

SPACE PROPULSION SYMPOSIUM (C4)

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DEVELOPMENT OF FLUID CONTROL COMPONENTS FOR LIQUID PROPULSION SYSTEMS OF ISRO

Abstract

Fluid Control Components play vital role in the successful operation of Liquid Propulsion Systems in launch vehicles and satellites of ISRO. They perform a wide variety of functions which include admission or cut off of propellants into the engines, filling and draining of propellants and stored gases, chilling of cryo propellant feed lines, pressure regulation, flow modulation, start and stop of engines, flow cut off and isolation etc. They handle different fluids including corrosive propellants, hot and cold gases, cryogenic fluids etc.,

The fluid components development in ISRO has evolved over last four decades, starting from direct acting simple solenoid valves and pressure regulators to large multi functional modules and miniaturised valves for micro thrust control. All the fluid control components required for the Liquid Propulsion Systems of Launch vehicles and Spacecrafts including the cryo stages have been indigenously designed and developed. The experience gained over the years during manufacturing, development, qualification, acceptance testing and flight system integration had provided a wealth of data which were useful in the refinement of design criteria and principles in the area of fluid control components.

This paper presents the development and flight pedigree of fluid control components which covers the following details:

Role of fluid control components Various types of fluid components developed Systems which use these components and missions accomplished Design aspects for various types of components Criticalities involved in the realization of components Materials used and fabrication methods for realization of the components Facilities and equipments used for realization of the components.