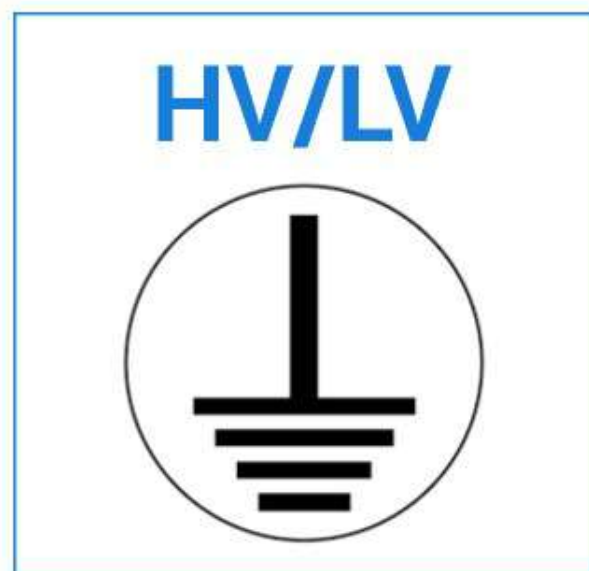


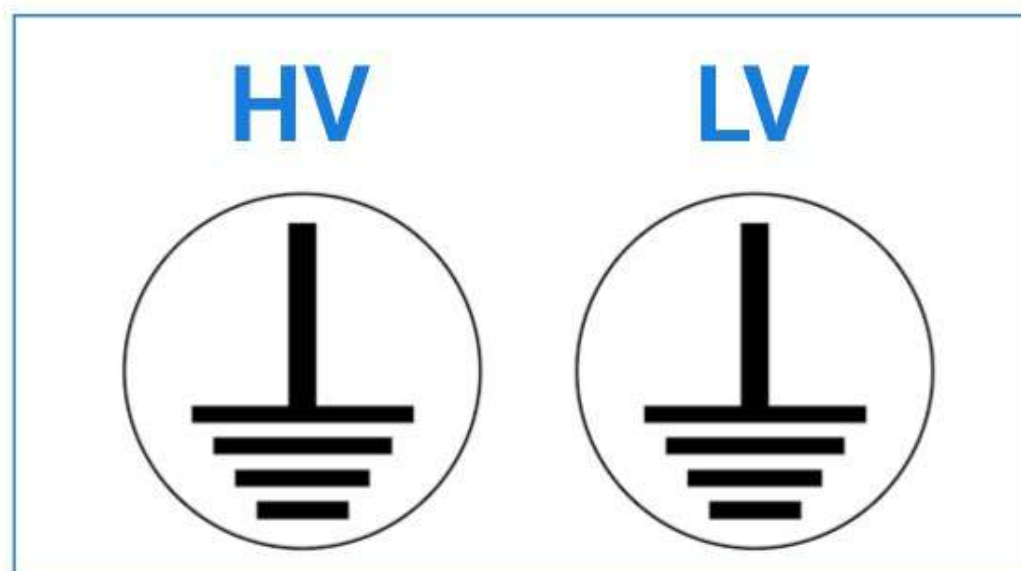


Segregated HV/LV Earthing Assessment

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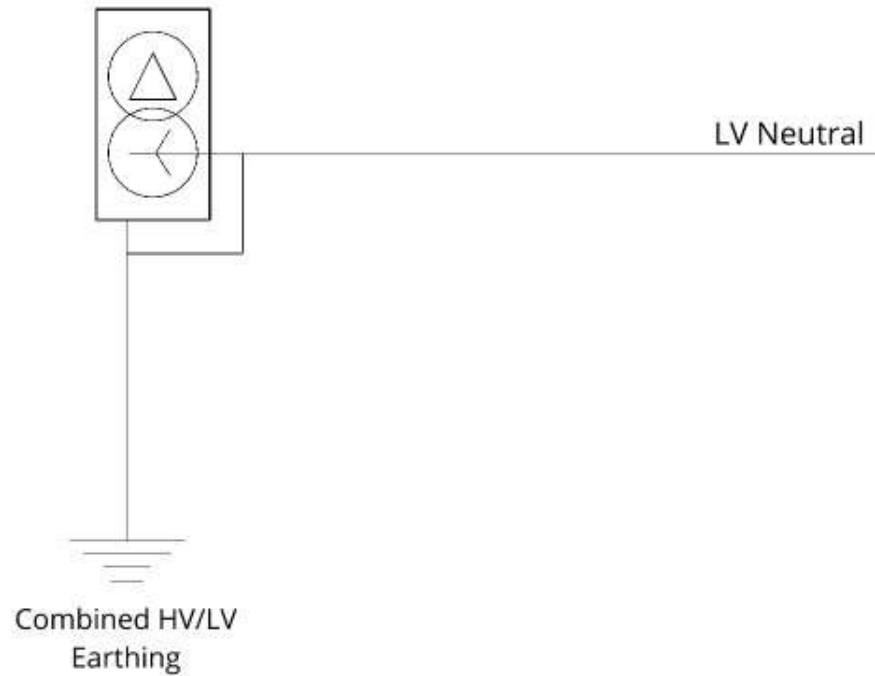


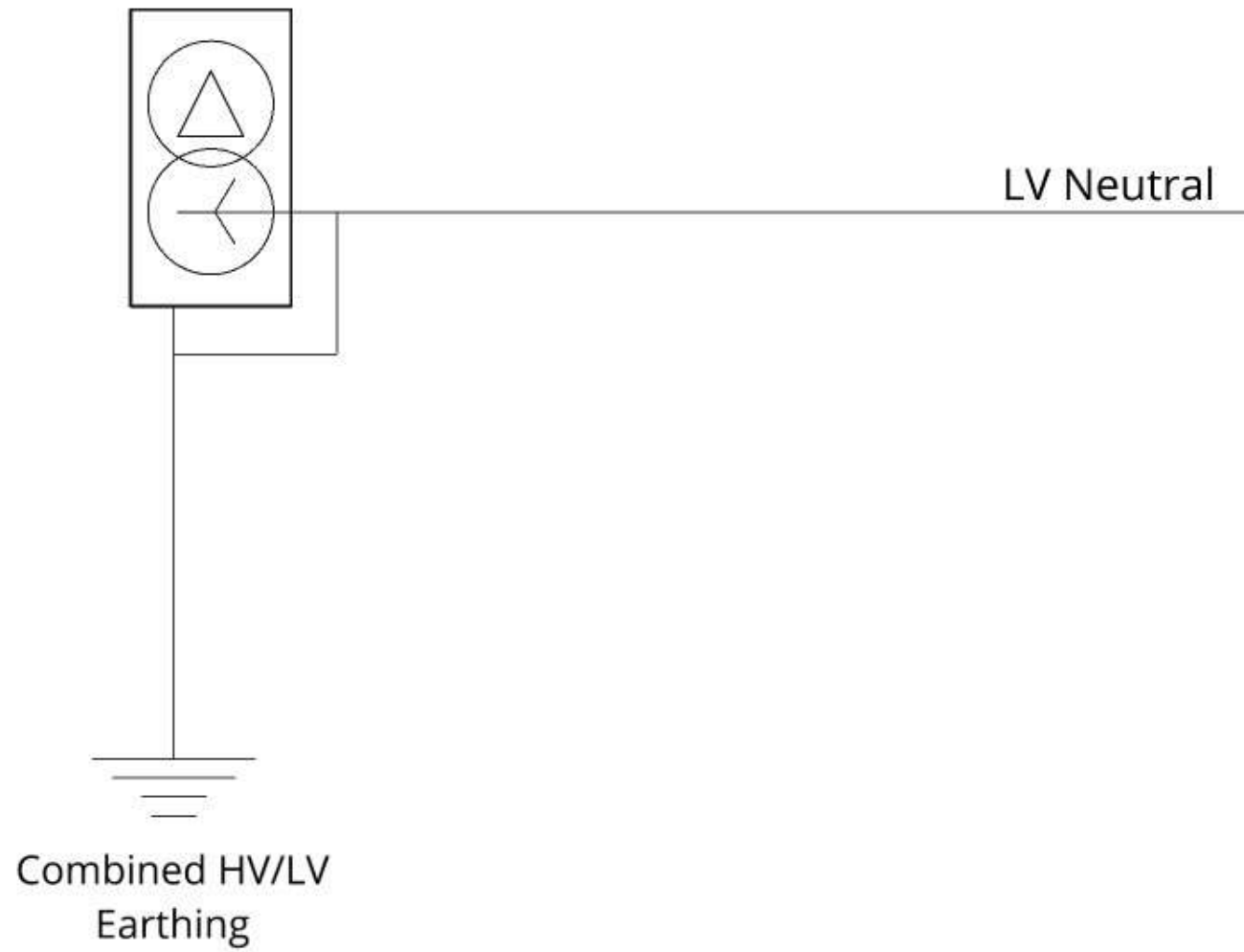
VS

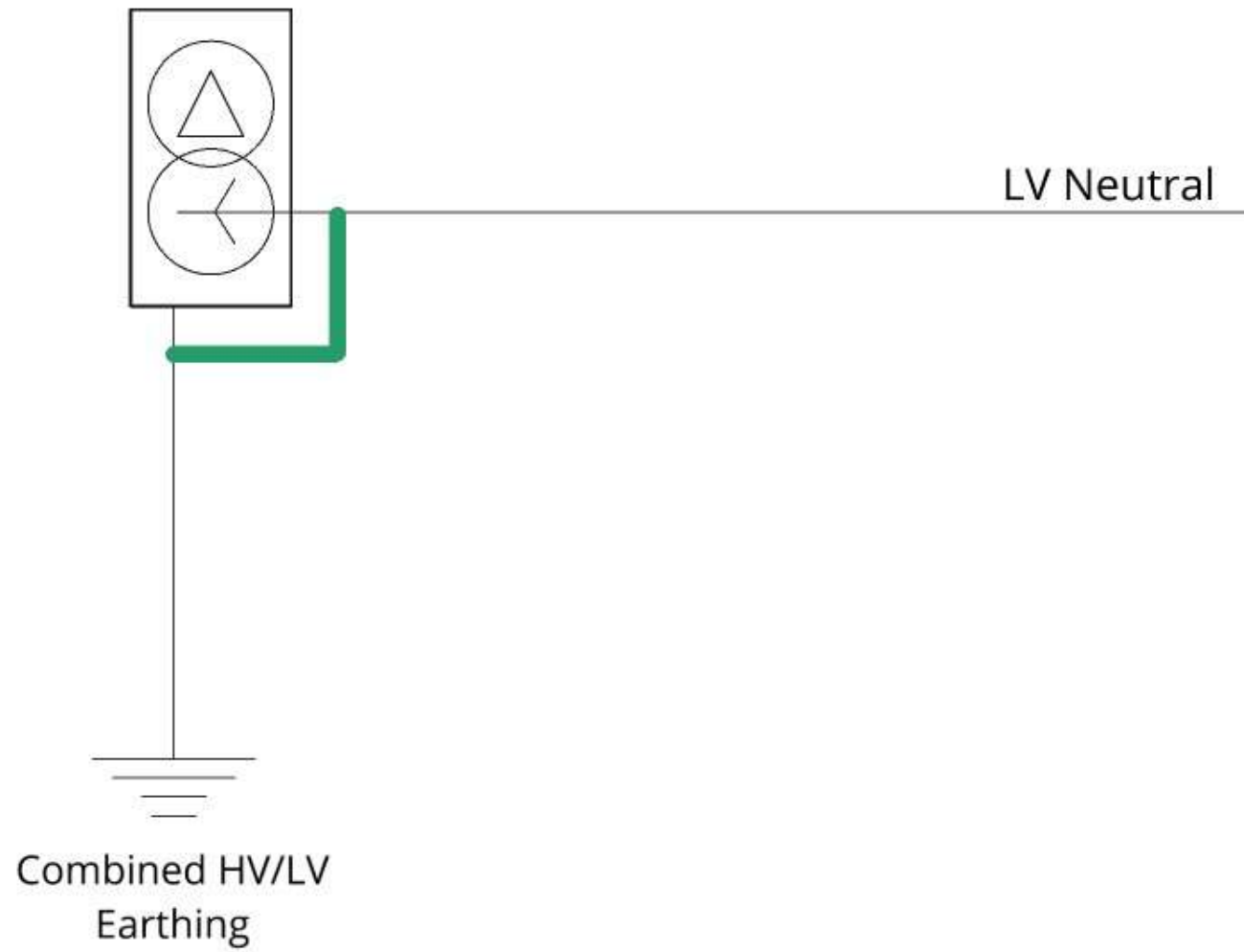




Combined HV/LV Earthing



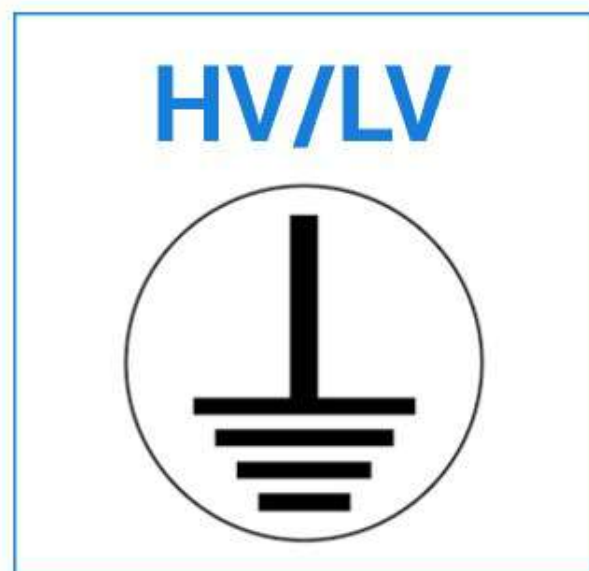




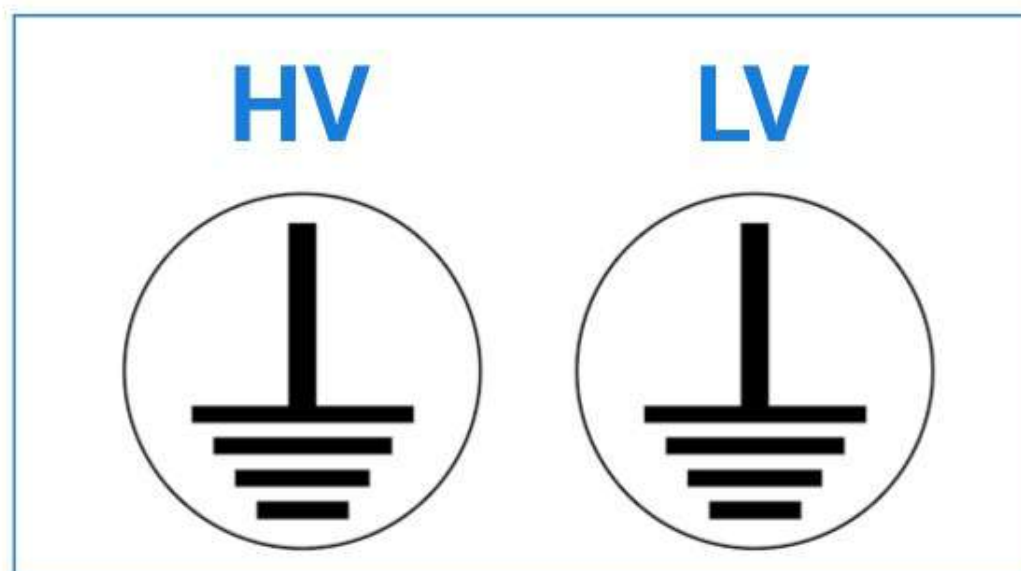


Segregated HV/LV Earthing Assessment

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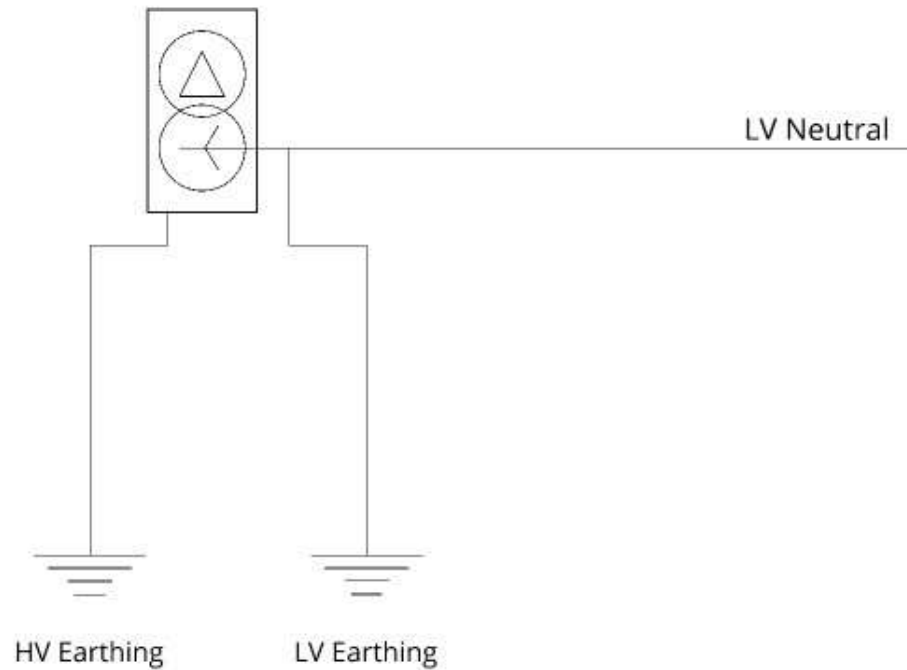


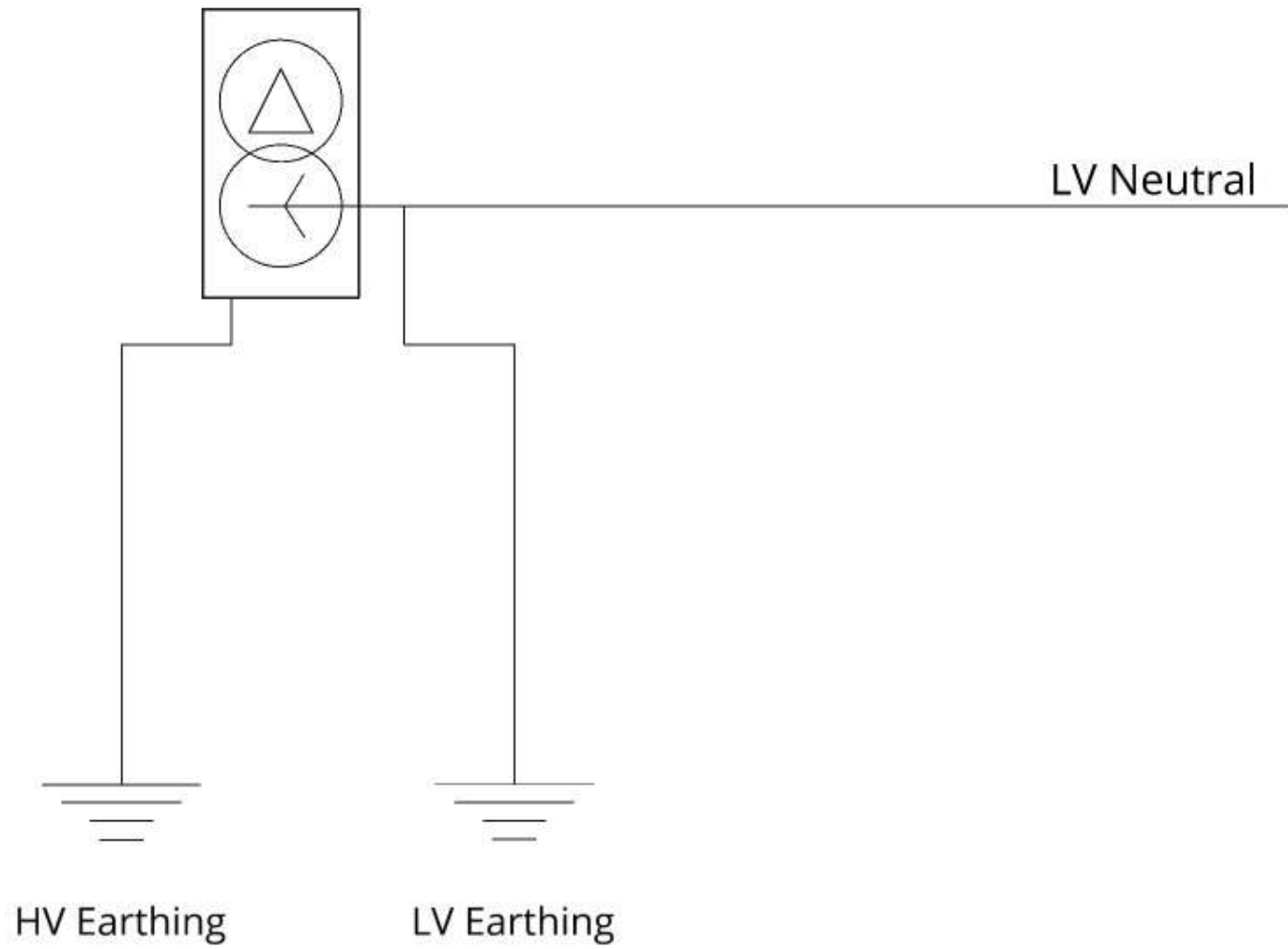
VS





Segregated HV/LV Earthing

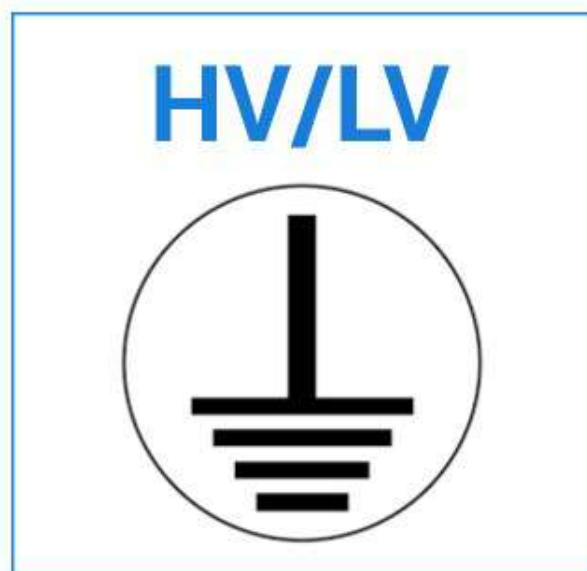




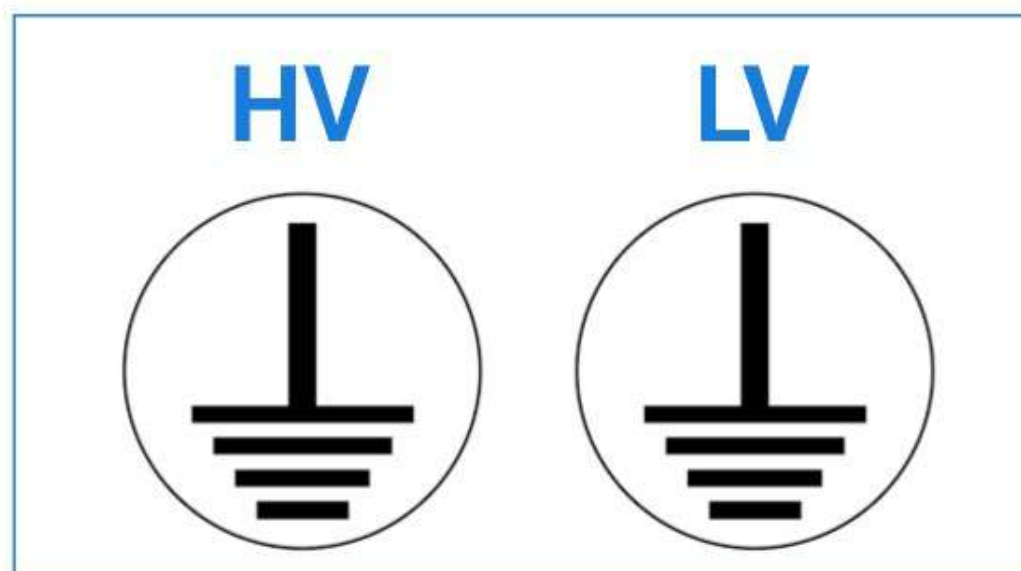


Segregated HV/LV Earthing Assessment

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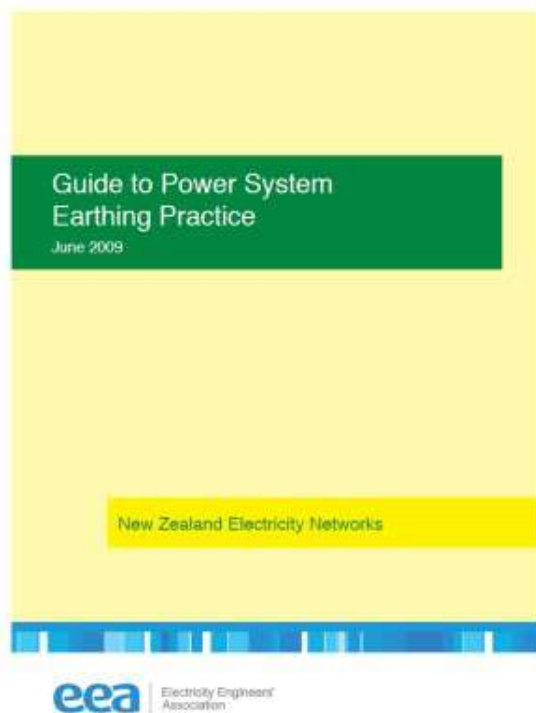


VS





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Electricity Engineers'
Association



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Assessment Overview

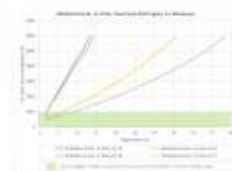
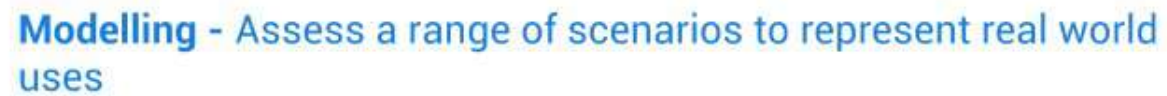


Table 9: Typical Minimum Separation Distances between HV and LV Earths for 11 kV Distribution Transformers

Size of MEN system	Size of HV earth electrode NOTE 1	Minimum separation distance (m)
Medium to large MEN system (> 50 customer earths)	Small	2
	Large	5
Small MEN system (5 to 50 customer earths)	Small	2
	Medium	5
	Large	10 NOTE 2
Very small MEN system (< 5 customer earths)	Small	10
	Medium	30 NOTE 2
	Large	50 NOTE 2





Inputs



Fault Data

Magnitude - 5 kA and 13 kA

Duration - 0.5 s, 1.0 s and 1.5 s

Fault Frequency - 1 in 30 years

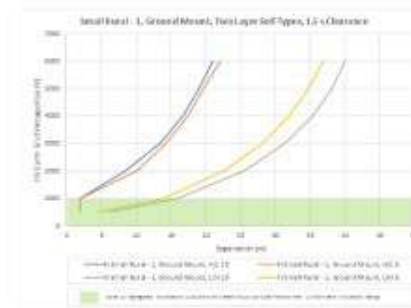


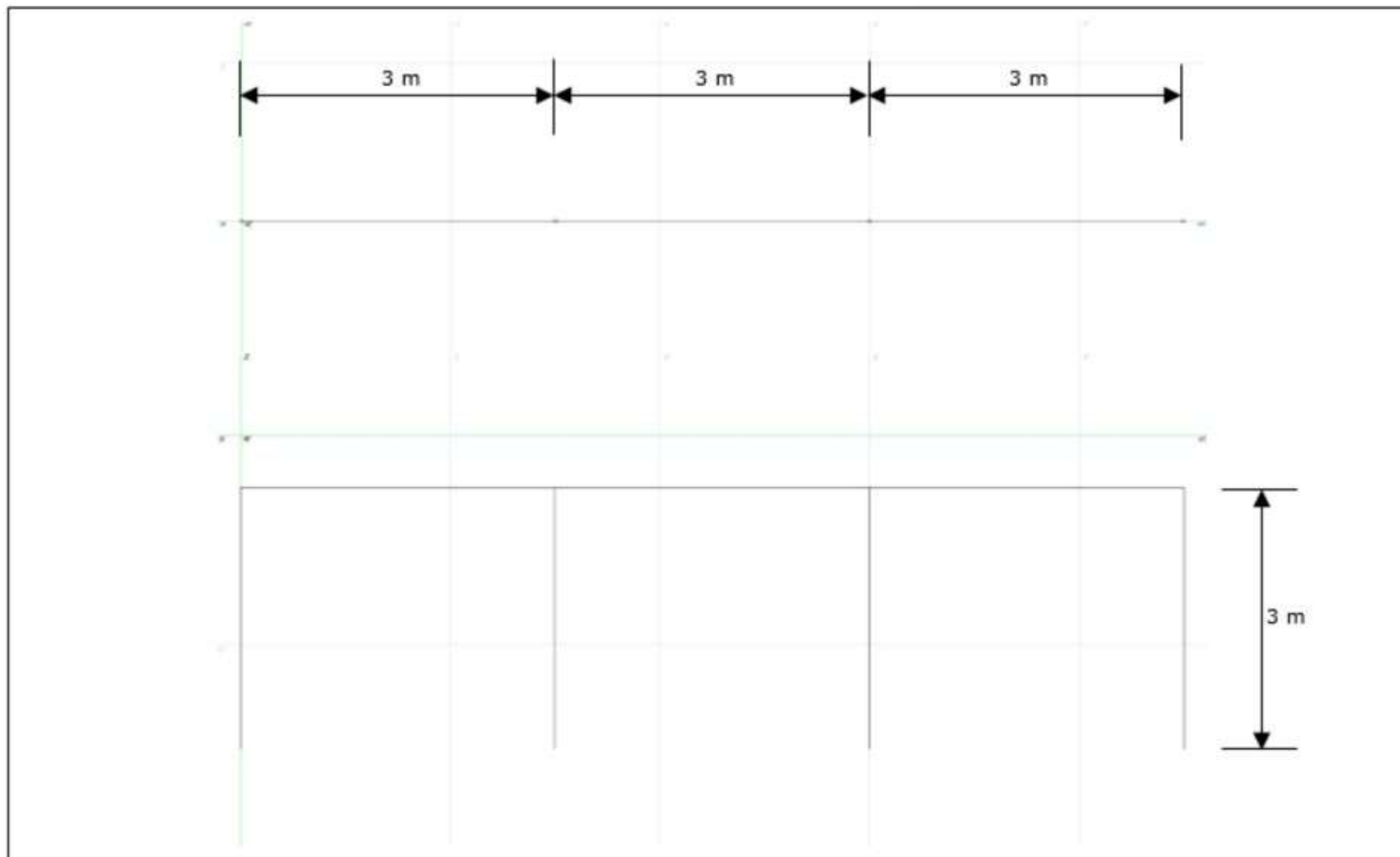
Soil Resistivity - Regional representation

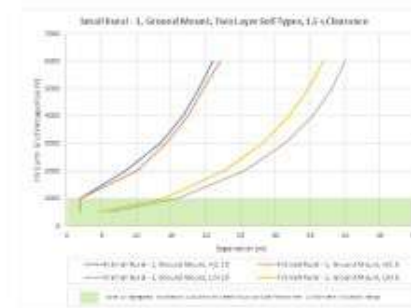


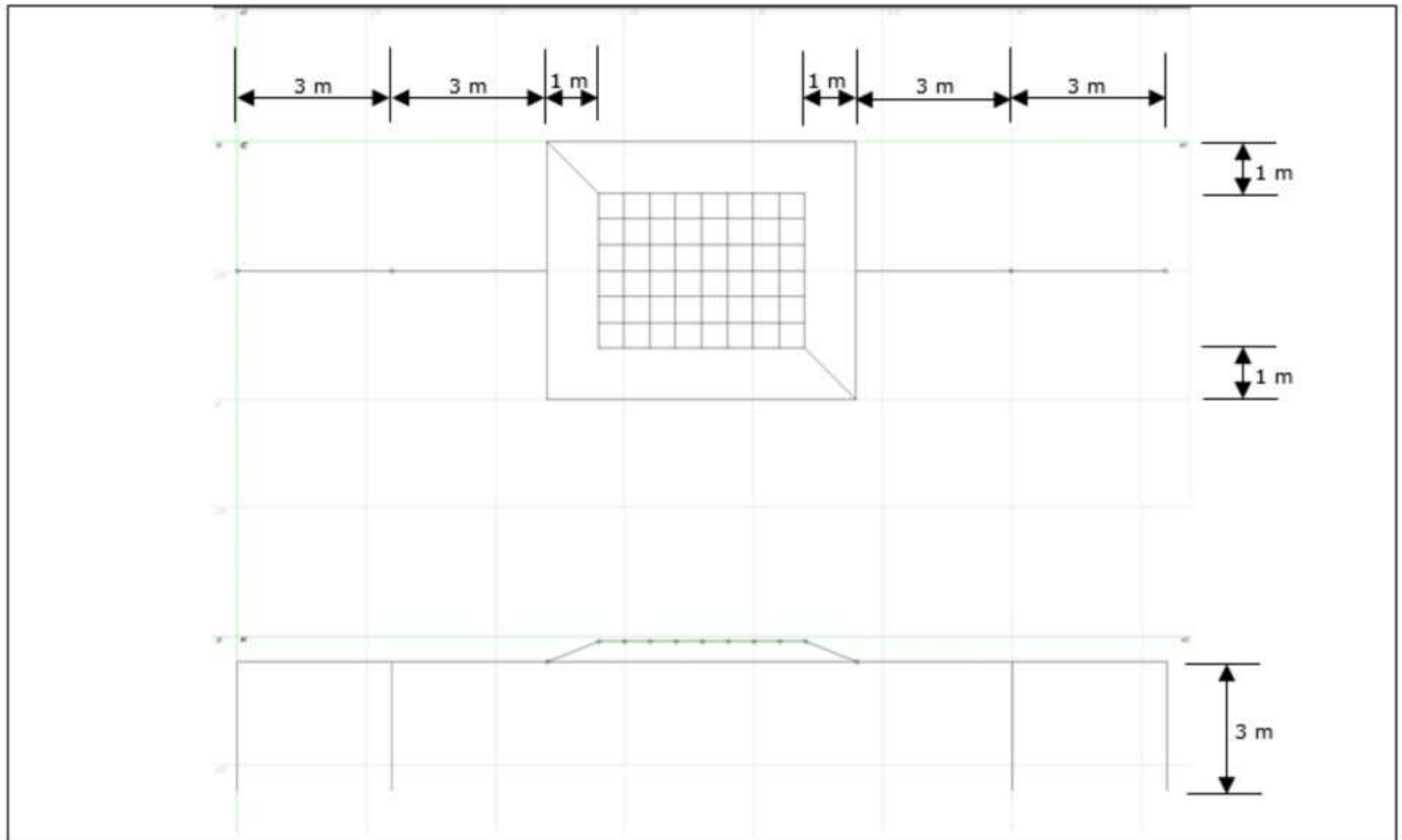
Earthing Systems - Steering Group Guidance

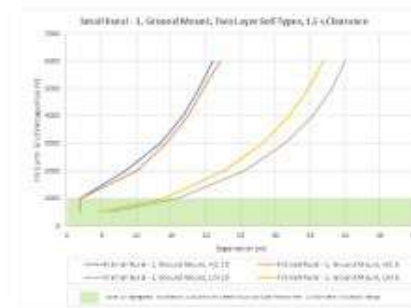


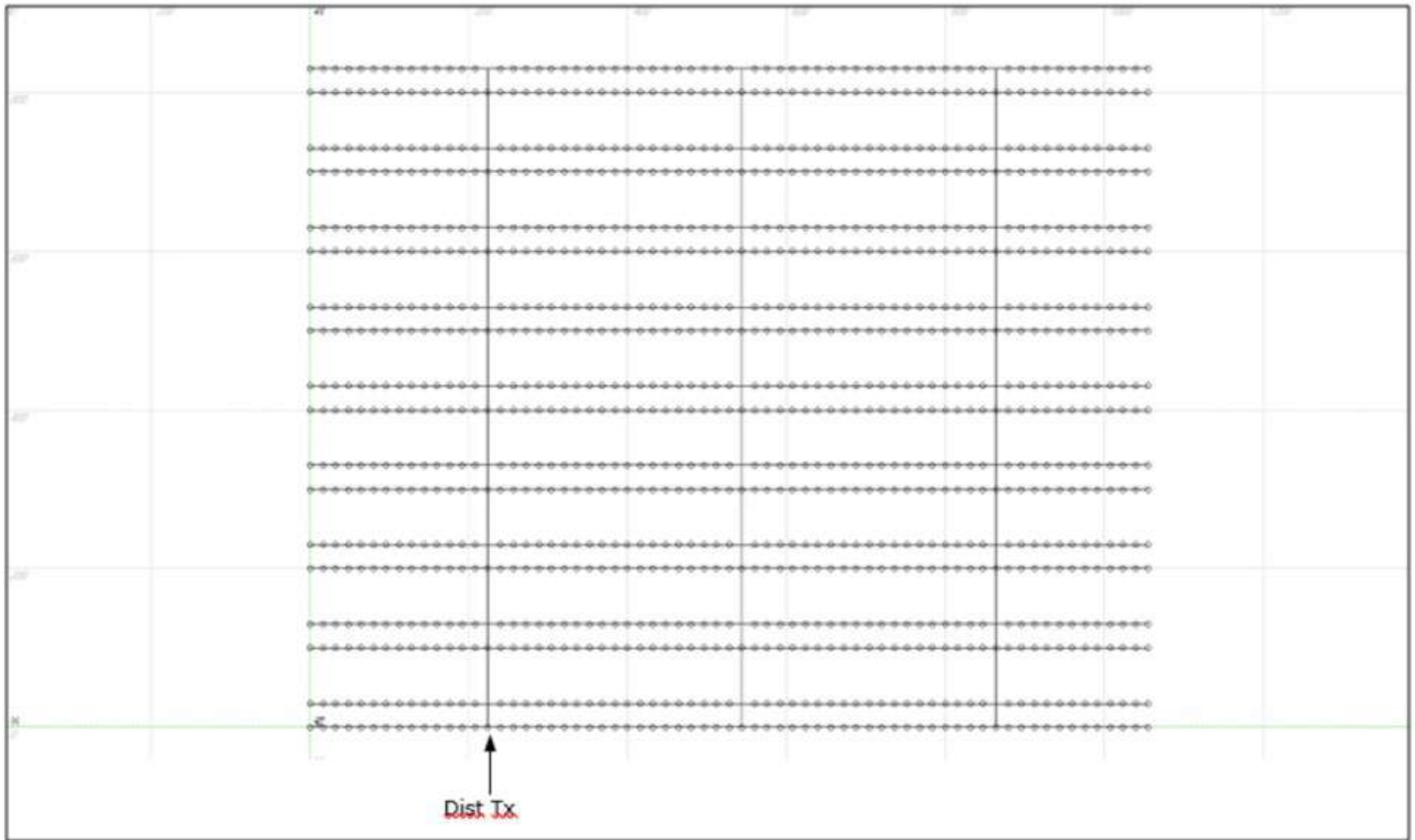


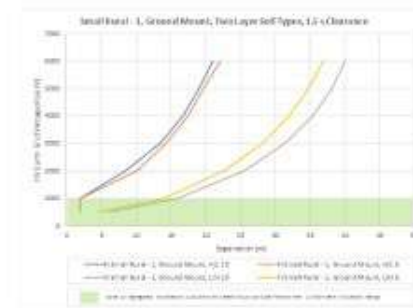


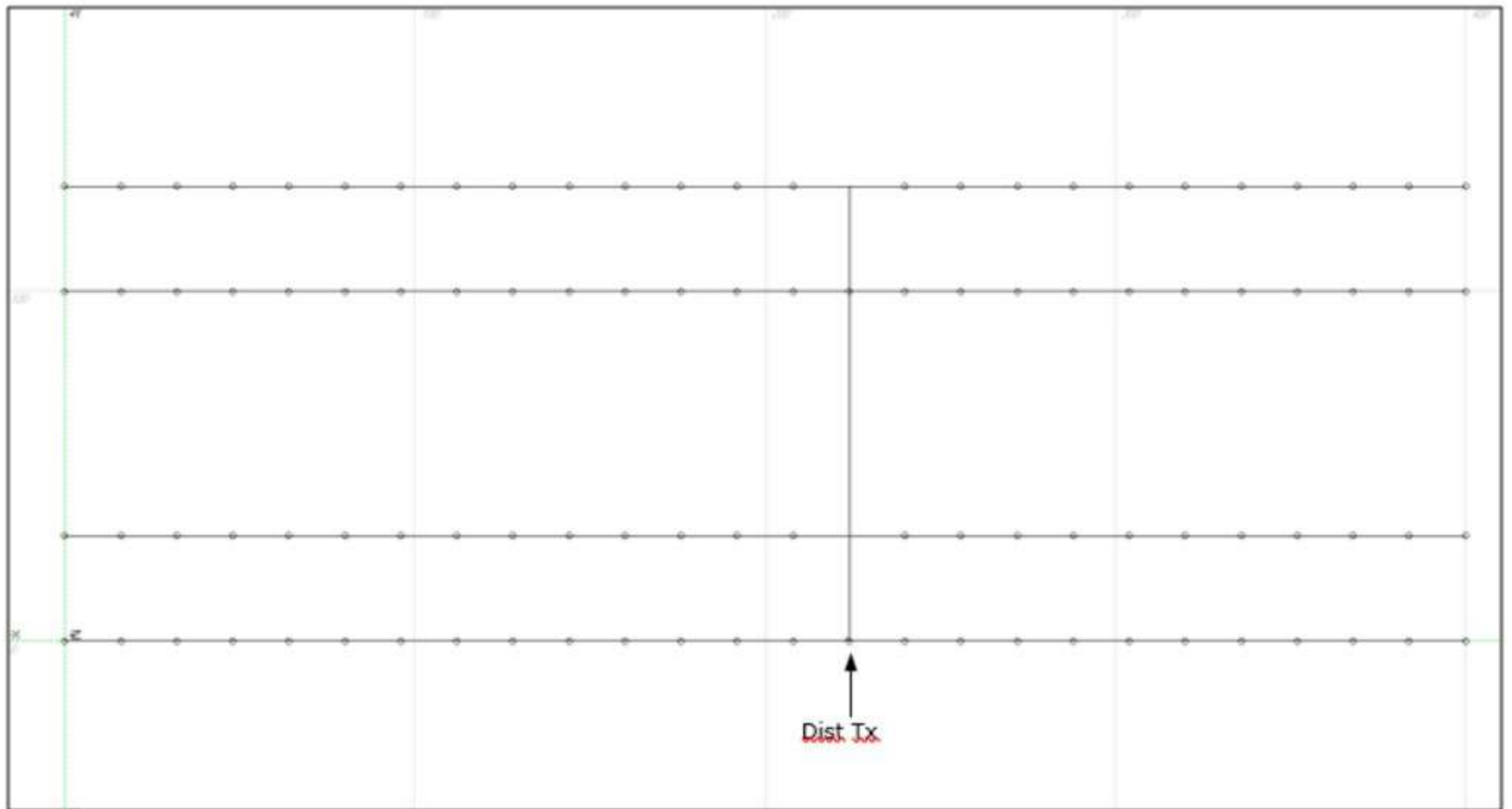


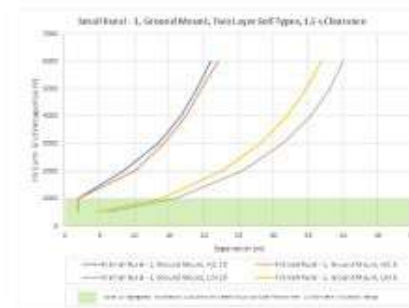


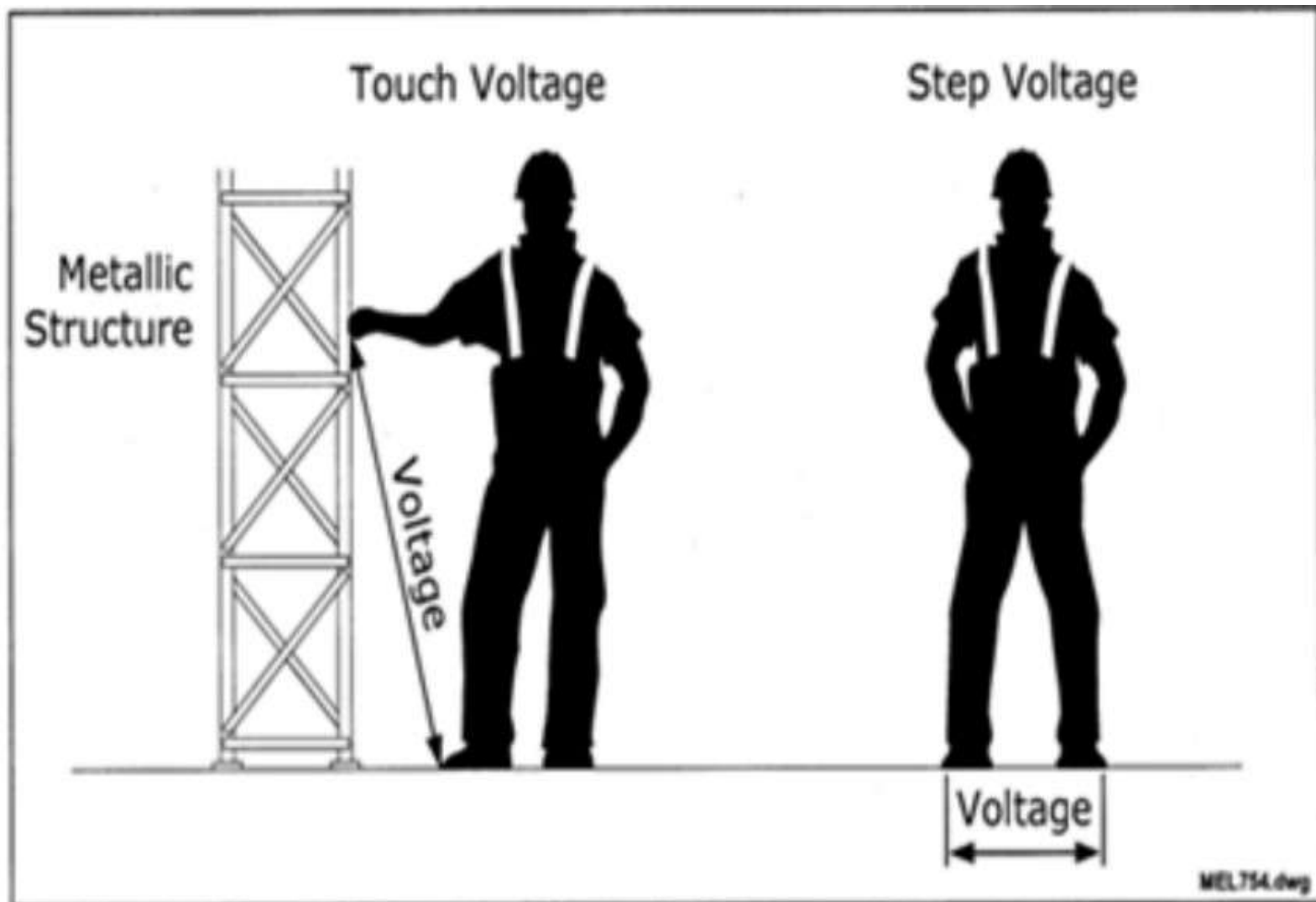


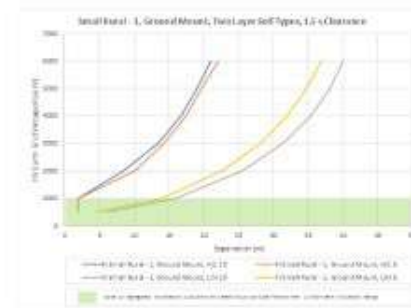








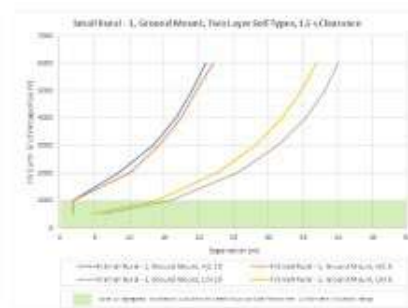
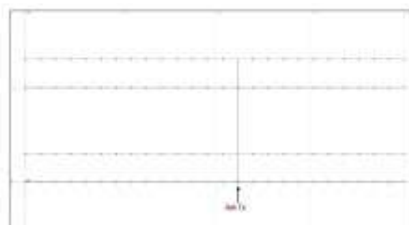
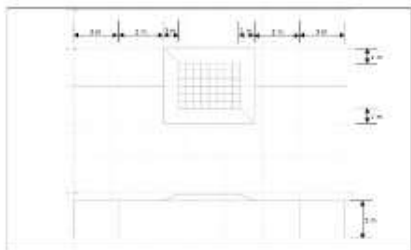
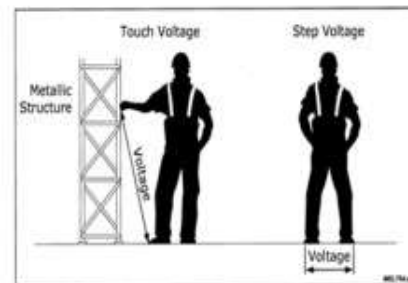
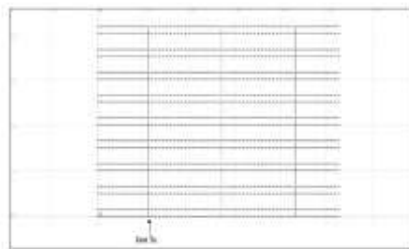
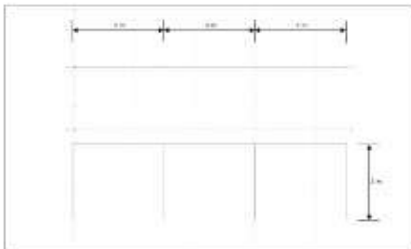








Methodology





Outcomes

No definitive result

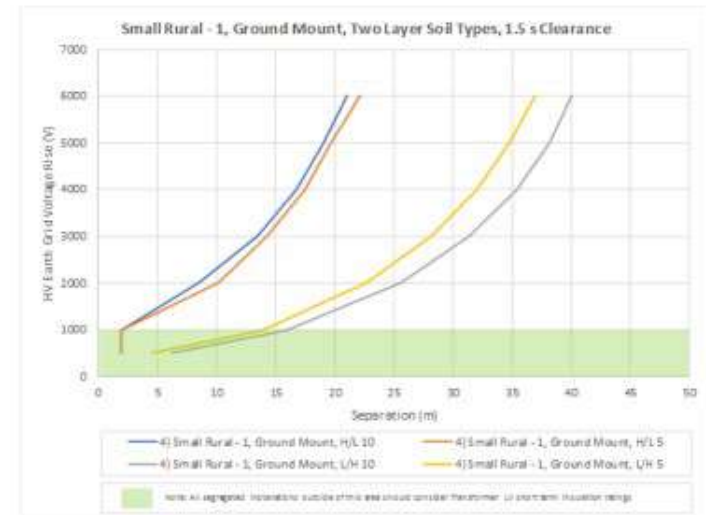
Scenario specific decisions

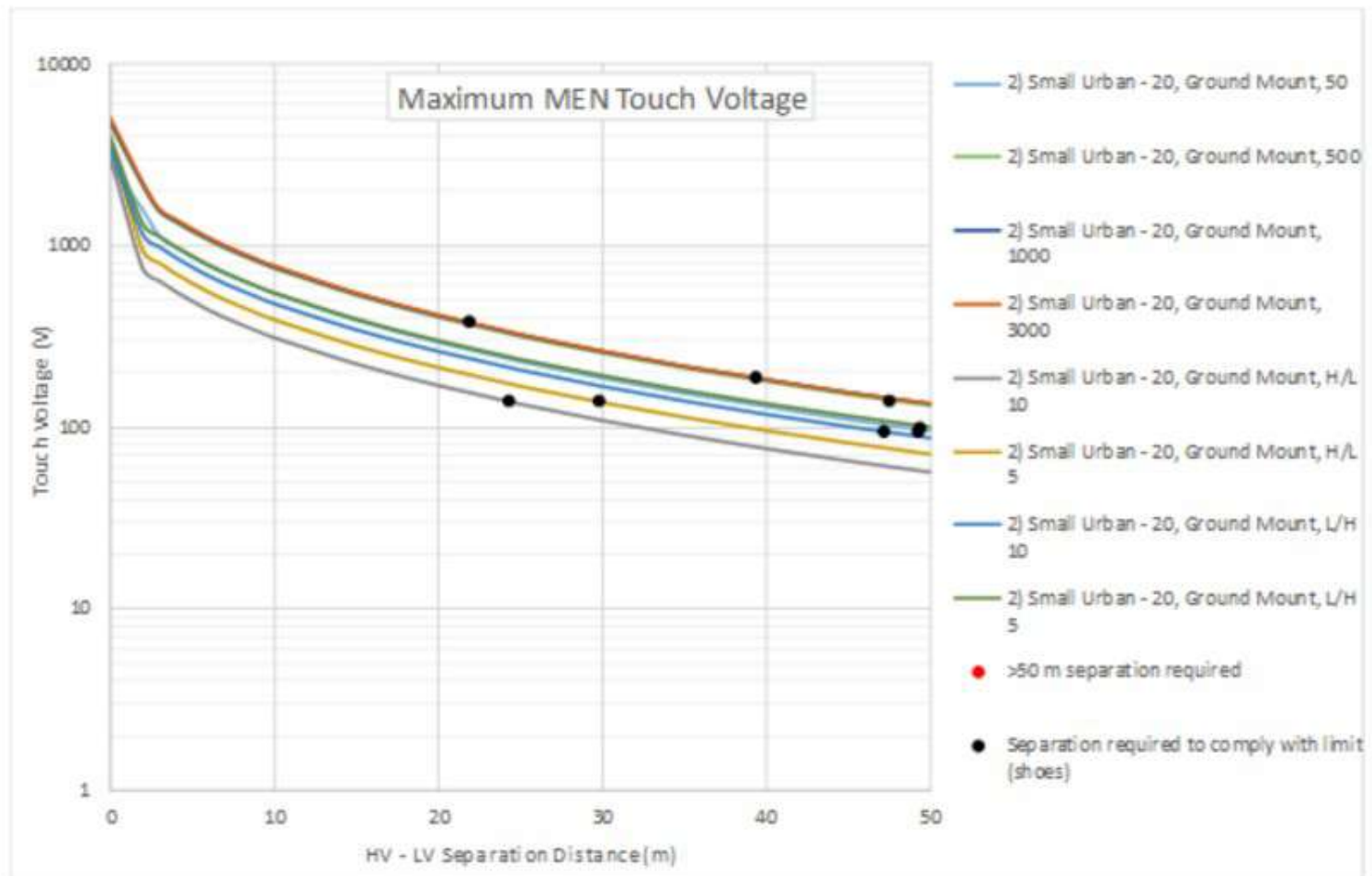
In General:

- Small Rural MEN - Segregated
- Urban - Combined

Required separation - 2 m to >50 m

HV Earth - High EGVR

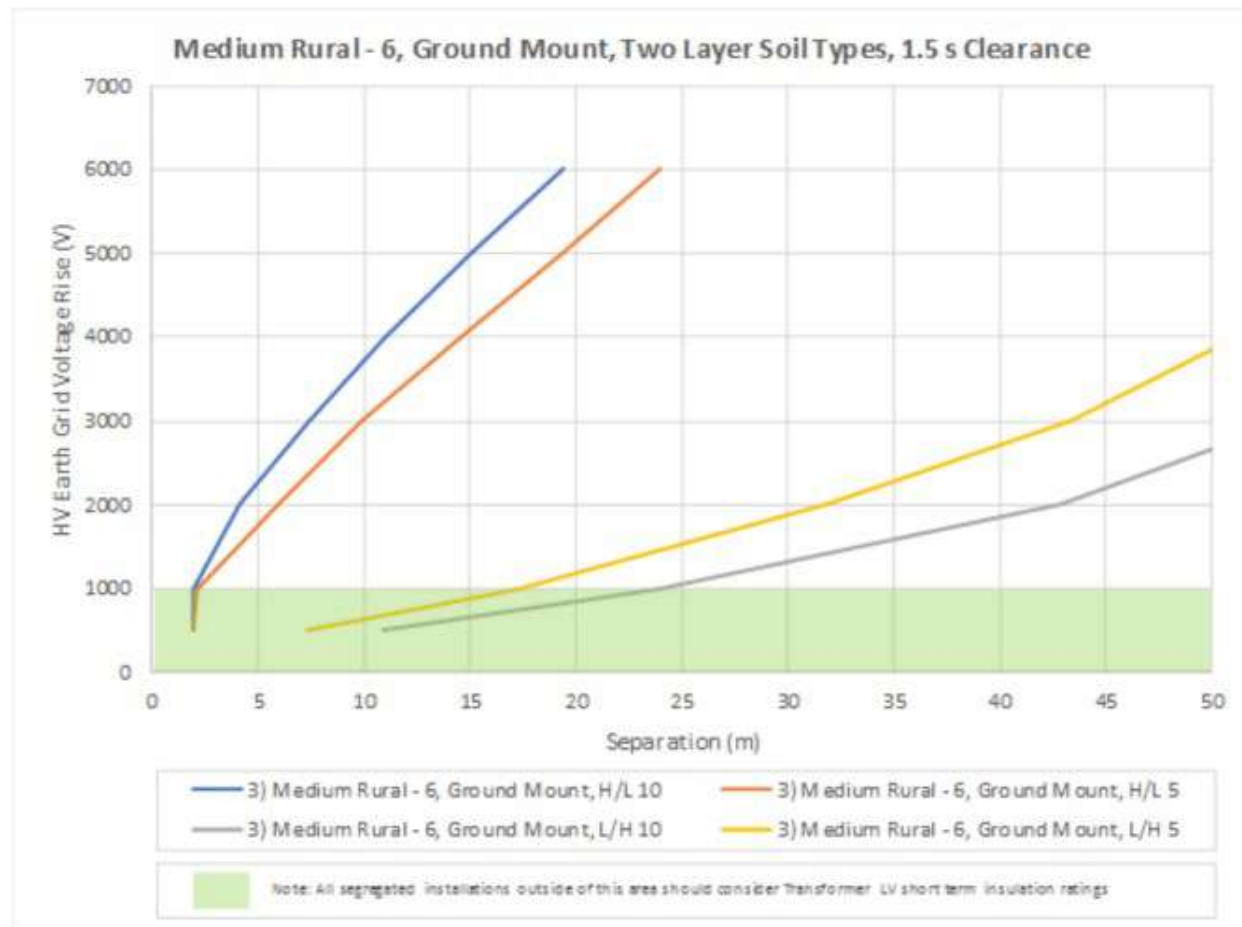














Recommendations and Considerations

Segregate when:

- 1. MEN touch voltages exceed the deterministic limits**
- 2. Probability of exposure, $P_e > 10^{-6}$**
- 3. Practicable to install at the location**

Considering the following,



Recommendations and Considerations

1. Extent of HV/LV earthing
2. Transformer LV winding insulation ratings
3. Fault duration
4. Soil resistivity structure
5. HV earthing connections
6. Transformer location
7. Separate conductive items
8. Overhead considerations
9. HV to LV clash
10. Lightning strikes
11. LV Faults on tank
12. Maintenance of separation



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