

MIL-LX CERTIFICATION UPDATE TF-1500-0500

Service Bulletin



June 2020

Humanetics is updating the certification test fixture and corridors used to validate the MIL-LX lower leg.

Background

MIL-LX LOWER LEG

The MIL-LX (Military Lower Extremity) lower leg is designed as a surrogate for analyzing the effectiveness of Anti-Vehicular Land Mine (AVLM) countermeasures. It is a straight leg design with energy-absorbing elements, optimized for measurement of vertical forces and accelerations. The MIL-LX lower leg is certified on the Humanetics drop tower using a specially designed mounting fixture.

Update

NEW TF-1500-0500 TEST FIXTURE

Humanetics has developed a new and improved TF-1500-0500 MIL-LX test fixture for the drop tower which incorporates many new features to reduce test variability. These include an X-Y table design to properly align the centerline of the leg under the centerline of the drop impactor mass and added thickness to the X-Y table to reduce fixture oscillation and movement. Additionally, a combination of multiple accelerometers were added to the drop impactor to translate the acceleration to the center of the drop mass.

The original fixture TF-1500-0283 (Figure 1) had a fixed leg mount, and a single accelerometer mounted off center of the drop impactor, whereas the improved design (Figure 2) has more adjustability and mass. The new TF-1500-0500 test fixture adds the capability to align the leg directly under the drop impactor, so the loading path aligns with the center of the leg. It has added accelerometers around the rim of the drop impactor so the accelerations can be averaged and then translated to the center of the mass.

UPDATED CERTIFICATION CORRIDORS

During validation testing of the new TF-1500-0500 fixture, varying test results were produced. As a result of the test analysis, updated certification corridors were developed for use with the new fixture. These new corridors were established using MIL-LX legs which passed both the old test corridors as well as the new, generating confidence that existing legs in the field will still pass the updated certification.

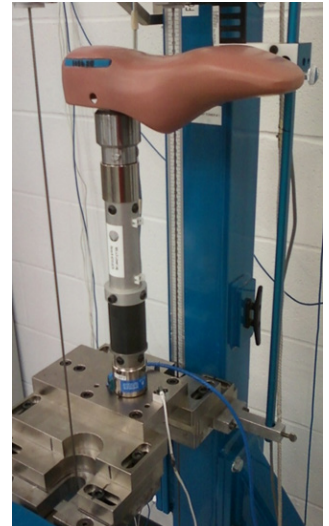


Figure 1 - Original MIL-LX test setup Figure 2 - New F-1500-0500 setup

The updated test corridors are in Table 1 and the updated channels appear in Table 2.

Table 1 - Updated Test Corridors

Test Parameter	Units	Lower Limit	Upper Limit
Temperature	°C	20.6	22.2
Humidity	%RH	10	70
Velocity	m/s	7.95	8.05
Peak Impactor Force	kN	-17.1	-14.0
Peak Upper Tibia FZ Force	kN	-5.6	-4.6
Peak Fixture Acceleration	g	-40	40

Table 2 - Updated Fixture Channels

Channels	Filter Class	Comments
Velocity	None	Trigger
Probe Accelerometer #1	CFC-1000	TO @ 5g's
Probe Accelerometer #2	CFC-1000	
Probe Accelerometer #3	CFC-1000	
Upper Tibia FZ	CFC-600	
Fixture Accelerometer	CFC-1000	
Probe	N/A	4.095-4.115kg

Rev 1, June 2020