

Casing Material

Alyssa Keyes



Acrylic vs. Polycarbonate

- Acrylic because it will not fade or yellow even if it is exposed to heat
- Acrylic has a higher clarity than Polycarbonate
- We will not need to drill into it if we fasten it together with 80 20
- It is cheaper than polycarbonate

Motor and Driving Wheel

Ian Glasgow

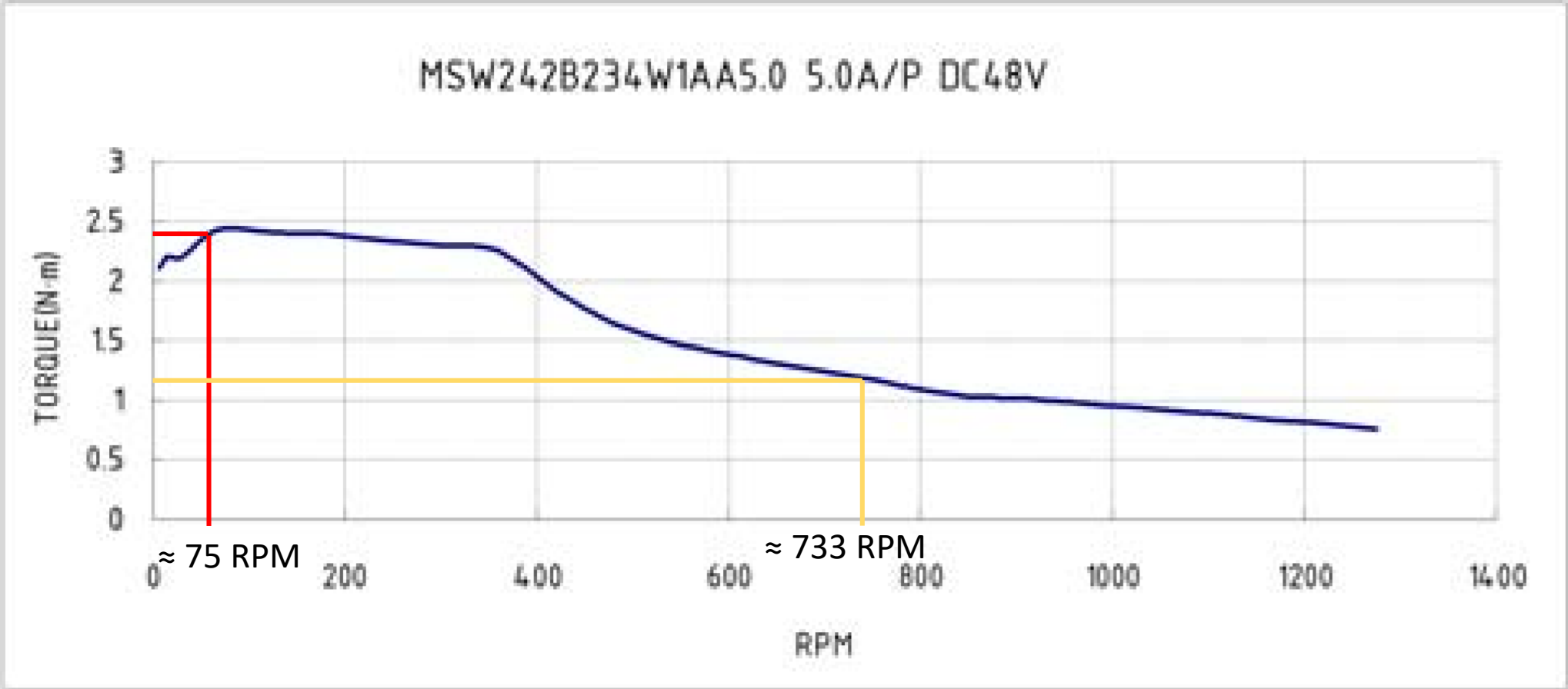
Friction Calculations

- ρ_{PVDF} ranges from 1.82 to 4.68 $\frac{lbm}{ft^3}$ Assume higher
- $L_{spool} = 120 \text{ ft}$
- $A = \frac{\pi((D_o)^2 - (D_{in})^2)}{4} = \frac{\pi((3/12)^2 - (1.5/12)^2)}{4} = .0368 \text{ ft}^2$
- $V = A * L_{spool} = 4.416 \text{ ft}^3$
- $m_{spool} = V * \rho_{PVDF} = 4.416 \text{ ft}^3 * 4.68 \frac{lbm}{ft^3} = 20.67 \text{ lbm}$
- $\mu_s = .23, \mu_d = .17$ PVDF to Steel friction from Kynar
- $F_{motor} > F_{friction} = \mu_s * N = .23 * 20.67 \text{ lbm} * 1 \frac{lbf}{lbm} = 4.75 \text{ lbf}$

Torque and Recommended Motor

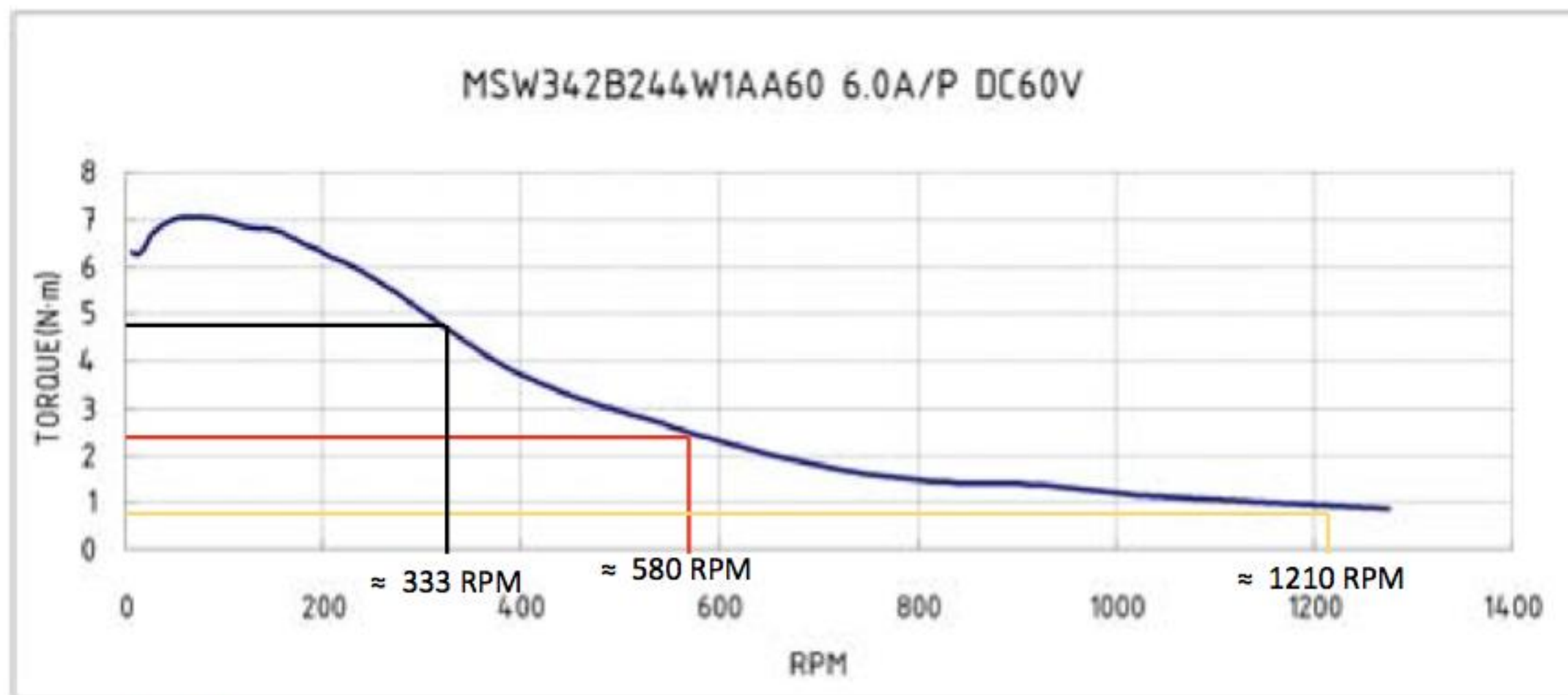
- Assuming a diameter of 1, .5 and .25 ft
- $\tau_1 = 4.75 \text{ lbf} * .5 \text{ ft} * 1.5 \text{ (error factor)} = 3.56 \text{ ft-lbf} = 4.82 \text{ N-m}$
- $\tau_{.5} = 1.78 \text{ ft-lbf} = 2.41 \text{ N-m}$
- $\tau_{.25} = .89 \text{ ft-lbf} = 1.205 \text{ N-m}$
- Based on this is recommend the NEMA 24 Stepper Motor [MSW242B234W1AA5.0](#) or the NEMA 34 Stepper Motor [MSW342B244W1AA6.0](#) depending on the diameter of the driving wheel

NEMA 24 Torque vs Speed chart



- D= .5 ft
- D= .25 ft

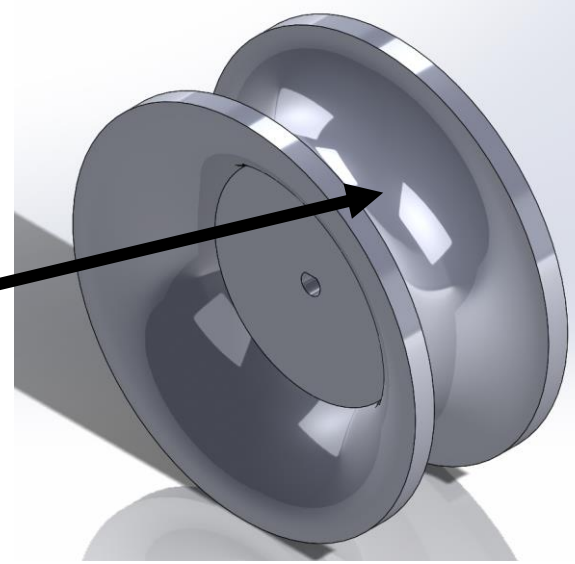
NEMA 34 Torque vs Speed chart



- D= 1 ft
- D= .5 ft
- D= .25 ft

Driver Wheel

Groove to keep insulation
in line



D = 9 in



D = 3 in (max insulation
diameter)

D = 6 in

This part will be 3D printed
as soon as we acquire
filament

Guillotine Rapid Prototype





4" -16" Heavy Duty Linear Actuator Motor Electric In electric Linear Actuator Lift 900N/225Lbs 12V With Mounting Brackets

★★★★★ [Write a review](#) [HALLOLURE](#) Walmart # 575606164

\$23.45

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Actual Color: 8 inch



Qty:

1 ▾

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Insulation Measuring and Cutting Module

The goal of the project is.....

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Sponsors	The Boeing Company <ul style="list-style-type: none">[1]
Team Name	Insulation Station
Duration	Fall 2019 - Spring 2020
Faculty Adviser	Dr. Swenson <ul style="list-style-type: none">Faculty Name
Mentor	Max Johnson <ul style="list-style-type: none">Mentor Names
Client	The Boeing Company <ul style="list-style-type: none">Name / Organization
Team Members	<ul style="list-style-type: none">Kyle DeeterIan GlasgowAlyssa KeyesRennie Scott

Problem Definition [\[edit\]](#)

Background [\[edit\]](#)

Deliverables [\[edit\]](#)

Specifications [\[edit\]](#)

Design Considerations [\[edit\]](#)

Project Learning [\[edit\]](#)

Final Design [\[edit\]](#)
