

MASTER SPREADSHEET

Project: *Electrodynamic Field Generator*

title: Design Hull Configuration

<u>INSERT HULL DIAMETER HERE:</u>	=	100	feet (designated 'Toltec')
DESIGN HULL RADIUS (R_h)	=	50	
Hull Volume Constant (C_v)	=	10	<u>Note:</u> $C_v = 1/5 R_h$
DRIVE RING RADIUS (r_f)	=	20	<u>Note:</u> $r_f = 2C_v$
Hull Area Constant (C_a)	=	0.12919	<u>Note:</u> $C_a = 0.012919C_v$
Negative Emitter Ring Radius ($C_v + C_a$)	=	10.12919	
Neutral Ring Radius ($C_v - C_a$)	= +	<u>9.87081</u>	
Radius (Neg. Ring & Neut. Ring)	=	20.00000	
FIELD HUB RADIUS (r_z)	=	30	<u>Note:</u> $r_z = 3C_v$
Drive Ring Radius (r_f)	= +	<u>20</u>	
HULL RADIUS (Field Hub & Drive Ring)	=	50	<u>Note:</u> $r_z + r_f = R_h$
Polar Hull Constant (h_z)	=	4.2637	<u>Note:</u> $h_z = 0.1421245r_z$
Polar Volume Differential (X_h)	= +	<u>103.4094</u>	<u>Note:</u> $X_h = (r_z^2 - h_z^2)/2h_z$
Radial Hull Constant (R_s)	=	107.6731	<u>Note:</u> $R_s \approx 2.153463R_h$
AREA of POLAR FIELD (POS) ZONE	=	2884.5458	<u>Note:</u> $A_z = 2\pi R_s h_z$
AREA of EMITTER RING (NEG) ZONE	= -	<u>2884.5452</u>	<u>Note:</u> $A_n = s(C + c)/2$, where:
$A_z - A_n$	=	.0006	$s = [(C_v + C_a)^2 + (\tan \alpha (C_v + C_a))^2]^{1/2}$,
			$C = 2\pi R_h$, and $c = 2\pi[R_h - (C_v + C_a)]$.
***Please observe that the outer areas A_z and A_n , respectively, are equal to within an error of:			
		.000021 %	*****
Drive Ring Displacement Angle (α)	=	$7^{1/2}^\circ$	<u>Note:</u> $\tan \alpha = .1317$
Volume of Central Section (V_c)	=	7447.4595	<u>Note:</u> $V_c = \pi r_z^2 h_f$, where: $h_f = (\tan \alpha) r_f$.
VOLUME of POLAR FIELD ZONE (V_z)	=	6068.2987	<u>Note:</u> $V_z = 2/3 \pi R_s^3 - \pi [R_s^2 X_h - X_h^3/3]$;
VOLUME of DRIVE RING SECTION (V_f)	= -	<u>6068.3004</u>	and $V_f = \pi h_f [R_h^2 + R_h r_z + r_z^2]/3 - \pi r_z^2 h_f$.
$V_z - V_f$	=	-.0017	
***Please observe that the inner volumes V_z and V_f , respectively, are equal to within an error of:			
		-.000028 %	*****
TOTAL HULL VOLUME (DISPLACEMENT)	=	39168.1172	<u>Note:</u> $V_h = 2(V_z + V_f) + 2V_c$