

# **Clamp Evaluation**

**2 Take-Up Nut & Bolt Clamp  
(Mission Rubber Company)**

**Compared to**

**1 Take-Up Worm Drive Clamp**

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**Prepared for Mission Rubber Company LLC  
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**An empirical study was conducted to compare Mission Rubber Company's 2 take-up Nut & Bolt clamp to a 1 take-up worm drive clamp.**

**Method:**

A fixture was used to support the clamp, 60 in. lbs. of torque was applied to the clamp, the vertical movement (deflection) was measured at two locations. The clamp was tested in two different orientations, (1) when bolt was parallel to deflection (9 & 3 o'clock), (2) when bolt was perpendicular to deflection (12 & 6 o'clock).

The deflection data was used to determine the transmitted load. The two locations were used to determine transmitted load balance.

**Conclusion:**

The 2 take-up Nut & Bolt clamp showed a 18% higher transmitted load than the 1 take-up worm drive clamp. Also the 2 take-up Nut & Bolt clamp showed no variation from parallel to perpendicular orientation. This implies an even load distribution. The 1 take-up worm drive clamp showed 23% variation from parallel to perpendicular orientation. Reference Table 1 for data.

The 2 take-up Nut & Bolt clamp is superior in load transmission regardless of orientation. One possibility for the superior performance is the 2 take-up Nut & Bolt clamp has a plastic shoe which tends to smooth out the applied torque.

**Data Summary:**

**Table 1 - Average Transmitted Load:**

	<b>Nut &amp; Bolt Clamp</b>	<b>Worm Drive</b>
<b>Parallel 1st cycle (lbs.)</b>	816	666
<b>Perpendicular 1st cycle (lbs.)</b>	816	508

**Table 2 - Right Indicator - Left Indicator:**

	<b>Nut &amp; Bolt Clamp</b>	<b>Worm Drive</b>
<b>Parallel; average difference in right-left deflection (inches)</b>	.010	.007
<b>Perpendicular; average difference in right-left deflection (inches)</b>	.014	.035

**Table 3 - Verification Trail, Average Transmitted Load:**

	<b>Nut &amp; Bolt Clamp</b>	<b>Worm Drive</b>
<b>Parallel 1st cycle (lbs.)</b>	800	549

