



# 50th Ball Bearing Knee Slider

Model Number: EX-593



## INTRODUCTION

Denton ATD 50th Ball Bearing Knee Slider units have been designed for the Hybrid III 50% Male Test Dummies. The Ball Bearing Slider is a knee slider mechanism which does not bind under high off-axis loading. Older knee slider designs allowed measurement of tibia-femur displacement with Hybrid III style test dummies. However, when subjected to off axis or combined loading, the internal friction caused them to "stick". This new slider uses ball bearing technology to virtually eliminate friction under any loading conditions. Assemblies are available as direct replacements on existing ATDs.

## FEATURES

The Advanced Lower Extremity (ALEX) development project had the goal of developing biofidelic lower extremities with advanced injury prediction capabilities for frontal crash test dummies. The testing identified a need for improvement in the sliding knee mechanism.

The Vehicle Research and Test Center conducted a study in 1994 to evaluate four prototype knee slider designs and compared their performance to that of the standard knee slider. The V.R.T.C evaluation was conducted with a series of tests developed to simulate a broad range of moderate to severe impact environments that the knee sliders may encounter. In each test, a fully instrumented Hybrid III 50th Percentile dummy lower extremity, containing the prototype knee slider, was impacted below the knee by a variety of masses at different orientations and speeds. The results of Denton ATD's Ball Slider proved to be outstanding. The stiffness response of the ball slider is very repeatable at all input energies tested and in all cases its response fell into tight corridors. When tested with varying knee flexion angles, the ball slider responds very similarly in stiffness despite a significant, though relatively slight, change in initial load. Large axial tibia loads show only minimal changes in initial load and stiffness.

Denton ATD's 50th Ball Bearing Knee Slider unit consists of a right and left side slider assembly. Knee assemblies are included in the complete package.

### Each knee assembly includes:

- Inboard Slider Assembly
- Outboard Slider Assembly
- Machined Knee, Modified
- String Potentiometer, Miniature
- Potentiometer String Pot Assembly