

TestUV^{strip}

UV Measuring strips for UV dose



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1. Description and intended use

The UV measuring strips TestUVstrip are made for measuring the UV radiation (dose) of various industrial UV light sources. These include powerful UV medium pressure lamps, which are used for UV curing applications:

- UV medium pressure lamps with Hg filling, e.g. UVH lamps
- Fe-doped medium pressure lamps, e.g. UVH xxxx Fe...
- Ga-doped medium pressure lamps, e.g. UVH xxxx Ga...

The UV dose of UV LEDs can also be measured with these UV measuring strips.

UV radiation (UV dose) from UVC low-pressure lamps used for UVC curing (e.g. CCure) or UVC sterilisation lamps (uv-fresh) can also be measured.

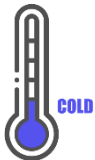
The UV measurement strips are sensitive in the entire UV emission range, i.e. wavelengths between approx. 230 and approx. 400 nm.

The UV measurement strips are not suitable for quantitative measurement of natural solar radiation because the dose of natural uv light is too low.



Please note that daylight can also expose the UV measurement strips over a longer period of time. Temperature has an additional influence on the measuring strips.

Therefore, the measurement strips must always be stored protected from light and heat.



Note: UV measurement strips that are already coloured a light blue when new, indicate that they have been stored at a too high temperature, (unexposed UV measurement strips have a matt white surface). **To avoid incorrect measurement results, please dispose of such UV measurement strips.**

2. Design and function of the UV measurement strips

The measuring film consists of a plastic PET/PEN film material. It is coated with a matt-white UV-sensitive layer which changes colour from light blue (low irradiation) to medium blue (higher irradiation) when exposed to UV light.

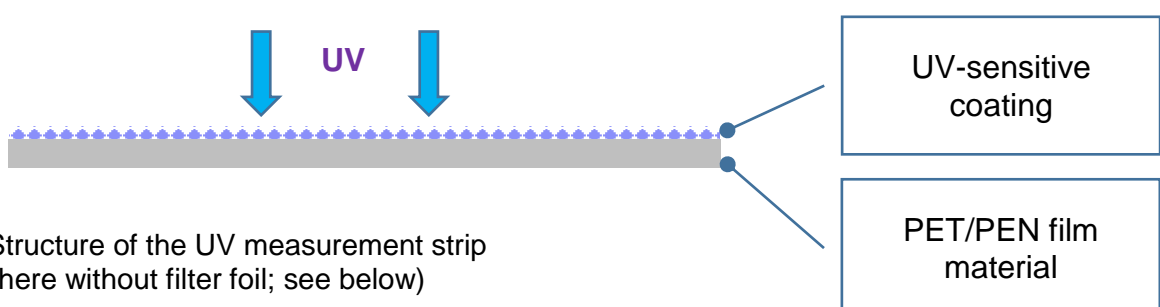


Fig. 1: Structure of the UV measurement strip
(here without filter foil; see below)

In order to be able to measure the irradiation from very powerful UV lamps or from slow processes (longer irradiation times), the UV measuring strips are supplied with a filter film. This reduces the UV radiation, so that high UV doses (with filter film) and low UV doses (without filter film) can be detected. The range of application is therefore extremely wide.

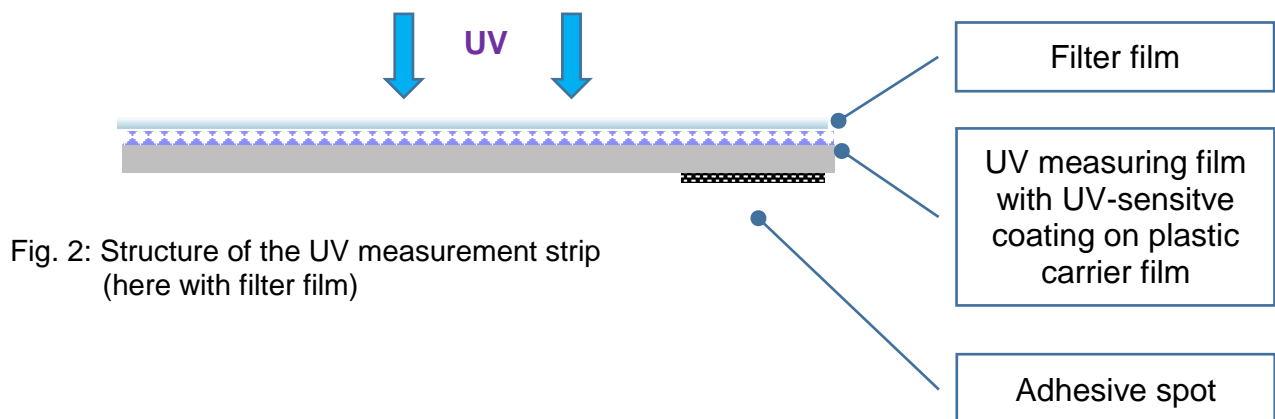


Fig. 2: Structure of the UV measurement strip (here with filter film)

The filter film covers the measuring film and can be removed by folding back or tearing off / cutting:

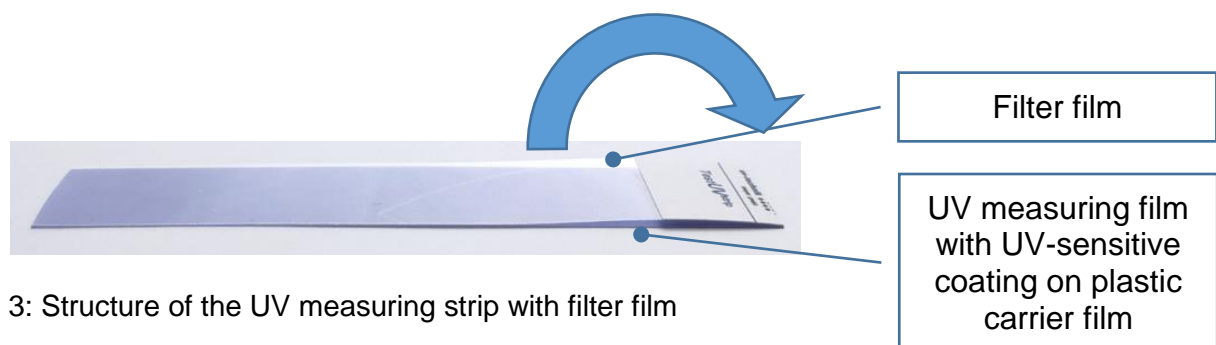


Fig. 3: Structure of the UV measuring strip with filter film

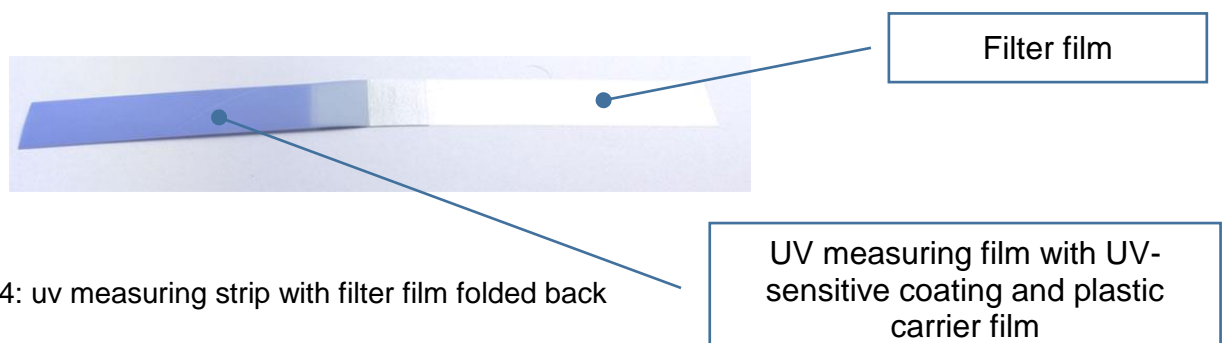


Fig. 4: uv measuring strip with filter film folded back

3 Measurement of the UV irradiation (UV dose) with the UV measuring strips

Pull protective film off the adhesive spot on the back and place the UV measuring strip on the desired location on your substrate where the UV dose is to be measured. If the UV measuring strip is too long, it can be cut to the desired length.

Take the measurement with the filter film on top of the UV measuring film (recommended) or remove it if the UV dose is very low.

Depending on the UV dose, the UV measuring strips change colour between light blue (low UV dose) to medium blue (higher dose). Please make sure that the blue discoloration remains in the low to medium range.

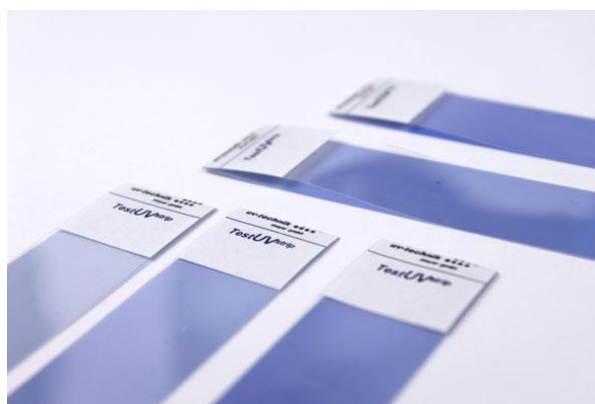


Fig. 5: Differently exposed UV measuring strips

Now look at the corresponding dose graph (see appendix). Depending on the type of uv radiation used, there are the UV dose graphs listed in the following table. Depending on the uv light source and intensity, carry out the measurement with or without filter film:

UV light source	Filter	Irradiation (Dose)	UV range
1. UV medium pressure lamp <ul style="list-style-type: none"> • Hg (with filter film) • Fe (with filter film) • Ga (with filter film) 	✓ ✓ ✓	120 ... 900 mJ/cm ² 50 ... 350 mJ/cm ² 180 ... 520 mJ/cm ²	UV full UV-A UV-Vis
2. UV medium pressure lamp at lower doses <ul style="list-style-type: none"> • Hg (without filter film) • Fe (without filter film) 	✗ ✗	10 ... 85 mJ/cm ² 13 ... 75 mJ/cm ²	UV full UV-A
3. UV LED 395 nm (with filter film)	✓	500 ... 5900 mJ/cm ²	UV LED
4. UVC low pressure lamp UVC LP (without filter film)	✗	30 ... 380 mJ/cm ²	UVC LP (low pressure)

➡ The corresponding dose graphs can be found in the appendix.



Performing UV measurements requires special care and caution. Make sure that you cannot reach into or get caught in running or rotating machinery.



Safety devices, such as shielding to protect against high-energy UV radiation, must be made ready for operation and used.



The use of suitable UV protection glasses is recommended. These provide effective short-term protection for the eyes.



Machine parts and also the UV measuring strips can heat up considerably due to UV radiation.



It is essential that suitable gloves are worn by the personnel.

4 Evaluation of an exposed UV measuring strip

Exposed UV measuring strips can be evaluated in two different ways:

- a) Visual inspection of the blue discolouration and comparing the density and the corresponding UV dose to the attached dose graph (see annex).
- b) Measuring the colour density value with a colour density meter and calculating the corresponding UV dose.

4.1 Visual evaluation of exposed UV measuring strips

Take the REFERENCE CARD and place the exposed UV measuring strip on one of the blue reference fields that best matches the exposed UV measuring strip. Evaluate the blue discoloration without filter. Fold back or tear off the film filter for evaluation.



Fig. 6: Comparison of the blue discoloration on the REFERENCE CARD.

The REFERENCE CARD has eleven blue reference ranges which correspond to different UV doses.

Read off the corresponding density. In the above example it would be the density 0.50.

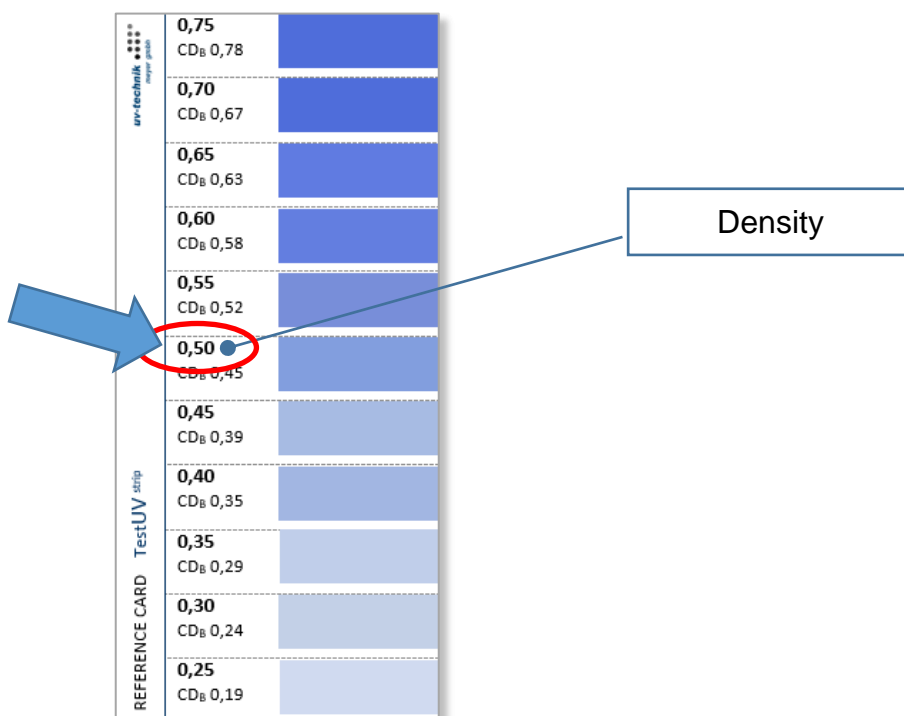


Fig. 7: REFERENCE CARD

Now the UV dose can be read from the dose graph ① using the density value ②. In this example the result for a UV medium pressure lamp (Hg) is as follows:

②
320 mJ/cm²

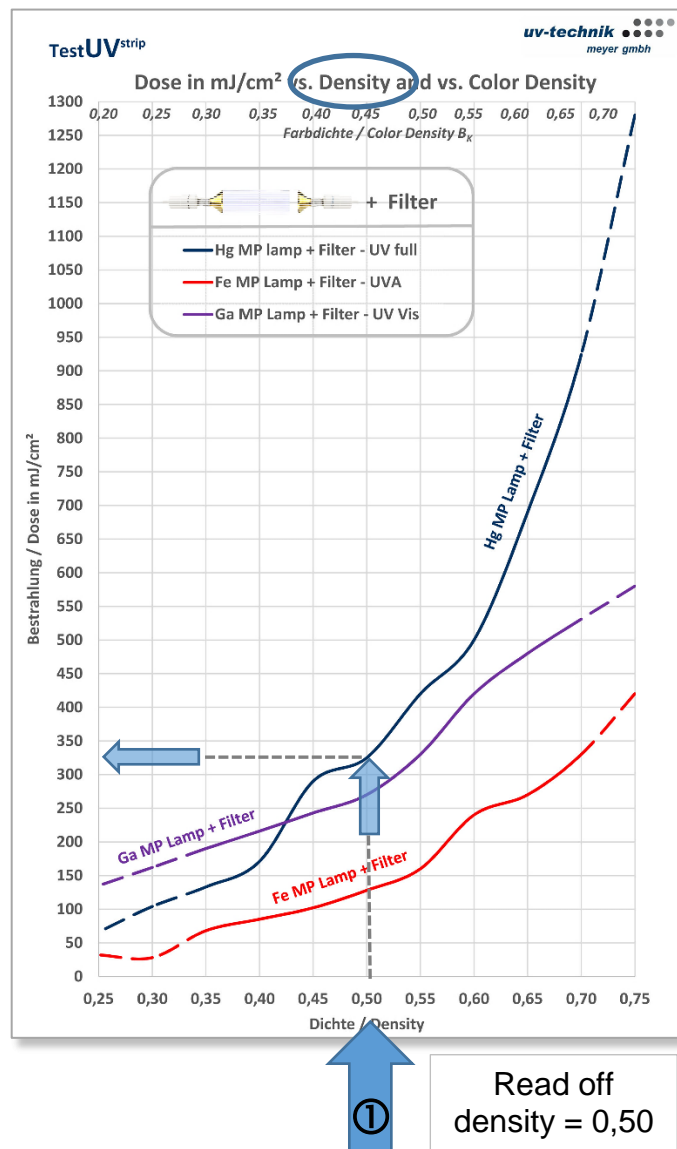


Fig. 8: Determining the UV irradiation (dose) via the density

Note:



Please note that especially with doped UV lamps (Fe, Ga) Due to aging, dirt or dust on uv lamps or with UV LEDs the variation in their emission wavelengths, the measured values can differ from values taken with uv radiometers or uv spectrometers. This happens particularly clearly when comparing measuring instruments from different manufacturers.

4.2 Evaluation by measuring the ink density with an ink density meter

As an alternative to visually determining the blue discoloration and the corresponding UV dose, a standard colour density meter can be used instead.

After irradiating the UV measuring strip, please remove the filter and determine the colour density of black CD_B (Colour Density Black; uncoloured drawing colour Key; B_K) with the colour density meter (densitometer).



Fig. 9: Measuring the CD_B value (B_K value, colour density black) with a densitometer

Note: The CD_B values (B_K) associated with the blue discolorations are also found on the REFERENCE CARD in addition to the density values:

Density	0,75	
	CD_B 0,78	
	0,70	
	CD_B 0,67	
	0,65	
	CD_B 0,63	
	0,60	
	CD_B 0,58	
	0,55	
	CD_B 0,52	
Colour density CD_B	0,50	
	CD_B 0,45	
	0,45	
	CD_B 0,39	
	0,40	
	CD_B 0,35	
	0,35	
	CD_B 0,29	
	0,30	
	CD_B 0,24	
	0,25	
	CD_B 0,19	

Fig. 10: Density and colour density on REFERENCE CARD

On the dose graph the color density is shown on the upper x-axis. The UV dose is determined here as follows:

Read the CD_B value (B_K value) from the densitometer. You will find it on the upper horizontal x-axis of the dose graphic (Color Density).

On the y-axis you can read the resulting UV irradiation (dose in mJ/cm^2):

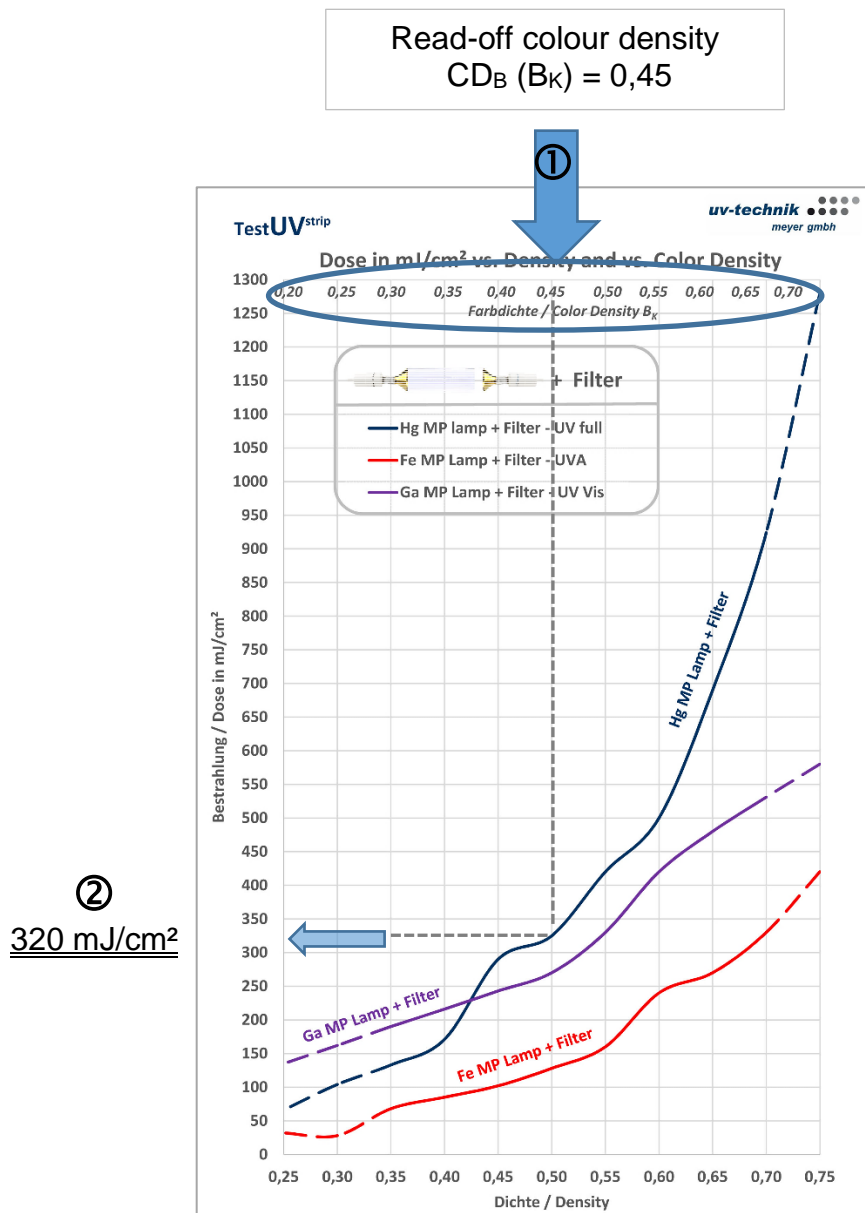


Fig. 11: Determination of the UV-irradiation (dose) by means of Measured the ink density $CD_B (B_K)$

5. Technical data

Test UV ^{strip}	
Art. No.	A009227 (1 PU = 10 pcs. uv measuring strips)
Spectral range	Full UV; max. sensitivity at 330 nm
Measurable irradiances (doses)	4 to 60 mJ/cm ² (without filter film) 60 to 900 mJ/cm ² (with filter film)
Size uv measuring strip	approx. 19 x 105 mm
Thicknesses	
UV measuring film	100 µm
Filter film	80 µm
Recommended storage temperature	2°C to 15 °C
Recommended storage time	max. 9 months from date of purchase



Note: At storage temperatures > 15 °C the following applies: Up to 23 °C the uv measuring strips can be used for up to two weeks without loss of quality; up to 30 °C max. three days; up to 40 °C up to two days.

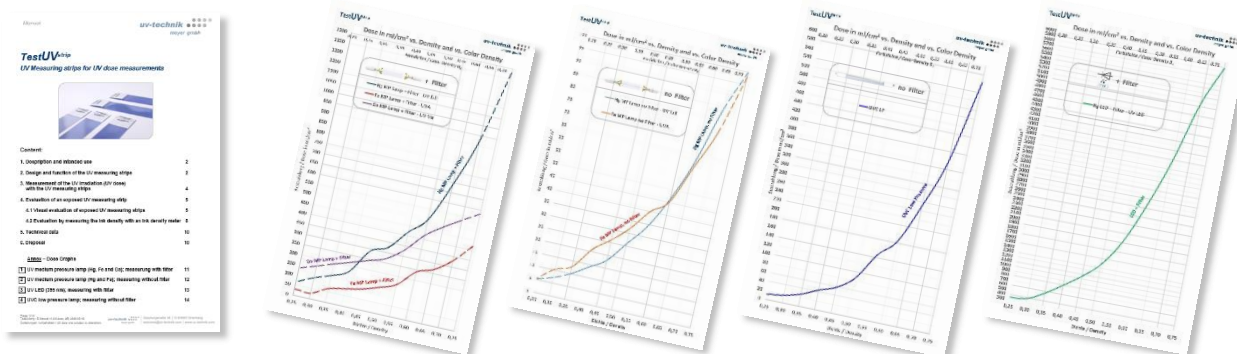
Please note that UV lamps with different fillings or doping quantities produce different emission spectra. Therefore, in comparison with physically working UV measuring instruments (radiometers, spectrometers) under the same measuring conditions, measurement deviations may occur.

6. Delivery

- Zip lock bag with 10 pcs. TestUV^{strip} UV measuring strips
- REFERENCE CARD



- Manual with four Dose graphs for UV medium pressure lamps (Hg, Fe, Ga), UV LED (395 nm) and UVC Low pressure lamps (CCure, uv-fresh®)



Attention:

Do not expose the UV measuring strips to strong heat.
If they become hotter than 80 °C they will start to deform thermally. Fire hazard exists if temperatures exceed 390 °C.



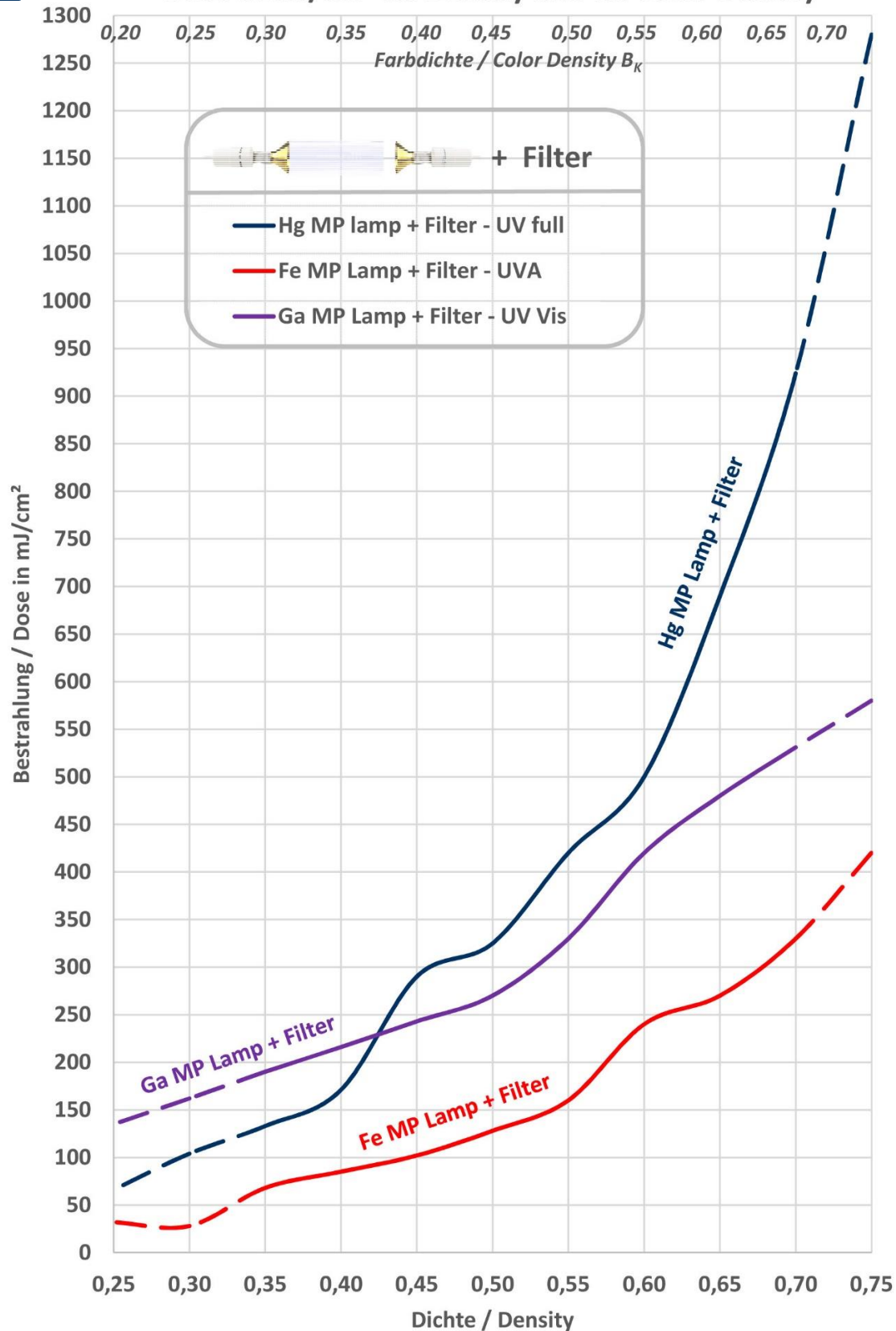
UV radiation is harmful to health. Protect your eyes and skin from the influence of direct UV radiation.



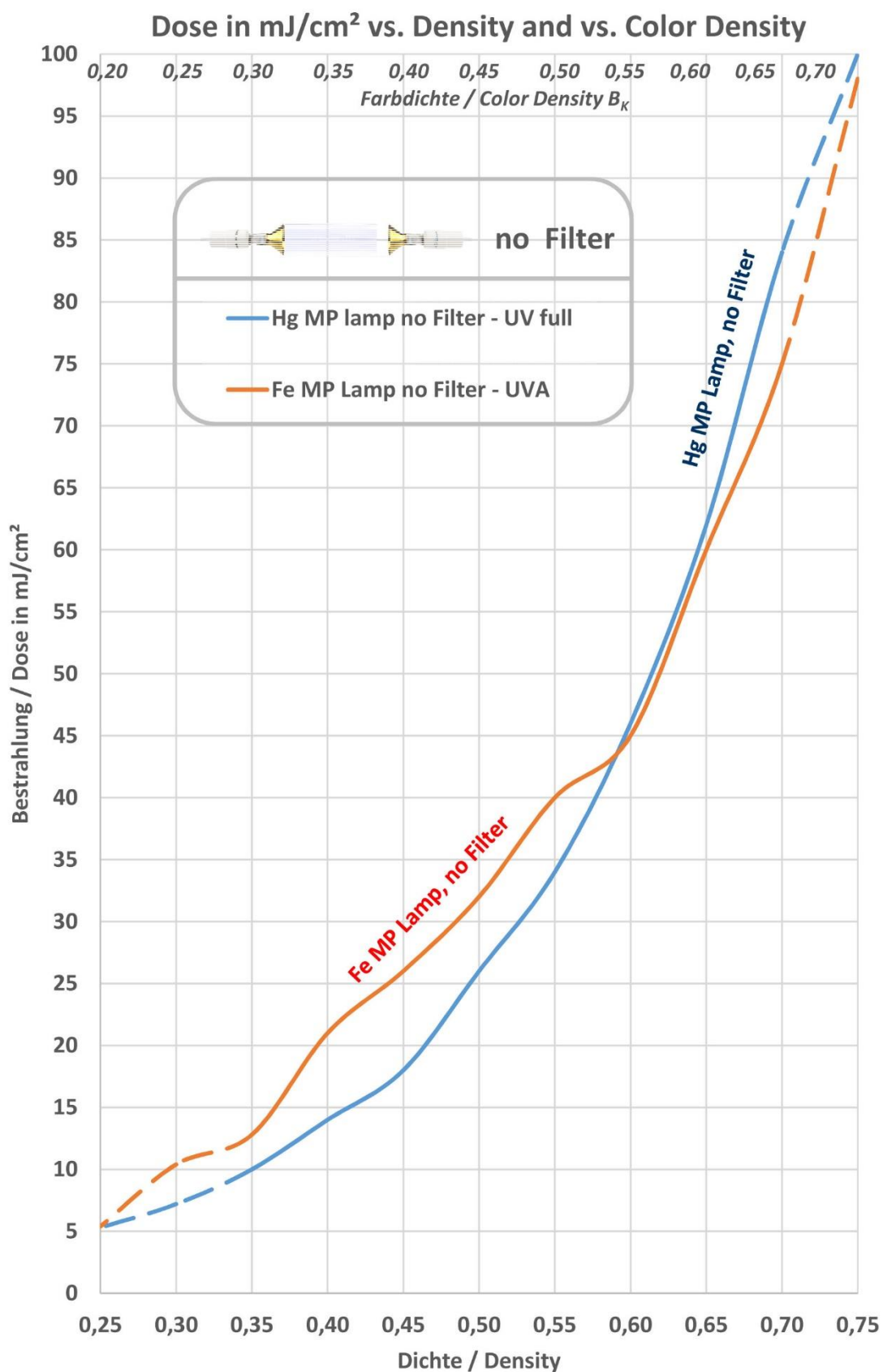
No liability is accepted for damage caused by UV measuring strips that fall off during the machine run.

7 Disposal

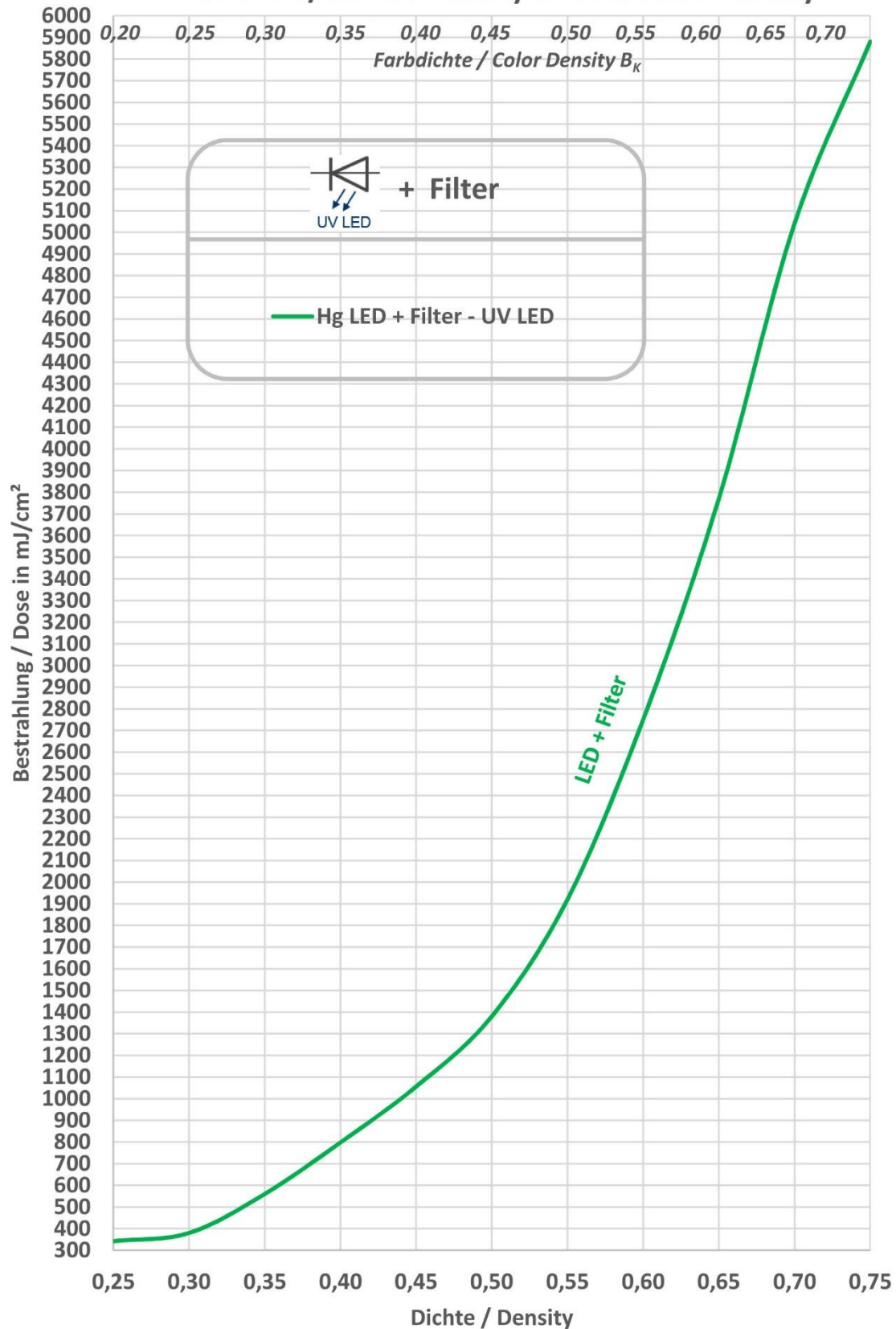
The uv measuring film and the filter film consist of PET/PEN and must be disposed of with the residual waste.

Annex**Dose Graphs****1****TestUV^{strip}**
uv-technik 
 meyer gmbh
Dose in mJ/cm² vs. Density and vs. Color Density

2

TestUV^{strip}
uv-technik 
 meyer gmbh


3

TestUV^{strip}Dose in mJ/cm² vs. Density and vs. Color Density

4

TestUV^{strip}