

Project: **ETAP** Page: 1  
Location: 19.0.1C Date: 07-10-2025  
Contract: SN:  
Engineer: Study Case: GRD1 Filename: IAPSERPV

---

---

**Electrical Transient Analyzer Program**

**Ground Grid Systems**

Finite Element Method

Number of Ground Conductors: 6  
Number of Ground Rods: 6  
Total Length of Ground Conductors: 38.00 m  
Total Length of Ground Rods: 36.00 m  
Total Computational Time: 0.00 minutes

Frequency: 50,0

Unit System: Metric

Project Filename: IAPSERPV

Output Filename: D:\Documentos pc\OneDrive\Cientes\IAPSER\ETAP\IAPSERPV\Grid1\_ Untitled.GR1S

**Ground Grid Input Data**

**System Data**

Freq. Hz	Weight kg	Ambient Temp. °C	Short-Circuit Current			Fault Duration (Seconds)			Plot Step m	Extended Boundary Length m	
			Total Fault Current kA	Sf Division Factor %	Cp Projection Factor %	Tf for Total Fault Duration	Tc for Sizing Ground Conductors	Ts for Available Body Current			
50.0	50	40.00	9.247	0.50	100.0	100.0	0.20	0.20	0.20	1.0	0.00

**Soil Data**

Surface Material			Upper Layer Soil			Lower Layer Soil	
Material Type	Resistivity ohm.m	Depth m	Material Type	Resistivity ohm.m	Depth m	Material Type	Resistivity ohm.m
Clean limestone	8000.0	0.300	Moist soil	10.0	3.00	Moist soil	5.0

**Material Constants**

Conductor/Rod	Type	Conductivity %	$\alpha_r$ Factor @ 20 °C 1/°C	K0 @ 0 °C	Fusing Temperature °C	Resistivity of Ground Conductor @ 20°C micro ohm.cm	Thermal Capacity Per Unit Volume J/(cm³.°C)
Conductor	Copper, annealed soft-drawn	100.0	0.00393	234.0	1083.0	1.72	3.42
Rod	Copper-clad steel rod	20.0	0.00378	245.0	1084.0	8.62	3.85
Rod	Copper, annealed soft-drawn	100.0	0.00393	234.0	1083.0	1.72	3.42

**Conductor Data**

Label	Type	mm²	From			To			Length m	Insulated Yes/No	Cost \$/m
			X	Y	Z	X	Y	Z			
---	Copper, annealed soft-drawn	35	33.20	4.70	0.50	40.70	4.70	0.50	7.50	NO	10.00
---	Copper, annealed soft-drawn	35	40.70	4.70	0.50	40.70	9.70	0.50	5.00	NO	10.00
---	Copper, annealed soft-drawn	35	33.20	9.70	0.50	40.70	9.70	0.50	7.50	NO	10.00
---	Copper, annealed soft-drawn	35	33.20	4.70	0.50	33.20	9.70	0.50	5.00	NO	10.00
---	Copper, annealed soft-drawn	35	36.95	4.70	0.50	36.95	9.70	0.50	5.00	NO	10.00
---	Copper, annealed soft-drawn	35	33.20	7.20	0.50	40.70	7.20	0.50	7.50	NO	10.00

**Rod Data**

Label	Type	Diameter cm	From			To			Length m	Insulated Yes/No	Cost \$/Rod
			X	Y	Z	X	Y	Z			
R0	Copper-clad steel rod	1.910	33.20	4.70	0.50	33.20	4.70	6.50	6.00	NO	100.00
R1	Copper-clad steel rod	1.910	40.70	4.70	0.50	40.70	4.70	6.50	6.00	NO	100.00

Project: **ETAP**  
 Location: 19.0.1C  
 Contract:  
 Engineer: Study Case: GRD1

Page: 3  
 Date: 07-10-2025  
 SN:  
 Filename: IAPSERPV

**Rod Data**

Label	Type	Diameter cm	From			To			Length m	Insulated Yes/No	Cost \$/Rod
			X	Y	Z	X	Y	Z			
R2	Copper-clad steel rod	1.910	40.70	9.70	0.50	40.70	9.70	6.50	6.00	NO	100.00
R3	Copper-clad steel rod	1.910	33.20	9.70	0.50	33.20	9.70	6.50	6.00	NO	100.00
R4	Copper, annealed soft-drawn	2.000	33.20	7.20	0.50	33.20	7.20	6.50	6.00	NO	100.00
R5	Copper, annealed soft-drawn	2.000	40.70	7.20	0.50	40.70	7.20	6.50	6.00	NO	100.00

**Cost**

Conductor			Rod			
Total No.	Total Length m	Cost \$	Total No.	Total Length m	Cost \$	Total Cost \$
6	38	375.00	6	36	600.00	975.00

Project: **ETAP**  
 Location: 19.0.1C  
 Contract:  
 Engineer: Study Case: GRD1

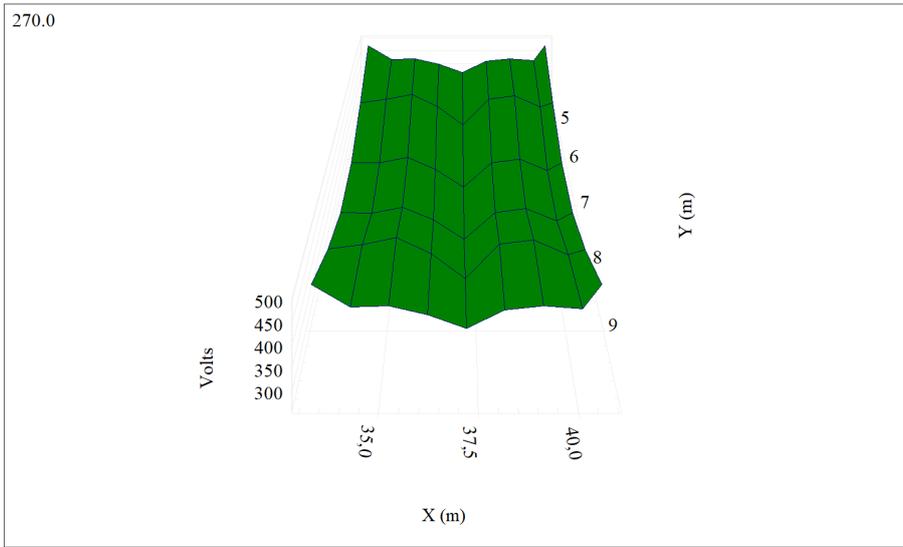
Page: 4  
 Date: 07-10-2025  
 SN:  
 Filename: IAPSERPV

**Ground Grid Summary Report**

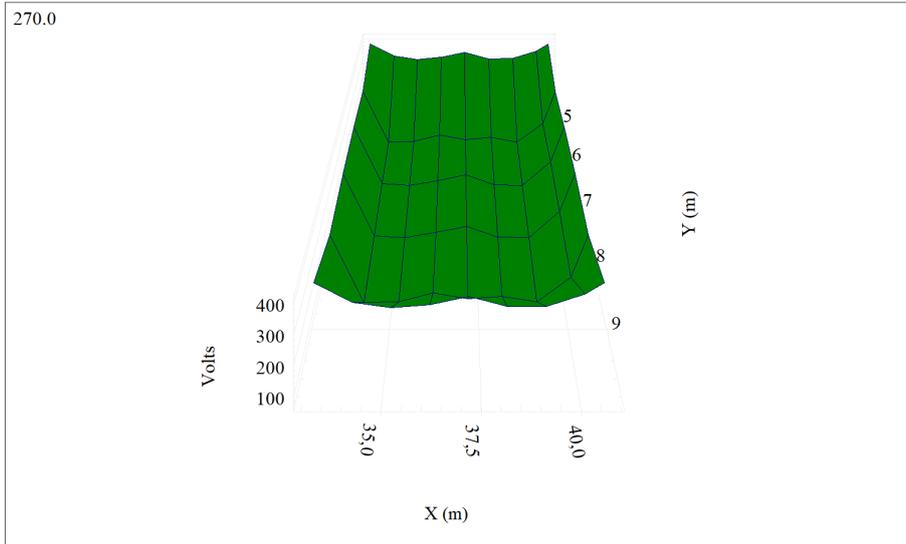
Rg Ground Resistance ohm	GPR Ground Potential Rise Volts	Maximum Touch Potential					Maximum Step Potential				
		Tolerable Volts	Calculated		Coordinates (m)		Tolerable Volts	Calculated		Coordinates (m)	
			Volts	%	X	Y		Volts	%	X	Y
0.260	2412.6	2966.5	495.0	16.7	33.2	4.7	11087.9	409.8	3.7	40.70	4.70

Total Fault Current	9.247 kA	Reflection Factor (K):	-0.998
Maximum Grid Current:	9.284 kA	Surface Layer Derating Factor (Cs):	0.870
		Decrement Factor (Df):	1.004

Grid1\_Untitled  
Touch Potential Profile



Grid1\_Untitled  
Step Potential Profile



Grid1\_Untitled  
Absolute Potential Profile

