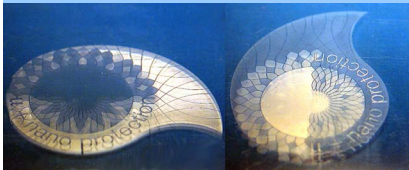
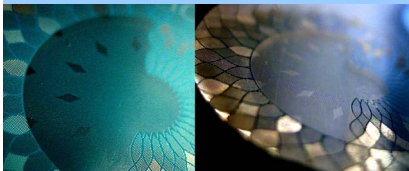




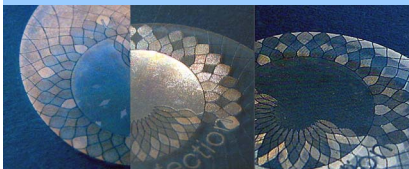
Optically variable features illustrated below realized using a stamping die (above) on 0.5 mm thick transparent OPP substrate



Contrast switch effect



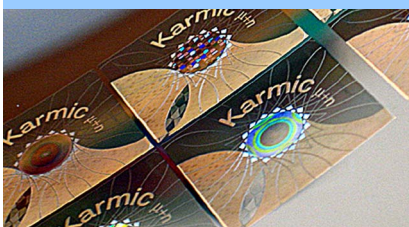
Transient image effect



Dancing tile effect



Light catching effect



Security : A recombined Lithoguard / DOVID on shim (DOVID by 3D AG)

Lithoguard Optically Variable features

a. Brand protection

For ornamental and brand protection applications Karmic proposes several distinctive and easily recognizable *Lithoguard* optically variable features which may be combined:

Contrast Switch (CS): A clearly defined contrast flip between two image zones upon tilting and/or rotation of the marking. This effect provides clear authentication especially on transparent packaging substrates.

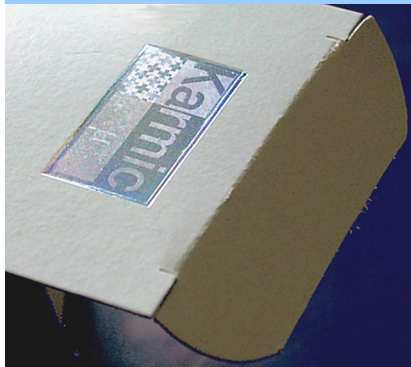
Transient Image (LAT): A more subtle contrast flipping effect between TI zones and image background upon tilt of the marking away from the observer. This effect is an eye-pleasing complement to the CS effect described above.

Dancing Tile (DT): A dynamic effect whereby a tiled portion of the image flips between three distinct positions giving the impression that the tiled motif “dances” about. This effect brings a marking to life and communicates the vitality of your brand image.

Light Catching (LC): Light is reflected back to the observer by our markings at a different tilt angle than un-marked portions of the substrate. This effect is present on all *Lithoguard* markings thanks to our precise relief structure.

b. Security

For higher security requirements, Karmic proposes discrete iridescence zones, ROVID/DOVID recombination with our partner **3D AG** and other special *Lithoguard* security features. For further information, we invite you to contact us.



Sheet-fed : Above, by stamping with diffractive foil on carton ("Laser" foil by Kurz)



Web-fed : Here, by roll-embossing on PC "Makrofol" film. (roll-embossing by 3D AG)



Direct to-object : Here, by injection blow-moulding on OPP (object by ADOP, France)

Lithoguard applications

Lithoguard can be applied on a wide variety of web and sheet fed materials as well as **directly** onto moulded objects. The table below gives an overview of current application possibilities.

	Parameters			Rendering					
	Lithoguard Tool type	Application temperature (°C)	Max resolution (dpi)	Diffractive hot-foil	CS effect	DT effect	LC effect	LAT effect	DOVID recombination
Application materials	Rigid & semi-rigid plastic sheets – OPP, PVC, ABS, PET	D	70 – 175	1200+		●	●	●	●
	Flexible plastic sheets – BOPP, PC	D	90 – 175	1200+		●	●	●	●
	Plain cartonboard	D	70 – 100	300	○	●	●	●	
	Varnished cartonboard	D	COLD	600		○	○	○	○
	Paper sheets	D	70 – 100	300	○	●	●	●	
	Plastic film – BOPP, PC	R	90 – 175	1200+		●	●	●	●
	Embossable foil PE	R	90 – 120	2400+		●	●	●	●
	Self-adhesive labels	R	90 – 120	2400+		●	●	●	●
	Injection-moulded plastic	I	PROC	1200+		●	●	●	●

Table Legend

- **Sheet-fed** substrate materials
- **Web-fed** substrate materials
- **Direct to-object** applications
- D Stamping die
- R Roll-embossing shim
- I Mould insert
- PROC Normal process temperature
- Rendering quality dependent on substrate / pre-press characteristics
- High rendering quality under all conditions

Only materials tested so far are listed here, please contact us with inquiries on the applicability of *Lithoguard* to other materials.