AE 771 Injector Design

Due: Friday April 9th, 2020

Henry Hunt

Project Objectives

1. Provide a table of your calculated and assumed values.
2. Provide images of the CAD model. Please dimension your CAD images.

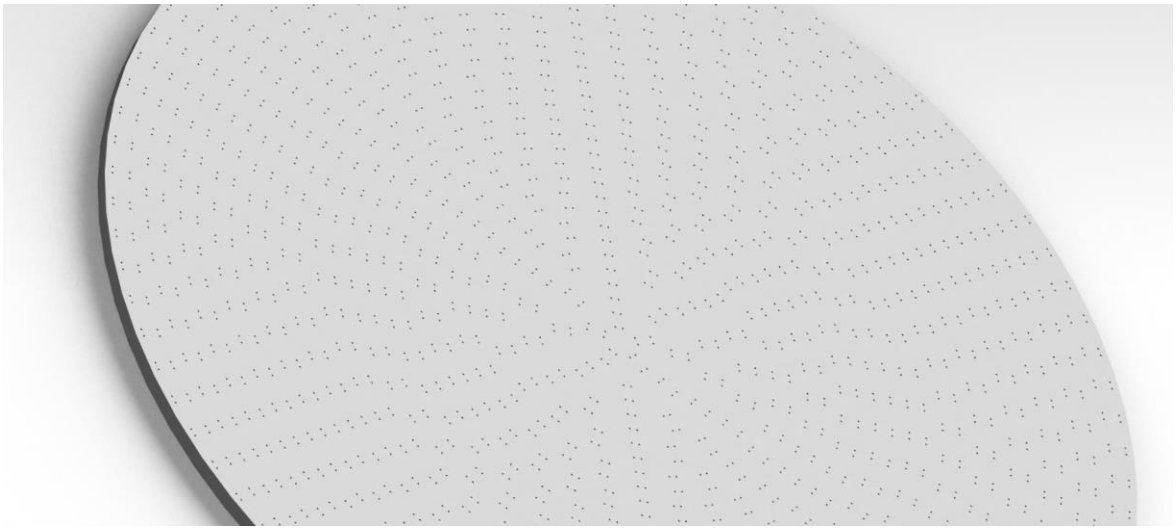
Code and Workflow

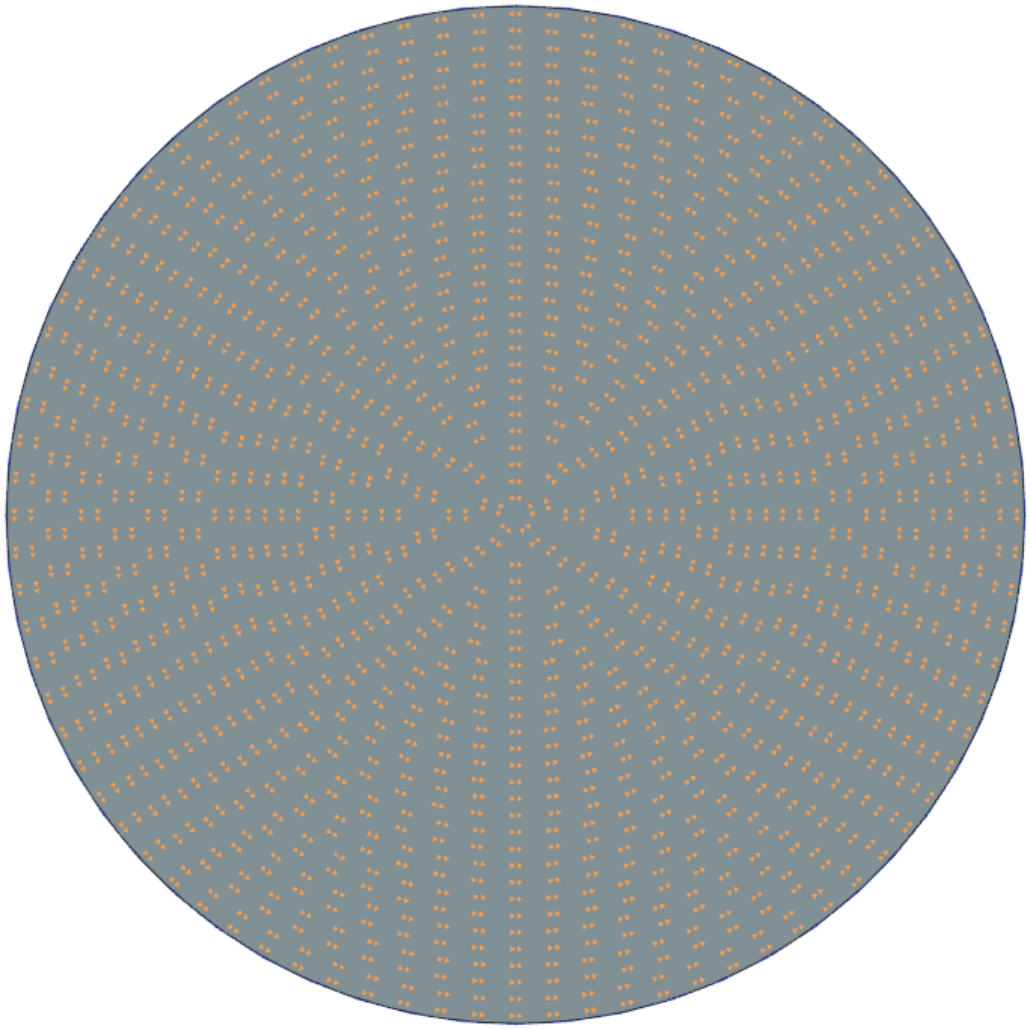
https://github.com/Drifterino/AE-771/blob/master/Injector%20Design.ipynb

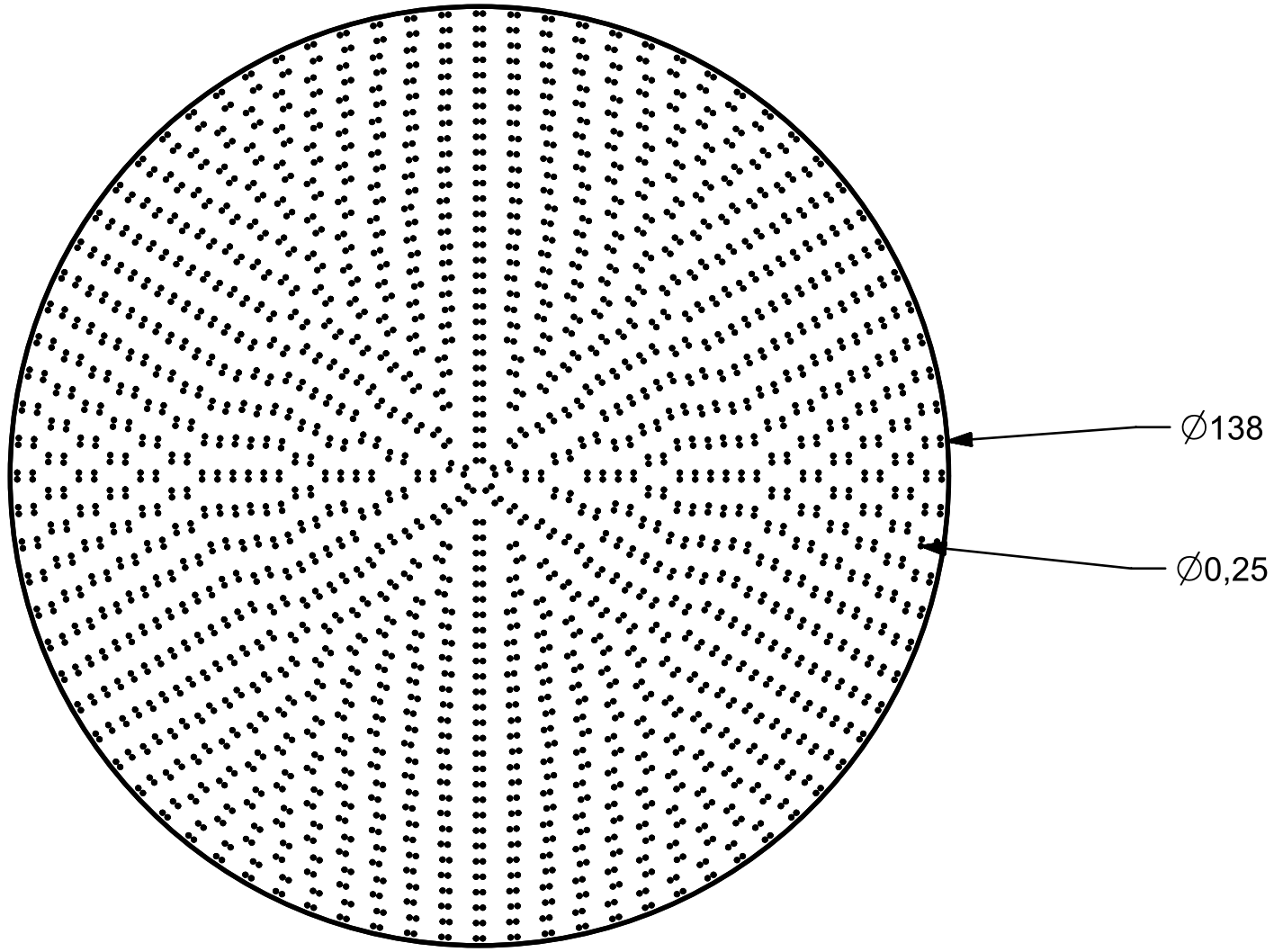
Assumed and Characteristic Values

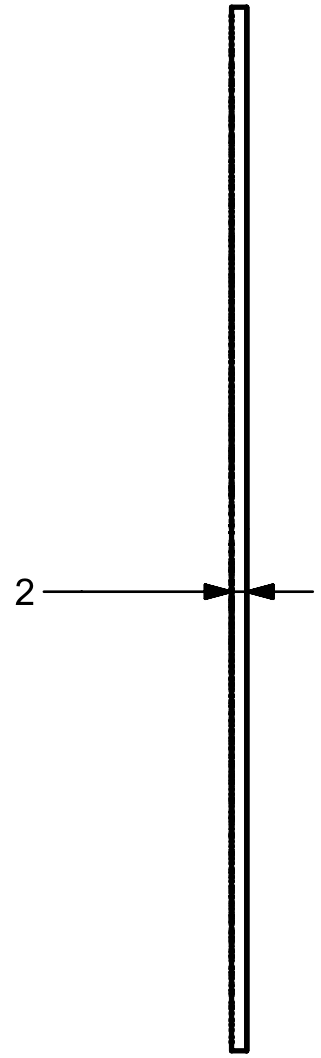
Symbol	Value	Variable	Units
Mdoto_A	8.411	Actual Oxidizer Mass Flowrate	kg/sec
Mdotf_A	2.471	Actual Fuel Mass Flowrate	Kg/sec
ρo	11168.9	Liquid Weight Density of Oxygen (Oxidizer)	N/m^3
ρf	691.2	Liquid Weight Density of Hydrogen (Fuel)	N/m^3
P1	6894750	Chamber Pressure	Pa
ΔP	1378950	Change in Pressure	Pa
Cd	0.9	Discharge Coefficient of Injector	~
Dc	136.544	Diameter of the Chamber	mm
Ac	14643.266	Area of the Chamber	mm^2
HoleSize	0.049	Area of the Holes	mm^2
θI	25	Injector Angle	Degrees
Ao	53.251	Required Area of Oxidizer Injector	mm^2
Af	62.891	Required Area of Fuel Injector	mm^2
A_OxyNew	53.251	Final Area of Oxidizer Injector	mm^2
FuelArea	62.439	Final Area of Fuel Injector	mm^2
D_OxyNew	0.23	Oxidizer Hole Diameter	mm
HoleDiam	0.25	Fuel Hole Diameter	mm
TreeSpace	2.276	Radial Space Between Holes	mm

CAD Model | Available on the GitHub as Injector.prt









ALL DIMENSIONS IN MM

SIEMENS		THIS DRAWING HAS BEEN PRODUCED USING AN EXAMPLE TEMPLATE PROVIDED BY SIEMENS PLM SOFTWARE		
FIRST ISSUED	4/9/2020	TITLE		
DRAWN BY	Henry Hunt			
CHECKED BY	Henry Hunt			
APPROVED BY	Also Henry Hunt	SIZE	DRG NO.	SHEET REV
		A3	Injector	A
		SCALE 1:1		SHEET 4 OF 4