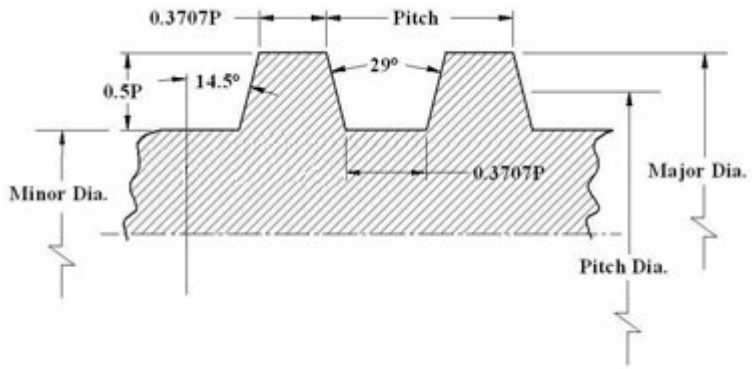
OBSERVATION REPORT

Log 1 - Vendor Lead Screw Profile Measurements

Dated: 12-01-2021



Let,
D = Diameter
P = Pitch
T = Teeth Length = 0.3707P
t = Teeth Gap Length = P – T
h = Teeth depth = 0.5P

Fig. 1 - External ACME Thread Profile [1]

MEASURING JIG

For finding the depth of cut in the lead screw, it is necessary to measure by means of CMM or a custom jig. Here is a simplified experimental version L01-X3 of Lead Screw Depth of Cut Measuring Jig.

Fig. 2 & 3 *- Measuring jig top view and isometric view.*

Fig. 4 & 5 *– Modified Tyre Gauge* [2]

In existing gauge, the (probe) pin diameter is to large, so that LED leg sealed by Heat sink tube, such that this leg pin will enter through the depth of cut of lead screw.

PROCEDURE FOLLOWED

Step 1: For the defining each lead screw of specific vendor, here we used masking tape for labelling and coined as 3D1, 3D2, so on and IG1.

Fig. 6 *– Labelled lead screw of 3dPrintronics*

Step 2: Initially the gauge to be set zero by sliding to and fro over the outer area of the lead screw.

Fig. 7 *– Setting the value to zero over the circumference.*

Step 3: Inserting inside the depth will get to know the teeth depth **h** value and this has to be taken randomly about 5 times or more.

Fig. 8 *– Average value of depth* ***h***

OBSERVATION TABLE

General Details			Vernier Reading				Tyre Gauge Reading
Sl.no.	Vendor	Start	Diameter **D**	Pitch **P**	Teeth Len. **T**	Gap Len. **t**	Teeth depth **h**
3D1	3dPrintronics	4	7.97	2.00	0.95	1.15	1.03
3D2	3dPrintronics	4	7.96	2.10	0.90	1.20	0.99
3D3	3dPrintronics	4	7.96	2.10	0.90	1.20	1.02
3D3	3dPrintronics	4	7.96	2.20	0.85	1.30	1.05
3D3	3dPrintronics	4	7.97	2.00	0.85	1.30	1.00
IG1	Igus	1	7.93	1.50	0.70	0.80	0.85
IG2	Igus	1	7.93	1.50	0.70	0.80	0.85

RESULT/COMMENT

- It is observed that slight variation occurs in the lead screws of each vendor and that is within the clearance value [3] a = 0.15mm for 8mm lead screw.
- Since each vendor is manufacturing on their dimensions, it is good to design acme nut by ourself using the observation data that obtained here.
- There is no assurance where the lead screw is acme or trapezoidal, that we need to find.

REFERENCES

1. Image Courtesy by https://www.engineersedge.com/hardware/external_acme_thread_13360.htm
2. https://www.amazon.in/Preciva-Tread-Depth-Gauge-Digital/dp/B074KD2D73
3. Central Machine Tool Institute (2017), **Machine Tool Design Handbook**, Page No. 106, 1st ed. Bangalore: McGraw Hill Education

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