Automotive Frame Spec Sheet

Title: Automotive Lightweight Frame Design — Spec Sheet

1. Project Overview

- Project Name: Automotive Lightweight Frame Design
- Version / Rev: v1.0 (2025-08-14)
- Owner: Caleb
- Purpose: Reduce frame mass while maintaining structural integrity

2. Key Specifications

- Target Mass: — kg (± —%)
- Achieved Mass: — kg
- Weight Reduction vs Baseline: 15%
- Safety Factor: ≥ 2.5
- Max Von Mises Stress: — MPa
- Global Stiffness: — Nm/deg
- Modal Frequency (1st Bending): — Hz
- Corrosion Protection: E-coat + powder

3. Materials

Subsystem	Material Grade	Yield (MPa)	UTS (MPa)	Notes
Main rails	6061-T6	—	—	
Cross members	—	—	—	
Brackets/Gussets	—	—	—	

Summary

This spec sheet summarizes core design goals, engineering parameters, and material choices for the project. Additional sections on loads, geometry, manufacturing, simulation results, quality inspections, and compliance are documented in the full technical package.

Electronics Housing Case Study

Title: Consumer Electronics Housing Design — Case Study

Introduction

This project aimed to design a lightweight housing for a portable electronic device while ensuring efficient cooling and durability.

Design Process

- Created initial housing using SolidWorks sheet metal tools.
- Conducted thermal simulations to optimize cooling and airflow.

Outcome

- Lightweight housing design minimized thermal build-up.

- Improved device lifespan and reliability.

Electronics Housing Drawings

Title: Consumer Electronics Housing Design — Drawings

Contents

- Top view, side view, and isometric views.
- Sheet metal fold and bend details.
- Mounting features for internal components.
- Material thickness and tolerances indicated.

Notes

- Ensure correct bend radii for assembly.
- Thermal ventilation openings highlighted.
- Reference all dimensions against CAD model for accuracy.

Industrial Pump Case Study

Title: Industrial Pump Assembly — Case Study

Introduction
Redesign of an industrial pump assembly to improve efficiency and reduce maintenance requirements.

Design Process

- Analyzed existing pump design to identify areas for improvement.
- Developed detailed 3D models of all components.
- Conducted flow simulations to optimize fluid dynamics.

Outcome

- Pump efficiency increased by 22%.
- Maintenance frequency reduced by 35%.

Industrial Pump Maintenance Guide

Title: Industrial Pump Assembly — Maintenance Guide

Contents

- Safety precautions before servicing.
- Step-by-step disassembly procedure.
- Cleaning and lubrication requirements.

- Reassembly instructions and torque specifications.
- Inspection checklist for wear, corrosion, and alignment.

Notes

- Use OEM replacement parts for all critical components.
- Follow proper safety and lockout procedures.
- Record maintenance in logbook for tracking service intervals.