

Comparing the Test Results – Understanding the Rating Levels

To recap some of our previous discussions, we have looked closely at the various ratings required by UL 1449 Third Edition. These included the Nominal Discharge Current Ratings (I_N) and the Voltage Protection Ratings (VPR).

If you recall, we also discussed the difference between the waveforms for Second Edition and Third Edition of UL 1449. Specifically the Second Edition waveform utilized to determine the Suppressed Voltage Rating (SVR) was a 6 kV/500 A combination wave. By contrast, the waveform utilized to determine the Voltage Protection Rating (VPR) in the Third Edition is a 6 kV/3 kA combination wave.

In the Second Edition, the Duty Cycle test, conducted using the 6 kV/3 kA combination wave, was conducted before and after the measured limiting voltage tests used to determine the Suppressed Voltage Ratings.

The same basic principle applies to the Third Edition. However, in the Third Edition, the Voltage Protection Rating is based on the 6 kV/3 kA and, for permanently connected devices (Type 1 and Type 2, typically) the duty cycle test is replaced by the Nominal Discharge Current Test discussed in the previous article. For Type 3 devices (cord connected and plug in devices) the Voltage Protection Rating is the same (6 kV/3 kA) and the duty cycle test using the same waveform is conducted.

Taken from Table 63.1 of UL 1449, the following shows how the VPRs are determined based on specific measured limiting voltage test results when conducting the surge testing according to Section 37 of UL 1449:

VOLTAGE PROTECTION RATING (VPR)

<u>Measured Limiting Voltage Rating (V)</u>	<u>Minimum Voltage Protection</u>
330 or less	330
331-400	400
401-500	500
501-600	600
601-700	700
701-800	800
801-900	900
901-1000	1000
1001-1200	1200
1201-1500	1500
1501-1800	1800
1801-2000	2000
2001-2500	2500
2501-3000	3000
3001-4000	4000
4001-5000	5000
5001-6000	6000

When comparing test results and ratings marked, it is critical to understand how this chart comes into play. For example, if a product has a measured limiting voltage of 401, it will have a VPR of 500. At the same time, if a product has a measured limiting voltage of 499 or 500, it has a VPR of 500. In essence, there can be a **99 volt difference** in measured limiting voltages between products and they can both have the same VPR. In some situations and application, this may not be significant. In other applications, it can be critical. *This is why it is important to not only compare VPRs and other ratings, but to also compare additional test results to ensure that the product needed for the application is the product being installed.*