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|  | |  | | --- | | **Simulation of vat**  **Date: Sunday, November 16, 2014 Designer: PAM**  **Study name: Study 1**  **Analysis type: Static** | | Table of Contents  [Description 1](#_Toc403918508)  [Assumptions 2](#_Toc403918509)  [Model Information 2](#_Toc403918510)  [Study Properties 5](#_Toc403918511)  [Units 6](#_Toc403918512)  [Material Properties 6](#_Toc403918513)  [Loads and Fixtures 7](#_Toc403918514)  [Connector Definitions 7](#_Toc403918515)  [Contact Information 8](#_Toc403918516)  [Mesh Information 9](#_Toc403918517)  [Sensor Details 10](#_Toc403918518)  [Resultant Forces 10](#_Toc403918519)  [Beams 11](#_Toc403918520)  [Study Results 12](#_Toc403918521)  [Conclusion 15](#_Toc403918522) | |
| Description No Data |

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| Assumptions |

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| Model Information  |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | |  |   ****Model name:** vat**  ****Current Configuration:** Default** | | | | | ****Solid Bodies**** | | | | | ****Document Name and Reference**** | ****Treated As**** | ****Volumetric Properties**** | ****Document Path/Date Modified**** | | **Mirror4** | **Solid Body** | ****Mass:0.208789 kg****  ****Volume:0.000148077 m^3****  ****Density:1410 kg/m^3****  ****Weight:2.04613 N**** | ****C:\Users\Nathaniel Tyler\Desktop\ribbed vat\floor.SLDPRT****  **Nov 16 15:32:44 2014** | | **Mirror5** | **Solid Body** | ****Mass:0.100621 kg****  ****Volume:7.13621e-005 m^3****  ****Density:1410 kg/m^3****  ****Weight:0.986081 N**** | ****C:\Users\Nathaniel Tyler\Desktop\ribbed vat\lip.SLDPRT****  **Nov 16 15:32:44 2014** | | **Cut-Extrude1** | **Solid Body** | ****Mass:0.0263832 kg****  ****Volume:1.87115e-005 m^3****  ****Density:1410 kg/m^3****  ****Weight:0.258555 N**** | ****C:\Users\Nathaniel Tyler\Desktop\ribbed vat\supportX.sldprt****  **Nov 16 15:32:44 2014** | | **Cut-Extrude1** | **Solid Body** | ****Mass:0.0263832 kg****  ****Volume:1.87115e-005 m^3****  ****Density:1410 kg/m^3****  ****Weight:0.258555 N**** | ****C:\Users\Nathaniel Tyler\Desktop\ribbed vat\supportX.sldprt****  **Nov 16 15:32:44 2014** | | **Cut-Extrude1** | **Solid Body** | ****Mass:0.0272929 kg****  ****Volume:1.93566e-005 m^3****  ****Density:1410 kg/m^3****  ****Weight:0.26747 N**** | ****C:\Users\Nathaniel Tyler\Desktop\ribbed vat\supportY.sldprt****  **Nov 16 15:32:43 2014** | | **Cut-Extrude1** | **Solid Body** | ****Mass:0.0272929 kg****  ****Volume:1.93566e-005 m^3****  ****Density:1410 kg/m^3****  ****Weight:0.26747 N**** | ****C:\Users\Nathaniel Tyler\Desktop\ribbed vat\supportY.sldprt****  **Nov 16 15:32:43 2014** | | **Cut-Extrude1** | **Solid Body** | ****Mass:0.215536 kg****  ****Volume:0.000152862 m^3****  ****Density:1410 kg/m^3****  ****Weight:2.11225 N**** | ****C:\Users\Nathaniel Tyler\Desktop\ribbed vat\wallX.sldprt****  **Nov 16 15:32:44 2014** | | **Cut-Extrude1** | **Solid Body** | ****Mass:0.215536 kg****  ****Volume:0.000152862 m^3****  ****Density:1410 kg/m^3****  ****Weight:2.11225 N**** | ****C:\Users\Nathaniel Tyler\Desktop\ribbed vat\wallX.sldprt****  **Nov 16 15:32:44 2014** | | **Cut-Extrude1** | **Solid Body** | ****Mass:0.240613 kg****  ****Volume:0.000170648 m^3****  ****Density:1410 kg/m^3****  ****Weight:2.35801 N**** | ****C:\Users\Nathaniel Tyler\Desktop\ribbed vat\wallY.sldprt****  **Nov 16 15:31:33 2014** | | **Cut-Extrude1** | **Solid Body** | ****Mass:0.240613 kg****  ****Volume:0.000170648 m^3****  ****Density:1410 kg/m^3****  ****Weight:2.35801 N**** | ****C:\Users\Nathaniel Tyler\Desktop\ribbed vat\wallY.sldprt****  **Nov 16 15:31:33 2014** | |

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| Study Properties  |  |  | | --- | --- | | Study name | Study 1 | | 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\Nathaniel Tyler\Desktop\ribbed vat) | |

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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:**** | **Delrin 2700 NC010, Low Viscosity Acetal Copolymer (SS)** | | ****Model type:**** | **Linear Elastic Isotropic** | | ****Default failure criterion:**** | **Unknown** | | ****Yield strength:**** | **6.3e+007 N/m^2** | | ****Tensile strength:**** | **4.07e+007 N/m^2** | | ****Elastic modulus:**** | **2.9e+009 N/m^2** | | ****Poisson's ratio:**** | **0.3** | | ****Mass density:**** | **1410 kg/m^3** | | **SolidBody 1(Mirror4)(floor-1),**  **SolidBody 1(Mirror5)(lip-1),**  **SolidBody 1(Cut-Extrude1)(supportX-3),**  **SolidBody 1(Cut-Extrude1)(supportX-4),**  **SolidBody 1(Cut-Extrude1)(supportY-1),**  **SolidBody 1(Cut-Extrude1)(supportY-2),**  **SolidBody 1(Cut-Extrude1)(wallX-1),**  **SolidBody 1(Cut-Extrude1)(wallX-2),**  **SolidBody 1(Cut-Extrude1)(wallY-1),**  **SolidBody 1(Cut-Extrude1)(wallY-2)** | | **Curve Data:N/A** | | | |

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| **Loads and Fixtures**  | ****Fixture name**** | ****Fixture Image**** | ****Fixture Details**** | | --- | --- | --- | | **Roller/Slider-1** |  | |  |  | | --- | --- | | Entities: | **1 face(s)** | | Type: | **Roller/Slider** | | | ****Resultant Forces****   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Components** | **X** | **Y** | **Z** | **Resultant** | | **Reaction force(N)** | **-0.495367** | **113.815** | **-1.0206** | **113.821** | | **Reaction Moment(N·m)** | **0** | **0** | **0** | **0** | | | |  | ****Load name**** | ****Load Image**** | ****Load Details**** | | --- | --- | --- | | **Force-1** |  | |  |  | | --- | --- | | Entities: | **1 face(s)** | | Type: | **Apply normal force** | | Value: | **114 N** | | |

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| Connector Definitions No Data |

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| Contact Information  | Contact | Contact Image | Contact Properties | | --- | --- | --- | | Global Contact |  | |  |  | | --- | --- | | Type: | **Bonded** | | Components: | **1 component(s)** | | Options: | **Compatible mesh** | | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Mesh Information  |  |  | | --- | --- | | Mesh type | Solid Mesh | | Mesher Used: | Standard mesh | | Automatic Transition: | Off | | Include Mesh Auto Loops: | Off | | Jacobian points | 4 Points | | Element Size | 16.031 mm | | Tolerance | 0.801551 mm | | Mesh Quality | High | | Remesh failed parts with incompatible mesh | Off |  Mesh Information - Details  |  |  | | --- | --- | | Total Nodes | 24049 | | Total Elements | 12336 | | Maximum Aspect Ratio | 42.727 | | % of elements with Aspect Ratio < 3 | 11.1 | | % of elements with Aspect Ratio > 10 | 2.98 | | % of distorted elements(Jacobian) | 0 | | Time to complete mesh(hh;mm;ss): | 00:00:11 | | Computer name: | NATHANIELTYLER | |  | | |

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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 | -0.495367 | 113.815 | -1.0206 | 113.821 |  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 | 267.312 N/m^2  Node: 10778 | 2.37154e+006 N/m^2  Node: 9013 | | **vat-Study 1-Stress-Stress1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Displacement1 | URES: Resultant Displacement | 1.54008 mm  Node: 581 | 137.912 mm  Node: 3595 | | **vat-Study 1-Displacement-Displacement1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Strain1 | ESTRN: Equivalent Strain | 6.28227e-008  Element: 7638 | 0.000556863  Element: 3771 | | **vat-Study 1-Strain-Strain1** | | | |  | Name | Type | | --- | --- | | Displacement1{1} | Deformed Shape | | **vat-Study 1-Displacement-Displacement1{1}** | | |

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| Conclusion |