

Project Info

Guide

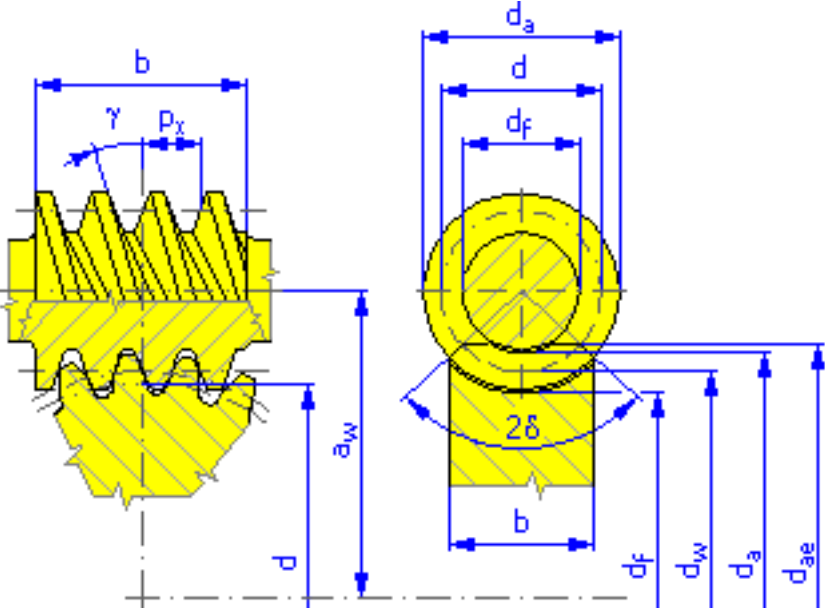
Type of Load Calculation - Torque calculation for the specified power and speed  
Type of Strength Calculation - Check Calculation  
Method of Strength Calculation - Legacy ANSI

Common Parameters

|                                    |                   |             |
|------------------------------------|-------------------|-------------|
| Gear Ratio                         | i                 | 40,0000 ul  |
| Module                             | m                 | 3,980 mm    |
| Axial Module                       | m <sub>x</sub>    | 4,000 mm    |
| Helix Angle                        | γ                 | 5,7106 deg  |
| Pressure Angle                     | α                 | 19,9086 deg |
| Worm Diameter Factor               | q                 | 10,0000 ul  |
| Center Distance                    | a <sub>w</sub>    | 100,000 mm  |
| Axis Circular Pitch                | p <sub>x</sub>    | 12,5664 mm  |
| Circular Pitch                     | p <sub>n</sub>    | 12,5040 mm  |
| Base Circular Pitch                | p <sub>b</sub>    | 11,809 mm   |
| Lead                               | p <sub>z</sub>    | 12,566 mm   |
| Worm Length                        | b <sub>1</sub>    | 60,000 mm   |
| Worm gear Width                    | b <sub>2</sub>    | 20,000 mm   |
| Axial Pressure Angle               | α <sub>x</sub>    | 20,0000 deg |
| Base Helix Angle                   | β <sub>b</sub>    | 5,3683 deg  |
| Contact Ratio                      | ε                 | 2,0063 ul   |
| Transverse Contact Ratio           | ε <sub>α</sub>    | 1,8472 ul   |
| Overlap Ratio                      | ε <sub>β</sub>    | 0,1592 ul   |
| Limit Deviation of Shaft Angle     | F <sub>β</sub>    | 0,0090 mm   |
| Guaranteed Backlash                | j <sub>nmin</sub> | 0,054 mm    |
| Limit Deviation of Center Distance | f <sub>a</sub>    | 0,032 mm    |

Gears

|                                | Worm             | Worm gear  |
|--------------------------------|------------------|------------|
| Type of model                  | Component        | Component  |
| Number of Threads              | z                | 1,000 ul   |
| Number of Teeth                | z                | 40,000 ul  |
| Unit Correction                | x                | 0,0000 ul  |
| Pitch Diameter                 | d                | 40,000 mm  |
| Outside Diameter               | d <sub>a</sub>   | 48,000 mm  |
| Root Diameter                  | d <sub>f</sub>   | 30,400 mm  |
| Outside Diameter               | d <sub>ae</sub>  | 172,000 mm |
| Base Circle Diameter           | d <sub>b</sub>   | 37,588 mm  |
| Work Pitch Diameter            | d <sub>w</sub>   | 40,000 mm  |
| Worm gear Chamfer Angle        | δ                | 24,62 deg  |
| Addendum                       | a*               | 1,0000 ul  |
| Clearance                      | c*               | 0,2000 ul  |
| Root Fillet                    | r <sub>f</sub> * | 0,3000 ul  |
| Tooth Thickness                | s                | 6,252 mm   |
| Axial Tooth Thickness          | s <sub>x</sub>   | 6,283 mm   |
| Limit Circumferential Run-out  | F <sub>r</sub>   | 0,0130 mm  |
| Limit Deviation of Axial Pitch | f <sub>pt</sub>  | 0,0090 mm  |
| Limit Deviation of Basic Pitch | f <sub>pb</sub>  | 0,0085 mm  |
| Virtual Number of Teeth        | z <sub>v</sub>   | 40,601 ul  |
| Min. Recommended Correction    | x <sub>min</sub> | -2,083 ul  |



Loads

|                       | Worm           | Worm gear   |
|-----------------------|----------------|-------------|
| Power                 | P              | 0,100 kW    |
| Speed                 | n              | 1000,00 rpm |
| Torque                | T              | 0,955 N m   |
| Efficiency            | η              | 0,663 ul    |
| Radial Force          | F <sub>r</sub> | 115,855 N   |
| Tangential Force      | F <sub>t</sub> | 47,746 N    |
| Axial Force           | F <sub>a</sub> | 316,718 N   |
| Normal Force          | F <sub>n</sub> | 340,231 N   |
| Circumferential Speed | v              | 2,094 mps   |
| Slide Speed           | v <sub>k</sub> | 2,105 mps   |

Material

|                                       | Worm              | Worm gear     |
|---------------------------------------|-------------------|---------------|
|                                       | User material     | User material |
| Ultimate Tensile Strength             | S <sub>u</sub>    | 500 MPa       |
| Yield Strength                        | S <sub>y</sub>    | 180 MPa       |
| Modulus of Elasticity                 | E                 | 206700 MPa    |
| Poisson's Ratio                       | μ                 | 0,270 ul      |
| Bending Fatigue Strength              | S <sub>n</sub>    | 165,0 MPa     |
| Contact Fatigue Strength              | K <sub>w</sub>    | 0,6 MPa       |
| Bending Fatigue Limit                 | σ <sub>Flim</sub> | 170,0 MPa     |
| Contact Fatigue Limit                 | σ <sub>Hlim</sub> | 200,0 MPa     |
| Hardness in Tooth Side                | VHV               | 110 ul        |
| Base Number of Load Cycles in Bending | N <sub>Flim</sub> | 250000000 ul  |
| Base Number of Load Cycles in Contact | N <sub>Hlim</sub> | 250000000 ul  |
| Wöhler Curve Exponent for Bending     | q <sub>F</sub>    | 9,000 ul      |
| Wöhler Curve Exponent for Contact     | q <sub>H</sub>    | 8,000 ul      |
| Max. Slide Speed                      | v <sub>max</sub>  | 12,000 mps    |

Strength Calculation

Factors of Additional Load

|                   |                |          |
|-------------------|----------------|----------|
| Overload Factor   | K <sub>o</sub> | 1,200 ul |
| Dynamic Factor    | K <sub>v</sub> | 1,010 ul |
| Lewis Form Factor | y              | 0,125 ul |

Results

|                               |                |            |
|-------------------------------|----------------|------------|
| Dynamic Load                  | F <sub>d</sub> | 384,042 N  |
| Surface-fatigue Limiting Load | F <sub>w</sub> | 1948,872 N |
| Bending-fatigue Limiting Load | F <sub>s</sub> | 5183,628 N |
| Lost Power                    | P <sub>z</sub> | 0,037 kW   |
| Max. Dissipated Heat          | Q              | 0,465 kW   |
| Check Calculation             |                | Positive   |

Summary of Messages

11:16:41 Calculation: Calculation indicates design compliance!