AAF INTERNATIONAL *Better Air is Our Business®*

AmericanAirFilter®
Type N RotoClone®

Engineering Data

Supplement to Bulletin APC-1-511

The Type N RotoClone® is the best solution to many dust collection needs. Combining high efficiency, low maintenance costs, simplicity, low water usage, and flexibility in one rugged, well proven piece of equipment, the Type N RotoClone has solved thousands of dust collection problems.

Performance

Sizing by Volume (ACFM) and Operating Line

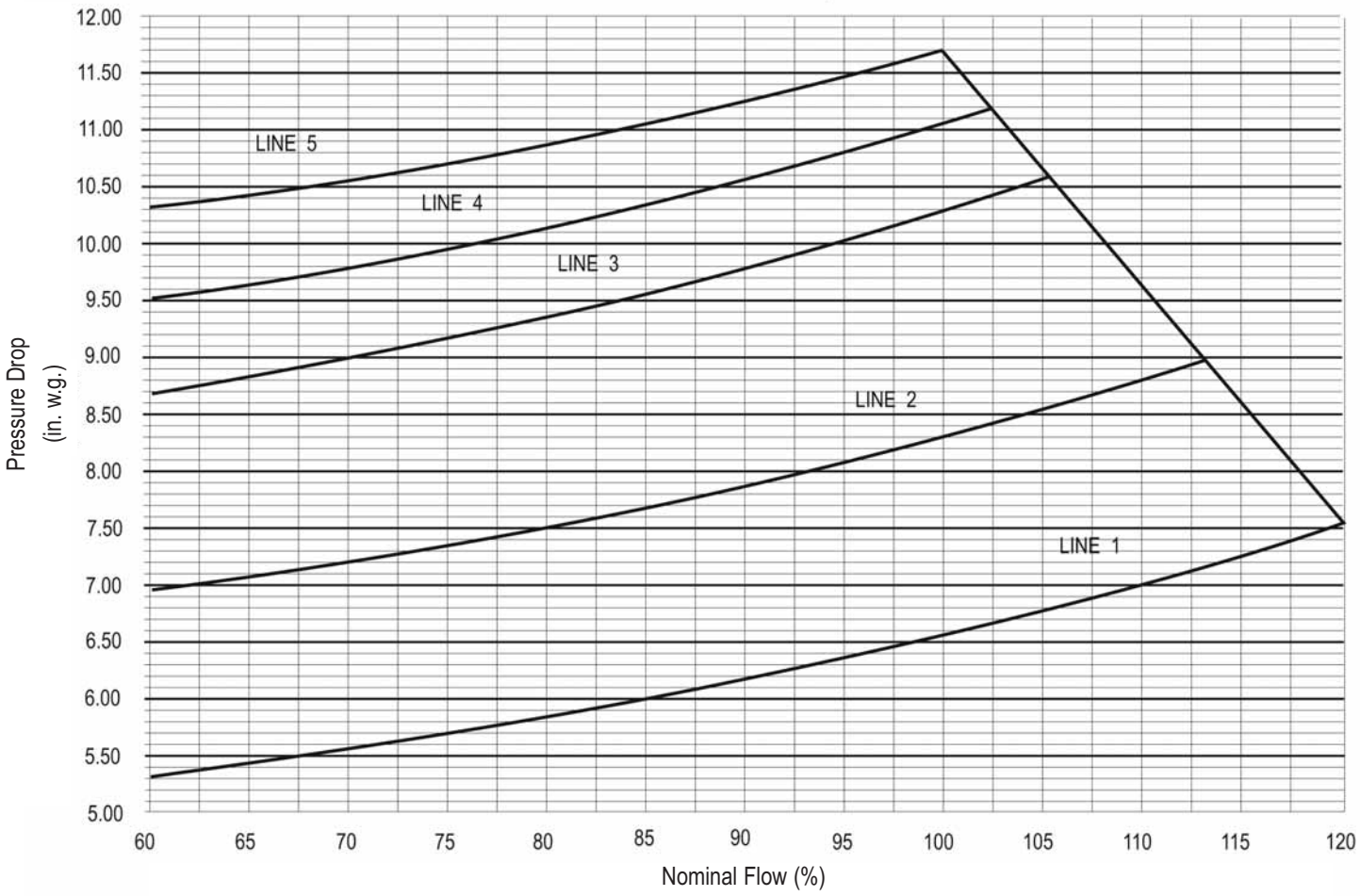
Size	Line 1		Line 2		Line 3		Line 4		Line 5	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
1.5	900	1800	900	1695	900	1578	900	1535	900	1500
2.5	1500	3000	1500	2825	1500	2630	1500	2558	1500	2500
4	2400	4800	2400	4520	2400	4208	2400	4092	2400	4000
6	3600	7200	3600	6780	3600	6312	3600	6138	3600	6000
8	4800	9600	4800	9040	4800	8416	4800	8184	4800	8000
12	7200	14400	7200	13560	7200	12624	7200	12276	7200	12000
16	9600	19200	9600	18080	9600	16832	9600	16368	9600	16000
20	12000	24000	12000	22600	12000	21040	12000	20460	12000	20000
24	14400	28800	14400	27120	14400	25248	14400	24552	14400	24000
28	16800	33600	16800	31640	16800	29456	16800	28644	16800	28000
32	19200	38400	19200	36160	19200	33664	19200	32736	19200	32000
36	21600	43200	21600	40680	21600	37872	21600	36828	21600	36000
40	24000	48000	24000	45200	24000	42080	24000	40920	24000	40000
44	26400	52800	26400	49720	26400	46288	26400	45012	26400	44000
48	28800	57600	28800	54240	28800	50496	28800	49104	28800	48000

Minimum capacities are absolute minimums; some degradation in operatability and efficiency can be expected at the minimum values. It is recommended that a smaller unit be used, rather than operating at these minimum ratings. It is best to operate the N RotoClone at no less than 125% of it's minimum rating.

Recommended Fan Sizes

N RotoClone Size	K Exhauster Size	HPK Exhauster Size
1.5	9	7
2.5	11	9
4	13	11
6	17	15
8	19	17
12	23	19
16	30	23
20	30	23
24	34	26
28	38	30
32	38	30
36	42	34
40	42	38
44	42	38
48	42	38

Pressure Drop



Humidification Process

The humidifying process through the Type N RotoClone is not truly adiabatic, but for practical purposes, it can be assumed as such. In addition to the sensible-latent heat exchange between the air and water, heat is also given up to the surroundings through the RotoClone housing. However, this latter loss is so slight as to be negligible, since it is beyond the accuracy range of the usual field measuring equipment.

If the process through the Type N RotoClone were truly adiabatic, the water temperature would be at the wet bulb temperature of the entering air. Also, if the humidifying efficiency were 100%, the exit air would be saturated at the wet bulb temperature of the entering air and at the RotoClone water temperature. Actually the water temperature will be lower than incoming wet bulb due to heat loss to surroundings and drain water.

The drop in air temperature as it passes through the RotoClone will depend on the temperature, moisture content of the entering air, and the humidifying efficiency of the RotoClone. The drier the entering air, the greater its capacity to pick up water vapor and the greater the drop in dry bulb temperature. Similarly, the greater the humidifying efficiency, the more effectively conditions are produced for maximum evaporation and the greater the water vapor pick up with corresponding greater reduction in dry bulb temperature.

Humidifying efficiency is defined as the ratio of dry bulb reduction to wet bulb depression. By equation, this definition can be written as:

$$H.E. = \frac{TE-TL}{TE-TW}$$

Where: TE = dry bulb temperature of entering air
TL = dry bulb temperature of leaving air
TW = wet bulb temperature of entering air

Knowing the RotoClone inlet dry bulb temperature and wet bulb temperature, reference to a psychrometric chart will provide the humid volume expressed in cubic feet per pound of dry air and the weight of water vapor per pound of dry air. From the initial TE point on the humidification chart, draw a line of adiabatic saturation or constant wet bulb temperature to the saturation curve to determine TW. Substituting TE, TW, and H.E. in the above equation will determine TL. The point where the line of constant wet bulb temperature for this particular inlet condition intersects the value for TL, determines the outlet condition from the Type N RotoClone.

Example:
300ºF = dry bulb temperature of inlet air
131ºF = wet bulb temperature of inlet air

Substituting the values for H.E., TE, and TW:

$$.95 = \frac{300 - TL}{300 - 131}$$

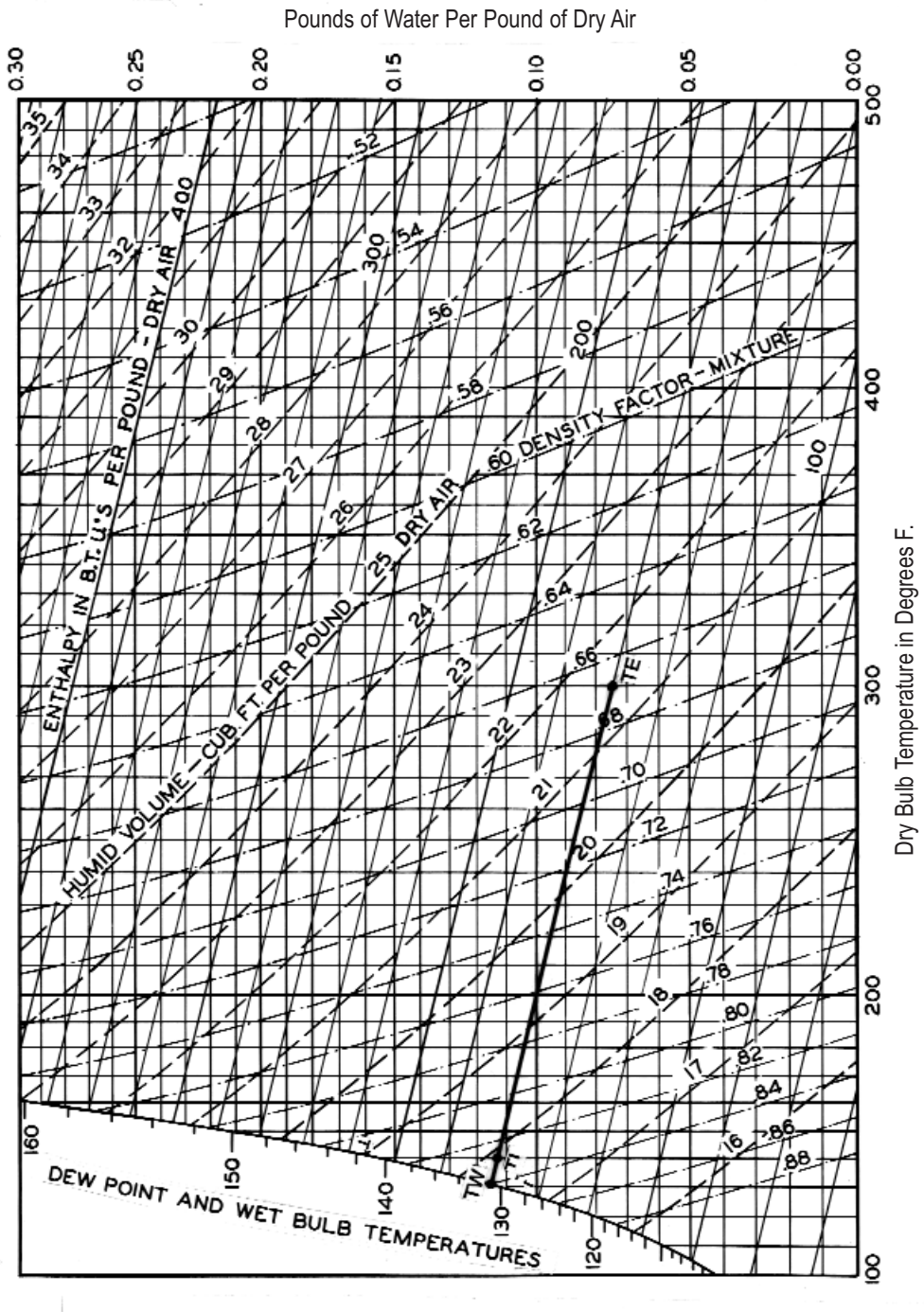
$$TL = 300 - .95\ (169)$$
$$TL = 139.5ºF$$

Following the line of constant wet bulb to the point of where it intersects the leaving dry bulb temperature (TL), the dew point is found to be 130ºF, a density factor of 0.83, and a humid volume of 17.8 cubic feet per pound of dry air.

The addition of water vapor to an airstream has the same effect on the air density as increasing the temperature. Therefore, it is important to know the density factor in the outlet of the Type N RotoClone for proper selection of exhauster RPM and motor horsepower since exhauster performance tables are based on standard air conditions.

Humidification Process

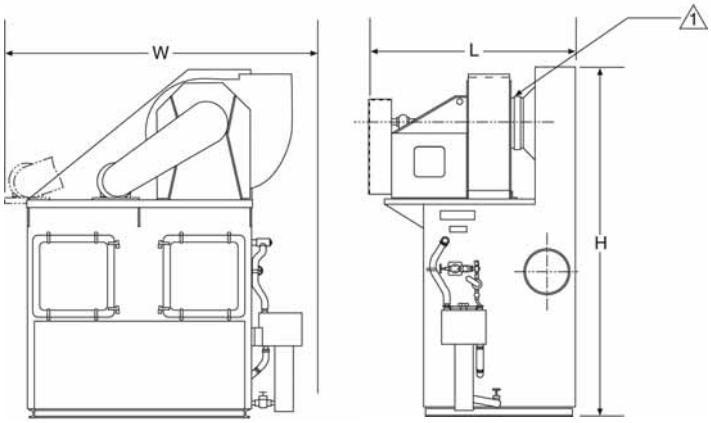
Due to the large amounts of water recirculated through the impeller and the resulting contact with the inlet air stream, the Type N RotoClone has a 95% humidifying efficiency for temperatures of 300ºF and below. For inlet temperatures above 300ºF, the air stream should be cooled with spray nozzles or by other methods prior to the Type N RotoClone.



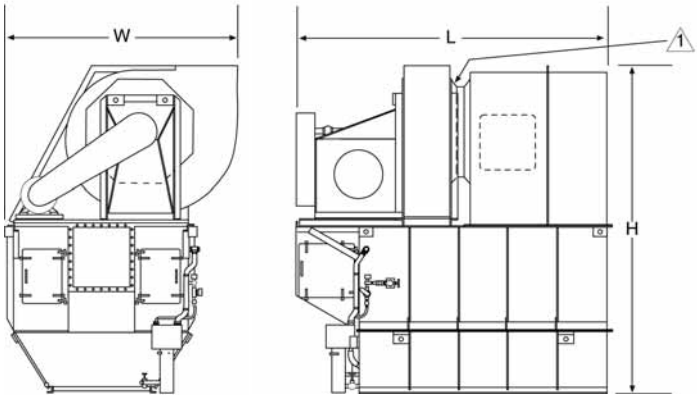
Psychrometric Chart—For Humid Air

(100ºF to 500ºF)

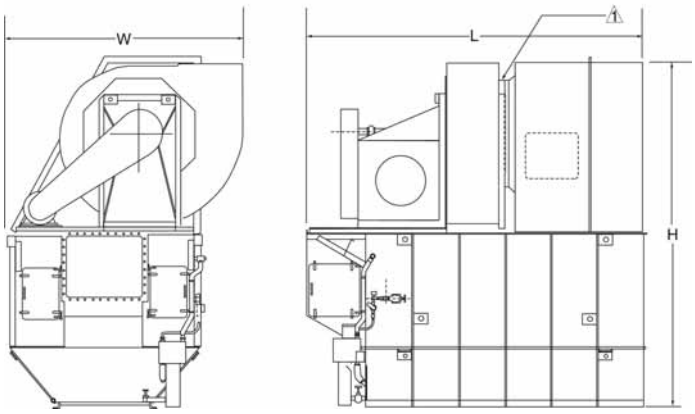
Arrangement B, Manual Sludge Removal



Size 1½ thru 6 with exhauster



Size 8 thru 20 with exhauster



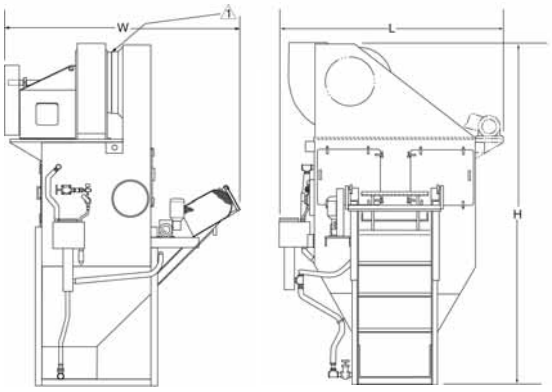
Size 24 and 28 with exhauster

1 Tape connection furnished by AAF.

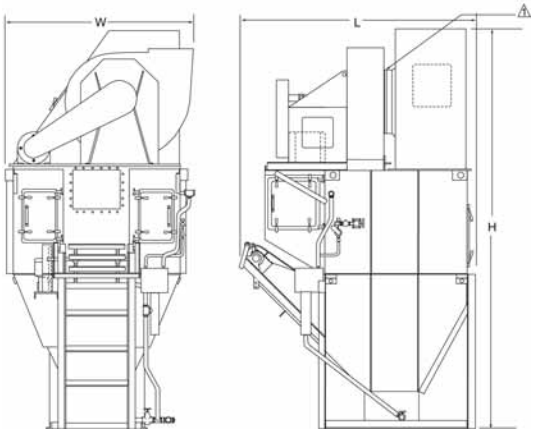
Size	L	W	H
1½	4–4	5–1	8–7
2½	4–6	5–6	8–7
4	4–10	5–10	8–11
6	5–10	7–10	9–8
8	7–2	8–5	13–8
12	8–11	8–8	15–2
16	12–0	9–7	15–8
20	12–11	9–7	15–8
24	14–11	10–9	17–0
28	16–11	11–2	17–0

Dimensions in feet and inches.

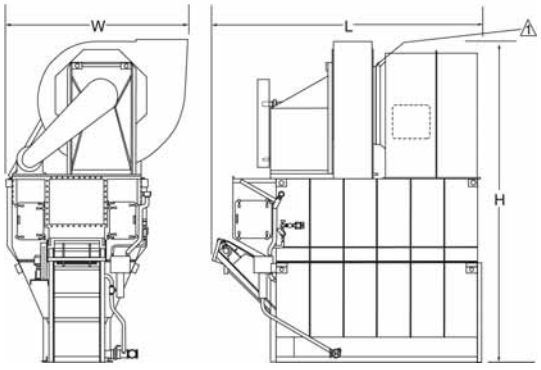
Arrangement C, Automatic Sludge Removal



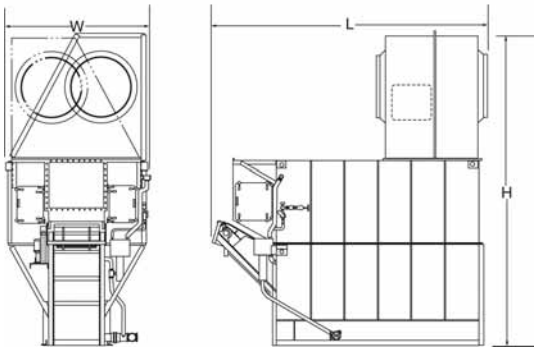
Size 1½, 2½, 4 and 6 with exhauster



Size 8 and 12 with exhauster



Size 16 thru 32 with exhauster



Size 36 thru 48 without exhauster

1 Tape connection furnished by AAF.

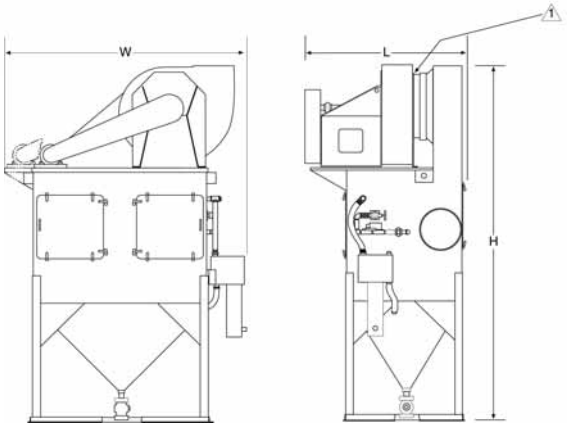
Size	L	W	H
1½	4–9	7–7	11–10
2½	5–0	7–7	11–10
4	5–6	7–10	12–2
6	7–5	9–0	12–11
8	8–3	8–5	15–8
12	10–3	8–10	17–0
16	12–2	9–9	17–0
20	14–2	9–9	17–0
24	16–2	10–9	18–4
28	18–2	11–4	19–0
32	20–2	11–4	19–0
36*	22–8	8–7	17–7
40*	24–8	8–7	18–0
44*	26–8	8–7	18–0
48*	28–8	8–7	18–0

Dimensions in feet and inches.

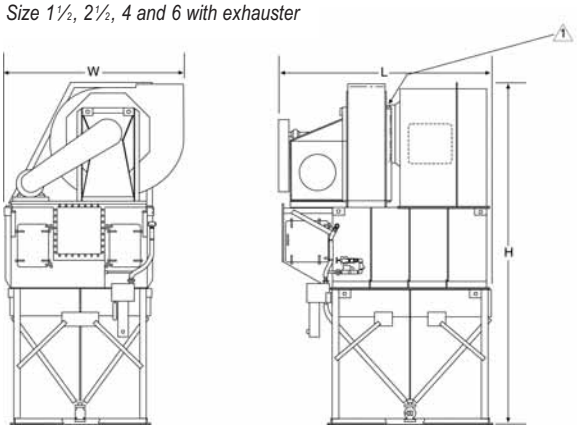
* Size 36 thru 48 without exhauster.

1 Size 36 may or may not have exhauster mounted depending on air volume.

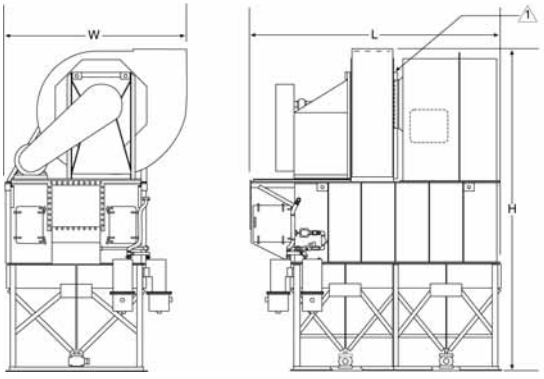
Arrangement D, Continuous Sluicing



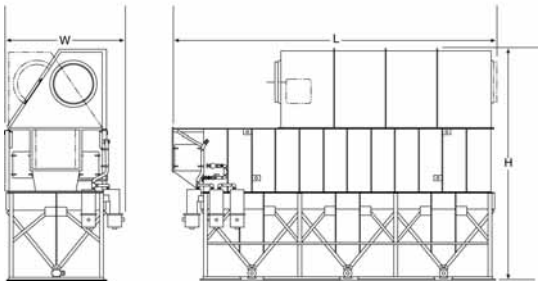
Size 1½, 2½, 4 and 6 with exhauster



Size 8 thru 20 with exhauster



Size 24 thru 32 with exhauster



Size 36 thru 48 without exhauster

1 Tape connection furnished by AAF.

Size	L	W	H
1½	4–6	4–9	10–6
2½	4–6	5–1	10–6
4	4–9	5–5	10–10
6	6–0	7–5	12–8
8	7–1	8–5	15–2
12	8–11	8–8	17–2
16	11–8	9–9	18–3
20	12–11	9–9	18–6
24	14–11	10–9	19–2
28	16–11	11–4	19–7
32	18–11	11–4	20–7
36	20–11	9–6	19–4
40	22–11	9–6	19–10
44	24–11	9–6	19–10
48	26–11	9–6	19–10

Dimensions in feet and inches.

1 Size 36 may or may not have exhauster mounted depending on air volume.

2 Size 36 and 40 have only two hoppers.

AmericanAirFilter
Type N RotoClone®

Normal Water Supply Rates

RotoClone Size	Arrangement B GPM Supplied 20 PSI	Arrangement C GPM Supplied 20 PSI	Arrangement D GPM Supplied 40 PSI
1½	.5	.5	6.0
2½	.5	.5	6.0
4	.5	.5	8.0
6	.5	.5	8.0
8	.5	1.0	11.0
12	.5	1.0	14.0
16	.5	1.0	22.0
20	1.0	1.5	22.0
24	1.0	1.5	34.0
28	1.0	2.5	40.0
32	—	2.5	40.0
36	—	2.5	40.0
40	—	2.5	40.0
44	—	2.5	60.0
48	—	2.5	60.0

With high temperature air, evaporation must be compensated for by increased water rates. A safe approximation will be 0.2 GPM of additional water per 1000 CFM for each 100ºF of temperature reduction in the RotoClone.

Product sizes and options subject to change.

Shipping and Operating Weights

	Arrangement B			Arrangement C			Arrangement D		
Size	*Operating Wt. Lbs. w/Fan ⚠	Water Cap. Gal.	Shipping Weight w/Fan ⚠	Operating Wt. Lbs. w/Fan ⚠	Water Cap. Gal.	Shipping Weight w/Fan ⚠	Operating Wt. Lbs. w/Fan ⚠	Water Cap. Gal.	Shipping Weight w/Fan ⚠
1½	2,600	90	1,600	6,300	300	2,300	3,700	120	2,100
2½	2,800	90	1,700	6,400	300	2,400	3,800	120	2,200
4	4,200	140	2,300	9,500	470	3,200	5,200	180	2,800
6	5,900	220	3,000	11,400	540	4,200	8.100	330	3,700
8	8,200	295	4,200	13,200	530	6,100	10,700	390	5,500
12	11,200	440	5,300	16,500	650	7,800	15,000	605	6,900
16	14,000	510	7,200	28,500	1,370	10,200	20,800	900	8,800
20	17,900	730	8,100	33,600	1,650	11,600	26,800	1,250	10,100
24	21,900	880	10,100	40,300	1,950	14,300	31,400	1,290	14,200
28	24,900	1,025	11,900	46,000	2,220	16,400	36,800	1,510	16,600
32	—	—	—	51,100	2,500	17,700	43,500	1,925	17,800
36	—	—	—	56,300	2,775	19,300	50,000	2,250	20,000
40	—	—	—	64,500	3,050	23,800	58,300	2,500	24,900
44	—	—	—	70,200	3,330	25,800	62,900	2,690	27,000
48	—	—	—	76,100	3,610	27,900	67,400	2,880	29,000

*Operating weights are based on the maximum sludge capacity with a sludge weight of 100 pounds per cubic foot.

⚠ Estimated with K Exhauster

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