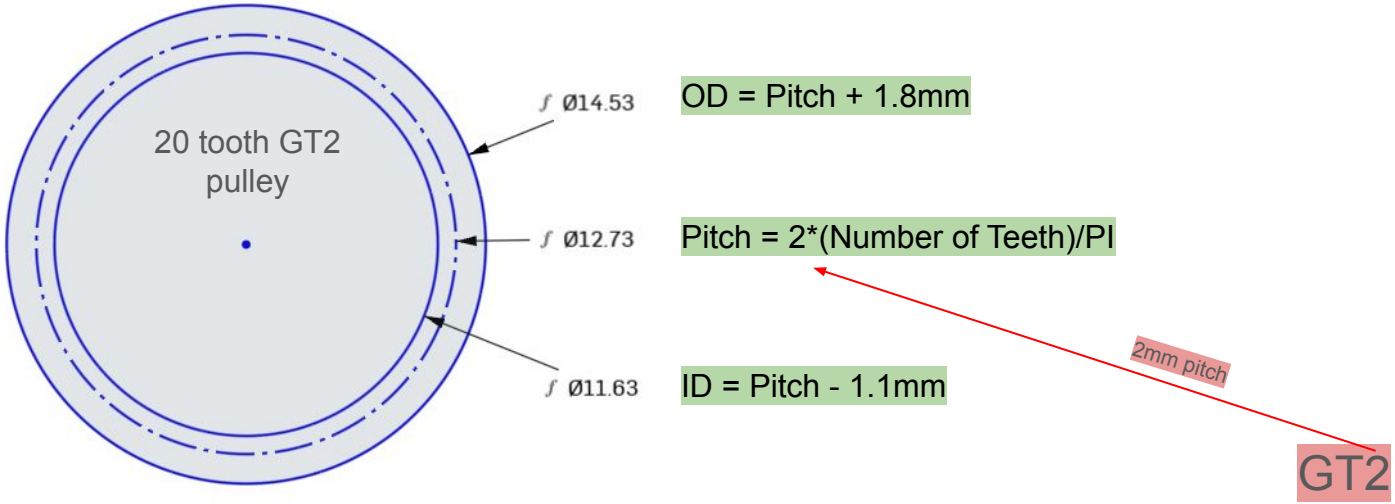
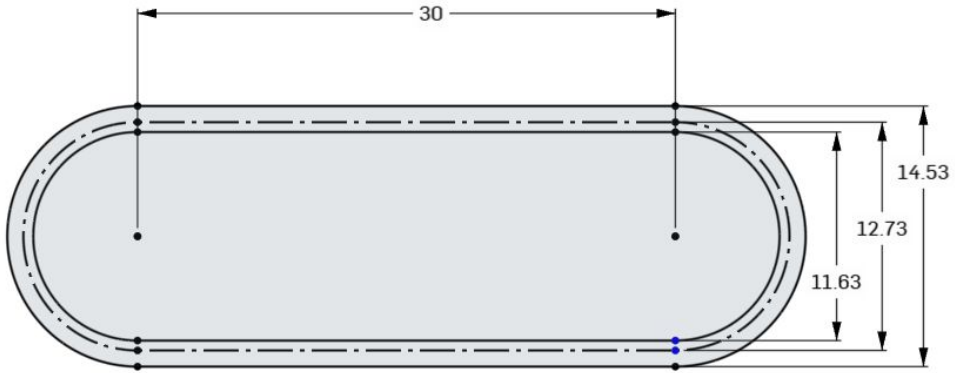
Pitch line: imaginary line within the belt used for calculations. Pitch is like the line that would remain if the belt was infinitely thin.



Pitch diameter is **not** in the middle of the OD and ID. 1.8mm and 1.1mm are typical measured values for GT2 belts

Since we know there are 20 teeth on the pulley with 2mm pitch, then the pitch circumference is 40mm. If we want to use a 100mm (50 tooth) belt, the distance between centers needs to be 30mm.

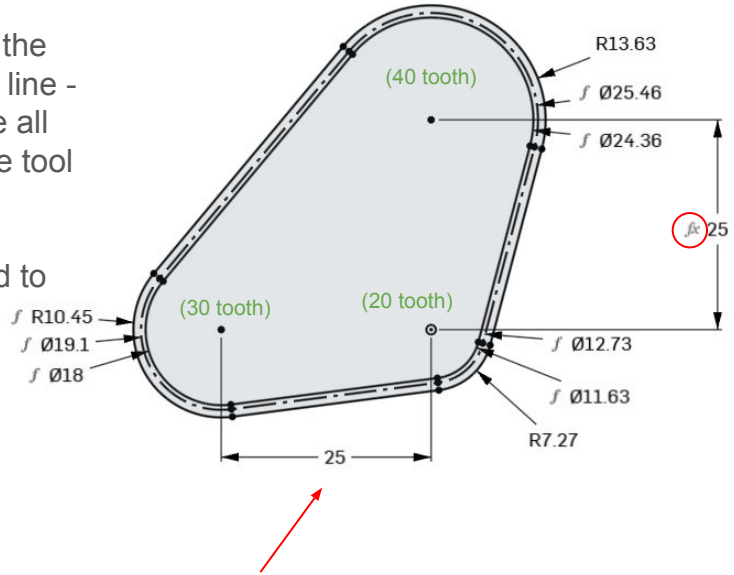


40mm + 30mm + 30mm = 100mm

This method is not scalable for more complex configurations

Measure method - step 1 (onshape)

- Define all geometry.
- Trim geometry that isn't part of the belt. Only required for the pitch line - must have continuous pitch line all the way around for the measure tool to work.
- Redefine constraints as needed to fully define the geometry (concentric, equal, tangent)

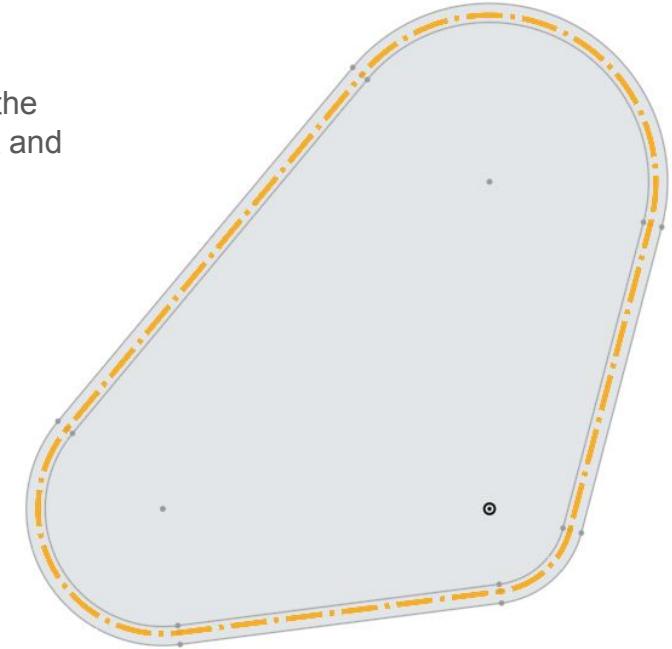


Use parameter dimension for at least one distance so it is easily editable. I named this one "d1"

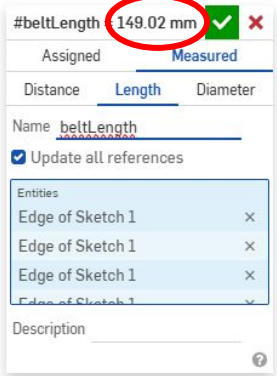
Fixed dimension

Measure method - step 2 (onshape)

- Exit sketch environment.
- Use the measure tool to select the entire pitch line. You can save it and give it a name for convenience.



149.02mm belts do not exist. We will decide to use a 150mm belt



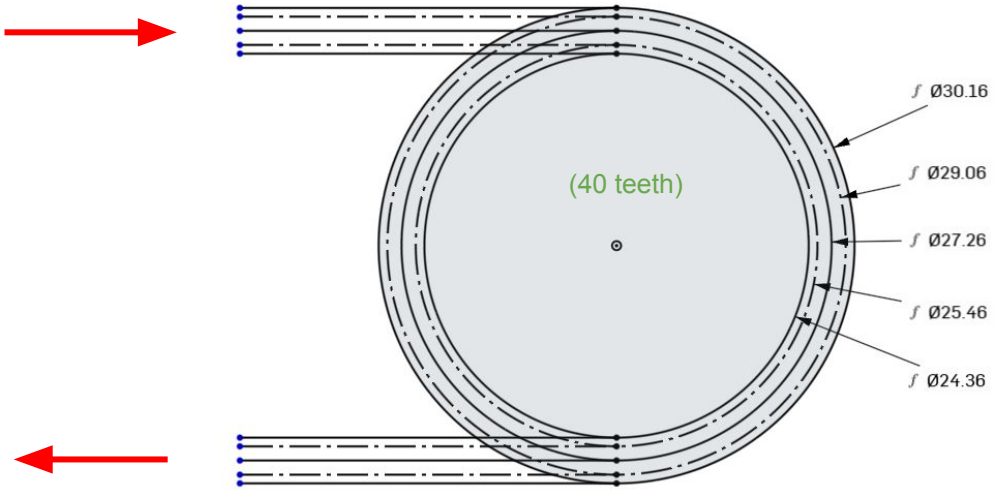
Measure method - step 3 (onshape)

- Adjust the parameter dimension by trial and error until the measured belt length is within 0.001mm of the desired belt length

Part Studio 1

Name	Variable type	Value
d1	Length	25.57 mm
beltLength ⓘ	Measured	150 mm

Back to back belts



majorOD = minorPitch + 4.7mm

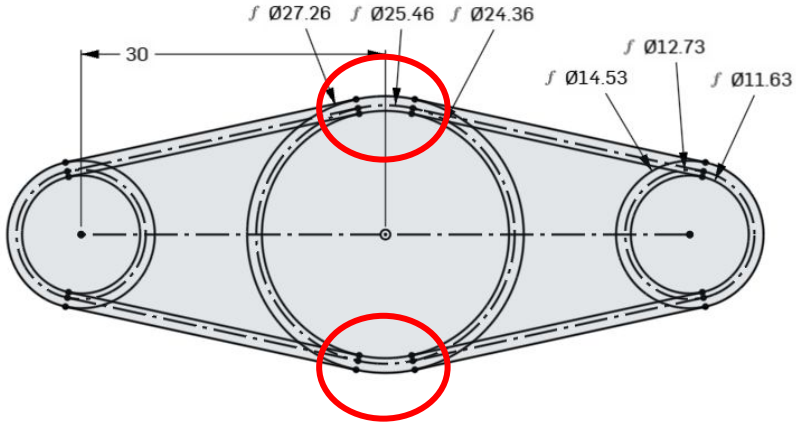
majorPitch = minorPitch + 3.6mm

minorOD = minorPitch + 1.8mm

minorPitch = 2*(Number of teeth)/PI

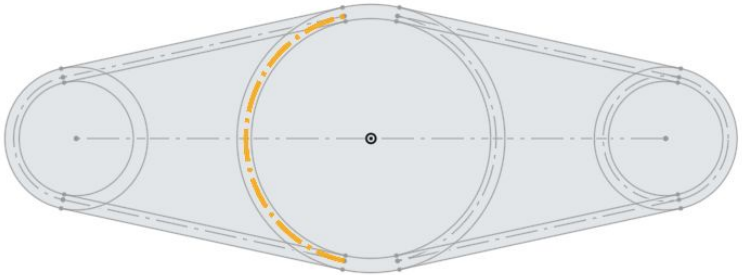
minorID = minorPitch - 1.1mm

Complication #1 - Problem

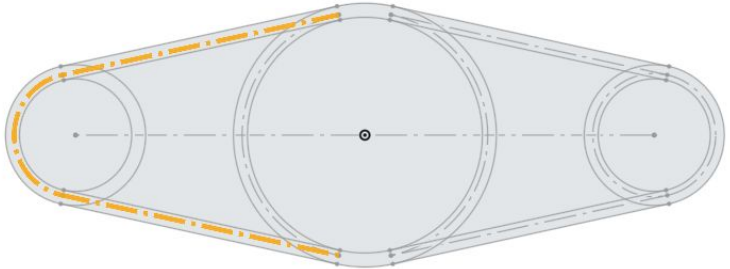


Belt touches in 2 discontinuous spots - will the belt teeth align with the pulley teeth on both sides?

Complication #1 - Solution



Measure this dimension (pulleyPitchLine)



Measure this dimension (beltPitchLine)

Part Studio 1

Name	Variable type	Value
d1	Length	29.31 mm
pulleyPitchLine ⓘ	Measured	34.42 mm
beltPitchLine ⓘ	Measured	74.42 mm

Adjust parameter dimension until (pulleyPitchLine - beltPitchLine) is divisible by the pitch which in this case is 2mm. This will guarantee that the belt teeth on both sides will always align with the pulley teeth.