

# Electrostatic Analysis of Power Line

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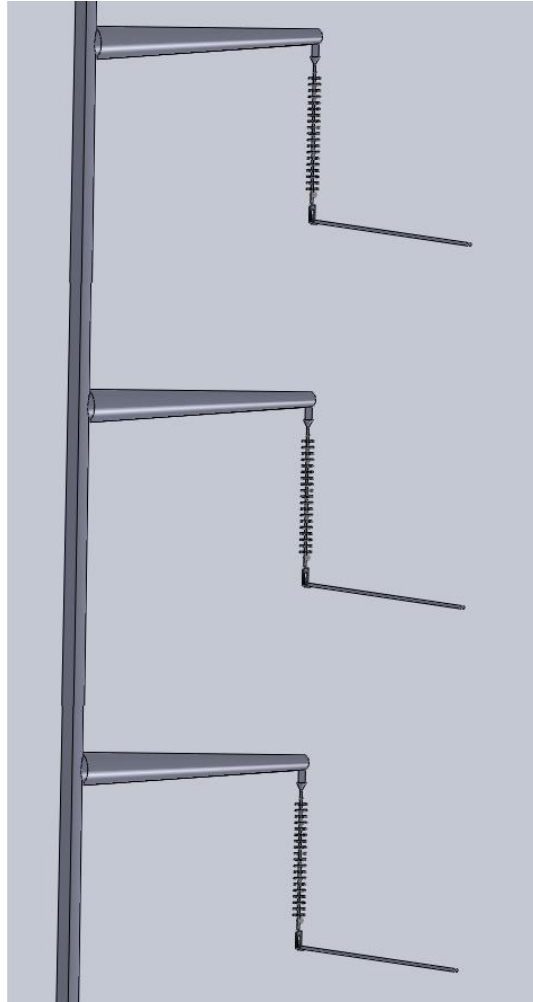
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## 1. Introduction

In this example an insulator from a three-phase power line is examined. The electric field distribution is obtained along the center of the rod and from the sheath. Both computations are taken over a length of 30cm from the energized end.

## 2. Model View

**Power Line Drawing part 2 modified  
View**



**Power Line Drawing part 2 modified\_Current View (Mesh)**



### 3. Materials

**Note:** R.P. stands for Relative Permittivity

<b>Nbr .</b>	<b>Part Name</b>	<b>Material Name</b>	<b>Permittivity Type</b>
1	conductor hanger-3-1-Body 1 (Imported1)	<a href="#">Air</a>	Isotropic
2	Inner Air 2-1-Body 1 (Cavity1[1])	<a href="#">Air</a>	Isotropic
3	Inner Air 2-1-Body 2 (Cavity1[2])	<a href="#">Air</a>	Isotropic
4	Inner Air 2-1-Body 3 (Cavity1[3])	<a href="#">Air</a>	Isotropic
5	Inner Air 2-1-Body 4 (Cavity1[4])	<a href="#">Air</a>	Isotropic
6	Inner Air 2-1-Body 5 (Cavity1[5])	<a href="#">Air</a>	Isotropic
7	Inner Air 2-1-Body 6 (Cavity1[6])	<a href="#">Air</a>	Isotropic
8	Inner Air 2-1-Body 7 (Cavity1[7])	<a href="#">Air</a>	Isotropic
9	Inner Air 2-1-Body 8 (Cavity1[8])	<a href="#">Air</a>	Isotropic
10	Inner Air 2-1-Body 9 (Cavity1[9])	<a href="#">Air</a>	Isotropic
11	Inner Air 2-1-Body 10 (Cavity1[10])	<a href="#">Air</a>	Isotropic
12	Inner Air 2-1-Body 11 (Cavity1[11])	<a href="#">Air</a>	Isotropic
13	Inner Air 2-1-Body 12 (Cavity1[12])	<a href="#">Air</a>	Isotropic
14	Inner Air 2-1-Body 13 (Cavity1[13])	<a href="#">Air</a>	Isotropic
15	Inner Air 2-1-Body 14 (Cavity1[14])	<a href="#">Air</a>	Isotropic
16	Inner Air 2-1-Body 15 (Cavity1[15])	<a href="#">Air</a>	Isotropic
17	Inner Air 2-1-Body 16 (Cavity1[16])	<a href="#">Air</a>	Isotropic
18	Inner Air 2-1-Body 17 (Cavity1[17])	<a href="#">Air</a>	Isotropic
19	Inner Air 2-1-Body 18 (Cavity1[18])	<a href="#">Air</a>	Isotropic
20	Inner Air 2-1-Body 19 (Cavity1[19])	<a href="#">Air</a>	Isotropic
21	Inner Air 2-1-Body 20 (Cavity1[20])	<a href="#">Air</a>	Isotropic
22	Inner Air 2-1-Body 21 (Cavity1[21])	<a href="#">Air</a>	Isotropic
23	Inner Air 2-1-Body 22 (Cavity1[22])	<a href="#">Air</a>	Isotropic
24	intermed^Power Line Drawing part 2 modified-1-Body 1 (Cavity1)	<a href="#">Air</a>	Isotropic
25	middle phase connector-3-1-Body 1 (Imported1)	<a href="#">Air</a>	Isotropic
26	Outer Air-2-Body 1 (Cavity1)	<a href="#">Air</a>	Isotropic

27	Power Line Drawing part 2 modified3 (IGES FILE)1-1-3-1-Body 1 (Imported1)	<a href="#">Air</a>	Isotropic
28	Power Line Drawing part 2 modified3 (IGES FILE)17-1-3-1-Body 1 (Imported1)	<a href="#">Air</a>	Isotropic
29	Power Line Drawing part 2 modified3 (IGES FILE)18-1-3-1-Body 1 (Boss-Extrude1)	<a href="#">Air</a>	Isotropic
30	Power Line Drawing part 2 modified3 (IGES FILE)19-1-3-1-Body 1 (Boss-Extrude1)	<a href="#">Air</a>	Isotropic
31	Power Line Drawing part 2 modified3 (IGES FILE)21-1-3-1-Body 1 (Imported1)	<a href="#">Air</a>	Isotropic
32	Power Line Drawing part 2 modified3 (IGES FILE)22-1-3-1-Body 1 (Imported1)	<a href="#">Air</a>	Isotropic
33	Power Line Drawing part 2 modified3 (IGES FILE)3-1-3-1-Body 1 (Imported1)	<a href="#">Rubber</a>	Isotropic
34	Power Line Drawing part 2 modified3 (IGES FILE)4-1-3-1-Body 1 (Imported1)	<a href="#">Glass</a>	Isotropic
35	Power Line Drawing part 2 modified3 (IGES FILE)5-1-3-1-Body 1 (Imported1)	<a href="#">Air</a>	Isotropic
36	Power Line Drawing part 2 modified3 (IGES FILE)6-1-3-1-Body 1 (Imported1)	<a href="#">Air</a>	Isotropic

## 4. Load & Restraint Information

Nb r.	Name	Voltage (V)	Select ed Faces	Selected Components
1	Fixed Voltage - 1	0.000e+000	0	0Power Line Drawing part 2 modified3 (IGES FILE)22-1-3-1 Power Line Drawing part 2 modified3 (IGES FILE)21-1-3-1 Power Line Drawing part 2 modified3 (IGES FILE)1-1-3-1 middle phase connector-3-1 Power Line Drawing part 2 modified3

				(IGES FILE)6-1-3-1
2	Fixed Voltage - 2	8.000e+004	0	0Power Line Drawing part 2 modified3 (IGES FILE)17-1-3-1 conductor hanger-3-1 Power Line Drawing part 2 modified3 (IGES FILE)5-1-3-1
3	Fixed Voltage - 3	- 4.000e+004	0	0Power Line Drawing part 2 modified3 (IGES FILE)19-1-3-1 Power Line Drawing part 2 modified3 (IGES FILE)18-1-3-1

## 5. Study Properties

### Mesh Information

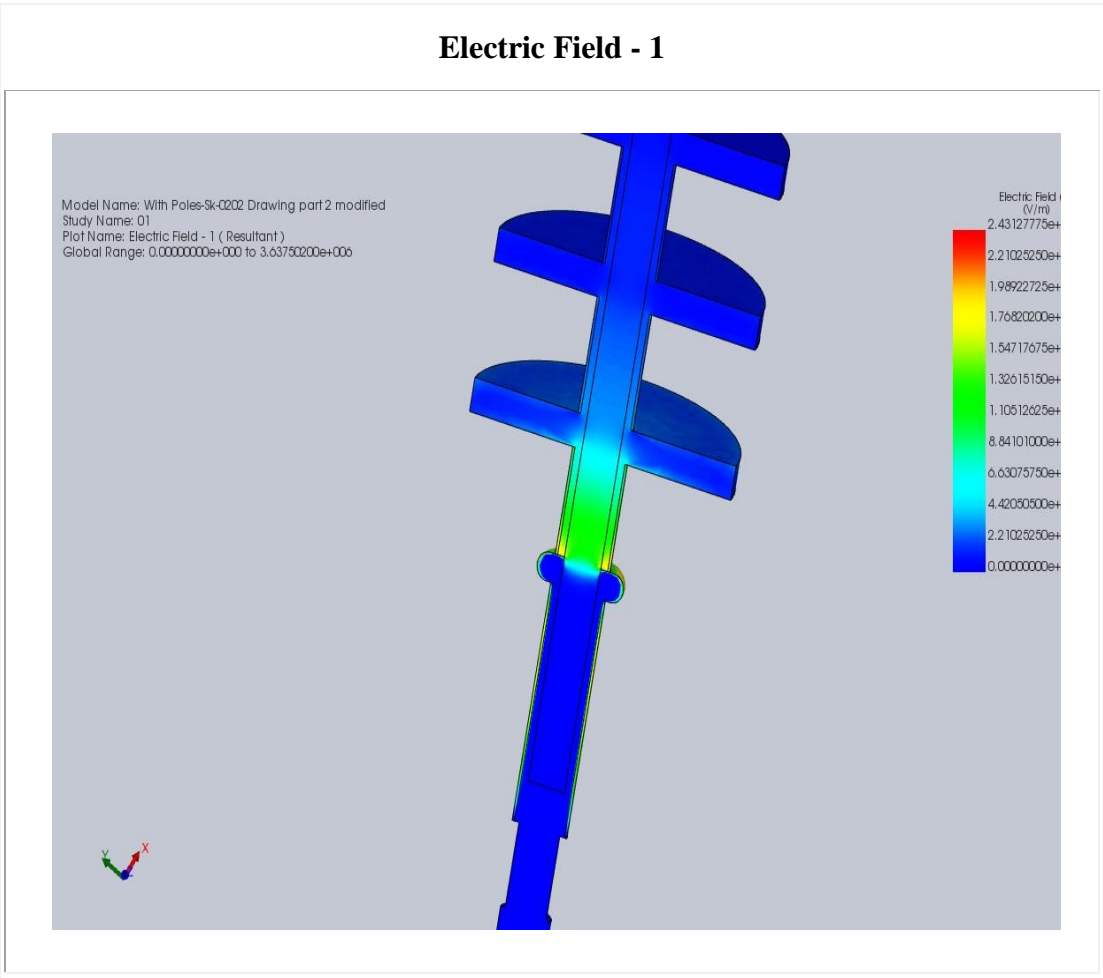
Nbr.Of Nodes	Nbr.Of Elements	Element Size (m)	Tolerance (m)
1337165	7805405	0.600000	0.000150

### Mesh Controls information

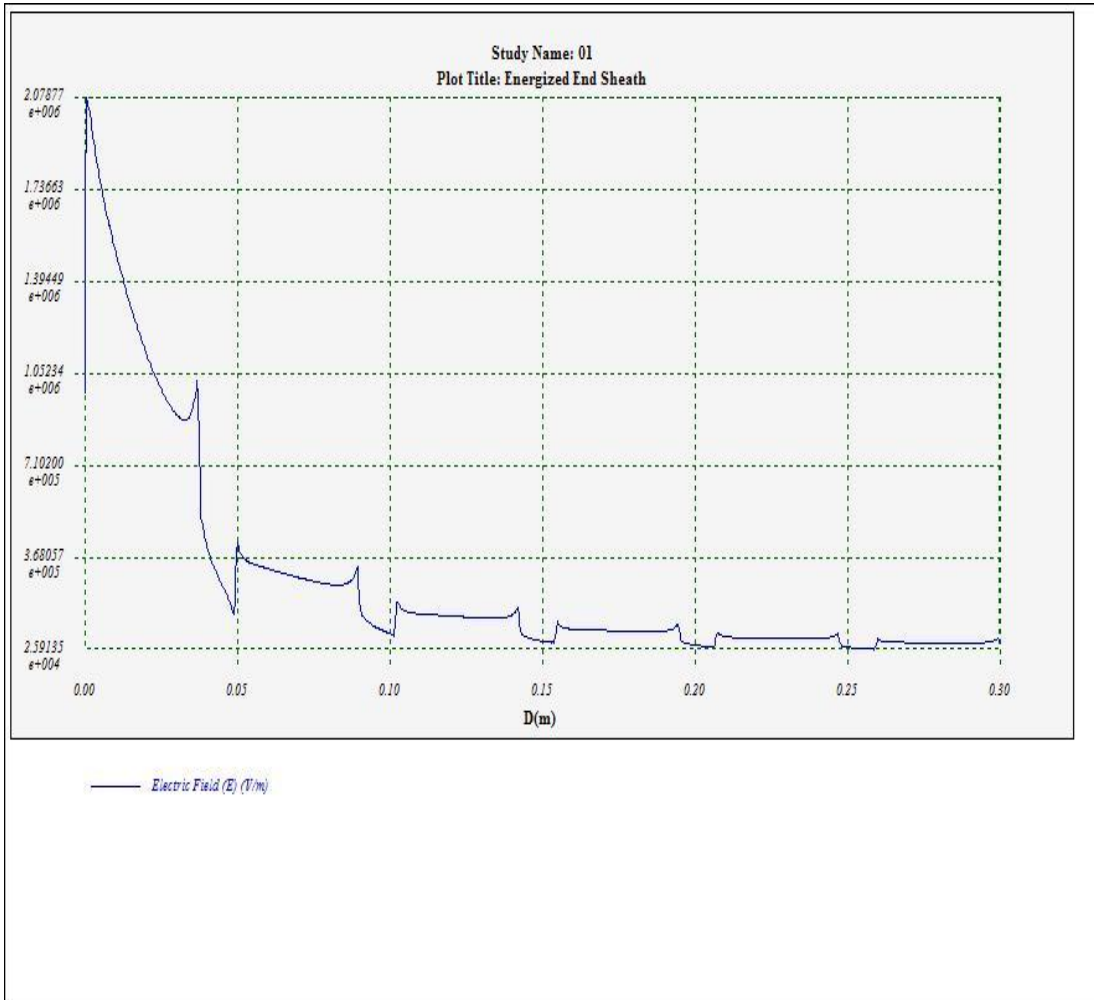
Nbr.	Name	Mesh Size	Size Unit	Components & Bodies	Selected Faces
1	MeshControl - 1	0.500000	mm	Inner Air 2-1	
2	MeshControl - 2	4.000000	mm	Power Line Drawing part 2 modified3 (IGES FILE)3-1-3-1	
3	MeshControl - 3	9.000000	mm	intermed^Power Line Drawing part 2 modified-1	

# 6. Electric Field Results

Electric Field - 1

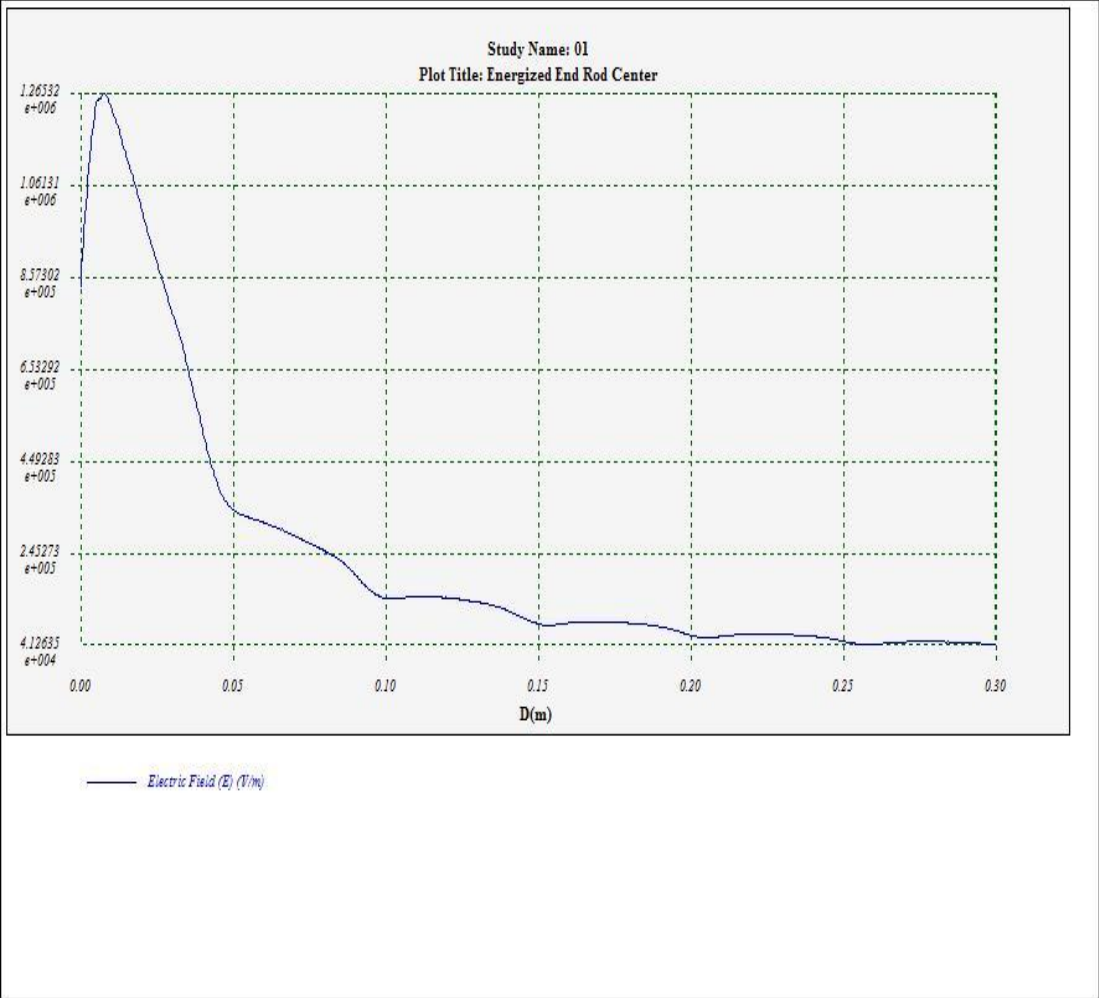


## Energized End Sheath



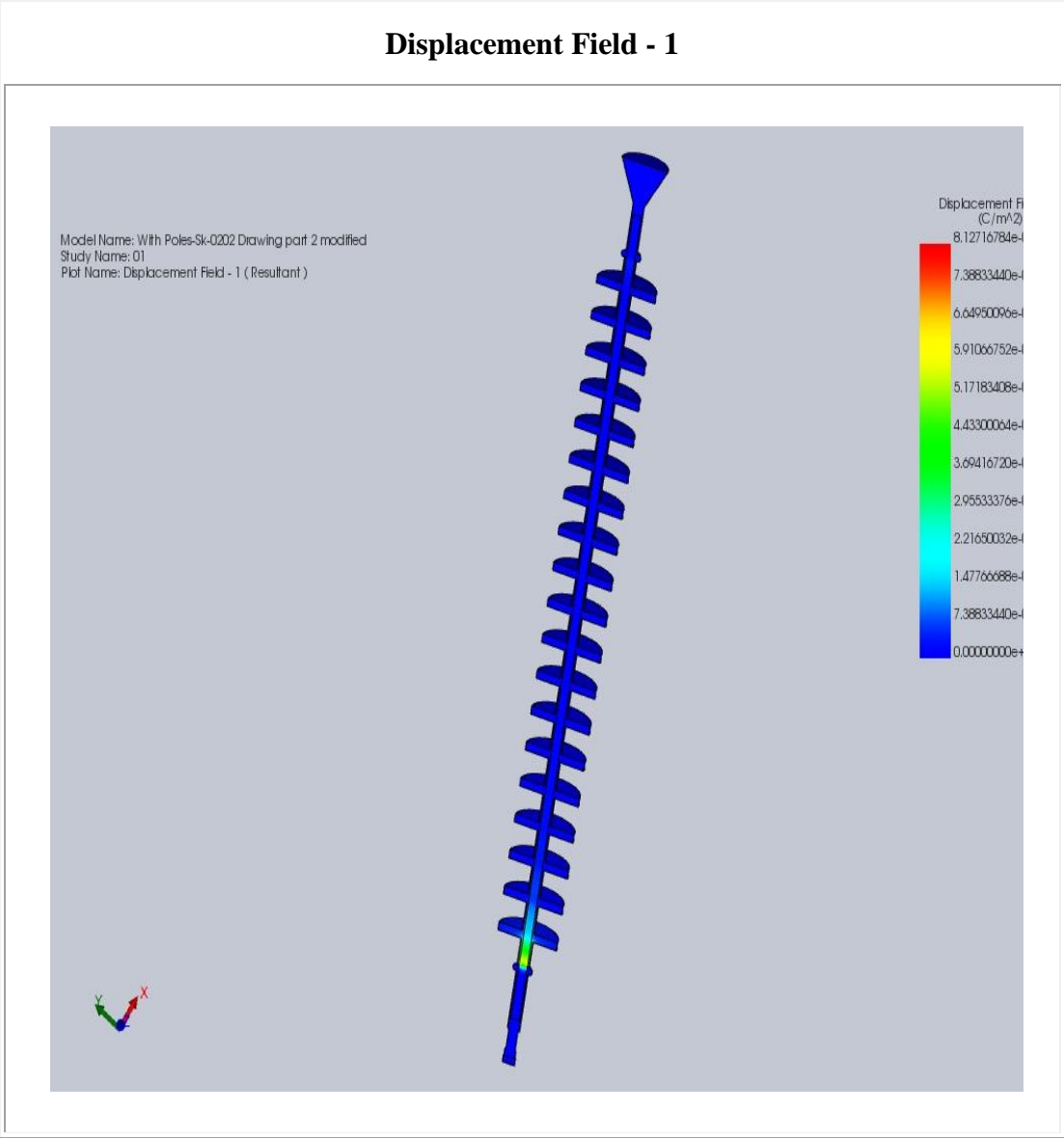


# Energized End Rod Center



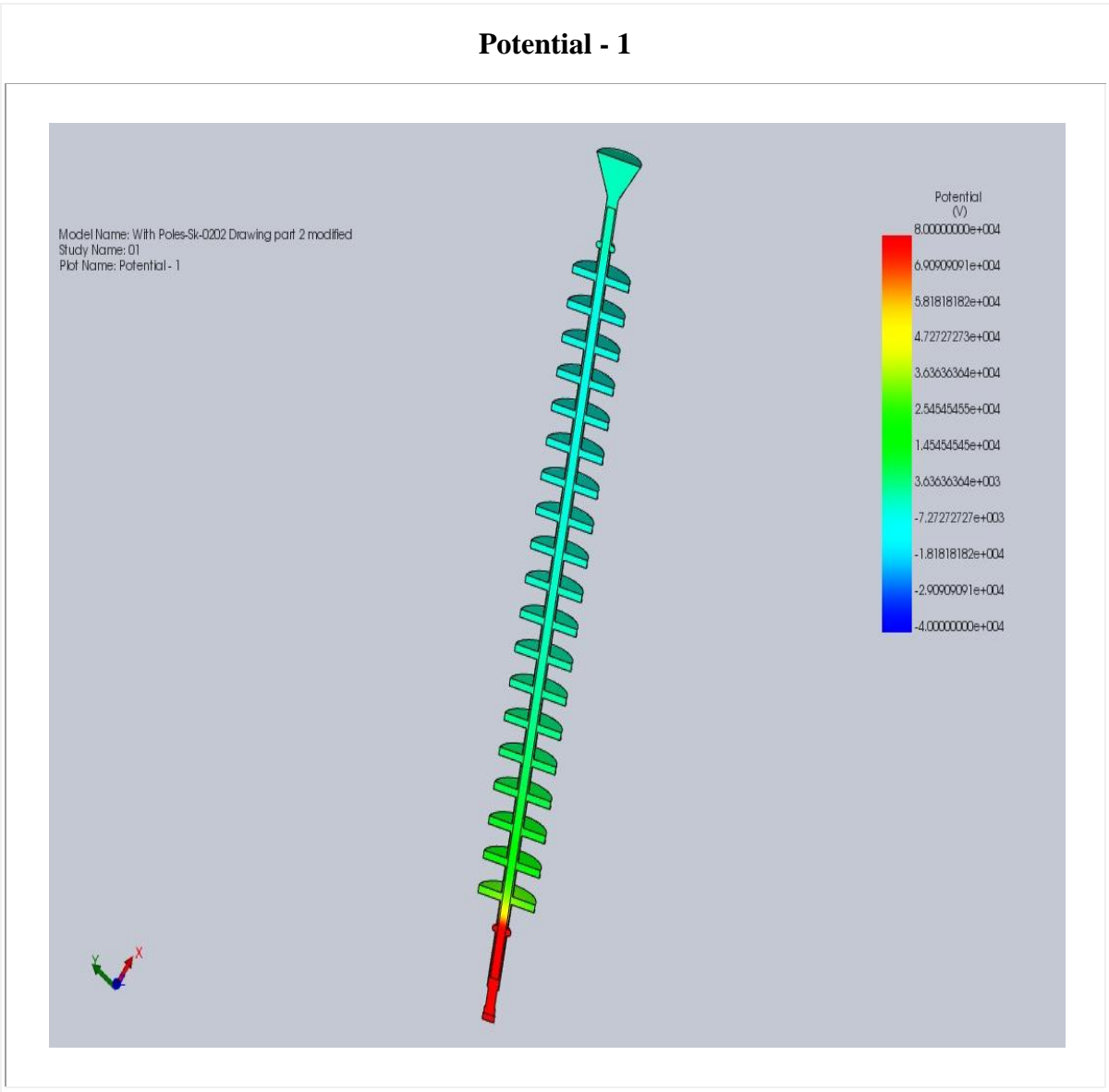
# 7. Displacement Results

## Displacement Field - 1



# 8. Potential Results

Potential - 1



## 9. Appendix

**Material Name:** Air

**Permittivity Type:** Isotropic

**Note:** R.P. stands for Relative Permittivity

<b>R.P.</b>	<b>Conductivity(Mho/m )</b>	<b>Polarization</b>	<b>Thermal Conductivity (W/m.K)</b>
1.000e+00 0	0.000e+000	No	2.400e-002

**Material Name:** Rubber

**Permittivity Type:** Isotropic

**Note:** R.P. stands for Relative Permittivity

<b>R.P.</b>	<b>Conductivity(Mho/m )</b>	<b>Polarization</b>	<b>Thermal Conductivity (W/m.K)</b>
4.000e+00 0	0.000e+000	No	0.000e+000

**Material Name:** Glass

**Permittivity Type:** Isotropic

**Note:** R.P. stands for Relative Permittivity

<b>R.P.</b>	<b>Conductivity(Mho/m )</b>	<b>Polarization</b>	<b>Thermal Conductivity (W/m.K)</b>
5.500e+00 0	0.000e+000	No	0.000e+000