

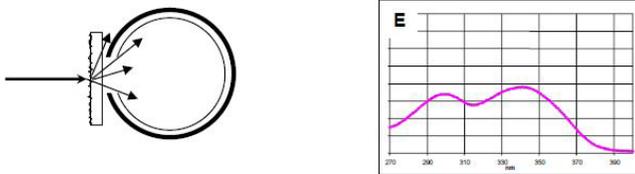
PMMA Standard Plates for Instrument Control Purposes

The plates have been cut out of a big sheet of a common sort of extruded, UV-stabilised Plexiglas®, guaranteeing the same optical properties for each plate. The effectiveness of UV-absorption is matching the range of common sunscreens. According to the extruding process, the distribution of the UV-filters is very homogeneous compared to a manually applied film of a test emulsion. The plates were roughened on one side by an industrial sandblasting procedure (glasspearls, 90-150µm, 30cm, 6bar) in a very reproducible way.

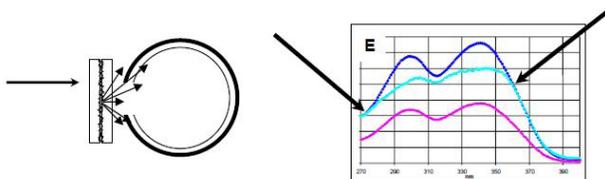
Because of their stable and standardised absorption and diffuse-scattering properties they are quite suitable as test "emulsions" to check and compare instruments used for in-vitro determination of UV-protection for intra as well as interlaboratory purposes.

Before measuring these standards against air as reference, the instrument has to be aligned in the appropriate wavelength band by measuring the black current (electrical noise).

The first extinction measurement through one plate should be done in the same way as with real emulsion films. The scattering surface should be orientated to the incident beam with the back of the polished plate positioned as near as possible to the aperture of the integrating sphere:



The second measurement should be done with two plates, orientated with the roughened surfaces to each other, to ensure that the position of the scattering surface is identical to that of the first measurement. Ideally, the attenuation of the light (absorption and scattering) should lead two doubled extinction values along the spectrum (upper spectrum in diagram, below):



Practically most spectrophotometers, equipped with an integration device, will run out of their linear measurement range at a certain degree of attenuation (middle spectrum). The points, where the flanks of the "upper" and the "middle" spectra diverge (arrows), determine the instrument's upper range of measurement in the UVA- and UVB-region.

Summing it up, several informations can be derived from two fast and simple measurements:

- Wavelength comparability between different instruments (measurement 1)
- Quantitative comparability, measuring a Standard "sunscreen" (measurement 1)
- Dynamic linear range of the instrument (measurement 2)

The plates can be used for routinely checking the instrument's performance