Magnesium AZ31B Tool Plate for Vibration Testing

Vibration Testing
A key aspect of vibration testing is the machine table and the fixture that supports the component. Both need to be stiff, strong, lightweight and have good damping characteristic to reduce resonance. Magnesium AZ31B-Tool Plate (TP) is an ideal material for these due to its combined physical and mechanical properties.

Damping Capacity of Magnesium
Damping capacity is a measure of a material’s ability to dissipate elastic strain energy during mechanical vibration or wave propagation. When ranked according to damping capacity, materials may be roughly categorized as either high or low damping. Low damping materials may be utilized in musical instruments where sustained mechanical vibration and acoustic wave propagation is desired. Conversely, high damping materials are valuable in suppressing vibration for the control of noise and for the stability of sensitive systems and instruments.

- Best damping capacity of any metal
- Lightweight material accommodates heavier loads
- Allows for higher resonant frequencies over aluminum
- Energy savings
Properties of Magnesium Alloys AZ31B-Tool Plate
AZ31B-TP has a density of 0.064 lbs/inch³ (1.78g/cm³) which is 30% lower than aluminum alloys. AZ31B-TP is suitable for vibration fixtures and with improved damping capacity has a yield strength of 10Ksi, ultimate tensile strength of 30Ksi, elongation of 9% and a Young's Modulus of 40GPa.

The low density and high damping capacity make AZ31B-TP the material of choice for vibration test fixtures. Fixtures fabricated from AZ31B-TP exhibit higher resonant frequencies relative to equivalent aluminium structures. This allows testing to be carried out at higher frequencies and shorter test times, reducing testing costs. The low density of the tooling plate leads to fixtures with lower weight. This has several benefits. Vibration test machines are limited to a maximum force that they can exert. As F=ma and high acceleration enables higher frequencies within a defined displacement, the reduced mass of a magnesium fixture increases the overall envelope of operation of any given vibration test bed. This allows multiple parts to be run in the same test, greatly reducing the overall cost.

AZ31B-TP is weldable and is stable allowing fabrication of complex fixtures.

SPECIFIC DAMPING CAPACITY
- AA6061-T6, Zn, Ti, 1.50%
- Cast irons, Ni alloys 2.50%
- Pure Al, Cu 3.50%
- Steel 4%
- Mg Alloy- AZ31B-F 10%

Visit www.luxfermrp.com for more information.

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Photos courtesy of Baughn Engineering