HDT T-Cup Component Gear Sets

- Precise Robotic Accuracy
- Large Center Through Hole
- Proven Reliability

Harmonic Drive gear
Precision Gear and Motion Control
For more information contact Harmonic Drive LLC at 800-921-3332 • Fax 978-532-9406 • www.HarmonicDrive.net
RATINGS AND OPERATING LIFE

The operating life expectancy of HDT Gear Sets is based on the rating of the ball bearings used for the input wave generator when run continuously at rated torque.

If gear sets are properly mounted and lubricated, gear tooth life will be well in excess of bearing life, provided maximum torque and speed limits are not exceeded. Flexspline life is infinite provided concentricity requirements are maintained. Ratings listed are for an L10 life of 3,000 hours. Median life, however, is 5 times this number.

Torque ratings for speeds other than those shown can be calculated by the following equations:

Rating @ N RPM = \( \left( \frac{1750}{N} \right) \times \text{[listed rating @ 1750 RPM]} \)

PREDICTED LIFE

\[ L_{10} = \left( \frac{1750}{T} \right) \times \text{[listed rating @ 1750 RPM]} \times 3000 \text{ hours} \]

Where \( T = \) mean torque and \( N = \) mean speed

MAXIMUM OUTPUT TORQUE

This is the maximum allowable torque that should be developed with dynamic torque at the input.

STATIC TORQUE LIMIT

This is the maximum allowable torque that should be applied to output when the input is locked. A typical example is the torque applied to the output during a work or machining operation when the gear is stationary.

MAXIMUM MOMENTARY OUTPUT TORQUE

Occasional momentary overload torques caused by collisions or emergency stops etc. should not exceed this value.
FEATURES
• Zero backlash
• Precise positional accuracy
• Large center through hole

• High ratio
• High torque
• ±5 arc second repeatability

APPLICATION EXAMPLE

ASSEMBLY GUIDE LINES
To achieve proper performance from HDT gear sets, certain mounting and alignment requirements are necessary. Excessive deflection or improper alignment will affect the smoothness of motion and may cause premature failure.

CIRCULAR SPLINE
The circular spline must be located either on its outside diameter or on one of the two pilot diameters provided. Vibration can occur if the housing interface is allowed to distort the circular spline from roundness. Two jack screw holes are provided to facilitate removal.

FLEXSPLINE
Under all load conditions, the flexspline must be rigidly supported in a position concentric and perpendicular to the circular spline datums as shown on the installation drawing. Overhung loads from an external source require a suitable two bearing support or a single four point contact or cross roller bearing.

WAVE GENERATOR BEARING
The wave generator is not designed to support a shaft. Bearing support must be provided to maintain the require position relative to the circular spline datums. Axial restraint must be provided in both directions.

LUBRICATION
The gear functions equally well in any mounting position provided it is adequately lubricated. Areas requiring lubrication are the circular spline and flexspline teeth, the wave generator bearing and the bore of the flexspline in the area of the wave generator contact.

Maximum input speed for each size is as follows:

<table>
<thead>
<tr>
<th>HDT Size</th>
<th>MAX INPUT SPEED (rpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>oil</td>
</tr>
<tr>
<td>14</td>
<td>12000</td>
</tr>
<tr>
<td>20</td>
<td>11000</td>
</tr>
<tr>
<td>25</td>
<td>9000</td>
</tr>
<tr>
<td>32</td>
<td>7000</td>
</tr>
<tr>
<td>40</td>
<td>5600</td>
</tr>
<tr>
<td>50</td>
<td>4500</td>
</tr>
</tbody>
</table>
EFFICIENCY

The efficiency of HDT Gear Sets varies with speed, ratio, lubrication, and temperature. The following graphs show the approximate measured values of efficiency against percentage of rated torque. These values can be adjusted by a temperature factor; however, extremes of temperature or excessively low loading should be referred to our Engineering Department.