

Dryer Technology: UV-Curing vs. Heatset

Parameters and calculation for Hybrid (Coldset-Heatset) Printing

Focus on Newspaper and Semi-Commercial production



Study supported by the following press manufacturers

KBA, www.kba-print.de, Mr. Marc Decker
 manroland, www.manroland.com, Mr. Axel Russ
 WIFAG, www.wifag.ch, Mr. Ernst Lehmann

Roland Thees, January 2011

	Heatset	UV - Curing
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Dryer Manufacturer		
	Goss Contiweb, www.gossinternational.com, Mr. Rob Bosman	Eltex, www.eltex.com, Mr. Thomas Litterst, Mr. Jens Froehlich
	Megtec, www.megtec.com, Mr. D. Aldinger	GEW, www.gewuv.com, Mr. Dave Lyus
	Vits, www.vits.com, Mr. Gerhard Hülswitt	IST, www.ist-uv.com, Mr. Arnd Riekenbrauck
		PRIME Systems, www.primeuv.com Mr. Erich Midlik

	Heatset	UV - Curing
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System	Hot Air	UV-radiation
		UV-radiation + Nitrogene

	Heatset	UV - Curing
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Ink-Suppliers:		
	Flint Ink, www.flintgrp.com	Arets, www.aret.com
	Sun Chemical, www.sunchemical.com	Flint Ink, www.flintgrp.com
	wide range of local and worldwide ink suppliers	Sun Chemical, www.sunchemical.com

Why to go for a hybrid press?

- Higher press operating grade, keep the presses productive not only with newspapers
- Added value for printed products, semi-commercial printing
- Printing commercial jobs, e.g. inserts, flyer, publications
- Glossy pages in the newspaper for better reader attraction and upscaled advertisement
- > the business model is fully depending on a marketing concept and saleability of products

	Heatset	UV - Curing
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How to go to a hybrid press

Upgrading an existing machine with a dryer	typically a unwieldy problem because of space requirements	Blanket-to-blanket is easy, satellite requires a specific check whether enough space is available.
Additional tower with dryer	additional space required	inside press
New press which includes everything	building required	inside press

	Heatset	UV - Curing
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General technical Aspects

Tower and changeability to coldset	compatible, short term change to coldset possible.	Dedicated tower recommended because of time consuming change to coldset.
Dryer, required space	In total 10 to 12 m required (1m per press-speed), + extra space for operator.	appr. 1,5 m in the press

Afterburner	can be integrated to minimize natural gas consumption and to avoid effective VOC's	-
Ink	compatible with coldset	dedicated
Ink distribution	compatible with coldset	separate, dedicated
Inking system	compatible with coldset	separate, dedicated
Ink mileage, copies per kg ink:	standard	appr. + 10 to 15 % higher mileage
Inking Rollers	standard	chilled, ideal temperature 28°
Chill water	Chill stand	Chill water for UV-Lamps
Electrical power	Circulation fan	for UV-Lamps
Air condition	appr. + 15%	no additional AC required
Blanket	compatible with coldset	Blanket lifetime reduced (up to 50%)
Plates	compatible with coldset	Plate lifetime reduced (up to 50%), plate burning recommended
Color sequence	as usual	KCMY recommended (because Black absorbs most of the light-energy)
Switch to Coldset	easy, appr. 0,45 manhours	problematic, appr. 6 man hours, compulsion to wash up tower
Day light in pressroom	not a problem	Ink fountain protection against direct UV-light recommended.
Environmental aspects	Ink-waste needs extra treatment. Pollution of VOC's (volatile organic compounds), CO ₂ (Carbon dioxide) and appr. 3 kg NO _x (Nitrogen oxide) per kg Ink because of 40% solvent.	Ink-waste and cleaning material is skin irritating and needs extra treatment. Avoid skin contact (gloves required).
Recycling, deinking of paper	Standardprocess	Deinking depends: on standard newsprint ink fragments remain on the paper, Coated Paper is easier to deink. National conditions to be verified, see www.paperrecovery.org

***** Heatset ***** UV - Curing *****

General product aspects

Daily operation	knowledge required	easy
Shrinking of paper	Yes. Mixed Coldset-Heatset productions require oversized heatset paper because of shrinking	No shrinking because of low temperature
Paper	tendency to get wavy	stays flat
Ink-water balance	normal	harder to find
Waste	+ 4 %	no additional waste

***** Heatset ***** UV - Curing *****

Energy-Consumption		
Power	Natural Gas (1 m ³ Gas equals appr. 10 KWh Electricity) plus electricity for Fans	Electricity
Consumption during production:	appr. 140 KWh; can be much lower in case of burning ink solvent, depending on brand.	appr. 130 KWh up to 200 KWh
Consumption during press run up to speed.	Extremely demanding consumption because of missing ink solvent, up to 1000 KWh -> expect higher costs in case of many startups	no extra consumption
Consumtion during press downtime	between no consumption and 30%, depending on brand	reduced power consumption, shutters close radiator notch.

Investment calculation:

Heatset vs UV:

Calculation based on _____

	***** Heatset *****	***** UV - Curing *****
Dryer-Unit		
Installation		
Building, Substructure		
Chill stand		
Chill water system		
Silicone Applicator		
Web turn unit:		
Exhaust system or stand alone afterburner if required		
Separate Ink-distribution system		
Separate Inking system		
Nitrogen Tank (appr. 50.000 litres) and delivery - optional -		
NN		
	0,00	0,00

	***** Heatset *****	***** UV - Curing *****
Maintenance hours per year:		
Lifetime UV-Bulbs:		appr. 1500 - 2500 h
=> appr. time for changing UV-Bulbs:		4,0
Cleaning UV		52,0
Cleaning Chill rollers	52,0	
Cleaning Water applicator	52,0	
Cleaning Silicone applicator	52,0	
Cleaning Web turn unit with air, 90°	52,0	
Cleaning Afterburner, Exhaust system	156,0	
hours per year:	364,0	56,0

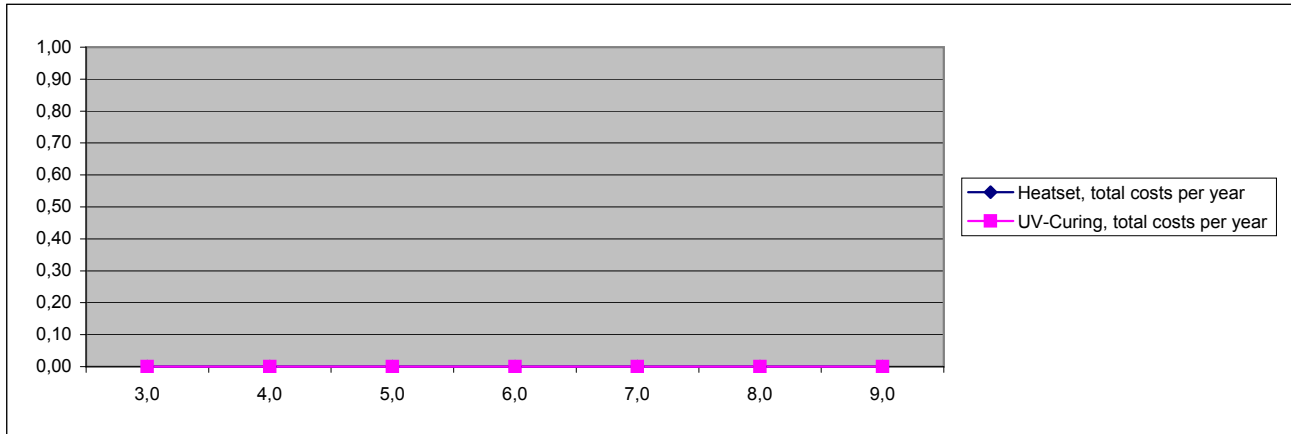
	***** Heatset *****	***** UV - Curing *****
Ink-costs per KG		
	.. costs per kg costs per kg ..
Black Ink-costs per KG, appr.		
Coloured Ink-costs per KG, appr.		
Consumables (average costs)		
	.. costs per hour costs per hour ..
Silicone / Additives costs per hour		
Natural gas costs per hour		
Electricity costs per hour		
Nitrogene cost per hour - optional:		
	0,00	0,00

Cost comparison parameters	***** Heatset *****	***** UV - Curing *****
Operating hours per day:	9	9
Operating days in a year:	360	360
= Operating hours per year	3.240	3.240
Rate of interest per year (capital costs)	5,0	5,0
Capital depreciation period per year	6,0	6,0
Black Ink usage per year in kg		0,0
Coloured Ink usage per year in kg (under consideration of higher ink mileage of UV)		0,0
Average labour costs per hour:		0,00

Estimation. Consumables per year:		
	***** Heatset *****	***** UV - Curing *****
Costs for black ink per year	0,00	0,00
Costs for coloured ink per year	0,00	0,00
Costs for additives like silicone per year	0,00	0,00
Costs for natural gas	0,00	0,00
Costs for electricity	0,00	0,00
Costs for nitrogene	0,00	0,00
	0,00	0,00

Cost comparison		
	***** Heatset *****	***** UV - Curing *****
Investment-costs in total:	0,00	0,00
Maintenance per year:	0,00	0,00
Depreciation costs per year	0,00	0,00
Average capital costs per year (50% of Investment / Capital Costs)	0,00	0,00
Ink per hour:	0,00	0,00
Consumables + additives per hour:	0,00	0,00
Variable costs in total per hour:	0,00	0,00
Total costs per year: Maintenance + Depreciation + Capital costs + (variable costs per hour * operating hours)	0,00	0,00
Total costs per hour during depreciation period:	0,00	0,00

Alternative calculation			
	***** Heatset *****	***** UV - Curing *****	
Operating hours per year: 3.240			
Depreciation period in years	Heatset, total costs per year	UV-Curing, total costs per year	
3,0	0,00	0,00	
4,0	0,00	0,00	
5,0	0,00	0,00	
6,0	0,00	0,00	
7,0	0,00	0,00	
8,0	0,00	0,00	
9,0	0,00	0,00	



Depreciation period in years: 6,0

Operating hours per year	Heatset, total costs per year	UV-Curing, total costs per year
2.460,0	0,00	0,00
2.720,0	0,00	0,00
2.980,0	0,00	0,00
3.240,0	0,00	0,00
3.500,0	0,00	0,00
3.760,0	0,00	0,00
4.000,0	0,00	0,00

