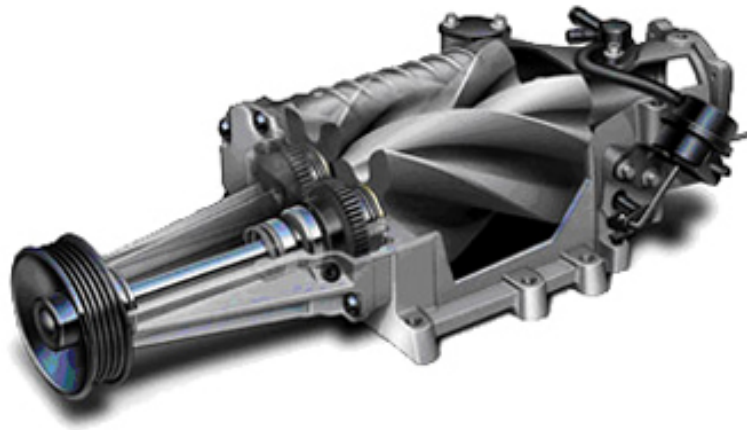


PRODUCT SPECIFICATION

TITLE	DATE	REV
Product Requirements	24 May 2018	0

Project Supercharger Product Requirements



Need 4 Speed
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PRODUCT SPECIFICATION

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Document History

Rev Number	Date	Modified By	Reason
0	18June2019	A.Hoang	Initial Release
0	18June2019	N.Miller	Initial Release
0	18June2019	B.Connolly	Initial Release
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1 Objective

The objective of this document is to document the requirements to design and manufacture a supercharged single-cylinder four-stroke engine that would fit in a snowmobile chassis.

2 Scope

The scope of this document is to define the requirements that is needed to satisfy the client and to design the layout of the KTM engine with the Eaton supercharger, new crankcase, and redesigning the rotating assembly.

3 References

3.1 Cited Documents

“1248 Standard for Engine-Generator Assemblies for Use in Recreational Vehicles | Standards Catalog.” UL, UL LLC, 2019, standardscatalog.ul.com/standards/en/standard_1248_3.

3.2 Acronyms

V Voltage
A Ampere
HP Horse Power

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4 Functional Requirements

4.1 User Interface Requirements

The operator shall be able to start the engine with an electric starter.

4.2 What it should do

Once the complete engine assembly is finished and the supercharger is added, it should be able to fit within the snowmobile chassis and be ready for testing/calibration.

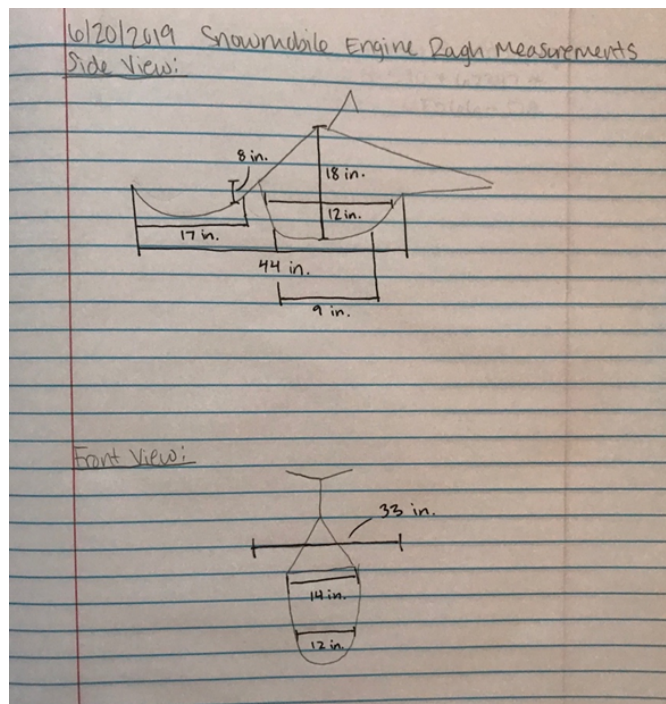
5 Mechanical Requirements

5.1 Strength Requirements

The design shall be able to produce no more than 80 HP with the functioning supercharger.

5.2 Spatial Requirements

The KTM engine and supercharger must fit within the snowmobile chassis. The dimensions of the snowmobile is below.



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5.3 Weight/Mass Requirements

The total weight shall not exceed 60 lbs.

5.4 Mounting / Interface Requirements

The mounting/interface requirements will become known once the original snowmobile engine can be removed and the KTM engine can be placed inside the chassis.

5.5 Appearance Requirements

There are currently no major appearance requirements.

5.6 Durability Requirements

The system won't be designed for long term use, but instead a proof of concept that we can get the KTM engine and supercharger installed inside the snowmobile and ideally become temporarily operational.

5.7 Reliability Requirements

All components (bearings) shall have a 90% reliability

6 Electrical Requirements

6.1 Operational Voltage

During operation the bus voltage shall remain above 12 V.

6.2 Operational Power Capability

During operation, the battery pack shall be capable of delivering or absorbing power per 14.0 – 15.0 V when fully charged.

6.3 Energy Storage Capacity

The battery shall target a maximum period of 10 hours at 0.5 A and a maximum of 14.4 V for recharge.

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7 Software Requirements

7.1 Functionality

The software allow users to design the layout of the engine, crankcase, and the rotating assembly of the KTM engine.

7.2 User Interface

SOLIDWORKS will be used throughout this project to design the KTM engine and the Eaton supercharger to fit into a snowmobile.

8 Environmental Requirements

8.1 Temperature

The Product is expected to have full operational capabilities in environments with ambient temperatures of -40°F to 158°F.

8.2 Environmental Sealing

In accordance with the international quality management ISO 9001 standard, KTM uses quality assurance processes that lead to the highest possible product quality.

9 Regulatory Requirements

9.1 UL Requirements

The components shall comply with the UL 1248 Standard.

9.2 Shipping Requirements

The KTM engine and Eaton supercharger should be bubble-wrapped and packaged in a cardboard box during shipment.

10 Cost Requirements

10.1 Prototype Cost

The total budget for this project will be around \$500. However, this does not include the stock KTM engine and the Eaton supercharger because we are already in possession of these parts. The remaining new and unexpected parts will be covered by our \$500 budget.

The expected parts will vary but might include some of the following: crank case, chain drives, gaskets, piping, lubricants, fuel, coolant, spark plugs, and raw materials.

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Machining and shop labor will be completed for free by the group members. The tools, machines, and location will be provided for free from the University of Idaho Machine Shop and Gauss Johnson senior design suite.

10.2 Production Requirements

There will only be one prototype produced by this group and the costs for this will all be included into one production sheet.

11 Schedule Requirements

The following are the major Project Milestones:

Summer 2019

- Client Visits June. 18, 2019
- Product Requirements Doc. Due June 24, 2019
- 2nd Client/Instructor Meeting June 25, 2019
- Design Validation and Concept Review July 1, 2019
- Project Schedule Due July 1, 2019
- 3rd Client/Instructor Meeting July 2, 2019
- Portfolio, Wiki page, Logbook Due July 5, 2019
- Snapshot Day 1 (Wiki page) July 8 , 2019
- 4th Client/Instructor Meeting July 9, 2019
- Design Validation Plan Due July 15, 2019
- 5th Client/Instructor Meeting July 16, 2019
- Project Value Proposition Due July 22, 2019
- 6th Client/Instructor Meeting July 23, 2019
- Snapshot Day 2 (Expectations) July 29, 2019
- Snapshot day 2 (GJ Design Suite) Aug. 1, 2019
- Portfolio Due Aug. 2, 2019

Fall 2019

- Semester Schedule and Re-group Aug. 27, 2019
- Engineering Release Review Sept. 27, 2019
- Industry Panel Oct. 1, 2019
- Logbook Due Oct. 10, 2019
- Snapshot Day 3 Oct. 15, 2019
- Wiki page Review Session Nov. 12, 2019

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- Team Member Citizenship Assessment Nov. 22, 2019
- Snapshot Prep Dec. 3, 2019
- Snapshot Day 4 Dec. 6, 2019
- Wiki page Review Session Dec 10, 2019
- Course Deliverables Due Dec. 13, 2019