

Panamax Technical Article....

MOVs in Surge Protectors

Properly designed AC surge protectors that use MOVs are long lived and rugged. The IEEE 'Standard Test Pulse' (6kv open circuit, 500 ampere maximum current, 20 microsecond pulse length) is intended to represent a 'worst case' exposure from lightning for equipment plugged into an interior AC receptacle. For 20 mm diameter MOVs, a standard size for high quality protectors, the manufacturer's rating indicate a lifetime of more than 500 surges of this size. Recently reported measurements indicate that the manufacturer's ratings are extremely conservative and that a life in excess of 1,000 surges of 3,000 amperes can be expected.

To give an idea of what this means to a user, the IEEE 500 ampere test pulse could be caused by a 'typical' lightning strike directly on to the power pole outside the building or to the AC service drop. Thus, if you had a direct strike to your building power feed once per year, in 500 years you would be approaching the manufacturer's rated MOV life. But as stated earlier, recent measurements demonstrate much better performance. For the much smaller surges, say 100 amperes, more commonly encountered, the rated MOV life is more than 100,000 surges! At still lower surge levels, the life is considered infinite.

Our evidence from extensive field experience (almost 4 million protectors installed) validates the analysis above. Panamax protectors are warranted forever against electrical damage and we repair or replace any damaged protector (see warranty for terms and limitations). An analysis of products returned shows that the MTBF (mean time between failure) due to lightning surges is approximately 9,000 years. The MTBF would be much greater for an 'average' installation, because we know that many of our products have been installed as a last resort in difficult locations where other products have failed, or have failed to protect the connected equipment.

If the 2-6 month lifetime that has been claimed for MOV-based protectors were true for our units, Panamax would be providing warranty replacements for approximately 10,000 units per day. Our experience - and that of our customers - is quite different!