

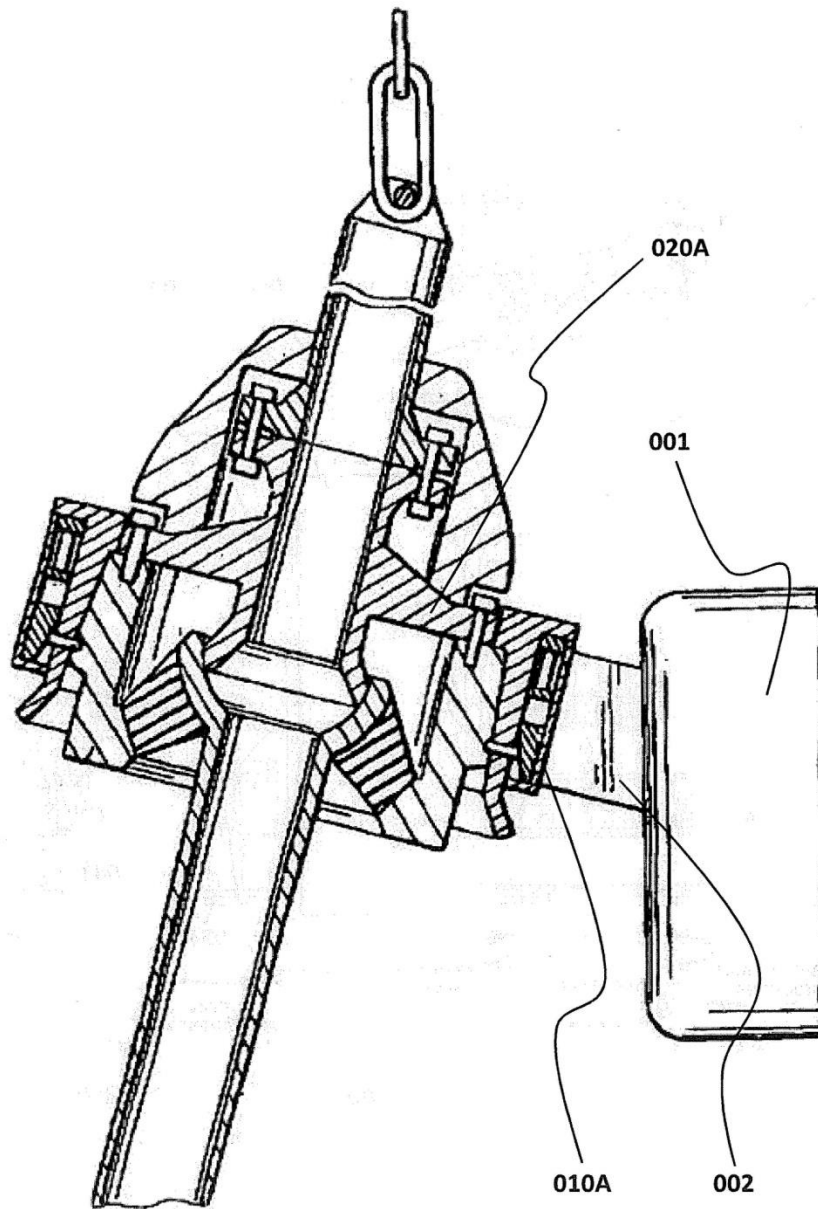


FIGURE 1 (PRIOR ART)

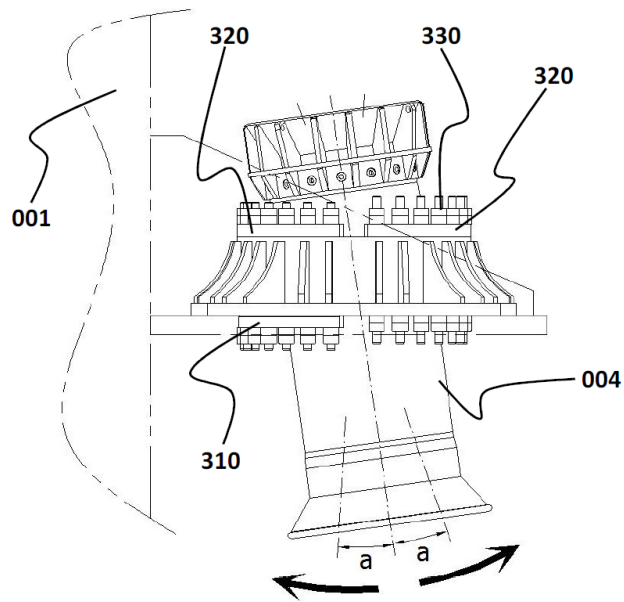


FIGURE 2A

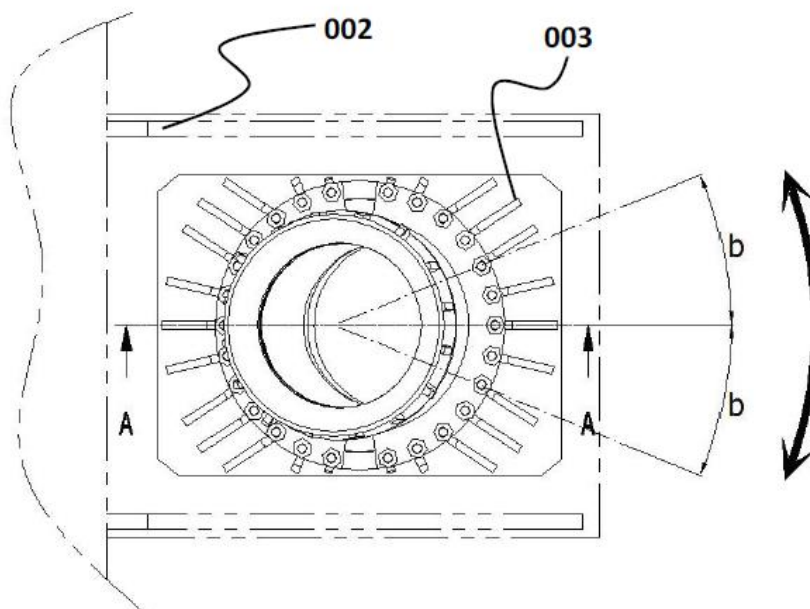


FIGURE 2B

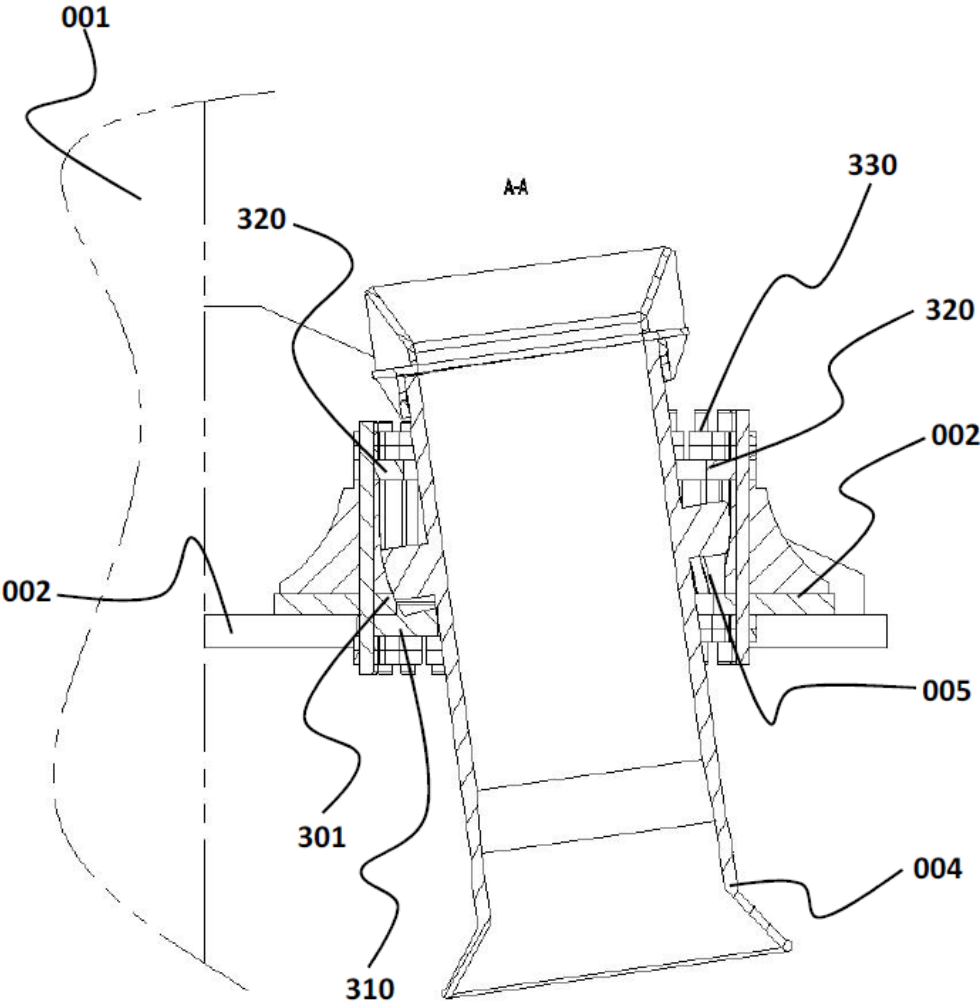


FIGURE 3A

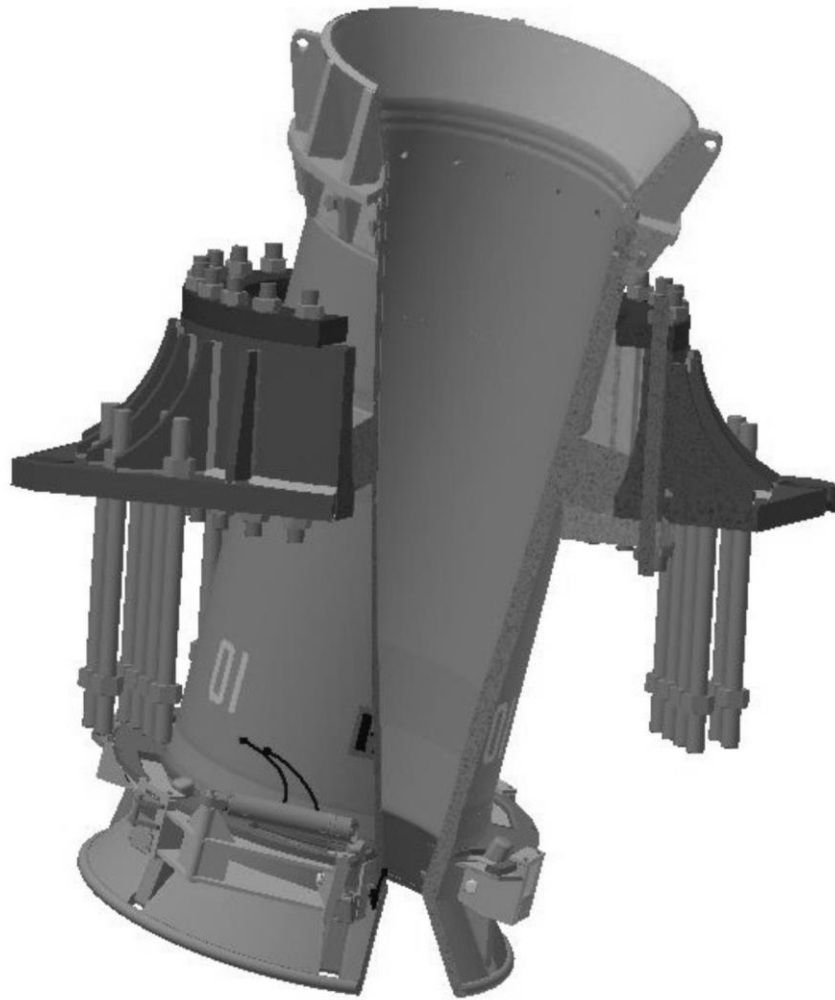


FIGURE 3B

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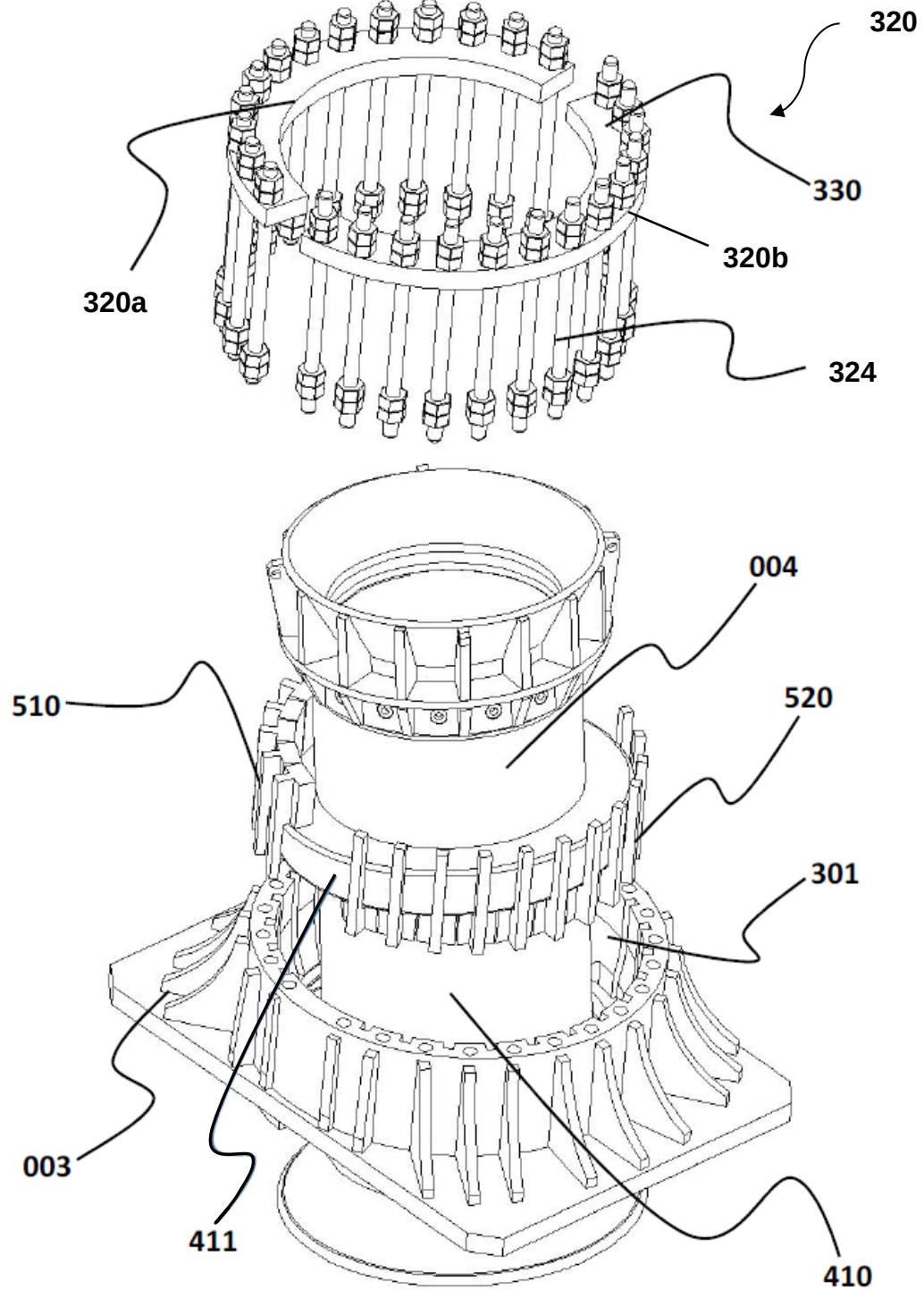


FIGURE 4

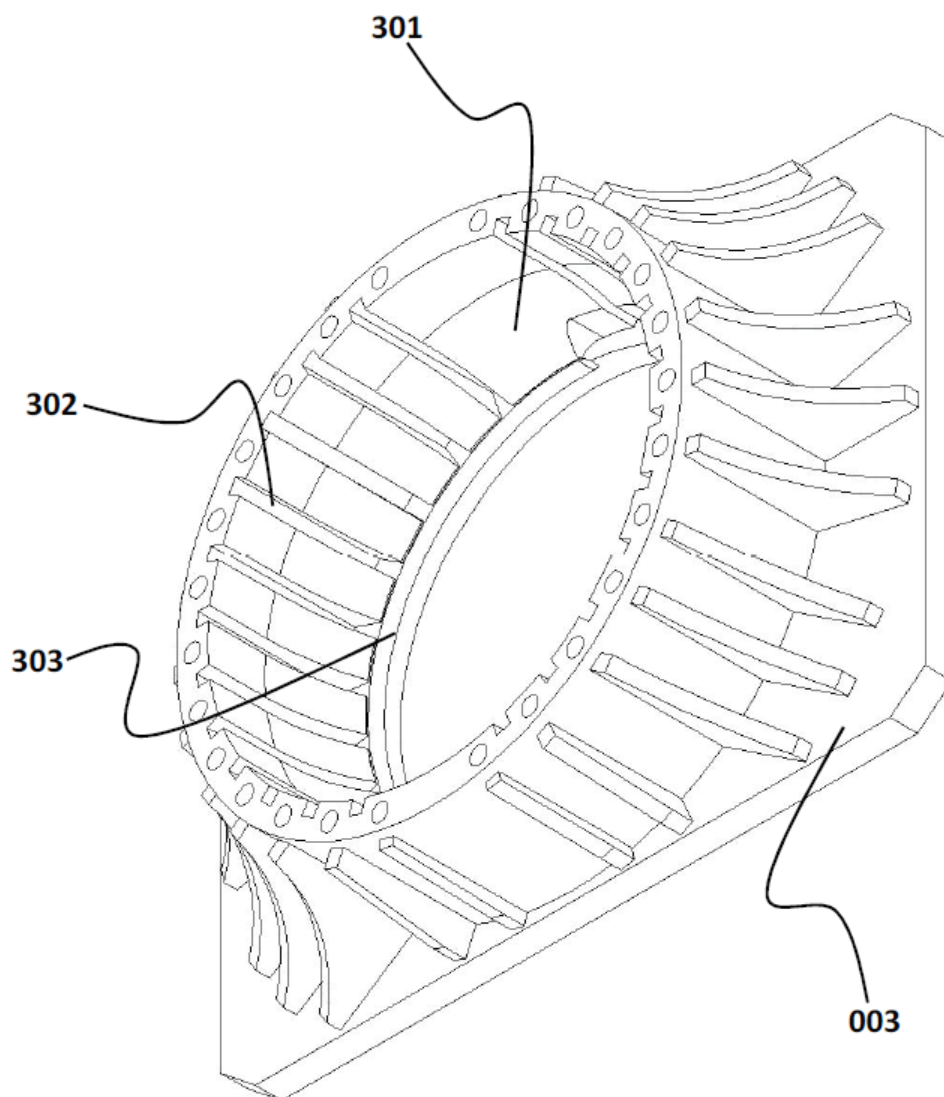


FIGURE 5

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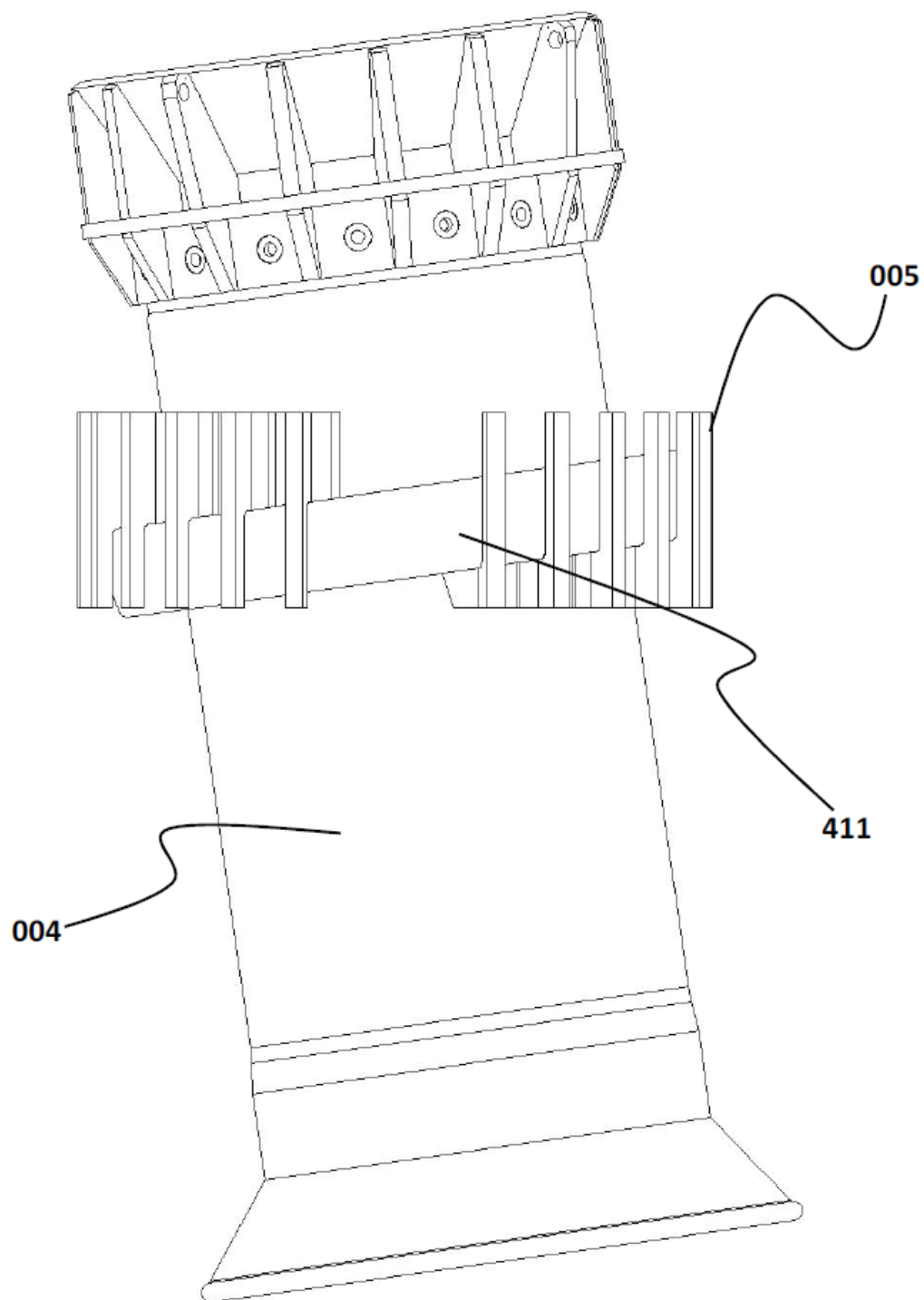


FIGURE 6A

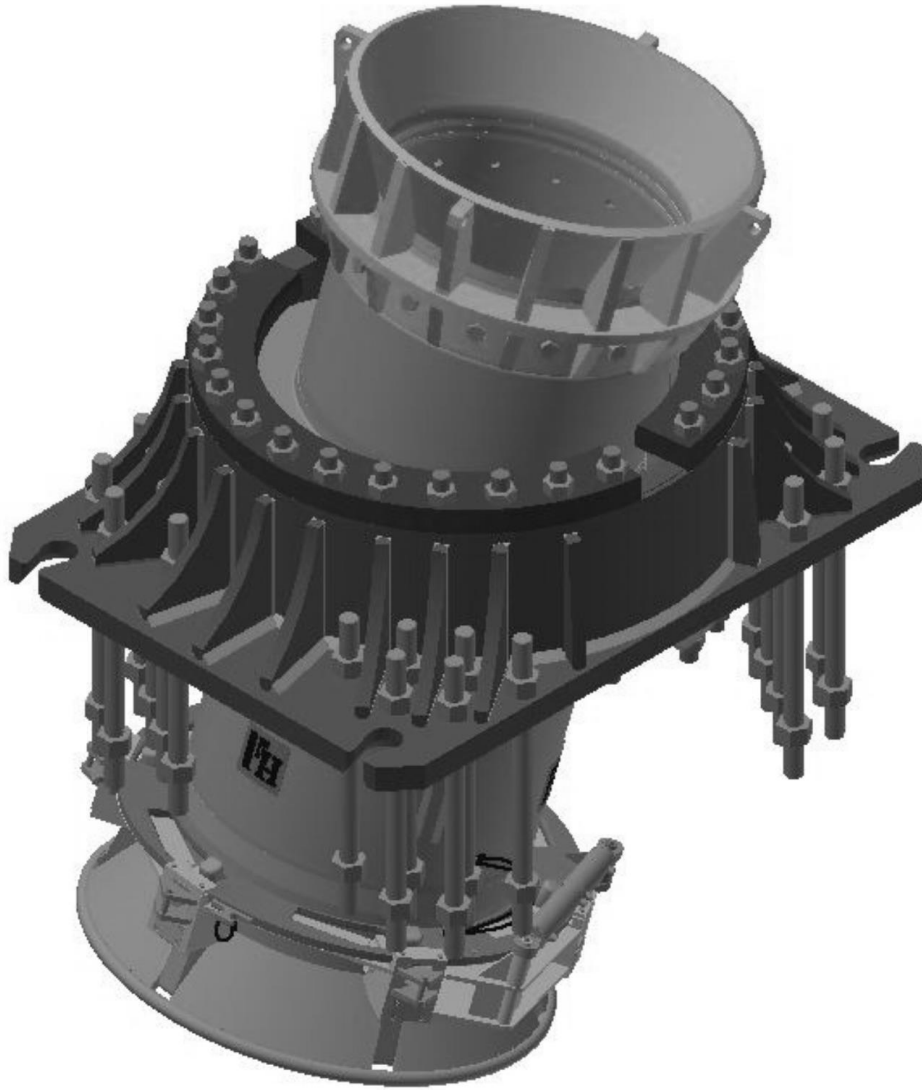


FIGURE 6B

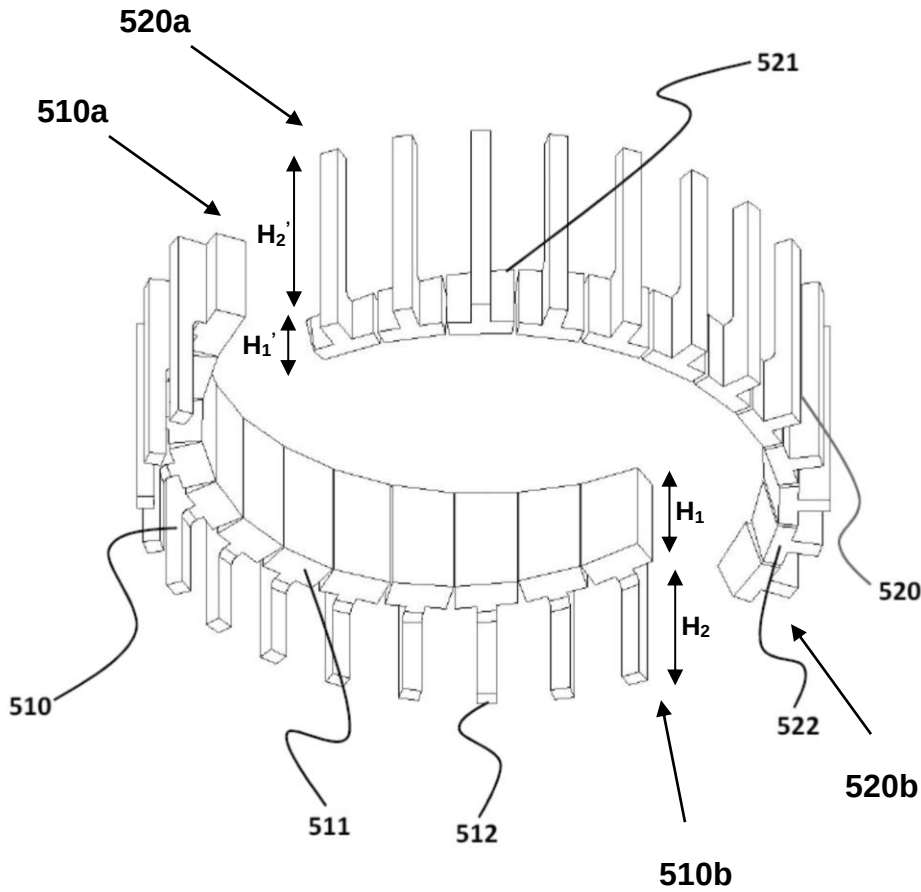


FIGURE 7

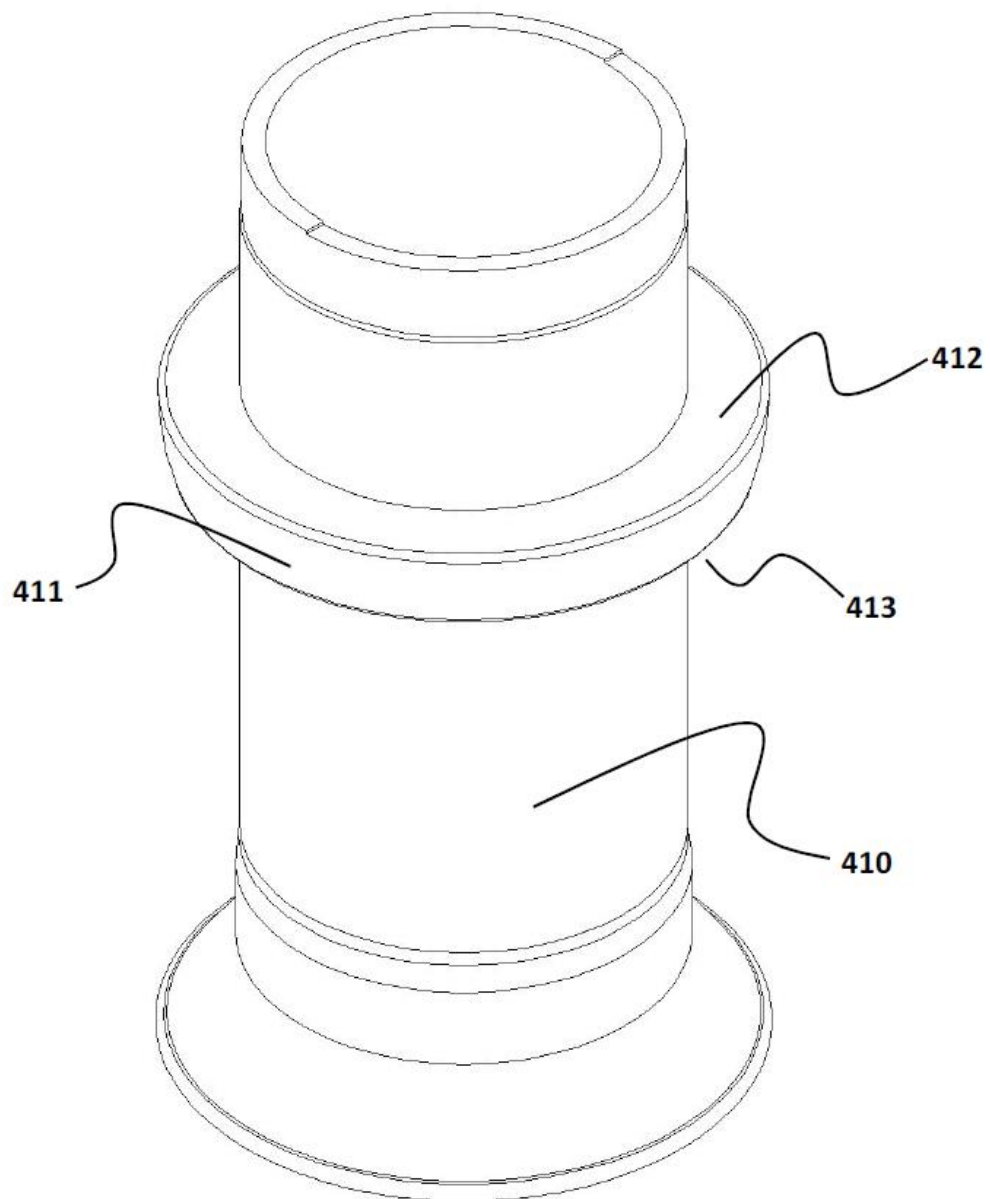


FIGURE 8

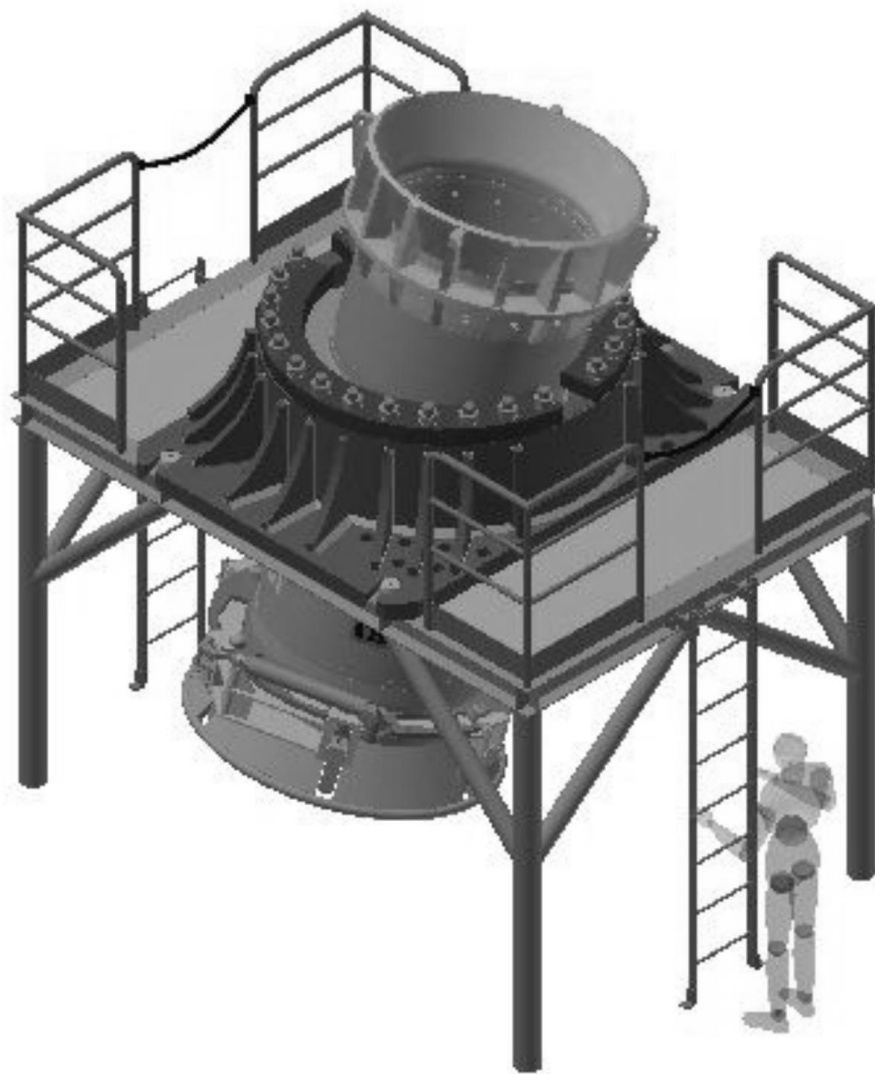
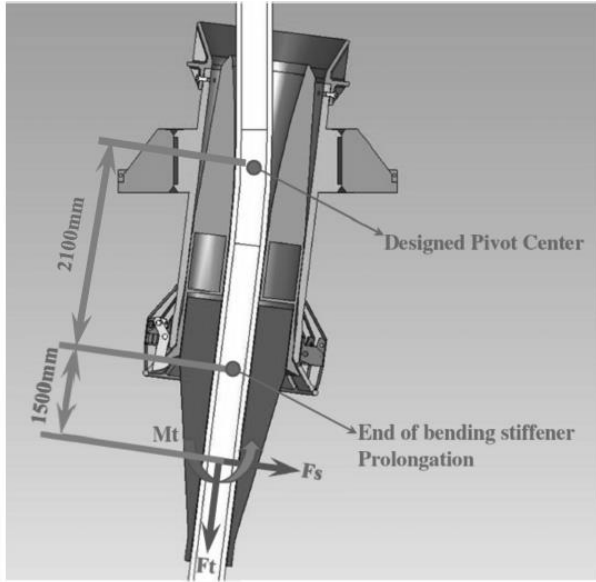


FIGURE 9

Flexible Riser Arrangement (DN48/40)



Rigid Riser Arrangement (DN48)

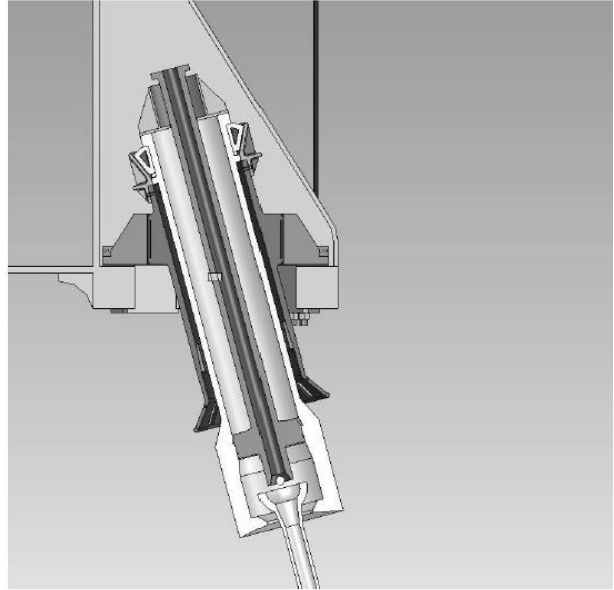


FIGURE 10A

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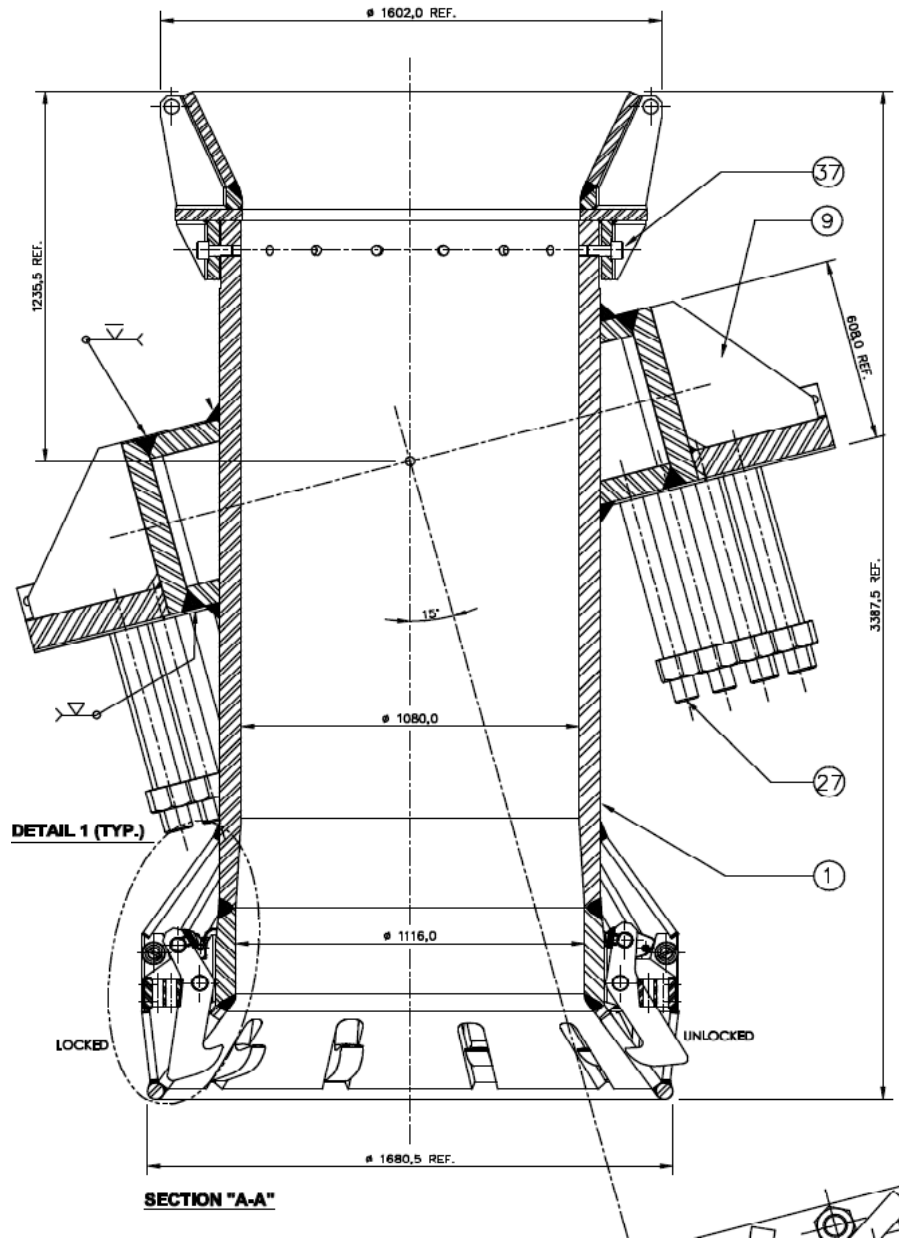


FIGURE 10B

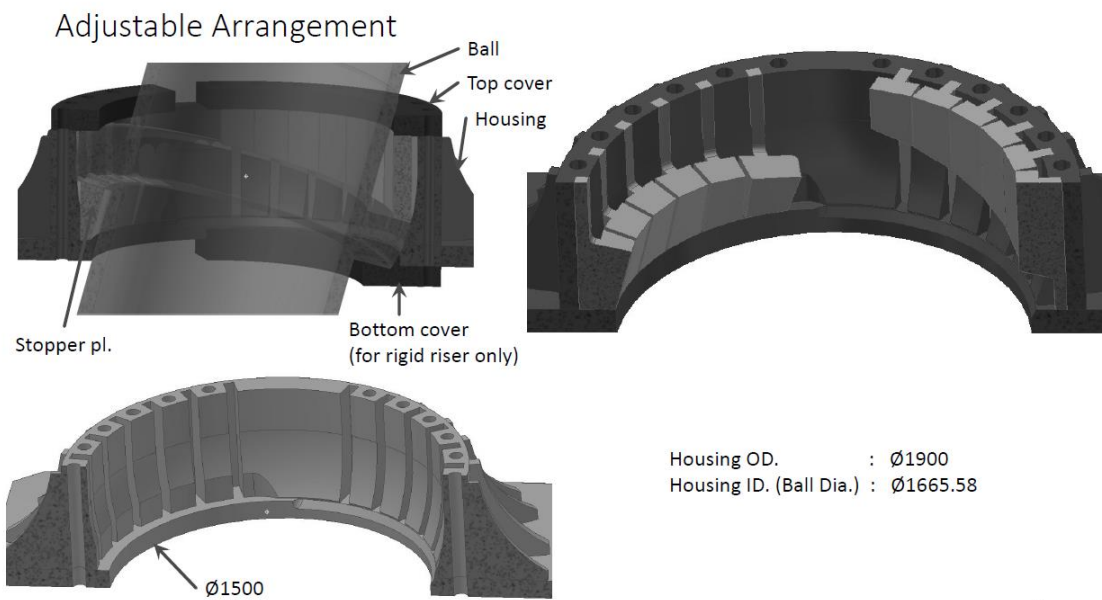


FIGURE 10C

a) ANSYS Setting

B: Static Structural
 Static Structural
 Time: 1 s
 23/11/2016 1:19 PM

A Fixed Support
B Standard Earth Gravity: 9.8066 m/s²
C Frictionless Support
D Moment: 6.9e+006 N·m
E Force: 1.617e+006 N

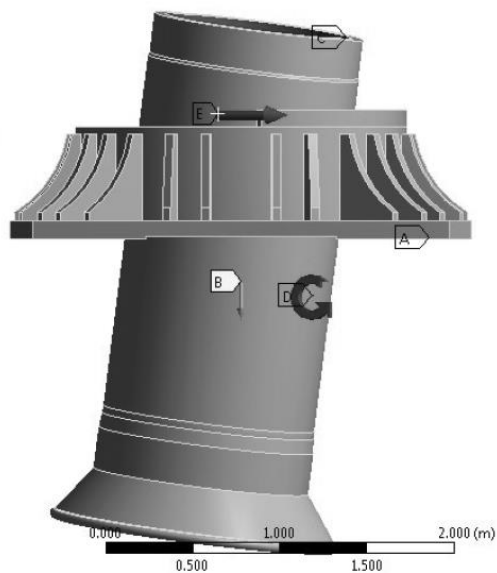


FIGURE 10D

a) ANSYS Result

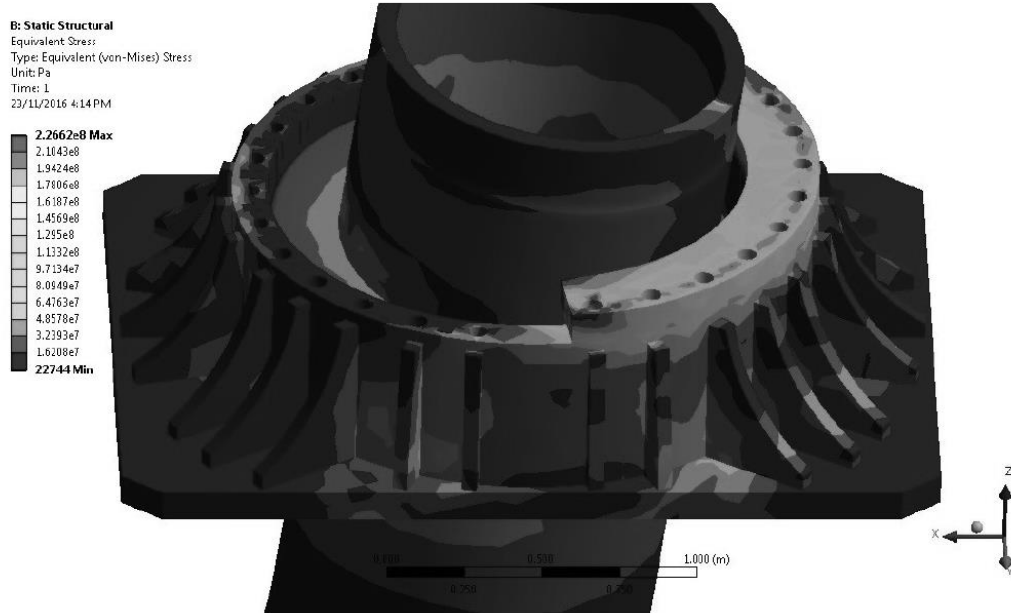


Figure 10E

a) ANSYS Result



FIGURE 10F

a) ANSYS Result

B-Static Structural
 Equivalent Stress
 Type: Equivalent (von-Mises) Stress
 Unit: Pa
 Time: 1
 23/11/2016 4:11 PM

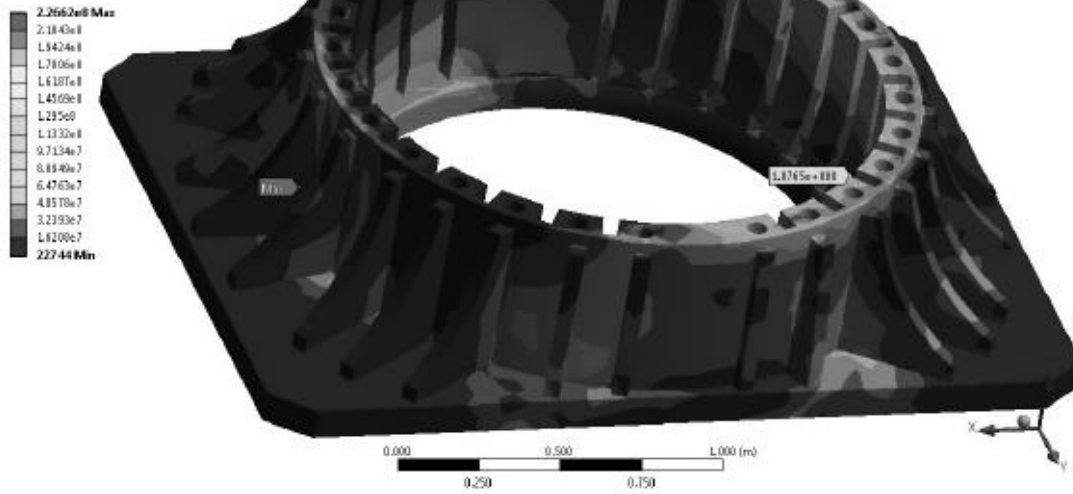


FIGURE 10G

a) ANSYS Result

B-Static Structural
 Equivalent Stress
 Type: Equivalent (von-Mises) Stress
 Unit: Pa
 Time: 1
 23/11/2016 4:11 PM

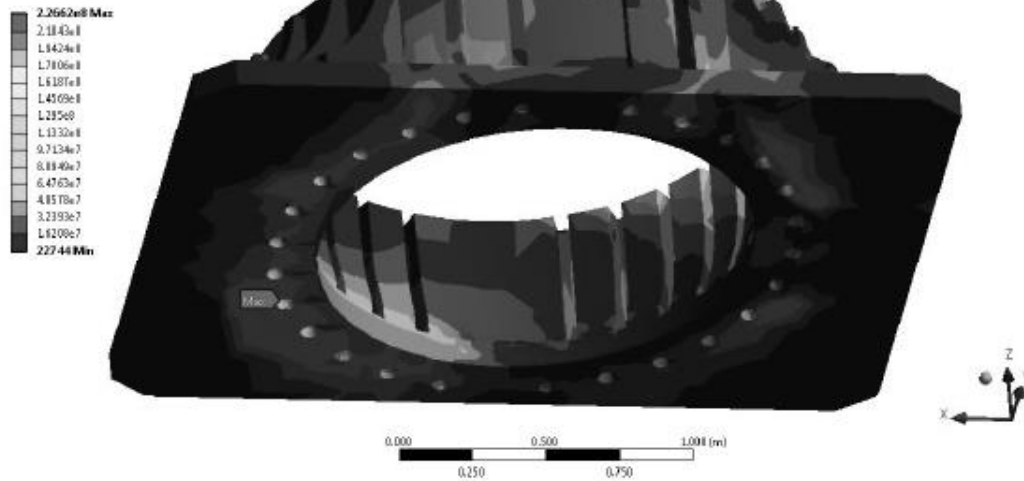


FIGURE 10H

a) ANSYS Result

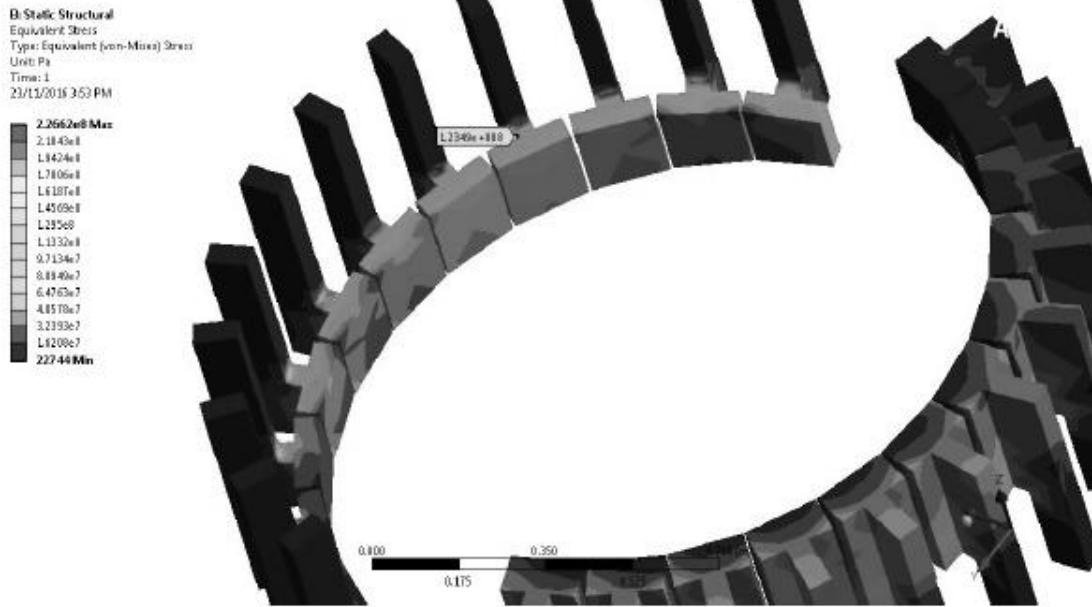


FIGURE 10I

a) ANSYS Result

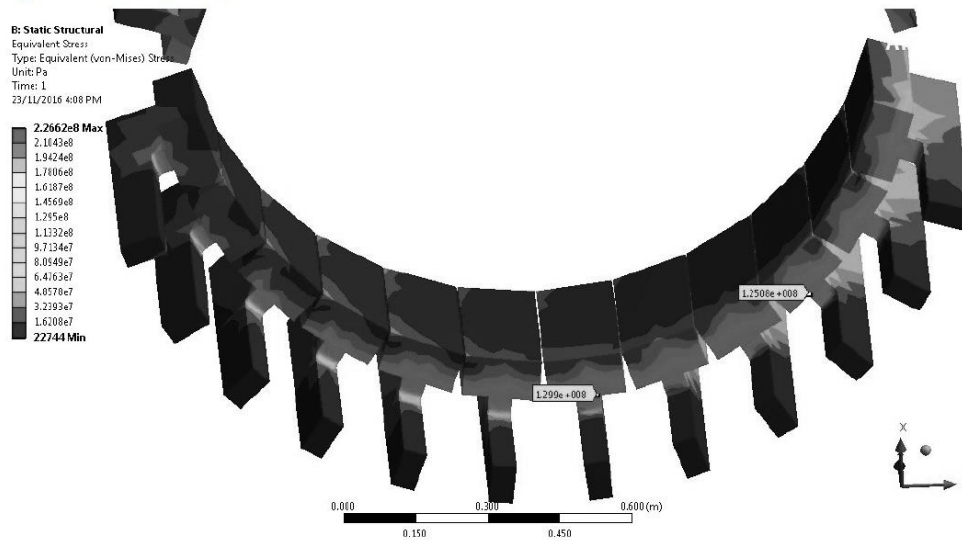


FIGURE 10J

a) ANSYS Result

B: Static Structural
 Equivalent Stress
 Type: Equivalent (von-Mises) Stress
 Unit: Pa
 Time: 1
 23/11/2016 4:12 PM

2.2662e8 Max
 2.1643e8
 1.9424e8
 1.7806e8
 1.6187e8
 1.4569e8
 1.295e8
 1.1332e8
 9.7134e7
 8.0549e7
 6.4163e7
 4.8578e7
 3.2193e7
 1.6208e7
22744 Min



0.000 0.150 0.300 0.450 0.600 (m)

FIGURE 10K

a) ANSYS Result

B: Static Structural
 Equivalent Stress
 Type: Equivalent (von-Mises) Stress
 Unit: Pa
 Time: 1
 23/11/2016 4:13 PM

2.2662e8 Max
 2.1643e8
 1.9424e8
 1.7806e8
 1.6187e8
 1.4569e8
 1.295e8
 1.1332e8
 9.7134e7
 8.0549e7
 6.4163e7
 4.8578e7
 3.2193e7
 1.6208e7
22744 Min

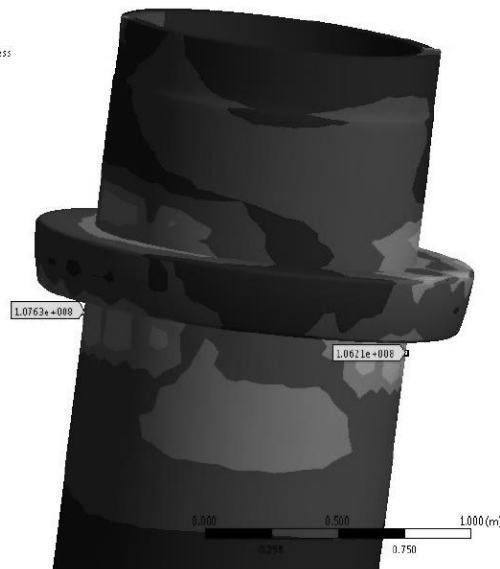


FIGURE 10L

b) ANSYS Setting

B: Static Structural

Static Structural

Time: 1 s

25/11/2016 10:51 AM

- A** Fixed Support
- B** Standard Earth Gravity: 9.8066 m/s^2
- C** Frictionless Support
- D** Moment: $1.673e+006 \text{ N-m}$
- E** Force: $1.14e+006 \text{ N}$
- F** Force Z: $5.931e+006 \text{ N}$



FIGURE 10M

b) ANSYS Result

B: Static Structural

Equivalent Stress

Type: Equivalent (von-Mises) Stress

Unit: Pa

Time: 1

25/11/2016 10:46 AM

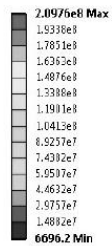


FIGURE 10N

b) ANSYS Result



FIGURE 100

b) ANSYS Result

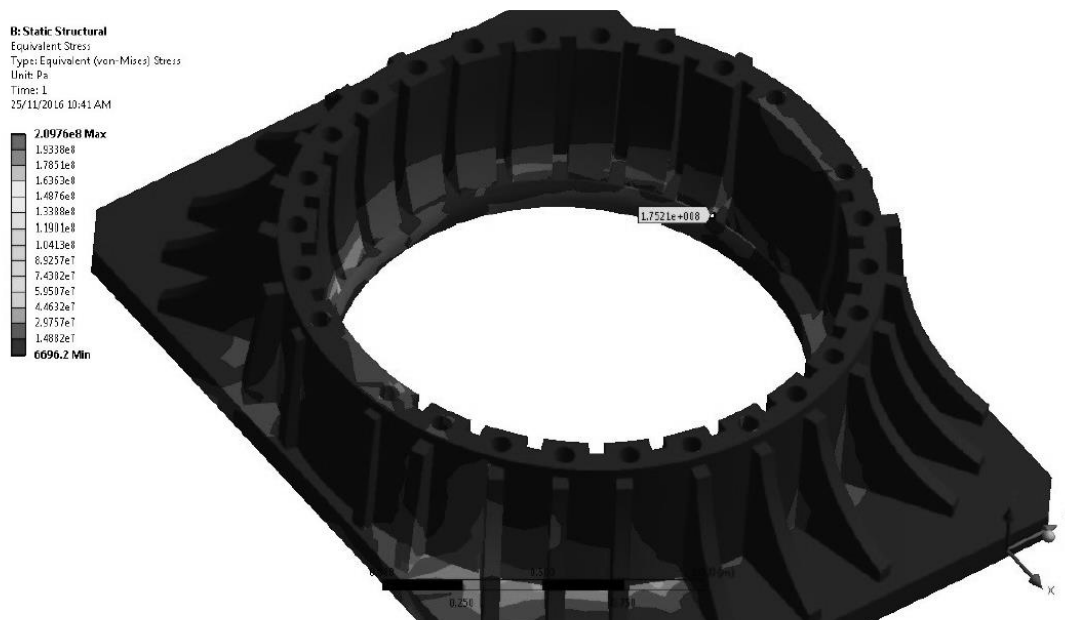


FIGURE 10P

b) ANSYS Result

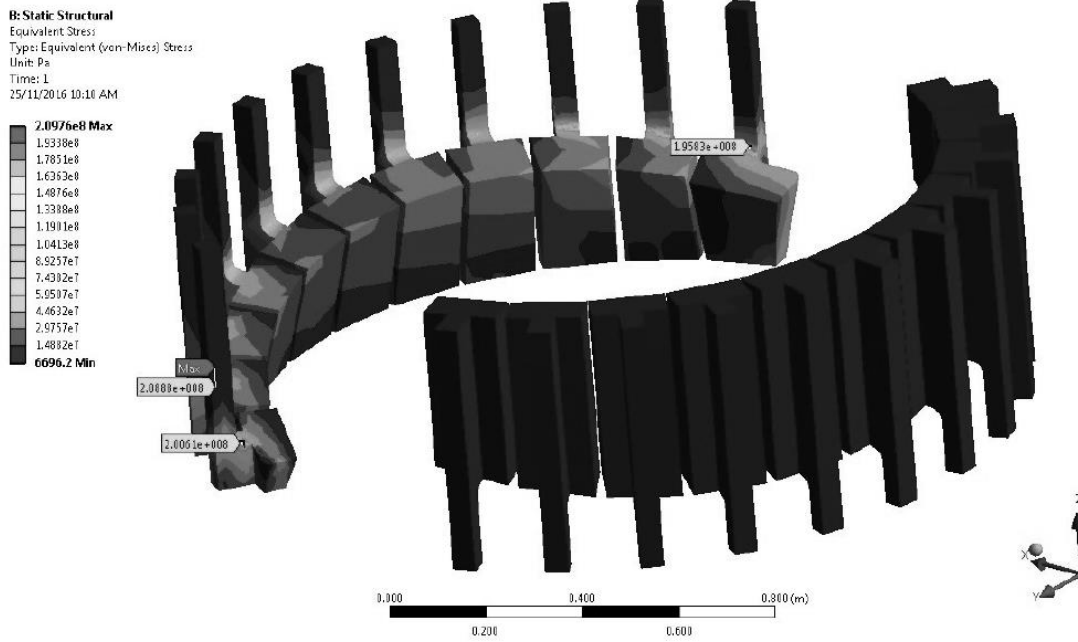


FIGURE 10Q

b) ANSYS Result

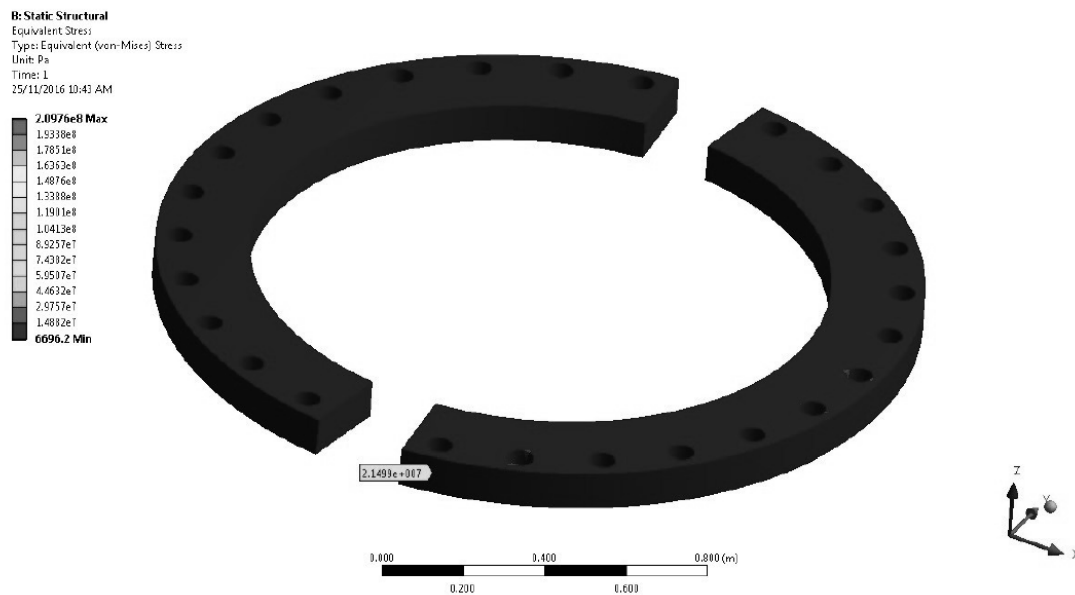


FIGURE 10R

b) ANSYS Result

B: Static Structural
 Equivalent Stress
 Type: Equivalent (von-Mises) Stress
 Unit: Pa
 Time: 1
 25/11/2016 10:46 AM

2.0076e8 Max
 1.5338e8
 1.7051e8
 1.6363e8
 1.4076e8
 1.3388e8
 1.1911e8
 1.0413e8
 6.9257e7
 7.4392e7
 5.0597e7
 4.4632e7
 2.9757e7
 1.4082e7
 6696.2 Min



FIGURE 10S

c) ANSYS Setting

B: TAB# AA 25
 Static Structural
 Time: 1 :
 25/11/2016 3:22 PM

A Fixed Support
B Standard Earth Gravity: 9.8066 m/s²
C Fz: 1.325e+006 N
D Mx: 4.99e+006 N-m
E Frictionless Support
F Fx: 1e+006 N



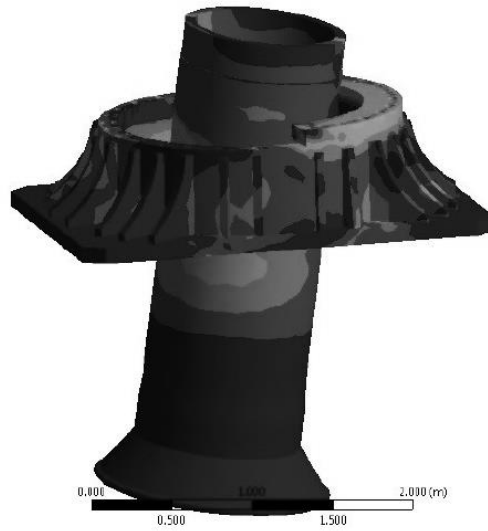
ANSYS
 R16.2

FIGURE 10T

c) ANSYS Result

B: TAB & AA 25
 Equivalent Stress
 Type: Equivalent (von-Mises) Stress
 Unit: Pa
 Time: 1
 25/11/2016 3:07 PM

1.614e9 Max
 1.4987e8
 1.3835e8
 1.2682e8
 1.1529e8
 1.0376e8
 9.2238e7
 8.071e7
 6.9183e7
 5.7656e7
 4.6129e7
 3.4602e7
 2.3075e7
 1.1548e7
 20816 Min



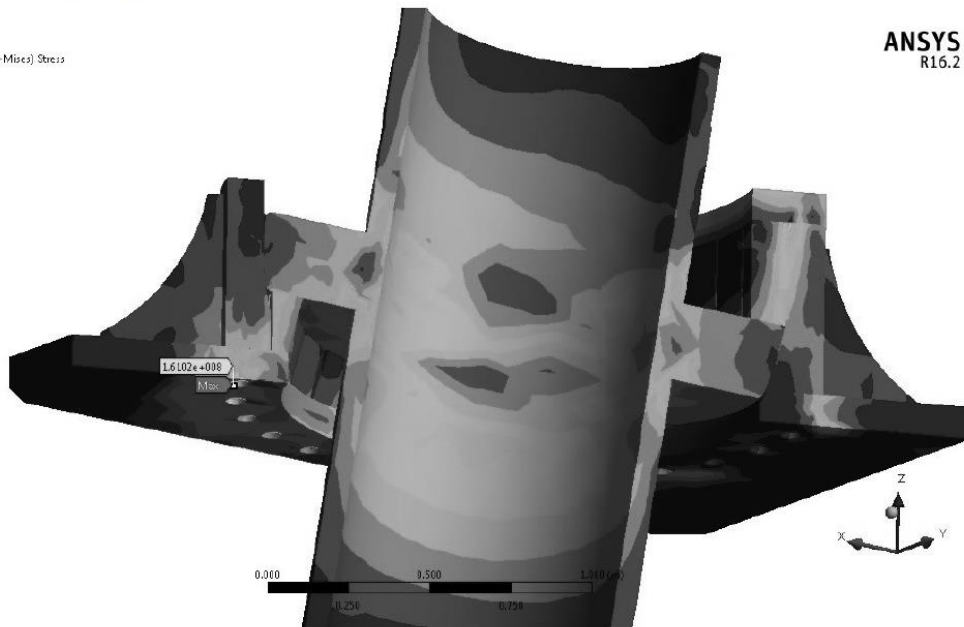
ANSYS
 R16.2

FIGURE 10U

c) ANSYS Result

B: TAB & AA 25
 Equivalent Stress
 Type: Equivalent (von-Mises) Stress
 Unit: Pa
 Time: 1
 25/11/2016 3:09 PM

1.614e9 Max
 1.4987e8
 1.3835e8
 1.2682e8
 1.1529e8
 1.0376e8
 9.2238e7
 8.071e7
 6.9183e7
 5.7656e7
 4.6129e7
 3.4602e7
 2.3075e7
 1.1548e7
 20816 Min



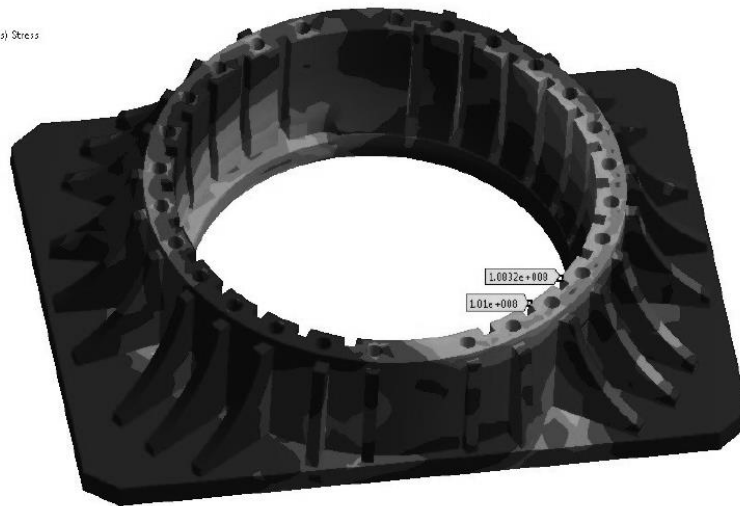
ANSYS
 R16.2

FIGURE 10V

c) ANSYS Result

B-TAB- AA-25
 Equivalent Stress
 Type: Equivalent (von-Mises) Stress
 Unit: Pa
 Time: 1
 25/11/2016 3:10 PM

1.614e8 Max
 1.4987e8
 1.3835e8
 1.2692e8
 1.1529e8
 1.0376e8
 9.2238e7
 8.071e7
 6.9183e7
 5.7656e7
 4.6129e7
 3.4602e7
 2.3075e7
 1.1548e7
 20816 Min



ANSYS
 R16.2

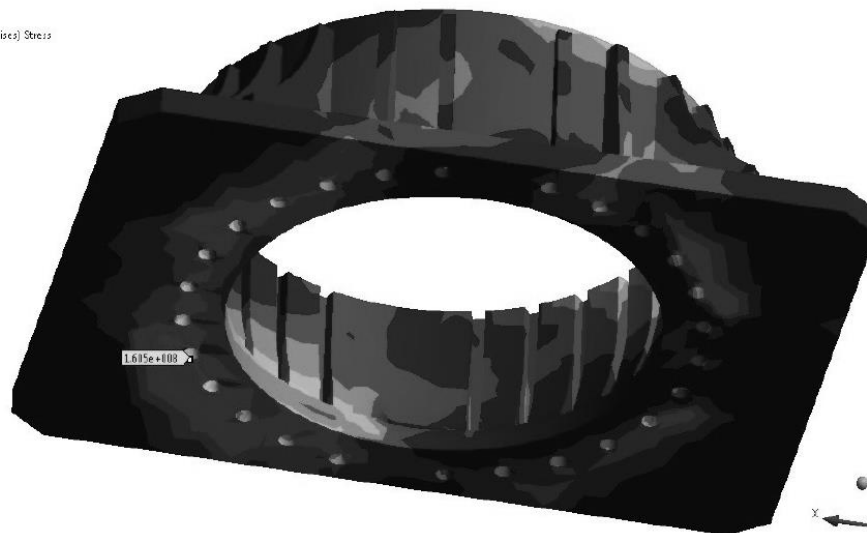
0.000 0.250 0.500 0.750 1.000 (m)

FIGURE 10W

c) ANSYS Result

B-TAB- AA-25
 Equivalent Stress
 Type: Equivalent (von-Mises) Stress
 Unit: Pa
 Time: 1
 25/11/2016 3:11 PM

1.614e8 Max
 1.4987e8
 1.3835e8
 1.2692e8
 1.1529e8
 1.0376e8
 9.2238e7
 8.071e7
 6.9183e7
 5.7656e7
 4.6129e7
 3.4602e7
 2.3075e7
 1.1548e7
 20816 Min



ANSYS
 R16.2

0.000 0.250 0.500 0.750 1.000 (m)

FIGURE 10X

c) ANSYS Result

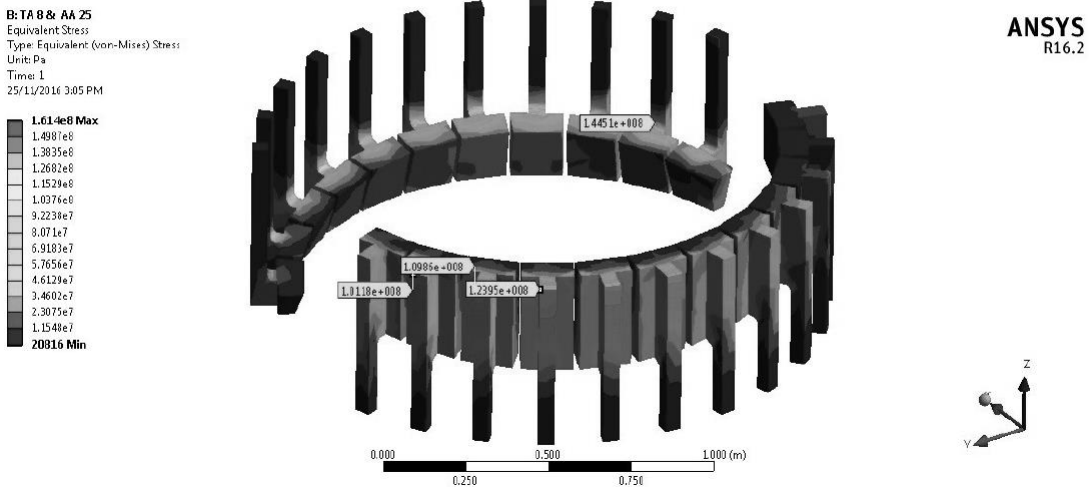


FIGURE 10Y

c) ANSYS Result

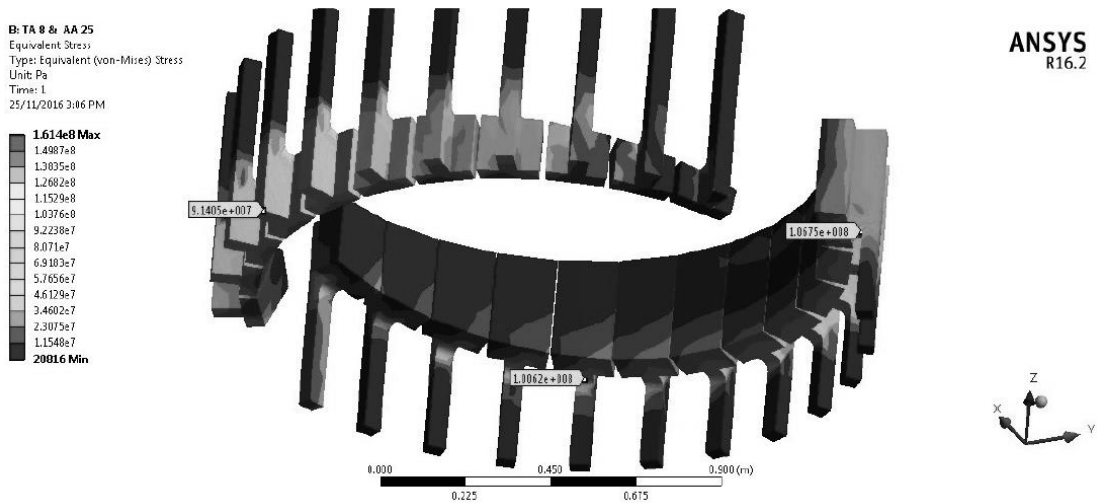


FIGURE 10Z

c) ANSYS Result

B: TAB8 AA 25

Equivalent Stress

Type: Equivalent (von-Mises) Stress

Unit: Pa

Time: 1

25/11/2016 3:13 PM

1.614e8 Max
1.4987e8
1.3835e8
1.2692e8
1.1529e8
1.0376e8
9.2238e7
8.071e7
6.9193e7
5.7656e7
4.6129e7
3.4602e7
2.3075e7
1.1548e7
20816 Min

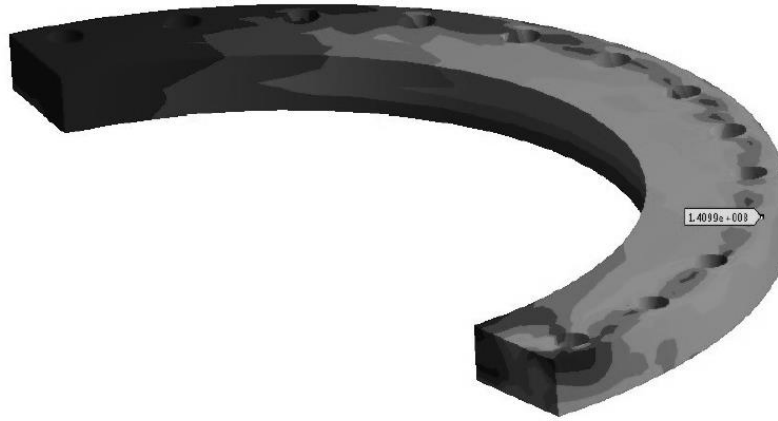
ANSYS
R16.2

FIGURE 11A

c) ANSYS Result

B: TAB8 AA 25

Equivalent Stress

Type: Equivalent (von-Mises) Stress

Unit: Pa

Time: 1

25/11/2016 3:14 PM

1.614e8 Max
1.4987e8
1.3835e8
1.2692e8
1.1529e8
1.0376e8
9.2238e7
8.071e7
6.9193e7
5.7656e7
4.6129e7
3.4602e7
2.3075e7
1.1548e7
20816 Min

ANSYS
R16.2

FIGURE 11B