Two-Stage Steam Rocket Design

Engineering Proposal for Aerospace Design Project

Prepared: April 13, 2025

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# Executive Summary

This proposal outlines the design and engineering specifications for a two-stage steam-powered rocket system. Our design addresses all requirements specified in the project brief, providing detailed AutoCAD designs, pressure system analysis, and comprehensive thrust and propellant calculations.

Key features of our proposed solution include:

A two-stage vehicle with modular separation system for optimal performance

Detailed pressure vessel design with appropriate safety factors

Comprehensive thrust calculations for steam propulsion

Precise propellant (water) requirements for specified mission parameters

Complete set of engineering drawings and specifications for manufacturing

# Technical Approach

Our approach to the steam rocket design combines fundamental engineering principles with practical design considerations to achieve a reliable and efficient propulsion system.

## Steam Propulsion Principles

[Placeholder for steam propulsion explanation and equations]

## Two-Stage Design Rationale

[Placeholder for two-stage design explanation]

## Material Selection

[Placeholder for material selection explanation]

# Design Specifications

The following specifications detail the engineering parameters for both stages of the rocket system, including pressure vessel requirements, nozzle geometry, and performance calculations.

## First Stage Specifications

[Placeholder for first stage specifications]

## Second Stage Specifications

[Placeholder for second stage specifications]

## Performance Calculations

[Placeholder for performance calculations and charts]

# Engineering Drawings

The following section contains engineering drawings and visualizations of the rocket design, including component layouts, stage separation interfaces, and structural outlines.

## Overall Vehicle Configuration

[Placeholder for vehicle configuration drawings]

## Pressure Vessel Design

[Placeholder for pressure vessel drawings]

## Nozzle Geometry

[Placeholder for nozzle geometry drawings]

# Project Implementation

The following timeline and deliverables outline our approach to implementing this design project, including key milestones and delivery schedule.

## Timeline

[Placeholder for project timeline]

## Deliverables

The complete project includes the following deliverables:

AutoCAD (.dwg) files for the complete two-stage vehicle

PDF report with pressure vessel calculations and safety analysis

Excel spreadsheet with thrust and propellant calculations

3D model files (.step or .stl) for visualization and manufacturing

Technical documentation with assembly and integration instructions

# Appendix: Detailed Calculations

This appendix contains the detailed engineering calculations for the steam rocket design, including mathematical derivations, parameter sensitivity analysis, and reference data.

## Thrust Calculations

[Placeholder for detailed thrust calculations]

## Pressure Vessel Analysis

[Placeholder for pressure vessel analysis]

## Propellant Requirements

[Placeholder for propellant calculations]