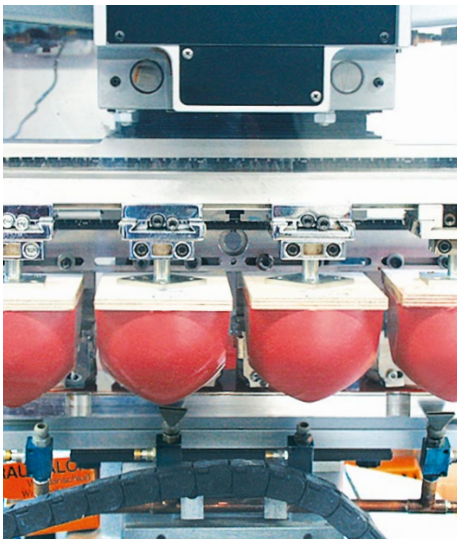
SunChemical®

Coates Screen Inks

Troubleshooting Guide for Pad Printing

- ✔ locate source of problem
- ✔ find reason of problem
- ✔ take corrective measures



The pad printing process offers almost unlimited application possibilities. Nearly all kinds of two- and three-dimensional substrates can be decorated with this printing process.

The main technical tools used in this process - the cliché and the silicone pad – allow printing of inks formulated with various combinations of resins, pigments and solvents. In addition manufacturers of pad printing machines offer a considerable choice of different and even individual printing equipment. The only disadvantage of this variety is that there is no real general standard. Process parameters have to be individually adjusted depending on local conditions.

If you encounter printing problems, insufficient print quality, insufficient adhesion etc. you will have to find the reason and cause of this problem. The most common problems, their possible causes and corrective measures are listed in the chart overleaf.

Some standard values about the most essential components of this process:

Repro / Film:

Positive reversed. Matt surface.
For a high quality reproduction of fine line motives we recommend a classic photo repro film with a resolution of 2.540 dpi and a density of > 4.00.
CtF (computer to film) is basically possible for simple applications if you have suitable hardware (printer, ink) and software (sufficient resolution).

Ink:

Generally not ready-to-print. Has to be adjusted to printing consistency by addition of 20 - 30% thinner (for our inks usually Additive A or U).

Cliché:

Polymer: depth of cliché approx. 30 µ for solvent-based inks and 16-18µ for UV-inks. Screening with 120 lines/cm, 86% coverage. Number of possible prints up to 20.000.
Thin steel: natural or coated finish, depth of cliché 24µ for single prints, 20µ for double prints. Number of possible prints up to 100.000.
Thick steel: depth of cliché 24µ for single prints, 20µ for double prints. Number of possible prints up to 1.000.000
Ceramic: Number of possible prints up to 3.000.000.

Pad:

Hardness: from 0 to 20 Shore A for flat prints
In exceptional cases > 20 Shore
For rotation prints > 40 Shore
The hardness results from a mixture of the silicone mass and silicone oil during manufacture.
Different treatments of the cast will produce smooth or rough surfaces.

Substrates:

Vast variety of substrates, partially pure materials, partially mixtures, partially coated.
Sometimes pre-treatment (flame/corona/plasma) is required (e.g. PP/PE materials).
Post-treatment may also be required (e.g. POM, flame treatment of ink).
Surfaces may also be contaminated (e.g. grease, oil) and need to be cleaned (de-greased).
In all cases pre-tests to determine suitability of printing inks are essential.

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	INK	CLICHÉ	PAD	SUBSTRATE	OTHER
PROBLEM – PAD DOES NOT PICK UP INK / OR ONLY PARTIALLY					
Possible Causes	› insufficient thinning, ink is too thick › dried up in the cliché › wrong thinner (evaporation too fast)	› not deep enough › surface of the cliché is damaged › wear and tear	› too flat › surface damaged › wear and tear		› speed of pad stroke too fast
Possible Solutions	● re-thin ● clean cliché ● use the recommended type of thinner (slower evaporation)	● use deeper cliché ● make new cliché	● use sharper pad ● use new pad		● adjust pad stroke to lower speed
PROBLEM – PAD DOES NOT RELEASE INK / OR ONLY PARTIALLY					
Possible Causes	› dried to the pad › pad too wet, ink does not sufficiently stick	› not deep enough › image too deep	› too flat › surface damaged › wear and tear	› surface contaminated with grease, hand-sweat, oil, separating agents	› process speed too slow › high ambient temperature
Possible Solutions	● use slower thinner ● use faster thinner	● use deeper cliché ● use more flat cliché	● use sharper pad ● use new pad	● clean surface, e.g. with alcohol	● adjust process to faster speed ● controlled room temperature of 18-22° C
PROBLEM – INSUFFICIENT ADHESION OF INK ON SUBSTRATE					
Possible Causes	› wrong ink system › wrong type of hardener, or insufficient hardener addition › no hardener added › hardener reaction time/hardener reaction temperature insufficient		› leakage of silicone oil	› surface contaminated, ineffective pre-treatment › ineffective post-treatment	› insufficient information about substrate
Possible Solutions	● use suitable ink system ● addition of hardener according to product data sheet ● sufficient drying time and temperature		● clean with solvents	● clean surface, e.g. with alcohol ● effective pre-treatment of surface ● effective post-treatment of surface	● obtain information about substrate ● carry out adhesion tests prior to printing
PROBLEM – FULL IMAGES ARE NOT PRINTED EVENLY					
Possible Causes	› too thin › colour is too transparent	› not deep enough › large motive not inclined (open system)	› too flat › too soft › surface too rough	› surface has too much structure › surface contaminated	› doctor blade pulls ink out of image (open system) › high ambient temperatures
Possible Solutions	● adjust ink to thicker consistency ● formulate more opaque colour	● use deeper cliché ● incline motive (open system)	● use sharper pad ● use new pad	● use sharp, hard pad ● blow air towards pad during ink transfer ● clean surface, e.g. with alcohol	● use stronger doctor blade ● screen motive and incline lines and areas
	INK	CLICHÉ	PAD	SUBSTRATE	OTHER

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PROBLEM – PRINTED COLOUR DOES NOT MATCH REPRO COPY					
Possible Causes	› too thin › colour too transparent › wrong formulation (if special colour) › changed substrate colour	› varying depth › wrong cliché material › wrong screening width	› wrong form › surface too rough	› changing substrate colours › repro copy was formulated on substrate with a different colour	› repro copy made for double or single print?
Possible Solutions	● adjust colour ● formulate a more opaque colour ● formulate colour on changed sub-strate colour	● measure depth ● use correct type of cliché material ● use correct screening width	● use correct form ● insert new pad with smooth surface	● formulate colour on correct substrate colour ● preprint white	● check colour with double or single print
PROBLEM – INK SPLASHES ON SUBSTRATE					
Possible Causes	› too thick › ink residues on pad	› too deep	› too flat › surface too rough	› static charge on surface	› low humidity › printing speed too high
Possible Solutions	● adjust ink to thinner consistency, re-thin ● adjust ink with more suitable thinner	● measure depth ● use flatter/or deeper cliché	● use sharper pad ● insert new pad with smooth surface	● discharge surface (ionize)	● check humidity if necessary increase (60-80%) ● slow down printing speed
PROBLEM – DISTORTION IN THE PRINTED IMAGE					
Possible Causes			› wrong form › wrong hardness › pressure too high › pressure on cliché and substrate are not the same › wrong touch-down of pad	› too soft › not distortion-free › deep spots for pad › interfering edges prevent pad deformation	› unsuitable substrate holder › print area is not in a horizontal position to cliché
Possible Solutions			● use correct form ● use correct hardness, less pressure ● use same pressure on cliché and substrate ● use other touch-down point	● other material ● pad assembly ● special pad (special shape)	● stable, firm substrate holder ● adjust substrate to a horizontal position to the cliché
PROBLEM – INSUFFICIENT OPACITY OF INK					
Possible Causes	› too thin › colour too transparent › ink transfer insufficient	› too flat › not screened › motive not inclined › wrong screening width	› too flat › too soft › rough surface	› surface contaminated › dark substrate colour › tension cracks of injection moulded materials	› doctor blade pulls ink out of image (open system)
Possible Solutions	● re-adjust colour ● formulate a more opaque colour ● check cliché and pad	● insert deeper cliché ● screen motive ● incline motive ● use coarser screening width	● use sharper pad ● use correct hardness ● insert new pad	● clean surface ● apply double prints ● use mild ink system (e.g. TP 249) with mild thinner (e.g. VD 10)	● use stronger doctor blade ● screen motive and incline areas and lines
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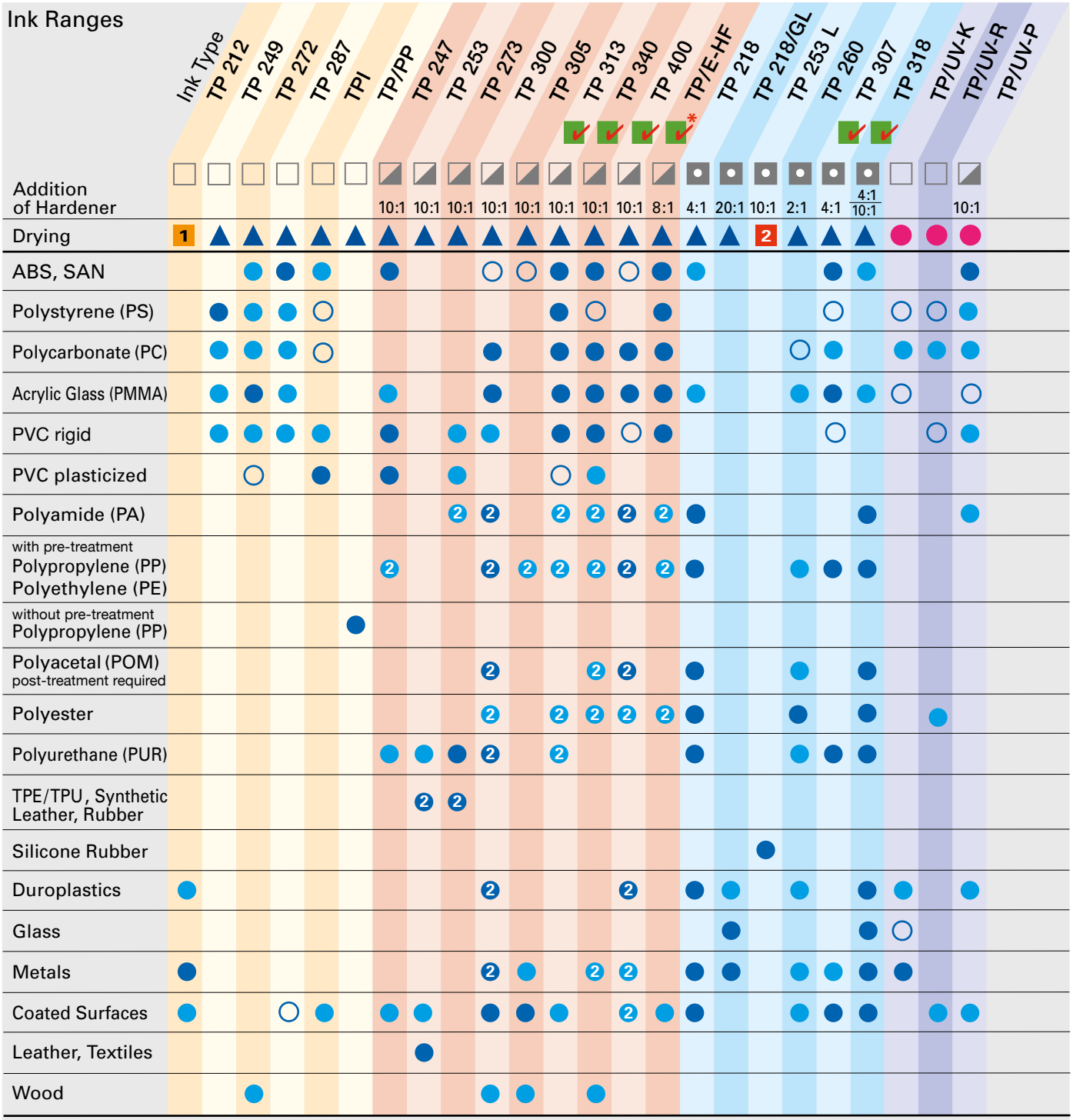

- = preferred for the application
- 2 = processing with hardener required
- = suitable for the application
- 2 = processing with hardener required
- = potentially suitable

The information given above is no guarantee for the suitability of pad printing inks for individual substrates.
The intention of this chart is to help printers choose suitable pad printing inks. Pre-tests are always essential.
This information is based on our present experiences 12/2018

- = **Does not contain:** aromatics, cyclohexanone, butyl glycolate, PAH, Solvent Naphtha
- = In addition: **free of halogens** according to DIN EN 61249-2-21
- = 1 - component ink
- = processing as 1 - and 2 - component ink
- = 2 - component ink
- = air-drying
- 1 = oven - curing at 140°C / 20 Min
- 2 = oven - curing at 160°C / 20 Min
- = UV - curing

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