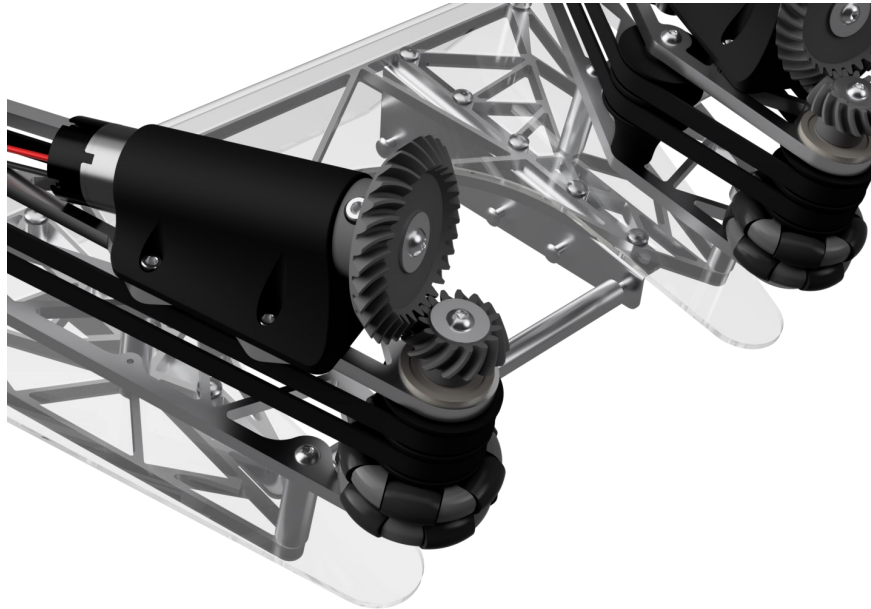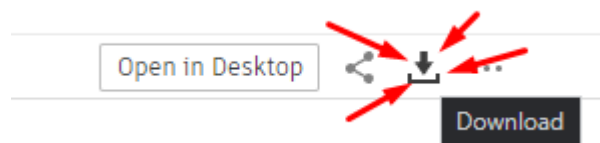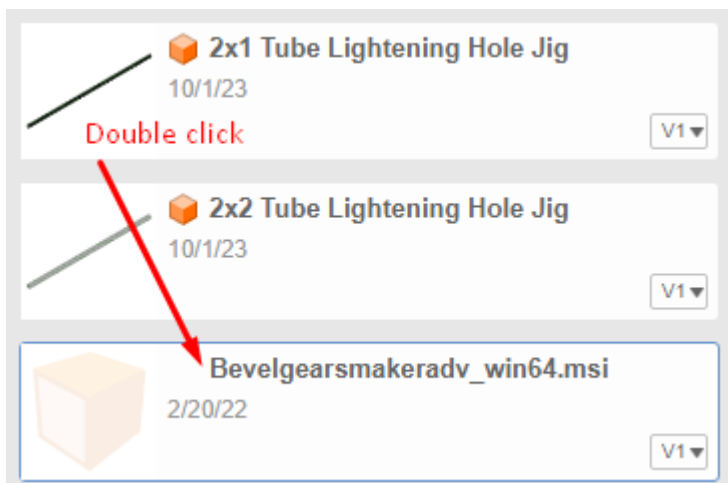# Bevel Gear Design Guide

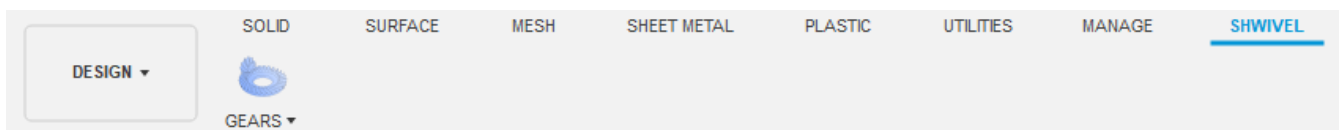*Document 231004a*
Revised Oct. 4, 2023

This guide will walk you through the process of designing bevel gears using Bevel Gears Maker (Advanced). Please do not redistribute or reuse this software except for your own educational use.

Install the software by downloading "Bevelgearsmakeradv_win64.msi" from "[team folder]/Plugins and Resources" in Fusion 360 as follows:

Close any open instances of Fusion 360, double click the .msi file, and follow on-screen directions to install. If it installed correctly, a new tab in Fusion 360 should exist called "Schwivel".

Bevel Gear Design Guide

Document 231004a
Revised Oct. 4, 2023

Open a new component to create your gears in to avoid conflicts and lags—these gears can be copied to your desired component/assembly later. Click the Bevel gears maker (advanced) button and notice all the options available in the menu.

Read this guide made by the developer of the software to fully understand its usage:
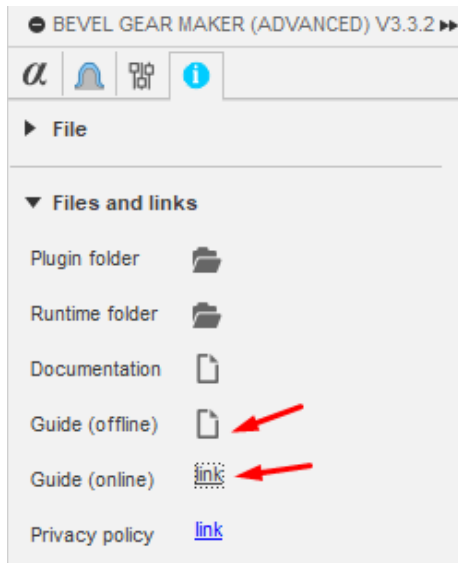
Recommended settings (roll over each setting in the plugin to see what it does):
[Main parameters tab]
Module: 2 mm or greater for 3D printing
Pressure angle: 20°
Clearance factor: 0.25
Shaft angle: (pick for your desired motor angle)
Teeth shape: Zerol unless the mechanism only spins one direction in which case helical is used.
Helix angle: 30° (for helical)
Use custom cutter radius: no
Use custom face width: optional—increase if you want a thicker gear
Pinion teeth number: change to suit
Pinion hand: default (unless helical, in which case right hand and left hand are suitable for applications in which rotation is in opposite directions)
Wheel teeth number: change to suit
[Modifications tab]
Pinion backlash: 0.05 mm (subject to change with testing)
Wheel backlash: 0.05 mm (subject to change with testing)
Tip relief: no
Crowning: no

Edge finishing: 1.00 mm, maybe smaller if the chamfer looks "too large"
Holes: Your choice, as typically we use hex holes and we have to add those manually, anyway

You can also add joints in the [Options] tab to automatically generate motion-linked joints for the gears.

Once you're finished, click "okay" and add the hole in the bevel gear for whatever shaft you're using by creating sketches on the top or bottom surfaces of each gear. A cylinder can be extended on either end of the gear to make the shaft engagement longer if needed. Usually adding 0.005" to the diameter of the hole makes for a suitably tight fit for a shaft.

That's it! Copy the gears to your desired assembly, change the material to suit, and modify as needed. If you don't need a motion link rigid group them so you don't lose the spacing.