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|  | |  | | --- | | **Simulation of Ammo Base**  **Date: Monday, May 10, 2021 Designer: Cameron Rosenberger**  **Study name: Static 2**  **Analysis type: Static** | | Table of Contents  [Description 1](#_Toc71562989)  [Assumptions 2](#_Toc71562990)  [Model Information 3](#_Toc71562991)  [Study Properties 4](#_Toc71562992)  [Units 5](#_Toc71562993)  [Material Properties 5](#_Toc71562994)  [Loads and Fixtures 6](#_Toc71562995)  [Connector Definitions 7](#_Toc71562996)  [Contact Information 7](#_Toc71562997)  [Mesh information 8](#_Toc71562998)  [Sensor Details 10](#_Toc71562999)  [Resultant Forces 11](#_Toc71563000)  [Beams 11](#_Toc71563001)  [Study Results 12](#_Toc71563002)  [Conclusion 17](#_Toc71563003) | |
| Description No Data |

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| Assumptions  |  |  | | --- | --- | | Original Model | Model Analyzed | |

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| Model Information  |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | |  |   ****Model name:** Ammo Base**  ****Current Configuration:** Default** | | | | | ****Solid Bodies**** | | | | | ****Document Name and Reference**** | ****Treated As**** | ****Volumetric Properties**** | ****Document Path/Date Modified**** | | **Fillet6** | **Solid Body** | ****Mass:1.26292 kg****  ****Volume:0.00046775 m^3****  ****Density:2,700 kg/m^3****  ****Weight:12.3767 N**** | ****\\apporto.com\dfs\SMU\Users\47865731\_smu\Documents\Ammo Base.SLDPRT****  **May 9 17:42:07 2021** | |

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| Study Properties  |  |  | | --- | --- | | Study name | Static 2 | | Analysis type | Static | | Mesh type | Solid Mesh | | Thermal Effect: | On | | Thermal option | Include temperature loads | | Zero strain temperature | 298 Kelvin | | Include fluid pressure effects from SOLIDWORKS Flow Simulation | Off | | Solver type | FFEPlus | | Inplane Effect: | Off | | Soft Spring: | Off | | Inertial Relief: | Off | | Incompatible bonding options | Automatic | | Large displacement | Off | | Compute free body forces | On | | Friction | Off | | Use Adaptive Method: | h-Adaptive | | Result folder | SOLIDWORKS document (\\apporto.com\dfs\SMU\Users\47865731\_smu\Documents) |  h-Adaptive Options  |  |  | | --- | --- | | Target accuracy | 98 % | | Accuracy bias | 50 | | Maximum no. of loops | 3 | | Mesh coarsening | Off | |

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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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| Material Properties  |  |  |  | | --- | --- | --- | | ****Model Reference**** | ****Properties**** | ****Components**** | |  | |  |  | | --- | --- | | ****Name:**** | **1060 Alloy** | | ****Model type:**** | **Linear Elastic Isotropic** | | ****Default failure criterion:**** | **Unknown** | | ****Yield strength:**** | **2.75742e+07 N/m^2** | | ****Tensile strength:**** | **6.89356e+07 N/m^2** | | ****Elastic modulus:**** | **6.9e+10 N/m^2** | | ****Poisson's ratio:**** | **0.33** | | ****Mass density:**** | **2,700 kg/m^3** | | ****Shear modulus:**** | **2.7e+10 N/m^2** | | ****Thermal expansion coefficient:**** | **2.4e-05 /Kelvin** | | **SolidBody 3(Fillet6)(Ammo Base)** | | **Curve Data:N/A** | | | |

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| **Loads and Fixtures**  | ****Fixture name**** | ****Fixture Image**** | ****Fixture Details**** | | --- | --- | --- | | **Fixed-3** |  | |  |  | | --- | --- | | Entities: | **1 edge(s), 3 face(s)** | | Type: | **Fixed Geometry** | | | ****Resultant Forces****   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Components** | **X** | **Y** | **Z** | **Resultant** | | **Reaction force(N)** | **-0.0279882** | **222.37** | **-0.0605838** | **222.37** | | **Reaction Moment(N.m)** | **0** | **0** | **0** | **0** | | | |  | ****Load name**** | ****Load Image**** | ****Load Details**** | | --- | --- | --- | | **Force-2** |  | |  |  | | --- | --- | | Entities: | **1 face(s)** | | Type: | **Apply normal force** | | Value: | **50 lbf** | | | **Force-3** |  | |  |  | | --- | --- | | Entities: | **4 face(s)** | | Type: | **Apply normal force** | | Value: | **25 lbf** | | |

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| Connector Definitions No Data |

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| Contact Information No Data |

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| Mesh information  |  |  | | --- | --- | | Mesh type | Solid Mesh | | Mesher Used: | Standard mesh | | Automatic Transition: | Off | | Include Mesh Auto Loops: | Off | | Jacobian points for High quality mesh | 16 Points | | Element Size | 0.42068 in | | Tolerance | 0.021034 in | | Mesh Quality | High |  Mesh information - Details  |  |  | | --- | --- | | Total Nodes | 73818 | | Total Elements | 41384 | | Maximum Aspect Ratio | 19.945 | | % of elements with Aspect Ratio < 3 | 17.8 | | Percentage of elements with Aspect Ratio > 10 | 2.7 | | Percentage of distorted elements | 0 | | Time to complete mesh(hh;mm;ss): | 00:00:02 | | Computer name: | NV-SMU1-GPU1 | |  | | |

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| Sensor Details  | Sensor name | Location | Sensor Details | | --- | --- | --- | | Displacement1 |  | Value : 6.570e-03 mm  Entities :  Result :Displacement  Component :URES: Resultant Displacement  Criterion :Model Max  Step Criterion : Across all Steps  Step No.:1  Alert Value: NA | | Stress1 |  | Value : 1.807e+06 N/m^2  Entities :  Result :Stress  Component :VON: von Mises Stress  Criterion :Model Max  Step Criterion : Across all Steps  Step No.:1  Alert Value: NA | |

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| Resultant ForcesReaction forces  | Selection set | Units | Sum X | Sum Y | Sum Z | Resultant | | --- | --- | --- | --- | --- | --- | | Entire Model | N | -0.0279882 | 222.37 | -0.0605838 | 222.37 |  Reaction Moments  | Selection set | Units | Sum X | Sum Y | Sum Z | Resultant | | --- | --- | --- | --- | --- | --- | | Entire Model | N.m | 0 | 0 | 0 | 0 | |
| Free body forces  | Selection set | Units | Sum X | Sum Y | Sum Z | Resultant | | --- | --- | --- | --- | --- | --- | | Entire Model | N | 2.29546 | -0.031976 | 1.8146 | 2.92625 |  Free body moments  | Selection set | Units | Sum X | Sum Y | Sum Z | Resultant | | --- | --- | --- | --- | --- | --- | | Entire Model | N.m | 0 | 0 | 0 | 1e-33 | |

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| Beams No Data |

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| Study Results  | Name | Type | Min | Max | | --- | --- | --- | --- | | Stress1 | VON: von Mises Stress | 2.203e+03N/m^2  Node: 38403 | 8.871e+06N/m^2  Node: 20202 | | **Ammo Base-Static 2-Stress-Stress1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Displacement1 | URES: Resultant Displacement | 0.000e+00mm  Node: 9 | 1.657e-01mm  Node: 562 | | **Ammo Base-Static 2-Displacement-Displacement1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Strain1 | ESTRN: Equivalent Strain | 7.284e-08  Element: 4452 | 1.059e-04  Element: 19056 | | **Ammo Base-Static 2-Strain-Strain1** | | | |  | Name | Type | | --- | --- | | Displacement1{1} | Deformed shape | | **Ammo Base-Static 2-Displacement-Displacement1{1}** | |  | Name | Type | | --- | --- | | Design Insight1 | Design Insight | | **Ammo Base-Static 2-Design Insight-Design Insight1** | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Factor of Safety1 | Max von Mises Stress | 3.109e+00  Node: 20202 | 1.251e+04  Node: 38403 | | **Ammo Base-Static 2-Factor of Safety-Factor of Safety1** | | | | |

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| Conclusion |