VEXU - "Make It Real" CAD Engineering Online Challenge Sponsored by Autodesk

# **VexPro Thundersquare Bearing Holder**

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### Summary

For our robots we wanted to use the VexPro bearing but we lacked a way to attach it to the bot. So we designed a bearing holder that was strong, but also compact.

## How We Designed it

We started by using Autodesk Inventor 2022 to create the part. We downloaded the CAD file for the .302 Diameter Flanged Thundersquare bearing and started thinking of ways to hold it onto the robot. The best way was using the bearings flange and having the flange be held to the metal of the robot. After the basic shape of bearing was made, we began test prints to get the





tolerances just right, too tight and the bearing

wouldn't go in and would break the parts, too loose and it could be misaligned causing friction issues.

After the basic shape was designed we had to figure out the best way to secure it to the metal. We added little nubs, similar to the Vex Bearings that would sit in the metal, they were made to perfectly go into the metal and in testing were able to hold the bearing into metal even if we tried to knock it out. We also added two holes to allow us to screw it to the metal. We tested it with no screws and it would not wiggle no matter how much force we put into it while still taking very little effort to slot into the holes of vex metal. We then screwed it to the metal with a bearing in the hole and it would not budge.



Figure 2. Bearing Holder on Steel 5 Wide

Figure 3. Dimensions of alignment nubs



Figure 4. Dimensions

## How We Use It

For the Tipping point game we realized that it was possible to take a fall onto your drivetrain, and we wanted to take measures to prevent that from causing damage to our robot, so we decided to use High Strength Axles in our drivetrain for our wheels and to use our custom bearing holders to support them. We found them to be very strong, even surviving 2 foot drop tests onto foam tiles with no issues.



Figure 5. 24 inch bot's drive channels

We also used them on our front intake roller for our ring collection mechanism as well as the conveyor rollers. We chose a High Strength axle to prevent it from bending from any interactions with other robots and because the custom bearing mounts are very low friction.

## Conclusion

This project was fun and yielded a very important part GOATS will always use on our robots. We believe that this bearing provides a solution for durable, low friction motion that is highly adaptable to any situation. We always try to build robust and reliable robots and this part helps us with that. This part taught us about tolerances and fitting parts into a 3D printed part. Going forwards we have a better understanding of tolerances, making future parts easier to create and requiring less trial and error.



Figure 6. VexU Team GOATS Logo