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|  | |  | | --- | | **Simulation of Schaft\_10x8**  **Date: 06.03.2020 Designer: Solidworks**  **Study name: Schaft\_10x8\_0N**  **Analysis type: Frequency** | | Table of Contents  [Description 1](#_Toc34392822)  [Assumptions 2](#_Toc34392823)  [Model Information 2](#_Toc34392824)  [Study Properties 3](#_Toc34392825)  [Units 3](#_Toc34392826)  [Material Properties 4](#_Toc34392827)  [Loads and Fixtures 4](#_Toc34392828)  [Connector Definitions 5](#_Toc34392829)  [Contact Information 5](#_Toc34392830)  [Mesh information 6](#_Toc34392831)  [Sensor Details 7](#_Toc34392832)  [Study Results 8](#_Toc34392833)  [Conclusion 13](#_Toc34392834) | |
| Description No Data |

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| Assumptions |

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| Model Information  |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | |  |   ****Model name:** Schaft\_10x8**  ****Current Configuration:** Default** | | | | | ****Solid Bodies**** | | | | | ****Document Name and Reference**** | ****Treated As**** | ****Volumetric Properties**** | ****Document Path/Date Modified**** | | **Aufsatz-Linear austragen1** | **Solid Body** | ****Mass:0.0727781 kg****  ****Volume:9.33053e-06 m^3****  ****Density:7800 kg/m^3****  ****Weight:0.713226 N**** | ****C:\Users\sq437\Desktop\Masterarbeit\BauV2018\Schaft Ra10mm Ri8mm.SLDPRT****  **Mar 6 13:01:30 2020** | | **Rotation3** | **Solid Body** | ****Mass:0.0298954 kg****  ****Volume:3.83274e-06 m^3****  ****Density:7800 kg/m^3****  ****Weight:0.292975 N**** | ****C:\Users\sq437\Desktop\Masterarbeit\BauV2018\Stopfen Schaft Lagerung Var2.SLDPRT****  **Mar 6 13:01:24 2020** | | **Cut-Extrude1** | **Solid Body** | ****Mass:0.0110468 kg****  ****Volume:1.41626e-06 m^3****  ****Density:7800 kg/m^3****  ****Weight:0.108259 N**** | ****C:\Users\sq437\Desktop\Masterarbeit\BauV2018\Stopfen Schaft Ringschraube Var2 ohne schrauben.SLDPRT****  **Mar 6 13:09:47 2020** | | **Fillet1** | **Solid Body** | ****Mass:0.00792918 kg****  ****Volume:1.09368e-06 m^3****  ****Density:7250 kg/m^3****  ****Weight:0.077706 N**** | ****C:\SOLIDWORKS Data\browser\DIN\bolts and screws\miscellaneous\eyebolt\_din.sldprt****  **Mar 6 12:38:14 2020** | |

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| Study Properties  |  |  | | --- | --- | | Study name | Schaft\_10x8\_0N | | Analysis type | Frequency | | Mesh type | Solid Mesh | | Number of frequencies | 5 | | Solver type | FFEPlus | | Soft Spring: | Off | | Incompatible bonding options | Automatic | | Thermal option | Include temperature loads | | Zero strain temperature | 298 Kelvin | | Include fluid pressure effects from SOLIDWORKS Flow Simulation | Off | | Result folder | SOLIDWORKS document (C:\Users\sq437\Desktop\Masterarbeit\BauV2018) | |

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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:**** | **1.0114 (S235J0)** | | ****Model type:**** | **Linear Elastic Isotropic** | | ****Default failure criterion:**** | **Max von Mises Stress** | | ****Yield strength:**** | **2.35e+08 N/m^2** | | ****Tensile strength:**** | **3.6e+08 N/m^2** | | ****Mass density:**** | **7800 kg/m^3** | | ****Elastic modulus:**** | **2.1e+11 N/m^2** | | ****Poisson's ratio:**** | **0.28** | | ****Thermal expansion coefficient:**** | **1.1e-05 /Kelvin** | | **SolidBody 1(Aufsatz-Linear austragen1)(Schaft Ra10mm Ri8mm-1),**  **SolidBody 1(Rotation3)(Stopfen Schaft Lagerung Var2-1),**  **SolidBody 1(Cut-Extrude1)(Stopfen Schaft Ringschraube Var2 ohne schrauben-1)** | | **Curve Data:N/A** | | | |  | |  |  | | --- | --- | | ****Name:**** | **1.0420 (G200)** | | ****Model type:**** | **Linear Elastic Isotropic** | | ****Default failure criterion:**** | **Max von Mises Stress** | | ****Yield strength:**** | **2e+08 N/m^2** | | ****Tensile strength:**** | **3.8e+08 N/m^2** | | ****Mass density:**** | **7250 kg/m^3** | | ****Elastic modulus:**** | **2.1e+11 N/m^2** | | ****Poisson's ratio:**** | **0.26** | | ****Thermal expansion coefficient:**** | **1.15e-05 /Kelvin** | | **SolidBody 1(Fillet1)(eyebolt\_din-1)** | | **Curve Data:N/A** | | | |

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| **Loads and Fixtures**  | ****Fixture name**** | ****Fixture Image**** | ****Fixture Details**** | | --- | --- | --- | | **Fixed-1** |  | |  |  | | --- | --- | | Entities: | **1 face(s)** | | Type: | **Fixed Geometry** | | |

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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 | 1.51045 mm | | Tolerance | 0.0755227 mm | | Mesh Quality Plot | High | | Remesh failed parts with incompatible mesh | Off |  Mesh information - Details  |  |  | | --- | --- | | Total Nodes | 69886 | | Total Elements | 38733 | | Maximum Aspect Ratio | 9.0152 | | % of elements with Aspect Ratio < 3 | 99.2 | | % of elements with Aspect Ratio > 10 | 0 | | % of distorted elements(Jacobian) | 0 | | Time to complete mesh(hh;mm;ss): | 00:00:10 | | Computer name: | QX2021 | |  | | |

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| Sensor Details No Data |

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| Study Results  | Name | Type | Min | Max | | --- | --- | --- | --- | | Amplitude1 | AMPRES: Resultant Amplitude Plot for Mode Shape: 1(Value = 61.0264 Hz) | 0.000e+00  Node: 51152 | 5.742e+00  Node: 66273 | | **Schaft\_10x8-Schaft\_10x8\_0N-Amplitude-Amplitude1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Amplitude2 | AMPRES: Resultant Amplitude Plot for Mode Shape: 2(Value = 61.0279 Hz) | 0.000e+00  Node: 51152 | 5.742e+00  Node: 66273 | | **Schaft\_10x8-Schaft\_10x8\_0N-Amplitude-Amplitude2** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Amplitude3 | AMPRES: Resultant Amplitude Plot for Mode Shape: 3(Value = 433.234 Hz) | 0.000e+00  Node: 51152 | 5.274e+00  Node: 5956 | | **Schaft\_10x8-Schaft\_10x8\_0N-Amplitude-Amplitude3** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Amplitude4 | AMPRES: Resultant Amplitude Plot for Mode Shape: 4(Value = 433.275 Hz) | 0.000e+00  Node: 51152 | 5.274e+00  Node: 19951 | | **Schaft\_10x8-Schaft\_10x8\_0N-Amplitude-Amplitude4** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Amplitude5 | AMPRES: Resultant Amplitude Plot for Mode Shape: 5(Value = 1255.37 Hz) | 0.000e+00  Node: 51152 | 5.496e+00  Node: 21955 | | **Schaft\_10x8-Schaft\_10x8\_0N-Amplitude-Amplitude5** | | | |   **Mode List**   | ****Frequency Number**** | ****Rad/sec**** | ****Hertz**** | ****Seconds**** | | --- | --- | --- | --- | | **1** | **383.44** | **61.026** | **0.016386** | | **2** | **383.45** | **61.028** | **0.016386** | | **3** | **2722.1** | **433.23** | **0.0023082** | | **4** | **2722.3** | **433.28** | **0.002308** | | **5** | **7887.7** | **1255.4** | **0.00079658** |   **Mass Participation (Normalized)**   | ****Mode Number**** | ****Frequency(Hertz)**** | ****X direction**** | ****Y direction**** | ****Z direction**** | | --- | --- | --- | --- | --- | | **1** | **61.026** | **0.16961** | **4.6875e-15** | **0.31484** | | **2** | **61.028** | **0.31484** | **2.3037e-13** | **0.16962** | | **3** | **433.23** | **0.082575** | **3.0442e-12** | **0.050722** | | **4** | **433.28** | **0.05072** | **2.3532e-13** | **0.082578** | | **5** | **1255.4** | **0.031871** | **3.3202e-12** | **0.015023** | |  |  | **Sum X = 0.64962** | **Sum Y = 6.8348e-12** | **Sum Z = 0.63278** | |

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| Conclusion |