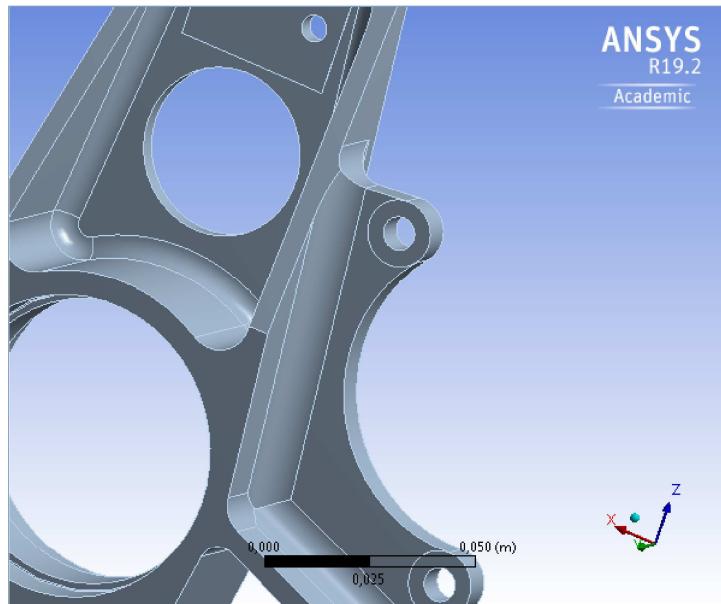




Project

First Saved	Tuesday, December 03, 2019
Last Saved	Tuesday, December 03, 2019
Product Version	19.2 Release
Save Project Before Solution	No
Save Project After Solution	No



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Units

TABLE 1

Unit System	Metric (m, kg, N, s, V, A) Degrees rad/s Celsius
Angle	Degrees
Rotational Velocity	rad/s
Temperature	Celsius

Model (B4)

Geometry

TABLE 2
Model (B4) > Geometry

Object Name	Geometry
State	Fully Defined
Definition	
Source	X:\Projets\EPSA\PAi_EPSA\porte moyeu_files\dp0\SYS-2\DM\SYS-2.scdoc
Type	SpaceClaim
Length Unit	Meters
Element Control	Program Controlled
Display Style	Body Color
Bounding Box	
Length X	0,15693 m
Length Y	4,01e-002 m
Length Z	0,2483 m
Properties	
Volume	2,381e-004 m ³
Mass	0,65954 kg
Scale Factor Value	1,
Statistics	
Bodies	1
Active Bodies	1
Nodes	418584
Elements	278426
Mesh Metric	None
Update Options	
Assign Default Material	No
Basic Geometry Options	
Solid Bodies	Yes
Surface Bodies	Yes
Line Bodies	Yes
Parameters	Independent
Parameter Key	
Attributes	Yes
Attribute Key	
Named Selections	Yes
Named Selection Key	
Material Properties	Yes
Advanced Geometry Options	
Use Associativity	Yes
Coordinate Systems	Yes
Coordinate System Key	
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
Clean Bodies On Import	No
Stitch Surfaces On Import	No
Decompose Disjoint Geometry	Yes
Enclosure and Symmetry Processing	Yes

TABLE 3
Model (B4) > Geometry > Parts

Object Name	SYS-2 Corps principal
State	Meshed
Graphics Properties	
Visible	Yes
Transparency	1
Definition	
Suppressed	No
Stiffness Behavior	Flexible
Coordinate System	Default Coordinate System
Reference Temperature	By Environment
Behavior	None
Material	
Assignment	Aluminum Alloy
Nonlinear Effects	Yes
Thermal Strain Effects	Yes
Bounding Box	
Length X	0,15693 m
Length Y	4,01e-002 m
Length Z	0,2483 m
Properties	
Volume	2,381e-004 m ³
Mass	0,65954 kg
Centroid X	-1,2941e-002 m
Centroid Y	2,9841e-002 m
Centroid Z	-5,0947e-003 m
Moment of Inertia Ip1	2,1506e-003 kg·m ²
Moment of Inertia Ip2	2,996e-003 kg·m ²
Moment of Inertia Ip3	1,0003e-003 kg·m ²
Statistics	
Nodes	418584
Elements	278426
Mesh Metric	None
CAD Attributes	
PartTolerance:	0,00000001
Color:	175.143.175

Coordinate Systems**TABLE 4**
Model (B4) > Coordinate Systems > Coordinate System

Object Name	Global Coordinate System	braking	inner	lower	outer	toe	upper	i	I	o	t	
State												
Fully Defined												
Definition												
Cartesian												
Coordinate System ID	0,											
Coordinate System		Program Controlled										
APDL Name												
Suppressed		No										
Origin												
Origin X	0, m	-8,1352e-002 m	2,0228e-032 m	0, m	-2,0228e-032 m	-0,1 m	0, m	-2,0228e-032 m	0, m	2,0228e-032 m	-0,1 m	
Origin Y	0, m	-1,e-003 m	6,13e-002 m	3,e-002 m	4,7e-003 m	3,9e-002 m	5,5e-002 m	4,7e-003 m	3,e-002 m	6,13e-002 m	3,9e-002 m	
Origin Z	0, m	3,5839e-002 m	-1,2157e-016 m	-0,1078 m	-1,058e-016 m	-4,08e-002 m	0,1024 m	-1,058e-016 m	-0,1078 m	-1,2157e-016 m	-4,08e-002 m	
Define By		Global Coordinates										
Location		Defined										
Directional Vectors												
X Axis Data	[1, 0, 0,]	[-0,45399 0, -0,89101]	[1, 0, 0,]									
Y Axis Data	[0, 1, 0,]	[-0,89101 0, 0,45399]	[0, 1, 0,]									
Z Axis Data	[0, 0, 1,]	[0, 1, 0,]	[0, 0, 1,]									
Principal Axis												
Axis		X										
Define By		Fixed Vector										
Orientation About Principal Axis												
Axis		Y										
Define By		Fixed Vector										
Transformations												
Base Configuration		Absolute										
Transformed Configuration		[-8,1352e-002 -1,e-003 3,5839e-002]	[2,0228e-032 6,13e-002 -1,2157e-016]	[0, 3,e-002 -0,1078]	[-2,0228e-032 4,7e-003 -1,058e-016]	[-0,1 3,9e-002 -4,08e-002]	[0, 5,5e-002 0,1024]	[-2,0228e-032 4,7e-003 -1,058e-016]	[0, 3,e-002 -0,1078]	[2,0228e-032 6,13e-002 -1,2157e-016]	[-0,1 3,9e-002 -4,08e-002]	

TABLE 5
Model (B4) > Coordinate Systems > Coordinate System

Object Name	u
State	Fully Defined
Definition	
Type	Cartesian
Coordinate System	Program Controlled
APDL Name	
Suppressed	No
Origin	
Define By	Global Coordinates
Origin X	0, m
Origin Y	5,5e-002 m

Origin Z	0,1024 m
Location	Defined
Principal Axis	
Axis	X
Define By	Fixed Vector
Orientation About Principal Axis	
Axis	Y
Define By	Fixed Vector
Directional Vectors	
X Axis Data	[1, 0, 0,]
Y Axis Data	[0, 1, 0,]
Z Axis Data	[0, 0, 1,]
Transformations	
Base Configuration	Absolute
Transformed Configuration	[0, 5,5e-002 0,1024]

Mesh

TABLE 6
Model (B4) > Mesh

Object Name	Mesh
State	Solved
Display	
Display Style	Use Geometry Setting
Defaults	
Physics Preference	Mechanical
Element Order	Program Controlled
Element Size	Default
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	0,29646 m
Average Surface Area	5,6282e-004 m ²
Minimum Edge Length	1.e-004 m
Quality	
Check Mesh Quality	Yes, Errors
Error Limits	Standard Mechanical
Target Quality	Default (0.050000)
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
View Advanced Options	No
Advanced	
Number of CPUs for Parallel Part Meshing	Program Controlled
Straight Sided Elements	No
Number of Retries	Default (4)
Rigid Body Behavior	Dimensionally Reduced
Triangle Surface Mesher	Program Controlled
Topology Checking	Yes
Pinch Tolerance	Please Define
Generate Pinch on Refresh	No
Statistics	
Nodes	418584
Elements	278426

TABLE 7
Model (B4) > Mesh > Mesh Controls

Object Name	Body Sizing
State	Fully Defined
Scope	
Scoping Method	Geometry Selection
Geometry	1 Body
Definition	
Suppressed	No
Type	Element Size
Element Size	2,e-003 m
Advanced	
Defeature Size	Default
Behavior	Soft

Static Structural (B5)

TABLE 8
Model (B4) > Analysis

Object Name	Static Structural (B5)
State	Solved
Definition	
Physics Type	Structural
Analysis Type	Static Structural
Solver Target	Mechanical APDL
Options	
Environment Temperature	22, °C
Generate Input Only	No

TABLE 9	
Model (B4) > Static Structural (B5) > Analysis Settings	
Object Name	Analysis Settings
State	
	Fully Defined
Step Controls	
Number Of Steps	1,
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
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	Off
Output Controls	
Stress	Yes
Strain	Yes
Nodal Forces	No
Contact Miscellaneous	No
General Miscellaneous	No
Store Results At	All Time Points
Analysis Data Management	
Solver Files Directory	X:\Projets\EPSTA\PAi_EPSA\porte moyeu_files\dp0\SYS-2\MECH\
Future Analysis	None
Scratch Solver Files Directory	
Save MAPDL db	No
Contact Summary	Program Controlled
Delete Unneeded Files	Yes
Nonlinear Solution	Yes
Solver Units	Active System
Solver Unit System	mks

fixations

TABLE 10	
Model (B4) > Static Structural (B5) > fixations > Loads	
Object Name	upper
State	
	Fully Defined
Scope	
Scoping Method	Geometry Selection
Geometry	3 Faces
Coordinate System	u l t o i
X Coordinate	0, m
Y Coordinate	0, m
Z Coordinate	0, m
Location	Defined
Definition	
Type	Remote Displacement
X Component	0, m (ramped)
Y Component	0, m (ramped)
Z Component	0, m (ramped)
Rotation X	Free
Rotation Y	Free
Rotation Z	Free
Suppressed	No
Behavior	
Rotation X	Deformable
Rotation Y	Free
Rotation Z	Free
Rotation X	Free
Rotation Y	Free
Rotation Z	Free
Rotation X	Free
Rotation Y	Free
Rotation Z	Free
Rotation X	Free
Rotation Y	Free
Rotation Z	Free
Advanced	
Pinball Region	All

FIGURE 1
Model (B4) > Static Structural (B5) > fixations > upper

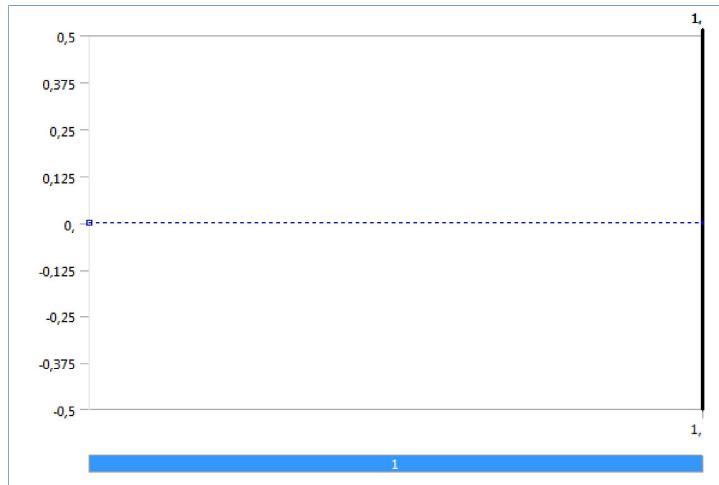


FIGURE 2
Model (B4) > Static Structural (B5) > fixations > lower

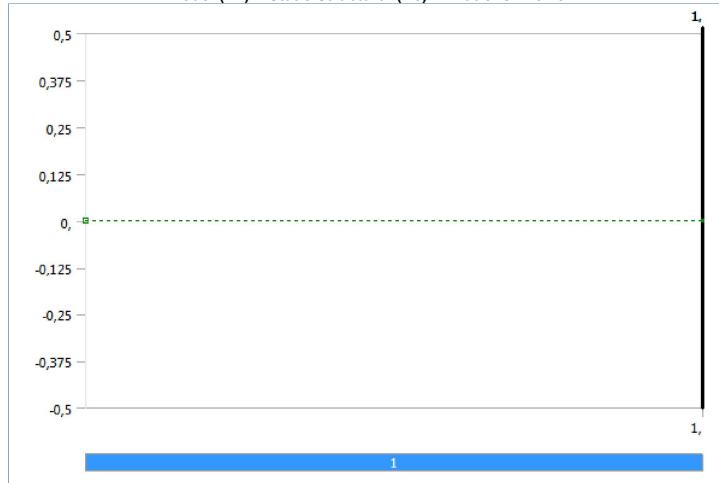


FIGURE 3
Model (B4) > Static Structural (B5) > fixations > toe

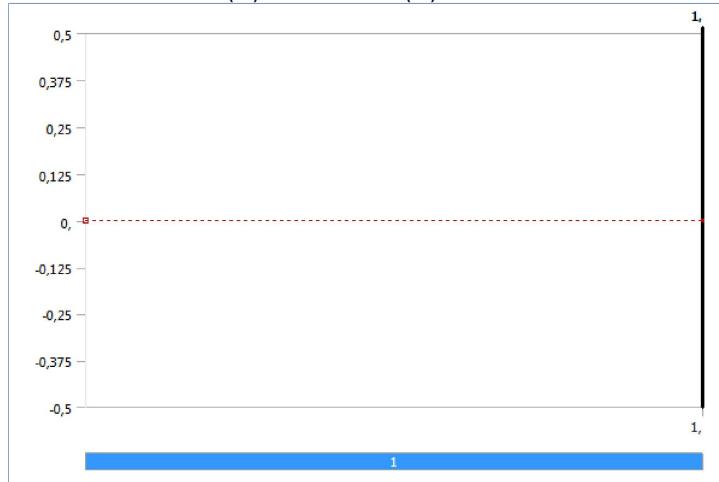


FIGURE 4
Model (B4) > Static Structural (B5) > fixations > inner

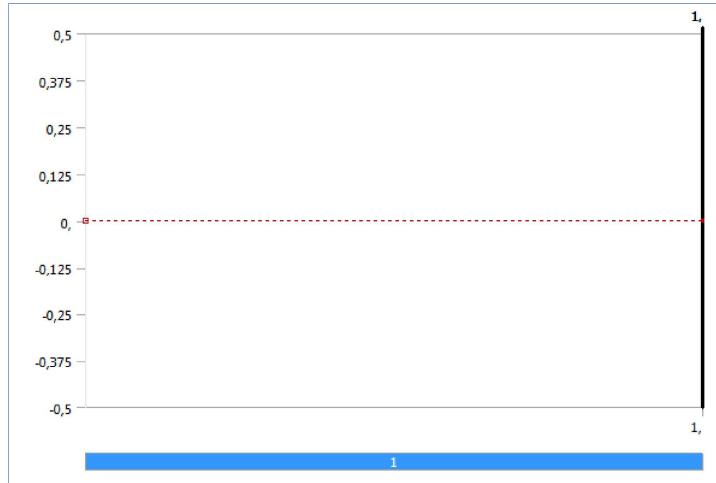
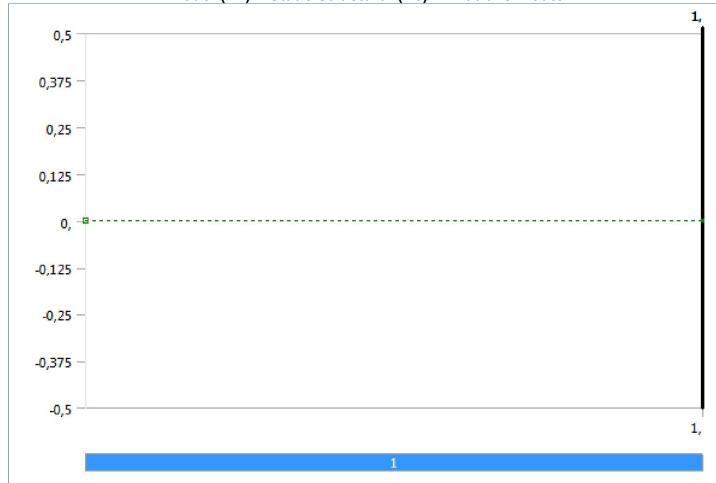


FIGURE 5
Model (B4) > Static Structural (B5) > fixations > outer



compression only

TABLE 11
Model (B4) > Static Structural (B5) > compression only > Loads

Object Name	inner	outer
State	Fully Defined	
Scope		
Scoping Method	Geometry Selection	
Geometry	3 Faces	
Definition		
Type	Compression Only Support	
Suppressed	No	
Advanced		
Normal Stiffness	Program Controlled	
Update Stiffness	Never	

charge

TABLE 12
Model (B4) > Static Structural (B5) > charge > Loads

Object Name	braking	outer	Remote Force		
State	Suppressed				
Scope					
Scoping Method	Geometry Selection				
Geometry	No Selection	3 Faces			
Coordinate System	braking	i	o		
X Coordinate	-5,e-003 m	0, m			
Y Coordinate	0, m				
Z Coordinate	0, m				
Location	Defined				
Definition					
Type	Remote Force				
Define By	Components				
X Component	8500, N (ramped)	0, N (ramped)			
Y Component	0, N (ramped)	-3000, N (ramped)			
Z Component	0, N (ramped)	10000 N (ramped)			
Suppressed	Yes	No			
Behavior	Deformable				
Advanced					
Pinball Region	All				

FIGURE 6
Model (B4) > Static Structural (B5) > charge > braking

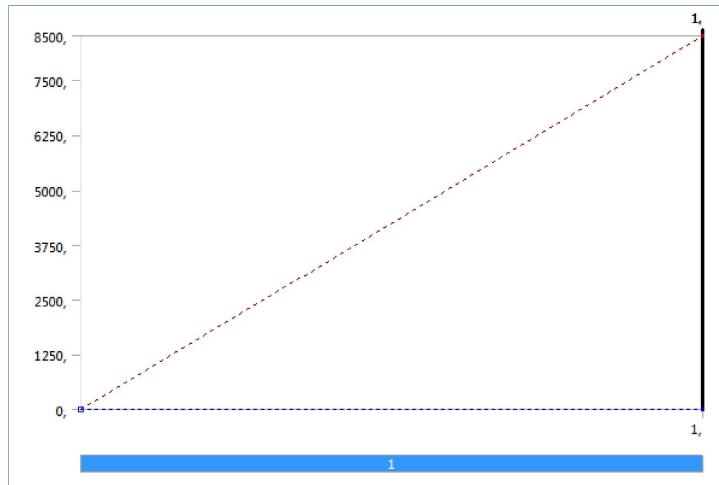


FIGURE 7
Model (B4) > Static Structural (B5) > charge > outer

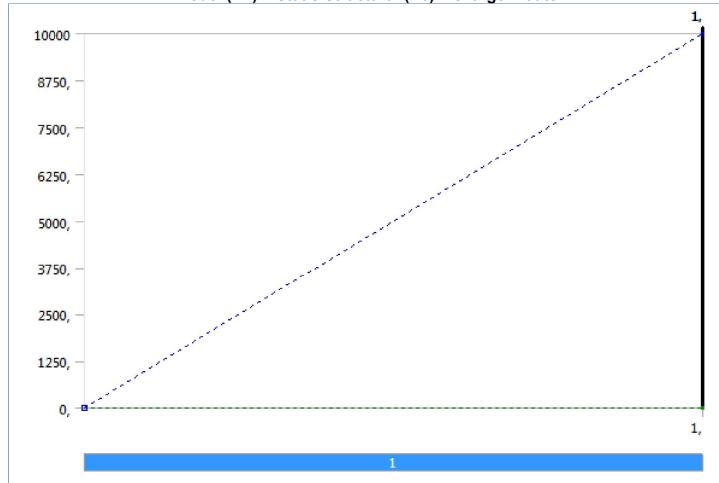


FIGURE 8
Model (B4) > Static Structural (B5) > charge > Remote Force

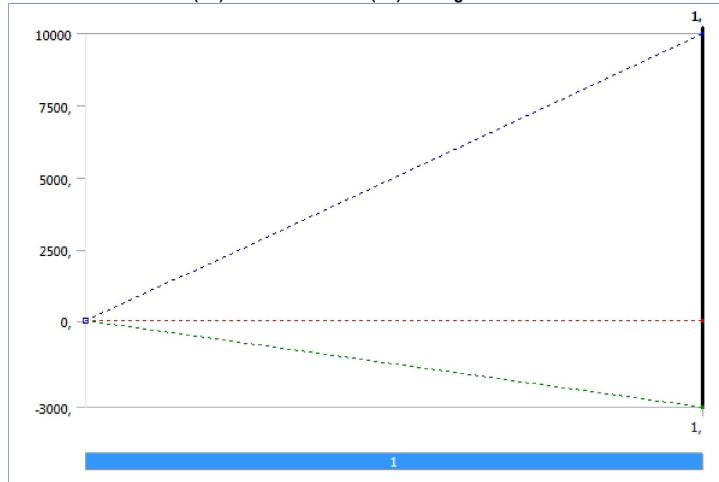
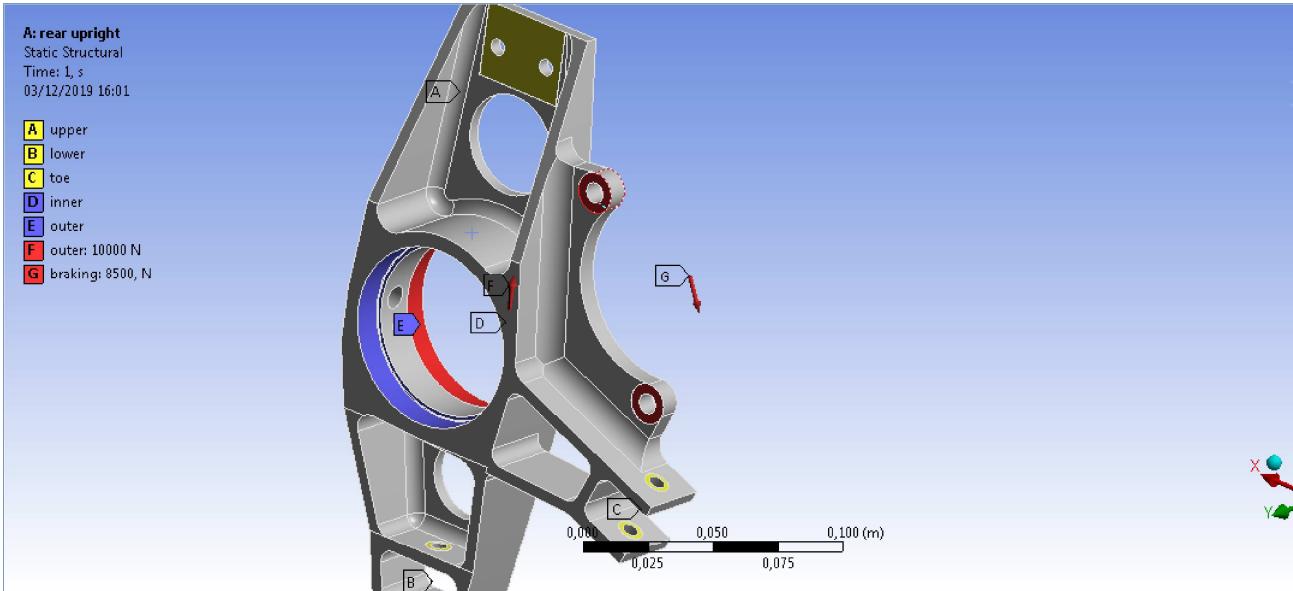


FIGURE 9
Model (B4) > Static Structural (B5) > Image

**Solution (B6)****TABLE 13**
Model (B4) > Static Structural (B5) > Solution

Object Name	Solution (B6)
State	Solved
Adaptive Mesh Refinement	
Max Refinement Loops	1,
Refinement Depth	2,
Information	
Status	Done
MAPDL Elapsed Time	30 m 50 s
MAPDL Memory Used	3,4814 GB
MAPDL Result File Size	227,69 MB
Post Processing	
Beam Section Results	No
On Demand Stress/Strain	No

TABLE 14
Model (B4) > Static Structural (B5) > 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 15
Model (B4) > Static Structural (B5) > Solution (B6) > Results

Object Name	Equivalent Stress	Total Deformation
State	Solved	
Scope		
Scoping Method		
Geometry Selection		
Geometry		All Bodies
Definition		
Type	Equivalent (von-Mises) Stress	Total Deformation
By	Time	
Display Time	Last	
Calculate Time History	Yes	
Identifier		
Suppressed	No	
Integration Point Results		
Display Option	Averaged	
Average Across Bodies	No	
Results		
Minimum	641,18 Pa	4,3059e-008 m
Maximum	1,3624e+008 Pa	3,2469e-005 m
Average	4,7296e+006 Pa	5,9808e-006 m
Minimum Occurs On	SYS-2Corps principal	
Maximum Occurs On	SYS-2Corps principal	
Information		
Time	1, s	
Load Step	1	
Substep	1	
Iteration Number	9	

FIGURE 10
Model (B4) > Static Structural (B5) > Solution (B6) > Equivalent Stress

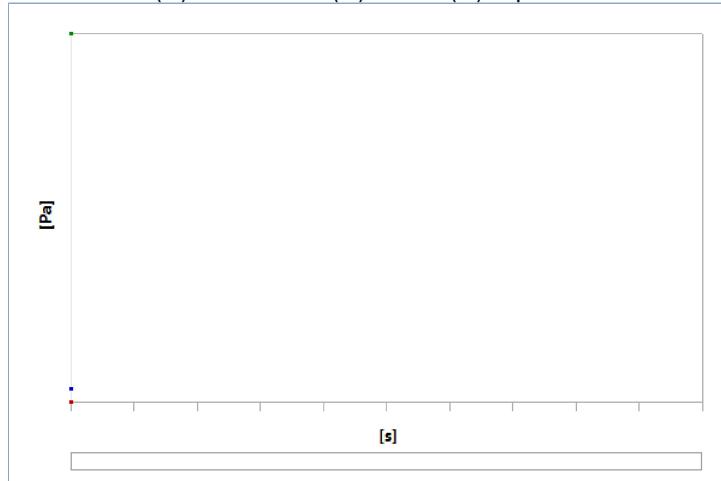


TABLE 16
Model (B4) > Static Structural (B5) > Solution (B6) > Equivalent Stress

Time [s]	Minimum [Pa]	Maximum [Pa]	Average [Pa]
1,	641,18	1,362e+008	4,7296e+006

FIGURE 11
Model (B4) > Static Structural (B5) > Solution (B6) > Equivalent Stress > Image

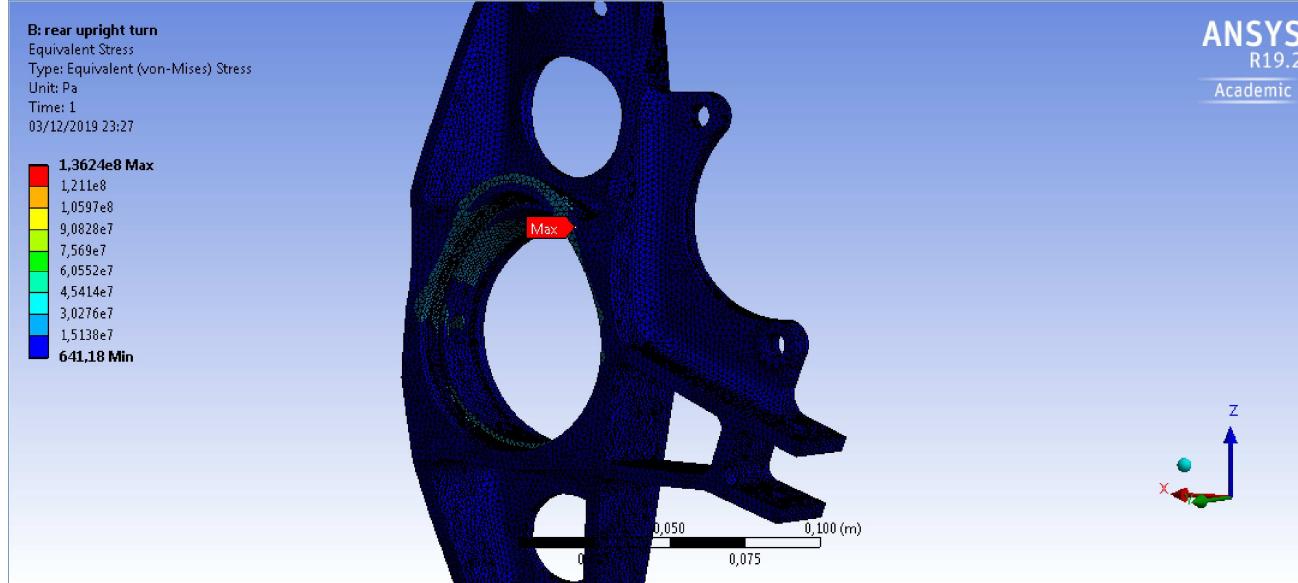


FIGURE 12
Model (B4) > Static Structural (B5) > Solution (B6) > Equivalent Stress > Image

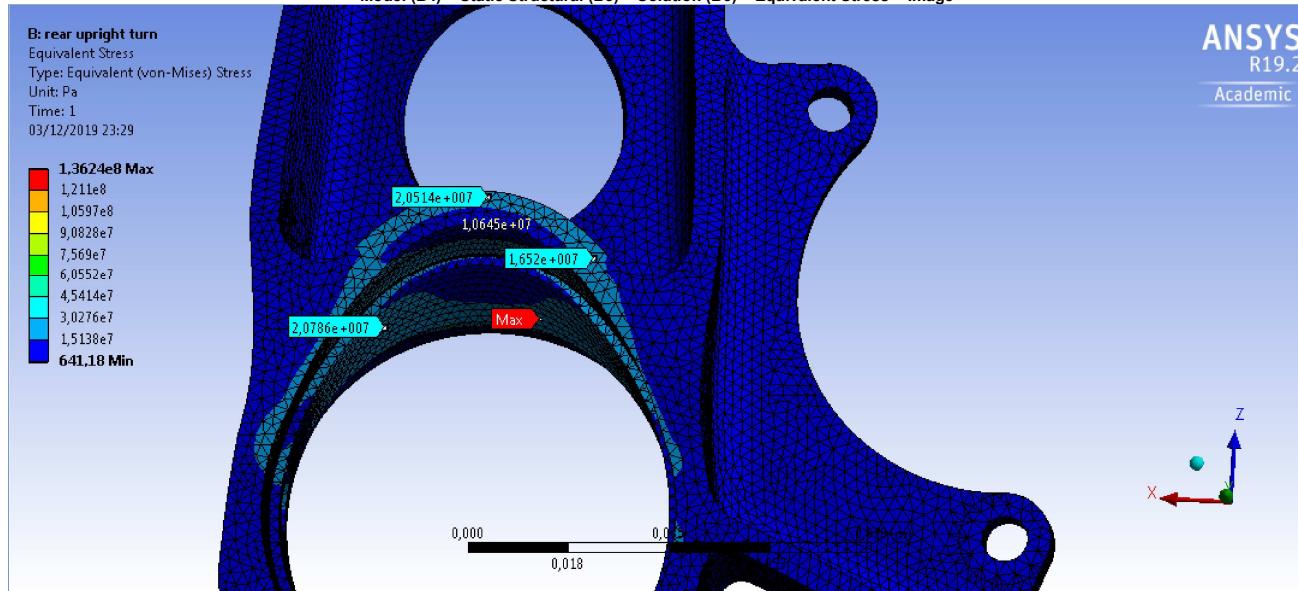


FIGURE 13

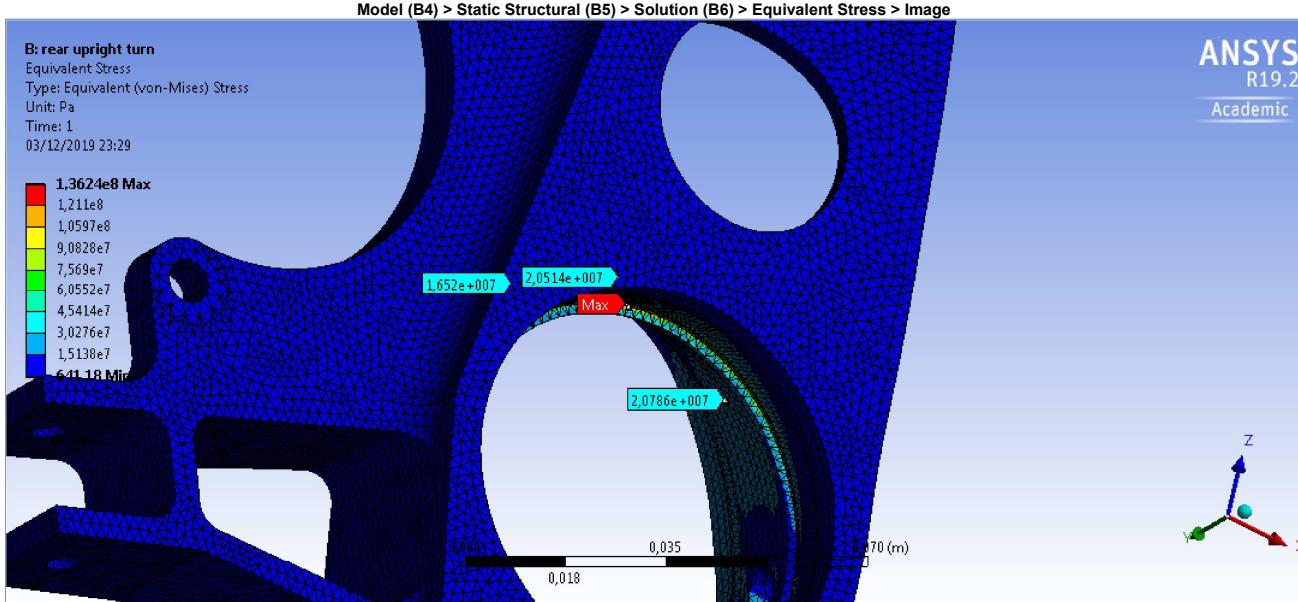


FIGURE 14
Model (B4) > Static Structural (B5) > Solution (B6) > Equivalent Stress > Image

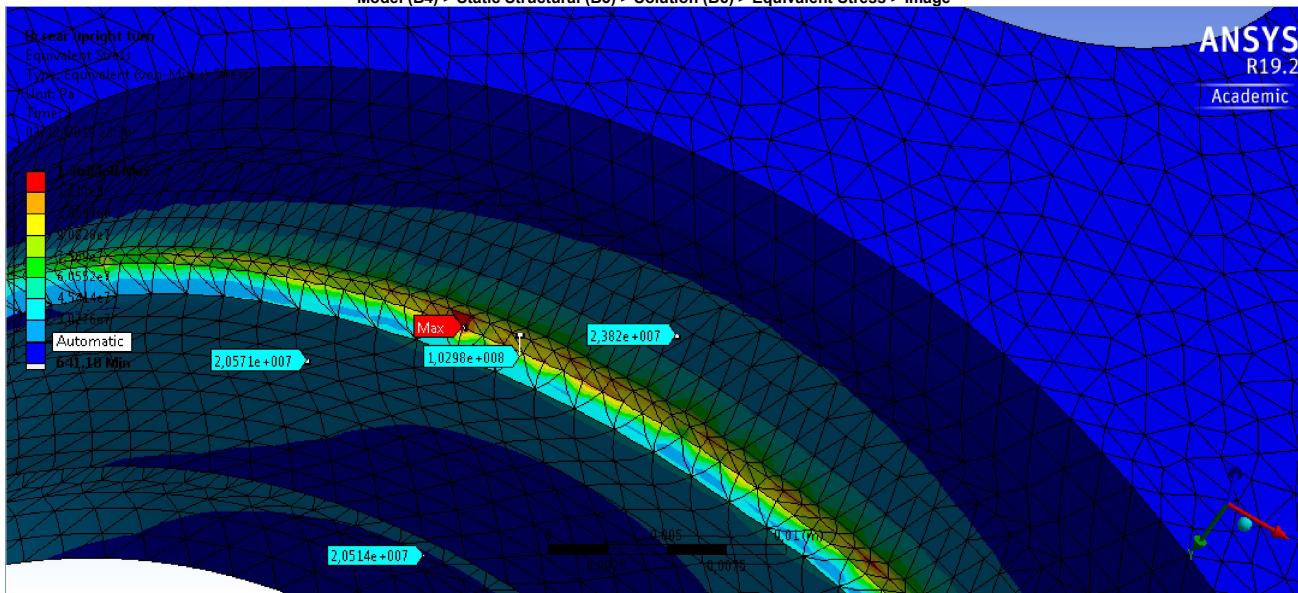


FIGURE 15
Model (B4) > Static Structural (B5) > Solution (B6) > Total Deformation

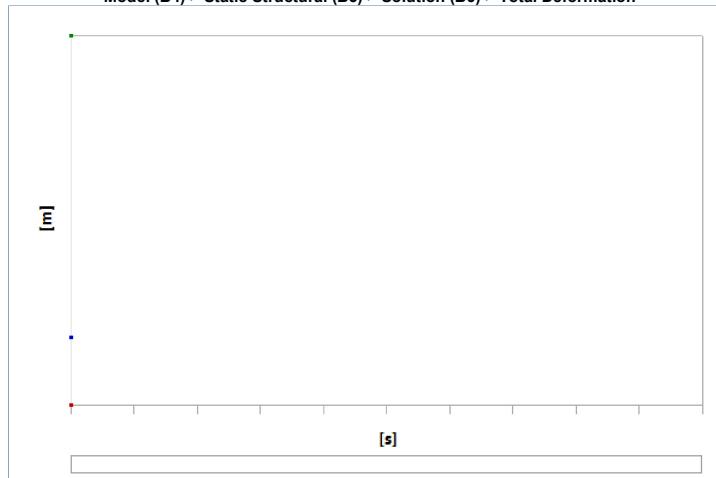


TABLE 17
Model (B4) > Static Structural (B5) > Solution (B6) > Total Deformation

Time [s]	Minimum [m]	Maximum [m]	Average [m]
1,	4,3059e-008	3,2469e-005	5,9808e-006

FIGURE 16
Model (B4) > Static Structural (B5) > Solution (B6) > Total Deformation > Image

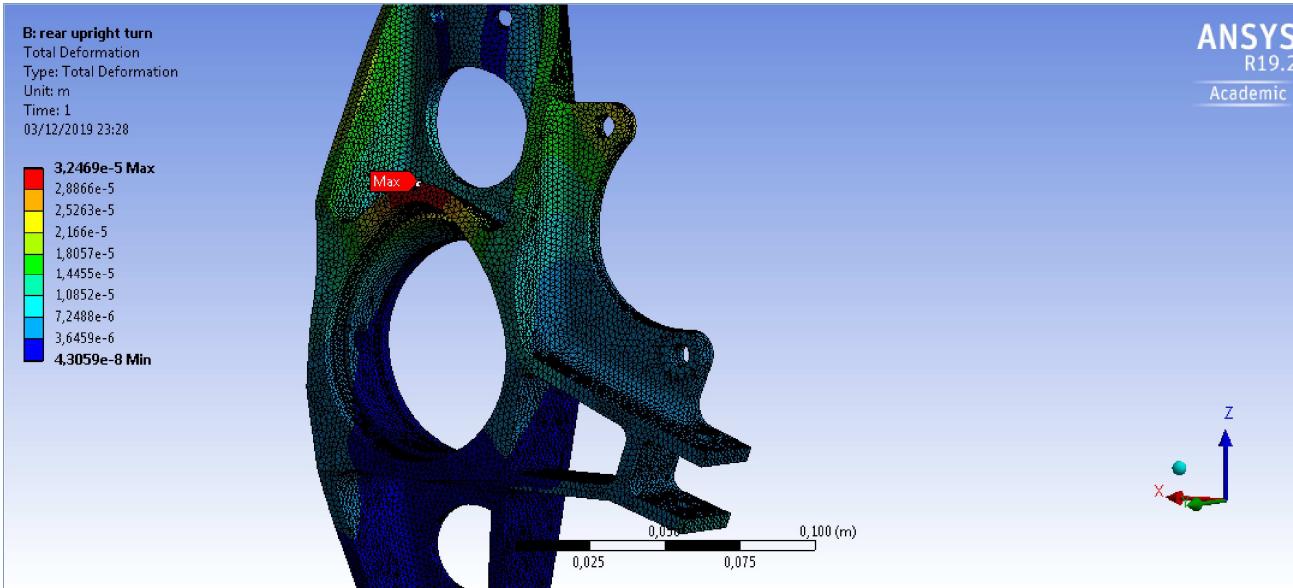
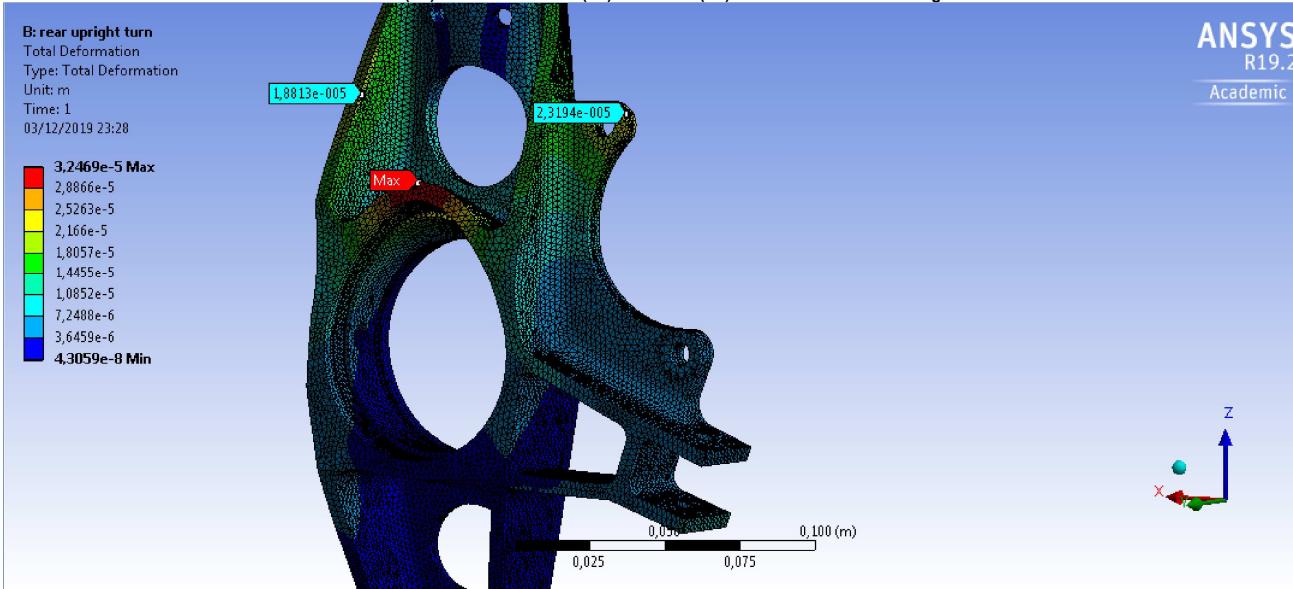


FIGURE 17
 Model (B4) > Static Structural (B5) > Solution (B6) > Total Deformation > Image



Material Data

Aluminum Alloy

TABLE 18
 Aluminum Alloy > Constants

Density	2770, kg m^-3
Isotropic Secant Coefficient of Thermal Expansion	2,3e-005 C^-1
Specific Heat Constant Pressure	875, J kg^-1 C^-1

TABLE 19
 Aluminum Alloy > Color

Red	Green	Blue
138,	104,	46,

TABLE 20
 Aluminum Alloy > Compressive Ultimate Strength

Compressive Ultimate Strength Pa
0,

TABLE 21
 Aluminum Alloy > Compressive Yield Strength

Compressive Yield Strength Pa
2,8e+008

TABLE 22
 Aluminum Alloy > Tensile Yield Strength

Tensile Yield Strength Pa
2,8e+008

TABLE 23
 Aluminum Alloy > Tensile Ultimate Strength

Tensile Ultimate Strength Pa

3,1e+008

TABLE 24	
Aluminum Alloy > Isotropic Secant Coefficient of Thermal Expansion	
Zero-Thermal-Strain Reference Temperature C	22,

TABLE 25	
Aluminum Alloy > Isotropic Thermal Conductivity	
Thermal Conductivity W m^-1 C^-1	Temperature C
114,	-100,
144,	0,
165,	100,
175,	200,

TABLE 26		
Aluminum Alloy > S-N Curve		
Alternating Stress Pa	Cycles	R-Ratio
2,758e+008	1700,	-1,
2,413e+008	5000,	-1,
2,068e+008	34000	-1,
1,724e+008	1,4e+005	-1,
1,379e+008	8,e+005	-1,
1,172e+008	2,4e+006	-1,
8,963e+007	5,5e+007	-1,
8,274e+007	1,e+008	-1,
1,706e+008	50000	-0.5
1,396e+008	3,5e+005	-0.5
1,086e+008	3,7e+006	-0.5
8,791e+007	1,4e+007	-0.5
7,757e+007	5,e+007	-0.5
7,239e+007	1,e+008	-0.5
1,448e+008	50000	0,
1,207e+008	1,9e+005	0,
1,034e+008	1,3e+006	0,
9,308e+007	4,4e+006	0,
8,618e+007	1,2e+007	0,
7,239e+007	1,e+008	0,
7,412e+007	3,e+005	0.5
7,067e+007	1,5e+006	0.5
6,636e+007	1,2e+007	0.5
6,205e+007	1,e+008	0.5

TABLE 27	
Aluminum Alloy > Isotropic Resistivity	
Resistivity ohm m	Temperature C
2,43e-008	0,
2,67e-008	20,
3,63e-008	100,

TABLE 28				
Aluminum Alloy > Isotropic Elasticity				
Young's Modulus Pa	Poisson's Ratio	Bulk Modulus Pa	Shear Modulus Pa	Temperature C
7,1e+010	0,33	6,9608e+010	2,6692e+010	

TABLE 29	
Aluminum Alloy > Isotropic Relative Permeability	
Relative Permeability	1,