To achieve the maximum lifetime of a channel electron multiplier the rules listed below should be strictly followed.

- After a bakeout, the analyzer needs 2-3 days to cool down. If channel electron multipliers are operated at higher temperatures (> 60°C) they can suffer severe damage. Some channel electron multipliers will lose gain and exhibit a markedly higher detector plateau. The interior parts of the PHOIBOS will cool down significantly slower than the housing. It is recommended to wait for a complete cool down of the detector assembly; at least 2 days. Even if the analyzer housing is cold, any internal parts on insulators may still be too hot for safe operation. It is imperative that all users are aware of the issue and take the necessary precautions.

- During first use after bake out, rapid desorption of surface adsorbed gas will occur from the walls of the channel electron multipliers, so care should be taken not to use the detector at full channel electron multiplier voltage and full intensity within the first few hours of operation. We recommend to increase the detector voltage over a period of 1.5 hours up to the recommended value. Use the SpecsLab mode Detector Voltage Scan and set start, end, step and dwell time parameter for this procedure (see Figure 1).

- During the first few days of operation of a new detector, it is recommended that high output currents are avoided (i.e. inputs above 1 Mcps). Taking this initial burn-in precaution can prevent premature failure.

- Choose a moderate value of the detector voltage to prevent rapid ageing of the detector. The optimum operating point is about 50 - 100 V beyond the plateau of the intensity versus detector voltage sweep, not more (see Figure 1).
Backstreaming from oil diffusion pumps or roughing pumps has to be avoided at all costs. It is strictly recommended to use cold traps and molecular sieve traps and maintain them according to manufacturers specifications.

Channel electron multipliers can be degraded by exposure to various types of hydrocarbon gases which raises the work function of the surface and hence causing gain degradation. Operation in a clean vacuum environment of 5×10⁻⁸ mbar or better is a must in order to ensure the long-life characteristics of these devices.

Other gases containing F, S and Cl, which may decompose under electron bombardment must not enter the detector area.

Due to the hygroscopic nature of the doped lead glass, it is important that the channel electron multipliers are not exposed to air for more than one day. Dry nitrogen should be used to vent the system.

High intensity sources like electron sources needs special care. Start with lowest source strength and narrow slit settings to avoid possible degradation.

Measurements at the secondary electron cut-off needs special care. Use low pass energies (3-5 eV) and small slit settings to avoid possible degradation.