

Anti-G pilot boots - Eurofighters How comfort can be improved

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Key Words:

Comfort, anti G- pilot boots, Eurofighter, Waterproofness, Breathability, Durability, Construction methods.

Abstract:

Background:

The scope was the developing of a boot system for the Eurofighter pilots. The wearing comfort and anti-G properties were considered as the critical issues for optimum performance of the pilots. The system should be without any support from conventional pneumatic systems. At high G exposures of up to 9 times the acceleration of gravity, blood injuries in the feet will be seen, if the pilot is not wearing the right footwear. Positive G-force will always exposed the feet of the pilot for the highest blood pressure. Pilots are mainly affected by G-forces, which are directed towards their feet.

The anti-G suits, including boots, are the most important precautions to save the pilots from the centrifugal forces.

The wearing comfort consists of 2 main elements, ergonomic and physiological features.

Ergonomic features:

Boots are build on a last. The last is the key to ergonomic comfort. By choosing the right last it is possible to develop a boot where the fitting is very tight. The right last in combination with the right leather (very soft) will even support the fitting area of the boots, which means that you can develop anti-G features.

To optimize the inflation of the boots, a special one-hand lace system was used.

Furthermore, the boots should be antistatic and the sole unit should provide the pilot with the best feeling/sensibility in the foot area during flying.

When not flying, the pilot should be offered the protection from water and cold conditions and of course it should be possible to run / walk over longer distances in an emergency situation. This can be achieved with membrane technology and by NOT using pneumatic support systems.

Physiological features:

The pilot is generally under a lot of stress, which means that the boots must allow moisture vapor to pass. Furthermore, the air convection is very low due to the close fitting of the boots. Therefore the humidity transmission becomes even more important. In other words, the components of the boots must be very breathable.

To optimize the breathability of the boots is a matter of design, components and production technology. Wrong design can lead to very low breathability and the same can happen when the wrong production technology is used.

All this should be done with respect to the durability and waterproofness of the boots.

Conclusion:

By using the combination of the know-how from the shoe manufacturer and the test pilots, it was possible to develop a boot system which optimized the comfort of the boots with the anti G properties that were needed without using a pneumatic system. This will provide the pilot with the best boots in an emergency situation. A boot where you can walk or even run over longer distances.

Limitation: Approved for public release

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