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Subject: **BicarBlast Cleaning Laser V10**
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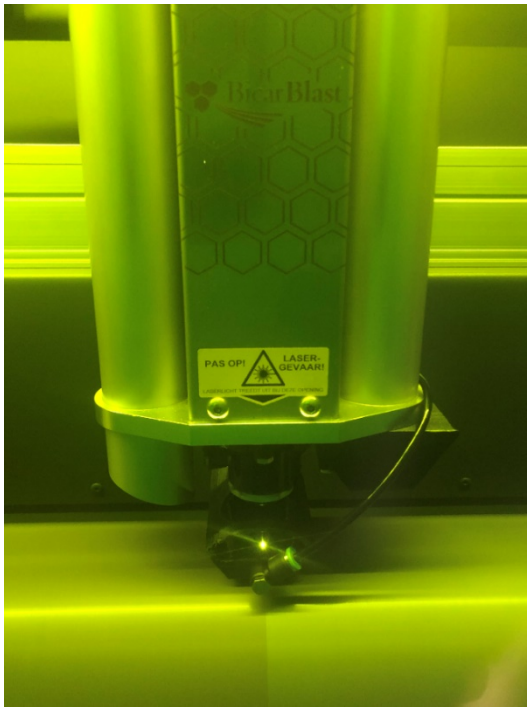
BicarBlast developed the AL1500 a laser for cleaning screen rolls (anilox rolls) and screen roll sleeves that is not damaging the surface of the screen roll.

Let's start with the wider view first.



The main function of a screen roll is to supply a consistent ink film.
Inconsistent ink supply results in a changing ink film thickness transferred.
This will affect the print process in two ways:

1. Changing the ink film thickness will change the colour printed. This is mostly compensated by changing the ink formula which is the dominating downtime factor in the print process (typically 30% of the total available machine time).
2. Changing the printed halftone dot size. To correct for this new print plates are needed. Which is very costly!

For the printer it is a must to always start printing with a clean screen roll. To avoid downtime.

There are many ways to clean a screen roll e.g. the use of industrial detergents or soda blasting (Also developed by BicarBlast).

The last few year's lasers are more and more used for cleaning screen rolls.

There are in general 2 groups of lasers:

1. A laser for collecting information e.g. reading the information on a CD or scanning a surface profile. These lasers have a very low power.
2. Lasers used for engraving and cutting. They have a relative high power. There are many different types of engraving lasers which will not be discussed.

There is a paradox in using a laser for cleaning the surface of a screen roll. The paradox is that the same laser type can be used for cleaning the screen roll as is used for engraving the surface of the screen roll with a pattern that holds the ink so it can be transferred from the ink tray or ink chamber to the printing plate.

Now you might understand that using an engraving laser for cleaning the engraving on the surface of the screen roll from ink residues that have been left in the engraving on the surface of the screen roll after printing might not be so logic as the laser could well re-engrave the screen roll too.

It is relatively easy to detect if a cleaning laser is too powerful. On most screen rolls the ends are not engraved over a distance of 10 to 15 mm. This is thus glossy polished ceramics. If a cleaning laser is too powerful than these ends get engraved by the cleaning laser and will not be glossy anymore.

A cleaning laser needs thus to be powerful enough to agitate and/or evaporate the ink residues in the engraving on the surface of the screen roll. At the same time it should never be so powerful that it is melting (engraving) and/or evaporating the ceramics on the surface of the screen roll.

This is not easy to do, as each laser has a focal point in which the power needs to be at the right level and at the same time the right focal laser spot diameter. Deviations will result in melting the ceramics or not applying enough power to remove ink residues.

The melting of ceramics on the screen roll surface should be avoided at all time.

The energy needed is relatively low to remove ink residues where a relative high energy level is needed to melt the ceramics. There is thus an operation windows that allows to use an engraving laser for cleaning not damaging the engraving.

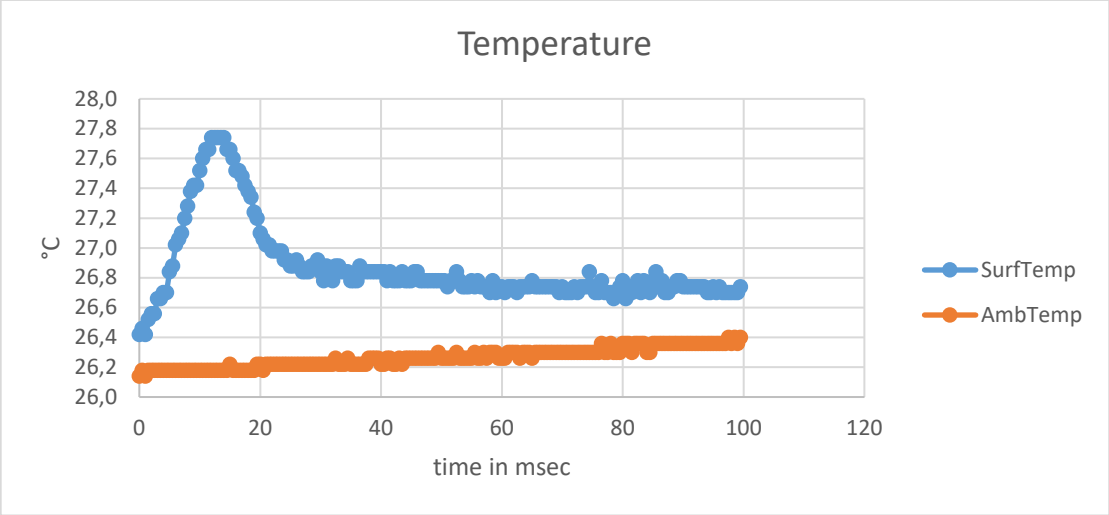
A test was conducted on the BicarBlast AL1500 cleaning laser unit.

The test principle was to measure the screen roll, in this case a sleeve, surface temperature, using a non-contact IR temperature sensor when the cleaning laser was passing the area where the sleeve surface temperature was measured. The screen roll sleeve was rotating at a speed of ≈4,000 RPM. Thus it is safe to assume that although the angle between the laser spot and the spot where temperature was measured is 90° the temperature measured still represents the actual sleeve surface temperature where the cleaning laser spot hits the surface.

The next image shows the setup:

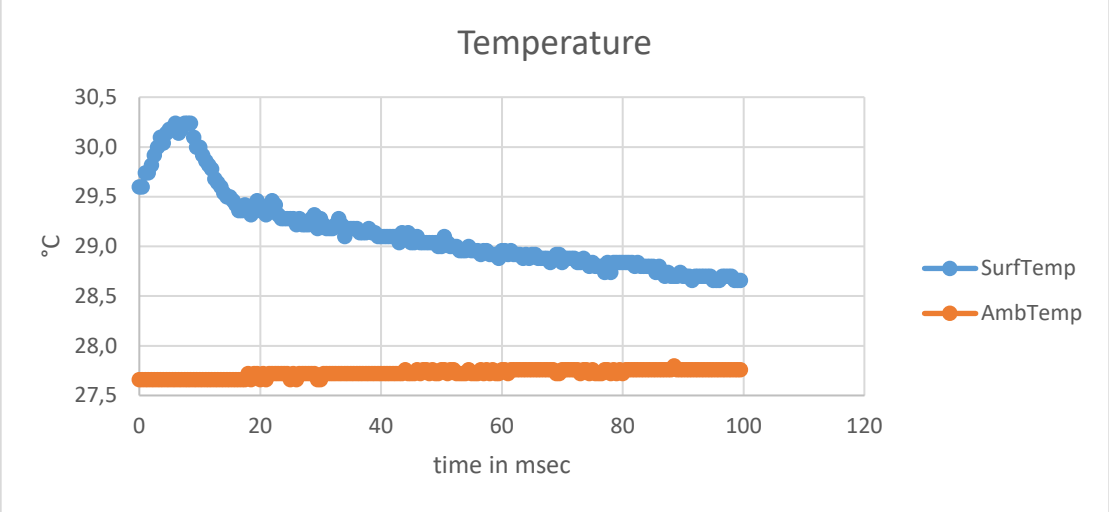
The black box in the centre holds the IR temperature sensor.

The following graph shows the sensor response when the cleaning lase is passing the spot where the IR temperature sensor measures the sleeve surface temperature. At the same time the surface temperature is measured also the ambient temperature is measured and recorded.



During the first pass the peak temperature was 27.8 °C on the surface.

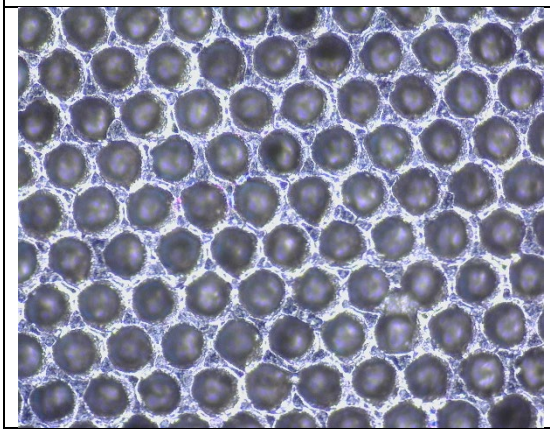
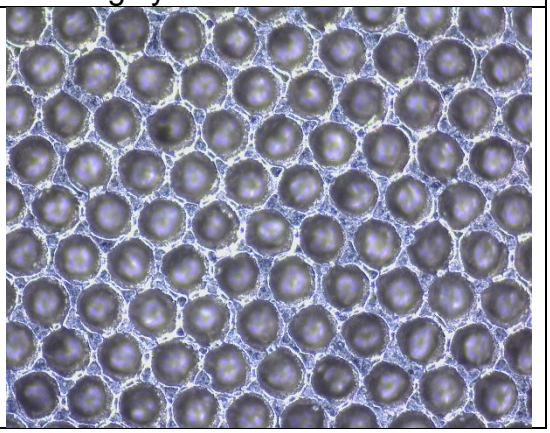
After several repeats the graph looked like this.



There is some increase in the ambient temperature and the maximum measured temperature on the surface is 30.3 °C.

The temperature changes on the surface are thus small while this cleaning laser was cleaning the ink from the surface. It means no stress in the ceramic surface layer but also no risk for melting the ceramic layer.

The following two images are of the screen roll surface.

Image of screen roll surface at start	Surface of the screen roll after 250 cleaning cycles
	

The images show that the BicarBlast AL1500 cleaning laser is not damaging the cell walls!

We can thus be sur that the BicarBlast AL1500 laser in combination with the used screen roll sleeve worked excellent. There was no risk for damaging the screen roll yet the screen roll was clean, no ink residue left in cells, after cleaning.

And yes… In this test we focused on the risk of damaging the screen roll surface. Naturally the cells are clean after 250 cleaning cycles. The customer ensured that screen rolls were also clean after applying the standard cleaning cycle consisting of multiple passes as the following two images confirm:

Before using the BicarBlast AL1500	After using the BicarBlast AL1500
	

The BicarBlast AL1500 reduced their screen roll cleaning cost from about 23 euro for conventional cleaning to 2 euro for applying the BicarBlast AL1500 cleaning laser per screen roll sleeve per cleaning cycle.

Good value for money!

Please contact if questions about this article

Kind Regards,

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Director