

Describe the method of generating involute curve in spur gear

INVOLUTE Curve is a single-curved line traced out by an end of a string when unwound it self from a circle. The circle involute has attributes that are critically important to the application of mechanical gears.

Steps to Draw Involute Gear:

1. Draw Base Circle:

Draw a circle with a calculated pitch radius (R).

2. Divide the Base Circle:

Divide the base circle into the desired number of teeth (N), e.g., 8 teeth.

From the base of the circle (Point A), draw straight line with a length equal to π^* diameter (d).

4. Draw Tangents :

Draw tangent through point B with a length of 7 times the circular pitch.

7

5. Draw Tangents:

Draw tangent through point C with a length of 6 times the circular pitch.

7. Draw Tangents:

Draw tangent through point E with a length of 4 times the circular pitch.

6. Draw Tangents:

Draw tangent through point D with a length of 5 times the circular pitch.

8. Draw Tangents:

Draw tangent through point F with a length of 3 times the circular pitch.

9. Draw Tangents:

Draw tangent through point G with a length of 2 times the circular pitch.

11. Connect Tangents:

Connect those tangent lines by a curve, and this forms the involute curve.

10. Draw Tangents:

Draw tangent through point H with a length of 1 times the circular pitch.

Result:

The connected tangents form the involute curve.

Design an experiment to measure the error of roundness for a cylindrical shaft

The Wilson machine is used to acquire data for measuring roundness error. It collects precise measurements of the part's surface at multiple points, capturing the deviations from a perfect circle.

Steps to measure roundness error:

1. Prepare the instrument:

- Turn on the machine and allow it to warm up for the specified time.
- Clean the workpiece surface to ensure accurate readings.
- Select the appropriate probe and measuring range based on the size and shape of the object.

2. Mount the workpiece:

- Secure the workpiece firmly on the machine's turntable or v-blocks, ensuring proper alignment.
- Use appropriate fixtures if needed for stability and accuracy.

3. Alignment:

- Align the stylus with the center axis of the cylindrical shaft, this step is crucial to obtain accurate roundness measurements.
- the machine should be stable and securely positioned to minimize any vibrations or disturbances that could affect the measurement results.

4.Set measurement parameters:

- Input the desired number of measuring points or sampling rate.
- Choose the appropriate filter and error correction settings for your application.

5.Initiate measurement:

 Start the measurement process, usually by pressing a button or icon on the machine's control panel.

6.Start Measurement Procedure:

 Start the roundness measurement sequence on the Wilson machine, this typically involves the stylus tracing the surface of the cylindrical shaft as it rotates. The machine collects data points at various positions around the circumference of the shaft. For better results do this for multiple points along the length of the cylindrical shaft.

7.Record and analyze results:

- The collected data is then analyzed by the machine's software. The software calculates deviations from a perfect circle to determine the roundness error.
- Review the graphical representation of the roundness profile for visual analysis.
- Results are displayed on the screen in graphical formats and numerical values, such as Total Indicator Reading (TIR) provided to quantify the roundness error.

Under the supervision of Dr. Lamees Al-Durgham

Alaa Adel Saqr 0201373

Bara Osama Edris 0206169

Yazan Omar Qasim 0204269

Ahmad Omar Bani Amer 0208801