



# **NASA Solid Propellant Grain Design and Internal Ballistics (Space Vehicle Design Criteria (Chemical Propulsion))**

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# NASA Solid Propellant Grain Design and Internal Ballistics (Space Vehicle Design Criteria (Chemical Propulsion))

## NASA Solid Propellant Grain Design and Internal Ballistics (Space Vehicle Design Criteria (Chemical Propulsion))

Probably the best book of its kind. If you design, build, test, or use solid propellant rockets, you need this reference handbook. It's the official NASA solid propellant design and ballistics guide, loaded with once highly-secret ballistics data, configuration geometry, burn rate parameters, scientific analyses, rocketry information, and military missile lore, providing data on all types of rocket and missile propellant grains. This valuable book gives the practical information you need to design and build a high-technology, state-of-the-art composite solid propellant rocket motor. The contents are the result of more than 25 years of investigations by the world's largest propulsion contractors. Literally millions of dollars were spent obtaining this critical yet hard-to-find data. The ballistic aspects of grain design are studied, outlining the steps necessary to achieve a successful grain design. The relationships of the grain design to steady-state mass balance and erosive burning are considered. Grain design criteria is reviewed, and recommended design criteria are included. This is the most complete and comprehensive book ever written about the theoretical and practical engineering design of solid propellant grains. It also covers best grain configuration for a given mission, analytical techniques for geometric analysis, drafting techniques, attaining optimum average thrust, duration, and impulse. Covers specific impulse, burn rate, propellant density; average and maximum expected operating pressures; nozzle throat area and expansion ratios; volumetric loading fractions; web fractions; port-to-throat area ratios; length-to-diameter ratios; configuration selection; ballistic constraints; processing practicality; structural integrity; burning rate augmentation and steady-state mass balance. Covers every topic related to solid rocket motor grain design. Superb reference textbook. It's especially useful for "amateur" rocket builders.

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