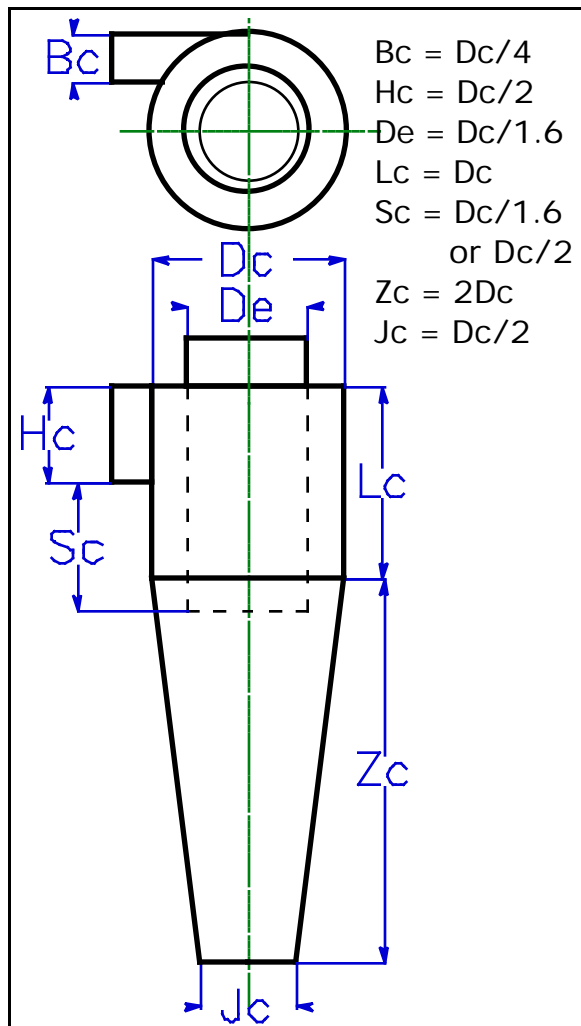


## 1D2D Cyclone separator design by gmhyde@wsu.edu

Adapted from C. B. Parnell, Jr., Texas A&M Cyclone Design (TCD) process.  
[c-parnell@tamu.edu (Calvin B. Parnell, Jr.)]



Estimating  $D_c$ :

Design [inlet] velocities,  $V_d$ , for 1D3D, 2D2D, and 1D2D cyclones are 3200, 3000, and 2400 ft/min, respectively. (That's why the 1D2D is more efficient; i.e., lower velocity, less pressure drop).

Inlet area,  $A_i$ , for each is  $Q/V_d = H_c \times B_c = D_c/2 \times D_c/4 = D_c^2/8$ ,

where

$Q$  = volume flow rate entering the cyclone in cfm.

For a 500 cfm system,  $D_c = \text{sq rt } (8 Q/V_d) = \text{sq. rt. } (8 \cdot 500/2400)$   
 $D_c = 15.49 \sim 16$  inches.

Another way is to get  $B_c$  from inlet area directly:

$H_c = 2B_c$

$A_i = B_c \times H_c = B_c \times 2B_c = 2 B_c^2 = Q/V_d = 500/2400$ .

Then  $B_c = \text{sq.rt. } [500/(2 \times 2400)]$

$B_c = 3.87 \sim 4$  inches.

$D_c = 4 B_c = 16$  inches -- same answer as above.

My unit was designed at 300 cfm, with the following dimensions in inches:

$D_c = 12$	$L_c = 12$
$B_c = 3$	$S_c = 6$ (7.5 if you use $D_c/1.6$ )
$H_c = 6$	$Z_c = 24$
$D_e = 7.5$	$J_c = 6$

Thus, it has a total height of barrel plus cone of 36 inches. I built it from galvanized flashing, a 20-inch wide roll. Flashing is a little thin, but it was easy to cut (left and right hand shears). It is light enough to hang by the plywood flange that forms the top of the barrel.