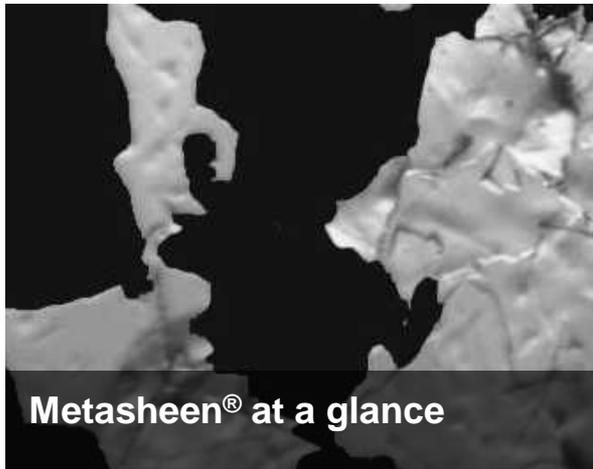


Achieving premium product appeal

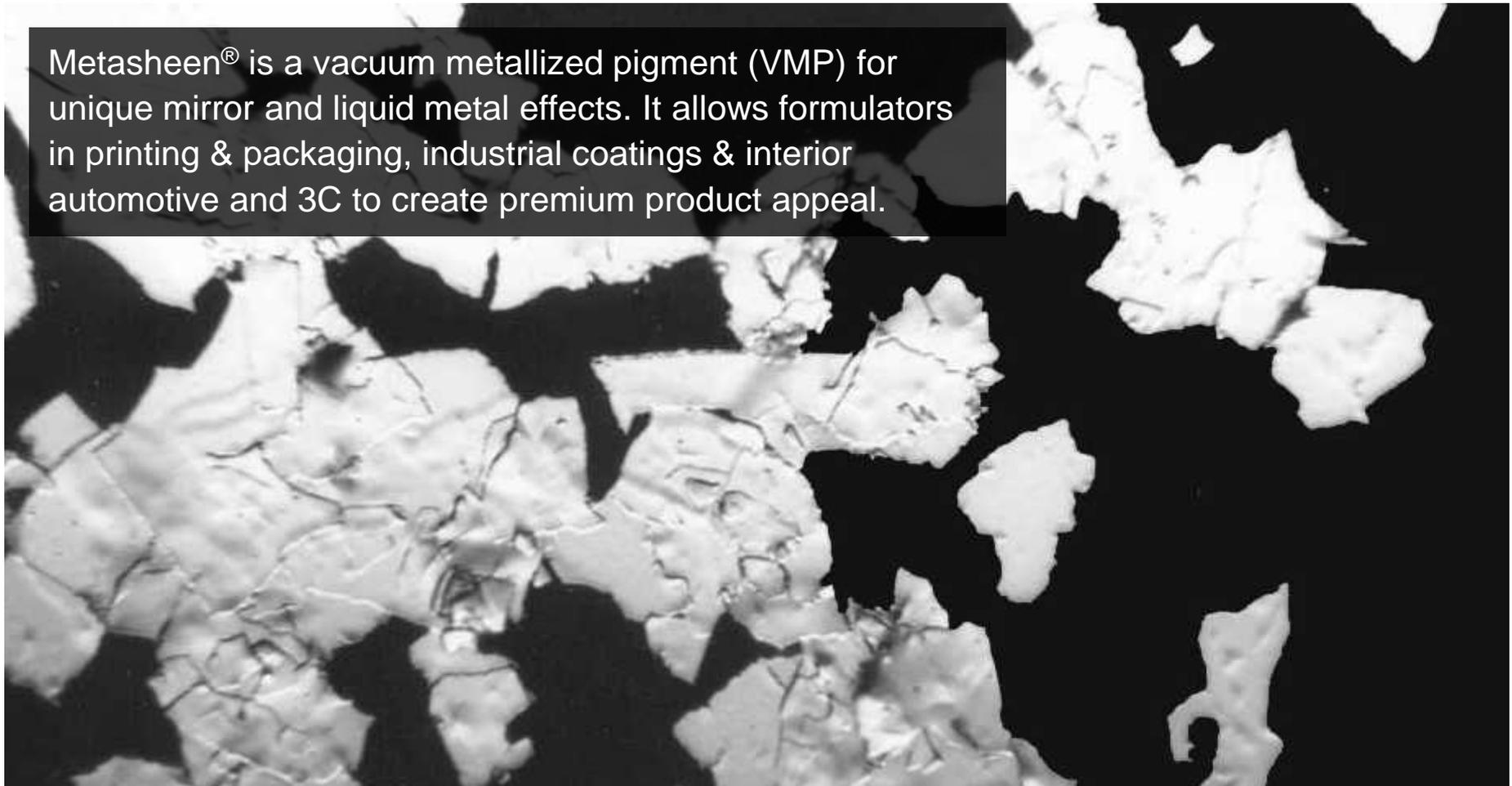
Metasheen® – Superior mirror
and liquid metal effects

Agenda

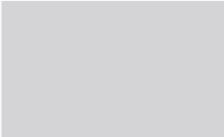


Metasheen® at a glance

Metasheen® is a vacuum metallized pigment (VMP) for unique mirror and liquid metal effects. It allows formulators in printing & packaging, industrial coatings & interior automotive and 3C to create premium product appeal.



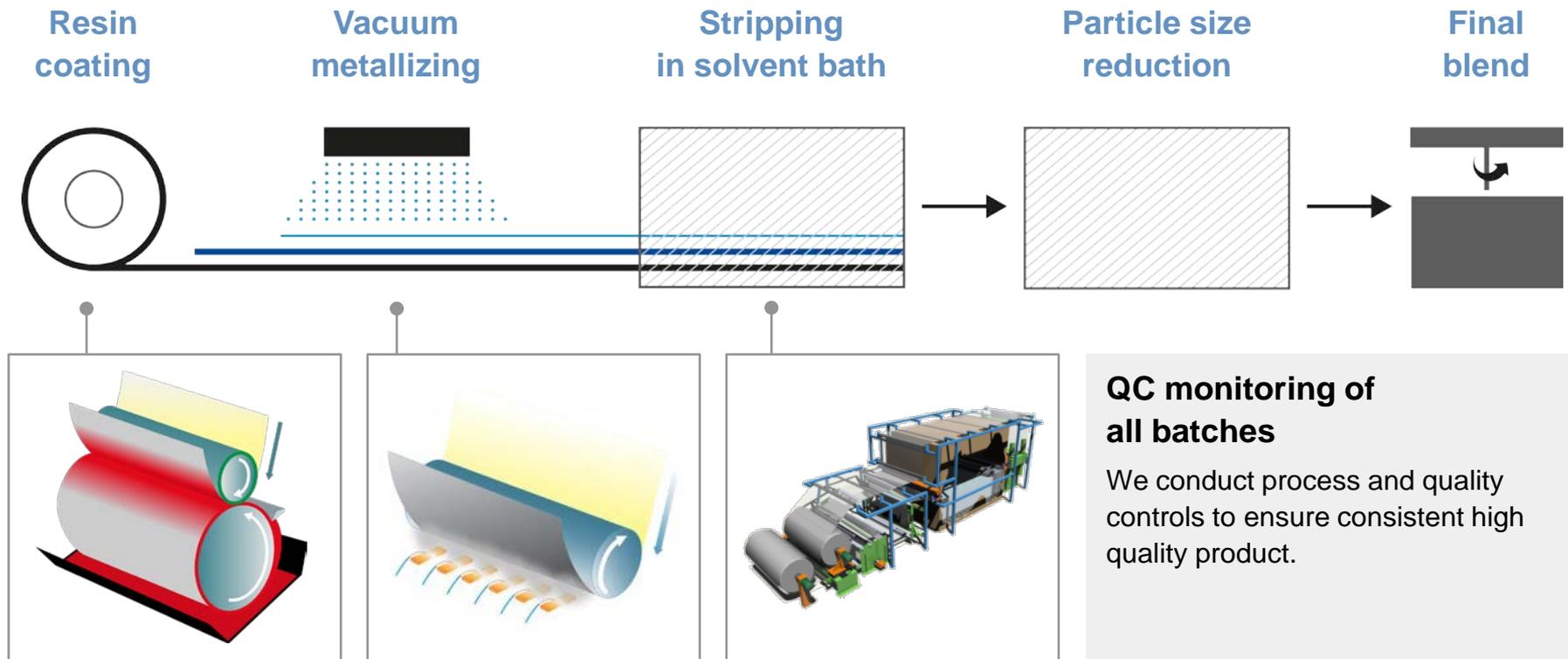
Overview Metasheen® series properties

Metasheen® series	Shade	Particle size d50	Appearance	Flake thickness
Metasheen® 11		8–12 µm	Ultra-dark chrome effect with the highest coverage combined with maximum brilliance	
Metasheen® 41		8.5–11.5 µm	Dark chrome effect with high coverage and excellent brilliance	
Metasheen® 71		11–13 µm	Mid-shade silver effect with high coverage and brilliance, considered a standard shade	
Metasheen® passivated 72/42	72 as 71 42 as 41	Same as associated series	Similar to its associated series, but less reflective due to passivation process	

Agenda



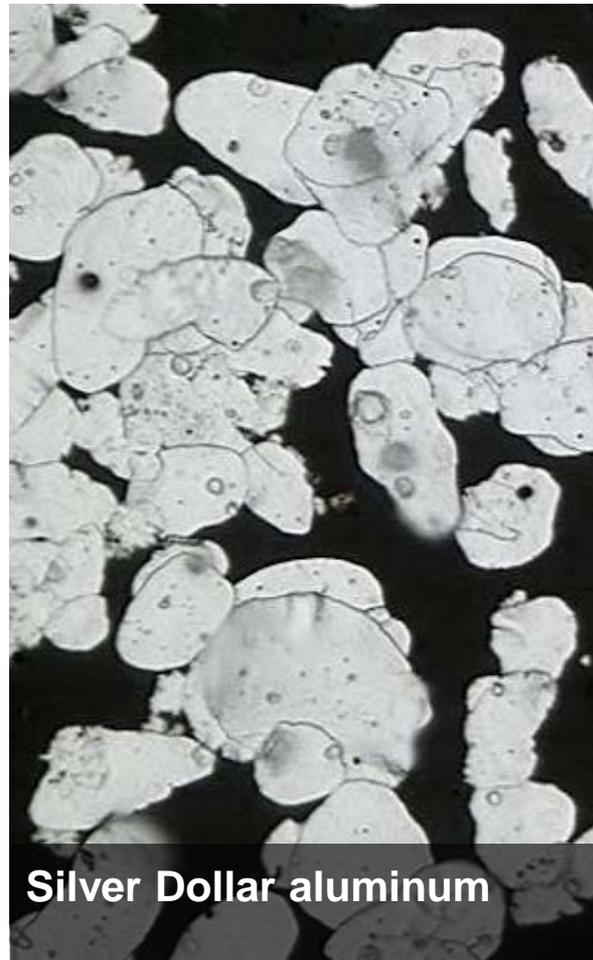
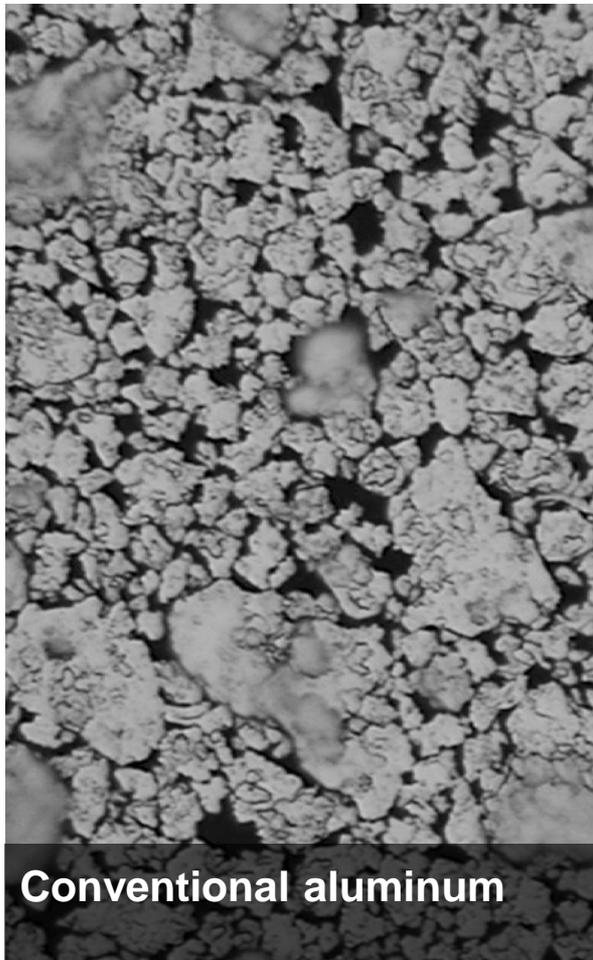
Integrated manufacturing process for consistent high quality



Optimized technical properties and logistics for consistent high quality

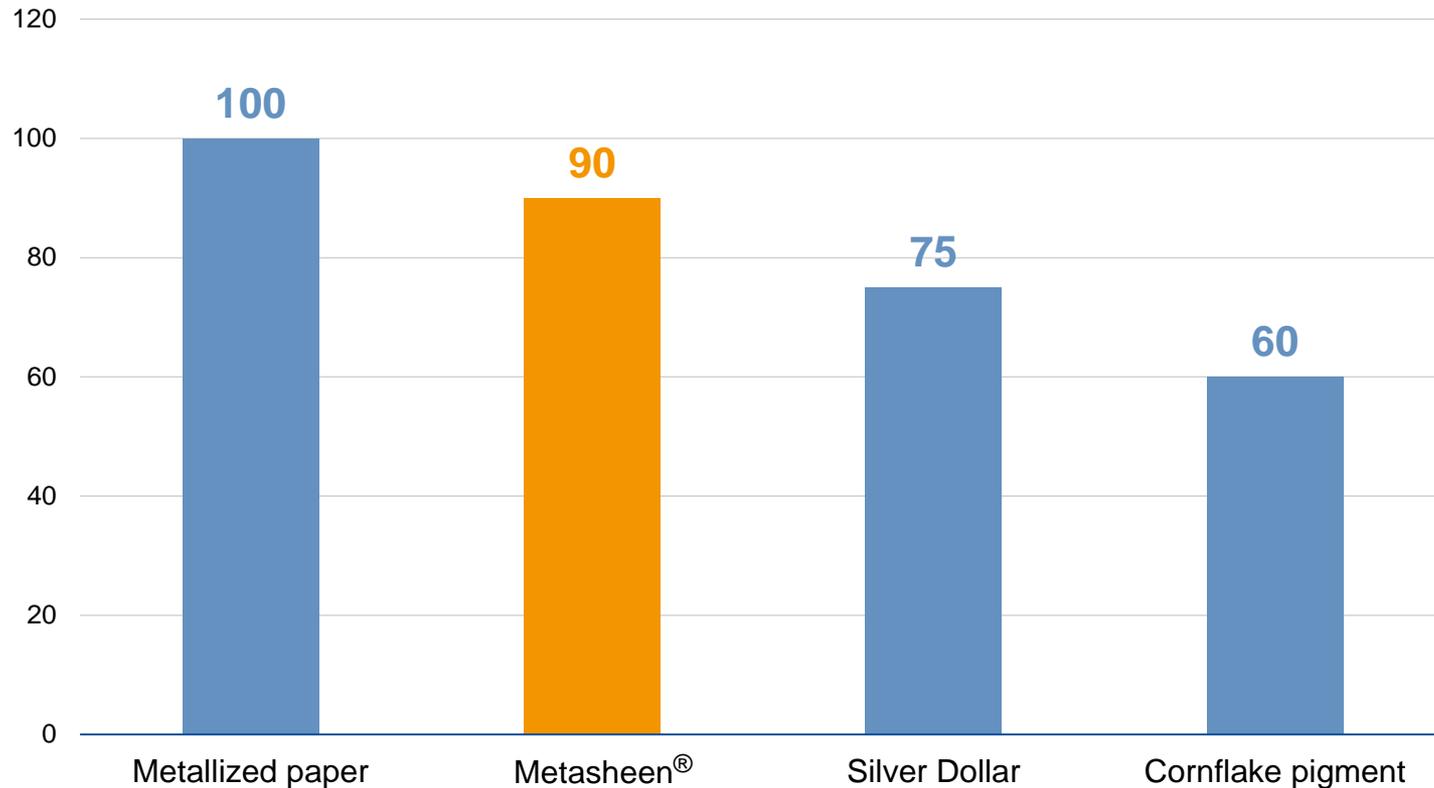
- Tighter roll specification
- Better viscosity control
- Optimized quality control methods
- New, centralized standardization and sampling concept

Exceptionally smooth surface delivers superior reflectivity for unique effects



Metasheen[®] gets closest to metallized paper effect

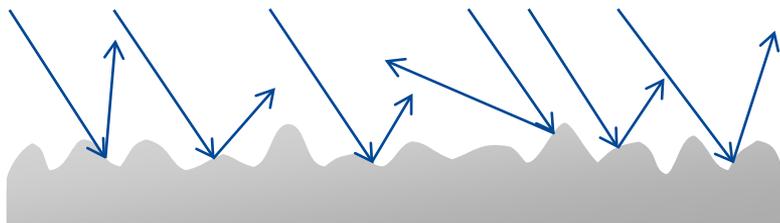
Comparative brilliance of metallic products



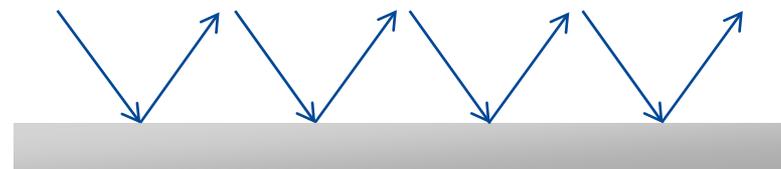
Cleaner reflection than conventional pigments

Schematic pigment comparison

Conventional 'cornflake' pigment scatters light from irregular surface



Optically flat VMP type reflects cleanly

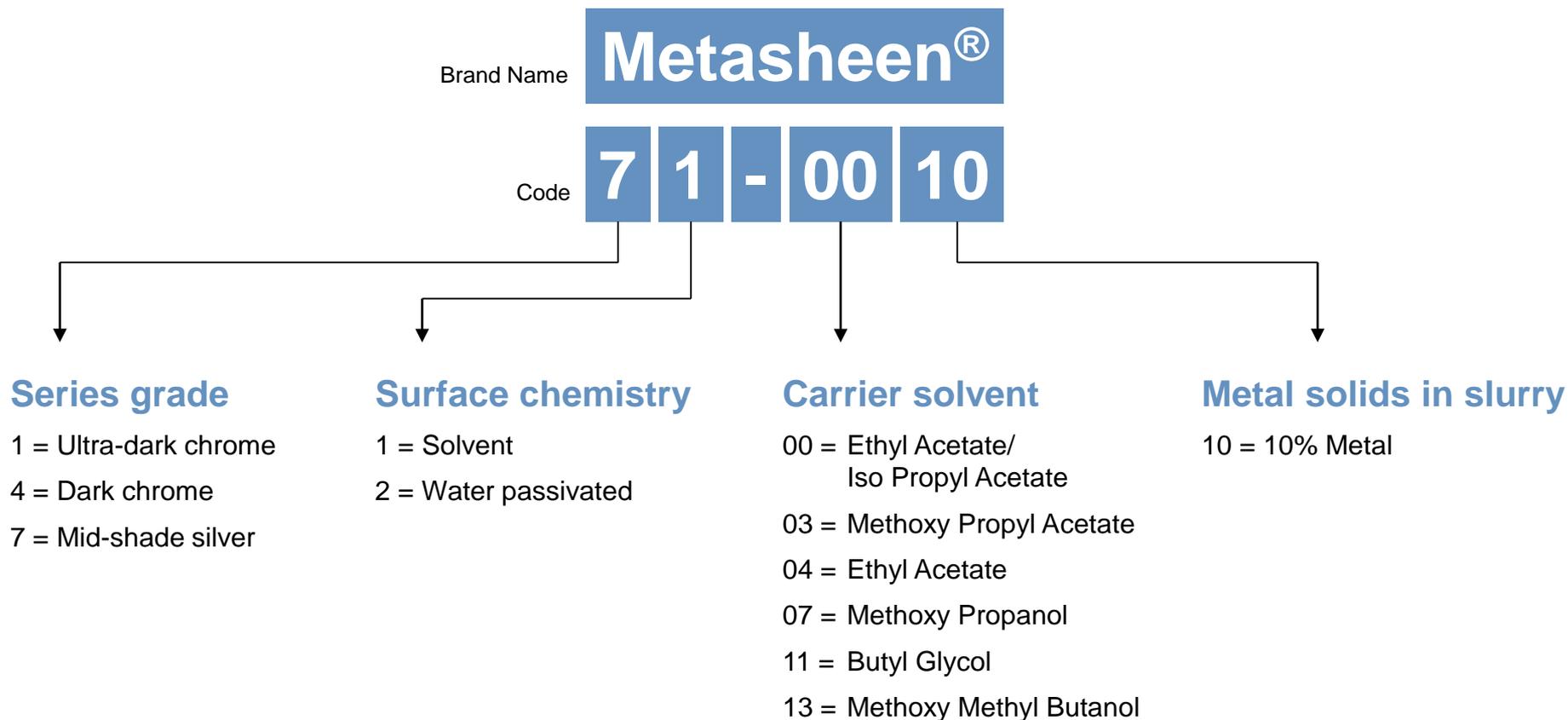


■ Flake surface

Agenda



Metasheen® nomenclature



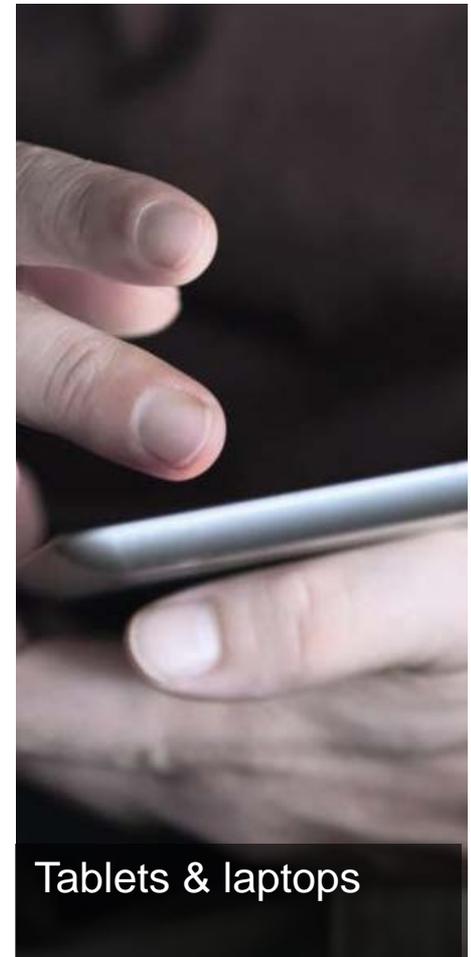
Core product portfolio across industries

	Printing	Coatings
11 series		Metasheen® 11-0010
		Metasheen® 11-0310
41/42 series	Metasheen® 41-0010	Metasheen® 41-0010
	Metasheen® 41-0310	Metasheen® 41-0310
	Metasheen® 41-0710	
	Metasheen® 41-1110	
	Metasheen® 41-1310	
		Metasheen® 42-1110
71/72 series	Metasheen® 71-0010	Metasheen® 71-0010
	Metasheen® 71-0710	Metasheen® 71-0310
		Metasheen® 71-1110
		Metasheen® 72-1110

Please talk to your local account manager for more information on customized solutions

Gravure & flexo printing

Examples of applications



Gravure & flexo printing

Metasheen® 41-0010

For premium mirror effects & colored mirrors



Benefits

- Can print in-line unlike some alternative technologies
- Lower cost alternative comparing to metallized substrates with coverage of design area less than 25%
- Lower evaporation rate comparing to pure ethyl acetate positively impacts product storage stability



Gravure & flexo printing

Core product portfolio

	Printing	Solvent	Particle size d50	Solid content	Application
41 series	Metasheen® 41-0010	50/50 Ethyl Acetate/ Iso-Propyl Acetate	8.5–11.5 µm	10%	Gravure/flexo
	Metasheen® 41-0710	Methoxy Propanol	8.5–11.5 µm	10%	Screen
	Metasheen® 41-1110	Butyl Glycol	8.5–11.5 µm	10%	Screen
	Metasheen® 41-1310	MMB (Methoxy Methyl Butanol)	8.5–11.5 µm	10%	Screen
71 series	Metasheen® 71-0010	50/50 Ethyl Acetate/ Iso-Propyl Acetate	11–13 µm	10%	Gravure/flexo
	Metasheen® 71-0710	Methoxy Propanol	11–13 µm	10%	Screen

Please talk to your local account manager for more information on customized solutions

Industrial coatings

Examples of applications



Industrial coatings

Metasheen® 71-0310

Versus alternative technologies



Benefits

- Smoother aesthetic appearance
- Sparkle free
- Higher optical flop
- Superior hiding power

... at lower pigment loading



Industrial coatings

Metasheen® 71-0310

Our primary offer



Benefits

- Matching current color trend for lighter shades
- Better intercoat adhesion than thinner flakes
- High compatibility with application systems



Plastics coatings

Metasheen® 41-0710

For premium mirror effect & colored mirrors



Benefits

- Compatible with all substrates
- No etch into polycarbonate substrates
- Standard solvent & shade for mobile phone and tablet



Core product portfolio for solvent based applications

	Industrial coatings	Solvent	Particle size d50	Solid content
11 series	Metasheen® 11-0010	50/50 Ethyl Acetate/ Iso-Propyl Acetate	8–12 µm	10%
	Metasheen® 11-0310	Methoxy Propyl Acetate	8–12 µm	10%
41 series	Metasheen® 41-0010	50/50 Ethyl Acetate/ Iso-Propyl Acetate	8.5–11.5 µm	10%
	Metasheen® 41-0310	Methoxy Propyl Acetate	8.5–11.5 µm	10%
71 series	Metasheen® 71-0010	50/50 Ethyl Acetate/ Iso-Propyl Acetate	11–13 µm	10%
	Metasheen® 71-0310	Methoxy Propyl Acetate	11–13 µm	10%
	Metasheen® 71-1110	Butyl Glycol	11–13 µm	10%

Please talk to your local account manager for more information on customized solutions

Core product portfolio for water based applications

	Industrial coatings	Solvent	Particle size d50	Solid content
42 series	Metasheen® 42-1110	Butyl Glycol	8.5–11.5 µm	10%
72 series	Metasheen® 72-1110	Butyl Glycol	11–13 µm	10%

Please talk to your local account manager for more information on customized solutions

Agenda



Flakes are dragged into flat alignment during drying

Film shrinks during drying



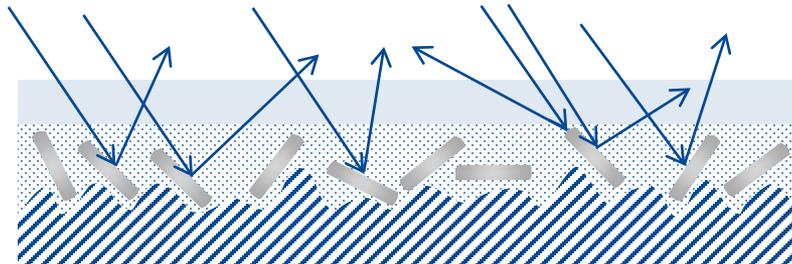
Flakes are dragged into flat alignment



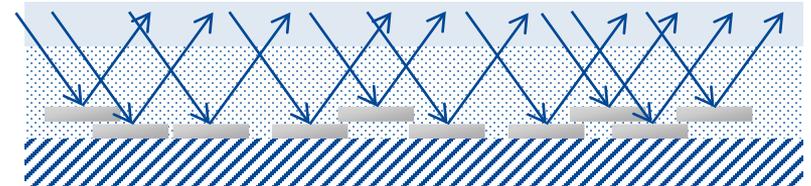
 Substrate  Binder/varnish  Metasheen® flake

Surface has to be smooth

Rough surface



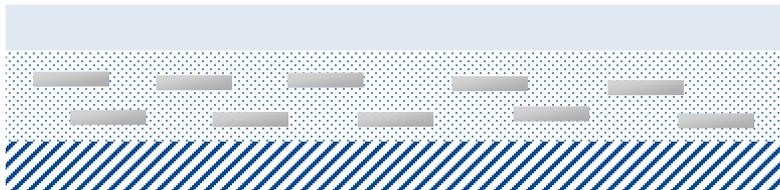
Smooth surface



 Substrate  Binder/varnish  Metasheen® flake  Topcoat/overprint varnish

High resin solid hinders orientation of flakes

High resin solids



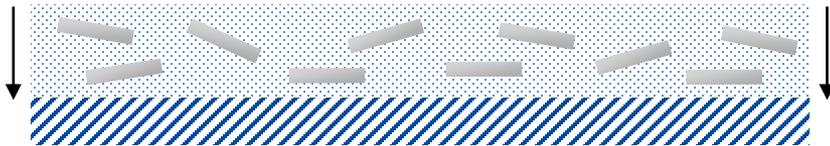
Low resin solids



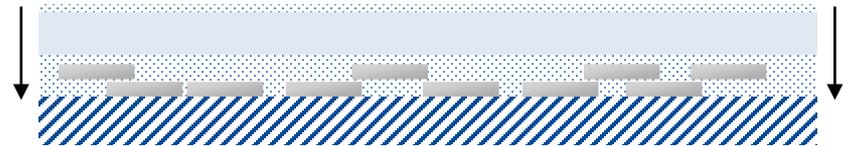
 Substrate  Binder/varnish  Metasheen® flake  Topcoat/overprint varnish

Evaporation time has to be optimized

Fast evaporation



Optimized evaporation



 Substrate

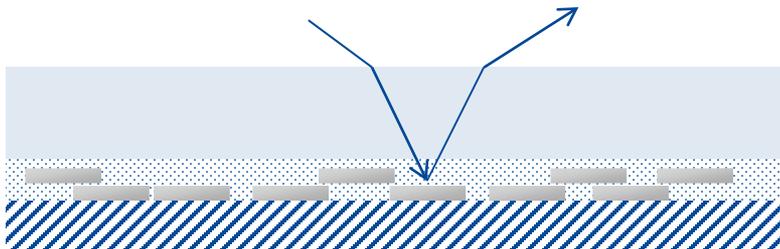
 Binder/varnish

 Metasheen® flake

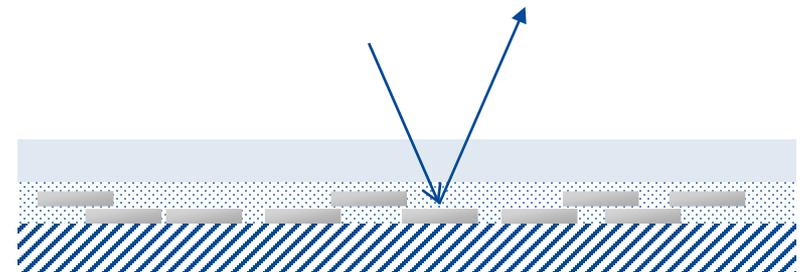
 Topcoat/overprint varnish

Topcoat thickness influences reflectivity

Topcoat/overprint varnish
too thick



Topcoat/overprint varnish
with optimized thickness



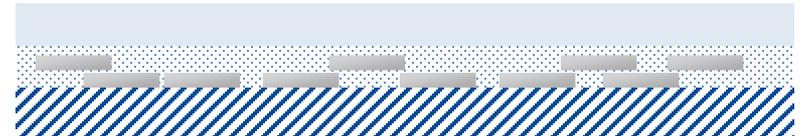
 Substrate  Binder/varnish  Metasheen® flake  Topcoat/overprint varnish

Strike-in caused by re-solubilisation of basecoat

Topcoat/overprint varnish
strike in



Topcoat/overprint varnish
with optimized compatibility



 Substrate  Binder/varnish  Metasheen® flake  Topcoat/overprint varnish

General formulation principle to add color

There are three possible ways of producing colored effects with Metasheen®

1. Metasheen® silver with a transparent colored lacquer

- Transparent colored wash option provides the cleanest and purest metallic effect
- Best overall effect is on film where Metasheen® is printed on the reverse and the colored wash on the substrate surface, this avoids any rewetting issues, applies to printing applications only

2. Tone Metasheen® with solvent soluble dyestuffs e.g. Orasol®

- Solvent soluble dyes provide the cleanest and purest metallic polychromatic effect
- The color observed through the film will tend to be weaker in color strength than the color observed from surface viewing

3. Tone Metasheen® with transparent pigments e.g. Microlith®

- Polychromatic colors made with transparent pigment are not as clean and pure as with the dyes

Coatings formulation principle (1/3)

Spray paint application guidelines

Basecoat

- Low solids, typical P:B of 1:7.5 to 1:18.5 depending on series being used
- Low dry film thickness (2–5 micron)
- 2K basecoat ideal to lock the pigment in place before topcoat application
- Viscosity too low to measure – solvent

Topcoat

- Minimum thickness for protection performance (30 micron)
- Contains solvents which are incompatible with the basecoat resin (prevent resolubilisation)



Coatings formulation principle (2/3)

Two effects, one pigment

Liquid metal effect

	Appearance	Recommendation	
		P:B Ratio	Slurry %
11 series	Ultra-dark chrome effect with the highest coverage combined with maximum brilliance	1:18.5	2.7
41 series	Dark chrome effect with high coverage and excellent brilliance	1:15	3.3
71 series	Mid-shade silver effect with high coverage and brilliance, considered a standard shade	1:10	5.0

High chrome, mirror effect

	Appearance	Recommendation	
		P:B Ratio	Slurry %
11 series	Ultra-dark chrome effect with the highest coverage combined with maximum brilliance	2.5:1	2.7
41 series	Dark chrome effect with high coverage and excellent brilliance	3:1	3.3

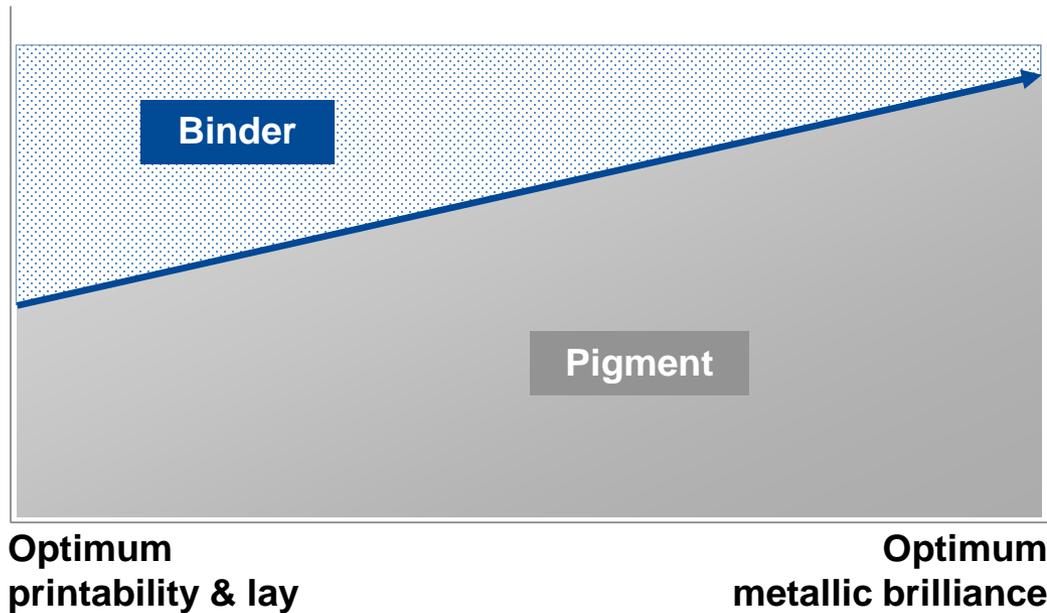
Guideline only, recommended for customers to carry out a ladder study

Printing formulation principle (1/2)

- Recommended: low solids, high viscosity resins
 - Nitrocellulose, Vinyl, Acrylic, Propionate, PU (PVB)
- High viscosity grades enable high P:B ratios and low resin solids
- Ester-rich solvent combinations are desirable for ink stability
- Typical pigment loading 2–4% for gravure inks, screen inks typically higher (4–7%)
- Over-pigmentation leads to loss of brilliance as flakes overlap
- Use only low shear mixing to avoid damaging flakes
- Inclusion of unnecessary additives leads to loss of brilliance

Printing formulation principle (2/2)

Pigment:Binder recommendations for ink



Recommendation	Pigment:Binder ratio
Gravure, surface and reverse	4:1.0 – 1:1
Screen surface	1:1.5 – 1:4
Screen reverse	1:0.8 – 1:1

Please get in touch

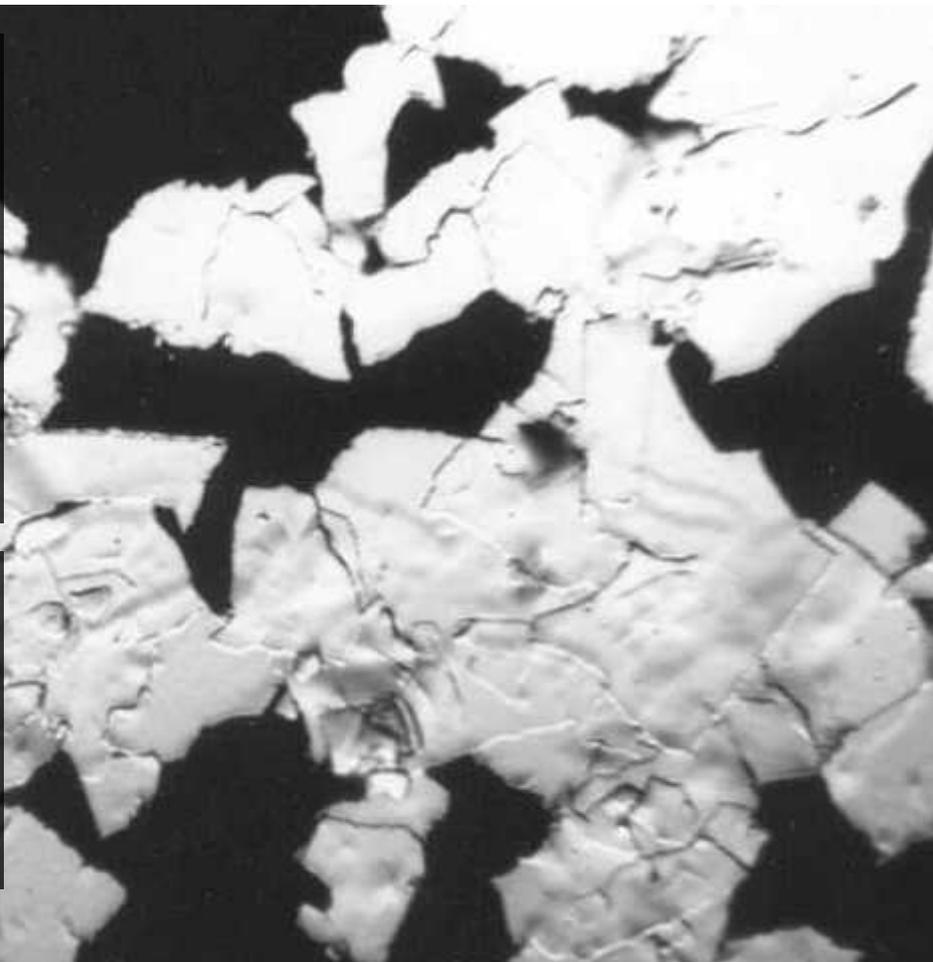
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Please also visit our website at www.basf.com/metasheen





We create chemistry