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|  | |  | | --- | | **Simulation of mte380\_01\_vertical\_mount\_02**  **Date: February 20, 2017 Designer: Solidworks**  **Study name: Bending**  **Analysis type: Static** | | Table of Contents  [Description 1](#_Toc475368891)  [Assumptions 2](#_Toc475368892)  [Model Information 2](#_Toc475368893)  [Study Properties 3](#_Toc475368894)  [Units 3](#_Toc475368895)  [Material Properties 4](#_Toc475368896)  [Loads and Fixtures 4](#_Toc475368897)  [Connector Definitions 5](#_Toc475368898)  [Contact Information 5](#_Toc475368899)  [Mesh Information 6](#_Toc475368900)  [Sensor Details 7](#_Toc475368901)  [Resultant Forces 7](#_Toc475368902)  [Beams 7](#_Toc475368903)  [Study Results 8](#_Toc475368904)  [Conclusion 10](#_Toc475368905)  [Appendix 10](#_Toc475368906) | |
| Description No Data |

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| Assumptions |

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| Model Information  |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | |  |   ****Model name:** mte380\_01\_vertical\_mount\_02**  ****Current Configuration:** Default** | | | | | ****Solid Bodies**** | | | | | ****Document Name and Reference**** | ****Treated As**** | ****Volumetric Properties**** | ****Document Path/Date Modified**** | | **3/16 (0.1875) Diameter Hole1** | **Solid Body** | ****Mass:0.292361 kg****  ****Volume:0.00010909 m^3****  ****Density:2680 kg/m^3****  ****Weight:2.86514 N**** | ****C:\Users\Mickey\Documents\UWaterloo\3rd Year\3B\MTE380\CAD\Lift vJake\mte380\_01\_vertical\_mount\_02.sldprt****  **Feb 19 18:35:54 2017** | |

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| Study Properties  |  |  | | --- | --- | | Study name | Bending | | 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: | Off | | Result folder | SolidWorks document (C:\Users\Mickey\Documents\UWaterloo\3rd Year\3B\MTE380\CAD\Lift vJake) | |

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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:**** | **5052-O** | | ****Model type:**** | **Linear Elastic Isotropic** | | ****Default failure criterion:**** | **Max von Mises Stress** | | ****Yield strength:**** | **9e+007 N/m^2** | | ****Tensile strength:**** | **1.95e+008 N/m^2** | | ****Elastic modulus:**** | **7e+010 N/m^2** | | ****Poisson's ratio:**** | **0.33** | | ****Mass density:**** | **2680 kg/m^3** | | ****Shear modulus:**** | **2.59e+010 N/m^2** | | ****Thermal expansion coefficient:**** | **2.38e-005 /Kelvin** | | **SolidBody 1(3/16 (0.1875) Diameter Hole1)(mte380\_01\_vertical\_mount\_02)** | | **Curve Data:N/A** | | | |

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| **Loads and Fixtures**  | ****Fixture name**** | ****Fixture Image**** | ****Fixture Details**** | | --- | --- | --- | | **Fixed-1** |  | |  |  | | --- | --- | | Entities: | **8 edge(s)** | | Type: | **Fixed Geometry** | | | ****Resultant Forces****   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Components** | **X** | **Y** | **Z** | **Resultant** | | **Reaction force(N)** | **0.00265861** | **22.1064** | **9.36667** | **24.0089** | | **Reaction Moment(N.m)** | **0** | **0** | **0** | **0** | | | |  | ****<L\_LdName/>**** | ****<Label\_LoadImage/>**** | ****<Label\_LoadDetails/>**** | | --- | --- | --- | | **<LoadName/>** | **<Image\_Load/>** | |  |  | | --- | --- | | <Details\_Load/> |  | | |  |  |  | |

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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: | Curvature based mesh | | Jacobian points | 4 Points | | Maximum element size | 0 in | | Minimum element size | 0 in | | Mesh Quality | High |  Mesh Information - Details  |  |  | | --- | --- | | Total Nodes | 18178 | | Total Elements | 8603 | | Maximum Aspect Ratio | 7.5507 | | % of elements with Aspect Ratio < 3 | 94.1 | | % of elements with Aspect Ratio > 10 | 0 | | % of distorted elements(Jacobian) | 0 | | Time to complete mesh(hh;mm;ss): | 00:00:02 | | Computer name: | MICKEYWUUU | |  | | |

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| Sensor Details No Data |

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| Resultant ForcesReaction Forces  | Selection set | Units | Sum X | Sum Y | Sum Z | Resultant | | --- | --- | --- | --- | --- | --- | | Entire Model | N | 0.00265861 | 22.1064 | 9.36667 | 24.0089 |  Reaction Moments  | Selection set | Units | Sum X | Sum Y | Sum Z | Resultant | | --- | --- | --- | --- | --- | --- | | Entire Model | N.m | 0 | 0 | 0 | 0 | |
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| Beams No Data |

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| Study Results  | Name | Type | Min | Max | | --- | --- | --- | --- | | Stress1 | VON: von Mises Stress | 27547.6 N/m^2  Node: 2357 | 1.95796e+007 N/m^2  Node: 968 | | **mte380\_01\_vertical\_mount\_02-Bending-Stress-Stress1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Displacement1 | URES: Resultant Displacement | 0 mm  Node: 133 | 0.70228 mm  Node: 370 | | **mte380\_01\_vertical\_mount\_02-Bending-Displacement-Displacement1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Strain1 | ESTRN: Equivalent Strain | 2.84731e-007  Element: 276 | 0.000128564  Element: 7662 | | **mte380\_01\_vertical\_mount\_02-Bending-Strain-Strain1** | | | |  |  | | --- | |  | | **Image-1** | |

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| Conclusion |

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| Appendix |