

Bell Nozzle Rocket Engine Calculations

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August 6, 2025

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Nomenclature

C_f	Vacuum thrust coefficient
\dot{m}	Mass flow rate
M	Molar mass
Ma	Mach number
$mol\%$	Mole percentage
P	Pressure
R	Gas constant
T	Temperature
v	Velocity
ϵ	Nozzle area ratio
γ	Ratio of specific heats
ρ	Density

Subscripts

a	Ambient
c	Chamber
e	Exit
s	Stagnation
t	Throat

Introduction

Documentation of calculations for a bell nozzle rocket engine

1 Propellant

1.1 Propellant Stoichiometry

2 Exhaust Gasses

2.1 Ratio of Specific Heats of a Multi-Compound Gas

2.2 Stagnation Pressure

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3 Combustion Chamber Geometry

4 Throat Geometry

5 Nozzle Geometry