

# 1.0 Electrostatic Discharge (ESD) | IEC 61000-4-2

## PURPOSE

This test is for electrical and electronic equipment subjected to electrostatic discharge (ESD) from operators/personnel directly touching (direct) equipment or being adjacent (air) to the equipment.



EM TEST esd NX30

## Contact Discharge Test Levels and Waveform Parameters



Level	Indicated voltage [kV]	First Peak current of discharge [A] ( $\pm 15\%$ )	Rise time $t_r$ with discharge switch [ns] ( $\pm 25\%$ )	Current at 30ns [A] ( $\pm 30\%$ )	Current at 60ns [A] ( $\pm 30\%$ )
1	2	7.5	0.8	4	2
2	4	15	0.8	8	4
3	6	22.5	0.8	12	6
4	8	30	0.8	16	8

The reference point for measuring the time for the current at 30ns and 60ns is the instant when the current reaches 10% of the 1<sup>st</sup> peak of the discharge current.

NOTE: The rise time  $t_r$  is the interval between 10% and 90% value of the 1st peak current.



Teseq NSG 437

### APPLYING THE ESD TEST

**Points of application** - all points that are accessible to the user in normal operation; not necessarily pins of open connectors nor points accessible only during maintenance or servicing.

**Application method** - contact discharge is preferred, air discharge is used where contact cannot be applied; both direct discharges to the EUT and indirect discharges to the coupling plane(s) are required.

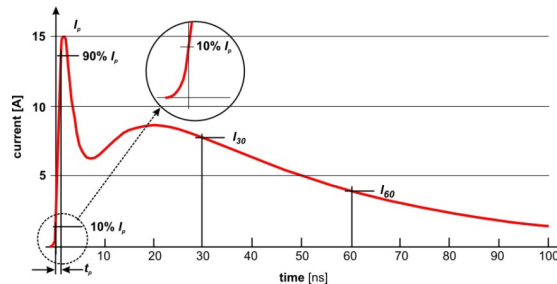
**Non-earthed apparatus** - should be deliberately discharged between each pulse, e.g. via connection of bleed resistor or by air ionization.

**Number of discharges** - normally ten in each polarity to each point of application - EN 55024 requires a total of 200, 50 at each point.

**Mode of application** - test generator must be perpendicular to the surface of the EUT; for air discharge, the tip must approach the EUT as fast as possible without causing mechanical damage; for contact, the tip must touch the EUT before the discharge is cancelled.

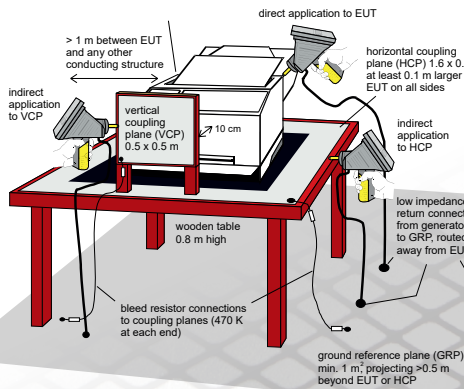
**Test levels** - all lower test levels must also be satisfied, i.e. if the test specification is 6 kV contact, then 2 and 4 kV must also be applied.

### Current waveform

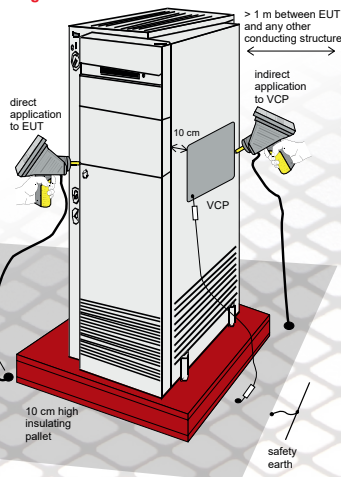


### Test set-up

#### Table-top EUT insulated from HCP



#### Floor-standing EUT



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