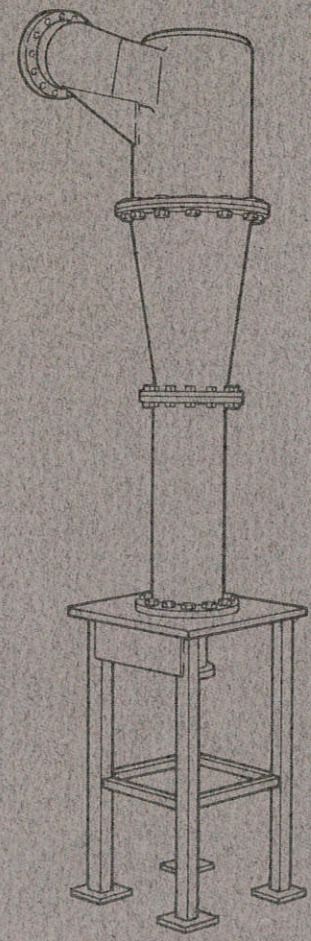


Black Clawson

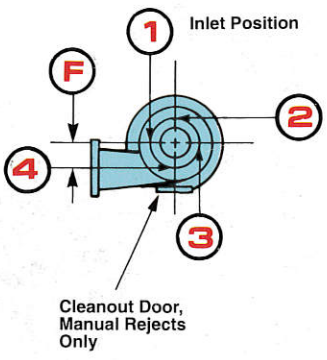
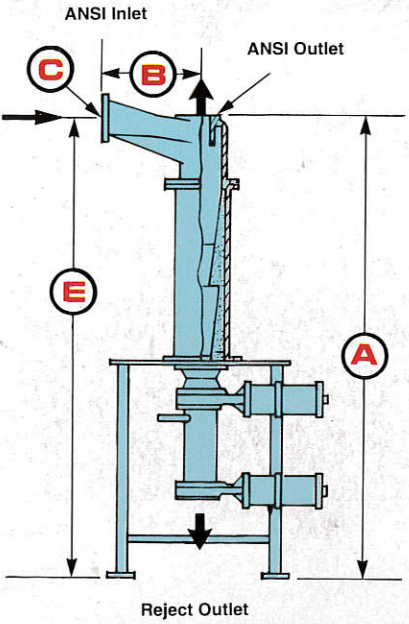
Excellence In
Centrifugal Cleaning
Technology



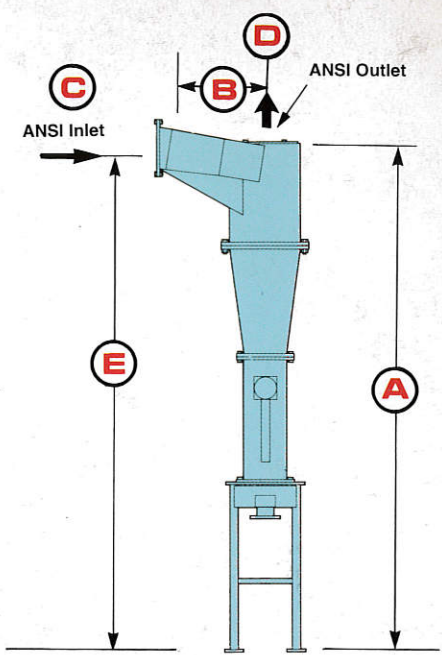
Liquid Cyclone™/Ruffclone™



Typical overall dimensions for automatic and manual reject Liquid Cyclones and Ruffclones.
NOTE: Approximate dimensions only—
not certified for construction or installation.



NOTE: Larger capacity manual reject boxes available



GENERAL DIMENSIONS—NOT CERTIFIED FOR CONSTRUCTION OR INSTALLATION

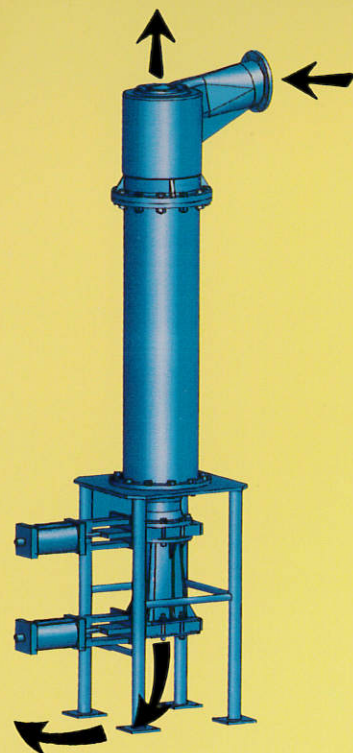
SIZE UNIT	DIMENSIONS								WEIGHT lb-Kg	
	A		B	C*	D*	E		F		
		AUTO	MAN	*	INLET	OUTLET	AUTO	MAN		*
8	in. mm	110.0 2794	96.2 2443	26 660	8 203	4 102	110.4 2842	96.5 2451	3.2 81	2000 905
10	in. mm	113.3 2878	104.9 2664	26 660	8 203	6 152	113.0 3048	104.6 2657	4 102	2350 1063
11	in. mm	116.8 2967	102.2 2596	26 660	8 203	6 152	116.0 2946	102.0 2590	4.28 109	2400 1086
12	in. mm	126.8 3221	112.8 2865	26 660	8 203	6 152	124.5 3162	110.5 2807	2.38 60	2500 1131
14½	in. mm	136.2 3459	122.2 3104	26 660	8 203	6 152	134.5 3416 ,	120.5 3061	5.72 145	2630 1190
17	in. mm	150.0 3810	136.0 3454	26 660	10 254	8 203	147.0 3733	133.0 3378	3.50 89	3100 1403
20	in. mm	167.0 4242	152.9 3884	26 660	10 254	8 203	163.8 4161	149.8 3805	8 203	3550 1606
25	in. mm	193.6 4917	179.7 5022	40 1016	14 356	10 254	192.0 4877	177.9 4519	10 254	4200 1900
30	in. mm	221.6 5629	207.9 5281	48 1219	16 406	12 305	219.5 5575	205.6 5222	12 305	4800 2172

*DIMENSIONS SAME FOR
BOTH AUTOMATIC & MANUAL
REJECTS DISCHARGE MAX.
OPERATING PRESSURE 100
P.S.I. [500 kPa] ALL UNITS

Excellence by Design

Black Clawson Company
Stock Preparation Systems, Engineering, Sales and Service

Shartle Division 605 Clark Street Middletown, OH 45042 U.S.A. Phone: (513) 424-7400 Fax: (513) 424-1168	Black Clawson-Kennedy Ltd. 455 Fenelon Blvd. Dorval, Quebec H9S 5T8 CANADA Phone: (514) 636-9524 Fax: (514) 636-9326	Black Clawson International Ltd. Westgate Works, East Dock Road Newport, Gwent NP9 2TT South Wales, UK Phone: (44) 01633-244441 Fax: (44) 01633-244939	Black Clawson Europe - Bordeaux 30 Avenue Pierre Curie 33270 Floirac, Bordeaux FRANCE Phone: (33) 56-38-54-00 Fax: (33) 56-86-39-63	Black Clawson Asia PTE Ltd. 40-B Sago Street Singapore 0105 Bukit Merah Central P.O. Box 0704 Singapore 9115 Phone: (65) 222-0590 Fax: (65) 222-0859
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Liquid Cyclone or Ruffclone accept recirculation loop maintains constant discharge pressure for direct feeding a pressure screen or refiner even when downstream flow volume demand varies.



Liquid Cyclone with continuous reject

Black Clawson

Liquid Cyclone™/Ruffclone™

A free vortex type separator for efficient removal of contaminants such as dirt, grit, glass, sand, pins, bolts, staples and foil from all types of paper slurries at consistencies from 0.1 to 6.0%.

Available in a wide range of sizes to accommodate flows ranging from 100-10,000 GPM (380-38,000 lpm) per unit, the Liquid Cyclone is field proven, with over 1500 units in operation.

The Liquid Cyclone is specifically designed for removal of high and medium specific gravity contaminants from stock slurries up to 6.0% consistency and is available with both automatic and manual reject systems. The non-plugging features permit continuous operation with a minimum of operator attention. No continuous bleed-off is required. Stock losses are kept to an absolute minimum.

Arrangement is vertical, in four or five sections, for convenient servicing, minimum floor space, and easy replacement of individual components. Both manual and automatic models are self-supporting; all required structural steel is supplied with the unit. Automatic reject models can also be wall mounted at any convenient height, or floor mounted with the reject chamber below the floor. Rejects can be discharged into a trough or box, above or below the floor. Both Liquid Cyclones and Ruffclones have no moving parts, and no continuous reject stream. Rejects are

APPLICATIONS:

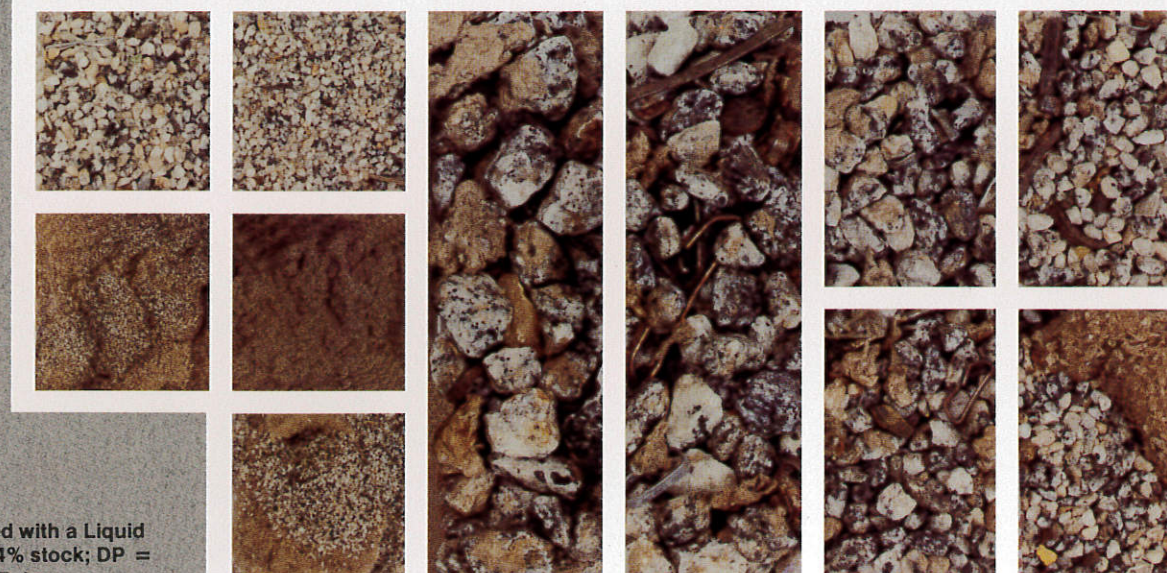
In addition to secondary fiber applications, Liquid Cyclones are suitable for:

1. Preceding refiners . . . for plate protection
2. After refiners . . . for protection from broken plates
3. Deflaker protection in a broke system
4. After the blow tank . . . for rock and metal removal
5. In a groundwood system for grinder grit removal
6. Ahead of primary and secondary screens . . . for tramp metal protection
7. Removing sand from chip washer water
8. White water cleaning
9. On batch or continuous waste paper pulper discharge pumps
10. Anywhere grit is encountered

discharged virtually fiber-free.

Stock enters the Liquid Cyclone through a tangential inlet having a downward slope. Accelerated centrifugal action is affected as the stock spirals downward along the wall contour toward the small end of the cone. The undesirable particles, grit, dirt, metal, etc., are forced to the outer wall and carried down and out at the bottom of the cone into a stilling chamber. Here, they are washed and good fibrous material which may have been carried along is reclaimed. Reject material is collected in the chamber at the bottom; cleaned fibers spiral up and exit out the vortex finder at the top of the unit.

The cone cartridge contains both upper and lower cones of CYRAM material cement packed in a steel jacket and flanged at each end. The upper cone section is the separation or cyclone area where reject material is separated by centrifugal action. Below is a modified cone, square in cross section at the top and round at the bottom. Dirt, and any good fibrous material which has been rejected downward with it, is decelerated and washed in this lower cone. The rejects settle into the reject chamber and the good fiber passes back up into the cyclone. There is very little fiber loss and it is extremely difficult to plug the unit.



Debris removed with a Liquid Cyclone from 4% stock; DP = 20 PSI (138 kPa).

Sizing Liquid Cyclones and Ruffclones

Ruffclones generally operate in the 5-15 psi (35-105 kPa) pressure drop range, and remove nuts and bolts, staples, rocks, paper clips, and other large and heavy objects, at consistencies up to 6%.

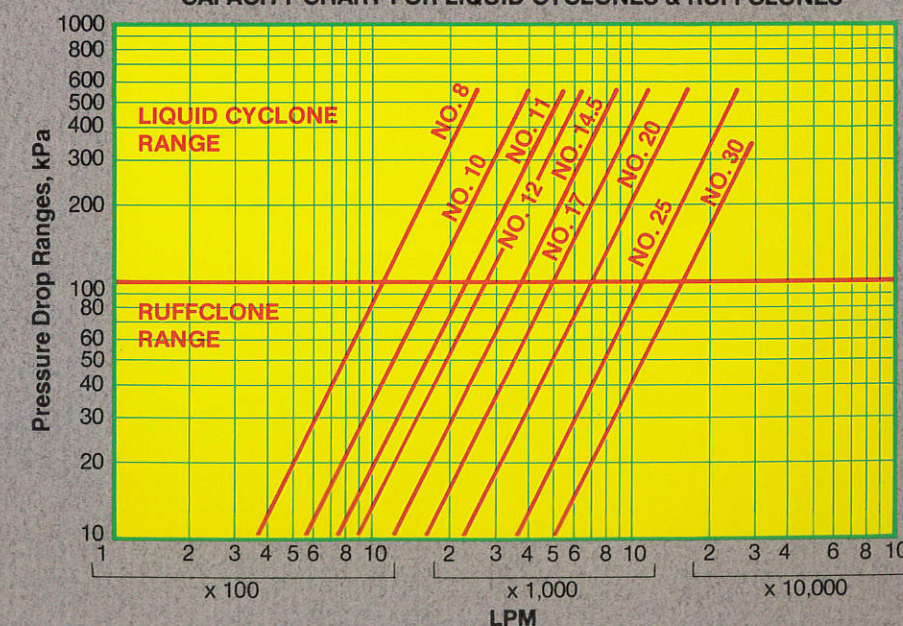
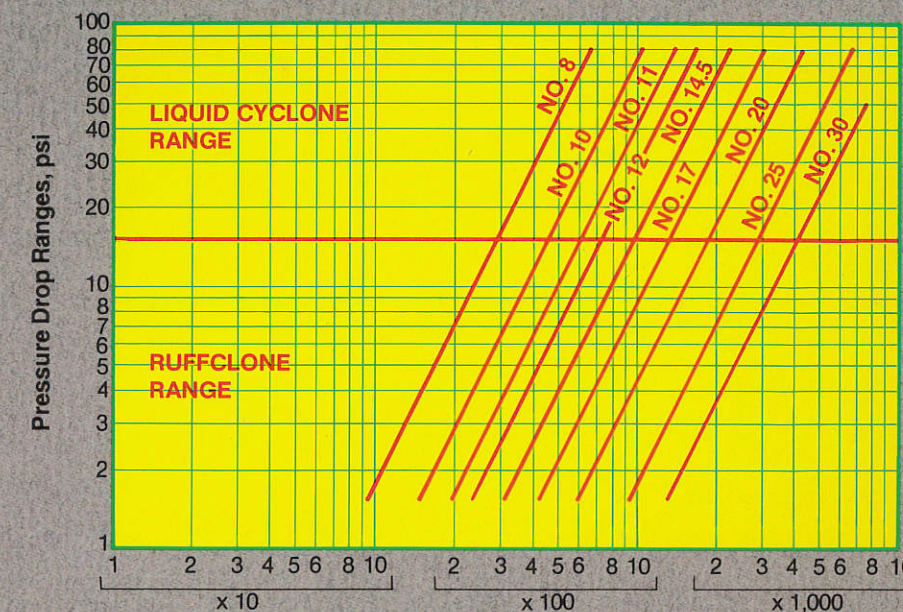
To select the proper size Ruffclone for your application, find the flow volume and desired pressure drop in the Ruffclone range of this chart.

Liquid Cyclones generally operate in the 15-35 psi (105-238 kPa) pressure drop range, and remove metal clips, glass, sand, metal foil, and other small, heavy debris and abrasives from water and stock at up to 5% consistency.

To select the proper size Liquid Cyclone for your application, find the flow volume and desired pressure drop in the Liquid Cyclone range of this chart.

Remember:

- Both Liquid Cyclones and Ruffclones clean more efficiently at lower consistencies and higher pressure drop ranges.
- If constant outlet pressure is desired (for direct feed into a pressure screen, refiner, etc.), then size the feed pump for your maximum flow volume plus 10-20% for recirculation.
- 10-100 gpm (38-380 lpm) of elutriation water is added to wash the fiber from the rejects. Elutriation water pressure should be 10 psi (70 kPa) higher than feed pressure.



Black Clawson Liquid CycloneTM RuffcloneTM

A free vortex type separator for efficient removal of contaminants such as dirt, grit, glass, sand, pins, bolts, staples and foil from all types of paper slurries at consistencies from 0.1 to 6.0%.

Available in a wide range of sizes to accommodate flows ranging from 100-10,000 GPM (380-38,000 lpm) per unit, the Liquid Cyclone is field proven, with over 1500 units in operation.

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7. Removing sand from chip washer water
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The cone cartridge contains both upper and lower cones of CYRAM material cement packed in a steel jacket and flanged at each end. The upper cone section is the separation or cyclone area where reject material is separated by centrifugal action. Below is a modified cone, square in cross section at the top and round at the bottom. Dirt, and any good fibrous material which has been rejected downward with it, is decelerated and washed in this lower cone. The rejects settle into the reject chamber and the good fiber passes back up into the cyclone. There is very little fiber loss and it is extremely difficult to plug the unit.



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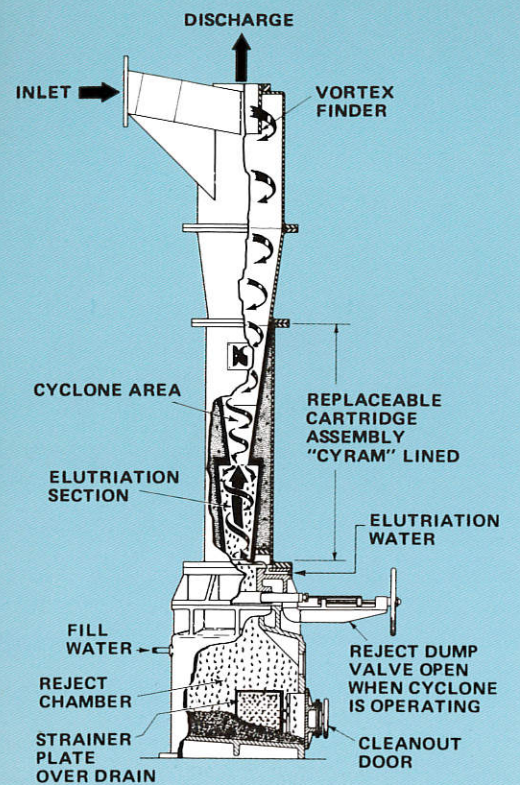
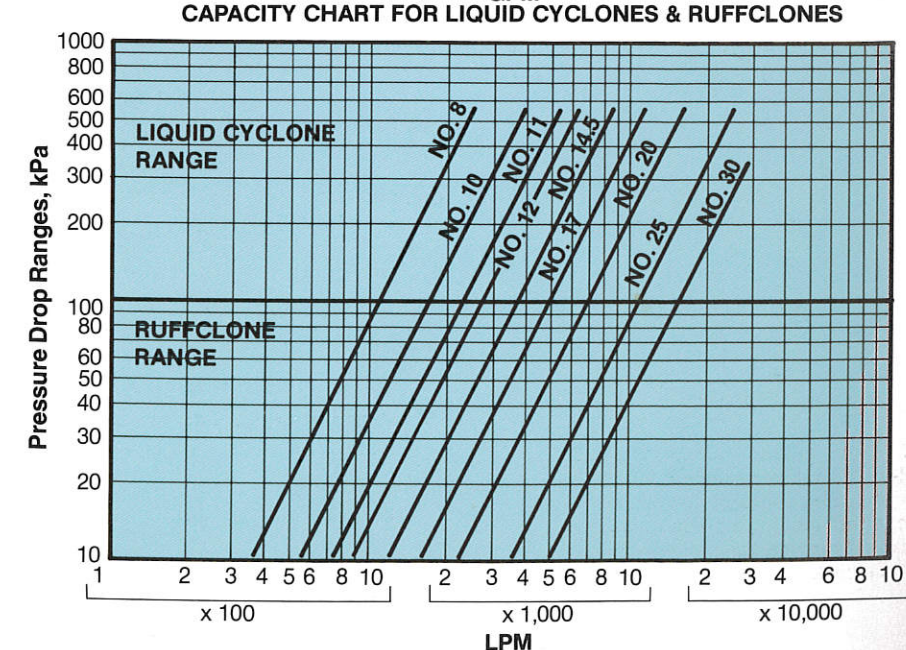
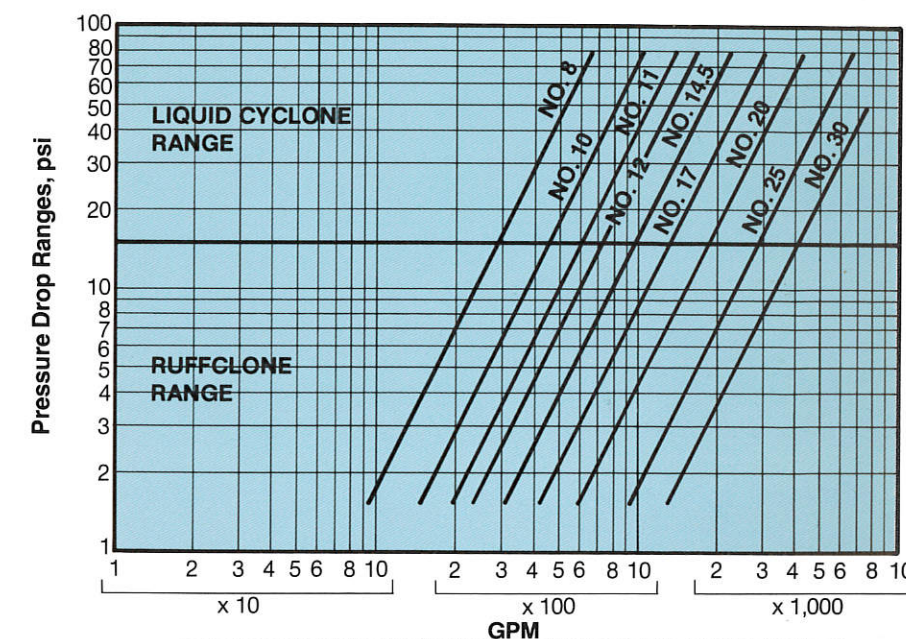
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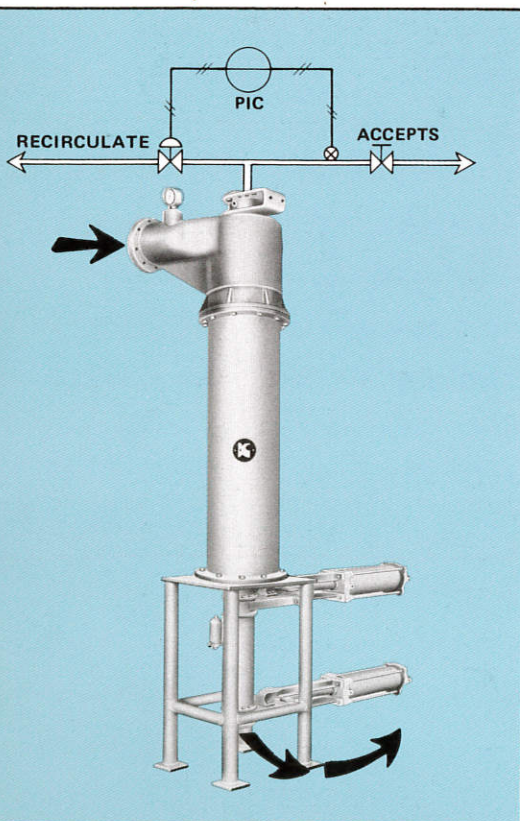
To select the proper size Liquid Cyclone for your application, find the flow volume and desired pressure drop in the Liquid Cyclone range of this chart.

Remember:

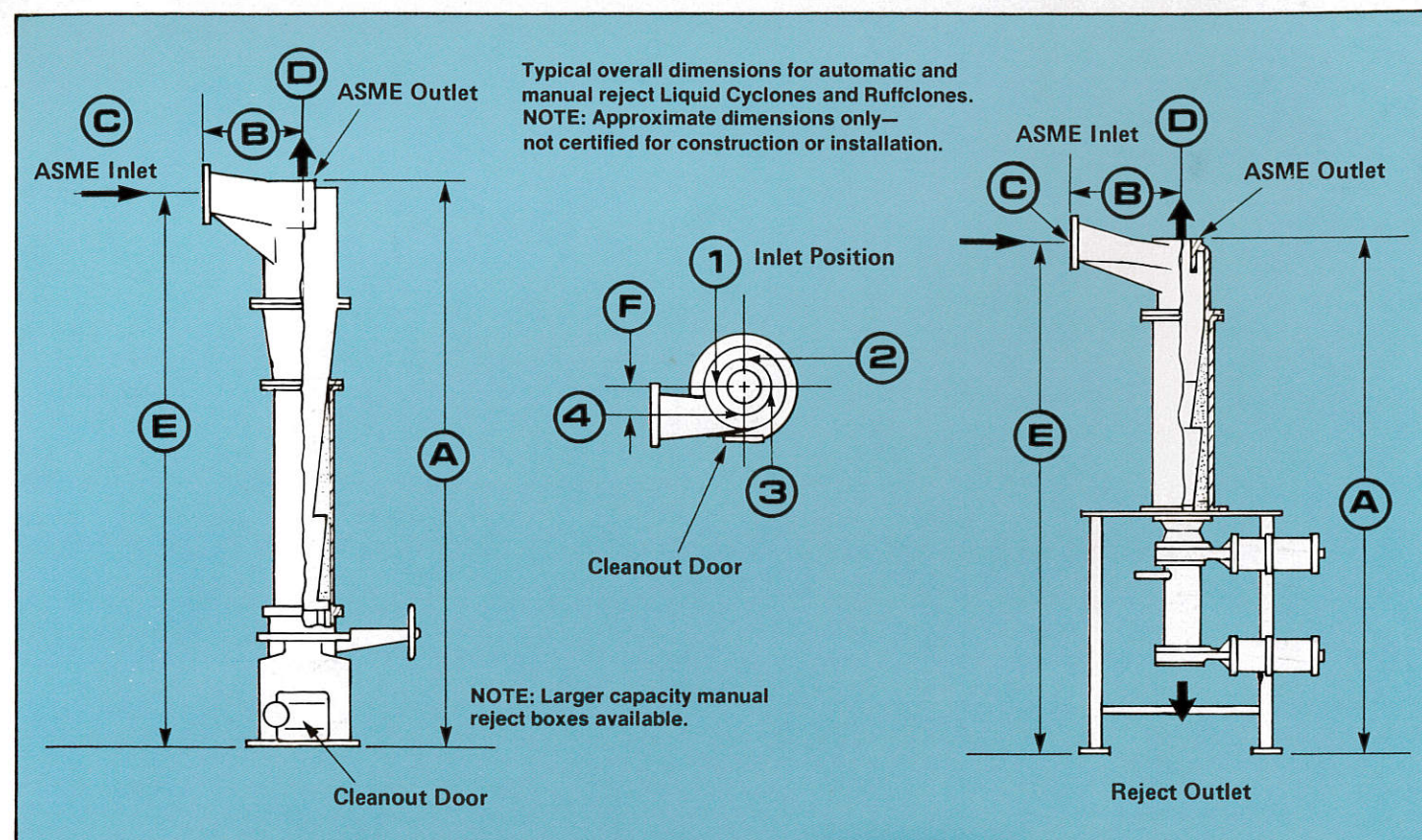
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Typical cross section—Liquid Cyclone with manual reject box.



Liquid Cyclone or Ruffclone accept recirculation loop maintains constant discharge pressure for direct feeding a pressure screen or refiner even when downstream flow volume demand varies.



GENERAL DIMENSIONS—NOT CERTIFIED FOR CONSTRUCTION OR INSTALLATION.

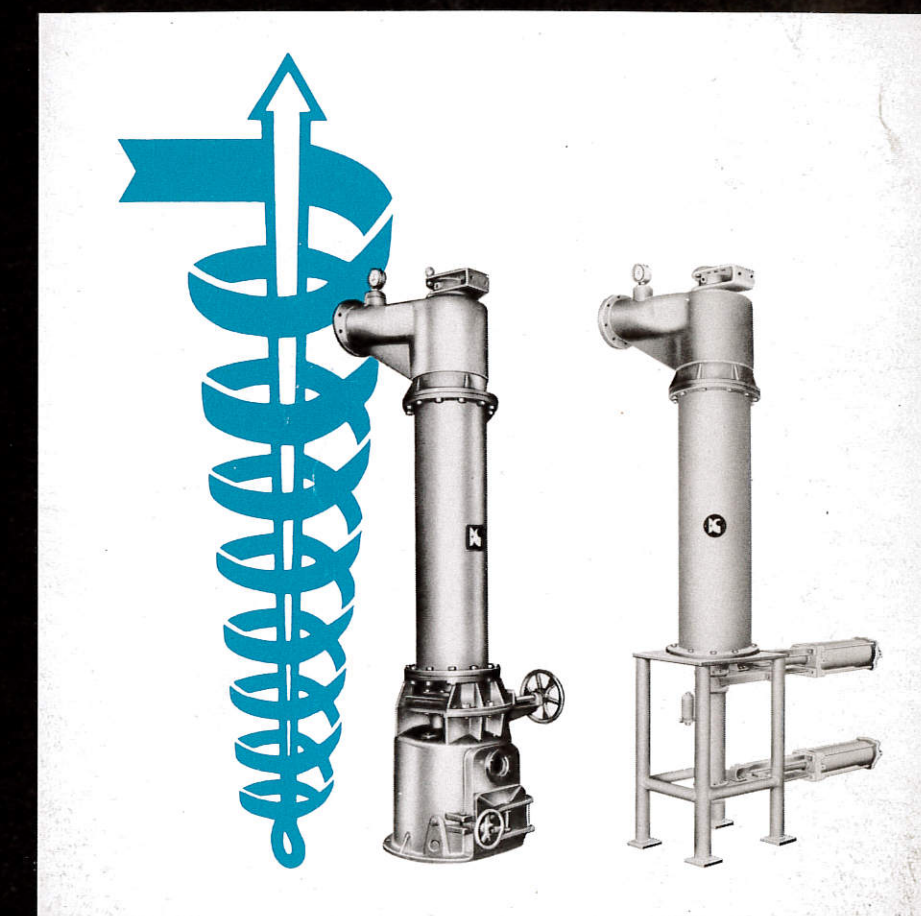
SIZE UNIT	DIMENSIONS									WEIGHT lb-Kg
	A			B	C*	D*	E		F	
		AUTO	MAN	•	INLET	OUTLET	AUTO	MAN	•	
8	in. mm	111.5 2832	96.2 2443	26 660	8 203	4 102	111.9 2842	96.5 2451	3.19 81	2300 1043
10	in. mm	120.3 3056	104.9 2664	26 660	8 203	6 152	120.0 3048	104.6 2657	4 102	2400 1089
11	in. mm	118.1 3000	102.2 2596	26 660	8 203	6 152	117.3 2979	102.0 2590	4.28 109	2500 1134
12	in. mm	128.2 3256	112.8 2865	26 660	8 203	6 152	126.0 3200	110.5 2807	2.38 60	2600 1179
14½	in. mm	137.5 3492	122.2 3104	26 660	8 203	6 152	135.8 3449	120.5 3061	5.78 147	2700 1225
17	in. mm	151.2 3840	136.0 3454	26 660	10 254	8 203	148.2 3764	133.0 3378	3.50 89	3200 1451
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25	in. mm	194.7 4945	179.7 5022	40 1016	14 356	10 254	193.2 4907	177.9 4519	10 254	4600 2087
30	in. mm	224.7 5707	207.9 5281	48 1219	16 406	12 305	228.4 5801	205.6 5222	12 305	5300 2404
35	in. mm	251.0 6375	234.2 5949	56 1422	18 457	14 356	249.0 6325	232.2 5898	14 356	5680 2576
40	in. mm	280.5 7125	263.0 6680	64 1626	20 508	18 457	278.5 7074	261.0 6629	16 406	8930 4051

* DIMENSIONS SAME FOR BOTH AUTOMATIC & MANUAL REJECTS DISCHARGE
MAX. OPERATING PRESSURE 75 P.S.I. (500 kPa) ALL UNITS

Black Clawson
Pulp and Paper Machinery Group
Shartle Division
605 Clark Street, Middletown, OH 45042
Phone (513) 424-7400/FAX (513) 424-1168

Liquid CycloneTM RuffcloneTM

**Black Clawson High Density
Centrifugal Cleaners**



Black Clawson

PULP & PAPER MACHINERY GROUP
Shartle Division