

Electrostatic Analysis of Power Line

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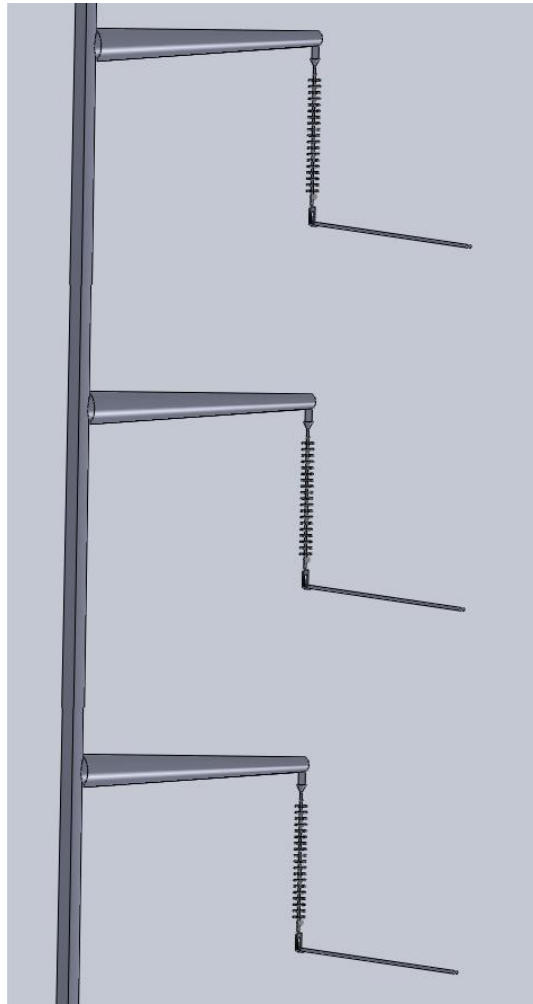
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1. Introduction

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

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

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

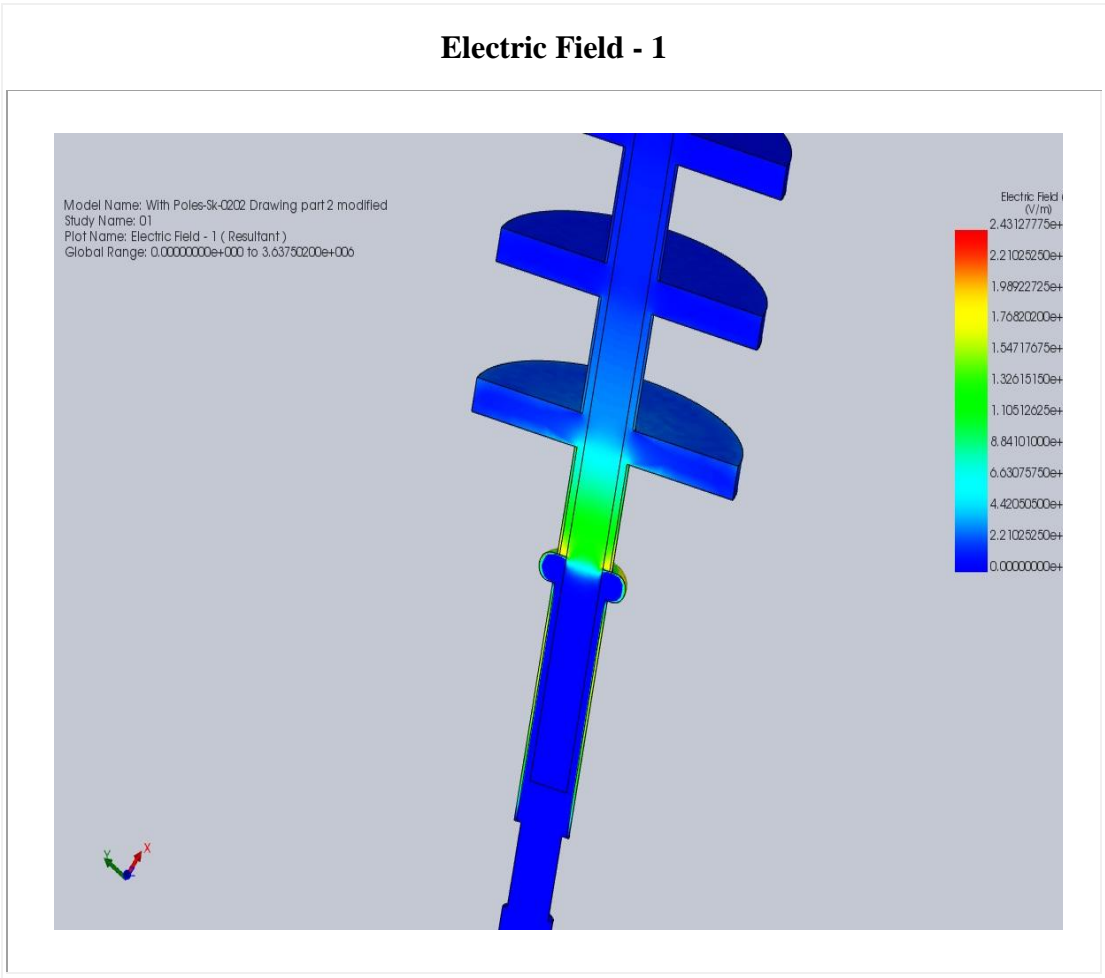
Nbr.Of Nodes	Nbr.Of Elements	Element Size (m)	Tolerance (m)
1337165	7805405	0.600000	0.000150

Mesh Controls information

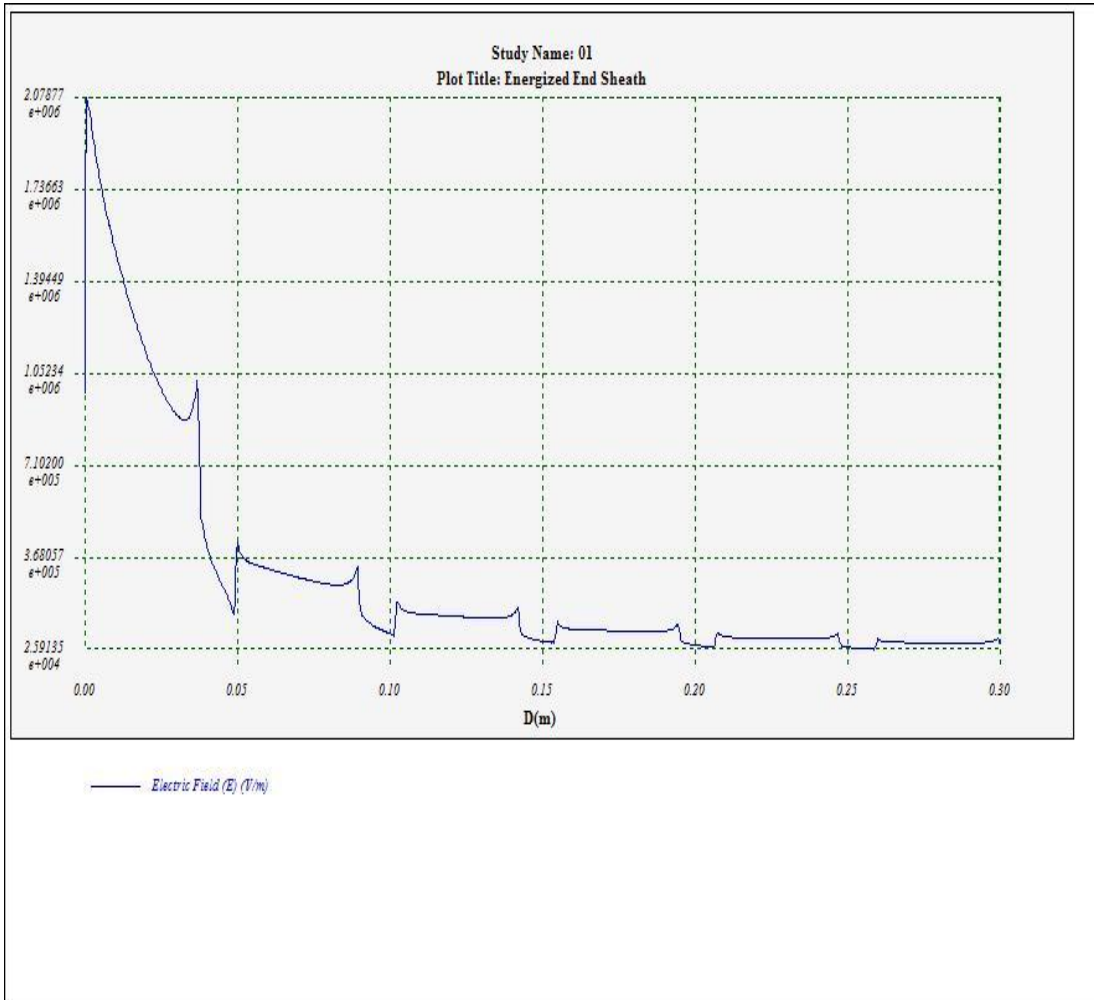
Nbr.	Name	Mesh Size	Size Unit	Components & Bodies	Selected Faces
1	MeshControl - 1	0.500000	mm	Inner Air 2-1	
2	MeshControl - 2	4.000000	mm	Power Line Drawing part 2 modified3 (IGES FILE)3-1-3-1	
3	MeshControl - 3	9.000000	mm	intermed^Power Line Drawing part 2 modified-1	

6. Electric Field Results

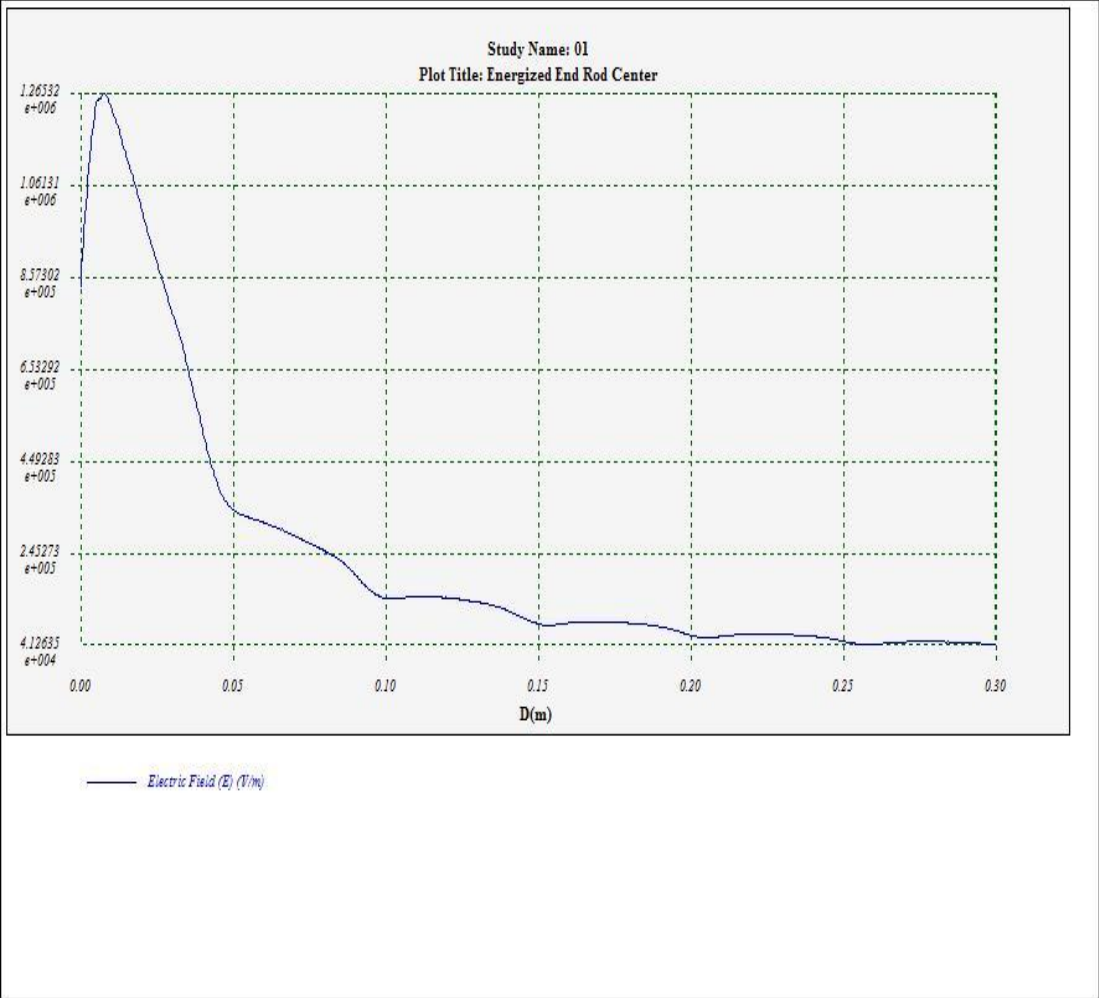
Electric Field - 1



Energized End Sheath

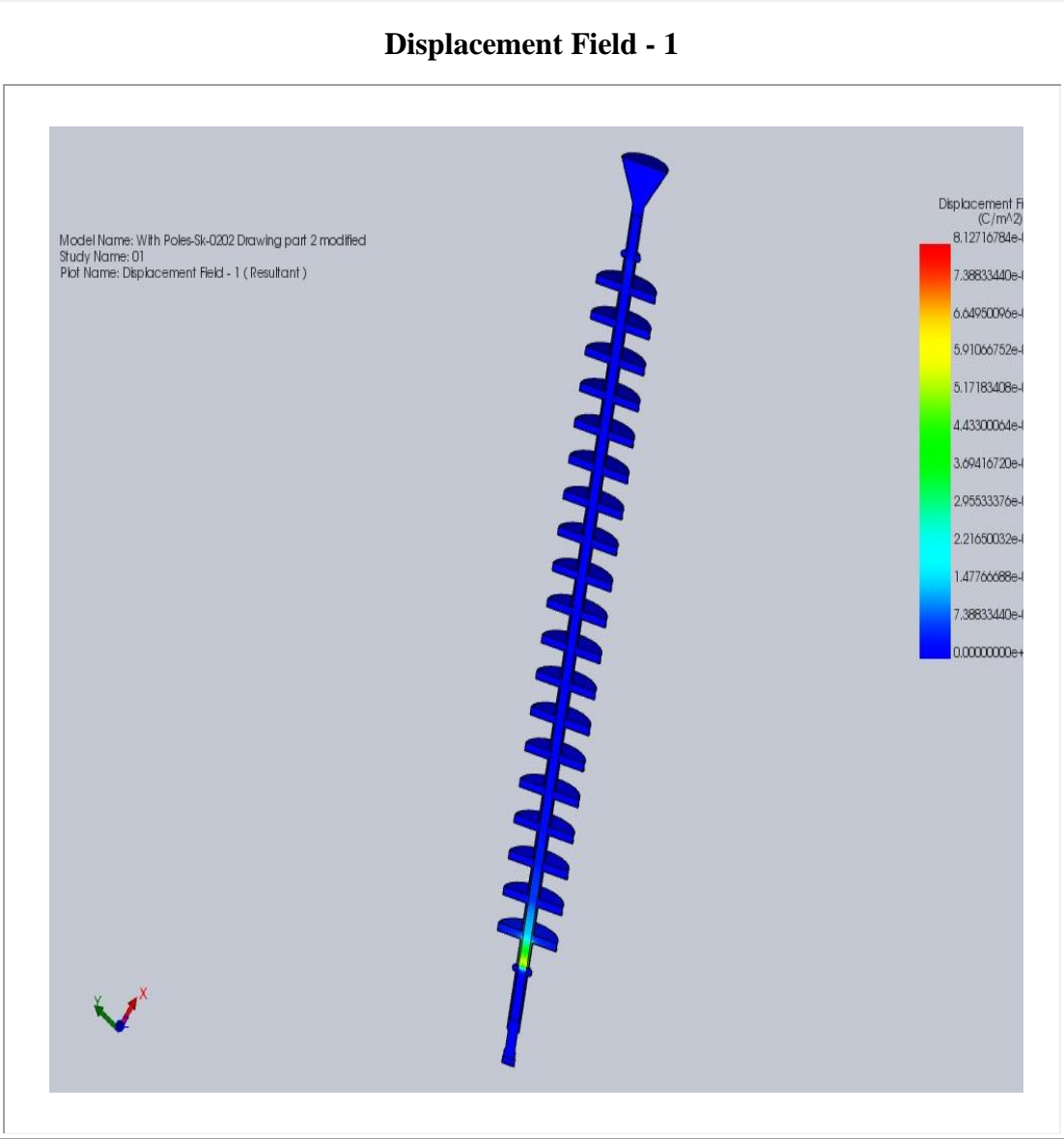


Energized End Rod Center



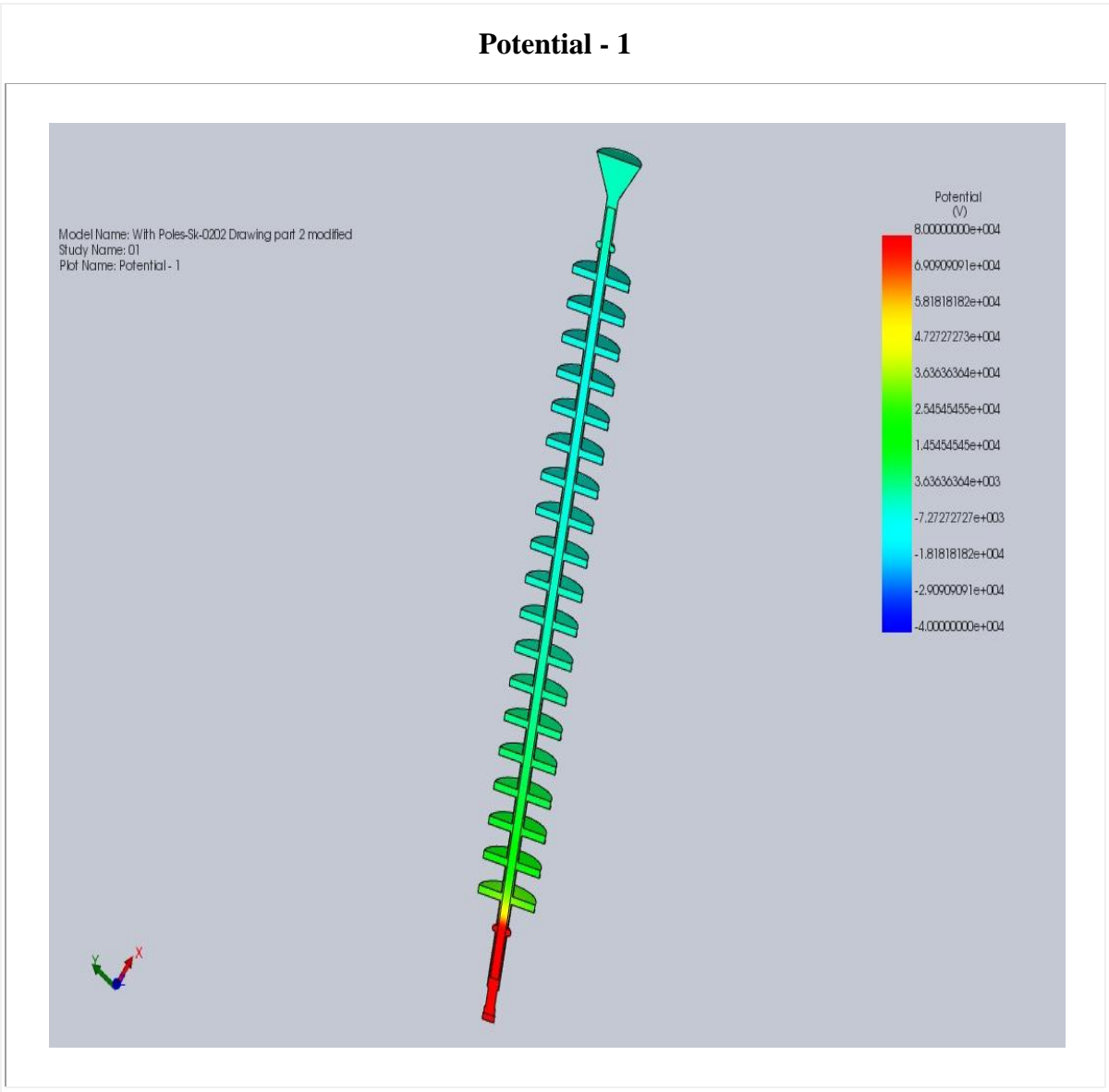
7. Displacement Results

Displacement Field - 1



8. Potential Results

Potential - 1



9. Appendix

Material Name: Air

Permittivity Type: Isotropic

Note: R.P. stands for Relative Permittivity

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

Material Name: Rubber

Permittivity Type: Isotropic

Note: R.P. stands for Relative Permittivity

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

Material Name: Glass

Permittivity Type: Isotropic

Note: R.P. stands for Relative Permittivity

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