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|  | |  | | --- | | **Simulation of Aluminum Combustion Chamber**  **Date: Saturday, October 19, 2019 Designer: Solidworks**  **Study name: Design Study 1**  **Analysis type: Design Study** | | Table of Contents  [Description 1](#_Toc22346857)  [Assumptions 2](#_Toc22346858)  [Model Information 2](#_Toc22346859)  [Study Properties 2](#_Toc22346860)  [Units 3](#_Toc22346861)  [Design Study Setup 3](#_Toc22346862)  [Study Results 4](#_Toc22346863)  [Conclusion 4](#_Toc22346864) | |
| Description No Data |

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| Assumptions |

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| Model Information  |  |  |  |  | | --- | --- | --- | --- | | Document Name | Configuration | Document Path | Date Modified | | Aluminum Combustion Chamber | Default | C:\Users\User\Desktop\UNHSEDS\Engineering\2019-2020\CATO\_HybridRocket\Propulsion\Runaway V2\Combustion Chamber\Material Type\Aluminum Combustion Chamber.SLDPRT | Oct 19 02:58:26 2019 | |

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| Study Properties  |  |  | | --- | --- | | Study name | Design Study 1 | | Analysis type | Design Study | | Design Study Quality | High quality (slower) | | Result folder | SOLIDWORKS document(C:\Users\User\Desktop\UNHSEDS\Engineering\2019-2020\CATO\_HybridRocket\Propulsion\Runaway V2\Combustion Chamber\Material Type) | |

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| Units  |  |  | | --- | --- | | Unit system: | SI (MKS) | | Length/Displacement | mm | | Temperature | Kelvin | | Angular velocity | Rad/sec | | Pressure/Stress | N/m^2 | |

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| **Design Study Setup** **Design Variables**   | ****Name**** | ****Type**** | ****Value**** | ****Units**** | | --- | --- | --- | --- | | **OD** | **Range with Step** | Min:3.1 Max:3.5 Step:0.1 | in |   **Constraints**   | ****Sensor name**** | ****Condition**** | ****Bounds**** | ****Units**** | ****Study name**** | | --- | --- | --- | --- | --- | | **Minimum Factor of Safety1** | **Monitor Only** | - | - | Static 1 | | **Mass1** | **Monitor Only** | - | - | - | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Study Results 6 of 6 scenarios ran successfully.   | Component name | Units | Current | Initial | Optimal | Scenario1 | Scenario2 | | --- | --- | --- | --- | --- | --- | --- | | OD | in | 3.1 | 3.1 | - | 3.1 | 3.2 | | Minimum Factor of Safety1 |  | 2.503646 | 2.503646 | - | 2.503646 | 4.862496 | | Mass1 | lb | 1.7164608 | 1.7164608 | - | 1.7164608 | 2.22324 |  | Component name | Units | Scenario3 | Scenario4 | Scenario5 | | --- | --- | --- | --- | --- | | OD | in | 3.3 | 3.4 | 3.5 | | Minimum Factor of Safety1 |  | 7.005427 | 8.939787 | 10.801476 | | Mass1 | lb | 2.746107 | 3.285063 | 3.840107 | |

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| Conclusion |