

SEPTEMBER 2022 | CASE STUDY

Leak Tests of Hydraulic Polycentric Disarticulation Knee Joints

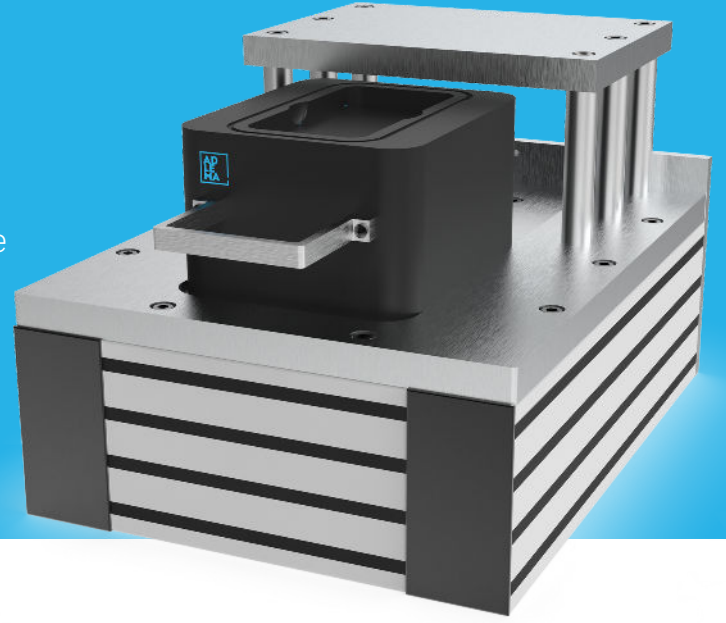
Hydraulic polycentric disarticulation knee joints allow amputees to have healthy knee joint functions as closely as possible. It is necessary for people with prosthetic limbs to walk comfortably.

The force required for swing and stance movement during walking is provided by the hydraulic piston. Twisting resistance and damping also provide a comfortable movement by mimicking a healthy knee. The leakage of hydraulic fluid out of the piston affects the performance of the joint and impairs the comfort of the user. It may cause malfunctions. For this reason, every product leaving the production line must pass the leak tests.



TEST METHOD

Hydraulic polycentric disarticulation knee joints do not have holes that can be vented to pressurize the product or test it by vacuum method. Leak tests should be done by means of the control volume created in the external environment. EP60 test apparatus is used in the leak tests of this product.



In one of the scenarios where leak-proof is expected, the liquid leaving the product is tested. Since the hydraulic fluid out of the product is tested, the leak test should be done by vacuum method for a healthier and faster leak test. Since the product filled with hydraulic fluid is tested, the leakage of the incompressible liquid cannot be tested by pressurizing the outside of the product. Even if the product leaks, the penetration of compressed air into the product will be blocked by the hydraulic fluid, making it difficult to detect leaks.

The product is placed in the EP60 Test Apparatus. Since the control volume will be smaller compared to the product volume, the sensitivity of the test will be high. In the leak tests where the pressure method and the control volume are used, in case of leakage of the product, the pressure decays as the air particles in the control volume will pass into the product. BT4000 series Advanced Level LeakTesting Device, which can monitor the pressure with an accuracy of 0.1 Pa, automatically decide whether the product is OK or NOK. When the vacuum method is used in the control volume, the negative pressure remains constant if the product does not leak. In case the product leaks, the particles coming out of the product to the control volume increase the pressure in the control volume. BT4000 series Advanced Level LeakTesting Device automatically decides the leakage of the product. Approved products are ready to improve people's lives.

