

DELIVERING AN EVOLVING HIGH-END TECHNOLOGY TO NICHE CUSTOMERS AND MEETING CHANGING REGULATIONS

Surprisingly, current Formula 1 cars weighing just 746 kg require Power Assisted Steering (PAS) systems because of the extreme levels of downforce generated at speeds of over 300 km/h.

MARKET



Motorsport



Automotive



Niche Automation

OTHER APPLICATIONS



Simulation



Test



Oil & Gas

CAPABILITY



Global Focus



Established Culture



Support



Expertise



Modelling & Simulation



THE CHALLENGE

Initially, Formula 1 allowed complex software controlled PAS systems, featuring multiple redundancy for safety. However, in 2002 an FIA cost-cutting initiative, outlawed the use of any electronic controls in power steering. The teams first investigated electric motor based solutions but reverted to more 'power dense' hydraulic technology. Following this regulation change, a variety of hydro-mechanical approaches were tried, however these were larger than ideal and challenging to set up.

THE RESULT

To address this issue, in 2005 Moog introduced a miniature linear hydro-mechanical power steering valve, the E243 Series, which was quickly adopted by the F1 teams.

The E243 valve, incorporated hydro-mechanical servo technology that Moog had first used in the US space programme back in the 1960s, when electronics were not considered sufficiently reliable for some critical systems.

Moog selected the power stage of a conventional servovalve, as a control element that could be integrated in the car's steering rack. Using an innovative approach, 'shaped' hydraulic ports within the E243 valve, along with springs and orifices were used to replicate software "lookup table" functionality. This approach allowed easy tuning of assistance level and system linearity, to give the driver the precise steering "feel" required.

Over the intervening years the Moog E243 valve range has been refined to reduce weight and improve controllability and today the entire F1 grid uses these tiny but essential devices.



E243-500/501 FAILSAFE SWITCHING VALVES

Contact us today to find out more about Moog precision motion control on 01684 858000