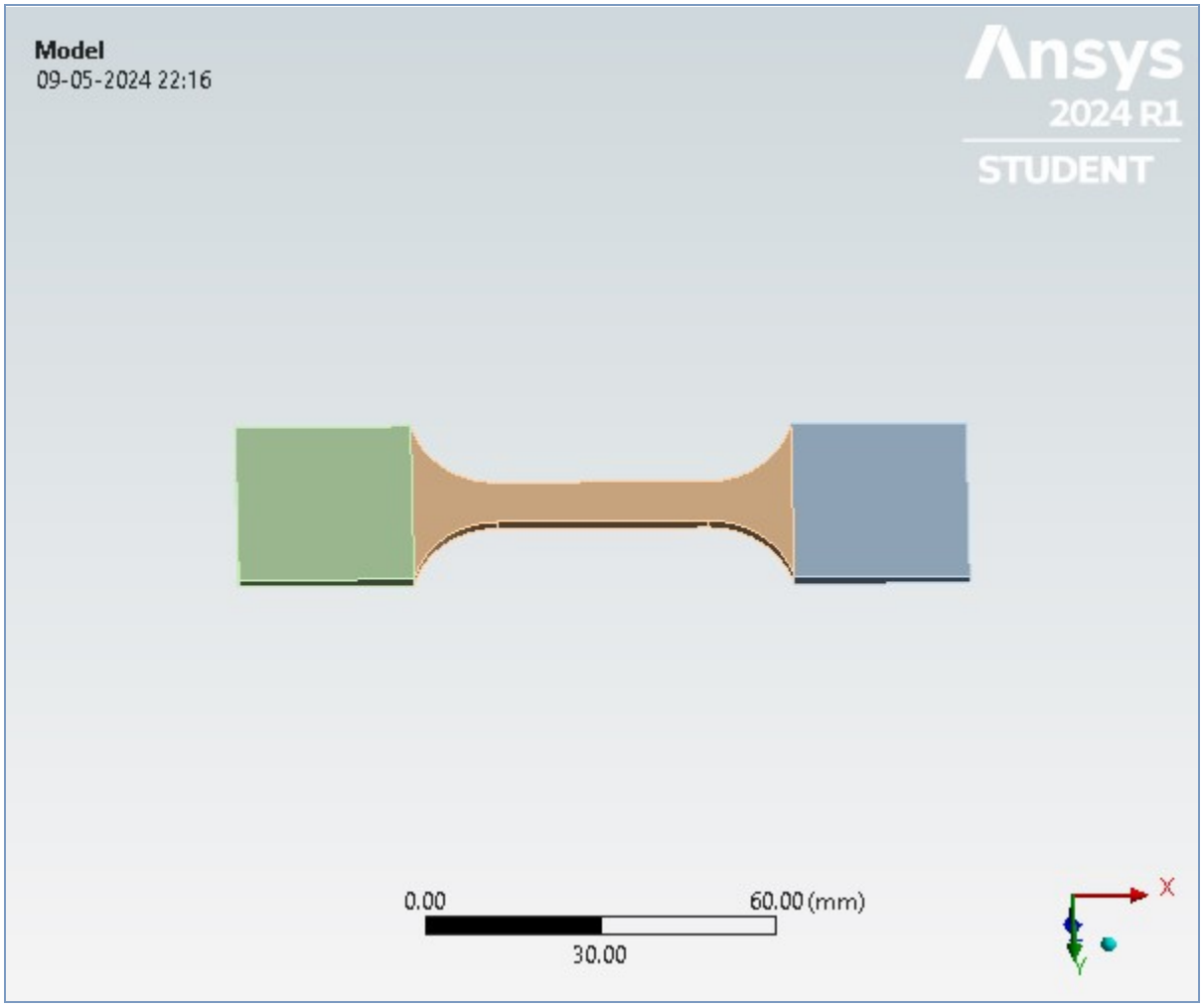
Project*

First Saved	Thursday, May 9, 2024
Last Saved	Thursday, May 9, 2024
Product Version	2024 R1
Save Project Before Solution	No
Save Project After Solution	No



Contents

Units

TABLE 1

Unit System	Metric (mm, kg, N, s, mV, mA) Degrees rad/s Celsius
Angle	Degrees
Rotational Velocity	rad/s
Temperature	Celsius

Model (A4)

TABLE 2
Model (A4) > Geometry Imports

Object Name	*Geometry Imports*
State	Solved

TABLE 3
Model (A4) > Geometry Imports > Geometry Import (A3)

Object Name	*Geometry Import (A3)*
State	Solved
Definition	
Source	C:\Users\am283\OneDrive\Desktop\medium\Medium.IGS
Type	Iges

Basic Geometry Options	
Solid Bodies	Yes
Surface Bodies	Yes
Line Bodies	No
Parameters	Independent
Parameter Key	ANS;DS
Attributes	No
Named Selections	No
Material Properties	No
Advanced Geometry Options	
Use Associativity	Yes
Coordinate Systems	No
Reader Mode Saves Updated File	No
Use Instances	Yes
Smart CAD Update	Yes
Compare Parts On Update	No
Analysis Type	3-D
Mixed Import Resolution	None
Import Facet Quality	Source
Clean Bodies On Import	No
Stitch Surfaces On Import	Program Tolerance
Stitch Tolerance	0.0000001
Decompose Disjoint Geometry	Yes
Enclosure and Symmetry Processing	Yes

Geometry

TABLE 4
Model (A4) > Geometry

Object Name	*Geometry*
State	Fully Defined
Definition	
Source	C:\Users\am283\OneDrive\Desktop\medium\Medium.IGS
Type	Iges
Length Unit	Millimeters
Element Control	Program Controlled
Display Style	Body Color
Bounding Box	
Length X	124.99 mm
Length Y	30.02 mm
Length Z	2.5011 mm
Properties	
Volume	6178.2 mm³
Mass	2.7363e-002 kg
Scale Factor Value	1.
Statistics	
Bodies	3
Active Bodies	3
Nodes	3440
Elements	423
Mesh Metric	None
Update Options	

Assign Default Material	No
Basic Geometry Options	
Solid Bodies	Yes
Surface Bodies	Yes
Line Bodies	No
Parameters	Independent
Parameter Key	ANS;DS
Attributes	No
Named Selections	No
Material Properties	No
Advanced Geometry Options	
Use Associativity	Yes
Coordinate Systems	No
Reader Mode Saves Updated File	No
Use Instances	Yes
Smart CAD Update	Yes
Compare Parts On Update	No
Analysis Type	3-D
Mixed Import Resolution	None
Import Facet Quality	Source
Clean Bodies On Import	No
Stitch Surfaces On Import	Program Tolerance
Decompose Disjoint Geometry	Yes
Enclosure and Symmetry Processing	Yes

TABLE 5
Model (A4) > Geometry > Parts

Object Name	*Medium-FreeParts*	*Medium-FreeParts[2]*	*Medium-FreeParts[3]*
State	Meshed		
Graphics Properties			
Visible	Yes		
Transparency	1		
Definition			
Suppressed	No		
Stiffness Behavior	Flexible		
Coordinate System	Default Coordinate System		
Reference Temperature	By Environment		
Treatment	None		
Material			
Assignment	Titanium alloy, Ti-6Al-4V, annealed	Titanium alloy, Ti-6Al-4V, annealed 2	Titanium alloy, Ti-6Al-4V, annealed 3
Nonlinear Effects	Yes		
Thermal Strain Effects	Yes		
Bounding Box			
Length X	30. mm		64.997 mm
Length Y	30. mm		30.02 mm
Length Z	2.5 mm		2.5011 mm
Properties			
Volume	2250. mm³		1678.2 mm³
Mass	9.9653e-003 kg	9.9652e-003 kg	7.4326e-003 kg
Centroid X	22.806 mm	-72.189 mm	-24.691 mm

Centroid Y	21.823 mm	
Centroid Z	1.25 mm	
Moment of Inertia Ip1	0.75258 kg·mm²	0.1293 kg·mm²
Moment of Inertia Ip2	0.75258 kg·mm²	3.5758 kg·mm²
Moment of Inertia Ip3	1.4948 kg·mm²	3.6974 kg·mm²
Statistics		
Nodes	1131	1178
Elements	144	135
Mesh Metric	None	

TABLE 6
Model (A4) > Materials

Object Name	*Materials*
State	Fully Defined
Statistics	
Materials	4
Material Assignments	0

Coordinate Systems

TABLE 7
Model (A4) > Coordinate Systems > Coordinate System

Object Name	*Global Coordinate System*
State	Fully Defined
Definition	
Type	Cartesian
Coordinate System ID	0.
Origin	
Origin X	0. mm
Origin Y	0. mm
Origin Z	0. mm
Directional Vectors	
X Axis Data	[1. 0. 0.]
Y Axis Data	[0. 1. 0.]
Z Axis Data	[0. 0. 1.]
Transfer Properties	
Source	
Read Only	No

Connections

TABLE 8
Model (A4) > Connections

Object Name	*Connections*
State	Fully Defined
Auto Detection	
Generate Automatic Connection On Refresh	Yes
Transparency	
Enabled	Yes
Statistics	

Contacts	2
Active Contacts	2
Joints	0
Active Joints	0
Beams	0
Active Beams	0
Bearings	0
Active Bearings	0
Springs	0
Active Springs	0
Body Interactions	0
Active Body Interactions	0

TABLE 9
Model (A4) > Connections > Contacts

Object Name	*Contacts*
State	Fully Defined
Definition	
Connection Type	Contact
Scope	
Scoping Method	Geometry Selection
Geometry	All Bodies
Auto Detection	
Tolerance Type	Slider
Tolerance Slider	0.
Tolerance Value	0.32143 mm
Use Range	No
Face/Face	Yes
Face-Face Angle Tolerance	75. °
Face Overlap Tolerance	Off
Cylindrical Faces	Include
Face/Edge	No
Edge/Edge	No
Priority	Include All
Group By	Bodies
Search Across	Bodies
Statistics	
Connections	2
Active Connections	2

TABLE 10
Model (A4) > Connections > Contacts > Contact Regions

Object Name	*Contact Region*	*Contact Region 2*
State	Fully Defined	
Scope		
Scoping Method	Geometry Selection	
Contact	1 Face	
Target	1 Face	
Contact Bodies	Medium-FreeParts	Medium-FreeParts[2]
Target Bodies	Medium-FreeParts[3]	
Protected	No	
Definition		
Type	Bonded	

Scope Mode	Automatic
Behavior	Program Controlled
Trim Contact	Program Controlled
Trim Tolerance	0.32143 mm
Contact APDL Name	
Target APDL Name	
Suppressed	No
Display	
Element Normals	No
Advanced	
Formulation	Program Controlled
Small Sliding	Program Controlled
Detection Method	Program Controlled
Penetration Tolerance	Program Controlled
Elastic Slip Tolerance	Program Controlled
Normal Stiffness	Program Controlled
Update Stiffness	Program Controlled
Pinball Region	Program Controlled
Geometric Modification	
Contact Geometry Correction	None
Target Geometry Correction	None

Mesh

TABLE 11
Model (A4) > Mesh

Object Name	*Mesh*
State	Solved
Display	
Display Style	Use Geometry Setting
Defaults	
Physics Preference	Mechanical
Element Order	Program Controlled
Element Size	2.5 mm
Sizing	
Use Adaptive Sizing	Yes
Resolution	Default (2)
Mesh Defeaturing	Yes
Defeature Size	Default
Transition	Fast
Span Angle Center	Coarse
Initial Size Seed	Assembly
Bounding Box Diagonal	128.57 mm
Average Surface Area	275.86 mm²
Minimum Edge Length	2.4585 mm
Quality	
Check Mesh Quality	Yes, Errors
Error Limits	Aggressive Mechanical
Target Element Quality	Default (5.e-002)
Smoothing	Medium
Mesh Metric	None
Inflation	

Use Automatic Inflation	None
Inflation Option	Smooth Transition
Transition Ratio	0.272
Maximum Layers	5
Growth Rate	1.2
Inflation Algorithm	Pre
Inflation Element Type	Wedges
View Advanced Options	No
Advanced	
Number of CPUs for Parallel Part Meshing	Program Controlled
Straight Sided Elements	No
Rigid Body Behavior	Dimensionally Reduced
Triangle Surface Mesher	Program Controlled
Topology Checking	Yes
Pinch Tolerance	Please Define
Generate Pinch on Refresh	No
Statistics	
Nodes	3440
Elements	423
Show Detailed Statistics	No

Static Structural (A5)

TABLE 12
Model (A4) > Analysis

Object Name	*Static Structural (A5)*
State	Solved
Definition	
Physics Type	Structural
Analysis Type	Static Structural
Solver Target	Mechanical APDL
Options	
Environment Temperature	22. °C
Generate Input Only	No

TABLE 13
Model (A4) > Static Structural (A5) > Analysis Settings

Object Name	*Analysis Settings*
State	Fully Defined
Step Controls	
Number Of Steps	144.
Current Step Number	1.
Step End Time	1. s
Auto Time Stepping	Program Controlled
Solver Controls	
Solver Type	Program Controlled
Weak Springs	Off
Solver Pivot Checking	Program Controlled
Large Deflection	Off
Inertia Relief	Off
Quasi-Static Solution	Off
Rotordynamics Controls	

Coriolis Effect	Off
Restart Controls	
Generate Restart Points	Program Controlled
Retain Files After Full Solve	No
Combine Restart Files	Program Controlled
Nonlinear Controls	
Newton-Raphson Option	Program Controlled
Force Convergence	Program Controlled
Moment Convergence	Program Controlled
Displacement Convergence	Program Controlled
Rotation Convergence	Program Controlled
Line Search	Program Controlled
Stabilization	Program Controlled
Advanced	
Inverse Option	No
Contact Split (DMP)	Program Controlled
Output Controls	
Stress	Yes
Back Stress	No
Strain	Yes
Contact Data	Yes
Nonlinear Data	No
Nodal Forces	No
Volume and Energy	Yes
Euler Angles	Yes
General Miscellaneous	No
Contact Miscellaneous	No
Store Results At	All Time Points
Result File Compression	Program Controlled
Analysis Data Management	
Solver Files Directory	C:\Users\am283\AppData\Local\Temp\WB_am283_15992_2\wbnew_files\dp0\SYS\MECH\
Future Analysis	None
Scratch Solver Files Directory	
Save MAPDL db	No
Contact Summary	Program Controlled
Delete Unneeded Files	Yes
Nonlinear Solution	No
Solver Units	Active System
Solver Unit System	nmm

TABLE 14
Model (A4) > Static Structural (A5) > Analysis Settings
Step-Specific "Step Controls"

Step	Step End Time
1	1. s
2	2. s
3	3. s
4	4. s
5	5. s

6	6. s
7	7. s
8	8. s
9	9. s
10	10. s
11	11. s
12	12. s
13	13. s
14	14. s
15	15. s
16	16. s
17	17. s
18	18. s
19	19. s
20	20. s
21	21. s
22	22. s
23	23. s
24	24. s
25	25. s
26	26. s
27	27. s
28	28. s
29	29. s
30	30. s
31	31. s
32	32. s
33	33. s
34	34. s
35	35. s
36	36. s
37	37. s
38	38. s
39	39. s
40	40. s
41	41. s
42	42. s
43	43. s
44	44. s
45	45. s
46	46. s
47	47. s
48	48. s
49	49. s
50	50. s
51	51. s
52	52. s
53	53. s
54	54. s
55	55. s
56	56. s
57	57. s
58	

	58. s
59	59. s
60	60. s
61	61. s
62	62. s
63	63. s
64	64. s
65	65. s
66	66. s
67	67. s
68	68. s
69	69. s
70	70. s
71	71. s
72	72. s
73	73. s
74	74. s
75	75. s
76	76. s
77	77. s
78	78. s
79	79. s
80	80. s
81	81. s
82	82. s
83	83. s
84	84. s
85	85. s
86	86. s
87	87. s
88	88. s
89	89. s
90	90. s
91	91. s
92	92. s
93	93. s
94	94. s
95	95. s
96	96. s
97	97. s
98	98. s
99	99. s
100	100. s
101	101. s
102	102. s
103	103. s
104	104. s
105	105. s
106	106. s
107	107. s
108	108. s
109	109. s
110	

	110. s
111	111. s
112	112. s
113	113. s
114	114. s
115	115. s
116	116. s
117	117. s
118	118. s
119	119. s
120	120. s
121	121. s
122	122. s
123	123. s
124	124. s
125	125. s
126	126. s
127	127. s
128	128. s
129	129. s
130	130. s
131	131. s
132	132. s
133	133. s
134	134. s
135	135. s
136	136. s
137	137. s
138	138. s
139	139. s
140	140. s
141	141. s
142	142. s
143	143. s
144	144. s

TABLE 15
Model (A4) > Static Structural (A5) > Loads

Object Name	*Fixed Support*	*Displacement*
State	Fully Defined	
Scope		
Scoping Method	Geometry Selection	
Geometry	5 Faces	
Definition		
Type	Fixed Support	Displacement
Suppressed	No	
Define By		Components
Coordinate System		Global Coordinate System
X Component		Tabular Data
Y Component		Free
Z Component		Free
Tabular Data		
Independent Variable		Time

FIGURE 1
Model (A4) > Static Structural (A5) > Displacement

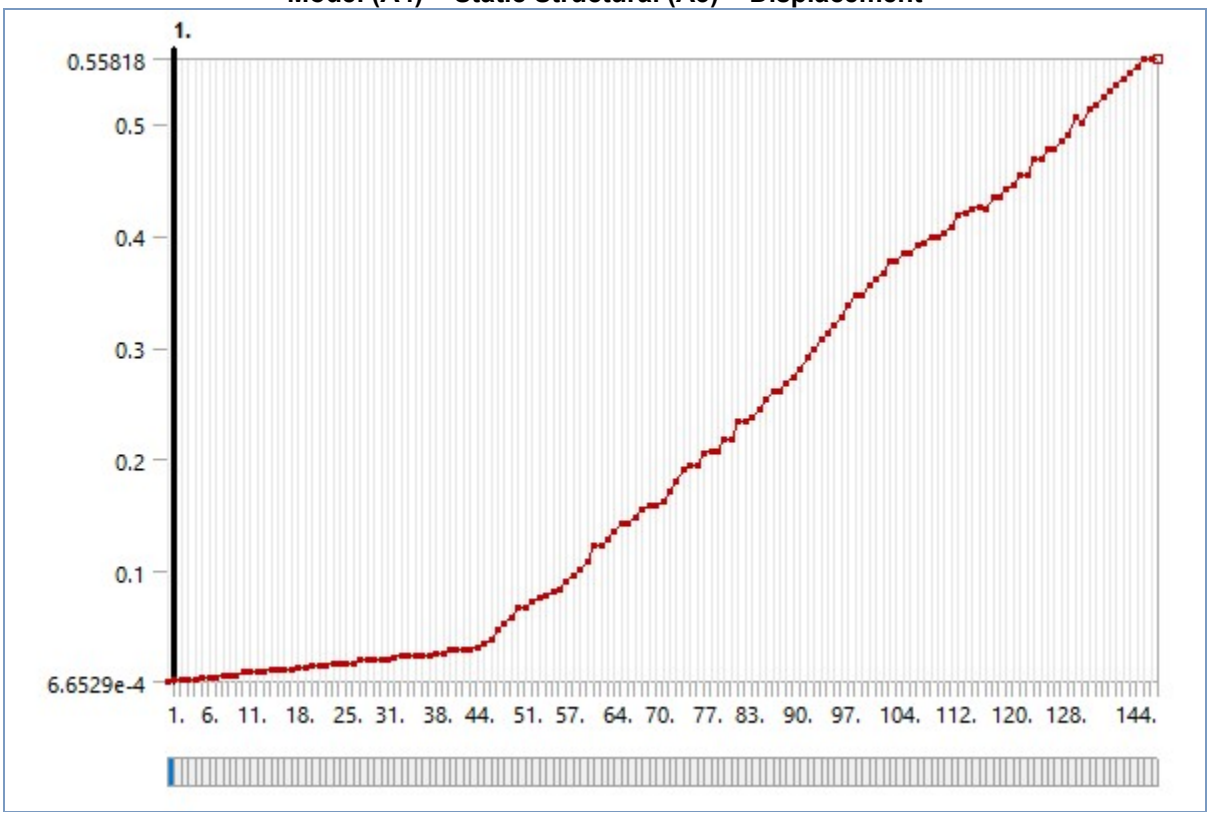


TABLE 16
Model (A4) > Static Structural (A5) > Displacement

Steps	Time [s]	X [mm]
1	0.	6.6529e-004
	1.	1.9959e-003
2	2.	
3	3.	2.6612e-003
4	4.	
5	5.	3.9918e-003
6	6.	
7	7.	
8	8.	6.653e-003
9	9.	5.9877e-003
10	10.	6.653e-003
11	11.	9.3142e-003
12	12.	9.9795e-003
13	13.	
14	14.	
15	15.	1.0645e-002
16	16.	
17	17.	1.1975e-002
18	18.	
19	19.	1.3971e-002
20	20.	
21	21.	1.5302e-002
22	22.	

23	23.	
24	24.	1.5967e-002
25	25.	1.7298e-002
26	26.	
27	27.	
28	28.	1.9959e-002
29	29.	
30	30.	
31	31.	
32	32.	
33	33.	2.1955e-002
34	34.	2.3285e-002
35	35.	
36	36.	
37	37.	2.3951e-002
38	38.	2.4616e-002
39	39.	2.6612e-002
40	40.	
41	41.	2.8608e-002
42	42.	
43	43.	
44	44.	2.9938e-002
45	45.	3.1269e-002
46	46.	3.393e-002
47	47.	3.8587e-002
48	48.	4.7236e-002
49	49.	5.2559e-002
50	50.	5.8546e-002
51	51.	6.653e-002
52	52.	
53	53.	7.2517e-002
54	54.	7.5179e-002
55	55.	7.8505e-002
56	56.	8.1166e-002
57	57.	8.3828e-002
58	58.	9.1146e-002
59	59.	9.6468e-002
60	60.	0.10113
61	61.	0.10778
62	62.	0.12241
63	63.	
64	64.	0.1284
65	65.	0.13439
66	66.	0.14237
67	67.	0.14171
68	68.	0.1477
69	69.	0.15501
70	70.	0.15768
71	71.	
72	72.	0.16233
73	73.	0.17165
74	74.	0.1803

75	75.	0.19094
76	76.	0.19493
77	77.	
78	78.	0.20491
79	79.	0.20757
80	80.	
81	81.	0.21689
82	82.	
83	83.	0.23285
84	84.	
85	85.	0.23818
86	86.	0.24483
87	87.	0.25281
88	88.	0.26146
89	89.	
90	90.	0.26745
91	91.	0.27344
92	92.	0.28076
93	93.	0.2914
94	94.	0.29872
95	95.	0.30737
96	96.	0.31336
97	97.	0.31934
98	98.	0.32733
99	99.	0.33731
100	100.	0.34729
101	101.	
102	102.	0.35527
103	103.	0.36126
104	104.	0.36724
105	105.	0.37656
106	106.	
107	107.	0.38388
108	108.	
109	109.	0.3912
110	110.	0.39386
111	111.	0.39785
112	112.	
113	113.	0.40251
114	114.	0.40783
115	115.	0.41781
116	116.	0.42047
117	117.	0.42313
118	118.	0.42513
119	119.	0.42446
120	120.	0.43444
121	121.	
122	122.	0.44109
123	123.	0.44575
124	124.	0.45506
125	125.	
126	126.	0.46837

127	127.	0.4677
128	128.	0.47702
129	129.	
130	130.	0.48434
131	131.	0.48966
132	132.	0.50629
133	133.	0.50097
134	134.	0.51361
135	135.	0.51694
136	136.	0.52359
137	137.	0.52891
138	138.	0.53423
139	139.	0.53956
140	140.	0.54621
141	141.	0.55087
142	142.	0.55818
143	143.	
144	144.	= 0.55818

Solution (A6)

TABLE 17
Model (A4) > Static Structural (A5) > Solution

Object Name	*Solution (A6)*
State	Solved
Adaptive Mesh Refinement	
Max Refinement Loops	1.
Refinement Depth	2.
Information	
Status	Done
MAPDL Elapsed Time	28. s
MAPDL Memory Used	539. MB
MAPDL Result File Size	59.875 MB
Post Processing	
Beam Section Results	No
On Demand Stress/Strain	No

TABLE 18
Model (A4) > Static Structural (A5) > Solution (A6) > Solution Information

Object Name	*Solution Information*
State	Solved
Solution Information	
Solution Output	Solver Output
Newton-Raphson Residuals	0
Identify Element Violations	0
Update Interval	2.5 s
Display Points	All
FE Connection Visibility	
Activate Visibility	Yes
Display	All FE Connectors
Draw Connections Attached To	All Nodes
Line Color	Connection Type

Visible on Results	No
Line Thickness	Single
Display Type	Lines

TABLE 19
Model (A4) > Static Structural (A5) > Solution (A6) > Results

Object Name	*Equivalent Elastic Strain*	*Equivalent Stress*
State	Solved	
Scope		
Scoping Method	Geometry Selection	
Geometry	All Bodies	
Definition		
Type	Equivalent Elastic Strain	Equivalent (von-Mises) Stress
By	Time	
Display Time	Last	
Separate Data by Entity	No	
Calculate Time History	Yes	
Identifier		
Suppressed	No	
Integration Point Results		
Display Option	Averaged	
Average Across Bodies	No	
Results		
Minimum	3.6043e-026 mm/mm	0. MPa
Maximum	1.0801e-002 mm/mm	1201. MPa
Average	2.3833e-003 mm/mm	260.59 MPa
Minimum Occurs On	Medium-FreeParts[2]	
Maximum Occurs On	Medium-FreeParts[3]	
Minimum Value Over Time		
Minimum	1.2904e-028 mm/mm	0. MPa
Maximum	3.6043e-026 mm/mm	0. MPa
Maximum Value Over Time		
Minimum	3.8619e-005 mm/mm	4.2943 MPa
Maximum	1.0801e-002 mm/mm	1201. MPa
Information		
Time	144. s	
Load Step	144	
Substep	1	
Iteration Number	144	

FIGURE 2
Model (A4) > Static Structural (A5) > Solution (A6) > Equivalent Elastic Strain

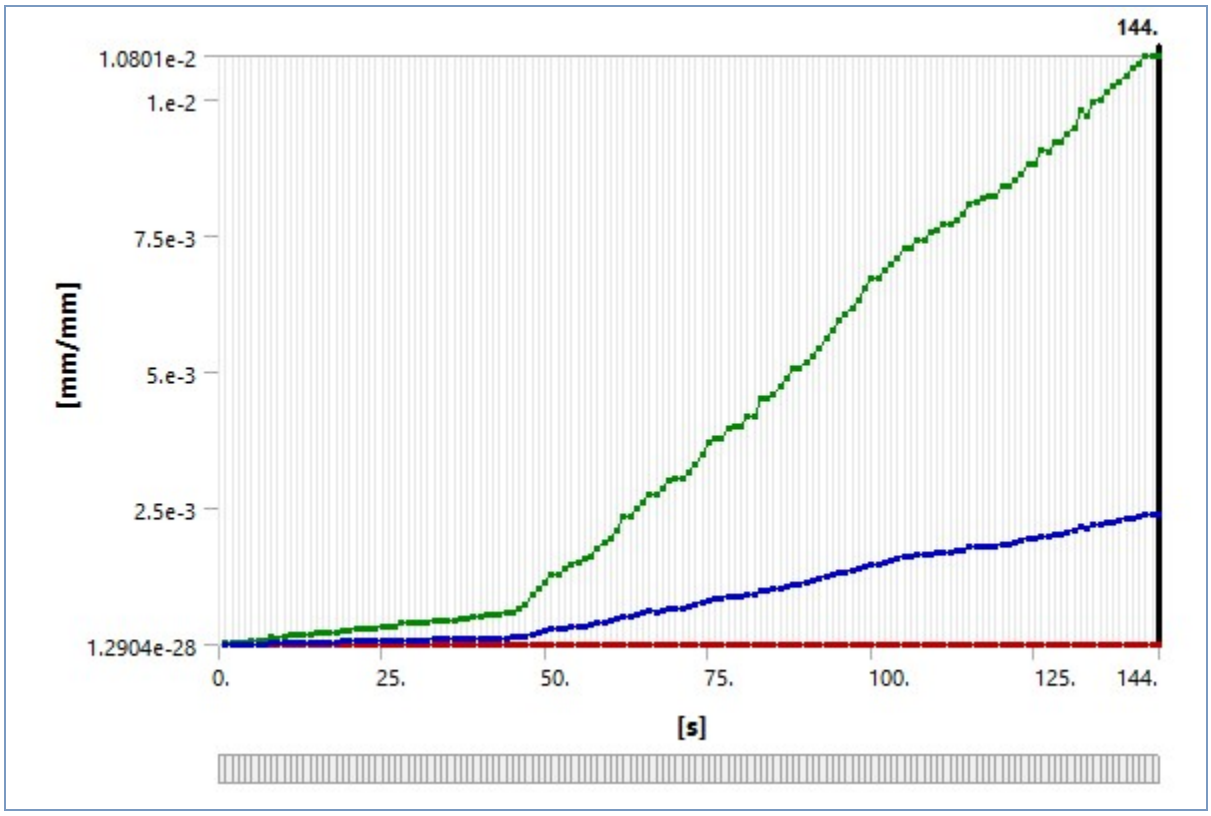


TABLE 20
Model (A4) > Static Structural (A5) > Solution (A6) > Equivalent Elastic Strain

Time [s]	Minimum [mm/mm]	Maximum [mm/mm]	Average [mm/mm]
1.	1.2904e-028	3.8619e-005	8.522e-006
2.			
3.	1.7169e-028	5.1493e-005	1.1363e-005
4.			
5.	2.579e-028	7.7238e-005	1.7044e-005
6.			
7.			
8.	4.2934e-028	1.2873e-004	2.8407e-005
9.	3.8727e-028	1.1586e-004	2.5566e-005
10.	4.2934e-028	1.2873e-004	2.8407e-005
11.	6.02e-028	1.8022e-004	3.977e-005
12.	6.4385e-028	1.931e-004	4.261e-005
13.			
14.			
15.	6.8887e-028	2.0597e-004	4.5451e-005
16.			
17.	7.7301e-028	2.3172e-004	5.1132e-005
18.			
19.	9.038e-028	2.7034e-004	5.9654e-005
20.			
21.	9.9001e-028	2.9608e-004	6.5336e-005
22.			
23.			
24.	1.0303e-027	3.0895e-004	6.8177e-005
25.			

26.	1.1177e-027	3.347e-004	7.3858e-005
27.			
28.	1.2858e-027	3.8619e-004	8.5221e-005
29.			
30.			
31.			
32.			
33.	1.4199e-027	4.2481e-004	9.3743e-005
34.	1.5064e-027	4.5056e-004	9.9424e-005
35.			
36.			
37.	1.5481e-027	4.6343e-004	1.0226e-004
38.	1.5902e-027	4.7631e-004	1.0511e-004
39.	1.7217e-027	5.1492e-004	1.1363e-004
40.			
41.	1.8508e-027	5.5354e-004	1.2215e-004
42.			
43.			
44.	1.9341e-027	5.7929e-004	1.2783e-004
45.	2.0216e-027	6.0504e-004	1.3351e-004
46.	2.1933e-027	6.5653e-004	1.4488e-004
47.	2.4974e-027	7.4664e-004	1.6476e-004
48.	3.0522e-027	9.1399e-004	2.0169e-004
49.	3.3981e-027	1.017e-003	2.2441e-004
50.	3.7867e-027	1.1328e-003	2.4998e-004
51.	4.2957e-027	1.2873e-003	2.8407e-004
52.			
53.	4.6862e-027	1.4032e-003	3.0964e-004
54.	4.8569e-027	1.4547e-003	3.21e-004
55.	5.0612e-027	1.519e-003	3.352e-004
56.	5.2397e-027	1.5705e-003	3.4656e-004
57.	5.4122e-027	1.622e-003	3.5793e-004
58.	5.8904e-027	1.7636e-003	3.8917e-004
59.	6.2424e-027	1.8666e-003	4.119e-004
60.	6.5314e-027	1.9567e-003	4.3178e-004
61.	6.9655e-027	2.0854e-003	4.6019e-004
62.	7.9059e-027	2.3687e-003	5.2269e-004
63.			
64.	8.2866e-027	2.4845e-003	5.4825e-004
65.	8.6877e-027	2.6004e-003	5.7382e-004
66.	9.2143e-027	2.7548e-003	6.0791e-004
67.	9.1506e-027	2.742e-003	6.0507e-004
68.	9.5459e-027	2.8578e-003	6.3063e-004
69.	1.0026e-026	2.9994e-003	6.6188e-004
70.	1.0176e-026	3.0509e-003	6.7324e-004
71.			
72.	1.051e-026	3.141e-003	6.9313e-004
73.	1.1086e-026	3.3213e-003	7.329e-004
74.	1.1645e-026	3.4886e-003	7.6983e-004
75.	1.2338e-026	3.6946e-003	8.1528e-004
76.	1.2611e-026	3.7718e-003	8.3232e-004
77.			

78.	1.325e-026	3.9649e-003	8.7493e-004
79.	1.3423e-026	4.0164e-003	8.8629e-004
80.			
81.	1.4012e-026	4.1966e-003	9.2606e-004
82.			
83.	1.5054e-026	4.5056e-003	9.9424e-004
84.			
85.	1.5388e-026	4.6086e-003	1.017e-003
86.	1.5794e-026	4.7373e-003	1.0454e-003
87.	1.6338e-026	4.8918e-003	1.0795e-003
88.	1.6907e-026	5.0591e-003	1.1164e-003
89.			
90.	1.7262e-026	5.175e-003	1.142e-003
91.	1.7676e-026	5.2908e-003	1.1675e-003
92.	1.8141e-026	5.4325e-003	1.1988e-003
93.	1.8829e-026	5.6384e-003	1.2442e-003
94.	1.9303e-026	5.78e-003	1.2755e-003
95.	1.9826e-026	5.9474e-003	1.3124e-003
96.	2.0271e-026	6.0632e-003	1.338e-003
97.	2.063e-026	6.1791e-003	1.3635e-003
98.	2.1157e-026	6.3336e-003	1.3976e-003
99.	2.1821e-026	6.5267e-003	1.4402e-003
100.	2.2414e-026	6.7198e-003	1.4828e-003
101.			
102.	2.2983e-026	6.8742e-003	1.5169e-003
103.	2.3323e-026	6.9901e-003	1.5425e-003
104.	2.3744e-026	7.106e-003	1.5681e-003
105.	2.4321e-026	7.2862e-003	1.6078e-003
106.			
107.	2.4824e-026	7.4278e-003	1.6391e-003
108.			
109.	2.5297e-026	7.5694e-003	1.6703e-003
110.	2.5464e-026	7.6209e-003	1.6817e-003
111.	2.5742e-026	7.6981e-003	1.6987e-003
112.			
113.	2.601e-026	7.7882e-003	1.7186e-003
114.	2.639e-026	7.8912e-003	1.7413e-003
115.	2.6936e-026	8.0843e-003	1.784e-003
116.	2.7165e-026	8.1358e-003	1.7953e-003
117.	2.7354e-026	8.1873e-003	1.8067e-003
118.	2.747e-026	8.2259e-003	1.8152e-003
119.	2.7395e-026	8.213e-003	1.8124e-003
120.	2.8109e-026	8.4061e-003	1.855e-003
121.			
122.	2.8466e-026	8.5349e-003	1.8834e-003
123.	2.8778e-026	8.625e-003	1.9033e-003
124.	2.9422e-026	8.8052e-003	1.943e-003
125.			
126.	3.0279e-026	9.0627e-003	1.9998e-003
127.	3.0266e-026	9.0498e-003	1.997e-003
128.	3.0802e-026	9.23e-003	2.0368e-003
129.			

130.	3.1234e-026	9.3716e-003	2.068e-003
131.	3.1673e-026	9.4746e-003	2.0907e-003
132.	3.2644e-026	9.7964e-003	2.1618e-003
133.	3.2414e-026	9.6935e-003	2.139e-003
134.	3.3229e-026	9.938e-003	2.193e-003
135.	3.3391e-026	1.0002e-002	2.2072e-003
136.	3.3812e-026	1.0131e-002	2.2356e-003
137.	3.4196e-026	1.0234e-002	2.2583e-003
138.	3.4497e-026	1.0337e-002	2.2811e-003
139.	3.4886e-026	1.044e-002	2.3038e-003
140.	3.5246e-026	1.0569e-002	2.3322e-003
141.	3.5621e-026	1.0659e-002	2.3521e-003
142.	3.6043e-026	1.0801e-002	2.3833e-003
143.			
144.			

FIGURE 3
Model (A4) > Static Structural (A5) > Solution (A6) > Equivalent Stress

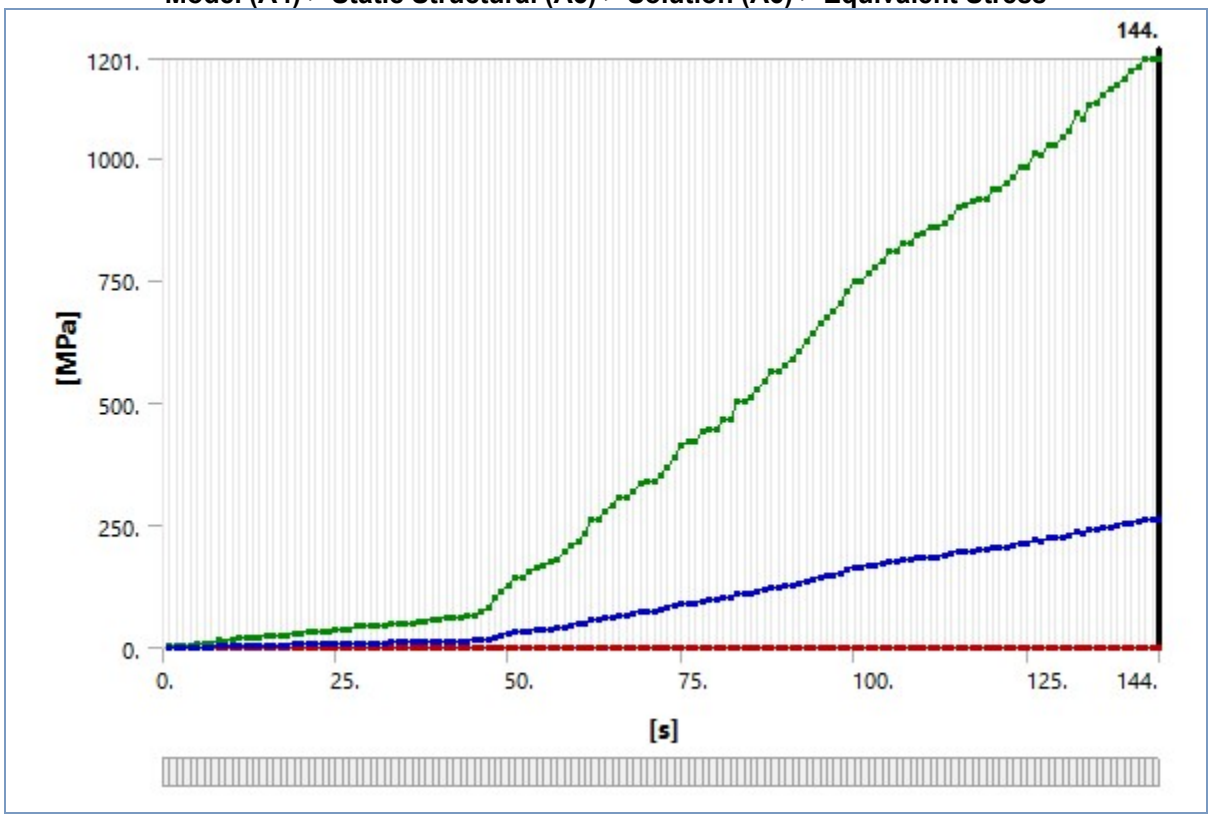


TABLE 21
Model (A4) > Static Structural (A5) > Solution (A6) > Equivalent Stress

Time [s]	Minimum [MPa]	Maximum [MPa]	Average [MPa]
1.		4.2943	0.93178
2.			
3.		5.7258	1.2424
4.			
5.		8.5886	1.8636
6.			
7.			

8.		14.314	3.1059
9.		12.883	2.7953
10.		14.314	3.1059
11.		20.04	4.3483
12.		21.472	4.6589
13.			
14.			
15.		22.903	4.9695
16.			
17.		25.766	5.5907
18.			
19.		30.06	6.5224
20.			
21.		32.923	7.1436
22.			
23.			
24.		34.355	7.4542
25.		37.217	8.0754
26.			
27.			
28.		42.943	9.3178
29.			
30.			
31.			
32.			
33.		47.237	10.25
34.		50.1	10.871
35.			
36.			
37.		51.532	11.181
38.		52.963	11.492
39.		57.258	12.424
40.			
41.		61.552	13.355
42.			
43.			
44.		64.415	13.977
45.		67.278	14.598
46.		73.003	15.84
47.		83.023	18.014
48.		101.63	22.052
49.		113.08	24.537
50.		125.97	27.332
51.		143.14	31.059
52.			
53.		156.03	33.855
54.		161.75	35.097
55.		168.91	36.65
56.		174.64	37.892
57.		180.36	39.135
58.		196.11	42.551
59.		207.56	45.036

60.		217.58	47.21
61.		231.89	50.316
62.		263.38	57.149
63.			
64.		276.27	59.944
65.		289.15	62.74
66.		306.33	66.467
67.		304.9	66.156
68.		317.78	68.952
69.		333.52	72.368
70.		339.25	73.61
71.			
72.		349.27	75.785
73.		369.31	80.133
74.		387.92	84.171
75.		410.82	89.14
76.		419.41	91.004
77.			
78.		440.88	95.663
79.		446.61	96.905
80.			
81.		466.65	101.25
82.			
83.		501.	108.71
84.			
85.		512.45	111.19
86.		526.77	114.3
87.		543.95	118.03
88.		562.55	122.06
89.			
90.		575.44	124.86
91.		588.32	127.65
92.		604.07	131.07
93.		626.97	136.04
94.		642.72	139.46
95.		661.32	143.49
96.		674.21	146.29
97.		687.09	149.08
98.		704.27	152.81
99.		725.74	157.47
100.		747.21	162.13
101.			
102.		764.39	165.86
103.		777.27	168.65
104.		790.15	171.45
105.		810.19	175.8
106.			
107.		825.94	179.21
108.			
109.		841.69	182.63
110.		847.41	183.87
111.		856.	185.73

112.			
113.		866.02	187.91
114.		877.47	190.39
115.		898.94	195.05
116.		904.67	196.29
117.		910.39	197.54
118.		914.69	198.47
119.		913.26	198.16
120.		934.73	202.82
121.			
122.		949.04	205.92
123.		959.06	208.1
124.		979.1	212.45
125.			
126.		1007.7	218.66
127.		1006.3	218.35
128.		1026.3	222.69
129.			
130.		1042.1	226.11
131.		1053.5	228.6
132.		1089.3	236.36
133.		1077.9	233.88
134.		1105.1	239.78
135.		1112.2	241.33
136.		1126.5	244.44
137.		1138.	246.92
138.		1149.4	249.41
139.		1160.9	251.89
140.		1175.2	255.
141.		1185.2	257.17
142.		1201.	260.59
143.			
144.			

	0.		

Chart

FIGURE 4
Model (A4) > Chart

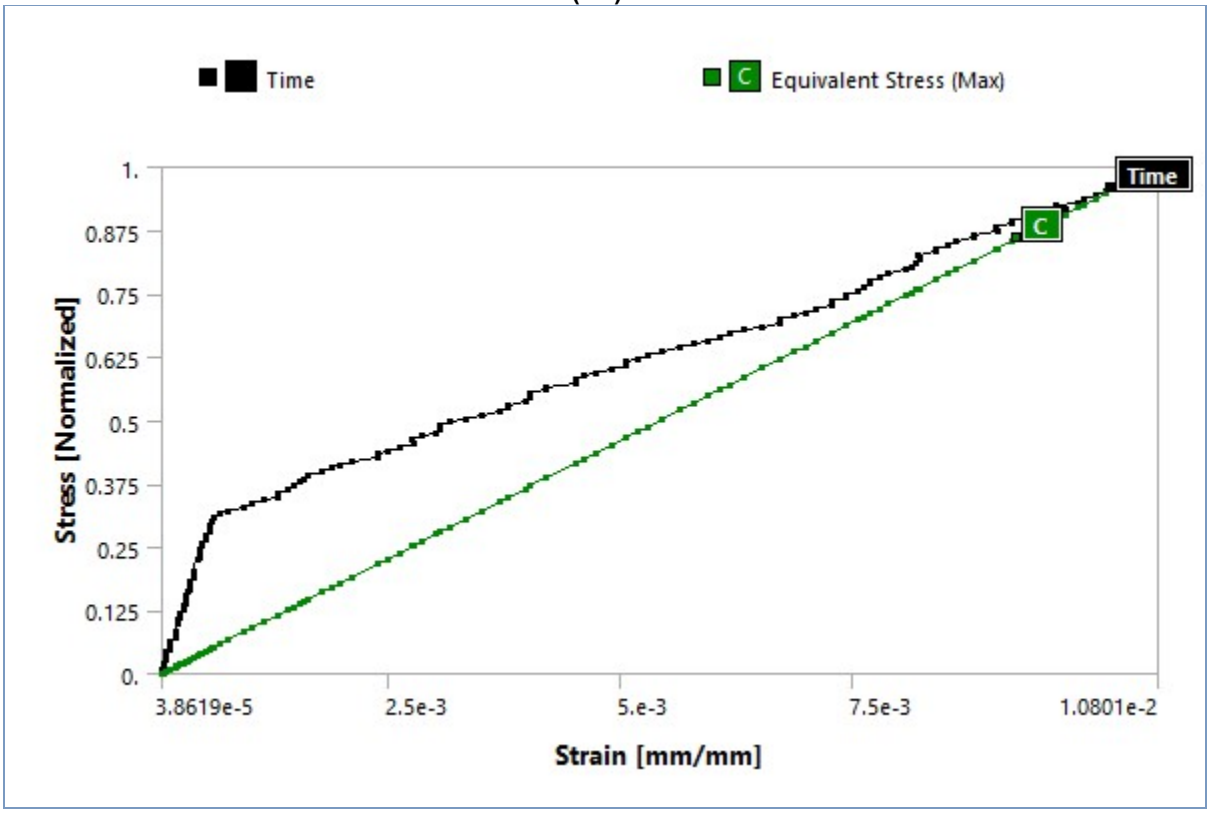


TABLE 22
Model (A4) > Chart

Steps	Time [s]	Equivalent Elastic Strain (Max) [mm/mm]	[C] Equivalent Stress (Max) [MPa]
1	1.	3.8619e-005	4.2943
2	2.		
3	3.	5.1493e-005	5.7258
4	4.		
5	5.	7.7238e-005	8.5886
6	6.		
7	7.		
8	8.	1.2873e-004	14.314
9	9.	1.1586e-004	12.883
10	10.	1.2873e-004	14.314
11	11.	1.8022e-004	20.04
12	12.	1.931e-004	21.472
13	13.		
14	14.		
15	15.	2.0597e-004	22.903
16	16.		
17	17.	2.3172e-004	25.766
18	18.		
19	19.		

20	20.	2.7034e-004	30.06
21	21.	2.9608e-004	32.923
22	22.		
23	23.		
24	24.	3.0895e-004	34.355
25	25.	3.347e-004	37.217
26	26.		
27	27.		
28	28.	3.8619e-004	42.943
29	29.		
30	30.		
31	31.		
32	32.		
33	33.	4.2481e-004	47.237
34	34.	4.5056e-004	50.1
35	35.		
36	36.		
37	37.	4.6343e-004	51.532
38	38.	4.7631e-004	52.963
39	39.	5.1492e-004	57.258
40	40.		
41	41.	5.5354e-004	61.552
42	42.		
43	43.		
44	44.	5.7929e-004	64.415
45	45.	6.0504e-004	67.278
46	46.	6.5653e-004	73.003
47	47.	7.4664e-004	83.023
48	48.	9.1399e-004	101.63
49	49.	1.017e-003	113.08
50	50.	1.1328e-003	125.97
51	51.	1.2873e-003	143.14
52	52.		
53	53.	1.4032e-003	156.03
54	54.	1.4547e-003	161.75
55	55.	1.519e-003	168.91
56	56.	1.5705e-003	174.64
57	57.	1.622e-003	180.36
58	58.	1.7636e-003	196.11
59	59.	1.8666e-003	207.56
60	60.	1.9567e-003	217.58
61	61.	2.0854e-003	231.89
62	62.	2.3687e-003	263.38
63	63.		
64	64.	2.4845e-003	276.27
65	65.	2.6004e-003	289.15
66	66.	2.7548e-003	306.33
67	67.	2.742e-003	304.9
68	68.	2.8578e-003	317.78
69	69.	2.9994e-003	333.52
70	70.	3.0509e-003	339.25
71	71.		

72	72.	3.141e-003	349.27
73	73.	3.3213e-003	369.31
74	74.	3.4886e-003	387.92
75	75.	3.6946e-003	410.82
76	76.	3.7718e-003	419.41
77	77.		
78	78.	3.9649e-003	440.88
79	79.	4.0164e-003	446.61
80	80.		
81	81.	4.1966e-003	466.65
82	82.		
83	83.	4.5056e-003	501.
84	84.		
85	85.	4.6086e-003	512.45
86	86.	4.7373e-003	526.77
87	87.	4.8918e-003	543.95
88	88.	5.0591e-003	562.55
89	89.		
90	90.	5.175e-003	575.44
91	91.	5.2908e-003	588.32
92	92.	5.4325e-003	604.07
93	93.	5.6384e-003	626.97
94	94.	5.78e-003	642.72
95	95.	5.9474e-003	661.32
96	96.	6.0632e-003	674.21
97	97.	6.1791e-003	687.09
98	98.	6.3336e-003	704.27
99	99.	6.5267e-003	725.74
100	100.	6.7198e-003	747.21
101	101.		
102	102.	6.8742e-003	764.39
103	103.	6.9901e-003	777.27
104	104.	7.106e-003	790.15
105	105.	7.2862e-003	810.19
106	106.		
107	107.	7.4278e-003	825.94
108	108.		
109	109.	7.5694e-003	841.69
110	110.	7.6209e-003	847.41
111	111.	7.6981e-003	856.
112	112.		
113	113.	7.7882e-003	866.02
114	114.	7.8912e-003	877.47
115	115.	8.0843e-003	898.94
116	116.	8.1358e-003	904.67
117	117.	8.1873e-003	910.39
118	118.	8.2259e-003	914.69
119	119.	8.213e-003	913.26
120	120.	8.4061e-003	934.73
121	121.		
122	122.	8.5349e-003	949.04
123	123.	8.625e-003	959.06

124	124.	8.8052e-003	979.1
125	125.		
126	126.	9.0627e-003	1007.7
127	127.	9.0498e-003	1006.3
128	128.	9.23e-003	1026.3
129	129.		
130	130.	9.3716e-003	1042.1
131	131.	9.4746e-003	1053.5
132	132.	9.7964e-003	1089.3
133	133.	9.6935e-003	1077.9
134	134.	9.938e-003	1105.1
135	135.	1.0002e-002	1112.2
136	136.	1.0131e-002	1126.5
137	137.	1.0234e-002	1138.
138	138.	1.0337e-002	1149.4
139	139.	1.044e-002	1160.9
140	140.	1.0569e-002	1175.2
141	141.	1.0659e-002	1185.2
142	142.	1.0801e-002	1201.
143	143.		
144	144.		

Material Data

Titanium alloy, Ti-6Al-4V, annealed

TABLE 23
Titanium alloy, Ti-6Al-4V, annealed > Constants

Density	4.429e-006 kg mm^-3
Tensile Yield Strength	845.7 MPa
Tensile Ultimate Strength	918 MPa
Coefficient of Thermal Expansion	8.789e-006 C^-1
Thermal Conductivity	7.187e-003 W mm^-1 C^-1
Specific Heat	5.226e+005 mJ kg^-1 C^-1
Resistivity	1.69e-003 ohm mm

TABLE 24
Titanium alloy, Ti-6Al-4V, annealed > Opacity

Red	Green	Blue
165	165	165

Opacity
1

Metallic Finish
1

TABLE 25
Titanium alloy, Ti-6Al-4V, annealed > Isotropic Elasticity

Young's Modulus MPa	Poisson's Ratio	Bulk Modulus MPa	Shear Modulus MPa	Temperature C
1.112e+005	0.3387	1.149e+005	41533	23

TABLE 26
Titanium alloy, Ti-6Al-4V, annealed > Isotropic Secant Coefficient of Thermal Expansion

Zero-Thermal-Strain Reference Temperature C
20

TABLE 27
Titanium alloy, Ti-6Al-4V, annealed > Embodied energy

Embodied energy mJ kg^-1
3.146e+011

TABLE 28
Titanium alloy, Ti-6Al-4V, annealed > Climate change CO2-eq

Climate change CO2-eq dBA
20.22

TABLE 29
Titanium alloy, Ti-6Al-4V, annealed > Recycle

Recycle
1

Titanium alloy, Ti-6Al-4V, annealed 2

TABLE 30
Titanium alloy, Ti-6Al-4V, annealed 2 > Constants

Density	4.429e-006 kg mm^-3
Tensile Yield Strength	845.7 MPa
Tensile Ultimate Strength	918 MPa
Coefficient of Thermal Expansion	8.789e-006 C^-1
Thermal Conductivity	7.187e-003 W mm^-1 C^-1
Specific Heat	5.226e+005 mJ kg^-1 C^-1
Resistivity	1.69e-003 ohm mm

TABLE 31
Titanium alloy, Ti-6Al-4V, annealed 2 > Opacity

Red	Green	Blue
165	165	165

Opacity
1

Metallic Finish
1

TABLE 32
Titanium alloy, Ti-6Al-4V, annealed 2 > Isotropic Elasticity

Young's Modulus MPa	Poisson's Ratio	Bulk Modulus MPa	Shear Modulus MPa	Temperature C
1.112e+005	0.3387	1.149e+005	41533	23

TABLE 33
Titanium alloy, Ti-6Al-4V, annealed 2 > Isotropic Secant Coefficient of Thermal Expansion

Zero-Thermal-Strain Reference Temperature C
20

TABLE 34
Titanium alloy, Ti-6Al-4V, annealed 2 > Embodied energy

Embodied energy mJ kg^-1
3.146e+011

TABLE 35
Titanium alloy, Ti-6Al-4V, annealed 2 > Climate change CO2-eq

Climate change CO2-eq dBA
20.22

TABLE 36
Titanium alloy, Ti-6Al-4V, annealed 2 > Recycle

Recycle
1

Titanium alloy, Ti-6Al-4V, annealed 3

TABLE 37
Titanium alloy, Ti-6Al-4V, annealed 3 > Constants

Density	4.429e-006 kg mm^-3
Tensile Yield Strength	845.7 MPa
Tensile Ultimate Strength	918 MPa
Coefficient of Thermal Expansion	8.789e-006 C^-1
Thermal Conductivity	7.187e-003 W mm^-1 C^-1
Specific Heat	5.226e+005 mJ kg^-1 C^-1
Resistivity	1.69e-003 ohm mm

TABLE 38
Titanium alloy, Ti-6Al-4V, annealed 3 > Opacity

Red	Green	Blue
165	165	165

Opacity
1

Metallic Finish
1

TABLE 39
Titanium alloy, Ti-6Al-4V, annealed 3 > Isotropic Elasticity

Young's Modulus MPa	Poisson's Ratio	Bulk Modulus MPa	Shear Modulus MPa	Temperature C
1.112e+005	0.3387	1.149e+005	41533	23

TABLE 40
Titanium alloy, Ti-6Al-4V, annealed 3 > Isotropic Secant Coefficient of Thermal Expansion

Zero-Thermal-Strain Reference Temperature C
20

TABLE 41
Titanium alloy, Ti-6Al-4V, annealed 3 > Embodied energy

Embodied energy mJ kg^-1
3.146e+011

TABLE 42
Titanium alloy, Ti-6Al-4V, annealed 3 > Climate change CO2-eq

Climate change CO2-eq dBA
20.22

TABLE 43
Titanium alloy, Ti-6Al-4V, annealed 3 > Recycle

Recycle
1