Longevity and lightfastness of SIHL MASTERCLASS media

The coatings on the SIHL MASTERCLASS products are all optimised for long-term indoor application, outdoor application is not recommended.

Various atmospheric conditions influence the longevity of materials and images – and this applies to both inkjet prints as well as chemically developed silver halide photos. It is therefore difficult to apply a general rule to the life-span of inkjet prints, with so many ink variations and their colour pigments playing a big role in the decay process. Bleaching of the print is one of the effects of this process, with the following environmental factors influencing how extreme it is:

- High humidity
- Ozone and other aggressive gases (“gas fading”)
- High temperatures
- Intensive light exposure (“light fading”)

High humidity

High humidity can dissolve the colour pigment and in extreme cases can lead to the bleeding of colours, a reduction in the resolution or a shift in colours. This is the reason that prints should never be hung or stored where the relative humidity is more than 70%.

Ozone / "gas fading"

Ozone is a very aggressive gas and causes a chemical reaction with sensitive, unprotected pigments, causing oxidation and leaving materials colourless. With inkjet prints this can lead to rapid distortion of the colours in images, the so-called “gas fading”.

The MASTERCLASS products offer the best possible stabilisation of colour pigments against these damaging influences. Nothing can stop waterbased colours oxidising from exposure to ozone gases. One can of course protect the print by mounting it behind glass, or with a laminate film or simply mounting it in a photo album.

Many different sources cause ozone to accumulate in the air: The use of copiers, laser printers, and fridges, or industrial pollution that is subject to strong sun rays in the summer months will all produce ozone gases.

High Temperatures

High temperatures accelerate the decomposition of prints and of the media itself. Therefore it is imperative that images / prints are not exhibited or stored in conditions of high temperatures.

Bleaching of colours / "Light Fading"

The fading of colours, through intensive lighting, strongly depends on where the image is on show. Pictures that are displayed near a south facing window will be more affected as intensive rays will shine on it for much longer periods of time.

Artificial and direct daylight spectrums have a different intensity of visual light and near UV-light. Depending on the proportion of these two light sources and the total intensity, the knock-on effect can have very different impacts.

To enable a better assessment of the impact of light different hanging conditions are specified in more detail below.

In a simplified model, assuming consistent conditions (temperatures, humidity, light source, and ozone influences) the fading /bleaching impact resulting from the light source is proportional to the illuminance multiplied by exposure time. Below you will find predicted illuminance levels for application under various conditions.

Typical lighting conditions

- **A** Indoor, indirect daylight with low intensity (further away from window), 200 Lux, 10 hours/ day
- **B** Indoor, indirect daylight with medium intensity (typical office conditions), 500 Lux, 10 hours / day
- **C** Indoor, indirect daylight with high intensity (near window), 2000 Lux, 10 hours / day
- **D** Direct daylight from south facing window 10000 Lux, 4 hours/ day

Based on a quick test, the prints were exposed to a high light intensity and estimated calculations of glass framed pictures were made in accordance with conditions A, B, C, and D. The findings are based on testing until a decrease in colour saturation or a noticeable colour shift was seen, both of which can impair the overall image impression.

The bleaching of colours due to light, the so-called "light fading", was checked using an Atlas Xenotest Alpha HE in accordance with the ASTM G26 Standard. This standard ensures that climate and lighting conditions are kept at a constant during the test. This apparatus uses a Xenon bulb, which is an advanced light source very similar to the light spectrum of the sun, especially in the near UV range 320 - 400 nm.

Since the influence of “gas fading” can be minimised by covering prints, this was not calculated during the test.

These sorts of tests can be directly correlated to the ‘real’ environmental conditions. Please request the complete test details from Sihl GmbH.

Extrapolated longevity of prints

In our tests the below named printers where used with their original inks. Please note that all calculations were made by extrapolation to the best of today's knowledge and belief.

Storage in extreme conditions and inappropriate use of media makes it impossible to estimate the life-span of a print.

Please refer to the following tables as guidelines in achieving the calculated longevity.

In addition to the fading of printed colours, under lighting influences, a change in the whiteness of the base paper is also perceptible. This is of course, depends on the decay of the applied optical brightener. However, these changes are not noted as a negative point and are neither comparable with nor better than that of 'normal' chemical photo papers. The yellowing (discolouring) of the base papers does not appear with the SIHL MASTERCLASS products (4848, 4852, 4853), as they contain no optical brighteners.

Remarks/ Comments:

During testing it was noted that the bleaching of the colours occurred mainly through reflected UV-light in closed rooms. Different results could be produced using fluorescent lights, due to their different spectrum and intensity variation. These conditions are valid for example with prints exhibited or hung in offices or museums, where they are more often than not light by artificial lighting source.

Our recommendations, can be found in the online 'instructions for use' pdf, are based on the above described conditions. If these recommendations are followed then SIHL MASTERCLASS media will have comparable or better image stability to that of traditional silver halide photo papers.

	A Indoor low intensity indirect daylight behind glass	B Indoor medium intensity indirect daylight behind glass	C Indoor high intensity indirect daylight behind glass	D Direct daylight from south facing window
Epson SP 9900 – Ultrachrome HDR - Inks	**Years**	**Years**	**Years**	**Months**
Metallic Pearl High Gloss Photo Paper 290 (4840)	94	47	23	18.8
High Gloss Photo Paper 330 (4841)	139	69	35	27.8
Lustre Photo Paper 300 (4844)	94	47	23	18.8
Lustre Photo Paper Duo 330 (4845)	102	51	26	20.5
Satin Baryta Paper 295 (4848)	83	42	21	16.7
Smooth Matt Cotton Paper 320 (4852)	102	51	26	20.5
Textured Matt Cotton Paper 320 (4853)	102	51	26	20.5

	A Indoor low intensity indirect daylight behind glass	B Indoor medium intensity indirect daylight behind glass	C Indoor high intensity indirect daylight behind glass	D Direct daylight from south facing window
Epson SP 9890 - Ultrachrome K3 Vivid Magenta- Inks	**Years**	**Years**	**Years**	**Months**
Metallic Pearl High Gloss Photo Paper 290 (4840)	80	40	20	16
High Gloss Photo Paper 330 (4841)	92	46	23	18.4
Lustre Photo Paper 300 (4844)	82	41	20	16.3
Lustre Photo Paper Duo 330 (4845)	78	39	20	15.6
Satin Baryta Paper 295 (4848)	71	36	18	14.2
Smooth Matt Cotton Paper 320 (4852)	80	40	20	16
Textured Matt Cotton Paper 320 (4853)	80	40	20	16

	A Indoor low intensity indirect daylight behind glass	B Indoor medium intensity indirect daylight behind glass	C Indoor high intensity indirect daylight behind glass	D Direct daylight from south facing window
Epson SP 3800 – Ultrachrome K3- Inks	**Years**	**Years**	**Years**	**Months**
Metallic Pearl High Gloss Photo Paper 290 (4840)	56	28	14	11.1
High Gloss Photo Paper 330 (4841)	67	34	17	13.4
Lustre Photo Paper 300 (4844)	63	31	16	12.5
Lustre Photo Paper Duo 330 (4845)	61	31	15	12.3
Satin Baryta Paper 295 (4848)	50	25	12	9.9
Smooth Matt Cotton Paper 320 (4852)	67	33	17	13.3
Textured Matt Cotton Paper 320 (4853)	67	33	17	13.3