48	45	50	52	51	54	53	51	48	52	53	58	60	61				
	100	.055	35	27	24	19	18	18	50	51	50	50	50	47	51	52	52	54	54	52	53	56	56	60	61	61				
	200	.200	47	41	39	36	33	26	56	57	54	54	55	53	57	59	57	58	59	57	58	60	60	63	64	63				
	300	.440	57	51	49	46	44	41	64	60	57	55	55	53	62	64	62	60	60	59	63	65	66	67	67	67				
	350	.594	62	56	54	50	48	46	65	61	56	55	55	53	65	67	63	61	60	59	65	68	68	68	68	67				
8	100	.036	34	22	19	18	18	22	51	53	54	51	48	45	53	54	54	55	52	50	60	60	59	61	57	57				
	200	.123	39	34	34	30	24	22	56	56	56	54	52	51	57	59	59	58	55	54	62	63	63	65	61	59				
	300	.262	49	44	42	40	38	35	60	59	58	55	55	54	61	61	61	60	59	58	64	66	66	66	64	63				
	400	.444	55	50	48	47	44	43	62	61	58	55	54	53	63	64	63	60	60	59	66	68	68	68	67	66				
	500	.711	60	56	55	53	51	50	65	59	56	56	55	54	66	66	63	61	59	58	68	71	71	69	68	68				
10	150	.033	37	24	18	19	16	18	52	56	49	47	47	43	56	61	55	51	51	48	56	60	56	57	56	53				
	250	.085	37	31	30	24	19	18	55	58	53	51	52	49	58	61	57	55	55	52	58	61	57	55	55	53				
	400	.192	45	43	39	37	35	29	60	61	57	55	56	52	62	65	60	59	60	57	65	69	66	65	65	62				
	600	.392	54	52	49	46	46	42	61	62	57	55	55	52	65	66	62	60	61	58	69	71	69	67	68	66				
	750	.609	60	58	55	52	51	49	64	62	59	56	56	53	70	68	64	61	60	58	71	73	71	70	70	67				
12	215	.037	37	23	17	18	15	18	52	57	54	56	53	51	54	58	57	59	56	56	56	63	64	65	65	65				
	400	.108	38	34	33	28	23	20	56	59	56	58	57	55	59	62	60	62	62	60	61	65	65	67	68	67				
	600	.227	44	44	41	39	37	34	60	62	58	59	57	55	61	66	63	63	63	61	64	69	68	70	70	69				
	900	.478	56	53	51	49	49	48	62	63	60	60	57	56	65	69	65	65	62	61	68	73	73	72	72	70				
	1150	.718	63	60	58	56	54	55	63	64	61	60	57	57	67	68	65	66	63	62	70	76	75	73	72	70				
14	300	.035	34	23	18	16	17	18	55	55	52	52	50	46	58	58	55	55	54	51	66	66	63	62	60	59				
	500	.093	37	33	32	28	23	20	57	57	56	56	55	52	61	61	59	59	58	55	67	67	65	64	63	61				
	800	.224	46	43	42	41	40	37	61	61	58	57	57	54	64	65	63	62	62	59	69	70	68	68	68	66				
	1200	.452	54	53	51	49	50	49	65	61	60	58	57	56	67	66	64	63	62	61	73	73	72	71	71	69				
	1550	.735	63	61	59	55	56	57	66	61	61	58	58	58	71	67	66	63	62	62	76	74	73	72	70	69				
16	390	.035	37	24	19	16	18	18	56	56	57	58	54	52	60	59	59	64	59	58	66	65	66	66	65	67				
	800	.136	43	39	39	38	35	24	62	62	61	60	59	57	64	65	64	65	63	61	70	69	69	69	68	68				
	1200	.032	52	49	47	47	48	44	64	63	61	60	59	58	67	67	66	65	64	63	72	72	73	73	71	70				
	1800	.691	64	61	58	55	57	58	66	63	62	59	61	61	70	68	67	65	65	65	75	75	75	74	73	72				
	2100	.908	67	65	62	59	60	62	69	64	62	60	62	63	72	68	67	65	65	66	77	76	75	73	72	72				
18	550	.034	36	23	17	16	15	18	57	58	56	56	57	53	67	61	58	59	62	57	65	65	62	63	62	63				
	1100	.130	40	37	34	35	34	24	61	62	60	61	60	58	64	64	63	64	64	61	68	69	68	68	68	69				
	1650	.298	51	49	46	46	48	46	64	63	62	61	60	59	67	68	68	67	66	64	71	72	73	74	73	71				
	2200	.567	59	57	55	53	55	55	70	65	63	60	60	59	68	70	68	67	65	64	75	76	76	76	75	73				
	2750	.956	66	62	61	59	59	60	72	65	63	60	60	61	74	70	68	66	65	64	78	78	76	77	74	73				
24	750	.040	36	25	19	18	17	18	59	60	57	56	54	51	63	63	61	58	55	53	68	69	66	64	59	59				
	1500	.147	45	42	38	38	36	29	63	64	62	62	61	60	66	67	66	66	65	64	72	73	72	71	70	68				
	2200	.318	55	52	50	49	51	50	66	64	63	61	60	60	68	69	68	67	66	65	75	76	76	76	75	74				
	2950	.546	61	60	58	56	57	57	68	65	64	62	61	62	71	70	69	67	66	66	77	78	78	77	75	74				
	3650	.810	68	66	64	61	61	62	68	65	65	63	63	63	73	70	69	67	66	66	76	79	78	77	75	74				

- NOTES:**
1. Based on tests conducted in accordance with AHRI Standard 880-2008.
  2.  $\Delta P_s$  static pressure difference from inlet to discharge.
  3.  $\Delta P_s$  is the minimum pressure required to deliver CFM shown with primary damper in wide open position.



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Discharge Sound Power  
2 Row Coil

Inlet Size (Inches)	CFM	Minimum $\Delta P_s$							1.0" $\Delta P_s$							1.5" $\Delta P_s$							3.0" $\Delta P_s$							
		$\Delta P_s$	Sound Power (db) by Octave Band							Sound Power (db) by Octave Band							Sound Power (db) by Octave Band							Sound Power (db) by Octave Band						
			(2)	(3)	(4)	(5)	(6)	(7)	(7)	(2)	(3)	(4)	(5)	(6)	(7)	(7)	(2)	(3)	(4)	(5)	(6)	(7)	(7)	(2)	(3)	(4)	(5)	(6)	(7)	(7)
6	75	.073	34	31	27	19	16	18	46	45	45	46	47	42	44	45	46	50	51	48	46	47	50	53	55	54				
	100	.121	40	32	33	28	24	18	47	47	46	47	47	43	48	47	47	49	52	48	47	47	51	55	55	54				
	150	.262	50	41	40	37	37	31	52	52	51	51	52	48	52	53	52	53	53	50	52	54	53	56	59	57				
	200	.455	56	50	47	44	46	41	59	57	54	53	54	50	57	57	56	56	57	55	57	58	58	60	61	59				
	250	.707	62	55	52	49	50	48	61	57	54	54	54	51	62	63	59	59	59	56	60	62	61	63	64	62				
7	75	.037	35	23	18	16	16	18	46	47	47	48	48	45	47	49	50	52	52	50	49	51	55	58	58	58				
	100	.061	35	27	24	19	16	18	52	51	50	50	49	46	52	53	52	54	53	51	52	56	57	60	60	59				
	200	.225	47	41	39	36	36	30	59	56	55	54	54	51	60	59	57	58	58	55	59	60	60	63	63	61				
	300	.512	57	51	49	46	47	44	63	60	57	54	54	50	64	65	61	60	60	57	63	67	65	67	67	65				
	350	.684	61	55	53	50	50	49	66	58	56	55	54	51	68	66	61	60	59	56	65	69	67	68	68	65				
8	100	.047	34	31	33	31	29	30	52	52	53	51	48	45	53	53	54	54	52	51	59	59	58	60	58	58				
	200	.151	40	34	35	32	30	31	54	55	56	53	51	49	57	58	59	57	55	53	61	62	63	63	61	60				
	300	.316	51	43	42	40	41	37	58	58	57	54	53	50	60	60	60	59	58	55	64	65	65	64	64	62				
	400	.521	57	50	49	46	47	44	58	57	56	53	52	49	62	62	61	59	59	56	65	67	67	66	66	64				
	500	.816	61	56	55	52	52	45	62	63	57	56	54	52	61	63	62	61	58	57	67	69	69	68	67	66				
10	150	.041	34	20	17	18	16	18	52	55	49	47	46	43	54	60	54	51	50	47	56	60	55	56	57	54				
	250	.098	34	31	30	22	19	18	56	57	52	51	52	48	57	60	56	55	55	51	59	65	61	59	58	56				
	400	.224	42	42	39	36	35	27	59	60	57	55	55	52	61	64	60	59	59	56	65	69	66	64	64	62				
	600	.437	53	51	47	45	45	41	60	60	57	54	54	52	64	64	62	60	60	58	69	71	69	68	69	66				
	750	.677	58	56	54	51	51	49	62	61	57	54	54	52	65	64	62	59	59	57	69	71	70	69	69	67				
12	215	.046	34	21	17	16	15	18	51	55	53	55	52	49	52	57	57	59	56	55	56	61	62	63	65	64				
	400	.135	37	33	33	29	24	20	56	58	56	58	56	53	56	60	59	61	60	58	61	64	65	66	67	65				
	600	.268	44	42	41	39	38	32	57	59	58	58	55	53	61	63	62	63	62	59	64	68	68	69	70	68				
	900	.496	53	52	50	48	49	48	59	60	59	58	55	53	61	63	63	62	59	59	66	71	72	71	70	68				
	1150	.867	60	58	57	54	54	55	60	61	59	58	56	55	62	64	63	60	59	67	71	72	72	70	69	68				
14	300	.043	34	24	18	16	15	18	55	56	51	51	49	45	58	59	54	54	52	49	65	65	62	60	59	57				
	500	.108	37	34	31	25	20	20	57	57	54	55	54	50	61	61	58	58	58	54	67	67	64	63	62	59				
	800	.262	44	43	41	39	37	30	60	61	58	56	56	52	63	65	62	61	61	58	69	70	68	68	67	64				
	1200	.545	52	51	49	48	47	44	61	60	58	55	55	52	67	65	64	61	61	58	72	73	72	70	70	68				
	1550	.919	63	58	58	54	55	55	61	58	59	55	56	54	67	64	64	60	60	58	75	75	73	71	70	68				
16	390	.042	38	24	18	16	17	18	55	53	53	51	50	47	59	56	56	55	53	50	64	63	61	61	59	59				
	800	.154	41	38	38	33	29	22	60	61	59	58	57	54	63	64	62	61	60	57	69	67	67	66	65	62				
	1200	.330	51	47	46	43	43	39	61	60	59	57	56	54	66	66	65	63	62	60	71	71	72	71	70	67				
	1800	.692	61	58	56	52	53	53	63	60	60	56	56	54	66	66	65	62	61	60	75	75	74	72	71	69				
	2100	.932	66	62	61	57	57	57	64	61	60	57	56	56	69	66	65	62	61	60	75	74	74	72	70	69				
18	550	.041	34	22	19	18	17	20	56	57	55	56	57	53	61	60	58	59	61	55	64	64	63	63	62	63				
	1100	.154	39	37	34	35	33	24	62	62	59	60	59	57	64	65	63	63	64	60	69	69	68	68	67	69				
	1650	.344	51	48	45	45	45	42	64	63	61	60	59	56	68	68	67	66	65	62	71	73	72	73	72	70				
	2200	.627	60	56	55	53	53	54	64	63	62	59	58	57	69	69	67	65	64	62	72	76	76	75	73	71				
	2750	.962	67	61	61	57	58	58	67	61	61	58	58	59	70	69	67	64	63	63	74	78	77	75	73	71				
24	750	.058	36	25	20	19	15	18	61	60	57	56	52	49	63	63	60	58	54	51	66	68	65	63	59	57				
	1500	.200	46	42	39	38	35	30	64	64	62	61	59	57	67	67	66	66	65	62	73	72	71	71	68	66				
	2200	.427	55	53	51	49	48	45	64	64	62	60	59	57	69	69	68	66	65	63	75	76	76	76	75	73				
	2950	.715	63	60	58	56	55	54	66	64	64	60	59	57	69	69	68	65	64	63	76	77	78	77	75	73				
	3650	1.037	69	66	65	61	60	60	67	65	65	61	60	58	71	69	69	65	64	63	76	77	78	76	73	73				

- NOTES: 1. Based on tests conducted in accordance with AHRI Standard 880-2008.  
 2.  $\Delta P_s$  static pressure difference from inlet to discharge.  
 3.  $\Delta P_s$  is the minimum pressure required to deliver CFM shown with primary damper in wide open position.



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**Radiated Sound Power  
1 Row Coil**

Inlet Size (Inches)	CFM	Minimum $\Delta P_s$							1.0" $\Delta P_s$							1.5" $\Delta P_s$							3.0" $\Delta P_s$						
		Sound Power (db) by Octave Band							Sound Power (db) by Octave Band							Sound Power (db) by Octave Band							Sound Power (db) by Octave Band						
		$\Delta P_s$	(2)	(3)	(4)	(5)	(6)	(7)	(2)	(3)	(4)	(5)	(6)	(7)	(2)	(3)	(4)	(5)	(6)	(7)	(2)	(3)	(4)	(5)	(6)	(7)			
6	75	.037	39	24	17	16	19	21	43	41	38	37	39	34	43	43	40	39	42	37	46	47	46	44	48	44			
	100	.121	40	27	21	16	19	21	49	44	41	38	40	35	46	45	44	42	45	41	48	48	48	47	51	47			
	150	.262	45	35	30	21	23	22	50	47	43	38	41	37	53	49	46	42	45	41	53	50	51	49	53	49			
	200	.455	49	41	38	29	31	27	52	50	46	41	43	41	54	52	48	44	47	45	59	55	53	50	53	49			
	250	.707	51	46	43	34	36	33	51	48	47	42	43	41	57	55	50	46	48	46	60	57	55	51	54	51			
7	75	.030	39	25	19	16	19	21	41	41	41	41	43	40	41	44	43	45	48	45	44	46	48	50	55	53			
	100	.055	39	26	19	16	19	21	44	42	41	41	43	40	44	45	44	46	48	46	48	47	48	52	56	54			
	200	.200	42	35	32	24	25	22	49	49	45	44	46	44	51	49	48	47	50	48	51	52	52	53	57	55			
	300	.440	52	44	41	34	34	31	51	52	47	43	46	43	53	56	51	49	51	49	53	57	56	55	58	57			
	350	.594	54	48	45	37	38	35	55	54	47	43	45	43	55	58	53	49	51	49	56	60	59	56	59	57			
8	100	.036	39	23	18	17	21	24	46	44	45	42	42	39	51	47	48	47	46	44	56	51	52	54	52	50			
	200	.123	39	29	24	21	22	24	49	48	48	44	45	43	51	50	51	48	48	46	57	54	55	56	54	52			
	300	.262	46	39	34	29	29	27	52	53	51	47	48	46	54	54	54	50	51	49	57	57	57	57	56	54			
	400	.444	51	45	41	35	36	33	55	55	52	47	48	45	57	60	57	52	53	51	59	59	61	58	58	57			
	500	.711	58	51	47	40	42	40	55	54	52	47	47	45	57	60	57	52	53	50	61	65	64	60	60	59			
10	150	.033	38	24	17	16	19	21	47	42	41	43	46	44	48	46	44	46	48	47	49	46	47	50	55	55			
	250	.085	40	27	21	18	19	21	39	37	36	42	45	43	51	47	46	46	48	47	53	52	51	51	54	54			
	400	.192	41	36	31	24	24	22	52	49	47	44	46	43	54	53	50	48	49	48	57	57	54	53	55	54			
	600	.392	51	44	41	34	34	29	55	50	47	45	46	44	56	54	53	50	50	48	60	62	59	56	57	55			
	750	.609	55	49	46	39	40	35	56	52	49	44	45	44	58	55	53	50	49	48	63	62	61	57	58	56			
12	215	.037	39	27	19	16	19	21	50	46	45	44	45	42	50	48	47	48	50	47	52	52	52	53	57	55			
	400	.108	39	31	23	19	20	21	52	52	49	48	49	45	54	53	51	50	52	49	56	55	56	55	58	56			
	600	.227	44	39	33	28	27	24	58	55	52	50	50	47	59	58	56	54	55	52	59	60	61	58	60	58			
	900	.478	54	49	43	38	39	35	59	56	52	49	49	46	62	60	57	54	55	51	64	67	66	62	63	61			
	1150	.718	57	55	48	44	45	42	58	60	52	49	49	46	63	63	57	54	55	51	67	69	66	63	63	61			
14	300	.035	40	29	20	18	20	21	49	46	44	42	40	38	51	50	47	46	44	42	57	57	53	52	52	51			
	500	.093	41	30	23	19	20	21	51	50	47	45	44	42	54	53	49	48	47	45	59	58	54	54	53	51			
	800	.224	43	37	32	30	29	25	55	53	49	47	47	44	57	57	52	51	52	49	63	61	57	57	57	54			
	1200	.452	50	45	41	38	38	36	58	54	49	46	47	45	62	58	54	51	51	49	65	65	61	60	60	57			
	1550	.735	57	52	47	43	43	43	59	55	50	46	47	45	66	60	55	51	51	50	68	67	62	59	59	57			
16	390	.035	39	27	18	17	21	24	47	44	42	40	41	38	51	47	44	43	44	42	55	53	47	50	50	50			
	800	.136	42	31	25	23	25	24	52	51	46	44	48	42	56	53	49	48	51	46	61	59	53	53	54	52			
	1200	.032	45	40	34	32	36	30	56	52	47	44	48	43	59	57	51	49	52	48	63	62	58	57	59	55			
	1800	.691	56	51	43	41	44	40	58	52	46	44	48	44	61	56	51	48	52	48	67	66	60	58	60	56			
	2100	.908	60	56	47	45	47	44	60	53	47	45	49	46	62	57	51	49	52	49	68	67	61	58	60	56			
18	550	.034	37	27	22	19	20	21	51	49	48	47	45	42	55	53	52	51	50	48	57	57	58	58	57	57			
	1100	.130	40	31	24	23	24	22	55	53	51	50	49	46	58	56	54	54	53	51	62	61	60	60	58	58			
	1650	.298	48	39	34	33	37	31	59	56	52	50	49	46	62	59	56	54	54	52	64	63	62	62	61	60			
	2200	.567	54	48	42	39	43	40	58	55	51	50	49	47	63	60	56	54	54	52	68	67	65	63	62	60			
	2750	.956	60	53	47	44	46	45	60	56	52	49	49	47	63	61	56	54	54	51	69	69	65	63	62	60			
24	750	.040	39	29	23	19	20	22	54	51	49	47	46	47	57	54	51	51	52	63	60	58	58	58	58	59			
	1500	.147	42	33	27	24	27	22	60	54	51	49	50	49	62	58	55	53	54	54	67	63	62	60	60	60			
	2200	.318	49	43	39	35	40	34	60	54	51	49	49	48	64	59	57	54	54	54	70	66	64	62	62	62			
	2950	.546	58	50	46	41	45	41	62	55	52	49	50	49	66	60	57	54	54	54	71	68	65	62	62	61			
	3650	.810	63	55	51	47	49	46	64	57	53	49	50	47	66	60	57	54	54	53	72	69	65	62	62	61			

- NOTES:**
1. Based on tests conducted in accordance with AHRI Standard 880-2008.
  2.  $\Delta P_s$  static pressure difference from inlet to discharge.
  3.  $\Delta P_s$  is the minimum pressure required to deliver CFM shown with primary damper in wide open position.



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**Radiated Sound Power  
2 Row Coil**

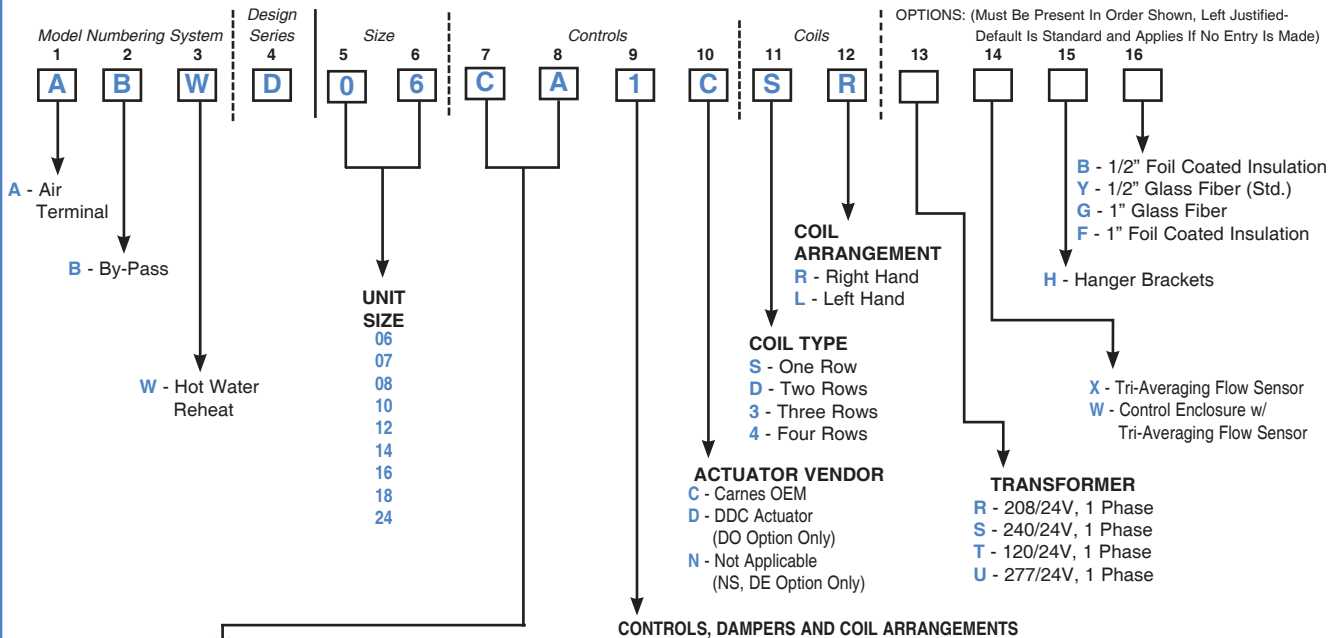
Inlet Size (Inches)	CFM	Minimum $\Delta P_s$							1.0" $\Delta P_s$							1.5" $\Delta P_s$							3.0" $\Delta P_s$							
		$\Delta P_s$	Sound Power (db) by Octave Band							Sound Power (db) by Octave Band							Sound Power (db) by Octave Band							Sound Power (db) by Octave Band						
			(2)	(3)	(4)	(5)	(6)	(7)	(7)	(2)	(3)	(4)	(5)	(6)	(7)	(7)	(2)	(3)	(4)	(5)	(6)	(7)	(7)	(2)	(3)	(4)	(5)	(6)	(7)	(7)
6	75	.073	40	25	19	16	19	21	43	37	37	37	39	34	43	39	40	39	42	39	48	43	45	45	48	45				
	100	.121	40	26	21	18	20	21	48	41	40	38	40	36	46	41	43	42	45	42	48	44	46	46	50	47				
	150	.262	43	35	29	22	26	22	50	46	44	39	42	36	53	48	46	43	45	42	53	48	48	48	52	49				
	200	.455	51	41	36	28	33	28	53	49	45	40	43	37	54	51	48	44	47	42	58	53	51	49	52	49				
	250	.707	57	46	41	33	37	33	53	48	45	40	42	36	56	54	50	45	48	43	60	56	53	50	53	49				
7	75	.037	39	26	21	19	23	25	41	39	39	38	40	38	41	39	41	43	44	43	41	41	44	48	51	50				
	100	.061	40	25	19	18	19	21	44	40	40	40	41	38	45	41	43	43	45	43	48	42	45	50	52	52				
	200	.225	44	36	31	24	27	23	49	46	45	42	45	40	49	48	48	46	49	45	50	49	51	51	54	52				
	300	.512	51	44	40	32	35	30	54	49	46	41	44	38	55	53	51	47	50	46	54	55	56	53	57	54				
	350	.684	56	48	43	36	39	35	57	51	47	41	43	38	58	55	52	47	50	45	55	57	58	55	58	54				
8	100	.047	36	23	17	17	21	24	47	43	45	43	42	38	50	46	48	48	47	43	55	50	52	54	52	49				
	200	.151	39	28	23	22	23	24	50	46	47	44	43	38	53	48	50	48	47	43	56	53	54	56	54	51				
	300	.316	47	38	32	27	29	26	51	48	47	45	44	39	55	51	51	49	49	44	58	55	56	56	55	51				
	400	.521	52	44	39	34	35	32	52	49	46	43	43	38	57	53	52	49	49	44	59	56	58	57	56	52				
	500	.816	55	48	44	39	39	35	55	49	45	41	42	36	57	55	51	49	48	44	62	61	60	58	57	53				
10	150	.041	39	24	17	16	19	21	44	41	41	46	49	45	47	46	43	49	53	51	49	46	46	51	57	58				
	250	.098	39	26	22	16	19	21	49	45	43	45	48	44	49	47	45	48	52	50	53	51	50	52	57	58				
	400	.224	41	37	30	24	26	22	52	50	46	46	49	45	54	53	50	50	52	50	57	56	54	54	57	57				
	600	.437	49	42	39	34	36	31	55	52	46	46	48	45	58	56	52	50	52	50	61	62	59	57	59	58				
	750	.677	54	49	44	39	41	37	55	51	46	45	48	45	58	56	52	50	52	50	63	63	61	58	59	58				
12	215	.046	38	27	19	18	20	21	45	45	46	46	47	43	47	47	48	48	51	47	53	51	52	54	58	55				
	400	.135	41	30	22	18	20	21	52	50	48	48	49	44	54	52	51	51	53	49	55	54	55	56	59	55				
	600	.268	42	36	32	30	29	23	56	52	49	48	49	45	58	57	54	52	54	49	59	60	59	59	61	56				
	900	.496	50	45	41	39	40	34	58	52	49	48	49	45	60	57	54	53	54	50	64	67	64	61	62	58				
	1150	.867	56	50	47	45	46	42	57	52	49	47	48	44	61	57	54	53	54	50	66	68	64	61	62	58				
14	300	.043	39	29	20	18	19	21	48	46	42	40	41	37	51	49	45	44	44	42	57	57	52	52	52	51				
	500	.108	41	32	24	19	21	21	50	50	46	44	45	39	53	53	48	47	48	43	59	57	53	53	53	51				
	800	.262	42	35	30	28	29	23	54	52	46	45	46	40	57	55	51	50	52	46	62	61	57	57	58	53				
	1200	.545	50	45	39	37	39	32	55	51	46	44	46	40	60	56	51	50	51	46	66	66	59	59	60	55				
	1550	.919	57	51	45	42	45	40	55	51	46	44	46	41	61	57	51	49	50	46	69	67	60	59	59	55				
16	390	.042	41	28	19	18	22	25	48	44	41	39	39	35	51	47	43	43	42	40	56	53	47	50	49	49				
	800	.154	42	31	24	22	24	25	54	51	46	44	46	39	56	54	49	48	49	44	61	59	52	53	53	50				
	1200	.330	45	39	33	32	33	27	57	51	46	44	45	39	60	57	51	50	51	46	63	62	58	57	58	53				
	1800	.692	58	50	42	40	42	37	55	50	45	43	44	39	61	56	50	48	49	45	67	66	60	58	58	54				
	2100	.932	58	51	45	44	45	40	57	51	45	44	45	40	61	56	50	48	49	44	68	66	60	58	58	54				
18	550	.041	39	31	23	19	21	21	49	49	47	47	45	43	55	53	51	51	50	48	56	57	57	57	56	57				
	1100	.154	39	32	27	24	25	22	55	53	51	51	49	45	57	56	55	54	53	50	61	60	60	60	59	58				
	1650	.344	46	38	33	30	35	28	58	56	51	50	49	45	62	60	56	54	55	51	64	64	62	62	61	59				
	2200	.627	54	47	42	37	41	36	59	55	51	49	48	45	63	60	56	54	54	50	66	67	64	63	62	60				
	2750	.962	59	53	48	42	46	43	60	55	51	47	48	45	64	60	56	52	53	50	69	69	65	62	62	59				
24	750	.058	39	27	21	19	20	22	55	50	48	47	45	46	57	54	51	51	50	52	63	60	58	59	58	59				
	1500	.200	42	32	27	24	24	22	60	54	51	49	48	47	62	58	55	53	53	52	67	63	61	60	59	59				
	2200	.427	51	44	39	34	34	29	60	54	52	49	48	47	63	59	56	54	53	52	69	67	64	62	62	60				
	2950	.715	58	51	46	42	42	37	60	54	51	49	47	46	64	59	57	54	53	53	71	68	65	62	62	60				
	3650	1.04	64	56	52	48	47	42	61	55	52	50	48	47	64	59	56	54	53	52	71	68	65	62	62	60				

- NOTES:**
1. Based on tests conducted in accordance with AHRI Standard 880-2008.
  2.  $\Delta P_s$  static pressure difference from inlet to discharge.
  3.  $\Delta P_s$  is the minimum pressure required to deliver CFM shown with primary damper in wide open position.



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**CONTROL TYPE**

- CA - Pneumatic Actuator with Mechanical Max./ Min. Stops by Carnes
- CM - Pneumatic Actuator by Carnes
- CE - Pneumatic Actuator by Carnes, Reset Controller by Carnes
- CX - Pneumatic Actuator by Carnes (Multi-function) Reset Controller by Carnes
- ER - Electric Actuator with Reheat Switch by Carnes (Enclosure Included)
- EK - Electric Actuator with (2) Reheat Switches by Carnes (Enclosure Included)
- ET - Analog Electronic Velocity Controller with Integral Damper Actuator (Enclosure Included)
- DD - SimplyVAV, DDC by Carnes for Staged Heat
- DM - SimplyVAV, DDC by Carnes for SCR Heat
- DO - DDC provided by Others, Mounted and Wired by Carnes, w/Carnes Inlet Sensor, w/3/8" Damper Shaft, w/Enclosure
- DE - No Damper Controls. Enclosure w/Carnes Inlet Sensor, w/Bare 3/8" Damper Shaft
- MA - Manual Damper by Carnes
- NS - No Damper Controls, w/Carnes Inlet Sensor, w/Bare 3/8" Damper Shaft (No Enclosure)

**CONTROLS, DAMPERS AND COIL ARRANGEMENTS**

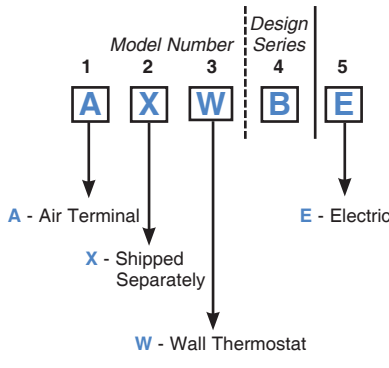
- \*1 - Normally Open - Right Hand Controls  
(All Electric/Electronic/Manual Control Types/DO, DE, NS)  
(All Pneumatic Control Types for Reverse Acting Thermostat)
- \*2 - Normally Open - Left Hand Controls  
(All Electric/Electronic/Manual Control Types/DO, DE, NS)  
(All Pneumatic Control Types for Reverse Acting Thermostat)
- 3 - Normally Closed - Right Hand Controls  
(All Pneumatic Control Types for Direct Acting Thermostat)
- 4 - Normally Closed - Left Hand Controls  
(All Pneumatic Control Types for Direct Acting Thermostat)
- 5 - Normally Open - Right Hand Controls  
(All Pneumatic Control Types for Direct Acting Thermostat)
- 6 - Normally Open - Left Hand Controls  
(All Pneumatic Control Types for Direct Acting Thermostat)
- 7 - Normally Closed - Right Hand Controls  
(All Pneumatic Control Types for Reverse Acting Thermostat)
- 8 - Normally Closed - Left Hand Controls  
(All Pneumatic Control Types for Reverse Acting Thermostat)

Left Hand Units:  
CCW to by-pass  
Right Hand Units:  
CW to by-pass

\* Electric Units **DO NOT** fail open. "2" is used for Left Hand Only. Electric Units are shipped with the Damper in the Open Position.

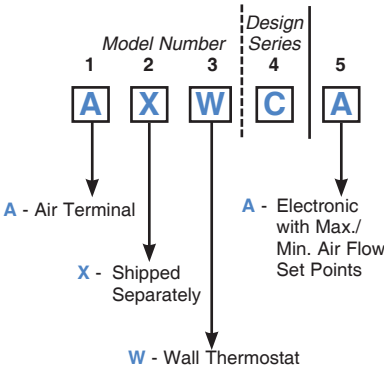
**NOTE:** Hand of controls is determined by facing the averaging flow sensor (inlet of the unit) with the supply air hitting the back of your head.

▼ **Electric Thermostat**



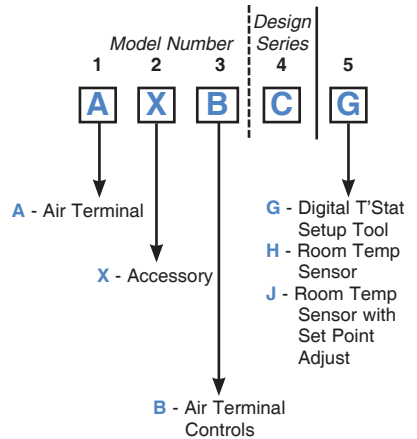
A Carnes Electric Thermostat **must be ordered** with the Electric EA and EB Control Options.

▼ **Electronic Thermostat**

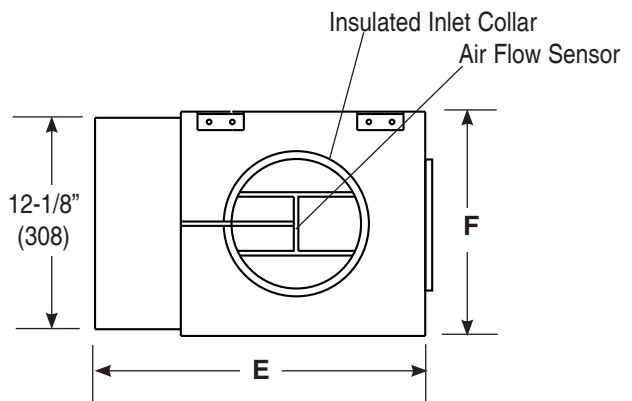
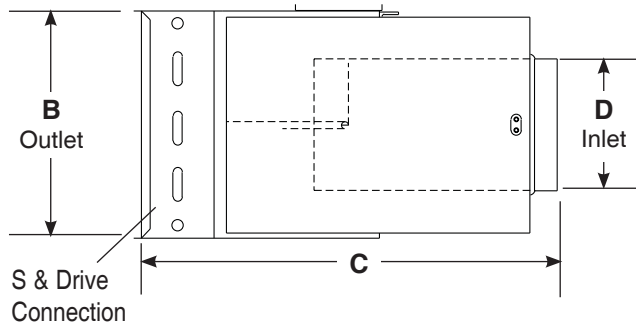
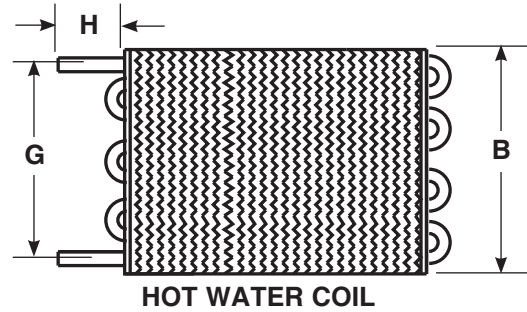
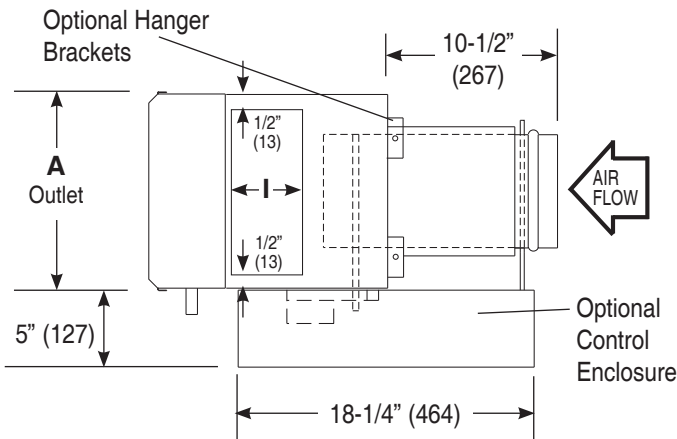


A Carnes Electronic Thermostat **must be ordered** with the ET Electronic Control Option.

▼ **Direct Digital Control (DD/DC/DM)**



Left Hand Units: CCW to by-pass  
Right Hand Units: CW to by-pass



DIMENSIONAL LISTED IN INCHES (Millimeters)

Unit Size	CFM Range	Outlet		1-Row	2-Row	Inlet		E	F	1-Row		2-Row		O.D. Conn.		I
		A	B	C	C	D	G			H Max.	G	H Max.	1-Row Coil	2-Row Coil		
		(mm)	(mm)	(mm)	(mm)	(mm)	(mm)			(mm)	(mm)	(mm)	(mm)	(mm)		
06	0-250 (0-118)	12 (305)	10 (254)	23-5/8 (600)	25 (635)	5-7/8 (149)	17 (432)	10-1/8 (257)	6-1/4 (158)	3 (76)	6-7/8 (175)	3 (76)	1/2 (13)	1/2 (13)	4-3/4 (121)	
07	0-350 (0-165)	12 (305)	10 (254)	23-5/8 (600)	25 (635)	6-7/8 (175)	17 (432)	10-1/8 (257)	8-3/4 (222)	3 (76)	9-3/8 (238)	3 (76)	1/2 (13)	5/8 (16)	4-3/4 (121)	
08	0-500 (0-236)	12 (305)	10 (254)	23-5/8 (600)	25 (635)	7-7/8 (200)	17 (432)	10-1/8 (257)	8-3/4 (222)	3 (76)	9-3/8 (238)	3 (76)	1/2 (13)	5/8 (16)	4-3/4 (121)	
10	0-750 (0-354)	14 (356)	12-1/2 (318)	25 (635)	27 (686)	9-7/8 (251)	19 (483)	12-5/8 (320)	11-1/4 (286)	3 (76)	11-7/8 (302)	3 (76)	1/2 (13)	5/8 (16)	5-3/4 (146)	
12	0-1150 (0-543)	16 (406)	15 (381)	25-5/8 (651)	27 (686)	11-7/8 (302)	21 (533)	15-1/8 (381)	13-3/4 (349)	3-1/2 (89)	13 (329)	4 (102)	5/8 (16)	7/8 (22)	5-3/4 (146)	
14	0-1550 (0-732)	20 (508)	17-1/2 (445)	29-5/8 (752)	31 (787)	13-7/8 (352)	25 (635)	17-5/8 (447)	16-1/4 (412)	3-1/2 (89)	15-1/2 (393)	4 (102)	5/8 (16)	7/8 (22)	7-3/4 (197)	
16	0-2100 (0-990)	24 (610)	17-1/2 (445)	30-5/8 (778)	32 (813)	15-7/8 (403)	29 (737)	17-5/8 (447)	16-1/4 (412)	3-1/2 (89)	15-1/2 (393)	4 (102)	5/8 (16)	7/8 (22)	7-3/4 (197)	
18	0-2750 (0-1298)	32 (813)	17-1/2 (445)	30-5/8 (778)	32 (813)	15-7/8x17-7/8 (403x454)	37 (939)	17-5/8 (447)	16-1/4 (412)	3-1/2 (89)	15-1/2 (393)	4 (102)	5/8 (16)	7/8 (22)	7-3/4 (197)	
24	0-3650 (0-1722)	32 (813)	17-1/2 (445)	30-5/8 (778)	32 (813)	15-7/8x23-7/8 (403x606)	37 (939)	17-5/8 (447)	16-1/4 (412)	3-1/2 (89)	15-1/2 (393)	4 (102)	5/8 (16)	7/8 (22)	7-3/4 (197)	