

Printers Blankets example to the printing industry

As used in the offset printing industry a printers blanket does transfer information from a plate to a substrate assisted by pressure. But the printing industry evolution has forced the addition of detailed consideration of a multitude of complex variables such as viscosity, surface tension, wetting, drying or curing, solvent affinity, abrasion and chemical resistance or reaction cross linking degree.

Most motor tyre manufacturing groups mastering considerable technology have had experiences in the manufacture of printers blankets which production has been frequently included in their specialties department.

With distinct directional properties in their composite textile and rubber multilayer structure printers blankets make extensive use of mechanical and chemical technologies in its design.

These technologies have been better served with the modern tools available after the invention of the transistor and subsequent integrated circuits (contaminants, voids and wetting) and the arrival of the aerospace industry (matrix to reinforcement stress transfer and temperature performance).



Carcass cloth surface showing excess rubber 'spots' from the first to the second ply gluing film.

In recognition of the unique printers blankets' characteristics and task a few factories have existed exclusively devoted to its manufacture with highly technological projects. But for one reason or another they were not to survive alone.



A typical compressive blanket with four plies. Please note the voids free structure and almost vitreous look reinforcement.

A common practice with a number of printers' blanket manufacturers has been to dispose of "second grade" blankets at discount price, in not very demanding markets and customers.

But in the actual global village reality, and as a result of a blossoming number of irreverent commercial practices, "second grade" blanket's trade is becoming increasingly profitable.

Besides Internet advertisements from the Asian poppy area with buying offers for any blanket's rubbish, bargain blanket rolls lists are currently available for trade in Europe at up to 70% off the regular price list.

However printers are hardly "enjoying" from such bargains, which are finally sold with still attractive looking 20 or 30% discounts.

Production costs control, industrial hygiene and ecological concerns have added new challenges to the industry, printers blankets production being not an exception.

Some new raw materials, attractively offered as "green" low cost options have in fact lower performance than their ancestors.

Blanket producers not resisting that temptation may get temporary added sales but in the long term technically minded competitors should get printers preference.

Roughly with a world annual output of 20 thousand tons only, printers blankets have been driven to a poor relative' status of the powerful motor tyre industry, probably explaining the cyclic turbulence printers blankets factories have lived for more than a century.

And regardless of offset industry evolution, production of printers blankets will become smaller as more expensive, longer lasting and more consistently produced new models

will replace ageing blanket concepts.

The laboratory is ~~being~~ fun

Maybe except for the old DIN 16621 standard, the printer's blankets had not undergone a sustained standardisation effort until around two decades ago ISO Technical Committee TC130 undertook the task of converging a printer's blankets standard. ISO 12636 standard was issued in 1998 including definitions, evaluation parameters and a limited number of minimum performance values of printers blankets.

But the use of this powerful tool enabling to relate blankets performance to the respective parameter values has not been spreading quickly.

Some printer's blankets commercial leaflets do include parameter sets of values said to conform with ISO 12636 standard. However different test routines are often used.

And in many instances its presentation is not even consistent over the full blankets range of the same factory making it flatly impossible for the printer to compare products from different sources.

Printers' blankets are widely considered as consumables. However they should be more accurately described as crucial printing equipment components. In fact its selection does condition overall press performance and printing profitability.

It is common printing experience to have blankets replaced after less than 100 thousand prints up to far more than 10 million copies: A staggering printer's blankets life variation of up ~1,000fold.

Furthermore offset printing business should keep in mind that printers' blankets account for approximately 0,1% of printing costs but for ~30% or more of overall printing efficiency.

Blankets still exist on the market based on manufacturing procedures and concepts not easy to reproduce industrially.

Thus blankets obtained from different jobs do often present noticeable printing performance variations which fact in itself is an explanation of why just a few factories have popular web blanket models included in their manufacturing ranges.

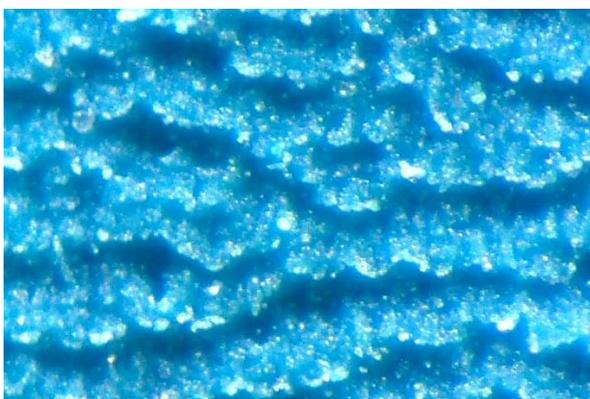
Regardless of how deeply blankets' characteristics variation may affect a particular printed document, every time adjustment is required to the job's make-ready routine,

overall printing operation costs will be increased.

Similar reasoning would apply to blankets chemical resistance and its resulting useful life.

Wear characteristics of printers blankets follow exponential patterns and a major trick to avoid an unacceptably large performance variation depends on its adequate and very careful surface rubber compound choice and on the respective vulcanisation operation.

During vulcanisation liquid rubber compound would ideally convert into an elastomer with 100% solids. Such a perfect reaction does not exist, some uncured rubber residues being left after vulcanisation.



Blankets surface relief showing almost translucent and very delicate rubber crests. Whitish grinding residue spots still remain on crest tops. Interactive film clips would also present a very soft and elastic rubber surface and illustrate the difficulty of removing any uncured residue.

Vulcanisation is a reaction usually assisted by a catalyst – an element whose presence is essential for the reaction to happen but that is not consumed during the reaction – finally becoming an impurity in the final elastomer.

The better the catalyst dispersion in the liquid rubber compound the lower amount of uncured rubber will remain and the lesser importance the catalyst impurity will have after vulcanisation.

During printing, catalyst crystals being not a part of the elastomer will tend to get loose and to detach from the blanket rubber surface, leaving holes which amount and size may



A blanket surface rubber with a catalyst crystal incrustation with $260 \times 40 \mu\text{m}$ after being easily removed from the elastomer surface and the respective hole.

account for the well-known ghost from previous plate images.

In a similar way extremely tacky uncured rubber residues are likely to become loosely linked to the cured elastomer. Depending on the rubber residue amount its presence will dramatically impair blanket paper-release and cleaning properties before each particle gets detached adding another hole to the elastomer surface.

And the beauty of printers blankets production is that laboratory analysis of even small blanket samples will reasonably portray the respective batch behaviour in the press.

Biographic Note:

The author, Duarte Miranda, graduated from IST, Lisbon, as electrical engineer in 1964.

With more than 30 years composite materials experience, in 1985 he became technical director of a Dunlop blanket's factory. Since then his professional life has been linked to printers blankets.