

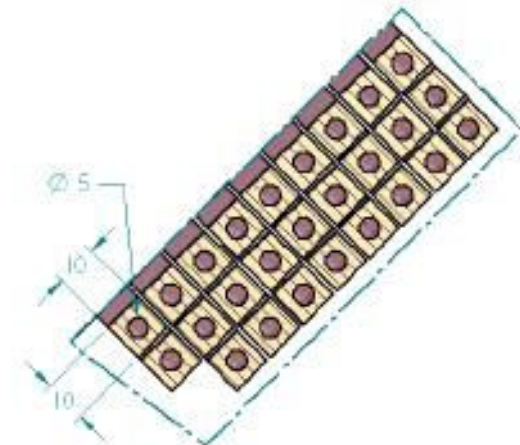
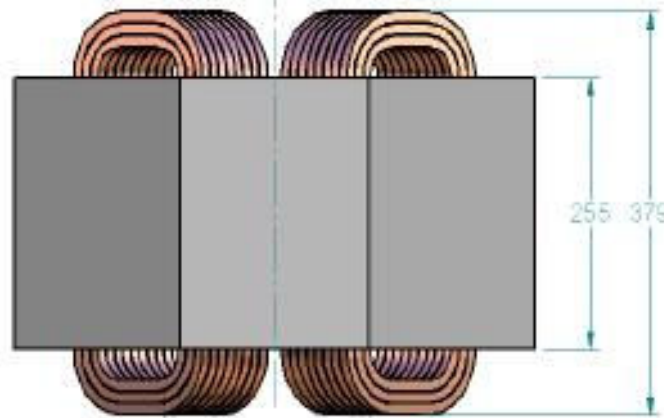
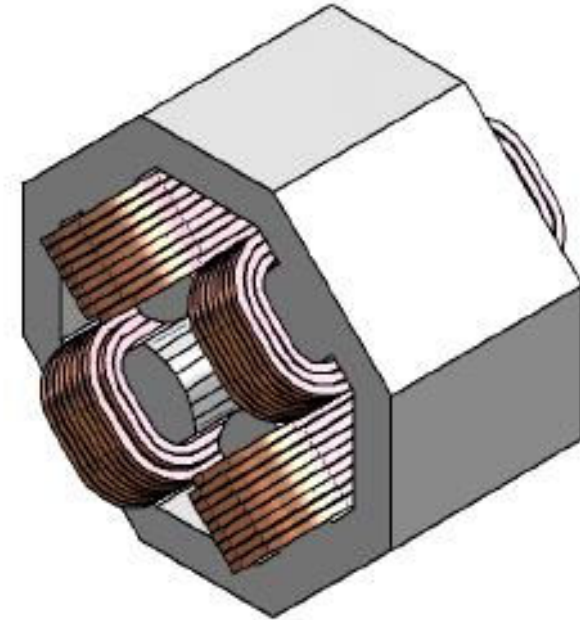
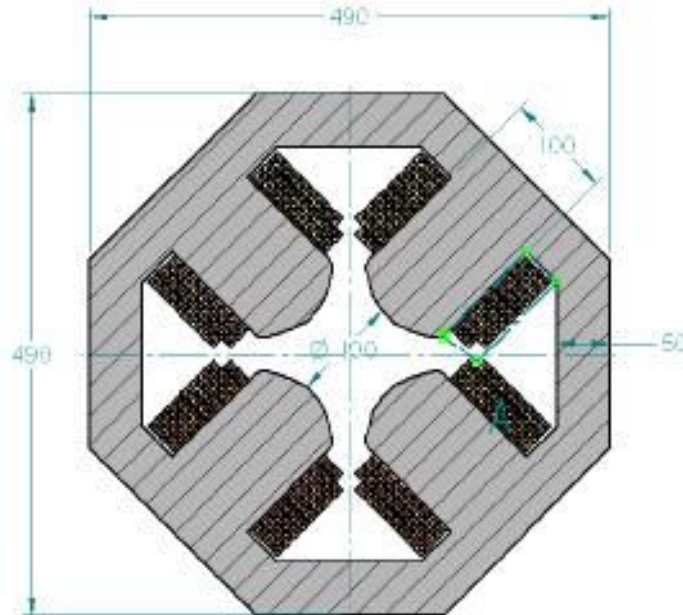
Davide Tommasini

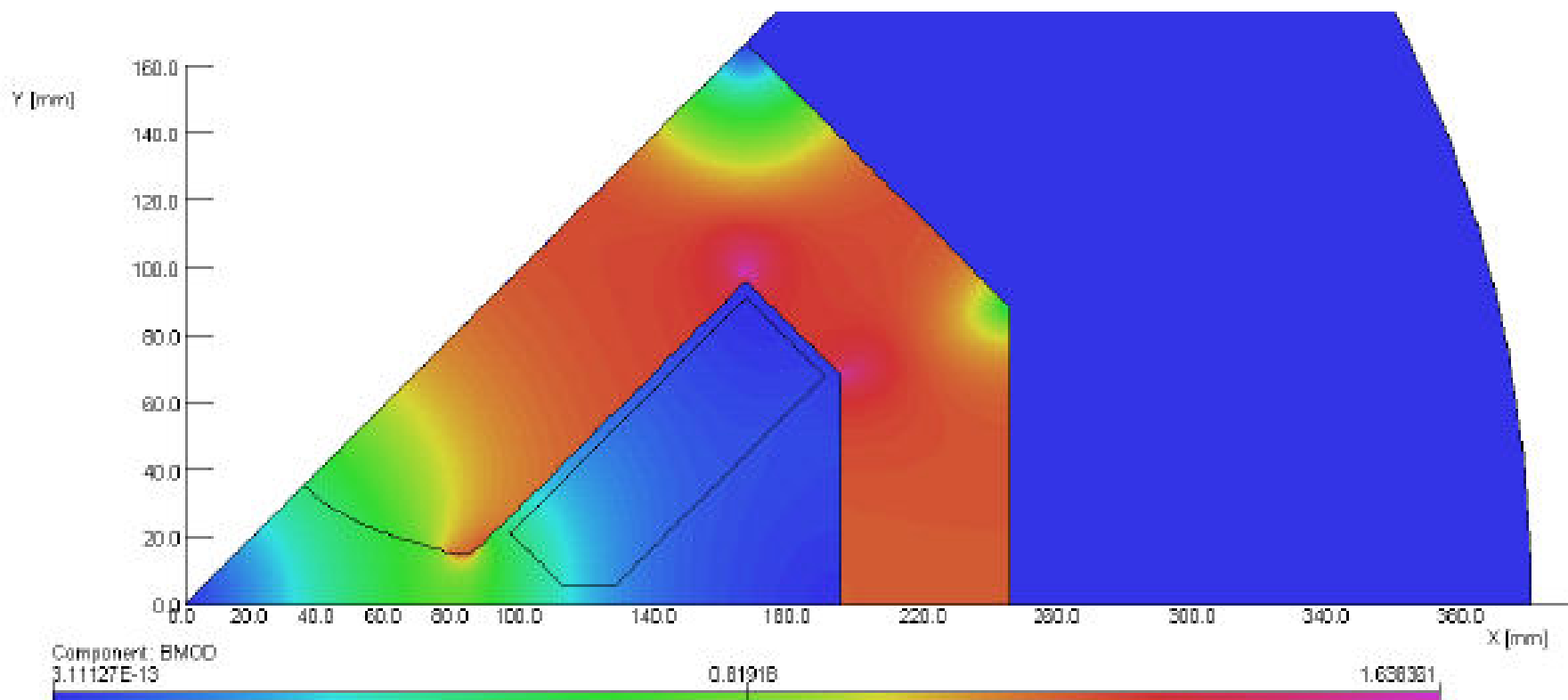
*with contributions by
Alexey Vorozhtsov*

Requirements :

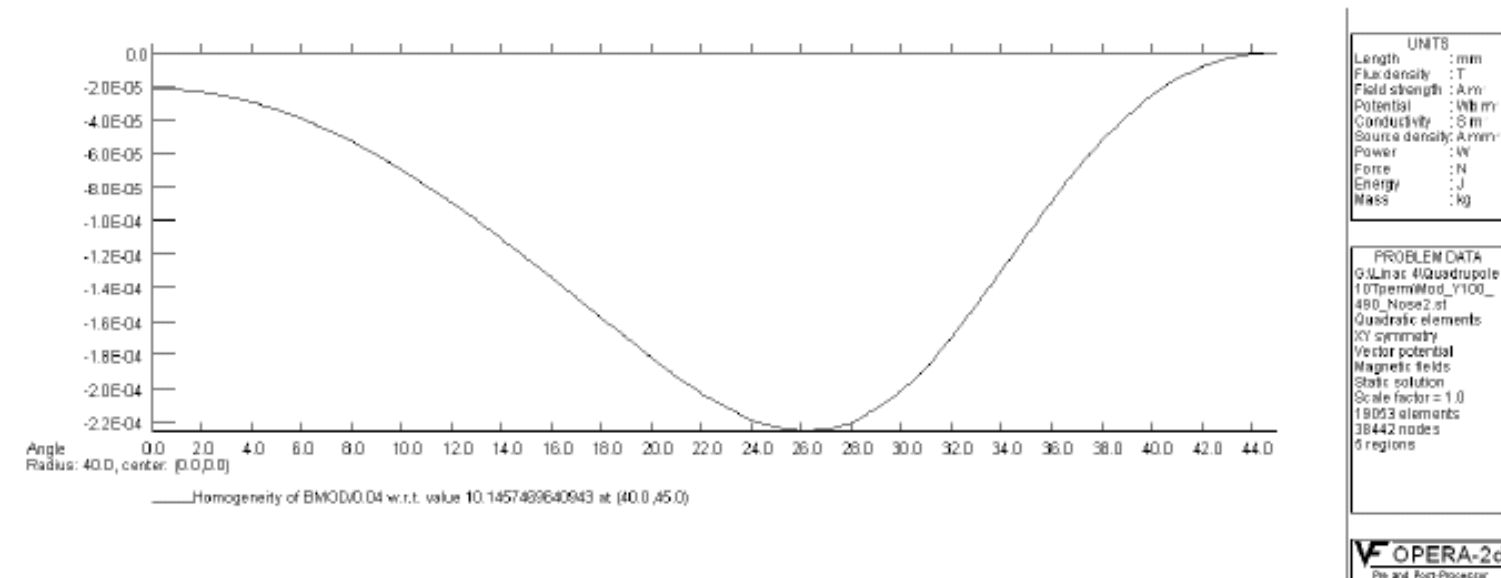
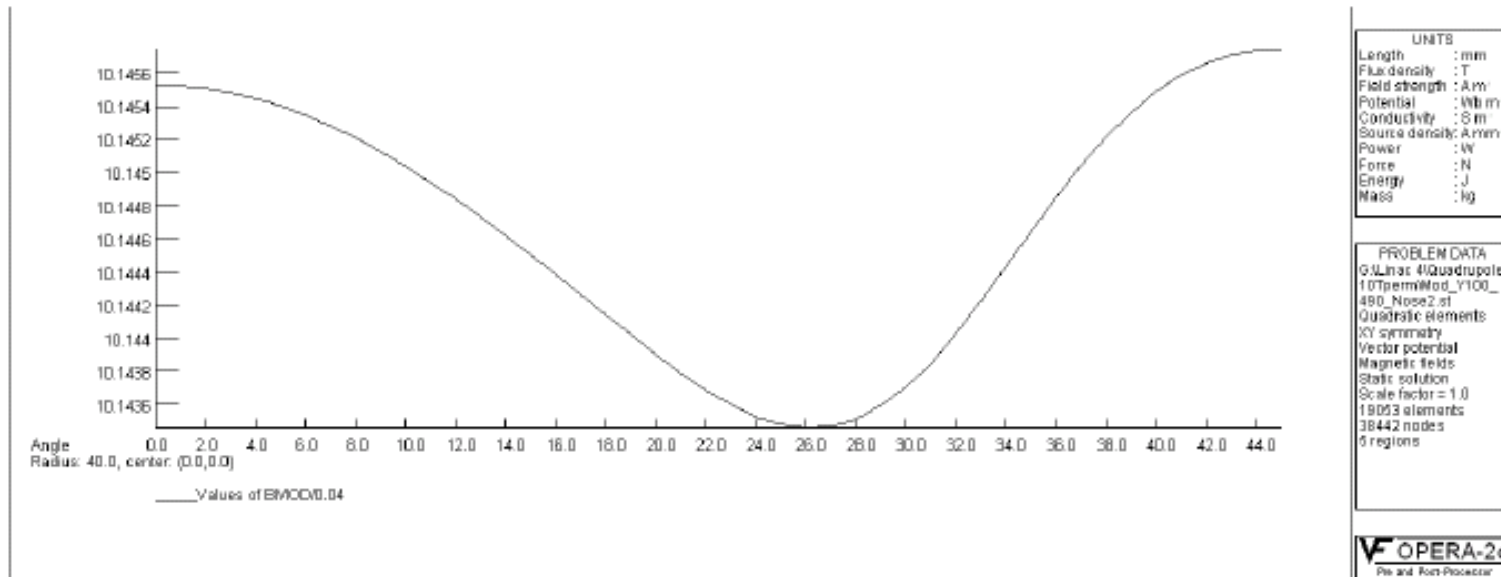
- Free aperture 100 mm
- Integrated gradient : tunable up to 3 T
- Field quality @ 33 mm (2/3 of radius) better than $\pm 5 \cdot 10^{-4}$
- Total length < 500 mm

General parameters	
Gradient [T/m]	10
Magnetic length [mm]	300
Iron length [mm]	255
Total length [mm]	379
Aperture radius [mm]	50
Max pole width [mm]	100
Total yoke weight [kg]	246
Total conductor weight [kg]	75
Electrical parameters	
Amperturns per pole [A]	10230
Windings per pole	26
Nominal current [A]	394
Current density [A/mm ²]	4.5
Total resistance [mOhm]	25
Total inductance [mH]	9.4
Voltage [R [*]] [V]	9.9
Power [kW]	3.9
Conductor type	
ID number (LUVATA)	6077
height/width [mm]	10
hole diameter [mm]	5
x-y [mm]	2.5
r [mm]	1
Total Conductor Length [m]	106
Cooling parameters	
Cooling circuits per magnet	2
coolant velocity [m/s]	1.4
Total cooling flow [l/min]	3.2
Pressure drop [bar]	3.1
Reynolds number	9720
Temperature rise [K]	17

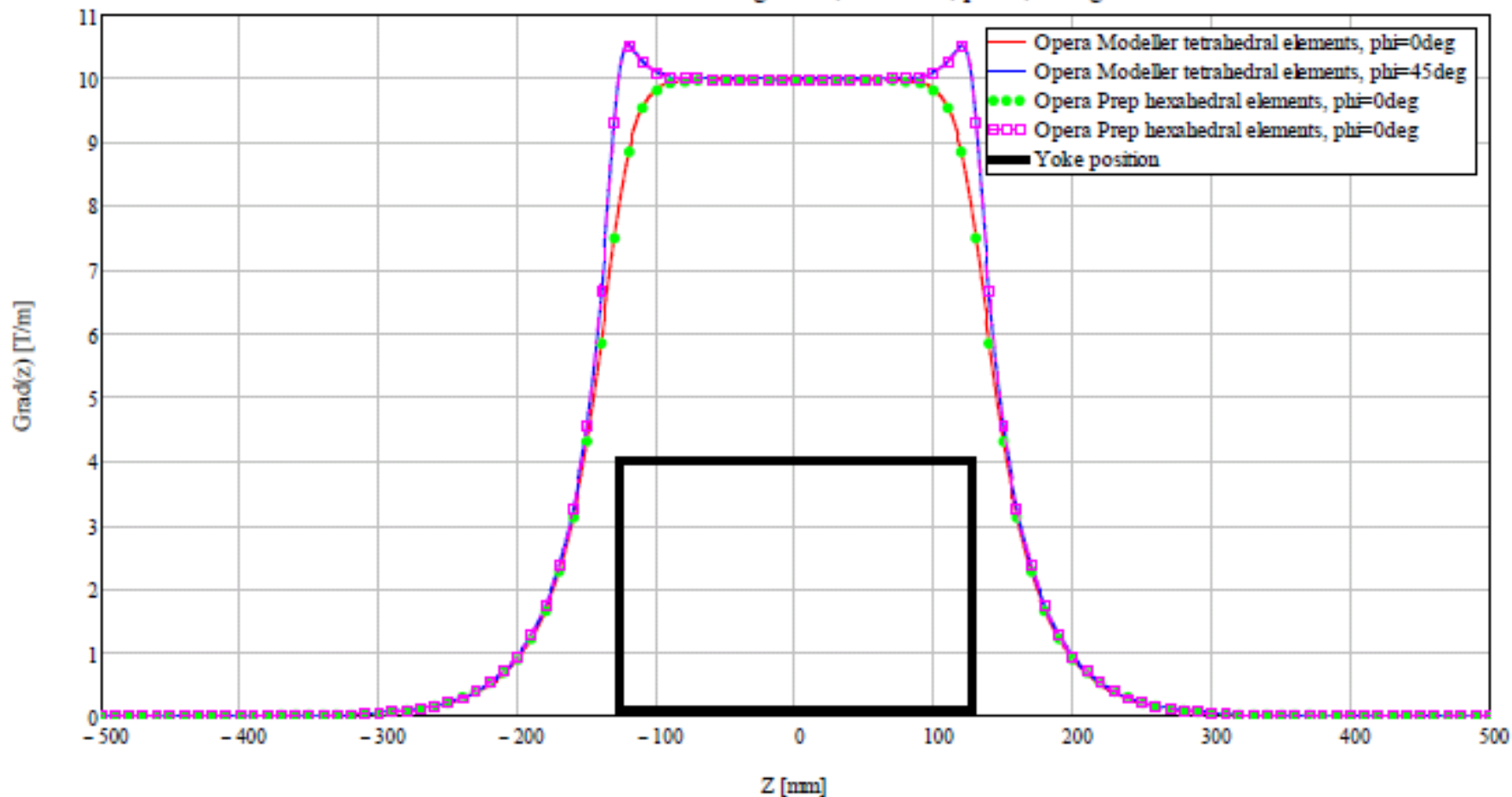




Field gradient and quality at R=40mm

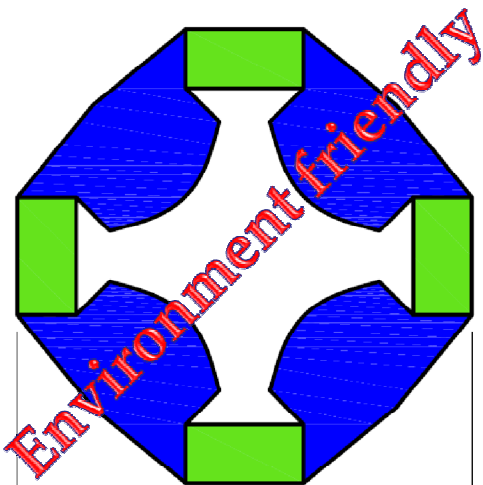


Gradient distribution along Z axis, R=40mm, phi=0, 45deg

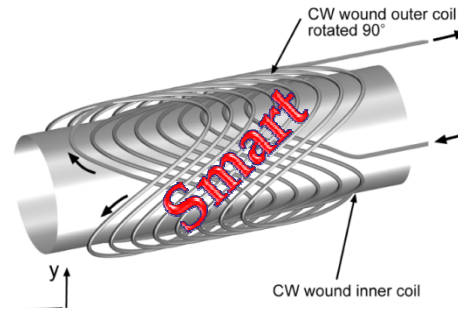




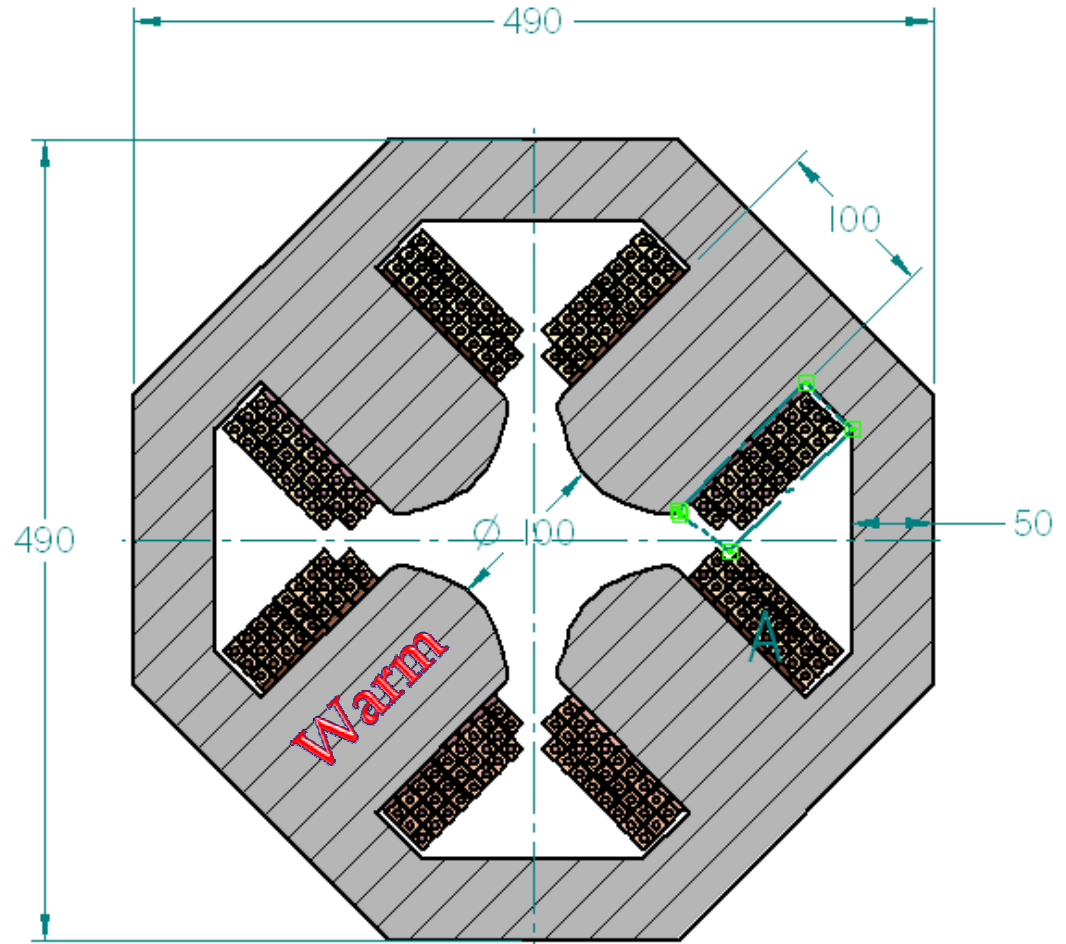
280



270



← not in scale



Easy magnet

Physical length < 400 mm