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Nathan Wang

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DATE: March 2nd, 2022

SUBJECT: D4 Bill of Materials



In this memo, we are going to talk about the bill of materials for Team Nugget, along with the first in depth drawing of our product and manufacturing information. After a thorough discussion, we decided on a hydraulic press door opening system. In order to have an in depth drawing of this, we used CAD to show our idea. Also, for the bill of materials we had to decide what materials would be best so that we can minimize cost while maximizing efficiency.

Our current CAD model is based mostly off of hydraulic motion. We have a step plate that is connected by two springs with a fluid bag in between them. As the user steps - or rolls in the case of a handicap user - the fluid bag is compressed which releases the fluid through the tube to the top of the door. At the top, the fluid enters a piston which is connected to an arm that opens the door. This arm moves at a pace directly related to the amount of pressure applied to the step plate. Finally, as the step plate is released, the fluid bag expands and the pressure of that brings back the fluid to fill the bag. This part resets the system so it is ready for the next user.

The bill of materials has all of our expenses we estimate to make our product. All the materials we chose were specifically chosen because they maximize efficiency by also minimizing cost. The aluminum alloy material used for the step plate was picked because it can last long and sustain a large amount of usage. For the fluid we chose to use hydraulic fluid DTE 24 because it will not freeze or be affected by the temperature around it. The fluid will also be able to withstand the pressure from the force of the step plate provided by the user.

For our product, there are specifics that go into the manufacturing process. In order to shape the plate we will have to work in the machine shop with the tools provided and form the ideal shape that is also aesthetically pleasing. Also, once those parts are formed we will have to attach all of the parts using adhesive or the screws in our bill of materials. Finally, we have lower and upper bounds for our annual production quantity which are 30,000 and 50,000 respectively.

If you would like any further details, please contact us at any of the following emails: Nate Saul ([nmsaul@purdue.edu](mailto:nmsaul@purdue.edu)), Samuel Graham ([graha205@purdue.edu](mailto:graha205@purdue.edu)), Dingming Lu ([lu807@purdue.edu](mailto:lu807@purdue.edu)), or Luke Bame ([lbame@purdue.edu](mailto:lbame@purdue.edu)).

Sincerely,  
Nate Saul

*Nate Saul*

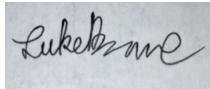
Samuel Graham

*SG*

Dingming Lu



Luke Bame



Attachment:

- Team Nugget Bill of Materials.xlsx
- Step Drawing.pdf
- Exploded View Step.png
- Exploded View Door unit.png
- Exploded View Door unit 2.png
- Door Assembly Drawing.pdf